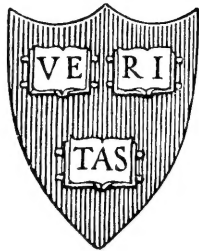


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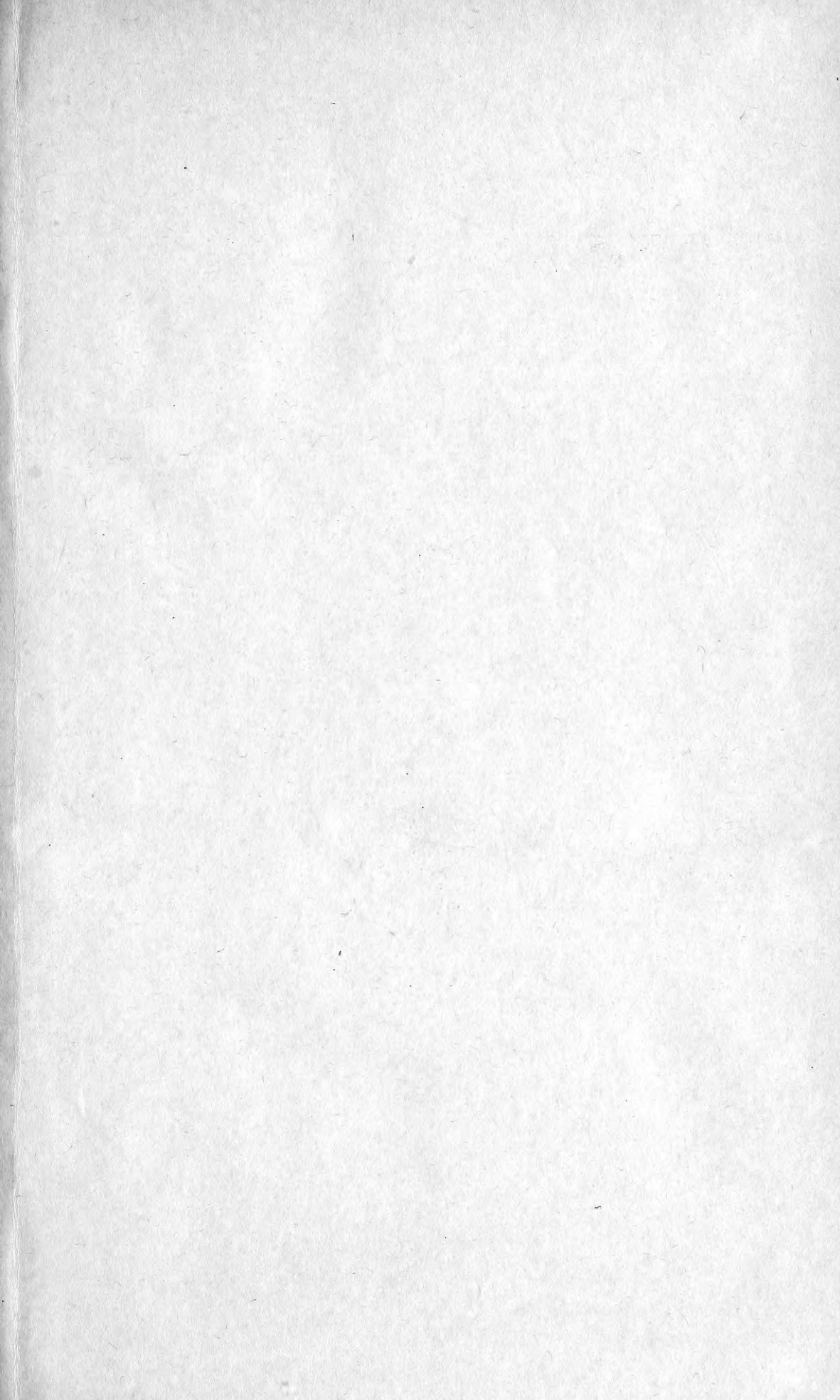


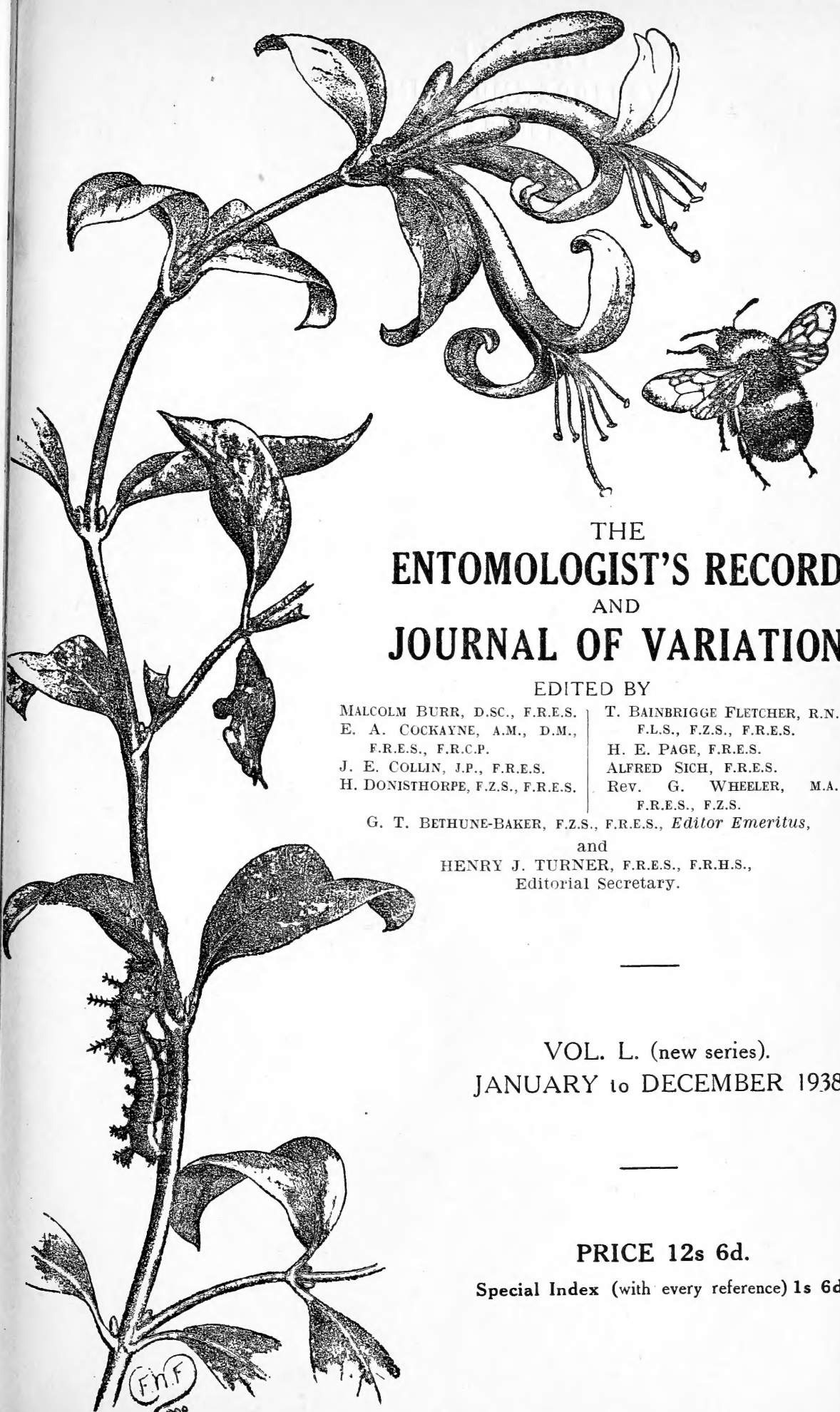
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AND
JOURNAL OF VARIATION

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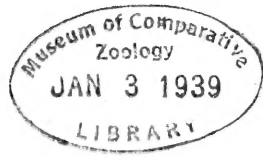
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NO. 1

THE THIRD BROOD OF HEODES (LYCAENA) PHLAEAS, LINN., 1761.

By S. G. CASTLE RUSSELL.

It seems to be generally accepted as a fact by entomologists and text books that there is a third brood of this butterfly, one author even going as far as to claim a fourth brood.

I am not convinced that a third brood does actually occur in nature in this country, i.e., in any appreciable numbers. After very long and hot summers large numbers of the insect are observed on the wing as late as September and October and it has been assumed that these are a fresh or third brood. My view is that this is merely the result of an extended emergence of the second brood.

Normally the first brood is on the wing in early May and June, the product of hibernating larvae. If the season has been favourable to hibernation (and this is rarely so in my experience) the imago is on the wing for a considerable period in May and June. Large quantities of eggs are deposited, and if the weather is cold and sunless very few imagines result, but if, on the other hand, the weather is hot and sunny, as in the abnormally warm summers of 1911, 1921, and 1933, there occurs a very large emergence of butterflies in August, when the first ones emerge, and in September and October when the late or delayed ones emerge.

In the above mentioned hot summers I collected from sorrel leaves very large quantities of ova in early August. These on each occasion produced several thousand larvae. Of these a very small number, not more than a score, produced imagines. The remainder of all sizes from small to full fed, insisted upon hibernating, and amongst them were a fair proportion of full-fed larvae which would not pupate. Practically the whole of these larvae died during the winter. A similar number of larvae collected in September and October followed the same procedure.

Now up to the present, I have not met with anyone who has succeeded in breeding a large number of imagines such as occur in nature from August ♀♀, but merely a small number comparatively speaking. It may of course be possible to do so if artificial heat is used for forcing, but this method I have not tried.

If therefore it is not possible to produce a large third brood by rearing in captivity under protected conditions, surely it goes a long way to prove that such brood does not occur under normal conditions in the wild! I am aware that a third brood, very limited in numbers, can be produced in captivity and in the wild, but this is also the case with other species. In an abnormally hot summer there is often a second brood of *Argynnis selene*, small in size and numbers.

As an example of an extended brood I may instance the case of *Maniola jurtina*, the imagines of which emerge continuously from late June until late September. On the Downs near Winchester almost every year large numbers of freshly emerged imagines are to be found together in late September, together with *Polyommatus (Lysandra) coridon* equally fresh, although the emergence commenced in late July.

I think an endeavour should be made to settle this question of a so-called third brood of *Heodes phlaeas*, and I should be glad to hear of the experience of others, notably Mr L. W. Newman, who has probably had more experience than most of us.

GYNANDROMORPHISM IN DIPTERA.

By P. A. H. MUSCHAMP.

I think I may say, without fear of contradiction, that cases of gynandromorphism are far rarer among Diptera than among any other order of insects. I have found quite a number of Coleoptera of uncertain sex and I have in my collection of Lepidoptera some 70 gynandrous insects, mostly moths. Last summer I took for the first time *Stratiomys chamaeleon*, L., 20 specimens, and most of them more or less gynandrous. As they were all taken on a small cluster of Umbellifers, I conclude that they came from a single batch of eggs. *S. chamaeleon* is a handsome black and yellow fly; the females I took are about $\frac{3}{4}$ of an inch long, with a wing expansion of an inch. There are notable structure and colour differences between the sexes. The eyes of the male are close together, whereas those of the female are broadly divided. The female has an inflated postocular rim, something like a horse-collar, and this is made even more conspicuous by being of a bright pale yellow colour. This is entirely wanting in the male. Thirdly, the genitalia of either sex are large and highly specialised; those of the male protrude and consist of a shining brown central plate, a pair of long orange lamellae, a pair of short broad lamellae, and a short transverse central piece. Two of my males are exactly alike. The genitalia and the frons are those of the normal male, the legs show too much yellow for their sex, but the great structural difference is that they have the broad postocular collar of the female, so that at first glance one would take them for females. The male genitalia are well developed and protruding. One fly (female ?) has female genitalia, eyes touching, no collar, femora 50% yellow, abdominal triangles brown but scutellum pale yellow. Two females have only a trace of the collar and have black femora. One male has the genitalia badly developed and hidden beneath the last tergite. Finally, one male (?) fly has protruding male genitalia, the separated eyes of the female, a very narrow brown (not yellow) collar and black femora.

CRYMODES EXULIS SSP. ASSIMILIS IN SCOTLAND.

By H. B. D. KETTLWELL, M.A., M.B., B.Chir.

I am not attempting to give a full history of this species in Scotland but merely to record certain facts and suggestions with the hope that others will, next year, prove what I believe to be the case, namely, that this species is reasonably common where it occurs and certainly very widely distributed.

Why so little has been known about this species for so long is a mystery to me. I think I am right in saying that in the last twenty years only odd or accidental specimens have been taken in places as far apart as the Isle of Arran to Inverness-shire.

Generalising, I think it is a true statement that no indigenous species can in reality be "rare" or it would soon cease to exist. Extremely local, yes. But this attribute of rarity is really an admission on our part of failure to understand fully its habits. When these are learnt how often does a species become "common."

About twenty-five years ago there lived a man by the name of Clark who knew more about *assimilis* than anyone else before or since. He certainly took a large number during his life and took it each year regularly at sugar on birch trunks and posts. He obtained ova and in due course larvae, but these always died very soon, and he was never able to breed it, and, in the light of what little we now know about it, no wonder. He considered that this species was not "freely" attracted to sugar, nevertheless, he averaged two or three per night. He never used "light," as his only means of light was a small oil lamp.

After several years of local enquiry and tracing his family tree I eventually found a son in another part of Scotland who knew all about his father's work and had even accompanied him on occasions to the locality. To him all my thanks are due for his great help.

I found his original inaccessible spot and sugared there for eight nights—eight nights of the worst possible weather in a year, when practically nothing came to sugar.

On my last two nights I used light for the first time and took two *assimilis* at exactly the same time on each night, namely, 12.10 a.m., which, therefore, may be the time of flight.

The object of this paper is to describe the type of country which is common throughout Scotland and quite characteristic, not only of Clark's locality but also of those of others who have recently taken or seen the species.

In Scotland there are areas, large or small, which are best described as "peat-hagg" country, where the surface of the ground is gullied by innumerable channels. In the winter these are filled with water but in the summer they dry up and leave soft stagnant peat with an occasional stump of a primeval pine.

In between these channels are islands of heather, grasses, and bosses of lichen. These areas are invariably "watersheds," so that from them there run little streams usually down a valley. The vegetation here is immediately altered and along the stream there are masses of a tufted coarse grass growing in ground which is always very wet. Clark believed that the species fed on this grass. Be this as it may, if one sugars on the edge of a peat-hagg area one has every chance of finding this insect. The great difficulty is always to find suitable objects to sugar.

I do not believe that altitude has any great influence on its occurrence; my own are taken between the 800-900 feet contours. I know that they occur up to 1600 feet and as low as 400 feet (approximately). The essential thing is the type of country. *C. exulis* in Iceland is a regular day-flying insect and it is suggested that it visits the flowers of Bog Asphodel.

There is only one individual in this country so far as I know, Mr H. B. Lawson, who has ever witnessed this day flight with *assimilis*. In 1930 he noticed a few large Noctuids about mid-day in the bright sun flying rapidly over the heather. He caught one for identification purposes and later discovered it to be this species. Clark never witnessed such a flight, nor did I, with the possible exception of one large Noctuid I saw but did not catch, flying very fast about 4.30 p.m.

Mr R. P. Demuth tried hard to observe a day flight of *exulis* at Unst on ground where it was occurring commonly at night, but saw no sign of one. Remembering that in Iceland during the summer months there is no night in the true sense of the word, it may be that in more Southern latitudes the day flying habit is less regular but at least it does take place at times.

Lastly, the time of emergence must vary greatly according to the season, locality, etc., and also the hatching period may extend over several weeks. Mr Lawson's flight was observed on 21st June and I have seen the specimen he took, and it had obviously been out some time. My own two were taken on 20th and 21st July, one worn and one newly hatched. But Clark considered early August as the best time. At Unst *C. exulis* is at its height from 12th July onwards, probably much earlier and later.

As an additional incentive to those who search new grounds I should like to add that from other odd scraps of information and from specimens taken by people who did not know what the insect was, together with existing records, I feel sure that this species will be found by any who work this type of ground, particularly up the West Coast or again more centrally from Crieff to Aviemore.

NOTES ON ORTHOPTERA OBSERVED IN 1937.

By PAUL FREEMAN, B.Sc., A.R.C.S.

My earliest collecting this year was on the sand-dunes near Wells, Norfolk, at the end of June and beginning of July. Only two species of Orthoptera were common there in the adult stage, namely, *Chorthippus albomarginatus*, De Geer, and *Myrmeleotettix maculatus*, Thunberg. Innumerable nymphs were present but I do not know of how many species. The difference in habitat of these two species was very distinct. The dunes were hummocky, with the flat parts bare and the slopes clothed with long marram grass. *Ch. albomarginatus* was confined to the grass on the slopes mainly on the land side, whilst *M. maculatus* was only found on the bare parts. One specimen of *Ch. bicolor*, Charp., was seen.

Whilst at Slough, Bucks., on the 25th July, I heard some *Acrididae* stridulating at 11 p.m. I caught some and found them to be *Ch. parallelus*, Zett. I spent most of the rest of the summer camping and regularly heard this species stridulating at night.

I found a colony of *Metrioptera brachyptera* at Woking, Surrey, on the 30th July. They were very difficult to catch as they kept to the thickest parts of the heather and disappeared as soon as they perceived the slightest movement. I caught a female nymph and put it into a large pill-box, where it immediately started to ecdyse. The long hind legs came out bent, the femora at their thinnest part and the

tibiae bowed. The femora were soon straightened but the tibiae stayed bowed, probably because of the unnatural conditions.

I caught some more *M. brachyptera* at Burnham Beeches, with Dr Burr, on the 25th August, and I took five females and two males home to watch. One female had a spermatophore resembling a piece of cotton wool, projecting from her genital opening. In captivity they ate grass, but were also carnivorous, as the females soon ate the males. I eventually saw a female ovipositing. She had her ovipositor thrust to its base in the soil, and when she had finished I found 9 eggs lying loosely in the soil.

On the 6th August I went to the New Forest for a week-end. *M. brachyptera* was common on a heath, as also was *Pholidoptera cinerea*, L., the latter only stridulating freely towards the evening, and was found along ditches bordering paths and in other damp places, whereas *M. brachyptera* loved the sun and heat. *Nemobius sylvestris*, Fabr. was very common locally in the woods, young nymphs as well as adults being present. Adults were caught by a friend at the end of August, which is unusually late for this species. *Acrydium vittatum*, Zett. was found along the rides, and *A. subulatum*, L. on the coastal cliffs near Barton. (I took *A. subulatum* at Colnbrook, Bucks., earlier in the year, which I believe to be a new record for that county.) Two species of *Ectobius* occurred, *E. panzeri*, Steph. and *E. lapponicus*, L., the former being the commoner. The males flew freely in the late afternoon, but the females required searching for amongst the undergrowth. *Omocestus ventralis*, Zett., was fairly abundant on the heath. *Leptophyes punctatissimus*, Bosc. was found in a damp meadow. It was best caught by sweeping the grass, and was found most abundantly near patches of *Lotus*, suggesting that it might feed on this.

Visiting South Benfleet, Essex, on the 12th September, I found *Metrioptera roeselii*, Hag. to be very abundant, especially along the sea-wall, and on the hill-sides near Hadleigh. *Conocephalus dorsalis*, Thunb. was quite plentiful on the sedges in the dyke behind the sea-wall. I also found a colony of *Tettigonia viridissima*, L., a species which I had never seen before. The males were stridulating mainly from rose-bushes, and I took one female crawling on the grass. They were very sluggish and could be picked off the bushes quite easily.

I caught a male of *Leptophyes punctatissimus* at Brentwood, Essex, on an apple tree on 23rd September, and I took it home to try and hear it stridulate. I let it loose in a quiet room, and watched it. It took about five minutes to recover from the shock and then proceeded to walk very slowly around the table, stridulating as it went. The stridulation could be heard from a distance of about 10 feet, and was in the form of a series of short chirps, 10 a minute. The note was not clear and metallic but rather blurred. Obviously it could not be heard in the field.

Chorthippus albomarginatus was common over most of the southern part of Essex in dry grassy places. The male has two stridulations, a normal one heard at any time and quite loud, and a much quieter one used only when the male is trying to induce the female to mate. *Pholidoptera cinerea* was also very abundant over this area, occurring everywhere in road-side ditches and similar places.—Imperial College, South Kensington, S.W.7., October 1937.

**PYRALIDAE AND MICROLEPIDOPTERA COLLECTED IN CYPRUS
DURING 1920 AND 1921.**

By **KENNETH J. HAYWARD**, F.R.E.S., F.R.G.S., F.Z.S.

During two visits paid to the Island of Cyprus, the first in the autumn of 1920 and the second in the late spring and summer of 1921, a number of Pyralids and Micro-lepidoptera were collected, mainly in the neighbourhood of Platres and Troödos (5000-6000 ft.). The majority of these insects passed to the National collection at South Kensington together with the remainder of my insects in 1923. The following list includes the specimens that it was possible to identify, together with a few other records that have come to hand. The insects are named and listed in accordance with Staudinger und Rebel, *Catalog. der Lepidopteren des Palearctischen Faunengebietes*, II Theil, 1901.

PYRALIDAE.

GALLERIINAE.

- Melissoblastes unicolor*, Staudinger.—Platres in July.
Aphomia sociella, Linné.—Platres in July.
Galleria mellonella, Linné.—Platres in August.
Lamoria jordanis, Ragonot.—Platres in August.
Lamoria melanophlebia, Ragonot.—Platres, 11th July.
Lamoria anella, Schiffermüller.—Very common at Platres in July and August and at Limasol in June.

CRAMBINAE.

- Crambus desertellus*, Lederer.—Limasol in February and October.
Crambus craterellus, Scopoli.—Fairly common around Platres in July.
Crambus sp.—An unidentified *Crambus* was taken in small numbers at Platres, in September (H.431).
Platytes carectellus, Zeller.—Not uncommon at Platres in August.
Eromene superbella, Zeller.—Cyprus, vide Staudinger, *Hor. Soc. Ent. Ross.*, XV, p. 188.
Ancylolomia tentaculella, Hübner.—Limasol and Platres in September.
Ancylolomia contritella, Zeller.—Mr Mavromoustakis informed me that this species occurred on the island.

ANERASTIINAE.

- Anerastia ablutella*, Zeller.—A single specimen from Platres in August 1921.
Saluria maculivittella, Ragonot.—Platres in July where I found it rare. There is a specimen in the British Museum taken at Larnaca by Bainbrigge Fletcher.
Ematheudes punctella, Treitschke.—Limasol in October. Also taken by Lederer, *Verhand. z.-b. Wien*, V, 186, 1855. Platres in July where it was uncommon. A specimen taken at Larnaca by Mr Bainbrigge Fletcher is in the British Museum collection.
Polyocha venosa, Zeller.—Cyprus, Staudinger and Rebel's *Catalog.*, II Theil, No. 228.

PHYCITINAE.

- Ephestia elutella*, Hübner.—Platres in July.
Psorosa dahliella, Treitschke.—Cyprus, vide Lederer, *Verhand. z.-b. Wien*, V, 186, 1855.

Euzophera umbrosella, Ragonot.—Cyprus, Staudinger and Rebel's *Catalog.*, II Theil, p. 24, No. 446, also Staudinger, *Hor. Soc. Ent. Ross.*, XV, p. 215.

Etiella zinckenella, Treitschke.—Limasol in March. Very common at Platres from June till September.

Epischnia prodromella, Hübner.—At Platres in June.

Epischnia leucoloma, Herrich-Schäffer.—Mentioned as Cyprian by Staudinger in *Hor. Soc. Ent. Ross.*, XV, p. 212, and by Staudinger and Rebel in their *Catalog.*, II Theil, p. 30, No. 565.

Alophia combustella, Herrich-Schäffer.—Common at Platres in July.

Salebria palumbella, Fabricius.—Platres in July. It is noticeable that these Platres specimens are all considerably smaller than the remainder of the series of this insect in the British Museum.

Salebria brephiella, Staudinger.—Limasol in March.

Salebria lepidella, Ragonot.—Common around Platres in July where it flies with *Alophia combustella*, from which it is not readily distinguished till caught.

(To be continued.)

NOTES ON COLLECTING, &c.

THE DISTRIBUTION OF *METRIOPTERA ROESELII*, HAGENB. IN ESSEX IN 1937.—In the March 1937 issue of the *Entomologist's Record* I recorded new localities for this species, which has previously only been found in a few localities around the mouths of the Thames and Humber. This year it is so plentiful at Brentwood, Essex (22 miles from Southend), that I decided to try to map its range.

The insects are gregarious and are found in long grass in dry meadows and along the roadside. As colonies are best detected by ear, the easiest way of finding them is by bicycling along the roads, for one can cover considerable distances, and in complete silence.

There were several large colonies at Brentwood and a few small ones to the north at Blackmore and Doddinghurst.

I then went in a southerly direction from Brentwood, and found numerous colonies along and near the L.M.S. Railway line embankment. The insects were found as far west as to within a mile of Upminster. No colonies were found more than half a mile south of the railway line until it approaches Canvey Island, where the insect is extremely numerous, especially along the sea-wall.

Going to the north-east, towards Chelmsford, colonies were almost continuous along the main road between Shenfield and Ingatestone, though mostly on the south side, very few being on the north, especially near Shenfield, possibly due to the difficulty of crossing a busy main road. At Chelmsford they appeared again along the by-pass and to the east towards Maldon on the mouth of the Blackwater. I was unable to explore more than 5 miles north of Maldon, but as the colonies were becoming fewer and smaller, I was probably near the northern limit. Riding inland again, towards Witham I found colonies sparingly up to two miles from there.

Hence the insect can be regarded as fairly common in suitable localities, in an area enclosed by a line drawn from somewhere north of Maldon, to Chelmsford, to four miles north of Brentwood, to one mile east of Upminster, and to Canvey Island.

I regard it as improbable that it has been overlooked in the past by entomologists, because of its very loud stridulation, but it is difficult to understand how a wingless species can spread over a considerable area in a few years, as is apparently the case here. Mr Attwood agrees with me that the colonies are much more populous this year than in previous years. I have never seen the macropterous form "*diluta*," but I doubt whether this would cause increase in numbers and distribution, supposing, as Dr Blair suggests, it were fertile.

I have usually found *Chorthippus albomarginatus*, De Geer along with *M. roeselii*, the former being common in suitable places in this part of Essex.

4th October was the last date on which I saw *M. roeselii*.—PAUL FREEMAN, Imperial College, South Kensington, S.W.7, October 1937.

A FEW ANT RECORDS FOR 1937, COMPILED BY MR N. BRANGHAM AND MYSELF.

1. *Ponera punctatissima*, Rog., Kew Gardens propagating pits, 9/10/37, N. Brangham. These included one ergatoid male, which is, I believe, the third British record.
2. *Ponera coarctata*, Lin., 25/10/36. Mill Hill rubbish dump, K. Guichard. One male only.
3. *Myrmecina graminicola*, Latz., 26/9/37. Allen, Mill Hill by sweeping.
4. *Myrmica scabrinodis*, Nyl., var. *sabuleti*, Mein., 19/9/37, near Watford, N. Brangham. New to Hertfordshire.
5. *Tetramorium caespitum*, Lin., Dungeness, 28/8/37, K. Guichard. Very common under stones in a small area.
6. *Formica fusca*, Lin., var. *rubescens*, For., Benfleet, 18/7/37, K. Guichard and W. O. Steel.
7. *Formica rufa*, Lin., var. *rufo-pratensis*, For., Weybridge, 12/9/37, N. Brangham.
8. *Formica rufibarbis*, F., Weybridge, 12/9/37, N. Brangham.
9. *Acanthomyops umbratus*, Nyl., near Watford, 19/9/37, N. Brangham. Apparently this is a new record for Hertfordshire. Also at Mill Hill, 24/10/37, K. Guichard.
10. *Monomorium pharaonis*, Lin., Watford, N. Brangham, 19/9/37. Found running about the tables in a restaurant, but a more detailed search was not permitted. Also in a large public building at Willesden, W. O. Steel, June 1937.—K. M. GUICHARD.

TISCHERIA DODONAEA, STT. AND *T. ANGUSTICOLLELLA*, DUP. IN HANTS.—For some years the mines of *T. dodonaea*, Stt. were sought in vain in situations where the white mines of *T. complanella*, Hb. were abundant. At last in the Autumn of 1936 the species was found comparatively common on the lower leaves of bushy oaks in several localities in the Southampton district, and moths were bred the following Spring. The egg is laid always on the midrib or on a side rib, and the dark yellow larva makes a top surface mine that never reaches to the edge of the leaf, and which is easily distinguished from the mine of *T. complanella*

by its brick red colour and concentric circles around the point of entry. The completed mine greatly resembles that of *Leucoptera scitella*, Zell., but is rather lighter in colour. The larva pupates in the mine and there appears to be only one brood annually. It should be added that in 1937 prolonged and diligent search only yielded three mines of this species, where in the previous year they were fairly common. This scarcity may be normal here and may account for previous failures.

T. angusticollella, Dup. has already been recorded from Hampshire, to be exact, from the Balmer Lawn, in the New Forest near Brockenhurst. Repeated search has been unsuccessful in finding mines elsewhere, though they surely must occur. On the more open parts of the Balmer Lawn only an occasional mine was found, but in sheltered places on the edge of the enclosures near, they occurred in September and October 1937 in moderate numbers, sometimes many on a single favoured rosebush. The egg is laid mostly on the midrib underside, and the larva makes a dirty white bladdery mine that often occupies the whole leaf, folding it more or less completely longitudinally. The species is possibly double-brooded here, because a certain number of mines were found empty and looking older than those which contained larvae. Moreover, it is regularly double-brooded on the Continent, feeding in June and again in September and October.

An excellent account by Olga Hering of the Palaearctic species of the leaf-mining genus *Tischeria* will be found in Krancher's *Entomologisches Jahrbuch* for 1926, pp. 99-106, with a plate of the genitalia of the oak-feeding species and seven text-figures of mines.—WM. FASSNIDGE.

BEDELLIA SOMNULENTELLA, ZELL. IN HANTS.—In April 1937 mines of this species were found commonly in leaves of *Convolvulus althaeae* at Cavalaire on the Mediterranean coast, this being my first acquaintance with this mine. However, as is often the case, larvae were later found locally at Chilworth, near Southampton, mining in the leaves of *Convolvulus sepium* in early July, while on 21st September, on the Bitterne marshes, practically in the town, mines were found in great profusion on the *Convolvulus* growing among the rank growth of reeds and willow-herb. Even as late as 3rd October many larvae were still in their mines, and pupae could be found in a loose silken web on the underside of the leaves. So far I have never met with the moth in nature.—ID. [*B. somnulentella* occurs very erratically, usually scarce, but occasionally in profusion.—T. B.-F.]

PHYLLOCNISTIS SUFFUSELLA, ZELL. AND P. SALIGNA, ZELL. IN HANTS.—*P. suffusella*, Zell. is a common double-brooded insect everywhere in the Southampton district, mining in the leaves of the Lombardy poplar chiefly, though it may occasionally be found in other varieties of poplar. Even in the town it occurs freely, and imagines may sometimes be found in the late Autumn or early Spring. *P. saligna* on the other hand appears to be decidedly rare here, though abroad the mines may be found commonly enough on *Salix incana*, so abundant by the sides of mountain streams in the French Alps. Along the banks of the Itchen near Southampton there grows a closely allied variety of *Salix*, with narrow blue green leaves, in which the under surface mine of *P. saligna* occurs sparingly in October. Not every mine contains a larva, for many are

parasitised, and even the tiny pupae spun up in a pucker at the edge of a leaf are very liable to the attacks of tits.—WM. FASSNIDGE.

CORRECTION.—The Rev. Alfred Thornley is not responsible for the third paragraph on p. 138; it was written by myself in continuation of "Cornish Notes," of which the two previous paragraphs form part.—C. NICHOLSON.

EGGS OF PHLOGOPHORA METICULOSA IN NOVEMBER.—On 6th November I received for identification from Mr R. Trotter, keeper of Round Island Lighthouse, Scilly Isles, a living specimen of this moth that had come in at the lighthouse window on 2nd November. It reached me in a matchbox in which there was also a spent match. This, I surmise, had become wedged in the slit, so often present between the chip bottom of the box and the side, so that it was not noticed when the moth was put in. During transit, however, it got loose and must have been a nuisance to the moth, which was considerably worn but quite active enough to crawl quickly out when the box was opened. I released it on the verandah, where it was pounced on by one of our pet wild robins and promptly swallowed, wings and all! On examining the box afterwards I found that the moth had taken advantage of the loose match to lay about 100 eggs on two sides of it in more or less continuous lines; there were three more on the top of the case inside, two on one side, one on the paper in the slit, and 134 on the chip bottom in singles, twos, threes, and small patches consisting of from 6 to 20. Some of these eggs were pale primrose in colour without markings and were possibly infertile, as they have not changed; but the vast majority were greyish-fawn with a small light brown dot on the micropyle, surrounded by a crenate ring of the same colour around the upper "edge" of the egg. The crenations are due to the ribs, which can be seen easily with a good pocket lens, and both the dot and the ring have become more distinct and broader, but none of the eggs have so far hatched, and as I am keeping them in a pill box in a cold room I am curious to see when they will, and to speculate as to what would have happened to them had they been laid out of doors. It seems likely that a continuous-brooded moth, like the present, would probably not be subject to quite the same conditions as most other species and that its eggs would hatch with far less provocation in the matter of warmth. At any rate, this case seems to shed some light on the origin of the small larva found in early February here and discussed in my notes on pp. 86-87 of vol. 43. Although *meticulosa* is one of the species regarded as possibly augmented by immigration, I see no reason to doubt that it is a resident of Round Island. But Mr Trotter adds that he has not seen any Clouded Yellow or Silver Yellow this year. "October is usually a good month for seeing Painted Ladies and Admirals on the move if one is on St Mary's [where he lives], but they are absent from Round Island."—C. NICHOLSON, Tresillian, Truro, Cornwall, 17th November 1937.

UNUSUAL FOOD PLANTS.—On 17th August some obvious geometer eggs laid on the glass bottom of a pill box were brought to me. On the 24th some similar eggs laid on the lid of another pill box were brought. As it was uncertain what either species was,

it was assumed that one lot was *Abraxas grossulariata* and the other *Opisthograptis luteolata*, because specimens of these had been recently in the boxes.

Accordingly, when the larvae began to hatch (first lot on 22nd and second lot on 28th) I gave a selection of food plants (hawthorn, blackthorn, wild plum, American currant, bramble, sallow, hazel) and left them to choose. The first lot chose wild plum, and eventually turned out to be *luteolata*; the others chose hazel and proved to be *grossulariata*—both rather unexpected choices. The latter were eventually turned out on our hazel bushes, but I kept a few *luteolata* to see the protective resemblance of the larvae at the bottom of the twigs in the day time and at the tops feeding at night.

Neither species is specially common here, but the bats show me, by leaving wings in the verandah, that the summer brood in August is the most abundant and sometimes extends into September.—C. NICHOLSON, Tresillian, Truro, Cornwall.

Mr E. Ernest Green, F.R.E.S., has promised to send us notes each month on the habits of the larvae of British Macro Lepidoptera, taken from his recorded observations during the past 23 years. This will no doubt be both useful and interesting to our readers. Mr Green in his letter making this offer remarks: "With reference to Captain Parsons' note, on p. 145 of the December Number of the *Ent. Record*, re the larva of *M. contigua*, I can say that I have found it feeding repeatedly on birch (*Betula alba*). For its purpose it appears to prefer small, isolated bushes or trees."

CURRENT NOTES.

We hear that the collections of M. Culot, the author of *Noctuelles et Géomètres d'Europe*, are now for sale.

A Meeting of The Entomological Club was held at 5 Hereford Square on 9th October 1937, Major Philip P. Graves in the chair. *Members* present in addition to the Chairman—Mr H. St. J. K. Donisthorpe, Mr H. Willoughby Ellis, Mr James E. Collin; *Visitor* present—Dr B. P. Uvarov. The meeting was called for 7 o'clock, and the guests were received by the Chairman and Mrs Philip Graves. Dinner was served at 7.30. After dinner, a reception was held, at which many friends of the Chairman were present, amongst whom were—Captain A. F. Hemming, Sir Guy A. K. Marshall, and Captain N. D. Riley. A buffet was provided, and the whole party dispersed at a late hour after a most pleasant entertainment.—H. WILLOUGHBY ELLIS, Hon. Secretary.

Messrs F. N. Pierce and J. W. Metcalfe have announced a further volume to the four already issued on the Genitalia of British Lepidoptera. It will be published shortly and will concern the *Genitalia of the British Pyrales and Pterophorids*. "The work is entirely new, nothing of the kind dealing with the whole of the British Pyrales and Pterophorids having been previously attempted." It will be illustrated by a series of plates containing nearly 500 outline drawings, including figures of the female organ in most instances.

The Austrian Entomological Society of Vienna has announced the issue early in the new year of a monograph on *Pieris bryoniae* and *P. napi* by the late Dr Leopold Müller and Ing Hanz Kautz. It will be illustrated by 16 plates in colour, containing about 250 figures. It is announced that "special regard to the English forms" of *P. napi* is given. The veteran entomologist, Dr Hans Rebel, is writing the introduction.

The Royal Entomological Society (London) will this year hold a *Conversazione* after the formal business of the Annual Meeting, in lieu of an Address by the President. For this Fellows are requested to bring exhibits. 19th January.

The firm of Herr Dr Wm. Junk of the Hague is issuing every six months a periodical entitled *Scientiae Naturalis Bibliographia*, containing titles of all works on Natural History, Biology, and kindred sciences published "anywhere in the civilized world" during the previous six months.

Lambillionea (Belgium) contains an article by Dr Roger Verity on the geographical forms and distribution of *Maniola (Pyronia) tithonus*. In it are discussed the ten geographical forms already described and two others are pointed out. The same number (November) has figures, among others, of aberrations of *Boarmia repandata* on the excellent plate.

In the November number of the *Entomological News* (Philadelphia) there is an interesting detailed account of the mass movement of *Vanessa cardui* in Wyoming on 2nd August 1935 by an observer who drove his car along a road across which the swarm was crossing. Counts were made at various stops made at intervals along a five mile course.

REVIEWS.

PROBLEMS OF HEREDITY IN THE LEPIDOPTERA, E. B. Ford. "Biological Reviews," 1937, 12, 461.—This review is full of interest for lepidopterists. A section on the red and yellow forms of Arctiids, *Catocalas*, and other genera deals not only with the genetic relationship of the two forms, but also with the pigments responsible for them. In a discussion on the uric acid derivatives, which cause the white and yellow colours of Pierines, it is suggested that the yellow colour of *Pieris napi* ab. *citrona*, Head. is due to the production of xanthopterin, the normal pigment of *Gonepteryx rhamni*, instead of leucopterin. Another section is devoted to the genetics of various melanic forms and a new explanation of the rapid spread of melanism in industrial areas is offered. In the final section on polymorphic mimetic forms the conflicting views of those who believe that perfect mimicry was produced by a single mutation, and of those who think that a slow evolutionary process was responsible, are reconciled, and the author's explanation is most convincing. It is impossible to give a satisfactory abstract in a review, and lepidopterists are recommended to consult the paper and read it carefully.—E. A. C.

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NOTES ON THE LIFE HISTORY OF LEUCANIA L-ALBUM, L.

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

In view of what has happened during the last few years I cannot refrain from giving the following quotation from Barrett: "Forty years ago (1857) Mr Stainton, when recording the first occurrence of an allied species, made the unfortunate remark 'How long are we to wait for *Leucania l-album*.' A few years later some enterprising collector, considering that the time had arrived when the question should be answered, announced the capture, first of one, but afterwards of more, specimens in Kent. But the matter was carefully investigated by the late Mr H. Doubleday, and the whole transaction exposed." One wonders now whether these records were false. At any rate the insect did reach this country occasionally, for there were at least three taken before 1933, one at Sandown, one in S. Devon in 1901 by Eustace Bankes, and one at Eastbourne in 1909 by E. P. Sharp. The last was a female and laid eggs, but owing to lack of experience in breeding the rarer immigrant *Leucanias* most of the larvae died of disease. In A. M. Longhurst's collection there was a worn specimen labelled Hampton and placed in a series of *comma*.

In 1933 G. W. Wynn took three specimens at sugar near Dartmouth in September (*Entomologist*, 1934, lxxvii, 9) and F. Pennington took one near the Lizard (*Entomologist*, 1933, lxvi, 271, and 1934, lxxvii, 15). In 1934 S. Pooles took one in Kent (*Entomologist*, 1934, 237). In 1936 Wynn reported that he had taken it every year in his original locality in July or in September or in both months, and so proved that it was breeding in S. Devon. At the Annual Exhibition of the South London Entomological Society G. A. Cole showed a male taken at ivy bloom in Devon and B. Kettlewell showed a very large number taken at sugar on the S. Devon coast to the west of Wynn's locality. There appears to have been an immigration on a large scale from Kent to Cornwall in 1933 or a year or two earlier. The immigrants may have been unusually numerous and the weather for the next three years exceptionally favourable, but it is scarcely believable that in the last few thousand years there has never been a similar coincidence of an immigration of great numbers of moths and good weather during and after it. One may, therefore, anticipate that in spite of its successful start the species will eventually die out.

Spending a fortnight from September the 14th to the 21st and with the help of instructions kindly given by Dr Kettlewell I was fortunate in finding *l-album* plentiful and in good condition. It was astonishing to see two, three, and even four on a post. The moth comes freely to sugar and no weather deters it completely. A night, when heavy rain washed off most of the sugar, a full moon, and a sea mist did not prevent them from coming to the posts, though it reduced their numbers. The majority come early, between 8 and 9 p.m. (summer time) and after that only a few stragglers appear. They sit with wings horizontal and often quivering, but as soon as they have settled down they are quite easy to box. A few when they have nearly finished feeding, close their wings altogether. The moths were commonest where large clumps of a grass, identified by Mr Wilmot as *Festuca arundinacea*, were growing, and this is probably the grass preferred for ovipositing. Females

seldom come to sugar before they have laid two-thirds of their eggs, if one may judge this by their thinness, but now and then one comes, which is full of eggs.

I had anticipated that there would be a difficulty in obtaining eggs and tried stems of *F. arundinacea*, cut so that a piece of sheath was present, and also pieces of dead leaf with rolled up edges. These were placed obliquely in deep glass-topped tins with canvas at the bottom, and a ball of cotton-wool dipped in water or a dilute solution of sugar was added. One moth, chosen because it had laid about a third of its eggs, was placed in each tin. Very few eggs were laid in the green sheaths, but the narrower curled dead leaves induced all the females except one to lay. The eggs were laid out of sight in single or rarely double rows covered with transparent cement, which glued them to both surfaces of the leaf. I saw one female laying eggs at 9.30 p.m. and kept these separate. They hatched in 14 days, but I think some hatched more quickly, taking twelve days at the most. The young larvae eat their eggshells, and, from the fact that a few had intestinal contents and were larger than the others, some must eat an unhatched egg or two. After eating the shell they remain lying side by side and make no attempt to find fresh grass. To test this I left one batch undisturbed and they had not come out in a fortnight, though still alive. Mr Edelsten tells me that the larvae from the female taken at Eastbourne by the late Edwin Sharp hibernated after eating their eggshells without eating grass at all. I think this must be the normal habit, and that mine intended to do the same, but, as it did not suit my arrangements, I brushed the little larvae out of their hiding places and put them on pieces of the sheath of *Dactylis glomerata*. Separate pieces of the white part of the sheath were cut into suitable lengths and placed in small glass-topped tins with newspaper at the bottom, and the tins were put into a box heated by means of an electric light bulb kept burning day and night. This method was used successfully for breeding *L. vitellina* and *L. albipuncta* (*Ent. Record*, 1936, xlviii, 25) and gave a temperature fluctuating between 74° and 84° F. For the first two instars they fed gregariously hiding inside the pieces of cut sheath and after that fed openly on the green leaves which were substituted, only hiding and collecting together when changing skin. They fed up with great rapidity and at almost the same rate. The majority of the eggs hatched between October 2nd and 4th, and the larvae went down into damp peat moss as follows:—20th October, 5; 21st, 14; 22nd, 46; 23rd, 69; 24th, 35; 25th, 3—leaving one larva, which hatched on 6th October, and had been kept as one of the three controls. This went down on 26th October.

G. W. Wynn (*Ent. Record*, 1935, xlviii, 14) gave a short description of the larva, which I supplement with a more complete one.

First instar. Head yellowish-brown without markings, ocelli black, antennae colourless. Legs pale grey with dark grey rings. Thoracic plate yellowish edged with darker brown. Ground colour grey at first, green after feeding, skin (seen under microscope) very finely pitted. Tubercles small and black, setae short and thin, spiracles white with black ring, circular. Pattern—a narrow red-brown longitudinal line runs down each side just internal to the anterior trapezoidal tubercle, leaving a pale dorsal line of ground colour. Between posterior

trapezoidals and supraspiraculars is a narrow red-brown line, and a much broader one fills the space between supraspiraculars and spiracles, and there is another narrower line running longitudinally just above legs and prolegs. First ecdysis after two days. Length 2.5-3 mm.

Second instar. Head pale yellow-brown with dark brown mouth parts. Tubercles small and black. Ground colour pale grey, dorsal area greenish and sharply demarcated from ventral after feeding. Pattern—dorsal line of ground colour with red-brown longitudinal line at each side running just internal to anterior trapezoidals; very thin paler one between posterior trapezoidals and supraspiraculars, then two more red-brown lines close together running parallel, one just above supraspiraculars, the other between them and spiracles, the latter broader; then another narrower line above legs and prolegs. These lines run across prothoracic and anal plates, which are almost the same colour as the ground. Legs and prolegs grey with black rings. Crochets pale brown. The larva is a semilooper and uses a silk thread in the first two instars. Second ecdysis after two days. Length 5.5-6 mm.

Third instar. Head pale yellowish-brown with two vertical irregular red-brown lines, one on each side of clypeus (front), and on each lateral aspect four narrower ones converging on the black ocelli. Between these and the anterior lines are faint broken vertical striae. Legs colourless, grey at segments, prolegs pale grey with darker rings. Tubercles small and black with short pale setae. Ground colour white. Pattern—On either side of white dorsal line is a fairly broad dark brown line, in which anterior trapezoidals are situated, then a line of ground colour and external to it a very narrow longitudinal line, in which are situated the posterior trapezoidals; then two fairly broad lines close together, the lower, which touches the spiracles, is the broader; then a broad white stripe below the spiracles with a faint broken red-brown line running along the middle of it, and finally a fairly broad brown stripe running above legs and prolegs. In the mid-ventral line is a row of brown spots, one on each abdominal somite from 1 to 6. Third ecdysis after three days. Length 10 mm.

Fourth instar. Head pale brown, on each lobe a dark brown vertical line and external to it two very narrow irregular lines with lateral branches giving a reticulated appearance, then an indistinct broken vertical line, and on lateral aspect four narrow lines running down towards ocelli. Ground colour greenish white, becoming pale brown soon after ecdysis. Pattern, from dorsum to venter—a pure white dorsal line, then a very dark distinct longitudinal brown line, then a paler brown line edged externally with darker brown, in which lie the anterior trapezoidals. Then there is a pure white stripe running between anterior and posterior trapezoidals, then a stripe of medium brown, then a stripe of pale ground colour, then a light brown stripe edged on each side with dark brown, then a stripe of medium brown bordered by darker brown, running above, but just touching spiracles, then a whitish spiracular stripe with a very narrow and very light brown line running along the middle of it, then a medium brown finely mottled stripe just above legs and prolegs. Fourth ecdysis after three days. Length 15 mm.

Fifth instar. Head yellowish-brown with a broad irregular vertical stripe running down each lobe just external to clypeus, outside this is

a faint brown reticular mottling, then six narrow vertical lines converging on ocelli. Pattern—a narrow pure white dorsal line, then a very dark olive-brown line, then a light reddish-brown broader stripe with a slightly darker border externally, then a broad stripe of pale ochreous ground colour, then a medium brown stripe, then a pure white line, then a light red-brown stripe, clearer and redder than the other, edged with darker brown, then a pale ochreous stripe of ground colour, then a medium brown mottled stripe with a distinct dark brown line bounding it internally and externally, running just above spiracles, then a stripe of ochreous ground, then a very light red-brown continuous line, then a broader stripe of ochreous ground, and then a mottled band of medium brown running just above legs and prolegs. Fifth ecdysis after three days. Length 20 mm.

Sixth and last instar. Head yellowish-brown marked with brown only slightly darker; on each lobe is a broad vertical line running down on each side of clypeus, and external to this is another line in front and two lateral lines. Between the two lateral lines are two faint vertical lines with side branches forming a reticular pattern, a single similar line runs between the inner lateral line and the line down the middle of the lobe, and another between this and the innermost and darkest line. The outer edge of the labrum is dark brown. Pattern; from dorsum to venter—There is a thin white dorsal line with a dark brown line just external to it, then an ochreous stripe, covered with many broken wavy lines of dots, and bordered by a darker and more complete line, just inside which lie the anterior trapezoidal tubercles, then a stripe of bright ochreous ground colour. Next comes a rather broad brown stripe, at the inner edge of which lie the posterior trapezoidals. In one form of larva this is uniform in colour throughout, in another form on each somite from the metathoracic onwards that part of the stripe in front of the posterior trapezoidal is black or very dark brown, but intermediate forms occur. The rarest, as in *albipuncta*, is the form with no darkening of the stripe. Outside this is a narrow ochreous stripe, then a narrow brown line, then a slightly broader ochreous stripe, then a narrow grey-brown stripe, then a narrow greyish-white stripe, then a broader grey-brown stripe, touching the external edge of which are the supraspiraculars. Next is a pale ochreous stripe, then a narrow red-brown line, then a very pale ochreous stripe, and then a grey-brown band above the legs and prolegs. The whole surface is irrorated with fine wavy lines of dots. The pale lines run across the prothoracic plate and there the white dorsal line is widest. The spot on the mid-ventral surface of each abdominal somite is pale red-brown and very inconspicuous. The skin is very thin as in *favicolor* and *pallens*, thinner than in most Leucanias, and this accounts for the wet appearance noticed by Wightman and for the pale red intersegmental lines noticed by Wynn. The larva, when full grown, is more slender than that of *albipuncta*, and the head is yellower and smaller and the colour is redder in tone. One larva was most peculiar in appearance. There was no hypoderm at all on the dorsal surface and only small irregular patches on the left side and rather larger ones on the right, where the normal colour and markings were visible. The greater part of the skin was quite transparent and was grey in colour owing to the intestinal contents. Five days after the fifth ecdysis it is full-fed, and

very quickly empties itself of food becoming a pale semi-transparent reddish brown. It goes into the earth almost as soon as the gut is empty. Length 32-33 mm.

The larvae of *vitellina*, *pallens*, and *favicolor* dislike exposure to light intensely and quickly run for shelter, but those of *l-album*, *lithargyria*, *impura*, *conigera*, *comma*, and *putrescens* have no objection to it, and remain quite quiet in bright daylight, merely rolling into a ring when disturbed. That of *l-album* will even continue feeding, if it is taken out of darkness into full daylight. This difference in behaviour is not correlated with the difference in the genitalia noted by Pierce, for *comma* and *putrescens* belong to a group very unlike the others, while *impura* and *conigera* have a pointed cucullus and the rest have a rounded one. The build of the various larvae, and their patterns fit in neither with their habits, nor with the differences in their genitalia.

The larvae shrink remarkably before pupating, and the pupa is rather small. The first pupae were noticed six days after the larvae had stopped feeding, but they may have pupated the previous day. One undoubtedly took seven days to pupate, but when dug up nine days after entering the earth all had pupated. They make a small neat, but fragile cocoon an inch or two below the surface of the peat moss.

Growth was astonishingly rapid. The quickest larva took 18 and the slowest 20 days from the time they started feeding to the time they stopped, though the temperature of the box was kept between 74° and 64° and sometimes fell to 72°, which was much lower on the average than that at which *vitellina* and *albipuncta* were kept.

Some of the pupae were put into the warm box at once, others were kept at room temperature for a time and put into the box for forcing at suitable intervals, and the last 29 were kept at room temperature until the moths emerged. The first moths appeared on 8th November, 51 days after the eggs were laid, 39 days after the larvae stopped feeding, and 14 days from the time they pupated. Those not forced emerged from 9th December to 15th, having been in the pupal state from 40 to 46 days.

The females all looked very thin and I dissected seven, but no eggs were visible in the ovaries even under a magnification of 20, although two had been in the pupa at least 44 days. I suppose the rapid growth in the larval period prevented their development. Wightman (*Ent. Record*, 1935, xlvii, 60) did not force his larvae, and the larval period was 28 days and the pupal period 21 days. He obtained a pairing, but the eggs, 180 in number, were infertile. Wightman's moth had a longer larval life but a shorter pupal life than some of mine. Apparently three weeks longer in the pupal state did not make up for a week less in the larval state.

Almost all the imagines were darker than any of the wild ones, though a number of these were in bred condition and cannot have faded. There was, however, no difference in depth of colour between those forced from the outset and those kept throughout at room temperature. They were about the same size as those taken at sugar. Variation was slight. A few had a distinct red tint, and the brown in some was darker and more extensive than in others throwing the white L into strong relief. The L was narrower in some and its length varied, but

only two or three had a very short L, 2 mm. long in the shortest instead of 4 mm. in the longest.

No specimen of ab. *o-album*, Milman (Milman, P. P., *Entomologist*, 1937, lxx, 107, 287) was bred. The only two known, one bred by Milman and one caught by G. W. Wynn, came from a more easterly locality, where the insect is less common. If it occurs to the West, where mine came from, it must be extremely rare.

I feel sure that forcing the larvae is the best way of treating this species, for a friend, who kept his larvae at 55° to 60° F., wrote in mid December to say that his first larva had pupated about 12th December, while the rest were still feeding and were of all sizes.

A VISIT TO PORTUGAL.

By E. SCOTT, B.A., M.D.

I paid a short visit to Portugal mainly for the purpose of collecting butterflies from 29th June-16th July 1936. The spot selected, recommended to me as a very charming place for a holiday was Cannas de Senhorim in the centre of the country on the main rail route from Paris to Lisbon. It lies about 20 miles north of the Estrella mountains. The hotel Urgeiriça exceeded our expectations. It consists of an estate containing half a dozen bungalows or villas to each of which a party of visitors is allotted. There is also a central block in which lunch and dinner are served. Breakfast and tea are partaken of in the villas whither they are carried gracefully and efficiently on the heads of the native serving girls. The hotel was under capable management and catered particularly for English visitors. There is a good hard tennis court and a splendid swimming pool, very welcome after the labours of the day under a southern sun. I was accompanied by my wife and sister, and we were joined there by Mr and Mrs Richardson, who had travelled to Lisbon by boat. The latter was untiring in his pursuit of the Hymenoptera, while not disdaining Lepidoptera and Coleoptera. Our whole party was comfortably accommodated in a bungalow known as the Villa Mimosa. The surrounding country is undulating and the estate is situated in the middle of extensive pinewoods cleared in places for crops and vineyards. The trees of Portugal are many and various. The conifer is predominant, particularly the stone pine which has a very large cone and provides resin for which it is methodically tapped by the country people. The eucalyptus has long been established in the woods and the roads are bordered in places by Mimosa, Ailanthus, Catalpa, Arbutus and other beautiful species. The soil is sandy and the undergrowth consists of heath, genista, ulex, and 3 or 4 varieties of cistus of which a yellow, a rose coloured and a white are particularly common. The olive tree is extensively cultivated in the clearings. The flora is very varied and space does not permit a detailed description. Particularly common is *Lavandula stoechas* and *Lithospermum prostratum*. The heavenly blue of our rockeries is a common weed in the woods, where it blooms throughout spring and summer. Vetches are rather scarce. 1936 proved an exceptionally poor season for butterflies. The winter had been the longest and wettest on record. May had been fine but the first part of June had been cold and rainy and

inclement weather continued for the first 2 or 3 days of our stay. Thereafter conditions were generally fine but by no means the cloudless sky that one expects in the south at midsummer. In consequence the early species had failed previous to our arrival and though, after the spell of bad weather cleared, emergences took place in increasing numbers during our short stay there were many generally common species absent or only met with in small numbers. I had been fortunate to get in touch with Mr J. S. Wattison, who has collected in Portugal for 25 years. He gave me much valuable information and kindly sent me a copy of his book on Portuguese butterflies. This is in the Portuguese language, but I understand that the author intends to bring out an English edition in the near future. Most of our collecting was done in the neighbourhood of Cannas and on the banks of the Mondego River four miles distant. However, we made several excursions in which we visited Bussaco, Vizeu, Mangualde and the summit of the Estrella. The visit to Bussaco was marred by rain and dull weather. We had a good day at Vizeu where we found a slope covered with genista, buddleia, and many other shrubs and flowers. This was alive with butterflies and provided a welcome series of *Argynnis pandora*. The summits of the Estrella were too cold for many butterflies and patches of snow were still lying in the gullies. Many species were flying on the lower slopes, but it would require at least a week to work even a small section of this range, which is about 60 miles in length and rises to a maximum altitude of about 6000 ft. The feature of Mangualde is a picturesque church perched among ancient trees on the top of a conical hill. The view is magnificent and the trees and rocks are the home of numerous *Satyridae* and on the day of our visit, 13th July, of a number of fresh *Laeosopis roboris*, ssp. *lusitanica*. The hotel Urgeirica possessed a car and the cheapness of the tariff encouraged us to make full use of it. Though butterflies were generally scarce in number and species compared with what one usually finds in France or Switzerland, I yet met with sufficient success to make me anxious to return preferably in May. I will briefly refer to the species met with.

Papilio machaon—Two or three specimens seen at the end of our visit.

P. feisthameli—Usually common. Only seen once on 16th July.

Pieris brassicae, *P. rapae*, and *P. napi*.

Pontia daplidice—The commonest "white." Met with everywhere on waste and cultivated ground.

Gonepteryx rhamni.

G. cleopatra—One only seen at Vizeu.

Colias croceus—Very common. I only noticed ab. *helice* on the higher slopes of the Estrella.

Leptidea sinapis and *Polygonia c-album*.

Eugonia polychloros—Seen once in the Hotel grounds.

Nymphalis io—Only seen on the summit of the Estrella.

Vanessa cardui and *V. atalanta*.

Argynnis pandora—Common in July. A fine race. Very fond of the flowers of buddleia.

A. cydippe—One ♂ only at the foot of the Estrella.

Issoria lathonia—Fairly common. One of the few butterflies flying at the summit of the Estrella.

- Melitaea aurinia*, race *iberica*—I took a worn ♂ and ♀ near the hotel, but later was lucky enough to find two webs of small larvae on honeysuckle. When they began to form webs for hibernation in September, I sleeved them on pots containing *Scabiosa succisa* in a cold greenhouse. They began to leave their webs on 7th January and fed on suitable days on shoots of honeysuckle introduced into the pots. They did not care for the scabious. The larvae were very hardy and active; quite black when full fed and larger than their English cousins. They began to emerge from the pupae on 17th May, and I bred a series of large and extremely brilliant specimens.
- M. phoebe*, race *occitanica*—I took one worn specimen on the lower slopes of the Estrella.
- M. didyma*, race *occidentalis*—Locally common.
- M. trivia*—I was fortunate in finding a brood of larvae on *Verbascum* near the hotel. I bred from these a series of small rather pale butterflies which emerged in August. I believe that this is the usual type of the second brood.
- M. deione*, race *rosinae*, Rbl.—A magnificent insect. It makes my specimens from Vernet and Var look very insignificant. The commonest *Melitaea* in Portugal. The larva is said to feed on *Digitalis*, a common plant, but I never succeeded in finding it.
- M. pseudathalia*—I bred a few specimens from two webs of larvae feeding on a common blue flower, which grows in a spike on waste ground. I cannot identify this plant. Some of the larvae fed up quickly on *Melampyrum cristatum* and produced imagines in August. The others died before hibernation. This is a peculiar race, the ground colour being rather terra cotta than fulvous. I am not aware that it has been named.
- Melanargia lachesis*—Common everywhere.
- M. syllius*—I only once met with this species, on 6th July, flying on a grassy slope near Bussaco with *M. lachesis* and *E. pasiphaë*. It was worn at this date.
- Satyrus circe*—Fairly common. Fond of resting on the trunks of olive trees. The few I took were very small.
- S. alcyone*—Common in the pine woods. The light band particularly of the forewings tends to be bright and sharply defined. race *vandalusica*.
- S. semele*—Common.
- Pararge aegeria*—Common. Mr Wattison informs me that freshly emerged individuals are to be met with in Portugal in every month of the year.
- P. megera*—Common.
- P. maera*—First seen on 11th July. After that commonly.
- Epinephele pasiphaë*—Flying on a slope near Bussaco on 6th July. The ♀s were fresh at this date but the ♂s quite worn.
- E. ida*—One of the commonest butterflies.
- E. tithonus*—Common.
- E. jurtina*, race *hispulla*—Common. A fine race but not so large as a series I possess from near St Raphael.

- Coenonympha dorus*, race *bieli*—First seen on 2nd July. Subsequently common everywhere. An insignificant form both in size and markings.
- C. pamphilus*, race *lyllus*—Only made an appearance during the last days of our stay.
- Laeosopis roboris*, race *lusitanica*—Locally common. Noticeably at Mangualde, on 13th July, where they were resting at midday under the oak leaves.
- Thecla spini*—A single specimen on 15th July.
- T. esculi*—Fairly common on lavender.
- Chrysophanus alciphron*, race *gordius*—Common on lavender.
- Heodes phlaeas*, race *eleus*—Common.
- Lampides boeticus*—Shares with the next species the distinction of being the commonest "blue" and probably the commonest butterfly in the district. The ♀s were to be seen ovipositing in a species of *Genista*.
- Tarucus telicanus*—This species was always to be found flying around gorse bushes on the shoots of which the ova are laid.
- Plebeius argus (aegon)*—Only taken on one occasion near Santa Comba Dao.
- Scolitantides baton*—Not common.
- Aricia medon*—Common. I took a series of large specimens with prominent red lunules and brown undersides. race *calida*.
- Polyommatus icarus*—Rare.
- Lycaenopsis argiolus*—Seen in the Hotel grounds.
- Hesperia sao*—I took two or three very small specimens. race *eucrate*.
- Adopaea linea (sylvestris)*—Common.
- Thymelicus actaeon*—Common.

SCIENTIFIC NOTES.

GYNANDROMORPHISM IN DIPTERA.—Mr Muschamp in the last number of the *Ent. Record* says that gynandromorphism is rarer in Diptera than in any other Order. He has overlooked *The Origin of Gynandromorphs*, published in 1919 by Morgan and Bridges. Not only do they record many examples in *Drosophila melanogaster*, but by a knowledge of the ancestry and the mutant characters found in the male and female parts and by direct cytological examination, they prove that most of these gynandromorphs arise owing to the loss of one X-chromosome. Many more gynandromorphous *Drosophila* have been recorded in the last eighteen years, and it is evident that in one genus of Diptera the phenomenon is by no means rare. The American workers found the frequency 1 in 2200. Is Mr Muschamp sure that his *Stratiomys chamaeleon* are not intersexes? I gather from his description that they are symmetrical, which is most unusual in true gynandromorphs. In *Drosophila* intersexuality is inherited, and numbers have been bred from the eggs of one female.—E. A. COCKAYNE, 16 Westbourne Street, W.2.

In Seitz, Vol. I (1907) of *Pal. Rhopalocera*, p. 64, Röber describes a Pierid under the name *dubiosa* and it is figured on plate 20c. His description is "Whether it belongs to *rapae* or is a distinct species

cannot be decided with certainty from the meagre material at present at disposal; somewhat larger than *krueperi*, more narrow winged, the black apical markings united, but traversed by thin white veins, a black spot between 1 and 2 median vein on forewing and another at apex of hindwing, the lower discocellular of forewing thinly black; underside of forewing white, its apex and underside of hindwing pale yellow, the inner area sparsely dusted with black, at apex of hindwing a black obsolescent spot, last segment of palpus black, with a few white hairs; appears to be restricted to the southern portion of the Region (Andalusia and Asia Minor)." The figure shows the apical black spot extended imperfectly down the outer margin about halfway. There is a medium sized spot immediately below the inner half of the apical blotch and joined up with it. Below lies a large conspicuous black spot. These two lie somewhat nearer the outer margin than in *rapae* and more resemble *krueperi* in these respects. But whereas the outer margin in the latter is a slightly outward curve below the apex, in *dubiosa* this curve is very slightly inward. In the Supplement, Vol. I, no further information is forthcoming. Can any of our continental readers give us further information about this? Where are the original types to be found? Can a more detailed description be made of them?—HY. J. TURNER.

NOTES ON COLLECTING, &c.

AN UNRECORDED ABERRATION OF LEUCANIA IMPURA.—Captain C. Q. Parsons of Torquay has submitted to me an example of the above species 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. Normally there is either a very slightly darkened ground colour line or no indication of a line. Very occasionally a glass will show an irregular row of a few black dots. It was taken near Torquay. Captain Parsons suggests that it be named ab. *nigrolinea*, n. ab.—HY. J. T.

AN UNRECORDED ABERRATION OF ANCHOSCELIS LUNOSA.—In the same box Captain Parsons sent a specimen of the above species, which was very much darker in colour than any form hitherto recorded. The most extreme dark form registered by Tutt is ab. *agrotoides*, Gn. Blackish grey, with pale nervures, and the stigmata quite black. The present specimen is almost a copy of the figure in Culot, *Noct. et Geom.*, I (2), plt. 53, fig. 5, which is said to be near *agrotoides*. But it differs in being a very dark, almost blackish, red brown f.-w. without the light outer marginal band, with stigmata black, but almost obsolescent on account of the dark ground colour, and without conspicuous veining as in *agrotoides*, and the h.-w. evenly dark blackish suffused. The specimen was bred with a number of similar examples from Chelston, Devon, and may be designated by the name ab. *intensa*, n. ab. The figure in South called *agrotoides* should have conspicuous light veining, and a lighter outer margin.—HY. J. T.

THE OCCURRENCE OF HELIOTHIS MARITIMA IN BRITAIN.—It has been discovered recently that under the name *Heliothis dipsacea* in British

collections there are really two species, which can be readily identified by locality and facies. Those from localities near the sea are *H. maritima*; those from other localities are probably true *H. dipsacea*. Those readers who have South's Vol. II, if they look on plate 19, fig. 1, 2, will see not *H. dipsacea* but *H. maritima*. *H. dipsacea* has the central band more direct to the inner margin, a less pointed apex of f.-w., somewhat wider forewings and without the dark line from the base, comparable with *basilinea*. We would like a card from our readers giving us the name and locality of any specimen of these two species they may have been able to recognise.—HY. J. T.

CASSIDA VITTATA, VL. AND DICTYOPTERUS AFFINIS, PK.—In May last year I took a single specimen of *Cassida vittata* at Sudbury, Suffolk. Fowler states that it is "taken on *Salicornia* and other salt marsh plants almost always found on or near the coast." He gives a list of localities and goes on to say "some of these records may be in error, as the species seems almost entirely confined to salt marshes."

Sudbury is about 20 miles from the coast (in a straight line); the spot at which I captured the beetle was a disused chalk quarry on a hillside. The nearest marshy ground is about one mile away beside a river, and is not a salt marsh.

At Box Hill on 27th August 1937 I captured one specimen of *Dictyopterus affinis*; this also appears to be an unusual locality.—F. D. BUCK, 10 Elthorne Road, London, N.10.

THIRD BROODS OF HEODES PHLAEAS, LINN. AND MANIOLA JURINA, LINN.—In his article on the above in the *Entomologist's Record* of January 1938, Mr Castle Russell mentions the late emergence also of *M. jurina*.

In normal summers it would appear that there is a possibility of a third brood also of *jurina*, for at Farley Mount, south-west of Winchester, I have taken apparently freshly emerged and very poorly scaled specimens as late as 7th October.

Insects of the second brood from the middle of August to the end of September—particularly the females—are much subject to various degrees of albinism. One taken by Dr Hobby on 24th August 1930, a male, is almost completely white except for the black nervules, and a female taken by me on 26th August 1933 has the lower wings similar to the former specimens—both are figured in the *Journal of the Entomological Society of the South of England*, December 1933.

In this indifferent Summer only one specimen showing marked general albinism was taken by me.—H. G. HARRIS, M.D.

CURRENT NOTES.

The Hon. Treasurer would be obliged if those who have not yet paid their subscriptions for the current (1938) volume would do so at their earliest convenience.

Of the Supplementary volumes of Seitz, Palaearctic Fauna, 2 new parts are to hand. Of Vol. III the completion of the Text with Appendix I and Appendix II of the Noctuae, 8 pp. and 2 plates, leaving

only the Index to complete the volume. The part to Vol. IV contains 16 pp. and 1 plt. of Geometers, for which Mr L. B. Prout is responsible. Of the some 12 species of the British fauna no less than 90 new forms are recorded and short diagnoses given of them. Everyone who makes any pretence to intensive study of our British Macrolepidoptera should acquire such volumes. We understand that facilities for deferred payments can be arranged with the publishers to genuine students.

In the December issue of *Iris* Prince Caradja, assisted by Edward Meyrick, reviews the material collected in the Chinese Province of Yunnan. The present portion of the article deals with the Pyralidae and a section of the Tortrices. Frhr. v. d. Goltz describes new *Erebia* forms in a further article.

The Main Seitz volumes appear steadily year by year. It is now more than 30 years since this great work was commenced in 1906. Periodically a number of parts come to my table and now and again a volume is completed and becomes the more useful with its valuable index. Recently we have received 5 parts of the Main Volumes; VI, American Bombyces, etc., and XI, Indo-Malay *Noctuidae*. The former consists of two sheets of 16 pp. and 1 plate of *Synanthedon* and *Hepialus* species; the latter consists of six sheets, 48 pp. and 6 plates of many species which rarely occur in the way of the ordinary students of Lepidoptera unless they have access to an extensive library.

The 19th January was the date of the Annual Meeting of the Royal Entomological Society of London. There were about 120 present in the meeting room to hear a very favourable and flattering report of progress in the various sections of the Society's work, and to listen to the Treasurer's financial statement, which showed a substantial balance of the funds. There are now over 700 Fellows on the List of the Society. An innovation of the meeting was the absence of an Address from the President, who after giving a few remarks on the past and future of the Society with short obituaries of Fellows and of eminent entomologists of foreign nations who have passed over during the year, adjourned the meeting to a conversazione where numerous exhibits had been placed on the tables. Facilities for light refreshments had been afforded.

In the *Ent. Zt. mit Int. Ent. Zt.* for January Dr Heydeman begins an article on some N.W. European Lepidoptera. He is dealing first with *Pseudoterpna pruinata* and its various forms. There will be 3 plates. The description of a new form is given, viz., *viridimelana*, succeeded by a discussion of the status of various names and forms of this species.

This being the 50th year of the issue of our Magazine, the panel of Editors at their last meeting decided to have a JUBILEE NUMBER later in the year. Among the articles there will be one giving the account of the origin and life of the Magazine; another will deal with the Progress of Entomology during the period. Possibly articles on the additions to our British Lists; the outstanding literature; notes on the illustrious entomologists who have passed from us; the change from the mere amassing of specimens to the more serious and scientific study of the life-history, and the body structure; etc.

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MEETINGS OF SOCIETIES.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—41 Queen's Gate,
South Kensington, S.W.7; 8 p.m. March 2nd, 16th.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY
SOCIETY.—Hibernia Chambers, London Bridge. Second and Fourth Thursdays
in the month, at 7 p.m. February 24th, March 10th, 24th.—Hon. Secretary,
S. N. A. Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

THE LONDON NATURAL HISTORY SOCIETY.—Meetings first four Tuesdays
in the month at 6.30 p.m., at the London School of Hygiene and Tropical Medi-
cine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may
be obtained through Members, or from the Hon. Sec., A. B. Hornblower, 91
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SPECIAL NOTICE.

REDUCTION IN PRICE OF BACK VOLUMES.

To commemorate the 50th volume of the magazine it has been decided, during the year 1938, to reduce the price of back volumes of the New Series (Vol. 37, 1925—Vol. 49, 1937) from 12/6 to 7/6 per volume. To be obtained, post free, from the Hon. Treasurer, 6 Footscray Road, Eltham, London, S.E.9. This offer is made to subscribers only.

Communications have been received from or have been promised by Capt. K. J. Hayward, (the late) Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, T. Bainbrigg-Fletcher, Dr Malcolm Burr, L. T. Ford, Wm. Fassnidge, Dr Verity, O. Querci, Rev. G. Wheeler, B. C. S. Warren, Dr E. A. Cockayne, W. Parkinson Curtis, Dr Burr, P. Freeman, T. F. Marriner (2), T. D. Fearnough, B. C. S. Warren, Dr H. B. Williams, Dr H. G. Harris (plate), B. D. W. Morley, P. B. M. Allan, H. W. Andrews, and Reports of Societies.

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IMPORTANT TO ENTOMOLOGICAL SOCIETIES AND MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation

(Vols. I-XXXVI.)

CONTENTS OF VOL. I. (Most important only mentioned.)

GENUS *Acronycta* and its allies—Variation of *Smerinthus tiltae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthene*, and *aurelia*—The Double-day collection—Parthenogenesis—Paper on *Taenioctenidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the Winter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist for 1890—Life-histories of *Agrotis pyrophila*, *Epunda lichenea*, *Heliophobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc., 360 pp.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED with the assistance of

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Entomological Congress, Bournemouth, 1938

THE SOCIETY FOR BRITISH ENTOMOLOGY announce that they have accepted an invitation from the BOURNEMOUTH NATURAL SCIENCE SOCIETY to hold the 1938 Congress in BOURNEMOUTH. The dates selected are the Whitsun weekend, 3rd—7th June, 1938, and **a cordial invitation to attend the Congress is extended to all persons of either sex who are interested in any aspect of British Entomology.**

Dr. O. W. Richards, M.A., D.Sc., F.R.E.S., F.S.B.E., President of the Society for 1938, will preside, and will deliver his Presidential Address. A number of interesting Papers will be read and discussed; the collections of the Bournemouth Natural Science Society and the Exhibits brought to the Congress, will be available for inspection; there will be a *Conversazione* and Dinner on the Saturday evening; and Field Meetings on the Friday, Sunday and Monday at Hengistbury Head, in the New Forest, and on the Sandhills and Heaths adjacent to Poole Harbour.

Visitors are invited to bring Exhibits, for the display of which facilities will be provided; it is suggested that exhibits might be selected to illustrate work which the exhibitor has in hand.

Any person having a matter of importance which they wish to bring before the Congress should let the Hon. Secretary have particulars at the earliest possible moment. The Council will endeavour to provide an opportunity for this to be done, and if desired for a Resolution on such matter to be voted upon.

Accommodation in Bournemouth will be available at moderate rates, and may be reserved when completing the Form of Application to be issued with the Programme.

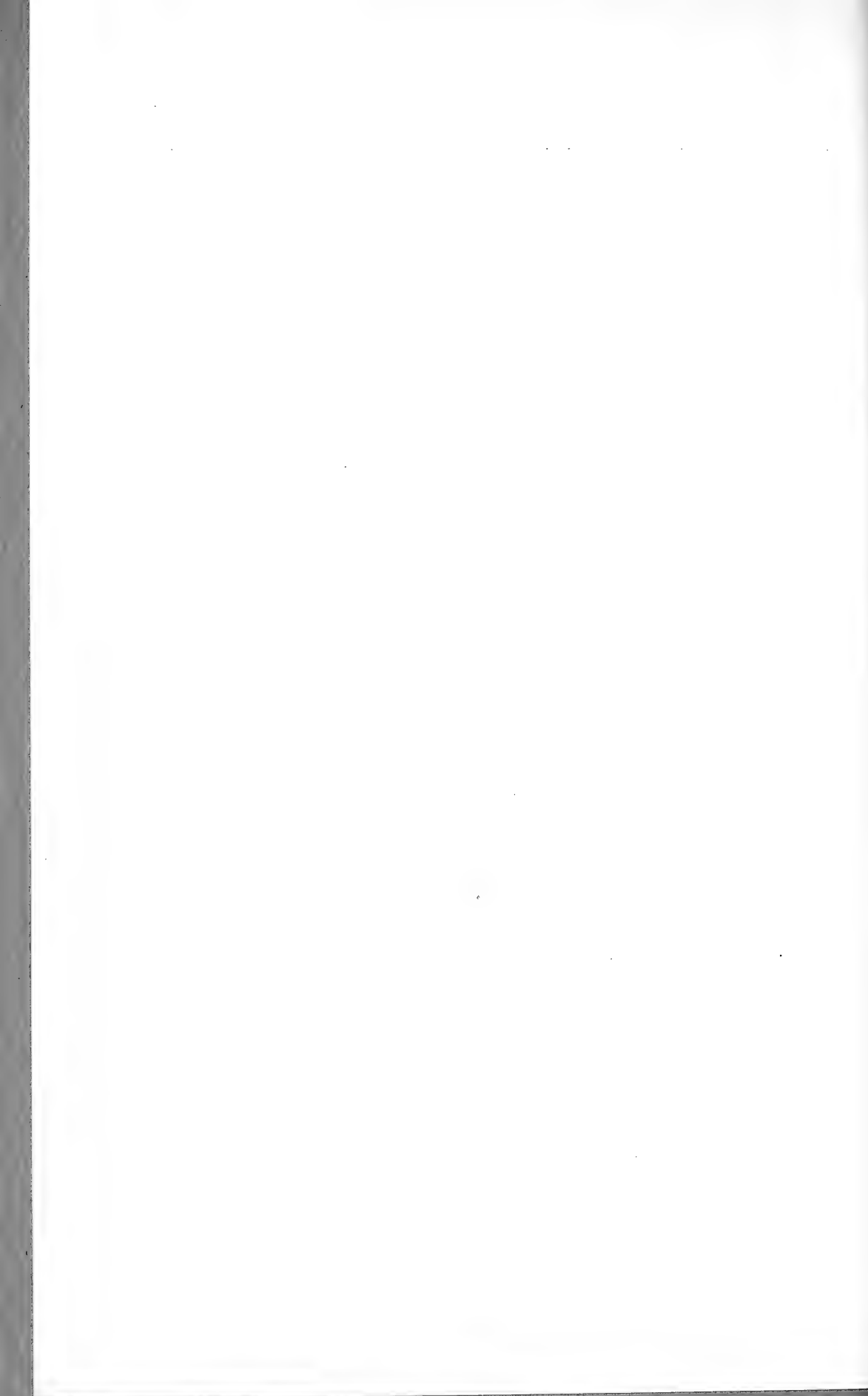
A detailed Programme with full particulars, directions and Application Form will be available shortly, and **a copy will be sent to any name and address on receipt of a postcard.** The Hon. Secretary will be pleased to answer enquiries, and to render every possible assistance.

The Council hope that every British Entomologist who can do so will attend the Congress so that it may be thoroughly representative.

Write for particulars to:—

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13,820

NAMES OF MICROLEPIDOPTERA.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

1. *EUCOSMA FARFARAE*, n. sp.

Tortrix brunnichiana, L.: Schiff., Wien. Verz., p. 132, No. F.2 (1775).
Tortrix brunnichiana, Froelich, Enum. Tortr. Wurtt., pp. 46-47, No. 93 (1828).

Halonota brunnichiana, Schiff.: Steph., List. Brit. Anim. B.M. X, p. 46, No. 5 (1852) [= *rusticana*, Hw. = *quadrana*, Steph.].

Epiblema brunnichiana, (S.V.), Froel.: Rebel, Cat. Pal. Lep. II 120, No. 2150 (1901).

Eucosma brunnichiana, Froel.: Meyr., Rev. Handb. pp. 555-556, No. 37 (1928).

Tortrix profundana, Hb., Samml. Eur. Schmett., Tort. t. 4 f. 21 (1796—24.xii. 1799).

Tortrix rusticana, Hw., Lep. Brit. [iii], p. 442, No. 154 (1811).

Spilonota rusticana, Steph., Ill. Brit. Ent., Haust. IV 93-94, No. 9 (1834); Wood, Index Ent., p. 137, t. 31 f. 904 (1836).

Spilonota quadrana, Steph., Ill. Brit. Ent., Haust. IV 95, No. 14 (1834); Wood, Index Ent., p. 137, t. 31 f. 909 (1836).

Epiblema brunnichianum, Schiff., ab. *ochreana*, Hauder, Ent. Zts. Frankf. a. M. XXXI 102 (1918).

The earlier synonymy of this species seems to be very doubtful. Schiffermüller's description of a moth from an unknown larva was merely a "blackish *Tortrix* with a whitish dorsal blotch." In 1801 Illiger (Wien. Verz., ed. ii, II. 69) marked this "†," which indicated that it was not then in the collection, but quoted *brunnichiana*, Linn., and *brünnichiana*, Fb., against it. In 1775 Fabricius (*Syst. Ent.*, p. 649, No. 21) had redescribed *Pyralis brunnichana*, Linn., and in 1787 (*Mantissa* II 229, No. 49) he repeated his former diagnosis for *Pyralis "brunnichana"* and added the reference "Wien. Verz. 132. 2" but without any note "Mus. Dom. Schieffermyller," which he gave against those species which he had examined in the Vienna Collection. It seems, therefore, that Schiffermüller's specimen had disappeared before Fabricius went over this collection, which was at Lenz when he examined it in 1784 (Autobiogr. of Fabricius; T.E.S. IV, p. xi: 1845). The remarks by Charpentier and Zincken (*Die Zinsler, Wickler . . .*, pp. 92-93: 1821) on *brunnichiana*, Schiff., therefore, do not possess much value. Froelich gave a full description of his *Tortrix brunnichiana* and quoted Fabricius, Charpentier and Hübner's t. 4 f. 21 (*profundana*). But, whether the name *brunnichiana* is to be ascribed to Schiffermüller, Fabricius or Froelich, it cannot be considered as a valid name distinct from *brunnichana*, Linn. 1767 (also now placed in *Eucosma*), the difference between *-iana* and *-ana* as an adjectival suffix not being sufficient to constitute distinct names. It will be noted that Schiffermüller himself, in writing the name as *brunnichiana*, quoted Linnaeus as the author of this name, although Linnaeus had named his species *brunnichana*.

Unfortunately, all the other four names, which have been given to this species, must be rejected as homonyms. *Tortrix profundana*, Hb. 1796-1799, was a primary homonym of *Tortrix profundana*, Schiff. 1775.

Tortrix rusticana, Hw. 1811, was a primary homonym of *Tortrix rusticana*, Hb., Samml., Tort. t. 11 f. 66 (1796-1799). *Spilonota quadrana*, Stephens 1834, is a secondary homonym within the genus *Eucosma* of *Tortrix quadrana*, Hb., Samml., Tort. t. 35 f. 223 (1811-1813). The sub-specific name, *ochreana*, Hauder 1918, was praeoccupied within the same genus by *tetraquetrana* ab. *ochreana* by Hauder himself.

So far as I can see, this common species has no valid name and it is therefore necessary to rename it [*farfarae*,] n. sp.

RETARDED EMERGENCE IN TRYPETIDAE.

By H. W. ANDREWS, F.R.E.S.

In August 1935 I gathered at Cranmore Heath, Isle of Wight, a large bunch of heads of saw-wort (*Serratula tinctoria*, Tr.) with a view to breeding *Trypeta vectensis*, Coll. and in June-July 1936 fair numbers of this fly emerged and also about a dozen *Euribia spoliata*, Hal. as recorded in Vol. XLIX of this magazine (Supplement to March 1937 issue). As both species were much in demand with correspondents, a friend kindly got a further bunch of seedheads from the same locality in the summer of 1936, from which I hoped for more specimens in due course.

On 25th June 1937 I noticed several *vectensis* on my window, and thinking that the 1936 seedheads had got uncovered I inspected the box, but found all was intact with no evidence of any emergences. I then looked at the box with the 1935 seedheads, which quite by chance had not been thrown away, and found the cover partly open and several more *vectensis* in the box. In the next three weeks there emerged from the 1935 seedheads nearly as many *vectensis* and considerably more *spoliata* (about two dozen) than were bred in 1936. The 1936 seedheads (a much smaller bunch) produced in the same period two or three *vectensis* and seven *spoliata*. The room in which both lots had been kept is upstairs, facing north, and without artificial warmth, except for an electric stove at week-ends in the winter months.

I know of no published records of retarded emergence in other British Trypetids, though certain species are known to be double-brooded. Mr Niblett mentions *Trypeta* (*Orellia*) *colon*, Mg., *Carphotricha* (*Noeeta*) *pupillata*, Fall., and *Euribia quadrifasciata*, Mg., as having more than one brood in the year. Dr Varley says (*in litt.*) of *E. quadrifasciata*:—"The first emergence in the year is in June and July, and flower-heads of black knapweed collected in July gave a lot of flies in August. Many more came out the following May. I am convinced that since the flower-heads were simply put in a box and allowed to dry there is no chance that these flies emerging in August laid eggs and bred in the emergence box. In fact, under field conditions they would find flower-heads suitable for them to oviposit very scarce indeed. I am of the opinion that the August emergents are wasted in the field. I have not kept knapweed flower-heads for longer than a year, so that I do not know whether *E. jaceana* hangs over for more than one winter. I noticed in September 1936 that a few larvae of *E. jaceana* remained in the old flower-heads, not yet having pupated. They might under normal conditions pass a second winter as larvae, but I have no direct evidence of this."

Dr Varley also drew my attention to records of an American Trypetid, *Rhagoletis complecta*, Cresson, the "Walnut Husk fly" of economic importance, which has been found by experiment to emerge two, three, and even four years after pupation; but in this case as the insect pupates in the earth the retardation is probably caused by conditions other than those applying to seedhead species.

In a somewhat different category comes *Myopites frauenfeldi*, Sch. I swept imagines of this fly in August 1935 from heads of the Golden Samphire (*Invula crithmoides*, L.) in the Isle of Wight, where the species was abundant, and at the same time collected a number of galled heads of the host plant. From these heads imagines continued to emerge till well into September of 1935, and from the same lot of heads in some numbers in June-July 1936, but not later than the middle of July.

Hitherto I have, as a rule, thrown away seedheads after the required insects have emerged, and I suspect other collectors do likewise, but it would be interesting to know if any dipterists who have kept seedheads for a year after the appearance of the first brood of flies have had experience of this "retarded emergence," in Trypetid species.

BEELZEBUB.

When Ahaziah ben Ahab was taken ill, he consulted his physicians. It seems probable, judging from the treatment recommended, that they diagnosed some intestinal complaint conveyed by flies, for Ahaziah sent messengers to consult the leading dipterist available at the time.

This was an unpardonable thing to do, as the chief dipterist lived in Ekron, which was a city of the Philistines. For a Jew Ahaziah was unusually unpatriotic.

Now the Philistines were no fools, and realised what modern commentators have until recently completely failed to understand, that flies are something more than a mere nuisance to bald-headed men, that they are a grave menace to public health. This is understood in all arid countries, and the valley of Jordan seems to have been particularly infested with this pernicious plague.

To cope with them the Philistines, not having the advantages of modern knowledge, did what many primitive, direct-thinking peoples do in difficulties. They set to work to appease their persecutors. To approach them, they focussed their efforts upon personification, that one should represent them all. They therefore appointed him Chief Fly, whose name in Hebrew was Beelzebub, the Lord of Flies.

It is amusing how this name has bewildered even the most learned commentators. No less an authority than Dr Bennett, formerly Professor of Old Testament Exegesis, writing in the *Encyclopedia Britannica* (eleventh edition), appears to have taken it for a territorial title, for he plaintively laments that there is no such place known as Zebub, for Baal to be lord of.

This "common Hebrew noun," he admits, quite clearly means flies, so it would perhaps be rather an odd place-name. Another learned divine, Dr Baethgen, author of *Beiträge zur semitischen Religionsgeschichte*, comments in even more naive manner. Beelzebub, he explains, is the "Baal to whom all flies belong or are holy." Quite right

so far, evidently. But he goes on to explain what strikes him as fantastic, that "As children of summer they are symbols of the warmth of the sun." No, Herr Professor Doktor, in your cool northern home you may think so, but I hardly imagine the average inhabitant of Palestine or Egypt would look with such romantic eyes upon the flies that swarm upon their festering sores and cling in thick pads to the eyes of their children.

How can a commentator commentate if he has never seen the scene of his commentation? How can he have a glimmer of knowledge of the conditions? Had he spent one single day in Egypt or Palestine, he must have realised how the poor Philistines were doing the best according to their lights to cope with creatures which one of the world's greatest thinkers, Zoroaster, had identified with the Demons of Corruption.

Zoroaster's observations, which seemed unknown to the commentators mentioned, have been abundantly confirmed by modern observation, and these "children of summer" are now recognised as carriers of serious infections of the eyes, probably of infantile paralysis, certainly of dysentery and typhoid, almost certainly of cholera, and possibly also of leprosy.

So the Government of Tanganyika, when appointing an official to combat the danger, had been anticipated by some three thousand odd years by the Philistines of Ekron, for clearly Beelzebub was the first Fly Control Officer of whom there is mention.

M. B.

PYRALIDAE AND MICROLEPIDOPTERA COLLECTED IN CYPRUS DURING 1920 AND 1921.

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

(Continued from p. 7.)

Salebria dionysia, Zeller.—Limasol in March.

Salebria semirubella, Scopoli.—Recorded by Lederer (*Verh. z.-b. Wien*, V, p. 186, 1855) as *carnella*, Linné.

Nephopteryx isidis, Zeller.—Taken at Platres from June till October, but was never common.

Dioryctria abietella, Fabricius.—Common in July at Platres.

Dioryctria mendacella, Staudinger.—Common during July and August at Platres and Troödos.

Acrobasis obliqua, Zeller.—Forest of St Nicolai in March.

Myelois cribrella, Hübner.—A single specimen taken in September at Platres.

Myelois pallipedella, Ragonot.—Uncommon at Platres in August.

Myelois pluripunctella, Ragonot.—At Platres in August. Uncommon.

Myelois incompta, Zeller.—Cited by Staudinger and Rebel in their *Catalog.*, II Theil, p. 41, No. 780.

Myelois cinerea, Staudinger.—Mentioned as from Cyprus in *Hor. Soc. Ent. Ross.*, XV, p. 210.

Myelois cognata, Staudinger.—A single specimen from Platres in September.

Myelois ceratoniae, Zeller.—Limasol in March.

ENDOTRICHINAE.

Endotricha flammealis, Schiffermüller.—This insect was very common around Platres from September till October in 1920 and June till September in 1921. One specimen was taken in which the forewings were olive-grey above except for the inner line, costa to inner line and the outer margin, which are of the normal reddish tone. The transverse band of the hind-wing in this specimen is also olive-grey.

PYRALINAE.

Ulotricha egregialis, Herrich-Schäffer.—This insect flew during July and the first week of August 1921 at Platres, but was somewhat uncommon.

Aglossa pinguinalis, Linné.—The form *asiatica*, Erschoff flies at Platres in August and September. I believe the insect has also been taken at Limasol by Mr Mavromoustakis.

Aglossa ommatalis, Hampson.—Obtained by Mr Mavromoustakis at Limasol in October and by Sir John Bucknill and by Miss Bate (*Ann. Mag. Nat. Hist.*, XVII, 219, 1906).

Pyralis farinalis, Linné.—Mentioned as from Cyprus by Staudinger in *Hor. Soc. Ent. Ross.*, XVI, p. 109. I obtained it very commonly at Platres in September and October, also around Troödos and Troöditsa in 1920, and again from June till September in 1921. Sir John Bucknill also took the insect, which varies very much in size.

Actenia brunnealis, Treitschke.—The specimens of this insect taken at Platres probably represent a local form. My notes (1923) mention that the insect was separated by Mr Tams for further study, but whether it eventually turned out to be a good separate form or not I do not know.

HYDROCAMPINAE.

Nymphula nymphaeata, Linné.—Taken on the island by Mr Mavromoustakis.

Duponchelia fovealis, Zeller.—Taken by Lederer (*Verh. z.-b. Wien*, V, p. 186, 1855).

Stenia punctalis, Schiffermüller.—Limasol in March. Also taken by Sir John Bucknill.

SCOPARIINAE.

Scoparia pyrenaealis, Duponchel.—Recorded under the name *incertalis*, Zeller, as occurring on the island by Lederer in *Verh. z.-b. Wien*, V, p. 186, 1855.

Scoparia staudingeralis, Mabille.—Limasol in October.

PYRAUSTINAE.

Glyphodes unionalis, Hübner.—Specimens were taken at Platres on 9th and 17th August 1921.

Euclasta splendidalis, Herrich-Schäffer.—Not uncommon at Platres in July, August, and September.

Hellula undalis, Fabricius.—Specimens were taken at Platres on 11th and 18th August 1921.

Nomophila noctuella, Schiffermüller.—This cosmopolitan insect was recorded by Lederer in 1885. I found it extremely common on the

island, most of the year at Limasol, at sea-level, and from May or June till October in the southern mountain range at altitudes between 4500-6000 ft.

Phlyctaenodes sticticalis, Linné.—Plentiful at Platres during the summer from May onwards till the colder weather sets in in October.

Antigastra catalaunalis, Duponchel.—I took a single specimen at Limasol on 16th September 1921.

Prochoristis crudalis, Lederer.—Recorded as from Cyprus by Staudinger and Rebel in their *Catalog.*, II Theil, p. 59, No. 1087.

Cynaeda dentalis, Schiffermüller.—Taken on the island by Sir John Bucknill.

Metasia octogenalis, Lederer.—Recorded from Cyprus by Staudinger in *Hor. Soc. Ent. Ross.*, XV, p. 181, and by Staudinger and Rebel in their *Catalog.*, II Theil, p. 61, No. 1114.

Metasia supbandalis, Hübner.—Recorded by Lederer (*Verh. z.-b. Wien*, V, p. 186, 1855). I found it common at Platres from June till September and also at Limasol during the latter month.

Metasia rosealis, Ragonot.—Very common at Platres, especially amongst the undergrowth in the pine forests from June till September. The insect shows considerable variation.

Metasia sp.—Near *carnealis*, Treitschke. Probably a new species. Platres (H.360).

Pionea ferrugalis, Hübner.—Platres in July, Limasol in December. Also taken by Sir John Bucknill.

Pyrausta diffusalis, Guenée.—Taken at Platres in August, but the insect appears to be scarce.

Pyrausta cespitalis, Schiffermüller.—Recorded from the island by Lederer (*Verh. z.-b. Wien*, V, p. 186, 1855). I obtained it at Platres and Troödos where it was quite common during July, August, and September.

Pyrausta sanguinalis, Linné.—Recorded by Lederer (*loc. cit.*). The insect was common around Platres in July.

Pyrausta aurata, Scopoli.—Common at Platres. As a rule I took it near streams or on marshy ground amongst reeds and rushes. It was on the wing from June till October on the southern mountain range, and has been taken in December at Limasol. Staudinger and Rebel in their *Catalog.* record the form *meridionalis*, Staudinger, as occurring in Cyprus (II Theil, p. 68, No. 1253b).

Noctuelia floralis, Hübner.—Recorded from Cyprus by Lederer (*Verh. z.-b. Wien*, V, 186, 1855). I took a pale lightly marked specimen at Platres on 9th August 1921.

Noctuelia isatidalis, Duponchel.—Limasol in December.

(To be continued.)

NOTES ON COLLECTING, &c.

ENARMONIA FUNEBRANA, TREITSCHKE.—We have received from Monsieur Paul Bovey a separate of an excellent paper written by him under the title "Recherches sur le Carpocapse des Prunes, *Laspeyresia* (*Grapholita*) *funebrana*, Tr." (*Revue de Pathol. végét. et d'Entom. agric. de France*, XXIV, pp. 189-317, 59 figs., 9 tabs.: 1937). This is

a very complete account of the structure, biology, parasites and control of this Eucosmid, of which the moth is rarely seen although the larva, as Stainton remarked, is "very frequent in plum pies." In England it is stated to be a pest of plums in Cambridgeshire, Worcestershire, and Kent; on the Continent it occurs throughout Central Europe to about 60° N., eastwards to Finland and Esthonia, where it is rare, to Russia and Turkestan, southwards in North Italy, and is said to occur in Syria, Egypt and along the North Coast of Africa. In Algeria it seems to be a recent arrival. It may be noted that it was first recorded in England ninety years ago by Stainton (*Zoologist*, 1848, p. 1989), who found it at Lewisham, and some ten years later it was recorded from near London, Guildford and Cambridge. In England we have, so far as we know, only one brood, but in Switzerland and other Continental localities there are two broods, in May-June and July-August (Kennel states April-May and August-October), the larvae of the first brood causing the young attacked fruits to drop off. Although the eggs are usually laid on fruits, they may be deposited on leaves, but only on leaves of branches containing fruits: the larvae, however, can feed on leaves, in the absence of fruits, but such produce unusually small moths. It would be interesting to know whether we really have two broods in England also; it seems possible that the first brood, feeding in the young fruits, has been overlooked.—T. BAINBRIGGE FLETCHER, Rodborough, 10th February 1938.

PTILOPHORA PLUMIGERA IN GLOUCESTERSHIRE.—As I believe that it is unusual for *P. plumigera* to be taken in numbers I should like to record the capture at light on 8th November last, between 8.30 and 11 p.m., of 34 specimens, three of which were females.

There was heavy rain in the early evening but by the time I reached the ground this had been replaced by a damp mist. The road was still wet, with the result that five specimens turned over on their backs and spoiled themselves before they could be boxed. The main flights appeared to be at 8.30 and 10 p.m., all the females appearing in the later flight. Unfortunately, I was unable to reach the spot before 8.30, though I had been a hundred yards away on the previous night between 6.30 and 8 p.m., without seeing a sign of *P. plumigera*, in spite of what seemed even more favourable conditions. Other species noted on these two evenings were:—18 *Poecilocampa populi* (1 ♀), 5 *Brachionycha sphinx* (rather worn), 2 *Erannis (Hybernia) auran-tiaria*, 5 *E. (H.) defoliaria*, 3 *Operophtera (Cheimatobia) brumata*, besides a number of *O. (C.) boreata*, including 12 females found in cōp., *Himera pennaria*, and *Oporinia (Oporabia) dilutata*. On 9th November cold conditions set in and in spite of several later visits only one more *P. plumigera* was seen, about 8.45 p.m. on the 11th. There was a very good growth of Sycamore all around the spot chosen, but I was only able to find one fair-sized Maple tree, and that several hundred yards off in the middle of the wood.

Though South mentions *P. plumigera* as occurring in Gloucestershire and most of the chalk natives are to be found plentifully on the local oolite, I have been unable to find any recent records.

Other species which I have taken recently in this county, and which are, as far as I know, hitherto unrecorded, include:—*Xylophasia*

scolopacina (first taken 24.7.37), *Bomolocha fontis* (24.6.34), *Chesias rufota* (June 1933), and *Zygaena loniceræ* ab. *citrina* = *flava* (July 1929).—AUSTIN RICHARDSON, Beaudesert Park, Minchinhampton, Glos.

ENARMONIA MOLESTA, BUSCK.—Monsieur Paul Bovey has also published a paper, "La Tordeuse orientale du Pêcher (*Laspeyresia molesta*, Busck) nouvel ennemi des cultures fruitières en Suisse" in *Bull. Soc. Sci. Nat. Vaud.*, LX, No. 246, pp. 63-68, 2 figs. (1938), on this Eucosmid, originally a native of Japan, which was introduced into the United States in 1913 and into the Italian Riviera at about the same date. In Italy it has been spreading steadily and was found in France in 1922 and in Southern Switzerland in 1937. It is a serious pest of the Peach where this is grown and will also attack pears, quinces, and apples, and will also mine in the shoots of Almond, Pear, Apple, Cherry and Apricot. As Mr Meyrick has already noted (*Rev. Handb.*, p. 590) this Eucosmid is likely to find its way into England also, so that all information about it is of some interest to us.—T. BAINBRIGGE FLETCHER, Rodborough, 10th February 1938.

SWARMING OF "FROGHOPPERS."—In the *Ent. Record*, Vol. XLVIII, for September 1936, page 100, I wrote a short note on the above subject which brought me a deal of correspondence, none of which, however, answered the query, "Do these insects swarm?" All the insects taken on that occasion were *Philaemus spumarius*. On 27th August 1936, a day similar to that mentioned in my old note, with light west wind and warm sunshine, I had a similar experience at my new abode some 400 ft. above sea level on the Fell side. I went out just before lunch, with my sweep net, along a nearby road with a broad verge of mixed grasses, whin, bramble, etc., on the east side open to the very slight west wind which was blowing.

I came across nothing except an odd beetle or two, and soon gave up and went indoors to lunch. After lunch my old friend Mr James Murray of Gretna came over on a visit and after a rest we took nets and went along the same road. For about 20 yards the whole place was alive with "Froghoppers." Every stroke of the net brought a dozen or more, and we quickly filled what tubes we had. Murray afterwards named these. The dominant species was *Philaenus spumarius* as before, but there were others on this occasion: *Athysamus grisescens*, *Megophthalmus scanicus*, *Oneopsis alni*, *Livia juncorum*, and several others. After Murray had left for his ride home and while the sun was still bright and the breeze the same, I got some fresh tubes and went to get a further supply, but in that short space of time, about two hours, the whole multitude had vanished and neither then nor on any day since, though I tried on several similar days during the following summer, 1937, did I find a single specimen on that ground. Again I ask, "Do Froghoppers swarm?" and when and why! Quien sabe?—T. FRED. MARRINER.

PERSISTENCE OF LIFE.—It is really wonderful what extremes of heat and cold some of the minuter forms of life will survive. During a recent blizzard when outdoor occupations were suspended, I re-read Shackleton's "In the Antarctic," and one passage struck me as worth repeating. It refers to the work of the biologist to the expedition, Mr

James Murray, and reads: "On this day Murray found living microscopical animals on some fungus thawed out from a lump of ice taken from the bottom of one of the lakes. . . . From our point of view, it was humorous to see Murray trying to slay these little animals. He used to thaw them from a block of ice, freeze them up again, and repeat the process several times without causing the rotifers any inconvenience. Then he tested them in brine so strongly saline that it would not freeze at a temperature above 7° F. and still they lived, and a good proportion of them survived a temperature of 200° F. It became a contest between rotifers and scientist, and generally the rotifers seemed to triumph."

Another Mr James Murray, our doyen of Border Entomologists, gave me an instance of the life persistence which came within his own experience. Mr Murray has a wonderful, world-wide collection of mosses, and he tells me that he one day soaked out a moss specimen from the western United States, and found, when he put the plant under his microscope, that there were a number of rotifers scrambling about among the leaves. He says they were not in the water used for soaking as it had been tested, and the specimen had been in his Herbarium for over 20 years. This was not an isolated instance.—T. FRED. MARRINER.

POLYOMMATUS ICARUS LARVAE.—Previous to 1937 I had never seen the larvae of the "Common Blue" butterfly; so towards the end of last May I devoted a Saturday afternoon to searching for them.

I began my search on a grassy bank, which is frequented by a colony of this insect, and where Bird's-foot Trefoil grows in large clumps. For a long time I was unsuccessful, and I was about to give up the search when I spotted a large clump of the food-plant growing quite alone on a patch of bare shale. I rooted up the whole plant and pulled it to pieces on my mackintosh, and examined it minutely, but still without success. I then scraped up the loose surface shale, and I was delighted to find amongst it five *icarus* larvae. Two of these hibernated larvae were almost full grown, but the other three were very tiny. The two large ones fed up and produced, at the end of June, two large females. The three small ones remained unaltered for two weeks, and then turned into three ichneumon cocoons.—T. D. FEARNEHOUGH, 12 Bransby Street, Sheffield, 6.

SOME NOTES ON EREBIA PRONOE, SSP. ALTISSIMA, GOLTZ.—In my *Monograph of the Genus Erebia* I placed the name *altissima*, Goltz as a synonym of the ssp. *tarcenta*, Frhst. (p. 312). This was a mistake due to lack of material, which illustrates yet once again how essential it is to be able to compare specimens from the locality from which a race has been described, with the description, if the true characteristics of the race are to be fully appreciated. Having been unable to obtain specimens from the Glockner district, from which *altissima* was described, I was obliged to depend on the description alone. From this I was to a certain extent misled by Goltz's remarks on the colouring of the underside of the hindwing of the male. These remarks I gave (*l.c.*), pointing out that the brown tone mentioned is often to be seen in the ssp. *tarcenta*. The most characteristic features of *altissima*, its small size and the very narrow though often continuous bands on the upperside of the

forewings, were not sufficiently stressed, and in a general way apply to *tarcenta* also.

Last summer I had the opportunity of taking a few specimens of *altissima* myself, not on the Glockner but just a little further east in that range of mountains. It was at once obvious to me that these specimens could not be included under *tarcenta*, and that Goltz had been fully justified in separating them. As already mentioned, in size *altissima* is a very small race, smaller than *tarcenta*, in some individuals as small as specimens of ssp. *varia* or ssp. *gardeina*. Coupled with this the band of the forewings is extremely narrow, yet sharply defined and often quite continuous. This feature is unmistakable, though a similarly developed band can occur in certain individuals of the ssp. *psathura*; but there is no real resemblance between the two races, the underside of the latter being unapproached by any other race of the species.

The underside of *altissima*, so far as my few specimens go, is very similar in pattern and colouration to typical *pronoë* or *tarcenta*, the bands of the hindwings are strongly shaded with the beautiful violet-blue shade on the silvery areas. These remarks refer to the ♂s only, for unfortunately I did not get any ♀s. From Goltz's remarks, however, it is clear that this colour is variable, and dull specimens are sure to be found if any large number of specimens are available.

I have a single specimen of *altissima* from much farther east in the Styrian Alps, and have seen one or two others from that district. These specimens have often puzzled me. I could not reconcile them with the description of *altissima* nor yet place them to any other race I knew, and they were too few in number for me to determine if they represented yet another race of the species. My few specimens from the Hohe Tauern have cleared up these questions and show that *altissima* is not confined to that range but extends far into the Styrian Alps; most probably it also occurs throughout the Carinthian Alps.

In my notes on the distribution of the typical race of *pronoë* (*l.c.*, p. 311) the references to the Hohe Tauern and Styrian Alps should be struck out, for it seems almost certain that *altissima* replaces the former throughout this region.—B. C. S. WARREN, F.R.E.S.

LARVAL COLORATION OF SPHINX PINASTRI, LINN.—In July last my friend Mr Clifford Craufurd obtained a batch of ova of this moth from a Dorset ♀ which had mated with a Suffolk ♂. He gave me a portion of the batch, and when they hatched, on July 11th, I fed them on the young "needles" of Spruce (*Picea excelsa*, Link). Mr Craufurd fed his larvae on Scots pine (*Pinus sylvestris*, Linn.). After the third moult I also fed my larvae on Scots pine.

My friend's larvae turned brown at the third ecdysis and became a darker tint the day before pupation. All my larvae remained emerald green with white markings (almost reticulations) throughout their careers, the only brown thing about them being the dorsal stripe. They entered the pupating soil in this same brightly hued coat.

Mr Craufurd's larvae were sleeved on the west side of a small tree. Mine were kept in a glass-fronted larva cage which faced west and never received any sun. Is the difference in coloration to be attributed to sunshine, or is more Vitamin A (β -carotene viâ flavone) present in the young leaves of Spruce than in Scots pine? Or what other reason can your readers advance?—P. B. M. ALLAN.

SOME INTERESTING OBSERVATIONS ON ANTS' NESTS IN THE BATH (N. SOMERSET) DISTRICT.—Two years ago, while staying near Bath, I spent much time studying the local ant fauna. This fauna can be divided, as is usually the case with ant faunas, into two distinct groups. The woodland group was similar to most of its type, consisting of *Formica rufa*, L., and a few colonies of *Acanthomyops* (*Dendrolasius*) *fuliginosus*, Latr. The second group, that of the open field, or rather hillside, was much more interesting. This fauna was represented by most of the Bristol species of the genera *Myrmica*, Latr. and *Acanthomyops*, Myr. It was not, however, the fauna itself that interested me most, but rather the fact that one could by merely glancing at the stones on any part of the hillside, say what ants were likely to be found under certain types of stones.

(1) Species of the genus *Myrmica*, Latr., under very thick (about 5 in.) rather diamond-shaped stones. These stones were usually about 8 in. long by 8 in. wide (at their widest point).

(2) The species *Acanthomyops* (*Cthenolasius*) *flavus*, F. and A. (*C.*) *mixtus*, Nyl. under large thin (about 1 in. thick) stone.

(3) Lastly the species *Acanthomyops* (*Donisthropea*) *niger*, L. under a small thin stone.

There seemed to be an abundance of approximately diamond-shaped, very thick, small stones, in the district, and there certainly was an abundance of the genus *Myrmica*, Latr.

I suggest that the reason for the apparent preference of ants of the genus *Myrmica*, Latr. for the small thick stones, is that they seem to be less affected, than other Bristol ants, by the cold (they may be found out on fairly sunny days early in January), probably owing to their chitinous armour being thickest. Besides not being affected by the cold, these ants do not have the affection, that other British ants do, for the sun. This would explain the preference for this type of stone, which presents a small area to the sun, but a large area to the cooling winds.—B. D. W. MORLEY, Bournemouth.

AEROPUS SIBIRICUS, L., IN ENGLAND.—This species was omitted from my recent little book on British grasshoppers because I could not believe that an alpine species could ever have been taken at Netley, or that so distinctive an insect could have been overlooked for a century. I had, in fact, so completely wiped the old record out of my mind that I had completely forgotten that I had ever included it in my first book on the subject, published in 1897.

It was M. Chopard who called my attention to the omission, and asked if I had any further evidence. So I wrote and asked Dr Hobby if the original specimen were still in the Hope Museum, to which he replied very promptly that it bears a MS. label: "Stephens type unique British specimen. Hills nr. Netley. An Alpine insect. prob. imported. M.B. 30.iv.97," in my own handwriting!

There is no question about the identity of the specimen, as there is no other grasshopper which has the fore tibiae dilated into great pear-shaped globes. I believe it seldom occurs in Europe at altitudes much less than 3000 feet, and its occurrence at Netley in Hampshire may be dismissed, I think, from possibility. Nor do I now think it in the remotest degree likely that an insect of its habits would be imported.

Dr Hobby suggests it may be from Netley in Shropshire, and this is within the bounds of possibility. There can be no question about the authenticity of the specimen, as it is alluded to by Stephens in *Ill. Brit. Ent. Mand.* VI, 32, as "This singular insect is in Mr Hope's rich collection; taken in the hills near Netley," with a cross-reference to his *Syst. Cat. Brit. Ins.*, 1829, No. 3343. "*Sibericus?* in Mus. D. Hope."

The explanation that it has not been reported since may lie in the fact that, so far as I am aware, no Orthoptera at all have been reported from Shropshire since Stephens wrote. It is a little surprising, though, that so distinctive a creature should not have been turned up in some of our northern hills.

It is a dull greenish brown grasshopper, with clubbed antennae, on which account it was formerly ranged in *Gomphocerus*, and the entirely distinctive feature in the male referred to above, that the fore tibiae are dilated into great pears. It is found in short grass at high altitudes.

Please, will someone go to the "hills near Netley" in August and have a good hunt for it? And I hope all collectors on high ground in the north in the later summer will also keep a sharp eye open for it.—MALCOLM BURR.

CURRENT NOTES.

A continuous article is running through the *Ent. Rund.* written by several authors dealing with the Lepidopterous Fauna of Inner Anatolia, and another such article giving an account of the Lepidopterous Fauna of Sta. Catharina, S. Brazil; this by the well-known entomologist, Herr Fritz Hoffmann.

The Annual Meeting, the "Verrall Supper," took place on 18th January, and as is usual was a most pleasing and successful gathering of old friends with many younger additions to the ranks. We hear that over one hundred and seventy were present.

It is with regret that we have received the news of the death of Major Austen, who for some few years was the chief of the Department of Entomology in the British Museum (Nat. Hist.). His study was Diptera; he was not a Fellow of the Entomological Society and was little known among entomologists generally.

The *Annales Entomologici Fennici* have now reached the conclusion of the third annual volume, and appears to be well produced. Naturally the matter contained in it deals with those Orders from which insect pests of forests and marshes come, and but little with the Lepidoptera of Finland and Scandinavian regions. The illustrations are adequate and the matter well displayed, and when in Finnish generally with a summary in German. We note one article in English, "Anomalous Mayfly Individuals."

L'Amateur de Papillons for November-December has articles on the *Agrotinae* (Noctuae); the summer form *florii* of *Hylophila prasinana* and the conclusion of the notes on the "emigrant" movements of insects by our colleague, Mr T. Bainbrigge Fletcher.

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.

Reprints of articles may be obtained by authors at very reasonable cost if
ordered at the time of sending in MS.

Articles that require ILLUSTRATIONS are inserted on condition that the AUTHOR
defrays the cost of the illustrations.

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

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.

Duplicates.—Numerous, Ova, Larvae, Pupae, and Imagines.—H. W. Head, Burnis-
ton, Scarborough.

Desiderata.—Certain common Bombyces from Scotland, Ireland and Cornwall.
Sanio, Rubi, Trifolii, Potatoria, etc., during the year.

Duplicates.—Numerous. Please send list.—B. W. Adkin, Highfield, Pembury,
Kent.

Desiderata.—Exotic Lepidoptera in papers.

Duplicates.—Exotic Lepidoptera in papers.—Capt. J. C. Woodward, R.N., The
Red House, Borden, Tonbridge, Kent.

CHANGE OF ADDRESS :

Harold B. Williams, Esq., LL.D., F.R.E.S., to:—Croft Point, Bramley, Surrey.

Wm. Fassnidge, M.A., F.R.E.S., to 4 Bassett Crescent, W. Southampton.

Orazio Quercl, Via Settembre 28, Formia (Littoria), Italy.

MEETINGS OF SOCIETIES.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—41 Queen's Gate,
South Kensington, S.W.7, 8 p.m. April 6th, May 4th, June 1st.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY
SOCIETY.—Hibernia Chambers, London Bridge. Second and Fourth Thursdays
in the month, at 7 p.m. March 24th, April 14th, 28th.—Hon. Secretary, S. N. A.
Jacobs, "Ditchling," Hayes Lane, Bromley, Kent.

THE LONDON NATURAL HISTORY SOCIETY.—Meetings first four Tuesdays
in the month at 6.30 p.m., at the London School of Hygiene and Tropical Medi-
cine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket which may
be obtained through Members, or from the 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, 7.45 p.m., at 55 Newhall Street, Birmingham. Visitors welcomed. Those
who would like to attend or exhibit please apply to—P. Siviter Smith, Peb-
worth, Stratford-on-Avon.

SPECIAL NOTICE.

REDUCTION IN PRICE OF BACK VOLUMES.

To commemorate the 50th volume of the magazine it has been decided, during the year 1938, to reduce the price of back volumes of the New Series (Vol. 37, 1925—Vol. 49, 1937) from 12/6 to 7/6 per volume. To be obtained, post free, from the Hon. Treasurer, 6 Footscray Road, Eltham, London, S.E.9. This offer is made to subscribers only.

Communications have been received from or have been promised by Capt. K. J. Hayward, (the late) Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, T. Bainbrigge-Fletcher, Dr Malcolm Burr, L. T. Ford, Wm. Fassnidge, Dr Verity, O. Querci, Rev. G. Wheeler, Dr E. A. Cockayne, W. Parkinson Curtis, Dr H. B. Williams, Dr H. G. Harris (plate), B. D. W. Morley, P. B. M. Allan, H. W. Andrews, E. E. Green, H. Donisthorpe, Brig.-Gen. B. H. H. Cooke, A. J. C. Wightman, K. H. Chapman, and Reports of Societies.

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

IMPORTANT TO ENTOMOLOGICAL SOCIETIES AND MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation

(Vols. I-XXXVI.)

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED with the assistance of

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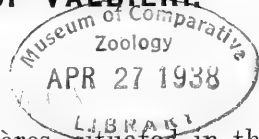
SESTRIERES.
BATHS OF VALDIERI.

SESTRIERES, CLAVIERES AND BATHS OF VALDIERI.

(Plate I.)

13,820

By H. G. HARRIS, M.D.



On 25th July 1937 I started to collect at Sestrières, situated in the Cottian Alps Piedmont, accompanied by my son, Mr J. H. Harris, who is responsible for the photographs and was also instrumental in taking such swift flying insects as *Colias palaeno* and numerous others.

Sestrières, which is 6500 ft. above sea-level, is reached by motor 'bus from Oulx, and the journey is just 24 hours from London. We stayed at the "Albergo Duchi d'Aosta," one of the two tower-shaped hotels which are peculiar to the district. It was my second visit, having stopped there in 1934.

The first mention I can find of Sestrières is that by Dr Verity, *E.R.*, Vol. XXXVIII, where he describes it as "a barren pass covered by a peat bog swept by winds or wrapped in clouds alternately, so that species are scarce and confined to little gullies where they seek shelter." I was lucky, therefore, on my two visits in 1934 and 1937 to find weather conditions very different on the whole from those described by Dr Verity.

In 1934 butterflies were swarming, but in 1937—what a difference—the weather was good and I was assured that the summer had been an excellent one, so it was difficult to account for the paucity of species, but most entomologists had the same tale to tell whether at home or abroad this year. To Dr Higgins, *Entomologist*, Vol. LXIII, we owe the first comprehensive account of this interesting locality. He spent, however, only two days here, but nevertheless took 71 species at the beginning and end of July.

One must also refer to a one day visit by the late Rev. E. Ashby in July 1933, *E.R.*, Vol. XLVI, page 106.

SESTRIERES has greatly altered in the last ten years, as it has been "discovered" as a winter sports resort. Three hotels have been built and a fourth tower-shaped building of 800 rooms is in course of erection, but in summer it is almost deserted. Entomologists must also regret the curtailment and draining of the peat bog for the sake of golf links, but there is plenty of good collecting ground left.

Above and to the south of the golf links is a plateau running from east to west, fringed with fir trees. The ground rising abruptly and culminating in Monte Alpette, 7470 ft., and Monte Sises, 8500 ft., both easily reached by cable ways. There is another cable way to Monte Banchetta, 8530 ft.; on the only occasion I made an ascent it was a cold and wet morning with few flowers and poor vegetation with little indication of insect life.

Very different was the scene on leaving the aerial car on M. Alpette; here was a natural basin formed amongst the hills with literally a mass of flowers of every conceivable hue on a background of vivid green. A walk of about three miles brought us back over steep undulating ground to the western end of the peat bog.

Colias phicomone race *pulverulenta*, Verity, was just emerging in numbers, as I saw some *in cōp*, and it was interesting to note, as Wheeler does in *Butterflies of Switzerland*, that at this height, 7500 ft., *C. phicomone* flies at a greater elevation than *C. palaeno*, and also

descends to a lower level than the latter—in fact *C. palaeno* was found at 6500 ft. The males were very difficult to catch but I was fortunate in finding one white and one yellow female.

Colias croceus had evidently not yet emerged, and only one *Aporia crataegi* was netted, probably its emergence was over.

On a hillside near the "Hotel Principi di Piemonte" and nowhere else I found a colony of *Thymelicus lineola*, small and closely allied to *T. ludoviciae*, but without the typical black markings of that species. I am inclined to think that this has never been described and may be a sub-species of *lineola* (size 22 mm.).

My son here netted a well-marked specimen of *Vanessa urticae*, to which Dr Verity has given the name of *opima*.

Dr Higgins discovered here *Erebia aethiopellus*, Hoffmsg., in numbers, and I naturally hoped to do the same but was only rewarded by four specimens in two years.

Dr Higgins gave an excellent description of this species in the paper mentioned above. He separates *E. aethiopellus* from *E. gorgophone*, Bell., the Barcellonette form; suffice here to say that *aethiopellus* is sprinkled with white atoms over the under surface of the hind-wings. Sestrières is probably the most northerly locality (Warren).

Other *Erebiae* taken were:—*E. melampus*; *E. neoridas*; *E. euryale*; *E. epiphron*, race *cydamus*, and *E. tyndarus*, race *subcassioides*, Verity.

Chrysophanus virgaureae, race *delicata*, Higgins, was common in 1934, but completely absent in 1937. In size the male is 34 mm. in expansion compared with 31 mm. for the Zermatt race and 38 mm. for the Valdieri one.

C. hippothoë was also absent this year. *B. pales*, subsp. *palustris*, abundant in 1934, but only just emerging in 1937.

Plebejus aegon, a small race, and one very blue female of *P. escheri*, ssp. *subappennina*, Turati, were captured.

Parnassius phoebus (*delius*) and *P. apollo* were also in evidence.

Mr Ashby gave a list of captures in *E.R.*, XLVI, so I will not give another list but will only note that he did not mention—*A. crataegi*, *V. urticae*, *L. coridon* or *E. aethiopellus*.

CLAVIERES, 5801 ft. This district can be reached easily in a 'bus from Sestrières in about one hour, so we paid it a hurried visit. I was much impressed by the possibilities of the terrain. There seem to be two routes to follow, either along the edge of the river towards the golf links, which Mr Ashby described and gave a list of captures, *E.R.*, XLVI—or else to cross the river and walk up the hillside through a forest. This latter route we followed. Insects which had not emerged at Sestrières were beginning to do so here, such as *C. virgaureae* and *Melitaea dictynna*. A few more of the small *lineola* skippers were found imbibing moisture and two females of *E. tyndarus*, ssp. *subcassioides* with pale grey undersides, one 44 mm., a large specimen; they look different from the other more numerous ones but Mr Warren refers them to the same subspecies. *Erebia goante* and *E. euryale* were also emerging.

Cameras are "verboten" in these places as one is quite close to the frontier, in fact we had a few words with two gendarmes, but the inspection of our *Erebias* removed their doubts.

On 31st July we left Sestrières for the Baths of Valdieri.

THE BATHS OF VALDIERI. The Baths of Valdieri, 4425 ft., are reached from Cuneo by motor 'bus; the journey taking 1½ hours. They are situated in the Alpes Maritimes in a rocky defile through which flows the river Gesso. The "Hydro," which is a large and commodious building, is almost the only habitation to be seen. There is no attempt at cultivation, as the land is precipitous and covered with boulders, neither are there sheep or goats to devour the herbage. I only discovered Valdieri by chance from perusing Baedeker, as it seemed the next most likely locality after being prevented from stopping at Certosa di Pesio, where Norris in 1892 (vide *Entomologist*, Vol. xxv) made his headquarters for the summer. Only later did the scattered articles by Dr Verity in the *Entomologist's Record* come to my notice. Mr H. Ashby also paid it a visit in 1931.

The aspect of the country is wild and precipitous with rough paths—especially towards the French frontier, where St Martin Vésubie could be reached in about five hours on foot.

Towards the South a rough military road with hairpin bends leads to Vallasco, height over 5000 ft., where there is an extensive peat bog surrounded by mountains. Here I found females of *Erebia tyndarus* flying, with much larger ocelli than usual on the front wing belonging to the race *subcassioides*, Verity.

On the peat bog was also flying *E. epiphron* race *cydamus*, Frust., some expanding to 42 mm., and on the hills above, *E. alberganus* (*E. ceto*), with *E. euryale* and a few *E. ligea*. On leaving the peat bog, which was surprisingly very unproductive, we came across an *Erebia* flitting from rock to rock and which gave considerable trouble to capture; it turned out to be *E. goante*.

About a mile from the "Hydro" we found *C. virgaureae*, a large race in good numbers, the males expanding to 38 mm. The females were a much finer race than the Swiss one.

C. alciphron r. *ultra-gordius*, Verity was in evidence, one being a very melanic specimen.

P. apollo was in fair numbers, but does not seem to differ from the Swiss race.

I again found more specimens of *lineola* of a small size, 24 mm., scattered about, but not abundant.

Around the sulphur springs, which seemed an attraction to many insects, were many *Pieris napi* ab. *napaeae*, a large form, some expanding to 58 mm., with the undersides of the lower wings a light primrose hue with very poor black striations.

The following, which were common in 1933, were this year almost absent, viz.:—*Brenthis daphne*, *Satyrus cordula* and *Argynnis paphia*. Not a single *Syntomis phegea* was apparent, and the "Hydro" corridor, which in 1933 was full of moths resting on the walls, was this year devoid of any.

The Hesperids, *alveus*, *alcaeae*, *carthami* and *cacaliae* were met with.

I append a list of the species not mentioned above, making in all 60 species caught or observed during the two years.

H. althaeae, Hb.; *P. sylvanus*, Esp.; *P. comma*, L.; *C. dorilis*, Hufn.; *C. minima*, Sch.; *P. donzelii*, Bsd.; *P. damon*, Schiff.; *P.*

icarus, Hb.; *P. eros*, Ochs.; *P. machaon*, L.; *P. brassicae*, L.; *P. rapae*, L.; *P. daphidice*, L.; *L. sinapis*, L.; *C. hyale*, L.; *A. aglaia*, L.; *A. niobe*, L.; *I. lathonia*, L.; *B. amathusia*, Esp.; *M. athalia*, Rott.; *P. cardui*, L.; *P. atalanta*, L.; *E. antiopa*, L.; *V. io*, L.; *P. c-album*, L.; *L. rivularis (camilla)*, Schiff.; *P. maera*, L.; *E. jurtina*, L.; *E. lycaon*, Rott.; *C. iphis*, Schiff.; *C. arcania*, L.; *C. pamphilus*, L.; *E. pharte*, Hb.; *E. meolans*, de Prunner (*stygne*, Ochs.); *M. galathea*, var. *procida*, Hbst.; *G. rhamni*, L.

ECTOBIUS LIVIDUS, FABR. IN NORFOLK.

By K. H. CHAPMAN, B.A., F.R.E.S.

A male nymph apparently belonging to this species was sent to the British Museum by Mr E. A. Ellis, Hon. Assistant Secretary of the Norfolk and Norwich Naturalists' Society, on 31st January 1938. Mr Ellis stated that it was captured by Capt. M. J. D. Cockle, on a marsh at "Wheatfen," Norfolk, on 21st December 1937, and that he could not identify it from Lucas' or Burr's works on British Orthoptera. The specimen thus came into my hands.

It was obviously an *Ectobius* nymph, and equally obviously not *E. panzeri*, Steph., and I at first thought it was *E. lividus*, Fabr. This made the record interesting at once, because Burr (*British Grasshoppers and their Allies*, 1936, pp. 44-45) says "Neither *E. lapponicus* nor *E. lividus* have been recorded, so far as I know, north of the Thames," and presumably the specimen taken by Capt. Cockle belonged to one of these two species, since it was too large to be *E. panzeri*, Steph., the only other British species. Unfortunately, we have in the British Museum only one nymph of *E. lividus*, Fabr., from Guernsey, and comparison of the Norfolk specimen with this and with nymphs of *E. lapponicus*, L., did not seem to help very much, because in all our nymph material of both species, there are numerous dark reddish spots on the dorsal surface of the thorax, more so than in the Norfolk specimen, and at the same time the latter has well defined *median* dark markings on the thorax above, which are not present in any of our nymphs, and further dark markings on the sides of the dorsal surface of the abdomen, which, so far as the British Museum material is concerned, are only present on one nymph of *E. panzeri*, Steph. Dr Blair tells me that he also has never seen a nymph of any of the British species of *Ectobius* with similar median markings on the thorax.

On the whole, however, I was inclined to think that the specimen was a nymph of *E. lividus* as I had thought at first. I asked Dr Hanitsch's opinion, and he replied "I see no reason why this cockroach should not be the nymph of *Ectobius lividus*, Fabr., ♂, though it is certainly not 'entirely fulvous above and beneath' as Malcolm Burr says (*Brit. Grasshoppers*, etc., p. 42). Besides Shelford's extensive collection, we have Lucas's here (Oxford), about 50 examples of each of the three British species, and quite a number of the *lividus*, especially also of the nymphs, have the disk of the pronotum speckled like the present specimen. The occurrence so far north is most remarkable. All our material here is from the South of England and the Continent."

The farthest north record of *E. lividus* given in Burr's "distribution map" is Glamorganshire, and as the species has been found no farther north in eastern England than Middlesex, Kent and Surrey, this record for Norfolk gives a (possibly temporary) discontinuous distribution for *E. lividus* in England. It would certainly be worth searching for the species in the intervening counties of Essex and Suffolk.

Mr Ellis has very kindly presented the nymph in question to the British Museum, and Capt. Cockle has kindly offered to look out for the adult of this *Ectobius* at Wheatfen.

With regard to the occurrence of *E. panzeri*, Steph., which Burr does not record on his map north of Suffolk, Mr Ellis tells me "*Ectobius panzeri*, Steph., is represented by two Norfolk specimens in this museum (The Castle Museum, Norwich). They are in James Edwards' collection, labelled 'Norfolk, Thouless' (H. J. Thouless). In the *Victoria History of Norfolk*, 1900, p. 91, Edwards includes *E. panzeri*, but gives no specific locality. Burr seems to have overlooked this record when preparing his distribution map."

This nymph from Norfolk had apparently very recently undergone ecdysis, when captured by Capt. Cockle, and one must take into consideration the effect of the gradual darkening of the integument subsequent to this, which may quite possibly give the insect an appearance of abnormal marking, if the darkening "spreads outwards" from various points, as often occurs. This is a further reason why more specimens from Norfolk are awaited with much interest, and I wish to express my thanks to Mr Ellis and Capt. Cockle for bringing the specimen to my notice.

THE NOTORIOUS CASE OF LADY GLANVILLE.

Lady Glanville is immortalised not only in association with *Melitaea cinxia*, but also in the story recorded by Moses Harris in the *Aurelian*, which most entomologists know from the allusion in Coleman's *British Butterflies* and in Dr Eltringham's classic address to the Royal Entomological Society.

The point is that some relatives of the lady brought an action at law to set aside her will on the ground that her interest in butterflies was evidence of a disordered mind. The instinctive reply is that a failure to show an interest in butterflies is rather evidence of a disordered mind.

The case was heard at Exeter, but I have been told that no records survive, which is a pity, as it would have been most interesting to read the evidence and speeches of counsel. Other relatives and some legatees under the will called the strongest possible evidence available in the country at the time, Hans Sloane and John Ray. The last gentleman went to Exeter, and satisfied the judge and jury of the lady's "laudable inquiry into the wonderful works of the Creation and established her will."

Harris, who wrote about 1766, alludes to Sir Hans Sloane, but Mr Bainbrigge Fletcher informs me that he was not knighted until 1716.

Ray died in 1705, and, I believe, spent the last fifteen years of his life as an invalid in his native village of Braintree, so presumably the case was heard before 1690.

Anxious to find more about Lady Glanville and the case, I put an inquiry in *Notes and Queries*, and am much obliged to the several gentlemen who were kind enough to come forward with some information. The most interesting is the suggestion over the initials R.S.B. in the issue of 2nd October 1937. He suggests that, as the trial was at Exeter, the Devonshire family of Glanville, and the only lady who seems to fit the case is Winifred, née Bouchier, who married Sir John Glanville of Broad Hinton. Sir John, who was Speaker of the House of Commons, died in 1661, and his widow may well have survived him until about 1690. Presumably the lady's interest was stimulated by Mouffet's work, which appeared in 1634. If anyone can add to this information, I shall be grateful.—MALCOLM BURR.

[Since writing the above, I find that Lady Glanville was the daughter of William Bouchier of Barnsley, Glos. She died at Broad Hinton, her husband's home, leaving seven children. Sir John Glanville, referred to in the D.N.B. as Sir John Glanville the younger, was born in 1586. He owned extensive estates.—M.B.]

SCIENTIFIC NOTES.

HYBRID TAENIOCAMPIDS.—The successful breeding of both sexes of the hybrid *Taeniocampa stabilis* ♂ × *T. opima* ♀ is recorded by P. Reckenthäler in the *Ent. Zeitschr.*, 1938, 51, 414. Most of the larvae were pale green, but some were grey-green, reddish green, or rose coloured, taking after *opima*. All the imagines had the blue-grey tint of *opima*, but in other respects the males were more like *stabilis* and the females were more like *opima*.—E. A. COCKAYNE.

INFLUENCE OF REFLECTED RADIATIONS ON INSECTS.—*Trials with Pieris brassicae*.—The experiments on the Sibyllini Mountains, that I related in this magazine (XLIX, p. 113, 1937) were carried out in early August but with some mature larvae. Afterwards the weather was bad for several days, but as soon as the sun shone again, from 22nd to 28th August 1937, we made other trials with caterpillars of different sizes. They were shut into two boxes of white paper together with some leaves of cabbage. One of those boxes was set upon a small bush growing among a plot of weeds near a verdant slope; the other was put on an arid place at the base of a dead tree.

During our trials the temperature in the shade varied from 18° to 23° Centigrade (64-73° F.), while its fluctuations in the sun were sometimes considerable. When the sky was clear the thermometer rose up to 40-50° (104-122°), but, if clouds intercepted the sun, the temperature dropped suddenly lower.

When sunshine continued sufficiently long, both the soil and the trunk of the tree became hot, reflecting solar rays above the box set in the bare place, and the larvae died in less than two hours.

In the verdant slope the temperature in the shade was the same as everywhere in the open at the same time; however, a thermometer in the sun, set upon the bush, marked less than another leant against

the old tree. Some days all the caterpillars within the box remained active after two hours in the rays of the sun, other days both the smallest and moulting larvae were caught by stupor, while the others continued feeding. Seldom did a few larvae die; often some mature caterpillars hung up in the box.

During the day the atmosphere was very clear, and the thermometers rose up to about 50° (122°), but the wind was always so strong that we were obliged to fix the boxes by strings. In spite of the high temperature of the solar rays and dryness of the air, both the barren ground and dead trunk of the tree did not get warm. The caterpillars within the two boxes were not injured after an exposure for three hours in the sunshine.

ORAZIO QUERCI.

COLLECTING NOTES.

MYOPITES BLOTII,⁸ BREB. AND OTHER TRYPETIDS IN THE ISLE OF WIGHT.

—During a short visit to the Isle of Wight from 28th July to 1st August 1937 I had the good fortune to sweep a short series of this rare Trypetid fly in a field near Yarmouth. I thought at first I had got *M. frauenfeldi*, Schm., but there were no host plants (*Inula crithmoides*) of that species to be seen in the neighbourhood, whereas there was a lot of flea-bane (*Pulicaria dysenterica*), given as a host plant of *blotii*. This fly has a close superficial resemblance to *frauenfeldi*, but the arrangement of the wing shading is seen to differ when the two species are examined together. Mr Collin, who kindly confirmed the identification, suggests that the two may prove to be biological races of one species. He tells me he is unaware of any other British localities for *blotii*, the one specimen in his collection having been bought long ago at Stevens and having an abbreviated label which cannot be definitely placed. *M. blotii* was also taken by Mr J. W. Saunt at Whippingham last summer, so the species seems established on the Island, both his captures and mine were in what may be termed "estuarine" localities.

The field at Yarmouth in which I took this species also produced *Oxyphora flava*, Geoffr. (= *miliaria*, Schrnk.): *Oxyna proboscidea*, Desv.: *Tephritis vespertina*, Law.: *Trypeta tussilaginis*, F.: *Euribia quadrifasciata*, Mg.: *E. jaceana*, Hering: *Ictericica westermanni*, Mg.: and *Sphenella marginata*, Fln. A visit to Freshwater gave me *Trypeta colon*, Mg.: *T. cornuta*, Mg. and *T. jaceae*, Desv.: whilst *Trypeta vectensis*, Collin was taken at Cranmore Heath.

On revisiting the Yarmouth locality in February of this year I collected a number of galled seed heads of *P. dysenterica* from which I hope to obtain more *blotii* this summer.—H. W. ANDREWS.

EARLY APPEARANCES.—*Monima stabilis* turned up at sugar on 12th March at Rodborough and *Brephos parthenias* was on the wing in numbers at Longhope, Forest of Dean, on 13th March. Both these dates are about a fortnight earlier than usual.—T. BAINBRIGGE FLETCHER, 13th March 1938.

SOME HIBERNATING INSECTS OUT IN JANUARY.—The mild weather in the early part of January enticed out several hibernating insects. In

the first week of the month I found in my study a lacewing which Mr Killington informs me is *Chrysopa carnea*, Steph., the only species known to hibernate in Britain, a savage mosquito which Dr Edwards tells me is *Theoboldia annulata*, and a small bug, possibly a Capsid.—M. BURR, Dorney.

CASSIDA VITTATA, VILL. INLAND, ETC.—I was much interested in Mr Buck's note on this beetle (antea, p. 237). There is no doubt that *Cassida vittata* is much more generally found at the sea-side, feeding on salt-marsh plants; but it is occasionally found inland, as in this case. I also have taken it far from the coast, in flood refuse in a willow swamp, Windsor Forest, on 20th December 1929; and the other inland records are probably correct.

Dictyopterus affinis, Payk., at Box Hill, is far more remarkable and is by far the most southern record for this beautiful beetle. It occurs in Scotland and Ireland, and was found at Doncaster by Corbett. Sherwood Forest was its most southern locality in Britain, where it was discovered by the Rev. A. Matthews and his brother. I retook it there in plenty on 11th July 1908.—HORACE DONISTHORPE.

EARLY DATES OF LEPIDOPTERA FROM GLOUCESTERSHIRE.—On all hands one hears of early appearance. Here are a few captures to swell the List. *Phlogophora (Hadena) meticulosa*, 21.III.38; *Chesias rufata*, 23.III.38; *Drymonia chaonia*, 30.III.38; *Polyploca ridens*, 30.III.38; *Ectropis consonaria*, 30.III.38.—A. RICHARDSON, Minchinhampton, Glos.

A NOTE FROM ECUADOR.—My correspondent, Mr William Clarke MacIntyre, who has been collecting natural history material in Ecuador for some years, has sent me the following note:—" *Morpho sulskowskyi* subsp. *sirene*, Niep. is doomed to become extinct in a couple of years, if not this spring. It was always very local, as you know, and now the natives have cut down all the woods where it formerly lived, and burned off all the food-plant. In these burnings, of course, they have destroyed all the larvae and pupae. I very much doubt if any will be found this May. The same will soon happen to the local variety of *Thecla coronata*. The natives are cutting down all the trees where they formerly bred. I wonder if something like that happened to *Adelpha ethelda*?"—HY. J. T.

A PECULIAR NEST OF TAPINOMA ERRATICUM, LATR. (HYM. FORMICIDAE).—I have lately been going through the notes of my observations on ants' nests, made at various times during the last three years. Whilst doing so I came across an extremely interesting note concerning a nest of *Tapinoma erraticum*, Latr., which I found on Silchester Common (Berks.) last year. The secondary nest, or solarium, which was constructed of dead petals, etc., of gorse and heather, interwoven with like material, was built around two branches of a gorse bush, at their point of division. It was cigar-shaped, being 6 in. long by about 2 in. in diameter.

Now, and this is the extraordinary thing, *T. erraticum* usually constructs its "nest proper" in the ground, having, like *Formica rufa*, L., a solarium, or secondary nest, immediately above it. In this case, however, the solarium was some three feet away from the "nest proper," in the branches of a gorse bush. The reason for this is, I suggest, that

had the solarium been situated on the ground it would have had much less sunlight, whilst, situated as it was, it experienced, whilst still being sheltered by the rest of the gorse bush, the maximum amount of sunlight, thus fulfilling its purpose as a solarium. I can find no record of a similar case, though *T. erraticum* is known, on the Continent, to construct its nest in many different ways.—B. D. W. MORLEY, Bournemouth.

EARLY APPEARANCES AROUND TORQUAY.—I took a freshly emerged *Orthonama (Percnoptera) obstipata (fluviala)* at light on 22nd March. It was an absolutely perfect female. The weather for the previous 48 hours had been warm with a light S.E. wind. I am anxiously waiting to know if she is fertile. The season is all wrong; this evening, 24th, I took *Selenia tetralunaria*, which I have never seen before April, and on the 25th I saw *Pararge aegeria*, which I presume is early, although I see South quotes Barrett as giving the third week in March in 1863.—(CAPT.) G. Q. PARSONS. (The obstipate died with laying.—C.Q.P.)

DEMETRIAS IMPERIALIS.—I have recently taken six and observed four others (unfortunately blown away by the wind before I could capture) on the Gravesend Marshes of this very local beetle. In every case they were found on the inside of the lower leaf or sheath of *Typha latifolia*, which had been cut some weeks before and were lying in heaps on the bank by the side of a ditch.—F. T. GRANT, 37 Old Road West, Gravesend.

[Nicholson took it in the Cliffe Marshes, near Gravesend, and I took it in the Gravesend Marshes, 1910. It shows it is still there.—H.J.D.]

CURRENT NOTES.

The general question of Nomenclature has now been put from various points of view and the Editors are of opinion that more space cannot be spared for further discussion. One of our colleagues writes: "Quot homines tot sententiae." These notes have served to reveal the many differing views on the subject of Nomenclature.

May the request for information concerning the distribution of *H. dipsacea* be repeated; so few have replied to the query.

We have just received with regret the announcement of the death of the great Prof. Dr Adalbert Seitz on 5th March, at the age of 78. The compiler of the great work on Lepidoptera which bears his name, he has been able with the specialists he gathered around him to advance and spread the knowledge of the Order to an extraordinary degree. Personally we began subscribing for the work at its commencement in 1906 and have found it a continued source not only of pleasure but of interest and reference. No one, who studies the Macro-Lepidoptera, can do ought without the assistance of these volumes.

The *Mitt. der Münch. Ent. Gesell.* for 1937 contains a "Contribution to our knowledge of the *Zygaena* of S.E. Europe;" "The Biology of *Erebia flavofasciata*," with 2 plates; "Notes on Persian *Lycaenidae*;" "A Contribution to our Knowledge of the Macro-Lepidoptera of S.W. Arabia," with one plate and text-figures; An article on the *Lycaenidae* of the Hindukoosh with 2 plates, etc. These and other items help to form a very useful and important issue.

The *Minen-Herbarium* arranged and brought out by our subscriber, Dr Martin Hering, Berlin, has been increased by the issue of a further 20 sheets, making 440 sheets in all, up to the present. There are now, we are told, 3 further parts to be issued, that is 60 sheets more, to complete the work. This handy Herbarium has been arranged by Dr Hering during the course of his field work in the observation of the leaf-miners in the four Orders—Lepidoptera, Diptera, Hymenoptera, and Coleoptera. It is rarely that one meets with an author who is not only an excellent exponent of his subject, but one of first rate ability in obtaining and preparing his own material in the field.

Dr Hering of Berlin University has now completed his important work, *Die Blatt-Minen Mittel-und Nord-Europas*, including Britain, with the issue of part VI. This is a fine achievement and a most useful book of reference on quite a new line of study. The Orders of Insects concerned are the Lepidoptera, Diptera, Hymenoptera, and a few Coleoptera. The present part contains details of the new species and facts which have come to hand during the progress of the work (September 1935–November 1937) in about 30 pp., a few corrections of errors and the necessary indexes. The whole work now comprises about 650 pp. with 7 plates and 500 text figures and should form an item in the library of all micro-entomologists. We congratulate the author on his work.

Can anyone tell me in what publication, or book, etc., I can find a photograph, or an engraving, etc., of:—Charles Janet, 1849–1932; Gustave Mayr, 1830–1908; Arnold Foerster, 1810–1884. European publications please copy.—HORACE DONISTHORPE.

The Society for British Entomology announce that they have accepted an invitation from the Bournemouth Natural Science Society to hold the 1938 Congress in Bournemouth. The dates selected are the Whitsun week-end, 3rd–7th June 1938, and a cordial invitation to attend the Congress is extended to all persons of either sex who are interested in any aspect of British Entomology.

TUTT'S PTEROPHORINA OF BRITAIN.—This was published in book form in November 1895, but most of it was first issued in *The Young Naturalist* (X, vii, 1889—III, ix, 1890) and in *The British Naturalist* (I, ii, 1891—III, xii, 1893, and (new series), I, i–iii, 1894), this portion going up to the end of his account of *A. tetradactyla* (p. 142 of the book). It was also issued in seven sixpenny parts in 1891–(?) 1895. Does any of our readers possess or know of a copy of this work in these parts or can anyone tell me the contents and dates of these parts? Any information will be welcome, as it is a question of correct quotation of these references.—T. BAINBRIGGE FLETCHER.

Lambillionea (Belgium) for January contains very interesting and useful matter for British entomologists. The monthly photographic plate consists of eleven figures all of species found in Britain. *Drepana falcataria*, the spring form and the summer generation *tenuistrigaria*; *D. lacertinaria*, the spring form, both ♂ and ♀ which differ, ♂ f. *scincula* and ♀ f. typical, and the summer form *erosula*; *D. binaria*, the spring form ♂ and the spring ♀ *aestivaria*; *D. cultraria*, the

spring form ♂ and the spring ♀ *aestiva*; and *Cilia glaucata*, spring form ♂ *obscurata*, and the spring ♀. Our kindly correspondent, M. B.-J. Lempe (Amsterdam) has contributed a series of interesting notes on each of these. Notable Observations on *Chrysophanus rutilus* are contributed by R. de Fleury, and another article describing a brood of *Lasiocampa quercus* in which three more or less gynandromorphous specimens were bred, all of which are figured. This latter article is a translation from the *Ann. Ent. Fenn.* by O. Tolavalta. The origin was the capture of some adult larvae in the summer of 1934, from which imagines were paired in 1935, and the resultant imagines bred in 1936 included these three gynandromorphs. *Lambillionea* is a magazine which deals with a fauna so closely like our own that British entomologists should certainly subscribe to it. It has now reached its 38th year.

We have received another separate from Dr J. W. Heslop Harrison, F.R.S., dealing with the Lepidopterous Fauna of numerous islands on the western coasts of Scotland; this pamphlet lists the species which occur on the isles of the Inner Hebrides. Summer expeditions to these areas are organised and carried out by lecturers and students of the University of Durham and have continued for several years.

We regret to hear of the passing of one who was known to many of a past generation of collectors of Lepidoptera and a great personal friend of our own, Mr A. Russell, of New Milton, where he had gone to live after the death of his wife a year or two ago.

As we go to press we have heard of the decease of two other entomologists. Mr Stanley Edwards, for so many years the business Hon. Secretary of the well-known South London Entomological and Natural History Society, passed away on March 20th after long residence in a nursing home. Mr Edward Meyrick, whose name for many years has been familiar throughout the world to all students of Micro-lepidoptera, has just passed away. Our colleague, Mr T. Bainbrigge Fletcher, will give a short memoir with portrait of Mr Meyrick in the May number.

SOCIETIES.

A meeting of The Entomological Club was held at Florence House, Heston, on the 29th November 1937, Mr H. Donisthorpe in the Chair. *Members* present in addition to the Chairman—Mr H. Willoughby Ellis, Mr Jas. E. Collin, Dr Harry Eltringham, Mr R. W. Lloyd, Major Philip P. Graves. *Visitors* present—Dr Karl Jordan, Capt. N. D. Riley, Mr W. Rait Smith, Mr W. H. T. Tams. The guests were received by Mr Donisthorpe and the Misses Kirk.

The meeting was called for 6.30 p.m., and during a pleasant conversation the Chairman's series of albums of photographs and reminiscences were inspected with much interest. Supper was served at 7.30, after which Dr Jordan described an interesting phenomenon observed by him in Angola. Below the first escarpment, about 50 miles from the coast, a brook of clear water fell over a ridge of igneous rock, forming a waterfall about 3 feet high and 10 inches thick at the top

of the fall. On the vertical surface of the ridge washed by the fall a Parnid beetle was found in some numbers. When scraped off the rock with a stick the beetles were washed away, but were soon seen flying back towards the waterfall. They dived into it and in spite of the considerable force of the falling water safely reached their original position under the waterfall and rather higher up than the point where they plunged into it. Dr Jordan suggests that the difference in pressure between the outer and inner strata of the falling water drove the torpedo-shaped beetle inward and upward like an air-bubble, the beetle being surrounded with air held in place by a dense coat of short hair, and the momentum of the plunge shooting the beetle deep enough into the fall that the pressure on its tail by the falling water was greater than the pressure on the head. The party broke up from 10.30 onwards, a very pleasant evening having been spent.—H. WILLOUGHBY ELLIS, Hon. Secretary.

REVIEWS.

LEPIDOPTERA OF THE CANARY ISLANDS.—There is always some fascination in the study of Island-faunas and the Lepidoptera of the Canary Islands have provided material for many collectors and authors, amongst whom Professor Dr H. Rebel is pre-eminent. So long ago as 1892 he published his first List of the species found there and has since followed this up by supplementary Lists, of which Part VII was published in 1917, and Part VIII (*Ann. Natural Hist. Mus. Wien*, XLIX, pp. (43)-(68) has just appeared in February 1938 and includes Additions and Corrections to date. These papers provide very useful and interesting material for the study of an insular fauna.—T. BAINBRIGGE FLETCHER.

MOTHS OF SOUTH AFRICA.—Volumes I (1932) and II (1933-35) of this series, by Professor A. J. T. Janse, dealt with the Geometridae. Vol. III, Part I (1937), includes the single South African species of Cymatophoridae (Drepanulidae), the small Family Callidulidae, and commences the study of the "Noctuidae," under which term the author includes not only the Noctuids, as usually understood, but also the Amatids (Syntomids), Arctiads and Lymantriads (Liparids), which, he says, form a group of moths of rather diverse appearance but structurally rather closely related. As the differences between these groups are clearly shown in a key (pp. 10-12), the terms to be applied to them are largely a matter of opinion. The Agaristids (not represented in Europe) occupy 38 pages, and on p. 50 the Noctuinæ [Noctuidae] are commenced, and continued up to the end [p. 144] of this Part. All the genera and species are dealt with very fully, each generic description stating full details of structure, including genitalia, and being accompanied by careful figures. Many of the genera are unfamiliar to European collectors, but some (*e.g.*, *Trachea*, *Euplexia*, *Oligia*, *Bryophila*, *Craniophora*) provide comparisons between European and S. African species, the descriptions being drawn up from S. African species and not from the European genotypes.—T. BAINBRIGGE FLETCHER: Rodborough, 15th February 1938.

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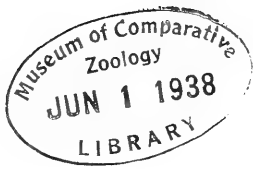
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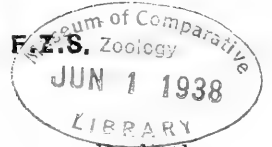
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EDWARD MEYRICK, F.R.S.

EDWARD MEYRICK, B.A., F.R.S., F.R.E.S., F.Z.S.

13820

(Plate II.)



Edward Meyrick, who died on 31st March 1938, was personally little known to the present generation of Entomologists but enjoyed a world-wide reputation as an expert on the Lepidoptera, especially the smaller species. He was born on 24th November 1854 at Ramsbury, Wiltshire, and was the son of the Rev. Edward Meyrick. He was educated at Marlborough College from 1868 to 1873 and was afterwards a scholar of Trinity College, Cambridge. In 1877 he went out to Sydney as a schoolmaster and afterwards to Christchurch, New Zealand, where he remained until 1886, returning to Marlborough early in 1887 and remaining there as an Assistant Master until he retired in 1914, thereafter residing at "Thornhanger," which became a place of happy memories to the many microlepidopterous pilgrims who found their way thither.

His early interests lay with the Lepidoptera, especially with the Microlepidoptera, and his first published note (*E.M.M.*, XI, 237-238: March 1875) recorded the first occurrence in England, near Marlborough in 1874, of *Myelois cirrigerella*, and in 1877 he noted the occurrence of two other species new to Britain. On his arrival in Sydney, in December 1877, he found himself in a new and almost unexplored field literally swarming with the smaller moths and in a preliminary note written in May 1878 (*E.M.M.*, XV, 70-71: August 1878) stated that he had collected 450 species, had received some 200 others from correspondents, and had seen some 500 or 600 more in other collections. To this wealth of material he applied his talents of classification and description and already in 1879 had commenced to describe the new genera and species. In 1882 these descriptions were extended to the New Zealand Fauna and thereafter every year saw a prolific output of papers, extended in 1886 to Lepidoptera from the South Pacific Islands, and continued later after his return to England. In 1890 a fortnight's visit to Algeria produced numerous novelties (*E.M.M.*, XXVII: 1891) and in 1893 he began work on the Oriental Fauna with descriptions of Microlepidoptera from Burma and Malaya (*T.E.S.*: 1894).

For many years he had been engaged on the classification of the Lepidoptera as a whole and had published, amongst others, papers on the classification of the Pterophoridae (*T.E.S.*, 1886), European Pyralidina (*T.E.S.*, 1890) and Geometrina (*T.E.S.*, 1892) and various notes on neuronal structure, but it was his "Handbook of the British Lepidoptera," published on 23rd October 1895, that really brought his views to the attention of British Lepidopterists. With its revolutionary ideas of Nomenclature and Classification this book raised a storm of criticism, expressed in the various reviews of it. Three years later, in a little-known paper (*Zoologist* (4), II, 289-298: July 1898) on "Moths and their Classification" Meyrick dealt with some of the objections to his views.

In 1899 the Macrolepidoptera of the *Fauna Hawaiiensis* appeared (the Microlepidoptera having been undertaken by Lord Walsingham) and a Supplement in 1904. In 1905 Meyrick commenced in the *Bombay Natural History Society's Journal* a long and important series of descriptions of Indian Microlepidoptera, continued until 1914. In 1908

his work was extended to the South African Microlepidoptera (*P.Z.S.*, 1908) and subsequently numerous new forms were described in various South African publications. In 1910 Wytsman's *Genera Insectorum* contained two parts, on the Pterophoridae and Orneodidae, and these were followed by others on the Gracilariidae, Micropterygidae and Adelidae (1912), Tortricidae (1913), Glyphipterygidae and Heliodinidae (1914), Carposinidae and Oecophoridae (1922) and Gelechiidae (1926) and the first eight of these Families, with a few others, were also dealt with in Junk's *Catalogus Lepidopterorum*. In 1910 also appeared an important Revision of the Australian Tortricina (*P. Linn. Soc. N.S.W.*, XXXV), the New Zealand Tortricina being revised in 1911 (*Tr. N.Z. Inst.*, XLIII). As the publication of so many descriptions, scattered in numerous papers published in various parts of the World, led to difficulties and delay, in March 1912 Mr Meyrick commenced the issue of his "Exotic Microlepidoptera," described in the Preface as "a spasmodic entomological magazine on one subject by a single contributor": of this twenty parts completed a volume and Part 5 of Volume V appeared in November 1937. With the issue of *Exotic Microlepidoptera* his separate papers on the Microlepidoptera of India, S. Africa and Australia were mostly discontinued, although additions to the New Zealand fauna were often recorded in the *Transactions of the New Zealand Institute*, and a series of papers in the *Trans. Ent. Soc. London* (1911 (1912), 1913, 1914, 1917, 1922) dealt with South American species.

In March 1928 appeared "A Revised Handbook of British Lepidoptera," in which the 1895 Handbook was brought up to date. This book has no date on the title-page and is often wrongly quoted as "1927," but in a letter to me dated 16.iii.28 Mr Meyrick stated "the 'Revised Handbook' duly appeared last week," the actual date of publication, noted in his own copy, being 8th March 1928. This edition followed the 1895 Handbook in its general arrangement, with considerable extensions and improvements in the microlepidopterous portion, of which the weakest part was that to which students had looked forward most eagerly, the key to the Families of Tineina. This Revised Handbook, together with his "Sketch of our present knowledge of Indian Microlepidoptera" (*Rept. Third Ent. Meeting, Pusa, III*, 999-1008: xii, 1920), give only a very incomplete idea of his views on the classification of the Microlepidoptera of the World, so many Families not being represented in either Fauna, and it is unfortunate that he could never be prevailed upon to attempt any general review of the whole subject, of which he had such an unique knowledge, especially as regards structural characters. With such an enormous assemblage of organisms there is sure to be criticism and revision of details, but as a whole his classification seems to be sound and the best that has been attempted so far, the main difficulty to a student lying in the separation of the Families.

During sixty years of intensive work Meyrick must have described over 20,000 new species of Lepidoptera, besides hundreds of new genera and several new Families. When he commenced to work at Exotic Microlepidoptera very little was known of these forms, of which only a few had been described mainly, by Fabricius, Cramer, Donovan, Stainton, Walker, Felder and Zeller, and in North America by Clemens and Chambers, so that he found an almost virgin field for exploration and had the inestimable advantage of possessing a very large percentage of

the known species in his own collection, which, it is understood, is to be offered to the British Museum (Natural History). With this advantage he became a centre to which Microlepidoptera were sent in from all parts of the World for identification and description, and it would be difficult to find any country from which Meyrick had not described some species, his work ranging literally "from China to Peru" and Argentina and from Greenland to the Subantarctic Islands of New Zealand.

Edward Meyrick was elected in 1880 to the Entomological Society of London, which thus loses its second senior Fellow, to the Zoological Society in 1889 and to the Royal Society in 1904, and he was also an Honorary Fellow of the Royal Society of New Zealand and of several Australian Societies.

During his later years he lived a very retired life at Marlborough but was actively at work until the end and was always most kind and helpful in considering problems and examining specimens. Of him we can indeed say, "We shall not see his like again."

He leaves a widow, two sons and two daughters, to whom our sympathy is extended.

The photograph, from which our Plate has been made, was taken in his garden at Marlborough on 7th September 1930.

T. BAINBRIGGE FLETCHER.

THE ARRANGEMENT OF COLLECTIONS OF BRITISH LEPIDOPTERA IN MUSEUMS.

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

I believe that the British Museum and the Hope Department at Oxford are arranging their collections of British Lepidoptera according to the county of origin. This seems to me to be a most mistaken method. If each county consisted solely of one geological formation and that formation were not found in any other county, it would be most useful, but unfortunately most counties contain various formations and the majority of them run into or crop up in others. The arrangement is therefore quite arbitrary and unnatural. As a result of it the whitish form of *Gnophos obscurata* from the chalk might appear side by side with the blackish form from the peat, and the dark moorland form of *Ematurga atomaria* with the paler ones from the downs or grassy marshland. On the other hand the whitish form of *obscurata* from the Kent and Sussex chalk, which is geographically continuous and geologically the same, would be separated in two different series. *Polia chiab* ab. *suffusa* occurs sparingly with the type in an area which falls into North Derbyshire and South Yorkshire, while further north in Yorkshire it is absent. The arrangement by counties would give no indication of this and indeed would tend to conceal it.

Nearly all the material in our museums is selected and therefore gives no information about the relative frequency of different forms of common insects, that are widespread and occur on all geological formations. Examples of this are *Triphaena pronuba* and *Apamea secalis*. It would be both interesting and instructive to know the relative num-

bers of the different forms of such species in various parts of the country, and though the arrangement by counties would show the forms that occur in them, it would give no information about their respective abundance.

I think this might be achieved in the following way. Equidistant lines might be drawn from east to west and from north to south, and consecutive numbers might be used for the horizontal zones beginning with the most southerly and letters for the vertical zones beginning with the most easterly. Each square would thus have a number and a letter. To obtain data about each species for all the squares would be a slow process, but the necessary information could be collected gradually, and if collectors would make accurate counts of the different forms of two or three species in their own district and record the total number and the percentages and send a representative series to the museum, they would make a real contribution to our knowledge. Material from larvae collected wild in several seasons would give the most accurate figures. A few records of this kind have been published, but they are quite inadequate and hard to find. Could not the editors of our periodicals and the secretaries of our local societies co-operate in a scheme of this kind? When sufficient data have accumulated series could be arranged in accordance with the squares on the map, supplemented by some graphic method such as a card placed at the bottom of the series from each area marked with squares proportional in size to the frequency of each form. In this way one could see at a glance what forms occurred in each area and their relative frequency there.

The ratio of typical *Xanthia fulvago* to its aberration *flavescens* and of *Dicycla oo* to *renago* demonstrated in this way would be most interesting. All we know now is that both aberrations become commoner towards the northern part of the range of these moths, and the arrangement by counties might not show even this fact.

For species which do not vary, such as *Dipterygia scabriuscula*, a pair from each area in which it occurs would show the range, and for species of which the forms are ill-defined a random sample from each area would suffice. I do not think any method would be suitable for universal application. Each species would require special consideration and the method best adapted to show the geographical variation and distribution could be used.

I will now return to destructive criticism of the arrangement by counties. Specimens of a rare aberration which occurs in most parts of the country would be separated from one another. Owing to their rarity they would probably be unrepresented in the series from some counties, though they really occurred there, and this would give a misleading idea of their distribution. Moreover, placing these rare aberrations far apart would prevent a proper appreciation of their variability. Most of the major aberrations, such as *Abraxas grossulariata*, ab. *nigrosparсата* and *Arctia caia*, ab. *schultzei* show considerable variation owing to the action of modifying genes, and this would tend to be hidden by the use of the method which I am condemning in this note.

I will now bring forward another constructive suggestion. I think the value of collections in museums would be increased if a label were placed at the side of forms that have been bred on scientific lines, to show their genetic relationship to the type or to other forms, with a

reference to the papers in which proof was given. Both the banded and melanic forms of *Ennomos quercinaria* are recessive to the type, whereas the banded form of *Angerona prunaria* is dominant. It cannot be said that either typical *Aplecta nebulosa* or ab. *thompsoni* is recessive, because in ab. *robsoni* the heterozygote is intermediate, but both are homozygous, the latter for melanism and the former for the pale ground colour. Typical *Biston betularia* is recessive to the so-called intermediate ab. *insularia*, and this in turn is recessive to ab. *carbonaria*, the three forming an allelomorphic series. Labels indicating such facts as these would add both to the interest and scientific value of a museum collection.

NAMES OF MICROLEPIDOPTERA.

By T. BAINBRIGGE FLETCHER, R.N., F.R.E.S., F.Z.S.

(Continued from p. 26.)

2. **PAMMENE INQUILINA**, n. sp.

Tortrix fimbriana, Hw., Lep. Brit. [iii], p. 446, No. 164 (1811).
Pamene [!] *fimbriana*, Rebel, Cat. Pal. Lep., II, 123, No. 2225 (1901).
Pammene fimbriana, Meyr., Rev. Handb., p. 586, No. 6 (1928).

The combination *Tortrix fimbriana* was praeoccupied by Thunberg in 1791 (*Ins. Suec.* (ii), p. 44, t. 5, f. 3) for a species now known as *Peronea fimbriana*, Thnbg. (Rebel, Cat., No. 1450). The name, *fimbriana*, Hw., 1811, being a primary homonym, was never valid and this species seems to have no available synonym and must therefore be renamed. The specific name, *inquilina*, which refers to the larval habit of living in galls, has been used in Eucosmidae for *Cydia inquilina*, Kearfott, 1907, but that is an *Enarmonia* and will not praeoccupy in *Pammene*.

3. **ETHMIA TERMINELLA**, n. sp.

Tinea sexpunctella, Hb., Samml. Eur. Schmett., Tin., t. 44, f. 304 (1805-1810) [♂].
 [nec *Tinea sexpunctella*, Fb., Ent. Syst., III, ii, 313, No. 115 (1794)].
Psecadia sexpunctella, Rebel, Cat. Pal. Lep., II, p. 167, No. 3140 (1901).
Ethmia sexpunctella, Meyr., Cat. Hyponomeut., p. 30 (1914).
Ethmia sexpunctella, Coney, Entom., LXX, 210, t. 4, f. 7 [larva and moth, both × 2] (1937) [England: Dungeness].

The name *Tinea sexpunctella*, Hb., 1805-1810, was a primary homonym of *Tinea sexpunctella*, Fb., 1794, and therefore was invalid from its inception and cannot be used for this species. I can find no available synonym and therefore rename it *Ethmia terminella*, the specific name now given alluding to the terminal black dots on the forewing, a character which readily distinguishes this from *E. decemguttella*, Hb., the only English species with which it is likely to be confused.

Tinea sexpunctella, Fb., 1794, described from Italy, is the same species as *Gelechia virgella*, described as *Tinea virgella* by Thunberg also in the year 1794. I have no evidence at present as to whether *virgella* antedates *sexpunctella* or *vice versâ*; pending more exact dates of pub-

lication, it is better to leave *sexpunctella*, Fb., 1794, as a synonym of *virgella*, Thnbg., 1794.

Ethmia terminella, the latest recruit to the British List, is widely distributed on the Continent and has been recorded from Belgium, France, Spain, Switzerland, Germany, Austria-Hungary, S. Europe, N. Africa and Asia Minor. I have taken it at Montreux (Switzerland) and at Hyères (S. France) and have also a specimen from Baluchistan.

4. *DOLICHARTHRIA*, Steph., 1834 = *STENIA*, Dup., 1845.

Dolicharthria, Steph., Ill. Brit. Ent., Haust., IV, 55 (30.iv.1834): type [*punctalis*, Schiff.=] *longipedalis*, Curtis, Stephens.

Stenia, Duponchel, Cat. méth. Lép. Eur., p. 201 (4.vii.1845): type *punctalis*, Schiff.

Stenia, "Guen.": Meyr., Rev. Handb., p. 421 (1928).

It is not evident why Stephens' genonym has been overlooked. It was duly described and has eleven years' precedence over Duponchel's *Stenia*, which, incidentally, is invalid in any case as being a homonym of *Stenia*, Kirby, in Richardson's *Faun. Bor. Amer.* (4), p. 133 (x.1837) (Coleoptera).

(To be continued.)

SCIENTIFIC NOTES.

Trials with Dacus oleae.—In November and December 1937 we continued our researches at Formia, a town on the seashore near Naples, with many larvae of olive-flies. They feed within the fruits whence most of them come out and form their pupae under the earth. From maggoty olives we obtained pupae of which we made three lots.

One of these lots was kept in the open, where temperature varied from 5° to 20° C. (41-68° F.), and there a few flies emerged on the finest days. There are still several pupae, which look to be alive, that have not yet produced their adults after two months.

Other pupae were put into a cage, which we set near the ceiling of our warmed room. In that place the temperature is 24-27° (75-81°) during the day, and 10-15° (50-59°) during the night. Many flies emerged gradually. Their emergences were plentiful on the sunny days, continuing scarce, for one day, if the sky became cloudy. However, the pupae were arrested in their development, when sunshine lacked for two days or more, although, if the weather was bad, the temperature within our room was often higher than when the sun shone.

The third lot of pupae were exposed, for about an hour, in the rays reflected by a sheet of tin. The thermometer in the shade marked 18° (64°), in the sun 44° (111°), and in the zone of reflected rays 65° (149°). The environment was dry and the wind was feeble. Afterwards those pupae were kept in our warmed rooms. Only a few adults developed inside those pupae but, being unable to come out from the shells, they soon died. All the other pupae dried, and no flies emerged from that lot.

From 21st to 25th December 1937 the sky was often serene at Formia, and we exposed, in reflected rays, many maggots that had just issued from olives.

One morning, while the temperature was 7° C. (45° F.) in the shade, 27° (81°) in the sun, and 48° (118°) in the zone of reflected rays, the maggots became excited, but they formed pupae after 30 to 60 minutes. Most of those pupae appear to be still living after a fortnight.

At the temperature of 18° (64°) in the shade, about 30° (86°) in the sun, and 50° to 65° (86-149°) in the reflected rays, some larvae were very excited during an exposure for 25 minutes. Afterwards in the shade they delayed 5-6 hours to form pupae which died and soon became black.

Other larvae were put into a box, filled with loose earth, under which they hid, but whence they came out as soon as reflected rays, varying from 45° to 65° (113-149°), owing to feeble nebulosity and wind, were sent over the box. Looking at the pupae formed under the earth (10-15 millimeters depth) we saw that some of them died in spite of the shelter and scanty December radiations.—O. QUERCI.

COLLECTING NOTES.

NOTES ON SOME LARVAE OF BRITISH LEPIDOPTERA.—I have taken many larvae of *Dilina tiliae* on the lime trees in my garden. I find the younger larvae under the foliage of the lower branches. As they grow older, they apparently move higher up, after which their presence is indicated by a fall of bitten leaves. I then search with field glasses and, on detecting a larva, the branch is severed with a "long-arm" cutter. Sometimes they can be found, at night, by the use of a small acetylene lamp. It is surprising how acetylene light shows up all larvae against foliage. I have often trapped the full-fed larvae by tying a strip of sacking around the trunk of the tree and packing the upper part with soil. When the larvae walk down the stem they find a convenient pocket of earth in which to pupate. Fully fed larvae have been found as early as August 1 and as late as September 30. On one occasion, three larvae were taken on the same day (August 7), one of which was quite small, one half-grown and the third more than three part grown.

Larvae of *Smerinthus ocellatus* are abundant on narrow-leaved sal-low plants just outside my premises. I once took eight fine caterpillars on one small plant, which they had almost stripped. I have also taken the larvae on apple trees (both cultivated and "crab") in my own garden, on willow and—once—on "sloe" (*Prunus spinosa*). They usually "go down" towards the end of August; but I have taken them as late as the beginning of October.

Smerinthus populi has been found almost full-fed towards the end of July and still quite young on the same date. Others were still feeding in late September. I have observed ova of this species as early as 27th June and as late as August 15. Larvae on Aspen (*Populus tremula*) have produced moths that appear to be smaller and with more pointed forewings than those on other species of poplar. I have reared females of the pale buff form from both Aspen and "white poplar" (*P. alba*).

I have only once seen a living larva of *Acherontia atropos*. It was stumbling along the furrow of a potato patch in a garden in Kent. I was a small boy of six years at the time. I ran home and reported that I had seen a strange beast with purple stripes and a curly tail. I was told that what I had seen must have been "an eft." Some years later, I was shown a picture of the caterpillar of a "Death's-head moth," which I immediately recognised as the "strange beast" of my earlier years.

Some twenty years ago, having learned that *Acherontia* larvae had been found in the neighbourhood, I showed a coloured picture of the caterpillar to my gardener, who was then lifting my crop of potatoes and told him that, if he found anything like it, he was to bring it to me at once. He said that he had seen "one of them beasts" a few days ago. When asked why he had not reported it to me and what had become of it, he replied—with a shame-faced grin—"I laid my spade across it." (*To be continued.*)—E. ERNEST GREEN, F.R.E.S.

EXTRA "BROODS" OF BUTTERFLIES.—Mr Castle-Russell's remarks (pp. 1-2) with regard to a third "brood" of *Heodes phlaeas* accord with my experience, so far as it goes. Last year, for example, I noted (xlix, 139) specimens on 2nd October and referred to these as a "third brood," although I am doubtful whether this term is correct. What seems to happen is that, in warm seasons, a few precocious adults hatch out from a brood of larvae of which the majority go through the Winter and emerge next Spring. The same thing probably happened in the case of the *Lycaena minima* found here in August 1937, and it seems better to refer to these cases as exceptional emergences. It is difficult to define a "brood," and thus to say that a species is *x*-brooded, when individuals refuse to conform to any rule. *Vanessa urticae*, for example, is usually considered to be double brooded (first brood about early July, second about end of August), with sometimes a later third brood, but my marking experiments here have clearly shown that some individuals of the first brood go straight into hibernation in July and are thus only single-brooded. In the case of a batch of larvae of *Selenia tetralunaria*, from eggs laid in May, all fed up and emerged as second brood the same year except one larva which kept on feeding for about two months after all the others had spun up and then hibernated as a pupa and emerged the following year as a single-brooded individual. *Coenonympha pamphilus* is another example of a species which is partly single-brooded and partly double-brooded, some of the larvae from eggs laid in May and June emerging as adults in August, others hibernating as larvae.—T. BAINBRIGGE FLETCHER, Rodborough, 28th March 1938.

ANCYLIS COMPTANA IN MARCH.—*Ancylis comptana* is usually first noticed here about the end of April. In 1937 I noted a few on the wing on 15th April. In 1938 there were large numbers out on 29th March and it must have appeared still earlier.—T. BAINBRIGGE FLETCHER, Rodborough, 29th March 1938.

LARVA OF OXYPTILUS PARVIDACTYLUS, Hw.—Last year (xlix, 32-33) I asked for any hints on finding this larva but did not receive any. On 23rd March I happened to notice a plant of *Hieracium pilosella* with a withered central shoot and examination showed a larva in the stem just

below the withered shoot. On 29th March I searched for more but was only able to find one. There are doubtless hundreds of these larvae on this hill-slope, but then there are tens of thousands of the plants and those showing external signs of attack seem to be few and far between. These two larvae were about full-grown, so that the date to look for them seems to be before May, allowing for the early season this year.—T. BAINBRIGGE FLETCHER, Rodborough, 29th March 1938.

BEES LAYING UP SECRET RESERVES OF HONEY.—My friend, P. S. Nazaroff, who is a good field naturalist, has written to me about a curious observation he made some years ago in the valley of the river Lunga, in the eastern side of Northern Rhodesia. His boys often used to ask him for matches to smoke out bees when they found nests, but sometimes they brought in honey which they had taken without any smoke. My friend writes:—"The bees have learnt from bitter experience by the constant robbing of their hives, and so now they lay up secret reserves of honey and pollen a long way from their nest and carefully cover over the mouth of the hole. Men and animals find bees' nests by noting the presence of the bees themselves, and so these secret reserves, laid up in case of emergency, are very difficult to find, as the bees so seldom visit them. My boys found several."—MALCOLM BURR (D.Sc., F.R.E.S.).

EARLY APPEARANCES.—One *Spilosoma menthastri* came to light here on 16th April. This is two months in advance of its usual appearance.—WALTER L. FREER, Chute, Hants.

[See p. 134, etc., in Vol. XLIX for the correct name of this moth. *lubricipeda (menthastri)*, the white moth. Linnaeus had two species under the name *lubricipeda*.—Hy. J. T.]

EARLY RECORDS IN 1938.—The locality is Rodborough unless otherwise stated. In March: 6th, *Cidaria multistrigaria*; 20th, *Monima gothica*, *M. pulverulenta*; 22nd, *Plutella maculipennis*; 30th, at Symond's Yat, *Semioscopis steinkellneriana* and *Mnemonica subpurpurella*; 31st, *Pararge aegeria*, had evidently emerged some days before. In April: 3rd, *Euchloë cardamines*, *Pieris napi*; 6th, *Callophrys rubi*, *Pieris rapae* already in *côp.*; 8th, at May Hill, *Incurvaria muscalella*; 9th, *Enarmonia jungiella*, Cl. (*Laspeyresia perlepidana*, Hw.); 10th, *Vanessa atalanta*; 11th, *Pyrausta nigrata*; 12th, *Nisoniades tages*, *Phytometra viridaria*; 13th, *Caloptilia syringella*; 15th, *Callisto anglicella*; 16th, at Belas Knap (980 feet), *Pyrausta cespitalis*, *Elachista rufocinerea*; 18th, *Tyria jacobaeae*.—T. BAINBRIGGE FLETCHER, Rodborough, Glos., 18th April 1938.

A FEW ORTHOPTERA FROM PORTUGAL.—In the autumn of last year I had the good fortune to spend a few weeks in a rather remote part of the province of Tras-os-Montes, in north-eastern Portugal, near the township of Sabrosa. It was well off the beaten track, a good long drive from the railway at Pinhao, on the upper Douro, on a plateau at an altitude from 500 to 800 metres.

The journey up the Douro was of great beauty and interest, my only regret being that I had arrived too late not only for the real Orthoptera season, but for the charm of the vintage. Still, I can confirm with pleasure all that Mr Scott has said in his article on Portugal in the

February number, of the delightful country and friendly and charming people. I had been in Lisbon two or three times before, the first time on a historic occasion in 1910, and lived among Portuguese in Angola, and always been treated by them in the most courteous and friendly manner. There was no hotel accommodation, but I was most hospitably entertained by residents.

The plateau where I was working is composed of crystalline schists and granite, but the contact is not visible in the scenery. Up to about 500 metres the ground is entirely under vineyards and olive gardens, replaced at a higher horizon with woodlands of edible chestnut, cork oaks, and pines, with an undergrowth of beautiful *Arbutus* in flower and fruit simultaneously, gorse, heather and other shrubs. The cork oaks look very odd when the bark is stripped, so that the trunks stand out dark red. This rough treatment does not appear to affect the health of the tree, which is so slow growing that the local folk say that if a man plants a cork tree it is for the benefit of his grandson. The stripping of the trees is rigorously controlled.

In the last week of October and beginning of November there was not much wild life in evidence. Birds were not numerous. I saw a few jays, blackbirds, some finches, including plenty of goldfinches, and some buntings, I think the rock bunting, *Emberiza cia*, and a kite. The only butterflies I noticed were a few whites. As to grasshoppers, the usual Mediterranean kinds were to be found on the rocks on sunny days, *Pezotettix giornae*, *Calliptamus italicus*, and *Oedipoda coerulescens* fairly common, up to 800 m., and an *Acrotylus*. On the alluvium of a mountain brook there were a few *Chorthippus bicolor*, a Pamphagid larva, and a few pairs of *Omocestus panteli*, Bol. I was glad to meet this Iberian species, which I had not before come across. It is related to our common *O. viridulus*, but brachypterous.

On the same ground I found a small yellow scorpion, a green tiger beetle, and a Carabid or two.

As late as November 10th, on the same place I found young larvae, freshly hatched, of *Pyrgomorpha conica*. This is a typical meridional species, a relict of the African connection, and it is interesting to note that its regime, like that of other Ethiopian relicts in the south of Europe, is different from that of the majority of our grasshoppers. Instead of hatching in the spring and growing up by the summer, it hatches at the beginning of winter. *O. panteli* was up there too, and I picked up a larva of the field cricket.—MALCOLM BURR (D.Sc., F.R.E.S.).

ENARMONIA MOLESTA, BUSCK.—Seeing Mr Fletcher's note on this species in the *Ent. Rec.* for March (p. 32) prompts me to record the breeding of a moth on 25th August last. The larva was found feeding in a peach of Italian origin bought in July. Peaches were to be obtained very cheaply in London last summer, and later on I came across another larva, which pupated and was still living in January, when it was very active. However, it managed to work its way out of the puparium (between folded lino) no doubt owing to being disturbed by me, and the pupa was later found dead on the bottom of the glass container in which it had been kept. It seems likely that this would have emerged in May or June but for the accident, and no doubt any larva

wandering from the fruit and pupating would emerge in the Spring. As this species will attack apple, pear, cherry, etc., and taking into account the larger quantities of peaches imported nowadays, it seems likely that it will soon become established in Britain. I can find no previous record of it having been actually reared in this country from imported fruit.—S. WAKELY, 4 Auckland Road, Upper Norwood, S.E.19, 13th April 1938.

THE EARLY SPRING.—*Amphysa prodromana* was flying over the heather here on March 6th, and *Peronea mixtana* on the same date after dark at rest on the heather tops. *Aglais urticae* was basking in the sun on March 3rd; *Nymphalis io* appeared on March 21st; at light *Selenia bilunaria* in some numbers with *Taeniocampa gracilis* and *T. incerta*.—THOMAS GREER, The Bungalow, Dungannon, 23.III.1938.

CURRENT NOTES.

May we urgently ask for short notes on collecting, especially of *Microlepidoptera*.

The October number of the Magazine will probably be the Jubilee number. Some contributors are unable to help until the autumn.

The Monograph of the British Aberrations of the Chalk Hill Blue Butterfly by P. M. Bright, J.P., F.R.E.S., and H. A. Leeds has just come to hand. The work is very attractively and well produced. A Review will follow later.

The Society for British Entomology announce that they have arranged to hold the 1938 Congress in Bournemouth. The dates selected are the Whitsun week-end, 3rd-7th June 1938, and a cordial invitation to attend the Congress is extended to all persons of either sex who are interested in any aspect of British Entomology. Visitors are invited to bring exhibits, for the display of which facilities will be provided. A detailed programme with full particulars, directions and application form will be sent to any name and address on receipt of a postcard by the Hon. Secretary, E. Rivenhall Goffe, 102 High Street, Southampton.

Russian entomologists are constantly making important additions to our knowledge of the Orthoptera. The latest, by L. S. Zimin, is an account of the morphology, systematics and ecology of the egg-cases of Acridian grasshoppers. Zimin, L. S., Tableaux analytiques de la Faune de l'U.R.S.S. Les Pontes des Acridiens (in Russian, published by the Zool. Inst. of Ac. Sci., Leningrad, 1938). The literature on the subject is scanty and it is characteristic that of the 35 titles quoted, only four are in other languages than Russian. This is justified by the importance of the subject in a country of so vast an area with so rich and varied a fauna. The subject is treated in detail and illustrated by 65 figures. To the systematist it is useful on account of the descriptions of the egg-cases of 70 species, with dichotomic tables. Not only is it now possible to identify such cases in the absence of the parent, but light is thrown upon the relationship of closely related species. It is

interesting that the group, *Chorthippus vagans*, *bicolor*, *biguttulus* and *vagans* have cases distinctive from their congeners and also *inter se*. True *Stenobothrus* and *Omocestus viridulus* oviposit in vegetable detritus and are described as hygrophilous while *Ch. parallelus* also oviposits above the surface of the ground, while the more xerophilous species bury their egg-cases fairly deep in the soil. The shape of the cases varies with these habits. The habits of our British species ought to be verified in this country.—M. B.

A striking instance of the results of a continued and intensive study of a restricted area was well exemplified by an exhibit at the meeting of the Royal Entomological Society in January. Our colleague, Mr H. Donisthorpe, on that occasion exhibited 48 species of Coleoptera new to Britain, of which no less than 16 were new to science. These were all taken in Windsor Forest during the last few years.

In the library of the Royal Entomological Society there is only the second volume of Bodenheimer's *Materialen zur Geschichte der Entomologie*. Unfortunately the publisher, Junk, declines to sell Vol. I separately, and the price of the two combined is £6 10s. This is a great pity, as it is a most interesting and important book.—M.B.

REVIEWS.

NATURE STUDY ABOVE AND BELOW THE SURFACE. (A Bridge between Amateur and Professional.) By H. C. Gunton, F.R.E.S., F.R.Met.S., pp. 134 and 17 diagrams.—This is a small book by the apostle of diagrammatical arithmetical entomology, but only a small portion of the book is taken up with the advocacy of the author's particular method of recording his observations. We, with many entomologists, may say that we do not see that the results claimed are any addition to the results of observations and experiences of the average practical field entomologist. In fact the minute registration of facts seems to lead to no practical results even in the hands of such an efficient expert in observation as is the author. But to return to the main part of the work; we have only praise for it. In this the author has ably covered almost the whole field of entomology, practical and theoretical, in a limited space, and in terse, well chosen, interesting yet comprehensive phrasing. He deals with his subject in four sections. The Introduction describes the aim and method of Nature Study, refers to the relation between insect and plant, shows the necessity of classification and correct nomenclature, treats of variation in life-history, and of phylogeny in relation to geological strata. The next section deals with Outstanding Phenomena, such as natural protection, variation, the so-called mimicry, the misnamed migration, assembly, dispersal, etc. A few final pages are devoted to the "Bridge" of the sub-title, connecting the amateur and the professional entomologists.

CORRECTION.—Line 16 from top of page 45 should read "(the *obstipata* died without laying)."

Line 4 of "Current Notes" page 45 read "homines."

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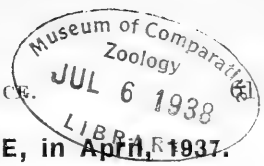
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LEPIDOPTERA AT CAVALAIRE, VAR, FRANCE.



LEPIDOPTERA AT CAVALAIRE, VAR, FRANCE, in April, 1937.

By WM. FASSNIDGE, M.A., F.R.E.S.

Cavalaire is a well-known summer resort on the Mediterranean bay of the same name, easily reached by autorail from Toulon, where a 'bus now runs from the P.L.M. station to that of the Chemin de Fer de Provence. Mention of the village always brings a smile to the lips of French friends, for its glorious beach has the reputation of being overrun by nudists, of whom in April we saw no signs. A very large area of forest behind the town was burned some twelve years ago, and in recent years too there have been lesser forest fires that must have caused great destruction of insect life. But many parts remain untouched by fire, and even the burnt areas are not devoid of interest. This was my second stay at Cavalaire so that I knew something of the possibilities of the locality and had certain definite aims. (Vide *Ent. Rec.*, XLI, 1929, p. 1 et seq.) Our stay lasted from 27th March to 22nd April.

We arrived in glorious weather, which continued for nearly every day of the four weeks we spent in Cavalaire. One of my chief wants was larvae of *Charaxes jasius*, L., which I had not found on my previous visit. Many of these had already disappeared from their silk-spun habitations, but enough were found up to mid April to yield a good series of imagines. Two of the best localities were behind La Vigie in Cavalaire itself, and the sheltered valley of La Sauvagère, about three kilometres distant, reached by autorail via Pardigon. (Halt by request—La Carade.) This charming valley should also produce *Callophrys avis*, Chapman in a normal season, though I only found one worn specimen this year. However, I did not want the species. Large isolated bushes and trees of *Arbutus unedo* in very sunny situations are best for *jasius* larvae, which are not difficult to find and easy to rear.

On 1st April we spent the day at Costebelle and sought likely spots for *Thestor ballus*, Fb. The weather was perfect, but we found no trace of this butterfly and I fear it has disappeared from this locality owing to the growth of scrub on the hillsides. Close behind the Hermitage, however, on a large patch of *Asphodelus microcarpus* we found nearly full fed larvae of *Hastula hyerana*, Mill., whose life-history and variation were so fully described by the late Doctor T. A. Chapman (*E.M.M.*, 1905, p. 100 et seq., and 1906, p. 243 et seq.). This locality is almost certainly the spot where Millière made his first acquaintance with this species. Walking back to Hyères we saw thousands of *Pieris brassicae*, L. pupae on walls by the roadside, while large numbers of the imagines were just drying their wings. On the old stone walls near Hyères grows *Parietaria officinalis* in great profusion, and on this plant were found very small larvae of *Vanessa atalanta*, L. (which for some time I hoped were larvae of *Polygonia egea*, Cram.), as well as mines of a *Cosmopteryx*, since identified as *C. parietariae*, Hering. Everywhere we went we found these two larvae in greater or lesser numbers and saw occasional specimens of *P. egea* flying around its foodplant. Occasionally, too, imagines of *C. parietariae* were seen flitting over the plants like brilliant gems in the sunshine. Another beautiful sight was offered by large numbers of a species of

*Micropteryx** as yet unidentified, which frequented the flowering bushes of *Pistacia lentiscus* and settled on flowers and leaves, in full enjoyment of the bright sunshine.

I was particularly anxious to take as many species of *Crambidae* (*Pyralidae*) as possible, so that a good deal of time was devoted to them. Lamping among the *Cistus* scrub yielded numbers of *Acrobasis obliqua*, Z. on any warm evening. Larvae of *Acrobasis porphyrella*, Dup. were found by dint of patient search on *Erica arborea* behind La Vigie, forming their typically Phycitid tubes among the twigs. This species appears to be very local, for we found it nowhere else. The imagines appeared singly at intervals from the end of May to mid August, and a few ichneumons emerged later than the moths in September. In the seedheads of *Daucus carota*, wherever the plant grew, were the larvae of *Hypotia corticalis*, Schiff., sometimes singly, sometimes two or three in one head. I kept these seedheads damp and imagines emerged freely at the end of August, only to perish miserably in my absence abroad. A few delayed their emergence until just before or after my return on 10th September, so that I managed to get a short series. In the unexpanded flower buds of *Cistus monspeliensis* the larvae of a Phycitid were quite common. I waited until the morning of our departure and then gathered a number of shoots containing nearly full-fed larvae, for *Cistus* is almost unobtainable here. Most of these duly pupated and emerged after aestivation in the latter half of September as *Acrobasis obliqua*, Z. It is rather strange to breed in September a species that was coming to light in numbers in April, while its larvae were still feeding. This habit of aestivation in larvae is shared also by a *Gelechiid* larva found at the same time in the same shoots of *Cistus*, and by the larvae of *Cymbalophora pudica*, Esp., which latter are common and full-fed by the end of April, but do not change into pupae until early September, emerging about a fortnight later. Contrary to general experience I have always found *C. pudica* easy to rear if the larvae are not disturbed, and damped occasionally. We also found on *Cistus monspeliensis* a few dull reddish larvae of a plume moth, from which two imagines were bred, identified as *Trichoptilus siceliota*, Z.

The only flowers worth searching after dusk were those of the Tamarisk bushes that grow close to the sea. Here on favourable evenings we took a long series of *Salebria cingillella*, Z. from 6th April onwards, and succeeded also in beating out a very few specimens by day. Larvae of *Agdistis tamaricis*, Z. in all stages of growth were not rare on these bushes, and two imagines were taken before we left. Among the insects taken at Tamarisk flowers were *Clytie illunaris*, Hb., rare this season though usually common, *Athetis selini*, Boisd., *Laphygma exigua*, Hb., *Xylomania conspicillaris*, L., *Cirphis scirpi*, Dup., *Orthonama obstipata*, Fb. = *fluviata*, Hb., *Eutelia adulatrix*, Hb., and one *Agrotis leucogaster*, Frr., an insect that I mistakenly thought occurred only in south-west France, where I have taken it freely at sugar in August. At the end of April a fair number of *Eupithecia ultimaria*, Boisd. were beaten by day from Tamarisk.

Not until 9th April did *Polyommatus (Lysandra) hispana*, H.S. put in an appearance. The first brood of this "blue" seems to be rather

**M. aglaëlla* was very common at Hyères in 1932, and possibly this is it.—T.B.F.

variable, especially in the underside of the female, and I spent some little time examining all I could see, being rewarded with six minor aberrations in the direction of confluent spots on the forewings underside, and one really first-class aberration of the extreme confluent form.

Diligent search was made for the resinous exudations caused by the larvae of *Dioryctria splendidella*, H.S. on trunks of the maritime pine, and at last a few were found along the beach that contained nearly full-grown larvae, but the species is clearly very scarce at Cavalaire, for no old traces were seen. The mines of *Bedellia somnulentella*, Z. were abundant in leaves of *Convolvulus altheae*, especially at La Vigie. The species is easily bred though badly parasitised. This was the first time I had found mines of this species, yet, as so often happens, I have found them since widespread in the Southampton district, even as late as mid-October. In very sheltered places small larvae of a plume moth were found commonly feeding on the central shoot and lower leaves of a species of *Inula*. In England they fed up well on *Inula dysenterica* and a good series was obtained, identified as *Pterophorus giganteus*, Mann. For a short article on this species with a figure of the moth see *L'Amateur de Papillons*, 1936, p. 67 et seq.

It was a great surprise to beat from a cork oak on 14th April a large male *Erannis marginaria*, Fb., and another a few days later. It seemed strange to see this common winter moth on a lovely hot day in April so far to the south of what one imagines to be its home.

Of course, we lamped on every night that seemed suitable and on some nights that did not. No great numbers of moths came, and the moon or the mistral rendered many nights hopeless. Yet we took *Rhoptria asperaria*, Hb. in good numbers, *Cosymbia puppillaria*, Hb. in amazing variety, a few *Euphyia basochesiata*, Dup., and many other species. On the whole the season was a bad one, and later reports show that it was bad in many parts of France, for Lepidoptera have been scarce and collectors disappointed. But the visitor to Cavalaire in April can be sure of carrying away with him memories of blue and emerald sea, of sunny skies and gorgeous flowers, of lovely valleys made lovelier by the melody of nightingales.

THE CUMBERLAND CHRYSOMELIDAE.

By T. F. MARRINER.

No county in our islands can show such a variety of surface as Cumberland. It ranges from over 3000 feet to sea-level, and with its mountains and sheltered valleys, lakes, tarns, bogs, pastures and arable land, and long sea coast, provides a unique home for a really wonderful range of floral, animal, bird, and insect life. Much of the county has been carefully collected over and studied. Many of the old time collecting grounds are now gone, having been drained and built over or cultivated, bringing a corresponding change in flora and fauna, but there still remain areas as yet unexplored and, for the naturalist, unspoiled. The county, like its neighbour Northumberland, has been singularly fortunate in having possessed a line of naturalists who have left behind them a fine record of their work, and it is upon these records that the present

race are basing their work, and seeking to add something as the fruit of their labours. Bishop Nicolson, the Heyshams, Johnathan Otley, J. B. Hodgkinson, Rev. A. H. Macpherson, Eric Dunlop, G. B. Routledge, T. S. Johnston, Ben Johnson, to mention only a few, have all done work which any county might be proud of. They represent Botany, Geology, Ornithology, Entomology, and each of these branches of work is being carried on to-day by living successors as carefully and as keenly, and just as thoroughly as the work of their predecessors. Very much of this work is done unhonoured and unsung, and, in fact, quite unrealised until one dips into the records or meets with a fellow worker in the field. Packed away in local records, transactions, note books and diaries there must be a whole world of fact and information, which can add to the interest and lessen the work of many a student of nature's secrets. In writing up this little account I am indebted to the work of many of our old time and present day naturalists and to them all I am grateful. The list is based upon my own collection made between 1904 and 1936, and when that fails I have made full use of our records.

Haemonia (Macrolea)—*H. appendiculata*, Pz. (*mutica*, Fab.).—A specimen of this was taken at Great Salkeld by Mr Britten in 1911. Of *H. curtisi*, Lac., I have three specimens taken at Talkin Tarn near a pool of stagnant water in 1925. This is probably the species taken there in 1922 by E. Pierce and recorded in the *E.M.M.* for that year.

Donacia.—My list gives nineteen species as British and ten of these are or have been recorded for Cumberland. *D. dentata*, Hoff. and *D. crassipes*, F., were recorded by T. C. Heysham. Four species, *D. dentipes*, F., *D. simplex*, F., *D. sericea*, L., and *D. discolor*, Pz., are quite common in our marshy areas, while *D. versicolor*, Brahm., *D. obscura*, Gyll., *D. impressa*, Pk., and *D. affinis*, Kunz., are rather rare and only to be met with in certain localities.

Zeugophora.—Only one of the three species listed as British has so far been found in the county, *Z. subspinosa*, F. I took this at Orton in 1929 and again in 1931.

We have two species of *Lema*, *L. lichenis*, Voet., and *L. melanopa*, and both are quite common.

T. C. Heysham once took *Crioceris asparagi*, L., but it has not turned up since.

Clythra quadripunctata, L. has been taken by F. H. Day in nests of *F. rufa* at Keswick.

Cryptocephalus.—We have only four species of this genus so far taken in the county. Two of these are common, *C. aureolus*, Suf., and *C. labiatus*, L. *C. pusillus*, L., has only been seen in two localities, Orton and Dalston, in both of which I have taken it. *C. fulvus*, Goeze, is rather a scarce item. T. C. Heysham recorded it from Burgh, Murray from Seascale, Day from Orton, and I got a single specimen at Newby Cross. The two species of *Gastroidea* we have, *G. viridula*, De G., and *G. polygoni*, L., are both common, the former on damp ground, and the latter everywhere when sweeping.

Timarcha tenebricosa, F.—The only record for this was one by Murray some years ago at Cleator Moor in west Cumberland.

Chrysomela.—Of the sixteen species of this we have nine recorded. Four of these were first recorded by T. C. Heysham, of which one, *C. graminis*, has not been found since, and *C. menthrasti*, Suf., rests upon

a record in Stephens. *C. staphylea*, L., *C. polita*, L., and *C. hyperici*, Forst., are all commonly met with, and *C. marginata*, L., was taken by T. C. Heysham at Burgh and by Britten at Great Salkeld. *C. orichalcia*, Müll., was taken by T. C. Heysham and has been found since at Armathwaite and Fishgarth. *C. varians*, Schal. is not uncommon though somewhat local in various east Cumberland localities, Gelt, Lanercost, Great Salkeld. *C. fastuosa*, Scop., was first recorded by T. C. Heysham from Cardew Mire. It has since been commonly found at Orton, Bowness, and other stations.

Phytodecta.—Of this we have three species. *P. olivacea*, Forst., is commonly taken on broom, and the var. *nigricans*, Weise, is in some districts more common than *olivacea* itself. I have a series of ten which I am told is v. *litura*, F., taken near Carlisle in 1926. *P. rufipes*, De G., was recorded from Armathwaite by T. C. Heysham. *P. pallida*, L., was taken by Binstead at Eskdale and has been turned up since.

Phyllodecta.—Of this we have two species, *P. vulgatissima*, L., and *P. vitellinae*, L., which are both abundant on osiers and willow throughout the county.

Hydrothassa.—I have taken *H. aucta*, F., and *H. marginella*, L., freely, but, though others have found *H. hannovera*, F., common, I have never come across it.

The two species of *Prasocuris*, *P. juncei*, Braham., and *P. phellandrii*, L., are quite common.

Of *Phaedon* we have *P. cochleariae*, F., wherever watercress grows, *P. tumidulus*, Germ., by sweeping on hedgebanks, *P. armoraciae*, L., common by our ponds, and var. *concinuus*, Steph., found all along our coast.

Melasoma.—*M. populi*, L., was first found in Baron Wood by T. C. Heysham. Some years later Murray came across it at Prior Rigg. Later, Day records it from Allonby, and I came across a number on an old poplar at Etterby. *M. aeneum*, L., is much more common than the last.

Two species of *Luperus* are common, *L. longicornis*, Fab. (*rufipes*, Brit. Cat.), and *L. flavipes*, L.

Lochmaea.—Day gives *L. capreae*, L., as scarce, but I have found it fairly common. *L. crataegi*, Forst., is common on hawthorn, and *L. suturalis*, Th., on heather.

Galerucella.—We have in Cumberland six species, *G. grisescens*, Joann. (*sagittariae*, Brit. Cat.) quite common in damp areas, as is *G. tenella*. *G. nymphaeae*, L., I have never taken this but it occurs on a lily pond at Tarn Lodge, from which Mr Routledge gave me specimens. *G. lineola*, F., *G. viburni*, Pk., and *G. calmaricensis*, L., are all common with us.

Adimonia tanacetii, L., is a most elusive insect with us, being found in numbers at one time and then not being seen for some years in the same locality.

Sermyla halensis, L., is common all over the lower county.

We have one record for *Podagrica fuscicornis*, L., an old one by T. C. Heysham.

Crepidodera.—*C. transversa*, Marsh., and *C. ferruginea*, Scop., are very common, while *C. rufipes*, L., has been taken several times to the

south of Carlisle. The presence of *C. (Ochrosis) ventralis*, Ill., rests on an old time record by T. C. Heysham.

Chalcoides.—*C. aurata*, Marsh. This is somewhat local and apparently confined to the east of the county. *C. helxines*, L., only once taken at Rose Castle by T. C. Heysham. *C. smaragdina*, Foud., the commonest species in the area.

Hippuriphila modeeri, L., we meet with fairly commonly.

Chaetocnema.—*C. hortensis*, Fourc., and *C. sahlbergi*, Gyll., are both rather rare items, while *C. concinna*, Marsh (*Plectroscelis*) is common everywhere.

Psylliodes.—We have six of the thirteen species listed. Two of these, *P. chrysocephala*, L., and *P. napi*, Koch, are quite common, *P. picina*, Marsh, *P. cuprea*, Koch, and *P. affinis*, Pk., are somewhat local, while *P. marcida*, Ill., is confined to the coast.

Haltica.—This is admittedly a difficult genus to work out. I could make little of it and sent my specimens to Mr Britten at Manchester. He very kindly arranged them for me. Of *ericeti*, All., I have a series taken in two localities, all of which are females. When returning my box, Mr Britten kindly put in for me a specimen of *H. britteni*, Shp., from Wan Fell, Cumberland. *H. oleracea*, L., appears to be our commonest Cumberland species but males seem to be very rare. I have a long series containing two males and two specimens of the so-called blue variety. The proportion of males to females seems to be about 10%.

Batophila.—We get only *B. rubi*, Pk., which I have taken freely at Lanercost.

Phyllotreta.—Here we have six species. *P. exclamationis*, Thunb., and *P. undulata*, Kuts., are very common, the latter too much so. The rest are somewhat scarce items. *P. nemorum*, L., I have taken near Carlisle. *P. flexuosa*, Ill., and *P. tetrastigma*, Com., I got in flood refuse at Carlisle, while *P. sinuata*, Steph., was recorded by Fowler from Eskdale, *E.M.M.*, 1912. Of *Aphthona* we have only *A. nonstriata*, Goeze, only occasionally come across.

Sphaeroderma.—*S. testacea*, F., and *S. cardui*, Gyll., are both common species in the county.

Apteropeda.—Two species, *A. globosa*, Ill., and *A. orbiculata*, Marsh, are got here; the first is somewhat scarce while the second is more common.

Mniophila muscorum, Koch.—Mr Britten took this at Great Salkeld some years ago and it has been found at Armathwaite since.

Mantura rustica, L., and *M. obtusata*, Gyll., have often been taken. Strangely enough, I found the var. *suturalis*, Weise, more common than *rustica* in two localities where both were present.

Longitarsus.—This also has proved a somewhat difficult genus to me. Personally I have only taken a dozen species while seventeen have been recorded for the county. *L. anchusae*, Pk., has been taken in some four localities. *L. castaneus*, Foud., I got from flood refuse at Carlisle. *L. patruelis*, Al. (*nigrofasciatus*, Goeze), *L. luridus*, Scop. (*brunneus*, Brit. Cat.), *L. atricillus*, L., *L. pusillus*, Gyll., and *L. jacobaeae*, Wat., are all commonly met with. *L. holsaticus*, L., I have taken near Carlisle. *L. distinguendus*, Rye., *L. piciceps*, Steph., *L. exoletus*, L., and *L. succineus*, Foud., are only met with very occasionally. *L. suturellus*, Duft.,

is found with its var. *fuscicollis*, Steph. *L. melanocephalus*, De G., and *L. gracilis*, Kuts., are both fairly common. *L. ochroleucus*, Marsh, is rare, and Mr Britten recorded the var. *poweri*, Al., of *L. gracilis*, Kuts., from Great Salkeld.

Cassida.—Of the twelve British species we have had five so far. *C. sanguinolenta*, F., is a rarity. It was taken by Mr Britten at Penrith. *C. viridis*, L. (*equestris*, F.), rests on a record by T. C. Heysham at Rickerby, Carlisle. *C. viridis*, L., is very common, as is *C. flaveola*, Thunb. *C. hemisphaerica*, Hbst., is scarce and has only been found in two localities.

SCIENTIFIC NOTES.

A FURTHER NOTE ON THE GENETICS OF *XYLOMANIA CONSPICILLARIS*, L., AND THE STATUS OF ITS ABERRATIONS.—Mr Austin Richardson took 13 *Xylomania conspicillaris*, ab. *melaleuca*, View., at Taunton on May 17, 1936, and obtained a large number of eggs from one of them. He gave small batches of young larvae to three friends and kept the remainder. Unfortunately his larvae with one exception died of disease when full grown and only one small female, ab. *melaleuca*, was bred. Two of his friends lost their larvae in the same way, but the third from his twenty larvae bred 7 ab. *malaleuca*, 5 males and 2 females, 2 typical specimens, both males, and 2 ab. *intermedia*, Tutt, both females.

This brood from a wild female, ab. *melaleuca*, like the one previously described (*Ent. Record*, 1937, 49, 81) produced all three forms and supports the view I expressed there that the type is the male, and ab. *intermedia* the female, of a pale form, which is recessive to the melanic ab. *melaleuca*, a form showing little sexual dimorphism. In Mr Richardson's brood the ratio of *melaleuca* to type and *intermedia* is too low, 8: 4 instead of 3: 1, but the numbers are too small for this to be of much significance. The important point is that once more a wild female *melaleuca* has produced offspring of all three forms, and that the nominotypical specimens are males and the *intermedia* females, while the *melaleuca* are of both sexes.

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NOTES ON COLLECTING, &c.

NOTES ON SOME LARVAE OF BRITISH LEPIDOPTERA.—*Hylonicus pinastri*.—I have been given many ova of this species, the result of moths taken in the newly-discovered locality near Wareham. Besides raising a fine series in captivity, I placed many larvae on small pine trees in my wood, for several consecutive years, hoping to establish the species in Camberley, where are large areas of pine trees. But, after the first few days of their release, they invariably disappeared; nor could I find any signs of feeding. I have, since, repeatedly searched the pine trunks, at the appropriate time, without any sign of the expected moths. I think I have discovered a clue to this failure. I was keeping a careful watch, one day, on some half-grown larvae that I had just placed on the pine

foliage. I missed one of them and, thinking that it might have fallen off, I searched the ground below. I soon found the unfortunate caterpillar in the jaws of a common wasp. A few minutes later, I caught a second wasp, just as it was on the point of pouncing on another of the same larvae. I have often noticed wasps investigating the foliage of pine trees, in search of aphides. I have no doubt that these insects had accounted for the other missing *Hyloicus* larvae. These caterpillars might have been expected to gain protection from their colouring, resembling—as it does—the natural stripes of the pine needles.

Larvae of the "Privet Hawk," *Sphinx ligustri*, are fairly common on privet bushes on the Hogsback, above Guildford. I have taken them, there, at all ages, from young to almost full grown, during the month of August. Amongst other of its recognized food-plants I have found it feeding upon Holly.

Of *Daphnis nerii*, in this country, I can only record the finding of a single egg on a bush of *Phillyria*, in a garden at Leamington. From my experience of the ova and young larvae of the "Oleander Hawk," in Ceylon, I believe that my find was of this moth. But, unfortunately, my egg was confined in a small glass tube, and forgotten for two or three days, while I was touring. When next I looked at it, the young larva had emerged and had drowned itself in a drop of moisture in the tube. From the extravagant length of the slender horn* and from the nature of the plant, I am convinced that I had found (and lost) the larva of the rare *Daphnis nerii*.

When I first went to Ceylon, *Vinchona* was being extensively cultivated, for the extraction of quinine. The foliage of these trees was so attractive to the caterpillars of *nerii* that we had to collect and destroy them. A dozen or more coolies were employed—each day—in the collection, and each man's task was a bushel-basketful of the caterpillars.

Larvae of *Metopsilus porcellus* are abundant upon *Galium saxatile*, all about Camberley. But they require diligent search amongst the dense tufts of the plant. I am told that they feed on the surface at night, when they may be readily found by the light of a lantern. I have never met with success by this method, but I have taken many by grovelling (on my stomach) and parting the tufts of *Galium*. On one such occasion I suddenly heard a voice asking if I were unwell and required assistance? I assured my interlocutor (a young lady) that I was not ill nor (as she might well have thought) a dangerous lunatic, but an entomologist in search of a particular kind of caterpillar. Many of these larvae fall victims to prowling hedgehogs. On 1st July I obtained ova from a moth captured at honeysuckle, from which larvae were raised. Larvae, found in the open, were full-fed by the third week in July and one had pupated on the 23rd of that month, but others were still feeding in the first week of September.

Chaerocampa elpenor. Larvae of the "Elephant" are common wherever the Rose-bay Willow-herb is found, and this plant is spreading throughout the district. The larvae usually feed at night, retiring to the base of the plants during the daylight hours. But they are occasionally to be seen high up on the stalks of the plants. Both black

*The life-history (all stages) of *D. nerii* is shown on tab. 1 of *Report of the Imperial Entomologist [India]*, 1929-30. Fig. 2 (Larva in first instar) shows this extremely long anal horn.—T.B.F.

and reticulated green forms occur promiscuously, but the former predominate. I have had larvae pupating as early as 10th August, while others have fed up to the end of September.

Hemaris fuciformis. These larvae, in the earliest stages, are readily noticeable by their habit of eating many small holes in the honeysuckle leaves. The young caterpillars are found on the undersurface of the leaves. When larger, they take their stand on the trailing branches. Unlike the following species (*tityus*) they cling firmly to their support and are not easily knocked off into the beating-tray. I usually find the larvae on quite low plants. On one occasion I took 12 half-grown caterpillars from a single small bush. Ova were found in the middle of May, and young larvae from the middle of June to the first week of August.

Hemaris tityus. Larvae of the "Narrow-bordered Bee-hawk" are fairly common on the "Devil's-bit Scabious," but they must be searched for very carefully. Unlike the "Broad-bordered" species, they are timid caterpillars and drop from their food-plant at the first disturbance of the foliage. On falling to the ground they quickly turn over on to their backs, concealing themselves in the grass and exhibiting the less conspicuous (dark) colouring of the undersurface. This habit makes them difficult to find. When moving the leaves it is necessary to keep one's eye on the surface beneath the plants. They are very heavily parasitized. Out of several dozen larvae that I have had in my hands I have succeeded in rearing only three examples of this moth. (*To be continued.*)—E. ERNEST GREEN, F.R.E.S.

STEGOBIUM PANICEUM, L. (COL.) IN COCOA.—Relatives who were staying with us during last winter from November to March left behind them in a cupboard (at Sudbury, Suffolk) two tins of cocoa, the malted variety. When they returned the tins were found to contain a considerable quantity of live beetles, the larvae of which were also present.

The tins were sent to me and the beetles were found to be *Stegobium paniceum*, L. I should like to point out that the two tins of cocoa were by different and prominent manufacturers, and the lids fitted quite tightly.

I understand that the beetle is found in warehouses. It is difficult to believe that the cocoa contained ova before leaving the two different warehouses, and I can offer no explanation as to how the insects got into the tins, because I know of nowhere in the district where cocoa or chocolate would be open for the beetles to breed in. I might add that the tins were never in use at the same time.—F. D. BUCK, 49 Elthorne Road, Holloway Road, N.19.

THE AMALGAMATION OF TWO COLONIES OF MYRMICA SCABRINODIS, NYL. (HYM. FORMICIDAE).—I observed this to happen, in one of my observation nests, on 11th April. Donisthorpe, in his book "British Ants," records his having observed this in 1912, in one of his observation nests. In that case, however, the amalgamation took place after the two colonies concerned had been in the same nest, though separated by a blocked passage, for three months. Thus it would be possible that the "nest odour" of each colony pervaded the other part of the nest, each colony becoming acclimatised to the odour of the other colony. In which case an amalgamation would be only natural.

In this case, however, the amalgamation took place when the colonies had been in the same observation nest only about eight hours, though they were at no time separated by any impassable barrier, being merely at opposite ends of the nest. The amalgamation was complete, there being no fighting, as far as I could see.

It is possible that both the ♀ concerned (there was only one in each colony) originated in the same nest, since the two colonies came from the same district. This raises the interesting question as to whether a ♀ originating in the same colony maintain the same "nest odour" and pass it on to their progeny. This question cannot be answered without much careful research.—B. D. W. MORLEY.

EARLY DATES IN THE WINDSOR DISTRICT, 1938.—*Brephos parthenias*, *Ectropis (Tephrosia) bistortata*, *Apocheima (Nyssia) hispidaria*, 4.iii; *Polyploca flavicornis*, 6.iii; *Monima (Taeniocampa) incerta*, M. (T.) *stabilis*, 8.iii; *Nothopteryx (Lobophora) carpinata*, 21.iii; *Ectropis (Tephrosia) punctularia*, (ata), 31.iii; *Pheosia dictaeoides*, *Lithina chlorosata (Phasiane petrarica)*, 20.iv.—B. H. COOKE (Brig.-General), F.R.E.S.

EARLY APPEARANCES IN 1938.—The locality is Rodborough unless otherwise stated. In April: 19th, *Cidaria fluctuata*; 24th, *Agrotis puta*; 25th, *Cidaria spadicearia*, Schiff. [*ferrugata*, Stdgr. nec Clk.]; 29th, at Highnam, *Micropterix thunbergella*. In May: 4th, *Coenonympha pamphilus*; 6th, near Newent, *Glyphipterix fuscoviridella*, *Esperia [Dasycera] sulphurella*; 8th, *Pararge megera*, bred *Lampronia rubiella*; 13th, at Symond's Yat, *Abraxas sylvata*; 14th, *Procris geryon* and *Oxyptilus parvidactylus* both well out, *Chlidonia subbaumanniana*, *Agrotis cinerea*; 16th, *Polia genistae*, *Agrotis exclamationis*; 20th, *Lycæna bellargus*, *L. icarus*; 22nd, *Pselnophorus brachydactylus*, at light.—T. BAINBRIGGE FLETCHER, Rodborough, Glos., 23rd May 1938.

A SPLIT BROOD OF *HORISME VITALBATA*.—In the Spring of 1937 a captured female of *Horisme vitalbata* laid a number of eggs in the box and the larvae were reared. This is an extremely easy moth to rear, all that is required being to put a stem of *Clematis* in a bottle of water and leave it until the larvae are full-fed, when they are placed in a pot of earth to pupate. Some moths emerged in the middle of August but about half of the pupae went through the Winter, the first moth emerging on 19th May 1938.—T. BAINBRIGGE FLETCHER, Rodborough, Glos., 23rd May 1938.

CURRENT NOTES.

An important contribution to the study of Arctic Zoology is made by N. Y. Kuznetsov, in a recent number of the *Travaux Zool. Inst.*, of the Academy of Sciences, Leningrad (tom. v. Livr. 1, 1938). It is in Russian, but the good résumé in English ought to be read by all interested in zoogeography, as the author's views are original and striking. The subject is too wide to deal with in a note, but it will come as a surprise to many to know how rich is the insect fauna in the area under discussion, which the author defines as a "complex of countries to the north of the northern limit of forests, occupied by tundra." For

his purpose he pays little attention to Vertebrates. The list includes only 63 mammals and 270 birds, most of which are migratory. But of insects, there are 325 species of Diptera, 565 of Hymenoptera excluding *Tenthredinidae*, and of those 221; there are 170 species of Trichoptera, of Orthoptera 9; 32 of Neuroptera, 627 of Coleoptera, and no less than 702 of Lepidoptera. Among the more limited there are known 10 species of fleas, only 31 Hemiptera, which is hardly surprising owing to the limited flora, 19 Odonata, 53 Ephemoptera, and 61 Collembola. Kuznetsov, as a lepidopterist, naturally bases his reasoning mainly on the butterflies and moths. In the European Arctic he admits 400 species. He mentions 9 as restricted to the Arctic.—M. B.

We congratulate our Hon. F.R.Ent.S., A. P. Semenov-Tian-Shansky, on being elected an Honorary Member of the Entomological Society of France, and of Belgium. On 19th December last his scientific jubilee was celebrated in the great hall of the Academy of Science in Leningrad, when a grand concert was given in his honour. Over six hundred guests gathered for the occasion, and Andrei Petrovich was overwhelmed with letters and telegrams of congratulation. Although his eyesight has been causing him much trouble for more than ten years, his beautiful handwriting is as firm and clear as ever.—M.B.

In looking over the pages of the *Entomological News* for February 1938 I find a statement that "The name *interligata*, Cabeau, has been applied to six different species of *Argynnis* as an aberrancy name" and that "all these names except the first are homonyms." This "wretched homonym rule" again. No wonder complaints are rife over such stupid and idiotic interpretation. The word *interligata* is a useful and informative descriptive name to be applied to every species in a genus, which has an aberrancy it indicates. *Flava* is an admirable name, but "they say" it must be applied to only *one* species in, say, the genus *Agrotis*. If used in a dozen species some one will soon show how clever [sic] he is in nomenclatorial manipulation. The homonym rule should apply to specific names only and not to any other, lower category. That is, the same specific name should not be applied to more than one species in a genus. The misapplication of this rule to other categories is nothing but disastrous to all descriptive nomenclature.

In the *Ent. Rund.*, March, p. 220, is described a new form from Anatolia of *Polia nana* (*Mamestra dentina*), viz., ssp. *sultana*, Schw. Small size, light grey colour, obsolescent and deficient marking, and narrower wings.

In August and September of last year there was an unusual number of the sphinx, *Celerio lineata*, observed in Ontario and other Canadian localities where it is not often taken. Evidently the result of a mass-movement. The drought in the Middle West and the resultant absence of flowers probably was a factor in the movement. One observer reported taking 40 specimens in his garden at petunia bloom.

The *Trans. Socy. Brit. Ent.*, Pt. 1 of Vol. V, has just been published. It contains a long and complete treatise on "The British Short-palped Crane-flies or Daddy-longlegs," by F. W. Edwards, D.Sc., F.R.E.S., with 5 plates and a very large number of text figures. This is a most

important addition to works on British Diptera. About 200 species are dealt with including many hitherto undescribed. The publication of such monographs has fully justified the changes which have successively taken place in this association of workers. May their work continue.

The whole 16 pp. of the *Ent. Rund.* for 22nd March is filled with notices from various well-known Continental writers on the late Dr Adalbert Seitz. There is a portrait.

The second number of Dr Junk's *Scient. Natur. Bibliographia* has recently been issued. This Record will undoubtedly be found useful in Scientific Institutions in keeping all departments of Natural Science up to date in the work which has been done recently or is in progress. Of course it is admirably produced. It consists of 72 pp. quarto, and its price is moderate.

We have received from Herr G. Warnecke his pamphlet on the Lepidopterous Fauna of the Friesian Islands, an area which has produced a considerable number of variant forms of our commoner species. There are several illustrations, including *Argynnis lathonia*, f. *melaena*; *Abraxas grossulariata*, f. *lacticolor* = *dohrni*; *Mamestra albicolon* forms, etc.

Our attention has been called to a correction of a point in the observation of the late Dr T. A. Chapman on the change of habit of the larva of *Cossus ligniperda* = *cossus* when ichneumonated, in making a cocoon prematurely before the time of hibernation when only partly grown. The correcting observation reported at the meeting of the Netherland Society was, that a sound half-grown larva makes a cocoon before hibernation as well as does an ichneumonated larva.

In addition to publishing valuable *Transactions*, the Socy. for Brit. Ent. also issues a Journal at intervals containing a number of small observations, and the current issue, Pt. 8 of Vol. I, contains no less than 37 of such contributions with three plates and text figures. We would like to have some such in the pages of the *Ent. Record*, especially on Variation.

The last issue of the *Revista Soc. Ent. Argentina* contains two more portions additional to the Monograph of the *Hesperiidae* of that area of S. America, Pts. IV and V adding new species forms. We must congratulate our friend Capt. Kenneth J. Hayward on the results of his long intensive study of the S. American "Skippers." In 1930 was published in this magazine the description of a new species of larva belonging to the Acronyctinae sent to us by Capt. Hayward. In the present volume the life-history of this species is described. *Speocropia smilacis*, Hayw. There are two plates depicting the various stages. Dr Uvarov contributes one of the several articles on Orthoptera, in the present volume.

The monthly plate in the April *Lambillionea* (Belgium) illustrates the hybrids (1) *pernoldi* (*elpenor* ♂ × *euphorbiae* ♀). (2) *euphorbiaella* (*euphorbiae* ♂ × *porcellus* ♀). (3) *standfussi* (*porcellus* ♂ × *elpenor* ♀). (4) *harmuthi* (*euphorbiae* ♂ × *elpenor* ♀).

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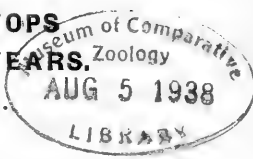
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OBSERVATIONS ON A COLONY OF ACANTHOMYOPS
(DENDROLASIUS) FULIGINOSUS, LATR., FOR 23 YEARS.

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., ETC.



13820

I was fortunate enough to witness the establishment of a colony of *A. (D.) fuliginosus*, Latr., and I decided to take advantage of this opportunity to obtain direct evidence as to how soon a new nest becomes infested by myrmecophiles.

On 27th August 1915, being at a common near Woking, during the heat of the day, I witnessed a fierce battle between two colonies of ants, on a bank and around a partly hollow birch tree, with a small hole at the base. On climbing the bank to investigate more carefully this interesting scene, I found that the tree belonged to the Yellow Ant, *Acanthomyops (Ukthonolasius) umbratus*, Nyl., which was being overwhelmed by the shining black *A. (D.) fuliginosus*, Latr. The ground was strewn with dead ants, mostly *umbratus* ♀ ♀; and I captured a number of live *fuliginosus* ♀ ♀ with *umbratus* ♂ ♀, mostly dead, fastened by their mandibles to the legs and antennae of the black ants.

At the next visit all the *umbratus* had disappeared and the *fuliginosus* were in complete possession of the tree, much frass being observed all around it. I have published some few accounts of these ants from time to time, and the number of myrmecophiles to date is given in "The Guests of British Ants," p. 9 (1927), as 39. It should have been 42 at that time—the mistake having arisen by counting the numbers in my journal incorrectly; or perhaps some of the species had been identified after the publication of the "Guests." The entrance to the nest has always been packed with grass, which has sometimes attracted the attention of non-myrmecophiles, such being *Aleochara succicola*, Th.; *Atheta nigricornis*, Th., several times; *Xantholinus linearis*, Ol.; *Clambus punctulatus*, Beck; *Hister merdarius*, Hoff., twice; *Euplectus karsteni*, Reich; *Coninomus constrictus*, Gyll.; *Corticaria denticulata*, Gyll.; and *C. eppelsheimi*, Reitt., once in some numbers.

We usually gave the ants some sugar before repacking the entrance with grass; this, I believe, helps to prevent them from wishing to desert their nest.

The following is a list of the species taken in the order in which they were found, but only the dates of visits are mentioned when an additional species was found:—

27TH AUGUST 1915.

Battle between *A. (D.) fuliginosus*, Latr., and *A. (C.) umbratus*, Nyl.

1. *Myrmedonia lugens*, Gr.
2. *M. cognata*, Märk.
3. *Phyllomyza lasiae*, Collin.

These three species, which were running about among the ants, must have come with the *fuliginosus*, being their guests.

10TH MAY 1916.

A large quantity of frass, thrown out by the ants, was found all around outside the tree. No doubt the result of enlarging the cavity inside the tree, to accommodate the *fuliginosus* carton nest.

4. *Myrmedonia laticollis*, Märk.
5. *Tropidopria fuliginosa*, Wasm., and No. 3 also present.

17TH AUGUST 1917.

Colony in a flourishing condition, ♂ ants present; much frass outside the tree.

6. *Amphotis marginata*, F., under bark of, and on tree.
7. *Scatopse transversalis*, Lw., running on tree, and near entrance.
8. *Blanajulus guttulatus*, Gerv., and No. 2 also present.

25TH MAY 1918.

9. *Oxypoda vittata*, Märk., in some numbers.
10. *Notothecta confusa*, Märk., and Nos. 3, 6, 7, and 8 also present.

19TH MARCH 1920.

The carton of the nest, of a light brown colour, built up near to the entrance of the hole in the tree.

11. *Microglossa gentilis*, Märk.
12. *Myrmedonia funesta*, Gr.
13. *Quedius brevis*, Er.
14. *Aphiochaeta ciliata*, Zett.
15. *A. aequalis*, Wood.
16. *Harpactes hombergi*, Scp., and No. 2 also present.

4TH APRIL 1920.

17. *Myrmedonia limbata*, Pk., and also Nos. 2, 12 and 13 present.

30TH MAY 1920.

18. *Ptenidium myrmecophilum*, Mots.
19. *Loxotropa fuliginosi*, Box.
20. *Limosina curtiventris*, Stnh.
21. *Cyphodeirus albinus*, Nic.
22. *Laelaps (Cosmolaelaps) cuneifer*, Mich., and Nos. 4, 9, 11, 12, and 13 also present.

20TH JUNE 1920.

23. *Ptenidium laevigatum*, Er., and Nos. 4, 9, 11, 13 and large larvae, 15, and 18 also present.

14TH AUGUST 1920.

24. *Ceraphron fuliginosi*, Box. and Nos. 2, 3, 4, 7, 12, 13 and larvae and pupae, and 19 also present.

28TH AUGUST 1920.

25. *Eulophus amempsimus*, Walker, a specimen emerged from a pupa of *Quedius brevis*, which had pupated at home from a larva taken on 20th June.

27TH SEPTEMBER 1920.

26. *Quedius mesomelinus*, Marsh.
27. *Othius myrmecophilus*, Kies.
28. *Spalangia erythromera*, Först., subsequently proved to be parasitic on No. 3, *Phyllomyza lasiae*, Collin, and No. 29, *Melichia ludens*, Wahl.; larvae and pupae of which were taken home.
30. *Aspilota nervosa*, Hal.

31. *Lagynodes ater*, var. *aterior*, Box.
 32. *Tettilus diversus*, Camb., young and egg sacks on the carton of the nest, and Nos. 2, 4, 12, 13, 16, and 22 also present.

22ND SEPTEMBER 1921.

Ants very active, the carton could be plainly seen in the hole in the tree.

33. *Stomaphis quercus*, L., several on an oak tree next to the birch tree, attended by many of the ants. Nos. 6, 13, 29, and its rather fat and broad larvae, and pupae, were fairly numerous in damp earth beneath the carton, and on the carton itself.

7TH OCTOBER 1921.

34. *Oxyptoda haemorhoa*, Sahlb.
 35. *Tettilus arietinus*, Camb., ♂, ♀ ♀ (♀ = No. 32), and Nos. 2, 3 larvae, and pupae, 4, 6, 11, 12, 22, 26, 28 in some numbers, 29 larvae and pupae. *Spalangia erythromera*, Först., 30.x.21, emerged from the Dipterous larvae and pupae taken home on 7.x.21.

8TH JUNE 1922.

36. *Dendrophilus pygmaeus*, L., and Nos. 2, 3, 4, 7, 9, 10, 11, and 13 also present.

22ND SEPTEMBER 1922.

37. *Schizoneura corni*, F., alate ♀, and Nos. 2, 3, 4, 6 in some numbers, 8, 11 abundant, 13, 22, 23, 29 larvae and pupae, and 36 one.

26TH MAY 1923.

38. *Heterothops nigra*, Kr., and Nos. 4 in plenty and larvae, 9, 11, 13 and larvae, 20, and 22.

3RD JULY 1924.

Colony in good condition, abundant and active, ♂♂ and w. ♀♀ present. A lot of frass in the hole.

39. *Thiasophila inquilina*, Märk.
 40. *Bracon anthracinus*, Nees.
 41. *Philophorus perplexus*, D. & G., very young running with the ants and Nos. 4, 6, 10, 11 abundant, 18, 22, 28.

29TH JUNE 1925.

Colony in splendid condition, very many large ♂♂ about, very active, others attending *Stomaphis quercus*, L., on oak tree nearby. ♂♂ and ♀♀ in entrance to the nest.

42. *Myrmedonia humeralis*, Gr., and Nos. 6, 7, 11 abundant, 18, 22, 28, and 39 present.
 43. *Neophyllomyza fagicola*, Hendel.

1ST MAY 1927.

44. *Antennophorus grandis*, Berl., on some of the ♂♂, and Nos. 4, 6, 9, 12, 21, 22 abundant, and 29 larvae present.

The last visit to this nest for over 10 years was on 21st September 1927, when the late Miss Kirk and I went there together. The colony was in good condition and we noted Nos. 4, 11, 12 and larvae and pupae of 3 and 29.

8TH APRIL 1938.

Mr H. Willoughby Ellis drove Miss D. Kirk and me down to this locality and we found the colony in good condition; many ♀ ♀ were out along the bank on both sides of the birch tree.

No. 45. *Dendrophilus punctatus*, Hbst. Very few myrmecopiles were to be seen; the nest was not packed, and little could be done. Miss Kirk and Mr Ellis took two specimens of the above from the refuse we had collected and sieved.

In connection with a few of these insects one may mention:—

No. 13. *Quedius brevis*, Er. Its larvae and pupae are frequently present; larvae taken home, and placed with some refuse from the nest in plaster cells have pupated and emerged from the pupae in 17 days. Pupae taken home, and isolated in plaster cells, have produced on several occasions the Chalcid, No. 25, *Eulophus amempsimus*, Walker.

No. 28. *Spalangia erythromera*, Först. This Chalcid, which was new to Britain when I first took it in a *fuliginosus* nest in 1906, I have reared from the pupae of No. 3, *Phyllomyza lasiae*, Collin, and No. 29, *Milichia ludens*, Wahl., from this colony. From No. 29, since the publication of "The Guests." The parasite is only to be found in the nests of *fuliginosus* (as are its hosts), and it is partly on friendly terms with the ants, occasionally tapping antennae with them.

No. 36. *Dendrophilus pygmaeus*, L. This species is the regular guest of *Formica rufa*, L., indeed, the only records I know of it with *fuliginosus* are the two occasions I took it in this colony.

No. 43. *Neophyllomyza fagicola*, Hendel. This little fly was first described from Austria in 1927. I took it first, new to Britain, in this colony in 1925. It only occurs with *fuliginosus*, with which ant I have also taken it at Wimbledon Common and Windsor Forest. It is first recorded for Britain in "The Guests."

No. 45. *Dendrophilus punctatus*, Hbst., was first taken in this nest on our last visit. It is chiefly found with *fuliginosus*, but also in other ants' nests and various other places.

EARLY STAGES OF INDIAN LEPIDOPTERA.

By D. G. SEVASTOPULO, F.R.E.S.

(Continued from Vol. xlix, p. 125.)

Buzura suppressaria, Guen. (Noctuidae).

Head lobed, mottled brown. Ground colour mottled brown. 1st somite lobed. 2nd to 11th somites with a pair of pale dorsal spots. 11th somite with a transverse black stripe. Pale lateral tubercles on 7th and 8th somites. Spiracles red. Anal plate and claspers reddish.

Another form has the ground colour dark green with a darker dorsal stripe and dark suffusion between the somites. A lateral patch on the 3rd somite, a transverse stripe on the 11th and the anal claspers black.

Pupa very dark purple, almost black. Abdomen ending in a long anal spike. Subterranean.

Foodplant.—*Cassia* sp. and *Lagerstroemia indica* (Crape Myrtle).

Described from a full fed larva found in Calcutta 9.xi.31, buried itself 11.xi.31, and a female emerged 11.i.32.

Hampson describes the green form only and says that the larva of the female is paler than that of the male. I have not observed this.

Moore, *Lep. Ceylon*, III, plt. 188, figs. 1, 1a, b, c (as *B. strigaria*).

Agathia laetata, F. (*Geometridae*).

Head brownish. Ground colour dark green dorsally suffused with dull reddish purple. 1st somite divided into two lobes and posterior somites slightly swollen. Very like the new growth of *Oleander* on which it feeds.

Pupa in a spun together leaf. Buff coloured with dark dorsal markings.

Foodplant.—*Nerium oleander*.

Described from a full fed larva found in Calcutta 6.xii.31, pupated 9.xii.31, and a female emerged 23.xii.31.

Hampson's description is "larva green with dorsal prominences on 1st and 11th somites. Pupa yellowish green above, green below, the abdominal somites black speckled," and this is copied by Seitz, except that the dorsal prominences are said to be on the "prothorax and 8th (?) abdominal somite."

Moore, *Lep. Ceylon*, III, plt. 197, figs. 1a, b.

Sylepta derogata, F. (*Pyralidae*).

Head brown, legs black. Ground colour green. 1st somite with two black dorsal spots. A white spiracular line. Clothed with sparse hair. Lives in a spun together leaf. Before pupating the larva turns pink.

Pupa reddish brown in a spun together leaf.

Foodplant.—Hollyhock.

Described from a full fed larva found in Calcutta 6.iv.32, pupated 9.iv.32, and a male emerged 15.iv.32.

Fletcher, *Some South Indian Insects*, plt. xxxv, figs. 2, 3, 4.

NAMES OF MICROLEPIDOPTERA.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

(Continued from p. 54.)

5. *OXYPTILUS BRITANNIODACTYLUS*, Gregson 1869.

Oxyptilus britanniodactylus, Gregson, *Entom.*, IV, 305-306 (viii, 1869).

Oxyptilus teucarii, Knaggs, *Ent. Ann.*, 1870, p. 143 (i, 1870).

Oxyptilus teucarii, "Jordan": Rebel, *Cat. Pal. Lep.*, II, 71, No. 1321 (1901).

Oxyptilus heterodactylus, Meyr., *Rev. Handb.*, p. 450, No. 4 (1928).

Our *Teucrium*-feeding *Oxyptilus* cannot be called *heterodactylus*, Villers. De Villers, who described it as *P[halaena] A[lucita] heterodactyla*, *Linn. Ent.*, II, 535, No. 1093 (1789), was not the original describer but merely copied the description from Müller, who described as *Phal[aena] Alucita heterodactyla*, *Fauna Ins. Fridrichsdal.*, p. 59 (1764), a Plume from Denmark. I do not think that it is safe to apply the name *heterodactyla*, Müller 1764, to our *Teucrium*-feeder, as this *Oxyptilus* apparently does not occur in Denmark (it is not included in four Lists of Danish species, the latest in 1930). Müller's description is very vague—merely "black with white spots"—and of the known Danish Plumes it seems to apply best to *Pselnophorus brachydactylus*, Kollar. The name, *Alucita heterodactyla*, Hw. 1811, taken from Villers, for the English *Teucrium*-feeder, is a primary homonym of *Alucita heterodactyla*, Müller 1764, and hence invalid, as are all subsequent

citations of Haworth's name under *Pterophorus*, etc. Later on, this species was mixed up by Stainton under the name *hieracii*, Zeller, which, of course, has nothing to do with it. Later still, it was known as "*teucree*, Greening" or "*teucree*, Jordan," but neither Greening nor Jordan ever described it as *teucree*, which would have been an appropriate name.

The history of its nomenclature (after Haworth, Stephens, Wood, Westwood and Stainton) is as follows:—

- (1) *Pterophorus hieracii* [nec Zeller], Greening, E.M.M., IV, 16-17 (vi, 1867) [Larva found on *Teucrium scorodonia*].
- (2) *Pterophorus hieracii* [nec Zeller], Greening, E.M.M., IV, 39-40 (vii, 1867) [Larval habits].
- (3) *Pterophorus hieracii* [nec Zeller], Knaggs, E.M.M., IV, 40 (vii, 1867) [Reared 14.vi from larvae sent by Greening].
- (4) *Pterophorus hieracii* [nec Zeller], Jordan, E.M.M., VI, 14-15 (vi, 1869) [The species with larva on *Teucrium* found by Greening is not true *hieracii*, Zell., "and next month I hope to describe it under the name of *Pterophorus teucree* (Greening)"]. *Pterophorus teucree* in this reference is a mere *nomen nudum*: had Greening given any description of the larva, it might have been possible to apply Jordan's *proposed* name (or "hoped to describe it" name) to the larva or any other stage *described* previously; but Greening gave merely a note on larval food-plant and habits, and a species cannot be described on habits or on the name of a plant. A description must be based on some stage or part of an insect.
- (5) *Oxyptilus britanniodactylus*, Gregson, Entom., IV, 305-306 (viii, 1869) [n. sp. described: Wales: larva described, on *Teucrium scorodonia*].
- (6) *Oxyptilus britanniodactylus*, Gregson, Procs. Northern Entom. Soc. [Manchester], meeting of 22.v.1869, pp. 3-4 (1869?). This description, which is precisely similar to that in (5), was printed and published but the exact date of publication is doubtful: possibly it may antedate (5) but the date of publication is the criterion, not date of reading the paper. In any case, we see that Gregson read his paper, with the complete description of his new species, on 22.v, whilst Jordan (whose communication (4) is apparently dated 14.v) was still only hoping to describe it.
- (7) *Oxyptilus teucree*, Jordan, E.M.M., VI, 122 (xi, 1869) [*nomen nudum*: merely mentioned as one of the English species].
- (8) *Oxyptilus teucree*, Jordan, E.M.M., VI, 151 (xii, 1869) [Name only included in List of British Plumes: foodplant *Teucrium scorodonia*].
- (9) *Oxyptilus teucree* (Greening), Jordan: Knaggs, Ent. Ann., 1870, p. 143 (i, 1870). [= *britanniodactylus*, Gregson; ? = *hieracii*, Dbl. Cat.: considers that *teucree* and the true *hieracii* may both occur in Britain.] This is the first valid use of the name *teucree*, as it is here applied as an alternative name of *britanniodactylus*, Gregson, *i.e.* to a definite *description*.
- (10) *Pterophorus britanniodactylus* [!], Morris, Brit. Moths, IV, 296, t. 132, f. 12 (1870).

I consider, therefore, that its proper name is *britanniodactylus*, Gregson 1869 = *teucree*, Knaggs 1870.

(To be continued.)

NOTE ON A THIRD ARGENTINE MOSAIC COLIAS.

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

In view of the comparative rarity of mosaic* specimens of *Colias*, it is of interest to be able to report a third specimen from Argentina. The first specimen of which I have knowledge fell to my net in Villa Ana (Province of Santa Fé) on the 23rd of January 1926, the second at Punta Lara in the Province of, and near the city of, Buenos Aires on the 3rd January 1932, curiously enough at the very moment that I was speaking about the Villa Ana specimen to my companion. The first of these specimens found a home in the collection of my old friend Henry J. Turner, the second and the specimen here mentioned are in the Breyer collection in Buenos Aires.

Whilst the first two specimens are in almost perfect state and are remarkably like one another, a fact that will be appreciated from the plate in the *Revista* of the Argentine Entomological Society, this new specimen is extremely worn and at first sight was taken by me to be a true gynandromorph.

The specimen was found in the collection of my friend Juan M. Bosq, and as this gentleman has more interest in Coleoptera than in the Lepidoptera it passed to my keeping in exchange.

Closer examination revealed that instead of being the gynandromorph I had taken it for, the apparently pure male right side was in reality partially female.

The following is a brief description of the insect:—

Label.—“Province of Buenos Aires—Juan Bosq col.”

Right side.—Forewing principally normal male, the area between the costa and the main radial vein and at the apex down to the lower radial, of the greenish white colouring and markings of the female form *heliceoides*, Capr. There is also a small dash of this female colouring near the margin in the lower cubital cell.

Hindwing principally of the male colouring with dashes of the white female colouring in the outer half of the costal cell, a speck in the radial cell, a long dash (not reaching the marginal black scaling) along the upper side of the second median from which a shorter dash runs back into the cell forming a rough “Y.” There is also a diamond-shaped patch in the angle formed by the lower discoidal and the lower median veins. In the black border there are a few white scales.

The yellow male scaling of both wings is somewhat thinner than normal and there is a brilliant copper sheen.

The underside of these wings is normal male except for the costal area of the forewing which is female (*heliceoides*) as above.

Left side, above and below, the normal female *heliceoides* form.

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1926. Hayward, *Ent. Rec. and Journ. Varn.*, XXXVIII, 74.
 1927. Turner, *ibid.*, XXXIX, 97.
 1927. Cockayne, *ibid.*, XXXIX, 99 (fig. genitalia).
 1935. Hayward, *Rev. Soc. Ent. Arg.*, VII, 183 (figures two mosaic specimens).

*“ mosaic ” is a misleading title. These specimens were really gynandromorphs.
 —E. A. C.

**PYRALIDAE AND MICROLEPIDOPTERA COLLECTED IN CYPRUS
DURING 1920 AND 1921.**

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

(Continued from p. 30.)

PTEROPHORIDAE.

- Trichoptilus xerodes*, Meyrick.—Very common around Platres during July and August.
- Oxyptilus distans*, Zeller.—Specimens of the gen. aest. *laetus*, Zeller, were taken commonly at Platres during July and August.
- Platyptilia rhododactyla*, Fabricius.—Platres, 8th July, a single specimen at light.
- Platyptilia acanthodactyla*, Hübner.—Common around Platres and Troödos in July.
- Alucita spilodactyla*, Curtis.—Taken in May at Limasol.
- Alucita phaeoschista*, Meyrick.—Described from specimens taken by me during the first fortnight of July, when it was quite common around Platres.
- Alucita magadis*, Meyrick.—Common at Platres from June till October.
- Pterophorus monodactylus*, Linné.—Limasol in November (Mavromoustakis) and common around Platres in July.
- Pterophorus carphodactylus*, Hübner.—Taken by Mr Mavromoustakis at Limasol in November.
- Stenoptilia zophodactyla*, Duponchel.—Common at Platres during July and August.

ORNEODIDAE.

- Orneodes hexadactyla*, Linné.—Platres, June till late October.
- Orneodes desmodactyla*, Zeller.—The *Handbook of Cyprus*, 1920, records an insect under this name as occurring on the Island.

TORTRICIDAE.

TORTRICINAE.

- Tortrix* sp.—A *Tortrix* in very worn condition was taken at Platres in July.
- Peronea aphorista*, Meyrick.—Described from a single specimen taken by me at Platres in September.
- Cnephasia gueneana*, Duponchel.—Limasol in March and May.
- Cnephasia nubilana*, Hübner.—Limasol in May and November.

CONCHYLINAE.

- Tozopera mauritanica*, Walsingham.—Limasol in May.
- Conchylis posterana*, Zeller.—A single specimen at Platres in July.
- Euxanthis straminea*, Haworth.—Limasol in March (Mavromoustakis) and at the same place in May where I took it sparingly.
- Carposina scirrhosella*, Herrich-Schäffer.—Two specimens from Platres in July.

OLETHREUTINAE.

- Evetria buoliana*, Schiffermüller.—Platres in July. Also recorded by Lederer (*Verh. z-b. Wien*, V, 187, taf. 2, fig. 4).
- Polychrosis staticeana*, Millière.—The Forest of St Nicolai in March and Limasol in May.

Steganoptycha nigromaculana, Haworth.—A single specimen from Platres in August.

Bactra lanceolana, Hübner.—Common around Platres from June till October, chiefly in the swampy grounds alongside streams.

Notocelia uddmanniana, Linné.—A single specimen from Platres in September.

Epiblema modicana, Zeller.—Mr Meyrick provisionally identified a single specimen taken at Platres in September as being this species.

Carpocapsa pomonella, Linné.—Occurs on the Island. Vide *Annual Reports of the Government Entomologist*.

Carpocapsa grossana, Haworth.—At Platres from July till August.

Carpocapsa splendana, Hübner.—Platres in September.

YPONOMEUTIDAE.

YPONOMEUTINAE.

Yponomeuta padellus, Linné.—Two specimens from Platres in July.

PLUTELLIDAE.

PLUTELLINAE.

Plutella maculipennis, Curtis.—I took a single specimen in July at Platres. It is also recorded from Cyprus by Staudinger in *Hor. Soc. Ent. Ross.*, XVI, p. 116.

GELECHIIDAE.

GELECHIINAE.

Gelechia sp.—Platres in August. A single specimen too worn for identification. (H.426).

Gelechia sp.—A second *Gelechia* that could not be identified, but which differed from the August specimen, was taken at Platres at the commencement of October. (H.215).

Platyedra vilella, Zeller.—Platres in August. Uncommon.

Sitotroga cerealella, Olivier.—At Limasol in May.

Euteles kollarella, Costa.—During August around Platres but not very plentiful.

Metanarsia modesta, Staudinger.—Limasol in December.

Oecocecis guyonella, Guenée.—Recorded as from Cyprus in Staudinger & Rebel's *Catalog*, II Theil, p. 162. No. 3016.

Phthorimaea operculella, Zeller, occurs on the island.

BLASTOBASINAE.

Blastobasis oecophila, Staudinger.—Platres in late July.

Dichomeris neatodes, Meyrick.—Described from a single specimen I took at Platres in September 1920.

Sarisophora ptochomorpha, Meyrick.—Described from a specimen I took at Platres in June 1921.

Neocorodes amnesta, Meyrick.—Described from a single specimen I took at Platres in September.

OECOPHORINAE.

Pleurota idalia, Meyrick.—Described by Meyrick from specimens taken in the forest of St Nicolai in May.

- Apiletria luella*, Lederer.—Recorded from Cyprus by Lederer (*Verh. z-b. Wien*), Staudinger & Rebel in their *Catalog*, and Staudinger in *Hor. Soc. Ent. Ross.*, XV.
- Psecadia bipunctella*, Fabricius.—Fairly common at Platres and at Limasol in February and in August.
- Depressaria comitella*, Lederer.—At Platres in August.
- Depressaria ledereri*, Zeller.—Recorded by Lederer in *Verh. z-b. Wien*, 1855, p. 187, taf. 5, fig. 12 nec 13. Also by Staudinger & Rebel in their *Catalog*, II Theil, p. 171, No. 3225.
- Depressaria appлана*, Fabricius.—Platres in September 1921.
- Depressaria rhodochlora*, Meyrick.—Described from a specimen I took at Platres in July 1921.
- Depressaria marcella*, Rebel.—Not uncommon at Platres in August.
- Depressaria amblyopa*, Meyrick.—Taken at Platres in July.
- Carcina quercana*, Fabricius.—At Platres in late July and early August.

ELACHISTIDAE.

SCYTHRIDINAE.

- Scythris temperatella*, Lederer.—Limasol in May. Also taken by Lederer (*Vehr. z-b. Wien*, 1855) and cited in Staudinger & Rebel's *Catalog* as from Cyprus.
- Scythris inclusella*, Lederer.—From the Stavrovoum range in May. (I believe these specimens were taken by Mr Mavromoustakis.)

TALEPORIIDAE.

- Taleporia instabilis*, Meyrick.—Described by Meyrick from specimens taken in January at Limasol by Mr Mavromoustakis.

TINEIDAE.

TINEINAE.

- Hapsifera luridella*, Zeller.—Flies around Limasol in May.
- Tinea ankerella*, Mann.—Taken at Platres in September.
- Tinea granella*, Linné.—Late July and early August at Platres.
- Tinea fuliginosella*, Zeller.—Platres in July.
- Tinea pellionella*, Linné.—Recorded as from Cyprus by Staudinger in *Hor. Soc. Ent. Ross.*, XV, p. 115.
- Tinea* sp.—Some very worn and unidentifiable specimens were taken at Platres in the pine forests in July.
- Tinea* sp.—A single *Tinea* that could not be identified was taken at Platres in July 1921.

(Notes on this paper to follow.)

COLLECTING NOTES.

FURTHER UNUSUAL DATES FOR 1938.—All the following species have been taken or seen in Gloucestershire unless otherwise stated:—4th March, *Vanessa c-album*; 29th March, *Pararge aegeria*; 3rd April, *Euchloë cardamines*; 8th May, *Cupido minima*, *Aricia astrarche* = *medon*, and *Brenthis euphrosyne*; 27th March, *Coenotephria derivata* = *nigrofasciaria*; 7th April, *Ectropis bistortata*; 11th April, *Calocalpe cervinalis* = *certata*; 16th May, *Nola confusalis*; 23rd April, *Mesotype*

virgata, Wallasey, and *Hydriomena coerulea* = *impluviata*, Wither-slack; 26th April, *Isturgia carbonaria*, Rannoch, well out with females, and *Mamestra glauca*, Rannoch; 29th April, *Anarta cordigera*, Rannoch; 30th April, *Anarta melanopa*, Rannoch; 11th May, *Cosymbia linearia* = *trilinearia*; 13th May, *Bomolocha fontis*; 14th May, *Harmodia* (*Dianthoecia*) *rivularis* = *cucubali*; 15th May, *Eulype hastata*, Oxford; 16th May, *Xylina semibrunnea*, ♀ to light, *Mamestra genistae*, and *M. oleracea*, *Axylia putris*, and *Harmodia bicurris* = *capsincola*. On 2nd June *Euchloris smaragdaria* bred; larvae found in Essex in September 1937, placed out on *Artemisia abrotana*, and the pupa brought indoors 20th May.—A. RICHARDSON, Minchinhampton, Glos.

SPHINGONOTUS CALLOSUS, FIEBER, RE-DISCOVERED IN SPAIN.—In the *Entomologist's Record*, 1936, p. 98, I alluded to my capture of a small *Sphingonotus* from the south-east coast of Spain at Torrevieja, between Cartagena and Alicante, with the remark that Dr Uvarov reserved his opinion as to its identity. My impression at the time was that it might be *S. callosus*, Fieber, originally described by him in 1853 as a Spanish species, but since then recorded only from such distant localities as Sarepta on the Volga, Algeria, Jaffa, and Turkestan.

Fieber, who described it by distinguishing it from the familiar south Spanish *S. azureus*, Rambur, gave no precise indication of locality, and in spite of the close collecting through the peninsula maintained by the Spanish and visiting orthopterists, it has not been recorded since.

It is, therefore, very gratifying to hear from Dr Uvarov that in making a revision of this difficult and rather vague genus, he has convinced himself that my specimens are the true *S. callosus* of Fieber. This is the more interesting, as several forms with marked oriental affinities have been taken in the neighbourhood of Cartagena, as I have noted in the article referred to, but the exact locality has not yet been run down, as the man who originally collected them and sent them to Don Ignacio Bolivar is long since dead. It was, in fact, in the hope of running down that oriental fauna that I went to the neighbourhood of Cartagena.

This re-discovery of the true *Sphingonotus callosus* enables Dr Uvarov to state that this Spanish species is definitely distinct from the eastern ones that have been recorded under that name. A full discussion of the problem will be published by Dr Uvarov in due course.—MALCOLM BURR, D.Sc., F.R.E.S.

BUTTERFLIES OF SHEFFIELD DISTRICT.—The Sheffield District is most certainly not a paradise for collectors of butterflies, for the number of species which occur is not very gratifying, and many of the species which do honour us with their presence are to be found only sparingly.

I have taken as the "Sheffield District" an area enclosed by a circle, having a radius of fifteen miles, and with the "City of Sheffield" at the centre. During ten years of collecting and search, this district has produced only twenty-three species of butterflies.

The area includes a great variety of ground. We have Magnesian Limestone in South Yorkshire, Carboniferous Limestone in North Derbyshire, large areas of Coal-measure clays and shales, and also large tracts of Millstone Grit moorland. A large proportion of the country

is, however, bleak and barren, and as the area is liberally studded with coal mines, and also includes the industrial sites of Sheffield and Rotherham, the scarcity of butterflies in species and numbers is perhaps not surprising.

The following species have been recorded during the last ten years: *Pieris brassicae*, *P. rapae*, and *P. napi*—All abundant. Our commonest species.

Euchloë cardamines—Almost confined to Magnesium Limestone area.

Gonepteryx rhamni—Always scarce.

Colias croceus—One specimen recorded, Norton, August 1934.

Pararge megera—Confined to Magnesium Limestone area.

Maniola jurtina—Common locally. Absent in most parts.

M. tithonus—Confined to Magnesium Limestone, where it is rare.

Coenonympha pamphilus—Common on heaths and moors.

Argynnis aglaia—Occurs in a number of localities.

A. cydippe (adippe)—Local and scarce.

Vanessa atalanta—Generally common.

V. cardui—Occasional visitor.

Aglais urticae—Generally common, sometimes abundant.

Nymphalis io—Usually occurs sparingly.

Heodes phlaeas—Common throughout the district.

Polyommatus icarus—Abundant locally.

Lycaenopsis argiolus—Very local.

Callophrys rubi—Common in several moorland localities.

Augiades sylvanus (Ochlodes venata)—Almost confined to Magnesium Limestone.

Erynnis tages—Reported Lindrick-common 1934.

Adopoea linea (sylvestris)—Very local and scarce.

Old records mention the following species, which now seem to be absent:—*B. selene*; *B. euphrosyne*; *C. tullia (typhon)*; *T. quercus*; *T. w-album*; *A. paphia*; and *P. argus = aegon*. *N. antiopa* has also been recorded in Sheffield.—T. D. FEARNEHOUGH, Sheffield. [*P. c-album*.—E.A.C.]

LEPIDOPTERA AT LIGHT.—With reference to Dr Harris' remark on p. 39 of your April number about the absence of moths on the walls of the Hydro "corridor," as compared with 1933, perhaps the following observation (for which I am indebted to M. Charles Boursin, himself an experienced collector of Alpine Heterocera) will explain, or, if it does not explain, will at least be of interest.

Winter-sports and other hotels in wild country often act as excellent moth-traps for the first few years after they are built. Then, gradually, their bright lights produce fewer and fewer specimens. Why? Because these lights especially attract the females of the Agrotid-Tri- fididae, and few of these females, once attracted, return to oviposit their full egg-contents on the breeding ground. The effect of this is cumulative over a number of years and the country in the immediate vicinity of the hotel becomes depopulated, at least in comparison with its former richness of wild life.

The moral for moth-collectors would seem to be to visit newly-built hotels, or to collect by light a mile or two away from the hotel, if its lights seem unproductive.—E. P. WILTSHIRE, Iran, 9.v.38.

CURRENT NOTES.

The Annual application for subscriptions to the *Wicken Fen Fund* is again due to those who have so generously supported it in the past. The area is still in need of care if the special flora and fauna are to be kept up when all around suffer from changing circumstances and absence of special supervision and care. The Treasurer tells me that during the past 20 years "considerably over £2000 has been subscribed" for the upkeep. May I remind readers that Mr W. G. Sheldon's address is: "West Watch," Oxted, Surrey. He, as Treasurer, will be pleased to receive subscriptions from any lover of the wild nature which here appears in a very specialized form.

We have just heard that the Meyrick collections of Micro-lepidoptera have already arrived at the British Museum, Cromwell Road, S. Kensington, and are in a good state of preservation. It is estimated that no less than 100,000 specimens with a very large number of types are comprised in this very valuable bequest.

Three further parts of *Seitz Supplement* to the Palaearctic Volumes have reached us recently. Of Vol. III the sheets contain the List of References for all Original Descriptions and the List of newly described forms of Noctuae in the volume. Of Vol. IV there are 3 sheets and 3 plates concerning the group Geometers. These parts are perhaps the most important for consultation by our British entomologists, dealing as they do with the huge genus *Cidaria* and many of its subgenera. The additions to the forms of British species are as follows:—In Sheet 15, mostly the subgenus *Euphyia*, the additional forms are *cuculata* with 4, *unangulata* with 5, *bilineata* 20, *polygrammata* with 3, with rectifications in *picata*, and reference to the casual *luctuata*. Sheets 19 and 20 continue the genus *Cidaria* under various subgenera. In *Thera*, *obeliscata* with 9, *cognata* 2, *juniperata* 6, and *firmata* with rectification. In *Chloroclystis*, *siterata* with 1, and *miata* with 4. In *Dysstroma*, *truncata* with 18, *concinata* 2, *citrata* 16, and *silaceata* 5. In *Electrophaes*, *corylata* with 5. In *Mesoleuca*, *albicillata* with 8. In *Melanthia*, *procellata* with 6. In *Eulype*, *hastata* with 9, and *subhastata* (treated as a species) with 8. Much of the work of our colleague, Dr Cockayne, in the above species, has been summarized in the text. The 3 plates contain nearly 200 figures in colour.

At the same time 6 further parts of the uncompleted Main Volumes of *Seitz Macrolepidoptera* came to hand. Of Vol. VI, American *Bombyces*, 1 part consisting of 3 plates with about 170 figures. Of Vol. XI, Indo-Australian *Noctuae*, 2 parts, made up of 3 sheets and 3 plates containing about 150 figures. Of Vol. XVI, African *Geometrina*, 3 parts, made up of 6 sheets and 3 plates with more than 150 figures. The genera recognized by students of the Palaearctic area—*Eupithecia*, *Chloroclystis*, *Gymnoscelis* and *Gonodontis* are features of these parts. The volumes of extra-European faunas will probably be very valuable in years to come to future generations of students, in particular the coloured figures.

In the *Ent. News* for April and May there are some interesting Notes on the double mating of various species of Lepidoptera, in an article

on the occurrence of this habit in *Epehestia kuehniella*. There are 2 plates of detail.

Double cocoons occasionally occur. In the *Ent. News* for March there is an account of a double cocoon of *Philosamia cynthia* found wild in Philadelphia. It was suspected by its size and when weighed was found to weigh 7 grams, whereas the average weight of a male and a female cocoon were 4 grams and 3 grams respectively. On opening the cocoon it was found to contain a male and a female pupa. There was no trace of a septum, nor any depression indicating a union of two cocoons.

Three Sphingid hybrids are figured in *Lambillionea* for March. (1) *hybridus* (*ocellata* ♂ × *populi* ♀), (2) *rothschildi* (*populi* ♂ × *ocellata* ♀) and (3) *leoniae* (*tiliae* ♂ × *ocellata* ♀). The regular issue of such plates month by month form a splendid record and a valuable addition to a useful magazine.

THE COLORADO BEETLE.—There is an increasing danger of the Colorado Beetle reaching this country by flight or other means, in consequence of its further spread on the Continent, where the greater part of France and a large area in Belgium are now infested. Outbreaks have also occurred in Germany, Luxemburg, Switzerland and Holland. This pest is described in the Leaflet enclosed in Vol. XLVI, No. 4 (April 1934), p. 48, and our readers can help by keeping an eye open for its occurrence, especially in South England.—T. B.-F.

We are glad to see the first part of *Orthopterorum Catalogus*, edited by M. Beier and published by Junk. It is a badly needed work. This part, by R. Ebner, deals with four of the most interesting subfamilies of the *Tettigoniidae*, the *Ephippigerinae*, the dominating group in the Western Mediterranean, with 92 species; their relatives, the *Pycnogastrinae*, also Iberian and Moroccan, with only 6 species; the *Bradyporinae*, of the Pontic area, with 8 species, and the Central Asiatic *Deracanthinae*, with 14 species. Herr Ebner has done his work with his usual care; full references to literature are given, classified according to subject, which simplifies reference by specialists. The price is 5.50 Dutch florins, 4.50 to subscribers. A further part is announced, the *Hetrodinae* and *Acridoxeninae*, also by Ebner, and the *Gryllacrididae*, by Karny, while several others are in preparation.—M. B.

How many moults do the larvae of *Saturnia pavonia* have? In Germany they are said to have three (4 stages), but in the Riviera they have four moults (5 stages). The former are said to be of 3 different colours and the latter of 4 colours.

SOCIETIES.

ENTOMOLOGICAL CLUB.—The Verrall Supper Meeting took place at the Holborn Restaurant on 18th January 1938. The meeting was called for 6.30 p.m. and the usual large attendance thoroughly enjoyed the conversation which was held in a special room before the supper. Supper was served at 7.30, Mr H. Willoughby Ellis in the chair. Grace was said by The Bishop of St Edmundsbury and Ipswich, and after the Toast of the King and the silent Toast to the memory of the Founder (Mr Ver-

rall), the Chairman announced that 185 acceptances had been received, which was hoped to be a record, but several could not attend through illness. He also reminded the gathering of the forthcoming Entomological Congress to be held at Berlin on the 20th August 1938. Invitations were available for any who wished to attend and he hoped that this country would be well represented. Mr Collin, the Verrall Supper Member of the Entomological Club, who is always responsible for the arrangements, is to be congratulated on another very successful gathering. The party broke up at a late hour.—H. WILLOUGHBY ELLIS, Hon. Secretary, 21st May 1938.

REVIEWS.

We have received from the publishers, Dr Wm. Junk, 's-Gravenhage, Holland, specimens of two important Catalogues he is bringing out. Already we have referred to the general excellence of the work done in the *Catalogus Coleopterorum* and the *Catalogus Lepidopterorum*. The success of these two works has induced the publisher to commence two further world lists, viz., the *Catalogus Hymenopterorum*, edited by Dr Hedicke, of Berlin, and the *Catalogus Orthopterorum*, edited by M. Beier. Both these Catalogues will be of inestimable value to all students who are specializing in the study of the Hymenoptera and of the Orthoptera, and every scientific institution must have these books in their reference library on the natural science side. The former has now reached part VI and of the latter part I was published in January of this year.—HY. J. T.

The London Naturalist for 1937, the Annual Journal of the nine smaller sectional societies which make up the London Natural History Society, has just been published. As usual, it is a very interesting account of the doings of these sections. The two sectional societies which are particularly entomological are the Entomological Section and the Plant Gall Section, the former of which is the direct descendant of the old and one-time well-known City of London Society, and the latter a valuable and interesting younger association of students and compared with the former has been the more energetic in holding nine field meetings against the six held by the other section. At the indoor meetings of the Entomological Section 6 papers were read, but to the Plant Gall people only two papers were communicated at the meetings. Almost a third of this Annual is taken up with entomological matter, a most unusual amount. The paper on Entomology and Malaria is well worth a perusal and admirable research work and observations are recorded in the Survey of Limpsfield Common.—HY. J. T.

LES ARACHNIDES DE FRANCE par Eugène Simon. Volume VI, Part 5. Paris. Encyclopédie Roret. Edgar Malfère Editeur. Rue Hautefeuille 12, 1937. Price 35 francs. This is the fifth and last part of Volume VI of this great work. *Les Arachnides de France* has had a remarkable history. Volumes one to five were published between 1874 and 1884 and dealt with spiders only. Volume seven appeared in 1879 and treated of Scorpiones, Chernetes, and Opiliones. There was no volume six! Before his death, which occurred in 1924, Simon decided to use the

missing volume as a medium for an up-to-date account of French spiders. He published part one of this volume in 1914. After his death Messrs L. Berland and L. Fage continued this work. Simon left behind him a great deal of material for this and fortunately for Arachnology the collaborators have been able to complete the whole work and see it published. However, they found four more parts were necessary, and these were published between 1926 and 1937, the date of the present part. Each part costs 25 francs except part five, which costs 35 francs. Neither Simon nor his successors treated of the Acari in *Les Arachnides de France*.

Volume six is thus practically a new work, complete in itself and is absolutely necessary for the student of European spiders. It is not too much to say that it is the best book on spiders in existence. It should find a place in every Arachnological library. The illustrations are line figures in the text and are distinct and accurate. They are a good deal better done than those of the earlier volumes which, however, possessed a small number of beautifully engraved plates.

Part five, of which I now write, deals with five families and illustrates the richness of the French fauna compared with ours. In the following table the first column gives the number of French species, and the second that of those known to inhabit Britain:—

Agelenidae	...	...	61	22
Pisauridae	...	...	4	2
Lycosidae	...	...	80	36
Oxyopidae	...	...	3	1
Salticidae	...	...	127	32
			<hr/>	
Total	...	...	275	93

So that in these families the French fauna is three times richer than ours, in the case of the *Salticidae* alone four times richer.

This is not due to less efficient collecting because in the case of the *Linyphiidae*, which are treated in parts two and three, and which are mostly small and obscure animals easily overlooked, we have 235 species against France's 390, or nearly two-thirds of their total. The British Isles are less than two-thirds the size of France which has, of course, Mediterranean, Alpine, and Pyrenean species which we do not possess.

Volume 6 gives tables of identification of all known French species with many figures of the distinctive structures, and an account of the distribution of each species both inside and outside France.

There are also some very interesting notes on species of the neighbouring countries and which do not occur in France. As regards nomenclature Simon's position was so dominant in Arachnology during his lifetime that one would like for the sake of uniformity to adopt his names wholesale and completely. I fear some writers are sure not to do this, but for the most part—except in the family *Lycosidae*—I can bring myself to do so. And I hope that even here I may some day be able to emulate the White Queen in my powers of belief. After all, as she said, it is all a matter of practice. And I shall try.

Les Arachnides de France is a great book, and volume six with its five parts is the most important contribution to Arachnology we possess.—A. RANELL JACKSON, Chester.

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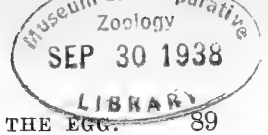
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OUR JUBILEE NUMBER

will be that published in mid-October and will contain only articles dealing with the progress of the Study of Entomology during the fifty years of the existence of the Journal.—THE EDITORS.

NOTES ON BREEDING APOROPHYLA AUSTRALIS FROM THE EGG.

By Captain C. Q. PARSONS.

13,820

A solitary female taken at ivy near Kingswear, S. Devon, on the 25th September 1937 was placed in a large-size collecting box, covered with muslin and containing dead grass, on the 26th. That night she laid 15 ova, mostly on the muslin, and a few on the box. On the morning of the 27th I found she was dead and had laid a very large number of ova in heaps all over the box. They hatched early in October, nearly all being fertile.

Remembering my failure to rear *lutulenta* without artificial heat, I decided to try what it would do. Having no electric light in the house, I purchased a small paraffin lamp for 1s 6d, which consumed roughly a gallon a month. It required refilling every 24 hours, but I should think the heat could be more easily regulated than when using an electric light bulb.

I placed the majority of the larvae in two of the smallest-sized glass-topped larva tins with young shoots of *Poa annua*. These I put in a large Jacob's biscuit tin together with the lamp, leaving the lid inverted about two inches open, covering the small tins with cardboard to keep the larvae in darkness. I started the temperature at 68° F., with the tin in a room without a fire, where the room temperature was more or less constant. The larvae soon started feeding. There was a fair degree of mortality in one tin in the first few days as the lid did not fit perfectly and the young grass rapidly withered before changing once a day. I transferred what remained of them to a larger tin the bottom of which I lined with newspaper, and tried them on *Avena elatior*, the False Oat Grass, which lasted much better and was less trouble to dry when gathered in wet weather: they fed on it until turning to pupae. In the second instar I tried a little *Silene inflata* mixed with the grass, which they only just nibbled, and, once again, in the last instar, when they refused it.

I soon lowered the temperature to 64°, and when they were in the penultimate instar to 60°. As the larvae grew larger I put them in two oblong cigarette tins, changing the food daily and relining the tins with fresh paper. As soon as they became fullfed they gave warning of their readiness to pupate by losing their brilliant colours and resting a few days. When this occurred they were put into another tin with about four inches of moss fibre mixed with damp earth and returned to the biscuit tin. The first caterpillar descended on 10th January, and the last about a week later. A month after the last had burrowed I turned out the tin, one larva had dried up and two had misformed pupae, the remainder had turned perfectly. Apart from the casualties on hatching and these three, I had no other mishaps. The larvae shewed no tendency to cannibalise as on several occasions they had devoured all their grass and were all present when mustered.

I placed the pupae on the surface of the moss fibre in a cigarette tin, keeping it damp, and returned them to the incubator, which was then heated up to 70°, and kept at that temperature until 19th May. This seemed to be about the temperature they would get on an average in nature from June to September, if they were lucky.

The first moth hatched on 15th May, two more appearing by the 19th, on which date I left for Belgium, when they were subject to what temperature nature provided, this being almost a frost for a night en route in the New Forest and low temperatures across the Channel.

They started to hatch again on 26th May, the last arriving on 8th June. They are all well up to size and of a much darker form than occur in Sussex and the Isle of Wight.

In conclusion, I might say that my lamp would provide a temperature of 80° in the coldest weather if required. I think it is possible the temperatures I have recorded were slightly higher than those actually inside the receptacle containing the pupae and the cigarette tins as it varied several degrees in various parts of the biscuit tin itself.

PYRALIDAE AND MICROLEPIDOPTERA COLLECTED IN CYPRUS DURING 1920 AND 1921.

By KENNETH J. HAYWARD, F.R.E.S., F.R.G.S., F.Z.S.

(Concluded from p. 82.)

[NOTES ON THIS LIST OF CYPRIOT MICROS.—

Oxyptilus distans, Zeller, "gen. aest. *laetus*, Zeller." *Oxyptilus laetus*, Zeller, is a species distinct from *distans*, differing in genitalia.

Platyptilia rhododactyla, "Fabricius." Should be ascribed to Schiffermüller.

"*Alucita magadis*, Meyrick." There is no such species of *Alucita*. There is an *Orneodes magadis*, Meyr., known only from the Khasi Hills, Assam, where I have bred it from *Colquhounia coccinea* in Shillong: it is most unlikely to occur in Cyprus. Storey (*Bull. S. E. Egypte* 1914, 75: 1916) has recorded *O. magadis* from Maadi, Aswan, Egypt, but this record is almost certainly based on misidentification. I have an undescribed *Orneodes* sp. from Mount Troödos, Cyprus, but this is nothing like *magadis*, Meyr.

Agdistis meridionalis, Zeller, occurs in Cyprus, and I have specimens from Larnaka and Zakaki.

"*Blastobasis*" *oecophila*, Stdgr., belongs to the Gelechiad genus *Oecia*, Wlsm. 1897, and has nothing to do with *Blastobasis*. This latter remark also applies to the Gelechiad genera *Dichomeris*, *Sarisorphora* and *Neocorodes*.

Pleurota idalia, Meyr., of which I have a series from Limassol, is, according to Dr Amsel, not distinct from *metricella*, Zeller 1847, or *pungitiella*, H.S., 1854, both of which names probably represent only one species.

Apiletria luella, Lederer, certainly occurs in Cyprus: I have a specimen from Limassol.—

T. B. F.]

CONTREXEVILLE, VOSGES, FRANCE.

By E. SCOTT, M.D.

The late Rev. E. B. Ashby stayed at Contrexéville from 9th June to 29th June 1934, and recorded his experiences in the *Record*, vol. xlvii, nos. 1 and 3. He found the neighbourhood very rich in insects, particularly butterflies, including the Apaturids, *Limenitis populi*, *Melitaea maturna*, *M. aurelia*, and the local *Coenonympha hero*. I have visited Contrexéville on two occasions since Mr Ashby was there. My first visit was from 27th May to 1st June 1935, and the second from 7th to 12th June 1937 in the company of Mr A. M. Morley and Mr S. F. P. Blyth.

We are able to add the following species to Mr Ashby's list of Rhopalocera:—*Papilio podalirius*, *Thecla betulae* (larvae), *Strymon pruni*, *Heodes dorilis*, *H. rutilus*, *Cyaniris semiargus*, *Glaucopsyche cyllarus*, *Polyommatus bellargus*, *Plebejus argyrognomon*, *Cupido minimus*, *Vanessa cardui*, *Araschnia levana*, *Melitaea cinxia*, *M. dictynna*, *Pararge megera*, *P. maera*, *Erynnis tages*, *Syrictus malvae* and ab. *taras*, *Powellia sertorius*, and *Carterocephalus palaemon*.

I comment upon the following:—

Strymon pruni.—Appears to have been overlooked by Mr Ashby. We found it fresh and widely distributed from 7th June at suitable spots on the borders of woods where the sloe grew tall and thick.

Heodes rutilus.—This rare and beautiful butterfly was a welcome discovery. We only took four fresh specimens in a small area by the road to the Fm des Evêques. The road runs through marshy meadows bordered by woods. These meadows are the haunt of many butterflies and swarm at the beginning of June with *Erebia medusa*, *Euphydryas aurinia*, *Argynnis ino*, *Melitaea dictynna*, and others.

Coenonympha hero.—Is well distributed in the district with a preference for damp meadows and the grassy borders of woods. It is common by the road to the Fm des Evêques and in a wide glade through a wood known as La Grande Tranchée. The difficulty in procuring this insect is due to its short flight period. So far as Contrexéville is concerned, a good date is 1st June.

Limenitis populi.—Appears about 6th June and quickly becomes common. The ♀♀ somewhat later. It is easily taken in the morning at damp places on the roads, and has a habit of skimming along at about 2 feet from the ground. There is a damp spot at the lower end of the Lac de La Folie where it was always found to congregate.

Melitaea maturna.—Emerges about 6th June. We found it widely distributed, but nowhere common in 1937, but Mr Ashby met with it abundantly in 1934. The ♂ has a habit of flying swiftly along the roads, whereas the ♀ frequents flowers, more particularly those of dogwood and privet.

Mr Morley has compiled a list of 70 species of Heterocera (Macro) which he observed in the course of day collecting from 7th-12th June 1937. The following are not in Mr Ashby's List:—(Nomenclature from "Seitz").—*Proceris statices*, *Zygaena trifolii*, *Z. achilleae*, *Cyboria mesomella*, *Gnophria rubricollis*, *Lithosia sororcula*, *Diacrisia sanio*, *Arctia caja* (larvae), *Hypocrita jacobaeae*, *Orgyia antiqua* (larvae),

Stilpnotia salicis (larvae), *Lymantria dispar* (l.), *Malacosoma neustria* (l.), *M. castrensis* (l.), *Eriogaster lanestris* (l.), *Haemorrhagia tityus*, *Macroglossum stellatarum*, *Dicranura vinula*, *Pheosia tremula* (l.), *Hepialus humuli*, var. *grandis*, *H. hectus*, *Acrionicta aceris* (at Mirecourt), *A. megacephala*, *A. psi*, *Chaemaepara rumicis*, *Rhyacia pronuba*, *Polia nana* (dentina), *Aplecta nebulosa*, *Monima incerta* (l.), *M. gracilis* (l.), *Eustrotia olivana* locally common, *Gonospileia mi*, *Phytometra chrysitis*, *Laspeyria flexula*, *Zanthognatha tarsipennalis*, *Aplasta ononaria*, *Chlorissa viridata*, *Acidalia immorata*, *Ptychopoda macilentaria*, *Cosymbia annulata*, *C. linearia*, *Ortholitha mucronata* (palumbaria), *Cidaria montanata*, *C. spadicearia*, *C. pectinitaria*, *C. bilineata*, *C. hastata*, *C. tristata*, *C. alternata* (sociata), *Euchoeca nebulata* (obliterata), *Abraxas sylvata*, *Lomaspilis marginata*, *Campaea margaritaria*, *Opisthograptis luteolata*, *Boarmia repandata*, *B. punctinalis* (consortaria), *Chiasmia clathrata*.

It appears that this district is very promising for the entomologist and its possibilities are still largely unexplored. The neighbourhood of Contrexéville is exposed to a long and severe winter with a short spring before a hot summer commencing at the end of May. So far as I can judge, nearly all the butterflies that occur can be taken in June and July. One feature is the abundance of Melitaeids. We have taken 7 species and it is not unreasonable to expect that *phoebe* and *parthenie* occur there also. The country is undulating, with the hills rising to about 200 ft.-300 ft. above the valleys. The woods stretch in all directions and invariably clothe the tops of the hills, giving way in their turn to rough flowery slopes before the cultivated valley areas begin. As regards moths, Mr Morley comments that a locality that produces *Scoria lineata*, *Zygaena achillaeae*, *E. olivana* (argentula), *A. ononaria*, *C. viridata* and *A. immorata* in close proximity would repay further investigation.

COLLECTING NOTES.

COLEOPTERA TAKEN AT MUCKCROSS, NEAR KILLARNEY, IN MAY.—On 11th May this year Miss Dorothy Kirk and I crossed over to Ireland to spend a fortnight with my friend, Mr Edwin Bullock, at his estate, Flesk View, Muckcross, near Killarney.

The weather was not too good, as it rained most days, but only once all day long. Except on that occasion, we were able to get out part of each day collecting. The result is, I think, on the whole, rather good. Besides getting a nice series of the Cockchafer, *Melolontha hippocastani*, F., the main object of the visit, we obtained seven species new to my collection, one of which I believe to be new to science, and one new to Ireland.

The nomenclature is that of the Beare and Donisthorpe Catalogue (1904).

The following is a list of the species taken:—

CARABIDAE: *Carabus granulatus*, L.; *Badister sodalis*, Duft., and *B. dilatatus*, Chaud.; a series of this beetle was taken in a damp spot under wet leaves, etc. *Nebria brevicollis*, F.; *Bradycellus sharpi*, Joy; *Harpalus latus*, L.; *Pterostichus vulgaris*, L.; *P. anthracinus*, Ill.; *P.*

nigrita, F.; *P. gracilis*, Dej.; *P. vernalis*, Pz.; *P. striola*, F.; *Anchomenus marginatus*, L.; *Bembidium atrocaeruleum*, Steph.; *B. saxatile*, Gyll.; *Perileptus areolatus*, Cr., this species was first discovered in Ireland by Bouskell and the writer.

DYTISCIDAE: *Agabus nebulosus*, Forst., *A. bipustulatus*, L., these species were taken in the place where Bullock takes *Bidessus minutissimus*, Germ., which small water-beetle was not present owing to the earlier drought. It had not rained for some time before our arrival!

HYDROPHILIDAE: *Helephorus aequalis*, Th.; *Ochthebius pygmaeus*, F.

STAPHYLINIDAE: *Atheta cambrica*, Woll., and *A. subtilissima*, Kr., under stones and shingle in bed of river; *A. ignobilis*, Shp., in "birch-bracket" fungus; *A. fungi*, Gr.; *Tachinus rufipes*, De G.; *Mycetoporus lepidus*, Gr.; *Quedius cinctus*, Pk.; *Q. fuliginosus*, Gr.; *Creophilus maxillosus*, L., the var. *ciliaris*, Steph., was not uncommon under fish traps; *Staphylinus erythropterus*, L.; *S. caesareus*, Ceder.; *Philonthus proximus*, Kr.; *P. splendens*, F.; *P. varius*, Gyll.; *P. varians*, Pk.; *Gabrieus nigritulus*, Gr.; *G. trossulus*, Nor.; *Xantholinus punctulatus*, Pk.; *Lathrobium brunripes*, F.; *L. fovulum*, Steph., the specimens taken of this species all have very dark legs; *Medon*, sp. n., a single specimen was taken by Miss D. Kirk under stones in bed of river; it comes nearest to *M. pecteniventris*, Donis., but to my mind is distinct. The latter was found under stones on shingle at the sea-side in South Devon. I have been waiting for Bullock to capture more specimens before describing it. *Scopaeus erichsoni*, Kol., and *Thinobius longipennis*, Heer, under stones in bed of river. *Stenus buphthalmus*, Gr.; *S. brunripes*, Steph., in nest of *Myrmica ruginodis*, Nyl.!

SILPHIDAE: *Necrodes littoralis*, L., *Silpha rugosa*, L. (*S. dispar*, Hbst., did not put in an appearance; probably it was too early), and *Necrophorus vespillo*, L., under fish traps. *Silpha subrotundata*, Steph., and the ab. *castaneicolor*, Donis., under stones on walls, and on roads, etc. *Catops varicornis*, Rosen., a species new to Ireland, was swept in a meadow.

COCCINELLIDAE: *Halyzia 16-guttata*, L.; *H. conglobata*, L.

HISTERIDAE: *Hister cadaverinus*, Hoff.

NITIDULIDAE: *Epuraea aestiva*, F.

PARNIDAE: *Limnius troglodytes*, Gyll.

SCARABAEIDAE: *Aphodius constans*, Duft.; *Melolontha hippocastani*, F., on apple, oak, beech, and especially sycamore trees, also on roads. *Phyllopertha horticola*, L.

ELATERIDAE: *Cryptohypnus riparius*, F.; *C. dermestoides*, Hbst.; *Athous haemorrhoidalis*, F.; *Corymbites holosericeus*, F.; *C. quercus*, Gyll., and ab. *ochropterus*, Steph.

TELEPHORIDAE: *Telephorus rufus*, L.; *T. bicolor*, F.

CISSIDAE: *Cis nitidus*, Hbst., in "birch-bracket" fungus.

CERAMBYCIDAE: *Rhagium bifasciatum*, F.; *Gramoptera ruficornis*, F.

BRUCHIDAE: *Bruchus atomarius*, L., rather common by sweeping *Vicia cracca*. Fowler merely says "on flowers," and the Irish List only says "local" and no food-plant mentioned. Reitter gives on *Vicia* species: *Lathyrus* and *Orobus*. It seems as well to record the exact food-plant when possible.

CHRYSOMELIDAE: *Lema cyanella*, L., and *L. septentrionis*, Weise, by general sweeping; one specimen of the latter is partly melanic;

Chrysomela banksi, F.; *Gastroidea viridula*, De G.; *Galerucella tenella*, L.; *Phyllotreta flexuosa*, Ill., by sweeping; this appears to be a very rare Irish beetle. *Apthona nonstriata*, Goez., very abundant by sweeping *Iris pseudacorus*, and the ab. *aenescens*, Weise, and other colour aberrations not uncommon.

CURCULIONIDAE: *Liophiloeus nubilus*, F.; *Polydrusus cervinus*, L.; *Gymnetron labilis*, Hbst.; *Centhorhynchidius troglodytes*, F.; and *Rhopalomesites tardyi*, Curt.—HORACE DONISTHORPE.

EARLY DATES FOR GRASSHOPPERS.—Grasshoppers were adult unusually early here in 1938. *Myrmeleotettix maculatus*, 13th June; *Stenobothrus lineatus*, 14th June; *Omocestus viridulus*, 17th June; *Chortippus bicolor* and *C. parallelus*, 6th July. *Gomphocerus rufus*, however, was not adult before the first week of August, its normal time.—T. BAINBRIGGE FLETCHER, Rodborough, Glos., 11.viii.1938.

VELLEIUS DILATATUS, F., IN WINDSOR FOREST.—On 2nd September 1925 the late Miss Kirk and I found a small, recently deserted, hornets' nest in a hole in the base of a small tree. On pulling out the nest and sifting it over paper a large white, Staphylinid larva was discovered among the débris.* This I concluded was the larva of the hornet's nest beetle (*Velleius dilatatus*, F.). Dr Blair having confirmed this, I presented it to the British Museum (Nat. Hist.) for their collection of beetle larvae.

Whenever I have found hornets' nests in Windsor Forest since then, which is not very often, I have set traps,† such as I employed with much success in the New Forest, but I neither took the beetle nor its larva again. Usually the nest had been destroyed, or the tree cut down, etc., and in old nests I only found *Cryptophagus loevendali*, Gang.

On 21st July this year I at last took the beetle itself. I was collecting in a remote part of Windsor Forest, and on pulling up a bunch of dry fungi a large black Staph emerged from the roots and made a dash for cover under some dead leaves.

The short glance I got of it made me think it was *Velleius*, although I was very surprised at it occurring in such a situation. I quickly picked up and threw a handful of leaves, under which it had disappeared, into my net. True enough, on sifting these it proved to be the hornets' nest beetle. I may mention that it bit me severely, drawing blood from my finger, before I had bottled it.—HORACE DONISTHORPE.

SOME OBSERVATIONS ON A MIXED ACANTHOMYOPS (DENDROLASIUS) FULIGINOSUS, LATR., ACANTHOMYOPS (CHTONOLASIUS) MIXTUS, NYL., COLONY.—Early this year I decided to study a mixed colony of *Acanthomyops* (*Dendrolasius*) *fuliginosus*, Latr., *Acanthomyops* (*Chtonolasius*) *mixtus*, Nyl., which I had noticed one day last year. When I arrived at the nest, however, I could find no sign of the *Acanthomyops* (*Chtonolasius*) *mixtus*, though many *fuliginosus* ♂ ♀ were about.

**Ent. Mo. Mag.*, 63, 111 (1927).

†*Ent. Record*, 13, 330 (1901).

I visited the nest several times with the same result. On 28th May, when visiting the nest, I noticed the *mixtus* once more, wandering about the nearby trees with the *fuliginosus*, and took about 40 *fuliginosus* ♂ ♀ and about 30 *mixtus* ♂ ♀, putting them in an observation nest, that I might better observe the exact relations existing between the two species. When first put in the nest one or two ants started to fight, but this soon stopped; the different species intermingling freely.

At the time of writing the ants have been in the nest nearly three weeks, during which time I have observed several interesting things—a *fuliginosus* ♂ regurgitating honey to a *mixtus* ♂, also a *mixtus* ♂ cleaning a *fuliginosus* ♀, and so on. It definitely appears that the relations existing between the two species, in this instance, is similar to that existing between workers of the same colony.

As in the case observed by Donisthorpe (*Br. Ants*, 1927, p. 226) the *mixtus*, being a subterranean species, do not appear to mind the light under these circumstances, and are to be found ascending trees with the *fuliginosus*, which are going to milk aphides; though I did not actually see a *mixtus* milking an aphid.

It appears that the *mixtus* will eventually die out, since their numbers are so few in comparison with those of the *fuliginosus*, though, certainly, they do not seem to have diminished in numbers since last year; in fact, there seem to be rather more of them.

Although the *fuliginosus* have an ascendancy of about 40 to 1, the *mixtus* are to be found in fairly large numbers, since the complete *fuliginosus-mixtus* colony is very large.—B. D. W. MORLEY, Bourne-mouth.

CURRENT NOTES.

CORRECTION.—On p. 133 of the *Entomologist* occurs a misstatement concerning the *Entomologist's Record*. Mr Warren *did not initiate* the discussion on Nomenclature as stated there. Our readers will know that the Rev. G. Wheeler began the discussion in October 1937, and it was continued by Brig.-Gen. Cooke in November. Mr Warren's contribution came to hand in December, but could not be published until February.

A meeting of The Entomological Club took place at 1/5 Albany, Piccadilly, on Tuesday, 31st May 1938, Mr R. W. Lloyd in the chair. *Members* present in addition to the Chairman—Mr H. Donisthorpe, Mr H. Willoughby Ellis, Mr J. E. Collin. *Visitors* present—Dr K. G. Blair, Dr Karl Jordan, Sir Guy A. K. Marshall, Dr S. A. Neave, Mr Otter, Capt. N. D. Riley, Mr W. Rait-Smith, Mr W. H. T. Tams. The meeting was called for 7.30, at which hour the members and guests arrived. Dinner was served at 7.45. After dinner, the Chairman's collections of Lepidoptera and Coleoptera were inspected, and many of the party took the opportunity of specially looking at portions of the Coleoptera, which contained rare specimens collected by the Chairman many years ago. A further collection of Coleoptera, made in the neighbourhood of the Chairman's country seat, Treago Castle, was

also on view. This district, but little worked in the past, would appear to be a very prolific spot for species of that order. Other visitors were interested in the works of art which surrounded them. Mr W. Rait-Smith was elected a member of the Club. The party broke up at between 11 and 11.30, after a very pleasant and most entertaining evening.—H. WILLOUGHBY ELLIS, Hon. Secretary.

In Part 4 of Vol. 5 of the *Trans. Society for British Entomology*, in a paper on "Some Relations of British Coleoptera to their Environment," Mr Geo. B. Walsh shows that the rate of loss of water in beetles is dependent upon the size of the elytra. This is particularly well seen in the case of the Brachelytra, which show little resistance to drought conditions, and which are almost invariably found in a damp environment.

This is a most interesting conclusion, for the Dermaptera, which so closely resemble the Brachelytra, are also dependent upon moisture. They are exceedingly scarce in arid countries, and where they do occur, as in the case of the specially hygrophilous *Labidura riparia*, it is exclusively in the few spots where there is some water.

Mr Walsh's observation that even sandhill beetles, living in an arid habitat, exposed to the full force of the sun, always chose the damper parts, and the statement of Dr Blair, that in the sandhills of N. Devon they burrow deeper in April, is in accordance with the specialised line of evolution of the Coleoptera in the arid districts of Central Asia.—M. B.

Dr Aurivillius in Seitz *African Rhopalocera*, V, 204 (1912) makes these remarks—"The action of some lepidopterists in regarding the first species (in a genus) as typical takes no notice of the whole previous history of the name and would consequently occasion the most wholesale and unnecessary revolutions in the existing appellations of the commonest butterflies. Among Linne's generic names we should have to employ *Papilio* for *priamus*, *Sphinx* for *ocellata*, *Bombyx* for *atlas*, *Noctua* for the Cossid *Duomitus strix*, *Geometra* for *lactearia*, *Tortrix* for *Hylophila prasinana*!!, *Tinea* for *Aphomia sociella* (a Pyralid) and in other insects the alterations would be quite as great. Among other generic names we should have to use *Pieris*, Schrnk. for *apollo*, *Hesperia*, Fb. for *cupido*, *Cupido*, Schrnk. for *virgaureae*, *Erebia*, Dlm. for *aegeria*, *Euploea*, Fb. for *plexippus*, etc. It is therefore to be hoped that everyone will strongly oppose this doctrine." Here is one source of the present chaotic condition of our nomenclature.—HY. J. T.

In the last few numbers of *Zeits. Oestr. Ent.-Ver.* a detail examination of the species in the two genera *Lithosia* and *Pelosia* has been in course of publication. In July this was concluded and the species were placed in groups as follows:—LITHOSIA—Section 1: *deplana*, Esp.; Sect. 2: *interposita*, Roths.; Sect. 3: *unita*, Hb., *pallifrons*, Z., *lutar-ella*, L., *flavociliata*, Led., *complana*, L., *lurideola*, Zinck., *caniola*, Hb.; Sect. 4: *szetchuana*, Stern., *griseola*, Hb., *affineola*, Brehm.; Sect. 5: *cereola*, Hb., *sororcula*, Hufn.; Sect. 6: *bipuncta*, Hb. PELOSIA—Sect. 1: *muscerda*, Hufn.; Sect. 2: *ramosula*, Stdgr., *angusta*, Stdgr.; Sect. 3: *noctis*, Btlr., *obtusa*, H.-S., with race *sutschana*, Stdgr. There is a plate of detail and text figures.

Apropos of the above, the name *pallifrons*, Zell., should be replaced by *pygmaeola*, Dbldy. Herr B.-J. Lempke points out (*Lamb.*, June 1938) that Zeller described *pallifrons* in November 1847, *Stett. e. ztg.*, p. 339, Doubleday described *pygmaeola* at the end of October 1847, *Zool.*, p. 1914 ("on sale three days before the end of every month") hence the November number of the *Zool.* was published on 28th October, and the name *pallifrons* becomes a synonym of *pygmaeola*. This statement has been verified by Mr Tams, *Lamb.*, June 1938, p. 126.

In 1923 there appeared in the *Deuts. Ent. Zeits.* of Berlin a most useful supplement on the "Macrolepidoptera of Digne," by Rudolf Heinrich. It was an excellent account of the Lepidopterous Fauna of that neighbourhood. In 1928 a series of additional records was issued in the same periodical. And now we have recently received from the author a copy of his further contribution to our knowledge of this neighbourhood, some 40 pages of matter from all sources, together with his further experiences. The 3 portions make a valuable book of 250 pages for collectors who intend to visit this area so wonderful for its abundance of Lepidoptera.

Three parts, Nos. 2, 3, and 4, of *Trans. Soc. Brit. Ent.* have reached us. (2) "A Revision of the British Species of the Genus *Hygrocryptus* (Ichneumonidae)," by G. J. Kerrich, with a plate. (3) "A Revision of the British Sawflies of the Genus *Empria*," by R. B. Benson. (4) "Some Relations of British Coleoptera to their Environment," by G. B. Walsh. Such contributions are extremely intensive studies of small groups, and most useful steps in the progress of our entomological science.

A most interesting account of the Life of the late Lord Rothschild, a Memoir issued in the *Novitates Zoologicae*, by Dr Karl Jordan, F.R.S., has reached us. It contains 13 portraits, an account of the contents of the wonderful Tring Museum, and a List of all articles written by Lord Rothschild from 1894 to 1925.

In the *Can. Ent.* for June Dr McDunnough criticises a number of Lord Walsingham's Plumes of the genus *Oidaematophorus*.

The Literature of Entomology continues to grow apace. There has come to our table recently the 2 volumes of *Opuscula Entomologica*, a new periodical established in 1936 as the quarterly publication of the Societas Entomologica Lundensis, Sweden. The contents deal with all Orders and are mainly in the Swedish language, but many articles are in German, French, or English. One of the most important to us, perhaps, is a long article on Gelechiid larvae dealt with from a morphological point of view rather than from the usual colour and pattern of markings. There is considerable diagrammatic illustration in many articles. The production is good; the print large; size small quarto; vol. II contains 152 pp. in the four parts.

The *Verhand. Zoo.-bot. Gesell. Wien*, 1936-7 (2 years) has recently appeared. As usual, it contains much general natural history matter.

Herr Franz Heikertinger has a comprehensive and critical memoir on the "Mimicry of the Rhopalocera of S. America," more particularly with reference to the Pierid genus *Dismorphia*. It is illustrated by 58 figures in the text and reviews the literature on the subject from Bates' classical contribution in the *Trans. Linn. Soc.*, 1862, to the present time.

REVIEWS.

A MONOGRAPH OF THE BRITISH ABERRATIONS OF THE CHALK HILL BLUE BUTTERFLY (*Lysandra coridon*, Poda), by P. M. Bright, J.P., F.R.E.S., and H. A. Leeds; pp. 120, 400 figs. on 18 plates, four of which are coloured; £3 3/-; (4to); Bournemouth.—This elegant, extremely well-produced book is an attempt to standardise descriptive nomenclature of the aberrational forms of the "blues." The authors have taken an immense amount of trouble and care to select a large number of simple descriptive terms, which, singly or in combination, can be applied to any aberrative form which has occurred, or may occur, in any species of Lycaenid, not as a name, more or less inapplicable and noninformative or often stupid, but as clear and precise information of the individual characters of the specimen in question. The common "chalk hill blue" was adopted as the basis of the application of the terms, and the whole of the figures on the plates are taken from that species, but a considerable number of examples of other species are dealt with in the text, in an attempt to show that these descriptive terms can be applied to the *Lycaenidae* in general. If entomologists will cease to name and to use the names already given to Lycaenid aberrations and refer to them under these particularly informative terms, a step will be really taken to clarify our nomenclature. The colour plates are as near the natural coloration as is possible with this difficult species, and the general perfection of the plates is a credit to all concerned in their production. The text is wonderfully clear in the display of matter, and the references, cross references, and so forth are everything that could be desired. Descriptions of the upper and under sides of both male and female typical forms are given and under each of these four headings the aberrational characters are classified. But why is the noninformative name *fowleri* not superseded by a descriptive term? The Law of Priority fortunately is not applicable to descriptive terms. One can understand the retention of *roystonensis*, which signifies an intersex. Special phenomena are dealt with by their chief specialist exponents, Mr F. N. Pierce, the Scaling; Dr E. A. Cockayne, Homoeosis, Gynandromorphs, and Intersex; and a Foreword is included from Mr S. G. Castle Russell, who saw the work through the Press. There is one regret which a perusal of the List of Subscribers gives rise to and that is the few who support individual effort among entomologists of the present day. Is it that the amateur, the origin and backbone of all our societies and all our entomological activities, is giving way to the professional? We must mention the fact that for more than 20 years Mr H. A. Leeds, enduring much physical suffering, has given "whole-hearted and painstaking attention" to the necessary details

of this work, and well deserves the congratulation afforded him in the text.—Hy. J. T.

THE GENITALIA OF THE BRITISH PYRALES WITH THE DELTOIDS AND PLUMES. By F. N. Pierce and Rev. J. W. Metcalfe. Pp. xiii + 69 + Frontispiece + 29 Tabs. F. N. Pierce: 21st June 1938.—This book is a continuation on similar lines of those issued on the Noctuidae (1909), Geometridae (1914), Tortricina (1922), and Tineina (1935), and supplements the first volume by including an account of the relatively few British Hypheninae or Deltoids, which were then omitted from the Noctuids. In all these books the authors have placed on record work of permanent value regarding the genitalia of our British Lepidoptera and it can only be regretted that their work seems to be unappreciated by our lepidopterists, judging from the very short list of subscribers (49 names for 51 copies) to this last volume. Have we really less than thirty who take any interest in these groups? Is it that most British lepidopterists are mere collectors, interested only in naming their specimens on superficial characters? Or do they consider that the study of genitalia is too tiresome or too complicated for their attention? Such study is undoubtedly difficult, and Mr Pierce, with his familiarity with their complexities during his work with them for the last fifty years,* perhaps fails to realize the difficulties encountered by the student who commences their study *de novo* and endeavours to make out the different structures here described and figured. On p. xi he says:—"We have been asked to give a diagram explaining the names used for the various parts of the genitalia. This would be easy if the parts were always separate, but they are often so fused and pushed out of place that it is a very difficult matter to decide to which part they belong. We might compare the difficulty with that of providing a single diagram of the wings of all Lepidoptera with their manifold forms." This analogy is not a good one, as most text-books find no difficulty in providing a diagram showing form and pattern of wings. If the specialist finds it "very difficult to decide," what of the beginner? I would suggest that this point might be met by indicating the salient structures on the diagrammatic figures on the plates. On p. 50, for example, we find *Alucita*, "Uncus with Gnathos," *Oidaematophorus*, "Valvae without Gnathos"; on turning to the figures of *pentadactyla* and *lithodactylus* on plate 27, the student is left to solve the puzzle of "where and what is the Gnathos"? A dotted line on the figure of *pentadactyla*, drawn from this structure to a letter or numeral in the margin, would elucidate this at once. With such indication the student would be helped and perhaps become sufficiently interested to pursue his studies of these structures, instead of being repelled by the apparent incomprehensibility of the subject.

Another minor criticism concerns such statements as "we have not seen the type" of *Trichoptilus* (p. 44) and of *Agdistis* (p. 53) and "we have only seen one species" of *Marasmarcha* (p. 53). The genitalia of *T. pygmaeus* have been figured by Lindsey and material of all these species was available if known to be required. Admittedly, the book would not have been finished yet if every possible side-avenue had been fully explored.

*F. N. Pierce. The determination of species of Lepidoptera by examination of their Anal Appendages (*Young Naturalist*, X, 51-56: March 1889).

There are various misprints, most of which are obvious, but the term "coremata" is wrongly written "coremeta" throughout.

Besides describing and figuring the genitalia of both sexes of the species dealt with, this volume essays to be a classification of the British Pyrales, Deltoids and Plumes, based on the structure of the male and female genitalia. The essence of classification is grouping and the older authors employed colour and pattern, together with the shape of wings, antennae and palpi, as the main characters for generic differentiation. With the acceptance of the theory of evolution, such systems ceased to be merely the lumping-together of species that looked more or less alike and became attempts actually to express the degree of relationship of one form to another, that is, they attempted to express the actual phylogeny of organisms. Superspecific categories (e.g., genera, families) are subjective concepts and it is often merely a matter of personal opinion of the taxonomist as to how the species are best grouped to indicate their relationships. One worker will tend to multiply groups by insistence on differences which are regarded by another worker as outweighed by resemblances, and the happy mean between "splitting" and "lumping" can only be arrived at by careful consideration of all the evidence that can be obtained. We can, therefore, only expect that a system of classification founded on any single character (whether genitalia or neuration or larval setae, to name only three) is unlikely to arrive at a result identical with that reached by consideration of other sets of characters. In the present case Mr Pierce has boldly recast the genera and families from genitalic characters only. That his system (or any system arrived at from consideration of only partial data) is incapable of improvement few will concede; but we may all agree that it is a valuable contribution to the general subject. That his system agrees fairly well on the whole with classification arrived at on other grounds seems to indicate that the broad lines of our classification are fairly correct. When we descend to details, the reasons for some of his conclusions are not always very evident: thus (p. 41), we find that "there is little to separate" *Zançlognatha* from *Pechipogo*, which is "closely connected" with *Laspeyria*. Then why separate them? Conversely (pp. 50-52) we find under *Oidaematorphorus* eleven species, which, on other characters, are usually grouped under at least four generic names. In the one case, similarity seems to be no bar to separation; in the other case an equal or less degree of similarity is held to prevent separation.

The "List of Generic Names with their Types" is perhaps rather out of place in a book of this sort, but we may note that Mr Pierce has definitely fixed the genotypes of a few genera (e.g., *Notarcha*, p. 24). As for *Bomolocha*, "Type still to be cited," Moore specified *crassalis* as type in 1885 (*Lep. Ceylon*, iii, 221), and it may have been fixed before that; Lederer apparently restricted it to *crassalis* in 1857 (*Noct. Eur.*, p. 214).

The authors state that the next group, with which they hope to deal, will be the [Sphingidae and] "Bombyces," to which we shall look forward with the hope that such a volume will receive much better support from subscribers, as it must be disappointing to the authors to produce so much good work with so little apparent appreciation.—T. BAINBRIGGE FLETCHER.

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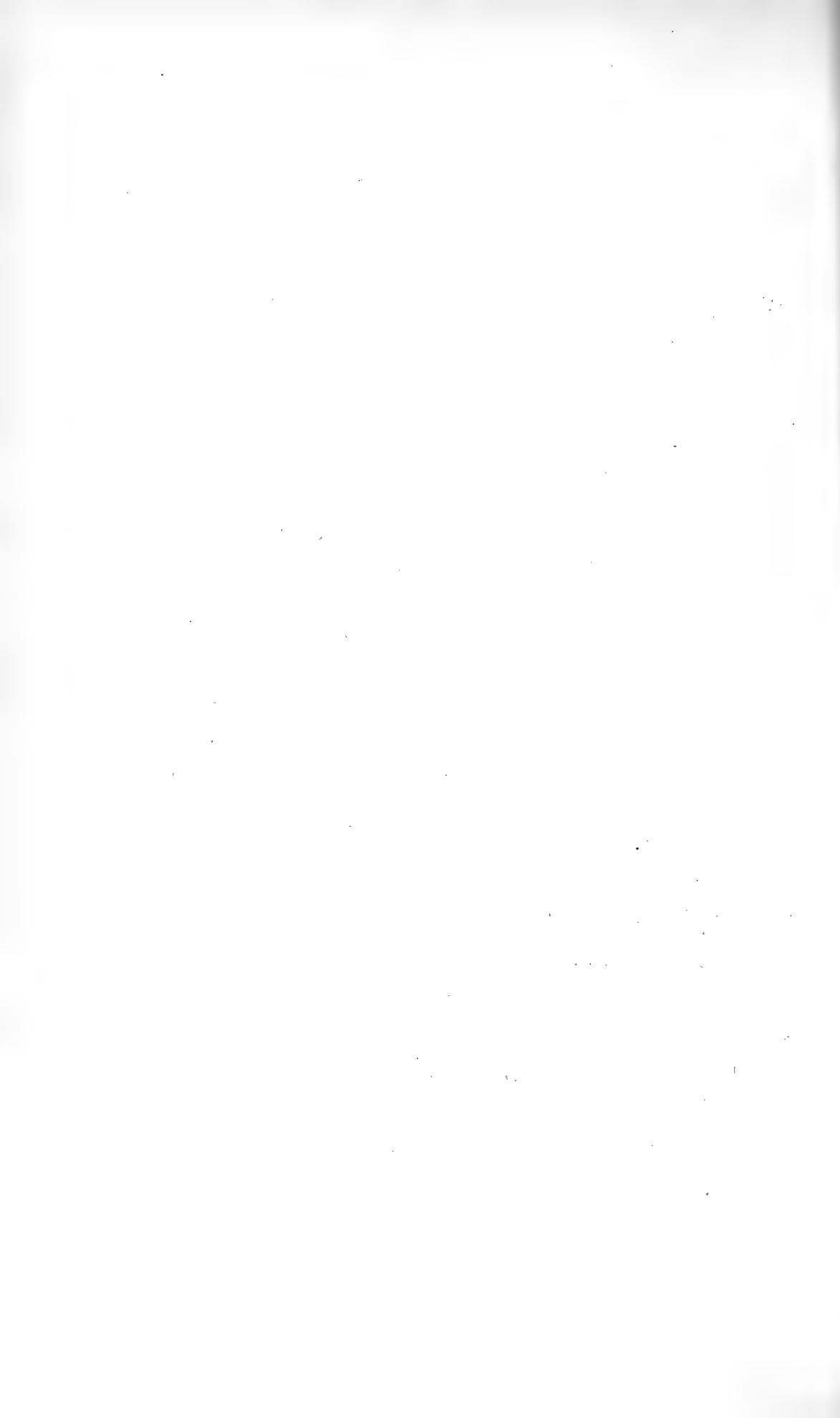
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The Entomologist's Record and Journal of Variation

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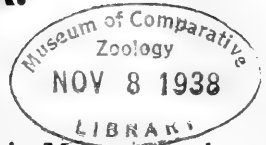
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PROLOGUE.



Fifty years have sped by since the Founder of this Magazine, the late J. W. Tutt, launched its first number into the Entomological world. It rapidly established its right to live, and it was not long before it became well known on the Continent and beyond the seas. The lamented death of its first Editor, in January of the year 1911, just after he had been elected to the Presidency of what is now the Royal Entomological Society of London, was a blow that was hard to recover from, but the panel of Editors succeeded in maintaining the standard set up by its Founder, and the *Entomologist's Record* now finds its way across the Atlantic and, in fact, nearly round the world. During its half-century of progress we have lost by death two other of its Editors, the Rev. C. R. N. Burrows and Dr Chapman, both of whom held positions that are still vacant.

In the present stress of life there seem to be fewer amateur entomologists than there were a generation ago, and we can only hope that this will rectify itself in the process of time, for it would be a thousand pities if the study of this branch of science were confined to professional entomologists only.—G. T. BETHUNE-BAKER (Editor Emeritus).

FIFTY YEARS OF ENTOMOLOGY, 1888-1938.

By A. D. IMMS, F.R.S.

The reader may be reminded that during the half-century covered by this short review entomology shed much of its obscurity and attained its present status and importance as a branch of zoology. Thus the fifty years of existence now heralded by the *Entomologist's Record* mark also a veritable jubilee of entomology itself.

Harking back to the year 1888, we are in a period when the progress of entomology in England was being upheld by the amateur. The names of Chapman, Godman, Lubbock, McLachlan, Merrifield, Sharp, and Verrall, to mention but a few, afford ample testimony. The leading, and almost the only, English text-book of the subject at that time was J. O. Westwood's "Introduction to the Modern Classification of Insects." Its two volumes had appeared as long previously as 1839-40, but their standard of excellence gave them a long lease of life.

The current teaching of entomology in England was of a perfunctory kind and was mostly limited to a few lectures in the general zoology course. Under the influence of T. H. Huxley, the type system of instruction in zoology had become established. This led to the adoption of the cockroach as representative of insects and, beyond an account of this creature, only a few generalities were imparted. Huxley's teachings inspired Miall and Denny to reinvestigate this type in some detail in their book "The Cockroach," which appeared in 1886. A new edition is now long overdue.

In the year 1888 there were no official economic entomologists in

England and the Board of Agriculture was as yet unestablished. It was mainly left to the private initiative of Miss Eleanor A. Ormerod to diffuse knowledge about injurious insects. Over in France Professor Brocchi, of the Institut Agronomique in Paris, dealt with any questions bearing upon economic entomology which the Ministère d'Agriculture referred to him. In the United States things were on a different footing; economic entomology was already well entrenched as a branch of agricultural activity. The names of Riley, Fitch, Hagen, Comstock, Packard, and Fernald are among those of luminaries of 1888—and they were all professional workers in the subject. Canada had its Department of Agriculture and had recently appointed James Fletcher as its entomologist and botanist.

It will be convenient to follow very briefly the development of some of the branches of entomology up to the present time. Text-books are "tools" of paramount importance; a sound work collating knowledge is an invaluable aid and a stimulus to progress. A fitting successor to Westwood's two volumes was David Sharp's treatise "Insects" in the Cambridge Natural History (1895-1899). Like Westwood, Sharp had published much on entomology before bringing out this work, which represents the fruits of much first-hand knowledge. Sharp's American contemporary, A. S. Packard, gave the world in 1898 the first book of comparative insect anatomy and physiology. His scholarly "Text-book" is among the best on insects which has emanated from the United States. It found a fitting successor in 1935 when R. E. Snodgrass published his "Principles of Insect Morphology." Two years earlier H. Weber had produced his "Lehrbuch der Entomologie"—a work of outstanding merit. In France L. F. Hennequy's "Les Insectes" was published in 1904, and in Italy the year 1909 saw the first volume of Antonio Berlese's "Gli Insetti"—an unsurpassed storehouse of facts replete with morphological and other detail. The extensive German "Handbuch" by Schroeder (1925-28), A. D. Imms' "General Text-book of Entomology," whose first edition came out in 1925, and J. H. Comstock's "Introduction to Entomology" are among the few other comprehensive books which have appeared. During much of the period under review the study of morphology has been paramount, but a significant change of viewpoint is evident to-day. A rapidly growing interest is being shown in insect physiology and a vast literature on this subject already exists; much of the older work is giving way to newer results based on greatly improved experimental technique. Words written in my 1937 address to the Royal Entomological Society of London on this subject may be fittingly quoted here.

"The applied entomologist in his efforts to find a surer foundation than purely empirical methods for the control of noxious insects, is devoting attention to the possibilities of insect physiology. He is realising that the most promising line of approach lies in a better knowledge of the inner working of insects themselves. The growing importance of insects as carriers of disease organisms of man and domestic animals is likewise creating a demand for similar knowledge. Applied entomology, therefore, as a whole, in its need for information of this kind, is focusing the attention of many workers on physiological problems. It needs also to be remembered that the rapid growth of the experimental viewpoint among general zoologists is another contribut-

ing influence, since an increasing number of zoologists is being attracted to the study of problems of a physiological nature afforded by the insect world. Already, more than one academic body has been led to provide for some measure of teaching and research in insect physiology. A very large literature on the subject in question is appearing in an extraordinary diversity of periodicals, many of which it has not been previously necessary to consult in connexion with entomology at all. The future burden of the worker in insect physiology of keeping pace with this literary growth seems likely to become increasingly difficult for this reason. One result from this increase in physiological knowledge seems to be that the morphologist will become better able to develop his subject, since it will be in the light of increased acquaintance with basic functions. Growth of physiological knowledge, also, is likely to involve the re-examination of many features of the minute structure of insects, with possibilities of interpretations being made from another angle of vision. In connexion with the foregoing remarks, reference needs to be made to an introductory manual of insect physiology by V. B. Wigglesworth, published in 1934. It formulates what is virtually a new subject and co-ordinates much scattered information, not readily accessible, or easily evaluated."

Among the more important achievements in insect physiology may be included A. Krogh's demonstration in 1920 of the significance of the physical process of diffusion in respiration. Also, the discoveries by various experimentalists of the presence in insects of what are comparable with the endocrine organs of vertebrates are noteworthy. We are beginning to realise that the influences governing moulting, metamorphosis and the proper growth of the gonads are internal secretions. Since such secretions are discharged into the blood they are comparable with hormones of the endocrine type. We have evidence that the small paired bodies known as corpora allata, in association with the sympathetic nervous system, just behind the brain, are endocrine organs and the seat of, at any rate, some of the secretions involved. Several recent workers in Germany have studied the physiology of colour change in the common stick insect, *Carausius morosus*. This creature is able to alter its general coloration in response to sudden changes in its surroundings, becoming dark or pale as the case may be. The response is effected by movements of pigment in the integument cells. The primary sensation of the background colour is received by the eyes from which an impulse is transmitted to the brain and induces the secretion of a hormone into the blood. Mention needs also to be made of Wigglesworth's suggestive work (1932) on the functions of the rectal glands which have long remained an unsolved problem. This experimenter brings forward evidence that the function of these organs is the absorption of water from the excrement and in this way facilitating its conservation when necessary. In sense physiology the life-long studies of von Frisch on the behaviour of the hive-bee are familiar to many while a new approach towards the solution of the functions of sensory receptors is being made by modern workers in Cambridge by isolating such organs from the rest of the nervous system. Sensory impulses in the nerves are recorded by means of an amplifier and Matthews oscillograph. By this means Pringle, a short while ago, showed that the campaniform organs (or so-called "olfactory pores") are not olfactory as usually

thought but function as "stress receptors," registering tensions and strains in the cuticular skeleton at the joints.

In other fields the great problems of evolution, natural selection and adaptive coloration have attracted wide interest. In these connections no name is better known than that of Sir Edward Poulton whose labours have extended continuously through the half century under review, up to the present time. W. M. Wheeler, of Harvard University, brought rare acumen and philosophic insight to bear in interpreting the origins and evolution of social behaviour in insects. P. Marchal in 1904 and F. Silvestri in 1906 made fundamental discoveries on polyembryony, elucidating its essential features and bringing to light one of the most remarkable of biological phenomena. The abilities of Silvestri enabled him to cover a wider field of research than any of his contemporaries. With his name is associated the discovery of the only two new orders of insects brought to light for many years. In the Protura and Zoraptera are minute forms of more than ordinary interest. The name of J. Pantel must be included among the outstanding investigators of the period. His splendid studies of the life-cycles and host-relations of Tachinid flies broke much new ground between 1898 and 1910. Among very recent advances the phase theory of locusts, so closely associated with the name of B. P. Uvarov, is of far-reaching significance. J. C. Faure and others have established Uvarov's contentions on both biological and morphological grounds. The whole phase idea has proved a fertile stimulus to research along diverse lines. The names of other outstanding workers, who have contributed to the advance of fundamental knowledge of insects, must be passed over owing to the exigencies of space.

Passing now to taxonomy we find that to-day, just as fifty years ago, this branch of entomology claims more devotees than any other aspect of the subject. Its home is in the great museums of the world—but outside these walls it is very little fostered by universities but still has a large following among non-professional workers. The international code of nomenclature as we know it to-day did not exist until 1889 when the parasitologist, R. Blanchard, initiated the beginnings of the present system which was brought forward at the First International Zoological Congress at Paris. Fifty years of taxonomy have witnessed an enormous addition in the number of descriptions of genera and species of insects. Taking the single order Coleoptera it will be remembered that between 1868 and 1876 Gemminger and Herold were able to catalogue the 77,000 species of this order in twelve volumes. Over 60 years later when a new catalogue of the world's species came to be compiled it was found to require 30 volumes and about 40 collaborators to list 240,000 species. The accumulations of described genera and species in all the major orders of insects seem to be growing too unwieldy for that essential stock-taking process known as monographing except as family or lesser units. We may ask whether Seitz's Lepidoptera and Lindner's "Palaeartic Diptera," with their numerous collaborators, will be the last of their kind. Both works have overtaxed the financial resources of some libraries in endeavouring to keep pace with their issues. The rapid growth of applied entomology has led to an enormous demand from all over the world for the services of the taxonomist. The naming of material is often of urgency and it may

as often as not entail the description of new species and genera. As S. A. Neave has pointed out, in his 1936 address to the Royal Entomological Society of London, these demands are quite impossible of satisfaction with the existing staffs of museums and kindred bodies. The outcome of this situation will be a slowing down of entomological progress unless the means are forthcoming for providing for the services of many more systematists.

The growth of knowledge of insect life of past ages would require a long article to do it justice. A definite landmark in insect palaeontology was the appearance in 1908 of the great volume of Anton Handlirsch entitled "Fossilen Insekten." This work collated and reviewed all that was known on the subject up to that time. After an interval unmarked by much progress the last fifteen years have proved extraordinarily fertile in new palaeontological discoveries, especially from rocks of Permian and Triassic ages. Largely through the energies of R. J. Tillyard, A. B. Martynov, and F. M. Carpenter, whole faunas of insect life of the past have been disclosed; strata hitherto unproductive of insect remains have proved remarkably rich; new orders have come to light and the ancestry of many existing groups traced back into remote ages.

The well-known discovery of Sir (then Major) Ronald Ross in 1897 of the carriage of the malarian parasite by *Anopheles* mosquitoes was the forerunner of a long series of later discoveries by many workers. Thus the great importance of insect-borne diseases in the Tropics came to be recognised. Schools of tropical medicine, each with teachers of medical entomology, were established at Liverpool and at London. The German Government later established a similar institution at Hamburg. Among other schools of this type must be included those at Harvard and other Universities in the United States and the Oswaldo Cruz Institute in Rio de Janeiro.

Another important event was the establishment of the Entomological Research Committee (Tropical Africa) in 1909 which was the forerunner of the present Imperial Institute of Entomology. The importance of this Institute not only to the British Empire but also to the whole world wherever entomology is concerned is well known. Another official organisation of great importance is the U.S. Bureau of Entomology which has more entomologists under its jurisdiction than are employed in the whole of the British Empire. The rise of this Bureau can be traced back to 1894 when L. O. Howard became chief of the Division of Entomology as it was then called. Under his wise and broadminded guidance and control it has risen to its present position of commanding importance. Dr Howard has the good wishes of the whole world of entomology in his retirement which took place a few years ago.

The introduction in 1889 of *Vedalia cardinalis* into California, in order to repress the cottony cushion scale, resulted in the first conclusive example of the biological control of an injurious insect. The success achieved as the result of this project led to a rapid application of the principle upon which it is founded to other countries. The striking results achieved in the Hawaiian Islands and very recently in Fiji, in combating various pests by biological means, rank as one of the most interesting chapters in applied biology.

Between 1889 and 1895 a number of government entomologists were

appointed in different parts of the British Empire but it was not until 1912 that the English Board of Agriculture, as it then was, appointed its own entomologist. To-day there are between 300 and 400 professional entomologists in the Empire. The Great War proved a real stimulus for the furtherance of the applied sciences including improved methods in agriculture. These in their turn resulted in an increased demand for trained men. In the case of entomologists the demand for the services of trained men outstripped the supply. Furthermore, the universities and colleges had neither the staff nor the laboratory equipment for the proper training in methods and research. Matters improved a good deal and now most universities make provision for at least some advanced entomological teaching. At the present time the demand for trained entomologists has very noticeably declined. Most of the existing appointments are filled by relatively young men: the economy campaign which came as a repercussion of post-war extravagance resulted in the closing down of a number of posts while allocations for new work were cut down all round. This state of affairs has persisted to a considerable degree ever since, and, coupled with the general uncertainty in international affairs, has left the outlook for entomology as a profession in a rather unpromising phase.

Possibly one of the most convincing methods of estimating the growth of a subject like entomology is by comparison of the contents of the yearly volumes of the Zoological Record. Thus, in the volume for 1888, the titles of 941 entomological papers are listed whereas that for the year 1936 (the most recent available volume) has the titles of 3725 papers entered. These figures speak eloquently for themselves. It is also noteworthy that, with the exception of the publications of certain old-established entomological societies, almost all the leading entomological journals are considerably younger than the *Entomologist's Record*, in fact very few date before the year 1900. The number of new entomological journals multiplies annually, without attempts to concentrate efforts on an individual group or subject, and consequently the burden of searching the literature is an ever increasing one. Even during the short period 1934-1936 no fewer than fifteen new periodicals devoted to entomology were launched. It is true that one is already defunct while some others seem little likely to survive on their intrinsic merits—nevertheless, the "residue" represents a substantial addition to periodical literature for so short a time. It is, on the other hand, to be regarded as an expression of vitality and of the importance of the subject in connection with human affairs.

This rather disjointed expression of personal views and impressions is concluded with congratulations to an old friend in the person of the "Editor Emeritus," G. T. Bethune-Baker, and to those others associated with the production of the *Entomologist's Record*.

The Editors much desire to obtain for each number:—Short items of entomological news, short notes on collecting results, and on results at dusking, sugar and light, unusual occurrence, and short observations. Readers are favourably disposed to such. Especially do we want notes from our microcollectors, and we would like to see more records of Diptera.

THE STUDY OF MICROLEPIDOPTERA.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

The *Record* commenced its existence in April 1890, not quite fifty years ago, but in any general, albeit brief, *résumé* of the study of Microlepidoptera it is better to go back some ten years earlier. Up to about 1880 the systematics of the Micros. had followed along much the same lines as in the case of other Lepidoptera, various authors having used external and obvious characters, such as colour, shape of wings, antennae and palpi, as a basis of differentiation of families and genera. Herrich-Schäffer, in the fifties, had realised the value of neuration characters and was followed by Heinemann and Wocke, but, although Stainton illustrated these characters in his book on British Tineina (1854), he made no use of them, nor did Zeller and most other authors of that date. With the general acceptance of the Theory of Evolution, the importance of neuration as indicative of phylogenetic affinities, and not merely as an aid to classification, was recognized by Meyrick first in his work on Australian Microlepidoptera (1879→) and afterwards, as regards the British species, in his *Handbook* (1895). So far as the British species are concerned, this *Handbook* represented the first attempt to arrange them in any natural classification, and it certainly acted as a stimulus to their taxonomic study, although regarded as revolutionary at that time. Meyrick's first scheme of arrangement was gradually modified and improved by further study of European and Exotic forms, as can be seen by comparison of his *Handbook* (1895) and *Revised Handbook* (1928) of the British species. The arrangement of the European species was largely recast by Arnold Spuler, whose book, "Die sogenannten Kleinschmetterlinge Europas" (1903-1910; republished separately 1913), contains no analytic keys, a want which has been supplied by Hering's two volumes in *Die Tierwelt Mitteleuropas* (1932), which include all the Central-European Lepidoptera. The North American Microlepidoptera (or a large proportion of them) have also been rearranged in Forbes' *Lepidoptera of New York* (1924). All these three systems, although mostly based on neuration characters, differ in details, principally in classification of some of the smaller and lower groups, and are not easy to correlate—a difficulty which is not decreased by the different terminology of the venation used by each author. Doubtless each prefers his own, but Herrich-Schäffer's notation is so simple that it is difficult to see what advantage is gained by any alteration: thus, Fw. vein 7 (H.S.) becomes II.5 (Spuler) and R.5 (Forbes: Comstock-Needham).

More recently, the study of the genitalia has been employed by some (*e.g.*, Pierce 1922, 1935, 1938) as a basis of classification; but, although the genitalia are useful for specific differentiation, it seems doubtful whether we know sufficient of this subject to employ it for separation of higher categories; at present, the species, of which the genitalia have been studied, form a very minute proportion of those described—and the species described are only a small fraction of those existing. Larval characters have also been used (Dyar, Chapman, Fracker) and also pupal characters (Chapman, Mosher), but in these cases also the proportion studied is very minute. All such characters must be considered and will doubtless be used to a larger extent as

knowledge increases, but we may be certain of one thing, that no finality in classification will be reached in our time. The thorny subject of Nomenclature has been tackled by Walsingham and Durrant (*E.M.M.*, 1897-1909) and in Fletcher's List of Generic Names (1929).

In a short sketch it is impossible to mention even briefly all the scattered literature published only on the British species in numerous magazines and local lists; in the case of European species this difficulty is increased, and, when we survey the world-wide species, we find many Families (*e.g.*, Scaeosophidae, Anomologidae, Cyclotornidae, Prototheoridae) unfamiliar even by name to European collectors. Only a very scanty selection of publications can, therefore, be mentioned here.

BRITISH ISLANDS:—Buckler's Larvae, Volume IX (1899), contains a few odd figures and descriptions; Meyrick's Handbook (1895) and Revised Handbook (1928) include descriptions of all genera and species; Barrett's Lepidoptera, Volumes IX-XI (1903-1907), contain descriptions and figures (often decidedly crude) of the Plumes and Tortricina only, with some useful notes on Life-histories, but the generic diagnoses are valueless verbiage.

EUROPE:—Rebel's Catalogue (1901) included all the Palaearctic species then known but is now considerably out of date; Spuler's Schmetterlinge Europas, Volume II (1903-1910), gives short but useful diagnoses, with some figures, of the Central-European species, to which Hering has added keys, as already stated; Rebel's edition of Berge's Schmetterlingsbuch is on much the same lines as Spuler; Hering's recent book on Leaf-miners (1935-1937) must also be mentioned, although not entirely devoted to Microlepidoptera; similarly, the American "Leaf-Mining Insects," by Needham, Frost and Tothill (1928).

EXOTIC:—Meyrick's Exotic Microlepidoptera (1912-1937) contains descriptions of new genera and species from all parts of the world.

N. AMERICA:—Dyar's List of N. American Lepidoptera (1903) is very useful to that date, with references to Literature; numerous papers have since been published by Busck, Kearfott, Miss Braun, Dietz, Lord Walsingham, McDunnough, Keifer, and others; Forbes' Lepidoptera of New York has already been mentioned.

CENTRAL AMERICA:—Lord Walsingham's volume in the Biologia Centrali-Americana, Heterocera, Vol. IV (1909-1915), is an outstanding work; Mr Busck has also described many new forms from Panama.

WEST INDIES:—The Microlepidoptera were dealt with by Lord Walsingham in P.Z.S. 1891 (1892) and 1897 and by Forbes (1930, 1931).

SOUTH AMERICA:—Meyrick has described many new forms in T.E.S. 1911 (1912), 1913, 1914, 1917 and 1922, and also in other papers.

AFRICA:—Lord Walsingham (T.E.S. 1881) dealt with S. African species and in 1891 and 1897 with W. African forms, in P.Z.S. 1896 with species from Aden and Somaliland, and in P.Z.S. 1907 (1908) with the Micros. of Tenerife; African species, mostly from S. Africa, were also described by Meyrick in P.Z.S. 1908 and subsequently in papers in the Annals of the S. African, Transvaal and Natal Museums and in Voyage Alluaud Afrique Orient. (1920) and in several shorter papers; Meyrick has also described Microlepidoptera from Abyssinia and Egypt, Count Turati many from Cyrenaica, whilst Lord Walsingham dealt with Moorish and Algerian Micros. in *E.M.M.* (1901-1911) and Zerny has recently (1935) listed species from Morocco; Professor Rebel's eight papers on the Lepidoptera of the Canary Islands (1892-1938) must also be mentioned.

ASIA:—Snellen (1884),

Filipjev and other Russian authors have described species from North Asia; Lord Walsingham described Asiatic Tortricina (*A.M.N.H.* 1900); the Micros. of the Indian Region were described by Meyrick in the *Bombay Journal* (1905-1914) and their life-histories by Fletcher (1921, 1932, 1933); some forms from Java and Sumatra were dealt with by Snellen and van Deventer and also by Meyrick (1921, 1922, 1925); species from Tonkin were listed by de Joannis (1931: descriptions by Meyrick); the Chinese fauna has provided several papers by Prince Aristide Caradja (descriptions by Meyrick); and a few species from Formosa were dealt with by Meyrick (1914) and from Borneo (1926), and Japanese forms have been described and figured in Matsumura's 6000 Illustrated Insects (1931) and in Esaki's *Nippon Konchu Zukan* (1932); the Micros. of the Islands in the Indian Ocean were also dealt with by Meyrick (1902, 1910, 1911, 1924 and 1930) and Fletcher (1910).

AUSTRALIA AND NEW ZEALAND:—Meyrick's numerous papers (1879-1938) form the foundation of all future work and very many new genera and species have been described by Lucas, Turner and other local workers; Hudson's *Butterflies and Moths of New Zealand* (1928) gave descriptions and coloured figures of all forms then known and a supplementary volume will be issued shortly; Philpott also wrote largely on New Zealand species; Tillyard's *Insects of Australia and New Zealand* (1926) gave a general account, with some figures; there is also a considerable literature on economic species in agricultural publications, as is the case in all other areas; the Australian Oecophoridae, which alone number as many species as the whole of the British Lepidoptera, are now being revised by Dr A. Jefferis Turner in a series of papers in *P. Linn. Soc. N.S.W.*; Durrant (1915) published a short paper on a few species from New Guinea and a collection by Miss Cheesman was worked out by Meyrick in 1937, in a paper not yet published.

OCEANIA:—The outstanding work is the contribution by Lord Walsingham to the *Fauna Hawaiiensis* (1907), but many new species and life-histories have since been added by Swezey and other local workers; Meyrick's work also includes papers on Juan Fernandez and Easter Island (1922), Samoa (1927), S. Pacific (1929); Society Islands (1934).

Turning to papers on special groups, once again only a few can be mentioned. The Plumes have produced a large outcrop of literature:—Walsingham's Pterophoridae of California and Oregon (1880), Fernald's N. American Pterophoridae (rev. edn., 1898), again revised by Barnes and Lindsey (1921), Hofmann's *Die deutschen Pterophorinen* (1896) and palaeartic Orneodidae (1898), Tutt's Monograph of the British species (1890-1895) with his *Brit. Lep.*, Vol. V (1907), new species by Meyrick in *T.E.S.* 1907 (1908), Fletcher's Plumes of Ceylon (1909, 1910) and of Seychelles (1910) and Revision of *Deutero copus* (1910), Meyrick's Pterophoridae and Orneodidae (Wytsman 1910) and Catalogue (1913), Wahlgren's Swedish Plumes (1915) and Fletcher's Catalogue of the Indian Alucitidae (1931). Papers on the Tortricina include Fernald's *Genera and Types* (1908), papers by Kearfott on N. American species, Heinrich's Revision of N. American Eucosmidae (1923, 1926, 1929), Meyrick's revision of the Australian and New Zealand species (1910, 1911) and his Catalogue of the Tortricidae (1912) and revision (Wytsman 1913), and Kennel's *Die palaearktischen Tortriciden* (1908-1921). In Gelechiadae Meyrick's revision in Wytsman

(1926) and Gaede's Catalogue (1937) are the most important; Benander's paper on the Swedish species (1928) also deserves mention here. In Oecophoridae, Meyrick's revision (Wytsman 1922); Turner's present revision of the Australian species has already been referred to. In Aegeriadae, Beutenmuller's Monograph of the Sesiidae of N. America (1901), the Catalogue by Dalla Torre and Strand (1925), Le Cerf's important contributions in Oberthür's *Et. Lep. comp.* and other publications, Hampson's revision of the African and Oriental species, and the articles in Seitz' *Macrolepidoptera*. Revisions in Wytsman's *Genera Insectorum* and Catalogues of the Families have also been published by Meyrick for the Carposinidae, Heliodinidae, Glyphipterygidae, Gracilariidae, Adelidae and Micropterygidae, and Catalogues only of the Yponomeutidae, Plutellidae and Amphitheridae. Wagner and Pfitzner have also issued a Catalogue of the Hepialidae (1914) (also articles in Seitz), and Tutt (*Brit. Lep. I: 1899*) gave a detailed account of the British Stigmellidae (Nepticulidae).

The above brief and necessarily very incomplete account may serve to show that active progress in Microlepidopterozoology has taken place during the last half-century. Even in the best-worked countries, however, new species still turn up and many life-histories and other details remain to be elucidated; in the remainder of the world, however, the greater part of its Microlepidopterous fauna is still to be discovered.

SOME CHANGES IN OUR OUTLOOK ON VARIATION.

E. A. COCKAYNE, D.M., F.R.C.P.

It is impossible in a few pages to review the great progress made in Entomology in the last fifty years. No more can be attempted than to show how the advances in knowledge have changed our outlook on some of the problems that interested our founder. Of the period when this journal was started Bateson was able to write with truth "the terms 'variation' and 'heredity' stood for processes so vague and indefinite that no analytical investigation of them could be contemplated." The way to a more precise understanding of variation and heredity and of the nature of species and subspecies was not opened until Mendel's paper was rediscovered in 1900. Proof that segregation of characters occurred in animals as well as in plants soon followed and it was shown that many mutant forms were determined by a single gene and were either dominant or recessive to the normal form. The phenomenon of reversion, so puzzling to Darwin, was explained, for forms that reverted to the normal were recessive. They were not lost, but were rendered latent, and if members of the F_1 generation were crossed *inter se* they reappeared in the ratio 1:3. Many rare aberrations of butterflies and moths regarded by contributors to our early numbers as meaningless sports or freaks are no doubt rare recessives, though in most cases proof of this is still lacking.

As time went on it was shown that, though the obvious effect of a gene might be only a striking alteration in colour or pattern, it had subtle but far-reaching effects on the constitution of the whole organism. It was also found that in a mutant form determined by a single gene considerable variation occurred and that this was due to the modifying

effect exerted by other genes, as Onslow in 1921 showed to be the case in *Diaphora mendica*. Here the white Irish male, ab. *rustica*, is dominant to the brown English male, but many buff forms exist and are due to the presence of modifiers. In *Spilarctia lutea* and its ab. *zatima* two modifiers causing increased radiation are present, but in some cases many genes contribute to the modifying effect and it is then said to be due to the gene complex.

Sex-linked inheritance was discovered in 1908 by Leonard Doncaster in the course of his breeding experiments with *Abraxas grossulariata*, ab. *lacticolor*, and was found to depend upon the fact that in the female there are two dissimilar chromosomes, X and Y, and in the male two similar ones X. The *lacticolor* character was found to be recessive and carried in the X-chromosome. This discovery has led to a better understanding of sex determination, not only in insects, but in vertebrates as well. Later it was found that in *Drosophila* the sex chromosomes of the male are XY and of the female XX. Largely owing to the work of Goldschmidt, it is now known that sex is largely dependent on male and female factors, the factor for maleness in *Lymantria* lying in the X-chromosome and that for femaleness in the cytoplasm. The valency of the X-chromosome differs in different races and species, that of *Smerinthus ocellatus* being so much greater than that of *Amorpha populi* that in the hybrid *hybridus* females are transformed into males or intersexes.

In his "Origin of Gynandromorphs" (1919) Morgan showed that in *Drosophila* most gynandromorphs are caused by the loss of an X-chromosome at the first cleavage of the fertilised ovum or at some subsequent division. Some gynandromorphs in Lepidoptera are produced in the same way, but knowledge of which characters are sex-linked and which are not has shown that many cannot be due to this cause and cytological investigation has proved that they originate through the fertilisation of each nucleus of a binucleate ovum by a separate spermatozoon. In *Bombyx mori* and *Argynnis paphia* the females that lay binucleate ova are recessive, and of the former species thousands of gynandromorphs have been bred. Facts, which were quite obscure in Tutt's day, such as the frequency of gynandromorphs in some species and their rarity in others and the occurrence of gynandromorphs of a species again and again in one locality, of *Polyommatus icarus* in Sligo for example, can now be readily explained.

Tutt's book on Melanism and Melanochroism (1891) testifies to his interest in this subject. Since his day melanic forms of many species of Lepidoptera, some occurring in the larva and others in the imago, have been discovered. Many of these may be new mutations, but whether new or not, there can be no doubt that some have become much commoner and have greatly extended their range, and the association of melanism with industrial centres both in this country and on the continent is indisputable.

Harrison and Garrett claim that they have produced melanic mutations by means of manganese sulphate in the food of the larva and Hasebrouck claims to have done likewise by means of other chemicals. Attempts by McKenny Hughes and Lampke to confirm the results obtained by Harrison and Garrett with *Selenia bilunaria* failed, but Harrison thinks this is accounted for by the high mortality in their broods. He says that melanic *bilunaria*, a recessive, is less hardy than

the normal form and, if the death rate is high, any melanic mutations obtained are likely to die before reaching maturity. Other critics have said that Harrison's results show an incredibly high mutation rate. It is true that high rates of mutation have been obtained in *Drosophila* by means of X-rays, but these mutations are for the most part grossly pathological, and it is now known that they are due to translocations and dislocations of the chromosomes. They are not comparable with the gene mutations resulting in physiological changes in colour and pattern, the class to which melanic mutations belong. Ford (1938) suggests that though industrial areas may be centres of melanism they do not necessarily cause it. He believes that most moths from time to time produce a melanic mutation, which may increase its numbers and range if the environment suits it. It is indeed surprising in what a high proportion of species a melanic form has been recorded. Some of them are very rare and others very local, but many have been found in rural areas. It has been shown by breeding experiments that some melanic forms, such as *Biston betularia* ab. *carbonaria*, *Boarmia rhomboidaria* ab. *rebeli*, and *Hemerophila abruptaria* ab. *fuscata*, are constitutionally stronger than the normal forms, and this explains in part why melanic *betularia* has continued to spread and has nearly superseded the typical form in localities far removed from its place of origin. In industrial areas many melanic mutants are better protected by day, especially those that rest on tree trunks, and there is some evidence that they are caught less often by bats, one of the great enemies of nocturnal moths. The combined effect of these advantages may be considerable and fully account for the rapid increase in melanism in some species. On the other hand, some melanic forms, such as *Selenia bilunaria*, are less hardy, and others, such as the black forms of *Papilio machaon*, *Arctia caia*, and *Callimorpha dominula*, are only just viable and remain great rarities.

Aplecta nebulosa, in addition to its extreme melanic form, ab. *thompsoni*, has a graded series of dark forms, which are probably multifactorial, several genes for increased pigmentation existing, and many other examples of this kind could be adduced, amongst them *Xylophasia monoglypha* and *Erannis leucophaearia*.

Apart from major mutations, minor heritable mutations occur and arise more frequently. These are of the greatest importance in evolution. Possibly new surroundings may induce them, but in any case, if the environment is different, those which are in any way advantageous will be favoured. Hence the spread of a species to a new area or a change of conditions in part of its existing range will lead to the formation of a new race differing from the old in a number of genetic characters. Complete isolation over a long period will lead to more and more differences until a subspecies is formed, and later still the differences may become sufficiently numerous and important for it to be regarded as a distinct species. This is probably the usual way by which a new species originates in the Lepidoptera.

The work of Goldschmidt and his pupils on *Lymantria dispar* shows what profound physiological differences may occur in a species, which is comparatively constant in external appearance, in the various parts of its geographical range. As he points out few of these differences

could be detected by a taxonomist, though many of them are of great biological importance.

Parallel variation, when this journal was founded, was merely an interesting fact to record, and though regarded as a proof of relationship or of common ancestry its significance was not fully understood. The wonderful work of the American school on *Drosophila*, which has enabled chromosome maps to be made showing not only the chromosome in which the gene for a given character is carried but the exact locus on that chromosome, has helped to explain it. It has been shown that the gene for a similar character occurring in two allied species of *Drosophila* may be carried at the same locus of the same chromosome and may in the hybrid behave as in the pure species. In other words, the character is not merely a similar character, but is the same character and the gene determining it is identical in both species. This is to some extent a corollary to the genetic explanation of the origin of races, subspecies, and species. Closely allied species have a great number of genes in common and the same mutant gene may occur in several of them. The white form of female, which is found in most species of *Colias* and has proved to be a sex-limited dominant in those investigated, is probably determined by the same gene derived from the common ancestor of them all. There is, however, the possibility that a gene may mutate in the same way in two allied species after they have become specifically distinct, just as the same gene mutation may occur more than once in the same species. The recessive melanic mutations of *Ennomos autumnaria* and *E. quercinaria* are rare and local and probably originated independently. This is supported by the fact that in some of the allied species no similar aberration is known. At present there is no proof that the melanic mutation in these two species is the same, but, since they hybridize, proof or disproof could be obtained by a suitable pairing.

At present there is a tendency to regard all variation as genetic and the present generation pays little attention to the work of Merrifield. Environmental conditions, however, can alter the colour and even the pattern of many butterflies and of some moths. High temperature will produce a lighter colour in both northern and southern races of *Lasiocampa quercus*, and low temperature will cause a darkening of colour in the southern race. These results are probably brought about in the same way as in *Heliothis peltigera*. Kettlewell's experiments have shown that in this species the shorter the period of development in the pupa the lighter the colour of the imago and the longer the period of development as opposed to the duration of the pupal stage the darker the colour. Thus environment can produce extremely pale or dark moths from pupae of the same genetic constitution. There can be little doubt that variation of this kind is not uncommon in some species under natural conditions.

Tutt collected most of the available information about hybrid Lepidoptera, but very large numbers of new hybrids have been bred during the last fifty years and cytological study of the behaviour of the chromosomes in various hybrids had not even begun while he was living. The view that a cross between two species could not produce a fertile hybrid is no longer accepted, although it is true that most hybrids are infertile. Recent work on the hybrid hawk moths has proved that in some cases hybrids are fertile and can even give a secondary hybrid with a third

species. These hawk moths all have the same number of chromosomes and, where this is so conjugation of corresponding chromosomes derived from each parent is much more complete and fertility more probable than it is when the chromosome numbers differ. Some hybrid *Bistoninae* and *Saturniidae* also show partial fertility and secondary hybrids have been bred in large numbers. Thus, one of the criteria accepted as proof of specific rank when the journal was founded is now known to be invalid.

Progress during the last half-century has been phenomenally rapid and has taken place in many unexpected directions, but it has been dependent to a great extent on the belated recognition of Mendel's Law. One wonders whether there will be any discovery so fundamental as that of Mendel to record when the next fifty years are over and our journal celebrates its centenary.

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THE GRADUAL CHANGE IN THE LONGTIME INSULAR OUTLOOK OF THE BRITISH ENTOMOLOGIST.

By Rev. GEO. WHEELER, M.A., F.R.E.S.

The collecting and study of foreign insects by British entomologists, especially as influenced by the *Ent. Rec.*, being the subject assigned to me for our Jubilee Number, I naturally started by finding out what had been done in this direction before the publication of our magazine began. The earliest mention of anything of the kind which I have found is in the 1st Vol. of the *Entomologist* (1841), but this consists only of a few notes by Doubleday from the U.S.A. and a list by Gosse from a part of Canada. When its publication was resumed in 1864 a few more foreign lists occur but mostly from far distant lands, and there is hardly anything approaching an account of a "collecting expedition" for several years, in fact, till the Rev. Dr F. A. Walker began his account of his entomological wanderings in 1875, but even these are hardly in the style of later accounts. A few more entomologists, such as Mr W. E. Nicholson (Switzerland, 1885), Mr Norris (French Riviera, 1889), and Mrs Nicholl (Digne, 1890) gave more lively accounts, but they were few and far between. Such records in the *E.M.M.* are even fewer. Dr White on N. Italy in 1867 is the earliest I have found. A few names which appear later in the *Ent. Rec.* also occur in the *E.M.M.* Mr Bethune-Baker wrote on Algeria in 1886 and subsequently on French, Italian, and Swiss localities, and Mr A. H. Jones on some of the same localities in 1886; Messrs Nicholson and Lemann also wrote on their expedition in the Pyrenees in 1894, but this was after the beginning of the *Ent. Rec.*

The 1st vol. of our magazine, in which a foreign collecting holiday was described, was that by Mr Tutt in 1894, and this gave a sort of standard which was more or less followed in all such subsequent communications both by himself and others. Such accounts as these had certainly a very stimulating effect on their readers. Judging from the large number of people who wrote to me for information (and sometimes itineraries) after the publication of my Swiss articles, the fact of reading about such expeditions did incite entomologists to follow in the same steps, though it would have been more useful to try new ground.

Before giving a detailed account of such articles in the *Ent. Rec.* it will be well to explain the principle on which the information is founded. I have been through every mention of a foreign locality from the beginning of the publication to the end of last year. I have not reckoned in among the articles enumerated any short notes unless they implied an expedition not otherwise mentioned, and I have also as a rule omitted articles giving life-histories of individual species, though these are the most scientifically important, because they do not give information as to the extent of foreign travel involved. It should also be added that the date given is that of the publication, not necessarily of the expeditions themselves.

In 1894 only one such article was published, that by Mr Tutt on an expedition in the Italian Alps. His communications of a like nature continued up to the time of his death. (I have not taken as separate articles those which refer to the same "holiday." Mr Tutt often divided his accounts into short parts, each dealing with a single locality, a practice which, whether intentionally or not, served to concentrate attention on each in turn.) In 1895 there were two articles, the other being by Dr Chapman; his articles on these subjects continued till the war, the last appearing in 1914, though he contributed to the magazine on other subjects till his death early in 1922. In 1896 there were 4 articles, including one new name, that of Mr Crompton, which, however, does not appear again. In 1897 there were 5 articles, with 4 new names—Mr H. Rowland-Brown, Mr Postans, the Rev. C. J. Buckmaster, and Dr Burr. Of these Mr Rowland-Brown continued his contributions, six in number, till 1903. He afterwards transferred his articles to the *Entomologist*, of the staff of which he became a member. Dr Burr's contributions, 21 in number, have continued to the present time. 1898 produced 6 articles with 2 new contributors—Mr Lemann and the Rev. F. E. Lowe; the latter continued to contribute articles up to the time of the war; they were 9 in number. In 1899 8 articles appeared with 4 new names, among which was the first of my own on this subject, of which 15 have appeared; Mrs Nicholl also wrote in this magazine for the first time, and subsequently in 1901 and 1902, Mr W. J. Kaye contributed the first of his 7 articles dealing with localities in Central and South America. It would be tedious to give the names of all contributors, as many of them did not write again, and I can now only mention those who became more or less regular contributors either on this or some other subject. In 1900 there were again 8 articles, with 2 new names, neither of which recur. Up to this point the number of articles had steadily if slowly increased, but in 1901 there was a slight decline, only 6 articles appearing, but for the next 3 years a sudden increase occurred, 11 of these communications

appearing in each of these years. The 3 new contributors in 1902 are too well known to escape mention. These were Dr J. N. Keynes, who in collaboration with his son published 8 articles up to the time of the war; the Rev. A. Mills-Moss, and Miss Fountaine, who published her only article in this magazine. She had previously published one in the *Entomologist*, to which she afterwards returned. In 1903 Mr Sheldon wrote the first of his interesting articles, 4 more of which subsequently appeared, the last being in 1912. He, too, later joined the staff of the *Entomologist*, which secured his later papers, including his account of a Russian collecting tour in 1914. In the same year Mr Simes gave us the first of his 4 articles mostly on S. Italy, Mr Sloper the first of his two contributions on this subject, and Mr Sich one of his only 3 foreign articles. All the new contributors in 1904 continued to write for the magazine. Mr Douglas Pearson's 11 articles appeared in nearly every year up to the war, and again in 1921, 1922 and 1923. Mr Powell has continued to write at intervals, and Mr Muschamp contributed 5 articles up to the time of the war. In 1905 the contributions still amounted to 10; in this year Major Graves began his many articles on Turkey, Syria, and Egypt, numbering, with a few on other localities, as many as 15; these continued till 1928; Mr E. M. Dadd also contributed the first of his 2 articles on the neighbourhood of Berlin. Col. Manders also wrote for us for the first time. In 1906 and 1907 an accountable falling off occurred; there were but 5 articles in each of these years. In the latter Mr A. H. Jones wrote one of his only 2 articles. In 1908 began a series of years providing an exceptional output, marking our highest point in matter of this kind, which continued until the war made itself felt in 1915. The number of articles was as follows: 1908, 10; 1909, 13; 1910, 16; 1911, 10; 1912, 15; 1913, 14; 1914, and 1915, 11. In 1908 Mr Tetley began his series of 5 articles which continued till the war. In 1909 Mrs Page wrote the first of her 6 articles, only one of which appeared after the war in 1922, and the Hon. N. C. Rothschild the first of his two. In 1910 Mr Earl sent in his first paper on a Swiss locality, followed by two others in 1915 and 1916, the latter, of course, referring to earlier experiences. In the same year Mr B. C. S. Warren wrote of the neighbourhood of Freiburg, giving further papers of the same nature but different localities in 1913, 1921, and 1923. Mr Alderson, who usually wrote on English subjects, contributed a long article on the Rhone Valley, and Miss Dorothy Jackson, well known for her Scotch articles, made her only foreign contribution. In 1911 and 1912 two notable names occur for the first time in this connection; Mr Bethune-Baker wrote the first of his series of delightful accounts of foreign collecting which continued till the war, and were continued afterwards in 1921, 1922, 1926 and 1930. In the following year began Mr Ashby's long series of 19 contributions, which only ended at his very unexpected death at the beginning of 1936. In the same year appeared the first of Mr Curwen's two articles on foreign collecting, cut short by the outbreak of war. Dr Buxton also contributed his first article on this subject in the same year. In 1913 Mr Turner began to write on his experiences on the Continent. Being held up in the Engadine by the war beginning, he helped on the lean years of its continuance by giving his entomological experiences of that enforced addition to his visit. In 1914 there was a considerable period before the outbreak of war and in

1915 a good deal of previously written material was still available and the number of contributions kept up to 11. But during the war there were two other sources of supply. Entomologists in the army, when not in the fighting line, kept up their interest so far as they were able and we owed contributions of this kind in 1915 and the two following years to Dr Burr, Dr Buxton, Mr Barraud, and Col. Manders, the last of whom was killed at Gallipoli, his latest contribution being written in the trenches. The other source tapped during these years was found in the notes left by Mr A. J. Fison which had come into the hands of his great-niece. It seemed a pity that his vast unpublished experience of Swiss collecting should be lost, and I sent a large pile of postcards written to me by him, and which I had never had time to edit, to add to the notes Miss Fison possessed; large extracts from these helped to fill the gap in a useful and interesting way. Thus 1916 provided 6 articles and 1917 3. In 1918 began a hopeful revival with 8 contributions, but the number has varied much in different years and has only twice exceeded this figure, namely, in 1921 and 1931. It is easy to understand that entomological expeditions abroad have never reached their pre-war numbers, however much day-trips, etc., have increased. The crushing income-tax and latterly the terribly unsettled state of so much of Europe are between them a sufficient reason, and it is not surprising to find the number last year reduced to 2, and that even one of these came from S. America and the other from Kurdistan. In the post-war contributions a few of the old names occur, though, except those of Dr Burr, Major Graves and Mr Ashby, hardly with the former frequency. Among the 8 articles of 1918 Dr Robertson's name occurs for the first time in this connection, and as he writes again in 1932 and 1935 we may hope for further communications from him. In 1919 only 3 articles appeared and in 1920 only 4, all from former contributors, the same being the case with 7 of the 9 which made a post-war record in 1921. In 1922 and 1923 numbers kept up to 7, and again all the writers were old hands with only two exceptions. 1924 produced only 2 articles but amongst them a name by no means new, but new in this connection, that of Mr Fassnidge, who has already written 7 articles, and we may hope (circumstances permitting) that we may receive more from his pen. Another new name appears among the 4 contributors in 1925, namely, that of Mr Hayward, who has continued to send his experiences in the Argentine and neighbouring states in 8 articles, the last of which appeared last year. The contributions doubled in 1926 and again we welcome a new name, that of Mr Haig-Thomas, who has written 6 articles and we may hope for more. From 1927 numbers varied for the next ten years from 4 to 7 except in 1931 when they again rose to 9. The years 1927, 1930, and 1935 produced 7; 1933 and 1934, 6; 1929 and 1936, 5; 1928 and 1932, 4. Several names new, or new in this connection, appear in these years. Commander Forbes wrote in 1929 and 1931, Mr J. S. Taylor in 1930, 1931 and 1933, Mr Parkinson-Curtis (a well-known contributor on other subjects) in 1934, Mr Welsh in 1933 and 1934, Dr Harris in 1935 and 1937, Mr Hawker in 1935 and 1936, and Dr E. Scott in 1935. As the old names pass new ones begin to take their place and we may well hope that among these we may find regular contributors.

It is worth noting also that in addition to our English contributors an increasing number of foreigners have also sent in articles of the

same nature for publication in our magazine. The following is a list: Mons. C. Oberthür in 1899 and 1903, M. Portschinsky in 1901, Herr Gillmer in 1906, Dr Reverdin in 1910, Count E. Turati in 1912 and 1913, Signor Querci 5 articles between 1918 and 1935, Mons. Lhomme in 1923 and Dr Romei in 1927. Perhaps one should hardly include M. Uvarov as he is resident in England. Dr Verity's voluminous writings are not generally, though not infrequently, founded on personal expeditions, but some, as for instance, his two seasons in the Swiss Rhone Valley, are certainly of this nature. The number of our contributors on this subject has amounted to 87.

In comparing our output in this category with that of the *Entomologist* we find that while that of the latter considerably exceeded ours in the 'twenties, yet on the whole the numbers were greatly in our favour. I only mention this to show that if the *Ent. Rec.* had never been started, or if it had not made a special feature of this kind of article, a very large amount of interesting, and indeed valuable, material would inevitably have remained unpublished, and it shows also that the stimulus in this direction of our magazine must have been considerable.

It seems likely also that the large number of illustrations of the places visited which have been given by many of our correspondents have had a considerable share in inciting others to visit scenes of so much beauty and interest.

While on the one hand Lepidoptera form the subject of the vast majority of contributions other orders have not been neglected. Orthoptera make a good second. This is chiefly owing to Dr Burr's wide experience. He has contributed 27 articles on this order which include France, Switzerland, Spain, Austria, Belgium and Holland, Greece, Turkey and the Caucasus in Europe, Persia and Siberia in Asia, and the Canaries, Madeira, Cape de Verde Islands, the Congo, and Angora in Africa. M. Uvarov has written on the Orthoptera in Macedonia, M. Portschinsky in Transcaucasia, Mr Annandale in Siam, Dr H. Scott in the Pyrenees, and Dr Chapman on the Riviera.

With regard to the Coleoptera, of which so much has been written in respect of the British species, very little has reached us with regard to foreign countries. Mr Tutt wrote in 1905 of the Saas Valley and Mr Ashdown of other Swiss localities in 1908. Dr Cameron of those collected by Mr Dollman in Rhodesia in 1919, Mr Sevastopulo in India, and Mr Taylor of the Transvaal in 1933. Mr Taylor's article includes also notes on several other orders. This is also the case with most of Mr Ashby's contributions.

The Hymenoptera have received rather more attention. Mr Donisthorpe wrote of those collected in Mesopotamia by Dr Buxton and Lieut. Evans in 1918, and Mr Crawley of those collected by Prof. Poulton and others in Australia in the same year, though collected earlier, and in 1920 on those collected by Dr Buxton and Lieut. Evans in Persia; Mr Donisthorpe also wrote of those of Sicily in 1926 and 1927 and Dr Chapman had previously written of those collected in S. France by Mr Saunders.

There are two papers on the Neuroptera, and two on the Odonata; of the latter one was by Mr Lucas on those collected by Dr Chapman in E. France, and the other by Mr Taylor on those he collected in Peru

and Columbia; of the former one was by Mr Lucas on specimens collected by Mr Barraud and the other by Dr H. Scott in 1923 on those he collected in the Pyrenees.

One paper occurs on the Rhyncota by Dr Chapman on specimens collected by Mr Kirkaldy.

With regard to the countries in which collecting took place France appears the most popular with 91 articles on the subject; Switzerland comes next with 76; Italy has 37 and Spain 22. Greece has 13, Germany and the Tyrol 11 each, Turkey and Austria 8, 4 each are concerned with Norway and Belgium and 3 with Hungary. Finland, Bulgaria and Portugal are dealt with in 2 each and Malta in 1. These are all the European countries mentioned except for a few notes on Orthoptera in Holland. Although Sweden has been visited and reported on elsewhere we have no paper on the subject. Denmark and Holland seem to be left severely alone; this is strange as both are so easy of access; perhaps some entomologist may be found enterprising enough to visit them.

Outside Europe but still near it we find 3 papers on Algeria, 7 on Egypt, 13 on Syria (including Palestine) and 5 on Asia Minor. Further afield 2 treat of Persia, 6 of India (including Mr Sevastopulo's descriptions of Indian larvae found in Calcutta), 2 of Ceylon and 1 each of Java, Kurdistan and Hong Kong. Various parts of Africa are dealt with in 5 papers, and Central and South America in 13. These do not include the wide range visited by Dr Burr and cited above in writing of the Orthoptera. Contributors to the *Ent. Rec.* therefore cover a wide range and must advance in no slight degree the knowledge of distribution of species.

FIFTY YEARS IN OUR STUDY OF PROTECTIVE RESEMBLANCES AS EXEMPLIFIED IN THE ORDER INSECTA.

By SIR EDWARD B. POULTON, D.Sc., M.A., F.R.S., Hon. Life Pres.
R.E.S.L., F.R.E.S., F.L.S., &c.

In attempting to bring forward a brief account of work and discussion upon Protective Resemblance, Warning Colours, and Mimicry, both Batesian and Müllerian, during the past half century, it is, I think, well to devote a brief section to their earlier history.

One of the most significant of the early statements upon Protective Resemblance was that made by A. R. Wallace in his section of the joint essay on Natural Selection read before the Linnean Society on July 1st, 1858:—"Even the peculiar colours of many animals, more especially of insects, so closely resembling the soil or leaves or bark on which they habitually reside, are explained on the same principle; for though in the course of ages varieties of many tints may have occurred, *yet those races having colours best adapted to concealment from their enemies would inevitably survive the longest.*" Much earlier than this W. J. Burchell wrote of "the intention of Nature" in giving to the Chameleon its power of changing colour, and to a pebble-like Acridian and Mesembryanthemum a resemblance protecting them from their natural enemies (1). He also wrote of plants "in this arid country, where every juicy vegetable would soon be eaten up," being given "an acrid or poisonous juice, or sharp thorns, to preserve the species from annihilation" (2). Both Protective and Aggressive Resemblances were also

recognised by Erasmus Darwin who wrote:—"The colours of many animals seem adapted to their purposes of concealing themselves either to avoid danger, or to spring upon their prey" (3). The Variable Protective Resemblance of the Octopus was observed by Charles Darwin in the Cape de Verde Islands in 1832. Writing a little later to Henslow, he referred to its "most marvellous power of changing its colours, equalling any chameleon, and evidently accommodating the changes to the colour of the ground which it passed over" (4). Wallace first suggested the meaning of the conspicuous Warning Colours of insects in reply to a letter from Darwin who was puzzled by the brilliant appearance of many caterpillars which could not be explained by Sexual Selection. The interpretation offered—an advertisement of distastefulness—received confirmation from the experiments of Jenner Weir and A. G. Butler (5), and has been the subject of investigation and discussion up to the present day. The superficial resemblances between insects of different groups were known long before the publication of Bates' classical memoir on Mimicry, the best examples known to me being those recorded by W. J. Burchell in his manuscript notebooks and on labels in his collections made in S. Africa (1810-15) and Brazil (1825-30).

H. W. Bates' paper explaining the resemblances between the butterflies of the Amazons was published in *The Transactions of the Linnean Society* for 1862, four years after the Darwin-Wallace Essay on Natural Selection was read in 1858. It was followed in the *Linnean Transactions* of 1865 by Wallace's description of analogous resemblances between Malayan butterflies, and in 1868 by Roland Trimen on those between the butterflies of S. Africa. Ten years later Fritz Müller first brought forward his hypothesis, explaining a large proportion of the examples of Mimicry as produced by the advantageous resemblance between distasteful species rather than by the resemblance of a palatable mimic to its distasteful model (6).

The year before the Jubilee period the earlier experimental work on the protective value of insect colours was brought together by the present writer (7). Much help was given by Jenner Weir and Raphael Meldola, whose name must always be remembered in the history of evolutionary thought during the early years of the period and for many before it. His work as Darwin's "general agent" in Entomology is briefly described in this journal (8). The immensely important discovery of protective counter-shading, explaining the meaning of the white undersides of animals, was first published in 1895 by Abbott H. Thayer in the April and October issues of "The Auk," the American journal of Ornithology, and a condensed account of the two articles appeared in "Nature" (1902). The author communicated a paper on the subject to the *Ent. Soc. Lond.* in 1903 (p. 553), discussed by the present writer on p. 570. The subject was expanded and finely illustrated in "Concealing Coloration in the Animal Kingdom," 1909, by his son, Gerald H. Thayer, with a second edition in 1918 (9). The number of publications on the concealing (Procryptic) adaptations of insects is so large that, in this brief article, I feel that I must not do more than refer to W. A. Lamborn's discovery of the method by which the larva of an African Tabanid fly prevents the wide cracks formed in the dry season from invading the clay cylinder in which the pupa lies hidden, and thus exposing it to attack (10). In a paper (11) read before the Lin-

nean Society in 1898 I attempted to describe under different heads the chief general characteristics of Mimetic Resemblances, Batesian and Müllerian, and to show that the evolution of each one had required the operation of Natural Selection. After the lapse of 40 years I venture to quote a sentence from A. R. Wallace's letter written 28th December 1898, the day on which Roland Trimen also sent congratulations:—“It is the completest, and most conclusive article that has yet appeared, and to all who *will* read and *can* reason, it is absolutely unanswerable.”

Probably the most important contribution to our subject in the Jubilee years and one which has been largely responsible for the dominant position of Africa as a field for Bionomic research in the present century, is the Memoir (12) by G. A. K. Marshall (now Sir Guy) on observations and experiments on insects during the period 1896-1901. An American friend, after reading it, wrote to me:—“It is the paper we have all been waiting for.” In spite of its length, close on 300 pages, and the great variety of the subjects treated, the memoir is remarkably easy to consult being provided with an elaborate but very clear table of contents and a separate index. It is of course impossible to attempt any account of this admirable work, but I cannot help referring to the first three plates illustrating the injuries to be found upon the wings of butterflies, which, when the specimens are fresh and unworn, must nearly always have been inflicted by enemies, especially birds. This evidence, powerfully enforced by Marshall's later publication on “Birds as a factor in the Production of Mimetic Resemblance among Butterflies” (13), led on to very many observations recorded by Prof. Hale Carpenter, Collenette, Lamborn and others.

The late R. Shelford, while Curator of the Sarawak Museum, wrote on the “Mimetic Insects and Spiders from Borneo and Singapore” (14), a paper of especial importance because of the variety of insect families which are considered and illustrated by fine coloured plates. Ten years later he published “Mimicry amongst the Blattidae” (15), describing and figuring many “Mimetic Cockroaches and Beetle models”—striking examples in a family which had rarely if ever been studied from this point of view. A very interesting nesting association between birds and social insects—Aculeates and Termites—is described by J. G. Myers (16), who concludes (p. 19) that the wasps, bees and ants “are all among the most vicious species” and holds that “association of birds with aculeates and of the latter *inter se*, corresponds to some definite ecological need,” and that “we are justified in assuming that this need is protection.” The long list of references also proves that this association has been observed by many naturalists.

The experimental method of investigating the palatability of protectively coloured and the unpalatability of conspicuous (Aposematic) insects and the validity of the results obtained were criticised by W. L. McAtee in 1912 (17) and again in 1932 (18), the years in which I wrote a reply (19). A few months later, on December 7th, the subject was discussed at the Entomological Society of London. The full report appears on pp. 79-105. Dr McAtee's rejoinder was communicated to the Society on 4th October 1933, appears in Pt. II of the *Proceedings*, pp. 113-120, and was followed by replies on 2nd May 1934, pp. 21-40, and by H. B. Cott's paper with four plates, pp. 109-120, including a brief ter-

minal note stating that I did not propose to continue the discussion.

The following publications by four naturalists are of much significance in relation to Dr McAtee's criticisms.

I wish that space permitted an adequate account of Dr Frank Morton Jones' paper on "Insect Coloration and the Relative Acceptability of Insects to Birds" (20), describing experiments conducted on the island of Martha's Vineyard, Massachusetts, in 1930 and 1931. A feeding-tray was set up at the edge of an extensive woodland and supplied with water and food so that birds of several species were attracted to it; then from time to time freshly killed insects were placed upon the tray instead of or in addition to the other food and the visits recorded, having been observed from a distance through field-glasses. The extremely careful discussion of the evidence obtained led the author to conclude that, although insect acceptability to birds is relative, coloration has material influence upon it. Further experiments also proved that certain insects feeding on poisonous plants are refused by ants as well as by birds and also indicated that in these instances, but not in others, the deterrent qualities are derived from the plants. Two years later Dr Morton Jones published an account (21) of further experiments in the same locality in 1932-33, and in S. Florida during March and April 1933. The results of the earlier work were confirmed and the conclusion reached that "acceptability of insects is determined, not primarily by numbers and availability, but by bird preferences" (p. 452).

An important paper (22) published by Dr H. N. Kluijver in 1933 proves that the Starlings of two colonies near Wageningen, Holland, certainly show preferences and discrimination in selecting insect food for their young; also that McAtee has not convincingly shown that so-called protective adaptations are of no importance. R. Carrick in his very interesting and convincing "Experiments to test the efficiency of protective adaptations in insects" (23) proved that a bark-like geometrid larva motionless on a bare twig of hawthorn fixed near a nest containing young, was unseen by the parent wren but seized when lying on a tray below the nest. Finally, Prof. F. B. Isely has conducted extremely interesting and successful experiments upon the "Survival Value of Acridian Protective Coloration" (24), exposing the insects upon plots of differently coloured soil and recording the effect of attack by enemies upon those which harmonised with the surroundings as compared with those which contrasted.

I had hoped to conclude with brief reference to Prof. Hale Carpenter's replies to recent criticisms of natural selection as applied to insect ecology and to the evidence of bird attacks on butterflies which he has collected; also to the fine work of very many naturalists, especially in Africa, but the limit imposed by the editors is already much overpassed and I must regretfully bring this imperfect statement to a close.

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2. *Ibid.*, p. 226. The same conclusions appear in a letter written by Darwin to G. H. Lewes in 1868 (*More Letters*, 1903, i, 308).
3. *Zoonomia*, i, 509, Lond., 1794.
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5. See *Life and Letters*, iii, 93, 94, 1887, for two of Darwin's letters to Wallace in 1867; also the footnotes on p. 94.

6. *Zool. Anzeiger* (Carus), I (1878), pp. 54, 55. Translation in *Proc. Ent. Soc. Lond.*, 1915, pp. xxii, xxiii.
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9. Both published by The Macmillan Co., New York. On pp. 21-23 of both editions the discoverer and his son generously refer to my early recognition of counter-shading in certain insects, although without any thought of its far-reaching importance. The references given are to *Trans. Ent. Soc. Lond.*, 1887, p. 294, and 1888, pp. 595-7.
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HALF-A-CENTURY OF ORTHOPTERA.

By MALCOLM BURR, D.Sc., F.R.E.S.

When the *Entomologist's Record* was launched, our beloved science had entered upon the last phase of its early period. The task of collecting, naming, and describing material and establishing classification was in full swing and something like a coherent system was crystallising out for most of the orders. Until well into the present century our literature consisted almost exclusively of faunistic catalogues and monographic revisions.

Orthoptera, in spite of their size and attractive appearance, had somewhat lagged behind the other orders, and in 1888 there were few orthopterists in Europe and none in Great Britain. Those who casually picked up our three dozen or so species, such as the Dales, Edward Saunders, George Porritt, C. A. Briggs, and a few others, could hardly find an author to whom to turn for comfort. Curtis' five beautiful plates of some of our outstanding species were already twenty-six years old, and after a reign of half-a-century Stephens was still the authority.

On the Continent the richer fauna was more encouraging, and men whose names stand out were then in full strength. Brunner von Wattenwyl, by birth Swiss but by service a *Hofrath* or Aulic Councillor and a high official in the post and telegraphs of Austria, was busy in Vienna. In both appearance and manner Brunner seemed to me a relict of the seventeenth century, and it was a proud and happy time for me when he took me into the field at Oberweiden, a classic spot, when there was

a difference of sixty years between our ages. Another grand survivor of the past century was the old Baron de Sélys Longchamps, who was still working upon the Odonata but found energy to take an interest also in the Orthoptera. He surveyed the fauna of his native parish of Waremme, near Liège, for three-quarters of a century, and retained the charm and dignity of an aristocrat of the eighteen-hundreds.

In 1882 Brunner gave us his fine *Prodromus der europäischen Orthopteren*, replacing Fischer's great work of thirty years previously. The *Prodromus*, still indispensable, has never been rivalled, much less surpassed, as a comprehensive account of the European Orthoptera. It was a stimulus to the study of the order, and so gave rise to the great activity of the succeeding decades. Brunner's series of revisionary monographs was still unborn and the classification of the order was but little changed from the system laid down by Serville in 1831 and modified by Stål in 1873-78.

In Lausanne de Saussure, distinguished member of the famous patrician family, who had given us his great work upon the Crickets in the sixties, produced a monograph of the *Oedipodidae* in the year of our birth, following it up with a supplement a year later.

Dr Hermann Krauss, a jovial doctor of Tübingen, was continuing the series of small but important articles which he had begun in 1873. They won him a high place in the roll of orthopterists.

These three were all amateurs. In Madrid a great Professor, Don Ignacio Bolivar, by 1888 had been at work already more than a decade. It seems barely credible that the man who had brought out the first systematic account of the Orthoptera of Spain ten years before our foundation should have been the very active President of the 6th International Congress of Entomology in 1935.

In the United States Samuel H. Scudder was still busy in Cambridge, Mass. He was the pioneer of the very small band of writers upon fossil Orthoptera.

In the nineties the burst of monographic activity continued. In 1893 Brunner, taking advantage of an exceptionally fine collection brought by Fea from Burma, gave us a general revision of the classification of the order, and this was associated with revisions of the Cockroaches, *Phaneropteridae*, *Pseudophyllidae*, *Stenopelmatidae* and *Gryllacridae*, while his colleague, Joseph Redtenbacher, did the *Conocephalidae*. When I first visited Brunner, in 1898, the two were collaborating on the *Phasmidae*. Bolivar gave us the *Tettigidae* and *Pyrgomorphidae*.

From Russia little had come since the forties, but that wonderful fauna was now being tackled by Zubovski, Ikonnikov, and Adelung. They lived in a world apart. In those days Russia was an even more mysterious country than to-day.

The American fauna was receiving by now the attention it deserves. Rehn and Hebard were starting their long partnership, dealing mainly with the Neotropical Orthoptera, while Morse, Lawrence Bruner, N. Caudell, Hancock and others were turning out a stream of literature.

Our own humble faunula had not so stimulating an influence. Brunner's *Prodromus*, in German and entomological Latin, began to soak through in the later eighties, with the result that Eland Shaw produced a synopsis of our British species, based upon Brunner, adding the localities noted by the handful of modern collectors. This came out

in *The Entomologist's Monthly Magazine* in 1889-90, but in reprinted form was very scarce and it was many years before I succeeded in securing a copy. In 1889 E. I. Miller published a brief synopsis in *The Entomologist*. In spite of that one can turn over whole volumes of the current entomological literature without finding an allusion to an orthopteron.

Some help came from over the water. Captain Adrien Finot, a French officer who had been taken prisoner at Sedan, secluded himself in a delightful chateau and garden surrounded by a high wall at Fontainebleau, where he buried himself in carpentry, photography, and Orthoptera. "I knew France prosperous under the Emperor," he said to me one day, "and I cannot be happy in a regime of republicans and Freemasons," an association which struck me at the time as being odd. But his seclusion was to the advantage of our order, as he gave us an excellent book in 1890 upon the Orthoptera of France, with good illustrations, which was very serviceable for our few species, and easier to understand than the *Prodromus*. In collaboration with Bonnet he gave a good book on the Orthoptera of Tunis and Algeria.

Important faunistic papers were now coming from these men and others. The opening up of Africa was bringing along masses of material, mainly to London, where for long they were neglected, and Berlin, where Ferdinand Karsch was kept busy naming and describing them, while in Italy Giglio-Tos gave a coherent account of the Mantidae in *Das Tierreich*. In Italy also Griffini began work, and Yngve Sjöstedt, after his return from Kilimandjaro to Stockholm, turned out a string of work on the African Acridians and the first monograph of the remarkable Acridians of Australia. In England, W. F. Kirby produced the great Catalogue of the Orthoptera and in Oxford, R. Shelford, fresh from Sarawak, was doing valuable revisionary work on the Cockroaches, which was continued by R. Hanitsch. Then came the younger generation of successors of Brunner, F. Werner, H. Karny, R. Ebner in Vienna, W. Ramme in Berlin, while in Paris L. Chopard produced numerous works on the Crickets and a new account of the Orthoptera of France. The Far East joined in, and we find the names of Shiraki from Japan and H. S. Chang and Pang Hua Tsai from China. In Spain Candido Bolivar started following in his father's footsteps.

It struck me as curious, when still a boy, that such jolly-looking insects as *Pholidoptera cinerea* and *Tettigonia viridissima* should be neglected and I had a good deal of difficulty in finding out their names. A note on some grasshoppers by C. A. Briggs caught my attention, so I wrote to him, and he put me on the track of Eland Shaw, and from that date I became ardent. The fact that there was no book on the British kinds was stimulating, so I got busy and my boyish effort was published in 1897. For all its immaturity it served its purpose for nearly a quarter of a century, for it was not till 1920 that Lucas brought out his book dealing with our British Orthoptera in a comprehensive manner.

To-day the position is different. The recreational amateur whose work laid the foundations of our science is yielding place to the professional, giving his whole time to the work, which has become more grimly scientific. In most settled countries the broad outlines of the fauna are now well known and most families have their classification generally accepted. Now it is the problems in biology that are taking

attention, ecology, regional variation, geographical distribution with all its implications, phase variation, physiology, embryology, and the immense development of applied Entomology. Russian names have now stepped into the foremost place, but this is hardly surprising, for the population of the U.S.S.R., both human and orthopterous, justifies the lead.

In our country, I am glad to say, is centred the international war upon the Locust, and it is not by mere chance that the Chief of Staff is a Russian, my old friend Dr B. P. Uvarov, who has put not only combined action against that plague but the study of the Orthoptera generally upon a modern basis.

Another entomologist who among us is welcome from abroad is Dr F. Zeuner, formerly of Freiburg i. Br. He has given us remarkable work upon the fossil Orthoptera, of which far more is known than generally realised. Zeuner's proposed classification of the Orthoptera is revolutionary and to my mind very satisfying, for he has put into precise expression notions that have been inarticulate in my head almost all my life. At the moment he has diverged into the detailed study of the Pleistocene climate, in search of important light upon the history of the Orthoptera fauna of our Region.

PROGRESS IN OUR KNOWLEDGE OF BRITISH COLEOPTERA, ANTS, AND MYRMECOPHILES

During the 50 years of the "Entomologist's Record and Journal of Variation."

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.

The difficulty in an article of this kind is to know what to select, and what to leave out. The subject is vast, the progress has been great, and the *Record* has had no mean share in the results.

I have always taken a great interest in the *Record* and the late J. W. Tutt, the founder, was a great friend of mine. Although many other people had helped him with the *Record*, when he honoured me by asking me to become a sub-editor in 1897 (Editor for Coleoptera), I was very pleased. My name was the first to appear as such, and I am proud to think it is still present on the panel in company with the distinguished and talented sub-editors we now possess.

It may be as well to divide this article into two sections:—Coleoptera; and Ants and Myrmecophiles.

COLEOPTERA.

Fowler's great work on the *Coleoptera of the British Isles* had come into existence before the *Record* was started—on April 15th, 1890—but the last two volumes, 4 and 5, were published after this date. There is no doubt whatever that this work has had more influence on the progress of our science, and attracted more entomologists than any other during our time, or before. It may be out of date and its chief fault to my mind is the omission of the references to the original descriptions; but apart from this I still prefer to work with "Fowler," unless I am using Reitter, Ganglbauer, or other foreign works. In the Supplement to Fowler (1913), and the "Annotated List of the Additions to the British Coleopterous Fauna" (1931) the work is brought up to those

dates, and references to the original descriptions are given.

There have been 3 Catalogues of British Coleoptera published during our period—Sharp & Fowler (1893), Beare & Donisthorpe (1904), and Beare (1930). I have been told that the 1904 was the best, though perhaps I should not mention it; but of course it is quite out of date now. Moreover, none of our catalogues are such in the true sense of the word; only lists. When shall we have a proper catalogue with dates, references, etc., to the species? What a chance was missed during the centenary meetings, etc., of the Royal Entomological Society of London, when such a one might have been published!

Of the more popular books of our time on British beetles I give the palm to the late W. E. Sharp's *Common Beetles of our Countryside* (1915). I read with some pride on the fly-leaf of my copy, presented to me by the author—"To H. St J. Donisthorpe (without whose initiative this book would not have existed), from his old friend. The Author, January 1916." Of the more pretentious works, Joy's *A Practical Handbook of British Coleoptera* stands out. Personally, however, I am unable to use it. The best review I have read of this book was by a Dane who wrote—"With Dr Joy's book one can name some beetles correctly, some incorrectly, and some not at all!" To mention the Coleopterists who have gone before in our time, and who have helped to advance the study of our British Coleoptera one must first mention G. C. Champion, the Rev. Canon W. W. Fowler, and Dr David Sharp. Most of the "old guard" have passed away now, though fortunately we still have our genial Commander Walker with us.

I give a list, as an appendix (A) of all those entomologists who have died in the last 50 years, and who did what they could to add to the knowledge of our subject. It were invidious to mention those still with us, but it is a pity there are not more younger men taking up our study. Of the Coleopterists on the Continent who have gone, and whose influence has been most felt by us, one may mention Bedell, Deville, Fauvel, Ganglbauer, and Reitter. Especially the late Sainte Claire Deville—there is no one like him now to whom one can send general Coleoptera to be named. The rest are too specialised, and many groups of Coleoptera are not worked at all.

Two great Catalogues—catalogues in the true sense of the word—Winkler's Palaeartic Coleoptera, and Junk's enormous work which is still being published and includes the work of all the eminent Continental Coleopterists, are of the greatest service to us. Local lists and County lists have been, and are being, published for all over the British Isles. Also two exchange lists were published. One, "A New Exchange List of British Coleoptera," by W. H. Bennett. Published at Hastings, I do not know the date, but it was a complete list of the beetles as known at that time and was clearly printed and very useful. The other, a more pretentious effort, "An Exchange List of British Coleoptera," by E. A. Newbery and W. E. Sharp, printed by J. H. Keys at Plymouth (1915). This was the first endeavour to bring the British Coleoptera in line with the European Catalogue of 1906. Finally we may mention that very many species have been, and are still being added to the British list by a small band of enthusiastic collectors. Just as an illustration for part of the 50 years; the 1904 Catalogue listed 3361 species, and that of 1930, 3566 species.

ANTS AND MYRMECOPHILES.

Our knowledge of the British *Formicidae* is now in a most satisfactory condition, and this I attribute largely to the fact that many of the greatest myrmecologists of all time were alive during our period.

The late Frederick Smith, who, however, was not of our time, as he died in 1879, had prepared the way. In spite of many criticisms on his taxonomical work, his observations on the habits, etc., of ants in this country are excellent.

Sir John Lubbock (1st Lord Avebury), who did not commence his study of ants until he was 40 years of age, and whose admirable works are so well known, stands alone as a pioneer among British Myrmecologists. His drawings of the nerves, muscles, and general anatomy of ants, are among the most beautiful I have ever seen. Also his construction of observation nests, his study of ants in captivity, and their habits in general, gave a tremendous impetus to this subject.

The great Continental and American Myrmecologists, Emery, Forel, Janet, Wheeler, and Wasmann, have all passed away comparatively recently, but we have been able to benefit fully by the enormous amount of valuable work they accomplished. One must not forget to mention that Emery completed his great work on ants in the *Genera Insectorum* before he died. It is thus fortunate that in taxonomy, anatomy, synonymy, and nomenclature in general, terminology, etc., etc., the *Formicidae* are in a far better position, and in more general agreement, than is the case in most of the other families of insects.

Two small popular books, Farren White's *Ants and their Ways* (2nd edition, 1895) and William Kirby's *Marvels of Ant Life* (1898), both admirable in their way, undoubtedly did much to popularise the subject. The ant fauna of the British Isles is a very poor one, and in the last 50 years, only five new species and a few new varieties have been added; moreover, it is not very likely that many, or indeed any, others will be discovered. The county distribution of our known species of ants, however, may well be added to.

The late E. W. Janson was the father of the study of British Myrmecophilous Coleoptera, and with the vast contributions by Wasmann on all creatures found with ants, a great deal is known on this most fascinating sideline in the study of the *Formicidae*. There is much, however, still to be discovered, and if any more entomologists, either young or older, were to take it up, they would be well repaid.

Finally, I may mention that in my *British Ants*, 1st edition (1915), 2nd edition (1927), and my *Guests of British Ants* (1927), I have endeavoured to bring all the known facts together on the most interesting of all insects. There is also as complete a Bibliography as I could find, in both books.

I give a similar list as an appendix (B) to that given for the section on Coleoptera.

APPENDIX A.

- | | |
|----------------------------|---------------------------|
| Atmore, E. A. (1930). | Bowhill, J. W. (1931). |
| Bates, F. (1903). | Bowring, J. C. (1893). |
| Bennett, W. H. (1931). | Butler, E. A. (1925). |
| Billups, J. R. (1920). | Champion, G. C. (1927). |
| Bishop, J. G. (1922). | Chapman, Dr T. A. (1922). |
| Black, J. E. (1925). | Chaster, G. W. (1910). |
| Blackburn, Rev. J. (1912). | Chitty, A. J. (1908). |
| Blenkarn, S. A. (1927). | Crawshaw, Rev. G. (1920). |

- Cruttwell, Rev. Canon C. J. (1911).
 Dollman, H. C. (1919).
 Edwards, J. (1928).
 Elliott, E. A. (1936).
 Fowler, Rev. Canon W. W. (1923).
 Fryer, H. F. (1930).
 Garde, P. de la (1913).
 Gardner, G. (1921).
 Gillo, R. (1891).
 Gorham, Rev. H. S. (1920).
 Hardy, J. (1899).
 Harris, J. T. (1892).
 Harwood, B. S. (1933).
 Holland, W. (1930).
 Janson, E. W. (1891).
 Janson, O. (1927).
 Jenner, F. H. A. (1924).
 Johnson, W. F. (1934).
 King, J. J. F. X. (1933).
 Leman, G. C. (1934).
 Lewis, G. (1926).
 Mason, P. B. (1904).
 Matthews, Rev. A. (1897).
 Newbery, E. A. (1928).
 Piffard, A. (1910).
 Routledge, G. B. (1934).
 Saunders, E. (1910).
 Sharp, Dr D. (1922).
 Sharp, W. E. (1919).
 Stevens, G. (1899).
 Stott, C. E. (1935).
 Taylor, J. (1920).
 Taylor, J. K. (1923).
 Thompson, M. L. (1934).
 Waterhouse, C. O. (1917).
 Waterhouse, E. A. (1916).
 West, W. (1918).
 Wood, Rev. Canon J. (1924).
 Young, Morris (1897).

APPENDIX B.

- Bignell, C. G. (1910).
 Bingham, Col. C. J. (1908).
 Champion, G. C. (1927).
 Chapman, Dr T. A. (1922).
 Chitty, A. J. (1908).
 Collett, E. P. (1937).
 Dale, C. W. (1906).
 Douglass, J. W. (1905).
 Evans, W. (1923).
 Fowler, Rev. Canon W. W. (1923).
 Frisby, G. E. (1936).
 Janson, E. W. (1891).
 Kirby, W. F. (1912).
 Lubbock, Sir John (1st Lord Avebury
 (1913).
 Michael, A. D. (1927).
 Morice, Rev. F. D. (1926).
 Rayward, A. L. (1935).
 Rothney, G. A. J. (1922).
 Saunders, E. (1910).
 Silverlock, O. C. (?).
 Step, E. (1932).
 Theobald, F. V. (1930).
 White, F. Buchanan (1894).

DIPTERA: PROGRESS AND OBSTACLES TO PROGRESS, 1890-1938.

By J. E. COLLIN, F.R.E.S.

If the state of our knowledge of the Palaearctic Diptera in 1938 be compared with that in 1890, when the first number of this magazine was published, one cannot fail to realise the enormous advance that has been made, not only in the number of described species, but also in their classification. The publication in 1903-07 of Kertész's Catalogue of the Palaearctic Diptera was undoubtedly a great stimulus to students of the Order, but even at that time, and still more in 1890, many families possessed only a skeleton framework of the genera and species now known to exist, others (chiefly those composed of the larger more conspicuous species) were more complete, but in the last half century all have received attention from competent taxonomists, and very much more is known about their true specific and generic characters. It has become increasingly evident that many of the more reliable characters are often microscopic or borne by parts normally more or less hidden, and the study of these characters with the resultant discovery of many unsuspected affinities and new species, has been one of the outstanding features of the period under discussion. It has become more than ever essential that, before describing any species, one should take the trouble to discover the characters one ought to describe.

The Diptera are no exception to the rule that some genera and species stand out isolated while others exhibit a gradually descending

gradation of isolation. Much work has been done in recent years in the lower scale of these gradations, indeed in the case of genera it is probable that some students have gone too low and suggested generic names where the degree of isolation no longer warrants their use, the extreme limit being that adopted by Townsend in 1935 (Manual of Myiology, II, p. 38) where it is stated that "two species, the progeny from whose crossing is sexually infertile, belong to separate natural genera. All those species which can produce fertile crosses belong to the same natural genus."

Very little progress has been made in our knowledge of the early stages of the Palaearctic Diptera, except in certain families of the Nematocera and some of the leaf-mining Muscidae, but flies of the genus *Drosophila* have proved invaluable laboratory material in the study of heredity and genetics.

An important event in the early part of the period was the publication in 1903 of a set of "International Rules for Zoological Nomenclature." In spite of the difficulties inherent in any attempt to make rules governing work done in the past these International Rules were remarkably well drafted, but failed in one respect. It was not realised that the permanent association of a generic name and its genotype being a complete innovation it was impossible for any rule for genotype fixation dependent upon past actions to prove satisfactory, so, naturally, Article 30, dealing with this point proved unworkable, and the "Zoological Commission," appointed to interpret the rules and to deal with any difficulties which might arise, were obliged to reconsider this Article. They also failed to realise the true facts, and finally recast the Article making two drastic alterations. The use of the amended Rule has resulted in wholesale changes in well-known generic names, and, what is worse, changes in the application of some of the names, nor is that all, for in the majority of these changes the reasons for making them cannot fail to offend against the intelligence and sense of justice of any right-minded person. We are asked in the first place to believe that when one of the old authors quoted a species as a "type" or example of a genus he meant a "genotype" in the sense of the new Rules, when it is obvious that he meant nothing of the sort; secondly, to agree that work, however conscientiously done, in connection with the application of a generic name by an author who divided a genus, but did not quote a "type" or example, shall have no priority over the subsequent mere quotation of such a type; *i.e.*, that work done according to the regulations prevailing at the time must comply with regulations made subsequently in order to be recognised. The Commission also altered Article 30 in relation to genera described without mention of included species. The original Article without being definite plainly indicated that the "origin" of a genus was the date when species were included, therefore genera published without mention of species were outside the Rules until validated by association with species. An exception might well have been made in cases where the author of such a genus subsequently himself placed species therein, for in such cases there could be no uncertainty as to the right of such species to be included in the genus, or even where a subsequent author had access to the original author's collection and could prove which species were intended to be included. The Commission, however, decided that all such genera were

valid from the date of publication and that any species thought to answer to the description would be available as genotype. An amazing decision for those professing to aim at stability in nomenclature considering that the right of such a genotype to inclusion in the genus might be challenged at any time.

All difficulties would have been met, and stability with continuity assured, by irrevocable decisions in all cases where genotype fixation, or the use of generic names, were uncertain under the original Article 30. It is quite certain that irrevocable decisions are necessary before an approximation to stability in nomenclature can be attained.

At the present time our knowledge of the insect world and of Diptera in particular, is far in advance of what it was fifty years ago, but we are deliberately making the study of insects more difficult by refusing to recognise that many of the birth-throes of Entomological Nomenclature are not worthy of recognition, and that continuity in the use of generic names is of far greater importance than blind adherence to rules framed by those who knew little or nothing of entomological history, and consequently often unjust in application.

DIPTERA: 1890-1938.

AN AMATEUR'S RETROSPECT.

By H. W. ANDREWS, F.R.E.S.

Although my recollections as a dipterist do not cover the full period commemorated by this Jubilee number, I can go back over the greater part of it, as it was in 1899 that I joined the Entomological Society of London, in that year under the Presidency of Mr Verrall, and, giving up Lepidoptera, began to collect Diptera.

In those days dipterists were far fewer in numbers than at present; at their head was the triumvirate of Verrall, Collin, and Yerbury, of whom Collin alone is left. Other well-known names were Dr Mead, of Bradford, known by his monographs on *Anthomyidae*, Bradley and Wainwright at Birmingham, and Grimshaw and King in Scotland. I have, too, most kindly recollections of Mr F. C. Adams, of London and Lyndhurst, who gave me a lot of help as a beginner, both in types and identifications. Major (then Mr) Austen was in charge of the Diptera at South Kensington, where the British section was rapidly increasing in numbers and value through the donations of Colonel Yerbury, who was one of those rare amateur entomologists who collect for others rather than themselves; but Austen was already becoming more and more occupied with the increasingly important medical and economic aspects of dipterology, which were soon to take up all his time.

Here I think it is fitting to pay a tribute to Mr Verrall, whose immense industry, endless enthusiasm and wide knowledge of palaeartic diptera, enabled him, practically single-handed, to establish order out of chaos and set the study of our native species firmly on its feet. His memory is kept alive amongst all entomologists by the annual "Verrall Supper," which, under the auspices of the Entomological Club, perpetuates the hospitality he, as a member of that Club, initiated as far back as 1887.

The chief difficulty for students then, as now, though now in far less degree, was the lack of reliable text-books in English. The three

volumes on Diptera in F. Walker's *Insecta Britannica*, published as far back as 1851-56, were the sole works dealing with British Diptera as a whole, and there were one or two monographs on single families in the magazines. A great standby was Schiner's "Die Fliegen," two volumes of the "Fauna Austriaca," from which those who, like myself, were not German scholars, could pick out diagnoses with the aid of a dictionary. Verrall's "List of British Diptera" (second edition) was a necessity, but it was solely a list of names. In such circumstances one's collecting naturally gravitated towards those larger and more conspicuous groups that could be easily identified, e.g., Tabanids, Asilids, and Syrphids. In 1901 there appeared the long expected Vol. VIII (the first published) of Verrall's projected series of volumes on British Flies, dealing with the *Syrphidae*. This work was a revelation to those accustomed to the meagre descriptions of the older books; indeed, if anything it was too elaborate, and I expect many besides myself skipped the minutely detailed descriptions and relied rather on the wholly admirable short paragraphs contrasting each species with its nearest allies. The next work of importance to come out was Wingate's "Durham Diptera" (1906). The title was misleading, as the book actually consisted of analytical tables covering most of the species mentioned in Verrall's "List," with those taken in Durham specially recorded. This was a most useful work, but naturally did not go far enough in doubtful cases. Verrall's next volume (Vol. V), dealing with the *Stratiomyidae*, *Tabanidae*, etc., came out in 1909, and was on the same scale of completeness as Vol. VIII. Since that date no book on British Diptera has been published so far as I am aware, but, especially since the War, there has been an increasing output of useful monographs on individual families published in the Magazines, or in the Transactions of Scientific Societies, notably those of Dr F. W. Edwards of the British Museum. With a view to helping students an annotated list of such monographs dealing with British Diptera was published in the *Entomologist's Record* in 1931, followed by a Supplement in 1935. There are also a number of Local Lists now in existence, mostly published by local Natural History Societies; some mere lists of names, others giving useful additional information. An up-to-date Analytical List on the lines of Wingate's work would be an immense boon, but in view of the costs of production and the small sale such a work could command, it is improbable that it will appear unless financed by some such Agency as the Ray Society. I must mention here that the above remarks on books deal with the taxonomic side of dipterology only, and of set purpose no reference has been made to medical and economic works.

Two main aids to diagnosis have come into general use during the last fifty years. Chaetotoxy, or the study of arrangement of bristles, first put forward by Baron Osten Sacken in his paper "An Essay on Comparative Chaetotoxy" in the *Transactions of the Entomological Society* 1884, and elaborated by Grimshaw in the *Entomologist's Monthly Magazine* 1895, has been a great boon, and has the advantage that it can be easily applied by anyone. Secondly, the study of the genitalia is being used more and more as a basis for the differentiation of species. This is not so easy a method to work as chaetotoxy, for, although in certain families the genitalia are conspicuous, they are, as

a rule, concealed, and the simplicity of the female genitalia compared with the complexity of those of the males practically confines this study to the latter sex. It is to be regretted, too, that almost every writer on the subject uses a different terminology.

During the period under review the number of species recorded as occurring in Britain has very greatly increased and there must now be nearly twice as many as were known in 1890. During his lifetime Verrall published in the *Entomologist's Monthly Magazine* three separate lists of "A hundred new British species of Diptera" in 1886, 1894, and 1911. In the preface to the second edition of his "List of British Diptera" (published in 1901 and containing 2800 odd names) he says: "About 300 species have been added to the old List." Since his death Collin must have added between 300 and 400 species to the "List," Edward even more, and every monograph published has recorded further additions in the family or group concerned.

Compared with the increase of recorded species, comparatively little progress, omitting pathological and economic subjects, has been made in the study of the bionomics of British Diptera. Probably the fact that the majority of our dipterists are amateurs who have not at their disposal the time requisite for successful investigation, and the concealed early stages, as parasites or otherwise, of so many Diptera, compared for instance with Lepidoptera, accounts for this. Mention should be made, however, of the publications of Dr Keilin and others of the Molteno Institute, Cambridge; also of Dr Hobby's writings on Predacious Diptera; Mr Hamm's on the courtship of certain Empid flies; and various papers by Mr Niblett and Dr Varley on the life histories of Trypetids.

It was not to be expected that the Diptera would escape being infected with the virus of "revised nomenclature," and many old familiar names universally known and easily recognised are now set aside by the modern school of dipterists, both in this country and more especially on the Continent. I am not an expert on this subject, but personally I much regret that such changes can be made by comparatively few individuals able to attend Congresses, and should like their decisions to be made subject to a subsequent referendum of known students of the Order of insects affected, before coming into effect.

Although the *Entomologist's Record* does not profess to deal with "Applied Entomology" no review of the progress of dipterology can be considered complete without some reference to its pathological and economic aspects, for it is precisely during the past fifty years that Diptera more than any other Order of insects have come to the front as directly affecting man himself. The association of Diptera with such diseases as malaria, yellow fever, sleeping sickness, and filariasis, to mention the more important, has led to the most intensive study of the various species concerned in all stages of their life histories, and the bionomics of such species have been studied from all angles, whilst the output of literature has been fully commensurate with the volume of research. On the economic side progress has not been on quite the same scale, but here also there has been considerable increase of knowledge since 1890, especially as regards such diptera as attack domestic animals and fruit crops. Mention, too, should be made of the establishment in 1913 of The Imperial Bureau (now Institute) of Entomo-

logy, which acts as a clearing-house and headquarters for Applied Entomology throughout the Empire, and of its off-shoot, the Laboratory at Farnham Royal (established in 1927) which deals annually with many species of diptera in the course of its work of breeding beneficial parasites.

ECONOMIC ENTOMOLOGY.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

In most branches of Entomology the progress during the last half-century is a development of previous lines. Economic Entomology, however, has witnessed a revolution in that time. In 1890 the United States was the only country in the world which maintained anything worthy of the name of a staff of Economic Entomologists and even there the Federal Staff was small, with a budget of only some £6000 a year. Nowadays almost every small colony throughout the world has its Government Entomologist and larger countries have a proportionally larger staff (the Federal Service in the U.S.A. now includes several hundred trained workers*). This increase in Government workers has been due directly to the recognition of the great losses caused by Insects, by native pests to home-grown crops, by new pests introduced from other countries, and by insect vectors of human and animal diseases. The damage to crops and stored products by native insect-pests has always been present and may be very serious, especially in warmer countries; that due to pests introduced from other countries became accentuated with the speeding-up of oversea transport and the introduction of new plants from one country to another; that due to insect vectors of disease has only been realized within the last half-century. Although the rôle of the mosquito in carrying the flarial worm causing elephantiasis was discovered by Sir Patrick Manson in 1879, it was not until 1898 that Anopheline mosquitos were definitely incriminated as vectors of malaria; thereafter, progress was relatively rapid and revealed the part played by mosquitos in the carriage of Yellow and Dengue Fevers, by Tsetse Flies as carriers of Sleeping Sickness and Nagana, by Fleas in connection with Plague, by Lice in the transmission of Typhus, and other similar cases, which have largely revolutionized the practice of Tropical Medicine. The recognition of the great importance of insect-borne diseases in the Tropics led directly to the foundation of the Schools of Tropical Medicine in Liverpool, London, Hamburg, and other centres, and, of course, to the practical application of the new knowledge of the control of such diseases as Malaria, Plague, and Yellow Fever. The history of Medical Entomology has been told and re-told in numerous text-books and general accounts and there is no space even to summarize it here, but it may be noted *en passant* that such groups as the Mosquitos, Fleas, and Lice, almost wholly neglected fifty years ago, have received an enormous amount of attention, biologic and taxonomic, resulting in an immense mass of literature. Van der Wulp's *Catalogue of the Diptera of Southern Asia* (1896)

*The appropriations for the U.S. Bureau of Entomology in the decade 1921-1930 amounted to 31,804,716 dollars, in addition to special appropriations of 10,000,000 dollars for Corn-borer Control in 1927 and of 4,250,000 dollars for Mediterranean Fruit-fly in 1929.

was able to enumerate only four species of Indian Culicidae; nowadays more than ten times this number of Indian Anophelines only are known, besides some two hundred species of Culicines. The recognition of the different species of Rat-fleas has elucidated problems of the apparently erratic distribution of Plague in various localities. In such cases—and, indeed, in almost all cases—Applied Entomology, to be really successful, must receive full support from the two branches of Systematics and Bionomics. As has been urged previously on more than one occasion, real success in economic work can only be secured if built up on a firm foundation of knowledge of the systematics and life-history (in the widest sense of the word) of the insects concerned, of control-measures as applied to insects generally, and of some knowledge of the particular subject (agriculture, forestry, medical or veterinary science, etc.) with which any particular insect is concerned, and, to attain the best results, the three branches of systematic, life-history, and applied work must go hand-in-hand. Systematic or life-history work is each valuable in itself and can be pursued as a separate subject, but the knowledge so attained can only be regarded as comparatively useless if merely gathered for its own sake and not applied as helping on the Great War against Waste in which we are constantly engaged with the Insect World. Economic work, considered solely by itself, tends to become mere eye-wash and perfunctory routine and the so-called economic worker who has no use for systematic work is always liable to make serious mistakes by his failure to distinguish between closely-related insects. But, if the three branches are all considered together, each will be found to afford to the others that mutual help which makes for real advances in knowledge. In this way, even the pure systematist may be regarded as an economic worker of the greatest assistance to the economic entomologist who is not too rabidly a pure economist to despise such help. In the case of malarial mosquitos, for example, it is not every Anopheline species which is able to carry the malarial parasite, and successful control-measures must rely on careful preliminary studies of the identity and life-histories of the species occurring in each area concerned.

Ever since man commenced to grow food-crops it has been recognized that no inconsiderable portion of the crops, which he grows for his own use, is devoted to the upkeep of the Insect World, to which tribute is paid both before and after harvest. The discovery of the rôle of Insects as disease-carriers naturally created more alarm, from the realization of the fact that insects were an actual danger as constituting a direct attack on man's person, than they had caused as a threat to his food-supply. Hence to a large degree the rather late and sudden realization of the importance of Applied Entomology and its rapid growth during the present century, and at the present time the general public is probably more interested in disease-carrying insects than in insect pests of crops. But in the future, as the human race increases in numbers and its food-supply becomes a more pressing problem, the proportion of crops which can be yielded to insects must become less, until control of the crop-pests will have become also a question of preservation of the human race.

The horizon of the ordinary Government official is usually limited to his own country or district, but insects have no respect for political boundaries. Many of the worst pests, indeed, are practically world-wide

in their range, having been carried by modern transport to new countries, where they have wrought even more damage than in their original homes, and this modern danger, linked with the control of plant imports, has also had a large share in the recognition of the importance of Applied Entomology, and the Economic Entomologist nowadays has not only to deal with the pests of his own country but has to endeavour to exclude foreign insects, which may become pests if imported. If his information is to be adequately complete, therefore, he must study the habits and control of insects, which are known or are likely to be pests, practically throughout the world, and must also know something of insects which may be employed to check weeds, and so on.

The methods of control of insects have also changed greatly during the last half-century. Fifty years ago, the stock-in-trade of the economic entomologist consisted largely of arsenicals and kerosine-emulsion, with a little pyrethrum for household insects, and little practical use was made of natural control by parasites, predators or diseases. Nowadays, methods of biological, chemical, mechanical and legislative control produce an ever-increasing volume of information to be assimilated and practised by the economic worker, and it is impossible to refer even briefly to all such methods in a short *résumé*. In the United States alone, for example, the U.S. Patents relating to Pest Control provide material for a monthly Review on this one subject. The technique of the introduction and breeding of parasites is large and complex and the necessity for the study of recently-introduced pests in their original homes is also a development of recent years.

Special training of Economic Entomologists is also a development within the last three decades. Previously, work in Applied Entomology was usually carried out by entomologists—often at first appointed in an honorary capacity, of which one effect was to retard progress, as Governments are apt to regard as of little importance scientific work which is done for them free of charge and usually without thanks—who had an innate keenness for the study of insects. Nowadays, recruitment to such posts is usually made from students trained *ad hoc*. With a few exceptions to prove the rule, however, it seems doubtful whether the modern method produces very satisfactory results—and I have heard the same criticism in other branches of biological work, in which the innate keenness of the man concerned seems to be the most important item in his equipment.

And the future? Here we may perhaps quote the words of Dr L. O. Howard, who has played such a great part in the development of Economic Entomology:—"The intelligence of the human race, *if brought to bear*, will conquer the insect menace."

THE DERMAPTERA: HISTORICAL NOTES.

By W. D. HINCKS, F.R.E.S.

The study of the Dermaptera or Earwigs in its early stages was bound up with the Orthoptera of which Order they were long regarded as a family, the *Forficulidae*. Even now many naturalists find it difficult to dissociate the two Orders in their minds, although it is probable that they are really not closely related. It is true that the very limited

Dermapterous fauna of our own islands and also of European countries has led to the continued inclusion of the Earwigs in Orthoptera works on the grounds of convenience. It is also true that a considerable amount of work has been devoted to the Dermaptera alone, and a tradition and historical background has become associated with the Order and the workers, whose past labours have done so much to elucidate this small but very difficult group.

About the middle of last century H. Dohrn produced a preliminary monograph exclusively dealing with earwings (1863-1867). Earlier (1839) Audinet de Serville had contributed a general survey in his "Histoire Naturelle des Insectes Orthoptères" and later Brunner von Wattenwyl, Bolivar, Fieber, Stål, Scudder and de Bormans (pseudonym Dubrony) made important contributions. Many other older authors whose names are too numerous to mention added a little to our knowledge though their influence to the general trend of systematics in the order was usually slight.

The end of the 19th century and beginning of the 20th marks the real commencement of the systematic study of Dermaptera. It was at this time that the first papers by the Dermapterist par excellence appeared, to whose studies we owe nearly all that is good in the present classification of the order, and not a little of what is bad. Dr Malcolm Burr commenced his studies at an early age and for nearly twenty years was the leading specialist on the Order. In 1900 de Bormans published his valuable and much criticised monograph in "Das Tierreich," and Burr owed much to the impetus which this work gave him. De Bormans' friendship and help and the gift of his collections to the young student must have been immensely powerful in stimulating Burr to that prodigious burst of publication for which he is famous and occasionally maligned, and which he maintained for twenty years. Under heavy business responsibilities Burr carried on his work with unremitting vigour until the Great War put "finis" to his work as it did to that of so many others. It is a pity that Burr was not able to complete the structure he was building step by step, and it would be unfair for us to judge hastily the errors and lacunae which he left. Anyone who has studied his papers and books can see that he was struggling almost alone with an intricate group and inadequate material, bringing it each year into a more satisfactory state, casting out his own and others errors as his knowledge progressed, and treating the work from a philosophical angle new to the Order in those days.

Early in the century Verhoeff, in a series of almost incomprehensible papers, laid down certain principles which served Burr as a basis for his work, especially when the crudities of Verhoeff's papers had been corrected by his disciple Zacher. To Zacher we owe the systematic study of the genitalia of these insects, paramount to the building up of a phylogenetic classification, which Burr expanded in his valuable contribution published in 1915-1916.

Shortly after Burr commenced his studies Borelli published his first Earwig paper and continued, in close touch with Burr, to write descriptive papers and notes up to so recent a date as 1932. Most of Borelli's work was restricted to the establishment of new species and occasional new genera, so that he influenced the general state of the Order far less than did his contemporary Burr.

Rehn commenced descriptive papers in 1905 and has continued to date. Busy with Orthoptera, only part of Rehn's entomological work has been given to the *Dermaptera*. In recent years in association with Hebard and lately with Rehn, junior, this writer's work has assumed considerable importance. Hebard, too, has independently published some very important researches which have contributed in no mean way to clearing up obscurities unavoidably left by Burr.

With Hebard opens the "modern" field as far as this Order is concerned and to mention a few names associated with its systematic investigation at present may seem undesirable, yet it is impossible to omit reference to the contributions of Bey-Bienko (a pupil of the great Semenov Tian Shansky, also a *Dermapterist* of merit), Chopard, Günther, Maccagno, Menozzi, Moreira and Ribeiro.

The abundance and wide distribution of *Forficula auricularia* together with its special advantages as an object for biological research has led to an immense literature by authors without a systematic bias. This valuable and interesting field has never been co-ordinated, and anyone with library facilities could do valuable work by summarising and collating all that has been written on this insect. Since Meinerts' "Anatomia Forficularum" (1863) a constant stream of papers has appeared dealing with many aspects of the economy of this abundant species. Some of these contributed are monuments of careful and intricate study furnishing data of the greatest possible biological value. It is impossible to mention the authors whose studies have produced the voluminous literature of this branch, but the names of Kuhl, Przibram, and Weyrauch serve to indicate something of its character.

The British field is so limited that we can only say that in thinking of our few native species we shall always connect with them the names of such workers as Leach, Stephens, Lucas, Worthington, and of course Burr.

In conclusion we may say that of the contributions to our knowledge all others fade into insignificance compared with that of Burr. His work has been the basis on which all modern study is built. However we may disagree with some details the general structure is sound. Burr's contributions to the "Genera Insectorum," "Fauna of British India," his Genitalia Study (1915-16) and immense number of shorter papers, his superb collection containing nearly 200 types preserved in the British Museum—all the results of twenty years spare-time work, constant enthusiasm and application and some good fortune—forms a contribution to be proud of and it will not be forgotten.

A BRIEF HISTORY OF THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION.

By H. E. PAGE, F.R.E.S.

For some years prior to 1890 James William Tutt took up the study of British Lepidoptera. He was possessed with boundless energy and in addition was well equipped with stores of information in most of the sciences, especially in Botany, Geology, Agriculture, Sound, Light, Heat, and Chemistry.

Moreover, he was a keen observer with an open mind, and he missed nothing in wood, field, or marsh that crossed his path.

Up to this time it was quite usual to form a collection of British Lepidoptera and comprise the whole in a cabinet of twenty drawers. A series of four specimens of each species was about the usual limit.

With the advent of Tutt came a revolution. His fierce energy was applied to collecting vast quantities of Lepidoptera, especially Noctuae, and it mattered little to him whether the species was common, local, or rare. He was out to learn all he could of any and all of them. As he stripped his setting-boards he noticed that *all* species were liable to variation, more or less, and to this he gave his special attention.

It goes without saying that he corresponded with all the leading entomologists at home and abroad and so it happened that he met Mr Albert J. Hodges, another keen collector. Between them they agreed to publish another magazine as there was at that time little (if any) space available for printing information as regards the study of variation of insects. Mr Hodges made himself responsible for the business side of the venture and Tutt was the sole Editor.

Thus the first number saw the light on April 15th, 1890, and the first article was by (the late) Dr T. A. Chapman, M.D., on "The Genus *Acronycta* and its Allies." Not content with the extra outlet for the new facts to hand, the energetic Editor issued three double numbers in the first volume, viz., No. 4 (July 1890), No. 9 (December 1890), and No. 12 (March 1891).

Besides editing "The Entomologist's Record, etc.," and his studies in the field, he worked out the Life Histories of the British Pterophorina and in April 1891 Mr J. E. Robson, of Hartlepool, had published two parts of his Monograph thereon.

The very next month this was followed by Vol. I of "The British Noctuae and their Varieties," which work eventually extended to four volumes.

Mr Tutt's association with Mr Albert J. Hodges continued until the end of Vol. V, after which the Editor assumed sole responsibility for the magazine. He called on the writer to assist him in managing the financial side of the business and also to be responsible for publishing all numbers as issued.

This arrangement continued except for some help by Mr J. Herbert Tutt from 1904 to 1910. Three volumes, VI, VII, VIII, were published in the two years 1895-6 and hence the Jubilee volume is not the Jubilee year.

From thence onward to Vol. XXXVII I assumed sole control which, of course, could not have happened after 1910 but for the Editors who elected to be responsible for future articles and supported by the great devotion and hard work of the Editorial Secretary, Mr Hy. J. Turner.

The first three volumes of "The Entomologist's Record, etc.," are devoted mainly to the insects of the British Isles. But in July 1893 the Editor went to Paris. On his return he wrote an article on "A Day's Entomologising in the Paris Environs (Bagneux)."

Thence followed at first annual, and later, still more frequent visits to various parts of the Continent of Europe. This extended study of the Palaearctic Group of Insecta was taken up by most of the leading students of the British Isles.

There is little doubt that the lead given by Tutt and his devoted band of workers prompted our Continental confrères to further efforts resulting in such a monumental work as that of Adalbert Seitz. One is

tempted also to ask how far this influence may have affected B. C. S. Warren to produce his magnificent Monographs of the Genus *Erebia* and of the Tribe *Hesperiidi* (European species) with revised classification of the Sub-family *Hesperiinae* (Palaeartic species), to say nothing of the work of Oberthur, Reverdin, Fruhstorfer, Standfuss, Verity and Wheeler.

For the first nine Vols. the Editor was solely responsible; but in 1898 the leading authority on Coleoptera, H. St J. K. Donisthorpe, edited all matter relating to this Order. The next year, 1899 (Vol. XI), Dr M. Burr likewise dealt with the Orthoptera, and in 1900 (Vol. XII) Tutt availed himself of the help as co-editors of Dr M. Burr, T. Hudson Beare, Dr T. A. Chapman, H. St J. K. Donisthorpe, and L. B. Prout.

As time went on these notable names were added to. Thus in 1905 (Vol. XVII) J. E. Collin helped with the Diptera, and in 1907 (Vol. XIX) A. J. Chitty joined the editorial circle and became responsible for the Hymenoptera section until his lamented decease the following year.

In 1908 (Vol. XX) the editorial committee was further strengthened by the powerful addition of such well-known names as G. T. Bethune-Baker, C. R. N. Burrows, A. Sich, and Geo. Wheeler, and in 1909 H. J. Turner.

Then in 1910 (Vol. XXII) R. S. Bagnall and J. R. le B. Tomlin were added to the list, which brings us down to January 1911, when our esteemed friend and Editor passed away, to the everlasting regret of the writer and all who knew him.

"The Entomologist's Record, etc.," now became the joint property of J. Herbert Tutt and the writer, and we were immediately approached by the aforesaid band of devoted Editors to arrange with their unsparing help for the publication to proceed as a tribute to our dear friend and former Editor. This was at once agreed to, and H. J. Turner assumed the onerous task of Editorial Secretary.

It is fitting to record here that the latter has more than fulfilled the confidence of everyone connected with the magazine and has never spared himself, in season or out, to keep up the prestige of this publication.

In 1919 (Vol. XXXI) it became necessary to raise the subscription from 7s to 10s per annum, and in 1925 (Vol. XXXVII) the writer ceased to assume sole financial responsibility, which was at once shared (if and when necessary) by the Editors, whose numbers were further increased by the help of Dr E. A. Cockayne, J. H. Durrant, H. E. Page, and W. H. Tams, and H. W. Andrews became the Hon. Treasurer. The last has proved himself as devoted as the rest of the panel, and deserves all praise for his keenness and work in making the magazine the success it is.

Since then T. Bainbrigge Fletcher lends his valued aid. As time goes on, it is inevitable that changes must occur, and hence we have to regret that the former Editorial list is reduced by the omission of the names of C. R. N. Burrows (deceased), Sir T. Hudson Beare, J. H. Durrant (deceased), L. B. Prout, W. H. Tams, J. R. le B. Tomlin, Dr T. A. Chapman (deceased), and others who have helped.

The present Editors are more than pleased at still having as their leader Mr G. T. Bethune-Baker who acts as Editor Emeritus.

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To commemorate the 50th volume of the magazine it has been decided,
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SOCIETY.—Hibernia Chambers, London Bridge. Second and Fourth Thursdays
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BACK VOLUMES OF

The Entomologist's Record and Journal of Variation

(Vols. I-XXXVI.)

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GENUS *Acronycta* and its allies—Variation of *Smerinthus tithae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthente*, and *aurella*—The Double-day collection—Parthenogenesis—Paper on *Taenitocampidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis paphia* var. *valesina*—Work for the Winter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist for 1890—Life-histories of *Agrotis pyrophila*, *Epunda lichenea*, *Heliophobus hispidus*—Captures at light—Aberdeenshire notes, etc., etc., 360 pp.

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EDITED *with the assistance of*

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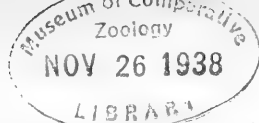
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NOTES ON THE ORTHOPTERA OF THE MIDDLE THAMES BASIN.

By L. R. A. GROVE, B.A., F.R.E.S.

In the British Association's Handbook to "The Natural History of the Oxford District" (1926), the late W. J. Lucas wrote concerning Orthoptera:—"In the past this Order has been much neglected, consequently records are comparatively few, and therefore, seeing what a diversity of surface and soil is to be found . . . in Oxon. and Berks., anyone taking up the study of the Order has much virgin soil in which to work." It was with these words in mind that the writer, helped by members of the Reading Museum Discussion Group, especially Mr C. Runge and Miss V. Smith, started to collect specimens and records to augment Lucas' list. Most of the material gathered is now in the Reading Museum.

The nomenclature used for the following records and notes is that set out in Dr Malcolm Burr's "British Grasshoppers and their Allies," 1936.

I must acknowledge help received from Dr Malcolm Burr, Mr K. H. Chapman and Mr W. A. Smallcombe.

Order ORTHOPTERA.

Sub-Order DICTYOPTERA.

1. *Ectobius lapponicus*, L.

Two examples from Pamber, collected by Charles Edward Collins, in July 1899. Dr Burr says of these:—"British specimens, and normal Europeans, are usually black, but these are red-brown, like the Serbian ones; Brunner calls the form *erythronata*."

2. *Ectobius lividus*, Fabr.

One from Pamber, C. E. Collins, 22.viii.1898. One from Mortimer Common, Berks., L.R.A.G., 22.iii.1936. One from Pamber, C. Runge, 19.vii.1936.

ALIEN COCKROACHES.

1. *Blattella germanica*, L.

Several during September 1936 from the cellars of Huntley, Bourne & Stevens, Reading, per Dr Colgate.

2. *Blatta orientalis*, L.

One from Stoneham, no date. One from Royal Berks. Hospital, Reading, 3.vii.1936. Five from S. Reading house, with egg cases, 10.xi.1936. One from Reading Town Hall, 26.ix.1936.

3. *Periplaneta americana*, L.

Reading district?—no dates.

4. *Periplaneta australasiae*, Fabr.

One from Reading, C. E. Collins, 1899. Several brought from banana vans in Reading Station during August, September and October 1936.

5. *Panchlora cubensis*, Sauss.

One from Reading, 1914. One from a Reading fruit shop, 1935. One from Baylis' Warehouse, Reading, per Mr Runge, 13.x.1936.

6. *Nyetibora sericea*, Burm.

Two from banana vans in Reading Station, 27.viii.1936, 25.ix.1936.

7. *Nyctibora holosericea*, Burm.

One from a banana van in Reading Station, 1.x.1936.

Sub-Order SALTATORIA.

Family 1: *Tetrigidae*.1. *Acrydium subulatum*, L.

One from Whiteknights, Reading, 1920, by Rev. S. O. Ridley. One from swampy ground west of the Flowing Spring, Playhatch, Oxon., by Mr Parsons, 23.ix.1936.

2. *Acrydium vittatum*, Zett.

One from Wokingham, by C. E. Collins, 19.iv.1899. One from Pamber Forest, 13.vii.1899. One on the surface of a pond on Mortimer Common, Berks., L.R.A.G., 22.iii.1936. Several from Pamber Forest—two-spotted and black non-spotted forms, 1936. Two from Chazey Wood, Mapledurham, L.R.A.G., 11.vi.1936, 1.vii.1936. One from Pamber, C. Runge, 19.vii.1936.

Family 2: *Acrididae*.1. *Omocestus viridulus*, L.

Several ♂ from Crookham, C. Runge and Miss V. Smith, 31.viii.1936. Several near Ruscombe Church, Berks., 31.viii.1936.

2. *Omocestus ventralis*, Zett. = *rufipes*, Zett.

One from Padworth, Berks., C. Runge and Miss V. Smith, 31.viii.1936.

3. *Myrmeleotettix maculatus*, Thunberg.

One from Pamber, 19.vii.1936. Several found in Pamber Forest later (1936).

4. *Chorthippus bicolor*, Charpentier.

Two from Pamber, 13.vii.1899. Noted in the Forbury, Reading, by Rev. S. O. Ridley, 1921. Purple form amongst lucerne, S. of Mapledurham Woods, Oxon., C. Runge, late Summer, 1935. Numbers at Caversham Mill, Oxon., L.R.A.G., 24.viii.1936. Two ♂ stridulating and fighting for 1 ♀ on S. slope of Hardwick Hill, Oxon., L.R.A.G., 13.ix.1936. Numbers on Streatley Hill, Berks., L.R.A.G., 4.x.1936. Numbers, with *C. parallelus*, on banks of Whitehall Plantation, Goring, Oxon., L.R.A.G., 4.x.1936.

5. *Chorthippus parallelus*, Zett.

Whiteknights, Reading, Rev. S. O. Ridley, no date. Bulmershe, Rev. S. O. Ridley, 1921. Burghfield Common, Rev. S. O. Ridley, 1921. Pamber, C. Runge, 19.vii.1936. Good number of ♀ on S. slope of Hardwick Hill, Oxon., L.R.A.G., 13.ix.1936. Streatley Hill, Berks., ♀, L.R.A.G., 4.x.1936. Grassy banks of Whitehall Plantation, Goring, alive with this and *Ch. bicolor*, L.R.A.G., 4.x.1936.

6. *Gomphocerus rufus*, L.

Three from S. slope of Hardwick ("Path") Hill, Oxon., L.R.A.G. and C. Runge, 13.ix.1936. First time recorded for Oxfordshire.

Family 3: *Gryllotalpidae*.*Gryllotalpa gryllotalpa*, L.

One found in a sack of Spanish Potatoes in Barker's grocery shop, Twyford, Berks., C. Scott, early 1935.

Family 4: *Gryllidae*.*Gryllulus domesticus*, L.

Mortimer, August 1896. Reading, 1911 and 1913. Early, near Reading, C. Runge, 1935.

Family 5: *Tettigoniidae*.1. *Leptophyes punctatissima*, Bosc.

One from Pamber, C. E. Collins, 10.vi.1899. One ♀ from Hall's Road, near Tilehurst Church, L.R.A.G., 22.vi.1935. Several ♀ from Pamber Forest, L.R.A.G., 5.vii.1936. One from Padworth, C. Runge and Miss V. Smith, 15.viii.1936. Two ♂ from Padworth, C. R. and Miss V.S., 31.viii.1936.

2. *Meconema thalassinum*, Fabr.

Pamber Forest, one small nymph, Spring 1936; several, C. Runge, 8.vi.1936, 19.vii.1936; several, L.R.A.G., 5.vii.1936. Hardwick Hill, Oxon., C. Runge beat one ♀ from an oak, 13.ix.1936. Padworth, one, C. Runge and Miss V. Smith, 30.viii.1936.

3. *Thamnotrizon cinereus*, L. = *Pholidoptera cinerea*, L.

One from Pamber, C. E. Collins, 13.vii.1899. One nymph, Hemdean Bottom, Caversham, L.R.A.G., early Summer, 1936. In plenty at Silchester (W. wall), L.R.A.G., 5.vii.1936. Several from Pamber, C. Runge, 19.vii.1936. Many heard stridulating at the bottom of Gravel Hill, Caversham, L.R.A.G., 23.viii.1936. Padworth, C. Runge and Miss V. Smith, 30.viii.1936. Several ♀ from house near Pppard Bowling Green, Miss V. Smith, 1.x.1936. Eggs were obtained from these. In plenty at Whitehall Plantation, Goring, L.R.A.G., 4.x.1936.

4. *Metrioptera brachyptera*, L.

Whiteknights, Reading, Rev. S. O. Ridley, 1919. Three from Pamber Forest, C. Runge, 19.vii.1936. Several from Crookham Marsh, C. Runge and Miss V. Smith, 30.viii.1936. One, kept in captivity at Reading Museum, was observed stridulating, 31.viii.1936. Of four listeners, one could hear the stridulation only up to a foot or so away, two could hear it at 5 or 6 feet, and one could not hear it at all.

5. *Tettigonia viridissima*, L.

Basildon, 1909. Hardwick Hill, Oxon., one ♂, C. Runge, August 1935. On 1.vii.1936 and 4.vii.1936, C. Runge brought into Reading Museum for observation respectively five ♀ and two ♂ and four ♀ and one ♂ nymphs from Hardwick Hill, Oxon. The following are my notes on these insects whilst they were kept together in one large breeding cage at the Museum:—

1.vii.1936. Eating *Forficula auricularia*. ♂ and ♀ nymphs both have two white lines running the length of the abdomen, about $\frac{1}{4}$ in. apart. Both sexes covered with minute black spots.

5.vii.1936. A changed skin in the cage. One ♀ the victim of cannibalism. These two facts go together! Feeding on "meal worms" and earthworms.

20.vii.1936. Three ♀ and one ♂ left. The rest eaten.

- 24.vii.1936. One ♂ in last instar.
 5.viii.1936. Two ♀ and one ♂ left. The male made its last change—a green globule conspicuous on back of the pronotum. Saw-fly larvae and small worms being eaten.
 9-10.viii.1936. ♂ eaten, two ♀ left.
 21.x.1936. Photographs (negatives now at the Museum) taken of one ♀ in the act of ovipositing. The other of the two Museum-reared females died 23.x.1936. She was opened and many eggs were taken from her. They were of two sorts, both of a dark honey colour and flattened dorsally. The larger were oval in plan and had a slight grooving up the middle. The smaller were lanceolate-leaf-shaped in plan.
 13.ix.1936. The Hardwick Hill site was visited by C. Runge and L.R.A.G. to make field observations. The Great Greens had left their usual grass slope habitat and had gone into a field of flax. Many ♂ judging by the stridulating. One ♀ caught on a flax head.

ALIENS.

Jamaicana sp.

Reading fruit shop, H. Dolton, no date. Reading fruit shop (crate of bananas), 4.ix.1935.

NOTES ON THE WINTER FLIGHT, IN MILD CLIMATES, OF VERNAL AND AUTUMNAL MOTHS.

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

Osthelder records *Cucullia wredowi-judaeorum*, Strand. from the Taurus in III and IV (*Mitt. Muench. Ent. Ges. e. V. XXIII.J 1933, Heft II, p. 51*), and compares this date with Sohn-Rethel's statement that *wredowi* is a winter moth. The exclamation-mark which he has written after this comparison leads me to think that the following notes may be of interest to readers in England and Europe, though rather obvious to those well acquainted with the Mediterranean fauna.

Winters on the Syrian and Palestinian coast are so mild that insect activity does not cease. The coldest months, January and February, are marked by heavy rainfall and storms, but rarely by frosts. Moths that in more strenuous climates fly in autumn and spring, here fly in the same season, winter; and larvae that elsewhere hibernate and feed chiefly in spring, here make no winter-pause but feed up rapidly. It is often only by the behaviour of a species away from this mild sea-coast that we can judge if a species be vernal or autumnal. This phenomenon occurs up to about 3500 feet on the seaward slopes of the Lebanon (and similarly in Palestine). Above this level, snowfalls occur in winter; and the vernal and autumnal moths occur, at these heights and in Inner Syria (which is cut off by the main range of the Lebanon from the sea's humid influence) more or less at their "normal" seasons, though this need not mean in the same month as in England. The same phenomenon must occur in many places in the Southern Mediterranean.

It is clear, from the dates at which Osthelder records the flight of such species as *oxyacanthae* and *areola*, that Marash has a severer winter than littoral Lebanon and Palestine, and that vernal and autumnal species will appear there too at their "normal" seasons.

Whether *judaeorum* belongs to *wredowi*, *tecca*, or neither, does not here concern us; *wredowi* and its congeners, by the criterion of their "normal" season, are spring moths. *Judaeorum*, at Beirut, appears first in November, but is most numerous in February. Its time of flight in the Taurus is "normal."

The following table shows the time of flight of a number of lepidoptera which afford a parallel to *wredowi-judaeorum* and bear out the generalisations made in my second paragraph above. The dates in columns 1, 2, 4 and 5 are those of my own records, those of column 3 of Pfeiffer's Marash Fauna (*loc. cit.* Osthelder):—

Species.	1. Lebanon and Cyprus Coast.	2. England.	3 Taurus	4. Meso- potomia	5. Kurdistan & Luristan
<i>Ocnogyna loewi</i> , Z.	XII-I	—	?	XII-I	XI-XII
<i>Blepharita trisignata</i> , Men.	XI-I	—	IX	—	?
<i>Cucullia</i>					
{ <i>wredowi</i> , Costa.	—	—	—	III-IV	?
{ <i>judaeorum</i> , Strand.	XI-III	—	III-IV	—	—
{ <i>chamomillae</i> , Schiff.	—	V	—	—	—
<i>Dichonia areola</i> , Esp.	XII-III	IV	III	—	?
<i>Aporophila</i>					
{ <i>australis</i> Bsd.	—	IX	—	—	—
{ <i>orientalis</i> , H. S.	XII	—	X-XI	—	?
<i>Meganephria oxyacanthae</i> , L.	XII-I	IX-X	VIII-XI	—	?
<i>Dryobota furva</i> , Esp.	XII-I	—	m. VIII- XI	—	?
<i>Dryobotodes roboris</i> , Hb-G.	XII	—	XI	—	?
<i>Antitype rufocincta</i> , Hb.	XII-I	—	XI	—	?
<i>Spudaea ruticilla</i> , Esp.	XII	—	III-IV	—	?
<i>Amathes</i>					
<i>lychnidis</i> , F.	XII-1	IX-X	XI	—	?
<i>kindermanni</i> , F.R.	XII-I	—	X-XI	—	—
<i>helvola</i> , L.	XII	IX-X	XI	—	?
<i>mansueta</i> , H.S.	XII-I	—	X	—	—
<i>macilenta</i> , Hbn.	I	IX-X	—	—	?
<i>Tathorhynchus exsiccata</i> , Led.	II	—	—	IV	?
<i>Larentia clavaria</i> , Haw.	m. X-I	X	XI	—	?
<i>Zimacra flabellaria</i> , Heeger.	XII-III	—	?	XII-I	?
<i>Dasycorsa modesta</i> , Stgr.	XII-III	—	III-IV	—	IV
<i>Crocallis tusciaria</i> , Bkh.	XI-XII	—	XI	—	?

N.B.—In one or two cases I have bracketed together above, as though they were one species, close relatives that are in fact, or according to some authors, specifically distinct. For the purposes of this article, a very close relative is almost as good as a subspecies.

The above use of the word "normal" begs the question: for if the first entomologists had been not Nordic but Phoenician, the winter-

flight of these species might have been regarded as "normal," and the fact that, in colder climes, some flew before, some after winter, would require explanation.

In my opinion the "normal" behaviour of a species, qua species, is, like the "normal" form, that of the common ancestor of the various present stocks before their dispersal from the centre of distribution; or, failing exact knowledge of that behaviour (and that form), that which is considered to approximate best to it. What the "normal" behaviour (in this sense) of the above species may be is a vast speculation, and each species would have to be carefully and separately considered in order to answer the question; it would be rash of me, therefore, to answer it in a short paper like this.

Nevertheless, these single-brooded species seem to me to form a class of moths whose behaviour is the direct opposite of that of a smaller class of single-brooded moths which, in England, fly in early autumn; I refer to the reed-insects, *Nonagria typhae* and *N. sparganii*, which in Syria (Amik Marsh) fly in late June and early July. Quick pupal development characterises this similar class, whereas the first and larger class is characterised by pupal aestivation. Now, aestivation is a habit, salutary in a hot climate, but unnecessary in a temperate or cold one; yet in England the pupae of *areola*, *australis*, *oxyacanthae*, and *chamomillae* aestivate. Why? Surely because this behaviour is an inherited, specific (or generic) character.

Why, on the other hand, do *typhae* and *sparganii* not behave in Syria like other moths with a quick larval and pupal development? The length of the summer and the availability of their marshland foodplant would permit two broods here. The hibernation of their ova, beginning in July, is unnecessary. Why is there no second generation? Surely, for the same reason: the behaviour is inherited from ancestors inhabiting (in this case) a colder climate.

Or is it wrong to assume that behaviour, which seems not called for by the present environment of a species or subspecies, indicates that it originated in a different environment where such behaviour was salutary and necessary?

In conclusion, the reader must be reminded that there are not two but three kinds of climate under consideration:

1. England and Central Europe.
Cold winter and short summer.
2. Taurus, Inner Syria (Amik, etc.), Kurdistan, etc.
Cold winter and long summer.
3. Coasts of Cyprus, Syria and Palestine.
Mild winter and long summer.

THE ORTHOPTERA OF NORTH GERMANY.

By MALCOLM BURR, D.Sc., F.R.E.S.

British entomologists seldom include northern Germany within their scope, presumably because the fauna, flora and climate are not very different from our own. The fauna offers us, however, some instructive and interesting points. As far as the Orthoptera are concerned these

are brought out by an examination of a recent paper by Herr Herbert Weidner, of the Zoological Museum of Hamburg. (*Verh. Ver. f. Heimatsforschung zu Hamburg*, 1938.) It is interesting to compare the list with our own, to note the differences in detail and habits, for the sake of stimulating our own observers. The district in question is the country between the Dutch and Danish frontiers, eastwards to Mecklenburg-Schwerin.

Among the earwigs, *Labidura riparia* occurs among the sand dunes, where it excavates burrows to a depth of a couple of metres. The larvae make smaller ones, so the holes must be individual homes. The large ones are 1 cm. in width, in the form of an obtuse-angled triangle. This hint might be taken by those who have the chance of collecting on dunes by the south coast, or in very dry white sand above highwater mark.

Apterygida albipennis was found gnawing the eggs of *Orgyia antiqua*. With us it is associated with hopfields, perhaps after the aphides.

They find *Chelidurella acanthopygia* apparently quite common under fallen leaves, especially in oak and beech woods. Perhaps it will be turned up in this country.

Ectobius lapponicus seems to be general from May to September, the more southerly paler form occurring occasionally. *E. panzeri* occurs with it in the sandy country; no allusion to var. *nigripes*. *E. livida* is not mentioned.

In the *Tettigoniidae*, *L. punctatissima* is a garden insect, much attacked by blackbirds and sparrows. The author has found it only on moss rose, and not often. *M. thalassinum* as with us. *C. fuscum* on rushes in two localities, but *C. dorsale* is fairly common in damp localities and edges of ponds. *T. viridissima* is clearly much commoner than with us, as it is familiar to all the children, who have a whole string of popular names for it. There has even been a regular trade in the males for the sake of their song, and in little cages for them, often quite elaborate, like tiny dolls' houses. There is a description of one sunning itself. It took a position with its right side flat on a leaf, to get the maximum heat, carefully extending its legs in such a way that they did not throw a shadow on the body, and after a few minutes, it changed its position to the other side. *Ph. cinerea* seems common enough. *M. grisea* is an addition to the local list; as with us, it is the western subspecies, *occidentalis*, Zeuner. In North Germany it is not confined to the coast, but is found in barren, sandy places in a clearing of mixed woodland, and a little *Trifolium arvense* and plenty of lichen (Flechten). It haunts only the rims of the clearings, and is very shy and active, taking refuge in clumps of broom. *M. brachyptera* seems to be common enough in damp moorland, heaths, and at the edges of woods, occurring also on dry heath land and dry sandy woodlands, a habitat not known to me in this country. It is evidently much commoner than with us, perhaps, because the district is more suited. *M. roeselii* is commoner to the south of the Elbe, but is recorded from several localities to the north. Noted from damp places, hedges and bushes, and the flanks of dams (*Deichböschungen*). We do not associate it with hedges and bushes. The author notes a single macropterous female. *D. verrucivorus* is widely distributed but localised; often common in meadows and the edges of woods, but all localities from moorland districts. When shall we get some more reports of this fine insect from our country?

The Field Cricket is recorded from numerous localities, but all on sandy soil covered with grass.

The Mole Cricket seems common enough in suitable localities and is well known to the turf-cutters in the moors.

Acrydium subulatum seems common near water, but is reported also from quite dry localities. Herr Weidner is not the only one to be worried about the identity of the various so-called *A. bipunctatum*, *kraussi*, *kiefferi*, *vittatum*. All the old records are entered as *bipunctatum*. The author handled 230 specimens under the names of *kraussi* and *kiefferi*. He struggled with the tables, and finally appealed to Mr Kjell Ander and Professor Ramme, who were able to compare his specimens with authentic material. The result is not surprising, that in spite of its great variability the only species of *Acrydium* occurring in that part of Germany is *A. vittatum*, to which must be referred all old records for that region entered under the names of *bipunctatum*, *kraussi* and *kiefferi*, and that the northern form, the true *bipunctatum* of Linnaeus has not yet been revealed there. That is to say, the position is the same as in England.

Although they beat us in the *Tettigoniidae* by two fine species that we have not got, in the *Acrididae* we are a long way behind. They have several steppe relicts, which we can hardly expect to find, and all striking species. *Oedipoda caerulescens* is common from July to September. In the true grasshoppers, it is rather odd that they have not *G. rufus*, or rather that its claim to be included is very doubtful. Weidner looks upon it as a disappearing species, not truly occurring in the district; he regards it as a glacial relict, together with *Bryodema tuberculata*, an outstanding species that has been abundant in some years but now seems to have disappeared; he associates it also with *Podisma pedestre*, a wingless central European form. Their commonest grasshopper is *M. maculatus*, evidence of the dominance of arid, barren country in the district. They have all our *Stenobothrids* and also some that might possibly turn up with us, as *O. haemorrhoidalis* (a pale relative of *O. ventralis*), *Ch. biguttulus* (the woodland brother of *Ch. bicolor*), and *Ch. mollis* (the smaller brother, haunting barren lands), *Ch. dorsatus* (a relative of *C. albomarginatus*) and *C. longicornis* (a moist-ground relative of *Ch. parallelus*). *Ch. vagans* is, on the strength of three records, in hardly stronger position than our own doubtful claim to this steppe relict. There are also notes of a couple of eastern and southern species.

On the whole, 50 species, and 14 "varieties," few of which merit special names, with which we compare our own list of 41, both including earwigs and excluding imports.

COLLECTING NOTES.

SAWFLIES IN SOMERSET.—Considering the infrequent recording of Sawflies it may be of interest to place on record a list of these met with on a visit to the peat beds at Sharpam, Somerset, from May 30th to 3rd June 1936, in company with Dr Newton.

Nine years had elapsed since my last visit and it was with regrets we found the only plantation of conifers had been completely cleared away in the meantime, and many things I had hoped to take again did

not present themselves. Fortunately, however, other acceptable species turned up, as the following list will show:—

Tenthredella temula, Scop.; *T. mesomela*, L.; *T. livida*, L.; *T. livida*, v. *dubia*, Strom.; *Tenthredo* (*Allantus*) *scrophulariae*, L.; *Rhogogaster viridis*, L.; *R. fulvipes*, Scop.; *Tenthredopsis carbonaria*, L. (*litterata*, Geoff.); *T. nassata*, v. *spretta*, Lep.; *Macrophyia annulata*, Geoff.; *M. 12-punctata*, L.; *Dolerus sanguinicollis*, v. *fumosus*, St.; *Athalia glabricollis*, Th.; *A. lineolata*, Lep.; *A. cordata*, Lep.; *Selandria stramineipes*, Kl.; *Strongylogaster lineata*, Chr.; (*cingulata*, F.); *Eriocampa ovata*, L.; *Empria* (*Poecilostoma*) *pulverata*, Retz.; *E. klugi*, St.; *E. liturata*, Gm.; *E. excisa*, Th.; *Hoplocampa pectoralis*, Th.; *Phyllotoma vagans*, Fall.; *P. microcephala*, Kl.; *Tomostethus luteiventris*, Kl.; *T. ephippium*, Panz.; *Monophadnus albipes*, Gmel.; *Blennocampa tenuicornis*, Kl.; *Scolioneura nana*, Klg.; *Fenusa pumila*, Kl.; *Dineura viridorsata*, Retz.; *Platycampus luridiventris*, Fall.; *Priophorus padi*, L.; *Nematinus luteus*, Panz.; *Pteronidea ribesii*, Scop.; *P. myosotidis*, F.; *P. curtispina*, Th.; *P. polyspila*, Forst.; *Arge ustulata*, L.; *Hartigia nigra*, Harr.

Although Diptera were not particularly searched for one Tabanid *Theriopectes tropicus*, v. *bisignatus*, Jan., which has its stronghold here was particularly pressing with its attentions, and, as on my previous visit, I found myself in the midst of a swarm of about fifty of them, *Sericomyia borealis*, Fln.; *Tropidia scita*, Harr., and *Odontomyia tigrina*, F. were also taken, but *Sericomyia lappona*, L.; *Herina* (*Pteropactria*) *frondescentiae*, Lep.; and the rare *Odontomyia ornata*, Mg. were not taken on this occasion.—J. W. SAUNT, "Riverview," Minerva Road, East Cowes, I.O.W., 5.viii.38.

MORTALITY AMONGST LARVAE OF STENOPTILIA GRAPHODACTYLA, TREITS. (LEP. PYRALIDINA).—Flowers of *Gentiana pneumonanthe* containing the larvae of this "Plume" fail to open, thus the larvae are nicely protected from the weather. The larva only feeds on the ovary of a flower, and when this is finished it moves to a fresh bud, which it enters by eating a hole at the base of a petal. Occasionally it enters a fully expanded flower, and is found head downwards eating out the base. After a shower of rain the upright flowers of this gentian are often half full of water, hence a larva in an open flower is in great danger of being drowned. This is the reason, I believe, why most of the larvae that I have found in the open flowers have been dead.—S. C. S. BROWN.

? AN EARLY RECORD OF PLUSIA MONETA, FAB.—On the 6th April 1881 Mr Jenner Weir exhibited, at the Entomological Society of London, "a beautiful *Noctua* bred in a nursery-garden at Blackheath, which he had not at present been able to identify. Although much resembling a *Gortyna* in colour, its general form rather indicated something allied to *Dicycla*." (*E.M.M.*, xvii, p. 280). It would be interesting to know if this specimen is still in existence and, if so, whether it is *Plusia moneta*, Fab. Barrett (vi., 105) states that, so far as he knew, *P. moneta* "was not noticed in these Islands before the year 1890."—P. B. M. ALLAN, Windhill, Bishop's Stortford.

[The original reference (*T.E.S.*, 1881, *Proc.*, p. v) reads:—"Mr J. Jenner Weir exhibited a beautiful specimen of a *Noctua* found at rest

in a nursery-garden at Blackheath, in August last. It was apparently a new species, and there was some difference of opinion among the members as to whether it came near to the genus *Dicycla* or *Gortyna*."

It seems unlikely that this specimen should have been *P. moneta*, which was immediately recognized when it turned up nine years later. See, for example, Barrett in *E.M.M.*, xxvi, 255 (October 1890).

W. F. Kirby was apparently present at the meeting of 6.iv.1881 (see last paragraph on p. vi of *Proc.*) and he should have been able to recognize *P. moneta*.—T.B.F.]

XYLINA LAMBDA IN CAMBRIDGESHIRE.—A male in bred condition was taken at ivy blossom on the night of 1st October. From a neighbouring patch of ivy on 7th October 1920 Mr S. G. Campbell took a male of this species also in "bred condition" (*Entom.*, 53, 279).—H. WORSLEY WOOD, Cambridge.

MACROPTEROUS FORM OF METRIOPTERA ROESELII, VAR. DILUTA.—It may be of interest to record that I took a female of the macropterous form of the Grasshopper, *Metrioptera roeselii*, var. *diluta*, on the 16th August 1938 at South Benfleet, Essex. The ordinary form is quite common there this year, but although a very large number was examined only one of the winged form was found. I believe it was suggested on the last appearance of the winged form in England that it was probably due to the extreme heat and the abundance of food causing extra rapid development. This year, however, the weather has not been unduly hot and as most of the other species of Grasshopper in this area are backward in comparison with previous seasons its occurrence would seem to be due to some other cause.

The last time I saw the macropterous form of *Metrioptera roeselii* was in 1934. Dr K. G. Blair had discovered it at Benfleet in the previous year 1933. Every year since I have searched for this form without success. According to my notes, the species *Metrioptera roeselii* has varied considerably in numbers during this period. In 1934 they were plentiful, in 1935 the insect was very scarce, possibly due to the severe frost which occurred in May of that year. In 1936 they were more plentiful but not really common, although they were scattered over a larger area in very small colonies. Last year it was quite common again and appeared in a number of new localities, Mr Freeman reporting it as far inland as Brentwood. This year the species is abundant but somewhat later in maturing than in previous seasons.—RICHARD W. ATTWOOD.

POSSIBILITY OF THE FIELD CRICKET (GRYLLUS CAMPESTRIS) OCCURRING IN ESSEX.—Some years ago a breach occurred in the Sea Wall near Pitsea, Essex. This breach has been repaired and strengthened by dumping London refuse and covering it with soil dug from the Marsh. Several acres have been covered with this material and it is now the home of thousands of Crickets. I happened to visit it on the 21st August 1938 just before a heavy thunderstorm. The sun was very hot and the noise caused by the stridulation of the insects was astounding. I do not know whether there are two species of Cricket here or whether an extra large form has been developed. There is, however, a very

stout creature about twice the size of the ordinary House Cricket and much darker in colour. It prefers to bask in front of a small circular hole down which it disappears at the least alarm. The ordinary form is content with any crack in the ground and never seems to be still. I spent a long time trying to get a specimen of this big form but the vibration of the ground caused by my movements warned the insects before I could get within reach. The only way to obtain them would be to dig them out, but unfortunately I had no suitable digging tool with me and as the storm was approaching fast I had to abandon my attempt. A large number of Black-headed Gulls were gathered on the dump and on going across to see what the attraction was I could find nothing but bare earth. I can only surmise that they were feeding on the Crickets.—RICHARD W. ATTWOOD.

CURRENT NOTES.

A room has been opened at the Tullie House Museum, Carlisle, to be known as the Routledge Room. In this are placed Mr Routledge's Insect Collections, comprising some hundred thousand specimens, including all Orders, and a fine library of Entomological books, including the best standard works in most branches of natural history. The collections were given to the Museum by the late Mr Routledge's sister, Mrs Hankin, who was present to open the room. A striking portrait of Mr Routledge has been hung in the room. The room is for the use of students of Entomology and there is probably no better equipped room for the purpose in the provinces.—T. F. MARRINER.

[Mr Routledge was a life-long entomologist, as was his mother before him. A keen collector, a personal friend and correspondent, from whom I received a large number of British Noctuae taken on his own estate in Cumberland, he had many acquaintances in the South London Society thirty or forty years ago, before he retired to his estate.—Hy. J. T.]

The hardy annual of the popular South London Entomological and N.H. Society appeared in June, and, as usual, is an interesting record of the activities of the members during the past year. An innovation in the arrangement of the matter published is that the Reports of Field Meetings are placed together in a separate Section instead of being interspersed with the reports of ordinary meetings. It will be no doubt an advantage to members, when wishing to visit a collecting ground, to be able to refer readily to previous records. We might suggest that in future reports the leaders of these field meetings attach references to the reports of previous meetings in the "Proceedings" published during, say, the past ten years. These reports, although largely dealing with the two Orders Lepidoptera and Coleoptera, by no means omit records of other Orders, of which there are a considerable and varied number. One is struck by the number of species to which, owing to recent nomenclatorial changes, it was found necessary to add the names used in text books ordinarily available for the younger or less informed members. On the first page opened at random we noted the error *distinturia* for *distinctaria*. Among such a

mass of scientific names in these reports errors are very difficult of elimination. The President's (Mr F. J. Coulson) Address is an important detailed summary of the "Secondary Sexual Characters in British Coleoptera." The papers more worthy of notice are Dr Blair's "Changes in the Insect Population of Britain during the last 100 years," and Mr E. E. Syms' "Notes on *Nemobius sylvestris*" (the wood cricket). There are eight plates, including 2 of Mr A. W. Dennis' excellent photographs of the Oxlip and of the hybrid (primrose \times cowslip). Page references on the plates and in the text have been apparently overlooked. Another valuable volume of records and of successful and useful activities has been added to those already issued during the past half century or more.

SOCIETIES.

A meeting of The Entomological Club was held on 21st July 1938 at "Woodhouse," Stroud, Dr Harry Eltringham in the Chair. *Members present* in addition to the Chairman—Mr H. Willoughby Ellis, Mr James E. Collin, Mr W. Rait-Smith. *Visitors present*—Professor G. D. Hale Carpenter, Mr T. Bainbrigge Fletcher, Mr H. W. Holloway, Dr Sheffield Neave, Sir Edward B. Poulton, Mr Austin Richardson, Mr C. J. Wainwright. The guests arrived by train and car during the morning in time to enjoy the floral prospect of the gardens, which, notwithstanding the inclement season, presented a gay scheme of colour. Luncheon was served at one o'clock, the items on the menu being enumerated in the Chairman's special Latin. The humour of these "original descriptions" greatly amused the gathering. After luncheon, Sir Edward B. Poulton said that his friend, Canon St Aubyn Rogers, had taken advantage of the Air-mail to send him on 4th July last five living pupae of *Papilio dardanus*, together with their female parent, of the form *cenea*. The box arrived about 12th July, and as the Hope Department was unusually cold for the time of year, Professor Hale Carpenter had taken them to warmer quarters in his house. That very morning he found that the first of these had most tactfully emerged over night so as to be ready to appear at the Club Meeting. It was a female of the form *hippocoon* and was the first living specimen of *dardanus* to be seen in England. Its behaviour was most ingratiating, fanning its wings not violently, but just so that the members and their friends could see the pattern favourably. After luncheon a meeting of the Club was held, during which Dr Sheffield Neave and Dr Richard Armstrong were elected members of the Club. The Chairman's very complete and interesting laboratory and some of his current work attracted many of the company. During the afternoon, in delightfully fine and warm weather, motor trips were arranged through the adjacent beautiful Cotswold country, where the panorama of the valley of the Severn and the estuary of the river in the far distance were clearly seen and much admired. The visitors who could not remain left before dinner; those who were able to stay the night were entertained by Dr and Miss Eltringham and left during the next morning. A most happy and entertaining meeting.—H. WILLOUGHBY ELLIS, Hon. Secretary.

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TO OUR READERS.—Short Collecting Notes and Current Notes. Please.
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EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge.
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Duplicates.—Numerous, Ova, Larvae, Pupae, and Imagines.—*H. W. Head, Burnst-
ton, Scarborough.*

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Sanio, Rubi, Trifolii, Potatoria, etc., during the year.

Duplicates.—Numerous. Please send list.—*B. W. Adkin, Highfield, Pembury,
Kent.*

Desiderata.—Exotic Lepidoptera in papers.

Duplicates.—Exotic Lepidoptera in papers.—*Capt. J. C. Woodward, R.N., The
Red House, Borden, Tonbridge, Kent.*

Change of Address.—Dr Malcolm Burr, F.R.E.S., to South Rest, High Salvington,
Worthing.

SPECIAL NOTICE.

REDUCTION IN PRICE OF BACK VOLUMES.

To commemorate the 50th volume of the magazine it has been decided,
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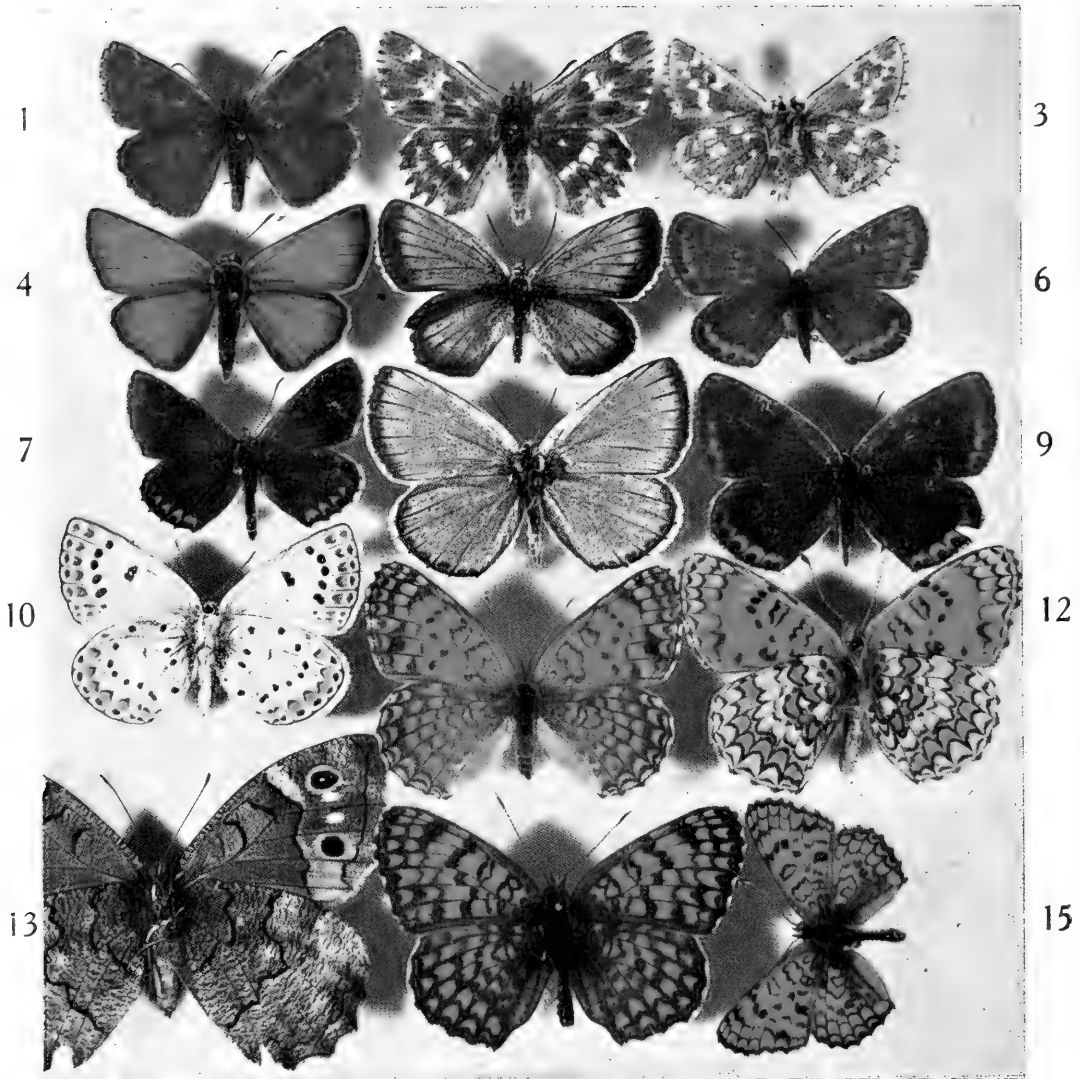
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1. *Erynnis tages*, L., race *magnatages*, ♂ : Vol. L, p. (1).
2. *Carcharodus lavatherae*, Esp., race *nigroobscurata*, ♂ : Vol. L, p. (1).
3. *Pyrgus serratulae*, Ramb., race *infraobscurata*, ♂ : Vol. L, p. (3).
4. *Adopaea flava*, Brünn., race *maxima*, ♀ : Vol. XLVIII, p. (3).
5. *Plebeius argus*, L., race *magnagraeca*, ♂ : Vol. XLVIII, p. (6).
6. *Plebeius argus*, L., race *magnagraeca*, ♀ : Vol. XLVIII, p. (6).
7. *Aricia allous*, Hb. = *medon*, Hüfn., race *macedonica*, ♂ : Vol. XLVIII, p. (7), and L, p. (6).
8. *Lysandra escheri*, Hüb., race *olympena*, ♂ : Vol. XLVIII, p. (8).
9. *Lysandra escheri*, Hüb., race *olympena*, ♀ : Vol. XLVIII, p. (8).
10. *Lysandra escheri*, Hüb., race *olympena*, ♂ underside : Vol. XLVIII, p. (8).
11. *Melitaea phoebe*, Schiff., race *ogygia*, Frhst., II g. *postogygia*, ♀ : Vol. L, p. (16).
12. *Melitaea phoebe*, Schiff., race *nigrogygia*, ♂ underside (Abbazia, Istria) : to be published.
13. *Eumenis allionii*, G.-H. = *fatua*, Fr., race *infracastanea*, ♀ : to be published.
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15. *Melitaea phoebe*, Schiff., race *ogygia*, Frhst., II g. *postogygia*, ♂ : to be published.

LEPIDOPTERA AT UVERNET, BASSES-ALPES, from 29th July to 8th September 1937.

By WM. FASSNIDGE, M.A., F.R.E.S.

Uvernet is a tiny alpine village situated on the Route Nationale, No. 202, from Barcelonnette to Nice via the Col de la Cayolle. It is only four kilometres from Barcelonnette and lies quite near to the Route Nationale, No. 208, which passes above the village and leads to the Col d'Allos. A turbulent stream, the Bachelard, flows noisily in a southerly direction down the valley to join the Ubaye at Barcelonnette. Beyond Uvernet the valley narrows till torrent and road lie in deep sunless gorges; while lower down below the village the stream bed widens into a barren waste of stones and debris where grow willows and alders, with *Hippophaes* and many low plants, a stony river bed liable to be flooded after sudden storms in the mountains. Two rocky peaks—the Chapeau de Gendarme, 2681 m., and the Pain de Sucre, 2555 m.—tower above the village to the south-east, and nearly all the slopes and gorges are well wooded. Here we spent six weeks in the summer of 1937, devoting all our time to field work, lamping on every possible night, sugaring fairly regularly, kept indoors by thunderstorms on three occasions only during the six weeks of our stay.

Already we had observed that Lepidoptera were scarce this year both in England and France, and at Uvernet we found the same scarcity, though of course in such a rich locality the scarcity was only relative. The only butterfly that was plentiful from beginning to end of our stay was *Polyommatus damon*, Schiff. In fact, it can be stated at once that practically no butterflies were observed worthy of note. I was specially anxious to take *Erebia glacialis*, Esp., but two visits to the Col d'Allos yielded only two specimens captured and not many more seen. Even common butterflies such as *Argynnis pales*, Schiff. were very scarce, and only one specimen each of *Plebeius orbitulus*, Prun., *Parnassius delius*, Esp., and *Erebia ligea*, L. came to our notice. However, our interests lay rather with the so-called Micros, so that we did not feel too deeply disappointed.

At the very end of July *Aglaope infausta*, L. was found flying in the early morning sunshine around blackthorn bushes. This was our first acquaintance with the species, and Mr Burras, who spent some months at Uvernet and the Col d'Allos in 1936, had only taken two or three. We found that it flew from about nine till ten o'clock in the morning, and not a single specimen was ever seen flying or at rest later in the day. If a cloud obscured the sun, it settled low on grasses and twigs and could not be beaten out. It preferred the sheltered side of bushes and was hard to follow on the wing.

The commonest tree on the mountain sides is the Scots pine or a very closely allied species. It was curious to see large numbers of these pines almost covered with mistletoe from the very top of the trunk to the lowest branches. No less interesting was it to find in the mistletoe leaves fair numbers of the bladdery mines caused by the larvae of *Argyroploce woodiana*, Barr., a Tortrix that is supposed hardly to occur outside Britain. Two specimens of the moth were captured at light by Mr W. Parkinson Curtis at the end of July, and I have received this

year 1938 a number of mined leaves from a friend in Barcelonnette, from which I have bred a long series from this first recorded French locality.

Except *Dendrolimus pini*, L., which came freely to our lamps, hardly any other species of pine-feeding Lepidoptera were seen, but one such species caused us to make the inevitable error to which all field workers are liable when cut off from their collections and literature. A species of *Thaumetopoea* that we rashly assumed was *T. pityocampa*, Schiff., came occasionally to our lamps, and was left to buzz about on the sheet. I took two specimens at last, feeling vaguely that there was a difference somewhere, and found later that I had taken for the first time *T. pini-vora*, Fr. For an account of this species see *Amateur de Papillons*, 1926, Vol. 3, p. 31, and Plate 8. Such incidents make one wonder how many species may have been overlooked in similar circumstances.

Uvernet itself is not specially high—only 1269 metres above sea level—but in three hours one may climb to the foot of the Pain de Sucre or to the high pastures above La Maure; or one may catch the motor 'bus and do the climb up to the Col d'Allos, 2243m., without any effort in something over an hour. Naturally we went several times to these higher alpine hunting grounds but with small success. The season had been an early one and many species were either over or worn to rags even at 7000 feet. Numerous common high alpine species were not seen at all. However, a few *Psodos chalybaeus*, Zerny, were taken on the shaly slopes at the Col. d'Allos, flying in company with *P. canaliculata*, Hoch. (= *trepidaria*, Hb.) and *E. glacialis*, while near by in a swampy depression flew a few worn *Crambus uliginosellus*, Zell., indistinguishable from New Forest specimens. A few *C. furcatellus*, Zett., and a single *C. zermattensis*, Frey var. *muller-rutzi*, Wehrli, almost completes the tale of our captures at higher altitudes. Along the footpath from the Col and on the far slopes towards the village of Allos, where in 1936 Mr Burras saw myriads of insects, this year on the 3rd August there were hardly any at all, in spite of good weather and abundance of flowers. After a few attempts we abandoned the heights and paid more attention to the lower slopes and to the river bed.

On the western slopes of the valley among the pines are scattered bushes of juniper, and in many of them were swellings and mines caused by the larvae of *Synanthedon spuleri*, Fuchs. Though not common, the species is widely distributed in the district. In the river bed towards Barcelonnette, where it spreads out to a mile or more in width, grows abundantly *Hippophaes rhamnoides*, some old stems being as thick as a man's wrist. On this plant we found a good number of larvae of *Celerio hippophaes*, Esp., and in the twisted shoots small larvae of *Peronea hippophaeana*, Heyd. While searching for these two species on 13th August my attention was drawn to a broken dead twig still hanging from the stem which reminded us somewhat of the mine of *Synanthedon flaviventris*, Stgr. Signs of an Aegeriid larva in the broken-off dead piece were clearly visible and the nearly full fed larva was soon exposed. Further search revealed large numbers of empty pupa cases projecting from exit holes chiefly in the thickest stems. So fresh did these pupa cases appear that search was made for the perfect insect in flight around the bushes, but without success. A great deal of time was devoted to the search for larval mines of this Aegeriid, for

no species was known to feed in the stems of *Hippophaes* so far as we could remember. Fortunately, a strong keyhole saw could be borrowed, and as the result of prolonged searching and much labour a considerable number of larvae was obtained. For the benefit of future seekers the advice is tendered to go equipped with really strong leather gloves, for the writer's hands got very badly torn, and one persistent thorn remained in the joint of his left forefinger until 18th November. These mines may be found in stems of any thickness from three-eighths of an inch upward, and in any part of the plant. Quite often they are at ground level or even in the roots, when the frass upon the ground betrays them; but they also occur freely up to six feet above the ground. The larvae of two species of longicorn beetles were also found feeding in the *Hippophaes* stems, but their frass is easily recognised. The stem above the mine is often killed and then withering leaves betray the presence of the larva. Moths duly emerged quite freely from the end of May 1938 in the forcing cage, and at the end of July 1938 in the open. The species appears to be *Paranthrene tabaniformis*, Rott., which usually feeds on some species of poplar.

Sugaring on the score or so trees and posts near the village yielded only large numbers of *Catocala*: *C. nupta*, L., *C. elocata*, Esp., *C. puerpera*, Giorna, *C. optata*, Godart, all commonly, with a few *Antitype polymita*, L. But lamping was a real pleasure and all our best captures were made at light. At first we used to sally forth to likely looking spots in the vicinity, though Mr Burras had urged us to lamp from the dining-room window facing west and overlooking the torrent. We had good results outside on favourable nights, but would find on our return that Mme. Lorenzi, our hostess, had set a petrol lamp on a table at this window, and that large numbers of insects were awaiting our examination. For some reason or another insects came far more freely to a light at this window than they did to a light at our bedroom windows or anywhere outside. A few of the rarer species taken at light were: *Lemonia taraxaci*, Esp. ♂♂ only, *Euxoa birivia*, Schiff., *Tholera cespitis*, Schiff., *Mythimna oxalina*, Hb., *Euxoa vitta*, Esp., *Atethmia xerampelina*, Esp. var. *unicolor*, Stgr., *Acrionicta strigosa*, Schiff., *Synedon cailino*, Lef., *Gnophos daubearia*, Boisd., *Tephronia sepiaria*, Hufn., *Eupithecia breviculata*, Donz., *Sarrothripus degenerana*, Hb., *Cochliotheca crenulella*, Bruand, *Rebelia surientella*, Bruand, *Psorosa alpigella*, Dup., *Euzophera pinguis*, Haw., *Anerastia lotella*, Hb., *Actenia brunnealis*, Tr., *Epischnia illotella*, Zell., *Orneodes desmodactyla*, Zell.

One of the characteristic plants of this locality is *Artemisia camphorata*, which I do not remember to have seen elsewhere in the Alps. Flying around this plant we took in early August a single specimen of *Cucullia cineracea*, Frr., but late in the month and in September large numbers of the larvae of this species were to be found at dusk and later, feeding on the flower spikes. When brought to England these larvae refused to eat *A. vulgaris* and *A. maritima*, but a certain number formed cocoons before our departure and emerged in July and August 1938. Our observations on the foodplant of this species fully confirms the note in *Amateur de Papillons*, Vol. 8, p. 250, 1937. On the same plant were found also numbers of larvae of *Phlyctaenodes aeruginalis*, Hb., feeding in a loose silken web. These

larvae remained unchanged throughout the winter and spring, but unfortunately they died before they could pupate.

Altogether about three hundred and fifty species of Lepidoptera were observed during our stay, some of which have still to be identified. A number of others have been bred since our return, among them *Arctia casta*, Esp., *Miselia dysodea*, Schiff., *Anepia irregularis*, Hufn., *Coenotephria berberata*, Schiff., *Tischeria angusticollella*, Dup., *Gracillaria cuculipennella*, Hb., *Phyllocnistis saligna*, Zell., *Peronea hastiana*, L. Enough has been said to show that this locality is a very rich and varied one, and it is certain that any entomologist, who could spend some time there in May, June, or July, would be well rewarded.

CONTINUOUS BREEDING. I.

By H. B. D. KETTLEWELL, M.A., M.B., B.Chir.

The field for scientific breeding of Lepidoptera in this country is still widely open for investigation, because with the exception of a few varieties in such species as *Arctia caia* and *Abraxas grossulariata* and certain melanics, the majority have not yet been systematically worked out.

E. B. Ford in his genetic treatise on "Problems of Heredity in the Lepidoptera" [*Biological Reviews*, Vol. 12, 1937, p. 462] states:— "Although I do not claim that all the genetic factors which have been studied in the Lepidoptera are recorded here only a small proportion of them is likely to be omitted." Nevertheless, out of a list of two thousand species of moths and butterflies occurring in this country, under sixty species are referred to by him! From such an authority this goes to show how great is the field left open for investigation. The reason for this surprisingly small list must be found in the following two factors:—

- (i) The ease with which "continuous breeding" can be undertaken is at present limited to comparatively few species.
- (ii) The range of so-called varieties is greater and more obvious in those species already worked.

Of these two factors the first is undoubtedly the more important.

I should like here to make clear the difference between merely breeding a species for a generation, which may be easy, but from a genetic point of view may be a small fraction of a very long story, and "continuous breeding" which is essential in working out a given variety. This second type of breeding is obviously more difficult than the first, as it involves one's ability to get fertile pairings as well as other complications such as wintering the species in some stage or other.

For example, it is the easiest thing in the world to pair *Parasemia plantaginis* and breed from the egg a second generation of the species, but here the family tree comes to an abrupt end, the reason being that at present we find this species very difficult to hibernate in captivity in the larval state as it does in nature. For this reason the genetics of all the varieties of this species are incomplete and even its common northern variety *hospita* has, to the best of my belief, not been bred for more than the one generation.

Approaching the same subject from another point of view with the idea of stressing that the future of forming collections must lie more and more in the scientific breeding of all species. If we look over the average standard collection of Lepidoptera we are bound in all fairness to admit that the same series is reduplicated in a hundred collections. Now and then we see a variety of a species taken wild by some means or other. Unseen in these series and infinitely more common [exactly how much more common the genetic pundits can tell us] lie those specimens which carry the strain of one variety or other—the so-called heterozygotes which if bred together would produce the requisite quota of the particular variety (= homozygote). With few exceptions at present known these heterozygotes are identical with the type and therefore cannot be picked out.

Carrying the argument one step further, every insect taken, and this applies most to those species which show large range of varieties, may potentially be heterozygous to some variety or other and as such is worth breeding and in breeding from. By this means we can do in captivity what rarely could happen in nature.

By this means also we can do in captivity what never could happen in nature. I refer to the cross-pairing of species showing marked geographical variation, East with West and North with South, producing the consequent diversity of forms in subsequent generations.

Lastly by continuous breeding it is possible, in certain species only, by selection of light or dark forms to eliminate or add certain factors in one direction or another with the production of even darker or lighter forms. This is called multifactorial heredity and is, of course, quite distinct from the simple mendelian type of heredity in which only two factors are concerned and which is clear cut with no intermediates. As an example of this we may mention the black, *atra*, form of *Lymantria (Psilura) monacha* or the radiated forms of *Spilaretia lutea*.

It would seem, therefore, that the future for lepidopterists will lie in specialists, the same as there are, of necessity, in every other branch of science, whose aim will be to work out a survey as it were of individual species not only by pure collecting but also by continuous breeding throughout the whole range of the species, as Goldschmidt has done with *Lymantria dispar*. Apart from the scientific knowledge gained, this would avoid the fatuous repetition which at present occurs in collections in our attempt at completion of the whole which, of course, is impossible in the lifetime of any one of us.

It is these thoughts which have prompted me to write up "Continuous Breeding" notes of these few species, which I have for the past few years been working on, hoping that it will help others. For it is extraordinary how after breeding the same species year after year simplifications and modifications will suddenly present themselves.

HERESY MOST FOUL

BY AN OLD MOTH-HUNTER.

I have got a bee in my bonnet. To the orthodox it is a ridiculous bee—nearly as stupid as those spelling ones which lately attacked, and stung, the B.B.C. It is this.

I hold that the scales on the wings of a lepidopteron, being attached to the wings by means of pedicels which fit into sockets in the wing membrane (Imms), cannot be blown off by the wind. Puff I never so hard through a glass tube not one scale can I remove from the wings of a living insect. I allege that not any wind known to Aeolus—not Boreas, Aquilo, Auster, Notus, Eurus, Africus—let alone Zephyrus; neither tempest, hurricane, tornado, nor typhoon—can detach scales from a lepidopteron's wings so long as that insect remains in the air.

It follows, therefore, that a Bath White, or a Queen of Spain fritillary, or a Long-tailed Blue, or a Clifden Nonpareil, which crosses the Channel or North Sea shortly after its eclosion, will arrive in England or Scotland, or wherever it first settles, in identically the same condition as that in which it left its native shores.

This hypothesis, of course, is heresy most foul, and it has all the weight of AUTHORITY against it. Time and again, in all the classic works on British lepidoptera, in the pages of *The Entomologist*, *The E.M.M.*, the "Record," the Proceedings of all the Entomological Societies, one comes across the orthodox statement—that a migrant which is in perfect condition, as fresh as paint, must, *de ipso facto*, have emerged from the pupa not very far away—must, in fact, be an Englishman (or Scotsman) born and bred. "Its fine condition," says Barrett (*E.M.M.*, xxv, 180) "forbids the idea that it can have flown any very great distance" (the italics are his own). And so say, and continue to say, all true brethren of the butterfly net and sugaring tin.

Mr F. W. Frohawk has no doubts whatever upon this subject. Again and again in his *Complete Book of British Butterflies* he proclaims his orthodoxy. "There is not the slightest doubt that several have been British born, as examples have been taken in perfectly fresh condition" (p. 99); "These were in the finest possible condition and had evidently bred in his garden" (p. 199); "Many of the specimens taken have been in very perfect condition, apparently freshly emerged" (p. 313); and so on.

Why, then, should I, an insignificant person whose opinions are of no interest whatever to anybody, make myself ridiculous by proclaiming this preposterous heresy?

The answer is just this—that I have been reading *The Migration of Butterflies* by Mr C. B. Williams for the *n*th time. And every time I read it my heresy swells within my bosom. "Practically nothing is known," says this very wise writer, "of the conditions or period of time in which butterflies get 'worn' or 'rubbed'; and any conclusion drawn from such evidence is unreliable in the extreme. I have captured specimens of *V. cardui* migrating through Cairo that were practically perfect, and yet it was impossible to believe that they had bred within four hundred miles. In the migration of *B. severina* . . . in 1928, the majority of the specimens were in almost perfect condition . . . Yet there is reason to believe that they had flown many hundreds of miles, and all from the same spot, as there is no known large area in the vicinity which contains their foodplant . . . Grossbeck notes that *A. argillacea* 'in fresh condition' was taken in New York in . . . 1911, yet the nearest cotton field was four hundred miles away and no other foodplant is known." Moreover in 1887 this same moth, *A. argillacea*, swarmed "fresh and unrubbed" at Ottawa—some 200 miles

north of New York and 600 miles from its nearest foodplant. No wonder that the French moths which I have been taking at my sugar, fifty miles from the coast, this year are as fresh as though they had come straight out of a handbox.

It is no use you quoting "*quot homines, tot sententiae*" at me. Even less shall I be moved if you remind me that Satan can quote Scripture for his needs. Either the scales of a lepidopteron's wings can be blown off during a sea voyage or they cannot.

I will go still further—as well will I be hanged for a sheep as a lamb. I will assert that unless a lepidopteron hits up against something *en route* it can travel miles and miles *overland* without parting with a single scale.

Are there any on my side? Or do I stand alone? If I do, my head is—so far—bloody but unbowed. Though the might of the big battalions be arrayed against me, though I be gnashed upon by all those who cherish immaculate specimens of rarities whose value depends on native origin, I shall continue to say (though it be in an undertone) "bosh!" whenever, in print, the freshness of an insect is adduced "in proof" of recent and local eclosion.

COLLECTING NOTES.

The present has been a very poor collecting year in this north Cumberland Fell area and, for me, it has just had a somewhat unusual and unfortunate wind-up. I was sitting by my dining-room fire the other morning enjoying my pipe and morning paper when I was informed that a blue tit was flying about in my den. The bird had evidently come in from the garden when the window was open the day before, and must have kept still and quiet when I was in the room in the evening, or I must have heard and seen it. Encouraged by our Treasurer, Mr H. W. Andrews, and my friend, Mr J. Murray of Gretna, I had this year taken up the study of Diptera, and had collected quite a number of local specimens. These I had been setting and had left on my table to dry. When I proceeded to investigate I found my tit visitor had been among them, and the pins, labels, and a few birdy foot-prints were all that were left to me of my first Diptera season. When the bird was caught and taken out of doors to be freed, it did not seem to show the usual tit liveliness, and I have been wondering whether the fact that the flies had been killed and kept in laurel tubes had anything to do with its sorrowful attitude.—T. F. MARRINER.

OCURRENCES IN CUMBERLAND.—Though *Aglais urticae* was more than usually abundant in this N.E. Cumberland area in Spring (1938) it has been more than usually scarce in the Autumn. Nor has *Pyrameis atalanta* been anything like as common as usual, though it did not appear until much later than its usual time, and odd ones are still to be seen in my garden now in November.

Acherontia atropos is not by any means of common occurrence in our Cumberland area, and has not been recorded during the last few years. A farm hand brought to me an almost fully-fed caterpillar of this moth on 18th September. He had, that day, found it while at

work on a farm near Easton. It pupated later and I have the pupa, which I am hoping will produce an imago in the Spring. Neither *Arctia caja*, L. nor *Abraxas grossulariata* have been as common as usual with us.—T. F. MARRINER.

COLIAS CROCEUS NEAR WORTHING.—I saw a "clouded yellow" on a fine sunny day on 1st September on Crockhurst Hill, on the Arundel Road, near Worthing. On a brilliant sunny morning on 11th October I flushed one from the grass a few hundred yards from the same spot.—MALCOLM BURR.

A GRASSHOPPER NOTE.—Grasshoppers are not by any means commonly met with in this North Cumberland Fell area where I am now living. I have only, so far, come across three shorthorns (Acridioidea) and one longhorn (Locustodea) in my wanderings.

Stenobothrus viridulus, L. On a patch of moist low-lying meadow, near Easton.

Stenobothrus bicolor, Charp. This seems to be the most commonly occurring species we have here and I have found it in widely spread localities of the area.

Tettix bipunctatus, L. is scarce. I have only come across it in October and in only one place.

The longhorn is *Metrioptera brachyptera*, L. In August 1936 I went for a car ride, stopping for sweeping, etc., at any likely spot. On the way I crossed the river bridge at Penton, and on my next halt gathered a grasshopper, which was afterwards named for me as *Metrioptera brachyptera*, L. On looking up the late G. B. Routledge's list, in the *Transactions of the Carlisle Natural History Society*, Vol. 4, I find he states that the insect is found commonly in Cumberland, and that England is the only part of the British Isles from which this insect has been recorded. My find will, in that case, be the first Scottish record, though where I found it any self respecting grasshopper could get from Cumberland into Scotland in three hops; at the time I did not realise I had crossed the Border.—T. FRED. MARRINER.

CURRENT NOTES.

Four new parts of the English edition of the Supplement to Seitz Macro-lepidoptera of the Palaearctic Region have just come to hand. Parts 74, 75 contain the Index, a List of Errata and Additions to Vol. III (Noctuae) and the final plate with 65 coloured figures of new aberrations. The Title pages and the Preface conclude the 3rd volume. [An error occurred in the advertisement in the November number. 16 plates in Vol. III should be 26 plates.] No student of the Geometridae of this country can afford to carry on without constant consultation of this most valuable summary of recent research accompanied, as it is, with the large number of generally very correct and well-coloured figures. Parts 76 and 77 are in continuance of Vol. IV of the Supplement and consist of 2 sheets of text containing a further contingent of the enormous genus *Cidaria*, by L. B. Prout, and 4 coloured plates of aberrations. The additions registered and briefly

described are: in the subgenus *Orthonama*, *lignata* (*vittata*) = 3; in *Calostygia*, *olivata* = 1, *pectinitaria* = 5, *salicata* = 5, *multistrigaria* = 4, *didymata* = 9; in *Lampropteryx*, *suffumata* = 5, *otregiata* = 1; in *Loxofidonia*, *tristata* = 8, *galiata* = 5, *rivata* = 2, *alternata* (*sociata*) = 9; in *Perizoma*, *taeniata* = 3, *affinitata* = 4, *alchemillata* = 4, *bifasciata* = 2, *minorata* = 3, *blandiata* = 4, *albulata* = 5.

An old and well-known "friend," *Common Objects of the Microscope*, by the Rev. J. G. Wood, M.A., F.L.S., has recently been revised by a new editor, W. J. Ferrier, F.R.E.S. The whole of the technical portion has necessarily been rewritten and brought up to date; and contains numerous figures of the more modern apparatus now in use, lent by the long famous firm of Messrs Watson & Sons. There are some 14 plates, 12 of them coloured, depicting a large number of "common objects" besides some figures in the text. There is no doubt this book will again serve its purpose, in rendering aid to a further generation of young students. It is issued by Messrs Geo. Routledge at the price 4/6.

In the current volume of the *Revue d'Entomologie de l'U.R.S.S.*, xxvii, nos. 3-4, are several items of more general interest. (1) L. A. Zenjakin discusses the temperature preference of *Operophtera brumata* and of *Chloridea obsoleta*. In his conclusions he states that the preference is dependent on the physiological qualities of the organism and finds its reflex in the condition of the unstable composition of the matter. (2) G. N. Sokolov employs the uncus of the male copulatory apparatus as a basis of classifying a number of species of *Lycaenidae* into 5 groups. The article is illustrated by many diagrammatic figures on six plates, each species being represented by a spread view as well as by a side view of the uncus. (3) S. Scoblo describes the daily rhythm of oviposition in *Euxoa segetum*. This species oviposits only at night, and never during the day. The daily rhythm of oviposition is maintained also when moths are kept in complete darkness. Eggs laid by moths kept in darkness perish, and the development of the embryo does not begin. Copulation by *Euxoa segetum* does not take place in complete darkness. The absence of copulation is, of course, the cause of ova perishing.

SOUTH AMERICA AS I SAW IT, by W. S. Blatchley, of Indiana, a United States correspondent, whose previous writings have been mentioned in this journal. Some of us were much delighted by his books, "My Nature Notes," "In Days Agone," etc., and can open them again and again to scan a chapter. The present is another of the series, comprising the "Observations of a Naturalist" on a desultory tour of parts of S. America. The companion of the early part of the journey proved so uncongenial that they at length parted company, after numerous unpleasant but amusing experiences. His journey to Rio de Janeiro was in the ill-fated "Vestris," which in a subsequent voyage was burnt with hundreds of her passengers. The author's routine throughout his tour was to visit museums of natural history, to meet well-known naturalists, to see private collections of note, and to collect around the places at which he stayed. From Rio he went to Sao Paulo, Santos, Montevideo, Buenos Aires, Cordoba, Mendoza and across the

Andes into Chili to Valparaiso. At Santiago he visited an old correspondent of our own, Signor Alfredo Paz, whom he describes as a collector of "Oh! My!" species. Thence through Bolivia to La Paz, on to Peru with Cuzco, Arequipa and Lima, returning home via the Panama Canal and Havana. His observations on the living conditions of the people, the civilization or want of the same, the staple products of the countries visited, and the common animals and plants he met with, are enlivening.

Past the activity needed to chase the butterfly, he brought back a large assortment of Coleoptera and Hemiptera obtained by searching and beating at all opportunities. The book is thus not only instructive but interesting and amusing. The remarks, made by a man with the experiences of a lifetime behind him, are always worth reading. There is a map of the journey, a feature so often omitted. The book is well produced and easy to read.

THE INSECTS OF CAMBRIDGESHIRE.—We are asked to announce that a limited number of copies of the *Zoology of Cambridgeshire*, the major part of which is occupied by the account of the Insecta, are now available. They are reprinted from the "Victoria County History of Cambridgeshire and the Isle of Ely," Vol. I, 1938, pp. 77-245. Applications, accompanied by a remittance of £1 1/-, which covers postage, should be made to the Editor, DR A. D. IMMS, Zoological Laboratory, Cambridge.

Mr J. C. F. Fryer calls attention to the gross omission of the name of Mr H. M. Edelsten as the joint author of the section of Lepidoptera with himself. "Not only in justice to a collaborator, who did his full share of the work, but even more because Mr Edelsten's knowledge and experience of the butterflies and moths of fenland are unrivalled. Mr Edelsten's name should be added to the title of the section." We understand that the editor of the Zoological portion, Dr Imms, is in no way responsible for this unfortunate omission.

The species of the *Stenobothrus* group, whose centre of evolution is agreed to have been the steppes of Siberia, the Angara continent of Suess, are characteristic of the Palaearctic Region. In the Ethiopian and Oriental Regions they are replaced by a similar genus *Aulacobothrus*, which occupies the savannah areas of Africa and India, and also of Southern China. It is extremely interesting to note that there are one or two species in South America, particularly the Argentine and Chili. As Uvarov points out (*Rev. Soc. ent. Arg.*, ix, p. 5, 1937), this type of generic distribution is indicative of the great antiquity of the genus.

In the same paper the same author draws attention to the interesting case of discontinuous distribution seen in the subfamily *Batrachotetrigini*. It is unfortunate that this group has so unwieldy a name, as it is one of exceptional interest. It is represented in Australia, South Africa, the Palaearctic deserts, the south-western portion of North America, Mexico and the deserts of Chili. There are certain other desert types with an analogous distribution, which suggests that the specialised desert fauna must have originated at a very remote period, probably in the Cretaceous.—M. B.

SOCIETIES.

A meeting of The Entomological Club was held in The Burford Bridge Hotel, Box Hill, Surrey, on Tuesday, 8th September 1938, Mr W. Rait-Smith in the Chair. *Members present* in addition to the Chairman:—Mr H. Donisthorpe, Mr H. Willoughby Ellis, Mr Jas. E. Collin. *Visitors present*:—Mr H. M. Edelsten, Mr F. W. Frohawk, Mr W. J. Kaye, Rev. John Metcalfe, Capt. N. D. Riley, Mr W. H. T. Tams. The company was invited to lunch, which was served at 1.15, after which Mr Donisthorpe exhibited two flies which had been recently added to the British list, the one a large Asilid, *Laphria gilva*, L., first taken by Mrs Blair on the occasion of the excursion of the South London Entomological Society to Windsor Forest and subsequently six more specimens were taken in the same place by Dr Blair, the Rev. C. Tottenham, and the exhibitor. The second was a pretty fly, *Chrysopilus laetus*, Zett. ? probably new to Britain as there is nothing like it in the British Museum collections. It was taken by the exhibitor as a pupa in the mud of a pond in Windsor Forest and subsequently successfully reared. Mr Collin, with regard to *Laphria gilva*, congratulated those who had captured this fine species in Britain, and added that it was by no means rare on the Continent; in Denmark, Lundbeck had recorded it as very common where *Tomicus typographus* was abundant and that it preyed upon that beetle; it appears probable therefore that if a search were made it would be found in other localities in this country. In the early afternoon a walk over the summit of Box Hill was undertaken and notwithstanding the slight misty rain, it afforded very great pleasure. The magnificent view over the South Downs was rather impaired by the weather conditions, but nevertheless provided a panorama which is too well known to describe. The easier journey down hill ended by arrival at the Hotel in time for tea and very pleasant conversations took place amongst the members and visitors. After a most enjoyable day the party dispersed about 6 o'clock.—H. WILLOUGHBY ELLIS, Hon. Secretary.

THE VIIITH INTERNATIONAL CONGRESS FOR ENTOMOLOGY.—This triennial gathering of entomological colleagues from all parts of the world has now been held for the seventh time and, we are told, was an eminent success from the social side; but as yet we have no information of the scientific results of the gathering. Perhaps it may be early to expect results as well over a thousand were present, probably the biggest Congress ever held in any branch of Zoology; over 300 papers were announced, and everything official had to be crowded into six days, 15th-20th August, giving no time for real discussion and consideration of any question. As about 50 countries were represented the language difficulty naturally put more or less of a brake on progress. Each day opportunities were made to visit the famous museums, and we know of one of these visits from a card of greeting received by us with signatures of seven well-known British entomologists, present in the Deutsches Entomologisches Institut Museum, Berlin-Dahlem.

On Monday, 15th August, the official opening of the Congress took place in the new Aula of the University, and the representative of the

Ministry of Education, the University Rector and the City President, welcomed the delegates. The permanent Secretary, Dr Karl Jordan, Dr Jeannel (for the delegates), and Dr Martini (Hamburg), the President of the Congress, all addressed the meeting. There followed a general meeting to see two insect films by Dr Ramme and Dr Avinoff.

In the afternoon there were meetings of the various sections in different rooms at the same time, and the real work of the Congress began. The sectional subjects in which we are most interested were under the main division, General Entomology, and were Systematic Entomology, Zoogeography, Nomenclature, Bibliography, Morphology, Physiology, Embryology, Genetics, Oecology. Under the main division, Applied Entomology, came aught that concerned Medical, Forest and Agricultural Entomology, Apiculture, Methods of dealing with pests and vermin, etc. Roughly, one could say the two divisions were Amateur and Professional. Each day was spent over this programme interspersed with visits to museums and societies and in sightseeing, including a reception at the Berlin Rathaus (Guildhall) by the City President, and on Friday evening the Banquet in the Marmor-Saal of the Zoological Museum. Visits were made to the famous protected area Bellinchen, to Sans-souci, the famous castle of Potsdam, and to the Schorfheide.

On Saturday morning, 20th August, the final general meeting of the Congress took place, and hearty votes of thanks were awarded. In his final speech Prof. Martini, as President of the Congress, drew the attention to the very great development of the International Entomological Congress and of international congresses in general. He pointed out that, on the one hand, the great, very great increase in the number of those taking part had, without doubt, proved the success of the policy, but that, on the other hand, a big drawback threatens slowly to creep in, the difficulty to arrange successful scientific discussions in the endless small sections and branches without too much disintegration. It would be, he said, the question of the future to find a way out of this dilemma, and he referred to the arrangements of the big entomological congresses of the United States in limiting the considerations to "special symposia."

We are informed that Sir Guy K. Marshall and Dr Walther Horn were elected as Honorary Members of the Congress and that the able local secretary of the Congress, Dr Martin Hering, whom we all know from his writings on leaf-mining, has been placed on the Executive Committee. There was no decision as to the next place of meeting.

Collecting trips were arranged before and after the Congress but so far no details have come to hand. Over 160 went on to Munich in the following week.

Among the well-known English entomologists who were present we note the following:—J. C. F. Fryer (Pres., R.E.Sy.Lond.), F. J. Griffin, Dr Hale-Carpenter, Dr A. D. Imms, Dr Karl Jordan (Secretary of the Congress), G. J. Kerrich, F. Laing, Sir Guy A. K. Marshall, Prof. J. W. Munro, L. B. Prout, N. D. Riley, J. Smart, W. H. T. Tams, W. R. Thompson, Dr C. B. Williams, Dr V. B. Wigglesworth, etc. Also representatives of Australia, A. J. Nicholson, and of Canada, A. Gibson.—
HY. J. T.

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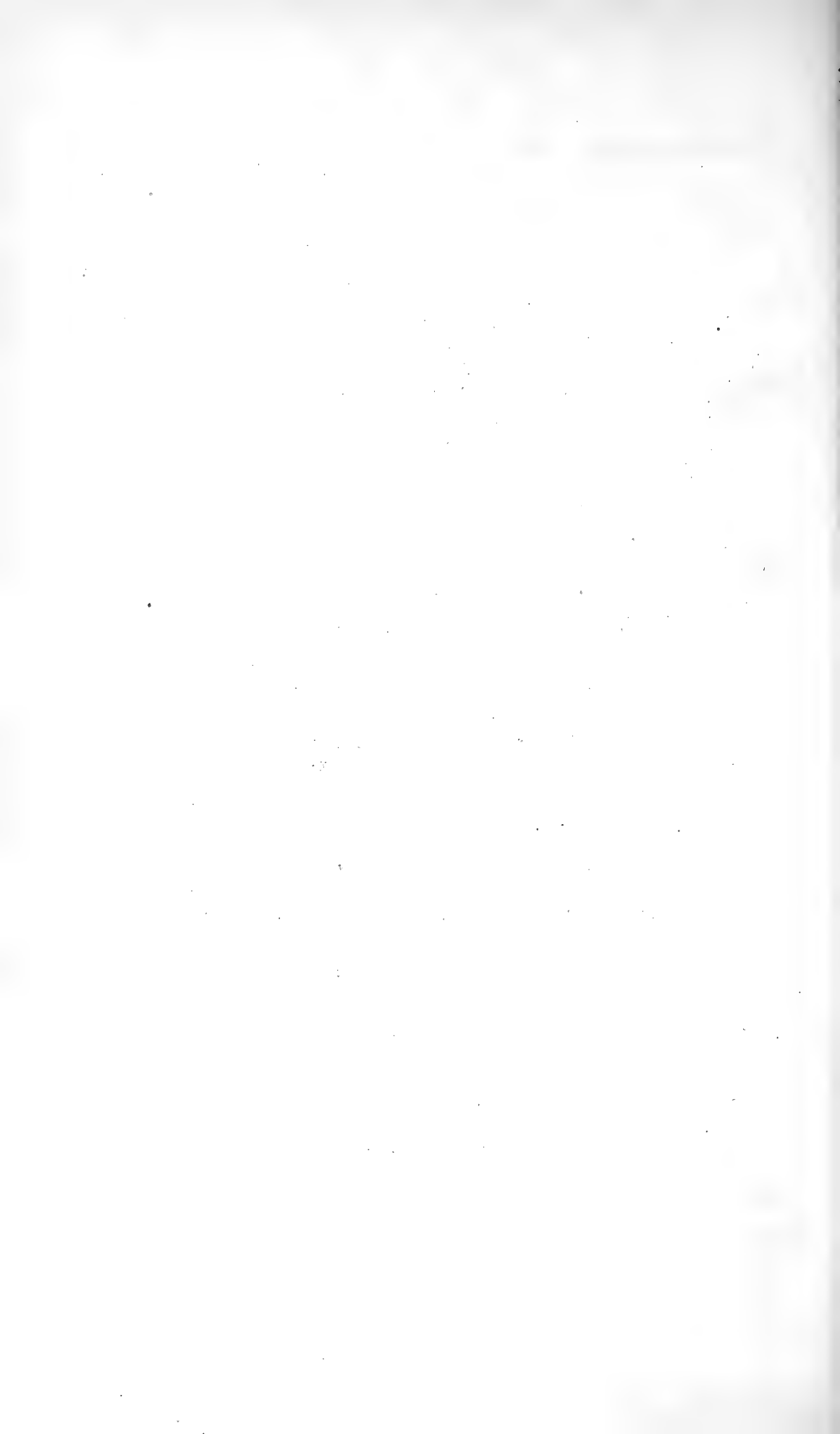
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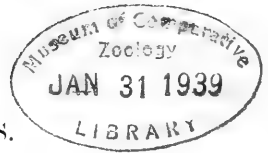
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SPECIAL INDEX.

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



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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CORRECTIONS.

- P. 2, line 6 from bottom: for "Kettlwell" read "Kettlewell."
- P. 32, line 22 from top: for "*Philaemus*" read "*Philaenus*."
- P. 45, line 20 from bottom: for "homimes" read "homines."
- P. 51, line 10 from bottom: for "*chiab*" read "*chi*."
- "Special Correction," on p. 95.
- P. (131), *Noct. Supp.*, line 14 from top, and p. (132), line 7 from bottom:
for "*It*" read "*It*."

represented by Herrich-Schäffer's figure, drawn from one of Zeller's four original males. Le Cerf also takes into account the fact that in his race the eye-spot of the apex is usually accompanied by other smaller ocelli on the forewing; this, however, is of doubtful value, as a distinctive feature, because the aforesaid figure exhibits a second ocellus, too, just behind the principal one, and, in fact, it exists nearly constantly in the male *Telmessia* of most regions. The female of Le Cerf's race has no pale area on the disc. He has erected the name of *oreas*, but Riley has pointed out that the very much older name of *pallescens*, Btl. certainly applies to it. In Le Cerf's *manioides*, from the same region, the apical eye-spot is twice as large as usual and the fulvous band is so faint that it is almost imperceptible. Next to this comes *kurdistana*, Heyne-Rühl, which is so dark that the fulvous band is broken into separate spots even in the female. Gaede is, no doubt, right in attributing this form to *telmessia*, as the *jurtina* of Asia Minor belong to the *hispulla* form, with large and sharp fulvous patches, and Heyne's description could not agree with any of its females, whereas I possess a single female of *telmessia* from Tecde, in the Malatia region of western Kurdistan, and it exactly corresponds with that description; it, thus, seems quite true that it constitutes a racial feature in that country.

To nominotypical *telmessia*, characterised in the male sex, according to Herrich-Schäffer's figure, by a broad fulvous suffusion all over the disc of the forewing, which even reduces the extent of the patch of androconial scales, so that it somewhat recalls the aspect of *M. nurag*, belong all the specimens I possess, from the coast of Anatolia, whence were Zeller's "cotypes," to Syria (Beirut) and Palestine.

On the contrary, a large series of June, from Ak-Chehir, in Central Anatolia, is distinctly different in the male sex, in that the apical ocellus is invariably single and rather small and the fulvous is always very much less extensive: in about 10% of my examples there is a small and faint tawny patch, between the band and the cell; in about as many there is no trace of tawny left and not even the ring around the eye-spot, whilst the black androconial patch becomes unusually broad; finally, the remainder are transitional and exhibit either a small round fulvous area, at the back of the apical ocellus, or only a slight suffusion of scales of this colour in its place, being all that remains of the usual fulvous band; it need scarcely be added that there never is any trace of tawny on the hindwing, as there occasionally is, beyond the end of the cell, in nominotypical *telmessia*. For this darkened form and race, characterised by the male sex only, because the female is perfectly similar to that of the latter, contrary to what is found in race *kurdistana*, characterised by its darkened female, I suggest the name of **marenigrans**, nom. nov.

Lasiommata maera, L.:—In all the works on localities of Anterior Asia this species is referred either to *adrasta*, Geyer-Hüb. or to *orientalis*, Heyne-Rühl, and only quite recently have a few authors, such as Graves, in connection with Palestine and Syria, and Pfeiffer, in connection with Northern Syria, begun to note the differences of aspect it exhibits within that region. The name of *adrasta* cannot, however, be applied quite correctly to any of them, because the form and race re-

presented by the original figure is quite peculiar to the west of Europe and notably to the south of France, so that even those of Italy and those of the Balkans cannot bear that name; the latter must not be called *orientalis* either, as some writers have done, but *silymbria*, Frühst., for this race spreads from Dalmatia right across to Macedonia.

As to the name of *orientalis*, Heyne's original description (in Rühl's *Grossschmett.*, p. 577, published in July 1894) translates as follows:— "A form allied to *adrasta*, in which the upper side of the forewing is strongly mixed with dark rusty-red; the underside of the hindwing is of a very light grey (silvery-grey). Inhabits Asia Minor." This diagnosis certainly applies perfectly to many individuals of the region in question, but only to those of the summer generations, owing to the underside colour, it mentions particularly; besides this, it omits the two upperside features, which can, in reality, be considered peculiarities of the Asiatic races, although they are not present, quite constantly, in all the individuals: one is the total, or partial, effacement, to a higher degree than in any other race, of the transverse dark streak, across the disc of the forewing, in both sexes; the other is the still more remarkable reduction of the ocelli of the hindwing to two, usually preceded anteriorly by a third, very small, fulvous space containing only a minute and blind black dot; in all the other races this is a small, but distinct, ocellus, with a white pupil, and there is at least another, fourth, fulvous space before it, when there are not more; one can add that the apical ocellus is, in some individuals, rather larger than in most other regions. If these features are taken as the characteristics of *orientalis* even in the broadest sense of the term, it will be seen that this name cannot be applied to any race from outside Anterior Asia, whereas the rusty-red colour, described by Heyne, is met with quite as commonly in other regions as in this one, where it does not prevail at all.

The next remark to be made is that, also inside that area, the name must be used with more precision, taking into account some perfectly clear variations, which exist there. To begin with, it must be restricted to the II generation of Asia Minor, whose underside colour, of a clear grey, agrees with the original description, whilst the underside of the I generation is thickly shaded with dark grey and cannot be included; I, therefore, name it **anteorientalis**, nom. nov., taking as "cotypes" my specimens of May from Ak-Chehir and the Sultan Dagħ in Central Anatolia, collected by Wagner; others of May, from Brussa, are exactly the same. This race is of the more or less usual and normal size of the species, in those specimens as well as in my June ones, which correspond to Heyne's description, and which I take to have been produced by the earliest emergences of the II generation.

According to Pfeiffer's observations in the Marash region of Northern Syria, there exists a I gen. in April, a II gen. in June and July, a III in August and September, and a IV, partial one, in November. According to Graves, in Palestine, on the Plateau, "the II gen. appears in late May and drags on well into August, probably owing to the operation of the summer pause." The latter remark is probably a more correct interpretation of what Pfeiffer has taken for a II and a III generation, although he states that the I has an ashy-grey underside, the II a greyish-brown, the III a whitish-grey, and the IV.

again, an ashy-grey one; I have pointed out striking differences of aspect between the early and the late emergence of the same generation, for instance, in the Italian *C. pamphilus* and *M. didyma*, which have very long-drawn ones, so that it is quite natural *maera*, too, should look different in its II generation, before and after the summer pause of its emergence.

To this must be added that the race of Syria and Palestine has a distinctly different aspect from the usual, widespread one, of Asia Minor, owing to its much smaller size and to its paler colouring: the brown of the upper side is often greyish in tone and the fulvous is yellowish and replaced by warm yellow in the apical region of the forewing around the eye-spot. The forewing of my Anatolian *orientalis* measures from 23 to 25 mm. in length, corresponding to an expanse of 40 to 42, whereas my examples from Beirut, in Syria, measure, respectively, 20 to 22 and 35 to 37, in both sexes. There may, of course, be larger ones in other localities, but, anyhow, the general size is distinctly lesser than in Asia Minor, also according to Graves's experience. Here, too, then, it will be necessary to make a distinction between these forms and the race, as a whole, on the one hand, and the race *orientalis* proper, of Asia Minor, on the other. I suggest **parvorientalis**, nom. nov. as suitable to the race, selecting as "holotype" a male from Beirut, in my possession, which is similar to true *orientalis*, in having a whitish-grey underside, so that it evidently belongs to Pfeiffer's so-called III generation; another, with a decidedly brown underside, I should name **castaneaparvorientalis**, nom. nov.; the I generation: **anteparvorientalis**, nom. nov. and the IV: **postparvorientalis**, nom. nov. (the latter has an intermediate appearance between those of the spring and of the summer emergences).

Agapetes (Melanargia) of the *russiae*, Esp. = *japygia*, Cyrilli group:—The more one finds out about this group of butterflies the more one realises how difficult it is to establish the relationships of the various forms, which compose it, and to value their degrees, according to the average standards afforded by other groups. During last century, when the most striking forms came to hand, they were described, in several cases, as distinct species, but Staudinger, in 1901, had already reduced them to four: *russiae* = *japygia*, *larissa*, *grumi* and *hylata*. Seitz, in 1908, realised that *grumi* was co-specific with *larissa* and also added very emphatically that there seems to be no way of drawing a line between *russiae* = *japygia* and *larissa*, because they are connected, in the most gradual way, by the forms usually collected under the somewhat indefinite name of *astanda*, Stdgr., from the east, and by the race Seitz has named *adriatica*, from the Balkans. The latter also points out that the *larissa* forms are more or less grouped around the Black Sea, whereas the *russiae* = *japygia* one encircle them in a broad arch; as a matter of fact, these extend from Spain, the south of France and Sicily, through Hungary, the south of Russia, and Armenia, to Persia, Turkestan and southern Siberia, where they end at the Altai mountains.

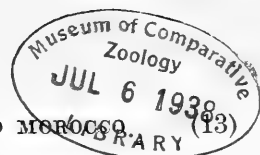
The genitalia of these insects are not promising, as a future help, in this question, for they differ so little that Pfeiffer, who has attempted to make use of them in the *titea*, Klug, group, has found they are so

invariable that they are no good even in the separation of the light-coloured forms of this species from the equally light *grumi*, Stdf. ones of *larissa*, which resemble each other considerably, but are certainly specifically quite distinct.

All, thus, seems to indicate that the *Agapetes* species are, in general, not very widely distinct from each other and that *russiae* and *larissa* are, in particular, not two species, but two exerges of the same one, which have spread westwards at two different geological epochs, *larissa* being the remnants of the Miocene migrations by the Hyrcanian isthmus and *russiae* having spread into Europe by the Siberian route, much later, after the Glacial Periods were over and the climate had permanently become sufficiently temperate for it, there. The very broad, black, upperside pattern of *larissa*, which chiefly distinguishes it from *russiae*, in which it is, on the contrary, reduced to the thinnest streaks, presumably is the most primitive form, not differentiated as much as the latter from the more usual, uniformly dark, upperside of the *Satyridae*, in general; it may have been preserved by the maritime climate, as in the case of many other butterflies, which passed, from the shores of the Han-Hai sea of Central Asia, when it dried up, to the shores of the Mediterranean; instead, *russiae* = *japygia* has probably acquired its reduced pattern on account of the Continental climate, which it underwent, during long ages, in southern Siberia, after the Han-Hai had disappeared; it has, evidently, become so fixed, hereditarily, that it only returned to a slight increase of a different kind from the one of *larissa*, when it spread southward to Turkestan and Persia, around the Caspian sea, and to Italy, where it has produced its culminating melanic, *medioitalica*, Vrtý., local mountain race. As noted above, when this second flow, from the north, met the old Miocene stock, which had survived the Glacial Periods in the warmer Mediterranean region, they interbred and produced such synexerges as *astanda* and *adriatica*.

If we next examine series of specimens from the Elburz mountains, such as those brought back by Wagner and by Brandt, in 1936 and sent to me, another conclusion is forced upon us: *hylata*, Mén., different as its aspect may be from *larissa* in its most highly characterised form, cannot possibly be a distinct species from it, for it is connected to it by a continuous series of transitional forms, and, what is more, these are, in the aforesaid materials, before me, much more numerous than the well characterised specimens of either. Thus, a series from Keredj consists chiefly of *massageta*, Stdgr., which has the broad black pattern of *larissa* above and the thin and faint one of *grumi* on the underside, mixed with a few transitions to the actual *grumi*, owing to the thinness of the pattern also on their upperside. Another series, from Pelur and Demavend-Tarsee, can, on the whole, be referred to *iranica*, Seitz, which is nearly as dark as *massageta* above, but has the underside pattern still more effaced, somewhat as in the less extreme examples of *hylata*, so that Seitz has described it as a variety of the latter; amongst my specimens some are transitional to *massageta* also on the underside and some are more an approach to *grumi* by their thin, but sharp, patterns on both surfaces. A third set of specimens, from Nissa, resemble the preceding one, but with the difference that the darker, *massageta*-like, individuals are scarcer and variation goes considerably further in

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the reduction of the pattern on both surfaces, so that it reaches the extreme degree, proper to nominotypical *hylata*, in which the black is practically obliterated on the underside, only leaving a pale reddish shade of the pattern.

Such facts obviously prove that all the forms of *larissa*, *grumi* and *hylata* intermix completely and cannot even be separated into exergic groups, like *russiae* = *japygia* and *larissa*, taking the latter as a whole. It should be noted, in this connection, that the former exists, too, in the Elburz mountains, whence Wagner has sent me specimens from the very high altitudes of Rehne-Demavend, 2700-3600 m.; they belong to its south-eastern *transcaspica*, Stdgr. race and I do not detect the slightest signs of admixture with *larissa* in that locality; this is interesting, as it shows that *russiae* replaces *larissa* in the colder localities of the latter's range, just as it is able to spread much further north, and it shows that their relationship is of a different nature from that which exists between *larissa*, *grumi* and *hylata*, which we have seen occurring together, as individual variations, in localities situated very near the aforesaid one of *russiae*.

Eumenis statilinus, Hüfn., race **minutula**, nom. nov.:—As far back as half a century ago, Staudinger had already recorded, in his paper on Asia Minor, that there exists, in some localities of that region and, for instance, at Amasia, a much smaller race of this species than in any other part of its range. Nobody has, since then, recalled this local form, but, now we are working out geographical variation as completely as possible, we cannot overlook it any longer, because it is actually a peculiarity of Asia Minor, shown by the specimens of my collection to be quite frequent and widespread, there, and because the small size is, according to all probabilities, not merely the result of starvation or other unfavourable conditions, which produce weaklings, but the result of a constant hereditary factor. This seems inferable from the fact that the average sized races of Italy and Spain never, on any account, produce weaklings, either individually or locally, except in the small *apennina*, Z. of certain high localities, whilst in Morocco there exists *hansii*, Aust., which is as small as the *statilinus* in question, from Asia Minor, and which is such a close ally of it that, for a long time, it has been considered a variety; however, lately, it has been separated specifically, so that its very small size is unquestionably a hereditary character. The length of forewing of *hansii* is about 25 mm.; that of my *statilinus* from Ak-Chehir, in Central Anatolia, is 24 to 25 and, in a couple from the hills near Yozgat, at about 1300 m., in the province of Angora, it is actually reduced to 20 in the male and 23 in the female. These sizes afford a sharp contrast with the very constant one of 27 mm. in both sexes of race *fatuaeformis*, Vrtý., from Constantinople and from Brussa, although the latter is already smaller than most races of *statilinus* and, presumably, a transition to the dwarf one of Asia Minor; in colour and pattern they are quite alike, in all the localities, I have just mentioned, of both races, but, for the reasons given above, I think the difference of size makes a distinctive name necessary for the small one and I propose that of **minutula**.

Melitaea didyma, Esp. and proposed allied species of Anterior Asia:—I cannot abstain from making a few remarks, suggested by the paper on this argument, published by Belter in the *Arb. morph. taxon. Ent. aus Berlin-Dahlem*, I, n. 2, p. 105 (1934). It contains a study of the male genital armature of some of the most striking Asiatic *didyma* and of *pekinensis*, *ala*, and *agar*, which are dealt with as distinct species. Up to this point one feels one can follow the author, although there may be some doubt concerning the first, but where one begins to find it necessary to criticise is in connection with *deserticola* and with two species from Anterior Asia, which he would want recognised. His reason for it is chiefly that their genitalia are different from the variations he has found in other races, which he considers as belonging to true *didyma*; they afford, however, no other features, visible to the naked eye, suggesting specific distinction, and the one he points out in his *montium* from the North Lebanon, at 1850 m., is quite a mistake: it consists in the outer orange band, on the underside of the hindwing, being broken into small internervular spots, each of which is bordered internally by a crescentic streak of black scales; he states this character is never seen in any real *didyma*, whereas I possess several European examples, chiefly of the female sex, which exhibit it perfectly clearly and it is quite frequent in the more oriental races of Anterior Asia: *araratica*, Vrtv., as shown in Herrich-Schäffer's figure 327, *casta*, Koll. = *persea*, auct. nec Koll. (according to Riley and others) and *magnacasta*, Vrtv. Belter's *montium* falls in with these more eastern races, not only by this particular character, but also by its general aspect, which is transitional between them and the more western races of Asia Minor, and, what is more, also its genitalia, as illustrated by Belter, are obviously a grade of transition in the successive series, made out by him as follows: *mauretunica*, *montium*, *tauricus*, *deserticola*. All of these are connected to each other by transitional forms, also in connection with other features, visible to the naked eye, and *mauretunica* is closely connected to *didyma* races of Europe, as I have shown it in my paper on the variations of *M. didyma*, in the *Ent. Rec.*, 1929, p. 116, so that there is a continuous series and nothing justifies splitting the aforesaid grades into separate species. Even *deserticola*, Obth., which might have seemed particularly distinct, is closely connected to *mauretunica* by *interposita*, Rothsch. On the other hand, it is certainly very interesting to note that the four grades of genitalia variations, made out by Belter, from *mauretunica* to *deserticola*, do have, together, a rather peculiar aspect of their own, intermediate between the other *didyma* ones and that of *M. agar*, Obth. of the Far East, and to note, furthermore, that, as I had already pointed out, in the *Ent. Rec.*, 1929, p. 127, they have other features in common, visible to the naked eye, which had led me to suggest that, as a whole, they constitute the Southern exerge of *didyma*; to them I had added also the races of the Southern and Central Iberic Peninsula and it will be interesting to see if their genitalia sustain this view. It is noteworthy, too, that Belter should have found the genitalia of the *didyma* from Southern Persia and from Anatolia, which he calls *persea*, Koll., to be different from the preceding and similar to those of nominotypical *didyma*. His Persian specimens, no doubt, belonged to the *dalmatina*-like forms, which Riley

considers should be referred to *casta*, Koll., and which I had included in the Central exerge of *didyma*, on the strength of wing characters. I have no doubt *araratica*, Vrtz. belongs to this same group, too. There remains to examine the genitalia of *magnacasta*, Vrtz. (the Persian insect figured by Seitz under the name of *persea*), so as to establish its proper position; I have suggested in my paper, mentioned above, that it may even be an *ala*, Stdr., which is unquestionably a species distinct from *didyma*, for, in Central Asia, they fly together, on the same grounds, and they never interbreed, as proved by the fact all specimens can be assigned either to one or to the other, with no difficulty, when one is sufficiently acquainted with their distinctive features.

On the contrary, Belter's supposed species from Anterior Asia, namely, *montium*, from high altitudes on the North Lebanon, and *tauricus*, from Marash, on the southern slopes of the Achyr Dagh, in Northern Syria (I have a large series, I take to belong to it, from Tecde in the Malatia region of western Kurdistan), do not fly at all with any other sharply distinct *didyma*, but are its only representatives, where they occur, and seem to be connected with its races of other localities by intermediate individuals, judging from Belter's descriptions and from my own materials.

All these considerations lead me to conclude *montium* and *tauricus* are, in no way, species of their own, but are distinct from *didyma* only as exerges or subspecies, and both belong to its Southern one, of which they are two races, or local forms, as best one likes to call them. It is noteworthy that Warren, in his treatise on the genus *Erebia*, has shown how subspecies differ genitally, there, very much the same as here, in *didyma*, and to remarkable degrees, without its making it the least advisable to lower the specific standard by considering them species, when there is no proof of sterility or other particular reasons for doing so.

Apart from this question of the nature, degree and rank of relationship, it is important to take note of the fact that the African representatives of *didyma* and some of those of Anterior Asia constitute a transition to *M. agar* of the mountains of Western China and are more closely connected with it by their genitalia than are even *pekinensis* or other Chinese and Asiatic *didyma*. It is a further contribution to what has been observed in many other species and groups, sustaining the hypothesis of early, Miocene, westward migrations, by the southern route. The most ancestral living types of those species have, anyhow, survived in the south of the Far East and in the south of the extreme West, whereas, in the other regions, they have, apparently, all been modified by the action of Glacial Periods and other local factors and conditions.



SUPPLEMENT TO THE " BUTTERFLY RACES AND ZYGAENAE OF MACEDONIA."

By ROGER VERITY, M.D., F.R.E.S.

The materials brought back by Querci last year, and which I have examined, were mostly collected during 1936 in the sunny, open neighbourhood of Skala, 300 m., at the foot of the Olympus, not visited during the two previous years. They have turned out more different from those of the much more Alpine surroundings of S. Dionisio than might have been expected, considering the comparative proximity (four hours walk) of those two localities and the difference of altitude of only about 500 m., so that some species have, distinctly, another aspect, and others which are very scarce in one locality are abundant in the other.

Interesting forms were also obtained by collecting in the Salonika region during the height of the summer and the second or third generation of some species has, thus, been exactly determined.

I, therefore, think this Supplement to my notes on Macedonia in the *Entomologist's Record* of 1936, Nos. 11 and 12, and 1937, Nos. 1, 2, and 3, will be useful to record the facts I have, since then, made out.

Erynnis tages, L., race **magnatages**, nom. nov.:—I have stated, in my previous paper, that the race of the Olympus is *subclara*, Vrtý. This applies to the population of S. Dionisio, 800 m., specimens of which were collected in 1935. A series of Skala, 300 m., affords, in the II generation, a decidedly distinct facies, which is all the more striking that this species varies so little in the whole of its broad range. The I generation of Skala, old female individuals of which were on the wing till 20th June, is a perfectly nominotypical *tages*. The II appeared at about that time and fresh specimens were found till 25th July; it is well worth distinguishing, and I name it *magnatages* because it is, first of all, larger than any *tages* I have seen, the length of the forewing being about 15 mm., against the usual average 13, and the expanse about 28, against the usual 25; the broader wings and the greater elongation of the hindwing at the tornus increase their surface still more; the tone of colour is decidedly brown and very warm, usually with a golden sheen; in about 30% of the individuals the dark spotting and the light grey spaces are entirely lacking and the whole wing surface is of a uniform brown colour; in about as many they are vaguely and partly perceptible and even in the rest they rarely stand out prominently; the underside is of a light, warm, brown.

Carcharodus lavatherae, Esp., race **nigrobicurata**, nom. nov.:—The capture, at Skala, 300 m., during the last days of June and the early ones of July, of several specimens of this new form has been an interesting addition to the little known oriental ones of this species. It seems to sustain Reverdin's latest view that the very distinct race of the Taurus Mts. of Asia Minor, which he had illustrated, in the *Bull. Soc. Léop. Genève*, iii, p. 103 (1915), under the name of *tauricus*, as a distinct species, fully belongs, on the contrary, to *lavatherae*, although it certainly is a very marked variation, entirely proper to the east of its range. In Vol. vi (1929) of the same *Bulletin* there is, in fact, a posthumous paper by him, in which he states the results of the examina-

tion of a specimen from Mt. Athos St.-Andrew (13th June); he had, at first sight, referred it to *tauricus*, but a closer inspection showed that its genitalia did not exhibit, in the least, the characteristics observed in the holotype male of the Taurus and agreed, instead, exactly with those of *lavatherae*; also, to the naked eye, several features of *tauricus* which had been deemed constant and specific were lacking in the Mt. Athos example, and, for instance, the extent of the translucent spaces of the forewing reduced, as compared with *lavatherae*. There was, therefore, obvious transition between the latter of the west and *tauricus* of the east in that form of Macedonia, but Reverdin states explicitly that it has decidedly the reddish general colouring of *tauricus*.

The form of Mt. Olympus agrees exactly with Reverdin's figures of *tauricus* by its large size and thick build and, what is more, by the smallness of the clear spaces on the hindwing, the premarginal ones being rendered nearly invisible by a grey shading, but the general colouring is of a cold, dark, grey, with perfectly black patches on the forewing and bands on the hindwing, which recall the facies of *Spilothyrus alchymillae*, Hüb. = *altheae*, Hüb., and differ from all the *lavatherae* hitherto known; also on the underside the forewings are more broadly and more deeply black and, in the male sex, the dark shades of the hindwing are dark grey, instead of pale reddish; in the females they are of an ochreous colour, similar to that of Oberthür's figure 607 in *Et. Lép. Comp.*, Vol. x, of a specimen from Akbes, in Syria, which is the nearest approach to the Olympus one, also by its dark upperside, although it is of a much more reddish tinge and smaller. I had given it the name of *ambigua* in the *Ent. Rec.* of 1925, p. 43, when I was in doubt as to what species it belonged exactly, as Oberthür had been before me, and I thought it probably was a *Spilothyrus stauderi*, but, since then, I have received from Fritz Wagner a series of Ak-Chehir, in Anatolia (18th to 26th June), which evidently agrees with it entirely and which is a *lavatherae* intermediate between race *rufescens*, Obth., of North Africa, found also in some localities of Asia Minor, and the race of Mt. Olympus I have just described and I propose naming *nigrobsecurata*. I must add that, in the latter, the translucent spaces of the forewing are quite as large as in the average *lavatherae* of the west, so that, evidently, there is, in these various forms, a great deal of mixture of the different characters and they can only be extreme variations of a single species; it does not seem as though the group *nigrobsecurata-tauricus-ambigua* could even constitute a different exerge from the group of western races, considering the genitalia found in the *tauricus* of Mt. Athos and considering that in Asia Minor there are races which can well be referred to *rufescens*, as shown by specimens of Beirut and of Amasia in my possession; thus there evidently is actual transition from them to *tauricus* through *ambigua*, as there is to the western *lavatherae* through the race *australissima*, Vrtý., *Ent. Rec.*, 1925, p. 41, of some localities of North Africa, such as figured by Oberthür (figs. 603-604, which I have taken as my typical couple), and of southern and central Spain. As Warren and subsequent authors have taken *australissima* to be synonymous with *rufescens*, I must again lay stress on the fact that they are perfectly distinct; my aforesaid series of Asia Minor is entirely made up, in both sexes, of the very reddish form, with ochreous bands on the underside of the hindwings, whereas one, for instance, from Albarracin only resembles it,

to a moderate degree, in a few exceptional females, as noted by Querci, and it would be quite a mistake to apply the name to it, as a whole in the way Zerny has done in the *Eos*, 1927, p. 343; the usual facies is the one of Oberthür's figures 603-604 and the racial name, therefore, is *australissima*, describable as being of a slightly more reddish, general, tone of colour than nominotypical *lavatherae* and *australior*, Vrtý., of Italy. It will be interesting to see if, in the Balkans, there exist transitional forms and races also between the two latter, known from as far east as Carniola and Albania, and *nigrobsecurata*, or whether these forms stand at the opposite ends of a single series of grades. Rebel and Zerny have noted that in Albania the underside markings are more prominent than in nominotypical *lavatherae* and this might be a first step towards *nigrobsecurata*, but no other exact information seems to be available.

C. orientalis, Rev.:—Having seen and obtained Skala specimens of May and June, I am now in a position to state that they can well be referred to the nominotypical form and more exactly to the individual one, in which the grey of the upperside is pale and cold in tone; a small specimen, with the white underside spaces of the hindwing standing out sharply on the grey, strongly recalls *C. marrubii*. The II generation does not differ either from *postorientalis*, Vrtý. (25th April 1928) = *aestatis*, Graves (May 1928), of Constantinople.

Pyrgus serratulae, Ramb., race *infraobscurata*, nom. nov.:—A few specimens of this species, which had not been seen before, were collected in 1936, from the 15th to the 21st of June, at Skala, 300 m., and on the path to S. Dionisio, at about 800 m. They strike one at once as different from the other races hitherto known; in size they are distinctly larger than the usual ones of the species, but not as much as *major*, Stdgr., of Asia Minor, or *magnagallica*, Vrtý. = *occidentalis*, Lucas, of France. On the upperside the white spaces are well pronounced on the forewing, but, on the hindwing, there is not the slightest trace of them, or even of grey shadings, in either sex, as there is in nearly all the *serratulae*, the rare exceptions only being individual in the other races. The chief characteristic of this one is, however, afforded by the underside of the hindwing, where the nearly absolutely constant yellow colour of the *serratulae* of all the other regions, except for a few aberrations, is, on the contrary, constantly and entirely replaced here, in both sexes, by cold, blackish and grey ones, whilst the narrow, clear space, which stretches along the outer margin of both fore and hindwing and is well known as a distinctive feature of this species, is of a bluish, slate grey, instead of white or dirty white, as in the other races. All my Skala specimens of both sexes also exhibit another very unusual peculiarity; Warren had remarked that, in *serratulae*, "the rarest form of underside variation is the reduction of the white markings"; now, in these specimens, the white spaces are reduced to such an extent that some of the smaller ones are entirely missing and the central white band-like one is reduced to a row of small separate spaces; they are also partly shaded with pale grey. These Skala specimens I take as cotypes of *infraobscurata*. The few I have from S. Dionisio are quite as grey, but broad white spaces exist on the under surface, as in any average *serratulae*, and stand out

sharply, as in *planorum*, Vrtý.; their extent is, however, distinctly not that of *balcanica*, Warren, from Montenegro.

Spialia orbifer, Hüb., race *tesselloides*, H.-S., II gen. **postesselloides**, nom. nov.:—The specimens collected at the end of July, in the neighbourhood of Skala, are very much smaller than those of the I generation, which is unusually large (18 to 20 mm. of expanse, against 22 to 25). In my previous paper on Macedonia I had applied Rebel's name of *minor* to the II generation of the Olympus, but, on second thought, it seems to me it would be more exact to restrict the latter name to the II of the nominotypical race and to distinguish, by a new one, that of *tesselloides*, which is quite as distinct from it as the I, and by the same features: much lesser extent of the white spaces.

Gegenes pumilio, Hoffm.:—Now I am in possession of specimens collected in the mountains above Skala and Stavros, at about 800 m., ^{Skala} 3rd June, I can confirm Querci's opinion that the race is quite similar to the Italian, nominotypical, one.

G. nostrodamus, F., race *nostrodamus*, F.:—Having obtained also the specimens of this species, recorded in my previous paper, I am able to determine the race they belong to, and I see they differ in no way from those of "Barbaria," described by Fabricius originally, or from Sicily, or Asia, and they show no tendency at all to vary in the direction of race *pumilio minima*, Vrtý., the northern form, I have described from Tuscany, which recalls *pumilio*, Vrtý., much by its smaller size and blacker tone of colour on both surfaces, so that the genitalia alone distinguish it with certainty from the latter. The Olympus examples of the two species differ strikingly from each other. The *nostrodamus* collected on 8th June, at Skala, are a little larger than those found, on 1st July, lower down, at about sea-level.

Scolitantides orion, Pall., race *orion* trans. ad *metioche*, Pall.-Frühst.:—The large series of specimens brought back by Querci, apparently, shows that those I had seen, when I attributed the Olympus race to *metioche*, Frhst., did not convey a correct idea of it. At Prionia, 1500 m., whence were my examples, this dark form, with nearly no blue above, except indistinct marginal lunules, is quite unusual in the male sex, which is, on the contrary, quite as blue, on an average, as the nominotypical *orion* degree of it; it is more frequent in the female sex, but far from preponderant, so that the race can nearly be referred to the nominotypical one. What had led me wrong in my previous judgment had been that most of the specimens sent to me were very worn and rubbed, so that they had lost a good deal of their blue scales. Another series, obtained at the much lower level of Skala, in 1936, contains a slightly higher percentage of *metioche* and is, on the whole, rather smaller in size.

Glaucopsyche cyllarus, Rott., race **parvandereggi**, nom. nov.:—In my paper of 1936 I have applied the name of *andereggi*, Rühl. to the race of Salonika and of the Olympus. Now I have before me further materials from both these regions and from the hills above that town, at about 350 m., and from the same altitude at Skala, I find it necessary to be

more exact and to make the following distinction: that the females do always belong to that dark form, with no trace of blue on the upperside, the males have a thick black marginal band and the underside of both sexes is distinctly darker than in nominotypical *cyllarus* of the German lowlands, so that all these features agree with the typical *andereggi* of the Valais and the western Alps, but, on the other hand, the size is very much smaller than the one of the latter, both on an average and in that its most characteristic giant males are not produced at all, nor is its other peculiarity, consisting in the very large size of the black spots on the underside of the forewing.

The wing expanse of this Macedonian race is of about 25 mm. in the male and in most females and varies from 20 to 28 in extreme individuals of the latter sex. The size, therefore, agrees with that of most southern races, but is very much smaller than the usual one of the *cyllarus* of Central Europe, not to speak of the very large males of *andereggi* mentioned above, and I conclude a distinctive name is necessary for this race. I select my Salonika specimens as "cotypes," noting, however, that it is not a purely eastern race and that the same name can be used for perfectly similar ones occurring further west, such as in the Po basin.

Aricia anteros, Frr.:—The large series of specimens collected in various localities of different sorts show notable local differences in the average aspect, which are well worth recording, although it is, no doubt, more correct to call them "forms" than "races," even though one uses the latter term in a broad sense, as we have been doing in connection with other species. Thus:—

At Salonika the I generation (the II has not been collected) is usually large, of a bright blue tinge and with large underside lunules, of a fine, rich, orange colour. This I take to be the nominotypical *anteros*.

At the highest altitudes on Mt. Olympus, such as at Prionia, 1500 m., only one generation is produced; it is quite as large or even slightly larger than the preceding, but the colours are less intense on both surfaces, the lunules of the underside being distinctly smaller and paler and those of the upperside of the female often entirely obliterated. It might be named **modicior**, nom. nov.

At Stavros, 700 m., on the same mountain, but in a deep, damp, gully, the I generation is smaller and very much poorer in pigment, so that the blue of the upperside of the male has an entirely different tone from the two preceding forms, tending to lilac and strongly iridescent, and the underside lunules are very small and of a dirty, yellowish, orange: form **inanis**, nom. nov.

At S. Dionisio, 800 m., the striking characteristic consists in the small size. The I generation is considerably below the average of all the preceding forms (length of forewing 13 mm. and expanse 23, against 15 and 26): form **minorata**, nom. nov. The II generation is very much smaller and even half the size of the I in many individuals, which are, thus, extremely minute. In both generations the colours are similar to those of the Prionia form, so that the II cannot be referred to *altera*, Züllich, of Bulgaria, because the latter is described as having the underside of a deep, warm, brown, in both sexes, and the upperside of the female of a lighter brown than the I generation, whereas nothing

of the sort is to be seen in this one, which I, consequently, propose naming *minoratissima*, nom. nov.

A. allous, Hb. = *medon*, Hüfn., race *macedonica*, Vrtv.:—To the description of my paper of 1936, I can add, on the strength of further materials seen and obtained for my own collection, that the typical generation of *macedonica* is the I one, always with a cold grey underside, whereas the II is sometimes of a bright fulvous and has no trace of blue metallic scaling at the base of the wings. I said that this insect is of a larger size than the *agestis* of the same region; I can now give the precise average measurements as being 15 mm. of length of forewing and 25 of expanse in the male; the typical female measures 15 and 28 respectively, but the wing surface is greater than the one of the male, owing to their broader shape. I can also add that this specimen has very large orange lunules on a gray underside; on the upperside their colour is of a light tone; what reminds one of *icarus*, as observed in my original description, is that, on the hindwing, each lunule has a large black spot, standing out on the brownish groundcolour, and narrowly edged, on the hind-side, by a few slightly bluish scales.

In my original description of *macedonica*, in my previous paper on this region, I said that Querci had observed, on the Olympus, a state of things similar to that existing in the Iberic peninsula and in the Atlas, where two species (*montensis*, Vrtv. and *cramera*, Ersch.) have been detected in the insects, once attributed to *agestis* alone. It is many years since I suspected the same thing in connection with some mountain races of Northern Italy, as distinguished from the lowland ones and from those of the mountains of peninsular Italy. Now I have seen the work of Bayard, in the *Livre Jubilaire de M. E. L. Bouvier*, Paris, 1936, p. 111, I find I must state, at once, to remove any misunderstanding and confusion, that, when I described *macedonica* as a race of *montensis*, I had not seen Bayard's figures of the falces=gnathos=subunci, showing that the latter has a culminating degree of length and thinness of the free branch of that process, so that it can well be a distinct species, as suggested by that author. This feature, together with the other, still more exclusive one, I had recorded when I named *montensis* in 1928, consisting in the position of the premarginal orange lunules, which are nearer to the margin than in *agestis* on both surfaces, is, however, nearly proper to the Iberic peninsula and to Africa, so that it has now become clear that *macedonica* does not belong at all to *montensis*, as restricted by the aforesaid characters.

On the other hand, there is no doubt, as stated above, that also outside those regions there exists a specific duplicity, corresponding to *montensis* and to *cramera*, although it does not seem to be as conspicuous, with regard to structure and to pattern of wings. To establish the limits between those twin groups and the names they should bear it must be noted that the races, which Bayard has lumped together under the name of *agestis*, exhibit a remarkable range of variation, in connection with the falces, as shown by his own figures and as found also by me, in my own mounts of the male genital armatures from many regions. On one side those variations lead up to the extreme *montensis* degree: not fully in Bayard's figures, but quite so in some of my specimens from very high altitudes in the Tuscan Apennines (Abetone pass, 1400 m.), and from the Maritime Alps (Valdieri, 1375 m.). On the other

side they reach the aspect of the less extreme *cramera*, as shown by Bayard's fig. 20 (Sicily) compared to 27. It can, next, be seen that the first kind of falces, just mentioned, is furnished by the races of Northern Europe and the northern parts of Central Europe and by those of high mountain masses, further south, *i.e.*, by the races which only produce one generation, or a scanty and nearly exceptional second one, and which resemble *montensis* by their long, pointed wings, by their, usually, deeper black colouring and by the much lesser development of the pre-marginal orange lunules, as compared with the following group. The oldest name, given to a race of this group, would be *medon*, Hüfn., from Berlin, but, as it is a primary homonym, the next one, *allous*, Hüb., must be used, to distinguish it, as a whole, from the other, apparently, specific entity. Hübner and Geyer's figures represent the widespread race of Northern Germany, parts of Northern France, and of England and the greater part of the Alpine region. In the same group are included: *alpina*, Stdgr. (the minute race of high altitudes), *inhonora*, Jach. of Russia, *macedonica*, Vrty., *montiummagna*, Vrty. of high altitudes (1400 m.) in the Apuane Alps of Tuscany, and *artaxerxes*, F., whilst *salmacis*, Stph. is presumably a result of interbreeding with the next, *agestis*, group and, in the Maritime Alps, there seems to be genitalic evidence of interbreeding with *montensis*.

The other group, which is an approach to *cramera*, both by the form of the falces it usually exhibits, by the extent of the orange lunules, by the less deep and warmer tone of colours and by the fact it produces regularly either two or three generations, according to latitude and altitude, includes the nominotypical *agestis*, Schiff., of Vienna, which is widespread in the southern parts of Central Europe, on the west coast of France and in England, and in the mountains of the south, where the surroundings are too dry and warm for the *allous*. This is, therefore, the species which goes on bearing that name in this, new, restricted, sense and, in it, must also be included the following degree, *gallica*, Obth., and the extreme one *calida*, Bell., with its I gen. *ornata*, Stdgr., as well as other races, such as *pallidefulva*, Vrty., *subcalida*, Vrty., *infracandida*, Vrty., *nizra*, Moore (Kashmir), according to a specimen I have examined genitically; I have mentioned above the race of high altitudes (1400 m.) in northern Tuscany, in which I have found the falces to be like those of *montensis*; to the naked eye it looks perfectly similar to the *pallidefulva*, I have described from lower altitudes in that region and which, on the contrary, is a highly characterised *agestis* by its very large premarginal, orange, lunules.

Presumably *cramera* and *montensis* have derived from migrations of the early Miocene by the African route, as they are both found in the Atlas, and the latter has spread, together with *Lysandra albicans*, after the Glacial Periods, through southern France, to the Maritime Alps and northern Tuscany, where it has mixed, respectively with *allous*, which had, then, got there by the Siberio-Russian route, and with *agestis*, which had derived from migrations of the later Miocene, such as the moufflon one, and got back to Northern Italy, after the Glacial Periods, from its southern refuges. Evidently, the specific distinction between *montensis* and the two latter is not so great as to reach total sterility and they have interbred. This hypothesis is suggested by the genitalia, similar to those of *montensis*, I have found in

those two cases, as stated above. It, of course, casts a doubt on the full specific distinction of *montensis* from *allous* and *agestis*. As there does not seem to be a very sharp distinction between the two latter, either, where they meet, in Central Europe, and the southern, *calida*, race of *agestis* is, genitally, a near approach to *cramera*, at the opposite end of variation, all the species, we have just made out, afford an interesting case of relationship, which is, apparently, best defined as one of "partial" specific distinction, standing just above the exergic distinction, in that some of their races occasionally exist on the same grounds, without interbreeding to any extent, as *allous* and *agestis* do on Mt. Olympus; this evidently happens because the race of *agestis* is, there, more southern and, therefore, more distinct from *allous* than the nominotypical one of Central Europe, which, presumably, does blend with it, considerably, in that region.

Polyommatus chiron, Rott. = *eumedon*, Esp.:—I have pointed out that the series of specimens collected on Mt. Olympus, at 300 m., contained a large percentage of individuals exhibiting the characteristic of form *fylgia*, Spang (no white streak on the underside of the hindwing). To be quite exact in this record, I must, now, add that I have seen the remainder of that series and that it consists in an intermediate form, with a streak, but short and very thin.

Lysandra thersites, Cant.-Chap.:—The examples found at Salonika in mid-summer are extremely small, smaller, in fact, than any others I have seen from Europe and similar to the form *postmicrorientalis*, I have described from the very arid region of Tecde, near Malatia, in western Kurdistan, in the *Bull. Soc. Ent. France*, 1935, p. 244.

Everes alcetas, Hoffm.:—The capture of a female of this species, on 15th April, above Salonika, at about 300 m., adds a species to my previous list. It is somewhat larger than the usual, average, size, and it has a well marked, though very thin, as it always is in *alcetas*, orange lunule on the underside; the ground-colour, on this surface, is decidedly grey and all the black markings well marked, so that it belongs to the same race as the typical Austrian specimens and, in no way, to the small and pale *diminuta*, Vrtý., of the I generation of the south.

Tarucus balkanica, Freyer, with I gen. **clorinda**, nom. nov.:—No one has, to my knowledge, recorded any definite seasonal dimorphism in this species, so that I must do so in connection with the Salonika examples, which exhibit it most distinctly, and I dedicate the spring form to the Signora Querci, whose energy and enthusiasm, in collecting, is well known. Freyer, and also Herrich-Schäffer, who gave this species the name of *psittacus*, very soon after the former had described it, have figured specimens, from "Turkey," of the II generation, as shown by their large size and clear ground colour, in the male sex, with a thin marginal black streak. Most of the specimens of that generation (mid-August) from Salonika are rather smaller and darker, but, nevertheless, the I generation of May differs from them, always very markedly, by being still smaller and darker. Freyer's male has a forewing, which measures 10 mm. in length and an expanse of 19, at the apex, where the fringes begin; the average expanse, at Salonika, is about 18 in the II generation, whereas in the I the length of forewing is 8 to 9, in that sex, and the expanse 16 to

17. The minute size, corresponding to these measurements, is accompanied by a much darker colouring of the upper surface, in that the tone of black is very much deeper and colder and the extent of the black markings is greater; the neuration is streaked with this colour, more or less thickly, and the outer margin is broadly shaded with it, so that the clear spaces, with a violet sheen, of the male, are very much broken and limited in extent, and, in the female, the white ones are, practically, abolished; in this sex, the whole wing surface is, thus, uniformly black, instead of being variegated, as it is in the II generation. On the underside the black pattern is, in both sexes, usually thicker in the I than in the II generation and the metallic pre-marginal spots of the hindwing are less coloured, in that they are more silvery and less green or blue.

Syntarucus piritheus, L. ab. **posticelatenigra**, nom. nov.:—This species, usually known as *telicanus*, Lang, varies so extremely little that it is well worth recording a form, collected at Skala, on 19th June, which I have never seen before: it is a male specimen, which bears a broad black band along the whole outer margin of the hindwing; its inner outline is tolerably sharp and parallel with the margin, at a distance equivalent to the extreme inner side of the two black dots, which are rather larger than usual and just perceptible, inside the band, owing to their deeper black tone.

Thecla quercus, L.:—On the strength of specimens from 850 m. to 1200, on the Olympus, I have applied the name of *interjecta*, Vrtv., to the race they represent, but I must, now, record the further fact that the species has been, subsequently, found also at Skala, at 300 m., and that it has another facies, there, which exactly agrees with the nominotypical form of England and Central Europe, for it is larger than *interjecta*, the underside is of a darker tone of grey, the black streaks are more accentuated, and the orange ones larger and of a warmer tinge; all these features are more marked in the male sex, whilst the female, as compared with it, gives the impression of being transitional to *interjecta*.

Gonepteryx cleopatra, L.:—Having seen a considerable number of specimens, I am, now, in a position to record that the Macedonian race belongs to the *dalmatica*, Vrtv., form, although some individuals do not have, to its fullest extent, the characteristic rounded shape of the wings, with a strongly convex outer margin and nearly no angle at apex of forewing and on hind margin of hindwing; most of them are only transitional to it. It must, furthermore, be noticed that all the females are of the entirely bright yellow *florii*, Turati, form, so that the race, as a whole, must bear this name, as contrasted to the Dalmatian one, whose females are of the more usual greenish-white colour.

G. rhamnii, L.:—I have referred the race of Salonika and the Olympus to *transiens*, Vrtv., but Skala specimens, of June, are so indented along the hind margin of the hindwings that they may better be looked upon as transitional from that race to the more extreme *meridionalis*, Röber, described from Algiers and southern Asia Minor.

It is noteworthy that, at Skala, also some *farinosa*, Z., were found, so that the three western species of *Gonepteryx* fly together, there, as they do in many localities of Asia Minor.

Leptidea duponcheli, Stdgr.:—I have named *fragilis* the race of Salonika, on the strength of the small form, which constituted the I generation, in the hills above that town, in the year 1935. In 1936 Querci was quite taken aback when the species began to emerge and exhibited a strikingly different look, for its size had increased and its structure had acquired nearly the normal nominotypical aspect. What had remained of *fragilis* was the yellow tinge, particularly strong at the base of the wings and evidently transitional to the entirely bright yellow form of Syria, *xanthochroa*, Vrty. There are, thus, some features, which do justify a distinctive name for the race of the east, as contrasted to the nominotypical one of Southern France and of the west, and that name will have to be *fragilis*, although its fragile appearance does not show constantly, to its fullest extent, either in all localities or in all years.

Pieris manni, Mayer:—It is noteworthy that two perfectly fresh males collected in the hills, above Salonika, on 16th November 1936, correspond, in aspect, to those of the IV generation, *septembrina*, Vrty., of September, in Peninsular Italy. There remains to be made out whether they belong to the same generation, perhaps retarded, at Salonika, by a long summer pause, due to extreme drought and heat, or whether they belong to a V generation, more frequent, there, than the rare and scarcely represented, frail form, *quercii*, Rostagno of Italy, in October. As far as facies goes, the two Salonika examples are different from the latter and similar to the former, for they are fully of the average size and strength of June nominotypical II generation *manni* and only differ from it by having a broader suffusion of black scales at the base of the wings, on the upperside, and a thicker one all over the hindwings, on the underside; the black markings of the upperside are large and of a deep black, with sharp outlines, in one specimen; they are smaller and partly veiled with white scales in the other, as it often is the case in the variations of all seasons and localities. This late form must be named **postmanni**, nom. nov., in the Balkanic nominotypical race, just as it has been named in Italy, in the Valais, in France, etc., where the corresponding form differs, in each case, from this one by the same racial features as the other forms and generations do from their corresponding one.

Parnassius mnemosyne, L.:—Prof. Kollar of Vienna, one of the specialists of the *Parnassiidi*, has pointed out, in *Lambillionea* of 1937, p. 97, and pl. VIII, some differences, he has detected, between the race of the Olympus and the Bulgarian *buveschi*, Bryk, to which others had referred it; he has, consequently, given it the new name of *clorinda*, in honour of the Signora Querci, who is the captor of the very few known specimens, from Prionia, 1500 m., and from the valley between Stavros and Skala, from 800 to 300 m.

Parnassius apollo, L., race *olympiacus*, Kol.-Rebel = *thessalicus*, O. B. Bang-Haas:—I have stated, in my previous paper, that Querci had, in 1935, found, on the Olympus, the *apollo* to be entirely different from the descriptions and figures of the three authors just mentioned. In 1936 he was very surprised to see that, in exactly the same locality, all the *apollo* had changed facies and had come to agree perfectly with the aforesaid descriptions. They were also very much scarcer than in the

preceding year. The explanation of this phenomenon presumably rests in the very great difference of climate, between those two years, during the spring months, when the larvae were feeding: mild and clear in 1935; cold and damp in 1936.

This experience is very instructive, like the *Leptidea* one, mentioned above, because it shows how necessary it is to make a distinction between purely somatic differences, produced by deviations during the development of the individual, due to differences in the surrounding conditions, and really constant hereditary, differences. Unfortunately this distinction is, in practice, extremely difficult, not to say impossible, in most cases, as it could only be accomplished by breeding experiments, on a large scale, in various kinds of surroundings, to see if the strains, one wants to compare, vary in the same way, under the same external conditions, or keep up constant differences of aspect, which could, then, only be due to distinct hereditary factors. It is this difficulty and consequent ignorance on our part, which induce me to use the term of "races" for aggregates of individuals, all or the majority of which exhibit some features distinguishing them from those of other co-specific aggregates. The term is usually looked upon as conveying the idea of characteristic hereditary factors and, in this sense, it would not be correct, as applied to many cases in which the features are of somatic origin, but this possibility can be borne in mind till it becomes possible to eliminate them by the aforesaid experimental proofs. It is no good trying to do so by rule of thumb or relying on some difference of structure to conclude there must be a hereditary one; the genital armature has, for instance, even been seen to vary regularly in the different generations. What, on the other hand, seems quite wrong is to use the term of "subspecies" in place of the more vague and less emphatic one of "race," as most authors are doing nowadays, because the former is recognised by the International Code of Zoological Nomenclature, and they want their discoveries to be enforced by it. It should, instead, be reserved for unquestionable hereditary differences, well fixed in natural surroundings and, thus, superior in rank to the very variable domestic breeds, kept up by artificial selection. Finally, I do not use the term of "local form," either, because nearly all the variations in question are not local at all, as they turn up, individually, also in the regions, where another form predominates. When they don't, one can be pretty sure one has a "subspecies" before one, in the true sense of the word, and "local form" would be a synonym. The simple word "form" would, apparently, in the present state of things, be the most correct expression, as a broad word of ignorance, like the old-fashioned "variety," but it has the defect of being rather too individual and of conveying no idea of an aggregate, such as are the entities, which I conclude had better, for the present, be called "races," till our knowledge about them has been improved and we can start out on new lines. Let us, in the meantime, take note of the experiments, which nature itself provides, and realise, on the strength of the Olympus *apollo*, that nearly none of the dozens of "subspecies," attributed to it in the last few years, are anything of the kind and that most of them are even scarcely "races," in the broadest sense of the word, as defined above, for they respond at once to external changes and alter their features to a most unusual extent. Yearly changes of this sort are, however,

much more frequent and conspicuous in many butterflies than has, as yet, been realised. The particularly bad weather of 1937 has, for instance, changed the aspect of several species in the Sibillini Mts. of Central Italy: the *apollo* collected, there, by the Quercis are smaller, the *ergane* larger, the *coridon* larger and brighter, too, the *alberganus*=*ceto* have broad fulvous bands, the *tyndarus* are less silvery on the underside, the *athalia* larger, to the extent that the "racial" names given to them, on the strength of other series, could not, strictly speaking, be applied to these series of specimens, because somatic features evidently prevailed amongst those described. It is no good discussing whether "local form" is preferable to "race," or not; "yearly forms" would have to be distinguished as well and this would not be fully satisfactory, yet. What one wants is to start on the new line of recognising "somations," when it is possible, and, as this term has already been erected by the students of genetics, making use of it, possibly with the indication of the external factor, which produces the form one is dealing with; thus, for instance, if the Olympus *apollo* of 1935 is more or less similar to *liburnicus*, Rebel & Rogenhofer, we will have: race *liburnicus*, som. *liburnicus*, and som. *olympiacus*, which can be usefully developed into: *caloris et siccitatis somatio*, or *cal.-sicc. som.*, and *frigidi et humoris somatio*, or *frig.-hum. som.* It must, however, first of all, be made out which of the so-called subspecies are to be grouped together as somations deriving from the same hereditary factors. Here, for instance, another *apollo* has been described lately from Macedonia and named subspecies *macedonicus*, Ros.; the cotypes were from the Kobelija and Shar-dagh, in N.W. Macedonia, and from the Mala Rupa, in S. Macedonia, between Gjeogzeli and Monastir, at an altitude of about 1600 m. Judging by Bollow's figure of a female in the Supplement to Seitz, it is a very white form, standing close to *liburnicus*, Rebel & Rogenhofer, of the Velebit Planina Mts., in Croatia, and not a different subspecies at all.

Papilio machaon, L.:—A few specimens, captured in 1936, now enable me to determine the Macedonian forms: The I generation, of April, from Salonika, has very broad black bands and is more or less the same as the one of Sicily, which agrees with Hübner-Geyer's figure of *sphyrus*. The II generation, as found on Mt. Olympus on 20th July, in very worn conditions, both at Skala, 300 m., and at Prionia, 1500 m., belongs to the form with the most reduced black pattern: nervures on disc scarcely edged with black scales at all, premarginal band very narrow on both fore and hindwing, basal suffusion of the latter nearly entirely abolished and abdomen with only a narrow streak of black along the middle of the dorsum; by these last features they correspond to *aestivus*, Zeller, of Sicily, but they are of smaller size, not being, like the latter is, larger than the average one of the species; for the same reason they differ still more from *gigantea*, Vrtý., of Dalmatia, and, in fact, they quite resemble the specimens I have collected at Portorose, in Istria, and I look upon as intermediate between the summer generation *aestivoidea*, Vrtý., of Central Europe and the more southern *gigantea* of the Balkans. These I found, in worn condition, on 10th September, and I have others, just like them, of 21st, collected by Montague at Kalabak (Macedonia), so that, according to all probabilities, in the Balkans, there is a III generation, in September, which has exactly the same facies as the II

of July and not that of *tertiana*, Vrtý., of Northern Italy, with broader black bands. On the other hand a single, very fresh, male, caught by the Quercis at Salonika, on 16th September, shows there is no absolute rule and variations occur, according to localities, for it is considerably darker than *tertiana* or *sphyrroides*, Vrtý., and it looks, by its thick black patterns, short tails and rather small size, like a reversion to the spring *sphyrus*, except that the frontal tuft of hair is quite short and the abdomen naked and black only on the back; in short, it exactly agrees with form *revertens*, Vrtý., which occasionally appears, in Italy, at the end of September and in October, as a IV extraordinary generation of favourable years.

P. alexanor, Esp.:—A female of this extremely scarce species was, at last, captured at Skala on 9th June, in very bad conditions of old age, but sufficient to show that the race of the Olympus is decidedly *attica*, Vrtý., for it is identical with my female “type” and it has the small size and the broad black bands, which characterise it and are just the opposite to the features of *magna*, Vrtý., of Dalmatia.

Coenonympha pamphilus, L.:—The II generation has been collected also at Salonika in mid-August and is a highly characterised *marginata*, Rühl, with some examples of very large size.

Hyponephele lycan, Rott.:—Having obtained females from the Olympus and from Naussa, in the Bermion Mts., I am now able to record the facies also of this sex in the region we are dealing with; in my other paper on it I remarked that the male resembles *catictera*, Turati, from Zeitun, in the Anti-Taurus, but that the female of the latter is unknown, so that the actual identity of these two races cannot, yet, be considered sure. The Macedonian females belong to the southern type, with a rather pale underside: yellowish fulvous forewing and cold, silvery, grey hindwing; the upperside is rather boldly marked, like *quercii*, Vrtý., of Portugal, but with smaller ocelli, as in many *magnobscura*, Vrtý., of Central Europe.

Agapetes galathea, L.:—I have stated the race of the Olympus and of the Bermion Mts. agrees very well with the *tenebrosa*, Frhst., of Trieste. The materials which have come to hand, now, require further analysis: to be perfectly exact, it must be noted that the form, or somation, as it certainly can be called, according to the remarks I have made in connection with the *apollo*, quite similar to the Trieste one, was found along the path from the Stavros fountain to the S. Dionisio monastery, at 800 to 900 m. An interval of about 300 m., in which no *galathea* were to be seen, separated it from a distinctly different one, which can well be described as gigantic, in size (male: length of forewing 30 mm. and expanse between the apexes 50; female: 33 and 55, respectively) and which is also less melanic, so that the white spaces at the base of the wings are, in particular, more extensive; it is worth distinguishing by the name of **tenebrogigas**, nom. nov.

On the Bermion Mts., near the village of Seli, at about 1400 m., flies a *galathea*, which contrasts strongly with the preceding by its remarkably small size (male, correspondingly: about 22 and about 40; female: 25 and 43) and which is nearly as fully melanic as *tenebrosa*, on an average: **tenebronana**, nom. nov.

Lasiommata ominata, Krul. (= *petropolitana*, Fabr.-Btl.) = *hiera*, auct. nec. Fabr.:—I have recorded this species on Mt. Olympus on the

strength of information from Querci, but a confirmation of it will be a good thing, for he tells me he only found two or three specimens, which he determined rather hurriedly and, at once, sent off to America, so that he cannot be absolutely sure they were not dark examples of *maera*.

Eumenis allionii, Geyer-Hübner = *fatua*, Freyer, race **infracastanea**, nom. nov.:—Collecting in the hills, above Salonika, at about 300 m., on 12th August has added this species to my previous list of those found by the Quercis. It was, however, still scarcer than *statilinus*. I should deem it a race distinct from those which have hitherto been described: on the upperside the general tone of colour is deeper than usual and there is none of the whitish suffusion on the hindwing, which exists especially in the females of the other races; there is only a row of white dots, standing out sharply; on the forewing the golden rings around the ocelli are unusually broad in the female and the hind-one extends backwards and broadens towards the tornus into a beginning of a band; the underside of the hindwing is characteristic, because it is darkened by thick brown streaks, covering it uniformly, even in the female sex, whilst also the ground-colour is of a warm tone of grey; the three black streaks, which stretch across it, are well marked. This underside recalls the Syrian and Palestinian race, usually known as *sichaea*, Led., more than the nominotypical *allionii* of Greece and Asia Minor, in which the underside of the female is of a cold and pale grey, with very indefinite streaks of a slightly darker tone of colour.

E. statilinus, Hufn.:—I am glad to be able to determine the Macedonian race with more adequate materials than I had when I, tentatively, referred it to *vettius*, Frhst. on the strength of a single female from Mt. Olympus. The specimens which have come to hand seem to show that at Salonika there exists a much smaller race, with the underside of the hindwing's ground-colour more uniform and more brown, transitional to my cotypes of *fatuaeformis*, Vrty., from Phanaraki, on the coast of the Bosphorus, whilst at Skala, 300 m., on the Olympus, the race is larger and most individuals must be referred to *vettius*, because of the white spaces and the white suffusions on the aforesaid surface of both sexes; the female, as a matter of fact, is often nearly uniformly greyish white, all over the hindwing underside.

E. fagi, Scop. = *hermione*, L., race *alcyoneformis*, Vrty.:—A specimen from Naussa, 1200 m., in the Bermion Mts.

E. alcyone, Schiff., race *latevittata*, Vrty.:—A series of specimens from a higher altitude on Mt. Olympus than the 850 m. given as the highest of *fagi* and, namely, from Prionia, at 1500 m., had been overlooked by Querci, amongst his materials of 1935. Having come into my possession, I, now, find it belongs to *alcyone*, which must, consequently, be added to my previous list, and it agrees exactly, as in the case of *fagi*, with the Italian race *latevittata*, Vrty. Although I have not examined its "organ of Jullien," I feel sure that a small male, collected at Naussa with the aforesaid *fagi*, belongs here. Therefore, in the Bermion Mts. these two species fly together at intermediate altitudes between their ranges, as in the Apennines of Italy, and on Mt. Olympus *syriaca* flies with *fagi* up to about 850 m., whilst *alcyone* replaces them both at higher altitudes.

Eumenis semele, L. race *mersina*, Stdgr.:—A fine series of specimens from Skala decidedly belongs to *mersina*, as large and well charac-

terised as it ever is in Asia Minor, in every respect; the females are very much larger than those from Salonika, which I have already recorded as transitional to *mersina*, but which further materials show to belong to it quite fully, too: the Skala ones have a forewing of 32 mm. in length and an expanse between the apexes of 56, whereas the Salonika ones only have 27 and 50, respectively; besides this, the former have the fulvous of the upperside of a paler tone and partly shaded over by brown scales to a slight degree. Higher up on the Olympus, at S. Dionisio, 800 m., the race is quite different from the Skala one and belongs to *senthes*, Frhst., as I have stated in my previous paper. Also in the Bermion Mts., at Naussa, 1200 m., there exists a comparatively small and pale race, with a broad fulvous band on the hindwing, which can be referred to *senthes*, although the white space on the underside of the hindwings is not particularly broad, as it is described by Frühstorfer, and there, evidently, are, in this and other respects, signs of transition to *mersina*, which should, very probably, be looked upon as synexergic, for nominotypical *semele* and *mersina* seem very much to be two distinct exerges, deriving from different strains. There is no doubt that the latter, with the nearly identical *subcinericea*, Ribbe, of Andalusia, with *algorica*, Obth., with *siciliana*, Obth., of Sicily, and with *aristaeus*, Bon., of Corsica, Sardinia and Elba, have a peculiar facies, somewhat closer to that of *Eumenis persephone*, Hüb. = *anthe*, O., which inhabits Asia Minor, too. It, therefore, seems very reasonable, from all standpoints, to consider that group as the most primitive one and as directly descended from the Miocene stock of the Mediterranean region and to regard all the other races, which live further north and at higher altitudes in the mountains of the south, like *senthes* in Greece, as having acquired a different constitution by frigoripetal variation, during the subsequent cold periods, along the Northern Mediterranean route of westward migrations, so that the two have become distinct exerges, which only intercross occasionally, when they meet, on grounds intermediate between those better suited to each of the two.

Aulocera circe, F., probably, race *pannonia*, Frhst.:—As far as I can judge by a few males from Skala, 300 m., the race is very similar, by its large size and by its rather broad white spaces, to the Italian *itala*, Vrty., so that I take it to be the same as the one of Croatia, named *pannonia* by Frühstorfer, who compares it precisely with it; I have, however, no actual specimens of the latter for comparison and I have no females of the Olympus, so that I cannot be sure whether it might not, instead, belong to the Hungarian *illecebra*, Frhst., as all these races are not very sharply distinct from each other. Anyhow, it is interesting to note that there is no tendency at all to resemble the well-characterised race of Asia Minor, with decidedly small white spaces.

Limenitis drusilla, Bergstr = *camilla*, auct. nec L. = *rivularis*, Stichel nec Scopoli:—I have determined the race of Salonika and of the Olympus as *reducta*, Stdgr. A female of 26th April from the former locality is worth mentioning, on account of its gigantic size, equalling the largest *herculeana*, Stichel, of Dalmatia and Southern Italy (length of forewing 33 mm. and expanse between the apexes 52); the white spaces are of average size, not having the unusually broad ones of *herculeana* nor the unusually small ones of *reducta*.

Melitaea trivialis, Schiff.:—Having had a chance to examine the whole of the extensive series of specimens brought back by the Quercis, I

can give a better account of the nomenclature to be applied to their broad variations, as already described by Querci, himself, in *Lambillionea* of 1937, p. 27.

The I generation of Salonika had been quite rightly diagnosed as *trivia-fascelis*, Schiff.-Esp. in my paper of 1937, p. (18) for these two forms are about equal in number in it. The II generation, collected in August, is very much smaller and extremely so in many individuals. One can refer its variations, in a broad way, to three of the well-known forms: 3% of both sexes belongs to the small, heavily marked *postfascelis*, Vrty., 82% of the males and 60% of the females to the small nominotypical *trivia* known as *nana*, Stdgr., and the remaining 15% of the males and 37% of the females to the very small form of a very light, dull ochreous colour, with extremely thin black markings, usually known as *catapelia*, Stdgr., but which is also Kollar's *persea*, according to Riley, so that it should bear the latter, older, name.

At Skala, 300 m., on the Olympus, the I generation has been correctly referred, as a whole, to *fascelis*, Esp., for the form with thin markings scarcely ever appears there. Also the II generation is correspondingly darker, so that 50% of the males and 40% of the females belong to *postfascelis*, Vrty., 50% of both to the small *trivia*, named *nana*, and the remaining 10% of the females, only, to the very light form, which agrees with *persea* = *catapelia*, when very small, and with *aabaca*, Frhst. (described from Spain, as being a *didyma*!) or with *robertsi*, Btl., when not so reduced in size.

At Prionia, 1500 m., in an arid locality, the I generation is the same as at Skala and, thus, *fascelis*, more or less entirely. Of the II generation only two individuals were found, showing, at that altitude, most strains are monogoneutic; those two had the nominotypical *trivia* aspect.

At Stavros, 700 m., in a very damp valley, below the fountain, the I generation was always *fascelis*, but with a tendency to unusual melanism, due to partial blending of the extremely large black markings and to a shadowing of black scales over a part of the ground colour. This melanic form is racial also in damp localities of Asia Minor, as shown by a large series from Brussa in my collection. The II generation was not looked for and is, thus, unknown.

M. didyma, Esp.:—I have determined the I generation of Salonika as agreeing perfectly with *oreithya*, Frhst., of Trieste. I can now add that a few specimens of the II, collected in the hills, at about 300 m., on 14th August, also agree with *postoreithya*, Vrty., and precisely with the form which has a very light ochreous ground-colour and very thin black markings, including the marginal band, which is broken into separate, internevular, dots on the forewing.

M. phoebe, Knoch., race *ogygia*, Frhst., II gen. **postogygia**, nom. nov.:—I propose this name for the generation of Salonika, which was found emerging in mid-August, on the hills above that town, where the heat was scorching. It is the most minute form of the species, hitherto known, as some specimens have a length of forewing of only 15 mm. and an expanse of 25, whereas the spring generation, although it is the smallest at that season, measures 20 and 35, respectively. The colour and pattern, on both surfaces, seem to be perfectly alike in the two generations.

NOMENCLATURE: THE INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE VERSUS THE PRIVATE CODES.

By B. C. S. WARREN, F.R.E.S.

The articles on nomenclature by my friends the Rev. G. Wheeler and Gen. Cooke, which have recently appeared in this Magazine, seem to omit so much that is of primary importance in the nomenclature problem that I feel some attempt should be made to fill the gaps, if only to counter-act the unfortunate impression (doubtless unintentional) that the control of nomenclature by the International Code means confusion.

First, it is well to recall that the system of nomenclature in operation for the past hundred and fifty years or so, is the initial cause of present difficulties. It is this that has necessitated the many changes of names which are held to be the cause of the trouble. The simplest way to make this clear is to take a few concrete examples.

Nomenclature in the past has been guided by the personal opinions of the writer of the moment. Borkhausen in 1778 changed Esper's names just because he did not like them. In more recent times writers have done the same, but tried to conceal the fact by propounding arguments to support their actions. To-day Gen. Cooke writes: "I have always known (and shall continue to know) the 'Adonis Blue' as *bellargus*." Truly the spirit of Borkhausen is with us still. Recently I was talking to another friend, Mr E. C. Joy, a specialist in this blue. "I have always known it as *adonis*," he said, "and always will." So both my friends pursue their course, and if I was like-minded I should call the insect *thetis*!

What is Gen. Cooke's remedy?

It is this outlook, and nothing else, which has given us the jumble of existing names; but these small examples show us something more.

Gen. Cooke further writes: . . . "the present wholesale alteration of names which have been known to generations of entomologists," and Mr Wheeler writes of the absurdity of changes of "well-known" names. Viewed in the light of the *bellargus-adonis-thetis* matter, what do these expressions mean? Just a name which has been familiar to one man for a certain time. It is strange to find an opponent of changes of names championing the change of name of the Adonis blue from *adonis* to *bellargus*. The name from which the popular name had been derived might surely have been held as most known to past "generations," but, note, *adonis* was not well-known to Gen. Cooke, so the change does not matter, it is not "confusing"—to him.

The idea of some standard of names well-known to all is, in fact, just a myth. I do not believe any writer started with the intention of changing names, but as Gen. Cooke points out, progress necessitates changes, and in most cases the existing names were soon found insufficient, or too inaccurately applied, to be used in connection with fuller material, so writers were forced to make changes, but as, unfortunately, there was no uniformity in their views, the result could only be disastrous.

To take another example. In 1903 Mr Wheeler published his much-valued book, which has been used by every English entomologist I ever met on the Continent. In those days Kane's book was, equally certainly, the most used by English collectors, yet Mr Wheeler used no

less than 61 generic names to the 36 in use in Kane. Kirby's book was also much used, yet in several specific names Mr Wheeler did not follow him. It must not be thought that I am criticising these changes, but in the past I have heard others complain of them. Next, an example from abroad. Fruhstorfer's work has been very much criticised (often quite unjustly) but in nomenclature he was far ahead of many of his contemporaries. Frhr. v. d. Goltz has frequently complained of Fruhstorfer's introducing new names in place of homonyms, with the usual emphases on confusion, etc., yet he seriously suggests in one paper, that all races of all species inhabiting one district should be known by the same name; i.e., all races in the Pyrenees as "*pyrenaica*," and so on. He followed this by saying that such races as already had names should have their names changed so as to conform to his suggestion! Again, though he nearly always rejects any change of name by Fruhstorfer (and it must be remembered that Fruhstorfer's changes were correctly made) he accepted Turati's change of *Erebia nerine*, Frhr. into *alecto*, Hb.; a change which could not be justified under any conditions.

From such examples (which could be multiplied by dozens) we can see very plainly that the much-denounced evil of changes of name is, to a very great extent, merely a cloak for personal likes and dislikes. The plain truth is that no collector or worker has the least objection to change a name, or several names, when the reason for doing so is in accordance with his own views. Unfortunately one must add that personal like or dislike of the man who makes the change also enters into the matter at times.

The controlling influences then, in entomological nomenclature, for nearly one hundred and fifty years, have been personal prejudices. Many workers, of course, have tried to introduce more scientific methods, but lack of agreement has only produced a fresh multiplication of names, and as long as it is possible for an individual to make changes because he considers them good, there will be no hope of improvement. The only possible remedy is an absolute control of nomenclature by the International Commission on Zoological Nomenclature. The acceptance of a fixed code of rules has so many obvious advantages that they need not be mentioned, but not least among them will be that a writer will not be obliged to give lengthy explanations demonstrating why he used a certain name, and the reader will be spared wading through endless arguments, in which he is not interested, before he can understand what the writer meant.

But, some reader will say, what prospect is there of any general acceptance of the Zoological rules? There are two answers to this question.

First: there is, never has been and never will be, the remotest chance of general acceptance of any individual opinions on the subject, not even among the entomologists of one country. For this reason alone the Zoological code has a great chance of being accepted.

Second: The experts on nomenclature, of many countries, have contributed to the rules, and therefore the amateurs of most countries will feel that the rules carry more weight than individual opinions.

I know that systematic workers in many countries have accepted the rules, while the fact that they have been accepted by the principal entomological institutions in many countries must not be overlooked: in this country by the British Museum and Royal Entomological Society.

THE INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE.

A REPLY TO MR WARREN.

By (REV.) GEORGE WHEELER, M.A., F.R.E.S., F.Z.S.

I am indebted to my friend Mr Warren first for having given me the opportunity of combating his views, and secondly for having made it so easy to do so; for he has missed, so far as I can see, the point of every objection that I have made.

I take it as axiomatic that the reason for anything whatever having a name is that the object in question should be recognisable without a description. (Of course in any technical or scientific matter that is to say recognisable by those studying, or interested in, the particular subject referred to.) There may possibly be people who do not accept this as axiomatic, but if so it is obviously quite impossible (and unnecessary) to argue with them. Two points appear to me to follow necessarily from this: (1) That no rule can be accepted that makes it uncertain to which of two or more objects a name is applied; and (2) that the use of two or more names for the same object is a matter of complete indifference so long as neither name has been applied to any object but the one in question; for example, General Cooke speaks of "*bellargus*" and Mr Joy of "*adonis*." Very well, let them; it produces no confusion, neither name is ever applied to any other butterfly. Mr Warren's use of "*thetis*" would not be so far from objection in view of its being the only name in use for one of the "coppers." There are numerous parallel instances, such as *acis* and *semiargus*, *medon*, *agestis* and *astrarche*. In all these cases the oldest name would be "correct," but the use of the others would be perfectly intelligible to all serious entomologists. While on this part of the subject I would add that the spelling of a name is a matter of the most profound indifference so long as no confusion exists. There is no reason why priority "fans" should not write *coridon*, *aegeria*, and so forth while those with even some slight classical knowledge are equally at liberty to write *corydon*, *egeria* and the rest. (The absurdity of keeping to the original spelling is well exemplified by the fact that while it is "correct" to write "*aegeria*" it is also "correct" to write of the form "*egerides*.") If confusion is to be avoided one rule is obviously essential, namely, that no name in general use for one insect can for any reason whatever be transferred to another—"sibylla" must remain "sibylla" and "camilla" "camilla." As things are at present it is impossible to know to which insect "camilla" is being applied. The transference of "*orbitulus*" to "*pheretes*" is perhaps even more inexcusable. Perhaps I have said enough to show that Mr Warren's contempt for the "confusion" involved is quite misplaced; the confusion is very real and upsets the whole object in anything having a name at all. Just in passing I may perhaps say that Mr Warren's suggestion that personal dislikes to individuals may influence dislikes to changes of names can certainly have no standing in this case, as Mr Warren and I have been rather intimate friends for more than thirty years, and I am sure he will not regard this as a case in point. Still, I am going to give two more instances from Mr Warren's own writings, both of which may seem ungrateful, though that is far from being the

case. At Christmas Mr Warren was kind enough to send me a little calendar to which was attached an excellent underside photograph of an aberration of one of the "blues" which he called "*glandon*"; not having had time to look the matter up I have still no idea to what insect it refers! Also some months ago he sent me for my collection in the Worthing Museum a beautiful and much desired series of "*Erebia claudia*"; in this case he was good enough to explain to my ignorance that this meant *E. arete*. It was quite unmistakable, and I have several times since been to gloat over the series of an insect I hardly hoped ever to see there; but it is still labelled "*E. arete*."

To turn to the International Committee on Zoological Nomenclature, it seems to me (and many others) that the first necessity for entomologists is to ignore it altogether. Considering that Insects greatly outnumber all other forms of life, such a Committee to have any weight with entomologists ought to consist predominantly of students of that branch of zoology; otherwise we are asked to submit our difficulties to a body of people with no qualifications for settling them. Had it not been for the War I have no doubt that this decision would have been reached officially in the 1915 International Congress of Entomology, so strong was the feeling on the matter at the Congress of 1912.

Mr Warren says that the alterations suggested are accepted by the British Museum and by the Royal Entomological Society. With regard to the first instance, Mr Warren's own work at the Museum must have shown him that it was not a very reliable criterion; and indeed in the under-staffed condition of the Museum and its consequent reliance on much amateur work, it can hardly be expected that its nomenclature should be altogether consistent; with regard to the Society I suppose he means that this nomenclature is used in their official publications, but from all the comments I have heard, not only from lepidopterists but also, for instance, from hymenopterists and orthopterists, I am sure that a "plebiscite" of the Fellows would result in an overwhelming majority against accepting the dictation of the Committee. Mr Warren appears (perhaps *only* appears) to consider that the Committee need not be expected to have read magazine articles bearing on the question, or apparently much else beyond more or less ancient books, and presumably they have not done so; but if they have not they are certainly utterly incompetent to express a considered opinion, let alone an ultimatum. I was rather amused at Mr Warren's congratulations on having Captain Hemming in his dual capacity; it appears to me to be a cause for regret. The entomological work on which he is engaged is very much a whole-time occupation, and whatever Captain Hemming's qualifications it is more than absurd to expect whole-time work from anyone who is engaged on political work of international importance. If blame is attached to Captain Hemming at all it is not for the mistakes of which his alterations of his former work show that he is conscious, but for having accepted a position to which it was impossible for him to give adequate time and attention.

I really should like to know to what Mr Warren is referring as "the Private Code." If he refers to the "Merton Code," excellent as far as it went, I fear there are comparatively few left who even know of its existence, and so far as I am aware no other code exists which could be so described. Possibly if there were it would be founded on common

By B. C. S. WARREN, F.R.E.S.

[Concluded from February, p. (2).]

English entomologists are fortunate in having Captain Hemming's book on generic names to refer to (to be completed by a second volume) in their own language; an eloquent testimony to the value of this book being the selection of its author as secretary of the Zoological Commission; a selection which is an immense gain to entomology, assuring entomologists of a ready ear for any difficult case which it may be desirable to submit to the Commission.

I may take this opportunity of pointing out what many entomologists seem unaware of, that in any case when the application of the rules seems to act in an undesirable manner, if a full statement of the case is drawn up and sent to the International Commission they will consider it on its merits, and if in their opinion the case is proved they will suspend the rules in that case and give a final ruling as to the use of the names in question. Examples of this are their consideration of the data given by Capt. Hemming on the Genus *Satyrus*, and their fixing of the type as *Papilio actaea*, Esper, in 1935, and their ruling that the names used by Freyer in his *Neuere Beiträge* are to be taken as published in connection with the generic names of Ochsenheimer and Treitschke.

In this connection I may refer to the question of the genus *Lycaena* and Mr Wheeler's reference to Mr Turner's arguments on this name, which have been published in this magazine. Mr Turner's detailed discussion might with advantage have been submitted to the Commission and would have led to a final ruling on the question, but, as it argued what *might* have been the case if the existing rules were other than what they are, as a magazine article it served no purpose. It is, perhaps, still not too late for the Editors to take some step in the matter, that is if the question has not been before the Commission already.

Mr Wheeler raises another point which rather confuses matters: i.e., the use of the generic names *Dryas*, *Argynnis* and *Brenthis*.

This, except for the case of *Dryas*, is purely a question of systematics. It may, eventually, prove impracticable to keep nomenclature completely separate from systematics, but in the publication of a list as a general guide to nomenclature, some systematic order had to be followed, and, obviously, lengthy discussions on systematic questions would be out of place in such a list. The ultimate use of the names (if valid) must rest with the next expert in systematics, who deals with the group. Capt. Hemming recognises this, for with reference to *Brenthis* (and in many similar cases in his book) he mentions that the name is valid from the point of view of nomenclature, and can be used if desirable (p. 23 list). It is also pointed out in the list (p. 22) that the use of *Dryas* as a generic name in connection with *paphia* had already been ruled out by the International Commission's decision against the validity of the *Tentamen*. There seems no real ground for complaint against the list in these cases, but the use of *Argynnis* to include *Dryas* and *Brenthis* is nothing new, having been in practice on the Continent since the publication of Seitz' book in 1909. This shows, however, that "generally accepted" in reference to generic names re-

quires as much qualification as "well known" in reference to specific ones.

In conclusion, there seems but little doubt that, as I have shown, changes of names are in themselves but a small matter, not really objectionable to anyone who is aware of the necessity. Also we must admit that changes do not cause the confusion they are alleged to, but have only been made use of in order to defend our personal predilections. So we must drop the methods of the eighteenth century, but the knowledge that a change based on the Zoological code is a step towards order, will soon be found to compensate for the slight trouble caused at the moment, and it will be surprising to many to find how little concern fresh changes will cause them, if met with a little goodwill.

Considering the causes which I have shown to have influenced nomenclature in the past, can any entomologist seriously question the absolute necessity for an expert control of nomenclature in the future?

Many entomologists do not seem to realise that a change under the code rules is a change towards a lasting stability in nomenclature, and we even find Gen. Cooke taking comfort from the thought that fashions change. That, of course, is what *has* been happening, when every man had his own code; it is exactly what will *not* happen under the code of the Zoological Commission.

I am sure my friends will forgive me this elaboration of their articles, and equally sure that with a little further consideration of the code, they will realise that in point of fact it is just what they are asking for.

By (REV.) GEORGE WHEELER, M.A., F.R.E.S., F.Z.S.

[*Concluded from February, p. (4).*]

sense, and be free from all the complications of the Zoological Code, which must be unintelligible to the vast majority of even scientific mankind. I believe my intelligence is usually considered nearly up to the average, and to me the whole thing is a mere mass of unintelligible verbiage.

I am keeping till last the part of my argument that will no doubt bring down a torrent of contradiction, but which I believe touches the real root of all the trouble. It is to me quite amazing that nobody seems to have seen that the law of priority, *unless under very severe restrictions*, is the one thing that makes fixity of nomenclature utterly impossible. For at any time an older name may be discovered which upsets one which has had a century or more of general use, and this again may have repercussions on others in consequence of one or another of the "homonym" difficulties, and a new series of alterations is set on foot. Again, some one discovers (or thinks he has) that the insect to which a name has always (or very generally) been attached is not the one intended by the original describer and proposes to transfer it to something else. Obviously, if the whole reason for the existence of a name is not to be set aside, such a person should simply be told that it does not matter in the least what was originally meant, and that the name must continue to be employed for the insect which every-

body knows under that name. All I have written above refers chiefly to specific names which are far the most important; generic names cannot be treated in exactly the same way, and it would probably take longer to bring them into a fixed condition; their present position is deplorable, but does not create the same amount of confusion as is brought about by the changes in specific names. I do not, of course, answer for General Cooke, but speaking for myself "the impression that the control of nomenclature by the International Code means confusion" was certainly not "unintentional"; it is, on the contrary, my main contention, first because as an entomological tribunal it is utterly incompetent, and secondly because its rules if carried out can, at least for a few generations, produce nothing else. In reading old books, or any earlier than say 1870, such confusion would not be for a few generations but for all time.

No doubt the paper I read on this subject to the International Congress of 1912 has long ago been forgotten, and is probably even unknown to many of the present-day entomologists, but I still think that it presented a solution of most of the nomenclature difficulties, and had time allowed of a discussion on the subject I believe that some at any rate of its suggestions would have met with acceptance.

THE NAMES OF THE "CLIFTON BLUE" (*ADONIS*, *BELLARGUS*, *THETIS*)

By GEORGE WHEELER.

When Mr Warren wrote of the difficulty of determining on a well-established name, he quite misunderstood what I meant by the term. His quotation of certain books—Kane's, Kirby's, and my own—did not even touch the fringe of the matter; it is no question as to the extent to which any one particular book is used, for it does not in the least follow that the users accept the nomenclature, but the extent to which writers in different languages make use of a name. There is only one way in which this can be arrived at. Every available mention of an insect, under any name, must be collected and the use of the names compared. A better example could hardly be found than that of the "Clifton Blue" (I am driven for the moment to the use of the English name). By the way, when I write of the *name* of a butterfly I am referring exclusively to the *specific* name, the generic name is for obvious reasons bound to change as systematic knowledge increases.

Now to follow out the specific names of the insect in question. Rottentburg in 1775 described this insect under the name of *bellargus*. In the same year Schiffermüller described it under the name of *adonis*. For the next few years the two names were used indiscriminately, with a slight preponderance in the use of *bellargus*, and up to 1790 neither name could be described as well established; but from 1790 till 1882 the name *adonis* was in almost universal use, the only exceptions in which *bellargus* was used being in 1791, 1804, 1830, and 1871. What would constitute a well-established name better than this? Fifty-nine references as against four! Surely the use of any name but *adonis* could do nothing but upset an almost universal practice and all for the sake of "red-tape" and a theory of more than doubtful utility.

But what about *thetis*? At the same time that Rottentburg described *bellargus* he also described, just previously, another species which he

called *thetis*, and which he described as a male. Göze makes a doubtful reference to this in 1780. Schneider in 1787, Borkhausen in 1788 and 1789, and Soriba in 1791 refer again to this name; I have not at hand the means of verifying how far they referred this name to the species now under consideration, or whether like Rottemburg they regarded it as a distinct species. Nothing further was heard of this till Kirby in 1871 gives it in a Synonymic Catalogue and Scudder took the matter up in 1875. Here is what Tutt says on the subject (*British Lepidoptera*, x, p. 326, note): "There can be no doubt whatever that the so-called ♂ of von Rottemburg's *thetis* was the strongly blue-tinted ♀, the ♀ of *thetis* the brown ♀, and *bellargus* ♂ the ♂ of the same species." Alas for priority! In spite of the fact that all these names are of the same year, that the name *thetis* was only due to a mistake, and had only "page priority" and had not been heard of in this connection for nearly a century, it was thought incumbent to overthrow the practice of nearly 100 years and introduce this name *thetis* as against the well-established *adonis* and the well-understood *bellargus*! Could folly go further? Comment appears to me superfluous.

MORE ABOUT NAMES.

By T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.R.E.S., F.Z.S.

There are perhaps few entomological subjects on which so much ink has been spilt as the subject of Nomenclature. Whilst most desire uniformity and fixity of names we find two opposed schools of thought, those who are derisively termed "priority-mongers" and those ultra-conservatives who champion the cause of "any old name, so long as 'I've always used it.'"

What is a name? To this question the most succinct answer, that "every name is a term for a definition," is given by Rothschild and Jordan in the Introduction to their *Revision of the Sphingidae* (p. xviii), and it is scarcely necessary to commend their clearly-written and common-sense remarks on the Principles of Nomenclature to those interested in this subject. For a name to be valid, it must have been published with a description, or a definition, or an indication, such indication being a bibliographic reference, or a published figure, or a definite citation of an earlier name for which a new name is proposed.

A homonym is the same name for two or more things. Synonyms are different names for one and the same thing. A generic name is rejected as a homonym if it has previously been used for any other genus; a specific name is rejected as a homonym if it has previously been used for another species or sub-species within the same genus. Rejected homonyms can never be used validly: some authors seem to suppose that, if A. described a species as *Tinea albella* in 1800 and B. described a different species as *Tinea albella* in 1810, the name *albella*, B. 1810, remains valid if that species is placed in another genus and called (say) *Gelechia albella*, B. 1810. It is not so. The name *Tinea albella*, B. 1810, was a primary homonym of *Tinea albella*, A. 1800, and never was or can be a valid name. Rejected synonyms, however, can be used again (if otherwise valid) in the case of erroneously suppressed names. Thus, in our hypothetical case, if C. had described

in 1820 under the name *Tinea nivella* the same species as B.'s *albella*, this species might have been standing in a List as *Gelechia albella*, B. 1810 = *nivella*, C. 1820; but, on finding that *albella*, B. 1810, was not valid (as being a primary homonym), the name would become *Gelechia nivella*, C. 1820 = *albella*, B. 1810 (nec A. 1800). The name, *Tinea albella*, B. 1810, is called a primary homonym of *Tinea albella*, A. 1800, as these two names are the same combination of the two names *Tinea* and *albella*. We may have a case in which two (or more) different species were originally described under the same specific name but in different genera, e.g., *Tinea atrella*, D. 1830, and *Gelechia atrella*, E. 1840; if by reclassification these two species are placed in the same genus, both specific names cannot stand in that genus, the later-described name sinking as a secondary homonym of the earlier name and becoming a synonym of its own specific name, the next synonym coming into use for this or, if necessary, a new name being given. A secondary homonym, however, remains dormant and can be used again so soon as it ceases to clash with the prior similar name in the same genus. The process is sometimes complicated, but usually there is not much difficulty in selecting the name which is "correct," provided that the proper combinations and dates are available; it is in this latter point that nearly all Catalogues are so defective; they simply will not give the full combinations and dates under which species were described, besides omitting numerous synonyms, with the result that many changes are found to be necessary because the names hitherto in use were still-born and can never be brought to life. This process, it will be seen, depends on the strict application of the Law of Priority, by which alone we can ascertain what is the scientifically-correct name of a genus or species. Between the "priority-monger," who vigorously applies rules to endeavour to secure uniformity, and the "any old name, so long as I've always used it" man, who has little desire for uniformity (or even scientific exactitude), there is a great gulf fixed.

Mr Wheeler is unfortunate in his example when he says " 'sibylla' must remain 'sibylla' and 'camilla' 'camilla'." (As a matter of fact, Linnaeus named his species *Papilio Nymphalis sibilla* in 1767, but Mr Wheeler says that he is indifferent to a mere matter of spelling.) The early English Entomologists were in no doubt as to the name given by Linnaeus to our English butterfly and we find, for example, Donovan (*Nat. Hist. Brit. Ins.* VII, 75-77, t. 244: 1798) going into the question of its correct name and saying:—"We consider the Common English Admirable, as the true *P. Camilla*; and that *Sibilla*, and not *Camilla* is the Austrian species, as we have received it from that country." Harris (1766 and 1775), Lewin (1795), Haworth (1803), Samouelle (1819), Curtis (1826), Stephens (1827), and Westwood (1841), all knew it as *camilla*. The two names seem to have been mixed up by Fabricius, and Hübner wrongly figured *camilla*, Linn., as *Papilio sybilla* [yet another spelling!] in his *Samml. Eur. Schmett.*, Pap. t. 22 ff. 103-105 (1799-1800). As it was less trouble to consult Hübner's pretty plates than to consult the original reference in *Mus. Lud. Ulr.*, we find the name "sibylla" applied to *camilla*, Linn. 1764, by Herrich-Schäffer (1844), Newman (1871), with the alteration "sibilla" by Stainton (1857) and by later authors. There has therefore been no continuity in the use of the name "sibilla" even in England, where

for some eighty years after Linnaeus had named it in 1764 it was correctly known as *camilla*, the name now restored to it after an approximately equal number of years' misuse of the name "*sibilla*." Aurivillius (*Recensio critica Lep. Mus. Lud. Ulricae*, pp. 101-102: 1882) said definitely:—"Nullum potest esse dubium, quin sit haec species *P. Camilla* L. et eo nomine appellari debeat"; this was over fifty years ago. When Mr Wheeler says that "no rule can be accepted that makes it uncertain to which of two or more objects a name is applied" he advances a platitude with which all can agree: but in cases such as "*camilla* versus *sibilla*," there is no question of any "rule"—it is a matter of fact, to be determined by consultation of the original description (or figure or type-specimen, as the case may be—provided, of course, that such is decisive, as it is in this case). To continue in the use of an exposed error is utterly unscientific, to say the least.

As for the spelling of a name being "of the most profound indifference so long as no confusion arises," so that "those with even some slight classical knowledge are . . . at liberty to write . . . *egeria*," it is unfortunately the fact that it is often the people with some classical knowledge (slight or otherwise) who so often disagree about the correct spelling. When I find a classical scholar of the calibre of Mr Meyrick using *aegeria* (*Handb.*, p. 337: 1895, and *Rev. Handb.*, p. 348: 1928), whilst Mr Wheeler tells us that it should be *egeria*, we can merely leave the classical scholars to fight it out amongst themselves, whilst noting that Linnaeus, who named this butterfly and who had an undoubted right to give it any name that he liked, called it *aegeria*, whilst Staudinger was equally correct in bestowing the name *egerides*. As for "no confusion" arising, it is unfortunately the case that these alterations do lead to confusion and unnecessary trouble. If I want to look up a reference to this species in a publication, why should I have to look it up in an Index (if any) under two letters, A and E—to say nothing of the fact that, on Mr Wheeler's argument, some other author might transform the spelling into "*oegeria*" or even "*haegeria*" or other variations too awful to contemplate? Lord Walsingham, who was something of a classical scholar, called a genus *Odites*; Mr Meyrick considers that this should have been *Hodites*. Latreille described a genus as *Yponomeuta*, which Zeller "improved" to *Hyponomeuta*. Such classical emendations are nothing but an infernal nuisance, especially when they affect the initial letter which is used for indexing. Would Mr Wheeler "correct" the name of the Clearwing genus "*Aegeria*" to "*Egeria*"? If not, why not? What is sauce for the goose, etc. It is usually understood that the scientific names of Insects must be either Latin or latinized.

When Mr Wheeler considers that "the law of priority *unless under very severe restrictions* [not specified] is the one thing that makes fixity of nomenclature impossible," he is, of course, quite entitled to his opinion. It is not, however, the Law of Priority that has introduced confusion but the lack of its strict application without fear or favour. As Kirkaldy put it (*Catalogue of the Hemiptera*, p. xiv: 1909):—"The priority rule is adopted not from any idea of credit to first describers, who often do not deserve any, but because it admits of the most entirely mechanical application, thus tending to eliminate

personal prejudice and to ensure stability." The Law of Priority is no modern invention, as some people seem to think: thus, Stephens, over a hundred years ago, wrote:—"In restoring the name *Aretia* to this genus, I have adhered to the rule, which is with justice generally adopted, of employing that which has the claim of priority" (*Ill. Brit. Entom., Haust.* II. 69: I.xii. 1828). There will undoubtedly be cases where an older name may be discovered and will have to replace one in current use—I have at present a long list of names of Microlepidoptera awaiting execution for this and other reasons—but there are comparatively few of such older names which are likely to be found applicable. No one (or only a very exceptional person) makes changes because he likes changing names but because he considers it necessary to do so for the sake of scientific exactitude. To pass on a name, which is known to be wrong, seems to me on the same moral plane as passing on a counterfeit coin.

When Mr Warren tells us that "the only possible remedy is an absolute control of nomenclature by the International Commission," and when Mr Wheeler tells us that, if only his scheme of 1912 had been accepted, everyone would have lived happily ever afterwards, I can only agree with both these views in differing from either. There has been too much of this attempt on the part of the tail to wag the dog, and as an Entomologist I refuse to accept rules made by Zoologists. Granted that Entomology may be described as a part (eighty per cent. or more) of Zoology; but Zoology is only a part of Biology, and yet the Botanists have their own Code. No Code of Rules—and the Zoological Code is unduly complex, far more so than the German 1894 Code, which was comparatively simple, yet comprehensive—can provide for all possible cases which may arise nor, when doubtful cases do arise, can any speedy decision be obtained from the Commission. Nor is the fact that any name is under consideration notified in any publication which Entomologists are likely to see. Further, when opinions are rendered, they are not made accessible (and are often of no interest) to Entomologists. And again, given that decisions have been rendered and made available, the utmost that the Commission can do is to pronounce on the validity of a name: it is not the business of the Commission to pronounce on the applicability of a name to a particular insect, and it is on this point that there is often ground for considerable difference of opinion. So, even if Mr Warren's opinion prevailed, we should still be far from unanimity of thought or action. It may be added that "absolute control of nomenclature" would doubtless be disclaimed by the Commission, which has itself stated that it has no power to force zoologists or others to adopt the International Rules. Mr Wheeler apparently thinks that such unanimity can be achieved by a show of hands at an Entomological Congress. I was at the Congress in Paris in 1932, together with about 300 other Entomologists, of whom only about thirty were sufficiently interested to attend the section on Nomenclature. What is the value of the votes of the ninety per cent. who were not thus interested? And are those who could not attend the Congress to be ignored? But to deal with nomenclatorial problems requires more than mere interest; it requires considerable experience of work on Nomenclature and also a good knowledge of the literature of the particular group. A better

plan, in doubtful cases, is to circulate them to those relatively few workers who are really in a position to give an opinion: this was done, for example, by Sir George Hampson some forty years ago, as regards certain specific questions, and the correspondence which ensued can still be read to advantage.

Another method is to publish one's own conclusions, not with the idea of ramming them down other people's throats but simply to bring any changes to their notice, leaving them free to adopt such changes or not. This I did some ten years ago in the case of the generic names of the Microlepidoptera. If the conclusions put forward are based on sound premises, they will probably gain acceptance by serious workers, who are in the best position to judge and who act as leaders. Catalogues have probably more influence on the general usage of names than is often realized, but unfortunately many authors tend to copy former catalogues (with all their errors and omissions) without verifying their references or tracing back the history of the names which they employ: thus, Rebel (Cat. No. 2012) misquoted Hübner's figure 69 of *pygmaeana* as "89," and in Kennel we find this blindly copied as "Hb.f.89," and this mistake will probably be repeated by other copiers. In other cases, as Mr Warren remarks in perhaps rather too general terms, the names used have been based on personal prejudices rather than on facts: thus, in his recent Catalogue (Part 79) Gaede quotes *Isophrictis tanacetella*, Schrank 1802, as a synonym of *striatella*, Hb., t. 42, f. 288, for which he gives the date 1802. Hübner's plate 42 was published sometime between 1800 and 1805, but we have no evidence that it was issued in or before 1802, and, curiously enough, under *malvella*, Hb., on page 234 of this same Catalogue Gaede quotes the date "1803" for t. 41 f. 281, whilst on page 411 he correctly quotes 1800-1805 for Hb., t. 41, f. 283. The combination, *Tinea striatella*, was preoccupied by Hübner himself in 1796 (t. 23, f. 154), and was first used by Schiffermüller in 1775. Under no circumstances, therefore, can *striatella*, Hb. 1800-1805, be the correct name for this species.

As for suspension of rules to produce a list of Nomina Conservanda, this should only be done on the very rarest occasions, and in the case of really outstanding and well-known names which would otherwise be displaced, usually by mere accident.

Musca domestica, Linn. 1758, as the genotype of *Musca*, Linn. 1758, is a case in point, as this is a well-known name not only of interest to Entomologists. But, when we find the author of a small local list putting forward numerous names, which are of no great interest to workers in or outside of Entomology, for fixation as Nomina Conservanda, there is brought into question the value of a rule which is apparently to be broken on every occasion that some otherwise necessary alteration does not meet with the personal approval of one particular worker. Proverbially, hard cases make bad law, and any rule, which can be broken practically with impunity, is soon brought into contempt. Not, of course, that the Commission has the power to force anyone to adopt their rule.

Mr Warren has pointed out that the differing usage of generic names for the species of *Argynnis* is a matter of personal opinion regarding their classification and not merely of Nomenclature. In all larger genera we find groups of species more nearly allied to one

another than to the others, and it is entirely a matter of personal opinion whether such groups should be separated as distinct genera or retained within a larger genus, *i.e.*, whether their differences or resemblances preponderate. This is purely a matter for decision by the specialist worker on each Family, and the personal opinion of different specialists is not always the same. But when, for example, we find in the so-called "Official List of British Butterflies" that eleven unfortunate species of "Blues" are split up into ten genera, we want to know on what grounds this has been done before swallowing these names wholesale. Had a key to these genera been given, we might have been in a position to consider how far they were really of generic value, *i.e.*, divided off on characters which would be considered of generic importance in any other group of Insects.

The unfortunate person, who suffers most by varying usages of names, is perhaps the Editor of an entomological magazine, who has to prepare an Index at the end of the volume and finds that one and the same insect has been referred to under several different generic and specific names. To insist on uniformity is impracticable, and many contributors will refuse to write if the names which they have used in their manuscripts are altered into others published over their signatures, as if they had used them. This is a most objectionable proceeding. It seems best that any editorial emendation should be introduced within square brackets, to show that it is an interpolation, thus giving the name as used by the author and also any other name preferred by the Editor for the sake of uniformity—and, if we may dare to whisper it, perhaps also for the education of contributors, all of whom cannot be expected to be versed in the latest style in names.

NOTE:—Why "Clifton" Blue? So far as I know, the English name was first applied to this species by Moses Harris (*The English Lepidoptera*, pp. 1-2, 1775), who called it the "Clifden Blue," as it was found on "commons near Clifden." Haworth (1803), Rennie (1832), Wood (1833), Westwood (1841), Newman (1870), all called it the Clifden Blue.—T.B.-F.

The combination, *Papilio thetis*, having been used by Drury in 1773, was not available for use in 1775. The combination, *Papilio adonis*, was also used by Cramer in 1775 for a *Morpho* from Surinam.—T.B.-F.

GENERIC NOMENCLATURE.

When the Royal Entomological Society appointed a Committee "to prepare lists of specific names to be fixed as genotypes of genera of British insects with a view to the suspension where necessary of the law of priority in respect of generic names," one was led to believe that the vexation of spirit engendered by constant changes in nomenclature was at last to be relieved. I believe I am not alone in regarding nomenclature as being a subject of the most trivial importance, names being given to insects for the same reason that they are given to towns and rivers, or to such objects as spades. On such a view the law of priority had long since become as inconvenient in entomological work as it would be in the ordinary use of language, if we were constantly to change place-names or descriptive nouns on the discovery that they were differently applied in the past. The terms of reference

to the Committee suggest to the plain man that an end is to be made of this fooling, but a study of their proposals in relation to Lepidoptera will force such a being to the conclusion that the reverse is likely to occur.

Had a purely arbitrary list of names in general use been proposed most entomologists would have accepted it with a sigh of relief. But the proposals we are asked to accept appear to be based, with few exceptions, and in defiance of the Committee's instructions, on the most rigid application of the law of priority, modified by a series of rules and opinions which I humbly suggest are such that no intelligent and reasonable body of men could possibly have formulated them, and which ought to be, and no doubt in due course will be, rejected by the general body of entomologists for reasons similar to those which in our English system of judicature lead the Court of Appeal to reject verdicts of juries when those verdicts are sufficiently absurd. I instance the rejection of the "Tentamen" and of the conception of the restriction of a genus, even when an author has extracted from an original mixed assembly a homogeneous group, and classified that group under its own name, as decisions which cannot long survive. The practice of destroying such an extracted genus by the deliberate selection of one of its species as the genotype of the original mixed assembly appears to me to involve the treatment of the work of our illustrious predecessors with a reckless contempt which our successors must regard with shame.

Rules which permit anarchy of this type are more appropriate to children's games than to science. I suppose the working entomologist would tolerate almost anything for the sake of peace, but there are certain fundamental matters in the proposed list of generic names for butterflies which appear to me to call for special comment.

1. The Committee exceed their terms of reference by expressing views as to what is a valid genus, e.g., they sink *Brenthis*, Hb. and *Issoria*, Hb. as synonyms of *Argynnis*, Fab. notwithstanding that they were long ago differentiated on structural grounds. It is true that we are told in a somewhat superior way that we may continue to err, but the use of these well-established genera is definitely discouraged. This action of the Committee is *ultra vires* and has no greater authority than any other amateurish attempt at "lumping."

2. Changes are proposed in specific nomenclature which can by no stretch of imagination be regarded as *intra vires* and which ought, if well founded, to have been made elsewhere with a proper explanation.

3. The proposals for suspension of the law of priority, which merit close attention as furthering the principal purpose of the Committee's appointment, are made on no intelligible basis. No-one will criticise the proposals relating to *Argynnis* and *Colias*, but to say that *Vanessa*, Fab., is a generic name by which *atalanta*, L. and *cardui*, L. have been almost universally known since 1807 is surely contrary to the facts. *Pyrameis*, Hb. has been more extensively used for these species than *Vanessa*, whether rightly or wrongly I care not.

Again, if the excellent principle of preserving long-established names is to be adopted it is surely applicable with singular appropriateness to the use of *Melanargia*, Meig. for the "marbled whites." No proposal is made for the retention of this name, for the obvious reason that the foolish, and I suggest contemptible, action of Scudder

in "fixing" *galathea*, L. as the type of *Satyrus* would leave that equally ancient name descriptive of nothing if the rules, which are absolutely and entirely artificial, were followed to their logical conclusion. Yet *Satyrus* has been "almost universally" used for an entirely different group.

These notes exemplify the reasons which lead me at present to ignore these proposals, an attitude in which I am supported by the lack of finality which they appear to have in the minds of their authors, as witness the abandonment of the proposal to substitute *Adopoea*, Billb. for *Thymelicus*, Hb. See *Proc. R. Ent. Soc. Lond.*, Series B. VI. 152.—HAROLD B. WILLIAMS (LL.D., F.R.E.S.).

THE INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE.

After carefully reading the arguments of Mr B. C. S. Warren and Rev. G. Wheeler in the February number (Vol. L, No. 2) I feel that these two writers represent such totally different points of view that the intervention of another is permissible.

Surely it must be admitted that if an individual is solely interested on a small group of insects such as the "blues" it is immaterial by what names he knows them, "*bellargus*," "*adonis*," the "Clifden blue." All his friends who specialise in his special group will know to what species he refers and he can ignore all name changes. But if he goes a step further and begins to study the moths, he will quickly find this idea impossible.

Take a few examples. *Barrettii* is a British species; all collectors know what this name means. But in many lists it is called *luteago* and Meyrick so calls it. Many collectors also call it *luteago* and add race *barrettii*. In point of fact *luteago* and *barrettii* are two distinct species, the first of which is not British and the latter is a form of the species *andalusica*. The argument that we can call it by the first name we knew it by will not stand. It is in fact *andalusica*, race *barrettii*.

Neurica of all older (before 1908) British authors is in fact *dissoluta* (ab. *arundineta*) a distinct species; again we cannot continue in error because we once so called *arundineta*, *neurica*.

The *guenéei*, Dblidy. of British lists is not *gueneei* at all, that being an ab. of *testacea*. Our species is a race of *nickerlii*, Freyer.

Nictitans is most peoples early name for all four species *oculea*, L., *paludis*, Tutt, = *fucosa*, Frr., *crinanensis*, Brrs. and *lucens*. We cannot so continue.

Fulvago is used by some for *paleacea*, *cerago* or *ochracea*, three very different species.

No. We may dislike all this name changing but we must go forward towards some authoritarian ruling. Frequent change is better than utter confusion. But I do doubt if so much change is really required, and here again it is the "free-lance" people who are at fault to my mind.

Alterations are often made in a name before the admissibility of the evidence on which such change is based has been tested. Then all too often the name is changed back again, but only after the error has been for all time in some work or article.

If the question was solely a local British one a good solution would

be to set up a committee whose consent to all changes of name for a given list would be needed. As it is an international question, the acceptance of the International Code of Zoological Nomenclature seems the right thing even when this cuts across the personal prejudices which we nearly all have. The writer has a great many.—A. J. WIGHTMAN (F.R.E.S.).

NOMENCLATURE: A PLEA FOR COMMON SENSE.

By Brigadier-General B. H. COOKE, C.M.G., C.B.E., D.S.O.

In the February number of the *Entomologist's Record* Mr Warren asks me what is my remedy for the present chaotic situation as regards nomenclature.

My first and foremost suggestion is to exercise common sense, and to make things as simple as possible for the great bulk of practical entomologists. Most of them, as I have suggested before, are not in the least interested in discussions as to whether a name was coined in 1775 or in 1778. They want to be certain of the identity of an insect when they see it mentioned in print.

Not only has the present system of sweeping changes of names little, if any, scientific value, it has the effect of discouraging budding collectors. South's *Butterflies of the British Isles* is still the standard work as far as such collectors are concerned. The new edition published in 1928 contained a revised list of 24 new names. Of these I think I am right in saying that only 6 agree as regards both generic and specific names with the list published by the Nomenclature Committee in 1934.

To take one instance, the old edition of South named the Small Skipper *thaumas*, the new edition calls it *flava*, the 1934 list of the Nomenclature Committee introduces *sylvestris* and, for all I know, may have made a further change by now. How can the young collector be expected to deal with this state of affairs? For some years I collected on the Continent, and got to know, and to correspond and collect with many foreign entomologists. No question ever arose about correct nomenclature. One list of names was referred to, and was recognised by all. Confusion was non-existent.

As regards remedies. I suggest that the broad principles to work on might be the following:—

(1) Clear our minds of all obsessions regarding antique records where they involve unnecessary changes, and realise that the one and only object of giving names is to enable insects to be easily identified.

(2) Retain, as far as possible, all specific names that have become generally known to living entomologists during the last 20 or 30 years.

(3) Absolutely bar the transfer of a well-known name from one species to another.

I can assure my friend Mr Warren that I have no desire to imitate the late Borkhausen. I have no affection for any particular names, only a wholesale dislike for unnecessary complication. As regards *bellargus*, my rather feeble little joke has been taken too seriously. Perhaps that name is not really coming back into fashion, and I may have misread the 1934 Nomenclature Committee's list. Or possibly the name has again been altered (to *adonis* ?).

longitudinal shades on the yellow portion of the hind-wings.”

“ He reports specimens in which ‘ the black shades ’ have become conspicuous straight black bars.”

Barrett, pl. 138, f. 2, gives a specimen in which one of the streaks of the black shading from the base of the dark base of the hindwing is prolonged into a “ straight long conspicuous black bar.”

The forms and names to be discussed are:—

interjecta, Hb. (1808-18), *Saml. Noct.*, 107.

ab. *rufa*, Tutt (1892), *Brit. Noct.*, 91.

ssp. *caliginosa*, Schwrd. (1918), *Verh. z.-b. Gess. Wien* (279).

a Southern race (1918), *l.c.*

Of these Tutt dealt with (1) Hübner's type as “ very dull reddish brown ” *interjecta*. (2) ab. *rufa*, the “ bright red ” form.

ssp. *caliginosa*, Schwrd., *Verh. Ges. Wien*, LXVIII (279) (1918).

FIGS.—*l.c.*

ORIG. DESCIP.—“ Dark red-brown forewing with yellow suffusion, sometimes almost orange yellow hindwing with broad black marginal band and strongly developed, dark basal rays.” N.W. Germany, Holland, Belgium, N. France, and England.

The figure (b. and w.) is that of the form predominant in England.

The author gives a figure of a specimen from near Fiume in which the forewing is said to be bright brown, bright yellow hindwing with narrower black marginal band, and says that the black basal rays are either obsolescent or quite absent. This is a rare form in Great Britain, but is the dominant form in the southern area of the species. He does not name this form.

There seems confusion. Hübner's type, figure 107, presumably from a northern (area) specimen is the form, which Schwrd. describes under the name *caliginosa*. Thus it would appear that the British form (from literature) is ssp. *caliginosa*.

Thus we get:—

(1) Hübner's “ very dull reddish brown, almost greyish,” by Tutt, a form rarely met with in Britain.

(2) The figure in Hübner (another copy), which is our “ rusty brown inclining to brick red,” Newman. Both being called *interjecta*.

(3) The dark red-brown form of Schwrd., which he names *caliginosa*, and which appears to be the form which we find in this country generally and in the northern area of the distribution of the species.

(4) The “ bright brown, with narrow bordered hindwing,” occurring in the southern area of its occurrence, and unnamed so far.

(5) The “ bright red ” form *rufa*, Tutt.

Triphaena, Ochs. & Tr. (1816-25). Most authors. [*Agrotis*, Ochs. & Treit. (1816-25), Stdgr., Barr., Splr., Culot]. *janthina*, Schiff. (1775), not *ianthina*.

Tutt gave Esper (1786) as the original describer. This was not so, for on turning to Esper, *Schm. Abbild.*, IV, 150, I find Schiff. (1775)

and five other previous authors given as references. Three in error under the name *domiduca*, Hüfn. (= *fimbria*). Knoch, *Beitr.*, II, 63: Göze, *Ent. Beitr.*, III (3), 35: Fuessl., *Arch.*, III, 1, pl. 16, 1 (1791). This figure is a form of *janthina* although called *domiduca*, Hüfn. [= *fimbria*]. The dark base of the hindwing, and the size, etc., are not characters of *fimbria*.

janthina, Schiff., *Verz.*, 78 (1775).

ORIG. DESCRIP.—“ A violet-blue brown marked (‘ grey-spotted ’) owl-moth. With yellow black-margined hindwings. A small crest on the abdomen, divided transversely into tufts.”

Borkhausen, *Naturg.*, 109, quotes the descriptions of Fab., *Mant.*, II, 152, of De Villers, *Ent. Linn.*, II, 278, neither of which refer to the yellow hindwings. He also describes a *Noctua janthe*, *l.c.*, 111, but on p. 809 acknowledges his error. He recognises Esper's *domiduca* as *janthina*, and also the *domiduca* of Knoch as *janthina*.

Illig., *Neu. Ausgab. Verz.*, I, 249 (1801), accepts Borkhausen's statements, and refers to Brahm, *Ins. Kal.*, II (1), 213, and to Panz., *Faun. Germ.*, XLII, 23.

Borkhausen, *l.c.*, gave a full description of the species. It was called *fimbria-minor* by De Villers, *Ent. Linn.*, II, 278; *l.c.*, IV, 403 (correction to *janthina*).

Tutt, *Brit. Noct.*, II, 91 (1892): Barrett, *Lep. Br. Is.*, IV, 10, pl. 133, 1 (1897): Stdgr., *Cat.*, III ed., 135 (1901): Hamp., *Lep. Phal.*, IV, 627 (1903): Splr., *Schm. Eur.*, I, 143, pl. 32, 7 (1903): South, *M.B.I.*, I, 234, pl. 116, 3 (1907): Warr.-Seitz, *Pal. Lep. Noct.*, III, 63, pl. 15a (1909): Culot, *N. et G.*, I (1), 30, pl. III, 14-15 (1909): Corti-Drdt.-Seitz, *Pal. Noct. Supp.*, III, 90 (1933).

Esper, pl. 104 (25), figs. 4, 5, gives two good figures, of which the latter is an aberration with the colour of the hindwing a very pale yellow, the base is a grey black.

Ernst. & Engr., *Pap. d'Eur.*, VII, 38, figs. 433 c, e (1790), are very good illustrations.

Fuessl., *Archives. Ins.*, pl. 16, figs. 1-5, gives excellent figures as *domiduca*.

Newm., *Brit. Moths*, 338 (1869), has a good b. and w. fig.

Splr., *Schm. Eur.*, I, pl. 32, 7, has a good figure.

Barr., *Lep. Br. Is.*, IV, pl. 138 (1897), has three good figures: 1a has colour generally light with absence of stigmata: 1b has stigmata strongly marked in white, with other whitish marking.

Hb., *Samml.*, 100 (1802), has a very good figure indeed.

Godt., *Hist. Nat.*, pl. LIX, 6 (1824), gives an excellent figure, but without the violet flush and with a very wide margin to the hindwings, intensely black.

Freyer, *Neu. Beitr.*, III, 262, has a good figure, but the stigmata are rather crude.

Wood, *Ind. Ent.*, 116 (1833), has a good figure.

Culot, *N. et G.*, I (1), pl. III, 14, 15 (1909), gives two excellent figures, the latter ab. *obscura*.

Panz., *Fn. German.* XLII, 23, gives a figure with more violet flush than usual.

South, *M.B.I.*, I, plt. 116, 3, gives a figure with only moderately wide black border to the hindwing.

Warr.-Seitz, fig., plt. 15a, is not bright enough to represent our average British, "inclining to brick-red" forewings.

Of the Variation Barrett writes:—"Not a very variable species, though in some individuals the forewings lose the purple tinge and become reddish-brown or even reddish drab, or on the other hand become very dark purple-brown; occasionally the two stigmata are much more distinctly marked with ashy white."

Barrett's plt. 138, figs. 1 and 1b, both have stigmata strongly marked with white which colour had run over on to the costal area.

Specimens with slight or very slight white partial surround of the stigmata are in most collections, and in some examples this surround is yellow.

Barrett's fig. 1a, plt. 138, is an unusually light-banded form, there being at least half a dozen light bands or transverse wide lines in addition to the partially light sub-basal area. There was an example in Sydney Webb's collection.

Gregson speaks of "straw-coloured" hindwings in one bred example "he has seen."

The Names and Forms to be considered are:—

janthina, Schiff. (1775), *Verz.*, 78.

domiduca, Hüfn. (1766), *Berl. Mag.*, III, 404.

ab. *rufa*, Tutt (1892), *Brit. Noct.*, 91.

ab. *latimarginata*, Rüb. (1900), *Ent. Nacht.*, 204.

ab. *flavomaculata*, Splr. (1903), *Schm. Eur.*, I, 143, plt. 32, 7.

ab. *obscura*, Culot (1909), *N. et G.*, I (1), 30, plt. III, 14-15.

v. *algirica*, Obthr. (1919), *Lép. comp.*, XVI, 102, plt. CCCCXIII, 4087.

f. *intermedia*, Roth. (1922), *Nov. Zool.*, XXVII, 35.

ab. *purpurascens*, Harsn. (1937), *Scott. Nat.*

ab. *peacocki*, Harsn. (1937), *l.c.*

ab. *subrosea*, Harsn. (1937), *l.c.*

ab. *plusioides*, Harsn. (1937), *l.c.*

ab. *virgata*, Harsn. (1937), *l.c.*

f. *ronansis*, Harsn. (1937), *l.c.*

Tutt dealt with (1) the purplish-brown type form and (2) *rufa*, the red-brown form.

Culot, *l.c.*, 30, remarks on the indefinite difference between ab. *obscura* and ab. *latimarginata*. "With a considerable number of examples in some localities it is difficult to draw a line of distinction."

ab. *latimarginata*, Rüb., *Ent. Nacht.*, 204 (1900).

ORIG. DESCRIP.—"They are generally somewhat smaller than specimens of the typical form, such as figured in Hoffmann's work, "Gross-Schm. Eur.," 1894, plt. 32, f. The forewings are darker and the stigmata sharper marked. The hindwings above and below deeper yellow, the black marginal band much broader and on the upper side runs on the costa as well as on the inner margin to the black basal area, so that on the upper side only a spot of yellow shows in the middle of the wing. The fringes of the hindwing are in most specimens blackish at the apex, more apparent than is the case in most specimens of the type form. On

the under side of the forewing the inner portion is intense black, and the outer marginal darker yellow, in many examples red-brown. The abdomen darker on the upper side and deeper yellow below." Harz.

Hamps., *Cat. Lep. Ph.*, IV, 627 (1903), says, "Smaller and darker and with broader terminal band to hindwing."

ab. *flavomaculata*, Splr., *Schm. Eur.*, I, 143 (1903).

ORIG. DESCRIP.—"In which the yellow of the hindwing shows as a round spot."

ab. *obscura*, Culot, *Noct. et G.*, I (1), 30 (1909).

FIG.—*l.c.*, plt. III, fig. 15.

ORIG. DESCRIP.—"An aberration remarkable for the size of the black band and the amplitude of the wings." Bdv. coll.

var. *algirica*, Obthr., *Lép. comp.*, XVI, 102, plt. CCCXCIII, 4087 (1918).

ORIG. DESCRIP.—"Differs from the normal form by the restriction of the black marginal band of the hindwings, the increase and strength of the yellow colour of the same wings, and the larger size." Algeria.

f. *intermedia*, Roth., *Nov. Zool.*, XXVII, 35 (1922).

ORIG. DESCRIP.—Intermediate between *janthina* and sub-sp. *algirica*. "In size and marking of forewings similar to ab. *rufa*, Tutt, but the hindwings have a much narrower black border, though not quite so narrow as in *algirica*."

var. *peacocki*, W. H. Harr., *Scott. Nat.* (1937).

ORIG. DESCRIP.—"Although black and blackish forms of *T. comes* are distributed very generally in North and West Scotland, melanic varieties of *T. janthina* have not hitherto been reported. However blackish insects not so extreme as those belonging to the allied species, were captured at various points on Raasay. In these examples the thorax and abdomen are black above whilst the upper wings have a blackish ground colour. This, nevertheless, exhibits the usual grey irrorations and markings observed in the more abundant red and purplish specimens. The variety is named *peacocki* after my friend, Prof. A. D. Peacock. It ought to be found well-scattered over the Scottish Highlands and Islands." (cf. *obscura*, Culot, I, 30, plt. 3.)

var. *purpurascens*, W. H. Harr., *Scott. Nat.* (1937).

ORIG. DESCRIP.—"Contrary to the indications of his knowledge that the greenish insect was the type of Esper, Tutt persisted in regarding the purplish form as such. Clearly such a position is untenable, and in view of the abundance of purplish varieties, the name *purpurascens* is suggested for them. They may be taken throughout the British Isles, including South Rona, Raasay and Scalpay, wherever the species occurs."

var. *virgata*, W. H. Harr., *Scott. Nat.* (1937).

ORIG. DESCRIP.—"Median area exhibiting a black band; on all the islands."

var. *ronensis*, W. H. Harr., *Scott. Nat.* (1937).

ORIG. DESCRIP.—“ In this variety the space between the submarginal and the outer lines, except for the reddish costal blotch, is filled in with grey. It was collected in all the islands, but more frequently in Rona—hence its name.”

var. *subrosea*, W. H. Harr., *Scott. Nat.* (1937).

ORIG. DESCRIP.—“ This insect presents a really magnificent appearance when fresh. It possesses a ground colour of a pinkish grey, sprinkled with blackish scales. The outer line is distinct while the space between it and the usual position of the central shade stands out as a darkish band, slightly suffused with rosy scales. The orbicular and reniform are both obsolete, but the submarginal line and the dull red costal patch are normal. The veins, especially vein 1 and those of the cell, tend to be outlined in black. The hindwings are normal. This form is scarce in Raasay.”

var. *plusioides*, W. H. Harr., *Scott. Nat.*

ORIG. DESCRIP.—“ In this insect the orbicular and reniform are well marked and filled in, except where the latter merges into the costal grey suffusion. Its general appearance recalls that of many British *Plusias*, from which fact the name is derived. Taken in the Inverarsch area of Raasay.”

THE GENUS TRIPHAENA.

These six British species until a generation ago were placed together in one genus. Then it was considered that there was evidence of a difference between two groups of the species and we find Hampson dividing them between *Triphaena* and *Agrotis* and Warren-Seitz between *Rhyacia* and *Triphaena*. But in the *Mitt. Münch. Ent. Gesell.*, XVIII, 53 (1928), Corti discussed this problem and pointed out that the reasons for this separation could not be substantiated and again placed the three species, which had been removed, in the genus *Triphaena*.

Agrotis, Ochs. & Treit. (1816-25), *Stdgr. Splr. Culot.* [*Triphaena*, Ochs. & Treit. (1816-25). Most authors. *Amphipyra*, Ochs. & Treit. (1816-25), H.-S.] *fimbria*, L. (1767) = *domiduca*, Hufn. (1767) = *fimbriata*, Schreber (1759).

Tutt did not bring forward two names used for this insect previous to the *fimbria* of Linné, although he had copies of works with the references in his library (one of these books lies before me now).

First we have the

domiduca, Hufn., *Berlin Mag.*, III, 404 (1767).

ORIG. DESCRIP.—In the later half of the year. “ The storm-hood (cowl). With alternate pale and dark brown, slightly developed transverse bands, the hindwings orange-yellow, with a broad black margin.”

Rottemburg in *Naturf.*, IX, 135 (1776), in the early half of the year, criticised and added to Hufnagel; he wrote “ Olive-green upper-wing and much broader dark indigo blue band on the lower-wing.” Plt. I, fig. 3, is a very good coloured figure.

Then we have

fimbriata, Schreber, *Novae species Insectorum*, 13 (1759).

FIG.—*l.c.*, fig. 9.

ORIG. DESCRIP.—“*Alis superioribus virente carneis, inferioribus fulvis; fascia nigra marginali. Habitat Haliae in der Heide, in Betula.*” A fleshy green form of our *fimbria*. This is doubtless the original description, but was overlooked when the time basis of the commencement of the binomial nomenclature was changed from the XII^{ed.} of the *Systema Naturae* of Linn., 1767, to the 1758 edition X. Splr., *Schm. Eur.* (Corrigenda), I, 352 (1908), has noted that *fimbriata* was the priority name. Fabricius (*Sys. Ent.*, 603, 1775) refers to Schreber's *Ins.*, fig. 9, for *fimbria*.

Tutt, *Brit. Noctuae*, II, 92 (1892): Barr., *Lep. Br. Is.*, IV, 7, plt. 137, 2 (1897): Stdgr., *Cat. III^{ed.}*, 135 (1901): Hamps., *Lep. Phal.*, IV, 626 (1901): Splr., *Schm. Eur.*, I, 144, plt. 32, 14 (1903): South, *Moths Br. Is.*, I, 233, plt. 116 (1907): Warr.-Seitz, *Pal. Noct.*, III, 63, plt. 14i (1909): Culot, *N. et. G.*, I (1), 81, plt. IV, f. 1-3 (1909).

Ernst & Engr., *Pap. d'Eur.*, VII, figs. 432 (1791), has 5 very good varied figures, but not one of them is of the light typical figure described by Gn. 432c is a very dark black green; 432i is dark mahogany colour with the elbowed and marginal lines very white, enclosing a dull brown area.

Fab., *Ent. Syst.*, III (2), 57 (1794), refers to the figure in *Naturfor.*, IX, plt. I, fig. 3, as representing *solani*. He dealt with *fimbria* proper on p. 59.

Panzer, *Fn. Germ.*, Heft. XII, 17-18 (1793), gives 2 figures: 17 dull mahogany brown with very pale yellow hindwings; 18 generally reddish-ochre in colour of forewings, the hindwings about the normal yellow colour.

Harris, *Eng. Ins.*, plt. V, fig. 2 (1782), gives a picture of a very dark blackish brown specimen (yellow brown in his description).

Hübner, *Samml.*, gives 3 excellent figures: 102 is a beautiful pale green; 551 is a very rich mahogany or reddish brown; 552 is dark green of various shades. The markings in all three are quite characteristic. 102 and 552 are said by Gn. to be the *solani*, Fab.

Godart, *Hist. Nat.*, plt. 60, 1-2 (1824), has good figures. 1 is pale and 2 is deep brown with a tinge of dull green; this latter he says is the *solani*, Fab.

Wood, *Ind. Ent.*, fig. 114 (1833), gives a good figure of the typical form.

Freyer, *Neu. Beitr.*, IV, 161, plt. 381 (1842), gives a good figure of the green form.

Gn., *Noct.*, V, 318, considers the type to be the form in which the forewings are of a clear, pale, nankin colour, with a very faint brown median band and markings, the stigmata hardly present (not figured by Hb.).

Newman, *Brit. Moths*, 339 (1869), gives 3 b. and w. very good figures. Barrett has 4 very good figures but not of the very extreme light or dark, plt. 137, IV. The species is so variable that it is almost impossible to match a specimen with a figure.

One feature in Barrett is not brought out and that is that the lighter examples have a very clear orange discal area in the hindwings, while the very dark examples almost invariably have dark (black) scales scattered in a somewhat darker orange area and the thick hairs seem to be darker. The submarginal area in the forewing of three of Barrett's figures is more contracted than in most specimens; usually this area is of considerable breadth.

Splr., *Schm. Eur.*, plt. 32, 14, gives two figures. A dull mahogany brown female, and a light somewhat olive shaded male.

South, *Moths Br. Is.*, I, 233, plt. 116 (1907), gives 4 good figures, but not one of the light form considered typical.

Warr.-Stz., *Pal. Noct.*, III, 63 (1909), gives 4 figs.: 14h is Tutt's *brunnea-virescens*, badly executed as there is no representation of *virescens* in it. 14i (1) is the pale nankin coloured type form. (2) is the *rufa*, Tutt, and (3) the dark olive green *solani*, Fb. They are well executed figures. He gave *domiduca*, Hufn. as a synonym.

Culot, *N. et G.*, I (1), 31, plt. 4 (1909), gives 3 excellent figures: (1) is the typical light form, (2) is the mahogany form, (3) is the dark green shades form. Typical, ab. *rufa*, ab. *solani* respectively.

The Names and Forms to be considered are:—

fimbriata, Schreber (1759), *Novae species Ins.*, 13, f. 9.

domiduca, Hufn. (1767), *Berlin Mag.*, III, 404.

fimbria, L. (1767). *Sys. Nat.* XIIed., 842.

ab. *parthenius*, Bergstr. (1780), *Schrift. Berl. Gesell. Naturf. Freunde*, I, 297.

ab. *solani*, Fb. (1787), *Mant.*, II, 150.

ab. *rufa*, Tutt (1892), *Brit. Noct.*, II, 92.

ab. *brunnea*, Tutt (1892), *l.c.*

ab. *virescens*, Tutt (1892), *l.c.*

ab. *brunnea-virescens*, Tutt (1892), *l.c.*

ab. *nigricans*, Busse (1925), *Zeit. des öst. Ent. Verein.*, X, 50.

ab. *obscura*, Lenz. (1927), *Osth. Schm. Sudbay.*, II (2), 234.

ab. *variegata*, Lenz. (1927), *l.c.*

ab. *iago*, Cath., *Am. de Pap.* (1929), IV, 287.

Tutt dealt with (1) the *fimbria*, L., (2) the *solani*, Fb., dark green, (3) the reddish ochreous *rufa*, (4) the pale green *virescens*, (5) the mahogany brown *brunnea*, and (6) the *brunnea-virescens* red-brown tinted green.

Of the Variation Barrett says:—

“There is considerable variation in colour in this species. The yellow-brown or yellow-drab forms are by far the most common, some of these are almost unicolorous, others shaded and banded with warmer colour, as stated. The olive-green specimens vary much in intensity of colour, and some of them have the broad darker band before the second line very dark and rich, with a strongly contrasting whitish-green band beyond it. In the red-brown forms the same degrees in intensity of colour occur, and there are intermediates in which appear shades of green or drab along with the red-brown colour; and others with the whole space from the base to the second line very dark red-brown.”

He reports specimens "With the forewings of the deepest olive green approaching olive-black, and with the dark shades still blacker."

Another "Of a rich tawny or purple-red, having the reniform stigma black, and very dark red-brown bands."

Another "in which the yellow portion of the hindwing is shaded with black."

And another "having a slender black line in the yellow surface just inside, and parallel with the inner edge of the broad black band of the same wings."

Out of a series before me of more than a hundred specimens there are no two alike in their particular featuring.

There seems so much instability of marking that practically every example is a form, which fact has no doubt prevented additions to the nomenclature except on very broad general lines.

ab. *parthenius*, Bergstrasser, *Schrift. Berlin Gesell. Naturf. Freunde*, I, 297 (1780).

FIG.—*l.c.*, pl. 3, figs. 1-3.

ORIG. DESCRIP.—"Somewhat of the natural history of *fimbria*, L." "Anticis griseo-fusco viridique undatis, binisque in disco maculis, altera reniformi; posticis aurantiacis, fascia nigra submarginati et latiore." This refers to a grey-green form of *fimbria*.

ab. *nigrescens*, Busse, *Zeit. des öst. Ent. Ver.*, X (1925), p. 50.

ORIG. DESCRIP.—"The olive green of the forewing has become very dark and in the most extreme example is very nearly black. The marking towards the basal area can here and there be seen through the dark colour. These include the margins of the orbicular and reniform stigmata, the outer transverse line and the wavy line. The two pale areas of the costa are mostly present; in the two darkest specimens only a mere remnant. The band of the hindwing is normal; the orange yellow is suffused with blackish, passing into a clay yellow colour. This is the same tone of colour as in Zöllner's figure of ab. *melanos*, *Iris*, XX, pl. II." 9 examples were bred from eggs laid by a normal female in Brunswick.

ab. *variegata*, Lenz., *Osth. Schm. Sudbay.*, II (2), 234 (1927).

FIG.—*l.c.*, pl. XIII, fig. 1.

ORIG. DESCRIP.—"With whitish marginal area, dark discal area and very dark reniform stigma."

ab. *obscura*, Lenz., *Osth. Schm. Sudbay.*, II (2), 234 (1927).

FIG.—*l.c.*, pl. XIII, fig. 3.

ORIG. DESCRIP.—"Dark forms in various colours."

ab. *iago*, Cath., *Am. de Pap.* (1929), IV, 287.

ORIG. DESCRIP.—"(*solani*, F6, form olive-green f.w.) with the colour of the hind-wings and the abdomen replaced by a coffee-brown tint."

Triphaena, Ochs. (1816-25) most authors, [*Agrotis*, Ochs. (1816-25) Stdgr. Hamps. Splr. Culot: *Rhyacia*, Hb. (1822) Warr.-Stz.], *subsequa*, S.V. (1775) Hb. (1802) = *orbona*, Hufn. (1767).

Later and more recent opinion is, that the *orbona*, Hufn. was the species with the black apical dot or dots, although no mention of it was made in the short diagnosis of the original description.

The similarity of the two species now represented by the names *orbona*, Hufn. and *comes*, Hb. was so considerable that the early authors confused them as one, e.g. Bork., more particularly as they both occupied the same area of distribution. The pre-apical costal black dot always present in this species was overlooked, and was not mentioned in the early descriptions of the two species; Hufnagel, the author of the name *orbona*, made no remark as to the existence of this apical dot (or double dot). Tutt followed the custom of his time and called it *subsequa*, Schiff. & Hb. and leaves the species at that.

Series of these two species can readily be separated. Generally the former are brighter in all ways. The black markings, band of hindwing, discoidal crescent of hindwing, the yellow of hindwing are bright, strong and definite in opposition to the same features in the latter which are dull, fuzzy and weak in definition. Even the very dark forms of the latter species fall under the term indefinite in marking for the most part.

The issue of the 3rd edition of the *Catalog* by Staudinger in 1901 revised the nomenclature and identified this species as the *orbona*, Hufn. and the commoner species as the *comes*, Hb. confirming his own action in the previous edition of 1871, which Tutt had rejected (*Brit. Noct.*, II. 93).

This was accepted by South in his *Moths of the Br. Is.* (1907) but rejected by Warr.-Seitz, *Pal. Noct.*, III, 42, pl. 9c, who name this species the *subsequa*, Schiff. and treat the *orbona*, Hufn. as the species we have come to call *comes*, Hb. A complete inversion of the references of these two species.

In the subsequent revision of Seitz we find Corti-Draudt-Seitz, *Pal. Noct. Supp.*, III, 90 (1934) reverse the determinations of Warr.-Seitz in the main volume (III, 42). The name *orbona*, Hufn. is that of the typical form. In place of *demarginata*, Schultz, *non-marginata* of Luc. is added. Other forms are *attenuata*, Warren; *nigra*, Tutt; *robusta*, Turati; *nigra*, Piesz.; *olivacea*, Trti.; *subsequa*, Schiff.; *consequa*, Hb.; *sarmata*, Ramb. No further figure of this species is given.

All this seems very confusing still.

orbona, Hufn., *Berlin Mag.*, III, 304 (1767).

ORIG. DESCRIP.—“Forewing red-brown with reniform brown spot. The lower wings orange-yellow with a black margin, and black discoidal.”

Rott. in *Naturforsch.*, IX, 125 (1776) redescribed it, “The mourning band.” “Never larger than *Phalaena brassicae*. Possibly the ♂ of *Ph. pronuba*.” (It will be remembered that *pronuba* has a black apical spot.) He says that the forewings have the same markings as *pronuba* (thus implying the apical spot).

Göze, *Beitr.*, III (3), 191 and 215 (1781) recognised two species, *orbona*, Hufn., Rott., de Geer, and *subsequa*, Schiff. respectively.

Bork., *Naturg.*, IV, 102 (1792) mixes the two species under the name *subsequa*, Schiff.

Treit., *Schmet. Eur.*, V (1), 258, 254 (1825) under the names *subsequa*, Hb. and *comes*, Hb. respectively, but under *comes*, he placed *orbona*, Hufn.

Vieweg., *Tab. Verz.*, II, 95 (1790), first united *subsequa*, Schiff. with *orbona*, Hufn.

Schiff., *Verz.*, 79 (1775) named a species *N. subsequa*, which, in the new edition of the *Verz.* by Illiger in 1801 (I, 250), was identified as the *orbona* of Fab. *Ent. Sys.*, III (2), 57; the *subsequa* of Bork. *Eur. Schm.*, IV, 102; the *subsequa* of Brahm *Ins. Kal.*, II, 1, 66, 27; and the *subsequa* of Esp. *Abbild. Noct.*, 104. The Fb. reference probably refers to both *orbona* and *comes*; that of Bork. says "no black apical dot, *orbona*;" that of Brahm refers probably to both species; Esper's figures are *comes*, Hb. A very mixed identification.

Tutt, *Brit. Noct.*, II, 93 (1892): Barr., *Lep. Br. I.*, III, 20, plt. 138, 3 (1897): Stdgr., *Cat.*, IIIed., 137 (1901): Splr., *Schm. Eur.*, I, 146, plt. 32, 10 (1903): Hamp., *Lep. Phal.*, IV, 385 (1903): South, *Moths Br. Is.*, I, 231, plt. 115, 1-2 (1907): Warren-Stz., *Pal. Noct.*, III, 42, plt. 9c (1909): Culot, *N. et G.*, I (1), 33, plt. IV, 8 (1909): Corti-Drdt.-Stz., *Pal. Noct. Sup.*, III, 90 (1934).

Most authors, who give illustrations, have good figures of this species under various names.

Hüb., *Beitr.*, I (3), 32, plt. IV, Y (1788) gave a good figure of a very dark brown tinted violet specimen to which he gave the name *subsequa* (probably from Esper), but in *l.c.*, I (4), *Verbesser*, 3 renamed it *interposita* (invalid).

Hüb., *Samml.*, 106 (1802) gives an excellent figure of *orbona*, under the name *subsequa*. He had previously, *Beitr.*, I, pt. 3, 23, fig. 4, Y (1788), given a good figure under the same name. Subsequently he changed the name to *interposita* in the Corrections (of course now considered invalid).

Freyer, *Neu. Beitr.*, III, 106, plt. 269 (1839) gives an excellent figure under the name *subsequa*. He says distinguished from *comes* by the sub-apical black dot.

Barrett has two good figures, one rather light and the other darker. The apical black spots are not so clear as in most examples I have seen (III, plt. 138).

Splr., *Schm. Eur.*, I, 146, plt. 32, 19 (1903) has a very good figure as *subsequa*.

South, *M.B.I.*, I, 231, plt. 115, 1-2 (1907) has two very good figures.

Warr.-Seitz, *Pal. Noct.*, III, 42, plt. 9c, gives figures and reverses the names *subsequa* and *orbona*.

Culot, *N. et G.*, I (1), 33, plt. 4 (1909), has an excellent figure.

Of the Variation Barrett says:—Usually only very slightly variable, but in the North-east of Scotland sometimes of a darker brown or else tinged with reddish.

Barrett records a specimen with pale yellow hindwings.

The Forms and Names to be considered are:—

orbona, Hufn., *Berlin Mag.*, III, 304 (1767).

subsequa, Schiff., *Verz.* (1775).

orbona Rott., *Naturf.*, IX, 125 (1776).

ab. *subsequa*, Hb., *Beitr.*, I (3), 32, pl. IV, Y (1788): *Verbesser*, *l.c.*, I (4), 3 (1789). [*interposita*, Hb.] invalid.

subsequa, Hb., *Samml.*, 106 (1800-3).

sarmata, Ramb., *Ann. Soc. ent. Fr.*, 315 (1870-1).

ab. *non-marginata*, Luc., *Ann. Soc. ent. Fr.*, 402 (1903) [belongs to *comes*].

ab. *nigra*, Piesze, *Jarb. Wien. Ent. Ver.*, 113, pl. I, 5, XVII (1907).

[Continental forms of Tutt's British *nigra*.]

ab. *attenuata*, Warr.-Stz., *Pal. Noct.*, III, 42 (1909).

race *robusta*, Trti., *Att. Soc. Lt. Sci. Nat.*, LXIII, 72 (1924).

ab. *olivacea*, Trti., *l.c.*

Tutt dealt with the *subsequa*, Schiff. and Hb. and says "I have seen nothing worth calling a variety," *B.N.*, II, 93.

Prout, *Ent.*, XV, 221 (1915), referred to the fig. of Hb. in his *Beitr.* (1788) III, 32, pl. IV, Y, and pointed out with reserve (but I think correctly) that it was wrongly named as *subsequa*. Hübner himself, *l.c.*, IV, *Verbesser*, 3 (1789), had evidently concluded it was wrongly named and published the name *interposita* to replace it. Doubtless Hübner took his name *subsequa* from the then recently (1786 ?) published plate CIV of Esper, but subsequently finding his own figure differed materially he renamed it *interposita*. Prout argued that since the figure Y has all the characteristics of *orbona*, Hufn., apical dot, dark band, dark well emphasised discoidal and absence of the fuzziness of the markings of *comes* one is quite justified in using the name *interposita*, Hb. as that of the brown form with violet tinge of *orbona*, Hufn.

subsequa, Hb., *Beitr.*, III, 32 (1788) [renamed *interposita* by Hb.].
Fig.—*l.c.*, pl. IV, fig. Y.

ORIG. DESCRIP.—This description seems to have been overlooked by most authors. "The forewings are pale violet brown with reniform and orbicular stigma on the disc; both are dark brown encircled by very pale colour; the ground on which they stand is similarly succeeded by a dark band margined by the pale waved line. On the costa are small white spots which mark the commencement of the transverse lines, of which one runs out in the direction of and another near to the outer margin. On the outer margin stand seven black spots and the marginal area itself is brown. The lower wings are golden yellow, darkened with grey-brown in the direction of the outer and hind margins, at their middle with a black reniform spot—and towards the outer margin with a black band; the outer margin is pale golden yellow."

The colour of the figure in my copy of the *Beitr.* has so deteriorated that it cannot be compared with the above description in all details especially on the forewings. The wing shape is that of *orbona*, Hufn.

subsequa, Hb., *Samml.*, 106 (1800-3).

ORIG. DESCRIP.—Made from the figure, "Light dull red-brown, with four slightly marked transverse lines and stigmata. With white and black small spots on the costa at the origin of the lines. Two deep black

adjoined sub-apical spots. Hindwing somewhat dull yellow with black submarginal band, incurved at about the centre, narrow compared with remaining *Triphaena* species. Very slight light blackish rays from the clouded base." This is no doubt an *orbona*, Hufn.

sarmata, Rambr., *Ann. Soc. ent. Fr.*, 315 (1870-1).

ORIG. DESCRIP.—“*Alis anticis angustis, supra fusco-rufis et fusco variis, linea transversa fulgurali (external line), macula costali nigra integrae notata, et duabus vel tribus aliis costalibus albicantibus; posticis flavis, fascia postica exterius dentata, intus in medio fortiter emarginata maculae media lunata nigris, hac subtus in medio flavicanti.*”

Reference. To the *Triphaena* of Guenée (*Noct.*, I, 319, A) described as the *consequa*, Hb. “But distinguished by the black band of the hindwing being strongly hollowed out on the inside while it is not so at all in the figure cited” (*Hb.*, 105). It is represented in the figure of *subsequa* beside it on the plate (*Hb.*, 106).

“Just the same size as *subsequa* and much resembles it. Colour of the forewings above generally of a dull red more or less deep varied with brown and other paler tints and slightly whitish. Costal margin marked with three small whitish spots of which that one adjoining the toothed line is more prominent and continues more or less visible along the line, but sometimes scarcely traceable; these lines start from the costa marked by shades or little blackish spots of which that of the outer line forms a black character enclosed in an obscure shade, not separated but entire on the costa.”

“Lower wings yellow.” “The base partly invaded by a brown tint in rays, along the inner margin to join up to the outer band; discoidal black, large and well marked.”

This appears to be a description of *subsequa*, Hb. which we now call *orbona*, Hufn.

ab. *attenuata*, Warren-Seitz, *Pal. Noct.*, III, 42 (1909).

ORIG. DESCRIP.—“Has the black border of the hindwing narrow and submarginal.”

Reference. “=*subsequa*, Haw. This is renaming of Haworth's description, *Lep. Brit.*, 161 (1809), which reads:—

ORIG. DESCRIP.—“*fasciâ posticarum alarum nigrâ, parum angustiore, et minus terminali quam in illâ,*” i.e. in *orbona*.

NOTE.—The two next forms have been included under the species *orbona*, Hufn. following the action of Corti-Draudt-Seitz, *Pal. Noct. Supp.*, III, 90 (1934). Without this indication and with the excellent coloured figures of Turati before me, I should, in spite of some *orbona* characteristics, certainly have placed them with *comes* as did Turati.—Hy. J. T.

r. *robusta*, Trti., *Att. Soc. Lt. Sci. Nat.*, LXIII, 72 (1924).

FIGS.—*l.c.*, pl. III, figs. 17-20 (very good coloured figures).

ORIG. DESCRIP.—“I have before me altogether 50 examples of the old species *comes*, Hb., which it is not possible to confuse with the races from the continent of Europe. To me they represent quite a distinct race of which the more important characters are, large size, more square wings, more robust in thorax and abdomen. Moreover, the yellow of

the hindwing has a decided tendency to orange. The lunule, which is nearly always present on the wings, is either absent or only very slightly expressed. Their black fascia is much less intense in colour, and spreads out thin to the outer margin of the wing." *Cirenaica*.

ab. *olivacea*, Trti., *Att. Soc. It. Sci. Nat.*, LXIII, 72 (1924).

FIG.—*l.c.*, 18.

ORIG. DESCRIPT.—"The new race also shows aberrations similar to those of the species both in colour and in the stigmata."

"Moreover, there occurs another form with greenish tinge, in fact olivaceous, which resembles certain forms of *T. fimbria*, to which I give the name *olivacea*."

Triphaena, Ochs. & Treit. (1816-25) most authors. [*Agrotis*, Ochs. & Treit. (1816-25) Stdgr., Splr., Culot: *Rhyacia*, Hb. (1822) Warr.-Stz.] *orbona*, Hufn. = *comes*, Hb.

The name *orbona*, Hufn. is invalid as it is used for the previous species.

Tutt, *Brit. Noct.*, II, 93 (1892): Barr., *Lep. Br. Is.*, IV, 17, pl. 139 (1897): Stdgr., *Cat.*, IIIed., 137 (1901): Hamp., *Lep. Phal.*, IV, 386 (1903): Splr., *Schm. Eur.*, I, 146, pl. XXXII, 20 (1905): South, *Moths Brit. I.*, I, 230, pl. CXV, 7-8 (1907): Warr.-Stz., *Pal. Noct.*, III, 42, pl., 9c, d, e (1909): Culot, *Noct. et Geom.*, I (1), 33, pl. IV, figs. 5-15 (1910): Corti-Drdt.-Stz., *Pal. Noct. Sup.*, III, 90 (1934).

Hüb., *Samml.*, f. 105 (1802) is a very dark *comes* form but not *curtisi*; very dark brown, so dark as to make all marking obsolescent. The hind-wing band is intense black. It is labelled *consequa*, i.e. *orbona*, Hufn. Hb., *l.c.*, 521 (1809-13) is a large specimen somewhat light red brown with clear markings labelled *comes*. Hb., *l.c.*, 680-1 (1818-22) is a light sandy brown specimen with clear marking but without the discal crescent in the hind wing; it is called *connuba*. The fore-wing is too pointed and the hind-wing band is distinctly that of *comes* and not *pronuba*. It is certainly a *comes* form. The figures are all very good.

Esper, *Abbild.*, IV, pl. CIV, 1-3 (1786) gives three very fair figures of different forms under the name *subsequa*, Schiff.

Ernst. & Engr., *Pap. d'Europe*, VII, 45, figs. 435a-g (1790) give seven figures, which are identified by Werneberg, *Beitr.*, II, 116 (1864) as a, d, e = *orbona*, Hufn. and b, c, f, g = *comes*, Hb. They are good average forms, the *comes* distinctively larger and somewhat duller.

Bork., *Naturg.*, IV, 102 (1792), under the name *subsequa*, Schiff., deals with *comes* but mixes the two species. He expressly says that the black spot near the apex, as in *pronuba*, with which he compares his species, is wanting.

Haw., *Lep. Brit.*, 161 (1809) describes an aberration with very narrow black band to the hind-wings under the name *subsequa*, Hb. which is an error. It is no doubt *comes*.

Treit., *Schm. Eur.*, V (1), 254 (1825) mixes the references.

Gott., *Hist. Nat.*, V, 156, pl. LIX, 2-4 (1825) gives three good figures of plain Continental forms, all with too much emphasis of the black band and no suggestion of the fuzziness generally present.

Stephens, *Ill.*, II, 106 (1829) deals with it under the name *orbona*.

Curtis, *Br. Ent.*, 348 (1831) gives a very pretty figure of a *comes* form which he labels *consequa*, Hb., 105, which it is not, as is readily seen by comparison of the two figures.

Freyer, *Neu. Beitr.*, III, p. 105, pl. 268 (1839) gives an excellent figure of a lightish grey-brown form.

Gn., *Hist. Nat.*, V, 319 (1852) treats it under the name *orbona*, Rott. but says it is the *comes*, Hb. and the *subsequa*, Esp.

Clark (& Tutt), *Ent.*, XXII, 145-7, pl. VI, 1-12 (1889) has 12 excellent figures of the various forms of this species, all from Forres, Scotland.

Meyr., *Handb.*, 100 (1896) placed *comes* in the genus *Agrotis*, but in the *Revised Hbk.*, p. 106 (1928) in *Graphiphora*, Ochs. close to *triangulum* and *xanthographa*.

Barr., *Lep. Brit. Is.*, IV, 17, pl. 139, gives 10 figs. (1897) under the species name *orbona*. 1a has a nice uniform light brick red ground with indications of the usual markings: 1b has a grey ground somewhat mottled: 1c has a very black brown ground with a light postdiscal band, two red brown stigmata, discal portion of hind-wing suffused dark, and very black submarginal band: 1d somewhat similar but the costal half lighter and redder including the surrounds of the two stigmata and upper portions of the transverse lines: 1e slightly darker than 1a in ground but with markings developed in a lighter shade, and the dark suffused hind-wing: 1f is of very dark ground with marking developed in a light fawn colour: 1h a somewhat mottled form.

Staudinger, *Cat.*, 137 (1901) places *subsequa*, Hb., *Beitr. to orbona*, Hufn. also *consequa*, Curtis; *adsequa*, Tr.; *prosequa*, Tr.; *curtisii*, Newman, and *subsequa*, Esper to *comes*; but the *consequa*, Hb., 105, he places to *orbona*, Hufn.

Hamp., *Lep. Phal.*, IV, 386 (1903) places *comes* in his omnibus genus *Agrotis*.

Splr., *Schm. Eur.*, I, 146, pl. XXXII, 20 (1905) gives a good figure of a very plain form under the name *orbona*, Hufn.

South, *Moth. Br. Is.*, I, 230, pl. CXV, 4-5, 7-8 (1907). The four figures are very good; fig. 7 is a distinctly red form and the *curtisii* is quite characteristic.

Warr.-Stz., *Pal. Noct.*, III, 42, pl. 9c, d, e (1909) use *orbona*, Hufn. for *comes*. They gave the name *attenuata* to the *subsequa*, Haw. (with the narrow black band on the hind-wing) and *conjuncta* to the *subsequa*, Curt. (with the stigmata joined); also they named a form from Cyprus as ab. *fumida*. There are seven good figures: *adsequa* 2, *prosequa*, *orbona* (*comes*), *rufescens*, *curtisii*, and *fumida*.

Culot, *Noct. et Geom.*, I (1), 33, pl. IV, figs. 9-15 (1910). All these seven figures are quite good and show the main characteristic forms except that the *curtisii* is of too uniform a coloration. The variation in this species being so excessive the author refrains from giving names to his figures.

Corti-Draudt-Seitz, *Pal. Noct. Supp.*, III, 90 (1934) say *subsequa*, Esp. (nec Schiff.) is a synonym: "to be added as synonyms *pronuba*-

minor, Vill., *orbona*, Fb. (nec Hubn.). Further, the following forms should be classified here: *adsequa*, Tr., *prosequa*, Tr., and *bergensis*, Splr., which in Vol. III were incorrectly placed with *orbona*. On the other hand *consequa*, Hb. and *sarmata*, Ramb. should be inserted under *orbona*."

Of the Variation Barrett says:—"Variation in this species appears to be local rather than climatal and somewhat arbitrary in its distribution. In the southern districts it has ground colour yellow-drab, yellow-brown, reddish-drab or greyish-drab; markings rather in the direction of their obliteration than otherwise, so that some individuals exhibit a lovely smooth creamy brown appearance almost devoid of markings. This creamy colour seems to be rather restricted to the south, but the general range of colouring as described appears to prevail throughout the United Kingdom, the markings becoming a little more pronounced in the north; but more decidedly so in the Orkneys, where both orbicular and reniform stigmata are distinctly dark brown, and the sub-terminal dark stripe of the fore-wings very conspicuous.

In North Wales there is a tendency in the direction of grey-brown colouring with the markings still indistinct; and in the North of Ireland to a warm reddish ground colour, as also in the case of Arran and the Scilly Isles, but so far as the British Isles are concerned the most interesting forms are found in the North-east of Scotland, especially in Morayshire. These take a very different range of ground colour—though accompanied by plenty of typical specimens and intermediate forms—deep claret-red, red-black, brown-black, deep rich red-brown, rosy-brown, dark liver-colour, or purplish drab; the two stigmata sometimes of the same colour, with slender yellow margins, often blacker with the margins yellow, or white; in some of these the transverse lines are pale and there is a marbling of yellowish over the surface: in others every line and every incidental curved streak or dot is accentuated or duplicated, or on the other hand, the whole dark or red surface is smooth and glossy, with little indication of the transverse lines. With this there is often in the hind-wings a suffusion over the yellow surface of smoky-black, till in some instances most of the yellow of the middle area is so beclouded as to become nearly black. This darkening extends only in a very small degree to the cilia."

"These remarkable dark forms, though common in North-east Scotland, are not confined to that district. These dark forms are usually smaller in size than typical specimens."

Barrett records specimens with:—

1. Whitish yellow hind-wings.
2. **Black marginal band of the hind-wing broken.**
3. Hind-wings very pale yellow, with central lunule obsolete.
4. Pale straw hind-wings with brown nervures and the black band almost colourless.
5. Smooth unicolorous chocolate black fore-wings. Orkney.
6. Intense red black fore-wings. Orkney.
7. Almost brick-red. N. of Ireland, Arran, and Scilly Isles.
8. Rich black-brown with chocolate markings. Hebrides.

Dr E. A. Cockayne writes me:—"Comes seems to me most difficult

to classify. So many of the colour forms shade off into one another. Half of one brood I had were almost unicolorous of a curious yellowish red with yellow around the stigmata. I cannot describe the colour. The other half were rich red with yellow around stigmata. None of either colour had more than a mere trace of the usual markings. I bred a *curtisii* with the ground colour of fore-wings faded in appearance, and the ground of hind-wings straw coloured, the black band of a grey colour. I have a specimen of ab. *non-marginata*, Luc. = *de-marginata*, Schultz. taken by Massey at Wallasey, the only British one I have seen."

The Names and Forms to be considered are:—

- orbona*, Hufn. (1767) *Berl. Mag.*, III, 304 [not comes].
orbona, Fb. (1787) *Mant.*, II, 150 (nec Hufn.) [invalid for comes].
subsequa, Esp. (1787-8) *Schm. Abbild.*, IV, 147, plt. 104, f. 2-3 (nec Schiff.) [invalid].
consequa, Hb. (1788) *Beitr.*, I (3), plt. IV, Y = *orbona*, Hufn.
pronuba-minor, de Vill. (1789), de Vill, *Linn. Ent.*, II, 279 [a possible name].
interposita, Hb. (1788), Hb. *Beitr.*, I (4), after p. 32, "Verbess." [invalid].
melanozonias, Gmel. (1790), *Linn. Sys. Nat.*, IV, 2544 [a possible name].
f. *consequa*, Hb. (1802), *Samml. Noct.*, 105 [invalid].
comes, Hb. (1809-13), *Samml. Noct.*, 521
ab. *subsequa*, Haw. (1809), *Lep. Brit.*, 161 [invalid]. Refers to an ab. with very narrow border.
connuba, Hb. (1818-22), *l.c.*, 680-1.
f. *adsequa*, Tr. (1816-25), *Schm.*, V (1), 256.
f. *prosequa*, Tr. (1816-25), *l.c.*, V (1), 254.
f. *consequa*, Curt. (1831), *Brit. Ent.*, VIII, 348 (nec Hb.) [wrong identification with Hb. 105. Curtis suggests a var. of Hb. 106].
f. *curtisii*, Newm. (1870), "Insect Hunter's Year Book" (*Ent.*) = *rufescens*, Tutt (teste Prout).
ab. *pallescens*, Ckrll. (1887), *Ent.*, XX, 240 and *l.c.*, xxii, 4 (1889).
f. *curtisii*, Clark (& Tutt) (1889), *Ent.*, XXII, 4, plt. VI (invalid name) = *clarki*, Prout.
ab. *pallida*, Tutt (1892), *Brit. Noct.*, II, 96.
ab. *grisea*, Tutt (1892), *l.c.*, 96.
ab. *rufo-grisea*, Tutt (1892), *l.c.*, 96.
ab. *ochrea*, Tutt (1892), *l.c.*, 97.
ab. *rufo-ochrea*, Tutt (1892), *l.c.*, 97.
ab. *virescens*, Tutt (1892), *l.c.*, 97.
ab. *rufescens*, Tutt (1892), *l.c.*, 97 = *curtisii*, Newm. (teste Prout).
ab. *rufa*, Tutt (1892), *l.c.*, 97.
ab. *nigrescens*, Tutt (1892), *l.c.*, 98.
ab. *rufo-nigrescens*, Tutt (1892), *l.c.*, 98 (replaced by *curtisii*, Newm., teste Prout).
ab. *nigra*, Tutt (1892), *l.c.*, 98.
ab. *virgata*, Tutt (1892), *l.c.*, 99.
ssp. *bergensis*, Spr. Schn. (1901), *Berg. Mus. Aarborg.*, 155, f. 2.
ab. *non-marginata*, Luc., *Ann. Soc. ent. Fr.* (1903), 402.

- f. *clarki*, Prout (1903), *Ent. Rec.*, XV, 222 [*l.c.*, XII, plt. VI, figs. C1, C2 (1900)] (= *curtisii*, Clark & Tutt).
 ab. *demarginata*, Schultz (1907), *Ent. Zts.*, XXI, 246, fig. = *non-marginata*, Luc.
 ab. *conjuncta*, Warr.-Stz. (1909), *Pal. Noct.*, III, 42.
 ab. *fumida*, Warr.-Stz. (1909), *l.c.*, plt. 9e.
 ab. *gredleri*, Htg. (1924), *Ent. Rund.*, XLI, 45.
 f. *corsatra*, Schaw. (1926), *Iris*, XL, 150.
 ab. *lineata*, Harrison (1937), *Scott. Nat.*, p. 171.

The analysis of the forms diagnosed by Tutt, *Br. Noct.*, II, 96 (1892), was as follows, with the subsequent revision made by L. B. Prout, *Ent. Rec.*, XV, 221-2 (1905), added in [].

1. Pale grey = var. *adsequa*, Tr.
- 1a. Pale grey, tinted with red = v. *pallida*, Tutt.
2. Dark stone grey = var. *grisea*, Tutt.
- 2a. Dark grey, tinted with red = sub-var. *rufo-grisea*, Tutt.
3. Dark blackish grey = v. *consequa*, Hb. [purple or violet grey, not blackish = *interposita*, Hb.] This cannot stand as it is *orbona*, Hufn.
4. Pale ochreous = v. *ochrea*, Tutt.
- 4a. Pale ochreous, tinted with red = sub-var. *rufo-ochrea*, Tutt.
- 4b. Pale ochreous, tinted with green = sub-var. *virescens*, Tutt.
5. Pale red = *rufescens*, Tutt.
- 5a. Bright dark red = v. *rufa*, Tutt. [h.w. not infuscated.]
- 5b. Reddish brown = v. *orbona*, Hufn. [delete and substitute] [b. Reddish brown, variegated with darker = ab. *comes*, Hb.].
6. Brown with red costa = v. *curtisii*, Newm. [del.] [7. Deep red more or less sprinkled with black, both f. and h. wings = *curtisii*, Clark and Tutt, nec Newm. = *clarki*, Prout].
 [8. Dark dull brown, hardly tinged with reddish excepting narrowly on the costa = ab. *curtisii*, Newm.]
7. = [9]. Black = v. *nigrescens*, Tutt.
- 7a. Black with red costa = sub-var. *rufo-nigrescens*, Tutt. [9a. ditto = *nigra*, Tutt].

Additional to above analysis:

1. Without lunules on h.w. = v. *connuba*, Hb.
2. With narrow border to h.w. = v. *subsequa*, Haw.
3. With contiguous stigmata = *subsequa*, Curt.
4. Reddish brown variated with darker = *prosequa*, Tr. [delete and substitute] [becomes new [6] above].

Appendix, *B.N.*, II, 172, var. *pallescens*, Ckll., "The hindwings creamy white," *Ent.*, XX, 240, and XXII, 4 (1889).

pronuba-minor, de Vill., *Linn. Ent.*, II, 279 (1789).

ORIG. DESCRIP.—"Alis incumbentibus griseis." "Similis omnino noct. *pronuba*, sed minor. Alae inferiores ut superiores subtus; species igitur diversa."

This is assumed to refer to *comes*.

consequa, Hb., *Samml.*, 105 (1802).

ORIG. DESCRIP.—(Made from the figure). "Deep, dark, purplish brown, with very slightly apparent markings. Costal origins of the

four transverse lines, not white, but bluish (under a glass). Wings somewhat larger and wider than in fig. 106, *subsequa*. The usual lighter marginal band can be traced. The hindwings pale orange yellow with intensely black marginal band wider and more uniform than in *subsequa*, and an intensely black discoidal crescent. Faint blackish rays come from the base, a broad one along the inner margin reaches the marginal band." The general shape of wing of this is quite different to that of *orbona* (*subsequa*, Hb.) which has the costa and inner margin nearly parallel. This must be a *comes* form.

comes, Hb., *Samml.*, 521 (1809-13).

ORIG. DESCRIP.—(Made from the figure). "A bold broad-winged insect of a general reddish-brown colour, most of the marking of the same colour but darker in tint; the reniform conspicuous from the light slender ring surround being in contrast with the darker interior. The submarginal is a widish darker band, the marginal a thin light line between two dark lines adjoining. Between the elbowed line and the submarginal band lies a row of darkish dots. The first (basal) and second lines start on the costa with white dashes. The orbicular is irregular in shape and scarcely perceptible. The hind-wing is very ample, and of a deepish orange yellow, the marginal black band is of rather below medium width. The discoidal is of irregular crescentic shape and rather narrow. Blackish streaks run below the costa from the base to the costal end of the black marginal band of hindwing."

ssp. *bergensis*, Spr.-Schnr., *Berg. Mus. Aarborg*. (1901), 155.

FIG.—*l.c.*, 2.

ORIG. DESCRIP.—"Sordide griseo fusca, abdomine dilutiore; alis anticis concoloribus maculis ordinariis strigisque fere obsoletis, alis-posticis pallide flavis, fascia lata lunulaque nigris ut in forma typica, subtus striga tenui undulata infra fasciam ornatis."

"The figure (coloured) somewhat resembles the Scottish form generally known as *curtisii*, in being dark and generally suffused, but wants the beautiful red brown of the *curtisii*, and the colour of the forewing is not so uniform."

ab. *clarki*, Prout, *Ent. Rec.*, XXV, 222 (1903).

FIG.—*l.c.*, XXII, pl. vi, figs. C1, C2.

ORIG. DESCRIP.—"Deep red, more or less sprinkled with black, both on fore and hindwings." = *curtisii* of Clark and Tutt nec Newm.

ab. *nonmarginata*, Lucas, *Ann. Soc. ent. Fr.* (1903), 402.

"Alis posterioribus margine nigro fere nullo." Auzay, Vendée, France.

"The forewings almost unicolorous, the hindwings almost uniformly yellow," i.e., almost the exact opposite to the var. *curtisii*, having only a blackish sinuous, very fine line, slightly expanded at its two extremities. Central lunule scarcely indicated. Underside agrees exactly with the upper." Corti & Draudt in *Supp. to Seitz, Pal. Noct.*, III, 90, place this to *orbona* and not to *comes*, with ab. *demarginata*, Schultz, *Ent. Zt.*, XXI, 246 (1907), as a synonym, without comment.

Prout, in *Ent. Rec.*, XV, 221 (1905), said: "The oldest valid name which I know for this species is *melanozonias*, Gmel., *Linn. Syst. Nat.*,

I, iv, 2544 (1790). The diagnosis is not first rate, but I do not think my determination is open to any possible doubt, especially when taken in conjunction with the fact that Zschack, in the *Mus. Lesk.*, places it next to *pronuba*, and gives it as European."

melanozonias, Gmel., *Linn. Syst. Nat.*, IV, 2544 (1790).

ORIG. DESCRIP.—"Ph. (Noctua) alis griseis ex luteo brunneis; posterioribus pallide flavis; disco macula transversa fasciaque submarginali nigra." *Mus. N.G. Lesk.*, p. 100, 297 (1788).

This reference has apparently been overlooked by all our continental authorities.

ab. *demarginata*, Schultz, *Ent. Zeit.*, XXI, 246 (1908).

ORIG. DESCRIP.—"They are distinguished by the absence of the broad black marginal band on the hindwings, which is almost wholly obsolescent, only the inner margin itself is alone represented by a marginal line of blackish grey scales. Almost unicolorous forewings."

ab. *conjuncta*, Warr.-Stz., *Pal. Noct.*, III, 42 (1909).

ORIG. DESCRIP.—"Burnt brown in colour, with the stigmata conjoined, and the veins paled." = *subsequa*, Curt. (nec Schiff.) = var. C. Guen.

ab. *fumida*, Warr.-Stz., *Pal. Noct.*, III, 42 (1909).

FIG.—*l.c.*, plt. 9e. The figure shows the lines rather conspicuous and edged by black, and the forewings are not yellow grey but dark, approaching *curtisii*.

ORIG. DESCRIP.—"From Cyprus: has a dark fuscous forewing tinged with grey; the lines and edges of stigmata grey; the fringe wholly fuscous; hindwing wholly smoky orange; underside with no red tinge; the forewing dull yellow grey, the hindwing greyish yellow."

ab. *gredleri*, Hartig., *Ent. Rund.*, XLI, 45 (1924).

ORIG. DESCRIP.—"I have met with a striking *subsequa* form with complete black centered orbicular and reniform stigmata on the forewings upperside and pale yellow hindwings." S. Tyrol.

f. *corsatra*, Schaw., *Iris*, XL, 150 (1926).

ORIG. DESCRIP.—After mentioning the forms *nigra*, *nigrescens* and *curtisii* the author suggests that his captures in the mountains of Corsica, which have the general characteristics of these forms, are really a mountain form, since in a hundred or so specimens from Austria before him, not one showed this character. In Seitz Draudt says "Uniformly deep black, with silky gloss and bluish grey sheen, only the surrounds of stigmata and the post-median line are indicated in a lighter shade."

var. *lineata*, W. H. Harr., *Scott. Nat.* (1937), 171.

ORIG. DESCRIP.—"Entirely black, except for clearly marked outer and submarginal lines; a few bred from Raasay ova." (cf. *nigra*, Tutt, II, 98.)

Triphaena (1816-25), Barrett and most writers, Corti, Drdt., Stz. [*Agrotis* (1816-25), Stdgr., Hamps., Meyr. (1), Culot: *Graphiphora*,

Ochs. (1816), Meyr. (2): *Rhyacia*, Hb. (1822), Warr., Stz.] *pronuba*, L. (1758).

Tutt, *Brit. Noct.*, II, 99 (1892): Barr. *Lep. Br. Is.*, IV, 25, plt. 140 (1897): Stdgr., *Cat.*, IIIed., 137 (1901): Splr., *Schm. Eur.*, I, 145, plt. 32, 16 (1903): Hamp., *Lep. Phal.*, IV, 337 (1903): South, *M.B.I.*, I, 232, plt. 115 (1907): Warr.-Seitz, *Pal. Noct.*, III, 42, plt. IXe (1909): Culot, *N. et G.*, I (i), 32, plt. IV, 4-5 (1910): Corti-Drdt.-Stz., *Pal. Noct. Supp.*, III, 90 (1934).

This species is discussed, and described by all the old authors and those, whose works are illustrated, figure it more or less satisfactorily for the form before them, e.g., Mad. Merian, Albin, Frisch, Reaumur, Ammiral, Wilkes, Schaeffer, De Geer, etc.

Ernst. & Engr., *Pap. d'Eur.*, VII, 40, f. 434 (1792), give 9 figs., 6 upper and 3 undersides. Three have varied markings and three have nearly uniform ground colour with sparse marking. One has almost white lower wings with dull black hind marginal band. The figures are quite good.

Esper, *Abbild.*, IV, 139, plt. CII (23), 1-3 (1786), illustrates 3 forms. 1, variegated; 2, unicolorous very dark red brown; 3, pale grey with strong reniform and apical spot.

Hübner, *Samml.*, 103 (1802). A large variegated strongly marked rich brown form, with much paler basal half of costa. Excellent figure.

Godt., *Hist. Nat.*, V, 151, plt. LVIII, 1-4 (1824). The colour of the hindwing is pink, no doubt a deterioration. The forewings are very good. 1, a very dark black brown; 2, a sandy brown; 3 and 4, variegated forms, with fairly emphasised markings.

Treit., *Schm. Eur.*, V (1), 265 (1825), *innuba* as a species. p. 260 *pronuba*.

Steph., *Ill.*, II, 103 (1829), treats f. *innuba* as a true species as do Ochs. & Treit., but suggests it is a "mere variety."

Wood, *Ind.*, p. 31, figs. 112, 113 (1833), two good figs., typical and *innuba*.

Freyer, *Neu. Beitr.*, III, 115 (1839), plt. 274 *pronuba*, plt. 275 *innuba* as a var. The former a varied form, dull ground, fairly expressed marking; the latter a light ochreous brown form with an emphasised reniform, the remaining marking faint. Figures good.

Guen., *Noct.*, I (v), 321 (1852) refers to A. red-brown, liver-coloured, unicolorous the *innuba*, Tr., and to B. a yellow-ochreous-testaceous colour, concolorous costa and thorax which form Tutt named *ochrea*.

Hump. & West., *Brit. Moths*, I, 108, plt. xxi, 1-3 (1846) gives 3 very good figs.

Meyr., *Hand.*, 100 (1895), places it in *Agrotis*, but in *Hand. Rev.*, 106 (1928), places it in *Graphiphora*.

Barrett gives 7 figures, *l.c.*, plt. 140. (1) A light brown form with slightly darker markings, black apical spot and dark reniform. (1a) A very variegated form with whitish lines, spots, etc., dark ground. (1b) Ditto, with yellowish lines, spots, etc. (1c) Very like *oleracea* with light surround of the stigmata. (1d) Dull red brown, row of black spots in the submargin, and other markings, except dark reniform, very faint. (1e) Small size comparable to *T. comes*. (1f) The white hoary specimen, "flour" suffusion, badly depicted.

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Hamp., *Ind. Moths*, II, 190, places it in *Agrotis* in the
Warr.-Seitz, *Pal. Noct.*, III, 42 (1909), suggests that the small form
hoegei, H.-S., with a black discal dot on the hindwing disc, and which
were all bred, may have been the result of hybridisation. They also
place the ab. *connuba*, Hb., a dwarf form with markings indistinct and
hindwings pale yellow, to this species; Tutt placed this among the
comes (*orbona*) forms. They give a fig. of *connuba*, plt. 9e, which,
although small, certainly looks to be a *pronuba* form.

Colot, *N. et G.*, I (i), 32, plt. 4, figs. 4-7 (1910), the two last called
innuba. The author says that the only agreement in the various books
he has consulted as to this form *innuba* is that the thorax and collar
are concolorous with the fore-wings.

Corti-Drdt.-Seitz, *Pal. Noct. Supp.*, III, 90 (1934) following on
the investigation of Kozantschikov [*Mitt. Münch. Ent. Ges.*, xviii, 53
(1928)] replaced the three species Warren put in *Rhyacia* back to
Triphaena.

Barrett speaks of the Variation thus:—

“Variation in this species is constant everywhere, so that no single
form can be admitted as the normal and typical. The light brown
specimens are often almost unicolorous, except that the reniform stigma
is dark; the purple equally so, but with the orbicular stigma yellow;
but often, in both, these markings are obscured or almost absent, and
only the constant sharp black wedge near the apex of the costa remains.
Occasional specimens are of a much blackened purple, or on the other
hand of a curious hoary grey-brown. In all cases the colour of the
thorax agrees with that of the forewings, but in the dark umbreous
purplish black forms there is usually an angulated black edging to the
back of the collar. Rarely individuals are met with no larger in expanse
than *T. comes* or *T. orbona*; these have also rather pale hindwings, but
are instantly recognised by their shape, and the absence of the discal
spot in the hindwings.”

He reports a specimen “of a most extraordinary whitened appear-
ance, almost as though the thorax and the face and hindwings were
obscured by a thin coat of flour.”

“Occasional specimens are of a much blackened purple.”

Others “of a curious hoary grey-brown.”

Another “has the forewings on one side dark brown, and that on
the other pale slate grey and its thorax is equally divided down the
middle into the same two shades.”

“Shetland examples are often of a bluish-grey or whitish-grey tint.”

A specimen which “has a distinct row of black spots, some of them
wedge-shaped, from the sub-apical black triangle to the dorsal margin.”

Stephens said of the Variation:—“No two specimens of this incon-
stant species are found precisely similar; it would therefore be fruitless
to attempt to describe its varieties; it may be observed that the ground
colour of the thorax and anterior wings is sometimes very pale griseous,
with a few darker markings, and the reniform (or posterior stigma)
conspicuously dark in its centre: the spaces between the stigmata and
a triangular spot between the anterior one and the base of the wing
are sometimes deep black, at others concolorous with the wings, as are
the stigmata themselves; the hinder margin is occasionally destitute of

the row of black spots, and is sometimes darker than the rest of the wing, at others lighter.''

The Names and Forms to be considered are:—

- pronuba*, L. (1758), *Sys. Nat.*, Xed., 512.
f. connuba, Hb. (1818-22), *Samml. Noct.*, 103 (see *comes*).
f. innuba, Tr. (1823), *Schm.*, V (1), 260 and 265.
ab. hoegei, H.-S. (1856), *Neu. Schm.*, 117-8.
ab. ochrea, Tutt (1892), *Brit. Noct.*, II, 99.
ab. rufa, Tutt (1892), *l.c.*
ab. brunnea, Tutt (1892), *l.c.*
ab. ochrea-brunnea, Tutt (1892), *l.c.*
ab. grisea-brunnea, Tutt (1892), *l.c.*
ab. ochrea-innuba, Tutt (1892), II, 100.
ab. grisea-lunula, Tutt (1892), *l.c.*
ab. caerulescens, Tutt (1892), *l.c.*
ab. distincta-caerulescens, Tutt (1892), *l.c.*
ab. denigrata, Schultz (1907), *Ent. Zt.*, XXI, 247.
ab. cracoviensis, Prüff. (1914), *Bull. int. Acad. Polon. Sci. B.*, 197. figs.
ab. maculina, Wihan. (1917), *Soc. Ent.*, XXXII, 4.
ab. pallida, Kais. (1919), *Münch. ent. Ges.*, IX, 13-14.
ab. nuba, Kais. (1919), *l.c.*
ab. decolorata, Trti. (1923), *Att. Soc. It. Sci. Nat.*, LXII, 49 (1923).

Tutt dealt with (1) pale greyish form almost unicolorous, *pronuba*; (2) greyish-ochreous ditto, *ochrea*; (3) reddish-ochreous ditto, *rufa*; (4) red-brown ditto, *brunnea*; (5) ditto, with ochreous costa, *ochrea-brunnea*; (6) ditto, with greyish costa, *grisea-brunnea*; (7) black brown, almost unicolorous, *innuba*; (8) ditto, with ochreous costa, *ochrea-innuba*; (9) ditto, with greyish costa, *grisea-innuba*; (10) slaty grey almost unicolorous, *caerulescens*; (11) ditto, with dark reniform and dark space between stigmata, *distincta-caerulescens*; (12) with black lunule on hindwing, *hoegei*.

ab. denigrata, Schultz, *Ent. Zt.*, XXI, 247 (1907).

ORIG. DESCRIP.—“In this form in the hindwing above as also on the underside all the black is washed out, so that the hindwing appears uniformly dark yellow.” Kufsteins.

“Al. post. unicoloribus, flavis, fascia marginali nigra nulla.”

ab. cracoviensis, Prüffer, *Bull. int. Acad. Polon. Sci. B.* (1914), p. 197, figs.

Corti-Drdt.-Stz., *Pal. Noct. Supp. say*, III, 90 (1934), “obtained through the influence of chemicals and the name is not justified.”

ab. maculina, Wihan., *Soc. Ent.*, XXXII, 4 (1917).

ORIG. DESCRIP.—“Unicolorous dark red brown. Reniform stigma small, circular, pale on a dark brown ground, united by a black longitudinal streak with the orbicular.” Tschaslau, Bohemia. Häufigkeitsgrad, 1/100.

ab. pallida, Kais., *Münch. ent. Ges.*, IX, 13-14 (1919).

FIG.—*l.c.*, fig. 2 [a very poor figure].

ORIG. DESCRIP.—“The aberration figured is a specimen of a uniform silky pale grey colour, the wings showing a light silky gloss, such as is never met with in *pronuba*. The photograph does not bring this out. But in spite of this delicate colour the specimen cannot be placed as f. *nuba*, but to the main form *pronuba*. First because the collar is light grey as the ground of the forewings, while the thorax has dark brown hair. Secondly, on the other hand in spite of the strong pallor the forewings are not somewhat washed out, but very delicate, yet clearly marked. The stigmata stand out sharply and are suffused by black atoms. The apical spots are also deep black. But the most striking are the hindwings. They are wholly dull yellow, moreover the black outer band is pale grey like the ground of the forewings and appears only as a cloud darker than the yellowish ground of the hindwings. The fringes of the hindwings are almost white.”

Under the name *innuba*, Tr., two forms are included, both of which have the collar and thorax of one and the same colour, one retains the name *innuba* and the other is here described under the name *nuba*.

f. *nuba*, Kais., *Mitt. Münch. Ges.*, IX, 13-14 (1919).

ORIG. DESCRIP.—“Forewings, collar and thorax are generally similarly chocolate-brown colour, of the stigmata, as a rule, only the paler margin stands out from the darker ground of the forewings, so that they appear clear on a dark ground, just the reverse to that of the other paler form. Hindwings as in *pronuba* form.” (The *innuba* form has the reniform mostly black-brown on a pale ground.)

ab. *decolorata*, Trti., *Att. Soc. It. Sci. Nat.*, LXII, 49 (1923).

ORIG. DESCRIP.—“A very fresh example with the posterior wings not saffron yellow but of a pale muddy yellow. The rest as in the normal example of *pronuba* had the colour of the forewing much as if it had been washed with white.” Cyrenaica.

ab. *postnigra*, n. ab.

ORIG. DESCRIP.—Dr E. A. Cockayne informs me that there is a specimen with hindwings “nearly black” in the Stephens’ collection at the Brit. Museum.

Examples are also reported in which the hindwings are of a smoky yellow. Dr Cockayne reports several examples known to him.

Graphiphora, Ochs. & Treit. (1816-25), Treit. Meyr. (2) [*Agrotis*, Ochs. & Treit. (1816-25). Many authors, Meyr. (1), Splr., Hamps.: *Rhyacia*, Hb. (1821), Stdgr., Warr., Stz., Culot: *Exarmis*, Hb. (1821), South: *Noctua*, Treit. (1825), Barr., Sth.] *augur*, Fb. (1775).

Tutt did not give the original description of *augur*, Fb., which was in the *Sys. Ent.* (1775), p. 604, and which was a very inadequate one. “Cristata, alis planis fuscis, characteribus atris.” Perhaps the common German name described it better: “Die deutsche karaktereule.” Tutt gave the fuller description of the *Ent. Sys. emend.*, III (2) (1794), p. 61 (not 66 as in *B.N.*).

Tutt, *Brit. Noct.*, II, 102 (1892): Barrett, *Lep. Br. Is.*, IV, 36, pl. 141, 3 (1897): Stdgr., *Cat.*, IIIed., 136 (1901): Hamps., *Lep. Phal.*, IV, 458 (1903): Spuler, *Schm. Eur.*, I, 144, pl. XXII, 13 (1903): South, *Moths B. I.*, I, 218, pl. 110, 6 (1907): Warr.-Stz., *Pal. Noct.*, III, 49, pl. 11g (1909): Culot, *N. et G.*, I (1), 35, pl. V, 5 (1910): Corti-Drdt.-Seitz, *Supp. Pal. Noct.*, III, 82 (1935).

Esper's fig., pl. 131, 2, *Abbild.*, IV (1786), named *omega*, is decidedly red brown in the area between the two transverse lines, which includes the stigmata. (The *augur*, Esp., plts. 87, 88, is *lunaris*, Schiff. Both Fab., *Mant.*, and Bork., *Natg.*, note this.)

Ernst. & Engr., *Pap. d'Eur.*, VI, 168, fig. 588 (1788), give two figures, which are reddish brown differing in emphasis. Marking well produced and edged with pale grey. They do not agree with the description which says blackish brown.

There is little difference, if any, between the figure of *augur* in Hüb., 148, and the two figures of *hippophäes*, Hb.-Geyer, 782-3. Perhaps the very slightest indication of reddish in the brown of the former (type form).

Treit., *Schm. Eur.*, V (1), 210 (1825), identifies both *assimulans*, Bork., and *omega*, Esp., as *augur*.

Dup., *Hist. Nat.*, VI, 31, pl. 73, 6 (1826), gives a very good figure. In his description he gives the colour as a shining brown grey, and does not speak of a red tinge. (Dup. spells it *assimilans*.)

Gn., *Noct.*, V, 325 (1852), points out that Bork. describes this species three times: 1, *augur*; 2, *omega*; 3, *assimulans*.

Smith, *Ent. Amer.*, I, 13 (1885), pointed out that *haruspica*, Grote, was structurally not *augur* and that the character of the marking and size could not be regarded.

Butler (*Tran. Ent. S.*, 382, in 1889) considered the American *haruspica*, Grote (1875), as distinct. Tutt, in *B.N.*, II, 102, says "nothing but a form of *augur*." Smith, *Agrotidae* (1896), 92, says "The structure of the sexual characters proves the distinctness of the American form beyond a doubt;" cf. *Ent. Am.*, I, 13. Also Speyer's name *grandis* (1875) applied to the American species falls before *haruspica*, Grote (1875). There are other differences besides the sexual characters.

Barrett, *l.c.*, pl. 141, gives three figures—a light male, a dark female and a soft shining pinkish-brown form with only the faintest trace of markings, known as *helvetina*.

Stdgr., *Cat.*, IIIed., 136 (1901), places *haruspica*, Grte., as a form of *augur*, larger and with less marking.

South, *Moths B. I.*, I, 218, pl. 110, 6 (1907), has a very good figure of a dark blackish brown form.

Spuler, *Schm. Eur.*, I, 144, pl. XXII, 13 (1903), has a good figure of the dark grey-brown form. He still considers *haruspica* as a form of *augur*.

Warr.-Stz., *Pal. Noct.*, III, 49 (1909), considers *omega* and *assimulans* as typical *augur*, and included only *hippophäes* and *helvetina* as forms of *augur*.

Culot, *N. et G.*, I (1), 35, pl. V, 5 (1910), has a very good figure, with a slight tinge of red and rather obscure marking.

Meyr., *Hand. Revised*, 103 (1928), says that the *helvetina*, Knaggs, was a bleached example of *augur*. Barrett seems not to agree with this for he says, p. 36, "It is of a beautiful soft shining pinkish-brown," which it could not be if bleached.

Of the Variation Barrett writes:—

"Not very variable, but slightly so in the obscuration of the blackish markings; the edges of the orbicular and claviform stigmata being often fragmentary. In northern districts, especially in the N. of Ireland, is of a more dull smoky, or blackish umbreous, with little or no indication of the reddish gloss; in the more southern portions of that country of a rather warm brown, and some individuals have the transverse lines beautifully clear. Specimens from the North of Scotland are sometimes tinged with black. Suffolk specimens frequently present a greyer shade than is usual elsewhere."

He reports specimens "having a black dash from the reniform stigma."

Another with "the stigmata large and conspicuous, with added black dashes."

Another "of a very pale brown colour with only two stigmata visible."

Another "having the two upper stigmata united by a black bar."

Another "of a beautiful, soft, shining, pinkish-brown, shading off very slightly paler behind, and with hardly the faintest indications of the usual markings. Its thorax is of the same colour, as also its head, and its hindwings whitish, tinged with grey behind."

The Forms and Names to be discussed are:—

augur, Fb. (1775), *Syst. Ent.*, 604.

f. *omega*, Esp. (1788), *Schm. Abbild.*, IV, 398, plt. 131, 2.

assimulans, Bork. (1792), *Naturg.*, IV, 209.

f. *hippophaes*, Hb.-Gyr. (1827), 782-3.

ab. *helvetina*, Knaggs (1872), *Ent. Mo. Mag.*, VIII, 182.

[*haruspica*, Grote (1875), an American species.]

ab. *abditata*, J. Joan., (1891), *Bull. Soc. ent. Fr.*, 81.

ab. *nigra*, Vorbrdt. (1911), *Schm. der Schw.*, I, 247.

ab. *conjuncta*, Schille (1924), *Pols. Pism. ent. Ver.*, III, 7.

ssp. *tobolskensis*, Shelj. (1929), *Mitt. Münch.*, XIX, 361.

ab. *bivirga*, Ceton. (1935), *Ent. Berich.*, IX, 192.

Tutt dealt with (1) the typical reddish brown form *augur*, Fb.; (2) *hippophaes*, Hb., the dark grey form; (3) ab. *helvetina*, Knaggs, a very pale form (silvery ?); 4, f. *omega*, Esp., a pale reddish form.

Bork., *Naturg.*, IV, 209 (1792), describes this species under the name *assimulans*, and in *Beitr.* of Scriba (1793), III, 272, Brahm redescribed it and figured it plt. xviii, fig. 6. If the colour of the figure can be relied on, the form was a striking aberration.

f. *assimulans*, Bork., *Naturg.*, IV, 209 (1792).

FIG.—Brahm, *Scriba's Beitr.*, III, plt. xviii, 6 (1793).

ORIG. DESCRIP.—"The forewings are yellowish grey bestrewn with very fine black specks. Two crenulate black transverse lines cross the wings and between them lie the usual stigmata. The first is a black round ring, the outer one is half-moon shaped and at the upper part is

obsolescent. Near the base is the beginning of a line which starts on the costa and disappears about the middle of the wing. Towards the hind margin there lies a dusky transverse shade, which on the outer side is defined with black, but on the inner side fades into the ground colour. Glossy." N. Germany.

Bork. goes on to distinguish his *assimulans* from the *pyrophila* of Fabricius (*Mantissa*), which it resembled somewhat.

race *abditata*, Joann., *Bull. S. ent. Fr.*, 81 (1891).

ORIG. DESCRIP.—“Forewings of a more or less brownish grey; the markings are confused, except the two usual stigmata, which are clearly marked. The reniform stigma is bordered with black, and the margin is a little more strongly coloured on the costa from the base of the wing. The other stigma is oval; it is surrounded by an unequally marked black line. Inside this border one finds another, whitish or greyish but a little clearer than the centre of the stigma. Just before the end of the wing is found a wavy band a little darker than the rest of the wing, and between the base of the wing and the oval stigma, one can trace another festooned line. The lower wing is whitish, a little smoky on the margin; the nervures are very distinct.” Caesarea (Asia Minor).

ab. *nigra*, Vorbrodtt., *Schm. Schw.*, I, 248 (1911).

ORIG. DESCRIP.—“There occur, especially on the Gotthard. quite dark almost blackish examples.”

ab. *conjuncta*, Schille, *Pols. Pism. Ent. Ver.*, III, 7 (1924).

Corti-Drdt.-Stz., *Supp. Pal. Noct.*, III, 82 (1835).

DESCRIP.—“A fairly common aberration in which a black longitudinal streak extends from the reniform stigma to the posterior transverse line.”

subsp. *tobolskensis*, Shelj., *Mitt. Munch.*, XIX, 361 (1929).

ORIG. DESCRIP.—“Size appears somewhat smaller than European specimens (expanse 36-38 mm.). Head, antennae, thorax, abdomen and all four wings much darker—black-grey. The transverse lines of the forewing upperside less distinct, the fringes of the forewings about the colour of the wings, that of the hindwings in their outer portion white (not yellow as in European examples). The underside of all the wings is much darker—blackish, but here all markings are very distinct.” Tobolsk, W. Siberia.

ab. *bivirga*, Ceton, *Ent. Bericht. Ned. Ent. Ver.*, IX, 192 (1935).

ORIG. DESCRIP.—“This example differs somewhat in marking, but the discal area of the forewing which lies between the two transverse lines is very much lighter in depth of colour so that it gives an entirely different appearance from the typical form.” Aalten, Holland.

Noctua, L.: Ochs. & Tr. (1816-25), many authors. [*Agrotis*, Ochs. & Tr. (1816-25), many authors: *Graphiphora*, Ochs. & Tr. (1816-25), Steph., H.-S., Meyr. (?): *Rhyacia*, Hb. (1822), Warr.-Stz., Drdt.-Cort.-Stz.: *Segetia*, Steph. (1829) Dup.] *castanea*, Esp. (1788).

Tutt, *Brit. Noct.*, II, 104 (1892): Barr., *Lep. Brit. I.*, IV, 100, pl. 148, 2b (1897): Stdgr., *Cat. III*ed., 137 (1901): Splr., *Schm. Eur.*, I, 143, pl. 32, 21 (1903): Hamp., *Lep. Phal.*, IV, 377 (1903): South, *M.B.I.*, 1, 219, pl. 110, 2-3 (1907): Warr.-Stz., *Pal. Noct.*, III, 39, pl. 8g (1909): Culot, *N. et G.*, I (1), 36, pl. 5, 11-12 (1910): Drdt.-Corti-Stz., *Pal. Noct. Supp.*, III, 81 (1933).

Esper, *Abbild.*, IV, ii (2), 27, pl. 187, 8-11 (1788-1795)? figures a unicolorous red form with white grey nervures on the outer margin. Werneburg, *Beitr.*, II, 52, says that the description of the four stages in no ways differs from that of *neglecta*.

Ernst. & Eng., *Pap. d'Eur.*, VII, 7, fig. 401 (1790), give 3 figs. which may represent this species. The authors say that it is difficult to describe it recognizably.

Hb., *Saml. Noct.*, fig. 160 (1800-3), is a very dark grey form, *neglecta*, with markings fairly discernable, and on the same plate another figure 163 labelled *laevis*, which is no doubt a form of *neglecta*.

Haw., *Lep. Brit.*, 207 (1809), identifies his *laevis* with the *laevis*, Hb., fig. 163, which is a form of *neglecta*.

Dup., *Hist. Nat.*, VI, 88, pl. lxxviii, 4 (1826), gives a dark black brown figure not recognizable as *neglecta*, which does not agree with his description. In his *Supp.*, IV, 87, pl. lviii (1842), remarks on its resemblance to *castanea*. His figure is a rich red form. He places it in the genus *Scgetia*.

Dup. stated, *l.c.*, that *cerasina* had been sent to him as being nearly related to *castanea*, but that his examination of the specimen led him to consider it a species on account of the cut of the wings, the marking, and the difficulty of estimating the bad figure of Esper to compare, the only agreement was in the depth of the ground colour.

Steph., *Ill.*, II, 154 (1829), describes and figures on pl. 21 a greenish or yellowish grey *neglecta* form. It may be that the plate is defective in my copy. On p. 157, *l.c.*, he describes *laevis*, Haw. as "very obscure" and thinks it is not distinct from *Caradrina alsines*.

Freyer, *Neu. Beitr.*, IV, 38, fig. 312 (1842), pictures an extreme *cerasina* form of very dark black red mahogany. In *l.c.*, II, 136, fig. 2 (1836), he pictures *neglecta* a large well-marked form of dull brown, and a dove-coloured ("ashy grey" in the text) form with a greenish tinge, very strongly marked lines, a form I have never before seen figured, or referred to. In *l.c.*, VI, 16, fig. 489, he again figures *neglecta* of a more usually known soft grey with sparse marking and refers to fig. 136 as a reddish variety.

H.-S., *Bearb.*, II, 361, figs. 131-3 (1846), gives 3 red figures as *cerasina*, 131 lighter red with clear marking, the other two very dark mahogany red with obsolescent marking in 132 and black hindwings in 133. These last two are doubtfully *castanea* as we know it. He treats *neglecta* as a separate species. The genus is *Noctua* in the text but *Graphiphora* in his Sys. List.

Spuler, *Schm. Eur.*, I, 146, pl. xxxii, 21 (1903), gives two very fair illustrations of *castanea* and *neglecta*.

On Plate 148 Barrett, *Lep. B. Is.* (1897), gives three figures. Fig. 26 is said in the text to be of a "creamy-ochreous" specimen, which it cer-

tainly is not. I should call the figure a rich ochreous possibly agreeing with Ridgway's Honey-yellow or Olive-ochreous.

South, *M.B.I.*, I, 219, pl. 110, 2-3 (1907). Fig. 2 is a greyish form, f. *neglecta*; fig. 3 is a reddish brown. The figures are good.

Warren-Seitz, *Noct.*, III, 39, pl. 8g (1909), treat *laevis*, Hb., Haw., as a synonym, and give 3 figures. 1, *cerasina* with red tints predominant; 2, *neglecta*, the red wholly lost; and 3, *castanea*, the pale grey typical form with slight reddish tint. The figures are fairly good, but too hard.

Culot, *Noct. et G.*, I (1), 36, pl. v, 11-12 (1910), gives two excellent figures, *castanea* and *neglecta*.

Corti-Drdt.-Stz., *Pal. Noct. Supp.*, III, 81 (1933), say "In the south the form ab. *neglecta*, Hb. is the more usual, in Sicily it is the more usual. In the Tyrol this grey form frequently has a brownish hue. In the S. Tyrol transition forms occur, i.e., *neglecta* with a heavy rufous tinge, which is not confined to the base. It is named *subrufa*, Dhn., and is said to differ from the English form *laevis*, Hb., Haw."

Barrett remarks of the Variation:—

"Not very variable, except that a recurrent form is of a deep rich red, or purplish red, with the same paucity of marking. The form appears to accompany the type, rarely in the Southern counties, rather more frequently in the Eastern, and of a peculiarly deep rich colour in the Breck-sand district; very much more commonly in the North, where indeed it becomes predominant. It is this variety which has been named *castanea*. It is connected with the type by intermediate gradations—pale drab at the base, toning gradually to purple red at the apex and hind margin; browner drab with the whole surface tinged with red; or grey-brown with a reddish tinge, most strongly expressed at the margins—a curious colour. A local tendency toward cream colouring is noticed in Salop. Specimens from Stornoway are very deep dark red."

He records examples "Of a most exquisite, smooth, creamy ochreous."

Another with "the R.-wing purple-red and the left buff," from Perthshire.

Another from the New Forest, "Of a pale reddish-grey, with the subterminal line sharply edged inside with dark brown."

Another, a Scottish specimen, "Pale drab colour, but with the costa red, almost rosy, and a shade of the same over the costal region."

The Names and Forms to be considered are:—

castanea, Esper (1788), *Schm. Abbild.*, IV, 2 (1), 27, pl. 187 (1788?-96?).
f. *neglecta*, Hb. (1800), *Samml.*, 160.

ab. *laevis*, Hb. (1800), *Samml.*, 163 [Haw., *Lep. Brit.*, 207 (1809)].

f. *cerasina*, Frr. (1842), *Neu. Beitr.*, IV, 38, pl. 312.

cerasina, Gn. (1852), *Noct.*, V (1), 336-7.

ab. *pallida*, Tutt (1892), *Brit. Noct.*, 105.

ab. *xanthe*, Wdfd. (1901), *E.M.M.*, XXXVII, 116.

race *syriacae*, Strnd. (Hamp.) (1915), 1903, *Arch. Naturg.*, LXXXI, A, Heft. 11: *Lep. Phal.*, IV, 377.

ab. *subrubra*, Dhn. (1925), *Ent. Zt.*, XXXIX, 122.

ab. *glaucoptera*, Schultz (1930), *Int. Ent. Zt.*, XXIV, 169.

Tutt dealt with (1) *castanea*, the unicolorous red tint with white ends of nervures. (2) *neglecta*, Hb., the dull, dark grey. (3) *laevis*, Haw., the reddish grey form. (4) *cerasina*, Freyer, reddish grey = *laevis*, Haw. (5) *cerasina*, Gn., which is the typical form = *castanea*. (6) *pallida*, Tutt, pale whitish ochreous, stigmata outlined in red. °

ab. *xanthe*, Woodfd., *Ent. Mo. Mag.*, XXXVII, 116 (1901).

ORIG. DESCRIP.—“In this form the colour of the primaries, instead of the usual red (as in *N. castanea* type), or grey (as in var. *neglecta*, Hb.), is a rich yellow, approaching more closely to that of mustard than anything else I can think of, but also somewhat similar to that of the male *Euthemonia russula*. The colour is darker towards the base, paling off a little towards the hind and inner margins. The thorax is of a darker, almost orange yellow; and the cilia of the secondaries are paler, approaching a lemon colour. The reniform stigma has the inner portion dark grey, almost black and the margin is visible, though not very distinct. The orbicular is slightly paler than the ground colour.” Market Drayton, N. Staffordshire.

ab. *syriae*, (Hamps.) Strand., *Arch. Naturg.*, LXXXI, abt. A, Heft. 11 (1915).

ORIG. DESCRIP.—Hamps., *Lep. Phal.*, IV, 377 (1903). “Hindwing white, the terminal area tinged with fuscous.” Syria.

race *subrubra*, Duhn., *Ent. Zt.*, XXXIX, 122 (1925).

ORIG. DESCRIP.—“There occur also, between these two forms, examples with strong reddish suffusion as in *neglecta* (but not only at the base), when in the Tyrol this subspecies appears pure grey with bluish tone. It cannot be put under *laevis* of Haw. (Hb.)”

ab. *glaucoptera*, Schultz, *Int. Ent. Zt.*, XXIV, 169 (1930).

ORIG. DESCRIP.—“Head, thorax, body, fore and hindwings white grey, lines and spots evenly emphasised, the lower portion of the reniform stigma darker.” Bred from larva among numerous others from Soltau, Germany.

Noctua, L. (1758) Ochs. & Treit. (1816-25) Godt. Bdv. H.-S. Gn. Smith. [*Agrotis*, Ochs. & Treit. (1816-25) Stdgr. Hamps. Splr. Cul.: *Graphiphora*, Ochs. & Treit. (1816-25) Godt. Steph. Wood. H.-S.: *Triphaena*, Hb. (1821) Meyr., 2: *Rhyacia*, Hb. (1822) Warr.-Stz.: Cort.-Drdt.] *baia*, Fb. (1787) = *baja*, Schiff. (1775).

Tutt did not give the original description of *baja*, but took that of Fab., *Mant.*, in 1787. Schiff. in the *Verz.*, 77 (1775), gave a very insufficient description of *baja*. It was one of those moths which “have a small longitudinal tuft on the thorax; on the forewings at the outer margin was a somewhat clear but a slightly more curved line than in the foregoing group [containing *Taeniocampa* species]; at the commencement of the outer margin are coalesced black spots; also in the discal area between the two transverse lines are grouped black markings.” No. 3 in this group is *N. baja*, attached to *Atropa belladonna* “with blackish spots on the outer margin.”

In the 1801 *Verz.* of Illiger & Hafeli, I, 238, we read that the first detailed description was made by Schrank in Fuessly's *Neu Magaz.*, II, 213, from the specimens in the Schiffermüllerian Collection.

Thus the name is *baja*, Schiff.

All the older authors spell it *baja* and not *baia* as Tutt, *Br. Noct.*, did, and they referred it to Schiff., *Verz.* Possibly South's List is the origin of the spelling *baia* in this country. It was *baja* in Stdgr., *Cat.*, Iled. (1871), from which South's List was an adaptation.

Tutt, *Brit. Noct.*, II, 105 (1892): Meyr., *Handb.*, 106 (1895): Barr., *Lep. Br. Is.*, IV, 85, plt. 147, 1 (1897): Stdgr., *Cat.*, Iled., 138 (1901): Hamps., *Lep. Phal.*, IV, 403 (1903): Splr., *Schm. Eur.*, I, 148, plt. 32, 27 (1905): South, *M.B.I.*, I, 220, plt. 114, 7-8 (1907): Warr.-Stz., *Pal. Noct.*, III, 44, plt. 9k (1909): Culot, *N. et. G.*, I (1), 41, plt. 6, 13 (1910): Meyr., *Revis. Hand.*, 112 (1928): Corti-Drdt.-Stz., *Pal. Noct. Sup.*, III, 77 (1933).

Ernst & Engr., *Pap. d'Eur.*, VIII, 20, f. 540 (1792), give two figures: the colour is too brilliant and the markings in too strong contrast. They refer it to the *baja* of the *Verz.*, Schiff.

Esper, *Abbild.*, IV (2), 603, plt. 167, 6 (1786?), figures *baia* under the name *tricomma*. It is very poor: the lower wings are much too yellow.

Hb., *Saml. Noct.*, f. 119 (1800-3), has the band of the forewing too brightly red, especially at its margins.

Godt., *Hist. Nat.*, V, 203, plt. LXIII, 4 (1825), gives a good figure of *baja*, but with rather prominent dark red stigmata.

Ochs. & Treit., *Schmet. Eur.*, V (1), 215 (1825), says it is the *tricomma*, Esp. and refers it to the *baja*, Schiff.

Freyer, *Beitr.*, II, 89, plt. 74 (1829), gives a good figure. He complains that the fig. of Hb. is far too variegated and bright. He does not agree that *tricomma*, Esp. is this species as the larva of that was said to feed on *Atropa belladonna*, whereas his larva fed on various low plants.

Wood, *Ind. Ent.*, f. 163 (1836), gives a rather poor figure.

Humph. & West., *Brit. Moths*, I, 130, plt. XXV, 8 (1842-3), has an impossible figure.

H.-S., *Bearb.*, II, 360 (1846), remarks on the colour of Hb., fig. 119, as "too bright and glaring."

Gn., *Noct.*, remarks that the ♀ fig. of *festiva* in *Engram.* is *baja*.

Meyr., *Hand.*, Ied. and Iled. (1895 and 1928), placed *baja* in *Triphaena*.

Dyar, *List N. Am. Lep.*, 134 (1903) accepts *smithii*, Snell. as the specific name of the *baia*-like insect of Canada and the Northern States, and makes no reference to the previous history of the species. This Warr.-Seitz ignores.

Splr., *Schm. Eur.*, I, 148, plt. 32, 27 (1905), gives a good figure of the Continental red-brown form. He calls it *baia*, and also the ab. *baiula* is with i and not j.

Hamp., *Lep. Phal.*, IV, 406 (1903), reports this species from Vancouver, Canada, U.S.A., Northern States, New York, as well as Japan and Siberia. No doubt this was based on the opinion of Smith, *The Genus Agrotis*, 1890, who strongly suspects that the American and

European are one and the same species from all the evidence then available to him. He refers to the definite statement of Speyer, *Stett. e. Zt.* (1875), as to their identity. Tutt does not refer to this.

Hamp., *l.c.*, includes *smithii*, Snell. as a form of *baja*, but Dyar in his *List N. Amer. Lep.*, 134 (1903), treats *smithii* as a good species of the genus *Noctua*, L. Of which Snellen in his description in *Tijd. f. Ent.*, XXXIX, 157 (1896) after detailed examinations says: "I hold the latter (the Amer. form) to be a very different sort; I name it *smithii*."

Warr.-Stz., *Pal. Noct.*, III, 44, plt. 9k, treat *tricomma* and *smithii* as synonyms of *baja*. The typical form and ab. *bajula* are figured, both good; *punctata* is included. The reference to Tutt's aberrations *purpurea*, *grisea* and *caerulescens* are only colour variations.

South, *M.B.I.*, I, 220, plt. 114, 7-8, ♂ and ♀. These two figures are rather too pale for average British specimens.

Culot, *Noct. et G.*, I (1), 41, plt. 6, fig. 13 (1910), gives an excellent figure of the typical form.

Draudt-Seitz, *American Noct.*, VII, 51 (1924), writes: "A(*grotis*) *baja*, F. (= *smithii*, Snell.). This species being otherwise Palaearctic (Vol. III, 44) occurs in Canada, U.S., as far as N. York in a hardly different form."

Barrett describes the Variation as follows:—

"Variation very slight, except the general range of ground colour, from reddish-brown to purple-brown, or even purplish drab; but occasional specimens are very pale in colour, or have pale transverse lines; in other instances the usually obscure markings are more distinct."

He reports a specimen "in which the sub-apical black triangle is broken up into three black wedges, from which the wing is crossed by a row of black dots."

Another "very dark red-brown with pale transverse lines," from Scotland.

The Names and Forms to be considered are:—

baja, Schiff. (1775), *Verz.*, 77.

tricomma, Esp. (1787), *Schm. Abbild.*, IV (2), 603, plt. 167.

baia, Fb. (1787), *Mant.*, II, 175.

ssp. *bajula*, Stdgr. (1881), *Stett. e. Zt.*, XLII, 411.

ab. *punctata*, Auriv. (1888), *Nord. Fjar.*, 115 [J. Mev., *Ent. Tijd.*, 71 (1884)].

ab. *purpurea*, Tutt (1892), *Brit. Noct.*, II, 105.

ab. *grisea*, Tutt (1892), *l.c.*

ab. *caerulescens*, Tutt (1892), *l.c.*

ssp. *smithii*, Snell. (1896), *Tijd.*, XXXIX, 157.

ab. *immaculata*, Hoffm. (1910), *Ent. Zts.*, XXIII, 223.

ab. *nisseni*, Roths. (1912), *Nov. Zool.*, XIX, 125.

f. *cinigera*, Filipj (1927), *Ann. Mus. Zool.*, U.R.S.S., XXVIII, 237.

Tutt dealt with (1) *baia*, Fb., the red form; (2) *tricomma*, Esp., the typical form also; (3) *purpurea* with a plum-coloured tint; (4) *grisea*, a pale greyish fuscous form; (5) *caerulescens*, with basal and costal areas with slaty tinge; (6) *bajula*, Stdgr., in the Appendix to Vol. IV, *Brit. Noct.*

ssp. bajula, Stdgr., *Stett. e. Zeit.*, XLII, 411 (1881).

ORIG. DESCRIP.—“A Noctuid (almost all ♀s) sent in great numbers from Lepsa (Central Asia), which were probably taken in the autumn at light, gives a tolerably variant impression of *baia*, to which I therefore apply the varietal name *bajula*. *A. bajula* is on the average smaller (appearing also narrower winged) especially paler (lighter) than *baia*. The freshest, cleanest examples have the forewings a pale grey brown and the hindwings dull black grey. The black spots on the outer margin so strongly emphasised in *baia*, are almost wholly absent before the apex, only very seldom are they present almost equally strong. The undersides of the wings, thorax and especially also the abdomen are not so apparently suffused red brown, but pale grey-yellow. The antennae of the ♂ and other characters are all quite the same or similar.” Tutt says in the Appendix to Vol. IV, *Brit. Noct.*, p. 117, that this form runs *grisea* very close but “always have the small apical costal streak well developed.”

Hamps., *Cat. Lep. Ph.*, IV, 404 (1903), says “Ground colour darker brown, much more suffused with grey.”

ab. punctata, (J. Mev.) Auriv., *Nord. Fjar.*, 115 (1888).

ORIG. DESCRIP.—“Transverse lines along their length with black dot-like spots on inside.” Funnen, Scandinavia.

ab. immaculata, Hoffm., *Ent. Zt.*, XXIII, 223 (1910).

ORIG. DESCRIP.—“A freshly emerged ♀ of the red form *purpurea*, Tutt, in which the black wedge-shaped spot in the apex of the forewing is quite wanting; also the rest of the marking is obsolescent.” Krieglach.

Hamps., *Cat. Lep. Ph.*, IV, 404 (1903), says “Forewings with series of black points on the lines.”

ab. nisseni, Roths., *Nov. Zool.*, XIX, 125 (1912).

ORIG. DESCRIP.—“♀. Palpi black-brown; head, antennae, and thorax pale wood-brown; abdomen pale yellowish wood-brown. Forewing wood-brown, somewhat clouded with rufous in median area; a sooty sub-basal, transverse, hair-like, convex line, a black spot beyond it, and two antemedian transverse, sooty, irregular hair-lines, the two stigmata large and somewhat faint, appearing only in outline; two postmedian, transverse, sooty hair-lines, the outer composed of dots; between the latter and the margin a transverse line of black coalescent spots. Hindwing brownish grey, fringe rosy brown. Length of forewing, 24mm.” Hab., Ain Draham, Tunisia (V. Faroult). 1 ♀.

ab. cinigera, Filip. (Alph. in lit.), *Ann. Mus. Zool. U.R.S.S.*, XXVIII, 237 (1927).

ORIG. DESCRIP.—“One ♂ from Sidemi (Jankovskij). Is distinguished from the typical form in colour, which is bluish-grey, not brownish. But the size, the marking, as well as the genitalia of the ♂ (according to the examination of Herr J. Kozancikov) agree with those of *baja*. I am not an advocate of racial determination from wholly insufficient material, but in this case I make an exception, since the Sidemi form was well-known to Alpheraky; I was never able to find the description, but I am aware that the name has got into the literature, so I must de-

cide to fix it. The form does not agree with the *coerulescens*, Tutt; this latter, which I do not know in nature, according to the description, has a bluish colour on the costal and basal part, while the specimens lying before me are wholly uniformly bluish-grey in colour. The species flies in Central Siberia in both forms at the same time, further west the form *cinigera* is completely unknown."

Corti-Drdt.-Stz., *Pal. Noct. Supp.*, III, 77 (1933), wrote of it, "The entire wing is coloured a bluish-grey in contrast to *coerulescens*, Tutt, in which only the costa and basal area are thus coloured:" plt. 11h, *cinigera*, E. Siberia, Minussinsk.

Noctua, L. (Ochs. & Treit., 1816-25). Many authors, Dup. H.-S. Barr. Sth. [*Agrotis*, Ochs. & Treit. (1816-25) Stdgr. Splr. Culot: *Graphiphora*, Ochs. & Tr. (1816-25) H.-S.: *Triphaena*, Ochs. & Tr. (1816-25) Meyr.: *Mythimna*, Ochs. & Tr. (1816-25) Hamp.: *Orthosia*, Ochs. & Tr. (1816-25) Gn.: *Cerastis*, Ochs. & Tr. (1816-25) Warr.-Stz. Corti-Drdt.-Stz.: *Rhyacia*, Hb. (1822) Corti-Drdt.-Stz.] *sobrina*, Gn. (1841-52).

Tutt (and others) put Gn. as the author of the name *sobrina* (1852). Gn., *Hist. Nat. Noct.*, V, 335, gave "Bdv. in litt." *Ind. Method.*, which was only a list. Stdgr. gives Gn., *Ann. Soc. ent. Fr.*, p. 239 (1841) *Essai Noct.* Dup. described and figured two insects under this name in 1842. Frr. figured two forms of it in 1845. H.-S. described and figured it in 1846. Gn., in 1852, only described the larva, but incidentally referred to the colour of the typical forms. In spite of the absence of descriptive detail the name *sobrina* has been accepted, with the author Gn.

Tutt, *Brit. Noct.*, II, 106 (1892): Barr., *Lep. Br. I.*, IV, 80, plt. 144, 2 (1897): Stdgr., *Cat.*, IIIed., 136 (1901): Hamps., *Lep. Phal.*, IV, 607 (1903): Splr., *Schm. Eur.*, I, 144, plt. 32, 11 (1903): South, *M. Br. I.*, I, 227, plt. 114, 6 (1907): Warr.-Stz., *Pal. Noct.*, III, 61, plt. 14c (1909): Culot, *N. et G.*, I (1), 34, plt. 5, 1-3 (1910): Corti-Drdt.-Stz., *Pal. Noct. Supp.*, II, 85 (1933).

Dup., *Hist. Nat. Supp.*, IV, 224, plt. LXIX, 5 (1842), gives two quite erroneous figures, and neither agrees with its description.

Freyer, *Neu. Beitr.*, V, 102, plt. 441, 3 (1845), described and figured under the name *mista*, a moth, which Stdgr. has identified as a form of *sobrina*, *Cat.*, IIIed., 136 (1901). It was identified by Weissenborn, who sent it to Freyer as *sobrina* and Gruner agreed with this. But Freyer himself compared it with the fig. 509 in Hübner and determined it as *mista*, Hb. He says that Boisduval considered *mista*, Hb., as an ab. of *rubricosa* in error (see *Ind. Meth.*, 1138, 1840). Freyer, *l.c.*, 122, plt. 455, 4 (1845), described and figured under the name *lapponi(c)a*, another insect which resembled *mista* and *baja*. This Stdgr. also identifies as a form of *sobrina*. These two figs. of Freyer are much alike, the former is only much darker than the latter.

H.-S., *Bearb.*, II, 360, figs. 127-9 (1846), gives good figs. of two forms, one with much darker ground than the other. He refers to *gruneri*, Tr., in *litt.* and gives a good comparative description.

Gn., *Noct.*, V, 335-6, places the form *gruneri*, Dup., from the Pyrenees, to this species. Larger and the reddish being changed to ashy white slightly rose. Hindwings pale. Thorax as forewings. Form A.

Stdgr., *Cat.*, 136 (1901), puts *mista*, Freyer, 441-3, to *sobrina* and *lapponi(c)a*, Freyer, 455, to ab. *gruneri*, Gn. (al. ant. fere tot. griseo-inspersis.).

Splr., *Schm. Eur.*, I, 144, pl. XXXII, 11 (1908), gives a good figure of the grey purple-red form.

South, *M.B.I.*, I, 227, pl. 114, 6 (1907). gives a fair figure of this grey suffused purple-brown species.

Warr.-Seitz, *Pal. Noct.*, III, 64, uses the genus *Cerastis*, Ochs. & Tr., and places *mista*, Frr. and *lapponica*, Frr. as synonyms, and only recognises *gruneri*, Gn., as a form which = *suffusa*, Tutt.

Culot, *N. et G.*, I (1), 34, pl. V, 1-3 (1910), gives three good figures, ♂ and ♀ and f. *gruneri* strongly powdered with grey.

Corti-Drdt.-Seitz, *Pal. Noct. Supp.*, III, 88 (1933), place *sobrina*, Bdv., in the genus *Cerastis*, Freyer. But they remark that it should probably be placed in the genus *Lycophotia*, Hb. They suggest that "perhaps this *confina*, Kozh. form from Minussinsk is a separate species." Differs in having the markings very finely emphasised in black, whereas in the name form the markings are indistinct.

Barrett, *l.c.*, pl. 144, fig. 2, has the subterminal line on the left forewing much too emphasised to be called "a faintly yellow cloud;" that on the right side is more correctly expressed. The general brown coloration is not a correct colour.

Barrett remarks on the Variation that it is "Extremely constant in colour and (absence of) markings."

The Names and Forms to be considered are:—

sobrina, Gn. Bdv. (1852-1841), *Hist. Nat.*, V, 335. *Ann. Soc. ent. Fr.*, 239.

f. *mista*, Frr. (1845), *Neu. Beitr.*, V, 102, pl. 441.

f. *lapponi(c)a*, Frr. (1845), *l.c.*, V, 122, pl. 455.

f. *suffusa*, Tutt (1892), *Br. Noct.*, II, 106.

f. *gruneri*, Gn. (1852), *Hist. Noct.*, V, 335.

ab. *confina*, Kozh. (1925), *Jahrb. Martjan. Minus. Mus.*, III (1), 75.

ab. **intensa**, n. ab.

Tutt dealt with (1) *sobrina*, Gn., dull reddish grey with indistinct margins (Rannoch). (2) *mista*, Freyer, more rosy red on the outer margin and centre, basal half whitish scales and along veins (Perth). (3) *gruneri*, Gn., reddish colour replaced by ashy white slightly rosy, hindwings paler. (4) *suffusa*, Tutt, dullest and least strongly marked, dull dark grey.

f. *lapponica*, Frr., *Neu. Beitr.*, V, 122 (1845) [*lapponia* in the text, *lapponica* on the plate].

FIG.—*l.c.*, 455. (Tutt says he considers this to be *castanea*.)

ORIG. DESCRIP.—"Has a similarity to *mista* and *baja*, but differs somewhat in shape. The forewings are brown-grey up to 2/3 from the base and overspread with an ashy suffusion. The marking is scarcely visible. The dark stigmata are almost gone and only traced by slight remnants. The bands are the same, of which that before the orbicular

and the next beyond the reniform go across the wings to the margins bowed towards the outer part of the wing. Between this second band and the fringes, which are coloured like the forewing, a second paler thinned out band exists. On the veins between these two lie a row of dark dots." The description and the figure do not agree. The markings, especially the transverse lines (bands), are much too emphasised instead of being practically obsolescent.

ab. *confina*, Kozh., *Jahrb. Martjan. Minus. Mus.*, III (1), 75, (1925).

DESCRIP.—Teste Drdt.-Stz., "differs from typical *sobrina* by having the transverse lines and stigmata finely and very distinctly indicated by black lines; these lines are usually indistinct." Minussinsk, *l.c.*, 85 (1933).

ab. *intensa*, n. ab.

ORIG. DESCRIP.—"An example from Aberdeenshire in the Burrows collection is without any grey suffusion and of an intensely dark brown with a slight red tinge. The colour so deep that it is only with difficulty even with a lens that any markings can be traced at all. In fact without a lens one would say a rough surfaced colour. The hindwings also partake in the dark coloration, being more smoky than any other example I have. Others from the same locality tend to approach this darkening."

Noctua, L. (Ochs. & Tr.) (1816-25) Gn. Barr. Sth.: [*Agrotis*, Ochs. & Tr. (1816-25) Stdgr. Hamp. Splr. Culot: *Graphiphora*, Ochs. & Tr. (1816-25) Meyr.: *Orthosia*, Ochs. & Tr. (1816-25): *Caradrina*, Ochs. & Tr. (1816-25) Steph. Freyer: *Eugrapha*, Hb. (1821): *Rhyacia*, Hb. (1822) Warr.-Stz.] *glareosa*, Esp.

Tutt, *Brit. Noct.*, II, 108 (1892) Append., IV, 118: Barr., *Lep. Br. I.*, IV, 32, plt. 141 (1897): Stdgr., *Cat.*, IIIed., 141 (1901): Hamp., *Lep. Phal.*, IV, 375 (1903): Splr., *Schm. Eur.*, I, 151, plt. 33, 15 (1905): South, *M.B.I.*, I, 218, plt. 110, 4 (1907): Warr.-Seitz, *Pal. Noct.*, III, 39, plt. 8f (1909): Culot, *N. et G.*, I (1), 50, plt. 8, 2 (1910).

Ernst & Engr., *Pap. d'Eur.*, give 3 very good figures of this species, VI, fig. 416 (1788).

Esper, *Abbild.*, IV (2), 387, plt. 128, 3 (1789), gives a figure of *glareosa*, with only the basal half of the forewing being of the typical light dove grey colour.

Hb., *Samml. Noct.*, f. 642 (1818-22), gave an excellent figure of the *hebraica* form. In the *Verz.*, 124 (1821), classified under the genus *Eugrapha*. In the former he wrote *hebraeica*, but in the *Verz.* he wrote *hebraica*. Warr.-Stz. adopted the first spelling.

Steph., *Ill.*, II, 159, plt. 21, 1 (1829), describes and figures (very poorly) *glareosa*. (Curtis notes that it is *hebraica*.) The figure is very poor and of a greenish yellow shade. Probably the plate has deteriorated in my copy.

Treit, *Schm. Eur.*, X (2), 79 (1835), suggests that *hebraica*, Hb., having been bred in number by Herr Hess in September, may be a second generation of *glareosa*.

Dup., *Hist. Nat.*, VI, 80, plt. LXXVII, 6 (1826), gave a rather dark dove coloured *glareosa* under the name *i-geminum*. Dup., *l.c.*, p. 75, plt. LXXVII, 3-4, gave two figures named *i-intactum* (of *hebraica*, Hb.) with the synonym *glareosa*, Esp. & Tr. But these are not *glareosa* as we know it, but probably *margaritacea*.

Freyer, *Neu. Beitr.*, III, 15, fig. 201 (1839), gave two other very good figures under the name *hebraica*, in the genus *Caradrina*. In *l.c.*, II, 146, fig. 185 (1836), he gave two figures under the name *glareosa*, and refers the first to the *i-intactum*, Hb., and the second to *kadenii*. (See fig. 186.) On comparing the two figs., 185 (2) and 186, one sees the absolute differences on both upper and undersides, and that the two figures of plt. 146 are *margaritacea*, Brk. (which Treit. called *glareosa*) (*I-intactum*, Dup.?)

H.-S., *Bearb.*, II, 199 (1846), says the figs. 642-3 Hb. *hebraica* are very good ♂ and good ♀. His figure III is of a dark rosy form given him by Keferstein, and he notes that Treit's *glareosa* is the *margaritacea*, Bork.

Gn., *Noct.*, V, 324 (1852), points out that this species was mixed by early authors with *margaritacea*, Bork., and that Duponchel had definitely separated it. He refers to the rosy tinted form as var. A.

Millière, *Icon.*, I, 234, plt. 26, 4-8 (1861) like most continental authors has an excellent figure of a dark form.

Weir, *Ent.*, XVII, 2 (1884) describes and figures a specimen in which "The ground colour of the upper wings, instead of the usual grey, is of a rich dark brown" (plt. I, fig. 1) and are lighter brown on the marginal area which runs inward to a dirty grey disc and base. Similar forms from the same place, Unst, Shetlands, were subsequently named *edda* by Stdgr., *Iris*, IV, 266 (1891). Weir does not name it.

In the *Young Naturalist*, V, 121 (1888), J. E. Robson describes a form of *glareosa* in the Gregson collection under the name *hebraicaoides*, which has a "dark cold brown colour, making the costal spots appear less distinctly defined, and the margins of the stigmata more so."

Barrett gives 3 figures on plt. 141. Fig. (1) a pale lilac-grey with the markings black, some of the submarginal area being dark brown grey without the lilac. (1a) Is a form of light brown ground colour somewhat darker on the outer and costal area. (1b) A blackish Shetland form.

Stdgr., *Cat.*, 141 (1901), places *hebraica*, Hb. and *I-geminum*, Dup. as *glareosa*, Esp., and Weir's Shetland *glareosa* as the *edda*, Stdgr., *Iris*, IV, 266 (1891).

The *edda*, Stdgr., is from Shetland as is the *suffusa*, Tutt. From the descriptions they would appear to be two forms with only a slight difference. The former is described as "dark brown black" (by Spuler as "rauch braun"), the latter as "rich dark brown; melanic." Possibly the "dark fuscous" of Meyrick covers both forms.

Spuler, *Schm. Eur.*, I, 151, plt. 33, 18 (1905), has a somewhat dark typical figure.

South, *M.B.I.*, I, 218, plt. 110, 4, gives a good figure of a dark slaty grey.

Warr.-Seitz, *Pal. Noct.*, III, plt. 8f. (1909), gives a figure dark grey on both wings and certainly not typical and far from "pearly" grey as in the text, p. 39. They treat as synonyms *decempunctata*, Vill., *heb-*

raeica, Hb. and *I-geminum*, Dup. The *suffusa*, Tutt, is put as a synonym of *edda*, Stdgr.

Culot, *N. et G.*, pl. VIII, fig. 2 (1909), has an excellent figure of a typical specimen.

Corti-Drdt.-Stz., *Pal. Noct. Supp.*, III, 63, correct the main volume in that in the *limbata*, Gouin. form the ground is bluish-grey not bluish-green.

Barrett reports on the Variation:—

“ Usually very constant in colour and markings, but subject to local or climatal variations in colour. Specimens from Ireland and the West of England are frequently tinged with a bright rosy pink beyond and below the two stigmata and especially so toward the costal margin before the apex. In Scotland the tendency is toward a deeper darker slate-grey, occasionally intensified to grey-black. This last form has been found in Perthshire, but is comparatively common in the Shetland Isles, where the species is more plentiful than in the South, and it is stated that the blackest specimens are found in those portions of the islands in which the rocks and soil are blackish, while in districts close at hand, in which the rock is of a paler colour, ordinary grey examples are found. The blacker Shetland specimens are sometimes wholly of the slate-black colour, but often have the two stigmata and the transverse lines outlined, faintly or distinctly, with whitish or yellowish, while the usual black spots are somewhat inconspicuous, or else that between the stigmata is sharply and intensely black. In these dark forms the hindwings are tinged with smoky grey, darker along the hind margin and at the apex. Intermediate specimens occur in all shades of slate grey; the pink clouding seems to be here unknown. Along with these variations in colour, alterations in shape occur, some individuals having their forewings conspicuously narrow. In Morayshire this peculiar form of the forewings is found associated with a clear pale grey colouring.” He reports a specimen with “ the forewings of a rich chocolate brown, the pale markings becoming very distinct; it also has dark hindwings.”

Others “ having the usual black spot which precedes the orbicular stigma produced into a sharp horizontal wedge, the point of which is towards the base of the wings.”

The names and forms to be considered are:—

- glareosa*, Esp. (1788), *Schm. Abbild.*, IV, 387, pl. 128, 3.
- decempunctata*, de Vill. (1789), *Linn. Sys. N.*, II, 273, pl. VI, 17.
- hebra(e)ica*, Hb. (1818-22), *Samml. Noct.*, 642.
- I-geminum*, Dup. (1826), *Hist. Nat.*, VI, 80, pl. 77, 6.
- hebraicaoides*, Greg. (1888), *Young Nat.*, 121.
- edda*, Stdgr. (1891), *Iris*, IV, 266.
- rosea*, Tutt (1892), *Brit. Noct.*, 108.
- suffusa*, Tutt (1892), *l.c.*
- limbata*, Gouin (1900), *Actes Soc. Linn. Bordeaux*, pl. IV, 5.

Tutt dealt with (1) *glareosa*, Esp., pale violet grey or pale whitish grey; (2) form *rosea*, Tutt, lilac grey tinted with rose; (3) *I-geminum*, Dup., base grey, outer half rosy; (4) f. *suffusa*, Tutt, rich dark brown, brownish black; (5) in Appendix, vol. IV, p. 118, f. *hebraicaoides*, Greg.,

dark cold brown ground colour; (6) f. *hebraica*, Hb., darker grey between the two outer transverse lines.

decempunctata, de Vill., *Linn. Entom.*, II, 273 (1789).

FIG.—plt. VI, f. 17 (plt. V in error).

ORIG. DESCRIPT.—“Clarescente griseis, punctis nigris decem.”

“Magna inter medias. Superiores alae griseae, fusco mixtae, ad basin fere 2 punctis nigris, tribus aliis inferius: alis clausis, haec decem puncta figuram trapezinam efficiunt, cajus latus superius rectum, inferius curvum. Alae inferiores infra albidae.”

This is a description of the typical form shown on the plate.

f. *edda*, Stdgr., *Iris*, IV, 266 (1891).

FIG.—*Ent.*, XVII, 2 (1884).

ORIG. DESCRIPT.—“This extremely striking form is from the Shetland Isles. The forewings are dark brown black with white transverse lines and slightly developed stigmata margined on the inner side with deep velvety black. The hindwings are, instead of white-grey, grey-black. This form is referred to shortly in the *Entomologist* (1884), 2, and there is a pretty good figure, only the hindwings are lighter than in the specimens before me.” Weir did not name the form he figured.

ab. *limbata*, Gouin, *Actes Soc. Linn. Bordeaux* (1900).

FIG.—*l.c.*, plt. IV, 5.

ORIG. DESCRIPT.—“Has the forewings with a wide black margin,” teste Gelin and Lucas, 1912.

Noctua, L. (1758), Ochs. & Treit (1816-25), Dup., Freyer, Gn., Newm., South, Barr. [*Agrotis*, Ochs. & Tr. (1816-25), Stdgr., Meyr., Splr., Hamp., Culot: *Rhyacia*, Hb. (1822), Warr.-Stz.: *Graphiphora*, Ochs. & Tr. (1816-25), Steph., Wood, Meyr.] *depuncta*, L. (1761).

Tutt, *Brit. Noct.*, II, 109 (1892): Barr., *Lep. Br. Is.*, IV, 41, plt. 142 (1897): Stdgr., *Cat.*, IIIed., 141 (1901): Hamp., *Cat. Lep. Phal.*, IV, 402 (1903): Splr., *Schm. Eur.*, I, 131, plt. 33 (1905): South, *M.B.I.*, I, 220, plt. 110, 5 (1907): Warr.-Stz., *Pal. Noct.*, III, 44, plt. 9i (1909): Culot, *N. et G.*, I (1), 49, plt. 8, 1 (1910).

Esp., *Abbild.*, IV (2), 683, plt. 117 (1789), unrecognisable as *depuncta*.

Bork., *Naturg.* (1792), IV, 528, describes an example sent him by Scriba, more fully than Linn. Treit, *Schm.*, V (1), 230, says that Bork. probably had a variety of *litura* before him in place of *depuncta*. But the words “hoary ashy-grey” suit *depuncta* rather than *litura*.

Hübner gives two figures of this species under the name *mendosa*. Fig. 120, *Samml.* (1800-3), is a reddish tinged form, which does not seem to be known now. Tutt had never seen it. Fig. 502, *l.c.* (1808-18), is a good one of our north British deep brownish ochreous form. Tutt says this is our usual form.

Godt., *Hist. Nat.*, V, 191, plt. 62, 3-4 (1824), gives two figures, 3 is too dark and 4 is too yellow with too dark hindwings. These are not at all good.

Steph., *Ill.*, II, 133 (1829), included *depuncta* on the authority of Haw., although he never saw a specimen and Haw. did not include it in his *Lep. Brit.*

Freyer, *Neu. Beitr.* (1836), II, plt. 166, gives a poor figure. The ground colour is brown grey and the veins very white, as also is the surround of the stigmata. The markings are too definite.

H.-S., *Bearb.*, II, 357 (1849), remarks on Hübner's figures: *mendosa* "120 better than 502 in outline, but the forewing is somewhat too pointed, colour quite incorrect. 502 form quite incorrect, margin of forewing much too oblique, colour too yellow, hindwing too grey." On Esper's fig., plt. 177, 3, he says "of no use."

Newman, *Brit. M.*, p. 344 (1868), gives a good bl. and w. figure.

Meyr., *Hand.* 104 (1896), genus *Agrotis*, *Revis. Hand.*, 109 (1928), genus *Graphiphora*.

South, *M. B. Is.*, I, plt. 110, f. 5, (1907), is a good figure.

Barrett, *l.c.*, plt. 142, give a good figure of the species, and another in which the usual black blotch between the stigmata is brown nearly of the ground colour, a darker submarginal band and the marginal band on hindwing wider and darker as well as the disc of the wing. The ground colour is hardly the specific tint.

Brown, *Dobr. Eur. Noct.*, 56 (1905), *pontica*, Asia Minor, darkest example in the collection.

Splr., *Schm. Eur.*, I, 151, plt. 33 (1905), gives a very good figure.

Warr.-Seitz, *Noct.*, III, 44 (1909), places *depuncta* in *Rhyacia* next to *ditrapezium* and *triangulum*, and treats the *mendosa*, Hb. as a type synonym. On plt. 9i is a good figure, perhaps too hard a brown.

Culot, *N. et. G.*, I (1), 49, plt. 7, 1 (1910), gives a very good figure of a somewhat dark form.

Of the variation Barrett says:—

"Usually but slightly variable in the tone of colour of the forewings and in the black or brown colour of the outer spots. Occasional specimens, however, are handsomer from the increased richness in the tone of reddish-brown and greater size of the markings."

Barrett records Scotch examples as "very remarkable for black clouding in the basal half of the forewings," and of N. Wales specimens "of a greyer tone of brown colour," and of another "of a smooth grey-brown with hardly a trace of markings."

The names and forms to be considered are:—

depuncta, L., *Fn. Suic.*, 321 (1761).

r. *mendosa*, Hb., *Samml. Noct.*, 120 (1800-3), 502 (1808-18).

ab. *consenescentis*, Stdgr., *Iris*, IV, 266, plt. VI (1891).

ab. *pontica*, Stdgr., *l.c.*, 267.

ab. *maddisoni*, Newm., *Proc. S. Lond. Ent. S.*, 93 (1923).

r. *meridionalis*, Dnh., *Ent. Zeits.*, XXXIX, 128 (1925).

ab. *obscura*, Clayhills, *Not. Ent.*, VI, 83 (1927).

ab. *arenoflavida*, Schaw., *Int. Ent. Zeit.*, XXVIII, 425 (1934).

Tutt was most indefinite in dealing with the typical form, (1) which Linn. described as "cinereae seu subgrisescentes" = slaty-grey. The Scandinavian examples in the Doubleday Collection were larger and in addition were tinged with a very faint reddish. (2) Forres specimens

are more ochreous slaty-grey, and very like the fig. 502, Hb., var. *mendosa*, to which they may be referred.

ab. pontica, Stdgr., *Iris*, IV, 266 (1891).

ORIG. DESCRIP.—“The forewings are reddish brown, more or less violet-grey suffused. The two black spots standing one over the other at the base are almost always run together as a transverse line; the central suffusion is as good as wholly wanting, allowing the transverse line, especially on the outside, to stand out much sharper. The hindwings of this var. *pontica* are, instead of being dark brown-grey blackish, wholly light dusky grey-white somewhat darkened on the outer portion.” Amurland and Turkestan.

ab. conseneszens, Stdgr., *Iris*, IV, 267 (1891).

ORIG. DESCRIP.—“As *ab. conseneszens* I name a constant aberration obtained in considerable number among the var. *pontica*, of which the forewings are wholly light grey, somewhat as in *glareosa*, Esp. No transition to var. *pontica* has been found and I at first considered this *ab. conseneszens* as a species differing from it. But the markings agree perfectly, only that on the light-grey forewing the dark markings stand out more prominently. The hind wings of the *ab. conseneszens* are just as light as those of the var. *pontica*.”

f. meridionalis, Danh., *Ent. Zeit.*, XXXIX, 128 (1925).

ORIG. DESCRIP.—“Characterised by a deeper grey-red general tinge. Also usually more robust, becomes more varied, especially the basal area, frequently a pale-grey-blue powdering, whereby the discal area especially becomes appreciably darker. The dark marking element mostly strong and copious.” Terlan, Klausen, Tiers, Sigmundskron. The southern form.

ab. maddisoni (*Proc. S. Lond. Ent. S.*, 1923, p. 93).

?ORIG. DESCRIP.—“A heavily marked specimen” (“with much dark brown on it.”)

Dr Cockayne has kindly furnished the following description of this form:—“Base, median area and stigmata thickly peppered with blackish brown scales; usual markings accentuated; marginal area lightly peppered with blackish scales; nervures blackened; oblique line of black hairs through tegulae.” Forres.

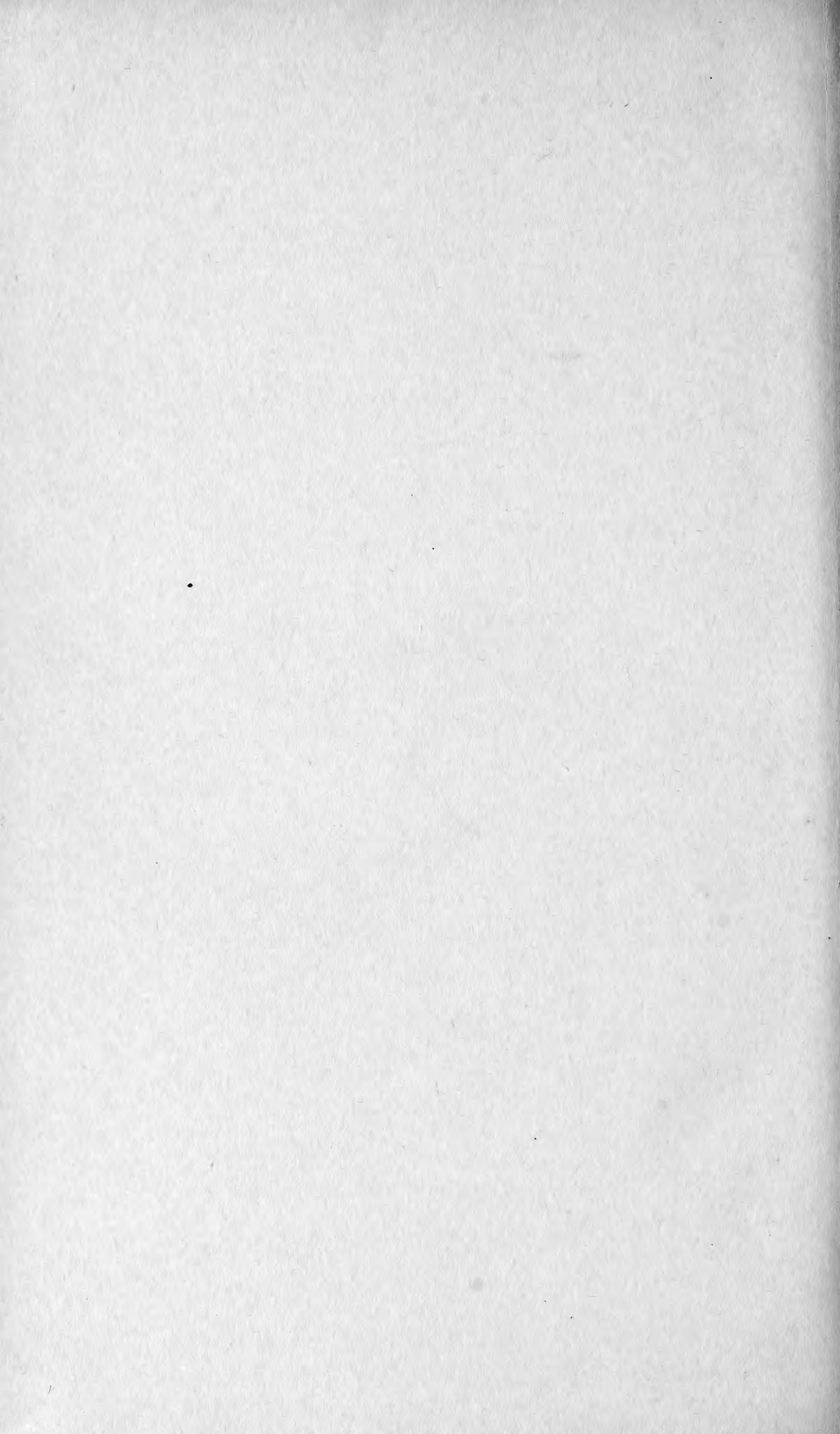
This was exhibited at the meeting of the Society on 22nd February 1923 by L. W. Newman. I cannot trace the author or the description.

ab. obscura, Clayhills, *Not. Ent.*, VII, 83 (1927).

FIG.—*l.c.*, p. 84.

ORIG. DESCRIP.—“The ground colour of the discal area is as dark as the deep black spots on the proximal transverse lines of a typical specimen. The basal area is somewhat paler as also is the marginal area, where the black veins are emphasised. The transverse lines are double and pale grey-brown. The margins of the stigmata are of the same colour but the waved line is somewhat darker. The hindwings are dark brown-grey. The underside of all the wings is decidedly darker than in the typical form.” Island of Runsala near Abo, Finland.

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