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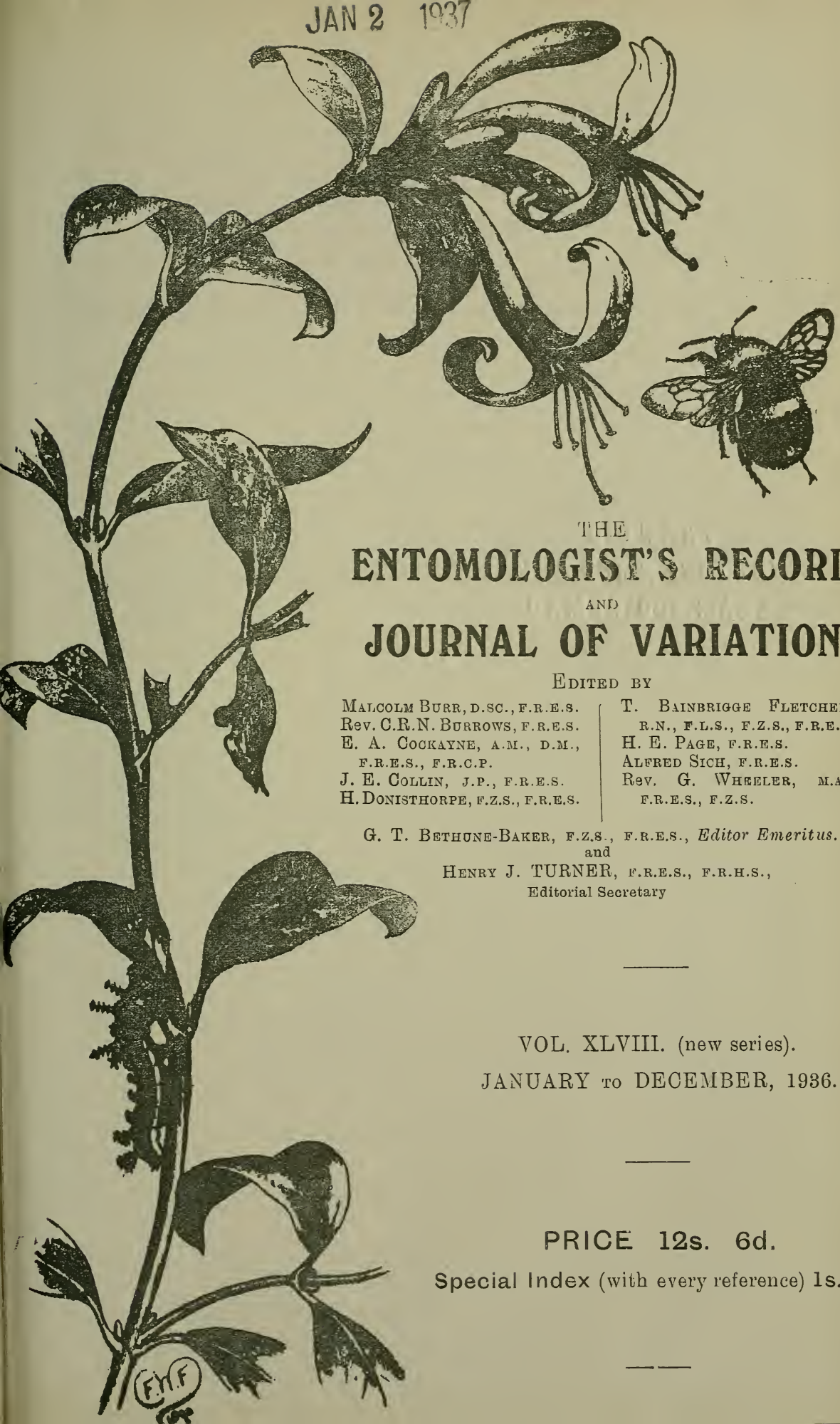

THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

VOL. XLVIII. (new series).
JANUARY TO DECEMBER, 1936.

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We have passed another successful year without any striking entomological event. Our secondary title has been kept in view throughout: "A Journal of Variation." The Supplement on British Noctuae has been a feature each issue and we have dealt with forms of Rhopalocera both of the Rhone Valley and of Macedonia. Two or three correspondents have furnished much appreciated notes on the micro-lepidoptera, while life-histories of several macro-lepidoptera, hitherto unknown, have been elucidated. Short field notes and observations have been sent and we wish our readers would keep this activity in view throughout the coming year; the duty of mutual help is progress. In the coming year we would like to see more illustrations. Already two plates are promised (one in January), and three more are being considered. The one regret of the year is that we have lost a colleague, the Rev. C. R. N. Burrows, and in him the writer has lost almost his last great personal friend.—Hy.J.T.

Vol. XLVIII.

No. 1

JANUARY, 1936

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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The Entomologist's Record
AND
JOURNAL OF VARIATION.

Vol. XLVIII. No. 1. January 15th, 1936.

The Oldest Insect on Record.

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.
(Entomological Department, British Museum, Natural History.)

On 20th September, 1921, Messrs. Phillips and Steltox sent me a small colony (or part of a colony ?) of *Stenamma westwoodi*, West., from Mount Garret Wood near New Ross, Co. Wexford, which consisted of a deälated ♀ (the Queen) some 50 ☿ ☿, and a number of large and medium sized larvae—these I fixed up in a four-chambered "Janet" observation nest. On 2nd October, 1935, the Queen died; she had therefore been in my possession in captivity for 14 years and 12 days. She had been restless for several days, wandering about away from the larvae. The last day she kept falling over, trying to climb the walls of the nest, falling on her back, and resting on her side at intervals.

The Colony had not done well for the past few months, the ☿ ☿ had died off until only three were left, and all the larvae, except two or three, had disappeared. Mr. Nixon kindly gave me a few *Stenamma* larvae from his colony, and Mr. Phillips was good enough to go and get me a number of small larvae from Mount Garret Wood, Ireland. These I introduced into my observation nest and the Queen and the 3 ☿ ☿ appeared to take great interest in them, collecting them into a heap with their own few larvae.

When the Queen was dying the ☿ ☿ appeared to "shampoo" her, and endeavoured to get her back to the larvae. Eventually she lay on her side and did not move again. When she was quite dead I mounted her on card, and killed and mounted the three ☿ ☿ also, so that they might accompany her to whatever Valhalla good ants may go to!

This ant must have been at least 16 years old and probably more. The marriage flight of this species takes place in September and October and, being fertilized in her first year, her first brood would be brought up in the spring of her second year. This would consist of a few small ☿ ☿ and a few larvae. It is certain that the colony would not have reached the size of 50 ☿ ☿ and a number of larvae before her third year. It is probable that she was 18 years old when she died and certainly over 16 years.

The next oldest insect (these records refer to adult insects only; the extended life of a larva is quite a different problem) known is a Queen of *Formica fusca* which Sir John Lubbock (Lord Avebury) says "must have been nearly 15 years old, and is therefore by far the oldest insect on record." The following is a reproduction of what he wrote [*Jour. Linn. Soc. Zool.* **20**. 133 (1888)] :—

"It may be remembered that my nests have enabled me to keep ants under observation for long periods, and that I have identified workers of *Lasius niger* and *Formica fusca* which were at least 7 years old, and 2 queens of *Formica fusca*, which have lived with me ever since December 1874. One of these queens, after ailing for some days, died on the 30th July, 1887. She must then have been more than thirteen years old. I was first afraid that the other one might be affected by the death of her companion. She lived, however, until the 8th August, 1888, when she must have been nearly 15 years old, and is, therefore, by far the oldest insect on record."

"Moreover, what is extraordinary, she continued to lay fertile eggs. This remarkable fact is most interesting from a physiological point of view. Fertilisation took place in 1874 at the latest. There has been no male in the nest since then, and, moreover, it is I believe well established, that queen ants and queen bees are fertilised once for all. Hence the spermatozoa of 1874 must have retained their life and energy for 13 years, a fact, I believe, unparallelled in physiology."

I may mention that my Queen last laid eggs in July 1935.

Other instances of comparative longevity in insects known to me are :—Janet kept a queen of *A.* (*D.*) *alienus*, Först. alive for nine years and ten months. He also kept specimens of the beetle *Claviger testaceus*, Preys., for over four years in his observation nests, and I have kept the same species for over three years. I also kept a specimen of the beetle *Amphotis marginata*, F., for two years and nine months.

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Notes on the Life-History of Agrotis ipsilon, Rott. (suffusa, Hb.).

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

All the standard works on the British Lepidoptera state that *Agrotis ipsilon* hibernates as an imago and lays its eggs in the spring. Barrett, for example, says "it has been found on the wing as early as February and eggs have been obtained from a captured specimen in March. He goes on to say that the larva feeds from April to June on low plants, and that he can find no record of a larva in the autumn or winter, and, like Newman before him, he quotes part of a note by the Rev. J. Hellins of Exeter. Hellins in the *Ent. Month Mag.* 1867-8, Vol. 4, p. 255, gives the following extract from his diary of 1862, "On 24th March, at Sallows, I captured a pair, male and female, of *suffusa*, apparently hybernated; I shut them up together in a box. By 7th April the

female had laid a number of eggs; on 30th April the larvae were hatched ; they ate lettuce and radish leaves, and became full-fed some time in the first half of July." He says the majority escaped through a hole in the bottom of the flower pot and only one moth was bred about the middle of August. I cannot trace the further quotation* from Hellins that *suffusa* hibernates in the perfect state, but does not pair until the spring. South, Scorer, and others give brief accounts, which appear to have been derived from the same source, and I can find no more recent record of the breeding of this species in England.

I have been anxious to get larvae for some years and, finding the moths very abundant on sugar at Dungeness in September, 1935, I sent seven males and ten females to Mr. C. N. Hawkins early in the month, and asked him to try to keep them alive until the spring. They were placed in a cage with perforated zinc sides and were fed on a solution of sugar sprinkled on Michaelmas daisies. On looking at the cage towards the end of the month, Mr. Hawkins found a large number of eggs laid on the outer side of the cage on the zinc. The first eggs hatched on 3rd October, and the remainder during the next three days, and the larvae, which are very small for so large a moth, were fed on *Sonchus arvensis*. For the first two instars they fed gregariously, eating all the parenchyma of one or two leaves and scarcely touching the others. The position of the leaf was immaterial; sometimes one at the top and sometimes one at the bottom was chosen.

The first ecdysis took place on 9th October, the second on the 15th, the third on the 20th, and the fourth and last on the 24th. The larvae in their fourth instar were still so small, that I felt sure they had two more instars to pass, like most Agrotids, and was surprised at the enormous increase in size, which took place at the last ecdysis. Growth throughout was very rapid. Larvae kept at a temperature of 70° to 90° F. were full grown on 28th to 31st October, and those kept at about 60° F. were full grown on 3rd to 7th November. The larval period of 25 days is remarkably short for a Noctuid.

The larvae were allowed to go down into earth four inches deep in a biscuit tin, which was kept at a temperature of about 60° F. and were left undisturbed until 29th November. The pupae were then dug up and some were already dark preparatory to emergence. They were in thick brittle cocoons, rather large for the size of the pupa, and were about three inches below the surface, not in contact either with the sides or the bottom of the tin. The pupae, very thinly chitinized and yellowish-chestnut in colour, were placed on damp flannel in glass-topped tins in a box heated to a temperature varying from 70° to 90° F., and the moths emerged from 1st to 11th December.

This showed that *ipsilon* will lay its eggs in the autumn and that the larvae can be forced with ease. An attempt was then made to find some information about its habits in other countries. Fleet-Paymaster T. Bainbrigge Fletcher said that in India, where it is often a pest, it is continuously brooded, and Dr. S. A. Neave gave me a reference to a paper by Voroniecka-Siemaszko* describing a plague of larvae, which occurred in the Lublin Government of Poland in 1928, where the climatic conditions are more like those of the British Isles. Large fields of beetroot were destroyed and in many fields the tubers of the potatoes were eaten. The damage caused was first noticed in the second half of June. The larvae observed late in July were nearly full-grown and approaching

pupation; those collected a fortnight later were in various stages of growth and included newly hatched individuals, which were on the undersides of the leaves, while the more mature ones hid in the upper layer of the soil. Under laboratory conditions the emergence of the adults from the collected pupae lasted till the end of August, but in nature the moths were on the wing as late as September and the first week of October. At the end of October the larvae burrowed into the soil to a depth of about six inches or deeper and constructed a hibernaculum. The author thinks it probable that hibernation occurs also in the adult stage, but gives no evidence for the statement.

This proves that in Poland the insect frequently passes the winter as a larva and the same is probably true of other parts of Northern Europe including the British Isles, though it is doubtful whether many survive in this country. It is unlikely that many of our September and October moths live until the spring. Though they often swarm near the coast in the autumn, records of their capture in the spring are few, and the collectors, to whom I have spoken, say either that they have never seen one or that they have only seen one on rare occasions. A male, very slightly worn, which I took at Braemar on June 27th, 1931, may have hibernated, but this is the only one I have seen so early in the year.

I think most of our moths die in the autumn after laying their eggs or without laying them at all, as those kept by Mr. Hawkins did, and that the usual stage during the winter is the larval one. I have little doubt that an occurrence such as that described by the Rev. J. Hellins is quite exceptional. It is strange that so little is known in England about this common moth, and that our books are still quoting an observation made in 1863.

*Voroniecka-Siemaszko. *Polski Pismo.* 1928. vii. 193-201.

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* [*E.M.M.* IV. 135. Nov. 1867.—T.B.-F.]

Effects of Temperature on the Development of Zerynthia rumina.

By ORAZIO QUERCI.

I. Records concerning the Development in Portugal.

(1) In the month of January, 1933, the temperature at Lisbon varied from min. .32° to max. 59°; on 3rd February it increased reaching 69° on the 5th, and then we took a male of *Zerynthia* (*Thais*) *rumina*, L.; but after the heat decreased (no lower than 60°) and until 13th March we took but a few males and a female which, from their poor condition, looked to have emerged several days before.

(2) The emergence of the *rumina* occurred from 14th March (max. 64°) to 7th April (max. 79°); however, the specimens, looking as if born on the day of their capture, were taken only when it was at least 62°.

(3) After 7th April the *rumina*, which we saw near Lisbon, were worn and the last female of that year was seen by us on 27th April.

(4) The single and worn female, which we took in February, was put into a breeding-cage with some plants of the *Aristolochia* upon which the larvae feed. For eight days the weather was fine but rather cold (max. 55°) and that *rumina* ♀ did not flutter until 24th

February (max. 56°) when she laid some eggs and died. Those eggs stayed a fortnight without hatching (max. 60°) and on 8th March (max. 63°) some eggs hatched and others dried up.

(5) The young larvae remained dormant, owing to the moderate heat for twelve days (max. 58° to 62°), and little by little died. We understood that in such a climatic condition the larvae of the *rumina* cannot live, and we expected more suitable weather to get other eggs. That was a mistake because at the beginning of April the heat increased up to 79°; many pupae were certainly formed in the country, but not in our broods, there being no big larvae.

(6) Many eggs were laid in our cages on 23rd March (59°) and they stayed for eight days at the temperature of about max. 64°, hatching on 31st March (max. 66°).

(7) The larvae of this batch grew rapidly from 3rd to 8th April (max. 79°, min. 51°), but after that date they became laggard (max. 73°) and on 19th to 21st April (max. 63°) they ceased to feed and some died.

(8) On 24th April the temperature rose to 75° and the larvae, which were still alive, started eating again, being more or less active for a week (max. 66° to 71°). A few of them were almost full grown when from 1st to 6th May the maximum was no more than 63°, and most larvae rotted. Only three larvae remained on the stems without feeding on the leaves which we set close by them. On 9th May (74°) one of these larvae turned active, ate a bit of leaf, hung up and formed the pupa on 12th May, 1933 (85°). That pupa was taken with us when we went to Tangier, Morocco, where the adult emerged on 10th May, 1934.

(9) The other two larvae of that batch turned active on 11th May, 1933 (75°), hung up on the 14th (80°) and changed with great difficulty on the 17th (89°). Those pupae turned black and died a few days after.

(10) A female of *rumina* laid at least 70 eggs on 22nd April (67°), they hatched on the 29th after the temperature had been for a week max. 75°, min. 52°.

(11) On 1st May the temperature dropped (max. 63° for six days) and all the larvae remained very small and dried up.

(12) In April of 1933 we took near Lisbon many larvae of *rumina* of different sizes. The smallest ones died after the cold weather (max. 63°) on 19th to 21st April, others rotted during the long wave of cold (max. 63°) at the beginning of May. A few of the biggest larvae resisted but only three of them pupated when the heat increased (max. 89°) in mid-May. The remaining larvae either collapsed, or formed imperfect chrysalids which died.

II. Records concerning the Development in Northern Morocco.

(13) At Tangier the temperature rose sometimes to 63° or 69° both in February and early March of 1934, and we took a few males and a female of *Zerynthia rumina*; afterwards, until the beginning of May, we caught specimens of both sexes. During that gradual emergence it was almost max. 63°.

(14) In May all the *rumina* on the wing were worn, and some of them were almost devoid of scales. We believe that there are specimens which remain hidden for several days.

(15) From February to April of 1934 we put into the cages some females which laid many eggs, hatching, in accordance with the climate, almost in the same time as at Lisbon (records 4, 6, 10).

(16) Both in March and April the larvae died quickly, being unable to feed, for lack of activity, as the temperature was rarely above 63°.

(17) On 20th April (65°) a female of *rumina* laid about 50 eggs; afterwards she was killed by the radiant heat (118°). By the end of April it was sometimes 66° or 68°, and the eggs hatched on 2nd May, but a few dried up.

(18) Besides those home-born larvae we took in the country, in May of 1934, many caterpillars of *rumina* of the most different sizes, which we reared apart. At Tangier the kind of *Aristolochia* is different from that of Lisbon, and the larvae are reddish while in Portugal they are grey.

(19) From 3rd to 24th May the climate at Tangier was a little milder than in early spring, being almost always max. 68°, min. 53°, and rarely rising to 72° or 74°. The growing larvae, which are inactive only when the temperature is below 64° (records 5, 7, 11, 12, 16), were not injured, but they grew slowly and only a few matured. As soon as the larvae matured they left the plants, cleared their intestine and stopped upon the nets of the cages, spreading a little silk around them, but after some time, as the temperature did not increase, they moved and tried to hang elsewhere. This useless work continued for a few days and those big larvae gradually became weaker, as besides the loss of silk and energy they rarely fed, and at last they became quite dormant.

(20) On 16th May (74°) we set the cages with these larvae in the sunshine (98°) and one of the larvae hung up and formed the pupa after two days (74°).

(21) On 18th May the weather was unsettled and the larvae in the sun (100°) fed actively. In the afternoon a larva hung up and pupated on 21st May (74°).

(22) From 19th to 24th May (max. 68° to 74°) the larvae stayed sometimes in the sun but none hung up and some of the dormant ones collapsed. On 25th May the thermometer marked 76° and the day following it rose up to 77°, however, the weather was sultry and many mature larvae rotted. On 27th May the heat decreased (70°) and the larvae were less active.

(23) At 7 a.m. of 28th May (74° in the shade, 97° in the sun) we made another exposure of the larvae in the light, and most of them fed actively, but two hours later the heat increased (77° in the shade, 118° in the sun) and the caterpillars became so excited that we set a shelter against the heat, and many larvae hung up. The following day was cloudy and sultry (about 70° for the whole day), and not only some big larvae rotted, but also a few of the suspended ones collapsed. We considered that the intense radiant heat had injured the whole brood, but the larvae which died were only those which had been longest in the mature stage, and would probably have never recovered. None of the other larvae were injured.

(24) Until now more than 70 of the larvae hatched at the beginning of May were dead and only two had pupated, but after 29th May the climate settled with the optimum range of pupation for the *rumina* (77° to 82° for some hours every day) and all the larvae, which had

hung up on 28th May, and had not died on the 29th, formed the pupae on the 30th, while the others grew, matured, hung up and pupated rapidly, both in the sun and in the shade. At the beginning of June 298 pupae of *rumina* were formed in our cages, and on 8th June all our larvae had pupated save one. Cleaning the cages we found 83 larvae, which had either dried or rotted, and 18 pupae looking sick, which afterwards died.

(25) Of the 50 larvae hatched at home on 2nd May (record 17) only four were still living on 3rd June (79°), and they hung up on the 6th (80°), but one pupa was formed on the 9th (79°), and the other larvae pupated incompletely and collapsed.

(26) The single larva of *rumina*, which did not pupate on 8th June (record 24), was reared by us with care and sometimes it ate a little bit, but by the end of June we could find no more *Aristolochia* and that larva died.

III. Temperature Experiments.

(27) Rearing some different species of Lepidoptera we had remarked that the pupae kept in winter in our warmed rooms produced adults after those, of the same batches, which we kept out of the window. We thought that an exposure in the cold is needful to the regular development of the pupae, and having many chrysalides of *rumina* we tried to get some out of season specimens from the effect of the cold in summer. On 15th June, 1934, we put into a refrigerator at 30° to 40° a lot of 38 pupae and at the beginning of September (78°) we took out 10 of them expecting that they should have not emerged as the temperature was still above that at which the *rumina* appear in the country, and none emerged. On 2nd October the heat decreased and we took out the other pupae which had been for three months and a half in a cold room. Those chrysalides delayed more than we expected in producing adults, and a male emerged on 17th November, a female on the 20th, and 12 other *rumina* climbed along the nets of our cages from 23rd November to 3rd December of 1934. On those days it was about max. 64°, min. 54°, that is almost the same as in March, when the *rumina* were more frequent in the country. A few of those adults were sent, by air mail, to the Museums of Natural History of Tring, London and Madrid, and to Mr. Hy. J. Turner at Cheam, and those butterflies arrived still living both to England and Spain. Of the 28 pupae, which had stayed long in cooling, 14 did not emerge at Tangier; however, one produced the adult in February of 1935 in the cabin of the steamer by which we came to Greece.

IV. General Conclusions.

(The figures in a parenthesis correspond to the records.)

Eggs.—Until the maximum temperature was below 61° the eggs of *Zerynthia rumina* did not hatch, and as soon as it was 63° some eggs hatched in a fortnight, but others dried (4). The hatching of the eggs required a shorter time if the daily quantity of heat increased (6, 15, 17), and when the maximum varied from 67° to 75° after the eggs were laid they hatched after a week and none dried up (10).

Young Larvae.—The young larvae were unable to feed, for lack of activity, and in a few days they starved upon verdant plants if after

their hatching the temperature remained below 64° for some time (5, 11, 16).

Growing Larvae.—The larvae, which met with a suitable climate after their hatching and were able to grow a little, resisted a subsequent period of cold weather, and some of them matured (7, 8, 9, 12, 19). The most resistant larvae were those almost full grown, but not yet mature. The radiant heat does not injure the growing larvae if it acts for a moderate time (23), and also in the country most larvae of *rumina* do not hide when the sun is shining. As soon as the temperature settled above max. 76° the larvae grew and matured rapidly even in the shade (24).

Mature Larvae.—The insufficiency of heat (less than 77°) prevented the mature larvae from suspending at once, and they being almost unable to feed became dormant (8, 19). In our cages only a few mature larvae resisted for long the unsuitable climate and hung up when the weather turned hot (8, 7, 12, 20, 21, 25), but most collapsed (12, 22, 23, 24). The larvae which matured when the temperature was above 86° and the vapour pressure was not high, (22, 23) hung up at once even in the shade (24).

Suspended Larvae.—Only two of about 800 larvae of *rumina*, which we have reared, formed the pupae at a temperature a little lower than that at which all the other larvae pupated in our cages (20, 21), and when that happened the vapour pressure was very low. The radiant heat hastened the end of the exhausted suspended larvae, but a moderate exposure did not injure the others (23). Above 76° the suspended larvae pupated in a short time, if they had recently matured (24); on the other hand, also at the optimum temperature, they delayed pupation for some days if they had remained long in the mature stage (8, 9, 12, 20, 21, 23, 24, 25). The most weakened larvae did not recover, even if the heat increased above the point of pupation, and they either collapsed without commencing to pupate (12, 23), or formed imperfect pupae which soon died (9, 12, 25).

Pupae.—The pupae of the *rumina* go over the winter wherever that species occurs. We have obtained the premature emergence of some pupae after the effect of the artificial cooling (27). The lowest temperature at which a few pupae produced adults was 62° (2, 13).

Imagines.—A female of *rumina*, which was already old when we took her, lived nine days in a cage (4), another female laid more than 70 eggs in about two hours (10), however, the experiments of this kind made at home cannot give support to a guess of what happens in the open country. One female laid some eggs when the maximum temperature was 56° only (4).

Control of the Fertility.—Both at Lisbon and Tangier the larvae of the *rumina* were injured neither by lack of food (24, 26), nor by parasites. None of the larvae taken in the country were affected with mites. The chrysalides long resisted the cooling (27). Only a few eggs were unable to hatch (4, 17). The most active factor controlling the abundance of the *rumina* was the mild climate, which allowed the adults to emerge and lay eggs, which hatched at low temperature (4, 6), but prevented many larvae from developing.

NOTES ON COLLECTING, etc.

Distribution of Polygonia c-album.—Mr. Craufurd (p. 131) ma bey interested to know that in "The Field" for 10th August, three specimens are recorded as having been seen in an East Hertfordshire wood within half a mile of the Essex border, which must be near Mr. Crauford's locality. I have a letter from Captain Parks, of Barlow, Essex, mentioning a specimen seen there on 14th November last, and in "The Field" of the 9th inst. is a record of 5 specimens seen in a garden on 27th September at Wandens Ambo in the same county. In the same journal for 28th September are records of a dead one found "on a window" at Eynesbury, Hunts, on 17th August, and "a very perfect specimen" on blackberries at Lawrence End, near Luton, Beds. on 7th September; all which notes go to show that this species is becoming very generally distributed in the eastern counties. But it has been scarce in Cornwall this year, though one of the few recorded, seen by a friend on the wall of his house at Redruth on 11th October, is the furthest southwest that has so far come to my notice. Another was at St. Kew Highway, near Wadebridge on 31st July.—C. Nicholson, Tresillian, Truro, Cornwall. 25*th November*, 1935.

Micro-Larvae Mining in Roots.—Opportunity should now be taken to collect the root-stocks and basal stems of various plants to obtain the larvae feeding in them. Better results would, of course, be probable, if, during the season's rambles, the positions of certain species of plants had been noted down. This method of collecting is by no means easy. A good pair of garden gloves and a strong digger with a fair sized stout hand-bag are the main tools required. The roots should be unearthed with as little damage as possible and when out of the ground the finer roots can be cut away, but the earth attached to the larger roots should not be shaken off. Each root should be wrapped separately in plenty of paper, so that there may be as little rough disturbance as possible.

A list of root-feeding and stem-feeding species should be made with the names of the plants into whose stems they burrow. A few days by the sea-coast should be looked upon as a good opportunity to search for likely plants.

The dead stems and roots of the mugwort, *Artemisia vulgaris*, will afford shelter and pabulum to several species. Little patches of frass at the mouth of small holes in the stems near the surface of the ground will indicate possibly *Eucosma foenella*, or *Hemimene simpliciana*, and possibly *Exaeretia allisella*. Cut the stems about an inch above these holes and dig up the root. *E. allisella* will feed again in the young stems which appear in spring, if they be present. Old yarrow roots, *Achillea millefolium*, growing on banks will be found to contain larvae of *Hemimene petiverella* and of *H. plumbagana*. If we have located the local plant tansy, *Tanacetum vulgare*, we may find larvae of *H. sequana*, *H. alpinana*, *Isophrictis tanacetella* and *Hemimene questionana* (*politana*). The roots of *Stachys arvensis* sometimes produce larvae of *Endothena antiquana*. Ragwort, *Senecio jacobaea*, must not be overlooked; for in its roots feed larvae of *Euxanthis aeneana*, *Phalonia atricapitana* and *Eucosma trigeminana*. It is better to try plants growing on sloping banks. If we select one and bend the dead stems downward, some

will break off about an inch from the ground, and on examination we shall find that they have been gnawed partly through, the cause of their fracture. On examination of the portion of stem in the ground, it will be found webbed over, the work of the larva of *E. aeneana*. This species generally mines in the smaller roots, a white larva with brown head. In the larger roots the light yellowish larva is that of *P. atricapitella*. While mining down the outside of the roots, partly inside, the pinkish larva of *E. trigeminana* will possibly be noted.

We quote from one of the older works on collecting larvae as to the treatment of these root feeders, which have been collected.—

"Get any medium sized boxes without lids, about twelve inches deep, and put a layer of earth about two inches deep at the bottom, sort out the roots, keeping only one sort in each box, and then place them side by side as close as possible, till the bottom is covered all over, then sprinkle earth all over till the roots only are covered, the stems remaining above the surface and shake well down to fill up the interstices and place out in the open air, leaving them exposed to all weathers till near the time of emergence. No more attention is required, and there is very little doubt but that at the end of the following season we shall be fairly well pleased with the result."

Asilus crabroniformis at Stroud in 1935.—*Asilus crabroniformis* seems to occur here every year in small numbers but in 1935 it was common. The first (a male) was noticed on 17th August and the first female on 26th August and the species was on the wing until 12th October. This fly is very fond of resting on half-dried cattle-droppings, partly to bask in the sun (closely squatting sideways) on the dark surface, on which it is relatively inconspicuous when settled, partly to prey on the insects attracted to the dung, and perhaps also in connection with its breeding habits. I took one female carrying a small grasshopper transfixed on its "beak," and many grasshoppers come to feed on the cattle-droppings. Pairs were seen *in cop.* on 7th September. Not being a Dipterist, I am not familiar with any references to the life-history of this species in English Literature, but Xambeu (*Le Naturaliste* XXI [(2) XII] pp. 55-56: 1899) has described its pupa which he reared from a long, large, fleshy, white grub, which he found predaceous on the larva of *Geotrupes hypocrita* at Port Vendres, Pyrénées Orientales. Presumably, therefore, the eggs are laid in cattle-droppings and the fly-grubs feed on the *Geotrupes* (and perhaps also other) larvae which occur in the cow-dung. *Geotrupes* (presumably *G. stercorarius*) is very common here and in the autumn one sees badger droppings almost entirely composed of broken fragments of these beetles. Perhaps some Dipterist can fill in details of the life-history of this conspicuous fly.—T. Bainbrigge Fletcher, Rodborough, Glos.; 26*th December*, 1935.

Wasps as Enemies of Butterflies.—The very dry, hot summer of 1935 was very favourable to wasp's nests, although, curiously enough, I saw very few hibernated females in the Spring; but, as the nests expanded, the food-requirements of the wasps led them to make an unusually intensive systematic search for insect prey. During the daytime the workers could be seen examining leaves for caterpillars and whole broods of such species as *Vanessa io* and *Aglais urticae* were

completely wiped out. *V. io* was common in 1933 and 1934 and there were numerous hibernated individuals in the Spring of 1935, but the species was very scarce in July and August, 1935, and I saw none at all after that; *A. urticae*, which was abundant in 1933 and 1934, was reduced to about 25% of its previous numbers in the Autumn of 1935: I think that the reduced numbers of both species can be ascribed almost wholly to the destruction of larvae by wasps in July, 1935.

In July and August, when the Blue Butterflies were resting in the evening, the worker wasps were quartering the ground systematically, flying over the grass and up to every grass-head and flower-head and grabbing at every Lycaenid which they disturbed. Many thousands of *Polyommatus coridon*, *P. icarus* and other species must have been destroyed in this way. Even when the butterfly escaped, irregularly-shaped patches were torn out of the edges of the wings and practically every individual of *P. coridon* showed such signs of attack. Normally one finds these Blue Butterflies settled down for the night in little colonies, often forty or fifty together, but these colonies were all broken up by the wasps' attacks, so that the butterflies were very scattered and were only found at rest singly. All the wasps examined proved to be *Vespa vulgaris*.—T. Bainbrigge Fletcher, Rodborough, Glos.; 26*th December*, 1935.

A Christmas Dinner for the Moths.—On 19th December we had a light snow-fall which was succeeded by a spell of very cold weather until 23rd December and on 24th there was more snow in the early morning, turning to light rain later. On 25th December there was a sharp rise of temperature (to 48° F. at mid-day) and sugar in the evening attracted about eight *Eupsilia satellitia* and a few *Conistra vaccinii* and *C. ligula*. These species seem to be active throughout the winter at any time when the temperature is more than about 40° F. Two *C. vaccinii* came to sugar on 26th December, 1934. Most of the other hibernating Noctuids (such as *Lithophane ornithopus* and *Axylia exoleta*) do not seem to come to sugar here after November until about the last week of March, when they turn up in company with *Monima gothica*, etc. I was surprised to see a hungry-looking toad sitting expectantly beneath one of the sugar-patches; one does not expect to see toads about at Christmas-time, especially after the strong frosts of the past week, but I have a note of two toads which were out on 26th December, 1934.

One very fresh *Poecilocampa populi* also came to light on 25th December. This seems to be unusually late. I have only seen one other this year and that came to light on 15th November, which is about the normal date.—T. Bainbrigge Fletcher, Rodborough, Glos. 26*th December*, 1935. [*E. populi* also came light on 26th and 27th December.—T.B.F.]

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at Friary Hill, Weybridge, on Saturday, 28th September, 1935, Mr. H. Willoughby Ellis in the Chair. Owing to the Entomological Congress at Madrid

a considerable number of invited guests, who were attending the conference were unable to be present. *Members Present.*—Mr. H, Willoughby Ellis (Chairman), Mr. W. J. Kaye, and Mr. R. W. Lloyd. *Guests.*—Mr. H. E. Andrewes, Major E. E. Austen, Dr. K. G. Blair, Mr. E. C. Bedwell, Mr. F. W. Frohawk, Mr. E. E. Green, Dr. S. A. Neave, Mr. W. Rait Smith, and Mr. H. J. Turner. The guests were received by Mr. and Mrs. Willoughby Ellis during the morning and luncheon was arranged for 1 o'clock after which, in sunny weather, the company divided between the gardens and museum. The Chairman's collections of Lepidoptera, Coleoptera and Hemiptera were on view and a very complete and varied collection of British *Sphingidae* attracted special attention as also that of the Hemiptera. In so short a time only a small section of the Coleoptera could be seen. On reassembly tea was served in the Lounge at 4.30 and the Company dispersed soon after 6 o'clock after a very pleasant day.—W.J.K.

Our Argentine correspondent, Capt. K. J. Hayward, has recently completed his Memoir in the *Revista Sociedad Entomologica Argentina*, on the Family *Hesperiidae*. The 5 parts comprise descriptions of the 240 species found in the Republic, of which no less than 46 are new to science. A few references are given to Seitz' Work and the most important in other literature, with localities, notes on the variation and a few biological notes where known. There is a profusion of very efficient diagrams of the venation and genitalia with useful black and white figures of practically all the species. The getting together of such a mass of particulars with the additional new matter is a most praiseworthy piece of work and the memoir should for a long time remain a source of reliable information upon which to base the biological study which must now follow. The final part contains the correction of errors, inevitable in work done away from the great libraries of Europe, and the omissions with matters which have come in during the progress of publication. Many naturalists have visited the Argentine but few have stayed long years as has the author, and wandered over many districts in the course of his various professional engagements.

OBITUARY.

Rev. E. B. Ashby, F.R.E.S., F.Z.S.

We regret to record the sudden death of Rev. E. B. Ashby, a regular contributor to our pages for many years past. He was in Barclay's bank until about two years ago, when he was pensioned. During the war he served in North Italy for a long period. On his retirement he took Holy Orders at Oxford and became curate at a church in Acton. His interests in Entomology were confined to the Lepidoptera and to the Hymenoptera, mainly of the districts he visited in his holidays which were invariably spent collecting on the continent, particularly in France and North Italy. He was a well-known figure at the meetings of the Royal Entomological Society. A man of strong physique and the picture of health, one did not expect him to pass away so suddenly. He was 60 years of age and unmarried.—Hy.J.T.

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.

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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *fuscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

For Sale.—A complete set of "The Vasculum" is on hand for disposal. Particulars and price on application to William Carter, 13, Kimberley Gardens, Newcastle-upon-Tyne.

Change of Address.—P. C. Harker from Middlemoor, Tavistock, S. Devon, to Flat 4, 11, Lexham Gardens, London, W.8.

Dr. Malcolm Burr, The Hermitage, Dorney, Windsor.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W.7. 8 p.m. Feb. 5th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Jan. 23rd. Feb. 13th, 27th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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British Trypetidae, additional Notes.

By M. NIBLETT.

Since the publication of my notes on *Trypetidae* in the *Ent. Record*, June, 1934, further observations have produced the following results, which may probably prove of some interest to students of this family of flies.

Orellia (*Trypeta*) *winthemi*, Mg.—Since my notice of the breeding of this species (*Ent. Record*, March, 1934), I have bred the flies from larvae obtained at Banstead, Beddington and Riddlesdown, Surrey; the fly has also been taken at Hitchin, Herts. (Dr. F. W. Edwards), and Wrootham, Kent (Mr. H. W. Andrews), while Dr. K. G. Blair has bred it from larvae taken at Eynsford, Kent. I am inclined to believe that it is of rather local occurrence, as many flower-heads of its host-plant *Carduus crispus*, L., which I have examined from numerous localities, have not contained the larva.

Orellia (*Trypeta*) *ruficauda*, Fab. (*florescentiae*, L.)—This species I have bred from larvae inhabiting the flower-heads of *Cnicus pratensis*, L. (Meadow Thistle); the heads were collected at Epsom in October 1934, the flies emerging at the end of June 1935. I have again found the larvae (August 1935) on this plant in the same locality. This is, I am confident, the first record of *Cnicus pratensis* as a host-plant of any species of Trypetid.

I have also bred the fly from larvae in the flower-heads of *Cnicus arvensis*, L., these emerging in May and June.

Orellia (*Trypeta*) *falcata*, Scop.—The larvae of this species I found in the roots of *Tragopogon pratensis*, L. in July; they tunnel the upper part of the root, and lower part of the stem, pupating in the latter. The larvae are yellowish, and rather active. The flies emerged from the third week in May to the third week in June of the following year.

Orellia (*Trypeta*) *colon*, Mg.—Further observations on this species establish the fact that it is definitely double-brooded.

Rhagoletis (*Spilographa*) *alternata*, Fall.—Fruits of *Rosa canina*, L. containing larvae of this species were gathered on 13th October, 1934; the larvae began to leave the fruits the following day to pupate. The flies emerged from 5th to 21st June of the following year. From pupae given me by Mr. T. R. Eagles, the larvae of which had been feeding in the fruits of *Rosa hugonis* var. *platyacantha*, the flies emerged during the first week in June. Neither series yielded any parasites.

Acidia cognata, Wied.—Leaves of *Tussilago farfara*, L. (Coltsfoot) were found 13.x.34 with the larvae of this species in mines. One larva pupated in its mine, the remainder leaving the mines in the course of a few days and pupating in the earth. The flies emerged in mid-June of the following year. Mr. J. W. Saunt sent me pupae of this species from mined leaves of *Petasites ovatus*, Hill. (Butterbur); the flies from these had all emerged by 10th June. This must I think be a rather local species. I have examined Coltsfoot in many localities, but have only succeeded in finding it in one of them.

Trypeta (*Spilographa*) *zoë*, Mg.—The larvae of this species have in my garden for some years past mined the leaves of *Chrysanthemum maximum*, and to a less extent those of *C. indicum*; in 1933 the larvae were so heavily parasitized by Chalcids, that in 1934 it was difficult to find a mined leaf, but in 1935 the leaves were again heavily attacked.

About mid-June mined leaves were collected and by the end of the month many larvae had pupated. The leaves not keeping very well, and there being many young larvae, I introduced fresh leaves which the larvae made use of. The larvae are very active, yellowish and semi-transparent, they gnaw away the cuticle of the leaf until they can insert the head, then force the head under, and form the mine by alternately gnawing and forcing up the cuticle with the head; the pupal period is short, about two weeks, the flies emerging during the latter half of July.

Ensina sonchi, L.—I have bred this species from larvae in flower-heads of *Picris hieracioides*, L. In 1934 heads with larvae and pupae in them were found on 18th August, from which the flies emerged on 22nd August, and 8th to 26th September. In 1935 heads with larvae in them on 10th August yielded the flies on the 17th. There is I feel sure more than one brood of this species, but they apparently overwinter as imagines.

Paroxyna (*Tephritis*) *plantaginis*, Hal.—The larvae of this species feed and pupate in the flower-heads of *Aster tripolium*, L. The larvae in a batch of heads collected on 8th September had all pupated by 12th October, the flies emerging from 21st June to 18th July of the following year. It seems remarkable that this species should survive in the locality from which the larvae were taken, the plants being covered by water at high tide, the puparia falling rather easily out of the ripe flower-heads, and the larvae being heavily parasitized by Chalcids. From 131 puparia I bred 24 *P. plantaginis* and 52 Chalcids, one species of these emerging in some numbers during May, while another species emerged from mid-June to the end of July.

Myopites longirostris, Lw. (*frauenfeldi*, Sch.).—I have been able to breed this species through the kindness of Mr. H. W, Andrews, who sent me a number of galled flower-heads of *Inula crithmoides*, L., from the Isle of Wight, containing larvae and pupae of this species. From these the flies emerged from 18th August to 16th September in considerable numbers, twice as many ♀ ♀ as ♂ ♂ emerging; they were but slightly parasitized by Chalcids; these emerged during September.

Terellia (*Trypeta*) *longicauda*, Mg. (*acuticornis*, Lw.).—I have bred this species from flower-heads of *Cnicus eriophorus*, Roth. (Woolly-headed Thistle), the flies emerging from 26th June to 18th July in considerable numbers. I have bred no parasites from the larvae of this species; the very large flower-heads they inhabit probably being some protection.

Chortophila (*Egeria*) *cinerea*, Pand. (*Anthomyiidae*).—I have introduced this note referring to the above species owing to the fact that I had mistaken the larvae and pupae for those of some species of Trypetid.

I have found occasional larvae in the flower-heads of *Senecio jacobaea*, L. and *S. erucifolius*, L. for several years, but failed to breed out the fly; a few pupated, but the majority died in the larval stage or were parasitized by Braconids. On 13.x.34 I gathered a number of flower-heads of *S. jacobaea* at Epsom with larvae in them, these pupated shortly after, and in the following June and July, 2 ♂ ♂ and 2 ♀ ♀ of *C. cinerea* emerged from 20 pupae. This is I believe the first record of the host-plant of the larva of this species. Mr. H. W. Andrews kindly identified the flies.

Collecting in Dorset (8th-21st July) and Kent (15th-29th Sept.) 1934.

By F. H. LEES.

[Read to the Entomological Section of the Birmingham Nat. Hist. and Philoso phical Socy., 18th March, 1935.]

(*Concluded from Vol. XLVII, p. 124.*)

And now for my story of the eventful fortnight we had in Kent at the end of September.

Sugar was undoubtedly "trumps" on this tourney, and I think we may claim to have led our trumps with surprising effect. Some of you may think that Fortune placed a few aces up the Professor's sleeve. Acknowledging some good luck in the deal is not to say, however, that more or less effortless proceedings on our part secured the results you envy. If our boots had been fitted with pedometers, I think many nights we should have put up double figures on the dial, from the time we unloaded the car and the hour of our return to that invaluable ally, and the amount of treacle, beer and other seductive agencies we got through must have been close on three gallons.

We were fortunate in having the aid of useful sketch maps of the best spots to visit and the guidance of friends to some of the remoter places, where we frequently found well pickled trees or posts on the ground we were advised to work—The names of Ashford, Tenterden, Hythe, Folkestone, etc., do not appear so frequently in Kent lists for nothing; they are at least excellent for jumping off places for some wonderfully good collecting country.

In the matter of our difficulties, on the other hand, the very scattered and inaccessible nature of our localities was largely overcome by the Professor never hesitating to use his car, if anything sufficiently solid to be regarded as a road existed, and the kind co-operation of our friends, already referred to. If the weather had been kinder, we should have done very much better, I feel sure, the wind on many nights being more than any but the most confirmed topers among the moth fraternity would face. On two nights, only, however, were we deterred from active operations altogether, though, but for our President's unquenchable zeal and spartan endurance, I confess there might have been more.

I think we shall always look back on our first four nights between the Southdowns and the sea with a feeling akin to amazement. The night of our arrival we thought, though too late to sugar, that we might as well have a closer look at some of the not particularly attractive looking fenland country we had been passing through, and finally arrived at a place where we knew some friends had been sugaring the previous week-end.

Behold, there on the old treacle patches were sitting the ubiquitous *Agrotus suffusa* (*ypsilon*) many *A. segetum* and a few *A. saucia*. Then came the first catch of interest, *Calocampa vetusta*; later, an announcement from the Professor that they (he was being eagerly assisted by Mr. Peter Whitehouse) had taken a "wainscot" about the size of *Calamia lutosa*, which it probably was; and then, a little later still, another one. No one was frightfully excited about it. One couldn't help but get *C. lutosa* in such a spot, though we hadn't expected it to come to sugar; nevertheless, we did feel encouraged to go again the

following night and set to work with our own bait in real earnest. To be quite candid I think the next night found me quite as pleased with the *C. vetusta* I had taken, as with a Noctuid that in my diary's record was afterwards amplified to 'one of the queer wainscots.' It was rather paler than the Professor's, whose series now included one so strangely striated that our speculations as to their identity now toyed with *Nonagria typhae*, rather than with *C. lutosa*, but still remained unsatisfied.

You must realize from what I've said, that as far as Professor Whitehouse and I were concerned, knowledge of the true facts concerning our puzzling captures came by slow degrees; but that is no reason why I should not speed up our slow motion progress for your benefit, so, disregarding chronology, I will say that after the specimens had been some four days on the boards, Dr. Kettlewell came along and murmured something about *Xylophasia zolliköferi*. No one of us could remember, however, what that strangely named beast was like precisely, but, as striation had no part in its make up as far as we could recollect, our captures continued to be regarded by us as unusual vars of a large form of *N. typhae* until the day we returned to Birmingham.

Another collector who saw them, as the Professor was packing up, pronounced decisively against *N. typhae* and seemed prepared to put his money on their being something unique. Back in Birmingham the Professor consulted Barrett's *British Moths* and was encouraged thereby to take his specimens to the British Museum, where Mr. Tams gave the decisive verdict, which translated the obscure "wainscots" of our records to the dizzy heights of fame as *Xylophasia zollikoferi*, both typical and vars. extraordinary—the catch of the season—and their happy captors found they had become makers of entomological history.

Now I must get back to Monday, 17th Sept., when, blissfully unaware of the importance of the captures we had made, our hopes were centred chiefly on *Leucania albipuncta*, which, we were told, had been taken in some numbers not only along the coast but inland as well. Professor Whitehouse and his son worked together, while I played a lone hand so that we might cover as large an area as possible. A shower of rain divided the night into a not very exciting preliminary period and a later, wonderful spell, when it seemed as though anything might be going to turn up next.

The Professor's territory proved most prolific, producing a further addition to his "Wainscot" series, a nice *Laphygma exigua* (a second eluded even his hawk-like pounce), several *L. vitellina* and *L. albipuncta* too! The two latter species were represented on my sugar patches also, though, perhaps mercifully for my steadiness in boxing, I did not recognize them at first glance. I also took two nice *Xanthia gilvago* and was the first to make acquaintance with *Xylina semibrunnea* and *X. ornithopus* (or *rhizolitha* as we called it). *C. retusta* was plentiful and the commoner species were in swarms. Fresh insects kept on coming and we probably ought to have made a night of it. The Professor, however, was under a solemn promise to take his junior partner home early, so that shortly after 1.30 a.m. we allowed the argument to prevail that we couldn't reasonably expect much more and ought to be well content with our "*Vitellina*" night, as we've always called it since. Maybe it was an opportunity lost, and of course it did not recur.

We worked the following evening as on the previous night, only to find most of Monday's rarer visitors conspicuous by their absence. As it seemed evident that the raptures of another "*Vitellina*" night were to be denied us, I was philosophically consoling myself with vague hopes of some nice vars. or, perchance, a mere unusual looking "Wainscot" if I persevered on my lonely furrow. Then, as I passed along, I happened to espy, just peeping out of an old bolt hole in a post I had sugared (into which some tiny rill of treacle had no doubt found it's way) the tip of the wings of (as I thought) a rather hefty looking *Mamestra brassicae*. I almost passed on—then, remembering my consolatory philosophy regarding varieties, I stooped box in hand to proceed more or less skilfully to manoeuvre the beast out of its lair. I was then conscious of a vague disconcerting challenge from those now revealed black bordered white underwings and of a voice—which surely could not be my own—murmuring, "*Alchymista*." I completed my task like an automaton, stared at my capture through the glass and then, like one in a dream, gazed into the vast surrounding darkness, saw afar off a moving light and struck out desperately in its direction. At last came a real human voice calling out, "any luck—what have you got."? My tongue, I believe, did frame the words—"You know that thing they call the "*Alchymista*" —well, I've got one . . ." Told promptly to 'get out,' I produced the box, when corroboration and congratulations followed.

That is why the report I received then of the Professor's own haul, has left no record on my mind. Never had such marvellous luck come my way (so I thought) before and my poor brain could only receive on the *alchymista* wave length.

Yet, so strange a paradox is man that it brought me a sense of real relief, as well as a glow of pleasure, when, after much persuasion, I prevailed upon my friend and host protestingly to consent—provided that I would accept all sorts of rarities in exchange—to put the "Alchymist" in his own collection, where you see it now.

Later in the week, another evening found us working with Dr. Kettlewell. Bright moonlight precluding much hope from sugar after the first hour (during which *X. semibrunnea* was the best insect taken), we were led to visit some awesome pools surrounded by treacherous marsh, that had once in yielding its *N. sparganii* to an intrepid collector nearly exacted from him his life as the price of his captures. Warned, we were forearmed against disaster and were fortunate in securing one specimen of the species, which was for all practical purposes 'over' so late in the month. The sallows around had quite an interesting insect population in which *X. lutea*, very fresh and beautiful, largely predominated.

The more extensive stretches of woodland on the higher ground were the scene of larva-beating expeditions by day, as well as of sugaring at night. Among numbers of unidentified larvae we took *Selenia lunaria* and *Boarmia roboraria*. One wood added *Polyploca diluta*, var. *ochrea* of *Amathes rufina* (or *helvola* as you now call it), a particularly welcome *Xantholenca croceago*, and *Ochria aurago*, to our captures at sugar, though it was to the ivy along a lane at the foot of the downs we were indebted for most of the last named species. The same lure, added *Chloroclysta miata* to our list, while the car lights on

the same trip attracted a fine *Ennomos autumnaria* ("Large thorn"), which the Professor duly netted.

Professor Whitehouse, after interviewing a number of the potato-diggers we came across from time to time, established a receiving depôt for pupae of *Manduca atropos*, with a result that was almost staggering. You will, I am sure, be congratulating him on his success in 'forcing' these grand insects, which on a small scale, I endeavoured in a tin-pot way to emulate.

Searching in suitable spots both by day and night for *Heliothis peltigera* larvae, was another way we had of avoiding any monotony in our proceedings, and the fact that our captures have turned out to be *H. dipsacea* is no reflection upon the industry applied to their detection, at which both the Professor and his son were particularly expert.

To conclude, I do not think I can do better than briefly describe our final fling on 29th Sept.

Setting out in the company of Mr. Hare of the South London Socy. in wind and pouring rain, we found the spot chosen far from a lepidopterist's elysium. The rain certainly did cease for an interval, whilst we put on the sugar, and then, did its best to wash it all away. We would not be denied, however, and stuck at it till 12.30 a.m. My companions took an *L. albipuncta* each, one of which was confided to my care—but silence shall veil its story and a row of asterisks be its memorial, how else can stark tragedy be delineated ? * * * !

As to my own catch, I was in the blissful state of not knowing in the least what I'd got, as my Acetylene Lamp had refused to function beyond about a quarter of a candle power for more than two minutes together, so, I'd just been scraping up all and sundry in desperation. Surprisingly enough, almost the last insect I boxed provided us with another mystery, unsolved till careful examination on our return home enabled me to pronounce the blessed words—*Orrhodia erythrocephala*.

Surely my cup was running over though I knew it not, in fact I was too busy cursing my lamp and wringing my garments to think about much else.

As the night was young and we were keen on getting some genuine *C. lutosa*, we gladly accepted Mr. Hare's offer to show us the spot, some five miles off, where very fine vars. were frequently taken. It was a weird miasmic place and the beam from the car's head-lights revealed billows of strangely nauseating vapour. Searching the reed stems under the circumstances was not pleasant and the nightmare effect upon myself was emphasized by my reserve electric torch proving as utterly unreliable an illuminant as my now defunct acetylene lamp. We then discovered that we were on the windward side of a huge burning refuse dump, and were finally forced to return to the road, where, by training the headlights over the marsh we managed to persuade a few more *C. lutosa* to accept our hospitality.

Rather belatedly we then remembered that we were due in Birmingham within sixteen hours and so back to our quarters we went, through dark and silent villages to not unwelcome beds, well content, and regretting only that even the best of holidays must have an end.

Early Stages of Indian Lepidoptera.

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

(*Continued from Vol. XLVII., p. 50.*)

HESPERIIDAE.

Suastus gremius, F., *gremius*.

Head brown with pale central and lateral stripes. Body glaucous green with a dark dorsal line. Spiracles black. Anal plate large and broad, the body flattened posteriorly.

Foodplant.—Palms of various species on which the larva lives in a turned over leaf.

Pupa very moth-like, enclosed in a cell made from a spun together leaf and covered with a waxy powder. Yellow-green with the last somite and cremaster reddish-brown. Thorax darker green with a lateral reddish spot anteriorly.

Described from a full fed larva found in Calcutta 11.xii.31, pupated 16.xii.31 and a male emerged 10.i.32.

Kershaw, *Butt. Hongkong*, 125, Plts. 14, 7a; DeNice. *Ind. Mus. Notes*, I. 9.

Udaspes folus, Cr.

Larva slug-like. Head dull black, heart-shaped and small for the size of the larva. Thoracic somites very slender giving the appearance of a neck. Colour bluish green due to the contents of the intestines and the blood, the skin itself being unpigmented. Anal plate very broad and flat. A white mealy blotch ventrally between each pair of claspers.

The larva lives in a turned over leaf on various sorts of Monocotyledons.

Pupa very pale green, torpedo-shaped with the head produced to a long snout. Attached by a girdle and the cremaster in a waxy cell. During the pigmentation of the developing imago, the eyes become red, but later darken to black.

Described from a full fed larva found in Calcutta 17.x.30, pupated 20.x.30 and a male emerged 11.ii.31.

Kershaw, *l.c.* 136-137, Plt. 14.

(*To be continued.*)

SCIENTIFIC NOTES AND OBSERVATIONS.

THE GENETICS OF DYSSTROMA TRUNCATA, HUFN.—K. Groth has written a valuable paper on this subject entitled "*Cidaria* (*Larentia*) *truncata*, Hufn. und *C.* (*L.*) *citrata*, L. (*immanata*, Hw.)" in *Fauna og Flora*, 1935, 3 Haefte (Ekstrahaefte). He finds that the red forms, *mixta*, Prout, *rufescens*, Ström., and *ochreata*, Schille., are dominant to all others. The extreme melanic form, *nigerrimata*, Fuchs, is dominant or epistatic to *perfuscata*, Haw., *perfuscata* to the typical *truncata*, and *truncata* to the white form, *centum-notata*, Schulze. Of the red forms, *mixta* is a combination of *rufescens* and *nigerrimata* and is dominant to the others, and *rufescens* is dominant to *ochreata*. *Nigerrimata* in the homozygous form is entirely black, but in the

heterozygous form has some lighter colour on the underside and hind-wings and has a greyish submarginal line. I have bred this form from Horsley. His coloured plate shows that his *perfuscata* are like many of the Scottish ones, and have rather brightly contrasted colours, while his *mixta* have a rich dark chestnut central area and a completely smoky border. The British specimens I have been accustomed to call *mixta* have the central area so smoky that the chestnut colouring is obscured and the border is either entirely dark grey or has a light grey line in it. His *ochreata* are not as yellow as ours. Though he says that *centum-notata* is recessive to all other forms he gives no data to support his statement. He draws no conclusions about the order of dominance of the other forms, but the results of all his breeding experiments can be explained in the way I have indicated.—E. A. Cockayne.

NOTES ON COLLECTING, etc.

Late February and early March.—Every opportunity when the weather is moderately mild should be taken to obtain the wingless females of the early moths during the next few weeks. The search must be systematic and persistent to get any measure of success. These females are like spiders and active in their attempts to evade capture. Those of *Alsophila aescularia*, *Theria rupicapraria*, *Erannis marginaria* (*progemmaria*), and *E. leucophaearia* may be found at dusk at rest on the twigs of hedges, on tree trunks, or in hollow trees, and even at the tops of fences near hedges. When beating the hedges quick and keen search must be made to secure the females, which very quickly run for safety. All hollow trees must be carefully examined for hibernating species. Tree-trunk searching for females of *E. leucophaearia* and *Apocheima hispidaria* is often tedious work, and running one's finger or hand down the trunk will often make one see individuals, which so closely approximate to the colour of the oak bark as often to defy search. The females of the latter species emerge in mid afternoon and soon climb to the higher branches, where pairing takes place. Those of the former are very active and may often be seen running fast as do spiders. Where *E. leucophaearia* abounds, as in Richmond Park, records are wanted of the percentage of dark (black) specimens. Many years ago there was one particular section of a copse in the centre of the Park, where year after year very dark males were sure to be found. The light variegated forms always predominated with a sprinkling of the quite black, and light-banded forms. The search for *A. hispidaria*, a few days after very cold weather in early or mid March is about the most likely time to choose, and the sheltered side of the trees is more productive. At this period of the year searching trunks will, in late March, often produce plenty of the Tineid, *Diurnea* (*Chimabache*) *fagella*, another species, which in many parts, has been gradually developing a melanic form, about which details of appearance and increase in numbers is wanted. Perhaps oak trunks are most frequented by this species, but it is taken on both beech and birch. Again we have an imperfect ♀. This time with abbreviated wings, which are lanceolate in shape and equally share the tendency to produce melanism. Relative proportions of light, intermediate and melanic forms should be recorded. It is noted that the melanic forms, soon

after being prepared for the collection, appear to lose the deep black they had when first seen on the tree trunk. One should keep a look out for hibernated specimens of many species, which may turn up from likely and unlikely places. Lanes with overhanging tangled roots and vegetation should be well examined, using a long stick and gently tapping and stirring under the "eaves." In fact this method of collecting is often lucrative at other seasons. Our series of *Calostigia* (*Amoebe*) *olivata* was taken in such a spot in the Chilterns,* where it is well distributed but wants catching in its lightning attempt at escape. *Tortricodes tortricella* (*hyemana*) will be seen flying in the oak woods on sunny days in abundance. On mild nights larvae of many Noctuid species may be found in early evening on the low vegetation growing below hedges on banks ; numerous species have hibernated as full fed larvae and are wandering before pupation. When looking for *C. fagella* look out for similar moths with an irregular black streak along the fold. This is a local species *Semioscopis avellanella* ; it has a normal female.

Abundance of Lycophotia (Charaeas) graminis on Dartmoor.—There is in *British Lepidoptera* by C. G. Barrett an interesting and lengthy account of the adventures of Major Still with this insect on Dartmoor in 1894 ; possibly this account may have slipped the memories of some by now and be news to others. On 18th August 1934 and 8th August 1935 I took the males of species in great profusion at light on Haytor, Dartmoor, in both cases in excellent condition and in various forms. The females occurred much more sparingly on the wing at dusk and were rather difficult to catch. I was unable to find any trace of them later, sitting on the grasses or heather, by the lantern. I have not tried light on any other occasion for this moth on Dartmoor, but have noticed odd specimens of both sexes on various parts of the moor in daytime. I have also visited the moor in bright sunshine, but have never had the luck to strike a large flight. On 18th August 1934 *Lygris* (*Cidaria*) *testata* occurred commonly at the same time ; possibly it was not out by 8th Aug. last year, though on that occasion I saw a few larvae of *Anarta myrtilli* and several imagines of *Calostigia didymata*, otherwise nothing of any interest.—C. Q. Parsons, Torquay.

Date of Emergence of Polyommatus coridon, Poda, at Dompierre.—On my way home from Mont Dore last year I spent two days at Dompierre-sur-Mer, Charente Inférieure, with the view of searching for the varieties of *P. coridon* which were described by the late Rowland Brown in the *Entomologist* of January, 1912 as being captured there on 5th August, 1911. It is true that that year had a very early summer and "males of *coridon* were flying in hundreds with females" "nearly all of the variety ab. *syngrapha*, Kef.," but to my chagrin not even a single male *coridon* was visible. I was told at La Rochelle that it was quite useless to expect to find this insect before 15th August or 1st Sept.

The late emergence of *coridon* there is curious, as it was flying in Hampshire by 28th July and Dompierre is many hundreds of miles

* Of course not now, but in late July.

further South. As regards *P. bellargus*, Rott., males only of the second brood were seen, so it was useless to look for the variety ab. *ceronus*.—H. G. Harris (M.D.), Southampton, *January* 1936. [*P. coridon* appeared at Rodborough, Glos., 11.vii.35, an unusually early date.—T.B.-F.]

Dragonflies in Leicester and Kent, 1935.—A few notes may be of interest on the Dragonfly season of 1935. Lucas in his standard work ignores Leicestershire and it may fill in a gap, if I mention that besides *Sympetrum striolata(um)*, *Agrion puella*, *Enallagma cyathigerum*, *Ischnura elegans* and *Pyrrhosoma nymphula* (all of which are widely distributed), I took on our Leicestershire waterways *Aeshna grandis* (flying in numbers), *Aeshna cyanea*, and *Calopteryx splendens* (abundant). On 17th September a fine specimen of *Aeshna mixta* was brought to me, which had been found in a window of Leicester General Post Office, in the very centre of the city. Perhaps, however, the most notable record for Leicestershire is that of the local *Erythromma naias*, which is quite common on one of our streams.

This gives 10 species which I have secured this year in Leicestershire.

I spent the end of July and early August in South East Kent. Here I found *Anax imperator* not uncommon, though generally occurring singly; *Lestes sponsa* abounded everywhere, and, not far from Sandwich, *Sympetrum sanguinea(um)* was flying in dozens, while *Libellula quadrimaculata* was frequent in the Canterbury district.

I was most interested however to discover that *Orthetrum cancellata(um)*, which Lucas appears to regard as a rare fly, was abundant in this S.E. corner of Kent, occurring at Deal, Sandwich, Folkestone and Canterbury. It was commonest at a village about 3 miles inland from the Kentish coast. (Lucas says his records are confined to July: I took a perfect female, not at all worn, on 7th August). Over a pond near a village, 20 specimens of *O. cancellata(um)* were flying together. Another favourite haunt was a cart-track running through cornfields about half a mile from the pond (the nearest water).

The blue-gray males would sun themselves, sometimes two or three at a time, on dry heaps of nettle and dock lying by the road-side. They were very watchful and alert, darting swiftly away at the approach of an intruder, to take up a similar position on the next heap further along. The brown females (which were fewer than the males) preferred to settle on the stalks of the standing corn on the edge of the field, and took alarm much more quickly, generally flying out over the corn, to be seen no more.

Lastly I wish to record the capture, near the same village—about 3 miles inland from the sea—of a male *Libellula fulva*. It will be remembered that Lucas (whose book indeed dates from the beginning of the century) says of this insect "Recorded captures may almost be counted on one's fingers." He gives only 2 records for Kent "A female at Kingsdown near Deal (C. G. Hall) 1881" and "A rather worn adult male near Sandwich in 1890" taken by himself.

My specimen was taken 10th July 1935.—Rev. J. G. Gillman, St. Andrew's Vicarage, Leicester. [Unfortunately Lucas did not use the prior spelling of the names.—Hy.J.T.]

Records of Erannis leucophaearia in Richmond Park some forty years ago.—1889.—March 9th "Very common." 1890.—February 25th "A few." March 7th "A few." 1891.—February 20th "A few." March 3rd "In numbers." March 18th "A few." 1892.—February 25th "A few." March 19th "A few." 1893.—February 4th "Swarms." February 15th "Swarms." February 25th "A few." March 3rd "A few." March 4th "Very common." March 7th "A few." 1894.—January 31st "Fully out." February 3rd "Swarms." February 24th "A few." March 5th "A few." 1895.—March 2nd "Fair numbers. Some very dark." March 6th "Some." 1896.—February 3rd "One." February 6th "Scarce." February 13th "Fairly common."

The latest date recorded for the species was in 1888 at Shirley on 29th March.

These records are all defective. Note should have been made on each occasion of (1) the direction and force of the wind: (2) the day and night temperature: (3) the amount of sun or cloud: (4) particulars as to the possible influence of frost and thaw on the emergence: (5) percentage of melanic and semimelanic forms. It is also worth noting if the dark forms appear at any definite portion of the emergence period; *i.e.* early or late, or indiscriminately.

Moths at Rest on Houses.—Mr. Siviter Smith does not say (last Vol. p. 137) whether his present house is new or old, but it occurs to me that, as it is of grey stone, it is not a particularly attractive resting place for moths, and, so far as *Metachrostis perla* is concerned, not likely to be so unless lichens are present, as I have only seen *perla* resting on walls on which lichens were present, but I remember seeing many years ago specimens flying around and alighting on the glass of my aunt's window in Ringwood High Street, apparently attracted by the light within, although the window was covered by a cream-coloured roller blind. *Catocala nupta* may not occur in the vicinity of the new house and *Polia chi* may not fancy it, although, of course, not attached to lichens, as its larvae feed on low plants.—C. Nicholson.

CURRENT NOTES AND SHORT NOTICES.

A Meeting of the Entomological Club was held at The Museum, Tring Park, on 16th November, 1935, Lord Rothschild in the Chair. *Members present:*—Lord Rothschild, Sir Edward B. Poulton, Mr. Horace Donisthorpe, Mr. H. Willoughby Ellis, Mr. Jas. E. Collin, Mr. W. J. Kaye, and Mr. R. W. Lloyd. *Visitors present:*—Mr. Gilbert J. Arrow, Major E. E. Austen, Dr. K. G. Blair, Mr. E. C. Bedwell, Mr. W. T. Calman, Mr. C. W. Collenette, Dr. E. A. Cockayne, Mr. Guy Dollman, Mr. J. C. F. Fryer. Mr. H. M. Edelsten, Major S. S. Flower, Mr. F. W. Frohawk, Prof. G. D. Hale Carpenter, Capt. F. Hemming, Major R. W. G. Hingston, Mr. H. R. Hewer, Dr. A. D. Imms, Dr. Karl Jordan, Mr. W. H. Laing, Mr. John Levick, Dr. Percy R. Lowe, Sir Guy A. K. Marshall, Dr. S. A. Neave, Mr. Wm. E. F. Nelson, Mr. Chas Oldham, Mr. Louis B. Prout, Capt. N. D. Riley, Mr. W. Rait Smith, Mr. H. Stevens, Mr. C. Sherborn, Mr. W. H. T. Tams, Mr. Hy. J. Turner, Dr. V. B. Wigglesworth, Comm. J. J. Walker, Mr. C. J. Wainwright, Mr. C. G. M. de Worms. The

members and visitors were received by Lord Rothschild at the Museum in the morning and the collections were open for inspection. The Chairman specially exhibited the following :—85 drawers of the genus *Colias* and 3 drawers of the two British *Colias* ; 19 drawers of Palaearctic *Cossidae* and 12 drawers of the Cuculline genera *Metapoceros*, *Cleophana*, and *Calophasis*, one drawer of Continental aberrations and 3 of British aberrations of *Arctia caja*, to show that, with the exception of the aberration *petreburgensis*, which is purely British, the aberrations of the "Garden Tiger" are similar throughout its range. Particularly interesting among the exhibits were, in the *Colias* a series of eighteen bred from the one ♀ of *Colias erate* aberration *chrysodona* which go far to prove *chrysodona* to be a hybrid ; the gynandromorphs of *Colias lesbia* and the 2 ♀ ♀ *Colias croceus* part normal ♀ and part ♀ form *helice*, the unique series of aberrations of *Arctia caja*, the new white *Cossus* from Persia, the long series of *Zeuzera nubila* and *Dyspessa vaulogeri*, the natural hybrids between *Cleophana diluta* × *Cleophana warrionis* and between *Papilio sesostris* × *Papilio orilus*, the gynandromorph of *Morpho eugenia* f. *uraneis*, the melanistic *Argynnis aglaia* and *Argynnis childreni*, the melanistic *Sphinx ligustri* from Germany and Hemel Hempstead and lastly the long series of the very rare *Colias chlorocoma*. Luncheon was served at one o'oclock and the large party on this occasion had to be accomodated in two rooms. After Luncheon Mr. Donisthorpe showed a Queen and two workers of the ant *Stenamma westwoodi*, West. The Queen had been alive in his observation nest for 14 years, *i.e.* from 20th September, 1921, on which date it was sent to him by Messrs. Phillips & Stelfox, to 2nd October, 1935, when she died. He estimated that this ant was probably 18 years old and certainly 16 years old and said that it was the oldest imaginal insect on record. The next oldest adult was recorded by Sir John Lubbock (Lord Avebury) in 1888, *i.e.* a queen of *Formica fusca*, which he stated, must have been nearly 15 years old and at that time was the oldest adult insect on record. Moreover the author goes on to say, what is very extraordinary, she continued to lay fertile eggs, a most interesting fact from a physiological point of view. Fertilization took place in 1874 at the latest. There had been no male in the nest since then and moreover he believed that it was well established that queen ants and queen bees are fertilized once for all, hence the spermatozoa of 1874 must have retained their life and energy for 13 years, a fact he believed unparallelled in physiology. Other instances of longevity in insects known to the speaker were (1) Janet kept a queen of *alienus*, Först. alive for 10 years also (2) specimens of *Claviger testaceus*, Preys. for over four years in his nests. For the comfort of the members of the party who did not use motor cars, conveyances were provided to conduct them to and from Tring station. The meeting was very successful and entertaining and a most happy and instructive day was spent.—H.W.E.

There have been several important Lepidopterological publications in recent months, which may subsequently be reviewed in these pages. Perhaps the most outstanding work is the *Genitalia of the Tineina*, by F. N. Pierce and Rev. J. W. Metcalfe ; a volume of 22+116 pp. with 68 plates, the fourth of the series and appearing 16 years after the appearance of the volume on the Tortrices.

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

For Sale.—A complete set of "The Vasculum" is on hand for disposal. Particulars and price on application to William Carter, 13, Kimberley Gardens, Newcastle-upon-Tyne.

Change of Address.—P. C. Harker from Middlemoor, Tavistock, S. Devon, to Flat 4, 11, Lexham Gardens, London, W.8.

Dr. Malcolm Burr, The Hermitage, Dorney, Windsor.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Feb. 27th. March 12th, 26th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Notes on Breeding Leucania vitellina, Hb. and Leucania albipuncta, F.

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

As both these wainscots had occurred at Dungeness for the past four or five years and I had never bred *vitellina*, I spent most of September at Lydd. *Albipuncta*, which had been rather common in 1933 and 1934, was a good deal scarcer, but *vitellina* appeared in the same small numbers as in previous years. One *albipuncta* came to sugar on 3rd September, five on the 5th, and one on the 7th, and one on the 9th, the earliest at 8.45 and the latest at 10.45 p.m. summer time. After that I got no more myself, but saw others taken, the last of which came to sugar on 17th September. The first *vitellina*, a very perfect female, came to sugar on 9th September, but proved to be infertile. The second was taken by Peter Whitehouse on 13th September, and four more came to sugar on the 21st. Most of them came at about 8.45. A few more were caught early in October after I had left. The majority of those kept for eggs were infertile, but the one taken on the 13th, though beautifully fresh, gave us a pleasant surprise by laying fertile eggs.

The same method was used to obtain eggs of both species. Dead seed-heads of cock's foot grass, *Dactylis glomerata*, with short pieces of stem attached, were bent round the sides of a big glass-topped tin, so that they remained pressed against the side. A bit of cotton wool soaked in a solution of sugar was placed on the paper covering the bottom and moistened from time to time. Both *vitellina* and *albipuncta* laid most of their eggs out of sight in the seed-heads, but a few were placed on the tin, where a seed-head rested against it.

The female *vitellina* started laying on 15th September and laid at intervals until the night of the 22nd or the early morning of the 23rd. She laid between 450 and 500 ova, 50 of which were laid the last night, after she had been placed in a new tin. Professor Beckwith Whitehouse generously let me keep a share of them. The first larvae hatched on 25th September and the last on 3rd October, and when I counted them I found I had about 112. They were kept in small glass-topped tins with newspaper on the bottom and were fed throughout on *Dactylis glomerata*. Clean stems were always chosen and cut into lengths to fit the diameter of the box. While they were hatching, the seed-heads were shaken over a piece of paper at least twice a day and the larvae were very difficult to dislodge. A few were a good deal larger than the others and had fed either on the eggshells of others, or had eaten unhatched eggs. At first the larvae showed a preference for the white part of the leaf near the base, where they fed gregariously. It saved time and trouble to use only the sheaths of leaves. The young larvae fed on the inner surface and the sheath was easily split, exposing them and making it easy to brush them off and put them on to fresh food. Grass was gathered every other day, and at first they were fed on alternate days, but later, fresh paper was put in daily and the frass cleaned out, and often it was necessary to put more grass in or to replenish it entirely. As they grew larger they were put into bigger tins, until, when they were in the last instar, they were in the largest size of tin and ten larvae were allotted to each.

The tins were kept in a wooden box heated by means of an electric light bulb, which was burning day and night. Fearing that the light might prevent the larvae from feeding freely, the bulb was placed inside a coffee tin with a slit on one side of the lid for the flex to pass through. At first the tins were kept near the open end of the box where the temperature was about 70° to 75° F. Later they were put nearer to the back of the box, and the lid was partly closed, but the temperature varied very much in different parts of the box. The coolest part was 80°F. and the hottest 92° to 94°F. The numbers were counted every time the food was changed, a very necessary precaution especially while they were small.

The first larva went down into peat moss on 27th October, and the last on 5th November. A separate biscuit tin full of damp peat moss was used for each day's full-fed larvae, and they were left undisturbed at room temperature for a fortnight. When they were dug up, some of the cocoons were kept intact and the pupae were removed from the others. Cocoons and pupae were placed on damp flannel or soft canvas in glass topped tins, about six in a tin, and were so arranged that only one or two should hatch in each tin daily. The tins were put into the heated box and the flannel was damped every day. Two pupae however were overlooked and left in an unheated room.

The first moths from the forced pupae hatched on 21st November and the last on 3rd December. The other two emerged on 3rd January. Thus they were from 10 to 11 days in the egg state, from 31 to 34 days in the larval stage, and from 25 to 28 davs in the prepupal and pupal stages, except the two in the unheated room, of which the prepupal and pupal stage was between 58 and 67 days.

From four to five days were spent in each of the first five instars, and eight days in the sixth. Not a single larva died or was lost from the time I started counting them: every larva, which went down, pupated successfully and only two imagines failed to emerge. I bred 101 moths and blew a few larvae.

A very full and accurate description or the larva and of the method adopted in breeding *vitellina* from the egg was published by W. Parkinson Curtis from notes left by E. R. Bankes (*Trans. Ent. Soc. South of England*. 1931. 7. 40.) In one respect my experience differed from his. My larvae had only six instars, but his changed skin six times and had seven instars. My larvae were very uniform in colour with the ground colour wood brown like the majority of those bred by Bankes. Buckler gives no figure of the larva, and that given by Boisduval, Rambur, and Graslin in the 'Collection des Chenilles d'Europe,' Noctuélides, Pl. 12, fig. 1, is paler and greyer than mine and the head is not large and prominent enough.

Bankes kept his larvae in ventilated tins at a temperature of 56° to 70°F. His fastest larva fed up in 55 days, but most of them were much slower, and his last did not pupate until the beginning of January. The larvae which fed most quickly did best and gave 78·4 per cent. of imagines, while the later ones only gave 43·6 per cent. Apart from the poorer results obtained from slow-feeding larvae there is another disadvantage. The *Dactylis* deteriorates very rapidly after exposure to frost, and it is difficult to get enough in good condition to feed a large brood of *Leucania* larvae. I attribute my greater success

to using closed tins without ventilation and to the much higher temperature used, and I hope these notes will be of service to anyone fortunate enough to take a fertile female of this beautiful species.

The moths were as large or larger than those caught wild, but amongst the forced specimens variation was slight. At one end of the scale were eight with the hindwings entirely plain and with the forewings a smooth cream colour with the markings very indistinct. At the other end were five with nervure 1 of the hindwings blackened for its whole length and the others blackened from the discoidal cell to the termen and with much grey suffusion near the margin in the interneural spaces, the forewings being richer and and less uniform in colour and with more distinct markings. In the great majority the grey suffusion and darkening of the nervures was present, but to a much less degree. The two pupae, which were overlooked, were kept in an unheated room near the window and during the spell of cold weather when the temperature remained below freezing point all day, they must have been cold for a much longer period than any wild pupa ever is. Both imagines had the hindwings entirely dark grey and their bodies were covered with grey instead of cream-coloured hair. As they were kept under the same conditions as the rest at the critical period just after pupation, I think their darker colour must have been due to their much slower development.

I have nine *vitellina* from South Devon, six bred by Bankes from Strete and three taken by P. P. Milman at Paignton, and one from Dorset, all of which have orange tinted forewings and plain hindwings, and I understand that Milman took about a hundred in 1907 and 1908 nearly all of which were similar. One which I took at Petit Tor has still deeper reddish orange forewings and hindwings slightly suffused with grey. My bred series compared with these has a much greyer appearance in both fore and hindwings and lacks the orange tint on the forewings and is more distinctly marked.

The Dorset and Devonshire *vitellina* taken during the last few years have the same orange forewings as those bred by Bankes in 1902 and captured by Milman in 1908, and at Bournemouth in 1901. On the other hand all those I have seen from Kent have the forewing pale with a slight greyish tint like those bred from Dungeness.

If the species is immigrant I think the Devon and Dorset specimens must come from a different locality from the Kent ones, but this does not seem to me at all probable. It is possible that *vitellina* is a permanent native and that it has devoloped two different local forms. The fact that none are taken for several successive years is no argument against this view. It is a scarce species at all times and it seems likely that, only when it experiences a series of unusually favourable seasons does it become common enough for more than odd specimens to be taken.

Two females of *albipuncta* were kept for eggs, one red and one brown. They were a little worn and though both laid freely the eggs of the brown one were all infertile. The red one laid more than a hundred eggs on 11th September and the following day, and the larvae, half of which I gave to Professor Whitehouse, hatched on 21st and 22nd September, but during the next two days about twenty of mine died. The 33 survivors were fed on *Dactylis glomerata*, but, though they had the same treatment as the *vitellina*, they grew at different

rates, like those I had last year. The largest entered the last instar on 19th October, and went down into the peat moss on 28th October, and by the 29th eighteen had gone down. Others grew more slowly and the last was full-fed on 13th December but did not pupate until 28th December. The moths emerged at intervals from 16th November to 9th February.

The colour of the larvae varied from bright reddish ochreous to greyish ochreous, and three had no black markings in the subdorsal stripe, a form of which I have seen no description. I blew one of these. Two larvae were lost, and two died in the penultimate instar, but all the rest pupated. The larva is not figured by Buckler, but good figures of the dorsal and lateral aspects are given by Boisduval, Rambur, and Graslin, *Noctuélides*, Pl. 13, figs. 5 and 6.

The imagines varied. One was a very light bright red and one darker red, ab. *rufa*, Tutt, and two were dull brown, the darkest being ab. *suffusa*, Tutt, but there were intermediates of different degrees of redness and the brood could not be separated into red and brown forms. They were large, the smallest being as big as the biggest captured one.

In the larval state *vitellina* and *albipuncta* behaved very differently. *Albipuncta* showed no dislike for the light and remained motionless, either stretched out or rolled up, but *vitellina*, unless changing skin, made violent efforts to find shelter. *Vitellina* had to be examined twice a day, when they were nearly full-grown; otherwise some would have been too near pupation to make cocoons, but *albipuncta* often waited for two or even three days after feeding had stopped before going down into the peat. The cocoons of *vitellina* are firm and very small for the size of the pupa, but those of *albipuncta* are very fragile and cannot be moved intact. Both are often attached to the sides or bottom of the tin or to a large lump of peat. The moths of both species emerge at any hour of the day or night.

July in North-Western Spain.

By P. HAIG-THOMAS, F.R.E.S.

In the company of Dr. and Mrs. Higgins, I collected during the month of July in the Cantabrian Mts. We stayed for the first week at the village of Espinama, 3000 ft. above sea level. Espinama lies at the foot of the Picos d'Europa, about 20 kilometres up the valley above Potes. The weather was variable and insects appeared to be late on the high ground. Our chief object in visiting the Picos d'Europe was to obtain series of *Erebia palarica*, *E. astur*, *E. gorge* race *gigantea* and *Plebeius pyrenaica* race *asturiensis*, all of which we eventually obtained. At the end of the first week of July, Mrs. Higgins took the first *E. astur* and *E. palarica*, only one of each. We decided therefore to go for a few days to the Puerto de Pajares. Here *E. palarica* was well out and among other common insects *Anthocharis euphenoides* was still flying fresh; on the last day I took three *E. epiphron* just emerging, as at Espinama *E. stygne* was very common and *E. evias* was still flying. Here again the weather left much to be desired.

We left the Puerto de Pajares on 11th July and motored to Leon and then on to Riaño due south of of Espinama on the southern slopes

of the Picos d'Europa. We collected for an hour or two below and above Riaño. The valley here is excellent collecting ground and it was unfortunate that we were unable to give more time to exploring the locality. We took nearly all the insects, which would be flying at this date at La Granja with the addition of *Melitaea trivia* and *E. palarica* while *Leosopis roboris* was exceedingly common and as large as the central Spanish specimens. After lunching off a delicious dish of fried trout, in an otherwise rather indifferent Hotel at Riaño, we motored back north over the pass into bad weather to Potes and thence to Espinama. During the next two or three days the weather was very bad on the north side. Dr. and Mrs. Higgins motored one day back to Riaño, where they completed their series of the central Spanish insects in beautiful weather, though at Espinama the hills were wrapped in fog. However between the 15th and 20th we had fair weather and went up to the Refugio d'Avilla, a very comfortable and clean refuge or small mountain hotel situated at 6,200 feet above the sea, and surrounded by the highest points of the Picos d'Europa. Within a mile of this refuge we took good series of *E. astur*, *E. gorge* race *gigantea* and *P. pyrenaica* race *asturiensis*. The flowers here were very fine, *Gentiana acaulis* and *G. verna* being at their best.

The Cantabrian Mts. differ much from the Pyrenees, the sides of the hills are clothed with deciduous trees and there are no conifers. Here and there are deposits of conglomerate, where the tall Mediterranean heath grows, otherwise the hills appear to be composed of limestone.

On the 20th July we left Riaño and motored to Jaca arriving there after dark, and the next day after collecting for a couple of hours, where the valley debouches on to the plain, we motored over the pass into France and on to Pierrefitte. Insects swarmed near Jaca, one might have been in the Eaux Chaude valley at Digne. The most interesting captures were two freshly emerged *Polyommatus dolus* and *Epinephele passiphäe*, rather worn, *Melanargia galathea* was common including the ♀ form *leucomelas*, which I had only previously taken at Digne. I was rather surprised to take this insect south of the Pyrenees, we we did not find it on the south side of the Cantabrian Mts., it being replaced by *japygia* race *cleanthe* and *M. lachesis*. On the next day we visited the *E. pytho* locality above Cautarets; it had not however yet emerged. We did, however, find a few worn *E. oeme*, which in 1924, when I last visited the locality, had fully emerged by 21st June a month earlier. A few days were spent in the well known localities at Gavarnie and we were able to add to our series of *E. manto* race *gavarniensis*, *E. gorge* race *ramondi*, *E. lefebvrei*, *E. gorgone* very common, *P. pyrenaica*, *P. orbitulus* race *oberthuri*.

The following is the list of insects taken in Spain.

Parnassius apollo, L.—Three races are described from the Cantabrian Mts., race *ardanazi*, Fernand. from Puerto de Oliva, Espinama, race *kricheldorffi*, Eisner, from the Picos d'Europa, 1800-2000m., and *asturiensis*, Pag. from Asturia (bred from pupae by Pagenststecher). We found *apollo* from 3200 ft. close to Espinama up to 5500 ft. on the Puerto de Oliva, also up to 6500 ft. at the Refugio d'Avila, abundant. It also occurred locally at the Puerto de Pajares, 5000-5500 ft. I can see no difference in my series from these different localities and I suggest that they all belong to race *asturiensis*. This race approaches

very closely to race *aragonicus*, Bryk, from Sierra Alta, the ground colour being almost as white. On the wing throughout July.

Papilio podalirius, race *feisthameli*, Dup.—Not common, but we were late for the spring brood, even on the high ground. Picos d'Europa.

P. machaon, L.—A few fresh on the high ground. Picos d'Europa.

Aporia crataegi, L.—Everywhere common.

Pieris brassicae, L.—*P. rapae*, L.—*P. napi*.

Pontia daplidice, L.—A few only.

Euchloë belia, Cr. race *simplonia*, Frr.—Common, but worn, on the Picos d'Europa; a few at Pajares, 5500-6000 ft.

Anthocharis (*Euchloë*) *cardamines*, L.—Still fresh at 5000 ft. 6.vii. Picos d'Europa.

A. euphenoides, Stdgr.—A few on 9.vii. at Pajares; some still fresh.

Gonepteryx rhamni, L.—Common everywhere.

G. cleopatra, L.—Below Espinama and at Riaño.

Colias phicomone, Esp.—A few around the Refugio d'Avila. I only took two ♂ ♂ and one ♀. These males are less dusted with green than race *oberthüri*, Vrty. from the Pyrenees, which by the way, was very common this year.

C. croceus, Frcry.—Common.

C. hyale, L.—Not common.

Leptidea sinapis, L.—Everywhere.

L. duponcheli, Stdgr.—2 at Jaca.

Erebia epiphron, Knoch.—Abundant locally in the Picos d'Europa, b.vii. 5500 ft. Just emerging at Pajares the same altitude, 10.vii. This race cannot be distinguished from the form at Gavarnie.

E. stygne race *almada*, Fruh.—Is a small *peñalarae*, Chap., and by far the commonest insect in the Picos d'Europa from 2000-6500 ft. At Pajares the insect was more local and somewhat smaller, otherwise identical.

E. evias, Gdt.—Still fresh, and large like *E. evias* from Digne. At Pajares it was smaller.

E. palarica, Chap.—Only one taken near Espinama. Common at several localities, Puerto de Pajares. A few taken at 2500 ft. near Riaño. Found always on conglomerate where the tall heath grows.

E. astur, Obthr.—A single specimen was taken at the end of the first week in July. It was abundant and males getting worn m.vii. flying over rocky screes at 6,500 ft. on the Picos d'Europa. Both sexes are very variable in the size of the spots on the forewing, and in some specimens they were almost absent.

E. gorge race *gigantea*, Obthr.—This fine insect was flying with *E. astur*; the ♂ ♂ common, ♀ ♀ difficult to find. It is very variable in size, but considerably larger than race *raymondi*, Obthr. from the Pyrenees, from which it can easily be distinguished by the broader fulvous-red band on the forewings and the diminution or total absence of spots on the hindwings.

E. tyndarus race *cassioides*, v.Hhmn.—Common on grassy slopes. Refugio d'Avila. 15-20.vii.

Melanargia galathea, L.—Only on the north side of the watershed of the Picos d'Europa, and at Jaca where the ♀ form *leucomelas*, Esp. also occurs.

M. lachesis, Hb.—On the southern slopes of the Picos d'Europa, common locally.

M. japygia race *cleanthe*, Bdv.—In the same localities as *lachesis* but much more widely distributed.

Satyrus alcyone, Schiff.—Just emerging at 4000 ft. Picos d'Europa, 19.vii. also common at Jaca.

S. actaea, Esp.—Very common at Jaca. 21.vii.

Hipparchia semele, L.—Not common.

Pararge aegeria. L.—*P. megera*, L.—*P. maera*, L.—*Epinephele jurtina*, L., common.

Epinephele lycaon, Roth.—Common at Jaca.

E. tithonus, L.—Common at Jaca.

E. passiphaë, Esp.—Common but worn at Jaca.

Aphantopus hyperantus, L.—Common.

(*To be concluded.*)

Lepidoptera in Denmark, 1935.

By Dr. HOFFMEYER.

(The Author's summary of his notes contributed to "Flora og Fauna" in 1935.)

It deals first with *Arsilonche albovenosa*, which was taken in Denmark for the first time. Next with *Nola centonalis* (*N. albula* has not been taken in Denmark). *N. centonalis* occurs in Denmark only in the extreme east, Bornholm, and in the extreme west, Fanö and Römö. A series of figures gives the paler, lightly marked forms from the former locality, while another series of figures gives the heavily marked form, race *holsatica*, from the latter areas. The next paper gives an account of "A Night on the Mose of Fröslev." This is a moor traversed by the frontier between Denmark and Germany not far from Flensborg. From this locality I mention *Heliothis dipsacea*. In 1891 only one specimen was known from all Denmark; now the species is known to be well distributed all over Jutland. Fröslev is the only inland locality for *Mesotype virgata*, which occurs commonly in many places on our coasts. The beautiful *Panthea coenobita* is new to Jutland; hitherto it has been known only from East Denmark: Bornholm, Seeland, Moen and Lolland. It seems to have invaded Jutland from the south. In North Germany it is plentiful in the east (East and West Prussia); in the vicinity of Flensborg only from 1890, near Lubeck from 1929. In Norway, Sweden and Finland, but in Norway and Finland only in the south. Probably the species will have a future in the many new plantations in Jutland. *Hadena funerea* (more correctly *H. aquila*, Donz. subsp. *funerea*) was very common on sugar in both 1934 and 1935. Frölev is the most northern locality hitherto known for this species. A few specimens of *Miana captiuncula* were taken in both 1934 and 1935. Before that it was only known in Denmark from Bornholm. The distribution of this species in northern areas seems to be very general. (*a*) Sweden Öland and Gothland (the large isles in the Baltic) and a few localities on the mainland coast; Finland (Äbo), Ösel and Estonia, Latvia and Bornholm. (*b*) Mitteldeutsche Gebirgsgegenden" Harz, Schlesien, Jena with long intervals through Württemberg and Bavaria to the Alps. (*c*) Great Britain, northern England and localities in Scotland.* (*d*) Two localities in

* And N. Ireland.—E.A.C.

Schleswig, *viz.*, Frösley on Danish, and Bredstadt on German ground. The species is certainly not a post glacial relic; but what then? *Phibalapteryx polygrammata* had only been taken in one locality in Denmark by Harsem on the east coast of Jutland about 1865, in rather large numbers; which locality has been spoiled long ago. It was a pleasure to me to find the species again in Frösley, in both 1934 and 1935. In 1909 a specimen was taken in the vicinity of Flensborg. In Sweden it has been found in some few localities; it is unknown in Norway, Finland and the Baltic States, very rare in Northern Germany, few localities and rather few specimens from Old-Prussia to Mecklenburg, but not in the North-west corner of Germany. From England it was known from Cambridge, but is, as I suppose, now extinct. *Boarmia secundaria.* Denmark is rather rich in *Boarmia* sps.; it is most curious that *B. ilicaria* occurs on our isles (Funen, Lolland, Falster), the next localities being far away in W. Germany. In Froslev *B. secundaria* was taken in 1934 and was by no means rare in 1935. I suppose this species is widening its area towards the north. About 1915 it was found in Lolland, in the 1920'ies in Moen, in 1930'ies in South Iceland, in 1935 in South Funen, by Frösley in 1934 and 1935. This is its northern limit; but German friends tell me, that they, too, have taken it in 1934 and 1935. (Ratzeburg by Lübeck, and Usedom by Stettin.) Among other varieties in Schleswig I took in the neighbourhood of Tönden (Fondern) the fine species *Amphipyra perflua.*

NOTES ON COLLECTING, etc.

Micro collecting in March.—Of the many species of Micro-lepidoptera, which pass the winter in the larval stage, quite a number can be obtained in March, still feeding or spun up for pupation in reed-heads, stems and roctstocks of various plants.

In their somewhat restricted localities *Euzophora cinerosella* and *Eucosma pupillana* are to be found in stems and roots of Wormwood; the larvae of the former species feed in the crown of the root and mine up the stems, the latter in the root-stock only. The stems and roots are exceedingly tough so that a strong trowel and a sharp knife are almost indispensable to obtain a supply.

Oak-galls—the soft spongy variety, not the hard round ones—collected in March will probably contain the larvae of *Pammene gallicolana*, *P. argyrana*, *P. splendidulana* and *P. fimbriana.* I have noticed that *P. gallicolana* occurs chiefly in the galls on small oak trees—up to about 15 feet in height; the other three species in galls on larger trees. The best method of treatment, I find, is to spread the galls in a thin layer on sand in a moderately deep seed box; the box should be kept out of doors under cover and the galls watered occasionally during dry weather.

The larvae of *Endothenia nigricostana* are common in most districts feeding in the stems of *Stachys sylvatica.* If a stem be opened it can readily be seen whether it contains (or has contained) a larva, but it is best not to open the stems. In cold weather the larvae will be found low down, sometimes in the roots. In mild weather it will be higher up. It pupates in the stem just above the root. This species like many others, is more easily obtained in the larval stage.

Seed heads of the Carline thistle growing on downs can be collected in March for *Metzneria carlinella*. Three or four larvae are sometimes to be found in a single seed head. *M. lappella* can be obtained in seed heads of burdock and *M. neuropterella* and *M. metzneriella* in seed heads of Knapweed. The last two species, however, are better collected in the autumn, as by March a large number of the seed heads have been emptied by birds.

The larva of *Gelechia domestica* can still be found at the end of March (and later) feeding on moss growing on walls about 5 or 6 feet from the ground. Occasionally—more frequently in the early morning of damp days—the larvae are on the outside of the moss and are then easily seen. Usually only about one-third of the larva is exposed and is not at all easy to see. It quickly retreats into its slight silken tube, if disturbed by the breath of the collector, or the smoke from his pipe. In cold and windy weather the larva remains in its tube.—L.T.F.

[According to Wood (*E.M.M.* XXV. 219-220, 1889) the larva of *gallicolana* is found in the galls in Sept.-Oct. and leaves them to spin up outside when the galls become wet with the winter rains. The larva of *splendidulana* is a leaf-feeder, sometimes entering the galls to spin up.—T.B.-F.]

The "Colorado Beetle."—J. C. F. Fryer, M.A., Director Plant Pathological Laboratory at Harpenden has just issued his Report on this pest for the year 1935. In spite of the unusual difficulty caused by the disastrous frost in May to the potato plants, there was no record of its occurrence during the year. A living beetle was captured on a lighter in the Surrey Docks, under circumstances suggesting that it had just arrived from America in one of the American vessels near by. It was immature and had probably come over in the pupa stage and had recently emerged.

Agrotis ipsilon, Hufn. (suffusa, Hb.)—Referring to Dr. Cockayne's remarks on *Agrotis ipsilon*, (*Ent. Record*, XLVIII. 2). Some years ago I was in S. Devon at Easter and captured two rather worn males at sallow bloom. I also collected some larvae among a large quantity of other larvae found on grass and low plants on the cliffs. These were only a quarter grown and appeared to have hibernated. I did not recognize them until they got larger. They produced moths early in July. I have also taken the imagines in Devon in July and presume these are the parents of the September brood.—H. M. Edelsten, Bramble Hill, Sussex.

Date of emergence of Polyommatus coridon, Poda., at Dompierre. —Your correspondent in the February number of this journal does not state the date on which he failed to find *P. coridon* at Dompierre-sur-Mer last year, but it may be of interest to some of your readers to give my experience there.

I visited Dompierre-sur-Mer in 1928 and 1929, and Angoulême in 1930. Between 28th and 31st August, 1928 at Dompierre I found both sexes of *P. bellargus* abundant, but beginning to go over. *P. coridon* was far less common, and I was evidently too late for it, as specimens of both sexes were worn. I only took about 9 blue females of the latter species.

Between 14th and 16th August, 1929, I found both sexes of *coridon* very abundant and fresh, but only took a few *bellargus*, these being also quite fresh. On 7th August, 1930, at Angoulême I found a few males of *coridon* but no females, and no sign of *bellargus*. I therefore came to the conclusion that 15th August is about the right date in that part of the world to hunt for *coridon*, the date for *bellargus* being probably about a week to ten days later.

The correct names, by the way, for the blue females of the races of these two species found in that part of France are not *ceronus* and *syngrapha*. The local race (or sub-species ?) of *coridon* is known as *galliae*, Obthr., that of *bellargus* is known os *coelestis*, Obthr. Both are described and beautifully figured in Oberthur's *Etudes de Lépidoptérologie Comparée*.

Coelestis is quite different from *ceronus*, as will be seen by comparing them. The blue females of *coridon* f. *galliae*, also I think figured by Gerhard under the name of *mariscolor*, do not differ much from *syngrapha*. I found at Dompierre that the proportion of blue females to brown was about two to one in the case of *coridon*; the numbers were about equal in the case of *bellargus*. In both species the females were definitely either brown or blue, I never saw any intermediates.—B. H. Cooke (Brig.-General) (F.R.E.S.). Inniscrone, Datchet, Bucks.

The Life-History of Asilus crabroniformis, L.—In reply to Mr. Bainbrigge Fletcher's query in his note on this species (*E. Record*, Vol. 48, p. 10) there is a very full monograph on "The Biology of the Swedish Asilids": by Douglas Melin. This appeared in the *Zoologiska Bidrag*: *Från Uppsala*: Band VIII: 1923. It is written in English, some 300 pages with many text figures and is thoroughly comprehensive. In a section on "The mode of nutrition of the larvae," pp. 257-271, the author comes to the conclusion that "on the strength of observations made on the larvae of the "robber flies" both in nature and in the laboratory, and on the strength of the nature of their mouth parts and the contents of the intestines, we must for the present follow Dufour in holding that these larvae are in the main adapted for vegetable nutrition."

In the case of the *crabroniformis* he had, however, only seen three larvae, and it is to be hoped that Mr. Bainbrigge Fletcher or some other worker in localities, where *A. crabroniformis* is common, will be able to obtain larvae and work out the life-history in this country.

Melin's work is in the library of the Royal Entomological Society and also in that of the South London Entomological Society.—H.W.A.

Schiffermuelleria grandis in Somerset.—*Schiffermuelleria grandis* seems to be very little known in England. It was originally described (*Entom.* I. 342: 1842) by Desvignes from three specimens from Bewdley Forest. Bewdley is in Worcestershire but Wyre Forest extends into S.E. Shropshire. It was afterwards recorded from N. Wales by Ashworth (*Zoologist*, p. 4814) and on 2nd June, 1883 from Needwood Forest, near Burton-on-Trent, Staffordshire, by Sang (*E.M.M.* XX. 41-42: 1882). In Meyrick's *Revised Handbook* it is noted only from Worcestershire, Staffordshire and N. Wales. It was therefore interesting to find an unnamed specimen of this species in

the late Mr. A. L. Rayward's collection of Microlepidoptera, this specimen being labelled as having been taken by him at Minehead, Somerset, on 26th June, 1934, as this locality indicates a considerable extension of its known range in England. The larva has been recorded to feed in decayed wood and under dead bark of oak and beech. This species may therefore be expected to occur in our Gloucestershire beech woods and in other suitable localities in south England. On the Continent *S. grandis* has been recorded from France, Switzerland, Germany, Austria and Carinthia. The moth is stated to fly in the warm sunshine, from 10 a.m. to 1 p.m. (sun time), at the end of May and in June, in N. Wales.—T. Bainbrigge-Fletcher, Rodborough, Glos., 15*th February*, 1936.

CURRENT NOTES AND SHORT NOTICES.

Some twelve months ago the death of the well-known versatile artist J. C. Dollman, was announced at the age of 84. In one part of his life he was an enthusiastic entomologist, but pressure of work and interests in other subjects prevailed and he gave his collection to the British Museum. Our late editor possessed a very beautifully executed drawing of the larva and pupae of *Daphnis merii*, which was reproduced in vol. IV. of *British Lepidoptera* facing p. 489.

The Collection of British Lepidoptera of the late Mr. R. H. Barker of Hull is at the Municipal Museum, Hull. It is contained in two cabinets and among other species there is a specimen of *Chrysophanus dispar* and a fine series of the very local clouded form of *Abraxas sylvata*, now said to be extinct in the district.

In the last part of the *Ann. Soc. ent. France* is published the 4th and last portion of "Catalogue of the Lepidoptera of the Pyrenees," which was commenced in 1932. We regret to learn that only a few weeks ago the author, M. J. P. Rondou, passed away at the age of 76, before seeing this final portion of his work published. This section deals with the Pyrales and Micros.

M. Léon Lhomme, the editor of *Amateur de Papillons*, having finished the Macro-lepidoptera in his "Catalogue des Lépid. de France," has just issued the first 164 pages dealing with the Micros, carrying out his intention not to publish in small parts but in larger sections. It deals with the *Phycitinae*, *Crambinae*, *Schoenobiinae*, *Aglossinae*, *Nymphulinae*, *Scopariinae*, *Pyraustinae* and *Galleriidae*.

Dr. Martin Hering, who for some years has been investigating the life-histories of mining larvae, and at intervals has distributed a very valuable Herbarium of mined leaves, has begun the issue in parts of a volume *Die Blatt-Minen Mittel und Nord-Europas*. There will be 6 parts which will comprise over 500 text figures and 7 plates. The arrangement is analytical throughout on a plant basis. *Abies*, with 5 species : *Acer*, with 20 species : *Achillea*, with 14 species ; and so on.

Our good friend Dr. Walther Horn is issuing in 2 parts a second and much enlarged edition of a List of the final destination of all the collections of Insecta of all Orders over the whole world. A valuable volume of reference in years to come. The first part contains 16 plates of figures of labels in the handwriting of a very large number of world known collectors.

The publication, through the pages of *Lambillionea*, of Addenda and

Supplement to the "Catalogue of the Lépidoptères de Belgique," begun by the late M. J. Lambillion, has now been completed and forms an excellent book of local reference.

In the 1934 *Report of the Smithsonian Institute* U.S.A. recently received, the only article which specifically interests us is that on "Arctic Butterflies" by A. H. Clark. It is illustrated by 7 plates with many figures. The facts collected and the conclusions arrived at show that wherever conditions are sufficiently moderate for vegetation, there will the Lepidoptera be found, although winter temperature may go as low as 60° below zero, if few days of summer sun allows a period without frost at night.

The volume of Seitz dealing with *American Bombyces* is rapidly nearing conclusion and will when completed comprise considerably over 1000 pages with nearly 200 plates. The volumes dealing with African Noctuae and African Geometers have been commenced. This colossal work was commenced in 1906 and 17 volumes were projected, 4 (Rhopalocera, Bombyces, Noctuides and Geometers) for each continent, and 1 for general entomological information. Of these volumes no less than 9 have been completed with 2 of four supplementary volumes subsequently added.

A meeting of the Entomological Club was held at 332, Great West Road, Heston, Middlesex, at 7.30 p.m. on the 11th December, 1935, Mr. Horace Donisthorpe in the Chair. *Members* present in addition to the Chairman :—Mr. Jas. E. Collin, Mr. R. W. Lloyd. *Visitors* present :—Rev. E. B. Ashby, Mr. R. B. Benson, Mr. de A. Donisthorpe, Dr. Karl Jordan, Mr. J. F. Perkins, Mr. W. Rait-Smith, and Capt. N. D. Riley. A very pleasant and entertaining evening was spent.—H. Willoughby-Ellis, *Hon. Secretary.*

The Verrall Supper meeting, under the suspices of The Entomological Club, was held at the Holborn Restaurant on 14th January, 1936.

The meeting was called for 6.30 when the usual conversazione was held in the reception room, and supper was served at 8 o'clock—Mr. H. Donisthorpe in the chair.

174 acceptances of the invitations issued were received and 172 sat down for dinner. This was four less than last year and there were some noticeable absentees. Mr. G. T. Bethune-Baker, who has always taken so much interest in the gathering, was unable to come. Mr. F. W. Frohawk, who has not missed an attendance for 45 years, was unfortunately still too ill to be present, and Sir E. B. Poulton, who is the sole survivor of those who were invited to the first supper given by Mr. Verrall in 1887, was absent abroad.

After the toast of the King and the silent toast of Mr. Verrall, the founder, the guests freely intermingled at the tables and continued to spend a most enjoyable evening.

The gathering continues to be very successful and it is understood that a considerable number of Entomologists are anxious to join the gathering and become subscribers, and it is necessary here to state that no invitations can be issued without first applying to Mr. J. E. Collin of Raylands, Newmarket, the Verrall Supper Member of the Entomological Club, who is responsible for the whole of the organization.

Appreciation was expressed on all hands of the excellent arrangements which were very complete, and Mr. Collin is to be congratulated on the great success of the gathering which every year is due to his forethought and organisation.

172 were present.—H.W.-E.

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.

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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *fuscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

Change of Address.—Dr. Malcolm Burr, The Hermitage, Dorney, Windsor.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 18th. April 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 26th. April 9th—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Entomological Congress, Cambridge, 1936.

THE SOCIETY FOR BRITISH ENTOMOLOGY announce that they have accepted an invitation from the CAMBRIDGE NATURAL HISTORY SOCIETY to hold the 1936 Congress in the City of CAMBRIDGE. The dates selected are from the evening of the 26th to the 29th June, 1936, 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. A. D. Imms, D.Sc., F.R.S., F.R.E.S., University Reader in Entomology, President of the Society for 1936, will preside, and will deliver his Presidential Address. A number of interesting Papers will be read and discussed; the collections of the University Museum, and the Exhibits brought to the Congress will be available for inspection; there will be a Conversazione; a Dinner and two Luncheons in College Halls; a Field Meeting at Wicken Fen with an *al fresco* Tea; and perhaps other items.

Visitors are invited to bring Exhibits, for the display of which facilities will be provided in the University Museum; 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 College buildings or in Lodging-houses (for both sexes, but separately) will be available at low rates, and may be reserved when completing the Form of Application to be issued with the Programme. The cost of attending the Congress need only therefore be small.

A detailed Programme with full particulars and directions 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:—

E. RIVENHALL GOFFE, Hon. Sec.,
102, HIGH STREET,
SOUTHAMPTON.

Effects of the Temperature on the Development of Pieris brassicae, L.

By ORAZIO QUERCI.

My wife, who since 1896 has followed the joys and sorrows of my entomological "game," reared the larvae, observing their lives.

I. Records Concerning the Development in Portugal.

(1) In November and December, 1932 (mean temperature 55° to 60° F.) some *Pieris brassicae*, L. were on the wing laying eggs.

(2) On 16th December we took a cabbage with more than a hundred larvae, which we reared in cages. At the beginning of January (max. 59°, min. 46°) those larvae grew and matured slowly.

(3) Only six larvae, kept in direct sunshine, pupated with difficulty from 2nd to 5th January (max. 58°, min. 50°).

(4) All the other larvae died from the attacks of *Microgaster glomeratus*, L.

(5) From January to 6th March (rarely max. 60°) no pupae emerged. On 7th and 9th March (max. 60° to 63°) two pupae produced males and both sexes emerged on the 13th and 15th (max. 64°, min. 50°). In the country, in spite of the parasites, a large emergence occurred from 5th February to 13th April and some worn adults flew until the 21st.

(6) From 8th February to 11th March we put into cages, with florid food-plants, some females which laid a few eggs, but these did not hatch although the weather was fine. On 12th March a female laid many eggs both in the morning (50°) and afternoon (55°). From 13th to 19th the maximum varied between 56° and 64°; on the 20th (max. 67°) the eggs turned dark and on the 21st (63° to 70°) they hatched gradually during the whole day.

(7) The larvae had hatched by day but not at the same time and they stopped, to change their skin, at different hours of each day on which they moulted. From 22nd to 30th March the daily temperature varied between 63° and 49°, being over 55° from about 10 a.m. to 4 p.m., and in this period the larvae moulted in a few hours.

(8) Other larvae, which commenced to moult after 2 p.m., were caught by the cold before they had time to change and remained dormant until the day following. From the longer pause without feeding they grew less than the others of the same batch.

(9) On 31st March (66°) the larvae were very active and those, which, not becoming dormant, had grown more rapidly, became full-fed.

(10) On 1st April it was about 54° for the whole day and the larvae which matured became dormant. They hung up on the 3rd (70°) but needed two days to form brown pupae.

(11) Most larvae, which matured on 3rd to 6th April (above 65° for several hours every day), hung up at once and formed green pupae in a few hours.

(12) From 2nd to 6th April, 53 both green and brown chrysalids were formed in our cages.

(13) The bright green pupae which were formed rapidly on 5th April (max. 71°) emerged on the 20th and 21st while other green pupae, formed more slowly on the 2nd (64°), produced adults on the 23rd.

(14) From 20th to 23rd April (max. 70°, min. 49°) 19 green pupae emerged at home. On the 24th it was 75° with high vapour pressure and any emergence ceased for a week. The last six green chrysalids in our cages produced adults at the beginning of May when the maximum decreased to 62°. From 6th to 11th May, although the climate was suitable, no other *brassicae* emerged from the brown pupae which had remained in our cages. Afterwards it was very hot.

(15) On 20th May we went to Spain where the brown pupae emerged from 14th September to 12th October, after that the intense heat had ended.

(16) Around Lisbon the second brood began to emerge 16 days later than at home and we cannot explain why that happened. Some adults were on the wing from 6th to 11th May and the emergence ceased as soon as the heat rose suddenly to 85°.

(17) The home-born *brassicae* did not mate in our cages, but a female taken in the country laid about 80 eggs on 8th May (max. 70°, min. 57°) which hatched on the 13th (max. 84°).

(18) Those larvae grew rapidly; however, on the 17th it was 89° and all of them rotted.

II. Records Concerning the Development in Greece.

(19) At Salonika the early brood adults were on the wing from 21st March to 21st April and a female laid many eggs from 11 a.m. to 4 p.m. on 23rd March (60° to 70°). Afterwards the weather was fine for a week but on the 30th it turned cold. In spite of that some eggs hatched in the morning (52°) and the others in the afternoon (48°) of that day.

(20) On 1st April it snowed (min. 31°); the young larvae became dormant and turned active on the 3rd (55°).

(21) From 6th to 9th April the temperature varied daily between 68° and 45°; some larvae moulted in a few hours (record 7), others in about a day (record 8), and the former became bigger than most of the same batch.

(22) On 11th April it was a little hot (79°) with high vapour pressure and the larvae were caught by stupor. On the day following (max. 71°) they became active.

(23) On 20th April it was about 64°, with low vapour pressure, for the whole day, and the larvae were very active.

(24) On 22nd April (about 60° for the whole day) the growing larvae remained active while those which matured became dormant. On the 23rd we put the dormant larvae in direct sunshine (85° to 92°) and they hung up in the afternoon (67° in the shade). After suspension they delayed to pupate until the afternoon of the 24th (70°) taking about 54 hours, since they had become full-fed, to form brown pupae.

(25) Three larvae matured at noon of 23rd April (67°) and hung up at once but later the heat decreased and they remained inactive and formed green pupae, in about 23 hours before noon (70°) of the 24th. Other larvae matured on the 25th and 26th (69° to 74°) and formed bright green pupae in almost 6 hours. On 28th April (max. 74°, min. 50°) seven larvae, which had delayed longer than the others to grow, hung up and pupated in 10 to 12 hours.

(26) At the beginning of May it was on an average max. 63°, min. 46°; on the 9th the heat increased (73°) and the day following some bright green pupae emerged. On the 12th it was 76° and the pupae suspended to produce adults, but afterwards, until the 18th, the maximum varied from 68° to 74°, reaching only once and for a short time to 76°, and all the chrysalids in our cages, even the brown ones, emerged. They had been produced by the eggs laid on March 23rd and had met with the best climatic conditions from 13th to 18th May. In the country, eggs were laid until 21st April (record 19) and the last formed pupae, being altered by 83° heat on 19th May and again by 90° heat on the 27th and 29th, should have remained dormant, as occurred at Lisbon (records 14, 15, 16).

(27) From 10th to 16th May we kept in a large cage, with flowery foodplants and at moderate radiant heat, about a hundred home-born *brassicae* and only two females mated laying very few eggs, which did not hatch. Afterwards we went to collect every day into the country and had no more time to rear larvae.

III. General Conclusions.

(The figures in parentheses refer to the records.)

Eggs.—Some females taken in the country laid upon the plants in our cages more than a hundred eggs on a day (6, 17, 19); others died without laying. The home-born females rarely mated (17, 27) and the few eggs which they laid never hatched. At a medium heat the eggs hatched after nine days; when the heat increased they hatched after either seven or five days (6, 17, 19).*

Growing Larvae.—Below 50° they became dormant and turned active only when the heat increased (20); between 50° and 77° they were more or less able to feed; above 77° they were caught by temporary stupor (22) and above 87° they collapsed (18).

Moulting Larvae.—To change their skin the larvae needed a higher temperature than that at which they were able to feed. At 60° to 83° they changed in a short time and between 55° and 60° they changed at a slower rate (7, 21, 23). Either below 55° or above 83° they became dormant, turning active when the climate became suitable, and moulting in about a day (8, 21, 22). That happened in any moult and the larvae, which most often became dormant, were the last, in any batch, to become full-fed.

Mature Larvae.—The full-grown larvae needed to hang up at a still higher temperature than that at which they were able to moult. Between 63° and 85° they hung up after a more or less short time (11, 25), but if it was below 63° after the larvae matured they became dormant and turned active as soon as the climate was suitable (10, 24).

Suspended Larvae.—When the temperature remained for some time above 65° after the larvae had suspended, those, which had avoided

* For other species of polygenetic (Scudder) butterflies we have remarked that only the adults of the early broods among them mated, while those of the last broods mated, but in mixed relation. In Morocco we had in a cage more than 200 pure-line *Pieris rapae*, L., of the fifth brood and none mated in spite of the fine weather. In Pennsylvania some *Papilio polyxenes*, F., both of the third and fourth broods emerged altogether, in separate cages, at mid-September, 1932, and did not mate; however, they paired when we exchanged the males.

becoming dormant in a mature stage, shed their skin without difficulty and formed green pupae (11, 25); however, if the heat decreased below the point of pupation the suspended larvae remained inactive until the heat increased and they formed either green or brown pupae in accordance with the duration of the inactivity in the suspended stage. Even in the most suitable climatic condition, the larvae which had been weakened by becoming dormant in a mature stage delayed longer to recover and to form brown pupae (3, 10, 24).†

Remarks.—The figures which we record as to be the limits of activity and vitality of the growing, moulting, mature and suspended larvae are not absolute. They refer to caterpillars reared generally in the shade, because when the cages were put in direct sunshine the larvae became very excited above 100°. In the country the matter should be different and more complex from the effects of the radiant heat, wind, humidity, nebulosity and grade of intensity of the vegetation, but, with the poor means at our disposal, we have not been able to study the influence of those factors.

Active Pupae.—The green pupae, formed in a short time, were the earliest to emerge in any of our broods. Sometimes they produced adults in about a fortnight (13, 26).

Dormant Pupae.—The brown pupae, formed with difficulty by the weakened larvae (3, 10, 24) emerged after the green ones when the temperature remained long below 77° (26).

Altered Pupae.—At 75° or 76°, if other climatic factors were favourable, both the active (green) and dormant (brown) pupae delayed to produce adults. The altered green pupae turned active when the climate settled at a suitable range (14) and when the temperature remained long at the optimum range both the green and brown pupae produced adults (26). As the result of a further alteration the brown pupae remained the whole summer in a dormant state and emerged in the fall (14, 15, 26).‡

Adults.—More or less active pupae were formed in any batch together with the dormant ones (10, 11, 12, 24, 25) and the chrysalids which delayed longer to emerge were often altered by the changes of climate (14, 26). The different initial grade of activity of the pupae and the further alterations of some of them produce the scattered emergence of adults of any batch. At Lisbon, in 1933, the early brood of *brassicae* emerged gradually during 68 days (5). Some pupae of the second brood emerged for six days in May, the others delayed emergence until the fall (16). A third brood was able to develop, because in autumn the climate is very lovely in Southern Portugal. Both in 1927 and 1932 we collected there and took some fresh *brassicae* until the beginning of December (1). At Salonika the first brood was on the wing for a month (19); the second for about a fortnight in May (26) and again for almost ten days in September. Afterwards pupae of a third brood were formed but we did not notice their emergence.

† Amongst the caterpillars, which we have reared, those of some *Papilio* and *Pieris brassicae* withstood better a period of remaining dormant. The mature larvae of other butterflies and moths scarcely ever recovered after being dormant about a day.

‡ The dormant (brown) pupae of the *Euchloë* and some *Papilio* never emerged in the year in which they were formed. All those which we have handled went over the winter, and sometimes they emerged after two years.

Control of the Abundance.—The larvae of *brassicae* resisted the cold better than those of the other *Pierinae*, which we have reared. The heat killed all the larvae of the third brood which hatched in May (18) and the species was carried on by the dormant pupae (14, 15, 26). Those which pupated in the open country should have died when, in summer, the temperature of the barren soil reached sometimes 150°, according to the data of the Weather Bureau, and only the chrysalids lying in the most sheltered and moist places were able to resist. In winter the pupae were not injured by the cold either at Lisbon (min. 32°) or Salonika (min. 28°). The climatic factors would not be sufficient to balance the great fertility of *brassicae* and a severe control is effected by the parasites which kill the larvae (4), and by the ants and other insects which eat the pupae.

Some Cumberland Sawflies.

By T. F. MARRINER.

This has no pretension of being regarded as a County List. It is merely an account of such sawflies as I have come across whilst hunting Coleoptera. The area covered in my outings is enclosed by a line from the coast near Maryport through Penrith to the Pennines, along the Northumberland and the Scottish Border lines to the Solway. This is the northern plain of the county. The collecting dates from 1921 to a couple of years ago. During a portion of that period I lived not far from the late Mr. G. B. Routledge and I was his companion and pupil on many a pleasant excursion. It was, indeed, Mr. Routledge who originally advised me to take such insects as bees, sawflies, etc., as I came across them, and he advised me as to where I could get my captures named. To him, to Dr. Perkins and others I owe a deep debt of gratitude for kindly help and encouragement.

When I came to go over my little collection of the Sawflies for the purpose of writing up a list for the *Ent. Record*, I found that, since some of my captures had been named for me, changes had taken place and that some, at any rate, of my names were out of date. None of our local entomologists could help me and I wrote to Mr. Hy. J. Turner pointing out my difficulty, and asking for advice. Mr. Turner has very kindly offered to put me right and I am very grateful to him.

Neurotoma flaviventris, Retz.—This I have come across on one or two occasions and have also bred from larvae taken from the webs where they congregate.

Pamphilius silvarum, Steph.—Fairly common in the Brampton area where, along with

Pamphilius hortorum, Kl.—May be netted on the wing in June.

Pamphilius depressus, Schrnk.—Not so common. Have only taken the ♀.

Cimbex femorata, L.—I have never seen this but include it on account of an interesting old-time record. Mr. T. C. Heysham took it at Carlisle in 1835.

Sirex gigas, L.—I have this from three areas of the county, widely apart. I took one at Heads Nook in the east in 1925, one at Floriston in the north in 1928, and had a specimen sent to me from the vicarage

garden at Drigg in the south west, in 1930. Curiously enough all these are ♀.

Sirex noctilio, Fb.—Of this I have two specimens, a fine ♂ brought to me from a Carlisle timber yard, and a ♀ found among some firewood logs bought from a timber yard. These are doubtless specimens imported to the area.

Trichiosoma latreillei, Leach.—I came across this on one or two occasions at Cumwhitton in 1925 and took both ♂ and ♀.

Trichiosoma tibiale, Steph.—Fairly common in some years on hawthorn but have only taken ♂.

Abia sericea, L.—Near Tarn Lodge, 1925, on Devil's Bit Scabious (*Scabiosa succisa*, L.).

Abia fasciata, L.—Fairly common but not so often seen as the preceding species.

Arge ustulata, L.—I very often came across this in July.

Lophyrus pini, L.—Seems fairly frequent on Scots fir.

L. sertifer, Geoffr.—Often met with in our pine woods.

Trichiocampus ulmi, L.—Only one or two specimens, taken at Floriston, north of Carlisle 1921.

Croesus septentrionalis, L.—Does not seem to be common nor to have any special plant. Got by sweeping low herbage near Lanercost.

Holcocneme erichsoni, Htg.—Fairly frequent on Larch trees.

Nematinus fuscipennis, Lep. (*abdominalis*, Panz.)—Found occasionally here on alder.

Nematinus acuminatus, C.—On birch, Cumwhitton 1925.

Pteronidea ribesii, Scop.—Too common in some years. In 1914 the gooseberry bushes in some gardens to the north of Carlisle were practically rendered leafless by this.

Pteronidea myosotidis, F.—Appears to be much rarer than the preceding species.

Pteronidea oligospila, Först.—Not so plentiful as the last two species, but not rare.

Amauronematus histrio, Lep., and *A. viduatus*, Zett.—Only taken in one locality, near Lanercost.

Pachynematus clitellatus, Lep. (*capreae*, Pnz.) (=*imperfectus*, Zadd.), *P. xanthocarpus*, Htg., *P. vagus*, F. (=*leucogaster*, Htg.)—Of each of these I have only single specimens.

Pristophora pallipes, Lep.—Appears to be widely spread though nowhere very common.

Lygaeonematus mollis, Htg.—This does not appear to be a common species with us.

Fenusa pumila, Kl. (*pygmaea*, Kl.) (=*betulae*, C.)—Fairly common but apparently local.

Calirsa (*Eriocampoides*) *limacina*, Retz.—A very rare species here apparently.

Holocampa testudinea, Klug.—Swept among rushes, Cumwhitton, 1925.

Mesoneura opaca, F. (=*Dineura verna*, C.)—Near Dalston, 1923.

Periclista albida, Kl. (*melanocephala*, F.)—One specimen in my garden at Kingstown near Carlisle, 1931.

Tomosthetus luteiventris, Kl. (=*fuscipennis*, C.)—Got fairly commonly when sweeping among rushes, Cumwhitton, 1925, Dalston, 1923.

Athalia lineolata, Lep. (=*rosae*, Kl.)—On Bugle (*Ajuga reptans*) and other low growing plants in Netherby woods, 1930.

Selandria serva, F.—Met with in several localities in June.

Selandria strammeipes, Kl.—Scaleby, 1922.

Strongylogaster lineata, Christ. (*cingulata*, Fb.)—Have only taken the ♀ of this, but it appears to be fairly common among bracken in various localities here.

Stromboceros delicatulus, Fall.—This pretty but frail looking species also occurs among bracken here, but is not so commonly met with as the last named species.

Empria (*Poecilosoma*) *liturata*, Gmel. (=*submutica*, C.)—I have only taken one specimen of this.

Allantus (*Emphytus*) *togatus*, Pnz. (=*succinctus*, Kl.) and *A.* (*Emphytus*) *calceatus*, Kl.—Both taken sparingly while *A.* (*Emphytus*) *pallipes*, Spm. (*grossularia*, Kl.)—seems fairly common in every part of the area.

Taxonus agrorum, Fall.—In some years this is fairly common on Germander speedwell (*Veronica chamaedrys*) in June.

Ametastegia (*Taxonus*) *globratus*, Fall.—Probably our commonest sawfly for it appears in the sweep net at almost any time between June and September.

Loderus vestigialis, Kl.—Is rather local in occurrence but quite plentiful where it is found on sallows in May.

Dolerus madidus, Kl. (=*lateritius*, C.)—Seems to be rather scarce.

Dolerus pratensis, L.—A few specimens swept among long grass, along with *Dolerus gonager*, F., in May and June.

Dolerus palustris, Kl. and *Dolerus puncticollis*, Thoms., were taken at Scaleby in 1930.

Dolerus haematodes, Sch.—One of our largest species; was fairly common in 1921, but I have no later record of it.

Dolerus picipes, Kl.—Seems to be fairly common and widely distributed in the area.

Dolerus aeneus, Htg. (=*elongatus*, C.)—Not scarce.

Sciopteryx costalis, F.—Armathwaite, 1925.

Rhogogaster punctulata, Kl.—This stands out as my only sawfly capture during 1924, which was a very bad collecting year in the area, with very few days when collecting outings were possible.

Rhogogaster fulvipes, Scop, (=*lateralis*, C.)—Got on two occasions from aspen in June.

Rhogogaster aucuparice, Kl. (=*gibbosa*, C.)—Not a common species with me.

Rhogogaster viridis, L.—This seems to be one of the commonest species here.

Pachyprotasis variegata, Fall.—Apparently very rare. Have only taken one specimen.

Pachyprotasis rapae, L.—Fairly common.

Macrophya punctum-album, L.—A pretty little insect, which I have occasionally got from privet in June and July. All my specimens are ♀.

Macrophya albicincta, Schrnk.—Two specimens from alder near Carlisle in June, 1932.

Tenthredo (*Allantus*) *scrophulariae*, L.—This pretty wasp-like insect is not scarce here.

T. (*Allantus*) *arcuata*, Först.—Fairly common on umbelliferous plants in August.

T. (*Allantus*) *amoenus*, Grav. (=*cingulum*, C.).—Apparently very rare. Have only taken the ♂.

Tenthredella temula, Scop. (=*bicincta*, F.).—Not rare.

Tenthredella olivacea, Htg.—The commonest species of the genus here.

Tenthredella mesomelas, L.—Wreay, 1921.

Tenthredella colon, Kl.—Have only taken a ♀ here.

Tenthredella atra, L.—Have only taken var. *dispar*, Klug. myself although Mr. G. B. Routledge told me he had taken the type form.

Tenthredella moniliata, Kl.—Not uncommonly met with.

Tenthredella livida, L.— Came across this on several occasions in 1921-1923, but have not seen it since.

Tenthredella balteata, Kl.—Somewhat scarce, in my experience.

Tenthredopsis literata, Geoff.—Have only one ♂ but the two ♀ forms var. *cordata*, Geoff. and var. *femoralis*, C. appear to be fairly common.

Tenthredopsis coquerbertii, Kl., *T. thornleyi*, Kn., *T. inornata*. Cam., and *T. tristis*, Steph., are none of them scarce.

Scope for our Orthopterists.

By MALCOLM BURR, D.Sc., F.R.E.S.

It is about a century since an unquestioned addition has been made to our meagre list of indigenous Orthoptera. Including one or two questionable cases, we cannot claim more than 30 species, to which we may add 5 earwigs. In France north of Paris there are just about double as many, one or two of which may be with us, and even little Holland has over 50.

But even if we do not add any species, we may at least know somethis more about the distribution of those we have got. If we take a line from the mouth of the Severn to the Wash, there are out of the 35 only 18 species recorded. Eleven of our species are recorded only south of a line joining the Severn and the Thames estuaries.

For Wales I can find records of 15 species, of Ireland 11, of the Isle of Man 4, and of Scotland only 11, of which one or two are doubtful.

No Blattids yet from Ireland or Scotland; no crickets from Wales; of our 10 *Tettigonidae* Scotland has but one little "ewe lamb," a single specimen—storm-bound specimen—of *L. punctatissima* from the extreme south-west. I am sure there are several species in Scotland, but they require looking for. Ireland has 2.

Much of our ignorance is due not to poverty, but to neglect of the few things we have got. I am convinced that that meagre 18 from north of the Severn-Wash line could be substantially increased. Even in our relatively rich and well-worked south, some of the most characteristic species have not yet been recorded from Somerset and Wiltshire.

I have recently been plotting on the map our known distribution of the Orthoptera, and find that those two counties are usually white islands in a sea of pink. That reproach should be removed in the coming season. *M. grossus*, *G. rufus*, *St. lineatus*, *Ch. albomarginatus*

and *Acrydium subulatum*, will most probably be turned up there, and *Myrmeleotettix maculatus*, which colours my map like a chessboard from Land's End to John O'Groats, is not on my list for Wilts. Bedfordshire has an unworthy list, apparently without records of most of our commonest species. Stafford and Warwick are a little better, but in most of my maps, that eastern-midland region is generally white, chiefly due, I suppose, to the terrible condition of two counties, of which I cannot find a single record of Orthoptera. Those two counties will, I hope, remove the reproach this coming season. They are Worcester and Salop.

Here are some suggested lines of research, enough to satisfy anybody.

Dermaptera.

Is *Labidura riparia*, Pall. extinct at Pokesdown? Does not it occur further west along the south coast, and in Ireland? It should be looked for under dry seaweed and rubbish above highwater mark, on pale sand.

Labia minor, L. seems to have been reported from most parts of England, but I have no records from Wales (except Glamorgan), or on a line from Dorset to the Wash; none from central Ireland, and very few from Scotland or north western England.

Forficula auricularia, L. What is its northern limit? Is it all over Ireland? What is the distribution of the macrolabious form? Cannot anybody find any more brachypterous specimens?

Forficula lesnei, Fin. has not been recorded north of a line drawn approximately from the mouth of the Severn to the south of Suffolk. It probably ranges north and west. Is it in Ireland? It *must* be, in the south-west.

Apterygida albipennis, Meg. has been reported only from the east coast, from Kent to Suffolk. It is usually associated with hops. Is it in Herefordshire?

Earwigs are adult from late July, and hibernate, so that adults may be found almost all the year, though by the next June the last generation are probably extinct and the young one hardly full grown.

Dictyoptera.

Ectobius lapponicus, L. ought to be reported from many more of our southern counties. I have no records north of the Thames, but it is pretty sure to be there. None from Ireland. Described from Lapland.

Ectobius pallidus, Steph. or *lividus*, Fabr. or *perspicillaris*, Herbst. is known from Kent to Cornwall and also Glamorgan; its range may well extend further north than that. And Ireland?

Ectobius panzeri, Steph. seems to be found on sandhills around the coast from Suffolk via Kent to Cornwall, but as it is also in Anglesea, it clearly should be looked for around the Welsh coast, and it very likely occurs up the east coast too.

Are there *no* wild cockroaches in Ireland?

Caught by sweeping and beating in late summer and autumn.

Gryllidae.

Liogryllus campestris, L. is recorded from scattered localities. The north Scottish records require verification. Is it in Ireland? Is it as rare as believed?

Nemobius sylvestris, Fabr. is common in the New Forest and Parkhurst. It is in Dorset, and vaguely reported from Cornwall. Verification and extension wanted, but above all, of a record from Derbyshire. It should be looked for in May in leafy banks and clearings in woodlands, especially in such parts of our ancient forest that have survived.

Gryllotalpa gryllotalpa, L. has an erratic record with us from Cornwall to Renfrewshire and Lough Neagh. There are so many gaps to fill in.

Adult in spring.

Acridiidae.

Adult from late July to September, except *Acrydium*, which is adult in early summer.

Mecostethus grossus, L. is recorded from bogs from scattered localities, but probably occurs in very many more. Is it true that the draining of the fens has exterminated it in Cambridgeshire? It is associated with *C. dorsalis* and *M. brachyptera*. I have no records north of the Severn-Wash line, but plenty in Ireland, especially the west.

Gomphocerus rufus, L. is known only from the southern counties and not all of those. Its range is probably a good deal wider, and into Wales and Ireland. I can trace no records from Wilts, Somerset, north Hants and east Sussex. I have taken it in northern Siberia.

Stenobothrus lineatus, Panz., so typical of high turf on limestone, has not been noted by me north of the Severn-Wash line, and scarcely above the Severn-Thames line; no records from Somerset and Wilts.

Omocestus viridulus, L., perhaps our commonest grasshopper, has not been fully reported. No records from eleven English counties, and not recorded from about half Ireland, Wales and Scotland. It is probably everywhere.

O. ventralis, Zett., *i.e.*, *rufipes*, Zett. I have notes from all counties south of the Severn-Thames line except, as usual Wilts, and from some in Anglia and a few in the north and only one from North Wales. Is it not in Scotland and Ireland?

Myrmeleotettix maculatus, Thunb. My maps look like a chess board. About half our counties still without records of this pretty little sandy-heath-loving grasshopper. Plenty of notes from Scotland, Wales and Ireland, but few from the Midlands, and white gaps everywhere, including Wilts.

Uvaro has found, in the British collection in the Natural History Museum, a specimen of *Chorthippus vagans*, Fieber, but with no indication of locality. This may have found its way there by chance, but it is quite likely a native species with us. A sharp look-out should be kept for it. It looks very like *Ch. bicolor*, but the hind border of the pronotum is rounded, and the cross sulcus of the pronotum is nearer to the hind border than to the fore border.

Chorthippus bicolor, Charp. It is ridiculous that of this universal grasshopper we have no records from eight English counties, including

as usual Somerset and Wilts. Scotland is very patchy, Wales too, and Ireland still more so. What is its northern limit ?

Ch. albomarginatus, De Geer., judging from my maps, is eastern and southern. I have no records from Devon, Somerset and Wilts, nor from the Midlands, the north of England, Scotland or Ireland and hardly any from Wales. It is characteristic of dry and scanty grass, but also found on wet grass.

Ch. paralellus. Zett., is probably universal, as I have notes from Land's End to John o' Groats, but with plenty of white spots to shame us, one, a big one, right in the middle of England. And none from Ireland !

Oedipoda caerulescens, L. This beautiful insect is on our list on the strength of a single specimen from the Scilly Island, which is not extant. *Verb. sat. sap.*

Acrydium subulatum, L. This wet-loving species has a very chequered map, and it looks as though it does not go beyond the Severn-Wash line, which I cannot believe. One from Ireland: Somerset and Wilts are blank of course.

Ac. bipunctatum, L. Out of the confusion of synonymy the Swedes have shown that what Linnaeus described was the northern form, found in northern, but not central, Sweden, in which the antennal segments are clearly very short, knotty. I know of two from Abernethy in Perth, but all the other specimens from Scotland, even farther north, that friends have sent me so far are the following species. Work is urgently wanted here.

A. vittatum, Zett., seems to be the name which we have got to use for what we have called *bipunctatum* for so many years, and recently *kiefferi*, Saulcy. But there can be no doubt that it was this species that Zetterstedt had a generation before de Saulcy. It is probably universal in the British Islands, as I have notes from Land's End to John o' Groats, but there is a big white spot in the midland counties, and of course, in Somerset and Wilts. Only a few localities from Wales and Ireland.

To be noted, that this genus is adult in spring and early summer.

Tettigoniidae.

I am sure that *Phaneroptera falcata*, Scop. is a true British insect, that requires confirmation. Both our records are from the end of Cornwall. No doubt it is also in south-west Ireland.

Leptophyes punctatissima, Bosca. is widely recorded from the south, west and east of England, but there is a big gap in the middle to fill in, and it has not been noted from the north. It is probably fairly widely spread in Ireland and the Lowlands of Scotland. I can find no records from Somerset, otherwise the southern part of England is complete. Wales wants working.

Meconema thalassinum, Fabr. has been recorded from all counties south of a line from the estuary of the Severn to the Wash except Wiltshire, where of course it occurs, and Bedford and Hunts. Wales is blank, barring Glamorgan. Our northern counties are very shaky, and Scotland still more so. I feel sure it is in the Lowlands.

Tettigonia viridissima, L. is widely distributed, as it is recorded from Northumberland and Cumberland, so I see no need to question Don's

record from Forfar. Otherwise, there are hardly any records north of the Severn-Wash line, and none from Ireland.

Pholidoptera cinerea, L., according to the map, is missing from Ireland and Scotland, which I can hardly believe. I have no records north of the Humber, or from the Midlands, or Wales. I expect it ranges into Scotland.

Decticus verrucivorus, L. is a northern species in Europe and Siberia, so why have we records only from south Hants and east Kent?

Platycleis grisea, Fabr., is characteristic of our south coast from Essex to Cornwall. It is probably in South Wales and southern Ireland. The record from Derby is therefore surprising. Lucas states that the specimens are now in the Derby Museum. The identification should be verified.

Metrioptera brachyptera, L., has a scattered distribution with us, mostly from the south, but it is also in Cumberland, and I see no reason why it should not be in Scotland, Wales and Ireland. It is found in bogs, and I am sure only needs looking for.

M. roeselii, Hagenb., has a curious distribution with us, as it seems confined to a strip along the east coast, from Herne Bay to the Humber. All records are from the coast itself, except a doubtful one "perhaps from Cambridgeshire." Does it *never* go further than a mile inland? [Benfleet, Thames Marshes; teste Dr. K. G. Blair.—Hy.J.T.]

Conocephalus dorsalis, Latr., is characteristic of rushes in our eastern and southern counties, but records are wanting from Cornwall. It is probably found in the southerly Midlands, and South Wales and Ireland.

In varied situations, on trees, shrubs, herbage, rushes, but seldom on grass; adult from late July to late September.

NOTES ON COLLECTING, etc.

Micro Collecting—Mid April to Mid May.—The larvae of *Tortrix forsterana* feeds between two leaves of ivy spun flat together. The feeding places are conspicuous by April and are easily found. *Eucosma pygmalena* is well out towards the end of April. The imago flies freely for a short time about midday in sunny weather around spruce trees, rather high up. At other times and in dull weather it can be beaten out, when it drops rather than flies to the ground.

The imagines of *Laspeyresia scopariana* can be found amongst *Genista tinctoria* making short flights over the herbage for about two hours at mid-day, when the sun is out. It is not easily seen and is probably often overlooked. During the first week of May the aborted shoots of Pine should be collected for pupae of *Evetria posticana*, *E. turionana* and *E. pinivorana*. The last half of April is the best time to search for the cases of *Nemotois fasciella* (*schiffermüllerella*) before the plants of *Ballota nigra*, on which the larvae feed, grow too high. This species is very local. Out of a number of plants in a district only a few will produce cases, up to 4 or 7, but I have found as many as 40 on a single plant. The larvae seem to prefer the dead leaves on the ground, but also eat the lower leaves, dropping off at the slightest touch. The curious flat figure of 8-shaped cases harmonize well with the loose rubbish and soil around the rootstocks of the plants, amongst which the cases will be found. It is better to leave the smaller cases, which

will not produce imagines until the following year, the larvae in these taking two years to reach maturity.

A close examination of catkins of birch will reveal signs of larval-feeding within. A supply of these will produce *Argyresthia goedartella* and *A. brockeella* in June-July. The larval-feeding sometimes causes the catkin to grow unevenly so as to be bent, but mishaped catkins do not necessarily contain a larva.

The larva of *Elachista cerusella* is full fed towards the end of April. It feeds in the Spring in the leaves of the Reed Canary grass (*Phalaris arundinacea*) making large white blotches, sometimes leaving a mine to enter a fresh leaf. The larva is easily seen in a tenanted mine—if the mine is empty the pupa will probably be found on the upper surface of the leaf close to the stem or in a similar position on a leaf near by. The larva of *E. poae* feeds in the leaves of *Poa aquatica* making long slender mines almost the full length of the leaf and sometimes mining down into the sheath. The mine, being only slightly lighter in colour than the leaf, is not so noticeable as the mine of *E. cerusella* and the larva, so far as my experience goes, wanders away from the food plant to pupate. It is full fed in early May.—L.T.F.

Early Appearance of Ligdia adustata.—On 30th March when sallowing I took a freshly emerged specimen of *L. adustata* on the wing. (Capt.) C. Q. Parsons, Torquay.

Lepidoptera at Light in Torquay.—As I have hardly seen any notices of captures in this locality in recent years, it may possibly be of interest if I give a report of my experiences at light. My list only includes species taken at the electric light lamps within a distance of half a mile from Torquay Railway Station and those attracted by light in the house in the same area during the period 1928 to 1935. Outside this radius I am somewhat hazy as to what was actually attracted by the light of my petrol lamp whilst carrying it, and those I caught, which were really endeavouring to escape from its rays. Of course there can be no mistake about it when actually using a sheet.

There is a very sad scarcity of birch and poplar in this district. Sallow consists of three neatly trimmed bushes in the hedge surrounding the Corporation Nursery Gardens and several, frequently burnt, on the banks of the railway cutting. There is quite a fair crop of *Silene inflata* or *S. maritima*, I'm not quite sure which, on the extreme edge of a precipitous cliff, which by the way is railed off. From about June to September any *Dianthoecia* which happen to alight on the mainland side of these railings would be promptly sat on by a member of the human tribe any time of the day or during the period of their natural flight.

I hope this description of the lack of suitable vegetation, or resting place, will explain the paucity of Notodonts and Dianthoecias.

Those species marked * denote one occurrence only. A (2) denotes twice.

Bombyces, etc.—*Nola confusalis*; *Lithosia lurideola*; *L. griseola*; *L. sororcula* (2); *Miltochrista* (*Calligenia*) *miniata*; *Arctia caja*; *A. villica*; *Phragmatobia fuliginosa*; *Diacrisia* (*Spilosoma*) *mendica*; *D.* (*S.*) *lutea* (*lubricipeda*); *Spilosoma menthastri*; *Psilura* (*Ocneria*) *monacha**; *Dasychira pudibunda*; *Poecilocampa populi*; *Drepana binaria**;

Cilix glaucata; *Dicranura* (*Cerura*) *vinula* (2); *Notodonta ziczac**; *Phalera bucephala*; *Thyatira batis**; *Metachrostis* (*Bryophila*) *muralis*; *M.* (*B*). *perla*; *Demas coryli**.—(*To be continued*).—(CAPT.) C. Q. PARSONS. Torquay.

VARIATION IN AGROTIS VESTIGIALIS.—Tutt seems (from your remarks re *A. vestigialis* in a recent number) to have omitted any mention of olive-coloured forms of this species, and *clavis*, Esp. seems to be the nearest to *violescens*, Heyden, which latter form exactly tallies with some of mine taken in South Devon. I have also one taken in the some locality closely resembling *olivacea*, Hartig.—(CAPT.) C. Q. PARSONS, Torquay.

WASPS FEEDING ON BUTTERFLIES.—Mr. Bainbrigge Fletcher's note in the January number is interesting as confirming the addition of yet another enemy of the defenceless butterfly. One can well imagine the baundance of Lepidoptera, were it not for the effective persecution of their numerous enemies, amongst which the genus "collector" is often credited with being one of the worst.

I remember years ago a plague of wasps at Royston Heath, and these I was informed by collectors were destroying large numbers of *Polyommatus coridon*, which were flying at the same time. Newly emerged butterflies were especially attacked whilst drying their wings. The wasps were so numerous that men from the Town Council were sent to locate and destroy the nests. Collectors, who were catching the butterflies for examination, told me that as many wasps as butterflies were netted, and during the few hours I was on the Heath I had the same experience. The aid of the Council was solicited because so many children, playing on the Heath, were stung.

More recently I caught wasps detaching and carting away pupae of *Papilio machaon* that had spun up in a leno-covered cage, the wasps obtaining access by chewing a hole in the leno.

I was surprised last season to observe a small sparrow-like bird in my garden eating the larvae of *Aglais urticae* that were feeding on a large patch of nettles. I then enclosed the patch in small mesh wire netting and placed several nests of the larvae that I found in another district thereon. The birds however managed to get through the wire and I surprised several which were unable to find their way back through the wire. In the meantime they had eaten all the larvae.

I was always under the impression that the only birds, which would eat hairy larvae, were cuckoos and pheasants. It seems possible that birds would account for the sudden disappearance of colonies of *Nymphalis io* from beds of nettle, when they are nearly or quite full fed. This disappearance has, I think, generally been ascribed to the larvae dispersing and wandering away to pupate. As an experiment I enclosed a brood of these larvae in a large leno-covered cage (from which they could not escape) on a bed of nettle in the garden. Later examination showed that they had all pupated so low down on the stalks of the nettle as to be almost imperceptible. None pupated on the cage.

In August last in a restricted area on a Down in this district, I saw on several occasions a blackbird busily engaged catching and eating male *P. coridon*. A large number which he had caught and failed to hold had pieces out of their wings. On each occasion I stoned him

away, but had the keeper been near I am afraid that there would have been one dead blackbird.

Last season I watched sparrows, or similar birds, engaged picking off the small larvae of *Pieris brassicae* and *P. rapae* on the cabbages in the garden, and in consequence I could find no pupae in their usual positions.

Birds, I think, must be held responsible for the destruction of large numbers of Lepidopterous larvae; they are far too numerous owing, I assume, to the absence of hard winters and are becoming a pest.—S. G. Castle-Russell. Crawley, near Winchester.

CURRENT NOTES AND SHORT NOTICES.

A monthly plate of *Lambillionea* for last year contains the figure of a curious aberration in the markings of the left forewing of a *Papilio podalirius* in which the usually regular straight fasciae are zigzagged very strongly. The same plate has two figures of *Melanargia galathea* in which all the black markings are much reduced in area although not at all obsolescent. Both species are Belgian examples. In the same number the species *Argynnis* (*Issoria*) *lathonia* is dealt with and its variation discussed by M. Lempke.

The Dobree Collection of European Noctuae which has been in the Museum at Hull for many years, and a Catalogue of which (xv.+156 pp. price one shilling) was issued in 1909, contained a certain number of type specimens. In the interests of students of Entomology it seemed desirable that these should be in the National Collection, and they are now in the Natural History Museum at South Kensington, which has supplied suitable specimens to take their places.

An account of the Lepidoptera of the Balearic Islands has been written by Dr. Rebel in a recent number of *Iris*. Some 391 species including a few Micros have been recorded up to the present time.

Australia is remarkably rich in *Acrididae*, and these have recently been revised by Prof. Yngve Sjöstedt in the *Kungl. Svenska Vetenskapsakademiens Handlingar*, 3rd Ser., Bd. 15., No. 2., 1935. With 2 plates. He gives an account of the synonymy and known distribution of the 474 species known from Australia, of which he has described about 200. This is a remarkable figure, approaching the total number of Orthoptera known in Europe. It is interesting to note the proportionate representation of the subfamilies. These are, of *Tetrigidae*, 35 species; *Eumastacinae*, 2; *Truxalinae*, 54; *Oedipodinae*, 28; *Pyrgomorphinae*, 33, and *Acridinae* or *Catantopinae*, 322. It is this last figure which is so remarkable and, compared with others, disproportionate. Several species with very wide distribution are included, such as *Aiolopus tamulus*, Fabr., which is common throughout the Oriental and reaches the Ethiopian region, and our old friend *Acrida turrita*, L., so familiar to everyone who visits the Mediterranean in the autumn and winter.—M.B.

The Society for British Entomology has just issued part 5 of Vol. I. of its Journal. It consists of 32 pages of short articles and notes, some 30 in number, of which 8 relate to Lepidoptera, 7 to Hymenoptera, 4 to Odonata, and 11 to other orders and general matters. There are two plates. The contents form a useful compendium of facts and observations useful later on to compilers of life-histories and works of general natural history.

REVIEWS AND NOTICES OF BOOKS.

CATALOGUE OF THE MACROLEPIDOPTERA OF IRELAND.—By Lt.-Col. C. Donovan, I.M.S. (ret.) Pp. 100. 5/- post free from the author Bourton-on-the-Water, Glos.—In course of time all local lists and catalogues become out of date and a real revision is necessary. Subsequent discoveries, fresh species, other localities, collation of local forms and races, distribution, relation of species to the flora and geological formations, the verification or otherwise of doubtful records, the application of the prior names of species and the recognition of the more advanced general knowledge of classification by the newer and more or less appropriate genera, are all items which it is necessary for a reviser to account for, and in this work they have been taken into account. The author was particularly qualified for the work; he had assisted Dr. Kane nearly 40 years ago to compile the original List, and has continued for many years, not only to record the work of others, but has made many discoveries and observations as an enthusiastic collector in all parts of Ireland. The records in Kane's book, which were at all doubtful, he has taken great pains to clear up, and throughout has carefully indicated the still doubtful records for future investigation. Tutt, in error, took the description of Fabricius, *Mantissa*, p. 178 (1787) with its erroneous spelling (*xantographa*) as the original description. Whereas the original was in the *Verz.* of Schiffmüller, 1775 p. 83 and was recorded by Goeze, *Beitr.* III(3). 218 (1781). Warr.-Seitz. (1909) and Draudt-Seitz. (*Sup.* 1932) both put Schiffermüller as the author; but one must admit that there is much confusion in identification of the names of the "ancients." Such corrections as *Acronicta* and *hyperantus* are made, although *janira* is selected before *jurtina*. *Dianthoecia barrettii* is considered at length on the same material which was used by the "Supplement to Tutt's British Noctuae," but, after acknowledging that the genitalia of *andalusica* and *barrettii* are identical, the compiler remarks, "Staudinger's specific name (*andalusica*) bears two years priority to Doubleday's *barrettii*, but the colour of the latter is decidedly browner ("fuscous" Doubleday; "dark purple brown," Barrett) and so should be regarded as a different species." He goes on to say, however, that "the Cork specimens approach the distinct pure grey of *D. andalusica*, but as they do not hit off exactly the veritable shade, may be known as ab. *andalusicidea* (ab. nov.)." The very dark brownish-grey form of Irish *barrettii* with confused markings is here named ab. *turbata* (ab. nov.). In treating of *Diacrisia mendica*, he refers to the race *rustica* with whitish males and asks if this race is found in the Iberian peninsula, as, if it is, it would be another link between Ireland and Iberia. The race *rustica* is reported from Hungary, S. Eastern Europe and Armenia. In fact there are so many interesting points raised in this very useful and practical treatise that one must congratulate Col. Donovan not only for the mechanical work of compilation, but for the scientific problems laid before the younger generation of entomologists, who must use this book as their guide, philosopher and friend.—HY.J.T.

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

We must earnestly request our correspondents NOT *to send us communications* IDENTICAL with those they are sending to other magazines.

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

Change of Address.—Dr. Malcolm Burr, The Hermitage, Dorney, Windsor.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. May 6th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. April 23rd. May 14th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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MAY, 1936

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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A note on Anthomyidae (Diptera) reared from the flowers of Senecio.

By J. E. COLLIN, F.R.E.S.

In the February No. of this magazine (p. 14) Mr. M. Niblett recorded the breeding of an Anthomyid from the flower heads of *Senecio jacobaea*, which Mr. H. W. Andrews had identified as *Chortophila cinerea*, Pand. The fact that the only Anthomyid of this group known as *cinerea* has been bred from fungi made me suspect that Andrews had been led astray in trying to name from the works of recent authors a species not included in their "Tables." Through the kindness of Niblett in sending me some of his specimens, it has been possible to prove that my suspicions were well founded for the species concerned is the little known *Pegohylemyia jacobaeae*, Hardy. The other mistake made by Andrews in quoting Pandellé as the author of *cinerea* may well have been due to the error of Seguy in his *Faune de France, Anthomyidae*, where a *Chortophila cinerea* is attributed to Pandellé instead of to Fallén.

So long ago as 1872 Hardy described an "*Anthomyia jacobaeae*" from females only found on the flowers of *Senecio jacobaea* in Berwickshire and stated to be very common during the first and second weeks of August, while in September the larvae were said to be prevalent everywhere in the flower heads of *S. jacobaea* and *S. aquaticus*.

In 1892 Meade described a "*Phorbia seneciella*" from specimens bred by Dr. A. Giard from larvae found in the flower heads of *Senecio jacobaea* growing on the sand dunes at Wimereaux (Pas de Calais), the flies appearing towards the end of June. Meade also stated that he had previously identified specimens of the same insect bred by Mr. Inchbald in Yorkshire from larvae found in the flowers of *S. aquaticus* as *P. florilega*, Zett.* It is important to note that Dr. Giard sent specimens of this *P. seneciella* to (among other Dipterists) Dr. Schnabl; it is probable therefore that the figures of the genitalia of this species given by Schnabl in his *Anthomyiden* were made from one of the original series of bred specimens.

It might be thought highly probable that these two names "*jacobaeae*" and "*seneciella*" represented one and the same species, but, having long possessed odd specimens of what were undoubtedly two distinct species, both said to have been bred from "Ragwort," and having examined in recent years long series of both species bred by the research workers of the Farnham House Laboratory of the Imperial Institute of Entomology, I knew that the occurrence of two distinct species was certain, and the possibility of the two names being available for these two species needed investigation.

The more important characters for the differentiation of Anthomyid species such as the chaetotaxy and genital structure were almost entirely ignored by these early describers, and the small differences one can find between the descriptions of *jacobaeae* and *seneciella* would be of little value except for the fact of the association of both species with the flower heads of *Senecio*. *P. jacobaeae* was described as $2\frac{3}{4}$-3 lines long (about 6 mm.) and with arista "distinctly short feathered," while the length of *seneciella* was given as 4-5 mm. and the arista as "*subpubescens*," and it was included by Meade in the genus *Phorbia* in which the arista should be "tomentose or bare," similar species with

* This was apparently recorded as *P. floricola*, Zett. by Inchbald in *The Entomologist*, for 1886, p. 9.

arista "plumose or subplumose" being placed by him in *Hylemyia*. Now, one of our species bred from *Senecio* is rather smaller and has only a pubescent arista and answers to the description of *seneciella*, Mde., an identification confirmed by a comparison of the male genitalia with that figured by Schnabl; while the other species is rather larger with decidedly longer pubescence to the arista, and therefore answers to *jacobaeae*, Hardy. That the difference in the aristal pubescence would have been noticed by Meade is proved by the fact that I possess specimens of *jacobaeae* incorrectly identified by Meade himself as Hylemyia *cinerella*, Mg.

Until quite recently the generic divisions in the Anthomyinae (the subfamily to which these two species belong) had little or no approximation to natural groups, while their limits were extremely vague; even now some of the modern genera are not readily defined. We have in *Pegohylemyia* with genotype *P. gnava*, Bouché (a species well known as attacking the flower heads of the garden lettuce) a group of species in which the larvae are known in several cases to live in the flower heads of different Compositae. In this genus the arista is long or short haired but never plumose, legs black with only one (anteroventral) spur to hind tibiae, middle tibiae with no anteroventral but two posterodorsal bristles (*Delia* has only one); males never with the peculiar curved and blunt-ended posteroventral spur to front tibiae sometimes present in *Delia*, and females never with a posterodorsal bristle to front tibiae in addition to the dorsal and posteroventral bristles.

Some of the species of *Pegohylemyia* have the outer cross-vein of wing somewhat sinuous and sloping so that the upper outer angle of discal cell is narrower than the lower angle, but in the two *Senecio* species this cross-vein is straighter and more upright with the angles more equal. From among those with this latter venation *P. jacobaeae* may be easily recognised by the transverse row of *three* nearly equal preapical bristles on upper side of hind tibia, in all other species (including *seneciella*) the posterodorsal preapical is very small or wanting; in addition *jacobaeae* is the only species of *Pegohylemyia* known to me in which the costa is hairy beneath; it is a slightly larger species with more distinctly pubescent arista than *seneciella* and the male is rather greyer; the sternopleural bristles are arranged 2 : 2 while in *seneciella* they are 1 : 2, the lower anterior bristle being absent. *P. seneciella* further has the lobes of the fifth abdominal sternite in male long and bare except for a tuft of bristly hairs near base of each lobe and a few shorter hairs towards tip; in *P. jacobaeae* these lobes have an even distribution of bristles and hairs. The female ovipositor of *seneciella* is remarkably broad, dorsoventrally flattened with a blunt and very short haired tip; that of *jacobaeae*, though also flat, is narrower with a more pointed and longer haired tip. In the male genitalia the mesolobe and forceps (or lamellae) are remarkably different in the two species and though the superficial resemblance of the forceps of *P. seneciella* to those of some species of *Pegomyia* led Schnabl to place this species in that genus, the genitalia are in general structure of the same type as other species of *Pegohylemyia*, while many of the chaetotactic characters of *seneciella* are definitely not those of *Pegomyia*.

Pegohylemyia seneciella, Mde., is a fairly well-known species which has been re-described by Stein, Seguy and Karl, but *P. jacobaeae* does not appear to have been previously recognised since it was described by Hardy in the first volume of the *Scottish Naturalist*, p. 254, though Meade in 1897 mentions it as being possibly the same as his *seneciella*.

Rhopalomastix janeti (Hym. Formicidae) a species of ant new to Science.

By HORACE DONISTHORPE, F.Z.S., F.R.E.S., etc.
(Department of Entomology, British Museum, Natural History).

Rhopalomastix janeti, sp.n.

☿ Head and thorax, reddish yellow, petiole and post-petiole, base of gaster, antennae and legs paler, yellow; sides of base of first segment of gaster and following segments, brownish. Eyes and teeth of mandibles black. Decumbent pubescence very short and sparse, more abundant on gaster; a few longer erect yellow hairs scattered over whole body. Head and thorax very finely and closely longitudinally striate; head covered with numerous small punctures. Gaster shining, covered with numerous extremely small punctures, second and following segments with extremely fine transverse striae.

Head subquadrate, slightly narrower at anterior margin, sides slightly rounded, posterior angles rounded, posterior border very slightly emarginate; *mandibles* rather massive, masticatory border armed with a few short blunt teeth, the penultimate one somewhat longer, the apical one longest; *clypeus* convex with a distinct projection in centre of anterior border; *antennae* 10-jointed, with large two-jointed club; *scape* short, when bent back not reaching beyond middle of head; *antennal forveae* large; *frontal carinae* short, flat, rather broad, close together, with a deep impression between them, forming a broader shallow pit posteriorly; *eyes* rather small, slightly projecting, composed of some 15-18 facets. *Thorax* parallel sided, flat, without any trace of sutures, rounded anteriorly and posteriorly; *epinotum* convex and rounded above, *declivity*, rather steep and somewhat concave. *Petiole* high, narrowed anteriorly and posteriorly to bluntly pointed summit; *post-petiole* transverse, rounded at sides and above, straight at anterior border, considerably rounded at insertion with gaster; *gaster* oval, pointed at apex; *sting* exserted, rather long. *Legs* short, characters of the tribe. *Long*, 1·8-1·9 mm.

This species is a little larger and a little darker in colour than *R. rothneyi*, Forel; it is less shining and the sculpture (striae, etc.) is much more distinct. The head is broader in proportion and slightly more narrowed in front, the eyes are larger, more prominent and possess fewer facets; the thorax is more parallel sided, the post-petiole is much less transverse and much more rounded posteriorly and the gaster is larger and more rounded at sides.

♀ Brown, shining, neck, anterior border of pronotum, pedicel and femora dirty yellow, mandibles and clypeus reddish yellow, sides of face, antennae, tibiae and tarsi paler yellow; pubescence, etc., as in ☿, but more sparing.

Head much as in ☿, but with no striae; eyes larger and with more facets; *ocelli* present; *antennae* 11-jointed. *Thorax*, flat on disc; *pronotum* very transverse, rounded anteriorly and posteriorly; *mesonotum* large, closely and finely longitudinally striate; *scutellum* and *epinotum* also finely longitudinally striate; *pedicel* and *gaster* much as in ☿. *Wings* opaque, veins and stigma light brown, one cubital cell. *Long*, 2·7 mm.

The female differs from the female of *R. rothneyi* (according to Forel's description) in not having a frontal furrow reaching to the

median ocellus, and in not having the head striate; and from *R. escherichii* in having the thorax striate.

♂ Lighter or darker blackish brown, head darker, funiculus, tibiae and tarsi brownish yellow.

Characters of the genus—12-jointed antennae, mandibles rudimentary, clypeus convex distinctly projecting in centre of anterior border, etc.

Head covered with very fine small punctures, somewhat triangular, broadest in front, rounded behind, *vertex* high with fairly large *ocelli*, *eyes* large. *Thorax* much as in the ♀, extremely finely longitudinally striate; *petiole* considerably longer than post-petiole, with a distinct projection beneath anteriorly; *post-petiole* broader, bell-shaped, and completely joined to the gaster as in some Ponerine species; *gaster* long oval, *genitalia* large, exserted. Wings as in ♀, but more transparent. *Long*, 2·1 mm.

Described from a number of workers, males, and one winged female, taken under bark of Mango at Bangkok, in Siam, by Mr. A. Manjikul in March, 1936. Types and allotype in Brit. Mus. Coll.

The ants were destroying the bark, and are said sometimes to kill the trees.

This Myrmicine ant comes in the tribe *Melissotarsinii* in which there are two genera, *Rhopalomastix* and *Melissotarsus*. *Melissotarsus* is confined to Africa and Madagascar and possesses four species. *Rhopalomastix* has only been found in India and Ceylon heretofore, and only possessed two species—*R. rothneyi*, Forel. from Bengal and Ceylon, and *R. escherichi*, Forel, of which only the female is known, from Ceylon; and two subspecies—*R. rothneyi* subsp. *johorensis*, Wheeler from Singapore, and *R. rothneyi* subsp. *javana*, Wheeler from Java. All that is known of their habits is that they nest in and under bark of trees.

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July in North-Western Spain,

By P. HAIG-THOMAS, F.R.E.S.

(*Concluded from page 31.*)

Coenonympha leander, race *iphioides*, Stdgr.—Occurred at two or three localities near Espinama on the northern slopes of the Picos d'Europa.

C. arcania, L.—Very common.

C. dorus, Esp.—Abundant at Jaca.

C. pamphilus, L.—Common.

Apatura iris, L.—Dr. and Mrs. Higgins took two or three fresh specimens and saw several more at Espinama. 18.vii.

Limenitis camilla, Fb.—Below Espinama and Riaño.

Pyrameis (*Vanessa*) *atalanta*, L.—*P.* (*V.*) *cardui*, L.—*Nymphalis* (*Vanessa*) *io*, L., *N.* (*Euvanessa*) *antiopa*, L.

Polygonia c-album, L.—Not common.

Melitaea (*Euphydryas*) *aurinia*, Rott. race *castillana*, Obthr.—Pajares up to 5500. Common in the gorges by the streams and at low elevations. Espinama.

M. phoebe, Kn. and *M. cinxia*, L.—Both common.

M. didyma, Ochs.—Common.

M. trivia, Schiff.—Dr. Higgins took two ♀ ♀ below Riaño.

M. athalia, Rott.—Very common.

M. deione, Hb.—Common and widely distributed up to 4500 ft. Picos d'Europa.

M. parthenie, Bork. (*parthenoides*, Kef.)—All over the Picos d'Europa. 4000-6000 ft.

M. dictynna, Esp.—A few at Pajares. 5500 ft.

M. dictynna, race *vernetensis*, Obthr.—Below Espinama.

Brenthis euphrosyne, L. and *B. selene*, Schiff.—Both common at Espinama.

B. daphne, Schiff.—Espinama and Riaño.

B. ino, Rott.—Espinama.

B. dia, L.—Common.

B. pales, Schiff.—Local. Picos d'Europa. 5000-6500 ft.

Argynnis lathonia, L.—Common.

A. aglaia, L.—Very common everywhere.

A. cydippe (*adippe*) Espinama.

A. niobe, L.—Near Espinama and Riaño.

A. paphia, L.—Common.

A. pandora, Schiff. (*maia*, Cr.).—A few everywhere.

Laeosopis roboris, Esp.—Rather small at Espinama and Potes: very fine and abundant below Riaño. This insect was taken on the northern slopes, 8.vii. but fresh on the southern slopes, m.vii.

Thecla spini, Schiff.—A few at Espinama and Riaño.

T. ilicis, Esp.—Local at Espinama.

T. aesculi, Hb.—At Riaño.

T. acaciae, Fb.—Common Espinama. e.vii.

Callophrys rubi, L.

Heodes virgaureae, L.—*Trans ad meigii*, Vogt., at Riaño.

Heodes hippothoë, L.—Very abundant and fresh around Espinama; b.vii.

Heodes alciphron, Rott. race *gordius*, Sulz.—Not common. Espinama and Riaño.

H. dorilis, Rott. and *Rumicia phlaeas*, L.

Cosmolyce (*Lampides*) *boeticus*, L.—Espinama and Jaca, a few only.

Syntarucus telicanus, Lang.—Below Espinama, one or two only.

Cupido minimus, Fuess.—The same form, without silver dusting, as that which I took at Nogures in the S. Alta near Albarracin. Very common. Picos d'Europa. 5500-6000 ft.

Everes argiades, Pallas.—A few below Espinama.

Plebeius argus, L. (*aegon*, Schiff.)—Common. Espinama and on south side hills below Pajares.

P. argyrognomon, Brgstr.—Riaño and Jaca. Common.

P. (*Latiorina*) *pyrenaica*, Bdv. race *asturiensis*, Obthr.—Picos d'Europa from 9500-6500 ft. Much commoner at the higher altitudes, well out 18.vii.

Scolitantides baton, Brgstr.—Not common. Picos d'Europa and Pajares.

Aricia medon, Hufn. (*astrarche*, Bergstr.)—Common.

Polyommatus eumedon, Esp. (*chiron*, Rott.)—On geranium. Getting worn, Espinama, 13.vii.

P. icarus, Rott.—Common everywhere.

P. hylas, Esp.—Common. Some of the ♀ ♀ show traces of blue on the upperside of both fore and hindwings.

P. bellargus, Rott.—Common but worn. Espinama. Four specimens of the form known as *polonus*, Zell. were taken.

P. coridon, Poda.—Common. Espinama.

P. arragonensis, Gerh.—Jaca.

P. admetus, Esp.—Common at Jaca.

P. dolus, Hb.—Jaca. Mrs. Higgins took two ♂ ♂ just out. The only ones we saw.

Cupido sebrus, Bdv.—One or two worn ♂ ♂ taken at Espinama. b.vii.

P. semiargus, Rott.—Not very common. Dr. Higgins took a ♀ with blue at the base of the wings.

Glaucopsyche melanops, Bdv.—Worn at Espinama. A large form had been locally common.

Lycaena arion, L.—A few at Espinama.

Lycaenopsis argiolus, L.—Everywhere.

Erynnis alceae, Esp.—Espinama, worn.

Carcharodus lavaterae, Esp.—Espinama, one or two only. A small race like that of the Central Pyrenees.

Powellia sertorius, Hffmsg. (*sao*, Hb.).—A few only. Picos d'Europa.

Hesperia carthami, Hb. race *pyrenaica*, Warren.—Pajares.

H. serratulae, Rmbr.—Picos d'Europa and Pajares. Common.

H. armoricanus, Obthr.

Nisoniades tages, L.—Common. Espinama.

Pyrgus sylvanus, Esp.—Common. Espinama.

Thymelicus acteon, Esp.—A few. Espinama.

Adopaea thaumas, Hufn.—Very common. Espinama.

Early Stages of Indian Lepidoptera.

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

(*Continued from p. 19.*)

Dasychira mendosa, Hubn. *Zutr.* II. 19 [Moore, *Lep. Ceyl.* II. pl. 115. f. 4b (lar.)].

Head, legs and claspers crimson. 1st somite white with four longitudinal crimson stripes and bearing subdorsal pencils of dark grey hair pointing forward. 4th to 7th somites with short dorsal tufts of greyish white hair, the skin between these somites velvety black. A lateral tuft of white hair on the 4th and another of plumose black and white hair on the 5th somite. A dorsal pencil of dark grey hair pointing backward on the 11th somite. Ground colour grey, a lateral series of crimson spots on a white line. 4th to 11th somites with a subdorsal series, the 8th to 10th bearing in addition a dorsal pair, of red spots. An interrupted white median line bearing a red spot on the 8th and 9th somites.

Pupa dark brown dorsally, the first three abdominal somites with patches of golden brown pubescence. Wing cases and ventral surface greenish. Enclosed in a cocoon of white silk mixed with larval hairs.

Foodplant.—*Lagerstroemia indica* (Crape Myrtle).

Described from a full fed larva found in Calcutta, 9.xii.31, pupated 15.xii.31 and a female emerged 23.xii.31.

Hampson describes another form of the larva with the ground colour blackish and the dorsal tufts bright yellow. All my specimens, however, have been of the grey form with greyish white tufts.

Orgyia posticus, Wlk. *Cat. Lep.* IV. 803 [Moore, *Lep. Ceyl.* II. pl. 100. f. 1b (Larva); *ocularis*, Moore, *Lep. Atk.* p. 44.]*

Head reddish brown. 1st somite with subdorsal pencils of long dark plumose hair projecting forward. Short dorsal tufts of yellow hair from the 4th to 7th somite. Lateral tufts of white hair on the 4th and 5th somites. A dorsal pencil of long brown hair on the 11th somite directed backwards. Ground colour blackish with a pale subdorsal line. A series of small lateral pinkish spots tufted with hair.

Pupa whitish, the thorax and first four abdominal somites dark brown. Enclosed in a cocoon of whitish silk mixed with larval hair.

Foodplant.—*Lagerstroemia indica* (Crape Myrtle).

Described from a full fed larva found in Calcutta 15.i.32, pupated 18.i.32 and a male emerged 24.i.32.

Hampson describes the larva as "yellowish, sparsely clothed with brown hair; one dorsal and two lateral brown bands; paired tufts of long brown hair on 1st and 11th somites projecting forward and backward; lateral tufts of grey hair from 4th and 5th somites; dorsal tufts of yellow hair on 4th-7th somites; the head red," and this description is copied almost word for word by Seitz.

(*To be continued.*)

SCIENTIFIC NOTES AND OBSERVATIONS.

Sex-limited Hereditary Cancer in Lepidopterous Larvae.—Federley (*Hereditas*, 1935, **22**, 193) has published the results of breeding experiments, which started in 1911. Since that date he has had a strain of *Pygaera pigra*, of which all the males died in the larval stage of a cancerous growth, which attacked any of the tissues excepting those derived from the entoderm. These tumours were very variable in histological appearances. When they grew in the ganglia they caused death by paralysis at an early age, but they grew to a large size in the haemolymph and killed the larva at a later stage, sometimes even in the last instar. The disease was transmitted by the healthy females, and even appeared in the males of a brood, in which one of these was crossed with a male *curtula*. Federley gives reasons for deciding that the heredity cannot be a simple mendelian one due to a gene in an autosome or in either of sex-chromosomes X or Y. He thinks that a mutation occurred in a Y-chromosome, and that the gene is recessive and stimulates active cell division, but cannot act in the presence of an X-chromosome. He says that the polar nuclei in

* *Notolophus posticus*, Wlhr. is a common defoliator of Castor in India; its Life-history is figured on plt. 17 in *Report of Proceed. of 3rd Entom. Meet-Pusa*, Vol. I, 1920.—T.B.-F.

Pygaera fuse and form a triploid, and divide forming new cells for a time even in normal moths, but soon perish. In this case he thinks that in the female, which has two X and one Y in the triploid polar nucleus, the two X-chromosomes inhibit the action of the Y, but in the male the two Y-chromosomes cause abnormal cell growth, which the one X cannot prevent. He thinks that the tumour is derived from the triploid polar nucleus included in the body of the moth.

Boveri, long ago, suggested that human cancer was due to a mutation in a somatic cell, and his theory has been revived recently and has received considerable support. Federley's theory resembles it in many ways, but the mutation instead of being in a somatic cell is in the Y-chromosome and the liability to cancer is hereditary in consequence. Federley's results are therefore of more than entomological interest.—E. A. Cockayne.

The Effect of Environment on Larval Colouring. A Note on the Larvae of the Syrian Race of Celerio euphorbiae.—Dr. Jordan (in *Seitz*, Vol. 2) describes the larvae of ssp. *conspicua*, R. and J., of the "Spurge Hawkmoth," as having few, if any, bright dots and as bearing two rows of eye-marks. My own observations of what is, I presume, this form, confirm this, but only in the free, natural state.

I have found larvae of the first brood fullgrown in June at Kartaba, in the Lebanon, and also in the Bekaa plain (Coelesyria). These wild larvae were invariably yellow, with a red, interrupted, dorsal line, red feet, head and tail (the latter blacktipped), and each somite bearing a large oblong black patch, containing two white eyes, the upper of which was the larger and slightly yellow-tinged, and the lower purer white and usually multipartite. On some larvae, but not many, a few white circular dots appeared on the hind edge of the black patch. Rarely, too, there were traces of a red subdorsal line. Sometimes an oval blackrimmed, white dot was placed behind the white spiracles and clear of the black patch. But this was the limit to which these dots were developed, or the black area extended, in the normal larva that had passed its whole growth out of doors, in the bright hot Syrian sunlight.

But when taken indoors in the first or second instar, the larvae produced an astounding variety of different forms. Though yellow when found most of these larvae were black by the fourth instar, and all by the fifth; that is, the colour reaction to a life of sheltered captivity was the invariable extension of the black patches to the entire exclusion of the yellow ground colour. Many of these mature black larvae also bore a large number of white round dots, so that they corresponded to the form of caterpillar figured in English and German textbooks. But the majority were plainer, the plain black form, with its two rows of white eyemarks, being strikingly unlike either the usual European or the usual (wild) Syrian form. These larvae were bred at Beirut, on the coast-level, where the air is much more humid than at either of the two localities from which the larvae were obtained. I therefore thought that the added humidity might be partly responsible for the change, until informed by Brother Cremona, of Ksara, who has bred this species season after season on the drier, inland Bekaa plain, that captivity produced the same colour-reaction in his larvae. I can only conclude, therefore, that it is a lack of strong, direct sun-

light that causes the spread of black pigmentation, and that Europe's cloudier skies produce naturally what a Syrian roof produced artificially.

To conclude: ssp. *conspicua* larvae have two race characters, the yellow ground colour, and the reduction of the number of small dots. The first of these characters disappears entirely under the alteration of environment detailed above; but the second is more tenacious: more dots appear on more larvae in captivity than in a natural state but the majority still incline to plainness.—E. P. Wiltshire.

NOTES ON COLLECTING, etc.

Micro-collecting—mid May to mid June.—The novice in the study of micro-lepidoptera will have no difficulty in obtaining an abundant supply of material in the larval stage during this period. Almost every tree or shrub will have one or more species feeding on the leaves or in the young shoots. The chief problem is a suitable receptacle in which to bring the larvae to maturity. The ordinary breeding cage is too large and allows micro-larvae to escape or wander too far from the food-plant.

A flat glass tongue-jar makes a convenient cage for small leaf-eating larvae. The top of the jar should be ground on a flat stone or door-step with a little silver sand and water—a process occupying only a minute or two. When covered with a piece of plate glass, the jar will be larva-tight even for the smallest specimens, and leaves, such as oak, will keep perfectly fresh for two or three days. With a supply of jars the transfer of larvae to fresh food in a clean jar is a simple matter. Only a few larvae and leaves should be placed in each jar to avoid sweating. In this manner I have bred several species of Tortrix from the egg. When full fed the larvae should of course be given suitable material in which to pupate.

A flower pot half filled with damp (not wet) sand or earth will be found more suitable for leaves which do not readily wither and dry up. The top, which should be ground level, can be covered with muslin or a piece of glass.

I made some breeding cages, which have proved very useful, out of sheets of celluloid rolled into a cylinder and the overlap cemented with a solution of cellulose or sewn with thread. The cylinders were made to fit a round tobacco tin about 4 inches in diameter. A sprig of the food plant can be kept in a small glass bottle packed round with moss, sand or earth. A larva-tight joint at the bottom can be secured by depressing the cylinder into the sand and the top can be covered with muslin.

The larva of *Cnephasia incanana* (*sinuana*) are most easily obtained just before the flower buds of the blue-bell, *Scilla nutans*, begin to expand. Light yellow frass exuding from between the buds indicates the presence of a larva within and is readily seen.

The larva of *Argyroploce pomedax* is to be found at the end of May, or early in June, feeding on the leaves of crab-apple, rolling one or more leaves in the typical Tortrix manner.

Shoots of poplar, bearing a small erect cone of frass, contain the larva of *Gypsonoma aceriana*. The larvae of *G. oppressana* feed in a similar manner, but the cone of frass lies along the shoot. The shoots should be kept in wet sand. The larva of *G. minutana* feeds between

two leaves of poplar spun flat together, and the larvae of *Eucosma cinerana* feeds in a similar manner on aspen. Both species pupate in the feeding places and can be obtained in early June.

The brown "caps" at the tips of new shoots of spruce are soon shed; if towards the end of May some shoots still retain the caps they will probably be found to contain the larva of *Eucosma ratzeburgiana*.

At the end of May shoots of *Epilobium angustifolium*, having the top leaves drawn together, contain the nearly full-fed reddish brown larva of *Mompha conturbatella*. Fungus growing on dead beech stumps should be collected at the end of May or early June for the larvae and pupae of *Scardia boleti*. Various species of *Tinea* can also be obtained from the same fungus—*T. corticella*, *T. cloacella* and *T. granella*, the latter sometimes thought to be more or less confined to warehouses. *S. boleti* can also be obtained from the fungus *Polyporus betulinus* growing on dead birch, and possibly the larva feeds on other kinds of fungus as well.—L.T.F.

Notes on some Tortrix larvae, May and early June.—Names in the following notes are for general convenience given as they stand in Meyrick's 'Handbook,' in spite of Mr. Sheldon's recent revision of some specific names.

One of the earliest larvae to appear is *Argyroploce urticana*, deep brown and very active, which at the end of April spins up the young leaves at the tip of birch twigs. It is soon followed by *Eucosma sinuana*, which at first rolls the leaves transversely, and later longitudinally; and by larvae of *solandriana*. Hazel leaves seem invariably to be rolled longitudinally by both species. About 10th June *solandriana* is over, and similarly rolled leaves are tenanted by *Cacoecia rosana*, a larva which sometimes resembles that of the other species, but has the head a deeper brown. Transverse rollings in birch, beech, etc., are usually the habitat of *Cacoecia xylosteana*.

Argyroploce ochroleucana seems to prefer the larger and fleshier leaflets of garden roses to ramblers or wild rose. It has the bright green body colour of *Pandemis heparana*, but is distinguished by the dark head. *Tortrix diversana* also feeds on rose sometimes, but its chief pabulum is plum. The larva is full-fed at the end of May or soon after; its normal colour is pale grey, but a form occurs, which is almost colourless, of a dirty whitish. It pupates in the larval habitation; the pupa is readily distinguished by its red colour.

Bilberry sometimes produces unexpected larvae. I was searching on Brasted Chart for larvae of *Argyroploce sauciana* in the third week of May some ten years ago, and found over a dozen larvae of *Pandemis cinnamomeana*, a larva which when young, is not unlike that of *sauciana*. Early in June 1923 in one of the combes of the Quantock Hills larvae of *Peronea schalleriana* were abundant in spun bilberry tips.

Eucosma ratzeburgiana is full-fed about 10th June. At the beginning of the month the light brown conical caps at the tip of spruce twigs are falling or ready to fall. Those that do not drop at a touch are spun by the larva which does not pupate inside. The larva of *Lathronympha hypericana* occurs early in May in spun tips of *Hypericum perforatum* when the growth is but a few inches high. Later in the month the larvae spun up in the taller stems, including laterals, are those of *Depressaria hypericella*.

Flowers of the dog daisy with the petals folded down contain regularly the larvae of *Cnephasia virgaureana*, *C. pascuana*, *C. longana*, and less often of *C. chrysanthemana* ; the last also sometimes feeds in the heart of *Achillea* shoots. The larva of *C. longana* is yellowish ; those of *virgaureana* and *pascuana* are grey, but may be distinguished by the colour of the pupa, the former being red, the latter black. *C. conspersana* feeds similarly in dog-daisy flowers, and in coastal localities, *e.g.*, North Cornwall, where there is none, it feeds in the flower-heads of a large hawk-weed. Early in July 1930 the species was plentiful among the grey rocks on the undercliff near Revelstoke, a few miles east of Plymouth ; no dog-daisy or hawk-weed was visible there, and I have had no opportunity since of discovering the food-plant.—R.E.E.F.

Notes on Laspeyresia conicolana, Heyl.—This Tortrix, recently added to the British List (*Entom.* LXIV, 1931, p. 27), has evidently a much wider distribution than was at first thought, and may be sought among scattered Scots pine trees anywhere in the South of England. At any time during the winter, a search among last year's fallen cones under some more or less isolated tree or on a sunny heath, will probably yield some that have the tiny exit hole showing at the tip of a scale between the central point and the apex, betraying the presence of this species. Some patience is needed, for the moth seems to have a preference for certain sunny trees rather than others, but where it is common, cones may be found where three or four larvae have fed. The scales affected are usually those situated from near the tip to the widest part of the cone. One scale with its seed provides food for the larva. In early April cones may be gathered from the tree itself, from the sunny side, and from branches as high as possible. It is very difficult to see where the moth has prepared for its emergence, for on 8th April, 1936, I could find only three mined scales after careful scrutiny of a basketful of cones gathered that day, which probably will produce a fair number of moths. These three mines each contained a blackish pupa that looks almost ready to emerge. The moth is out early in June, and may be taken, sometimes freely, with a long handled net, as it flies high around the tips of the pines.—W. Fassnidge, Southampton.

Lepidoptera at Light in Torquay. (*Continued*).—Noctuina.—*Acronicta psi*, *A. ligustri**, *Diloba caeruleocephala*, *Leucania conigera*, *L. lithargyria*, *L. pallens*, *L. impura*, *Gortyna ochracea* (*flavago*)*, *Xylophasia monoglypha*, *X. hepatica*, *Laphygma exigua**, *Neuronia popularis*, *Lycophotia graminis* (2), *Luperina testacea*, *Mamestra brassicae*, *Apamea basilinea**, *A. secalis* (*didyma*), *Caradrina taraxaci* (*blanda*), *C. morpheus* (2), *Agrotis puta*, *A. exclamationis*, *A. corticea*, *A. segetum*, *Noctua plecta*, *N. c-nigrum*, *N. triangulum*,*, *N. primulae* (*festiva*), *N. xanthographa*, *Triphaena janthina*, *T. comes*, *T. pronuba*, *Pachnobia rubricosa*, *Taeniocampa gothica*, *T. incerta*, *T. stabilis*, *T. munda**, *Amathes lychnidis* (*Orthosia pistacina*), *Omphaloscelis lunosa*, *Orrhodia vaccinii*, *Ochria* (*Xanthia*) *aurago* (2), *Calymnia trapezina*, *C. affinis*, *Harmodia* (*Dianthoecia*) *cucubali**, *Polia flavicincta**, *Dasypolia templi* (see note), *Epunda lichenea*, *E. nigra**, *Phlogophora meticulosa*, *Xylocampa areola* (*lithorhiza*), *Plusia chrysitis* (2), *P. gamma*, *P. iota**, *Rivula sericealis*, *Hypena proboscidalis*, *Zanclognatha tarsipennalis*, *Z. grisealis*, *Aventia* (*Laspeyria*) *flexula**.

GEOMETRINA.—*Ourapteryx sambucaria, Opisthograptis luteolata, Campaea (Metrocampa) margaritaria* (2), *Ellopia fasciaria (prosapiaria)* (2), *Selenia bilunaria, S. tetralunaria, Gonodontis bidentata, Crocallis elinguaria, Ennomos fuscantaria, E. quercinaria, Colotois (Himera) pennaria, Phigalia pedaria, Biston (Pachys) strataria* (2), *Boarmia lichenaria*, B. repandata, B. rhomboidaria (gemmaria), Ectropis (Tephrosia) bistortata*, Hemistola chrysoprasaria (Geometra vernaria)* (2), *Hemithea aestivaria (Nemoria strigata), Cosymbia (Ephyra) trilinearia*, C. (E.) porata*, Ptychopoda (Acidalia) dimidiata, P. (A.) biselata, P. (A.) dilutaria, A. seriata (virgularia), A. sylvestraria (marginepunctata), A. aversata, Abraxas grossulariata, Lygdia adustata, Theria (Hybernia) rupicapraria, T. (H.) marginaria, Erannis (H.) defoliaria, Alsophila (Anisopteryx) aescularia, Operophtera (Cheimatobia) brumata, Oporinia (Oporabia) dilutata, Calostigia pectinitaria (Larentia viridaria), Perizoma flavofasciaria (Emmelesia decolorata), Eupithecia venosata*, E. linariata, E. (oblongata) centaureata, E. icterata (subfulvata), E. haworthiata, E. innotata (fraxinata)*, E. subnotata, E. vulgata, E. abbreviata*, E. dodoneata, E. exiguata, E. pumilata, E. rectangulata, E. coronata, Acasis (Lobophora) viretata, Thera variata,* [?] *Cidaria (Melanthia) ocellata, Xanthorhoë (Melanthia) procellata*, Epirrhoë alternata (sociata), Xanthorhoë montanata, X. fluctuata, Earophila (Anticlea) badiata, E. derivata (nigrofasciaria), Ochyria (Coremia) designata, X. ferrugata, Euphyia (Camptogramma) bilineata, Orthonoma obstipata (C. fluviata)*, Horisme (Phibalapteryx) tersata, Cidaria siterata (psittacata)* (2), *Euphyia (C.) corylata* (2), *Dysstroma (C.) truncata, Lampropteryx (C.) suffumata, Euphyia (C.) silaceata, Lygris (C.) pyraliata* (2), *Ortholitha chenopodiata (limitata), O. bipunctaria*.*

NOTE.—One ♀ on 1st May, 1930, in Seaway Lane, still in bred condition and most fertile and one ♂ on 11th Nov., 1931, in Belgrave Road, a thickly populated part of the town.—(CAPT.) C. Q. PARSONS, Torquay.

WASPS FEEDING ON BUTTERFLIES.—Has not Mr. Castle-Russell missed one rather important point in classing birds as a growing pest in their destruction of lepidopterous larvae? Insects are so astonishingly prolific that were it not for their numerous enemies the earth would soon be overrun by them and all vegetation would disappear, with the result that, as all animals depend directly or indirectly for their existence on the vegetable kingdom, all animals would disappear also! Apart from the well-known so-called "parasitic" insects, most of which are not parasitic at all but predatory, there is no doubt that wasps, both social and solitary, exercise considerable check on the increase of the insect hordes, and the social wasps would be kept in check by the badger, if the latter were not senselessly persecuted in most parts of the country.

I don't think the absence of hard winters can be credited with much of the responsibility for the abundance of small birds in some districts; it is rather the absence of their animal checks, the beasts and birds of prey, which are so severely and unjustifiably kept down in the interests of game preservation.

It is rather surprising news that Mr. Castle-Russell observed a small sparrow-like bird—could it have been a hedge-sparrow?—eating larvae of *Aglais urticae* off nettles. One usually looks upon Vanessid larvae,

feeding, as most of them do, quite exposed, as protected by their spines from predatory birds, and I am not at all sure that even cuckoos or pheasants have been seen to eat them, although the former are known to have a penchant for the hairy and otherwise unpleasant larvae that other birds won't touch. In this connection, I may mention that I have records of the robin feeding its nestlings on larvae of *Abraxas grossulariata* and *Pteronidea ribesii* (Gooseberry Sawfly), both supposed to be distasteful to birds in general. It would be useful if Mr. Castle-Russell could determine this year what the birds really were that were eating larvae of *Aglais urticae*, *Pieris brassicae* and *P. rapae*. Vanessid larvae would have no terrors for wasps on account of their spines, but young larvae of *Hipocrita jacobaeae* were passed over repeatedly by workers of *Vespa vulgaris*, hunting over ragwort in the garden here.—C. Nicholson. Tresillian, Cornwall.

Melanism in D. fagella.—Under "Notes on Collecting," No. 2 of the current volume for February, 1936, it was mentioned that further information was wanted concerning *Diurnea* (*Chimabache*) *fagella*, especially in relation to its melanic form. I am sending you under separate cover 47 ♂ examples taken from oak trunks in Stoneywell Wood, Charnwood Forest, in half-an-hour's search last Sunday, 18th April.

As was remarked, the darker forms appear to fade slightly after death, and on looking at them in the box, the darker specimens give a unicolorous darkish brown appearance. Actually, many of them when taken are a sharp black. As another comparison, it may be noted that the forms light enough to be seen easily on the trunks at a casual glance are in this district not more than 25% of the whole.

Stoneywell Wood is situated at an altitude about 600 feet, and consists mainly of oak, interspersed with birch. This micro is frequent in all the localities that I have worked in Leicestershire.—Herbert A. Buckler. Leicester. 23.iv.36.

P.S.—I have only seen two females this year, both of them of the darkest form, taken *in cop.* on tree trunks.

Cornish Notes, 1935.—So far as my own observations and reports that have reached me show, last summer was disappointing, speaking generally, for the more interesting and spectacular butterflies, but the "Whites" were in about their usual numbers, *i.e.*, *Pieris brassicae* was common in both broods, *P. rapae* less common, and *P. napi* decidedly uncommon. The "Browns," also, were in about normal numbers and I have seen a few *Argynnis paphia* in the garden and elsewhere, as usual. *Heodes phlaeas* was very scarce hereabouts and *Polyommatus icarus* also, though fairly common in some localities. *Lycaenopsis argiolus*, on the other hand, was common in both broods, the first being attracted in May by our laurestinus flowers, which were exceptionally late, as they did not begin to open until April; this season they began to open in November and attracted the local hive-bees, which have been visiting them on every suitable day since, up to the present time (31st March), the sound of their humming being quite summery on sunny days, even when the temperature was kept down by a cool wind. The usual sprinkling of *Gonepteryx rhamni* occurred in the Spring (29th March to 23rd May), but I saw only one in the summer and that

was an Carrine Common, near Truro, on 9th August, and my wife saw one in the garden on 28th August. In 1934 the larvae on the buckthorns in my garden were really plentiful, but were nearly exterminated by the usual ichneumon, *Anilasta ebenina*, whose larva spins the little greyish-white cocoon with two dark bands and the head of the larva at the end! *Colias croceus* was in normal numbers—one near Truro on 13th August and one near here on the 21st.

Polygonia c-album was seen by the Vicar of Landulph, near Saltash, in his garden on March 12th, a cold day with bright warm sun, after "snow and a bitter east wind" the day before! It was reported in this magazine (last Vol. p. 105) as abundant at West Looe in July, and 2 were seen at Par Station on 31st July, as well as one at St. Kew Highway on the same day. I also have a record of var. *hutchinsoni* from near Bude on 9th July, and another from the same district in September. On 5th August one was caught on blackberry blossom in Luxulyan Valley; on 29th September one in a Falmouth garden, feeding on dandelion and rotten apple, and on 11th October one in a garden at Redruth. The Bude specimens are easily Cornwall's "furthest north," and the Redruth one the "furthest west" to date. I have no records of this species in the Truro district in 1935.

Nymphalis io, so common in 1934, was scarce generally in 1935. I saw one in the garden on 20th March and one was seen near Looe on the 21st, both days being sunny and warm. I saw seven in this neighbourhood on 2nd April and one in the garden on the 3rd, again both sunny days, but not warm. Nothing more was seen of *io* until 13th August, when one settled on a scabious in a garden in Truro city, and I saw 2 on Carrine Common on the 17th, which was dull and showery, and one in the garden shortly afterwards—a very meagre result for a species that is generally very common in the county.

Nymphalis polychloros. In view of the scarcity of records of this species for many years it is extremely interesting that notes of its occurrence of late have been appearing in various periodicals and may be usefully summarized here in chronological order.

In the *Entomologist* for January 1935, p. 9, a specimen is recorded as captured at Petersfield on 14th July, 1934 and in *The Field* for 19th October last, Mr. Frohawk reports that three specimens were shown to him at Tresco in the Scilly Isles that had been taken in 1934; one of these was found floating on the sea on 16th July after an E.S.E. gale, and was in an exhausted state, but otherwise in perfect condition; one flew into a house a week later; and the third was captured in Tresco Abbey gardens early in August. Mr. Frohawk suggested that, as this species is not indigenous to the Scillies, these three specimens were possibly immigrants from the mainland (at least 27 miles N.E.) or from the Continent. He also suggested that, although it is not recognized as a immigrant, it may prove to be so, which would account for its abundance in certain years and scarcity in others; but it is of course a resident also, and used to occur pretty regularly in Epping Forest, where it bred and was not infrequently taken in the Spring after hibernation.

The next specimen was seen in his garden by Lt. Col. Mosse at Tunbridge Wells on 1st April and was "in very fair condition," evidently hibernated; and another was recorded by Edwin Cohen as

seen at Brockenhurst on 5th May; both these records are also from *The Field*.

In the *Entomologist* for October last, p. 240, Granville Clutterbuck reports the capture of one on a farm window at the Lizard on 3rd August. In *The Field* of 21st September, a specimen is reported from Winchester and in the *Western Morning News* of 24th September, Lord Rendlesham reports one preparing to hibernate in his drawing-room at Bosloe, near Falmouth, on 22nd September. (*To be continued*). —Charles Nicholson, Tresillian, Truro, Cornwall.

Borkhausenia pseudospretella, Stt., in Wasps' Combs.—In the Autumn of 1933 I dug out a deserted wasps' nest in my garden and placed two or three large pieces of comb on a table in an out-door room, where they lay exposed until in May 1935 I noticed that they were being attacked by larvae, which were running silken galleries through the comb. The insect concerned proved to be *Borkhausenia pseudospretella*, Stt., which has a very wide range of food, but, so far as I know, has not been bred previously from this one. As Chapman remarked (*E.M.M.* XXXI. 96. 1895), "the waste material of a wasps' nest contains very little silk, much wasp larva excreta, and a trifling weight of wood paper, practically little or no nutritive material." *Tinea palles-centella*, however, has been bred from a wasps' nest preserved in the Grosvenor Museum, Chester (*E.M.M.* XXX. 113. 1894), and *Aphomia sociella* is commonly found breeding in wasps' nests.—T. Bainbrigge Fletcher, Rodborough, Glos., 6th April 1936.

CURRENT NOTES AND SHORT NOTICES.

It is pleasant to see collaboration between father and son in scientific work. The example of Madrid is followed in America, for in a recent number of the *Proceedings of the Academy of Nat. Sci. of Philadelphia*, 1935, pp. 457-508, there is an important article by J. A. G. Rehn and his son J. W. H. Rehn entitled "A Study of the Genus *Hemimerus*." This is a queer ectoparasite on the giant African rat, *Cricetomys gambianus*, and its position has been the subject of discussion for many years since Walker first described it in 1871, putting it in the *Gryllidae*. The authors confirm the opinion that has prevailed since Hansen, in 1894, showed that it is related to the earwigs, although it has no forceps. The Danish author also showed that it is viviparous.

Now there is ample material from many parts of Africa, from many races of the rat in question, and the authors describe five new species, bringing the total number known to eight. Interesting characters are afforded by the form of the last sclerites of the female, which is correlated with the nature of the bristly hair on their hosts, which in turn is correlated with the altitude and climate of its habitat. "Those that live on animals with harsh, long, adpressed hair possess a definite ability tightly to close and even lock the anal orifice."—M.B.

Part 59 of the *Supplement to Seitz Fauna Palaearctica* has just appeared. It contains sheet 27, 8 pp., of the Noctuae and plts. 14, 15. The British species dealt with are *Erastria trabealis*, with 5 new forms added to the 1 form included in the main volume; *Sarrothripus revayana*, with 1 new form to the 8 previous ones; we note that in the main volume no less than 17 named forms were turned down as

synonyms, and that apparently the thorough revision of the variation of this species by Mr. W. G. Sheldon* has been overlooked; *Hylophila prasinana*, with 3 new forms to the previous 2; *Hylophilina bicolorana*, with 1 to the previous 1 form; *Mormonia sponsa*, with 6 new forms to the 6 previous; *Catocala fraxini*, 7 new forms to the previous 5; and *C. nupta*, with 6 new forms to the previous 13. The two plates contain 123 figures.

Six sheets of letterpress and 9 plates have recently been added to the Seitz Volume XV. the *Fauna Africana* and deal with the Noctuae of that region. The large number of figures will be a splendid help to students of the African fauna which no doubt in the near future will yield a large number of new species as more intimate knowledge of the many little worked areas comes to hand. At the same time a sheet and two plates of the *American Fauna* have appeared in which Mr. Prout deals with numerous species of Geometers.

Mr. W. G. Sheldon is issuing his Annual Appeal for subscriptions to the Wicken Fen Fund. In the interest of the peculiar Fauna and Flora of this portion of the British Isles it is essential that the area should remain in about the same state it has been for many years past. Were it not for the care carried on by the aid of the present Fund the altered conditions in the demand for the products of the Fen, neglect of cutting at certain times, the failure to keep the channels free from overgrowth, etc., would soon bring about the disappearance of some of the plant species by the crushing dominance of others, and as a consequence the probable disappearance of many local species of animal life confined to the area. To carry out this object costs money and entomologists as well as botanists and lovers of nature are asked to contribute. Last year over £120 was subscribed. Contributions should be sent to Mr. Sheldon, the Hon. Treasurer, West Watch, Oxted, Surrey, who will be pleased to send permits for observation or collecting to subscribers on application.

Prof. Dr. Hering of Berlin has recently issued two more parts of his *Minen-Herbarium*, each containing 20 specimens of larval mines. The Diptera are responsible for 22 of these, the Lepidoptera for 12 and the Coleoptera for 6. The whole series so far consists of the mines of 400 species, and forms an admirable reference collection for the identification of those insects which disfigure the foliage of so many of our more familiar trees, shrubs and other plants. Having distributed the examples of mines for a number of years Dr. Hering is now issuing a comprehensive work on them, "Die Blatt-Minen Mittel-und Nord-Europas," which is just as indispensable to the possessors of the Herbarium as the Herbarium is to those who are subscribing to the parts of this volume. This study of mines is a most attractive investigation in entomology from a hitherto unattempted angle, and adds immensely to our knowledge of the life-histories of so many insect forms, and its bearing on economic entomology must not be overlooked.

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* See *Entomologist*, LII. 97, 122, with an excellent plt. of 22 figures, 19 of which are newly described forms, 1919. Let us hope that this oversight will be rectified in the Appendix to the volume before it is concluded.

Will readers please send short Notes on Collecting.—EDITORS.

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

We must earnestly request our correspondents NOT *to send us communications* IDENTICAL with those they are sending to other magazines.

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

Change of Address.—Dr. Malcolm Burr, The Hermitage, Dorney, Windsor.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. June 3rd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. May 28th. June 11th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Cumberland Chrysopidae.

By T. F. MARRINER.

I first made the acquaintanec of these insects while working at the *Coccinellidae*. The Chrysopid larvae like those of the *Coccinellidae* feed upon Aphides, and in some cases are not unlike the latter in appearance.

Like the "Ladybirds," too, the *Chrysopidae* possess that rather rare thing among insects, a popular name, in fact three. They are known as "Lace-wings," as "Golden-eyes," and as "Stink-flies." The first two of these may be said to be due to 'personal appearance,' the beautiful tracery of the wings, and the gleaming gold of the eyes, while the third is due to the fact that the insects leave behind a somewhat disagreeable odour after being handled. This odour is probably protective, for I have noted that birds leave the Lacewings alone just as they do the Ladybirds.

We have, I am told, 13 species of Lacewings in the British Isles, and Cumberland can boast of nine of these.

Chrysopa vittata, Wesm.—Seems to occur over the whole lower area of the County, with the exception of the coast plain, and is quite common in June and July. My specimens were taken on Cumwhitton Moss in July 1925. This is a favourite and very productive collecting ground some seven miles east of Carlisle.

C. flava, Scop.—Apparenfly not so widely distributed as the last-named species, nor yet so definitely and entirely confined to the lowest areas. It is on the wing with us from June until well into September. My specimens were taken in August 1926.

C. alba, L.—This species also I have taken on Cumwhitton Moss (July 1926), and in Gelt Woods (August 1925). It appears to be a lowland species and is fairly widely distributed. It occurs in June, July, and August.

C. flavifrons, Brauer.—Taken in my garden at Kingstown just north of Carlisle in July 1930, and in June 1931. These are the only occasions on which I have come across this species.

C. tenella, Sch.—Apparently the earliest species on the wing with us. I took a specimen in Mr. Routledge's garden at Tarn Lodge in May 1921, and also came across it again on Cumwhitton Moss in July 1925.

C. vulgaris, Sch.—This also is found on Cumwhitton Moss. It is on the wing until very late in the year apparently, if the weather be mild. Mr. Routledge showed me a specimen he had just taken in his sitting room at Tarn Lodge on 17th December 1917.

C. prasina, Ramb.—I have not come across this, but Mr. Routledge took one specimen near his house in July 1921.

C. phyllochroma, Wesm.—Apparently somewhat rare. I have specimens from Cumwhitton Moss taken in July 1925.

C. perla, L.—Another rare item with us. My specimens were taken near Dalston, some three miles S.W. of Carlisle, in July 1921.

Ozoir-la-Ferrière; Puy de Dôme mountain; and Le mont Dore, France, in June-August, 1935.

By the (late) Rev. E. B. ASHBY, F.R.E.S., F.Z.S.

Leaving Victoria station on the morning of 28th June, I arrived at the station of Ozoir-la-Ferrière, in the Forêt d'Arminvilliers, near Paris, that night about 8.30 p.m., and walked on to the village of Ozoir, where I put up for two days at the Restaurant—Hotel de Paris, a sufficiently decent little hotel, but too far from the grounds I wanted to work in the forest on the other side of the line, partly in the direction of the village of Pontcarre. On 29th and 30th June I worked two different grounds, one on either side of Ozoir-la-Ferrière railway station, but in neither case did I see a single specimen of *Cyclopides morpheus*, Pall, which I hoped to have obtained in the pink of condition. It had not yet emerged this late year. The insects I did obtain at Ozoir are classified as follows:—

Rhopalocera.—*Thecla w-album*, Kn.; *Apatura ilia*, Hb. (seen only twice); *Limenitis camilla*, L. (1764); *Polygonia* (*Vanessa*) *c-album*, L.; *Argynnis cydippe*, L.; *Satyrus galathea*, L.; *Coenonympha arcania*, L.

Heterocera.—*Hipparchus* (*Geometra*) *papilionaria*, L.; *Comibaena* (*Phorodesma*) *pustulata*, Hufn.

Hymenoptera.—*Tenthredo arcuatus*, Först.; *Ammophila sabulosa*, L.; *Halictus scabiosae*, Rossi; *Panurgus calcaratus*, Scop; *Bombus sylvarum*, L.; and *Osmia aurulenta*, Panz.

Odonata.—*Libellula depressa*, L.

Coleoptera.—*Cantharis livida*, L.; *Leptura fulva*, De Geer.

I caught the above-mentioned *Ammophila sabulosa*, L., as it was crossing a road a little way out of the village of Ozoir. It was conveying in its jaws a green caterpillar nearly as long as itself, which it seemed to find difficult to carry. It settled on the road and I netted the pair. The insect dropped the caterpillar but remained on the ground near it. I boxed the larva and in doing so the insect got out from under my net, but settled again on the road close by the net, evidently hoping again to catch the larva. When I got up and raised my net again to catch it, it made no attempt to avoid it, but continued to search again for the larva on the road surface by a series of very short flights and frequent settlings. I then secured it, but I did not succeed in bringing the larva through, though it fed for several days.

Returning to the Gare de l'Est at Paris, on the afternoon of 30th June, I left the Gare de Lyon that night for Clermont Ferrand and arrived there early the next morning, putting up at the Hotel Terminus just opposite the station, where I stayed comfortably for 5 days. During this period I went once to the summit of the Puy de Dôme mountain, but as the fog on the summit (height 4,805 ft.) rendered collecting impossible, I descended the road, collecting a large number of Coleoptera on the steep roadside until the autobus on its return journey caught me up later. Most of the mountains in the neighbourhood bear the name of Puy, derived from the Latin "podium," and nowhere can the results of volcanic action be better studied than in Basse-Auvergne and Haute-Auvergne, divisions of Auvergne, Arvernia, an old province of France. The distance from Clermont-Ferrand to the top of the Puy de Dôme is from 8 to 10 miles.

On the other 4 days I managed much better by taking the morning blue autobus from the centre of the Place de Jaude, in the middle of the city, and going as far as the Pont de l'Abri Inn on the right of the road. I then continued by walking along the road in the direction of the mountain, carrying my lunch, and soon getting on to good ground on the foothills, reached in about 20 minutes walk. I stayed on these foothills until about 5 p.m., when I got back to the Inn at the Pont de l'Abri in time to catch a returning autobus at 5.30 p.m. That is the only way to work the Puy de Dôme mountain now in a short stay, unless one is prepared to hire a private motor car in Clermont-Ferrand. The Electric Railway from the city to the summit, which I used in 1913, is a thing of the past and all the rails have been torn up from the road and are stacked along the roadsides at intervals. The insects of the Puy de Dôme mountain region which I captured were :—

Rhopalocera.—*Pararge maera*, L. ; *Erebia stygne*, Ochs. ; *Erebia ligea*, L. ; *Satyrus galathea*, L. ; *Aphantopus hyperantus*, L. ; *Coenonympha arcania*, L. ; *Melitaea dictynna*, Esper ; *Limenitis populi*, L. ; *Plebeius argus*, L. ; *Aricia agestis*, Schiff. ; *Polyommatus icarus*, Rott. ; *Cyaniris semiargus*, Rott. ; *Lycaena arion*, L. ; *Chrysophanus hippothoë*, L. ; *Aporia crataegi*, L. ; *Papilio podalirius*, L. ; *Hesperia carthami*, Hub. ; *Hesperia serratulae*, Ramb. ; *Hesperia onopordi*, Ramb.

The *C. arcania* were a small race ; the *S. galathea* showed a marked tendency towards var. *latelians*, Obthr., *i.e.*, a considerable increase in white pigment, the best examples of which I have taken since the Great War at Montmien, not very far from Fontainebleau. I was interested in finding *L. populi* here ; it settled on me when I first saw it, but I was able to net it next day, after much persuasion.

Heterocera.—*Zygaena lonicerae*, Sch. ; *Diacrisia sannio*, L., both sexes ; *Arctia testudinaria*, Fourcr. ; *Aspitates strigillaria*, Hb. ; *Pseudoterpna pruinata*, Hufn. ; *Argyroploce pruniana*, Hübn.

Neuroptera.—A species of *Chloroperla*.

Rhynchota.—*Therapha hyosciami*, L. ; *Syromastes marginatus*, L.

Hymenoptera.—*Tenthredo arcuatus*, Först. ; *Tenthredo zonula*, Klug. ; *Tenthredo perkinsi*, Morice. ; *Tenthredo mesomella*, Thms. ; *Arge rosae*, L. ; *Athalia glabricollis*, Thoms. ; *Ichneumon xanthorius*, Frst. ; *Amblyteles armatorius*, Fst. ; *Nysson spinosus*, Fab. ; *Crabro cribrarius*, L. ; *Panurgus ursinus*, Gmel. ; *Panurgus calcaratus*, Scop. ; *Dasypoda plumipes*, Panz.

Coleoptera.—*Harpalus latus*, L. ; *Silpha obscura*, L. ; *Silpha tristis*, Ill. ; *Silpha nigrita*, Cz. ; *Byrrhus pilula*, L. ; *Geotrupes sylvaticus*, Pz. ; *Hoplia philanthus*, Füss. ; *Phyllopertha horticola*, L. ; *Lacon murinus*, L. ; *Dorcadion fuliginator*, var. *mendax*, Muls. ; *Labidostomis pallidipennis*, Gebl. ; *Timarcha tenebricosa*, Fabr. ; *Otiorrhynchus fuscipes*, Walt. ; *Liparus* (*Molytes*) *germanus*, L. ; *Leptura scutellata*, Fabr. ; *Hippodamia variegatus*, Goez.

On Friday, 5th July, I left Clermont-Ferrand by railway-autobus for Mt. Dore. I do not advise anyone to adopt this method if they have any " set " insects in their luggage as I had ; the better method, slower but safer in every way, would have been to take the train from Clermont-Ferrand station to Mont Dore station, where the Hotel omnibuses meet the trains, and I adopted this method when I left Mt. Dore in returning to Clermont-Ferrand and Paris.

I stayed at Mont Dore until 1st August, at the Hôtel Mêtropole et

Etrangers, a very comfortable and well managed hotel, which I can most thoroughly recommend.

There is choice at Mont Dore of many other very nice hotels, villas, and pensions. Situated as it is in the valley of the river Dordogne, formed by the junction of the small streams Dor and Dogne at the foothills of the Pic de Sancy mountain, 6186 ft. This is the highest mountain of the Central Plateau of France, a short distance to the south of the small town of Mt. Dore. This mountain asthma-cure resort and watering place lies in a very attractive valley, the next station south of La Bourboule, better known as an attractive Golf and also Cure Resort.

The direct route to Mont Dore is via the Quai D'Orsay station at Paris and there are through carriages from there to this terminus station at Mont Dore on the Orleans Railway. The season is from 15th May to 15th September. There are a number of collecting grounds south of and parallel to Mt. Dore; these I will briefly enumerate, *viz.*, the road to Besse, and the Grande Cascade, the Cascade du Serpent, the Pic du Capucins, with the woods before it and the very productive large marsh which lies beyond and just below it. From the village of Rigolet following the telegraph posts over a scrubby pasture rise leads to a wooded eminence alongside which a small stream flows with a smaller marsh. It was here, that wondering small cowherds stared with interest on several occasions at the English Entomologists. The full day which is devoted to the ascent of the Pic de Sancy on the straight road from Mt. Dore leading up to the Buvette at its foot, discloses some good grounds to the left of the road, at different points, which can be gradually visited on other days. For the ascent of the Pic du Sancy itself Mr. G. T. Bethune-Baker in "A week at Le Mont Dore," in *Ent. Record*, Vol. XXXIII, No. 4, 15th April, 1921, should be read, as the account of the climb is exceedingly well written though his gloomy conclusions after a short stay in June are not to be accepted for July and at any rate early August. I must not omit to refer again to the Grande Cascade, just below which I was catching 2 very presentable specimens of *Polyommatus amphidamas*, E. (*helle*, Hb.,) on 11th July, though I never saw the species again in the district after that date.

Nor must I omit the widely extended generally level plateau above the Grande Cascade, which stretches away in the direction of the Croix St. Robert, passing on the right the Carriere de Sarrevielle, on through the Plateau de Durbise, where the Sentier de Chaudefour exists, but which I never succeeded in finding in a region of no direction posts and no person possessed of any intelligent local knowledge.

In this solitude I tramped all day on 8th July with practically no shade, in the direction of and to the right of Moneau, near where a wooded valley on the right discloses itself. Some distance after passing the above mentioned quarry, at the top limit of this wooded rise, walking each step amongst *Rosa alpina* (not yet in flower) up to one's knees at each step, on an almost pathless area, where one hopes to find a path leading down by a stream through the wood to the valley below. This hope is soon disillusioned when one staggers up the stream banks again to a large snow patch to quench ones interminable thirst. There, an Osprey flew backwards and forwards, not more than 30 yards above me, so tame and so curious that I could with difficulty

frighten it away. Here it was that I first discovered a headquarters of a race of *Polyommatus amphidamas*, E., a race apparently unrecorded previously by either English or French naturalists, as far as I can gather from the available literature on the district. I was able to secure 5 good specimens of this beautiful insect at this late date, and I should have secured more on this soaking ground, had not the burning heat compelled me to seek shade at some distance. Apparently W. F. de Vismes Kane missed it about the year 1880, certainly G. T. Bethune-Baker did in 1920. Probably in that inaccessible place, the Vallée de Chaudefour, which I could not reach on this day, frequented by Kane, it occurs, here and there, in very sunny places. It loves to settle and sun itself every few moments, in its copper-like habits of flight, on the leaves of the large bushes which grow on the slopes of these very inhospitable and wet slopes, which it is almost impossible adequately to describe, and where it also settles on small flower heads in this mountain district. Nor must I omit to mention a long area leading up from Chambon Village, where the road runs parallel to a stream, which later bifurcates, the one branch leading up eventually to the *amphidamas* ground after a horrid long wet grind; and the other parallel all the way to the road, leading eventually right up to the confines of the Vallée de Chaudefour, where the valley is confined in a pocket by the southern steep slopes of the Pic de Sancy. Again I must mention also the valley leading up from the Buvette at the foot of the Sancy Massif to the stony Gorge de l'Enfer, with its rough stony path; also the Val de la Cour, and some excellent ground, which Mr. Mosely, to whom I am very much obliged for his previous knowledge of Mont Dore, found parallel to the vallée of the Dordogne and to the Ancien Chemin de Besse.

I was told that there was a track over the Pic de Sancy range to the Vallée de Chaudefour, but I could not find it.

Certainly there is no direction post. I think Kane must either have used the ancien Chemin de Besse, which now finishes at the Buvette, or he must have stayed at Chambon village or at Besse, and have worked this profitable vallée from one of these places, unless the whole of the ancien Chemin de Besse was operative in his day.

(*To be concluded.*)

SCIENTIFIC NOTES AND OBSERVATIONS.

Note on Three Genonyms.—The following notes are on some generic names used in *Cat. Lep. France Belg.*, Vol. II, Part 1.

Page 84. *Ommatopteryx*, Kirby, 1897 = *Eromene*, Hb. 1826 (*praeocc.*). *Ommatopteryx* was published by Kirby (*Handb. Lep.* V. 274 : 1897) to replace *Eromene*, Hb., *Verz.*, p. 366 (1826) (*praeocc.*) and "*Euchromius*, Guenée, *Europ. Microlep. Ind. Meth.*, p. 86 (1845); Meyrick, *Handb. Brit. Lep.*, p. 396 (1895) *nom. praeocc.*" The name *Eromene* was praeoccupied by Hübner himself, *Verz.*, p. 256 (1825) in *Noctuidae* and is therefore ruled out. The name *Euchromius* was introduced by Guenée in *Ann. S.E. Fr.* (2) III. 324 (1845) and *Eur. Microlep. Index*, p. 86 (1846), but was neither described nor was any reference given to *Eromene*: it is therefore invalid from this date.

The name *Euchromius* is not identical with *Euchromia*, Hb. (*Verz.* p. 121 : 1820 ?) or with *Euchroma*, Solier (*Ann. S.E. Fr.* II. 284 : 1833 : Coleoptera, *Buprestidae*). So far as I can ascertain, the name *Euchromius* was first validated by description by Meyrick in *T.E.S.* 1890, 479-480 (Sept. 1890) and, if not described previously or used with a reference to *Eromene*, Hb. 1826, it should be quoted as *Euchromius*, Meyrick, 1890. It has, of course, precedence over *Ommatopteryx*, Kirby, 1897.

On page 90 we find *Donacaula*, Meyrick, 1890, used for *mucronella*, Schiff. Mr. Meyrick himself has stated (*Arb. üb. morph. u. taxon. Entom. aus Berlin Dahlem*, I. No. 1 : 1934) that *Donacaula*, distinguished from *Schoenobius* by the stalking of Fw. 10 with 8, cannot be maintained, as the structure is inconstant in *mucronellus*, so that *Donacaula* is merely a synonym of *Schoenobius*. This correction should also be made in Mr. Meyrick's *Revised Handbook*.

On page 93 we find the genonym *Asopia*, Treits., used for *farinalis*, Linn., instead of *Pyralis*, Linn. 1758. I do not propose to argue this matter here and merely note that there is no need to reject the name *Pyralis*, Linn.—T. Bainbrigge Fletcher, Rodborough, Glos. 22*nd May*, 1936.

NOTES ON COLLECTING, etc.

June.—From the middle to the end of June the larvae of *Cucullia chamomillae* are to be found feeding on the flowers rather than on the foliage of chamomile (*Matricaria*) and the very similar looking stinking mayweed (*Anthemis*). They feed during the daylight hours as do the larvae of all the British "sharks" except *C. umbratica*.

An ideal spot is a field which has recently gone out of cultivation and is covered with the foodplant, among which there is nothing of value growing, as here the larvae may be swept in mid June from the flowers, or if searching is preferred, look for flowers which have holes eaten into the deep yellow centres. They are easily noted and the larvae are found rolled in a ring on the same head or one nearby. As the larvae progress in size they leave very obvious tracks, eating the white petals off and leaving the centre part only, and at this stage the larva is in the stem just below the denuded flowerhead. When fullfed they eat through the stems and let the flowerheads fall off and are of course most easily located at this stage, but they are also now most heavily "stung." It pays to take small larvae, which feed up in a very short time indeed.

These larvae are fullfed about the beginning of July, and are very beautiful, like china with a high glaze, and vary greatly in colour and hue. They go deep into earth to pupate.

Micro-Collecting, Mid June to Mid July.—A visit to some farmyard buildings—the older and dirtier the better—should prove productive of many species; cases of *Tinea pellionella* on the walls, imagines of *T. fuscipunctella*, *T. misella*, *Trichophaga tapetiella*,* *Aglossa pinguinalis* and *Pyralis farinalis*, will probably be found in plenty. An electric torch is useful for searching the dark corners favoured by the *Tinea*. If there is an old stack in the yard *Pyralis glaucinalis* and *P. costalis* can be dislodged by beating the sides of the stack, with a stick.

* *tapetzella*, L. *Sys. Nat.* Xed. p. 536 (1758).

The larva of the beautiful *Cerostoma sequella* feeds on the leaves of maple in June, preferring tall trees to hedges, and is not easily obtained, but at the end of the month the boat-shaped cocoons can be found spun in the moss growing on the trunks.

The larva of *Zelleria hepariella* feeds on ash under a slight web on the leaflets at the tip of a frond, and is full fed towards the end of June. The bright green larva is very active and is likely to drop when the leaf is picked; it pupates in a dense white silken web.

The larva of *Mompha decorella* feeds in the stems of the common willow herb (*Epilobium montana*) making a slight gall. The stems of infected plants above the gall are usually more branched and redder in colour; this enables the galls to be found readily. Very rarely a stem contains two galls. Stems containing a gall should be gathered in July, trimmed of the leaves and side shoots and stuck in wet sand. The larva pupates in a slight silken cocoon within the gall, the imago emerges in the early part of August.

The white ribbed cocoons of *Bucculatrix maritima* can easily be found on almost any salt-marsh in spite of their small size. The larva feeds on the leaves of *Aster tripolium* but abandons the plant to pupate on any short thin stem close by. The cocoons of the second brood can be collected in early July.—L.T.F.

Platycleis grisea, Fabr., NOT in Derbyshire.—In his *British Orthoptera* Lucas gives, with all reserve, a very surprising record for this species from Derbyshire. As I have never heard of its capture much more than half a mile from the south coast, I have always felt very sceptical about this northern mention, so wrote to the Curator of the Derby Museum. He was kind enough to send me the specimen. It is a damaged, female nymph of some species of *Copiophora*, a South American genus of *Conocephalidae*, several species of which have turned up from time to time at Covent Garden and elsewhere. It is, of course, no more British than the cobras which have been reported at times, and has nothing in common with the genus *Platycleis*, except that both belong to the *Tettigoniidae*.

The woodcricket, *Nemobius sylvestris*, Fabr., reported from Derbyshire by the same authority, quoted by Lucas, must of course be regarded very sceptically. Unfortunately, the specimen cannot be traced.—Malcolm Burr, The Hermitage, Dorney, Windsor.

Acrolepia granitella.—In Meyrick's *Revised Handbook of British Lepidoptera* August is stated to be the period of the imago. I have dislodged this species from thick corn in September and October and again in April and May and I have taken a ♀ flying around *Inula* at dusk as late as the 10th June. Evidently this species hibernates. —L. T. Ford, St. Michaels, Bexley,

Four new food-plants of Parascotia fuliginaria, L.— On 23rd May, 1936, Mr. C. N. Hawkins and I found three larvae of *fuliginaria* sitting on the under side of a large specimen of *Polyporus betulinus*, (Bull.) Fr., near the outer edge. Two were actually eating it, and there were several holes in the surface. We found two more larvae on a rather hard brown fungus, with deep ribs on its under surface

growing on dead pine, identified as *Paxillus pannoides*, Fr. A considerable number were found eating or resting on a white fungus growing flush with the surface of the dead wood of birch and pine, *Corticium vagum*, Berk. et Curt. A single larva was found on an oak log, on a bracket-like fungus with orange-yellow lower surface, growing on the bark. This fungus was *Stereum hirsutum*, (Willd.) Fr.

I am indebted to Miss F. L. Stephens of the British Museum for kindly identifying the fungi. Fungi, on which the larva has been found feeding in a wild state in this country in previous years, are *Polystictus versicolor*, recorded by E. E. Green, *Polystictus abietinus*, *Polyporus schweinitzii*, and *Daldinia concentrica* by me (*Ent.* 1932, LXV. 53; *Ent. Record* 1935, XLVII. 91.).—E. A. Cockayne, 116 Westbourne Terrace, W.2.

Note on the Larva of Agrotis agathina, in the Exeter and Newton Abbott district.—I have obtained the larva of *A. agathina* in four separate localities, with very considerable patience and exertion during the daytime by simply beating them into a tray, selecting heather growing on convenient banks and, where these are not obtainable by beating, tall straggling shoots. I have not yet succeeded in getting *Noctua neglecta* by this method, though I feel sure it must occur in these localities, as I have taken the moth within a few miles in the same sort of country, so presume the caterpillar must strongly dislike the midday sun. The idea is well worth trying in the case of *A. agathina* for those who live far from a heath and feel the effect of summer time.—(Capt.) C. Q. Parsons, Torquay.

Cornish Notes, 1935 (*continued*).—*Aglais urticae* was first seen in a Truro street on 30th March, a sunny warm day; two in April, 4 in July, and about half a dozen in August and September, in various parts of this neighbourhood, complete the record, which is below normal for recent years.

Vanessa atalanta was first seen on 11th July (at Falmouth) and the next on 31st July in a Truro garden, both apparently fairly good. Then a worn one appeared on scabious in the garden on 2nd Sept. and after that from 1 to 7 specimens were seen on *Escallonia* in the garden frequently until 10th Oct., nearly all of them in perfect condition, and the last seen flew through the verandah on the sunny morning of 9th Nov. after heavy showers in the night.

Vanessa cardui, a somewhat faded specimen was reported in *The Field* as seen at Tresco, Isles of Scilly, on 11th April after at least 3 days of S.W. gales. The only specimen seen by me was a very worn one on *Buddleia aviculata* in the garden on 29th Sept. This species of Buddleia, although, with its small tufts of very fragrant cream and brown flowers, comparing very poorly with the common *B. variabilis*, with its long spikes of crowded flowers in various shades of purple and violet, is nevertheless attractive to lepidoptera by day and night, and blooming as it does throughout the autumn and into early December it furnishes a useful attraction long after the other species and most other garden flowers have shut down for the winter and it is well worth growing in consequence.

Until I read Mr. Bainbrigge Fletcher's remarks on "Wasps as Enemies of Butterflies" on pp. 10 and 11 of the January number of

this magazine I was at a loss to account for the lamentable scarcity of *io*, *urticae* and *atalanta* during last summer, and had to fall back on the frosty and otherwise very unseasonable spell of weather about mid-May, followed by the disappointingly short flowering of the Buddleias, due probably to the succession of hot dry summers of 1933, 1934 and 1935; but Mr. Fletcher's evidence offers a further factor to contribute to the failure, and I am inclined to think that it may be a very large factor, although wasps, whilst rather more numerous hereabouts than usual, were not excessively so, and last year was less hot and dry than 1933 and 1934. Are there any data about the effect of frost on the eggs of Lepidoptera that do not usually hibernate in that stage?

In surprising contrast to the general experience of butterflies in Cornwall last year was a report from the St. Columb district from a correspondent whose evidence I have no reason to doubt, as he knows our butterflies well. He recorded Red Admirals as common in the garden on Buddleias and Blue Globe Thistles (*Echinops*) in August and September; 150 to 200 Clouded Yellows including 2 var. *helice* on Cornish Marl Clover on a farm near Wadebridge in the first week of September and "a very large population of Painted Ladies" in the last week of June. He also said that "Peacocks and Tortoiseshells were in great numbers." I could get no further particulars about any of these records but it seems probable that the *cardui* were part of an immigration to which those reported with *noctuella* and *stellatarum* at Mullion by Mr. Parkinson Curtis at that time (See *Entomologist*, August 1935, pp. 185-6) belonged. My correspondent subsequently recorded a Brimstone, a Peacock and a Red Admiral as seen flying in Carnanton Woods, St. Columb Major, on 13th Nov. a sunny day with occasional showers and not specially warm.

I am not quite sure what Cornish Marl Clover is, but believe it to be simply *Trifolium medium*, which is locally common in the county and is extensively cultivated in the north for fodder, to the virtual exclusion of the commoner *T. pratense*.

Danais plexippus, L. [=*archippus*, Fb.], is not known to have favoured Cornwall with a visit last year, although reported from three English counties and one Welsh one.

Macroglossum stellatarum, a specimen in good condition came into a Falmouth house on 5th March and was alive when given to me on the 13th. I kept it for a week and then released it on a warm sunny day. The next reported was on 17th Sept. in a garden near Newquay and I saw one flying around variegated Japanese honeysuckle on our verandah on 27th Sept. A meagre record for 1935 considering how common it was in 1933 and 1934; but 2 or 3 specimens annually is about the normal number.

On 28th July a one-inch green larva of *Eumorpha elpenor* was found on a young fuchsia in a pot in the garden and was brought in and fed on willow herb and evening primrose. After its next ecdysis it assumed the usual black-brown colour characteristic of this species hereabouts. I have never seen a full-grown *green* one. *Herse convolvuli*; one was found at rest under our verandah roof on 24th, and I caught one at flowers of *Nicotiana* at 8 p.m. the same evening. On the 28th a specimen in good condition was flying in the verandah at 7.30 and I caught a very worn male at *Nicotiana* later on the same evening. On 4th June a fine female *Sphinx ligustri* was brought to

me in the evening for identification and I put it on one of our verandah posts where it settled down comfortably and on the 6th it was still there and *in cop.* with a male in the morning; the male left in the evening and the female began laying *on the post* and continued on the 8th, flying on that evening. It was rather remarkable that she laid some 3 dozen eggs in an open batch on the post, instead of flying away on the 6th, and laying them singly on privet in the usual way. (*To be concluded*).—Chas. Nicholson, Tresillian, Truro, Cornwall.

Procris cognata, H.S., in the Cotswolds.—This species, which is *cognata*, H.S., with the spine on male clasper, as defined by Dr. Jordan, and *globulariae*, nec Hb., of most British authors, is recorded only from Kent and Sussex in most text-books. Tutt (*Brit. Lep.* I. 413) gives records from Cheltenham and Newnham in Gloucestershire, but states that these are "probably erroneous and want confirmation," and in the unpublished "Victoria County List" of Gloucestershire Lepidoptera I find this species recorded from Cheltenham, Newnham and Leckhampton. On 24th June, 1935, I took a freshly emerged male and thereafter up to 11th July more examples of both sexes in a very restricted area at Rodborough and found that I had also taken one on 29th June, 1934, but passed it over at the time as *P. geryon*, which is very common here during the last week of May and the first half of June. The occurence of this species in Gloucestershire is thus definitely confirmed and evidently it is more widely distributed in England than has been realized. The orange-yellow eggs were found on a species of *Centaurea* (not *C. nigra*) but none of my larvae survived the winter. On 16th May I noted empty blotch-mines in the *Centaurea* leaves on the ground where the species occurs, so presumably the larva is full-fed about then. The early stages have been described by Cockayne and Hawkins (*Ent. Rec.* XLIV 17-23, 62: 1932). My young larvae blotched the leaves but did not seem to enter inside the blotch, remaining outside and dropping off the leaf at the least disturbance.

Whether the name *cognata*, H.S., can stand I leave to experts in this group to say. *Procris cognata* was described by Herrich-Schäffer in *Schmett. Eur.* VI 42 (1852), but there is another *Procris cognata*, Lucas, *Expl. Alg.* p. 373, t. 3, f.2 (1849), which Staudinger (*Cat. Lep. Eur.* I. 390, No. 4408: 1901) quotes as a synonym of *P. notata*, Zeller, a name which Jordan (Seitz *Macrolep. Pal.* II. 8) sinks as a subspecies of *globulariae*, Hb.; so that the name *Procris cognata*, H.S., 1852, is apparently a primary homonym of *Procris cognata*, Lucas, 1849, and hence invalid.—T. Bainbrigge Fletcher, Rodborough, Glos. 22*nd May*, 1936.

CURRENT NOTES AND SHORT NOTICES.

Part 2 of Dr. Hering's work on Leaf-Mines (*Blatt-Minen Mittel- und Nord-Europas*) has been issued and continues the List of plants from *Carex* to *Festuca* with tabulated descriptions of the insect larva which are attached to each, the mines of some hundreds of species being dealt with in the 112 pages. There are 2 plates of figures and many text figures, and over a hundred species are thus illustrated. Species of *Carex* (rush) have 26 species of insects attached to them; *Crataegus* species have 27; *Cirsium* have 20; *Centaurea* have 19; *Aira* (now called *Deschampia*) have 17; *Festuca* have 19; *Carpinus* have

18; and so on. Such works as these entail an enormous amount of of field research and this work in particular took years of collecting and observing as we know from the admirable *Minen Herbarium* which Dr. Hering has been issuing. The display of the matter is also very helpful and aids successfully in practical use of the book. Subscribers to this work should know that the price will be enhanced after completion.

Insect Pests of Crops, 1932-34. Bull. 99, Ministry of Agric. and Fish. His Majesty's Stationery Office. Price 1/- nett (postage extra). —In this report the method of tabular presentation of the facts, which was not given in the last report, has been reverted to as being of more value, in that it summarizes the whole of the facts without omission of many individual records as in the report referred to. After 12 pages of general remarks on the various classes of crops, the methods of control and particular introduced pests, the Tabular Record occupies 23 pages. The columns are Pest, Crop, Year, Province and Remarks. For example, in Cereals we have Lepidoptera:—*Apamea secalis*—Cereals generally—1934—Norfolk, Berks—Instances of severe damage. The records were made by the officers stationed in the various provinces into which England and Wales is divided for this and other purposes, and the Bulletin has been arranged by the officers of the Ministry under the guidance of J. C. F. Fryer, F.R.E.S., Director, Plant Pathological Laboratory.

Don Candido Bolivar Pieltain has been appointed Assistant Secretary of the Ministry of Labour in the Spanish government, which includes "Beneficencia" and Public Health. Orthopterists will regret that such responsibilities must occupy his entire time and energies. Politicians are an abundant species, but good entomologists are rare.—M.B.

REVIEWS AND NOTICES OF BOOKS.

The Genitalia of the British Tineina. By F. N. Pierce and J. W. Metcalfe. Octavo, pp. xxii + 116 + 68 tabs. December, 1935. 30s. —This book has three different titles and we quote that on its spine. The genitalia of the Tortricina were dealt with by the same authors in 1922 and the present volume deals, on similar lines, with the families included under the term Tineina together with the *Eriocraniadae* and *Micropterygidae*. Plate 68 also gives figures of genitalia of some of the *Aegeriadae* but these are not described in the text. The *Stigmellidae* (*Nepticulidae*) are not included because they have already been dealt with by Petersen; their omission here seems to be a pity, since few British collectors are likely to have Petersen's paper at hand; there is, however, a homely proverb about a quart and a pint pot, so we must not object to an attempt to keep this book within sizable limits. As it is, it contains a mass of detail, in a little known subject, which will take some time to digest. In their previous volume on the Tortricina the authors wrote:—"We . . . . present a definite scheme of classification, based entirely on the genitalia . . . . [and] . . . . while fully admitting that the final classification can only be arrived at upon the study of all the characters, we feel confident that the present arrangement marks a big step towards the goal, and our confidence is strengthened by the close agreement of our results

with those . . . . reached by the study of other structural characters." This statement may be considered true of the present volume also, although the authors merely remark that "the British Tineina, unlike the [Tortricina], do not fall into a small number of natural groups, but rather into many which are also well-defined." It is, therefore, satisfactory to find that, broadly speaking, the authors' classification on generic characters supports that which has been arrived at on other structural and biologic characters; here and there we find a species shifted from one genus to another (*e.g.*, *Mompha stephensi* to *Blastodacna*). Our chief criticism on their classification concerns their inclusion of the three species of *Acrocercops* with the *Heliozelidae*; we are emphatically of opinion, based on our own knowledge of the structure and biology of numerous species, that *Acrocercops* belongs to the *Lithocolletidae*, an opinion which was held by Chapman (*Entom.* XXXV. 139-140: 1902). This seems to be a case where convergent characters in the genitalia cannot be held to outweigh other points of dissimilarity. The *Adelidae* and the Trichoptera both have very long antennae and case-making larvae, but these are merely convergent characters which do not postulate especially close relationship. *Antispila* and *Heliozela* form quite a distinct group, with very specialized habits, and we agree with the authors in placing the *Heliozelidae* much nearer the *Adelidae* than in Mr. Meyrick's classification.

The authors themselves doubtless will agree that this book is only a preliminary survey of a very large subject. There are gaps here and there and some of these might have been filled, although the completion of every possible omission would have delayed publication *sine die*. But here and there we do come across small omissions, which could have been filled had the authors indicated their wants before publication; thus on p. 28, we read "*Blastobasis*, type *phycidella*, Zell. We have not seen the type," although *phycidella* is a common species and specimens could have been supplied had it been known that they were wanted; on pp. 12 and 16 the genus *Phthorimaea* is split into two sections, A and B, and again the authors say that they have not seen the type, an easily procurable species, whose genitalia had previously been figured at least twice, by Philpott and Busck.

There are a few misprints (p. iii, "*Strathmopoda*," "*Stromopteryx*"; pp. xv and 65, "*thamesis*" for *tamesis*; pp. 4,5, "*Psalmathocrita*"; p. 5, "*Xytosphora*" and "*erincella*," etc.), and on p. 91 the authors have repeated the unfortunate mispelling of Duponchel's name *angusticollella*. It may seem ungracious to refer to such small blemishes, but unfortunately these incorrect names have a habit of getting repeated.

We regret to see such a short list of subscribers and can only hope that this was due merely to lack of information regarding the approaching appearance of this volume and that we have a few more, who are interested in the British Tineina, than would seem to be indicated by this list. As it is, it would seem disheartening to the authors to receive so little appreciation of their long and arduous labours as pioneers in this field of work. To those select few (shall we say?) who are not contented with a mere half-loaf (and the smaller half at that!) in studying even such a restricted fauna as is provided by the British Lepidoptera, this volume will be not merely welcome but a necessity.—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.

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *fuscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

MEETINGS OF SOCIETIES.

The Royal Entomological Society of London.—41, Queen's Gate, South Kensington, S.W.7., 8 p.m. October 7th, 21st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. June 25th. July 9th, 23rd.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

Communications have been received from or have been promised by Capt. K. J. Hayward, Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, A. J. Wightman, T. Greer, T. Bainbrigge-Fletcher, R. E. Ellison, Rev. E. B. Ashby (late), Dr. Malcolm Burr, Capt. C. Q. Parsons, E. P. Wiltshire, Dr. E. A. Cockayne, Rev. R. E. E. Frampton, C. Nicholson, Wm. Fassnidge, and Reports of Societies.

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

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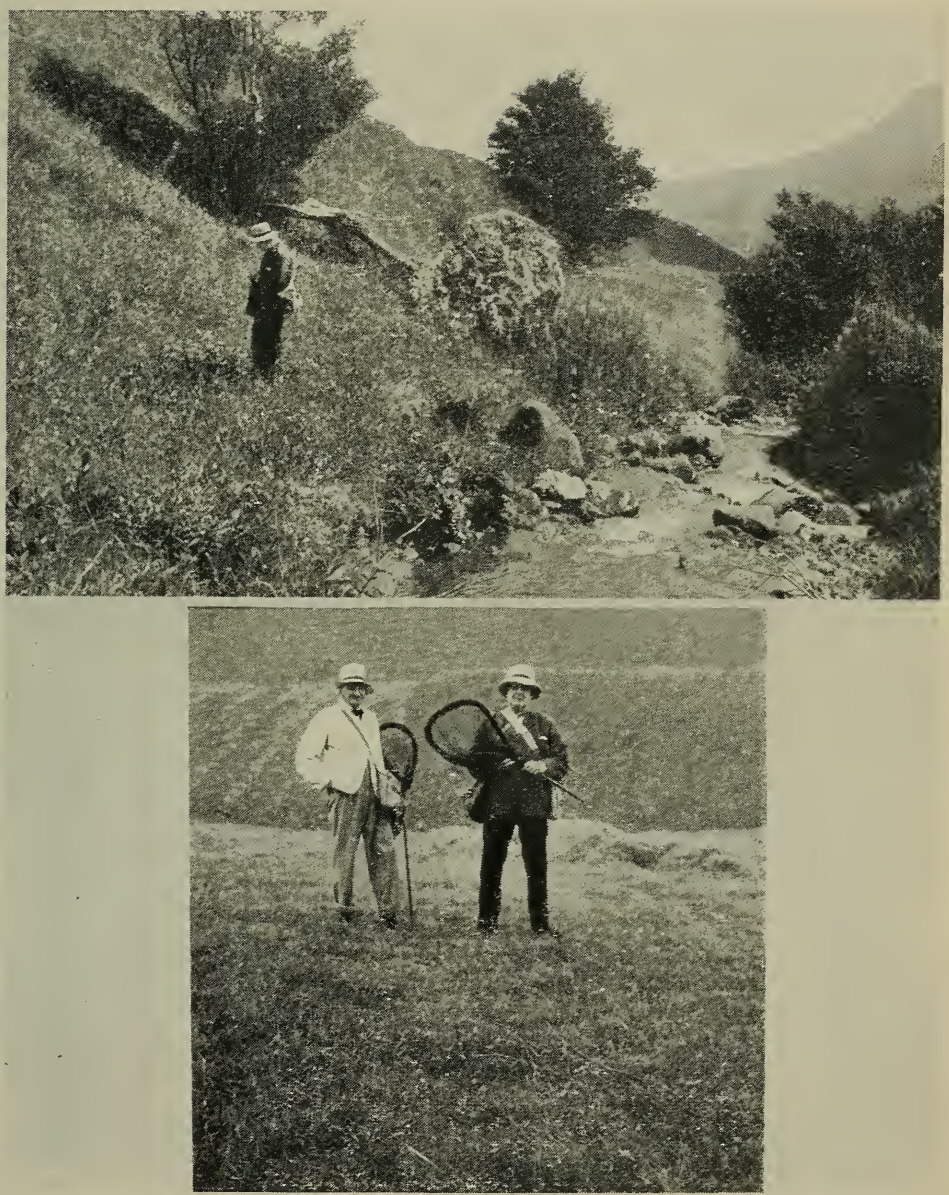

The Entomologist's Record.

Rev. E. B. Ashby and Dr. H. G. Harris in the Vallée de Chaudefour.

Ozoir-la-Ferrière; Puy de Dôme mountain; and Le mont Dore, France, in June-August, 1935.

By the (late) Rev. E. B. ASHBY, F.R.E.S., F.Z.S.

(*Concluded from page 73.*)

Dr. H. G. Harris of Southampton, who had been staying at Dieuleüt, joined me on 16th July and we collected together until 31st July; he was joined on 28th July by his son Mr. J. H. Harris, who helped me to find a nest of the wasp *Polistes gallica* in the Vallée de Chaudefour, which Dr. Harris succeeded in reaching by auto. on 30th July. It was on these very interesting days that Mr. J. Harris took a series of delightful photographs, and was the recipient of the second edition of a very deliberate volley of oaths, which a French proprietor in that valley poured upon us for unintentionally treading upon the edge of his grass. I think the farmer must have inherited this characteristic from his grandfather in Kane's time because its volume was well maintained, and its indications as precise. His was the only complaint I received during my whole visit. Two bad thunderstorms occurred by day on 12th and 13th July much to my discomfort, and during two or three nights our sleep was disturbed. We found *Aricia eumedon=chiron* very widely distributed, contrary to Mr. Bethune-Baker's short experience in June, and very fresh, settling freely, wherever the flowers of *Geranium sanguineum* attracted it. We also discovered a few of the imagines of *Araschnia levana*, gen. aest. *prorsa*, L. going over, not far from Chambon village, and also in the wood from the Grand Salon de Thé on the way to the Pic de Capucin, Mont Dore. Dr. Harris, and his son left for Dompierre near La Rochelle on 31st July, with several new species, I think, added to his collection. On 27th July, I gave a display of the insects of the Auvergne district in French before about 60 people of various nationalities in the Hotel Salon. The very popular Doctor Schmeller presided. This gentleman has lived at Mont Dore, in the spring and summer months for many years, and is extremely well qualified to advise any botanist, entomologist, or any one possessing asthma or allied troubles, who may seek relief by a beneficial and pleasant cure at Mont Dore. I can only add that Dr. Schmeller is kindness personified.

The following insects were taken by me in the Mont Dore region:—

RHOPALOCERA:—*Pararge maera*, L. and var. *adrasta*, Hb.; *Erebia epiphron*, Knoch and var. *cassiope*, Fabr. and var. *nelamus*, Boisd.; *Erebia aethiops*, Esp.; *Erebia manto*, Esp. and ab. *caecilia*, Hb. and also ab. *caecilia*, Dup.=*constans*, Elwes; *Erebia oeme*, Hb.; *Erebia stygne*, Ochs. and *Erebia euryale*, Esper. The Mont Dore region produces a special form of the undersides of this species; lightly dusted with whitish (W. F. Kirby); and with the underside of the hindwing without ocelli (Berce) viz. ab. *philomela*, Hb.; *Erebia ligea*, L.; *Erebia tyndarus*, E. race *arvernensis*, Oberth.; "notamment Mt. Dore"; *Satyrus galathea*, L. var. *procida*, Hbst.; *Eumenis semele*, L.; *Satyrus hermione*, L. (1 seen, Rigolet); *Maniola jurtina*, L.; *Aphantopus hyperantus*, L.; *Coenonympha pamphilus*, L.; *Coenonympha arcania*, L.; *Argynnis* (*Brenthis*) *selene*, Schiff. (Pic de Sancy); *A.* (*B.*) *euphrosyne*, L. (Pic de Sancy); *Argynnis aglaia*, L. race *arvernensis*, Guillemot and Brams, (Moneau and Vallée de Chaudefour); *A.* (*B.*) *daphne*, Schiff. a

small race; *A.* (*B.*) *ino*, E., Dr. Harris took a nice variety of this insect with striated hindwings, and I took 2 females ab. *arvernensis*, Guill. deeply shaded with blue-black (Vallée de Chaudefour); *Argynnis lathonia*, E.; *A. niobe*, L. ab. *eris*, Meig., and ab. *pelopia*, Bkh.; *A. cydippe* L. (*adippe*, L.), and var. *cleodoxa*, Ochs., and var. *intermedia*, Tutt; *A. paphia*, L.; *Melitaea didyma*, O.; *M. dictynna*, E.; *M. pseudathalia*, Rott.; *M. aurelia*, Nick.; *Vanessa atalanta*, L.; *V. cardui*, L.; *Aglais urticae*, L.: *Nymphalis polychloros*, L.; *N. io*, L., *N. antiopa*, L. (1 seen, Rigolet); *Polygonia c-album*, L. var. *hutchinsonii*, Robson; *Limenitis camilla*, L. 1764; *L. populi*, L., (one large female seen high up on Pic de Sancy, near the Source of the Dor, 16th July): *Cupido minimus*, Fuess; *Plebejus argus*, L.; *Aricia agestis*, Schiff.; *Polyommatus icarus*, Rott.; *Cyaniris semiargus*, Rott.; *Aricia enmedon*, E.; *Scolitantides orion*, Pall.; *Lycaena arion*, L.; *Polyommatus virgaureae*, L.; *Heodes hippothoë*, L., generally abundant and widely distributed, and sometimes showed variation on h.w.; *H. alciphron*, Rott. var. *gordius*, E.; *H. phlaeas*, L.; *H. amphidamas*, E. very localized; *Leptidea sinapis*, L., one worn specimen; *Aporia crataegi*, L., and female observed ovipositing; the 3 common *Pieridae*; *Colias croceus*, Fourcroy, Lower Vallée de Chaudefour; and 1 ab. ♀ *helice*, Hb., route de Besse, Mont Dore, worn; *Gonepteryx rhamni*, L.; *Parnassius apollo*, race *cebennica*, Le Cerf (Vallée de Chaudefour and environs); *Hesperia carthami*, Hb.; *Hesperia serratulae*, H.S.; *Hesperia onopordi*, Rambur; *H. malvae*, L., *H. ludoviciae*, Mabille, smaller than *Adopoea lineola*, Ochs.; "bordure noire élargie, fond des ailes obscurci," locally abundant, especially Route de Besse.

HETEROCERA:—*Macroglossum stellatarum*, L.; *Ino statices*, L.; *Zygaena lonicerae*, Scb.; *Parasemia plantaginis*, L., and var. *hospita*, Schiff.; *Diacrisia sannio*, L.; *Agrotis corticea*, Hb.; *Hadena nana* (*dentina*), Esp.; *Cleogene lutearia*, Fabr.; *Psodos quadrifaria*, Sulz: *Metrocampa margaritaria*, L.; *Anaitis praeformata*, Hb.; *Melanippe tristata*, L.; *Hylophila prasinana*, L.; *Larentia caesiata*, Schiff.; *Eriopyzodes imbecilla*, Fabr.

DIPTERA:—*Therioplectes distinguendus*, Verrall; *Therioplectes aterrimus*, Mg.; *Tabanus sudeticus*, Zlr.; *Leptis scolopacea*, L.; *Laphria flava*, L.; *Ischyrosyrphus laternarius*, Müll.; *Syrphus torvus*, O.S.; *Sericomyia lappona*, L.

COLEOPTERA:—*Carabus violaceus*, L.; *Carabus nitens*, L.; *Carabus monilis*, F. var. *consitus*, Pz.; *Carabus arvensis*, Hb.; *Carabus purpurascens*, Fab.; *Silpha tristis*, Il.; *Silpha nigrita*, Cz.; *Hoplia coerulea*, Drury; *Aromia moschata*, L.; *Rhagium bifasciatum*, F.; *Leptura scutellata*, Fabr.; *Agelastica alni*, L.; *Timarcha tenebricosa*, Fabr.; *Chrysolina cerealis*, L.; *Chrysolina salviae*, Germ.; *Chrysochloa tristis*, Fabr.; *Chrysochloa cacaliae*, Schrank; *Chrysomela graminis*, L.; *Liparus germanus*, L.; *Otiorrhynchus fuscipes*, Walt.

NEUROPTERA:—*Panorpa meridionalis*, Rambur; *Perla cephalotes*, Curt.; a *Perlodes* species; a *Chloroperla* species.

ORTHOPTERA:—*Forficula auricularia*, L. ♀; *Decticus verrucivorus*, L.; *Orphania denticauda*, Charp, and larva; *Gryllus campestris*, L. ♀.

HYMENOPTERA:—*Sirex gigas*, L.; *Cimbex femorata*, Kirby; *Abia caudens*, Kono; *Abia fulgens*, Zadd.; *Tenthredo vespa*, Retz.; *Tenthredo arcuatus*, Först.; *Tenthredo perkinsi*, Morice; *Tenthredo maculata*, Geof.;

Tenthredo albicornis, Fab.; *Tenthredella livida*, L.; *Tenthredella mesomelas*, L.; *Tenthredopsis nassata*, L.; *Arge ustulata*, Schk.; *Arge atrata*, Först.; *Rhyssa persuasoria*, L.; *Vespa vulgaris*, L.; *Crabro vagus*, L.; *Crabro cribrarius*, L.; *Crabro peltarius*, Schreb.; *Bombus sylvarum*, L.

I left Mt. Dore the evening of 1st August, reaching Hounslow the following evening. I must again thank those many entomologists who have helped me to identify my more difficult captures.

[Mr. Ashby was very pleased at finding *H. amphidamas* at Mt. Dore, it had only previously been found in France, by Mons. Deslandes, at Porté, Hautes-Pyrenees. *Araschnia levana* was also recorded by us for the first time for the Puy de Dôme (vide *Entomologist*, Nov. 1935).—H. G. Harris.]

Supplementary Notice on the late Rev. Edward Bernard Ashby. —He was born at Chislehurst, Kent, in 1877, and was educated at St. Ann's School, Redhill, and Queen's College, Newfoundland. He originally intended to go into the Church, but changed his mind* and took up Banking instead. Until five years ago he was with Messrs. Barclay's, when he retired and took Holy Orders; becoming Curate at St. Gabriel's Church, North Acton. Previously to that he had always been interested in Church work. He died suddenly on December 17th last from heart trouble. His susceptibility to this was never suspected, otherwise precautions might have been taken. Only a few days before his death on December 11th, he was at the Entomological Club Supper of the writer, when he appeared to be in the best of health and spirits. His large collections of insects of all orders have been divided into three parts; one has gone to the British Museum (Natural History); one to the Rothschild Museum at Tring, and the third to the Hope Department, Oxford Museum.

He is buried in the pretty little churchyard of old Heston Church, only a few yards away from the last resting place of our late dear Miss Kirk.—H.St.J.D.

* As a matter of fact he gave up the idea because of a bad stammer which was afterwards cured. He told me this himself.—G.W.

NOTES ON COLLECTING, etc.

Corrections.—p. 9, l. 5 from bottom, for *Endotheta* read *Endothenia*.
p. 48, l. 19 from bottom, for *pygmalena* read *pygmaeana*.
p. 76, l. 1, for *pannoides* read *pannoides*.

July and August.—Towards the end of July and in early August the larvae of several *Cucullia* are to be found by those who care to search for them.

C. asteris is widely spread and can be found both in woodland country on *Solidago* and in coastal areas (on aster) but probably the best place to take them is where extensive timber cutting has produced a large area of cleared land in which Golden Rod (*Solidago*) is growing in great quantity. These larvae prefer the flowers and are to be found at any time of the day or night high up on the food plant where they can be seen at a distance. Take small larvae only. Large larvae are apt to be "stung." [Not my experience.—E.A.C.]

C. gnaphalii occurs in just the same sort of area as described above, but is more local. The larvae of this species prefer leaves to flowers. They feed by day in bright sunlight, but between meals leave the foodplant and lie concealed under any suitable foliage. A good time to search is when the sun breaks through on a dull day. The larvae crawl with a swift but jerky movement, ascend the stem of foodplant a few inches, feed rapidly and then descend and hide again, resting with head down on the ground if not prone altogether. They are greatly victimized by ichneumon flies, which attack even tiny larvae. The parasite larva quickly matures, pupates and emerges ready for another raid on others of the same brood of larvae..

C. lychnitis feeds usually on black Mullein (*Verbascum nigrum*) and is to be found from early July till September. This long period is due to the fact that pupae which have lain over one or more years often produce moths in May or early June, while the normal emergence period for one-year pupae is July. That the larvae of this species is often found on *V. scrophularia* may be due to the fact that the usual foodplant is very liable to disappear from localities where it has been in evidence for a number of years and then reappear so that moths must often emerge and be unable to find the *Verbascum* near at hand. *C. verbasci* larvae also occur on *V. nigrum*. Both species may be found together.

These larvae remain on the plant all day and as is usual with such larvae are badly "stung."

Dancing Habits of Some Braconidae.—On 14th June when in Windsor Forest I noticed what I took to be a cloud of "midges" swaying gently up and down over Miss Irene Kirk's head. Striking at them with a small fly net, I found I had captured some small Braconids. The insects then transferred themselves to me, "dancing" over my head. We captured more specimens, and found they were all one species, which Mr. Nixon has kindly named for us as being probably *Blacus paganus*, Hal. ♂ ♂.

Of an allied species, *Blacus tripudians*, Hal., Haliday says the males sport together in airy dances on warm, sunny afternoons, like the gnats of the genus *Chironomus*, and he adds "spectaculum gratissimum"! Marshall says he has observed a similar habit in another species, probably *ruficornis*.

As for the reason of this habit one can only suggest it is some kind of love dance, or marriage flight.—Horace Donisthorpe, Entomological Department, British Museum (Nat. Hist.)

References.—Haliday, A. H., *Ent. Mag.* 3. 42 (1836).

Marshall, J. A., *Trans. Ent. Soc. London*, 1889, p. 170.

Micro Collecting. Mid-July to mid-August.—The larva of *Phtheochroa rugosana* feeds on bryony (*Bryonia dioica*) during this period eating the berries, stems and leaves, concealed in a cavity formed by spinning a portion of a leaf to a stem or berry. It hibernates as a larva in a strong silken puparium. The larvae will spin up best on some rough material such as virgin cork; they should be kept out of doors for the winter.

The larvae of the second brood of *Euxanthis straminea* feed in the

seed heads of knapweed (*Centaurea nigra*) on the unripe seeds, and pupate in the heads. The imagines emerge towards the end of August.

Gracillaria azaleella is becoming a pest in glass-houses in the south of England, where azaleas are grown in numbers, and the larvae can be found at almost any time. Apparently there are two main broods—the larger in July to August—but late and early members of each almost make the species continuously brooded. The larva spins a leaf into a cone and when full fed pupates on the underside of a leaf between the edge and midrib, sometimes two on a leaf. I was asked to rid some azaleas of this species and gathered over 150 larvae, cocoons and imagines from only three plants.

The larva of *G. cuculipennella* feeds on the leaves of privet and ash at the end of July and early in August, making a typical *Gracillaria* cone. It pupates in a long spindle-shaped cocoon slung inside the cone in which it has last fed.

The larvae of *Epermenia chaerophyllella* feed in little companies on the underside of the lower leaves of *Heracleum* at the end of July making large brown blotches. The larvae leave the plants to spin their cocoons—in captivity they will spin up on the leaves or on the side of the breeding-cage.

The imagines of *Orthotaelia sparganella* are very sluggish and are seldom seen unless one resorts to the somewhat uncomfortable process called "grouting," but the larvae and pupae can be found in great abundance in the lower part of *Sparganium*. The pupae, if taken out of the stems, should be kept on damp flannel or blotting paper. In my note on *A. granitella* in place of "corn" read "cover," in the June no. —L.T.F.

Acrolepia granitella, Treits.—With reference to Mr. Ford's note (*ante*, p. 75), the following records (all under *Acrolepia granitella*) may be noted:—

(1) Barrett, *E.M.M.* XIV. 271 (1878): Pembroke, moth hibernates, larva VI in leaf flea-bane.

(2) Stainton, *E.M.M.* XVI. 36 (1879): larva *Inula helenium*, *I. dysenterica*.

(3) Meyrick, *E.M.M.* XXVII. 59 (1891): larva mining *Inula* leaves in Algeria.

(4) Sich, *Ent. Rec.* XXVIII. 207 (1916): Babbacombe (S. Devon), 20.vii.1916, larva and pupa on *Inula dysenterica*, open net-work cocoons underneath mined leaves, moth excl. VIII.

On the Continent this species is well-known to have a special predilection for sheltering in caves and fissures in rocks: see Demaison, *Bull. Soc. Ent. France* 1910, p. 76 (Lourdes, 28.viii.1908); 1911, pp. 402-403 (Catalonia, 23.vii.1910; also previous references to similar occurrence at Reims); 1915, p. 257 (N. Brittany, in caves, 31. vii and 2.viii.1915). All these records refer to dates in July and August, when the species emerges, but possibly it may hibernate in such situations.—T. Bainbrigge Fletcher, Rodborough; 30*th June*, 1936.

Curious Action of Pergesa porcellus, Linn.—*Pergesa porcellus* is common in my garden every June and may be seen feeding in numbers at the Valerian flowers for a short time from 10 p.m. (summer

time), and sometimes also at *Silene* flowers. Occasionally one visits a sugar-patch, hovering as at a flower. On 18th June, however, I was surprised to find a specimen resting on the tree-trunk alongside a sugar-patch and feeding actively on the sugar. I have seen a few thousands of flower-frequenting Sphingids feeding in various parts of the world but never before one that sat down to its meal.—T. Bainbrigge Fletcher. Rodborough. 29*th June*, 1936.

Hypena obsitalis, Hb.—Barrett (*Lep. Brit. Is.* VI. 322 : 1900) recorded only a single specimen of *H. obsitalis*, taken at Bloxworth, Dorset, on 21.ix.1884, and considered that this specimen must have been an accidental importation. South (*Moths*, II. 93-94 : 1909) also knew only of this one specimen. Since then, it has been recorded as taken at ivy at Paignton on 5.x.1908 by Milman (*Entom.* L. 44 : 1917) and on 11.vii.1917 another example was seen at Iford, Dorset, by Haines (*Entom.* L. 256 : 1917). As this species has recurred in the same part of England over an interval of more than thirty years, it seems probable that it is a regular inhabitant and not a mere casual introduction, as implied by Barrett. It is curious that there are no more recorded captures, but doubtless the species is overlooked and a search in likely places might well turn it up. I used to find *H. obsitalis* in Malta in shallow caves and at Hyères (S. France) I have taken it frequently at and around ivy-bloom and in the house. A search in very shaded corners (shallow caves, old mine-shafts, out-houses, thick ivy, etc.) is indicated by collectors in Dorset and South Devon. South's figure is good as far as it goes but only represents one form of *H. obsitalis*, which is an extremely variable species, so that collectors should not keep a look-out only for this one form. My Maltese specimens were taken mostly in May and June, those from Hyères between November and January inclusive.

Warren (*Seitz, Pal.* III. 435-436 : 1913) states that *H. obsitalis* is "merely a chance immigrant" in Britain ; his figures (t. 73i.) should be compared with that given by South. Culot (*Noct. Eur.* II. 225-226 : 1917) also records this species from S. Europe and gives two figures (t. 80, ff. 13, 14), which give a better idea of it. In L'homme's *Cat. Lep. France*, I. 337, No. 917, *Hypena obsitalis* is recorded mostly from localities in S. France but also as occurring as far north as about 47° N. Latitude. It seems, therefore, quite possible that this species occurs as a resident in the warmer parts of S.W. England and it would be worth while looking for it during the late summer in such shaded places as I have indicated. Lhomme gives its time of appearance in France as "vi., vii.-x.," to which I might add "xi.-i."—T. Bainbrigge Fletcher. Rodborough. 30*th June*, 1936.

Siona (Scoria) fagaria (belgiaria) in Devon.—I took a freshly emerged male of this species on Great Haldon on 7th June, and should be interested to know if anyone else has seen this moth in Devon. I can find no record for the county of Devon, but I may have overlooked it in one of Studd's articles.—(Capt.) C. Q. Parsons. Seaway Lane, Torquay. (P.S.—In my note on the larvae of *A. agathina* in the June No. it should read "with *very little trouble*."—C.Q.P.)

[C. G. Barrett, *Lep. Brit. Is.* VII. 30 writes, "Still found in Surrey, and tolerably common in the New Forest, and in Dorset, also found in

Kent, Sussex, and Berkshire. Curiously enough I find no records in the rest of the Southern Counties, nor in the Eastern or South Western." Nor does South record the species from Devon. Perhaps other readers may have *fagaria* from Devon. In its haunts it can be trodden up from among heather on slopes, *e.g.*, Shirley and Oxshott in Surrey on sandy gravel soil.—Hy.J.T.]

Cornish Notes. (*Concluded from p. 78*).—On 18th Oct. the manager of the County Council Depot at Tresillian gave me a female *Arctia caia* that he had found some days previously on the floor of his office shed. She had laid 340 eggs in a small tin in which he had placed her and I kept these eggs for over a month, but they did not hatch and were no doubt infertile, as they began to lose their shape and one or two here and there in the patches became light grey. This is the first example of this species that I have met with here in any stage. Curiously enough another late specimen was reported as having been found on a wall at Dartington, Devon, on 2nd Nov. *Plusia gamma* was represented almost entirely by wings left in our verandah by long-eared bats, which find it a happy hunting ground from July to October. The first *gamma* wing was found on 4th July and the last on 21st Nov., a hundred and twelve specimens having been accounted for during that time, mostly in August and September. It was very interesting to determine how many specimens were represented when more than one wing was found and in the case of hindwings I made no attempt to differentiate. On one occasion about a dozen wings were found and these I worked out as representing 7 specimens; on another occasion 5 specimens were represented; but mostly only one or two wings were found. During September the flowers of *Escallonia macrantha* attracted *gamma*, *atalanta* and *urticae* by day, and, when I was watching for *convolvuli* in the evenings, *gamma* was common at the *Escallonia* flowers behind the *Nicotiana* plants, but *convolvuli* never took any notice of those flowers, and *gamma* took no notice of *Nicotiana*, probably because its tube is much too long for their tongues. Two *Nomophila noctuella* were seen in the garden—a brown one on 13th Aug. and a nice fresh dark grey one on the 21st. The wings of 4 others were found in the verandah on 8th, 13th, 20th Aug. (very worn) and 2nd Sept. (good).

On 28th Oct. I noticed a perfect specimen of the typical form of *Miselia oxyacanthae*—I have not seen var. *capucina* here yet—resting on the floor of the verandah and on picking it up it seemed dazed, although apparently quite uninjured and a female. It moved its legs feebly, but rested in a natural position with its legs spread in a normal way. I boxed it, thinking it might have been stunned in some way, but although it was kept for over a week it never moved and eventually died and was pinned without being set, as a curiosity.

Dysstroma truncata, which is usually common in the verandah in the autumn—mainly the dark grey form, with an occasional *centum-notata* and *comma-notata*—was represented by only one living specimen (26th Sept.) and the remains of 8 specimens on 3rd July, 13th, 21st, 25th, 29th Sept., 14th, 15th (2) Oct. respectively.

There is very little of interest to report in "other orders." I was surprised to find a lively specimen of *Chrysopa vulgaris* on the window in the hall on the evening of 14th Jan.

Bombus lapidarius, *B. lucorum*, and *B. terrestris* appeared first in our verandah on 20th, 21st and 26th March, respectively, all warm sunny days.

Andrena fulva (♀) was first seen in the garden, where it nests, on 11th April, and there were 2 in the verandah on the afternoon of the 23rd. On 11th Jan. I picked up a "queen" of *Vespa vulgaris* crawling rather sleepily on the wet surface of the main road in Tresillian village. The 9th and 10th were sunny and mild after frosts in the night, but the 11th was dull, breezy and showery after slight frost, and I was very surprised to see a hibernating wasp at large. I brought her home, gave her a feed of honey and she settled down comfortably in normal hibernating pose in the box in which she remained for several weeks before I liberated her.—CHARLES NICHOLSON, Tresillian, Truro, Cornwall.

CURRENT NOTES AND SHORT NOTICES.

The first day of the 2nd Congress of the Society of British Entomology, at Cambridge on 27th June, was a pleasing success. The meetings were held in the Lecture Room and Laboratory of the University Museum of Zoology and some 80 members of the Society were present. Dr. A. D. Imms, D.Sc., F.R.S., F.R.E.S., University Reader in Entomology and President of the Society for 1936 presided and gave his Presidential Address, "Insect Phylogeny." After giving a historical survey of the views of various authorities and the bases of these views, he stated the more recent views of Tillyard and others, illustrating his remarks by a series of suitable diagrams. Although the subject was a very intricate morphological one it was handled in a masterly way and made quite intelligent to the mixed audience present. This was succeeded by a Talk on Wicken Fen from a botanical standpoint with a series of admirable lantern slides clearly illustrating the character of the mass growth and describing what had to be done to prevent the growth of any one component from becoming too vigorous and thus changing the ecological character and its consequent reaction upon the present fauna, which lovers of nature were anxious to preserve. The Visitors then went into the courtyard and the official photograph of the Congress was taken. Lunch ensued and was served in the Hall of Christ's College, at which it may be noted that both Milton and Darwin were students. Time allowed a short visit to the beautiful Fellows Garden of the College. In the afternoon the subject "Insect Migration" was discussed, initiated, in the regrettable absence of Dr. Williams through illness, by Capt. Dannreuther and Mrs. Grant. This was succeeded by a capital and clearly arranged address on the "Respiration in larvae of parasitic Hymenoptera and Diptera," illustrated with many slides of the preparations made in this inquiry. At 4.15 p.m. tea was taken in the Main Laboratory where various Exhibits were laid out. In the evening a Conversazione was held in Christ's College and the Congress Dinner took place at 8 p.m. in the College Hall.

A meeting of the Entomological Club was held on Wednesday, 20th May, 1936, Mr. R. W. Lloyd in the Chair. The meeting was called for 7.30 p.m. at 1, 5 and 7 Albany, Piccadilly, W.1. *Members present*, in addition to the Chairman:—Mr. H. Donisthorpe, Mr. H. Willoughby

Ellis, Mr. Jas. E. Collin, Dr. Harry Eltringham, Mr. W. J. Kaye. *Visitors present*:—Dr. K. G. Blair, Dr. Karl Jordan, Sir Guy A. K. Marshall, Dr S. A. Neave, Capt. N. D. Riley, Dr. Hugh Scott. Dinner was served at 8 o'clock and on retiring the Chairman showed and explained his collection of Alpine Lepidoptera. The guests then dispersed about the various apartments which are rich in articles of Vertu and Works of Art. Only a comparatively small portion could be seen during the evening but the fine collection of prints and old water colour drawings presented an opportunity of seeing what is probably a unique collection brought together in a private residence. The happy party remained till the later hours of the evening and many hopes were expressed that a further opportunity may occur to enjoy even more fully the rare and beautiful things, which owing to lack of time, could only be so inadequately appreciated.—H. Willoughby Ellis.

We trust that readers will furnish us with further short notes on collecting. The early and late appearance of species, the abundance or otherwise of species compared with previous years.

Part 60 of the *Supplement* to Seitz *Palaearctic Rhopalocera* has appeared. It deals with the Geometers by L. B. Prout on sheet 8 with 2 plates of 88 figures; additions to only a few British species are contained in this part including *Sterrha sylvestraria* (*straminata*) with 1 addition; *S. laevigata* (a probable introduced species) with 7; *S. inquinata* (*herbariata*) with 3; *S. biselata* with 1; *S. trigeminata* with 1. The long-used name *bisetata* is here corrected to the original name *biselata*, Hufn.

Of the main volume of Seitz 3 further parts came to hand with the above, all dealing with the African Fauna. Pt. 596 contains only 3 plates of *Geometridae* 12. 13. 14. containing over 150 figures. Parts 594, 595 contain Sheets 27, 28, with four plates 25-28 of *Noctuidae*.

The decease is announced of Prof. Doctor Raffaello Gestro, the honorary Director of the Musio Civico di Storia Naturale of Genoa and honorary President of the Società Entomologica Italiana. He was one of the most eminent of Italian Entomologists and had reached an advanced age.

From Dr. E. Berio of Genoa we have received a copy of his memoir "Contribution to the Knowledge of the Variation of *Agrotis puta*, Hb. (Noct.)" which was published in the *Ann. Mus. Civ. St. Nat. Genova*, vol. LIX. pp. 69-117 and 3 plates. In it the author reviews the recorded variation and the names used by previous writers, some twenty in number, and then proceeds to describe nearly 30 new forms, which he names, and most of which he figures (b. and w.). In the first part 46 variant forms are dealt with and in the second part the geographical and subspecific forms are discussed. The latter portion treats of ssp. *meridionalis*, Splr., Spain: ssp. *subrubra*, Dnhl., Italy: ssp. *toisea*, Berio, N. Africa: ssp. *syricola*, Cort.-Drdt., Syria: ssp. *radius*, Haw. England: and ssp. *renitens*, Hb., Central Europe.

Messrs. Philip Allan & Co., will shortly produce a popular handbook of our British Orthoptera by our colleague Dr. Burr. Although it will be freely illustrated, every effort is being made to keep the price down, and to bring the book out in time for the coming season which, for the Orthoptera, is not in full swing until August. The title will be "Our Grasshoppers and their Allies. A stimulus to their Study."

Lambillionea still continues the record and illustration of aberrations of the continental butterflies with excellent photographic plates; in the May number 3 named forms of *Colias hyale* are figured, ab. *parisiensis*, Obthr., ab. *elongata*, Vorbrdt., and ab. *radiiformis*, Schultz, all hitherto not figured although previously described.

The recent issues of *L'Amateur de Papillons* contain some very interesting and useful matter. There is a Discussion going on with regard to the apparent irregular relation between climate and the distribution of species, tending to show that climate is far from being the main factor in governing such specific areas. An account of the distribution and variation of *Thais* (*Zerynthia*) *hypermnestra*, Scop. (*polyxena*, Schiff.) in the S.E. of France is interesting reading. It occurs even in bleak neighbourhoods at 800 metres altitude. Useful field notes are given of the various stages and a black and white plate of 11 figures is added. There has also been an article well worth our photographers' consideration on the Stereoscopic Photographs in colours of imagines and larvae of Lepidoptera.

We have received 7 separates on the Argentine Fauna contributed by our correspondent Capt. K. J. Hayward to the *Revista* of the Argentine Entomological Society and to the *Anal. S.C. Argent.*, containing mainly descriptions of new species and forms of Argentine Lepidoptera, taken by himself in his collecting expeditions, and illustrated when necessary by figures and diagrams.

The *London Naturalist* for the year 1935 has just come to hand. It is as usual a very good record and report of the various smaller societies (sections) comprised in the London Natural History Society. Entomology is much more evident in the pages this year, about 27 pages being occupied by two of the six papers read at the meetings which take some 17 pages and the reports on Entomology in the Society 1 p., on Dragonfiies 1 p., Butterflies in 1935 a summary of 3½pp. of notes received by a number of observers, on Galls 1 p. These reports are largely due to the careful work of the Hon. Minuting Secretary, Mr. H. J. Burkill, M.A. Is it not necessary in all reports and such like to indicate the old familar names which occur in the ordinary text-books consulted by the beginner, when using the revised names? Where can one find *Ochlodes venata* in our text-books? It is impossible in our times for beginners to obtain every new book issued. They can afford, say, South's books and trust to pick up revisions in reports and magazine artictes. Linnaeus wrote *hyperantus* and *aegeria*. The remainder of the 114 pp. of this capital Report is taken up with matter relating to the other sections of the Society's activities.

The Spanish Journal *Eos* continues to issue very interesting and useful memoirs. The part 3 of volume IX contains (in English) a "comparative study" of the "Nesting Habits of Solitary Bees." It consists of 110 pages with 13 plates. The largest section of the memoir deals with the Adult Period: Maternal Cares, Choice of Nesting-site, Cells and their Construction, Provision of Food, Laying of the Egg, Sealing up of the Cell, Number of Cells in a Nest, Arrangement of Cells, Distribution of Sexes in a Nest, and Closing of the Nest.

Dr. Hedicke is editing a *Hymenopterorum Catalogus* published by the famous house of Herr Dr. W. Junk, similar to the *Lepidopterorum Catalogus* which is now fast drawing to a close, we hear. This new Catalogue will be compiled by specialists in the order throughout the

world. The Catalogue hitherto in use has been that of Dalla Torre issued some thirty or forty years ago and now long out of date. If these Lists of references are as well done as some of those in the *Lep. Cat.*, the *Hymen. Cat.* will be well worth the trouble and expense of issue and will accelerate the advancement of the knowledge of the Order.

A meeting of the Entomological Club was held at Chantry Lodge, Guildford, on Saturday, 30th May, 1936, Mr. W. J. Kaye 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. E. Andrews, Major E. E. Austen, Dr. K. G. Blair, Mr. Hugh Main, Mr. F. A. Oldaker, Mr. W. H. T. Tams, Mr. C. J. Wainwright, Dr. G. A. Waterhouse (of Australia). At 12.30 the guests were received by Mr. and Mrs. and the Misses Kaye on the terrace of their garden which overlooks beautiful and extensive views over the Surrey hills. Amongst the interesting collections in the Chairman's Museum the Trinidad collection of *Rhopalocera* created much interest. The butterflies of Trinidad number over 600 species. The *Sphingidae* and several groups of mimetic species of *Heliconius* were also inspected and discussed Amongst the latter *Heliconius charithonia*, in the larger Antilles, was mimicked by females of *Dismorphia* widely differing from the males. At 1 o'clock luncheon was served and early in the afternoon most of the Members and guests walked, under the guidance of the Chairman, up to the Chapel of St. Martha's which stands on a hill 573 ft. high. The views from this point are very fine and can be enjoyed towards every point of the compass. The present little church is barely 100 years old having been entirely restored from what was nothing but a ruin. The original structure was built about 1190 on a spot once the scene of the execution of some early Christian martyrs (hence the corrupted name of St. Martha's) and was used as a Chantry by pilgrims journeying to Canterbury during the Plantagenet period. On return to Chantry Lodge, tea was served on the terrace in warm and sunny weather, which enabled the view across the hills to be enjoyed in comfort in the open. The guests dispersed about 6 o'clock with many pleasant memories of their visit.—H. Willoughby Ellis (*Hon. Secretary.*)

REVIEWS AND NOTICES OF BOOKS.

Catalogue Des Lépidoptères de France et de Belgique.—Volume II, Fascicule I: pp. 172: Léon Lhomme; December 1935. Price 40 francs (including postage).

The second volume of this useful catalogue, dealing with the so-called Microlepidoptera, is to be published in parts, each devoted to one or more Families. The first part includes the Pyralidina, the second will include the "Plumes," Phaloniadae and Tortricidae, and the third the Eucosmidae. We can most cordially recommend this catalogue to our readers and it will be indispensable to all interested in the Micros., as practically all our English species are found in France also. It is more than a mere list of names, as it includes references to literature, full details of the distribution of the species in France and Belgium, short diagnoses of subspecific forms and notes on larval foodplants and sometimes on biology. This catalogue can be obtained direct from Monsieur Lhomme, Chateau du Carriol, par Douelle (Lot).—T. Bainbrigge Fletcher.

LES INSECTES NUISIBLES AUX PLANTES CULTIVÉES.—Volumes I (Decem. 1935) and II (Jan. 1936): pp. xii + 1921, 7 coloured plates and 1361 text figures. By A. Balachowsky and L. Mesnil. Paris: Busson. Price 200 francs.—These are indeed portly tomes, 10½ by 8 inches, and scaling about 12 lbs. wt. They include a complete account of all insects noxious to cultivated plants, the subject-matter being arranged under the plants attacked, so that Chapter I (which runs to over 600 pages) includes Pests of Fruit-trees, Chapter II Pests of the Grape-Vine, Chapter III Pests of Cereals and Grasses, and so on, after which we find polyphagous pests attacking all crops, Insects injurious to Stored Products, and a Section on Insecticides, Volume II concluding with a Bibliography and a General Index. We may well be ashamed to acknowledge it, but we have no comprehensive work of this kind, or anything to approach it, on the Insect Crop-pests of England. We congratulate the authors on its production. It should prove most useful to all who are in any way interested in Crop-pests, not only in France but in all the adjacent countries in which these insects occur. To the Economic Entomologist it will be indispensable. The non-economic worker will find many details of interest to him whatever be his particular group, and even the pure Systematist, who turns up his nose at Economic Entomology, will have to consult it for descriptions of some new species (see, for example, *Oscinella grossa* on p. 1012, *O. agropyri* on p. 1015). The printing and get-up are good and most of the figures are excellent and quite sufficient for the recognition of the insect concerned, although one can pick out a few that are not up to the mark (*e.g.*, fig. 1083, *Phthorimaea operculella*, which is hopelessly bad). On pages 112 and 114, blocks 90 and 93 have been transposed by an accident in printing. On p. 1644 the full-grown larva of *Agrotis* "*ypsilon*" is stated to be 4 to 4·5 mm. long, an error for cm. (but why not say 40-45 mm. ?). The zealous hunter for exact accuracy may note a few similar minor errors (p. 125, *Cacaecia* for *Cacoecia*, p. 505 "*gloweri*" for *gloveri*, p. 1323 "*chalcistes*" for *chalcites*, etc.) but they are few and do not detract from the value of the book, which should be found most useful by all entomologists with a working knowledge of the French language.—T. BAINBRIGGE FLETCHER.

LEPIDOPTERA (in *Die Tierwelt Mitteleuropas*, VI. Band, 3 Lief (pp. 1-94, 240 figs.), and *Ergänzungsband*, I. (pp. ix.+545, 808 figs.)). By M. Hering. Leipzig; 1932.—These two volumes appeared some four years ago but we do not remember having seen any notice of them in the English journals, and the fact of their publication is probably known to few of our readers. Both deal with the Lepidoptera of Central Europe and are on the same plan, comprising Keys to Families and Genera in the main volume and to Species in the supplementary volume, both illustrated by numerous diagrammatic sketches. The divisions into Families and Genera are mainly those used in Spuler's book to which Dr. Hering's publication will form a useful supplement. Those who have attempted the preparation of lengthy keys of this sort will be in the best position to realize the immense amount of work which Dr. Hering has put into these. As these Keys include English forms, they will be of use to collectors on this side of the Channel also, and still more so to those who are able to collect on the Continent.—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.

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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

MEETINGS OF SOCIETIES.

The Royal Entomological Society of London.—41, Queen's Gate, South Kensington, S.W.7., 8 p.m. October 7th, 21st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. July 23rd. Aug. 13th, 27th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

Communications have been received from or have been promised by Capt. K. J. Hayward, Rev. C. R. N. Burrows, H. Willoughby-Ellis, Hy. J. Turner, D. G. Sevastopulo, A. J. Wightman, T Greer, T. Bainbrigge-Fletcher, R. E. Ellison, Dr. Malcolm Burr, Capt. C. Q. Parsons, E. P. Wiltshire, Dr. E. A. Cockayne, Rev. R. E. E. Frampton, Wm. Fassnidge, Rev. T. G. Edwards and Reports of Societies.

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

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Melissoblaptes bipunctanus, Zeller 1848.

By LEONARD T. FORD.

I was fortunate in finding this species in some numbers on the sandhills between Sandwich and Deal on the 16th July of last year. At about 10 p.m. the females were making short but vigorous flights over the herbage and the males were resting on the ground or on plant stalks vibrating their wings, which were half raised, for a second or so at short intervals.

As the moth has not yet been reared from the egg I thought it would be worth while to make the attempt. I had previously tried to rear larvae from ova which the Rev. R. E. E. Frampton kindly supplied to me.

A female was placed in a large flower-pot half-filled with sand and furnished with a spike of viper's bugloss on the flowers of which she could feed. I also put in the pot as much of the flora of the sandhills as I could gather from my garden leaves, flowers and seeds of *Lotus*, *Cerastium*, *Plantago*, *Trifolium*, etc., and some bits of grass. As the larva is reputed to feed on dead insects, a few were also included. Fresh blossoms, etc., were added every few days. At the end of August I noticed some slight silken webs on the surface of the sand but could not see any larvae. On stirring up the sand, however, I uncovered a small larva, less than a quarter of an inch long and dark brown in appearance. During the autumn and winter a little fresh vegetation was added to the collection in the pot and the sand was damped slightly at intervals. By May the surface of the sand was covered with silken tunnels with adhering grains of sand. The tunnels were in groups of 1, 2 or 3, each group radiating from a vertical silk lined tube in the sand. On 24th May I dug up a larva from one of the vertical tubes ; it was then 15 mm. in length, dirty-white in colour, but the undigested food within gave the larva the appearance of being black or dark brown for $\frac{3}{4}$ of its length ; head brown with a few hairs ; plate of 2 and anal plate blackish brown ; a sub-dorsal row of black spots, two to each segment, the four spots of the two rows almost forming a square, a lateral row of black spots, one to each segment, a black sub-triangular spot on penultimate segment with apex towards the head ; a few greyish hairs. On 23rd June the larva, which in the meantime had made a fresh tube, was again disinterred. It was then 17 to 20 mm. long, with a few greyish hairs on the head and body ; face almost black, head dark brown, plate of 2 and anal plate blackish-brown ; body nearly uniform in breadth, very dark brown, almost black, lighter on the underside ; legs and pro-legs light yellow-brown. Owing to the dark colour of the skin the sub-dorsal and lateral rows of spots do not show but are perceptible under a magnifying glass. The larva is somewhat wrinkled and is similar in general appearance to the larva of *Aglossa pinguinalis*, but not so black.

It was not practicable to keep a larva under close observation because, as far as I could ascertain, the larvae never leave the tubes, feeding at the end of the surface tunnels and extending them when necessary to reach fresh food. I could never see a larva in my flower-pot although I inspected it frequently both during the day and night. I did not wish to disturb them unduly, as digging up a larva involved the destruction of its vertical tube.

On 25th June of this year I visited the spot where I had found the imagines in the previous year. I soon found the surface tunnels in the moss, *Brachythecium albicans*, B. and S. Although I searched for some time I could not find any traces of larvae except in the moss. Evidently *Brachythecium albicans* is the natural food although the larvae in captivity will eat almost any dry vegetable matter. Some of the dead insects which I put into the flower-pot became disintegrated during the winter. I cannot say positively that parts of the insects were eaten by the larvae; at any rate dead insects do not form the normal diet. Some dead moths added in the Spring were not touched.

The vertical silk-lined tube, in which the nearly full-fed larva lives, extends 4 or more inches below the surface. At the top it is fairly strong but lower down it is very fragile and practically impossible to follow for its full length. The larva pupates in the tube about $1\frac{1}{2}$ to 2 inches below the surface in a very thick silken sub-triangular cocoon. Apparently just before pupation the tube from the surface to the lower end of the cocoon is strengthened by being lined more thickly than before with silk, for a tube containing a cocoon is much stronger than one containing a larva, so tough in fact is the former that on one occasion when peeling off a layer of moss I pulled up a tube with its cocoon. A tube containing a larva is much too delicate to pull out of the ground.

The pupa (a male, which I dug out of the ground at Sandwich) is pale yellow-brown, the head, thorax, wing cases and dorsal line darker in colour; length 14 mm., breadth $3\frac{1}{2}$ to 4 mm.; breadth uniform for $\frac{2}{3}$ of its length. The pupa is of the incompleta type, cremaster without hooks; antennae, legs and wings clearly defined. It has three movable segments and the five central segments show tubercular scars. The chitin is very thin, the wing markings showing clearly two or three days before emergence; pupal stage about three weeks. The moth emerged on 4th July at about 8 p.m. As I then still had a larva from Sandwich the period of emergence must be well over three weeks.

Mr. W. R. Sherrin of the British Museum (Natural History) kindly identified the moss on which the larva feeds.

Notes on the Lepidoptera of Skye.

By W. S. GILLES, F.I.C., F.R.E.S.

As there do not appear to be many published notes on Lepidoptera in the Isle of Skye, some observations made during a series of summer visits, extending over a period of 20 years, may be of interest. The island cannot be considered by any means a paradise for lepidopterists; the great dearth of trees, in contrast to the mainland, militates against that. The rainfall is excessive and bog conditions prevail nearly everywhere. Ling is scattered throughout, but the Bell Heather is far more abundant, otherwise bog-myrtle is perhaps the commonest plant. As compensation the scenery is magnificent and the atmospheric effects marvellous.

Among the butterflies, *Erebia aethiops* is common in grassy hollows, appearing during the last week of July. *Coenonympha tullia* r. *scotica* is plentiful in Glen Sligachan and similar boggy areas towards the

end of June. *Argynnis aglaia* is generally distributed over the whole island and common. There is a tendency towards ab. *borealis*, Staud., the blacks spots on upper side being enlarged and marginal area paler; the silver spots on under side are also smaller. It is sometimes out by the middle of June. *Polyommatus icarus* is of the fine large single-brooded form occurring elsewhere in the North of Scotland and Ireland, the males of a deep rich blue and the females with much blue on them, ab. *coerulea* being not uncommon.

No attempt is made to give anything like a complete list of the moths found in Skye but only random notes on species I have come across. *Parasemia plantaginis* is occasionally seen flying wildly over the higher moors, ab. *hospita* being not uncommon. *Saturnia pavonia*, *Bombyx rubi* and *Lasiocampa quercus* f. *callunae* are all common in the larval state all over the moors. *Dicranura vinula* is also universally distributed on the dwarf sallows. Ten larvae of *Notodonta ziczac* were found this year on sallow at an altitude of 1500′ on the slopes of Sgurr nan Gillean. *Pygaera pigra* is very abundant in the larval state all over the island on the sallows, and is of course single-brooded here; the moths are quite distinct, smaller, with the lighter areas on the forewings much reduced in intensity, giving the insect a more unicolorous appearance. *Acronicta rumicis* is frequently met with as larva on sallows, a large proportion are of the melanic form *salicis*, Curt. *A. menyanthidis* larvae are often abundant on bog-myrtle, full fed by mid-August. *Hadena glauca* larvae occur, but not commonly, on heather. *H. pisi* f. *scotica*, Tutt, is another abundant moorland species. *Plusia festucae* is occasionally seen, flying over the moor in bright sunshine. Larvae of *Anarta myrtilli* are common on *Erica* and *Calluna*, the form is larger than the southern one and bright crimson in colour.

The Geometridae are those usually met with in the Highlands; a few are worthy of note: *Crocallis elinguaria* is common in Glen Sligachan, at rest all over the moor, many are ab. *fasciata*, Gillm. *Euphyia bilineata* is a common moorland species, most are ab. *infuscata*, Gumpp., but the race *atlantica*, Stdgr., occurs. *Eulype hastata* larvae are extraordinarily abundant in spun-together leaves of bog-myrtle all over the boggier parts of the island; they appear to form a race intermediate between the type and *subhastata*, Nolck. Among the Crambidae, *C. margaritellus* is generally distributed in grassy places, similar in type to those found on the mainland of Scotland. *C. ericellus* is found fairly freely on the moors, appearing towards the end of June and remaining in good condition till mid-July. Among the Tortrices, *Peronea hastiana* is common on sallows; I have bred a large number, but all dull-coloured forms, such as one finds in most localities. *P. aspersana* is plentiful everywhere. I have bred the form ab. *fuscana*, Sheld., of *Rhacodia emargana*. *Penthina dimidiana* is fairly common in shoots of bog-myrtle. Among the Tineae, *Telphusa triparella* r. *myricae* has been bred commonly from bog-myrtle.

In Spain again.

By MALCOLM BURR, D.Sc., F.R.E.S.

The International Congress gave me a heaven-sent opportunity of visiting Spain again, and reviving memories of collecting in that wonderful fauna during many seasons before the war, and of renewing old friendships.

Don Ignacio Bolívar published his general account of the Orthoptera of Spain in the year I was born. I used to see him fairly often about thirty years ago, and we corresponded regularly from about 1897 to the outbreak of war. And last September, I found this grand old entomologist still going strong, and his son Don Candido, whom I had known in the "larval stage," not only inheriting his father's mantle, but taking an active part in his country's affairs. The latest news I have is that he is Secretary of the President's Council. I fear that this means a strenuous life, and that Entomology will suffer.

When the Congress was over, I slipped away to the south by the night train, travelling with a party of sailors returning from leave to the naval base at Cartagena. They were most of them typical good-looking young specimens of *Homo mediterraneus*, but one was of northern stock, a Gallego, a vigorous fellow who dominated the conversation all night, although it was his second in the train. They had the charming manners of the country. The Gallego, seeing that I had been in Spain before, asked me how I liked it. I told him that I had seen a great deal of this country many years ago, and that I was very fond of it. His reply was "*Señor, el encanto de un pais no es en sus rios y montañas, sino en su gente*," to which I should have liked to have added, "*y en sus ortópteros.*"

About seven in the morning I left the train at a small wayside station called Calasparra, in the unfashionable province of Murcia, where tourists do not throng. A friendly porter put my kit on a motor-bus, that stopped for needed refreshments at the town of Calasparra, situated of course about three miles from the station, and then we climbed 25 kilometres to the prosperous little town of Moratalla, a pleasant place on the flanks of a lofty hill, overlooking the extensive olive groves that form its wealth.

I called on the alcalde to report that I was an eccentric but harmless Englishman, who had come to make inquiries about a certain wolf, and to catch grasshoppers. Unfortunately, I was much too early in the season for the first and nearly too late for the latter. The alcalde did all in his power to help. I then took a seat outside the posada and called for a glass of wine. When I tried to pay my penny, the proprietor told me that the señor in the corner had paid for me, so I thanked the señor ceremoniously, and begged the favour of inviting him to have a glass with me.

"Oh, no, Señor!" he exclaimed, "You are an Englishman honouring us with a visit, the second time a foreigner has come to Moratalla, and you must not pay for your own refreshment."

This little incident, and others like it, are worth recording even in an entomological paper, to counteract some of the alarmist rubbish that has been spread, or at least exaggerated, in the press.

I stayed three or four days at Moratalla, where the usual late

September species were numerous enough, such as *Mantis religiosa* and a species of *Ameles*; among the grasshoppers *Acridella nasuta*, L., larvae, *Omocestus raymondi*, Yers., (?), *Chorthippus biguttulus*, L., *Dociostaurus genei*, Ocsk., the inevitable *Aiolopus strepens*, Latr, *Oedipoda caerulescens*, L., and *O. miniata*, Pall., on the rocks above the town, *Anacridium aegyptium*, L., both adult and immature, *Calliptamus italicus*, L., *Pezotettix giornae*, Ocsk., which spends most of its time *in cop.*, like tiny frogs, and *Paratettix meridionalis*, Ramb., by a water course just outside the town.

I picked up one or two of the solitary phase of *Locusta migratoria*, L., I was glad to take *Sphingonotus azurescens*, Ramb., the southern form, and *Pyrgomorpha conica*, Ol., another southern species. More interesting still was a short-winged *Omocestus*, which Dr. Uvarov finds is new, so he has described it under the name *Omocestus burri*, Uv. It is related to the endemic Iberian *O. minutissimus*, Bol.

At Moratalla I found a species of grasshopper that I have known ever since I first collected in the south of Europe, and, like everybody else, regarded it as *Euchorthippus pulvinatus*, F. de W. But the examination of this fresh material, together with some from the Sierra de Guadarrama, Sierra de Gredos and from Portugal, has enabled Dr. Uvarov to establish that the Spanish form is not the true *pulvinatus* of Fischer de Waldheim, which is of course a Russian species, but distinct. It was described many years ago by Brisout de Barneville under the name *declivis*, which has always appeared in the books as a synonym of *pulvinatus*, as it was not suspected that there were two closely related but distinct species. The true *declivis* is therefore now recorded from Spain for the first time, but it is also a native of the south of France, Italy and Macedonia.

At night I used to listen to the undulating lilt of *Oecanthus pellucens*, the bush-loving cricket that sings so sweetly in the autumn evenings in the south of Europe. It is such a fragile pale little creature, that one wonders how it can produce so great a volume of sound. I have never seen it actually performing, but a photograph of an American species shows that it raises its disproportionately large elytra into a vertical position, which gives a wonderful resonance. All who strolled about the grounds of the Residencia de los Estudiantes during the Congress must remember three of the characteristics of the autumn evenings in the south, the music of this cricket, the hoarse whistle of the Scops owl, both against the background of the dark green bushes of oleander, with their beautiful crimson flowers. As I looked down from the train window on to the grey, baked plains of Murcia, I wondered what were the spots, as though of blood, in the dried stream beds, and only when close enough did I realize that it is the oleander that gives that spot of colour to the somewhat mournful landscape.

On 18th September, I drove down to Calasparra to catch the train to Cartagena. I had an hour or two to wait, during which I was splendidly entertained by the old porter, his wife, and charming daughters.

As Cartagena is a naval base and garrison town, resembling Dover in that way as well as physically, I judged it wiser not to potter about the fortifications collecting grasshoppers. I regretted that, as I had hoped to trace down a locality where many years ago a collector, long dead, found some extremely interesting Orthoptera and beetles of

Asiatic affinities. So I took the motor bus along the coast to the east. The broad flats beyond the high ground are given up to aviation, so I did not linger there, especially as from a hurried glance I saw no sign of Orthoptera, but stopped at a pleasant little village called Torrevieja, now being turned into a resort about forty kilometres up the coast towards Alicante, in the province of that name.

The local industry is salt evaporation, so here I felt I might find the local race of *Dericorystes millieri* var. *novae-carthaginis*, which is known only from Cartagena. I had taken two species of the genus in the Transcaucasus, and always found it on *Salsola*, which I rightly expected to find along this coast. I was right about the *Salsola*, but found no trace of *Dericorystes*. I did take however several specimens of a small *Sphingonotus*, about which Dr. Uvarov cautiously reserves his opinion. There was the common *Acrotylus insubricus*, Scop., and of course *O. caerulescens*, L., two larvae of a species of *Phaneroptera*, *Acridella nasuta*, L., adult and larvae, *D. genei*, Ocsk., *A. thalassina*, F., and also two southern forms. *Pyrgomorpha conica*, Ol., immature, and *Calliptamus siculus*, Burm. Perhaps the most interesting was *Thisoicetrus littoralis*, Ramb., a well-known species restricted to the seashore of the coast of southern Spain. As Rambur's original material came from Andalusia, we may feel reasonably certain that these specimens are the true *littoralis*; this is not without its importance, as a second species, *adspersus*, Redt., originally described from Turkestan, has been reported from "Cartagena." I never found *T. littoralis* more than a hundred yards or so from the beach, flying actively among the long herbage and scanty grass.

On the 22nd, I went to a locality which can be identified as Puente de Greda, as it is marked by a handsome bridge where the road crosses the estuary of a small stream, the Greda. The channel and banks of the river are covered with thickets of *Salsola* and other succulent plants, and reed beds. On the few dunes by the shore itself, I noticed numbers of what looked to me like a bluish butterfly, though it did not fly nor settle like one. Out of curiosity I caught one, and found it to be *Deiopeia pulchella*. It was a delight to examine so exquisite a creature, which I had only once before seen alive, when, as a small boy of about ten, I had taken one at the Folkestone Warren, also near the sea; but there, I suppose, it was a Frenchman.

The common things here were *Aiolopus thalassina*, F., *Acrotylus patruelis*, H.S., and *A. insubricus*, Scop., *O. caerulescens*, L. and immature *Empusa*. There were also *Omocestus raymondi*, Yers. (?), *Acridella nasuta*, L., *L. migratoria*, ph. *solitaria*, *Pyrgomorpha conica*, Ol., adult, *A. aegyptium*, L., adult and immature, the latter both yellow and green, *Oecanthus pellucens*, Scop. I worked for *Acrydium*, but the only Tetrigid I found was *P. meridionalis*, Ramb. Truly southern, too, there was *Calliptamus siculus*, Burm., *Thisoicetrus littoralis*, Ramb., and one species of real African appearance, that is found only on the very edge of Europe, *Tropidopola cylindrica*, Marsh. It is one of those elongated, almost cylindrical grasshoppers, of which I used to take several species in the uplands of Angola. Here I found it by beating reeds. The adult is pale buff, to match the grass in the dry season; the larvae are green, which must have been the primary colour.

It was very tantalizing to be in so good a spot so late in the season. The local speciality, *Pycnogaster sanchezgomezi*, I. Bol., was over, which

I regretted, as it would have been nice to have made the acquaintance of that obese Tettigonid, and compared its habits with those of *Ephippigera*, the *Hetrodidae* of Africa, and *Bradyporus* of the Black Sea district.

I strolled back to a hut rigged up near the beach, where a family was spending the summer and paying their expenses by selling refreshments. If it had been in England, it would have borne the inscription "Tea and Minerals." As it was in Spain, it provided melons, fish, eggs, and wine out of a jug. Refreshed appropriately, I turned my steps reluctantly homewards, by motor-bus to Cartagena, and then by the night train to Madrid. When we stopped at Calasparra I looked for my friends, the old porter and his family. I had sent them a card to explain that I should not have the pleasure of seeing them, as I was passing in the middle of the night, but the passage of a train is an entertainment, and the family were out in force. The good-looking daughter asked me if I would like a cup of coffee, and a moment later her mother appeared, and held up to me a big cup of black coffee, piping hot, and half a tumbler of brandy: "This will help you on your journey, Señor," and, as they waved good-bye, they made me promise to write. Is it surprising that I am fond of Spain and the Spaniards?

P.S.—The above was written, of course, before the appalling outburst of civil war that brings sadness to the countless friends of Spain, in particular to those who had the good fortune to enjoy her splendid hospitality last summer, during the calm that preceded the storm.—M.B. Dorney. 5.viii.36.

Early Stages of Indian Lepidoptera.

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

(*Continued from p. 59.*)

LYMANTRIIDAE.

Porthesia (*Euproctis*) *scintillans*, Wlk.

Head yellow-brown. Ground colour blackish. A pair of red tubercles tufted with hair on the 1st somite. A pale dorsal stripe from the 1st to the 3rd somite, the portion on the 3rd being yellow with a red central line. A black dorsal swelling on the 4th and another on the 5th somite, that on the 4th edged anteriorly and laterally and that on the 5th posteriorly with yellow. A yellow dorsal stripe from the 6th to the 10th somite with a red central line. A black dorsal swelling on the 11th somite. 4th to 10th somites with raised black lateral blotches dotted with white.

Pupa. Yellowish-brown, thorax and wing cases greenish. Abdominal somites with a subdorsal and lateral dark line. Enclosed in a thin cocoon of brown silk mixed with larval hairs.

Foodplant.—*Lagerstroemia indica* (Crape Myrtle).

Described from a full fed larva found in Calcutta 18.x.31, pupated 22.x.31 and a male emerged 31.x.31.

Hampson describes three other forms of larva, but omits this, the only form I have seen. Seitz's description is as follows:—"Head and

legs brown, head with two hair tufts on red tubercles. Dorsum white with a red streak, the third joint with a red tubercle, 4th and 5th joints with black hair tufts, penultimate joint with a black torus, last joint brown. On the sides greyish brown and red longitudinal stripes." He does not give the food plant.

Hamps. *Moth. Brit. Ind.* I. p. 483. Strand-Stz. *Indo-malay Bomb.* X. 333.

NOTES ON COLLECTING, etc.

Ibalia cultellator, Latr., in Windsor Forest.—On 15th August, 1936, when beating burnt Scots' pines in Windsor Forest, a specimen of this very large Cynipid fell into the beating tray. It is known to be a parasite on the Wood Wasp (*Sirex gigas*, L.). I have placed the specimen in the British Collection of *Cynipidae* in the Natural History Museum, where it was only represented from Guildford by one specimen (G. C. Champion), Rickmanhurst, one specimen (R. Benson) and a certain number of specimens bred by the late G. H. Crawshay at Leighton Buzzard.—Horace Donisthorpe (British Museum, Nat. Hist. Entomological Department.)

Micro-collecting in September.—The larvae of many species can be obtained by collecting the seed heads of various plants towards the end of September and during October. *Laspeyresia rufillana*, and *Lozopera francillana* in seed heads of wild carrot: *Phalonia badiana* and *Metzneria lappella* in seed heads of burdock; *Phalonia roseana* and *Endothenia gentianana* in teazle heads; *Phalonia curvistrigana*, *P. subroseana* and *P. implicitana* in seed heads of golden-rod; *Metzneria neuroptella* and *M. metzneriella* in seed heads of knapweed.

The seed-heads should be spread in a thin layer on sand in shallow boxes and covered with wide mesh muslin or leno to protect them from the attacks of birds. The seed boxes used by nurserymen make convenient receptacles. The boxes should be kept out of doors (but under cover during the winter) and the contents watered freely during dry weather. The seed-heads will keep free from mould if they are thinly spread and the muslin cover is of wide mesh.—L.T.F.

A Swarm of "Froghoppers."—In August, 1934, I was convalescing after a breakdown, and was lying on a deck chair in my garden at Kingstown, near Carlisle, one day when I noticed that a Chrysanthemum plant near me was simply swarming with 'froghoppers.' I had not noticed them come but I know they had not been there half an hour before. I called for help and tubes and took some fifty specimens. I found that every chrysanthemum plant in the garden was alive with them. I was called indoors to tea and when I again came into the garden an hour later there was not a single 'froghopper' to be seen. I mentioned the experience to one or two entomologists, but they could not account for it. Do these insects migrate? Do they swarm? Can any one give information on this point?—T. F. Marriner.

A Query.—Here is another curious happening for which I can discover no explanation. In the hedge opposite the garden gate of my new Fellside home, is a huge straggling gooseberry bush. On the afternoon

of 8th June this year I found this bush simply swarming with the caterpillar of *Abraxas grossulariata*. I collected some half-dozen to breed out, and meant to secure a further batch next day, but when I went to do so, there was not a single specimen to be found. I searched the hedge and all around very carefully but found none. What had happened to them? Birds will not touch them. They had not dropped to the ground or I should have found some. The weather had not changed. I have not been able to account for the disappearance.—T. F. Marriner.

Some Autumn Tortrix Larvae.—*Laspeyresia splendana* and *Pammene juliana*.—Infested acorns drop about the middle of September, two or three weeks before the natural fall, and may be distinguished by irregular patches of discoloration. In my own case the collected acorns were kept each year in shallow gauze-covered trays for purpose of observation, and as the larvae appeared out of the acorns they were removed to suitable pots with litter, scraps of cloth, etc., and put out for the winter. *Pammene juliana* usually left the acorn between the middle and end of September. The larva is white with a small brown head; the tubercular dots conspicuous, of a dark dull red. It is active and wanders about, trying to escape from the tray. The larva of *Laspeyresia splendana* leaves the acorn from the end of September on, once at least as late as 26th October. It is dirty whitish with a brown head and no visible dots or other markings; it is sluggish and makes no attempt to escape. Of both species I obtained most from the Cambridge district, and some from Sidmouth; they both existed in my own West Kent locality, but were in practice unobtainable as owing to the ravages of *Tortrix viridana* year after year the oaks were unable to fruit.

If larvae of *Laspeyresia pomonella* and *L. funebrana* cannot be readily obtained from the fruit, recourse must be had to the tree trunks; but if the larvae are disturbed from their winter habitation the former species will usually die and the latter, I believe, always. The bark of old apple trees flakes off easily, and the former larva can often be removed without undue disturbance; and I once found about fifty under or near ancient grease-bands on two apple trees. The bark of stone fruit trees does not flake off readily; the best method therefore with *Laspeyresia funebrana* is to fasten a canvas band tightly around the tree trunk, and to remove it every morning and collect the larvae before they have had time to spin up.

The larva of *Phalonia badiana* (dirty whitish) may be found in burdock seedheads full fed at the end of September and on during October. The white larva of *Metzneria lappella* is often plentiful in these heads; it may be collected at anytime during the winter but may as well be left till March, when the hard knot formed by a few seeds spun tightly together is easily found by pressing the withered heads.—Rev. R.E.E.F.

An evening at Light in S. Devon.—I have just returned from a short holiday in S. Devon where I have on several occasions tried the attractions both of sugar and light on the cliff face.

One memorable night on 19th June produced between 10.30 p.m. and 2 a.m. (summer time) over 60 species of Macro-lepidoptera at a

Corporation lamp favourably situated on the sea front and commanding an extensive view of the cliffs. There was a considerable quantity of *Silene nutans* growing near and some low sallow bushes, a little elm but no other hard timber. The captures included *Sphinx ligustri*, *Choerocampa elpenor*, *C. porcellus*, *Arctia villica*, *Dasychira pudibunda*, *P. palpina*, *Macrothylacia rubi*, *Agrotis lucernea*, *A. lunigera*, *Dianthoecia albimacula*, *Habrosyne derasa*, *Thyatira batis*, *Notodonta dromedarius*, *Lithosia caniola*, *Chariclea umbra*, *Acontia luctuosa*, *Cucullia umbratica*, *Biston betularia* (typical form) *Mysticoptera sexalata* (*sexalisata*), *Calothysanis amata*, and many others. Subsequently, a few days later, I took an excellent series both of *A. lunigera*, *A. corticea* and *Leucania putrescens* at sugar near the same spot.—Rev. T. G. Edwards (M.A.), Tulse Hill, S.W.2.

Catching Morphos in the Corcovado, Rio de Janero.—"On Sunday, 19th March, Paineiras (Corcovado) by the 9 a.m. train. The sun had been up since 6 a.m. and continued to shine all day, there being practically not a cloud in the sky. Numerous men with butterfly nets were stationed all along the railway line, as there have been every Sunday since *Morpho anaxibia* has been about. I saw practically nothing till after 10 o'clock. Then I saw a ♀ *M. anaxibia* fluttering around a tree and settling. With considerable difficulty I got to the tree, as it was right in the thick forest and on a steep incline. I managed to find where it had settled, but it flew up before I could get my net into position. After that I saw very little except an *anaxibia* ♂ now and again, till at 11.45 I managed to catch a male, and almost immediately afterwards there were a number of females flying about. Their flight was rapid, but pausing every instant, as if laying an egg. They were flying very high, and the stick of my net was too heavy to swing it into position quickly enough. So I did not manage to catch a single one. At 12.10 noon, they as suddenly stopped flying as they had started, and I saw no more females, but managed to catch two more males.

There were a couple of boys with nets a short distance from where I was. I asked them if they had caught anything and they showed me three males. They both had dark blue nets and sticks only about 1½ to 2 metres long. While speaking to them a male came flying about 20 to 30 feet above the ground. One of the boys immediately started waving his net about rapidly a couple of feet or so above the ground, and I was absolutely dumbfounded to see that butterfly come floating right down, and one might say, right into the net! Another one came along almost immedietely and the boy went through the same performance, but this one seemed to hesitate in its flight and described a circle, but did not come down and so was not captured. All the men have dark nets with relatively short sticks. They sell the specimens and get anything from about 4d. to 4/- or 5/- a piece for them." [Copied from notes sent me by a friend in S. America some 20 years ago.—Hy.J.T.]

Immigration of Plusia gamma.—On Sunday, 23rd August, I noticed a large number of *P. gamma* in my garden, the numbers of which continued at about the same level for the following seven days. My brother tells me that on the 24th they were in hundreds in the

public gardens, and I also noticed a considerable number in other gardens that I passed. For the first few days all appeared to be making their way northward after feeding, but latterly they have been flying about the garden in any direction, and to-day all seem to have disappeared.—George Wheeler. Gratwicke Road, Worthing. *3rd September*, 1936.

CURRENT NOTES AND SHORT NOTICES.

In the *Ent. Zeits.* and *Int. Ent. Zeits.* of recent issues there have been appearing a series of articles on the ova of the *Noctuidae* illustrated with figures of each species. These figures in each case give a vertical view, a side view, a view of the micropyle and a view of the general surface of the egg, the last two views of course, magnified much more than the first two. The June issue deals with the eggs of 6 species of the genus *Xanthia*.

The journal *Kontyû* published by the Entomological Society of Nippon, Japan, has reached its Vol. X. The contents are varied and illustrated by 4 plates, one in colour. Although the list of contents and the literature references are in English, practically the whole of the magazine is, unfortunately for us, in Japanese character. But so far as we can judge, the matter is of a very interesting nature, including a "Synopsis of Nemeobiid Butterflies." "Lepidoptera and its early forms." "Some Malformed Beetles from Korea." "Species of the Genus *Notonecta*, new to Japan and Corea," etc.

The *Revue d'Entomologie de l'U.S.S.R.*, the continuation of the *Revue Russe d'Entomologie*, has reached its Vol. XXV. In part 3-4 most of the articles are in Russian, but descriptions are as a rule in Latin and the nomenclature is in Roman and Italic characters; nearly every article has a sufficient summary in German. Every title is printed in full in Western characters, as also are the literature references. The article which interests us most is that on *Euxoa* (*Agrotis*) *aquilina*, Schiff. (not our British *aquilina*) of which the summary is in English. We have referred to this elsewhere, in *British Noctuae*.

The June issue of *Arbeit. uber Morph. u. Taxon. Ent.* Berlin-Dahlem contains a worthy appreciation of "A Monograph of the British Neuroptera," by F. J. Killington, in the Ray Society Series. The Notices of publications in this valuable journal (16 pp.) are well worth perusing. The plates of the Brit. Mus. "Immigrant Butterflies and Moths" and Lt.-Col. Donovan's "Cat. of the Macrolep. of Ireland" are also noticed.

In the *Mitt. Münch. Ent. Gesell.* is the first portion of an exhaustive study of the Geometrid species *Acidalia contiguaria*, Hb., with a plate of figures of different forms. The writer, Herr Dr. Leopold Müller of Linz, contests the change of the long-used name to *eburnata*, Wocke (nec *eburneata*, auct.) in a long argument. He then deals with the distribution, the geographical and subspecific forms and afterwards commences a discussion on the aberrant forms.

Those interested in the suggested continuance of certain names, of which the validity has been contested, will find a "Notice of the Possible Suspension of the Rules of Nomenclature for Certain Cases," in the *Canadian Entomologist* for May issued on 6th June.

The *Revista de la Soc. Ent. Argent.* for 1935, vol. VII, contains a

large amount of solid matter in its 234 pages. There are 18 plates and numerous text figures. Of the 18 articles 12 deal with the Lepidoptera of which 5 are by our correspondent Capt. Hayward. There are descriptions of many new species. We note that in all articles there is a considerable number of literature references. No paper is worth doing unless its extracted facts are substantiated by " chapter and verse."

It is now more than 30 years since the first number of Seitz' wonderful work on the Macrolepidoptera of the World began and the next part to be issued will be Part 600. In addition to the Main work there have also been issued 61 parts as a Supplement to the Palaearctic Section. It is marvellous that a work of this nature should continue regularly for so long a period. No doubt this steady continuance is due to the work and guidance of one and the same editor-in-chief the talented Dr. Seitz, who not only has been at the head, but for long periods of his career collected, observed and studied the Lepidoptera in all parts of the world.

The last issued part 61 of the Supplement contains 2 plates of over 100 figures of aberrations of Palaearctic Geometers, including those of numerous forms indigenous to this country. Of the Main Volumes 2 parts of the Bombyces of the American fauna with 3 plates and 3 sheets of descriptions, and 1 part of African Noctuae with 2 plates and one sheet of descriptions, have just appeared. Altogether the five plates in these 3 parts contain 230 coloured figures.

Part 6 of Vol. I. of the *Journal of the Society for British Entomology* has just been issued. It consists of 24 pp. which contain 15 communications. An important article on method of research in the investigation of the Fauna and Flora of a given area is "The Use of Sweep-net Samples in an Ecological Survey," by members of the Department of Entomology of the University Museum, Oxford. Mr. Parkinson-Curtis discusses the status of the two designations of *Eupithecia*, *distinctaria*, H.-S. and *constrictata*, Gn. Most of the remaining matter is made up of records in all orders including " Attacks of Birds on Insects " and an account of the wild pairing of *Taeniocampa gothica* ♀ with a ♂ *T. stabilis* and details of the consequent brood. Thirteen imagines were reared.

We could welcome notes on this cold and erratic season. Since June records from the Kent coast, the S. of England, the New Forest, Devon and Cornwall are almost unprecedented for the paucity of appearances and captures. What species have not turned up in their usual haunts? What are the results of larvae beating and searching? Have *Polyommatus coridon* and *P. bellargus* (*thetis*) been in their usual numbers in their special haunts? We would point out that many parts of the country are as yet entomologically unexplored. Surely the beautiful country lying east and west of the Wye from the Radnor Forest to the Black Mountains would produce interesting results if explored by enthusiasts for a few years. We know that two nearby areas, that of the Symon's Yat district and the Abergavenny district, have produced wonderful results. The latter was the special hunting ground of the late Dr. T. A. Chapman and Dr. Wood.

Look out for immigrant species! Already an example of *Phryxus livornica* has appeared in Sussex. The very beautiful green form of the larva of *Choerocampa elpenor* was exhibited at the South London Entomological Society in August. Buckler figures this form, but his picture does not show the beauty of the texture of the green larval skin.

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.

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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *fuscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

MEETINGS OF SOCIETIES.

The Royal Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7., 8 p.m. October 7th, 21st.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Sept. 24th. Oct. 8th, 22nd.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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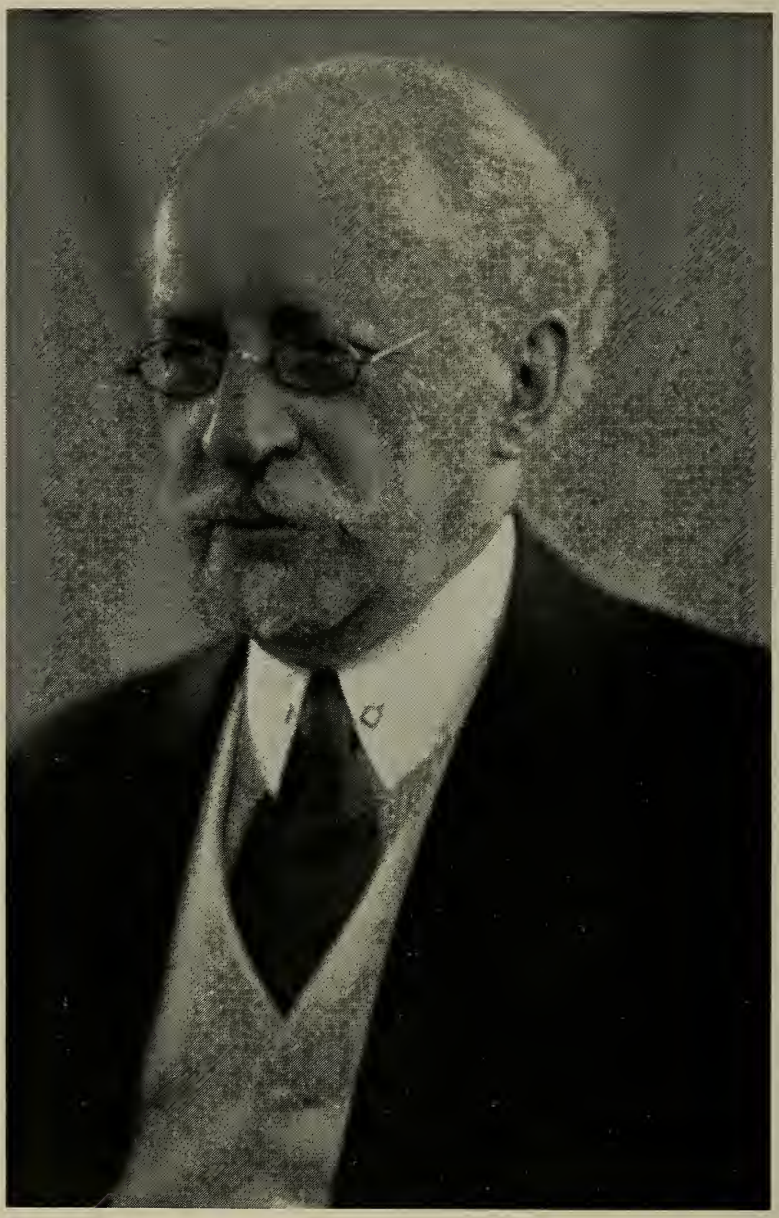

Marked Migrant Butterflies.

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

The fact that many of our "British" Butterflies (and Moths) are not true residents throughout the year but immigrate across the Channel during the late Spring is now accepted by most observers. Indications of directions of flight of a species such as *Vanessa atalanta*, for example, show that these are mainly northwards in May-July and southwards in September-October (see Mrs. K. J. Grant, *Entomologist*, LXIX, 127, fig. 1 : June 1936). But, although these records give an idea of the movements of the species at particular seasons, we are so far without any information as to the actual movements of individuals. To attain this necessitates the marking of individual butterflies in such a way that each individual may be recognizable at any time or place. In 1935, therefore, I tried some experiments in marking butterflies. My first attempts were by snipping pieces from the edges of the wings in various positions but I found that the possible combinations of such markings were too small to be of any use nor would they be sufficiently striking to attract attention by other observers. After trials of several methods, therefore, I have marked individuals with numbers on small labels applied directly to the wing. The process is quite simple. After netting, the specimen is examined for sex and any individual peculiarities (condition, chips, splits or tears of the wings, markings, etc.), which are noted in a Register ; a small patch on the upper surface of the right forewing is then rubbed clear of scales and a small label is attached to this bare patch with Canada Balsam ; the butterfly is then placed in a glass-bottomed box for a few minutes, to allow the adhesive to harden, and it is then released. The label, which does not incommode its flight in the least, is written in waterproof Indian Ink on tracing-paper, a small sheet of labels being written up and each one cut off as required. The labels that I have used consist of the letter "R" with a number (thus, R. 75), "R" meaning Rodborough and the number indicating the individual. (Any combination of letters and/or numbers can be used, provided that each marker has his distinct series). It is desirable to descale the portion of wing to which the label is to be applied, as in some of my earlier experiments, in which I did not descale, I found that the labels sometimes became detached by being pulled off with the patch of the underlying scales ; since practising descaling I find that the label is very rarely lost. Should it become detached and the specimen be recovered, the rubbed patch is an indication that it has been marked previously and the detailed description in the Register will usually enable it to be recognized and re-labelled. The foregoing statement rather implies that marked individuals are often seen again, but this is contrary to the facts. In previous years, when I have seen several examples of a species such as *Vanessa atalanta* in my garden day after day, I have supposed that they were the same. As a general rule, these migrant butterflies seem to be merely birds of passage : they turn up in the garden, are marked and released and are not seen again, their places being taken by new arrivals. During this season I have marked up to date (27.ix.36) 67 *V. atalanta*, 7 *V. cardui* and one *V. io*. Of the *V. cardui* one individual remained here and was seen frequently for ten days after release ; of the *V. atalanta* six remained for two or three days (usually these were released rather late

in the evening and the next day may have been dull), one for seven days and one for twelve days; so that only three individuals out of seventy-five remained for any appreciable period; all the rest flying off again at once or almost at once. I may note that fluctuations in the numbers of *V. io* and *V. urticae* also indicated movements of individuals but I only marked the one *V. io*, which turned up after all the others had left.

The object of marking these butterflies is, of course, to obtain information of the actual movements of individuals. Should anyone observe a butterfly bearing a label as described above I should be glad to know when and where it was found and its number. The chance of an individual butterfly being recovered is small (in the case of ringed birds only a very small proportion is ever noted again) but it has seemed worth while to try this method on the off-chance of securing some definite information.

Lysandra corona, a new "blue" from Persia.

By ROGER VERITY, M.D., F.R.E.S.

Having just purchased from Fritz Wagner of Vienna a collection of butterflies made by him, during last June and July, in the Elburz mountains, which stretch along the southern shore of the Caspian sea, I have, amongst them, come into possession of a striking new "blue." It is so distinct from all the others, hitherto known, that it had been noticed at once by Wagner, who kindly reserves me its description, and I give it the pretty name one finds in ancient maps for the mountains of the eastern portion of the Elburz: **corona**, nom nov.

Its nearest ally seems, without doubt, to be *caelestina*, Ev. and that is why I consider it, generically, a *Lysandra*, as Chapman, in the *Ent. Record* of 1910, p. 102, states that the male genital armature of that species belongs to the large group of species now called by this name and by the one of *Agrodiaetus*, for no one has detected any difference in their genitalia and they are only divided into two lots, bearing those names, by their general facies, as represented respectively by their genotypes: *coridon*, Poda and *damon*, Schiff.

The species *caelestina* has such a different look from all the others, which group around those two genotypes, that Staudinger had judged it the ally of *sebrus*, evidently owing to its underside markings, and, now the genitalia have revealed its true nature, one finds in reality, no definite features obliging one to consider it positively a *Lysandra* rather than an *Agrodiaetus*. The tone and uniformity of its grey underside, decidedly cold and ashy in hue, the presence of the very broad basal area of metallic scales, which are very blue in the male, and the very distinct orange, premarginal, spots in the female, induce one, however, to consider it a *Lysandra*, for they do not exist in any *Agrodiaetus*, whereas they clearly resemble, in a rudimentary form, the aspect they usually exhibit in the former.

The new species *corona* is more puzzling, in this respect, because the upperside look of the males and the lack of premarginal orange spots on the underside of the female bring it closer to the latter genus and make it, more or less, intermediate between the two. I call it a *Lysandra* chiefly because it would not do to separate it from its very

close ally *caelestina*. It seems to stand to it in very much the same way as *P. eros*, O., stands to *icarus*, Rott.; this impression, one has from the upperside colours of their males, is sustained by the fact that *corona* flies at the very high altitude of 3000 m., where it was collected at Kendevan, from 3rd to 9th July.

Its size is a little larger than the one of *caelestina* (length of fore-wing about 16 mm., instead of 15) and its wings a little broader. The club of the antennae is entirely sooty black, instead of russet on one side, as in the latter species. The blue of the male is the same as that of *eros* and very similar also to *damone*, Ev. form *iphigenia*, H.S. or *iphidamon*, Stdgr., but slightly greener; the marginal black band is, however, still less definite than in *iphigenia*, for it consists of grey, rather than of black scales, and it only appears, as a shaded area, in certain lights, whereas in others it vanishes and leaves the wing looking like the one of *phyllis*, Stdgr., in that respect; on the hindwing there are some more definite black internervular dots, but their outline is shaded; there is no discocellular streak on either fore- or hind-wing. The underside is exactly as in *caelestina*, except that the small, *sebrus*-like, black spots are a little larger on the fore-wing and the characteristic broad metallic area, extending far out towards the tornus, of the hindwing is green, instead of blue, in the male; as stated above, the female has no orange premarginal spots and the grey chevrons are scarcely perceptible either; in some males there is a row of the latter all along the margin of both fore- and hind-wing, but they are much fainter than in *damone* of the same region.

Andrei Petrovich Semenov-Tian-Shansky. (*Plate.*)

By MALCOLM BURR, D.Sc., F.R.E.S.

On 21st June, 1936, a great personal friend of mine and eminent zoologist celebrated at the same time his seventieth birthday and the 50 years jubilee of his scientific activity, Andrei Petrovich Semenov-Tian-Shansky, Hon. F.R.E.S.

He comes of a distinguished family of the higher official class of old Russia, associated with that culture, which so clearly distinguished the cream of the Russian cultivated classes.

His grandfather, an officer in the army, fought at Borodino in 1812. His father, Petr Petrovich, (1827-1914), was an outstanding geographer, naturalist, statistician, and art connoisseur, who received not only the highest honours his Tsar could give him, but the *Ordre pour le Mérite* from the German Emperor. For his work in exploring and surveying the Tian Shan Mountains, the family received the right to add the epithet Tian-Shansky to their name. On the centenary of his birth nine years ago, his portrait was published in *The Times*. He was a member of Alexander II's Committee for working out the details of the emancipation of the serfs.

His second son, Andrei, inherited his father's love of nature. He took the Natural Science school of St. Petersburg University, specialising in biology and systematic zoology. In 1886/87 he began investigating the Freshwater Protozoa of Central Russia, working mainly on the family estate in the Riazan Government. In 1886 he published his first scientific article. While still a student he received

the silver medal for working out the entomological results of the Asiatic explorations of the great explorers Przewalski and Potanin, and then began a career of extraordinary activity, with a series of expeditions into central and south western Asia, into a whole new world of natural life. He collected generally all over Russia, especially in the centre and the south, and from 1879 to 1913 scarcely missed a summer's field work in his home district, and, in later years, in the Novgorod Government. Andrei Petrovich is a keen sportsman, as well as first rate all-round naturalist, and had a big shoot near Luiban' in the Novgorod Government, where I spent a happy week-end with him in 1915, collecting insects during the day and shooting wood-cock at night.

His activity and output were astonishing. He made enormous collections, and in addition to his own extensive material, worked out the results of many famous expeditions.

From 1890 to 1897 he was on the staff of the Zoological Museum of the Academy of Science. He had to do his own mounting, as he was single-handed.

In 1914 he presented his Palaearctic Coleoptera to the Museum. It consisted of over 700,000 specimens, and was especially rich in Central Asian forms. He also gave the Museum the greater number of his types of Hymenoptera, Diptera and Orthoptera. His collection of Chrysids contained 550 species, of which only 24 were exotic. Almost all the 10,577 specimens were determined, and many were types.

Outside Russia he travelled little. Why should he? His own country was vast enough, and offered unending scope. In 1900 he visited the museums of Berlin, Dresden and Vienna.

In 1886 he began his lifelong connection with the Russian Entomological Society. From 1906 to 1914 he was Vice-President, then President till 1931, when he was elected Honorary Life-President. In 1901 he founded the *Revue russe d'Entomotogie*. In 1910 he became Chairman of the permanent Biogeographical Committee of the Imperial Geographical Society, of which he was good enough to enrol me as a member at a meeting in 1915.

His activity was so all-embracing that it is difficult so say which were his special lines. In the Coleoptera he obtained general recognition as an authority on the *Cerambycidae*, and in the Hymenoptera on the *Chrysididae*. He did important work on the *Mydaidae* (Diptera) and on the Aphaniptera.

Since 1886 he has published over 250 entomological works, mainly on systematics and biogeography, and many hundreds of reviews and short notices. He has described over 800 species and more than 60 "races." almost entirely of the Russian fauna, mainly of insects, but also including some mammals.

He introduced several original conceptions and new terms in the philosophical expression of his views, especially in his favourite subject of geographical distribution.

In 1918 he published an important essay on the taxonomic boundaries and definitions of the subdivisions of the species, which stimulated much work on the part of our workers.

Quite recently, in 1936, he published a remarkable summary of his views on the limits and subdivisions of the Palaearctic Region.

In his honour six genera have been named, and no less than 154 species and races, including several vertebrates, by no less than eighty authors, *quorum pars minor fui*.

His mental activity is extraordinary. Himself a poet of distinction, he has made important contributions to the history of Russian lyric poetry, and to the biography of Pushkin, whom he regards as the most polished of all poets. A statuette of Pushkin always stands upon his writing-table. He is recognised as one of the most scholarly latinists of Europe, and during the most difficult days of the revolution he translated Horace into Russian verse.

He has been a prolific contributor to the press on numerous subjects, and is a fluent, convincing and erudite speaker, as I can testify, after taking part in many meetings under his chairmanship.

He has been honoured by most of the scientific bodies of the world, including our own Royal Entomological Society, which elected him Honorary Fellow in 1913.

It was a particular pleasure to me to enter into correspondence with this gifted Russian in the early years of the century, and in 1910 I made his personal aquaintance and cemented one of the most treasured friendships of my career. It was in that year that I had the honour of attending the jubilee of the Russian Entomological Society, as Delegate of the Linnean, Zoological and Entomological Societies of London, under the chairmanship of his grand old father.

Five years later, during the early days of the war, I had occasion to spend several months in Petrograd. It is characteristic of Russian hospitality that his mother said to me, "Malkom Arturovich, places are laid at the table for three of my sons. A fourth will now be permanently laid for you. Do not trouble to telephone to say whether you can come or not. You are always welcome, without any formality at all. While you are here in Petrograd, I count you as one of my own sons."

I took my gracious hostess at her word, and after every meal, when her sons trooped out and each kissed her hand, according to the charming old Russian customs, to thank her for their good dinner, I was happy to join them.

It was well that his venerable father was taken before the outbreak of the great war, and his mother was spared the sight of the debâcle.

Andrei Petrovich enjoys excellent health, and continues work with unfailing energy, in spite of the relentless progress of glaucoma. He has always been short-sighted, but for the past years has been dependant upon the help of his assistants and pupils, of whom he has trained several, who have already attained distinction. Last November he wrote to me in the same firm and remarkable handwriting, that he then had fifteen works in hand.

Long may he be spared to continue to train a school of careful and thoughtful entomologists.

Effects of Alimentation on the Development of some Pierinae.

By ORAZIO QUERCI.

In the studies in the biology of *Pieris rapae*, printed in this magazine, I related that their larvae generally died when the temperature reached to 90°. However, at the beginning of August, 1932, it was very hot at Philadelphia, for two consecutive days, and some larvae, which we were rearing, formed pupae instead of dying. Also in the open country the larvae were not injured and a few days after that heat-wave a large emergence occurred.

At Salonika, Greece, where we live now, I often spoke with my family about that matter, and my son-in-law, Dr. Enzo Romei, proposed to carry out some experiments to state the influence of alimentation on caterpillars. We put into an incubator, in different conditions, many larvae of *Pieris brassicae*, *Pieris rapae* and *Colias croceus*, and we saw that when the larvae are fed with luxuriant plants they grow and pupate very rapidly even if the temperature rises to 110° with very little aeration, moderate light and about 95 per cent of relative humidity. On the other hand, other larvae fed with some plants which we rarely sprinkled with water, rotted at about 90°. They become very active when the heat increases and an excess of unsuitable food produces their death.

This experiment explains the behaviour of the larvae at Philadelphia where, in 1932, the food plants were always more or less verdant for the whole season. Looking at what I related in the *Ent. Rec.*, XLVII, 1935, we see that the larvae died, on 6th June, because the temperature increased while the vegetation was almost dry (p. 47). From 12th to 17th June it rained and the caterpillars were little injured by the waves of heat of the 22nd and 26th, but they died on 1st July as it was hot when the country had turned barren (p. 61). The mortality was considerable, for lack of rain, until 20th July (p. 74) and the butterflies on the wing were scarce from 26th July to 10th August (p. 87). On 3rd August it rained even during the night, the heat was moderate for two days and the vegetation recovered. The high temperature of 5th to 10th August did not affect the well fed larvae in the country (p. 87) and there the butterflies were plentiful until 5th September (pp. 112 and 125). In August the result of our breedings was poor, not for the cause which I relate in my paper (p. 87), but because sometimes, instead of getting plants in the meadows of the Parkway, we used the *Lepidium virginicum*, growing near home, which was injured by the dust of the street.

By the end of August the vegetation faded and it was still more damaged by the short shower of the 27th which dried at once from the effect of the intense heat and strong wind (p. 112). At the beginning of September it was hot, the unsuitable food killed most caterpillars and the butterflies were very scarce from 7th to 16th September (p. 125). Looking at the specimens taken on those days, which are in my set, I see that most of them are worn.

On 5th and 6th September it rained and afterwards the climate was lovely. The *Lepidium virginicum* bloomed again and the mortality of larvae ceased for some time. Many *Pieris* were on the wing from 18th to 25th September (p. 125), but after 16th September the decay

of vegetation caused the death of most caterpillars and, by the end of that month and later on, the Lepidoptera became scarce in the country.

Speaking about *Pieris brassicae*, in the *Ent. Rec.*, XLVIII, p. 38, 1936, I related that all our larvae rotted at Lisbon, Portugal, when the temperature rose to 89°, however, at p. 40 of the same paper, I remarked that the figures which I recorded as to be the limits of activity and vitality of the larvae were not absolute as I supposed that other factors, besides temperature and humidity, would affect the larval stage. Now, having seen that the larvae of that species live quite well at 110°, I have inquired about the real cause of their sudden death and, in my note-book, I have read that, on 16th May, 1933, we were unable to go to Mata do Alfeite and get plants, where cabbage grew in a moist place, and took some leaves in the dusty Park Edward VII, near home. Our larvae, being excited by heat, fed actively and rotted.

After many years research, making and revising mistakes, I can now state, with the support of many experiments, that in the Temperate Zone heat can not cause death of larvae of butterflies until the quality of food is unsuitable. In summer the control of abundance is made directly by alimentation, and the climatic factors have a great but indirect influence.

Random Notes on Argentine Collecting.

2.—An Unproductive Winter Expedition.

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

In the late autumn of 1933, a telegram from the Argentine Ministry of Agriculture offered me the leadership of an exploring Commission they were about to send out to examine certain territory for signs of wintering locusts, the *Schistocerca paranensis*, Burm., whose enormous invasions during the last few years have caused such grave alarm in the country.

Four days later, I had arrived back in Buenos Aires, and after some fifteen days of hectic preparation, the expedition left on the evening of 24th May for the city of Córdoba, where we had to spend one day awaiting suitable train combinations. On the 26th we left for Serrezuela in the west of the province of Córdoba, which I had selected as the jumping off place, myself going right through to La Rioja to pay certain official calls, returning on the 28th to join the remainder. Some days were spent awaiting the remaining personnel, arranging and hiring transport, overhauling the somewhat alarming amount of baggage we perforce carried, and in exploring the northern end of the Sierras de Serrezuela.

As soon as possible we commenced the exploration of the ground allotted us, an area comprising the whole of the province of La Rioja, the northern portions of San Juan and San Luis, the west of Córdoba and the extreme south of Catamarca, an area equal to that of England and Wales. The greater portion of this area consists of isolated mountain ranges lying before the pre-cordilleras, including the Famatina group crowned by the Cerro Oveno, 22,500 feet, the isolated ranges in many cases reaching 10,000 feet. The object of the expedition was to survey this area for any signs of overwintering locusts and to collect

all information possible as to their movements, and as a secondary object to collect animals, plants, insects and minerals for the collections of the Ministry of Agriculture.

To give a detailed description of the itinerary followed is beyond the scope of this short article. Leaving Serrezuela the expedition split for a time, meeting again a few days later, having examined the northern and southern portions of the plain that lies east of the Sierras de Malanzan as well as the eastern side of this range. Reunited, we made a complete circuit of the Sierras de Ulapes, after which a move was made into the northern portion of the province of San Juan, where we skirted the Sierras de la Huerta as far as Valle Fertil. From this point a trip was made into the heart of the Sierras de Rivero, Chaves and Usno, before again returning to the south of La Rioja to follow up the western side of the Malanzan range. From here we proceeded to Chilecito, the largest town in Rioja, crossing the Mogotes and Colorados and the vast uninhabited valley that precedes the fertile areas around Vichigasta and Nonogasta. From Chilecito the Nevado de Famatina was explored at several points and altimately crossed by the Cuesta de Miranda, probably the finest mountain road in South America, and which rises to nearly 8000 feet at its highest point, to enter the valley of Villa Unión-Vinchina that lies at the foot of the barren pre-cordilleras. I had hoped that we might reach a large sheet of water that lies about three days mule ride beyond Jaguël, the frontier village with Chile, and which is known as the Laguna Brava. It has for a long time been my desire to visit it, since it is very isolated and little known and must be very beautiful, but the mountain paths were blocked with snow, so that an opportunity was lost, that may not again arise.

Returning to Chilecito we skirted the Nevado de Famatina and entering the Valley La Rinconda with the Sierras Los Ramblones on our left, proceeded to Tinogasta in Catamarca. From this point we followed the barren *Opuntia* covered sandy wastes that form the boundary between the two provinces, as far the northern point of the Sierras de Velasco, whose western side we followed down for about half their length before turning back to the olive-yards af Aimogasta. From Aimogasta we followed the eastern side of the Velascos as far as the city of La Rioja passing through the interesting quebrada to the west of that town. Leaving La Rioja we proceeded north into Catamarca, thence east to cross the Sierras de Cebillá to Chumbicha, after which the remaining fortnight or so of our exploration was confined to the low-scrub covered plains and salt marshes that lie on the eastern side of the province of Rioja.

We were lucky in that we had no rain to contend with, the nearest approach being an evening of wet mist, that closed down on us as we were crossing the seemingly interminable jumble of dry watercourses and boulder-strewn, cactus covered scrub at the foot of the pre-cordilleras, but on two consecutive days it snowed and was generally unpleasant. The days were on the whole sunny and only thrice had we to beat our way against the sonda, or dust bearing wind, that is such a common feature of those areas, and which blows almost continuously from the end of August till mid-October or even later every year. Once even the thermometer rose to the unusual winter maximum of 84° F., a contrast to the nights, which were almost always cold. We struck four separate cold spells, the first at Valle Fertil,

followed by our stay at the foot of the pre-cordilleras, again at the foot of the Sierras de Cebillá and finally during the last days on the plains, when the nightly minimum fluctuated between 23° and 14° F., falling once as low as 5° whilst we were in the Sierras de Cebillá, decidedly too cool to make bivouacking pleasant.

In consequence it was not to be expected that many insects would be found, especially when the barren nature of most of the territory we traversed is taken in account, country, where even in the height of the season one has to work hard and with some skill to obtain material.

Whilst the initial preparation was under weigh at Serrezuela more time was available than after we began to move. Never the less, long afternoons sweeping would only produce a score or so of the commonest beetles, Hemiptera and small flies. Apart from a *Thecla* new to the fauna, only the very commonest butterflies could be found, worn *Catopsilia cipris*, Vanessids, *Tatochila autodice*, *Terias deva*, a few *Euptychia* and the ubiquitous Hesperiids *Erynnis notata*, *H. americanus* and *H. orcus*.

(*To be concluded.*)

NOTES ON COLLECTING, etc.

Collecting in N. Wilts in June, 1936.—*Theretra porcellus* was common during the latter half of the month visiting, at dusk, the flowers of red Valerian. It was frequently accompanied by *Plusia gamma*, *P. chrysitis* and *Abrostola tripartita*. On 21st June at 8.30 a.m. I saw *Hemaris fuciformis* flying over a bed of pansies and on 25th June at midday I took a very fair specimen of this moth at the Valerian flowers.

On the same day I saw *Pyrameis cardui*, in perfect condition, on a clump of Sweet William. This I presume was an immigrant.

Euphyia silaceata was common at dusk in the local woods, also *Angerona prunaria*. The male var. ab. *corylaria* with the orange-red colour confined to the middle area of the forewings and a small orange blotch on the centre of the hindwings being almost as common as the typical form. On 18th June I caught two good specimens of *Cepphis advenaria* which Barrett records as being "very rare in Wilts."

Acontia luctuosa, *Euclidia glyphica* and *Zygaena trifolii* occurred in the middle of the month, the last in great plenty and I obtained one ab. *minoides* having all the spots united. *Parasemia plantaginis* was very plentiful in one rather restricted area flying over rough ground at 6.30 p.m.—(Rev.) Walter L. Freer, Chute Vicarage, Andover, Hants.

"Froghoppers" and "Magpie" larvae.—Had T. F. Marriner given (pp. 100 and 101) the name of the "froghopper" that swarmed temporarily in his garden near Carlisle, perhaps some explanation could have been suggested. Tutt in his "Migration and Dispersal of Insects" in old volumes of the *Entomologists Record* makes no mention of the migration of "froghoppers," but Mr. Marriner's account is quite consistent with such a movement—probably purely local in extent, since no other reference to it seems to have appeared.

The probable explanation of the sudden disappearance of the larvae of *Abraxas grossulariata* is that one or two cuckoos appeared on the

scene and cleared the bush of larvae; for, contrary to Mr. Marriner's belief, the cuckoo eats these larvae, and also many other species (especially hairy ones), which other birds will not touch, including those of the Gooseberry Sawfly (*Pteronus ribesii*, Scop.). I have a record of the robin taking the latter larvae to feed its nestlings, and I believe I have seen also a note of its taking those of *grossulariata*, but I cannot trace it at present.—C. Nicholson, Tresillian, Truro, Cornwall, 23*rd Sept.* 1936.

Tortrix viridana.—Apropos of the reference (p. 101) by the Rev. R.E.E.F. to this species and its ravages in West Kent, it may interest him and other readers to know that hereabouts it is unknown. I was very much surprised when I realized this and the only explanation of the moth's absence that can be offered is that the prevailing oak here is *Quercus sessiliflora*; in fact I have not yet come across a tree of *Q. robur* (*pedunculata*) although it is said to be very common in the county according to Davey's *Flora of Cornwall*. Prof. J. W. Munro suggests that as the newly hatched larva can attack only leaves that are just unfolding from the buds, and *Q. sessilifiora* is earlier than *robur* in opening its leaves, the latter are too far advanced for the little larvae when the eggs hatch.—C. Nicholson, Tresillian, Truro, Cornwall, 23*rd September* 1936.

Further extracts from a S. American correspondent.—My friend writes (1) Winter in Rio Janeiro. (His first experience there after spending many winters in the Argentine). "We are having lovely weather just now (18th May), about as warm as anot very hot summer at home, but the difference in temperature between now and what it was in January and February is very great. After midnight and up to about 8 a.m., it is quite cool, at times cold, and one finds a blanket necessary. However people tell me that in June and July it gets "very" cold. But I have been so long in S. America that I am hardly a competent judge, because anyone, who has passed through a few summers like the one that has just ended, will feel the slightest fall in temperature. So to me it is not cold yet, because in San Paulo it was much colder, while some people, who have been here some years already, feel cold. As I have told you, the months of June and July are two of the best months for *Papilio* and *Heliconius* species, and many other smaller butterflies, I don't think that the cold can be so very severe."

(2) Later he writes "I have come to the conclusion that there is no winter in Rio, at any rate such as it is, is very pleasant.

(3) Later still he writes "The little difference there is in the temperature during the night is a blessed relief."

(4) A Hunting-ground near Rio.—My friend writes "I have discovered a new hunting-ground, which promises very favourably. It is quite a long way from the town; takes 45 to 50 minutes in my car, but it has the great advantage of being only accessible by motor car or a 2½-3 hours walk on foot; so I have it practically to myself. It is at a place where the forest almost reaches down to the sea, and it is at the foot of the highest mountain around here, known as "Gavea," which rises abruptly up from the sea-level to over a thousand metres above the sea. Between the sea and the rising ground it is swampy

and I understand that the very local *Papilio ascanius* is to be found here."

(5) ANOTHER NEW HUNTING-GROUND. My friend says "One of the best places for *Papilio* species was beyond Fribourg beside a river about 200 metres above sea, where the pigs from a neighbouring pig-sty were accustomed to drink. There occurred *Papilio stenodesmus*, *P. protesilaus* v. *nigricans*, *P. asius*, *P. protodamus* v. *choridamas*, *P. lysithous* and *P. iphites*, with *Catopsilia philea*, *C. trite*, *C. argante*, and a large number of *Appias drusilla*."—[Copied HY.J.T.]

AGLAIS URTICAE, L., IN ABUNDANCE.—The "Small Tortoiseshell" has occurred in great numbers both in Windsor Forest and at Heston this autumn. Many examples could be seen at one time on the flowers in the front garden. Has it been equally common elsewhere?—HORACE DONISTHORPE. [Yes. In many places.—HY.J.T]

TORTRIX PRONUBANA, HB. AT HESTON.—This pretty little insect has been very common flying about the privet bushes, etc., in and outside front gardens. It used to be equally common at Putney.

I understand it has only been in this country since 1910, coming from the Mediterranean and has spread everywhere.—IBID.

PHILONTHUS RECTANGULUS, SHARP, AT WINDSOR.—This species has turned up in some numbers at Windsor in cut grass heaps; the grass being decaying and very warm. I have searched grass heaps in the same spots for years back and also manure heaps and it certainly was not there before. It has only been on the British list for two years, and appears to have spread all over the country. It was originally described by the late Dr. Sharp from Japan.—IBID.

CURRENT NOTES AND SHORT NOTICES.

The next species of Noctuae to be discussed in the Supplement are the rest of the Agrotids. One would like to have any facts as to the variation of these species. Mr. Sperring has reported an example of *A. ripae* which is practically black and I have a similar one bred from Dawlish Warren many years ago.

The Annual Volume of the Italian Institute of Agriculture in Portici, Italy, (*Boll. Lab. Zool. Gen. et Agr.*) vol. XXIX, has just been published. As usual it contains at least one intensive study of an economic question. More than 200 of the 300 pp. is taken up with an intensive experimental investigation of the Orthoptera, which occur in the Italian Island of Egeo off the coast of Asia Minor. Photos of the character of the country and numerous diagrams illustrate the memoir. The other articles deal with the Isopoda and the Hymenoptera.

The Belgian *Lambillionea* for July gives 2 photographic plates of the various forms of the beautiful *Zygaena carniolica*, 40 figures in all. The variation of this species is discussed, as well as the variation in *Z. occitanica*.

We might point out to readers that Dr. Verity's "Butterflies of the Rhone Valley" can be obtained separately. See our advertisement columns.

Also that Vol. I of the "Supplement to Tutt's British Noctuae"

which brings our knowledge more up to date, can also be obtained separately.

Our "Catalogue of the Varieties of British Geometers" can still be obtained. It is very probable that with the kind assistance of Mr. L. B. Prout we shall later on issue a Supplementary List of subsequent additions and amendments, this time with references for the original descriptions of such.

A very interesting Bibliography of the very rare books on Natural History has been recently issued by the well known specialist in such work, Dr. Wm. Junk, under the title "Rara Historico-Naturalia." It consists of two quarto volumes of closely printed matter on all details of each item it was possible to obtain up to date. There are in all 880 items dealt with. Particulars of English works are in English. As an example the notice of the works of Haworth which covers 2 whole pages, and is issued with the English prospectus, is so informative that those who possess a copy of Haworth's "Lepidoptera Britanica" will feel a desire to insert the notice in it.

It is reported that on 20th Aug. thousands of *Plusia gamma*, which up to that date had only been seen in dozens, were seen on a quarter mile line of lights along the front at Hastings. They increased in number nightly until 27th Aug. Thousands were recorded from Dungeness during this period, hundreds at Eastbourne but none at Brighton. At the first named place they are reported as coming ashore in waves at about a hundred per minute. Presumably they crossed the Channel from the coast of France, but whence? When were they bred and where? They must have been in countless numbers allowing for losses on the journey, in such number as to be common observation. Did they congregate together before starting? Or was the mass assembly the result of the attraction of the massed lights? The larvae too must have shown their tracks. Is there no entomologist anywhere along the opposite coast of France from whom information could be obtained? The unfortunate part of this investigation of these "mass-movements" of Lepidoptera, is that practically the whole of the records are isolated. I refrain from using the term "Migration" with its specific implication of so much that is not in any way applicable to the Invertebrate Groups of Insects.

In the more recent issues of the *Trans. Roy. Ent. Soc.*, a paper by Mrs. O. W. Richards on the "Feeding habits of Lepidoptera," sums up all that has been recorded on the feeding and drinking, particularly moisture absorbing habits, and is well worth reading. Another paper details a long series of experiments by Robert Carrick to test the "Efficiency of Protective Adaptations in Insects." Perhaps one of the most important contributions is that by the Society's Registrar, F. J. Griffin, A.L.A., on the "Dates of appearance of the parts of Seitz *Grossschmetterlinge der Erde*," of which all the earlier parts were not dated. This will form a most useful reference list for many years to come. All the later issues are dated on the first page of each sheet of 8 pages, but even these in some cases are incorrect as dates of actual publication.

The Annual Exhibition of the South London Entomological Society takes place on 22nd Oct. at 6 p.m. in Hibernia Chambers, London Bridge, S.E.1. Visitors are welcome.

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

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.*

MEETINGS OF SOCIETIES.

The Royal Entomological Society of London.—41, Queen's Gate, South Kensington, S.W.7., 8 p.m. October 21st. Nov. 4th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Oct. 22nd (Exhibition). Nov. 12th, 26th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Random Notes on Argentine Collecting.
2.—An Unproductive Winter Expedition.

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

(*Concluded from page 113.*)

From this point until we reached Valle Fertil, except for a few fleas collected from two species of hares and some scale insects of which we took a fair number throughout the trip on wild plants, we saw nothing. In Valle Fertil alone were there a reasonable number of insects on the wing, those already mentioned, an *Actinote*, several *Thecla*, *Phyciodes liriope*, *P. claudina* and *P. simois*, *Precis lavinia* and some *Colias lesbia* and others, all equally common, but an indication of a rich summer fauna that I hope one day to sample when opportunity offers. Here by a small stream I found again the snow-white larvae of *Halisidota texta*, but they were all stung by a Braconid. In some pools in this stream, back in the sierras, a great number of *Hydrobatidae*, or water spiders, were disporting themselves soon after sunrise one morning, in spite of its having fallen below freezing point during the night. In these same pools were a few *Notonectidae*, and many *Gyrinidae* of a species that may prove new. Whilst in this neighbourhood an illustration of the danger that may arise from forming sudden conclusions was well illustrated. At a spot where a number of *Prosopis nigra* were growing, I noticed many cases of a Psychid, and on collecting them was surprised to find a number occupied by a Noctuid larva that I had previously found in quantities in La Rioja under flat stones beneath a large and very ancient algarobo tree. They had taken up winter quarters in the empty cases of the *Psychidae*. Probably the most interesting entomological results of the trip were connected with the *Psychidae*, since we found in considerable quantities two new species, the first whilst exploring the hills behind the city of Córdoba the day we were forced to spend there on our way up, on posts and bushes along a railway line, the others on the salt marshes to the east of La Rioja on a plant known as "Barba del tigre" a somewhat unusual foodplant were it such, the insects when found being in a state of hibernation.

In the Nevado de Famatina I went up to nearly 12,000 feet in the hopes of finding late specimens of *Colias blameyi* or *Mathania loranthi*, having taken the latter species there some two years previously, but no Pierids showed up. At Vinchina, at the foot of the pre-cordilleras a few common Vanessids and Hesperiids were flying near a water channel and it would be interesting to know what the summer population of that valley might comprise. Near here, back in the mountains, I came on a tiny cup-shaped watered valley with a fine outlook over the plains from the nearby peaks, where the ground was thickly strewn with old Indian pottery, the more primitive thick black and red types, the thinner polished and graven black pottery and the bi- and tri-coloured ceramics that are associated with the more advanced civilizations of the northern parts of Catamarca and of Salta. Undoubtedly this valley had been used for many hundreds of years as a hiding place for travelling tribes, or where the womenfolk had been left during raids. The whole of the area we covered is rich in old Indian remains and it

would have interested me to have spent some time on closer examination of certain areas, especially the northern borders of Rioja, and Schaqui to the west of the Velascos, in both of which places we saw much broken pottery shards and other evidences of pre-Columbian occupation.

From now on, the low temperatures of the nights caused the disappearance of all but the hardiest and commonest insects, and we had to content ourselves with marking down likely spots for future examination. One of such places is the little village of Santa Cruz (one of many of that name), that nestles at the foot of the Famatina range beyond the Valle La Rinconda, but undoubtedly the most interesting spot was a deep valley near Chumbicha to the east of the Sierras de Cebillá, and through which the Chumbicha-Andagalá road passes, where the vegetation was almost tropical, and where the trees were filled with Tillandsias, mistletoes and other parasites, a valley never collected in, and where most interesting things must exist and probably new species.

Whilst the insect collections were poor, we managed to find a not inconsiderable number of interesting plants, some thousand specimens eventually finding their way into the Ministry's herbarium. The greatest number of these came from Valle Fertil where we collected 250 species in two days including many beautiful tiny ferns from the rocks in the valleys. In Serrezuela we had collected the majority of the commoner plants of the region so that more time was spent during the latter part of the trip in looking for rarer species. We concentrated chiefly on cactus in order to augment the poor collection then housed in the Ministry's green-houses, and some 64 forms resulted. The great number of *Opuntia* of the *papyracantha* type was very marked. Each area had its own form, all of which botanists would probably consider forms of one species, but they varied greatly, bare, with long thick or with short, or even silky, spines. In some places the whole landscape was covered with these forms almost to the complete exclusion of other cactus types. Very beautiful are the valleys where the giant candelabra cacti rear their candle-like bodies sometimes nearly thirty feet above one, favourite nesting places for many species of woodpeckers. In fact a great many birds, wise with the knowledge of experience, utilize the giant forms of cactus for nesting, safe from the onslaught of larger birds of prey, or from marauding animals. Even some of the ground nesting smaller birds place their skillfully hidden nests in the clumps of ground-cacti where they must be very safe.

As is only natural on a trip of this sort, we saw from time to time most of the larger animals, the most surprising being perhaps a puma strolling at midday down a forest track ahead of us. Foxes, comedreja (*Didelphis* sp.), and skunk we saw commonly, and I became decidedly unpopular, when I added a very diseased specimen of one of the latter to our collections in order that the nature of the scab, with which it was attacked, might be diagnosed. On one occasion we came on a female of the giant hurón (*Galera barbara*) with her family trailing out in Indian file behind her and on another the rare mayuatú (what it is called in English I do not know), *Procyon carnorivorus* f. *nigripes*, crossed the path ahead of us.

Our observations on the locust were not considerable. We had been sent out too late to make personal observations on the areas where eggs

had been laid and had to rely on local information. It appears, however, that everywhere these areas had been invaded by a beetle, without doubt *Trox suberosus*, which had decimated the eggs so that the resultant and very reduced hatch had been taken care of by the birds. On two occasions we encountered flying swarms and were able to observe the reactions of the insect to intense cold, the second swarm being traced to their alighting ground in forest and observed under conditions of snow and a temperature of 5° F. The full results of this and other explorations was recently published by the Ministry of Agriculture. *

Whilst little was achieved entomologically and our final reports on the locust were negative as to permanent overwintering quarters in the area explored, yet it was a trip of great interest, especially in view of the fact that we were almost always well off the beaten tracks, and for the most part amongst the very beautiful mountain scenery, that is to be found in this quarter of the world.

We were lucky in our weather and in the fact that we came through without accident to personnel or animals in spite of the nature of much of our travelling. Nor was sickness registered if a few isolated attacks of puna, or mountain sickness, that overtook my two assistants on one or two occasions be omitted.

Of how, when an accident, seven leagues from the nearest village, depriving us of all our lubricating oil, we slaughtered a goat and melting down its fat enabled a car to reach its destination, albeit highly odoriferous ; of how, a hundred kilometres from the nearest supplies, we found our reserves of petrol turned to paraffin and of the Turk who gave us salad dressed with this same illuminant, these and many other incidents are tales for other pages.

Some Notes on Collecting Lepidoptera in the Bishop's Stortford District in 1936.

By P. B. M. ALLAN, M.A., F.S.A.

This town, on the borders of Essex-Hertfordshire, is the centre of a good hunting-ground for the lepidopterist. It is 13 miles north of Epping Forest and 26 miles south of Cambridge.

The present year has been notable, so far as the Lepidoptera of this district are concerned, chiefly by reason of *Agrotis ravida*. This moth is probably a migrant, and Barrett remarks that it is "of very uncertain occurrence" with us. Certainly only an occasional specimen has been seen here during the last thirty years. This year, the first was taken (at a lighted window) on 29th June and the following morning two were disturbed when opening the doors of a garage. Thereafter it was seen in increasing plenty, and throughout July and August it was seldom absent from sugar. Twenty were taken by one collector in two nights, and it was to be seen at lighted shop windows in the town itself. The last one seen, quite a fresh specimen, was on 31st August. It is fond of barns and outbuildings, and was frequently to be found in spiders' webs, on beams, window-frames, etc.

* Informes de las Comisiones Exploradoras 1933. (Com. Central de Invest. sobre la Langosta. Min. Agric. de la Nac. Bs. Aires. 1934).

Plusia gamma, which seems to have reached us in Army Corps this year, has been abundant throughout the district, its first appearance in numbers having been on 2nd July. All specimens captured at flowers that evening were very worn. The native-born progeny of these visitors began to appear the following month and were scarcely less numerous than the invaders. *P. moneta* also visited our delphiniums in plenty. *Xanthia gilvago* was taken in moderate numbers during September, having been absent from this district for several years.

Five 'Prominents' are always with us—*Pheosia tremula*, *Notodonta ziczac*, *Pterostoma palpina*, *Lophopteryx camelina*, and *N. dromedarius*. *P. tremula* has been more frequent than usual; the larvae of the second brood being less than half grown by mid-October. *P. palpina* was not so common as it was last year, when larvae were to be found on aspens, sallows and willows throughout the district. *N. ziczac* is one of our 'regular' moths and does not seem to vary greatly in numbers from year to year, while *L. camelina* inhabits many a small thornbush in September. Recently a small aspen yielded one specimen of each of these four moths—surely a record! *N. dromedarius* is never common here. Three males answered the call of a freshly emerged female on 17th May; but autumnal searching of birch and alder failed to disclose a larva. *N. trepida*, still unpupated was dug up in his cocoon so late as 24th October.

Of the hawkmoths, *Smerinthus ocellatus* was not so common as last year, when his larva visited our sallows in force; *Amorpha populi* also was less frequently seen than usual. *Mimas tiliae*, a town-dweller, is always with us. *Theretra porcellus* put in an appearance at light, but *Macroglossum stellatarum* avoided the neighbourhood. *Sphinx ligustri* is not one of our moths, though he occurs—or used to—at both Epping and Cambridge. We have to go to Newmarket for him.

March sugaring and sallows yielded *Taeniocampa munda* (four at sugar on two nights), *T. gracilis*, *T. gothica*, and the usual crop of the genus *Taeniocampa*, while throughout the summer *Dicranura vinula* broadcast his larvae on our aspens. Of the 'kittens,' *Cerura furcula* was much commoner than *C. bifida* this year, the larvae being half-grown by mid-October.

Beating in September showed that *Gastropacha quercifolia* is still a common moth with us, though by no means so abundant as in 1934, when almost every small blackthorn bush, as far north as Cambridge, seemed to harbour a larva or two. *Lasiocampa quercus* also fell into the autumnal beating-tray on most days. Ova of *Cosmotriche potatoria* were found on *aspen* and a young larva of this moth on a blackthorn bush some three feet from the ground!

Of the οἱ πολλοί, *Amphipyra pyramidea* appeared at our sugar in as great abundance as in 1934, and some nice forms (including two black ones) were selected from the thousands of *Xylophasia monoglypha*. *Triphaena pronuba* seemed to vary more than ever, and no two *T. comes* were alike. As for *Agrotis nigricans*, 'her infinite variety' was so great that it was difficult to decide which was the type! *Agriopis aprilina* seemed to emerge from every pupa dug in September; among them an unusual specimen with much white in the forewings. But one can forgive *A. aprilina* disappointing our hopes of *Drymonia trimacula*, for he is so lovely a moth. *Gonoptera libatrix*, usually abundant with us, was rare this year, as was *Catocala nupta*, normally one of our

commonest moths. *Malacosoma neustria* must have flown to us in force from the Continent, for its larvae appeared almost everywhere. *Noctua plecta* was scarce, *N. c-nigrum* common. *Apamea secalis* gave nightly exhibitions of the six forms pictured by South, and threw in a few additional ones. *N. xanthographa* followed suit by displaying variations of stigmata in tones of red and grey. *Cerigo matura* (*cytherea*) took care to get rubbed before he visited our sugar, *Phlogophora meticulosa*, on the other hand staying away if a single scale was out of place. What prizes this moth and *A. aprilina* would be if they were rare! *Metachrostis perla* and *M. muralis* (*glandifera*) awaited us on the walls of the town as we went stationwards each morning. *Cucullia verbasci* defied ichneumons on many a figwort in early July.

Of the better class moths, *Acronicta tridens*, *Pygaera curtula*, *Drepana lacertinaria* and *Palimpsestis octogesima* were taken in the larval state, and *Aporophyla lutulenta* at light. Of *Polia flavicincta*, formerly common here, only one specimen came to a lighted window on 26th September. Three male *Saturnia pavonia* were attracted (on three afternoons, each at precisely four o'clock) by a 'calling' female brought from another part of the country. This moth has been recorded in this district only twice in the last thirty years. Probably it is always with us, though unobserved, for there is no open country or heather here. From the ova, a number of larvae were liberated.

Habrosyne derasa, *Thyatira batis*, *Calymnia affinis*, *C. diffinis*, *H. lithoxylea*, *Leucania pallens*, *L. comma*, *L. impura*, *Dipterygia scabriuscula*, *Mania maura*, *L. conigera* and the usual host of 'sugarites' came to cheer us up on the most unpropitious evenings. Altogether it has been a good season for the *Noctuidae*.

The *Geometridae*, beginning the season with *Theria rupicapraria*, were represented equally well, though many of the larger species were late in appearing; a freshly emerged *Biston strataria* being found on 26th April. Most of the 'Thorns' were taken at light, at rest, or in the larval state. *B. betularia* is as common here as elsewhere, and we breed it in the hope of obtaining the original grey form; for *carbonaria* (*doubledayaria*) has long superseded the type in this district. A good number of dark forms of moths of many families were taken, probably owing to the very wet summer.

As for the butterflies, many of them have been 'conspicuous by their absence.' *Polygonia c-album* has established itself here, but by no means in plenty; *Limenitis camilla* has a precarious foothold in two small woods. Only one *Vanessa cardui* was seen, and neither *Colias croceus* nor *C. hyale*. *V. atalanta*, however, came in fair force, and *Strymon w-album* appeared, punctual as usual, in a very restricted area. In 1934 it was common in several parts of the district. *V. io* hardly appeared. *Heodes phlaeas*, usually plentiful, was 'thin,' as were *Lycaenopsis argiolus*, *Maniola tithonus*, *Hipparchia hyperantus* and *Pararge megera*. Even *Coenonympha pamphilus* was not so abundant as usual, nor were the smaller 'whites.' But we had twelve degrees of frost here on 29th May, and June-July 1936 are best forgotten, so far as butterfiies are concerned.

NOTES ON COLLECTING, etc.

Aestivation of Lepidoptera.—In the month of December 1929, while collecting at Cristo near Santiago of Cuba, we marked a large quantity of butterflies, taken in a meadow around home, by clipping with scissors the tip of their forewings, and then released them. In January we saw some of those marked specimens flying, but afterwards they disappeared, when the country became barren. A few, however, reappeared after it rained in May and June; a female of *Telegonus habana*, Lucas, showing its sharp cut, was on the wing at the beginning of July, and a female of *Choranthus radians*, Lucas, looking to be the one which we had handled eight months before, was recaptured in August. We certainly recognized that skipper because, besides its peculiar edge, it was affected with albinism on its left wings.

In the Cuban bungalows we noticed many moths and a few butterflies, which remained several months in lethargy, and when they started flying again they were covered with dust and cobweb. A *Dione vanillae*, Lin., hid a long time in our house, a lethargic *Siderone nemesis* (*ide*, Hb.) was found in a hole of a tree, and *Papilio devilliers*, Godt., *Catopsilia eubule*, Lin., *Junonia coenia*, Hb. and *Victorina steneles*, Lin. were observed in caves.

Not only in the Tropics but also in some countries of Northern Africa and Southern Europe, where sometimes it never rains for about five months, we noticed the aestivation of many moths and some *Satyrus*, *Pararge*, *Epinephele*, *Argynnis*, *Lycaenidae* and *Hesperiidae*. By the end of September 1936 we took near Salonika, Greece, some females of *Maniola jurtina*, Lin. and both sexes of *Argynnis maja*, Cr. and *Maniola lupinus*, Costa, which had remained more than four months in lethargy as those species emerged here in May. A few living specimens were sent to the British Museum. A male of *Macroglossm stellatarum*, Lin. sat on a wall of my room last July, and after three months it is still on the same spot.

From the above recorded data we infer that, in the countries where the high temperature of barren soil kills even most chrysalids, there are some species of Lepidoptera which are carried on, during the dry season, by adults in a lethargic state, which awake and lay eggs when the wet season begins.—O. Querci, 3 Lysimaxoy, Salonika, Greece.

Loxostege palealis, Schiff., in Hants.—This species appears to be well established in Hampshire, usually considered to be its western limit, though larvae have been taken at Winspit in Dorset by Mr W. Parkinson Curtis, and one specimen was taken at light by M. S. C. Scarsdale Brown at Abbotsbury in the west of Dorset, in August 1935. Larvae were found at Highcliffe, Hants, in rough fields close to the sea where *Daucus carota*, L. abounds. By that date many larvae had already left their tubes in the wild carrot heads, but enough were found to show that the insect is well established here. At various dates in August 1936 search was made for the perfect insect without success. Probably August was too late, for one specimen was taken by Capt. W. B. L. Manley on 8th July, 1936, in a field at Farley Mount near Winchester, about fifteen miles inland. Larvae were searched for at Highcliffe on various dates in 1936, but none were found until 9th Sept. when they were again moderately common, mostly still small. Search at Farley

Mount on 12th Sept., 1936 yielded only three larvae, enough to show that the moth is breeding there. No great success attended the attempt to rear this species, for only three imagines emerged all together in the second week of August 1936. Examination of one of the remaining cocoons on 11th Sept. showed a perfectly healthy larva, evidently going over until next year, so that there is no need to despair. It should perhaps be stated that the cocoons have been kept in a closed shed in the garden, and have been well damped at frequent intervals.—Wm. Fassnidge, (M.A., F.R.E.S.), 47, Tennyson Road, Southampton, 19*th Sept.* 1936.

Luffia (Bacotia) sepium, Spey. in Hants.—As the habits of this Psychid appear to be little known, it may be advisable to set out the writer's experience in 1936, when an attempt was made to secure a series. An excellent account of this species will be found in Tutt's British Lepidoptera, Vol. 2, page 254 et seq., but not every entomologist possesses this work, and some even seem not to possess the necessary patience to read through Tutt's laborious and painstaking volumes. The first case was beaten on 7th May from a spruce fir in the open at Farley Mount near Winchester. On 9th May four cases were beaten from blackthorn, crabapple and larch in the Great Cover at Baddesley near Southampton. On 12th May four more were beaten from scots pine near Lyndhurst Road; and on 14th May eight cases were beaten from larch in the Great Cover. In all seventeen cases were obtained, representing at least ten hours of hard work. Unfortunately the jar of the beating stick caused at least two larvae to be dislodged from their cases, one of which was successfully replaced, while the other larva could not be found. The cases were found in the beating tray either by searching, or by gently turning out the debris, leaving the larva clinging to the fabric with its case at right angles to the surface. The larvae were placed in a jam-jar with plenty of tree lichens damped slightly at intervals. They showed a marked tendency to leave their cases and several had to be carefully replaced in them. They fixed their cases for pupation either on the muslin or on pieces of lichen-covered twigs. Six moths emerged between 28th June and 6th July, first two ♂♂, then four ♀♀. The time of emergence could not be observed. Every entomologist has probably noticed that when a certain species is specially worked for, it turns up unexpectedly. So it was in this case, for on 4th July, lamping and sugaring in the Great Cover, a ♂ *B. sepium* came to my sheet at 11.30 p.m. summer time, on a cool evening wet with dew, when practically nothing came to light, and nearly the only insect at sugar was *Aletia turca*, L.—Id.

Phalonia flaviciliana, Wilk. in Hants.—My first acquaintance with this beautiful insect dates from 26th July, 1929, when I captured two specimens sitting on flower heads of *Knautia arvensis*, Coult. after dark at Farley Mount, near Winchester. Not until this present year, 1936, did I complete a series. Larvae were found abundantly in seeded heads of the field scabious, which contained also the larval tubes of *M. cirrigerella*, Zinck., at the end of July and the beginning of August, 1935. No special watch was kept on them, and it was only by chance that two empty pupa-cases were noted in the box on 29th Sept., 1935, from which two moths must have emerged some time previous to that

date as a partial second brood in captivity, though only one of them could be found. The normal emergence took place next year over a long period, beginning on 30th June and ending in the second week of August, when I was away from home. In nature the moth was found freely from 8th July, flying in the early evening among the field scabious and settling on the flowers. It is a delicate insect, and its colours soon fade with the wind and rain of a tempestuous July such as we have this year experienced. Fortunately it is easy to breed, for it is, when fresh, perhaps the loveliest of the British Tortricina.—ID.

MYELOIS CIRRIGERELLA, ZINCK., IN HANTS.—In the *Entomologist's Record* for 1935 on page 115, I gave some account of the larval habits of this species and of the chance capture of a single specimen. Although great hopes were entertained of breeding a good series from the larvae then taken, no opportunity was neglected of observing the habits of the moth in the field. July 1936 will long be remembered as a most unpropitious month for entomologists from a weather point of view, but in spite of every discouragement several visits were paid to the localities at Farley Mount near Winchester, and some results obtained. On 5th July the moth was well out, sitting in the evening on the undersides of flower heads of *Knautia arvensis*, Coult., never on unexpanded buds, very inconspicuous and not easy to box. They readily flew and were then difficult to follow. Several times two were noted on a single head but none were seen *in cop.* Already at this early date some specimens showed signs of wear. As the evening drew on, a wet blanket of fog swept over the hills and insects ceased to move. On 8th July a second visit was paid to the locality and a certain number of *M. cirrigerella* were taken in spite of a high wind and low temperature. On 11th July Mr. L. T. Ford and I went again in a tearing wind, and found only four specimens, these being almost the only moths seen. We paid a visit to another locality not far from the first, only to find that the herbage had been nibbled down to the roots by the rabbits, which this year have increased to abnormal numbers, so that hardly a single flower of the field scabious was to be found. On both 14th and 15th July rain and wind made the search hopeless, and no other opportunity to visit Farley Mount presented itself until well into September, when all trace of larval feeding had disappeared, and scarcely the remnant of a scabious head was left.

Naturally hopes ran high of breeding a good series from the 1935 larvae, but slowly they were dashed as day followed day and none emerged. On 17th July, when the weather was even worse than usual, I lost patience and decided to investigate. The cocoon is made of tough parchment-like silk, surrounded by coarse fibres mingled with grains of earth and other debris, and has roughly a spherical shape. When however this outer covering of coarse silk and debris is removed, the cocoon proper is seen to be shaped like a bun, clay coloured and very tough, measuring 5mm. in diameter with a depth or thickness of 2·5mm. Carefully and patiently cut open with fine sharp scissors, a living larva was revealed curled up within, head almost touching tail. In this quiescent stage the larva is fat and stumpy, very pale greenish in colour, head and plate of a dark brown, with a few scattered hairs. When removed from the cocoon it moved feebly, and slowly crawled in a helpless way, looking far too large to be contained in such a small

cocoon. Clearly these larvae are going over and may emerge next July, though I cannot recall any instance of a Phycitid larva behaving in this way. The cocoons have been kept since August 1935 in a closed shed in the garden, and have been damped at regular intervals. I have no facilities for keeping pupae through the winter exposed to all the elements, nor am I at all sure that this is necessarily the best method. Next year I hope to record the results.

Mr. E. Meyrick kindly permits me to add the following comment: "I also do not remember any record of a Phycitid larva living two years. I am of opinion, however, from general experience, that in many Lepidoptera the occurrence of such an event is more common than is generally supposed. I think also, judging from the distribition of the family, that their constitution is mainly adapted to climates with a hot and dry summer, and that, at any rate in this exceptional summer, your pupae did not, under the circumstances you provided for them, accumulate a sufficient store of heat to effect the required development. In nature most Phycitids seem to like a hot, dry situation (in a collection from Iraq which I have just been working out the Phycitids were the most numerous family in species, and Iraq is a pretty severe test in both heat and dryness), and perhaps you overdid the damping. Possibly also, not merely heat but direct sunlight or sun heat may be needed, even within a cocoon so stout as in this species."—Ed.

CURRENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at "Woodhouse," Stroud, on 29th July, 1936, Dr. Harry Eltringham in the Chair. *Members present in addition to the Chairman.*—Mr. H. Willoughby Ellis, Mr. W. J. Kaye. *Visitors present.*—Mr. T. Bainbrigge-Fletcher, Dr. Malcolm Burr, Mr. E. B. Ford, Mr. H. W. Holloway, Sir Guy A. K. Marshall, Capt. W. D. Riley. The party was received by Dr. and Miss Eltringham, and during the morning a tour of the extensive and picturesque gardens was made. The party also inspected the Chairman's Laboratory, which is constructed to secure the best possible light both for general and photographic work. There is a large roof light, the main work bench faces a north light, and the whole of the interior is enamelled white. The principal microscope is a Leitz inclined eyepiece binocular, and there is a Greenhough Binocular for dissection and low power work. The photomicrographic apparatus is provided with a system of distant controls for the mechanical stage, substage condenser, and fine focussing. The removal of air, chloroform vapour, and other processes of embedding in paraffin and celloidin section-cutting, is effected by a hydraulic air-pump of special design, which registers the degree of vacuum and also controls the rate of readjustment of atmospheric pressure. There is an electric hot plate for mounting sections, melting paraffin and similar purposes. As an annexe to the Laboratory there is a photographic Dark Room, containing a vertical micro-projector for low power drawing, adjustable for both magnification and enlargement, a photographic enlarging apparatus, the usual developing lamps, and a combined clockwork and electric contact printing machine, which can be set to give any desired exposure for contact printing of papers and lantern slides.

Nearly all this apparatus has been designed and constructed by Dr. Eltringham in his own workshop, which is fitted with two electrically driven Hines' lathes, and a full equipment of special tools and appliances.

Luncheon was served at 1 o'clock, after which motor car tours of the wonderful Cotswold district in which "Woodhouse" is situated were made. Unfortunately, visibility was not sufficiently good to enjoy to the fullest extent the far distant views, in some cases ranging upwards of 40 miles. The first point was Wallbridge, famous for its cloth mills, then through Stroud up the Slad Valley to Birdlip where a halt was made at the top of Crickley Hill giving a fine view over Gloucester and Cheltenham as far as the Malvern Hills. The haze was not quite so dense at this point and a very considerable portion of the expanse was seen. Thence to Cranham Woods through Painswick and the outskirts of Stroud through Paganhill and Cainscross up the long Selsley Hill and along the extreme edge of the Cotswolds to the top of Frocester Hill where an amazing panorama right over the whole of the valley of the Severn as far as the mouth of the Bristol Channel and beyond could be seen. Across the river the "Sugar Loaf" mountain at Abergavenny can generally be seen 35 miles distant and sometimes the Brecon Beacons still further away. On to Owlpen Manor, through Horsley to Nailsworth and Woodchester, passing the Monastery and Nunnery, we returned to "Woodhouse" *via* Lightpill, a marvellous drive.

Those who were able to stay at "Woodhouse" the night were further entertained by Dr. and Miss Eltringham, and most pleasant recollections remain of a very happy time.—H. Willoughby Ellis (*Hon. Secretary*).

Part 3 of Dr. Hering's *Blatt-minen Mittel- und Nord-Europas* has just been published. It consists of 112 pages with 2 plates of 5 figures and 90 text figures. Hundreds of species are treated of in short terse paragraphs in analytical tables. The bulk of the species are Diptera and Lepidoptera and the mining species found in the British Isles are included. The arrangement is on a botanical basis, the species which mine plants from *Forsythia* to *Myrica* being given in the present part. A species which has several host plants is given under each to illustrate the differences in the mines. For instance *Gracillaria syringella* is dealt with under *Forsythia*, *Fraxinus*, *Ligustrum* and *Syringa*. (*Gracilaria* with one *l* is not correct). Most of the species of the genus *Coleophora* have their cases figured. Mines of the Tortrices of the *wahlbomiana* group are described but the species are too indeterminate to be allocated to them. Extreme care is taken to discriminate between mines; even the disposition of the frass in the mines is used to aid in the separation of some species. This work should be in the hands of all micro-lepidopterists and micro-dipterists and on the shelves of all our libraries. The wording is very simple and even those with a mere smattering of German and a dictionary could readily work with this manual. Not only that, but the work can be obtained now at half the price, which will be charged for it after full publication.

The Royal Entomological Society is making strides with its publication. Now that the more important and lengthy memoirs are published separately and issued separately, it is possible to purchase

one separate paper, without having to buy a whole mass of matter of no use to the purchaser. Publication now takes place at numerous dates throughout the year and matter is not held up, as formerly, until the biennial part be issued, when the matter might be perhaps somewhat out of date. Up to June last ten separate memoirs were so issued. All such are called *Transactions*. The smaller memoirs of only a few pages are issued as *Proceedings* A. "General Entomology," at short intervals in batches. *Proceedings* B. "Taxonomy," the continuation of "Stylops," which serial, as a separate one, has had to be discontinued. And *Proceedings* C, a Journal of the Meetings issued beforehand with précis of the matter to be brought before the approaching meeting. These arrangements are quite good and steps which facilitate progress.

Another matter, now under consideration by the Society, is the time of meeting. It is proposed, if Fellows agree, to meet at five o'clock, and the tea to precede the meeting. Such a proposal will certainly not meet with general approval, since it ignores the city men who willl be shut out from attending at all regularly. A proposal to meet at, say, six o'clock or six-thirty would doubtless be welcomed by the large majority of the Fellows. At the present time of meeting we know of Fellows, who reach home in the early hours of the next day, and many have a rush to catch trains and have frequently to forego the conversazione item of the gathering. As a regular attendant at the meetings, the writer of this note has for many years never reached home until eleven p.m. or later. Earlier meeting if arranged, will be a great improvement and a welcome one to many of us.

On 22nd October the S. London Entomological Society held its annual exhibition meeting, which, as usual, was again a very successful gathering, considerably over 200 members and friends being present. In spite of the adverse season a good number of striking aberrations were shown, a few very local species or accidental visitors were also shown, and a series of this seasons captures were exhibited by some fifty contributors. A fine bred series of *Catocala fraxini* from ova laid by a captured ♀ was shown by Doctor Cockayne, the pick of the Lepidoptera from the Island of Skye recently described in this magazine were brought up by W. Gilles, an immigrant example of *Xylina furcifera* was in one box, another, from Bishops Stortford, contained a good series of *Agrotis ravida* (*obscura*) which had been taken in very considerable numbers this season in that neighbourhood, Mr. Castle-Russell exhibited a number of very fine aberrations of British Rhopalocera, obtained by him during the present year. Several drawers of the C. H. Williams collection just being brought under the hammer and containing some of the more interesting aberrations especially of *Abraxas grossulariata* were on the table. A good number of new exhibitors was present and it is hoped that some may become future members of this most flourishing Society.

Pt. 61 of Seitz. *Palaearctic Noctuae, Supp.*, recently issued contains no letterpress, but 3 plates with more than 200 figures of aberrations from *Cucullia* to *Athetis*, including *Brachionycha nubeculosa*, *Dasypolia templi*, *Aporophyla lutulenta*, *Crino adusta*, *Antitype flavicincta*, *Xantholeuca croceago*, and other aberrations. Occasionally figures are given where those in the main volume are somewhat questionable as correct representations of the species. At the same time there are issued 2 sheets and 1 plate of the American *Geometridae* and 3 sheets of African *Noctuidae*.

From the text these plates illustrate, we learn that the Noctuid found on the Southern Coast of Britain and hitherto known as *hispida* is not that species at all, but should be called *oditis*, Hb., of which *argentea*, Tutt, *pallida*, Tutt, *obsoleta*, Tutt, and *intermedia*, Tutt are forms. *Hispida* is quite a different species and does not occur in Britain but in Andalusia, Sicily, N. Africa and Palestine, of which *purpurascens*, Trti., *rufescens*, Trti., *hispanica*, Warr., *blanca*, Ribbe, and *jordana*, Stdgr., are forms. Other species in this small group recently demonstrated are *seposita*, Trti., *turatii*, Schaw., and *machlyum*, Trti. Six forms of this group of species are figured.

The current number of *Lambillionea* is a magazine which should be in the hands of all lepidopterists who are interested in Variation, for its beautiful photographic illustrations and its admirable summaries of the described forms of species, most of which occur in the British Isles. This October number illustrates 11 aberrations of the underside of 6 species of *Lycaenidae*. The historical facts connected with *Lymantria dispar* and the descriptions of the named forms, which occur wild or have been obtained in various breeding experiments, are dealt with. Some 20 of these are given and the remainder will be dealt with in a subsequent number. We must congratulate Herr B.-J. Lempke the writer of this last on the useful work he is compiling. The notes on the Belgian lepidopterous fauna in each number deal largely with species, which also occur with us.

Some while ago we reviewed a book *The Insect Wonders of Australia* by Keith C. McKeown. So successfully attractive was that work that the author was induced to write a work on similar lines entitled *Spider Wonders of Australia*, a copy of which has just come to hand. It consists of over 270 pages in 18 chapters with a good index and 33 illustrations. The first chapter entitled "The Strangeness of the Spider World," introduces us to the small "black list" the poisoners, the remarkable "cave dwellers," the water dwellers, the marvellous web of the "social" spider, the protective colours, shape and habits assimilating both living and inanimate surroundings, and the casting of limbs in defence with the power of regeneration. Other chapters deal with (1) the garden orb-weavers and describing how the newly hatched spiderling spins around itself a balloon with long fine threads attached, which float in the air and afford a rail along which the "balloon" floats with the breeze to a distant "coign of vantage." (2) The Wolves of the spider world. (3) The Huntsman Spiders. (4) The Angling Spiders, which spin a line and furnish it with a bait to allure a wandering moth. (5) The Net-casting Spider, which spins a net to be held in readiness to cast over the luckless insect, which approaches near enough. (6) The Assassins of the Ants. (7) The Snarer of Birds. (8) Spiders whose webs are used to capture fish; and records of a snake and a mouse captured by spiders, etc. Many exact records made by observers are reported verbatim and increase the scientific value of this book, which is well printed and produced in every way.—Hy. J. T.

We regret to announce the sudden death of our much loved colleague the Rev. C. R. N. Burrows, F.R.E.S. A notice of him will appear in a later issue.

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

We must earnestly request our correspondents NOT *to send us communications* IDENTICAL with those they are sending to other magazines.

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *juscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.—Entomological Pamphlets and Separata.—*R. B. Janson, 44, Great Russell Street, W.C.1.*

MEETINGS OF SOCIETIES.

The Royal Entomological Society of London.—41, Queen's Gate, South Kensington, S.W.7., 8 p.m. Nov. 18th. Dec. 2nd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Nov. 26th. Dec. 10th.—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

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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, A. J. Wightman, T. Greer, T. Bainbrigge-Fletcher, Dr. Malcolm Burr, E. P. Wiltshire, Dr. E. A. Cockayne, Rev. R. E. E. Frampton, Orazio Querci, Dr. Verity, and Reports of Societies.

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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Notes on Cucullia gnaphalii.

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

In late June six moths that had resulted from larvae taken in Sussex in 1935, were placed as they emerged in a large leno covered cage (with glass inspection front) in which several plants of *Solidago virgaurea* were growing, and to these a wild ♂ taken by Mr. G. W. Wynn was added.

The moths remained exposed to daylight and motionless during the day, but became active well before dark, feeding readily from a vessel of sugared water and visiting flowers of *Silene inflata* and *Lychnis dioica*.

After about a week all the moths were dead except a ♀ and at this time I failed to note any ova in the cage. But during the next few days a large number were laid on the leno of the cage and on both sides of the radial leaves of the *Solidago*, always singly.

These ova were at first white, but quickly developed red markings, became dull reddish-grey, then almost black and hatched in about seven days from start to finish.

The young larvae were very active, elongated and transparent looking, with the reddish dorsal stripe, so prominent a character of the full-fed larvae, plainly visible. Once feeding had commenced this was hardly to be discerned until the larva was about 10 days old, when it again become plain as a red line.

They were exceedingly restless, crawling all over the food plant in search of isolation. When two larvae met, one or the other would fall from the plant at first touch and remain hanging from a fine thread like a Tortrix larva, then quickly regain its former position by this thread. They soon took to dropping from the plant when touched and feigning death on the floor of the cage and jumping about like a spring if further molested. They feed frequently both in sunlight and at dusk and probably during the night, favourite periods being dawn, in the early morning sun and half-an-hour before sunset.

A curious habit which may only occur in captivity was the tendency to feed in concert. At one moment there would be no movement in the cage, then a larva would be seen mounting the foodplant with furtive jerky movements, punctuated by cautious stops, and begin to feed on some special leaf which it had selected after several rejections. Within a few moments other larvae are seen on the move and in about a minute or so the bulk of the larvae are feeding or searching for suitable food. Flowers are not favoured, leaves being preferred, but unopened buds are freely taken.

The small larvae appear defenceless and drop to the ground to escape when touched, but large larvae emit a greenish-brown fluid when lightly touched and strike with their head the offending object. This fluid is fatal to small larvae and probably dangerous to parasitic flies. If the interference continues they fall from the plant and feign death in a tight ring.

The protective resemblance of this larva to the stems and leaves of its foodplant is very marked. The red of the dorsal stripe agrees well in colour with both the stem of the well-grown plant and the curled edges of some of the leaves, which are often purple in colour. The green of the larva matches the normal leaves, especially the undersides.

This species really makes a surface cocoon; although the larva appears to go down, it enters loose earth, spins a roof over its head, well covered with small bits of mould, then works downwards till it is entirely enclosed, the cocoon rising during the process, and the finished cocoon in captivity can always be seen and lifted from the soil without disturbance of its surroundings.

Polyommatus parameleager, another "blue" from Persia.

By ROGER VERITY, M.D., F.R.E.S.

Size and wing-shape similar to those of the male of *meleager* from the same region, with the hindwings indented in the same way, towards the tornus. The whole surface of both fore- and hindwings, somewhat recalls *admetus*, as it is hairy and uniformly brown, with a golden sheen. The discocellular spot exists, but is only faintly visible. The hindwings exhibit a row of premarginal dots, although they are rather indistinct. The underside is like that of *meleager*, the only difference being that it is considerably darker, more brown and more hairy, whilst the ocelli are much larger and stand out much more prominently.

This provisional description of what is, no doubt, a hitherto unknown species, has been made out from two males, collected by Brandt on the northern watershed of the Elburz Mts., at an altitude of about 1000m., on 12th August, 1936. I name it **parameleager**. [15.xii.36].

Caloptenus italicus, L., in England.

By MALCOLM BURR, D.Sc., F.R.E.S.

I am happy to report that yet another grasshoper is to be added to our list, although at the moment only a single specimen has been noted. It is *Caloptenus italicus*, L., of which a solitary female is reported by Mr. J. D. Cowper, who states that he took it on Ballard Down in Dorsetshire in 1933. Mr. Cowper, who did not recognize the importance of his capture, says that his attention was attracted by the brightness of the wings.

This is a surprising capture. *C. italicus* is a very abundant species in the Mediterranean area, and is typically South European. In France it reaches the Loire, but seems to be extremely rare further north, although in the east of Europe it reaches Latvia. The distribution seems analogous with that of *Thymelicus acteon*.

It is earnestly to be hoped that next season entomologists will make a special point of verifying this capture, to find if this species is really native on Ballard Down, or whether this female is a sheer chance specimen. Both alternatives seem equally unlikely.

It can be recognized at a glance, for the wings are clear hyaline with a pink flush near the base. In general colour it is dark brown, but this varies considerably in the south. The female is usually at least twice the size of the male. Mr. Cowper's specimen is a very dark one, and smaller than the average, possibly a stunted northern form.

It is of heavier build than our native grasshoppers, and not very active. The male, which has noticeably large, bowed cerci, is somewhat smaller than our common *Ch. bicolor*, but of stouter build, while the female is a good deal bigger than a female *C. bicolor*, but much smaller

than a female *M. grossus*. It is to be noted that on the prosternum there is a kind of blunt tubercle or knob. This is characteristic of the *Catantopinae*, of which subfamily this is the first instance of an apparently natural record in this country. Its big relative *Anacridium aegyptium*, L., which is a fairly common stowaway at Covent Garden, has the same feature.

Cornish Notes 1936.

By CHARLES NICHOLSON.

A year of which the first half was distinctly disappointing so far as Lepidoptera were concerned, but this was amply and most interestingly atoned for by the second half.

January and February were abnormally wet, both being blessed with over 7 inches of rain ; March was little better with $4\frac{3}{4}$, but April, May and June all failed to give $2\frac{1}{2}$ and May even failed to reach $1\frac{1}{2}$. The last 3 weeks of June were really warm and sunny and especially welcome after the long cold spring.

The first item of interest in my diary was the finding of a "queen" of *Vespa vulgaris* walking on the wet road in Tresillian Village on 11th January. The temperature of that day did not rise above 44° and that is not suitable weather for a "queen" wasp to be about in ; but the 9th and 10th both gave temperatures of about 52° throughout the day and no doubt that had tempted her most unwisely out of hibernation. Taking pity on her I brought her home, gave her a feed of honey and kept her more or less hibernating until the last week of the month, which again gave readings in the fifties, and she was then released.

In August I received an S.O.S. from neighbours that a wasps' nest was giving them trouble and on going to deal with it on the 21st found that it was a small *vulgaris* nest, founded possibly by my early pensioner ! But that was not the only *vulgaris* nest hereabouts for workers continued in evidence to date and one was seen prospecting around our dustbin on 16th November.

On 16th October I was invited to inspect a hole in the ground in another neighbour's garden, from which wasps were issuing and they had tried to burn it out. This turned out to be a small *V. germanica* nest and I eventually took it out for them. The interesting thing about this nest was that moorhens somehow discovered it and from the fact that I twice saw them scurrying away from it I concluded that they had been feeding on the numerous dead wasps that were lying about, in and around the cavity. Although I used a solution of cyanide of potassium for the wasps, I don't think that the small quantity of fumes they would inhale would be sufficient to harm any birds that might eat them.

A warm spell in early March brought out *Bombus lucorum* on the 10th, *B. terrestris* on the 17th ; but I did not see *B. pratorum* until 7th April, on which day *Andrena cineraria* and *A. rosae* were seen in the garden, where both these species live. On that day also, which was sunny with a light N.E. wind, 2 males and a female of *Meloë proscarabaeus* were seen crawling on a grassy part of the garden, the first I have seen of this species in Cornwall. On the nights of 10th, 11th, 12th April there were slight frosts, but the following day in each case

was sunny and fairly warm in spite of the N.E. wind of which we get a lot in the spring and it blows right across these gardens. Easter Monday was the coolest of these three days, and there were a few hail or rain showers, but it was sunny all day and in the morning a *Bombus* (probably *terrestris*) was seen visiting flowers of *Lithospermum prostratum* on the rockery, although the plant was white with hoar frost!

As I was standing near a bucket of water in the garden on 31st August one of our pet robins, who was hanging about in expectation of being fed, darted at an insect flying near and knocked it into the water. I glanced at it to see what it was, as it looked unusual, and saw to my astonishment that it was *Strangalia aurulenta* (♂), a month later than its usual time, due no doubt to the wet and not very warm July. Since the boom year, 1931, when 17 specimens were seen in the garden, we have been favoured with one every alternate year and this one chose a cloudless day to fly around.

On 4th September I casually glanced at the fruiting heads of wild carrot by the railway at Three Mile Stone near Truro and found that *Dolycoris baccarum* was resting in them, sometimes 2 or 3 in a head, which was quite new to me, as I had always found this Pentatomid bug on mulleins, to which it is particularly attached.

On 26th June I was surprised to see a very fine greyish fawn grass snake making its way slowly over the rockery in front of the window, and looking very alert, as if for a possible meal. Vipers are said to be common about here, but I haven't seen one yet, though my wife has; slow-worms on the other hand are certainly not uncommon and have been seen in the garden.

As regards Lepidoptera, the "Whites" have been about normal —*brassicae* common in both broods, *rapae* less common and *napi* uncommon in both sexes, the second brood commoner than the first. *Euchloë cardamines*, much more frequent than usual, and many eggs found on *Cardamine pratensis* and *Lepidium smithii* on roadsides. *Colias croseus* (*edusa*), decidedly common in the county, but, of course, not so much so as in 1933; mostly seen singly, but as it was attracted by Michaelmas Daisies of the *novae-angliae* section, especially *pulchellus* and "Barr's Pink," where these were grown freely 2 or 3 of the butterfly were sometimes seen at once. First seen on 5th July, when a fine female was noticed ovipositing on *Trifolium dubium* (Small Yellow Clover)—one of the plants that pass for shamrock, and the most likely to have been the real species—in a cornfield. These plants were very small and flat on the soil amidst the cornstalks, which at that spot were about a foot high. One egg was found and reared, the imago emerging on 20th September, a female with large spots in the black band, as its mother had. Species last seen hereabouts on 11th October. *Gonepteryx rhamni*, more frequent than usual hereabouts, but no ova or larvae seen. Imago common in some parts of the county. First seen (♂) 18th April; first fresh one (♂) 24th August; last seen (♂) 11th October.

(To be continued.)

NOTES ON COLLECTING, etc.

Leucania l-album in 1936.—I wrote you some time ago about *L. l-album* in South Devon. I saw it again in July last but not last month (Sept.) owing to the extremely rough weather on that coast. It first appeared in 1933. I have seen it every year since. Apparently it is quite established. It is rather surprising that it survived the wet and cold weather of last winter and spring.

In view of your note on the species in your Supplement to Tutt's *British Noctuae*, I. p. 309 it may be of interest to you to know that I captured a specimen of *Luperina dumerilii*, Dup. in perfect condition on 10th September last, in Sussex. Mr. Tams has confirmed its identity.—G. W. Wynn. 19*th Oct.*, 1936.

A Transitional Form of Aglais urticae.—This specimen of *A. urticae* has been sent to me for inspection. Its first aspect impresses one that it is not a normally marked specimen and yet no general name or phrase will indicate its characteristics, nor is any one of its aberrant features at all outstanding. All the markings of the fore-wings are extended slightly and the colour shades are also slightly aberrant, so that the contrast between the lighter markings with the darker ones is more marked. Perhaps generally the impression is that it is a dark specimen on the whole. The details of the fore-wing pattern are as follows. The orange-yellow of the costal blotches is lighter in tint; the orange-red of the general ground is somewhat deeper: the blue marginal spots are small and inconspicuous (darkened): the fringe is strongly chequered lighter and darker: there is a general fuzziness of the edges of the outer marginal band, of the two discal spots and of the pronounced blackening emphasis of the veins: the outer marginal band is considerably increased in width and joins up with the first black costal blotch entirely enclosing the white apical spot, a feature I have only seen in one other example out of many scores from at home and the continent which I have examined: the widening of the outer marginal band and the well sized discal spots with the fuzzy edges causes a closer approach of these features: the upper discal spot stands only slightly clear of the central black costal blotch: the orange-yellow costal blotches are somewhat extended to the upper discal spot and to the blackened vein respectively: the upper discal spot is irregularly joined to the outer black costal blotch by a thin cloud of black scales. The specimen was captured in Coventry by Mr. F. V. Sills and is in perfect condition.—Hy.J.T.

[With reference to "small variations," Prof. Hale Carpenter says (*Bedrock*, Oct. 1913 "The Struggle for Existence in Tropical Africa," —"This is certainly a difficulty when one studies minute differences in cabinet specimens only, and in truth it does seem an "enormous assumption," to suppose that minute fluctuational varieties cause such a change in appearance that the difference can be seen on the wing. But yet it is so, as any field naturalist will agree. The commonest *Pseudacrea* on Bugalla Island was the form known as *P. terra*. Having seen large numbers of these on the wing, the writer soon became familiar with what might be termed the average, or typical appearance of this form: and it was extremely interesting to find what

a small departure from the type was enough to give the insect a different appearance. One specimen caught and sent to the Hope Department with the note " Looks distinctly different on the wing," had simply a very slight sprinkling of orange scales on part of the black costal (anterior) border of the fore-wing just internal to the apical orange bar. Again and again one found that a slight sprinkling of white scales on this orange bar near the apex, or a slight difference in the breadth of the blackish area separating the bar from the adjacent patch of orange, was enough to make the butterfly appear, on the wing quite different from the type. This may seem very remarkable when these small variations are seen in the cabinet, but it is a fact." Hy.J.T.]

Further Extracts from a S. American Correspondent.—*Morpho catenarius*. I found the caterpillars in two colonies, one of about 10 and the other of about 30, all sitting together. At first I thought it was a beautiful orchid flower. They had already changed their skin for the last time and were about $\frac{3}{8}$ inch thick and about 3 ins long. The predominant colour is dark red—like red velvet—but on closer examination they have also deep yellow, blue and white markings. They spin a web all over the surface of a leaf and sit on it all together —they make sure that the leaf cannot fall off by spinning it securely on to the branch.

At night they feed and the next day you find them in exactly the same place again—in fact if you had not seen them feeding at night (and to do this they of course separate) you would think they had not moved. When changing their food I always leave their spun-over leaf (their house) and I have had them three weeks and they still inhabit the same house. The leaf drying up doesn't worrv them—in fact I found them on a dried-up leaf. A gentleman here (at Sao Paulo), who has collected many years, told me it was useless trying to feed *Morpho* caterpillars in captivity as they always sat in a corner in the cage, or ran about away from the food,—but this only happens when you take their house away from them when changing food.

Only one of my family died and all the rest turned to chrysalis, but 7 or 8 of these went black after turning. This was not from ichneumon attack. The first caterpillar when it wanted to turn crawled under some paper I had put into the bottom of the cage to facilitate cleaning, a place where it had no room to turn. So I pasted a 3 in. strip of paper around the top of the cage on the outside so as to darken it and after that they mostly suspended themselves from the top of the cage, except a few that suspended themselves from the leaves of the food. After changing their skin for the last time they fed for 5 or 6 weeks before turning.

Morpho catenarius and Protection.—I think that the larvae get their protection from the fact that when all in a bunch they look like some flower. There are quite a number of trees here (Sao Paulo) that have large red flowers. From observation, I have come to the conclusion that the colour red is in itself a protection. All butterflies that are red or red-brown on the top wings sit with their wings (except when asleep) wide open, *e.g.*, *Heliconius*, *Dione*, *Argynnis*, *Pyrameis*, etc. Butterflies with blue nearly all sit with wings tightly shut and have

the underside very leaf-like. There is further the striking example of the *Celerio* family *galii*, *lineata*, etc., which, as soon as touched, will open their top wings and show off their red underwings, and the same with many of the *Hyperchiria* family, where the colouring around the eye on the underwing is red or orange colour, or in some cases the eye itself is red. Talking of this reminds me of the extra protection the *Heliconii* enjoy in the peculiar smelling liquid in their bodies, which actually they can eject. It is a bright yellow colour. The dark one I sent you with the blue-green sheen and yellow band on fore-wing—I believe the *sara* form of *H. apseudes* actually ejects this liquid from the points of its feelers. [?]

Lepidoptera in Co. Clare.—At the end of June, 1936, my son and I spent a pleasant time with Col. Donovan and his sisters, Mrs. G. E. Lucas, Miss B. Donovan, and a friend, Miss French, in the "Burren" district of Co. Clare.

We made Lisdoonvarna our headquarters, where there are several excellent hotels. We were able to make a number of excursions per motor to the coast near Blackhead, to Ballyvaughan and to the locality near Corrofin, where Mr. R. A. Phillips discovered *Argynnis* (*Brenthis*) *euphrosyne* (a new Irish butterfly) some years ago. *Irish Nat.* 1923. We re-found *euphrosyne*, but it was far from abundant and getting worn.

I had long wished to visit Co. Clare and see the "Irish Burnet" on the wing in its haunts and ascertain how it was so abundant in this wild, rocky, intensively grazed country; I observed that the foodplant, *Thymus serpyllum*, was left severely alone by grazing animals, and even the goats, which roamed about in troops, would hardly touch it; other plants of the district, which were apparently immune, were *Geranium sanguineum* and *Dryas octopetala*. During our stay the weather was fine and at times unusually hot. No night work was attempted.

The following are the more interesting Lepidoptera met with:—

Leptidea sinapis, L.—Widely distributed in the district, abundant near Ballyvaughan.

Argynnis aglaia, L.—Males just emerging on the coast and inland near Corrofin.

A. euphrosyne, L.—Very local and not very abundant near Corrofin and more or less worn; two specimens seen near Ballyvaughan to the north.

Euphydryas aurinia, Rott.—Several colonies on the moorlands between Lisdoonvarna and Kilfenora: a fine bright form.

Coenonympha tullia (*tiphon*), Müll.—On the moorlands but not abundant.

Cupido minimus, Fues.—Local and fairly abundant on the coast, rarer inland.

Polyommatus icarus, Rott.—Abundant, some nice all blue ♀s; apparently double brooded in Co. Clare.

Erynnis tages, L.—Locally common on the limestone.

Hemaris tityus, L.—Several specimens observed at flowers near Corrofin.

Zygaena purpuralis, Brün.—Locally common all over the limestone area, abundant near Corrofin, flying in dozens in the sunshine, or resting in the grass or on the flowers of *Geranium sanguineum*; an isolated colony on the moorland near Kilfenora where there is a good growth

of *Thymus* on the bog banks; the imago here frequented *Lychnis flos-cuculi*.

Z. filipendulae, L.—Flying with *Z. purpuralis* near Corrofin, but comparatively rare; one ab. *cytisi*, Hb.

Adscita statices, L.—Near Corrofin but not common.

Setina irrorella, Cl.—Locally abundant on the coast and also inland near Corrofin.

Parasemia plantaginis, L.—Abundant near Corrofin, a beautiful aberration with the fore and hind wings almost all yellow was unfortunately missed; Miss French captured a very similar form.

Eulype (*Melanippe*) *hastata*, L.—On the moorland above Lisdoonvarna, 500 feet.

Epirrhoë (*Melanippe*) *tristata*, L.—Locally abundant on the limestone.

Euphyia (*Anticlea*) *cuculata*, Hufn.—Several beaten out of hazel scrub by the ladies, near Corrofin.

Eupithecia palustraria, Dbl. (*pygmaeata*, Hb.).—Several captured in a rough meadow near Gort, also seen on the wing near Black Head.—THOMAS GREER, The Bungalow, Sandholes, Dungannon, Co. Tyrone, 23*rd November*, 1936.

COLLECTING AT RY (NR. ROUEN), 12TH-25TH AUGUST, 1936.—In 1934 I paid a visit to this locality and recorded my observations in the issue of this magazine for March, 1935. This year several other specimens were found.

Ry is 15 miles east of Rouen just off the main road to Beauvais and is between 350 and 450 feet above sea level. The country is very much like that of the chalk downs of Hampshire. The weather was marvellous and very hot except for the 18th and 20th, on both of which days we had a lot of rain.

The Satyrids were all plentiful and this year I saw several *Eumenis semele*, L.; *Satyrus galathea* was common all the time, and *E. jurtina* showed tendency to albinism.

My most remarkable capture was that of two specimens of *Argynnis* (*Brenthis*) *euphrosyne*, L., on the 23rd and 25th respectively. The specimens (now in the British Museum) were in very good condition and evidently specimens of the 2nd brood. I caught one *Issoria lathonia*, L., on 23rd August and on 24th August one *Argynnis paphia* ab. et var. *valesina*. *Melitaea parthenie*, which was very common in 1930, when I visited this place, was very late and I only saw one this year on 25th August. In 1930 I took a very fine *obsoleta* var. of this insect. *Argynnis* (*Brenthis*) *dia*, L., was exceedingly plentiful.

I captured one *Nymphalis antiopa* on 17th August, but *Vanessa cardui* and *V. atalanta* were absent. The only *atalanta* I saw was at Dieppe just before I returned to England. *Polygonia c-album*, L., was very common in 1930 but has now vanished from the locality: I did not see any in 1934 either. *Limenitis camilla* (*sibilla*) was plentiful but very worn.

Polyommatus icarus, Rott., was very common the ♀s showing a good deal of variation. *Aricia agestis*, Schiff. (*medon*) was common but the specimens were extremely small. *Polyommatus* (*Lysandra*) *coridon* was plentiful and I took two specimens of ab. *syngrapha*. *Cyaniris semiargus*, Rott. was fairly scarce, but I took one ♂ and 2 ♀s.

I found one *Strymon w-album*, Knoch, on 13th August and this year for the first time I saw several *Thecla betulae*, L., *Polyommatus dorilas* (*hylas*) was much more frequently met with this year.

In 1934 *Colias hyale* was abundant and *C. crocens* absent but this year there were only very few *hyale* and I saw only one ♂ *croceus* and took one ♀ ab. *helice*. The common 'whites' were very numerous, as was *Gonopteryx rhamni*, L.

Papilio machaon, L., was much commoner this summer and one met stray specimens both down by the river and on chalky slopes.

I only took 2 *Adopoea linea* (*sylvestris* ?) and saw a few *Urbicola comma*. *Carcharodus alceae* was fairly common but rather tricky to catch.

I only noticed one *Macroglossum stellatarum* on the 13th: it was fairly worn and a slight west wind was blowing. *Callimorpha quadripunctaria*, Poda, was common.

The season must have been exceptionally good to judge by the fresh species I observed.—P. C. Hawker, 11D, Lexham Gdns., London, W.8.

REVIEWS AND NOTICES OF BOOKS.

Grasshoppers and their Allies. A Stimulus to their Study. By Malcolm Burr, D.Sc., F.R.E.S. Price 6/-. Philip Allan & Co.—Dr. Burr's promised book is published. There are over 160 pp., 6 plates, 40 maps of distribution and 56 text figures. This is an admirable little handbook with a great deal of matter compressed, not unduly, into a small space, a credit to the hearty collaboration of both author and publisher, for both have evidently given of their best. The illustrations, numbering nearly 130, furnish identificatory details of some 37 species and replace a mass of word pictures which are always more or less inadequate. Throughout, the secondary title "A Stimulus to their Study," is always kept in view. Far from being filled with elementary matter, so necessary as it must be, we find highly scientific questions cropping up here and there, the ecological associations, the occurrence of multiple species, distribution questions, brachypterism, etc. The novel feature for a book of this nature is the distribution map, which is given for every species, for more effective teaching than any group of words. Unfortunately it adds to the cost. This book can truly be said to be "up to date" for we find details of the confirmation of a species last recorded in 1837 by its capture in the I. of Wight by Dr. Blair and exhibited on 26th Oct. 1936 at the meeting of the Royal Entomological Society of London. We must complain that strict priority in names has not been set free from the 'um and 'ah of classic chains. Linné wrote *lapponica* (1758), it was Stephens (1837) who used *lapponicus*. But *Tettigoniidae*, is used free of classic domination. There is no Index. Perhaps in this case it may be dispensable, but there is a tendency for this omission to grow. Pity then the future student. 'Tis a wonderful little book.

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

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SUPPLEMENTS.

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.*

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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.

Desiderata.—Species of Dolerine and Nematine sawflies not in my collection; list sent.—*R. C. L. Perkins, 4, Thurlestone Road, Newton Abbot.*

Duplicates.—Albimacula*, sparganii*.

Desiderata.—Ova of D.oo. pupae of X. gilvago, D. caesia. *A. J. Wightman, "Aurago," Bromfields, Pulborough, Sussex.*

Duplicates.—Pyralina*, Salicis, Ianthina*, Orbicularia*, Repandata in variety, Doubledayaria, Black rhomboidaria*, Black virgularia* and others.

Desiderata.—Hyale, Welsh aurinia, Polychloros, Tiphon Agathina, Lunigera, Lucernea, Neglecta, Diffinis, Populeti, Gothica v. gothicina, White Leporina, Tridens Putrescens. Littoralis, Typhae v. fraterna, Rurea v. Combusta, Gilvago, Fulvago v. flavescens, Liturata v. nigrofulvata. *Harold B. Williams, Woodcote, 36, Manorgate Road, Kingston Surrey.*

Desiderata.—Urgently wanted for research work at the Royal College of Science, Pupae normal form of *Hemerophila abruptaria.*

Duplicates.—Pupae of var. *fuscata* of the same species offered in exchange.—*J. A. Downes, 5, Trinity Road, Wimbledon.*

Desiderata.—M. aurinia (artemis) Larva English, Irish and Scotch.

Duplicates.—Numerous, Ova, Larva, Pupa and Imagines.—*H. W. Head, Burniston, Scarborough.*

Duplicates.—Argynnis liauteyi, Chrysophanus phoebus, Albulina ellisoni and many rare species from Syria and Morocco.

Desiderata.—Rare British and European Macro-lepidoptera, especially Zygaenidae, Arctiidae, Agrotidae.—*R. E. Ellison, Moccas Rectory, Hereford.*

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.—Entomological Pamphlets and Separata.—*R. B. Janson, 44, Great Russell Street, W.C.1.*

Desiderata.—Exotic Lepidoptera in papers.

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

MEETINGS OF SOCIETIES.

The Royal Entomological Society of London.—41, Queen's Gate, South Kensington, S.W.7., 8 p.m. Jan. 20th (Ann.).

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. Jan. 14th, 28th (Ann.).—*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 Medicine, 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, Pebworth, Stratford-on-Avon.

IRISH NATURALISTS' JOURNAL

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SPECIAL INDEX.

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

VOL. XLVIII. (new series) (1936.)

The Entomologist's Record & Journal of Variation.

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

LEPIDOPTERA.

NEUROPTERA.

ODONATA.

ORTHOPTERA.

RHYNCHOTA.

Notes on Egyptian Lepidoptera observed at Reservoir, Aswan, between October, 1919, and April, 1922. V. Pyralidae.

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

Fourteen years have passed since I first commenced to pen these notes, and although several species are still undetermined, there now seems little hope of their being cleared up.

The insects dealt with were taken at Reservoir, whilst I was resident there between the dates mentioned, and in previous numbers of this magazine a short description was given of Reservoir (Suppl. April, 1925), and the Macrolepidoptera other than the *Pyralidae* and the Microlepidoptera were enumerated in subsequent numbers as a Supplement (July-Aug., Sept., Dec., 1925, and March, June, July-Aug., and Nov., 1926). In the present notes, the *Pyralidae* are dealt with.

It was my custom to forward my Pyralid specimens to the Entomological Section of the Ministry of Agriculture, Cairo, and many of the names here quoted are the result of the untiring efforts of my late friends G. Storey and E. W. Adair, both of whom have since crossed the great divide. Whenever possible, specimens were placed in the collections of the Entomological Section, and recently Dr. H. Priesner has had the courtesy to look through these collections to see whether any previously unidentified material sent by me has now been classified. A few of my specimens were not at the moment in the collection and Dr. Priesner suggested that they were possibly still being studied by Dr. Zerny of Vienna, to whom much unidentified material from the Ministry's collections had recently been forwarded. My private collection was handed over to the British Museum, South Kensington, in 1923, and the majority of the species here enumerated should be found there, incorporated in the National Collection and bearing my "H" numbers and the corresponding data labels.

In order to maintain continuity with former lists, I have followed the *Catalog der Lepidopteren des Palaearctischen Faunengebietes* von Staudinger und Rebel, 1901, to which work the genus numbers, etc. here quoted, refer.

Family PYRALIDAE.

Sub-family "A." Galleriinae.—Genus 1. *Arenipses*, Hamps.

sabella, Hamps. and Rag.—Taken occasionally all the year.

Sub-family "B." Crambinae.—Genus 15. *Eromene*, Hbn.

ramburiella, Dup.—Uncommon, taken occasionally between March and June.

ocellea, Haw.—Always very abundant. I took an aberration in which the ground colour was white with the usual markings.

Sub-family "D." Anerastiinae.—Genus 31. *Anerastia*, Hbn.

ablutella, Zell.—Common from March till November. The black discal spot on the forewing above was sometimes much reduced, and in one instance had a dark shade above it so that it appeared to be double.

Sub-family "E." Phycitinae.—Genus 41. *Plodia*, Gn.

interpunctella, Hbn.—Two specimens were taken only. March. Appears very rare.

Genus 42. *Ephestia*, Gn.

cautella, Walk.—February till June and October-November. Very variable and not uncommon.

Genus 47. *Syria*, Rag.

niveicosta, ?.—Rare. The only specimen taken was on 16th April, 1920.

Genus 57. *Heterographis*, Rag.

hellenica, Stdgr.—Only taken twice. May.

delicatella, Möschl.—Only taken once, 7th April, 1920.

samaritanella, Zell.—March till June and again in October and November. Common. I took one aberration in which the ground colour of the forewing was a very pale yellowish white, the area between the inner and outer lines being slightly clouded with grey, and the wings void of all markings. This species varied very considerably in colour, ranging from dark brown to light ochreous. One of my brown specimens had the area between the inner and outer lines very light with basal and submarginal areas dark. The intensity of the markings was also very variable.

convexella, Led.—Common, February till June.

fathmella, Ob.—Uncommon, from March till June.

sp. H. 415. This insect was fairly common from April till June.

Genus 68. *Euzopherodes*, Rag.

tenebrosa, Zell.—Uncommon, March till June.

Genus 69. *Hyphantidium*, Scott.

tacapella, Rag.—October and November. Taken also at Ma'adi near Cairo.

Genus 85. *Etiella*, Zell.

zinckenella, Tr.—Uncommon. Taken from March till June. This insect probably also appeared in the autumn.

Genus 104. *Salebria*, Z.

Five species of this genus were taken but have not yet been specifically determined.

sp. H. 95.—Common from March till June.

sp. H. 96.—Very rare. I took it only three times, namely 5th November, 1919, 20th March and 9th June, 1920. One of these specimens was placed in the collection of the Ministry of Agriculture, Cairo, under number 2728.

sp. H. 252.—Two specimens in May, 1921.

sp. H. 253.—One specimen in October, 1921.

sp. H. 731.—Two specimens in November, 1921.

Genus 107. *Nephopteryx*, Zell.

isidis, Zell.—Not very common. Only taken in May and June though it may have appeared at other times also.

cleopatrella, Rag.—One specimen on 11th February, 1920.

Genus 127. *Cryptoblabes*, Zell.

gnidiella, Mill.—Reservoir in June (one specimen). Ma'adi in November.

Sub-family "H." Endotrichinae.—Genus 136. *Endotricha*, Zell,

consobrinalis, Zell.—April, May and June. Not common.

Sub-family "I." PYRALINAE.—Genus 145. *Aglossa*, Latr.

pinguinalis, L.—Two specimens in March.

Genus 147. *Pyralis*, L.

farinalis, L.—One specimen, 7th May, 1920.

Genus 155. *Actenia*, Gn.

wollastoni, N. C. Roths.—Two specimens in April, 1920.

Sub-family "M." PYRAUSTINAE.—Genus 170. *Zinckenia*, Zell.

fascialis, Cr.—Taken occasionally all the year.

Genus 173. *Synclera*, Led.

traducalis, Zell.—November. A single specimen. At Ma'adi in October and November.

Genus 174. *Ercta*, Walk.

ornatalis, Dup.—Rare. November. At Ma'adi in October and November.

Genus 178. *Glyphodes*, Gn.

unionalis, Hbn.—Rare. A single specimen in November, 1919. Also at Ma'adi in November, 1920.

Genus 180. *Hellula*, Gn.

undalis, Fbr.—Taken all the year and generally common. Varied very considerably from unicolorous light specimens on which only the lines and the reniform stigma showed up, to heavily marked and very dark specimens.

Genus 184. *Nomophila*, Hbn.

noctuella, Schff.—Abundant all the year. In some cases the markings of the forewings were so reduced as to give the insect a unicolorous appearance.

Genus 185. *Pachyzancla*, Meyr.

licarsisalis, Walk.—Fairly common from September till November. Also taken at Ma'adi.

Genus 189. *Antigastra*, Led.

catalaunalis, Dup.—April and May, October and November. Uncommon.

Genus 198. *Pionea*, Gn.

ferrugalis, Hbn.—Common from March till November.

Genus 200. *Pyrausta*, Schrk.

incoloralis, Gn.—Rare. Three specimens in November.

Genus 201. *Cornifrons*, Led.

ulceratalis, Led.—All the year and common between February and June and again between the beginning of October and the end of November. Varied greatly, the more notable aberrations being:—

1. Forewings of whitish ground colour, the lines and stigma being faintly defined in light ochreous and only visible on close inspection.—

2. Forewings unicolorous ochreous, the lines and stigma a shade darker, the lines terminating at the costa and inner margin in a brown spot, head and thorax of the same colour as the wings.

3. Forewings unicolorous grey-brown without markings.

4. Forewings unicolorous grey-brown, the stigma standing out sharply, the other markings wanting.

The remainder of my series were mostly dark and finely marked specimens.

Genus 202. *Tegostoma*, Zell.

moeschleri, Chr.—Common from March till December.

kabylalis, Reb.—Rare, one specimen in April.

Genus 204. *Noctuelia*, Gn.

floralis, Hbn.—Common all the year.

The two following species do not appear to figure in the Catalog.

Psara phaeopteralis, .—Rare, a single specimen in November, 1919. (det. Storey).

Crocalia aglossalis, Rag.—Not very common. Flies from April till December.

Fifteen species remain unidentified. Single specimens only were taken of six.—(H. 108—April: H. 110 and 113—March; H. 114, 117 and 115—May; and H. 121—November). Two specimens were taken of H. 135 in February and June, and three of H. 122, March and November, a specimen of this species being sent to the collection of the Ministry of Agriculture, Cairo, and placed in the collection under number 2729. Of the remainder, H. 94 was common from April till August, H. 106 in March and April, H. 116 common March till October (No. 2750 coll. Min. Agric. Cairo), H. 236 rare in April and H. 235 and 248 rare in June. These specimens should now be found amongst the Pyralids of the National collection in South Kensington and the above details may be of interest should they eventually be worked out.

Summary.—The total number of species of identified Lepidoptera cited in these and previous notes as having been taken at Reservoir is as follows.—Rhopalocera 15, Grypocera 1, Sphingidae 5, Bombycidae 5, Noctuidae 23, Geometridae 10, Pyralidae 44, Microlepidoptera 36, =139.

In the above Summary, forms, aberrations and unidentified species are not included. Two forms and one aberration of Diurnals have here or elsewhere been described as new and one noctuid moth. Amongst the Microlepidoptera Meyrick has elsewhere described ten as new, and amongst those he was unable to definitely determine (and it must be confessed that the material was in some cases very scanty and ill conditioned), he definitely states (*in lit.*) that four others are new, and of two of these he writes, "These appear to be a curious new genus but I am unable to ascertain the characters."

To the above list of 139 identified species must be added 15 Pyralids and 16 Microlepidoptera so far unidentified. Thus the fifty or so acres at Reservoir on which vegetation of some kind was to be found in those days, completely isolated from contact with other vegetative zones by the surrounding desert, produced no less than 170 species of Lepidoptera.

More notes on the Early Stages of Syrian Lepidoptera.

By E. P. WILTSHIRE.

This paper completes a series of larval descriptions, of which the first part appeared in the July-Aug. number of the *Entomologist's Record*, 1935. The general faunistic list there referred to has proved too long to be published here in short instalments without suffering from the process, and will, it is hoped, appear elsewhere, as a whole.

The species hereunder described are chiefly "Pugs" (*Eupithecia*), and no plate is given illustrating them, though I have some quite good photos of them; because of their smallness and variability, it is felt that a plate would not help readers to distinguish these species from their close neighbours.

Some photos of Syrian Cuculliid larvae are being held in reserve till the day, when I am in a position to use them for comparison with other species of this group, which I have more recently met with in the Near East.

Phalera bucephaloides, Ochs. ssp. *syriaca*, Zy.

Ovum: white, round, flattened below, tinged below with green; apical dot, greenish grey. Laid 31st Aug., 1933; hatched 13th Sept.

Larva: differing from that of *bucephala* as follows: Its general appearance is that of a pinkish grey larva, with a bright white and yellow wavy spiracular stripe; its pose is more exaggerated, the head being thrown back to rest on the back of the 6th somite, and the rear three somites being lifted at right angles to the body. The general appearance of *bucephala* is that of a yellow larva, striped with black and white.

Young larva: lemon-yellow, with glossy black head, long, pale, greyish hairs, and final claspers represented by two black spikes.

Half-grown larva: bluish or pinkish grey, banded with yellow; dorsal chain of large black dots, edged on either side by a fine whitish line. On sides, a similar whitish line above a fine black line that connects a series of smaller, black lateral dots. Spiracles, black, set in a broad creamy-white area. Anal claspers, atrophied, black.

Full-grown larva: similar, but with the paler dorsal lines no longer white but pale grey and not so outstanding. The black markings too are less intense, being now laid on as a black powdering.

Head, black until last instar, marked by a yellow scissors-mark.

The larvae fed up quickly on oak, pupating very soon after burying, in November. Emergences, 27th May and 19th and 27th June, 1934.

Syntomis mestralii, Bugn.

Larva: black, tapering to head. Hairs, in ridges, sooty brown, reminiscent of a sweep's broom, and rounded behind. Head, red-brown; feet, black.

Foodplant: in captivity, vetch and lotus.

Found wandering by day amid snow, on Jebel Kineseh, in early spring; also found at night, at Shtorah.

Pupa: in a slight cocoon, among leaf-litter.

Sterrha holliata, Homburg (det. Prout)

Ova laid at the end of June were of an orange colour and hatched after a week. The larvae fed up on low plants, including heather and dandelion.

Larva: slender, smooth, pale olive-brown, with a whitish sublateral line edged below with a series of black horizontal streaks, each streak beginning at the front end of a somite, but not reaching the rear end. Subdorsal line, white just behind head, black on thoracic somites, and paler just before anal orifice. Dorsal line, only represented by a chain of faint dark dots, one per somite.

Larentia clavaria, Haw. ssp. *pallidata*, Stgr.

Larva, variable in colouring: green, as in England, or reddish-brown, or purple, with intermediate forms.

Variation commences by a darkening of the dorsal area between the two pale, yellowish subdorsal lines, and with reddish marbling low down laterally. The following forms more or less cover the gradation from green to purple.

Form one: plain green.

Form two: green, with a greyish stripe along the back bordered with thin yellowish (the subdorsals), and often also with reddish or brownish shading low down on sides.

Form three: green-grey, more extensively marbled with red or brown, the yellow subdorsals being still clear.

Form four: grey-brown dorsally, with a blue-grey stripe separating the yellow subdorsals from a lilac-coloured sublateral area; dots, yellowish-white.

Form five: uniformly reddish or purplish-brown, with a darker dorsal area, and white dots and bristles.

Spiracles, black, white-ringed.

The larva feeds from November to March, on hollyhock.

Full-grown larvae observed in November were all green; in December most were reddish; in January all were either forms 3, 4, or 5, the commonest being 4.

The moth appears on the Syrian coast immediately after the first heavy rains: in 1933 the first prolonged rainfall came about 21st Oct. and the moth was taken on the wing on 23.x, 27.xi, 12.xii.33; and in 1934, the first heavy rain in Beirut fell on 11.xi., and the imago was noted on 12.xi., 23.xi., 11.xii.34. It was also taken on 22.i.33 and ova laid then hatched 13-14.ii. In December the imago and larvae of all sizes may be noted.

The ova were pale yellowish-green, and oval, and turned grey before hatching.

Eupithecia laquearia, H.S. (det. Prout).

The larva has at least two forms:

Form one: bright green or dull yellowish, with a dorsal chain of

dark purple or red trident-head marks, the outer prongs of each mark being outside and below the subdorsal line when this is indicated, which it is not always.

Form two: bright green, with pale yellow fine hairs. Dorsal line, yellowish-edged and dark grey, slightly swollen in the middle of each somite; somital joints yellow; spiracular line, yellow and wavy, brightest on the last somite, where it touches the dark dorsal line,

Foodplant, *Hypericum serpyllifolium*.

Larvae found in September produced imagines in October, but in September the imago was also taken at light not uncommonly at Middle Heights. The larva is much infested by a Dipterous parasite.

Eupithecia dodoneata, Gn., subsp. *dubiosa*, Dietz. (det. Prout).

Larva, brownish-grey, $\frac{1}{2}''$ to $\frac{2}{3}''$ long, sometimes tinged with green and paler. Dorsal line, interrupted, and with dark grey spear-heads or V's along it. The forepart of each somite is dorsally tinged with red-brown. Subdorsals, just visible as fine grey lines; sublateral stripe more marked than in the following species.

Foodplant, Terebinth.

The larva feeds at night in April and May, and is fond of the berries of its foodplant. The imago flies in March and comes to *Crataegus* flowers, on the Coast.

Eupithecia quercetica, Prt. (ined.)

The larva has at least two forms:

Form one: ochreous, with a pink tinge, and with five yellowish or white oblique lateral marks, edged in front with pink. Rear somites, paler, with rosy-grey dorsal lines here showing clearest.

Form two: darker; the dorsal line has become a series of purplish V marks pointing forwards; blackish grey under the lateral dashes. Skin, roughened.

This species varies more, is brighter coloured, and more variegated in appearance, owing to the lateral dashes, than *dubiosa*, Diet.

Foodplants: oak, buckthorn, hawthorn, cistus.

It feeds at Middle Heights in April and May; I have never seen the imago wild. In captivity it emerges in the following March and April.

New Heterocera from Asia Minor.

By HANS BYTINSKI-SALZ.
(Instituto di Zoologia, Anatomia e Fisologia comparate R. Università Padova).

Mr. E. P. Wiltshire, British Vice-consul at Bagdad, Iraq, kindly submitted to me for determination a number of moths which he collected in Syria and the Lebanon. Though several investigators have been recently collecting in this territory, the number of species new to science or new to this country in the catches of Mr. Wiltshire is astonishingly high and a faunal list will shortly be published by himself. I am very much indebted to Mr. Wiltshire for placing this material at my disposal and I want also here to express my gratitude to him.

This paper contains also a few new species and forms which I received from Malatia Tecde, Kurdistan, through the kindness of the late Carl Höfer, Vienna. Kurdistan proves to be an almost unexplored country and a number of new and interesting species from Mr. Höfer's material have been published by Ch. Boursin (*Athetis salzi*) and Dr. E. Wehrli (*Eumera höferi*, *Ourapteryx malatyensis*, *Erannis ankeraria* ssp. *syriaca*).

Paratypes of these new Forms published here will be found also in the collection of the late Mr. Höfer at Vienna, but as this collection is at present inaccessible, I am unable to state the number and sex of them.

Mr. Charles Boursin kindly sent me an *Amathes* form from Syria, which was in his collection under the *in litt.* name *hypotaenia* and which proved to be specifically identical with a dark *Amathes* form, which Mr. Wiltshire brought from the Lebanon. I am very much indebted to Mr. Boursin for his kindness in sending me also a photograph of the genital apparatus and to let me publish this new species together with the other Syrian material.

I am including for comparative reasons also a new race of *Zygaena corycia* from Palestine, which I owe to the kindness of Dr. H. G. Amsel, Bremen.

Zygaena corycia, Stgr. race **wiltshirei**, race nov.

This new race of *corycia*, which flies at Kineseh and apparently in the same form also at Beirut, differs very much from the ssp. *staudingeriana*, Reis. in being of smaller size (wing exp. 22 m.); apex of the forewing more rounded, spot 3+5 slightly constricted. The outer margins of the spots 3+5 and 2+4, which are very clear cut in ssp. *staudingeriana*, Reis., diffusing a little against the margin. Margin of the hindwing not so blackened as in ssp. *staudingeriana*, Reis. Antennae very slender, almost unknobbed.

Type population: Kineseh. A male of apparently the same race from* Beirut in my collection.

Types: 1 ♂ 1 ♀ Kineseh, 16th June, 1934, in coll. Wiltshire.

Zygaena corycia, Stgr. race **amseli,** race nov.

A very similar race flies in Palestine where it was brought from Ain Karem near Jerusalem by Dr. Amsel. Resembles very much ssp. *staudingeriana*, Reis. but being of smaller size (22-23 mm.); forewing, more rounded. Margin of the hindwing, much blackened. Antennae, less knobbed. A transitional race between ssp. *staudingeriana*, Reis. and *wiltshirei*, By.S., which deserves a name also on account of its isolated occurrence in Palestine.

Cotypes: 2 ♂ 3 ♀ Ain Karem, Palestine, 21st April, 1930, in coll. meâ.; other Cotypes in the collection of the Museum für Naturkunde, Berlin.

Diaphora mendica ssp. **malatiana,** ssp. nov.

A ssp. belonging to the *rustica*, Hbn. group with whitish males. Nearest to ssp. *syra*, Daniel, of which I possess 4 ♂ Cotypes. Ground-colour, more creamy yellow, almost as yellowish as the Irish ssp. *hibernica*, Obth. Costa and apex pronouncedly suffused with grey. Much more heavily marked than *syra*, Daniel. On the forewing always all 6 large spots present; marginal spots on the hindwing from 2 to 6. The discal spot on the under side of the hindwing very large, always clearly visible. Sometimes traces of the discal spot also on the upper-side.

Cotypes: 4 ♂ Malatia Tecde, 6th May-20th June, in coll. meâ.

Cerura **höferi,** sp. nov.

An apparently new species of the difficult *interrupta*, Christ.—*sureyae*, Rebel.—*petri*, Alph.—*syra*, Gr. Grsh. group. Nearest to *syra*, Gr. Grsh. and their form *palaestinensis*, Bartel.

♂: Ground colour white. Basal band pale, broadly interrupted; traces of the accompanying lines on the costal and hind margin. Subapical lines almost obsolete, the inner and outer reaching the inner margin of the wing, the middle ending just a little below the subapical spot. Subapical spot situated as in *syra*, Gr. Grsh. and not so obliquely as in *sureyae*, Rebel. of pale colour, larger than in *syra*, Gr. Grsh., on the inner margin irrorated with yellow. A row of very distinct marginal spots; discal dots on both wings present.

♀: Ground colour of the wings white, only at the base and the costa slightly yellowish. Basal band, pale, continuous, but constricted in the middle. Traces of accompanying lines, especially on the veins. Subapical band completely absent, its outer border only indicated by little dots on the veins. Subapical spot situated as in *syra*, Gr. Grsh. pale, pronounced as in the male. Marginal spots very conspicuous.

M. Gaede describes and figures in *Seitz, Palaearktische Grosschmetterlinge*, Vol. II. Suppl. p. 174, pl. 14c, a form from the Püngeler collection which he considers to be a form of *syra*, Gr. Grsh. He pictures also a ♂ of the f. *palaestinensis*, Bartel. *C. höferi* has the

* *Editor's Note*: Mr. Wiltshire thinks its occurrence actually in Beirut unlikely, and considers that the example so labelled came from Jebel Kineseh, or from some neighbouring mountain.

ground colour of this "*syra*" picture, all markings much fainter, the spots as large as in "*syra*" but of the pale colour of *palaestinensis*, Bartel. The specimens differ from typical *syra*, Gr. Grsh. from Syria (Beirut, Baalbek) by the pronounced whitish colour. I am at present unable to say whether the form which is pictured in Seitz Suppl. II. pl. 14c, is identical with *höferi*, By.S.; it comes at least very near to this form—in any case they are decidedly no typical *syra*, Gr. Grsh. *Höferi*, By.S. has nothing to do with *sureyae*, Rebel, as it shows traces of ochreous suffusion near the bands and the subapical spot is not so oblique as in *syra*, Gr. Grsh. Mr. Höfer also wrote me in 1933 that he presented this *Cerura* form to Prof. Rebel, who agreed that this form was unknown to him. I am not yet convinced that these 5 forms: *syra*, Gr. Grsh., "*syra*, Gaede," *sureyae*, Reb., *höferi*, By.S. and *palaestinensis*, Bartel, are not all forms of *syra*, Gr. Grsh. *Höferi*, By.S. is in any case the least related to *syra*, Gr. Grsh. and so I am treating it here as a distinct species.

Types: 1 ♂ 1 ♀, Malatia Tecde, Kurdistan, the ♂ taken in June, the ♀ on May 26th in coll. meâ.

Pygaera pigra, Hüfn. var. (ssp. ?) *ferruginea*, Stgr. forma **flavidior**, f. nov.

I have a series of 7 ♂ from Malatia Tecde; 6 of them are all alike and agree well with the very summary description of the var. *ferruginea*, Stgr.: "multo dilutior, al. ant. laete ferrugineo-et cinereo-mixtis." One ♂ however has a pale yellowish ground colour, as light and even more yellow as in *Pygaera powelli*, Obth. All markings obsolete, only traces of 4 spots of the submarginal row present.

Holotype: one ♂ Malatia Tecde, 1st August.

Bryophila ravula, Hbn. forma **mediochracea**, f. nov.

Ground colour as in f. *grisescens*, Obth. but in the forewing the whole field between the antemedian and postmedian line is reddish brown. It is the contrary of the ab. *ravulana*, Strd. in which this space is of the ground colour and the antemedian field is brown. The form seems to be quite common in Asia Minor where also the ab. *ravulana*, Strd. is found, but occurs as a rare aberration also in other places. A picture of this form will be found in Rambur, *Catalogue systématique des Lepidoptères de l'Andalousie*, 1858, plate IV. fig. 1, and of a transitional form in Culot, *Noctuelles d'Europe*, plate 23, fig. 11. Transitional forms in which there is a red brown blotch near the antemedian line are more common. I have seen specimens from Shweir, Beirut, Amasia and Sardinia.

Cotypes: 2 ♂ Beirut, 11th-25th Oct., 1934, in coll. Wiltshire; 1 ♂ Granada in coll. meâ.

Amathes **hypotaenia** (Boursin *in litt.*), sp. nov.

♀: Ground colour of the forewing dark red brown similar to *Conistra vaccinii* ab. *spadicea*, Hbn. Basal line very inconspicuous; antemedial and postmedial lines double, suffused with black. A very distinct dark brown subapical spot as in *A. litura*, L., continuing into a transverse row of faint dark dots between the veins. Also a faint row of marginal dots which is followed by a thin light line. A middle shadow begins at the costal edge of the postmedial band and runs

obliquely inwards till it reaches the hind margin in the middle between the antemedial and the postmedial line. The species is easily to be recognised by the depressed elongated orbicular which forms an angle of only about 30° towards the basal part of vein IV. All other species of the genera *Conistra*, *Spudaea* and *Amathes* have a much more upright orbicular. Reniform, large, partially filled with grey. Both marks surrounded by a fine red line. Hindwing, slightly greyer with large discal spot, darker postmedial line and light fringes. Underside of the forewing, greyer, with dark reniform and a double postmedian line. Marginal field and fringes, lighter. Hindwing, lighter grey with dark discal spot and a broad postmedial line; marginal field and fringes, lighter.

♂ : a very worn specimen, darker greyish brown, markings less distinct.

Male Genitalia somewhat similar to that of *Amathes lychnidis* but has a long additional arm on the cucullus. Harpe without corona, deeply bifurcate. The apical arm broad-pointed, the basal arm digitiform, shorter and uniting on the base with the very similar ampulla. The aspect of the harpe is like a dam's antler-horns; clasper, very long, S-shaped, reaching to ¾ length of the harpe.

Holotype: ♀ } Beirut, Syria, in Coll. Ch. Boursin.
Allotype: ♂ }

Amathes hypotaenia, By.S., var. **wiltshirei,** var. nov.

Mr. Wiltshire collected a series of specimens in the Lebanon which specifically agree with the former species. Being all alike and of a distinct uniform dark aspect, I am treating them as a good local variety.

♂ : Ground colour of the forewing, dark blackish brown as in *Conistra ligula* f. *polita*, Hbn., extending from the base as far as the row of transverse dots which begins at the subapical spot. The antemedial and postmedial lines double, not very distinct. Orbicular and reniform, faintly outlined in light brown. Subapical spot of little contrast, followed by a light leather-brown, transversal, submarginal band. Margin a little darker, crossed by a row of dark dots, each of which has a little pale mark inside. Marginal line waved, pale brown. Hindwings of the same colour as in *hypotaenia* crossed by a broad postmedial band and a large discal spot. Underside as in *hypotaenia*.

Holotype: 1 ♂ Arayah, Lebanon, 15.xii.34, leg. Wiltshire in coll. meâ.

Allotype: 1 ♀ Arayah, 16.xii.34, in coll. Wiltshire.

Paratypes: In coll. Wiltshire and Ellison, and the British Museum.

Praestilbia armeniaca, Stgr. f. **designata,** f. nov.

Palpi and shape of the wing agree well with this species, but without any traces of the black markings on the forewing; the dark inner line which accompanies the postmedian line is also obliterated. The most conspicuous designs are the thin light outline of the orbicular, reniform, the antemedian and postmedian line.

Type: 1 ♀ Aley Lebanon, 10th Oct., 1934, in coll. Wiltshire.

Archanara **wiltshirei,** sp. nov.

♀ : Wings, broader than in *A. geminipuncta*, Hatsch. Length of

forewing, 15 mm: span, 34 mm. Colour, light reddish-brown, as in typical *geminipuncta*, the white spot on the forewing obsolete; the two dark spots in the middle and on the end of the cell, very large, the latter quadrate. Veins, suffused with black, especially on the outer margin. Hindwing, lighter than forewing: in *geminipuncta* it is slightly darker.

♀ genitalia, similar to *geminipuncta*, but the upper edge of the ostium bursae less deeply rounded. A good distinctive character is the hind margin of the 9th tergite which in both species is armed at the edge with numerous spines. In *geminipuncta* the edge is straight, while in *wiltshirei* it shows a very deeply arched incision in the middle, dividing the edge of the 9th tergite into two separate lobes. This character is also well to be seen if the segments of the abdomen are extended and the dorsal scales brushed away.

♂ genitalia, larger and more chitinized than in *geminipuncta*. Harpe, more obliquely bent, cucullus more spatulate. Clasper, elongated, sharp pointed, with a few long stiff bristles. Aedoeagus with a field of small spines, as in *geminipuncta*, but more chitinized. Edge of the tip less spinous, followed by three parallel rows armed with little teeth.

Allotype, reddish-brown ♂, veins very markedly black-radiated. The white dots by the cell, fairly well visible.

Holotype: 1 ♀ Amik, Syria, 7.vii.34, leg. Wiltshire in coll. meâ.

Allotype: 1 ♂ Amik, Syria, 7.vii.34, leg. Wiltshire in coll. meâ.

Paratypes: ♂ ♀ ♀ ♀ ♀ ♀ 2.vii. and 7.vii.34 in coll. Wiltshire, Boursin et Ellison, et Brit. Museum.

Archanara wiltshirei, By.S. f. **brunnea**, forma nov.

Archanara wiltshirei varies very much in colour. One ♀ of 37 mm. wing expanse is of an uniform dark brown aspect as in *geminipuncta* f. *nigricans*, Stgr. The dark cellular spots less contrasted than in the type form, no white spot being visible. The outer third of the wing, slightly suffused with black. Hindwing, grey, darker than the forewing, not lighter on the base, as in *orientalis*, Wagner.

Holotype: 1 ♀ Amik, Syria, 7.vii.34, leg. Wiltshire, in coll. meâ.

Allotype: 1 ♂ 7.vii.34, in coll. Wiltshire.

Paratypes: ♀ ♀ ♀ 2 et 7.vii.34 in coll. Wiltshire. In some of these the white spots are visible on the cell.

I do not think *Arch. wiltshirei* is the same as *Arch. geminipuncta* ssp. *orientalis*, Wagner (*Intern. Ent. Zeitschr.* 23, p. 553. Tab. fig. 13-14). Figure and description do not agree at all. *Arch. wiltshirei* is smaller, of lighter colour, with pronounced discal spots which are absent in *orientalis*. Hindwing, not lighter than the forewing. In case f. *brunnea* agrees specifically with ssp. *orientalis*, Wagner, of which I, however, have grave doubts, *orientalis*, Wagner must be treated as a distinct species and not as a ssp. of *geminipuncta*, Hatsch.

Phytometra generosa, Stgr. f. **malatyana**, forma (var.?) nov.

Of *Phytometra generosa* I have specimens from the Lebanon (Bsharré) and Akshehir (Anatolia) which agree well with the description of Staudinger's type from Haradjan near Zeitun in the Taurus. They are of a light reddish brown ground colour with a broad green

metallic band behind the postmedian line which reaches from vein III_1 to the hind margin.

I have a ♂ from Malatya which differs remarkably from the typical *generosa*, Stdgr. All colours lighter and rosier. A complete metallic band from the costa to the hind margin, which expands on the hind margin also a little into the postmedian band. Another green metallic band directly behind the basal line only a little narrower than the outer metallic band and reaching from the subcosta to the hind margin of the forewing. Hindwings also somewhat lighter than in *generosa*, Stdgr.

As I have only one specimen I am treating *malatyana* as a form, but I think it is a distinct local variety, perhaps a good species.

Holotype: 1 ♂ Malatya Tecde V. in coll. meâ.

Editor's final footnote: Mr. Wiltshire informs me that a plate is being prepared of most of the new forms described from his Syrian material, and will be published in the faunal list of the Lebanon now in preparation.

The Butterfly races of Macedonia.

By ROGER VERITY, M.D., F.R.E.S.

The residence of the well known butterfly collector Orazio Querci and his family collaborators, during two years, in Macedonia, has afforded an important contribution to the study of the distribution of butterfly races in Europe, and carried us a step on towards the general Catalogue and Map one is beginning to feel considerably the need of, after the great amount of analytical work, which has been performed during the last thirty years, or more, and which very much wants to be organized into a whole, by establishing the connections between the more striking variations, described, as a rule, from regions distant from each other.

In this sense Macedonia has turned out to be part of the zone of transition between the well known races of central Europe and the extreme ones of more southern latitudes in Greece, which had been observed and described as far back as half a century, or more, ago, owing to their very different facies from the former. We have, thus, begun to establish, roughly, the limits of those races, respectively southward and northward, in the eastern part of the Balkans. This has been a rather unexpected discovery, for, on their western coast, as I have pointed out on other occasions, the corresponding zone of transition is fully five degrees of latitude further north, namely at Trieste and in Istria, where the change of aspect of the races, from those of central Europe to the distinctly southern, Mediterranean, ones of Dalmatia, is most impressive, coinciding with the northern limit of the olive tree and, therefore, evidently with climatic factors. In Italy this limit is constituted, very sharply, by the chain of the Apennines between Emilia and Tuscany and between Piedmont and Liguria, just about one degree further south than Istria. To the east, it runs southwards very abruptly, along the Dinaric Alps, as far as Montenegro, and, thence, the butterflies of Macedonia seem to show that it cuts across the Balkans as far south as the latitude of Mount Olympus, which actually corresponds to that of Naples, *i.e.*, to the heart of the Southern zone, in Italy.

I have endeavoured to point out, in the following pages, the mixture, existing in Macedonia, of species and forms of central Europe with others, proper to the south, and, in some cases of widespread species, the blending of features of the Northern exerge of the former zone with the Central exerge of the latter one in a single synexergic race. Altitude has, of course, something to do with the presence of these races and species, from different sources, in the same regions, but perhaps less so than in others, for one finds perfectly characteristic ones

of the Northern strains as low down as 300 m., at the foot of Mount Olympus, whereas it will be seen from the following notes that many southern species rise to considerable altitudes.

Exact resemblance to races of Asia Minor is far less than might have been expected, although a good many foreshadow them to some extent. Large size is, in a great many species, quite a feature of the region we are dealing with, which can well be called a land of giants, as far as butterflies are concerned. Quite a number of species belong to the same race as at Trieste and in Istria, or in Carniolia, so that the present record of this fact establishes the broadness of their distribution, to an unsuspected extent, across the whole of the Balkans and between at least five degrees of latitude. In a few cases the same race extends as far as the western Alps, quite apart, of course, from the most widespread ones, which have, more or less, the same aspect in the whole Mediterranean region.

Superfam.: *Grypocera* or *Hesperiides*.	Subfam.: *Erynninae*.
Fam.: *Hesperiidae*.	Tribe: *Erynnidi*.

Erynnis marloyi, B. race *marloyi*, B. :—Salonika (May).

E. tages, L. race *subclara*, Vrty.:—From sea-level to 1000m. I. gen. *tages*, L.: Salonika (May); II. gen. *subclara*, Vrty.: Mt. Olympus (August).

Carcharodus fritillarius, Poda=*alceae*, Esp. race *fritillarius*, Poda. II. gen. *aestiva*, Hormuzaki, on Mt. Olympus from 12th July to 25th Aug., but one female of 3rd September is distinctly a *magnaustralis*, Vrty., so that the race is evidently not the pure nominotypical one of Styria and Central Europe, but transitional to more southern ones. The species is recorded by Querci from sea-level to 1000m.

C. altheae, Hüb. race *altheae*, Hüb.: Salonika (3rd June).

C. orientalis, Rev.: Salonika, up to 500m., Cortiati Mts., from 600 to 1000m., and Mt. Olympus, at Scala, 300m. (14th July). I have seen none of these specimens, except in photograph, but there can be no doubt that they belong to the nominotypical race, considering the restricted area of the species and the proximity to Peloponnesia, whence it was described.

Pyrgus sidae, Esp. race *sidae*, Esp.; Salonika (May) and Mt. Olympus, up to 850m.

P. malvae, L. race *elegantior*, Vrty.: Salonika and Mt. Olympus up to 1200m.

P. alveus, Hüb.: I have only seen a photograph of the single specimen found on 5th July in the Bermion Mts. between Naussa and Seli, at 800m., but it certainly belongs to the nominotypical form, as that is the only one found from the Eastern Alps eastwards.

P. armoricanus, Obth. race *persica*, Rev.=*prostanae*, Pfeiffer: Salonika (May) and Mt. Olympus, up to 1000m. (June and Aug.-Sept.). This race differs from the western ones, not only genitalically, as stated by Warren, but also by its larger size and broader white spaces, as well described by Pfeiffer from Anatolian specimens. The II.

generation has sharper and darker marking, on the underside, of a redder and deeper tone, and can be distinguished under the name of **postpersica,** nom. nov., as Reverdin and Pfeiffer have both described the I. one. My summer specimens from the Olympus will be the "co-types."

P. cinarae, Rbr. race *cinarae*, Rbr.: Bermion Mts.; found between Naussa and Seli, 800m., on 5th July.

Spialia (*Powellia*) *orbifer*, Hüb. race *tesselloides*, H.-S.: From sea-level to 1500m. I have before me the I gen. *tesselloides* from Salonika, of May, and from Mt. Olympus, of June, and the II gen. *minor*, Rebel, from the latter locality, of August and September.

This race, apart from the usual very broad individual variations of this species, is decidedly a large and dark one, on the whole, very similar, if not identical with the one from central Asia, Staudinger has named *lugens* in 1886. It had, however, been well figured by Herrich-Schäffer under the name of *tesselloides*; he informs us it came from "southern Europe" and he had received it from Keferstein; the latter in the *Stett. Ent. Zeit.* of 1851, quoting Herrich-Schäffer's figures, gives "Turkey" as its habitat; it, therefore, comes in particularly well as the name of the Macedonian race, we are dealing with. One wonders how Staudinger can have come to state, in the *Horae Soc. Ent. Rossicae* of 1870, that *tesselloides*, H.-S. was from Sicily and one wonders how Warren, in his recent monograph on this tribe, can have taken up this mistake and made the further blunder of referring these figures of Herrich-Schäffer to the allied species, known till then as *sao*, called by him *sertorius* and, apparently, henceforth, to be designated as *hibiscae*, Hüb., by right of priority; such a conclusion cannot be considered even for a moment, because those excellent illustrations, except for the antennae, which are unnaturally long, plainly and unmistakably represent an *orbifer*. It is time that name should be revived and made use of correctly.

Tuttia tessellum, Hüb. race *tessellum*, Hüb.: Mt. Olympus, up to 900m. (June-July). These specimens agree exactly with the original figures from Russian ones.

Subfam.: *Hesperiinae.*
Tribe: *Hesperiidi.*

Adopaea lineola, O. race *major-clara*, Tutt: Salonika (June) and Bermion Mts., at Seli, 1200 m., on 5th July.

A. flava, Brünn = *thaumas*, Hufn. (nec *sylvestris*, Poda) race **maxima,** nom. nov.: From sea-level to 1000 m. I take Salonika specimens of June as "co-types" of the Grecian race, I propose naming *maxima*, chiefly characterized by its much larger size than any other of the species: the forewing of the male averages 14 to 16 mm. in length, from base to tip, and that of the female 17 to 18. Staudinger had been struck by this feature as far back as 1871, when he records it from the Velukhi and the Parnassus. There are, otherwise, no peculiarities to be noted in the way of colours and pattern. As in the case of the race, which comes next in size, *macta*, Vrty. = *major*, Tutt, most females have an extensive black pattern (marginal band, discocellular streak, nervural

streaks, basal suffusion), but a few individuals stand out, amongst them, by exhibiting, on the contrary, very thin ones, like those of *iberica*, Tutt.

A. acteon, Rott. race *acteon*, Rott.: From sea-level to 1000 m. My specimens are from 300 m. on Mt. Olympus, collected in June. They are large and of a rich tone of colour on both surfaces, but not more so than in some individuals of Central Europe, belonging to the range of variation of the nominotypical race.

Hesperia comma, L. race *pallida*, Stdgr.: Mt. Olympus, at the Monastery of S. Dionisio, from 800 to 900 m. (August). As noted by Tutt, some Grecian examples are darkened, on the upper surface, to a remarkable extent, but the underside exhibits most markedly the characteristic tendency of *pallida* to have very prominent white spaces on the hindwing, extending into long, tapering projections along the nervures. The general look of this race is so particular, it might have made one suspect a distinct species, but I have examined the genitalia of some of Staudinger's "co-types" from the Taurus, in my possession, and I have detected no difference from those of all the *comma* of various regions, also examined by me in that respect.

Ochlodes (*Aagiades*) *venata*, Br. & Gray = *sylvanus*, Esp. (= ? *sylvestris*, Poda) race *esperi*, Vrty. = *sylvanus*, Esp., homon.: Salonika (June) and Bermion Mts., at Naussa, near Verria (July) and race *anatolica*, Plötz: Mt. Olympus and notably at the Monastery of S. Dionisio, 800-900 m., (June to August).

The latter race agrees well with that of Anatolia by its very large average size, similar to the one of *venata* and thus larger than any other western race, and by the higher percentage of individuals with a clear green underside. The individual form with a uniform yellow underside has been named *taurica* (B.-H.) Garde, from the Taurus; there is, thus, a series of these large oriental forms, which, through *hyrcana*, Christ., leads up to *venata* of the far east of Asia.

Gegenes pumilio, Hoffm. race *pumilio*, Hoffm.: Mt. Olympus, at S. Dionisio, 800 to 900 m. (2nd September). According to Querci it is perfectly similar to the nominotypical race of southern Italy, as figured by Hübner from Calabria, but he has only sent me the photograph of one male.

G. nostrodamus, F.: Mt. Olympus, at 300 m. (June). Reported by Querci in 1936, but not seen by me.

Superfam.: *Rhopalocera* or *Papilionides*.	Subfam. (acc. to Chapman, in Tutt, B.B., I, p. 319): *Lycaeninae*.
Division: *Lycaenida*.	Tribe: *Lycaenidi*.
Fam.: *Lycaenidae*.	

Heodes ottomanus, Lef. race *ottomanus*, Lef.: Mt. Olympus from 850 to 1200 m.

Lycaena (*Heodes*) *phlaeas*, L. race *nigrioreleus*, Vrty.: I gen. *phlaeas*, L.: Salonika (April) and II gen. *nigrioreleus*, Vrty. (May-June), race *aestivus*, Z.: II gen. (June) and III gen. (Sept.), *aestivus*, Z.: Mt.

Olympus. I do not know from what altitude come these two series, both of which are alike and distinctly blacker than the June one of Salonika, but Querci has found the species up to 1500m.

Palaeoloweia tityrus, Poda=*dorilas*, Hufn.=*dorilis*, auct., race *dorilas*, Hufn., with some females of the *phocas*, Rott. form, which has the ground-colour of the forewings of a uniform, clear, fulvous: Mt. Olympus, from 850 to 1200m.

It is rather surprising this race should exhibit no tendency to resemble the brighter southern one *locarnensis*, Tutt, which spreads eastward to Asia Minor, whence I have it from Anatolia.

P. alciphron, Rott.: Querci has found a few specimens on Mt. Olympus, between 850 and 1200m., in 1935, but he has not furnished me with any, so that the race, it produces there, I am unable to determine. In 1936 none were found in the same locality.

Subfam.: *Plebeiinae.* | Tribe: *Plebeiidi.*
Group: *Scolitantidi.*

Scolitantides orion, Pall. race *metioche*, Frhst., *i.e.*, the dark, southern race, with many males and nearly all the females of the *nigra*, Gerh. form: Mt. Olympus, from 300 to 1200m. (June). Size always very small.

Turanana baton, Bergstr. exerge (or twin species ?) *vicrama*, Moore, race *schiffermülleri*, Hemming: I gen. **anteschiffermülleri,** nom. nov.: Salonika (May) and II gen. *schiffermülleri*, Hemm.: Mt. Olympus, up to 1500m. (June-August).

As the first generation is constantly of a considerably smaller average size than the following ones, I take this occasion to name it, my Salonika series being a well characterized one suitable to select as "cotypical" of it.

Group: *Iolanidi.*

Iolana iolas, O. race *bureschi*, Hemm.: Salonika, up to 500m. and Mt. Olympus, at about 300m. (end of June: both sexes very worn). My examples from the latter locality fully bear out the description of *bureschi*, to the effect it is "the largest and darkest race of the species hitherto known; the female is uniform blackish brown, faintly scaled with blue at the base of the wings."

Group: *Glaucopsychidi.*

Glaucopsyche cyllarus, Rott. race *andereggi*, Rühl.: Salonika, up to 500m. (May) and Mt. Olympus, up to 1700m. (May). I have not seen female specimens from the latter locality; those of the former agree exactly with the race of the Valais and of Piedmont, Northern Italy and other, more eastern regions, chiefly characterized by its entirely deep black females, with no blue dusting on the upperside.

Maculinea (*Lycaena*) *arion*, L. race *obscura*, Frey.: Mt. Olympus, from 850 to 1200m. and Bermion Mts., at the same altitudes. My July examples, from the Olympus, at 800m., and from Naussa, near Verria, differ in no way from the typical *obscura* of the Alps, just as in the case of the aforesaid *andereggi*.

Group: *Lycaenopsidi.*

Lycaenopsis argiolus, L. race *calidogenita*, Vrty.: I gen. *calidogenita*, Vrty.: Salonika (April) and II gen. *canicularis*, Vrty.: Mt. Olympus, up to 1500m. (June to August). The species exists ubiquitously, in the region, up to this altitude.

Group: *Plebeiidi.*

Lycaeides idas, L. = *argyrognomon*, auct. (nec Bergstr.) race *balcanica*, Züllicher: Salonika (May), Mt. Olympus, from 850 to 1700m., and Bermion Mts., from 850 to 1200m.

Plebeius argus, L. race **magnagraeca,** nom. nov.: Mt. Olympus, at 300m. (May). The species was found also in the Bermion Mts., from 850 to 1200m., but I have seen no specimens.

The large series collected in the former locality belongs to a striking race, of the largest size known in Europe; namely, it is only equalled by *cleomenes* and the *killiasi* of Carniola (mine are of Pokoijscha), by those of Krasna, in Rumania, and by *argigas*, Vrty. of the Carso, above Trieste, of Istria, ex. As large size seems to be a feature, which is very frequent and characteristic in the northern Balkans, it is not surprising also Macedonia should produce it. As to the pattern, the very broad black marginal band of the male upperside evidently derives from close relationship with *killiasi*, not to speak of its still darker forms *cleomenes* and *carinthiaca*, but the underside affords, on the contrary, a sharp contrast with them, and especially with the two latter, by its much whiter ground-colour; this is not of the peculiar pure white tone of the Southern exerge *hypochiona*, peculiar to Spain, but certainly of the greyish white one of the Central exerge, including, besides its races of Asia Minor and Italy, that of the Parnassus, in Greece, which Staudinger actually referred to *hypochiona*, but which Tutt rightly distinguished by the name of *graeca* and I, since, separated, still more emphatically, on the strength of the tibial spines (*Iris*, 45, p. 41). Also the females of the Olympus strongly recall those of *graeca* by the striking development of the premarginal fulvous lunules on the upperside and in both sexes the orange ones of the underside are often unusually prominent. It seems extremely likely that this race, I propose naming *magnagraeca*, should be a synexerge produced by the blending of the two aforesaid exerges, just as I have suggested *argigas* is, where their areas meet, further west. A considerable percentage of individuals are smaller in size than the most highly characterized *magnagraeca* and have narrower black margins in the male sex and some agree entirely with the, more southern, pure *graeca* race of the Central exerge.

P. sephyrus, Friv. race *sephyrus*, Friv.: Salonika, up to 500m. (May) and Mt. Olympus (July-August).

Aricia anteros, Frr. race *anteros*, Frr.: From sea-level to 1500m.: I gen. *anteros*, Frr.: Salonika (May) and Mt. Olympus (June); II gen. *altera*, Freyer: Mt. Olympus (August).

A. agestis, Schiff. = *medon*, Hufn. = *astrarche*, Bergstr., race *pallidefulva*, Vrty.: From sea-level to 1500m.: I gen. *subornata*, Vrty.: Salonika (April); II gen. *pallidefulva*, Vrty.: Mt. Olympus (June to August). Both generations identical with the Italian ones.

A. montensis, Vrty. race **macedonica**, nom. nov.: Querci was particularly struck by this insect, which flew on Mt. Olympus at all altitudes and especially at S. Dionisio 800m. and on the Bermion Mts., above Naussa, in August and at the beginning of September, in company with the preceding, but was always very distinct, even on the wing, owing to its much greater activity; it settled more rarely and for a shorter time and it flew much more rapidly, so that it was quite difficult to capture. It was also much scarcer than *agestis* and only one female was found at Prionia 1500m. on 14th June, remarkable by its very large size and by its extensive and bright premarginal lunules, well marked also on the forewing, where they exhibit a somewhat unusual aspect, so that the upperside, on the whole, recalls that of *icarus*. The male differs from *agestis* by its longer and more pointed wings, by its blacker upperside colouring with much reduced or nearly obliterated premarginal lunules and by the pale ground-colour of the underside. As also the genital armature differs from the one of *agestis* by the constantly greater length of the lateral apophysis of the uncus, or gnathos or falces, there, apparently, is every reason for considering it a distinct species, together with the Iberic *montensis*, the first race belonging to it which was described and named, and together with *montiummagna*, Vrty., which it resembles most, and other French and Italian races. It chiefly differs from the latter by its darker males and by the peculiar look of the female described above, which seems to require a distinctive name, so that I propose the one of **macedonica**.

Polyommatus chiron, Rott.=*eumedon*, Esp. race *chiron-fylgia*, Rott.-Spang.—This species is very local: so that it was only found by Querci in 1936, during May, at the unusually low altitude of 300m., on Mt. Olympus; this altitude, at such a southern latitude, evidently accounts for the aspect of the race, which exhibits the very unusual feature, in Europe, of not having any white streak, on the underside of the hindwings, in nearly half the individuals of both sexes, such as described under the name of *fylgia* from the most extreme northern latitudes, showing it is a result of ill-development from unfavourable surroundings of all sorts; on the upperside, males of the usual form, with no trace of premarginal lunules above, and females with two or three very thin ones.

P. icarus, Rott. race *zelleri*, Vrty.:—From sea-level up to 1500m. The race is perfectly similar to that of Peninsular Italy. The following nomenclature is the one I have used for it in that region, but its origins are rather confused and seem to need an accurate revision: I gen. *zelleri*, Vrty.: Salonika (April-May); II gen. *transferens*, Vrty.: Salonika (May-June) and Mt. Olympus (June); II gen. *aestivalis*, Tutt: Mt. Olympus, possibly, from other localities (June to August), with some striking *albescens*, Tutt, individuals in August.

P. meleager, Esp. race *macra-alpiumclara*, Vrty.:—Mt. Olympus from 850 to 1200m. (July-August). The very large series of specimens I have before me consists of a remarkably variable mixture of forms, similar to those I have described from Italy, but from surroundings as different from each other as Tuscany, which only produces *macra*, and the Upper Adige, which produces *alpiumclara*, whereas on Olympus they are produced together and in much greater numbers.

Cyaniris semiargus, Rott. race *parnassia*, Stdgr.;—Mt. Olympus, at 300m. (end of May to first days of June) and Naussa, on Bermion Mts.

(5th July). None of the large series of specimens I have before me exhibit the slightest trace of the faint orange lunules, transitional to the much more accentuated ones of *bellis*, Freyer, which Staudinger describes in "the majority" (not in all) of his *parnassia*; by their "uniformly smaller size and by their lighter grey underside than examples from Germany and Switzerland," they agree perfectly with Staudinger's description, so that there can be little doubt they belong to the same race as his "co-types" from Mt. Parnassus, although, on the Olympus, there, apparently, is a complete lack of the *bellis* feature, which usually shows itself more or less frequently and markedly in the Balkans and particularly so in northern Greece, including Macedonia, and in Turkey, whence it was described, contrary to Staudinger's statement that it is from Asia Minor, as noted by Tutt, who has named the race of the latter region *intermedia*.

Lysandra thersites, Cant.-Chapm. race *orientis*, Shelj. (=*orientalis*, Chapm., hom. of an *amandus*): From sea-level to 1500m.: I gen. *thersites*, Cant.-Chapm.: Salonika (May); II gen. *orientis*, Shelj.: Salonika (June).—The striking feature of these specimens, as compared with those of western Europe, is their much lighter colouring.

L. escheri, Hüb. race **olympena**, nom. nov.: Mt. Olympus, from 850 to 1500m.—This gigantic race is comparable only to *balestrei*, Frhst., but the length of the forewing varies from 18 to 19 and occasionally reaches even 20mm. in both sexes, whereas *balestrei* measures only 17 to 18, large as it already appears, as compared with all the other races; the wings are, furthermore, broader and more rounded, with a very convex outermargin, so that the effect of very large size is increased still more. This shape of the wings, the broad and diffused marginal black band, no approach to which exists in any other race of the species, and the rich tone of blue, with no shade of pink in it, give this race a considerably greater resemblance to *Plebeius sephyrus* than to the other *escheri*; in many specimens the same may be said of the underside, on account of its bold markings, both black and orange, and especially of the broadness of the latter, which often actually blend into a continuous premarginal band and more particularly so in the female sex; the tone of the ground-colour varies considerably, from dirty white to dark grey in the male and equivalently in the brown colour of the female.

L. amandus, Schn. race *orientalis*, Stdgr.: Mt. Olympus, from 300 to 1700m. (Jnne).

L. argester, Bergstr. =*dorylas*, Schiff. =*hylas*, Esp. race *golgus*, Hüb.: Mt. Olympus, from 850 to 1200m. (August).

L. bellargus. Rott. race *fuscescens*, Tutt: From sea-level to 1500m. —My series is from Mount Olympus, at 300m.: I gen. *bellargus*, Rott., of the largest form to be met with in central Europe and with females having rather large and bright premarginal lunules; most of them with a blue suffusion at the base of the wings, above, and some very extensively, over the whole wing: June; II gen. *fuscescens*, Tutt, with a few individuals transitional to the southern race *etrusca*, Vrty.: August.

L. coridon, Poda, race *graeca*, Rühl: Mt. Olympus, from 850 to 1200 m. (August).—The series I have before me agrees most perfectly with all the features Rühl describes, comparing it with *apennina*, Z.; his words convey an excellent idea of its aspect, when set together with

emphasized, the reniform of a deep brown, and the orbicular, which is very small, reddish. The submarginal area of the forewing is occupied by a band of rusty colour which does not reach up to the apical angle. A spot of the same colour almost triangular, which sets out from the costa, runs parallel to this band for two-thirds of its length, on the upper portion of this spot one sees three small oblique whitish characters; finally one notices several other small marks of black colour between the costa and the first nervure. The surface of the hindwings is of a bluish-white with their inner margin reddish.

"The forewings of the female have the same markings as those of the male. but on a bistre ground, dotted with black-brown. The lower wings are of a bluish-white suffused with brown, and reddish on their margins.

"The underside of all wings is whitish suffused with brown in both sexes.

"The body of both sexes is the same colour as the wings. Antennae yellowish."

Calberla, *Iris*. I. 229, plt. XII. fig. 10 (1888), gives a figure of the ♀ of *trux*, a badly executed one, which he allocates to the *lenticulosa* of Dup. All the markings up to the outer transverse line are very indistinct, which is marked by a double curved line of black points on the veins, between which are found white points; the whole wing is dusky yellowish black grey, the orbicular and reniform stigmata show as black spots, and below the latter towards the margin the wing is palest.

Duponchel's figures and description of *lenticulosa* show the race to be different from any other form. The very distinctive, quite separated, submarginal and costal fasciae are quite distinctive. Features such as the double dotted transverse postmedial line, show it to be a *trux* form.

These figures, 5 and 6, may be compared with Hübner's figures 768 and 723 respectively. But Duponchel's figures have the feeling of stiffness and fig 5 is irrorated with red particles, which one does not meet with, in any examples I know, in such a pronounced and general fashion.

Lhomme in his *Cat. Lep. Franc.* recently published, omits all mention of the *lenticulosa* of Dup.

ab. *terranea*, Frr. *Neu. Beitr.* I. 63, *Züt.* 178 (1833).

Figs.—Frr. *l.c.* plt. 34: Warr. (Seitz) *Pal. Noct.* III. plt. 6: Culot *Noct.* I(1). plt. 14.

Orig. Descrip.—"The present Noctuid is a discovery of recent time. Hübner has already figured it on figs. 723-725, but this figure is very different from mine. On Hübner's plate, which I have, the figure is very poorly coloured and not recognizable. I bought these Noctuae for two years running from an insect-collector from the Valaisian country, in both sexes, and give my figures from them, of which the male varies extraordinarily towards the Hübnerian figure. I had the opportunity of comparing about a dozen specimens, and assured myself that this Noctuid varied uncommonly. But all showed conformity in the marking, especially on the underside of all the wings. This Noctuid comes very near *N. segetis* of Hübner. The chief characteristic of the dark examples is the pale powdering running into white before and after the stigmata, and the white row of dots which is visible on

the wing veins of the forewing towards the zigzag line. The ♂ has pectinated, the ♀ threadlike antennae. In size the two sexes show a slight difference. The ♂ is smaller than the ♀. The triangular, strongly dark brown shade on the costa of the forewing towards the apex is characteristic. The stigmata, particularly the reniform and the claviform, are strongly marked and very dark coloured."

ab. *olivina*, Stdgr. *Cat. Lep.* ed. 3, 152 (1901).

Figs.—Hb. *Samm. Noct.* 768, 769 : Warr. (Seitz) *Pal. Noct.* III. plt. 6 : Culot, *Noct.* I(1). plt. 14 : Frr. *Beitr.* II. 62 (as *trux*).

Orig. Descrip.—Gn. *Noct.* V. 279 (1882) var. A.—"I place under this variety all the examples with a pale grey or greenish ground, scantily powdered, markings partially obliterated, most frequently without claviform and orbicular stigmata, having the lower wings of an almost pure white in the ♂."

Stdgr. *l.c.* "Al. ant. viridescenti-vel violaceo-griseis."

The fig. 768 of Hübner is grey and not olive-grey, quite clearly a distinct form.

ab. *amasina*, Stdgr. *Cat.* ed. 3, 152 (1901).

Figs.—Warr. (Seitz) *Pal. Noct.* III. plt. 6 : Culot, *Noct.* I(1), plt. 14, figs. 5 ♂, 8 ♀.

Orig. Descrip.—"Al. ant. sordide griseis, in ♀ obscurioribus, linea transversa vel fascia media (umbra) nigricante."

Hampson, *Cat. Lep. Phal.* IV. 246 (1903) "Forewing fuscous grey, darker in female, with the medial shade blackish."

ssp. *alpina*, Splr. *Schm. Eur.* I. 163 (1905).

Fig.—*l.c.* plt. 35, f. 14c.

Orig. Descrip.—"In Wallis is found a reddish-brown *lunigera*-form which in no way differs from the ab. *rufescens*, Tutt (! !), and one may name this form *alpina*."

f. *conclamationis*, Trti. *Att. Soc. It. Sci. Nat.* LXIII. 71 (1924).

Fig.—*l.c.* plt. III. f. 12, 13.

Orig. Descrip.—"Not larger than very small *exclamationis*, L., from which its uniform lutescent cretaceous ground colour without any scattered markings and its compressed claviform do not suffice to distinguish it, however, it has the antennae of the ♂ with much longer cilia at the base and the complete absence of the brown collar of the former." The female is darker. Cyrenaica.

f. *pseudolunigera*, Trti. *Att. Soc. It. Sci. nat.* LXIII. 71 (1924).

Fig.—*l.c.* plt. III. f. 10.

Orig. Descrip.—"With black claviform and the orbicular spot clear and distinct." Cyrenaica.

ab. *rubrofusca*, Schaw. *Zeit. Oestr. Ver.* XVI. 35 (1931).

Orig. Descrip.—"Forewing, head and thorax dark red brown." Corsica.

ssp. *subalba* (Corti) Draudt. *Seitz. Pal. Noct. Sup.* III. 51 (1933).

Figs.—*l.c.* plt. 6c. 6d.

Orig. Descrip.—" Considerably darker stigmata and pure white hindwings in the ♂.

Agrotis, Ochs. and Treit. (1816-25). Most authors. [*Rhyacia*, Hb. (1822) Warr.-Stz. : *Euxoa*, Hb., Hamp., Corti, Meyr.] *vestigialis*, Hufn. (1765) ; Rott. (1776).

Tutt, *Brit. Noct.* II. 16 (1892) : Barr. *Lep. Brit. Is.* III. 281. plt. 124 (1896) : Stdgr. *Cat.* IIIed. 152. (1901) : Hamp. *Lep. Phal.* IV. 170 (1903) : Splr. *Schmett. Eur.* I. 164. plt. 35. 17 (1905) : South, *Moths. Brit. Is.* I. 202. plt. 104 (1907) : Warr.-Stz. *Pal. Noct.* III. 36. plt. 7i (1909) : Culot, *N. et. G.* I(1), 90. plt. 15. 8-9 (1909-13) : Corti, Seitz. *Pal. Lep. Supp.* III. 47.

Tutt took the *vestigialis*, Rott. (1776) as the type. Had it not been that Rott. had identified the unrecognizable description of Hufn. named *vestigialis*, the *valligera*, Schiff. *Verz.* (1775) would have been the name of the type, as assumed by many writers.

vestigialis, Hufn. *Berl. Mag.* II. (4), 422 (1765).

Orig. Descrip.—" White-grey ; the forewing powdered with brown, and with brown spots ; the hindwings wholly white-grey." A worthless description had it not been interpreted by Rott. *Naturf.* VIII. 107 (1776), a contemporary.

Illiger, *Verz.* 1800, points out that the *valligera*, Schiff. *Verz.* 80, is the *valligera*, Fab. *Ent. Sys.* III(2). 72, the *Bombyx clavis*, Esp., the *B. trigonalis*, Esp., and the *valligera*, Bork. IV. 551.

Fab., *Sys. Ent.* III. (2) 72, says that his *valligera* is that of the *Verz.* Schiff. p. 80.

Hübner's fig. 478 is the *valligera*, Bork., deep rich mahogany brown.

Frr. *Neu. Beitr.* I. plt. has 2 good dark figures, brown but not mahogany as Tutt says of *valligera*, Bork.

Godt. *Hist. Nat.* V. plt. 65, has 2 very good figures, the first the grey *vestigialis* ♂, the second a dark fuscous ♀ (*nigra* ?).

Warr.-Seitz. *Pal. Noct.* III. plt. 7i give ♂ and ♀ figures very like those in Godt. Light ♂ and dark ♀.

Ernst. and Engr., *Pap. d'Eur.* VII. fig. 441., give four upper-side figures of different shades. 441g is very dark with hindwings wholly uniform dark brown somewhat lighter near the base. The figures can hardly be called good.

Barrett. *l.c.* plt. 124 gives six figures ; 1 and 1a, ♂ and very dark ♀ ; 1b, has the ground colour tinged with yellow, a blotched dark reniform and hindwing with a much emphasized dark marginal band ; 1c, has the claviform deep black and extended as a partial central band to the inner margin ; 1e, is a dwarf hardly more than half the normal expanse with a pure white ground ; 1d, like 1c but with lighter ground colour.

Bork. *Naturg.* IV. 552, notes that it has been identified with the *clavis* of Hufnagel in error, and that Esper has taken the brown and the whitish-grey forms as two separate species *clavis* and *trigonalis*, quite without foundation, since a series of the species will contain a continuous row of forms, from the darkest to the lightest.

Esper included the species and forms of it as a *Bombyx*, as did Haworth.

Of *signata*, Bdv., de Villers took one specimen in Alsace and that was subsequently destroyed.

Of the Variation Barrett says "Rather variable. In the male the ground colour is sometimes whitish drab, and in such specimens all the markings are occasionally obscure and indistinct, so that the forewings are nearly unicolorous, but in other cases the stigmata are all strongly marked, while the other markings are almost obliterated. Olive-brown specimens are sometimes as obscurely or as sharply marked, and frequently the black spot between the two upper stigmata is obliterated. The more reddish forms are commonly well-marked, showing the lines, stigmata, and hind-marginal wedges to great perfection, and frequently those specimens are of slightly larger size. In the female the range of variation in colour is quite as great; these are occasionally of a pale drab, but more often dark reddish brown or deep olive- brown sometimes clouded with blackish, especially towards the middle of the dorsal margin, in others richly clouded with reddish, while the pale oblique stripe comes out most conspicuously; the stigmata are large and very dark, in a deep brown stripe, and the hind-marginal wedges and clouds very sharply defined. Sometimes a dark cloud along the costa unites with the upper stigma, in other cases the subcostal region is conspicuously pale. The thorax varies in depth of colour in conformity with the forewings, and the hindwings in both sexes follow suit—from clear, pure white in the palest males to pale greyish brown in the darkest; and in the females from pale grey, varied with white, to dark grey. Occasionally in both sexes the forewings are tinged with grey rather than brown. There is also a tendency to local variation, a peculiar faint shade of umbreous, for instance, in Lancashire specimens, differing a little from the various shades of reddish. All the variations melt insensibly into each other; it appears impossible to draw any definite lines of variation; yet the species has been loaded with varietal or synonymic names, which seem to have no definite application and to be of little importance."

The Names and Forms to be dealt with are as follow:—

vestigialis, Hufn. (1765) *Berl. Mag.* II. 422.—Rott. (1776) *Naturf.* VIII. 107.

valligera, Schiff. (1775) *Verz.* 80.

f. *trigonalis*, Esp. (1782) *Schm. Abbild.* III. 352, plt. 76, 6.

f. *clavis*, Esp. (1782) *l.c.* 319, plt. 63, 5.

[*valligera*, Fab. (1787) *Mant.* II. 158.]

clavifera, de Vill. (1789) *Linn. Ent.* II. 174.

f. *valligera*, Brk. (1792) *Naturg.* IV. 551.

f. *valligera*, Hb. (1802) *Samml. Noct.* 150.

f. *sagittifera*, Haw. (1803) *Lep. Brit.* 118.

ab. *signata*, Bdv. (1840) *Ind. Meth.* No. 855.

ab. *obsoleta*, Tutt (1892) *Brit. Noct.* II. 19.

ab. *brunneo-obsoleta*, Tutt (1892) *l.c.* 19.

ab. *nigra*, Tutt (1892) *l.c.* 19.

ab. *lineolata*, Tutt (1892) *l.c.* 20.

ab. *nigra-obsoleta*, Tutt (1892), *l.c.* 18.

ab. *albidior*, Ptrsn. *Lep. Fn. Est.* I. 166 (1902) : Culot (1909-13) *N. et G.* I (1). 90.
ab. *pallida*, Splr. (1905) *Schm. Eur.* I. 164.
ssp. *extersa*, Slast. (1911) *Hor. Ross.* XL. 71.
ab. *olivacea*, Hrtg. (1924) *Ent. Rund.* XLI. 45.
ab. *violascens*, Hydm. (1929) *Int. Ent. Zt.* XXII. 425.
ab. *pseudochretieni*, Hydm. (1929) *l.c.*
ssp. *amurensis*, Stdgr. ( )
ab. *angustipennis*, Bart. ( )

Tutt dealt with A. Whitish grey forms—(1) With distinct markings (*valligera*, Fb.), *vestigialis*, Rott. (2) With the wedge marks extended to outer margin, *lineolata*, Tutt. (3) *signata*, with more or less obsolete markings.

B. Greyish fuscous forms—(1) With distinct markings, *sagittifera*. (2) With more or less obsolete markings, *trigonalis*.

C. Pale reddish ochreous form—(1) With distinct markings, *clavis*.

D. Brownish or reddish brown forms—(1) With distinct markings, *valligera*, Bork. (2) With basal half brown, *valligera*, Hb. (3) With more or less obsolete markings, *brunnea-obsoleta*.

E. Blackish fuscous forms—(1) With distinct markings, *nigra* (var. B. Guen.). (2) With more or less obsolete markings, *nigra-obsoleta*.

clavifera, de Vill. *Linn. Ent.* II. 174 (1789)

Orig. Descrip.—" Alis purpurascentibus, inferioribus albis, stigmatibus fascia nigra junctis." " Alae superiores fasciis duabus nigris, quarum una inaequalis stigmata gerit et quasi clavem representat, altera saepe ovalis prope superius stigma. Insuper ante marginem plurae maculae nigrae, lanceolatae, transversae positae. Alae inferiores infra albae aut fuscae."

Hübner's fig. 150 (Tutt quoted 170 in error II. 19) is not typical and hence its name *valligera* designates a form. The name *valligera* having been already used by Borkhausen is not available for Hübner's different form f. 150, and we here substitute **pseudovalligera** to designate the brownish and reddish grey forms with distinct markings and with basal half of forewings brown.

ab. *albidior* Petersen, *Lep. Fn. Est.* I. p. 166 (1902).

Orig. Descrip.—" Many examples have a whitish ground colour."

ab. *pallida*, Splr. *Schm. Eur.* I. 164 (1905).

Orig. Descrip.—" Wholly paler, yellowish coloured and has more whitish hindwings." S. Russia.

ab. *extersa*, Slastshevsky, *Hor. Ross.* XL. 71 (1911).

Orig. Descrip.—" A uniform brownish grey, while no trace of the stigmata can be seen."

" Alis ant. fere unicoloribus, strigis transversis ambabus lineaque undulata vix pronuntiatis."

" The species varies very much; the usually sharp markings become more or less obsolete. This most extreme aberration in this direction I describe under the name *extersa*."

"The f.w. are almost unicolorous, brownish grey, beyond the outer transverse line in the centre paler. The two transverse lines are very indistinct, the waved line wholly obsolete, the claviform only indicated by a slight darkening. The whole cell 1b between the two transverse lines very faint, the position of the orbicular somewhat more distinctly darkened. Of the stigma itself no trace is observable." Warschau Dist.

Heydemann asks whether this really belongs to *vestigialis*.

ab. *olivacea*, Hartig. *Ent. Rund.* XLI. 45 (1924).

Orig. Descrip.—"Differs from *albidior* by its olive-coloured ground. Only the upper half portion of the claviform on the forewing becomes whitish. This stigma forms a wide olive-coloured spot to the inner margin, which unites the inner and middle transverse bands. The marginal and costal areas and the reniform are darkened olive colour. The orbicular whitish." S. Tyrol.

ab. *violascens*, Heydem. *Int. Ent. Zt.* XXII. 430 (1929).

Fig.—*l.c.* fig. 9.

Orig. Descrip.—"Inner margin and marginal areas and especially the costa are bright violet-rose tinted on the pale brown ground. Sometimes this appears only on the costa. Observed only on the ♂ ♂."—Pomerania, and Mecklenburg.

ab. *pseudochretieni*, Heydm. *Int. Ent. Zt.* XXII. 430 (1929).

Figs.—*l.c.* figs. 10, 11, 12.

Orig. Descrip.—"Diagnosed by the complete absence of the orbicular stigma." As in fig. 10 "in some examples there exists a black spot more or less effaced as a remnant of the obsolete orbicular." S. Tyrol.

Specimens with "somewhat narrower wings" which may occur anywhere have been named *angustipennis*, Bart. (Seitz.)

Specimens which are "predominantly dark, blackish often with dark costa and distinct dark transverse lines from the Apfel Mts. and Kentei are named ab. *amurensis*, Stdgr. (Seitz.)

The *tritici—cursoria—obelisca—aquilina—nigricans* Group.

Tutt devoted nearly 40 pages of his volume II. to the consideration of the species in this Group, the members of which are so extremely variant, that it has more than once been suggested that they represent but one very variable, widely distributed species. This view was particularly advanced in the *Jahrb. Nassau. Ver. Naturk.*, 1880-81, and referred to in the *E.M.M.* Vol. XIX. by Warren of Warr.-Seitz.

Tutt went into considerable detail to show, most entomologists thought conclusively, that each of the above names, except *aquilina*, represents a distinct species. 1892.

It is only right, however, to point out that F. N. Pierce, in *Genitalia of the Noctuidae*, p, 53, 1909, made the following remarks, "This Group is an example of failure of the genitalia for specific

classification, the points of difference being very minute. In Prof. Smith's work on the *Agrotidae*, he calls this group *Carneades*, and records some 120 species, mostly with the harpes so similar that he, in some cases, makes one figure do for 13 species."

Dr. Cockayne says (*in lit.*) "The larvae of *cursoria* is very different from that of the others."

Agrotis, Ochs. and Treit. (1816-25) most authors, [*Euxoa*, Hb. (1822) Hamp., Meyr. Corti.] *obelisca*, Schiff. (1775).

Tutt took the figure 123 of Hübner as the type. This was not so. A short and inadequate description of the species under the name *obelisca* was given by Schiffermüller, *Verz.* 80 (1775).

Orig. Descrip.—"Lepidopteron with pale or distinct orbicular and reniform stigmata. A fawn coloured, pale, rounded Noctua."

This was expanded by Schrank, in *Fuess. Neu. Mag.* II. 217 (1785).

"The size of *N. segetum*, the forewing reddish, dark brown, glossy; the reniform and the orbicular whitish; across the reniform is placed a narrow blackish equal-sided triangle, which the orbicular surmounts without being its colour (hence the name *obelisca*); to the middle of the ground lies another narrow streak, which runs out to beyond a third of the wing. The hindwing whitish, with brownish veins. Glossy."

Schrank says that the *obelisca* of Borkhausen is not that of the *Verz.* He also says that the *stichica*, Bork. has a great similarity with it.

Illiger, *Verz.* (1801), p. 258, agrees with these remarks, which he quotes.

Tutt, *Brit. Noct.* II. 28 (1892): Barr. *Lep. Br. I.* III. 353, plt. 133 (1896): Stdgr. *Cat.* IIIed. 151 (1901): Hamp. *Lep. Phal.* IV. 182 (1903): Splr. *Schm. Eur.* I. 161, plt. 35 (1905): South, *Moths Br. I.* I. 208, plt. 106 (1907): Warr. Stz. *Pal. Noct.* III. 26, plt. 5hi, 6a (1909): Culot, *N. et G.* I(1). 81, plt. 13, f. 9-11 (1909-13): Corti-Stz. *Pal. Noct. Supp.* III. 28 (1931).

It seems to be rather hopeless to unravel the tangle of names which have been used in these most variable and confusing species in this group of Agrotids. An endeavour has been made to give the various opinions of those entomologists who have considered the subject, and then to give the remarks of the late Dr. Corti, whose knowledge of the *Agrotidae* was unrivalled.

Tutt recorded 2 forms *ruris*: *ruris*, Hb. and *ruris*, Gn., and again 2 forms *villiersii*: *villiersii*, Hb.-Gy. and *villiersii*, Gn. The second use in each case cannot stand. In the case of *ruris*, Gn.; although placing *ruris* to Hb., Tutt completely ignored a description of the figure, "Reddish brown, with greyish costa," and gave his own description, "Reddish grey, with no costal streak." I rename it **ruris-guenèei.**

Tutt dealt with (1) the Hübner figure 124 as type. (2) The reddish-brown with grey costa, *ruris*, Hb. (3) Reddish grey, with no costal streak, *ruris*, Gn. (4) Deep violet brown, with white costa, *plectoides*,

Gn. (5) Pale purplish-grey, with yellow costa, *villiersii*, H-Gyr. (6) Greyish-ash, with an ochreous tinge and almost unicolorous costa, *villiersii*, Gn. (7) Blackish-vinous, with costa whitish, *hastifera*, Donz. and (8) The form finely dusted with grey and pale, *grisea*, Tutt.

Tutt placed the *pratincola*, Bork. to this species. Subsequent authors have placed this form to *tritici*, and have placed the *praticola*, Hb. to *obelisca*, *e.g.*, Hamp., Warr.-Stz.

Of Esper's *molothina*, Werneberg says =*ruris*, Tr. var. " Was placed to *velum* by H.-S. with a ?, but did not agree with it. Esper's *molothina* was found at Frankfurt a. M. and belonged to Gering's collection ; it is none other than one of the numerous varieties of *ruris*, Tr. The antennae are figured with too strong pectination, an error which often occurs in Esper's figures. In the description it was remarked on thus : The shaft is boldly stout and goes gradually to a fine point. The two rows of side fibres are also very stout and are directed perpendicular from the shaft. Just so are the antennae of *ruris*. The figure of the insect is like figure 535 in H.-S."

Illiger says, *l.c.* that Borkhausen's, *Naturg.* IV. 500, *obelisca* is not that of the Vienna List (Schiff.), but probably the *stichica*, Bork. is *obelisca* to which it has the greatest similarity.

Haw. *Lep. Brit.* erred in copying Hübner as *obeliscata*, p. 222.

The fig. 443 of Ernst. and Engr. of *obelisca* is too light and too large, otherwise it portrays the species.

The figure in View. *Tabell.* II. 60, plt. 3, 2, does not show the ordinary form of what we know as *obelisca* but probably designates the form *ruris*, Hb.

Owing to the uncertainty of the date of the Hübner-Geyer plates, authors have taken different dates for priority. Stdgr. *Cat.* 151 (1901) and Hamp. *Lep. Phal.* IV. 182 (1903), both treat *villiersii* under the author Gn., and omit to note that Hb. had described a different form under the same name. Both Stdgr. and Hamp. treat *hastifera*, Donz. as a true species. Hamp. treats *praticola*, Hb. as a synonym. Stdgr. places *fictilis*, Hb. as a synonym of *villiersii*, Gn.

Hübner's fig. 123. *Saml. Noct.* (1802), taken by Tutt as the type, is of a most unusual deep dull red coloration with no great emphasis of the costal streak which is light ochreous. I do not know this form. It appears to be a ♂ but the antennae are too thin. H.-S. describes this form with much red suffusion. Fig. 416 *ruris* (1808), is a more uniform ground, with an average emphasis of the costal streak ; ♂ , it is brown and not red.

Fig. 710 *fictilis*, Hb.-Gyr. (1826-8) is a bad figure for any *obelisca* form. A very large ♂ .

Figs. 869-870 *villiersii*, Hb.-Gy. (1834-41) are 2 very large *obelisca*, the former generally very pale ochreous ground, the latter a slightly browned grey ground, the markings of both being clearly defined and definite. The ♂ has well pectinated antennae. H.-S. says these 2 figs. are copied from the *Ann. Soc. ent. Fr.* (1837).

An examination of the figs. 567 and 710 *fictilis* of Hb. suggests *tritici* very strongly. The submarginal area arrangement of marking is never found in *obelisca*, whereas it occurs in forms of *tritici* or the *aquilina* form.

In the case of *villiersii*, Hb.-Gey. (1834-41), Splr. notes that the latter figures were copied from Gn.'s fig. in the French *Ann.* of 1837,

thus showing that Gn. was the prior user of the name *villiersii*. But as the quite diverse descriptions of the forms emphasize a strong distinction, it here also necessitates a distinctive name and we suggest that the Hb.-Gey. figure be called **villiersii-geyeri,** the "Pale purplish grey, with yellow costa," while Gn's. description, "Greyish-ash with an ochreous tinge, and almost unicolorous costa," form, retains the simple name *villiersii*.

Steph. *Ill.* II. 124, treats *obelisca* and *ruris* as two separate closely allied species. He refers to the extensive variation of these two forms; the stigmata of the latter sometimes nearly obsolete.

Godart, *Hist. Nat.* V. 124 refers to an American insect which in no way differs from the *obelisca* of Europe. (This is probably the species subsequently named *obeliscoides* by Gn.) On plt. LXIV. f. 3, is a good figure of a form with a wide dull white costal streak from the base to a point not far from the costa, much more emphasized than usual. Godt. considers that the *B. molothina*, Esper, belongs to *aquilina* and not here.

H.-S. *Bearb.* II. figs. 529-530 give ♂ and ♀. The h.w. of the ♂ has too great a contrast between the disc and bordering band and the ♀ seems of too dark a brown. Fig. 532 is a ♂, very red. Figs. 534-535 *ruris*, are much too variegated for this form. 534 is a bad figure. In fact all the figs. of this species of H.-S. are unusually poor.

Gn. *Noct.* I. (V.) 291, says that Godt. plt. 64, 3 is very bad, that the *obelisca*, Steph. is the *prati(n)cola*, Hb. 567 ♀.

Werneb. says, *Beitrag.* II. 117, that fig. 443 of Ernst and Engr. Vol. VII. is a very large *obelisca*, is nearest to fig. 532 of H.-S., but is lighter in colour, similar to *valligera*. His remarks are quite correct.

Werneb. says, *l.c.*, of figs. 444*a* ♂ and *b* ♀ that the ♂ is like the fig. 535 in H.-S. The ♀ with red-yellow head and neck and white transverse lines on the forewing was unknown to him. *ruris* fig. 446*b* is a var. of *ruris* 444*a* ♂.

Werneb. *l.c.* II. 178, says of Bork. IV. p. 553 *pratincola* that Treit. and H.-S. both cite this description to *tritici*, but the whole description particularly the size given and the similarity with *valligera* denotes that he himself held it to be *obelisca*.

Spuler, *Schm. Eur.* I. 161. plt. 35 (1905), gives 2 good figures, *obelisca* and *ruris*, and figures *hastifera* as a true species. He states that since Hb.-Gey's. figs. 869-70 were copies of Gn's figures, Tutt's statements are in error. But in view of the quite diverse descriptions by the two authors, one must assume that there are two forms, confused under the same name.

Culot, *N. et. G.* plt. 13 (1909-13) gives 4 figures. 9-10 ♂ and ♀ *obelisca*, good but do not show sufficient variation in markings and the pale streak is not emphasized sufficiently. 11 is the pale *villiersii*. 12 is a good figure of *hastifera* (which Culot treats as good species) and corresponds closely to our British form, a similarity recognized by Tutt.

Warr.-Stz. *Noct.* III. 27 (1909) treats *praticola*, Hb. and *declarans*, Wlkr. as synonyms; deals with *fictilis*, Hb. (710), *ruris*, Hb., *villiersii*, Gn., ab. *plectoides*, Gn. and describes the Ural Mt. form *carbonis*. He treats *hastifera*, Donz. as a true species. If Tutt's statement is correct that the British examples agree very closely with this form rather than with Hübner's *obelisca*, a further change of name is necessitated.

On plt. 5 the figures are, 5*h. hastifera, obelisca* ♂ and ♀; 5*i. villiersii*, ♂ and ♀, *ruris, fictilis*: 6a. *carbonis*. The basal colour of the whole plate is brown and the figures are more or less poor in colour except the last. The marking appears to be correct in design.

Of the Variation Barrett says:—"Very little variable, and this mainly in the shade of colour of the forewings, which in some specimens is of a paler purple-brown, in others, but more rarely, pale slate-brown; in some examples the first transverse line is complete, dividing the pale subcostal stripe." Isle of Wight specimens are generally of a greyer tendency.

Barrett reports "A specimen in which the first transverse line is very distinctly shown and more perpendicularly placed than usual."

The Names and Forms to be considered are:—
obelisca, Schiff. (1775) *Verz.* 80.
molothina, Esp. (1782) *Abbild.* III. 33, plt. 85, 1.
quadrula, de Vill. (1789) *Ent. Linn.* II. 286.
[*pratincola*, Bork. (1792) *Naturg.* IV. 553.]
obelisca, Hb. (1802) *Samml. Noct.* 123.
praticola, Hb. (1808-18) *l.c.* 567.
? ssp. *fictilis*, Hb.-G. (1825-28) *l.c.* 710.
f. *villiersii*, Hb.-G. (1834-41) *l.c.* 869. [=**villiersii-geyeri.**]
f. *ruris*, Hb. (1827) *l.c.* 416.
f. *villiersii*, Gn. (1837) *Ann. Soc. ent. Fr.* 173, plt. VIII. fig. 2.
[*obelisca*, H.-S. (1845) *Bearb.* II. 344.]
? ssp. *hastifera*, Donz. (1847) *Ann. Soc. ent. Fr.* 525.
ssp. *plectoides*, Gn. (1852) *Hist. Nat. Noct.* V. 292.
f. *ruris*, Gn. (1852) *l.c.* V. 291-2. [**ruris-guenéei.**]
ssp. *declarens*, Walk. (1856) *Lep. Het.* X. 347.
ab. *grisea*, Tutt (1892) *Brit. Noct.* II. 31. Barrett. *Lep. Br. Is.* plt. 133.
r. *carbonis*, Warr.-Seitz. (1909) *Pal. Noct.* III. 27. plt. 5hi. 6a.
ab. *badia*, Gillm. (1910) *Int. Ent. Zt.* IV. 145.
ssp. *corsicola*, Corti. (1931) Seitz. *Pal. Noct. Supp.* III. 29. plt. 31i.
r. *stephensii*, Heydmn (1933) *Int. Ent. Zt.* XXVII. 247. South *M. Br. I.* I. plt. 106. fig. 11 (1907).

Corti-Seitz. *Noct.* III. *Sup.* 28 (1931) calls *obelisca* "a difficult group of forms." He says that "the ab. *fictilis*, Hb. 710, illustrated in the main volume (III. 5i.) is no *obelisca* form." Also "The ab. *ruris*, Hb. illustrated on the same plate is not an *obelisca*. The ab. *villiersii*, Gn. is not an *obelisca* form." He goes on to say that "*obelisca* does not vary greatly"; "it is often very difficult to separate certain forms from *tritici, aquilina*, etc."; "the ab. *carbonis*, Warr., is a form of *hastifera*, Donz."

Corti, *l.c.*, confirmed the view of Warr. that *hastifera*, Donz. was a sp.; he treats *aquilina*, Schiff., as a true species; *ruris*, Hb., as a form of *A. temera*, Hb.; *villiersii*, Gn. (not Hb.) as a form of *temera*; and *fictilis*, Hb. (fig. 710) as a form of *A. temera*, but not *fictilis*, Hb. (fig. 479) which he places to *A. aquilina*, Schiff.=*hübneri*, Bdv.

quadrula, de Vill. *Linn. Ent.* II. 286 (1789).

Orig. Descrip.—" Alis deflexis, subincarnatogriseis, maculis quadratis nigris."

" Alae superiores incarnatofusca. Maculae ordinariae quadratae, nigrae, albido cinctae, praeter puncta tria nigra versus basin et aliud inter stigma superius marginemque exteriorem. Pars postica ejusdem alae obscurior videtur. Thorax hirsutus, vellere fusco. Omnes alae subtus exalbidae, atomis fuscis irroratae."

Tutt placed *praticola*, Hb. 567 (1808-18) to *tritici* although Gn. placed it to *obelisca*. Most recent authors place it to *obelisca*.

Original Descrip.—" The anterior wings are of a brownish grey colour with a slight reddish tinge, with an abbreviated, followed by a complete, double, transverse, basal line; claviform outlined in black, reniform and orbicular outlined in pale with a dark quadrate spot between them; a pale transverse elbowed line (beyond reniform) outlined in black (both sides), hind margin clouded with darker. Posterior wings whitish, outer margin dark grey." Tutt, *Brit. Noct.* II. p. 54. We would add that the part basal and succeeding wide lines each start from two deep black marks on the costa, and that the reniform (on the inside) and the orbicular (on the outer side) are partially emphasized by deep black edging.

ab. *declarens*, Walk. *Cat. Het.* X. 347 (1856).

" ♂. Pallide cervina; antennae subpectinatae; abdomen albido-testaceum; tarsi nigro fasciati; alae anticae lineis transversis indistinctis undulatis fuscis, margine exteriore cinereo nebulosa, orbiculari et reniformi ex parte nigro marginatis, hac magna obliqua subelliptica; posticae albae, marginibus subcinereis."

" ♂ pale fawn-colour. Antennae slightly pectinated. Abdomen whitish testaceous. Tarsi with black bands. Forewings with very indistinct, transverse, undulating, brown lines; a greyish tinge along the exterior border; orbicular and reniform with incomplete black borders, the former large, oblique, subelliptical. Hindwings white; borders slightly greyish."

ab. *carbonis*, Warr.-Stz. *Pal. Noct.* III. 27 (1909).

Fig.—plt. 6a.

Orig. Descrip.—" Has the ground colour purplish black, with the costal streak and upper stigmata pale and the cell deep black; all the lines indistinct." Uralsk.

ab. *badia*, Gillm. *Int. Ent. Zt.* IV. 145 (1910).

Orig. Descrip.—" Forewings, head and thorax dark red-brown in colour as in *A. segnum** ; abdomen and hindwings yellowish brown, the former darker than the latter. Basal streak on the forewing wanting; orbicular and reniform stigmata somewhat a little lighter, the former on the outside, the latter on both outer and inner side, marked with fine black (in the direction of the base from the margin); the former open outwardly, the latter both inwardly and outwardly; between the two stigmata a black brown square (the pyramidal apex of the orbicular is

* Now *sigma*, Schiff.

wanting). The median vein not white but of the ground colour. The claviform thin and longish emphasized with black, not very distinctly, the inner very indistinct transverse line upright. The outer transverse lines doubled, on the inner side somewhat lighter and therefore against the dark red-brown ground colour, standing out as a red-brown band. The angulated line obsolescent and only represented by 6 yellow-brown little spots before the darker outer part of the marginal area. The dark fringes are separated from the outermargin by a fine light yellow slightly waved marginal line. The costa of the forewing not becoming light but the same dark red-brown. Hindwings yellowish white, strongly darkened by brown powdering, especially the veins. Fringes yellow-brown, separated from the outer margin by a yellow border line, The cross vein of the hindwings sickle-like darkened." Rheinpfalz.

ssp. *corsicola*, Corti. Seitz. *Pal. Noct. Supp.* III. 29 (1931).

Fig.—*l.c.* plt. 3li.

Orig. Descrip.—" A very nice local race occurs in Corsica concurrently with the type form. Generally smaller and much more brightly marked, colour more inclined to be grey to grey-brown, the light transverse bands well developed. Costa and stigmata a delicate yellowish, like the transverse bands, subterminal line absent or very faint, outer marginal area very dusky." July. Schawerda suspects this form to be a separate species.

f. *stephensii*, Heydm. *Int. ent. Zt.* XXVII. 247 (1933).

Fig.—South, *M. Br. I.* I. plt. 106. f. 11 (1907).

Orig. Descrip.—" The males throughout similar to the figure given by South, only they are still smaller as in our native *tritici*. The ground colour of the forewings is not red-brown as in the inland *obelisca*, but grey-black with reddish undertone as in *c-nigrum*. The female is without this undertone, dull grey-brown. Transitions up to only a little less dark than *obelisca* appear to occur. The paleness of the costa, as in that, up to the reniform, which like the orbicular becomes yellow-white, is emphasized on the outside, finely by black and on the innerside filled in with grey. Marginal area blackish. Hindwings quite agree with South's figure, whiter than the Vienna *obelisca* and much less dark grey powdered. Those of the ♀ are wholly dark grey, not brown-grey, as in the typical form." Schleswig-Holstein.

Agrotis, Ochs. and Treit. (1816-25); most authors [*Euxoa*, Hb. (1822) Hamp; Warr.-Stz; Corti-Stz.] *nigricans*, L.

Tutt, *Brit. Noct.* II. 32 (1892): Barrett. *Lep. Br. I.* III. 331. plt. 130 (1896): Stdgr. *Cat.* IIIed. 149 (1901): Hamp. *Lep. Phal.* IV. 249 (1903): Splr. *Schm. Eur.* I. 160. plt. 35 (1905); South. *Moths Br. I.* I. 207. plt. 106 (1907): Warr.-Stz. *Pal. Noct.* III. 30. plt. 6h. (1909): Culot. *N. et G.* I(1). plt. 12 (1909-13): Corti.-Stz. *Pal. Noct. Supp.* III. 32 (1932).

Barrett has 9 figs.: Spuler has 1 fig.; South has 2 figs.: Warr.-Stz. 2 figs.: Culot 2 figs. All differing.

Esper. IV. plt. 135. 2-3. ♂ and ♀. Tutt was correct in his summary of the ♂ "reddish fuscous," with paler shade of stigmata, but the ♀ should be noted as having very pale ringed stigmata and conspicuous small pale blotches along the outer margin (not sagittate.) Bork. suggests the latter may be *xanthographa* (IV. 470). Esper. *l.c.* plt. 107 (labelled *pinastri*) is *nigricans* see *l.c.* p. 175 note. This figure is recognizable.

Treit. *Schmett.* V(1) (1825) treats *fumosa*, Hb., *fuliginea*, Hb., *carbonea*, Hb., *nigricans*, L., *rubricans*, Esp., as one species.

A very dull species with no markings of sufficient prominence to be given as characteristic. The extensive variation of the species has been that, examples here and there, which have had some character emphasized, have received names, with the result that we have a large number of named forms most difficult to determine, and different authors have used the same name for different varieties. For instance, *fumosa* has been used by Fab., Haw., Hb. and Godt. for different forms, (see later); and Warr.-Seitz. has named 2 forms *fumata* and *fumida* respectively; while Godt. has used *fuliginea* and Hüb. *fuliginea*, in each case depicting different forms. (See later.)

nigricans in Fab. *Ent. Sys. Emend.* III(2), 115. 346 (Schiff. *Verz.* 81. 19).

"Alis deflexis nigricantibus: stigmatibus ordinariis pallidioribus. L. *Fn. Swec.* 1220."

"Puncta aliquot minutissima ad marginem crassiorem."

fumosa, in Fab. *Ent. Sys. Emend.* III(2). 115. 348 (Schiff. *Verz.* 81. 18).

"Alis deflexis nigricantibus; striga-postica punctorum alborum."

"Nimis N. nigricans affinis. Differt tantum striga postica punctorum cuspidatorum alborum. Corpus totum nigricans."

Of the Variation Barrett says—"Variation in this species, in spite of the obscurity of its markings, is very considerable: in the ground colour especially—to umbreous, clay-red, purple-red, reddish-brown, pale brown and pale purple-brown, in the southern and eastern counties and in the fen districts; to blackish with yellow reniform stigma, in the north and north-west; and to almost jet black in Ireland. In some instances, irrespective of darker or lighter colour, the markings become distinct, and are even added to, a black spot preceding the orbicular stigma, and a square black or brown blotch occupying the space between that and the reniform stigma, is more distinctly yellow or is quite of the ground colour; in which last case all the markings are usually obliterated, leaving the wings unicolorous, or mottled with faintest possible black streaks. Of these the dull black or black-brown forms, with yellowish edging to one or both stigmata, were formerly looked upon as a distinct species under the name of *A. fumosa;* while those of more reddish colour, with the interspaces of the discal cell black, appear to have been known as *A. obeliscata;* and light red or clay-coloured specimens without the black interstigmatic spots as *A. ruris.* Another form of very dark purple-brown colouring, but the transverse lines and stigmata all yellowish, and the former rather spread and clouded, was known as *A. dubia.* A still more extreme form in which the yellowish colour runs in slender longitudinal lines is probably what was known as *A. marshallana*,

though this is not so certain; but the identity of all as one species has long been recognized, and all are so inextricably blended together by every shade of intermediate variation, that even as varietal names the value of these designations is doubtful. The last form appears to be the most rare."

Barrett reports a specimen "Having the purplish front margin of the forewings as in *A. ravida* which it curiously resembles."

"Another which has before the hind-margin a distinct row of short black wedges."

"A rich deep black, with the reniform stigma edged with yellowish, but the other markings very indistinct; its hindwings are not unusually dark." Howth near Dublin.

"The more brightly marked forms seem to preponderate in the Cambridge Fen district, but in most localities the dull obscurely marked varieties are in an immense majority."

Barrett's description of *marshallana* indicated above is quite different from both Westwood and Humph.'s figure and from their description; in neither is there any suggestion of radiation. In the figure there is no trace of "yellowish colour running out in slender longitudinal lines," the whole figure is very dark "sooty-brown" with markings in a slightly lighter shade, with the deep black showing as large irregularly ovoid blobs running longitudinally. The description and the figure do not agree at all, From Barrett's remark above he evidently did not feel certain about the form.

Barrett *l.c.* on plt. 130 gives 9 figs. as follow.

Another very difficult insect to figure. 1. a ♂, has white orbicular and white outline in basal side of reniform: 1*a*. a ♀ somewhat lighter with normal indecisive marking: 1*b*. normal ground with decisive, clear marking: 1*c*. dark ground with light (whitish) basal, subbasal, discal and submarginal series of small blotches: 1*d*. dark brown, not black, with only the hind marginal blotches and the reniform whitish: 1*e*. similar, but the same marking with the orbicular, dark cream not white: 1*f*. a lighter mottled form.

The Names and Forms to be considered are—

nigricans, L. *Fn. Suec.* 322 (1761) [Culot, *N. et G.* I(1). plt. 12, 6 (1909-13)].

ab. *rubricans*, Esp. *Abbild.* IV. 395, plt. 130 (1786).

ab. *fumosa*, Fab. *Ent. Sys.* III(2). 115 (1794)=?*fumosa*, Schiff. *Verz.* 81 (1775)=?*fumosa*, Gmel. *Ent.* 2574 (1788).

ab. *fumosa*, Hb. *Samml. Noct.* 153 (1802)=*fumosa*, Fab.

ab. *obeliscata*, Haw. *Lep. Brit.* 22 (1809).

ab. *ruris*, Haw. *l.c.* 221 (1809).

[ab. *fumosa*, Haw. *l.c.*] =*fumata*, Warr.-Stz.

ab. *dubia*, Haw. *l.c.* 222.

ab. *vilis*, Hb. *Samml. Noct.* 511 (1808-18).

ab. *fuliginea*, Hb. *l.c.* 602 (1818-23).

ab. *carbonea*, Hb. *l.c.* 700-1 (1823).

[ab. *fumosa*, Gdt. *Hist. Nat.* V. 264, plt. 70 (1824)] *cf.* Hb. 153=*fumida*, Warr.-Stz.

ab. *ursina*, Gdt. *l.c.* 271, plt. 71 (1824).

[ab. *fuliginea*, Gdt. *l.c.*, VI. 90, plt. 78 (1826)] =*fuliginea*, Hb.

ab. *marshallana*, Westw. *Br. Mths.* I. 122, plt. 24, 15 (1841).
ab. *rustica*, Ev. *Fn. Volg. Ur.* 193 (1844), *cf.* H.-S. II. 526 and 495.
[ab. *armena*, Ev. *Bull. S.N.S. Mosc.* 222 (1856)] *cf. tritici.*
ab. *pallida*, Tutt, *Brit. Noct.* II. 34 (1892). Cf. *uniformis*, Rougem. (see below).
ab. *flavo-pallida*, Tutt, *l.c.*
ab. *rufa*, Tutt, *l.c.*
ab. *striata*, Tutt, *l.c.* 35.
ab. *rufo-variegata*, Tutt, *l.c.* 35.
ab. *quadrata*, Tutt, *l.c.* 36. [Culot, *N. et. G.* I. (1). plt. 12. 7.]
ab. *ochrea*, Tutt, *l.c.* 36.
ab. *fusco-variegata*, Tutt, *l.c.* 36.
ab. *fumata*, Warr.-Stz. *Pal. Noct.* III. 31 (1909).
ab. *fumida*, Warr.-Stz. *l.c.*
ab. *uniformis*, Rouge. *Cat. Lep. Jura*, 94, plt. I. 6 (1903) = Tutt's *pallida* (1892) teste Rebel.
ab. *oppidicola*, Krul.
ab. **subradiata**, nov. ab.
ab. **radiata**, nov. ab.

Tutt dealt with the following forms.

A. Ground colour grey :—(1) ab. *pallida*—reddish tinge, stigmata and strigae almost obsolete. (2) ab. *flavo-pallida*—reddish tinge with stigmata and strigae yellow.

B. Ground colour pale reddish :—(1) ab. *rufa*—stigmata and strigae of a paler shade of ground colour. (2) ab. *ruris*—stigmata and strigae yellow. (3) ab. *obeliscata*—dark patch between the stigmata. (4) ab. *striata*—stigmata, transverse strigae and longitudinal dashes along the nervures bright ochreous. (5) ab. *rufo-variegata*—characteristics of (3) and (4) combined.

C. Ground colour dark reddish brown and reddish fuscous (1) ab. *rubricans*—stigmata and strigae of a paler shade of ground colour. (2) ab. *vilis*—transverse strigae and stigmata yellow. (3) ab. *quadrata*—dark quadrate spot between orbicular and reniform. (4) ab. *ochrea*—transverse strigae nearly obsolete, stigmata and transverse shades along nervures ochreous. (5) ab. *fusco-variegata*—characters of (3) and (4) combined.

D. Ground colour blackish-fuscous :—(1) ab. *dubia*—darker stigmata and strigae, white line at outer margin. (2) *nigricans*, L.—stigmata paler.

E. Ground colour blackish brown :—(1) ab. *fumosa*, Godt.—Smoky brown, paler strigae and ochreous reniform. (2) ab. *marshallana*—Sooty brown, yellow strigae, indistinct stigmata. (3) ab. *ursina*—Blackish-brown, darker transverse lines and stigmata, border of reniform white (almost unicolorous). (4) ab. *rustica*, Ev.—unicolorous except slightly paler orbicular and reniform.

F. Ground colour black :—(1) ab. *carbonea*—3 stigmata yellowish, transverse lines yellowish. (2) ab. *fumosa*, Haw.—2 stigmata yellowish, transverse lines pale grey. (3) ab. *fumosa*, Fab.—paler strigae and a row of white spots. (4) ab. *fuliginea*, Godt.—Smoky-black, unicolorous, except outline of stigmata rather paler.

And ssp. or ab. *armena*, Ev.—a pale local ssp. (See Tutt. *Br. Noct.* IV. 113). Now placed to *tritici* by recent writers. (See later).

Warr.-Stz. *Pal. Noct.* III. 31 (1909), notes 22 forms. He replaces *fumosa*, Gdt. (nec F.) by *fumida*, Warr., and *fumosa*, Haw. (nec F.) by *fumata*, Warr.

Corti-Seitz, *Pal. Noct. Supp.* III. 32 (1932) suppress as synonyms of the typical form:—*fumosa*, Hb.; *rustica*, H.-S.; *ursina*, Gdt.; *fuliginea*, Hb.; *carbonea*, Hb.; *uniformis*, Rgt.; and *oppidicola*, Krul.

Perhaps the Japanese *nigricans* forms a genuine subspecies. It is larger, darker, very often with reniform stigma with red or reddish centre.

fuliginea, Hb. *Samml.* 602 (1818-23).

Orig. Descrip.—Very dark black brown with intensely black squarish blotches (1) between the prediscal transverse line and the orbicular; (2) between the orbicular and the reniform; (3) beyond the reniform; and (4) apical but not touching the apex. No. (1) has a narrow extension to the inner margin; no. (3) a wide extension almost to the inner margin. The stigmata are uniform with the ground colour, but outlined with lighter dull surround. The claviform is not perceptible. These blotches do not touch the costa except the apical one. (Made from the figure 602.)

To this Tutt did not refer, but took Godart's figures, which are somewhat different from Hübner's figure, in shape and in the emphasis of the stigmata in the ♀, which give the impression of "markings on the moon," a raised lighter rim with a dark interior, but hardly worth separating by a distinctive name.

Hoffmann and Kloss, *Schm. Stierm.* 368 (1914) refer to an aberration without naming it in which the

"Basal and outer-marginal areas are black, the central area inclusive of the stigmata leather yellow. This colour runs on both upper wings very symmetrically."

ab. *uniformis*, Roug. *Cat. Lep. Jura.* Plt. I. f. 4.

Vorbrot "Schm. Schweiz." I. 276. "Is very certainly only an especially pale, brown grey" *nigricans*.

ab. *subradiata*, nov. ab.

Dr. Cockayne has submitted the following description of an apparently hitherto undescribed form.

Orig. Descrip.—"With medium-brown nervures, orbicular, reniform and claviform outlined with blackish-brown and orbicular with brown dot in centre. There is a slight brown suffusion on forewing—a band across wing and a little suffusion near inner margin (base) and between nervures 1 and 2 base. The rest of wing is a dirty cream. It has a curious radiatad appearance."

ab. *radiata*, nov. ab.

Orig. Descrip.—"In this form the radiation is the outstanding feature of two specimens in my own collection. The waved line and the outer marginal line are emphasized on the veins by light straw coloured dots, each in one transverse line is joined to the corresponding dot on the other transverse line by a light connection along the vein. The wing colour is that of dry earth, lighter in one specimen than in

the other. The stigmata are partly outlined with black, less apparent in the lighter specimen, but shown up in the other by a square deep black space between the orbicular and reniform." Both from the eastern coast of England.

The above two forms are quite different and form a section to add to Tutt's analysis. G. Radiated forms.

Agrotis, Ochs. and Treit. (1816-25) most authors [*Euxoa*, Hb. (1822), Hamps., Warr., Corti.] *cursoria*, Hufn. (1766).

Tutt *Brit. Noct.* II. 39 (1892) : Barrett *Lep. Brit. Is.* III. 324. plt. 129 (1896) : Stdgr. *Cat.* IIIed. 148 (1901) ; Hamp. *Cat. Lep. Phal.* IV. 248 (1903) : Splr. *Schm. Eur.* I. 159. plt. 35 (1905) : South. *Moths Br. Is.* I. 206. plt. 106 f. 1-4 (1907) : Warr. Seitz. *Pal. Noct.* III. 30. plt. 6g (1909) : Culot. *N. et G.* I(1). 72. plt. 11. f. 13. 15-18 (1909) : Corti-Seitz. *Pal. Noct. Supp.* III. 29. plt. 3l. 4a (1932).

South has 4 excellent figures. Warren-Seitz. has ♂ and ♀ figures, but the general colour does not convey that of the ordinary *cursoria*.

Spuler. *l.c.* plt. 35. 1 is not a good figure, colour unrecognizable.

Warr.-Seitz. *l.c.* gives figs. of a ♂ and ♀ quite good ; the ♂ grey not ochreous, ♀ markings well contrasted.

Culot *l.c.* fig. 13 is an ochreous form, but not ab. *ochrea*, which is shown in f. 18. Figs. 15-16 both dark forms darkish brown with reddish tint and transverse markings, probably represent ab. *brunnea*. Fig. 17 is called ab. *sagitta*, comparable with Hübner's figure 596.

Barrett, *l.c.* plt. 129. 11 figs. 1 and 1*a*, ♂ and ♀ , are the only figures which suggest this species. 1*b* suggests a very light *graminis* : 1*e* somewhat resembles *cinerea* : 1*h* might be a *tritici* : 1*i* a very black brown insect with indistinct markings and aberrant shaped and broad forewings may be anything ; perhaps *nigricans*.

Corti-Stz. *l.c.* plt. 3*l*, *currens*, is a dark brown, not red brown, form. (Stdgr. does not give the ground colour in his description, but Hampson says that the h.w. are entirely suffused brown, which in this figure is not so.) On plt. 4*a* is good fig. of the *sagitta* form. Plt. 3*l* has a good figure of *obscurior*, which appears to be a *cursoria* form and certainly not a *tritici* form to which species it has been hitherto placed.

Of the Variation Barrett writes :—Variable in an extraordinary degree, hardly two specimens being precisely alike, and all the varying shading insensibly into each other through intermediates. The varieties in colour and marking seem to extend equally to both sexes, and even with regard to the hindwings there is apparently no strict rule. Most of the forms are in some degree local.

In the forms ranging more particularly around the type the ground colour varies from brownish-buff to pale buff, yellowish-brown, reddish-brown, dull umbreous, and greyish-brown, throughout its area of distribution ; in eastern districts to whitish-brown or even slate-white, while in the west the more umbreous tints prevail, intensified in the west of Ireland to an exceedingly dull sordid umbreous, and blackish brown. In nearly all cases the colour of the upper part of the

thorax follows that of the forewings. In some of those already mentioned the transverse lines of the forewings are distinct, as also are the transverse clouded markings, and brown blotches are noticeable between and beyond the stigmata and outside the second line; in others the lines are distinct but the clouded markings absent, or the lines have disappeared and the clouding has taken possession; the upper stigmata moreover are white, or white with a brown central cloud, or obscure and devoid of white, or nearly imperceptible; the nervures range from whitish to yellowish or very pale brown, or are concolorous with the rest of the wings, or very often a portion of the median in the middle area is marked with a stouter straight whitish line. In individuals where the dark clouding is absent and the transverse lines are conspicuous, the stigmata are sometimes almost obliterated and the first and second lines drawn nearer together, duplicated and formed into a very pretty pattern quite unlike the ordinary forms. In other cases the lines also disappear, and the forewings become unicolorous yellowish brown, except that a brown spot then shows itself in place of the reniform stigma. In the grey-white or slate-white varieties, which seem confined to the east coast, and are rare there, the markings are usually neat, small, sharp, often abundant, the pale nervures edged with darker, and the lines well but slenderly marked; more rarely these, following the example of the brown forms, have the markings mainly obliterated; but on the north east coast of Scotland they are sometimes found much intensified and blackened.

On the Lancashire coast a form is not uncommon of a dull pale umbreous with the transverse lines and the upper stigmata indistinct, but the claviform stigma, a spot before the orbicular, a square blotch between it and the reniform, and a central basal streak all blackish. All along our eastern coasts, in company with the paler forms already described is a range of far more beautiful varieties, having the ground colour smooth yellowish-brown, or whitish-brown, shading off to fawn colour, having a very smooth creamy appearance from the absence of the usual umbreous clouding. In these the dark crescents on the collar are often black or deep brown, the transverse lines are sometimes slenderly distinct, but more frequently absent; there is a broad white or whitish-brown straight stripe from the base along the subcostal region, the two upper stigmata are wholly white or but faintly clouded with brown, coalescing with the stripe, the claviform stigma is distinct, edged or filled with brown or black, and the large squared blotch between the reniform and orbicular stigmata is either rich dark brown, bright brown, or black; very often also the space beyond the reniform stigma is richly clouded with fawn colour. Other specimens have the white subcostal stripe joined to the two white stigmata, but are devoid of the dark spots and clouding of fawn colour, and lean towards the whitish-grey varieties. Others more particularly from the coast of Aberdeenshire and Kincardineshire, are most exquisitely coloured, the markings just described intensified, the subcostal stripe, the two upper stigmata, and the median nervure snowy-white, the claviform stigma and the spots before and between the stigmata brilliant black, the hind margin blackened, and the middle of the wing clouded with rich purplish-red, shading off to brownish-white, or ashy-white. Another beautiful form from the same district is dark purple-brown or red-brown with the transverse lines black, the two upper stigmata dark with sharp

white outlines, the claviform black margined, and the hind-margin rich dark purple-brown. An extreme variety from the Aberdeen district is deep black-brown but showing the typical shape of the elbowed second line; others have the central portion of the forewings entirely deep black or black-brown, and the transverse lines obliterated; others again in unbroken sequence shade off to dull dark brown, pale brown and pale buff, all the typical markings more or less obliterated until the species is hardly recognisable; one specimen is of the colour and appearance of *chenopodii*, another bears a most curious resemblance to *Agrotis suffusa*, and a dark purple-brown example so closely resembles one of the varieties of *A. tritici* that it can only be recognized with any certainty by its underside. A curious form from the Orkneys is dark slate-colour, smooth and unicolorous except the two whitish stigmata; others from that locality are much more ordinary. Those obtained from Unst, Shetland have the rich fulvous or tawny-colouring, with strong markings, like those from Aberdeenshire, and they vary comparatively little. [Dr. Cockayne, from personal knowledge of this area, does not consider this statement as correct.]

In many of the forms the hindwings are occasionally quite white, or on the other hand wholly tinged with greyish-brown, but in the vast majority the grey brown hind-marginal band is more or less visible.

The underside of the forewings is far more constant than the upper, the hind marginal space, beyond the dark stigma and stripe, being always pale and shining, often white. By this the species may be recognized when all the characters of the upper side seem to have been lost.

He records a specimen "almost smooth straw-colour, but with the transverse lines thick and complicated, the spaces between stigmata and hind-marginal cloud red-brown, and the whole wings beautifully variegated."

The Names and Forms to be considered are as follow;—

cursoria, Hufn. (1766), *Berlin Mag.* 496.
ab. *mixta*, Fab. (1787), *Mant.* II. 144: (1794), *Ent. Sys.* III. (2), 36.
f. *sagitta*, Hb. (1808-18), *Samml. Noct.* 596.
f. *armena*, Ev. (1856), *Bull. Mosc.* 222.
ab. *obscura*, Stdgr. (1871), *Cat.* IIed. 86.
ssp. *cespitis*, Swnh. (1885), *Trans. Ent. Soc.* 349.
ab. *caerulea*, Tutt (1892), *Brit. Noct.* II. 41.
ab. *costa-caerulea*, Tutt (1892), *l.c.*
ab. *puncta*, Tutt (1892), *l.c.*
ab. *pallida*, Tutt (1892), *l.c.* 42.
ab. *distincta*, Tutt (1892), *l.c.*
ab. *obsoleta*, Tutt (1892), *l.c.*
ab. *obsoleta-puncta*, Tutt (1892), *l.c.*
ab. *ochrea*, Tutt (1892), *l.c.*
ab. *brunnea*, Tutt (1892), *l.c.* 43.
ab. *marginata*, Tutt (1892), *l.c.*
race *obscurior*, Stdgr. (1892), *Rom. Mem.* VI. 420.
ab. *sagittata*, Stdgr. (1896), *Iris*, IX. 249.
ab. *currens*, Stdgr. (1896), *l.c.*
ab. *vaga*, Stdgr. (1896), *l.c.* 250.

race *asiae-minoris*, Strnd. (1915) [*Cat. Lep. Phal.* IV. 249 (1903)], Strnd. *Arch. Naturg.* LXXXI. Abt. A. Heft 12, p. 144 (1915).
f. *mülleri*, Hanel. (1920), *Int. Ent. Zt.* XIII. 185.
ab. *nigrescens*, Hanel. (1920), *l.c.*
ab. *nigrovittata*, Hanel. (1920), *l.c.*

Tutt dealt with—A. Ground colour slaty-grey. (1) *caerulea*, without pale costa. (2) *costa-caerulea*, with pale costa.
B. Ground colour greyish-white (slightly ochreous). (1) *armena*, with obsolete markings, and white hindwings (now treated as a separate species). (2) *mixta*, with distinct transverse markings. (3) *pallida*, with longitudinal markings.
C. Ground colour yellow-ochreous. (1) *obsoleta* with obsolete markings. (2) *cursoria*, with distinct transverse markings. (3) *ochrea*, with longitudinal markings. (4) *obsoleta-puncta*, with a black spot in lower part of the reniform.
D. Ground colour brown, with a reddish tint. (1) *obscura*, with obsolete markings. (2) *brunnea*, with distinct transverse markings. (3) *sagitta*, with longitudinal markings.
And Tutt also placed *puncta* to *armena*; described an extreme *pallida* = *distincta*, Tutt; and named as *marginata* = an extreme *brunnea* with whole of wing to the subterminal line of a deep blackish fuscous.

It seems quite impossible to determine the value of some of these Agrotid names. No two authorities on the continent agree on the determination and even in Seitz we meet with uncertainty and acceptation of opinion. I can only include opinions as I find them.
Warr.-Seitz places *armena*, Ev. as a true species but states that it resembles *cursoria* but is paler. This therefore carries ab. *puncta* with it.
The *obscura*, Stdgr. *Berl. Ent. Zt.* (1870), 113, should probably be placed to *armena*, see Corti-Seitz. This is probably the ab. *obscura* of Stdg. *Cat.* Ed. II. (1871) of which Tutt says that, he has "never seen any British specimen in any way resembling them." "Al. ant. fere totis rufo-brunneis."

Race *cespitis*, Swinh. *Trans. Ent. Soc.* (1885) 349.
Fig.—*l.c.* plt. 9. f.4.
Orig. Descrip. "Very pale fawn colour; thorax with a slender brown band in front; abdomen whitish; tarsi with black bands; forewings with pale brown marks on the costa, mostly in pairs; a dark brown sinuous marginal line; orbicular spot, long, large and club-shaped, with brown border; claviform long and narrow; reniform large, with incomplete brown borders; an interior and exterior brown irregular undulating line; fringe pale cinereous with a brownish line running through the centre of it; hindwings white, tinted with fawn colour towards the costa." Quetta. Aug. and Sept.

Race *obscurior*, Stdgr., "*Rom. Mem.*" VI. 420 (1892).
Fig.—Corti.-Stz. *Pal. Noct. Sup.* III. plt. 31.
Orig. Descrip.—"Dorries sent me two specimens from Suifun (Amur-gebiet) which, as both those found by Graeser at Nikolajewsk and Chabarowka, come near the dark ab. *eruta*, but have the markings

of r. *aquilana*. Seven specimens, which the younger Dorries sent from the Lutshan-Gebiet, are similarly dark, as those from Suifun, and one is quite justified in naming these dark Amur-forms as var. *obscurior*."

This race has been attached to *tritici* hitherto, but Corti.-Seitz. *Pal. Noct.* III. *Sup.* 29 (1932) says "Probably the almost red-brown form from Berlin, the Baltic Provinces, Russia and Sarepta and also in England and denominated hitherto as ab. *obscurior*, Stdgr. is a definite variety," of *cursoria*.

Hampson's note *Cat. Lep. Phal.* IV. 294 (1903) "Similar to *eruta* but blacker," is apparently an error of identification. [*eruta* = Fuscous brown, irrorated with grey, the markings indistinct.]

ab. *sagittata*, Stdgr. *Iris*. IX. 249 (1896).

Orig. Descrip.—"Pale sand-grey. As ab. *sagittata* I must name those divergent specimens which were sent mostly as *sagitta*, Hb. of the European *cursoria*. The chief characters of the forewings of this often occurring aberration are a lighter (whitish) costal streak, lighter, mostly dark margined, upper stigmata, and forewings less marked by transverse and longitudinal lines. But there occur all intermediates from the typical form to this ab. *sagittata*. Really typical ab. *sagittata* occurs singly but rarely under the var. *currens*."

l.c. Kozhantochikov says that the "ab. *sagittata*, Stdgr. (=*sagitta*, H.-S.) is a genuine separate species." Hübner's fig. 596 is a bad shape ♂. Her.-S.'s fig. 26 is ♀ and lighter in ground colour but with brighter stigmata. Hübner's fig. is much brighter rufous-brown, but the stigmata are not pronounced. Some Aberdeen and Shetland specimens resemble Hb. 596.

Hampson.—"Fore-wings suffused with red brown, the costal area to the post-medial line, the orbicular and reniform and the area before the subterminal line, whitish." *Cat. Lep. Ph.* IV. 248 (1903).

r. *currens*, Stdgr. *Iris*, IX. 249 (1896).

Orig. Descrip.—"This very variable species was sent in large numbers particularly from Jedirin-Gol. Alpheraky most probably sent specimens varying from one another, and therefore I said to myself 'We have from Ourga (also certainly from eastern Changai) all the forms and all the intermediates and I can only see *Ag. cursoria*, which varies immensely.' He has judged aright, but I find that these Mongolian specimens are throughout different from our German (European) *cursoria*, and that they should have a distinctive name as var. *currens*.

"They are mostly somewhat darker, especially on the hindwing and on the underside, the forewings are often more strongly (transverse) marked, etc. Frankly there is no good defined difference, many examples of this v. *currens* cannot be distinguished from European *cursoria*."

Hampson.—"Darker; hindwings entirely suffused with brown." Central Asia, *Cat. Lep. Ph.* IV. 248 (1903).

The variety *currens*, Stdgr. *l.c.* is according to Filipjef "synonymous with *detorta*, Ev.," a *tritici* form, Seitz-Corti. *Pal. Noct. Sup.* III. 32.

r. *vaga*, Staud. *Iris*, IX. 250 (1896).

Orig. Descrip.—"Another form I note as ab. *vaga* from 9 examples

lying before me; I am not certain whether they all really belong to v. *currens*. Their forewings are almost more like those of *obelisca* ab. *ruris*, Hb. than those of *cursoria*, they also resemble somewhat the more typical *conspicua* or *saucia* v. *margaritosa*, both of which last species are quite separable by their much larger size. One specimen of this apparently ab. *vaga* form is quite large, 45mm. (others are only 36-40mm.), and it appears to me therefore especially as a pale aberration of *cursoria*; but I can separate it only by its size from the other *vaga*. Further these ab. *vaga* are distinguished only by the more uniformly toned markings of the forewings, and by the underside of the hindwings, the costal parts being somewhat more thickly darkened than the usual v. *currens*."

l.c. Corti-Seitz says "The ab. *vaga*, from Ulias established by Staudinger is a variety of *adumbrata*, Ev." Corti.-Seitz *Pal. Noct. Sup.* III. 28.

Hampson.—"Forewings uniform brownish grey." Central Asia. *Cat. Lep. Ph.* IV. 248 (1903).

ab. *asiae-minoris*, Hamps. [*Cat. Lep. Ph.* IV. 249 (1903)] : Strand. *Arch. Naturg.* LXXXI. Abt. A. Heft. 12. p. 144 (1915).

Orig. Descrip.—"Hindwing entirely white." Asia Minor.

This is close to *armena* apparently, which is wholly "greyish-white" with mostly obsolete marking.

ab. *mülleri*, Hänel. *Int. Ent. Zeit.* XIII. 185 (1920).

Original Descrip.—"For the most part agrees with the form *sagittata*, Stdgr. but with complete absence of the inner and outer waved lines on the fore-wings." Dievenow, Charlottenburg.

ab. *nigrescens*, Hänel. *Int. Ent. Zts.* XIII. 185 (1920).

Original Descrip.—"General colour of the fore-wings black-brown, with the exception of a fine, pale yellow frame surround of the orbicular and reniform stigmata, as well as the submarginal line." Dievenow, Charlottenburg.

ab. *nigrovittata*, Hänel. *Int. Ent. Zts.* XIII. 185 (1920).

Orig. Descrip.—"Forewings—Ground-colour yellow-brown. Space between the inner and outer waved lines dark brown. The darkening extends to the inner margin, the foremost part of this space above the subcostal vein, yellowish." Dievenow, Charlottenburg.

Agrotis, Ochs. and Treit. (1816-25). Most authors. [*Euxoa*, Hb. (1822) Hamp., Warr.-Seitz., Corti.-Stz.] *tritici*, Linn. (1761).

Tutt says, *Brit. Noct.* II. 43. "If there is any British species more variable than all others this is probably the species." And again, "Great as are the differences between the different forms, it is entirely in different shades of ground colour, and suppression or special development of markings, that the variation takes place."

Each writer who takes up this *tritici* species, or group of forms? (species?), seems to disagree with previous authors and yet is unable to really make our knowledge more definite. The fact, that Pierce was

unable to use the result of his genitalic examination to separate definitely the species *obelisca*, *nigricans*, *cursoria*, *tritici* and *aquilina*, makes the difficulty still more. He remarks, *Genitalia of the Noctuidae*, p. 53 that, " This group of five species is an example of a failure of the genitalia for specific classification, the points of difference being very minute."

Hence, without an enormous amount of material, it seems futile to discuss these forms and with a list of the names imported into this species, a summary of the various opinions of the chief recent authors, and the original descriptions not given in Tutt's volume, one must perforce leave the fuller investigation to the future.

Possibly the best method of dealing with the names would be to take one form by itself and thoroughly investigate it in all its connection as P. Curtis has done with *pseudogothica* (*subgothica*, Haw.).

Tutt, *Brit. Noct.* II. 43 (1892) : Barrett, *Lep. Br. Is.* III. 336, 347 (*aquilina*), plts. 131-2 (1896) : Stdgr. *Cat.* IIIed. 150 (1901) : Hamp. *Lep. Phal.* IV. 293 (1903) : Splr. *Schm. Eur.* I. 160, plt. 32, f. 6 (1905); South, *Moths Br. Is.* I. 207, plt. 106, 7-11 (1907) : Warr.-Stz. *Pal. Noct.* III. 35, plt. 6k (1909) : Culot, *N. et G.* I(1). 76, plt. 12, f. 11-18; plt. 13 (1909-13) : Corti-Stz. *Pal. Noct. Sup.* III. 33, 26 (*aquilina*), plt. 4ef and 3gh (1932) [the continental species *aquilina* is meant.]

Barrett, *l.c.* on plts. 131-132, gives 18 figs. (including 3 of *aquilina*).

Hardly two examples of this species agree so that one can pick out scarcely any form with strong outstanding characters. 1d. on plt. 181 is uniformly brown like *oleracea*, with a fine white submarginal line and white encircled orbicular and reniform : several other figures have strong white markings : the *aquilina* figures are dominated by brown with markings of a lighter or darker shade of brown.

South, *l.c.* plt. 106, gives 5 figs. all of which are dominated by the general rich brown coloration of the plate and give no idea of the beauty of many of the variegated forms of this species.

Warr.-Stz. *l.c.* plt. 6k. gives three figures : *tritici* with no white markings, the costal streak apparent, but not emphasized, except by smoothness ; *aquilina*,a brown form, larger ; and *eruta*, small with grey suffusion over dark ground, markings more or less present.

Culot, *l.c.* plts. 11, 12, 13, gives ten figures : 11, 14 *tritici*, a grey brown with fairly obvious markings ; 12, 11 *tritici*, a brown almost uniformly coloured specimen with a few cloudy markings ; 12, 12-13 *subgothica*, well marked with light and dark, one with whitish costa ; 12, 14 *eruta*, a deeper brown form ; 12, 15 *fumosoides* another brown form with smoky marking ; 12, 16 *costa-fusca*, a grey variegated form ; 12, 17 *siepi*, a uniform medium-brown form with black transverse lines before and beyond the stigmata ; 12, 18 *aquilina* ab. *unicolor*, a light brown-ochreous form with scarcely any markings ; 13, 1 *aquilina*, a blackish brown form with lighter orbicular, reniform and other markings.

The names given to some of these figures are open to criticism.

Corti-Stz., *Pal. Noct. Sup.* III. plt. 4 ef. give 4 figures of *tritici* forms, two of which are of new forms ; *insulana* ; *reisseri* ; *sagittifera*, Steph. ; and *pseudogothica*, P. Curt. They give on plt. 3gh. figures of *aquilina* treated as a species, and of the forms *rabiosa*, new ; *falleri* ; *distincta* ;

and *obscurior*. The following are also figured and treated as true species;—*siliginis*, Gn.; *vitta*, Esp.; and *siepi*, Obthr. on plts. 4f., 31., and 3e. respectively.

Barrett, *l.c.* says of the Variation:—"Variation in this species is so extensive as hardly to be defined by words, while all the forms, however extreme, are so completely united by intermediate gradations that no satisfactory line can be drawn between any of the different varieties, though the names which have been applied to them are sufficiently numerous. The ground colour varies from whitish-brown through all shades of wainscot brown, greyish-brown, reddish-brown, umbreous, chocolate-brown, and rich purple-brown, to deep brown-black. Specimens may even be found, though rarely, of a pale slate-grey, or whitish-grey, and others of a soft fawn colour. In my own experience such as these have occurred in Norfolk, where, on the other hand, I have found my blackest specimens. Elsewhere the blacker forms seem to be more particularly confined to the west coast of Ireland and the north and west coast of Scotland. In markings the variations are perhaps a little more defined. Ordinarily in all the variations of ground colour the orbicular and reniform stigmata are visible, either wholly pale or with pale margins; though in size the orbicular is far from constant. With these, especially in the coast forms, is usually the pale subcostal stripe—white, yellowish-brown, brownish or even reddish—and in a considerable proportion of them a whitish line branches off from the stripe along the median nervure. In all these distinctly marked specimens there is a general tendency to clear, smooth colouring, often beautifully shaded, and to distinctness of the transverse lines, of the black wedges before the subterminal line, and especially of the deep black spaces before and between the stigmata; and these various characters are combined or separated in every proportion and variation of arrangement. It is also a curious circumstance that these well-marked and handsome forms, in all the colours, seem to be confined, or almost confined, to the coast and to the stretch of ancient coast in the west of Norfolk and Suffolk, known as the Breck Sands. In Sherwood Forest a deep purple-brown form prevails, but the usual inland forms, found mainly upon heaths, are pale umbreous, mottled all over the forewings with darker umbreous, sometimes showing the stigmata faintly paler, or the transverse lines rather darker, but often all obscured by the brown mottling. In these the only distinct marking is sometimes a well-defined dark brown cloud lying along the hind-margin beyond the subterminal line. Perhaps the tendency of this range of variations may best be expressed by stating that the more extreme forms bear in some cases a most curious resemblance to *Caradrina cubicularis* and in others to *Hadena chenopodii*. In the coast varieties very curious resemblances also occur, setting aside the constant resemblance of the browner forms to the very closely allied *A. aquilina*, some take a purplish or lilac shade which makes them resemble *A. obeliscata*; others, with rich fawn colour, a somewhat more distant approach to *A. agathina*; while in other purple-red forms an occasional specimen shows so red a subcostal stripe as to remind one of *Noctua plecta*, and I have a specimen from the N. of Ireland, which, but for its far narrower wings, would surely be mistaken for a red *N. xanthographa* with distinct yellowish stigmata. These suggestions may seem fanciful,

but the actual resemblances are rather startling, and no method suggests itself by which they may be realised so good as that of pointing out the species which seem to be imitated. That there is *actual* imitation is not, for a moment, to be supposed. Perhaps the most curious apparent imitation is that to a N. American species—*A. subgothica*; of this a fine example is before me. Its general colour is rather dark umbreous, stigmata paler but not strikingly so, the orbicular small and oblique, the subcostal stripe very pale brown, and from it, just before the orbicular stigma, a similar pale brown stripe obliquely down the wing straight towards the anal angle. This oblique stripe appears completely or partially in occasional specimens of other colourings and markings, which do not at all resemble *A. subgothica*, and it is perhaps most frequent in an east coast form having whitish-brown or very pale wainscot-brown ground colour, the forewings of which are also very narrow." [On p. (48) above, line 7 from bottom read *obelisca* and not *obeliscata*.]

Barrett records the following individual forms.

1. "The usual dark markings are of a rich velvety black, purple-black and purple-brown, the subcostal stripe clear white, and in some, the median nervure, the first line and the two stigmata outlined with the same; others have the subcostal stripe yellow." Scotland, N.E. Coast.

2. "It resembles *A. obelisca* in some degree, but is more dull in colour and devoid of the pale subcostal stripe; transverse lines distinct, black; stigmata of the ground colour but outlined in black; otherwise unicolorous. Hindwings dull pale grey." Dumfriesshire.

3. "A remarkably delicate light-brown." Norfolk.

4. "Equally pale but has the whitish stigmata almost squared, the intermediate spot strikingly black." Antrim Coast.

List of names used in the *tritici* complex.

tritici, L. (1761) *Fn.S.* 320.

aquilina, Schiff. (1775) *Verz.* 80. Now considered a good species.

nigrofusca, Esp. (1786) *Schm. Abbild.* IV. 383. pl. 127.

vitta, Esp. (1786 ?)* *l.c.* IV. 457. plt. 143. f.6.

pratincola, Bork. (1792) *Naturg.* IV. 553. Now considered a pure synonym.

domestica, Fab. (1793) *Ent. Sy. etc.* III(2). 23. Now treated as a pure synonym.

aquilina, Hb. (1802) *Samml. Noct.* 135. Considered probably a true continental species only.

ab. *pupillatus*, Haw. (1803) *Lep. Brit.* 118 (1809) 223 as *pupillata*.

praticola, Hb. (1808-18) *Samml. Noct.* 567. Should be attached to *obelisca*.

eruta, Hb. (1808-18) *l.c.* 623. Probably a true species.

fictilis, Hb. (1808-18) *l.c.* 479. Considered by some to be a figure of typical *aquilina* (Schiff.) ?

ab. *sordida*, Haw. (1809) *l.c.* 222.

valligera, Haw. (1809) *l.c.* 222.

ab. *albilinea*, Haw. (1809) *l.c.* 223. Is the *lineolata*, Haw.

* The figure was published before 1792 but not the description. See Ernst. and Engr. *Pap. d'Eur.* VIII. 38 (1792).

ab. *lineolata*, Haw. (1809) *l.c.* 223.

ab. *subgothica*, Haw. (1809) *l.c.* 224. Becomes *pseudogothica*, P. Curt.

ab. *sagittifera*, Steph. (1829) *Ill.* II. 119. "Possibly a local race in England." (Corti).

ab. *hortorum*, Steph. (1829) *l.c.* 122.

ab. *ocellina*, Steph. (1829) *l.c.* 122.

ab. *cuneigera*, Steph. (1829) *l.c.* 123. Is the *valligera*, Haw.

ab. *venosa*, Steph. (1829) *l.c.* 123.

obeliscata, Steph. (1829) *l.c.* 124. =*obeliscata*, Haw. Possibly *obelisca*, Schiff.

seliginis, Dup. (1836) *Hist. Nat. Sup.* III. 211. plt. 19. Probably a good species.

segnilis, Bdv. (1840) *Index Meth.* 110.

ab. *vitta*, H.-S. (1846) *Sys. Bearb.* II. 343. f. 527-8.

detorta, Evers. (1851) *Bull. Mosc.* 627 (1856) : *l.c.* 184. Probably a good species.

siliginis, Gn. (1852) *Hist. Nat. Noct.* V. 287. This is *seliginis*, Dup.

gypaetina, Gn. (1852) *Hist. Nat. Noct.* V. 290. Probably a good species.

varia, Alph. (1889) *Rom. Mem.* V. 138, plt. 7, 1. Probably a good species.

jaculifera, Gn. (1853) *Hist. Nat. Noct.* V. 262=*subgothica*, Haw. in pt. Comparable to *aquilina*. Canada.

ab. *obsoleta*, Tutt (1892) *Brit. Noct.* II. 47.

ab. *puncta-obsoleta*, Tutt (1892) *l.c.* 47.

ab. *costa-obsoleta*, Tutt (1892) *l.c.* 47.

ab. *nana*, Tutt (Zell.) (1892) *l.c.* 47.

ab. *caerulea*, Tutt (1892) *l.c.* 47.

ab. *costa-caerulea*, Tutt (1892) *l.c.* 48.

ab. *minor-caerulea*, Tutt (1892) *l.c.* 48.

ab. *pallida*, Tutt (1892) *l.c.* 49.

ab. *fusca*, Tutt (1892) *l.c.* 50.

ab. *costa-fusca*, Tutt (1892) *l.c.* 50.

ab. *ochracea*, Tutt (1892) *l.c.* 52.

ab. *nigra*, Tutt (1892) *l.c.* 56.

ab. *costa-nigra*, Tutt (1892) *l.c.* 57. Is the *ocellina*, Steph.

ab. *virgata*, Tutt (1892) *l.c.* 58.

ab. *obsoleta-pallida*, Tutt (1892) *l.c.* 49.

ab. *obscurior*, Stdgr. (1892) *Rom. Mem.* VI. 420. Considered to be form of *aquilina*, Schiff.

distincta, Stdgr. (1892) *Iris*, V. 358. Considered to be a form of *aquilina*, Schiff.

siepii, Obthr. (1907) *Bull. Soc. ent. Fr.* (27.) Now treated as a species.

ab. *fumosoides*, Culot (1909-13) (Obthr.) *N. et G.* I(1). 78, plt. 12, 15.

donzelii, Bng.-Haas (1910) *Iris*, XXIV. 37, plt. iii. f. 9.

wagneri, Corti (1926) *Schw. ent. Anz.* V. 3.

falleri, Schwrd (1927) *Zt. Oestr. Ent. Ver.* XII. 110.

ab. *pseudogothica*, P. Curt. (1927) *Ent. Rec.* XXXIX. 141. Replaces in part *subgothica*, Haw. "Possibly a local race in Gt. Britain," Corti.

obeliscata, Wagner (1929) *Mitt. Münch.* XIX. 74.

venosa, Schw. (1930) *Zt. Oestr. Ent. Ver.* XV. 9.

rubiosa, Corti (1931) *Pal. Noct. Sup.* III. 27. A race of *aquilina*.
insulans, Corti (1932) *l.c.* 33.
reisseri, Corti (1932) *l.c.* 33.

Tutt attempted to analyse the forms which came under his notice. He pointed out that the typical form described by Linn. *Sys. Nat.* had the following characteristics—streaked costa; pale median nervure; row of wedge-shaped spots parallel to the hind-margin; colour cinereous; 2 stigmata pale; claviform black; black spot in the orbicular stigma: *cf.* Newman's first figure in *Brit. Moths.* p. 330 (1869).

A. Ground colour pale slaty-grey.
   a. Without pale costa (1) Transverse and longitudinal markings obsolete = *obsoleta*. (2) as in (1) but lower half of reniform blackish = *puncta-obsoleta*.
   b. With pale costa (1) Transverse markings indistinct, longitudinal slightly developed = *costa-obsoleta*. (2) as in (1) but very small = *nana*, Zell.

B. Ground colour clear slate or dove-colour.
   a. Without pale costa. (1) Transverse markings more or less distinct = *caerulea*.
   b. With pale costa. (1) Trans. and long. markings more or less distinct = *costa-caerulea*. (2) As in (1) but very small = *minor-caerulea*.

C. Ground colour slaty fuscous.
   a. Without pale costa. Trans. markings more or less distinct = *eruta*, Hb.
   b. With pale costa. Trans. markings more or less distinct = *vitta*, Hb.

D. Ground colour greyish white.
   a. Without pale costa.—Trans. markings more or less distinct = *pallida*.
   b. With pale costa.—(1) Distinct markings and dark space between the stigmata = *sagittifera*, Steph. (2) Indistinct markings = *obsoleta-pallida*.

E. Ground pale greyish-fuscous.
   a. Without pale costa. (1) Markings distinct = *fusca*. (2) Markings indistinct = *siliginis*, Gn.
   b. With pale costa. (1) Distinct trans. markings = *costa-fusca*. (2) Dark space between stigmata and no wedge-shaped spots = *subgothica*, Haw. (*pseudogothica*, P. Curt.).

F. Ground dark greyish fuscous.
   a. Without pale costa. (1) Distinct trans. markings = *sordida*, Haw. (2) Two trans. lines, central area pale = *pupillatus*, Haw.
   b. With pale costa. (1) With distinct markings = *tritici* (typical).

G. Ground pale yellowish ochreous.
   a. Without pale costa. (1) Trans. markings more or less distinct = *ochracea*.
   b. With pale costa. (1) More or less distinct markings = *detorta*, Ev.

H. Ground reddish-brown.
   a. Without pale costa. (1) Distinct trans. markings = *valligera*, Haw. (2) Indistinct trans. markings = *cuneigera*, Steph.

b. With pale costa. (1) Distinct trans. markings = *albilinea*, Haw. (2) With the cuneiform spots strongly developed = *lineolata*, Haw.

I. Ground dull brown.

a. Without pale costa. (1) Distinct transverse marking = *aquilina*, God.

b. Pale costa. (1) Distinct markings = *tritici*, God. = *fictilis*, Hb. (2) Indistinct markings = *aquilina*, Hb.

K. Ground blackish-brown.

a. Without pale costa. (1) With distinct trans. markings = *venosa*, Steph. (2) As in (1) but more ash-coloured = *hortorum*, Steph.

b. Pale costa. (1) With ill-developed trans. markings = *nigrofusca*, Esp. (2) Distinct markings = *gypaetina*, Gn.

L. Ground black.

a. Without pale costa. (1) More or less distinct markings = *nigra*.

b. Pale costa. (1) Costal streak ill-developed = *ocellina*, Steph. (2) Ditto well developed = *costa-nigra*.

He dealt separately with (1) *vitta*, Esp. Fuscous brown, whitish costal streak and central nervure, white surround of orbicular, reniform pale outline, dark fuscous shade on hind-margin. Hindwings white and grey outer margin. (2) *domestica*, Fab. Forewings cinereous, waved trans. lines black, ordinary stigmata, anterior white (orb.), costa 7 black spots and 3 white. (3) ab. *virgata*: with dark central band, between basal and elbowed line; ground pale ochreous tinted with reddish, claviform very black; orbicular pale grey; reniform pale. In Vol. IV. Tutt deals with (4) *varia*, Alph. with the costa standing out strongly from the dark ground which is almost black; very large claviform. And (5) *detorta*, Evers. Edge of reniform perfectly straight basad; much resembles *senna*, Hb. *Praticola*, Hb. (567) is also given, but at present it is considered to be a form of *obelisca*, and the *pratincola*, Bork. is transferred to *tritici*.

Her.-Schäf. *Sys. Bearb.* II. 343 (1848-) discusses the figures thus:—Hüb. 479 is *aquilina* (Tr. calls it *tritici*): but Hb. 630 *recussa* is a true species. H.-S. (Plt. 103) 527, 528 belong to v. *vitta*. (Plt. 104)* 527, 528, very black examples; 520, 530 very coppery-red examples. Hb. 533, 534 *vitta* are very bright coloured examples with much white on the costa. One with fore-wings narrower and the other broader, rounded at the apex, the white streak of the costa rarely goes as far as the apex. Esp. *Noct.* plt. 67 by colour is *aquilina*; Duponchel also places *vitta* Hb. as well as *ruris* to *aquilina*. Tr. considers this last to be a true species. Hb. 530 *aquilina* an example with no transverse lines nor elbowed line. The *pratincola*, Bork. is *tritici*. Hb. 567 is a tolerably reddish ♂. Hb. 623 *eruta* is a moderately sharply marked nearly unicolorous female such as often occurs; the best of the figures of Hb., the forewings mostly mixed with white grey, the hindwings whitish; thus in no way to be distinguished from *segnilis*, H.-S., 545 has very light ground colour and sharp marking (Frr. plt. 255). The most unicolorous examples with the utmost minimum of marking,

* The numbers 527-28 occur on both plates, 103-104.

are *segnilis*, those with much white on the costa and sharp white middle vein are *vitta*, Hb.

Warr.-Seitz, *Pal. Noct.* III. 32 (1909), considered the *pratincola*, Bork. and *domestica*, Fb. as synonyms of the typical form. He deals with the following aberrations:—*aquilina*, Schiff. (=*fictilis*, Hb. fig. 479): *obeliscata*, Stph.: *eruta*, Hb.: *siliginis*, Gn.: *obscurior*, Stdgr.: *detorta*, Ev.: *varia*, Alph.: *distincta*, Stdgr.: *obsoleta*, Tutt: *costaobsoleta*, Tutt: *coerulea*, Tutt: *costacoerulea*, Tutt: *pallida*, Tutt: *sagittifera*, Steph.: *fusca*, Tutt: *costafusca*, Tutt: *sordida*, Haw.: *pupillata(us)*, Haw.: *ochracea*, Tutt: *virgata*, Tutt: *valligera*, Haw. (*cuneigera*, Steph.): *albilinea*, Haw. (=*lineolata*, Haw.; *aquilina*, Hb., f. 536): *venosa*, Steph.: *hortorum*, Steph.: *nigrofusca*, Esp.: *nigra*, Tutt: *ocellina*, Steph. (=*costanigra*, Tutt.)

Culot. *N. et G.* I(1). 76, plt. 12, f. 11. (1909-13), gives a figure of what he considers typical *tritici*, which is of a light ochreous-grey ground, with well developed stigmata and darker clouding partly around them; black sagittate marks small; double submarginal line with fuzzy edge both sides. Fig. 12 is a fine figure of ab. *subgothica*. Fig. 14 is the form *eruta* of slaty coloration with concolorous costa. Fig. 15 is the ab. *fumosoides* (see below). Fig. 16 is Tutt's *costa-fusca* with a thin fuscous line along the costa. Fig. 17 is ab. *siepii* (see below). Fig. 18 of a uniform pale sandy colour with faint remnants of the stigmata as the only markings, ab. *unicolor*, Hb., which may be an extraordinary form of *aquilina* it is said. Plt. 13, fig. 1 is *aquilina*. Culot gives a number of names which have been associated with *tritici*, but it seems almost impossible to unravel the group of forms rightly or wrongly brought under this name. One can only give the indications and opinions of others.

Corti-Seitz, *Pal. Noct. Supp.* III. 33 (1932), calls *tritici* "a group of forms," and criticises the names and forms already dealt with by Tutt and Warren thus. He says "*aquilina*, Schiff. is a separate species, also *eruta*, Hb. and *siliginis*, Gn.; *detorta*, Ev. and *varia*, Alpher. do not belong to *tritici* but to the sub-genus *Mesoeuxoa*:—*distincta*, Stdgr. is a form of *aquilina*, similarly *obscurior*, Stdgr." He goes on to say that "The other denominations of aberrations by Tutt and other English authors appear to me absolutely unjustified as they only refer to quite unimportant colour and marking aberrations and cannot be clearly separated from one another."

He agrees with Curtis (Parkinson) that *subgothica*, Haw. (changed to *pseudogothica*, P. Curt.) is perhaps a genuine local race in England, and possibly *sagittifera*, Steph. is one also. He suggests *obelisca(ta)*, Steph. may be *obelisca*, Schiff. but cannot decide. He names a race from the Isle of Sylt as *insulans* and a race from Sierra Nevada, Spain, as *reisseri*, and gives a colour aberration ab. *fumosoides*, Culot (Obth. *in l.*) from Brittany. He treats *siepii*, Obthr. as a species.

aquilina, Schiff. (1775) *Verz.* 80.

Orig. Descrip.—Among the Noctuae whose larvae live in the ground. "The moths have a very small crest, mostly narrow, mostly earth-coloured or with quite dusky upper wings, with a third stigma (claviform) below a pale streak under the other two stigmata. With black collar." "The Black-toothed Eagle Brown." Not British according to all recent continental authorities.

As Parkinson-Curtis points out, *Ent. Rec.* XXXIX. p. 141 (1927), the complication in the use of the name *subgothica*, Haw. on both continents is so confusing that he has substituted the new name *pseudogothica* for its use in connection with *tritici*. That is for the "pale greyish fuscous form, with pale costa, with dark space between the stigmata and no cuneiform spots."

Stephens, *Ill.* II. 124 (1829) says his *obeliscata* is that of Haworth.

Haworth, *Lep. Brit.* 222 says with a ? that his *obeliscata* is that of Hübner, *Noct.* f. 123. This last is called *obelisca*, and not *obeliscata* by Hb.

seliginis, Dup. (1836) *Hist. Nat. Sup.* III. 211 (*siliginis*, Gn.).

Fig.—*l.c.* plt. 19-6.

Orig. Descrip.—"Forewings blackish brown, with the two usual stigmata of a light brown and very regular; they are finely encircled with black, and inside the outer sides only edged with whitish grey. A short distance from the outer margin and parallel to it the wing is crossed by a waved line of small black sagittate spots each with a white dot on the outer side." Between the orbicular and the base of the wing the transverse lines are ill developed, and irregular, black traces only. It does not suggest a *tritici* form. It is suggested by Tutt that it is a sub. var. of his *fusca*, *l.c.* 50. He does not give the original description. All opinions of it differ.

siliginis (Friv.) Gn. (1841)? (1852) versus *seliginis*, Dup. (1836) versus *segnilis*, Bdv. (1840).

The French authors each spelled this name in their own way altering the MS. name of Frivaldski.

"*Siliginis* is the genitive of *siligo*, which, however, is not a Latin word; but the *seligo* of Dup. is in a similar position, and *segnilis*, Bdv. is the same. The rectifications (!!) so called are equally bad. Guenée settled the matter by adopting the prior name *siliginis*.

subsp. *varia*, Alph. *Rom. Mem.* V. 138 (1889).

Fig.—*l.c.* plt. 7. f. 1.

Orig. Descrip.—"Six specimens are very notable by the costa, the median nervure and the cellular spots of the fore-wings, which are of a greyish white, which encroach distinctly on the deep, at times almost black ground. A series of sagittate black markings about on the submarginal waved line interiorly and with the claviform, large and very dark, give to these individuals a very different appearance from that of *tritici*. The hindwings are of a brownish grey with a whitish fringe and in both sexes; there is a distinct cellular lunule. One specimen somewhat resembles *A. distinguenda*, Ld. but it cannot be that, since the antennae are much more shortly pectinated."

Hamp. *Cat. Lep. Ph.* IV. 294, 1903, ab. *varia*, Alph. The costa, fascia, veins and stigmata prominently white.—Cent. Asia; Mongolia; Siberia.

race *obscurior*, Stdgr. *Rom. Mem.* VI. 420 (1892).

Orig. Descrip.—"They are very near the dark ab. *eruta*, Hb., but with the markings of *aquilina*." Amur.

race *distincta*, Stdgr. *Iris*, V. 358 (1892).

"A small ♂ 30mm. in expanse belongs to one of the extraordinarily numerous varied forms of *A. tritici*. Among a great number of *tritici* from very varied localities, I have no specimen nor any form with which this Kentei ♂ can be placed. It has bristly or sawlike, short-lashed antennae and narrow forewings, only increasing in width slightly towards the hind margin. They are as brightly marked as in many *tritici* var. *aquilina*, with light costa, light (whitish) upper stigmata, a light (dull grey brown) strongly dentate outer marginal band and a distinct white median vein. Specimens with similarly brilliant markings, but far wider forewings, which are very much larger, and have male antennae tolerably strongly comblike, I have in numbers from Amasia and Sarepta sent to me as var. *distincta*. Of this form the males have almost entirely white hind-wings with dark discal line, these in the females are pretty strongly grey in the outer half."

Hamps. *Cat. Lep. Ph.* IV. 294 (1903). Large; markings prominent, bright; hindwing white; antennae thick.—S. Russia; Pontus.

Euxoa tritici, L. var. *siepii*, Obthr. *Bull. Soc. ent. Fr.* (27) (1907).

"Characterised by the uniform grey-brown tone of the superior wings and by its two much emphasized black lines, the subbasal and the elbowed, crossing almost perpendicularly from the costa to the inner margin. These two lines are formed by a series of little dashes of a jet black, making an uninterrupted line, except immediately below the costal margin. In one specimen on the right upper wing, these two lines are extended along the internal border, by a black streak more or less thickened at its two ends." Plan d'Aups, S. France.

ab. *fumosoides*, Culot. (Obthr. in l.), *N. et G.* I(1). 78 (1909-13).

Fig.—*l.c.* plt. 12. f. 15.

Orig. Descrip.—"Nom qui convient très bien à sa coloration enfumée." The figure is of a general smoky-brown coloration with no light markings whatever other than shades of smoky-brown. The transverse line next beyond the stigmata is black and the most conspicuous feature, emphasized on the outside by a thin lighter brown edging line. Other usual features are slightly or partially emphasized by black, the orbicular, reniform, 2nd line, sagittate marks, etc. No suggestion of the usual variegated appearance of this species. Coast of Brittany.

f. *donzelii*, Bng.-Hs. *Iris*, XXIV. 37 (1910).

Fig.—Plt. iii. f. 9.

Orig. Descrip.—"Forewings yellow-grey, slightly powdered blackish, with small sharply margined basal area from the costa to just before the inner margin. The disc, with the stigmata large, somewhat brighter grey coloured orbicular and reniform (the claviform is completely wanting) is defined by very sharp black lines, the inner commencing almost at right angles becomes more or less curved; the outer is strongly bent and is emphasized by extraordinary sharp toothed marking. The marginal area with a clearer angulated line and containing darker scaled sagittate spots partly obsolescent. The

marginal line is whitish grey in one of the two specimens lying before me with slight black discoidal, which in the other example is wholly wanting. The hindwing in one is wholly white, in the other a slight grey powdering on the margin." Digne.

f. *wagneri*, Corti, *Schw. ent. Anz.* V. No. 12, p. 3 (1926).

Orig. Descrip.—" This fine new species comes from Albarracin in Spain. It absolutely agrees with dark examples of *subdistinguenda*, only that tone of colour is much more intense, becoming red towards the margins, but the antennae of the male are not doubly ciliated. The toothing is distinctly stouter than in *tritici*. The upper part only of the antennae is ciliated. A full description is unnecessary here, since I can refer to the figure of *urbana* given in *Iris*, 1922, on plt. xvii. The clear border line on the forewing in *wagneri* is slightly darker, the light costal streak is darker in *wagneri*, violet-brown, whitish powdered, orbicular and reniform also, black outlined. Thorax of the colour of the forewing, abdomen reddish grey. Tarsi black ringed. Underside of the forewings dark suffused, in the middle a shining, mother of pearl, brighter streak, in place of the reniform a dark spot. Hindwing underside white-grey, on the costa powdered straw-grey, a rather distinct discoidal spot is present, which is also distinctly curved on the upperside of the hindwing. But in this character *wagneri* can only doubtfully be distinguished from *subdistinguenda*, in which the discoidal spot as a rule is not visible on the hindwings." Corti treats this as a true species in Seitz *Supp.* The *urbana* figures in *Iris* suggest the *tritici* complex. The fig. in Seitz. plt. 3 is spoilt by the general colour of the plates.

ab. *falleri*, Schaw. *Zt. Oest. Ent. Ver.* XII. 110 (1927).

Figs.—*l.c.* 6 text figs. p. 110.

Orig. Description.—" Notable on account of the violet to wine-red suffusion, which lies over the dark brown fore-wings and which is especially strong under a lens. This distinguishes it from all other forms. The race is a well marked contrast. Most examples have a more or less clear or dark brown ground colour, deep black basal streak, wholly black-filled claviform stigma, black pyramidal spot, and black sagittate marks on the outer marginal line. The transverse lines in a few specimens are black on the innerside of the outer and the outer side of the inner line. The costa and the middle veins white-grey, as well as the orbicular and reniform stigmata, which are mostly filled in with black. On all the wings there is a violet-red shimmer and gloss.

" The hind-wings are white and towards the margin becoming more or less grey-brown. In the females the darker outer-margin of the white hind-wings is wider or the whole hind-wing is more grey-brown than white, etc." S. Corsica.

ab. *pseudogothica*, P. Curt. *Ent. Rec.* XXXIX. 141 (1927).

Orig. Descrip.—*Brit. Noct.* II. 48 as *subgothica*. This was attributed to Haworth but Haworth's *subgothica* has been proved to be an American species *jaculifera*.

race *obeliscata*, Wagnr. (nec Schiff.) *Mitt. Münch.* XIX. 74 (1929).

Orig. Descrip.—" A quite variegated form which on the one hand

resembles *obelisca*, but on the other hand also resembles *distinguenda* and *subdistinguenda*. The different antennae structure distinguishes it from the two latter." From Turkestan, Naryn.

ab. *falleri-venosa*, Schawrd. *Zt. Oestr. Ent. Ver.* XV. 9 (1930).

Orig. Descrip.—" A ♂ *falleri* in which the normal light-brown ground colour of the forewings and thorax is coloured a light vinous-red. The black markings are normal but less strong. Hindwings normal." Mt. Ceppo, Corsica.

r. *rubiosa*, Corti.-Stz. *Pal. Noct. Sup.* III. 27 (1931).

Fig.—*l.c.* 3g (type).

Orig. Descrip.—" Usually with very distinct markings, white dentate line behind the sagittate marks, and fairly pale costa." Central Asia, Issyk-kul, Juldus, Saisan.

Note :—Corti remarks (*l.c.* p. 33) " Denominations of aberrations by Tutt and other English authors appear to me absolutely unjustified as they only refer to quite unimportant coleur and marking aberrations and cannot be clearly separated from one another."

race *insulana*, Corti.-Seitz. *Pal. Noct. Sup.* III. 33 (1932).

Fig.—*l.c.* plt. 4e.

Orig. Descrip.—" Red brown, paler costa, with white dots, orbicular and reniform stigmata pale, filled with whitish, encircled by black, the space between the stigmata dark. Claviform stigma dark, subterminal line whitish, sagittate marks usually present. Hindwings white, dusky at margin and on veins." Isle of Sylt. Great similarity with *agathina*, Dup.

race *reisseri*, Corti.-Seitz. *Pal. Noct. Sup.* III, 33 (1932).

Fig.—*l.c.* plt. 4f.

Orig. Descrip.—" Pale grey-brown, costa paler to whitish. Reniform and orbicular stigmata whitish, cell between them dark, claviform stigma large, brown with dark edge, obliquely downwards from same a pale brown stripe, median nervure whitish, marginal area darker, sagitatte marks present. Hindwings pale grey brown with white ground, a dark marginal line, fringes white. Discoidal spot is absent, or exceedingly faint." Sierra Nevada, Spain.

Note :—The enigma of the so-called (*tritici*) *aquilina* seems unsolvable. The continental authorities do not include the British Isles as producing the *aquilina*, Schiff., which has, with the numerous forms attached to it, a very wide range. Culot does not mention the British Isles in describing it, and Corti in Seitz' *Supp.* also does not mention the British Isles. The latest discussion, a very thorough one, of this question, occurs in the *Rev. d'Ent. U.R.S.S.* vol. XXV. p. 288 (1935) by Kozhautshikov, based on over 400 examples from different parts of the Palaearctic Region. This writer states that the items united to *aquilina* form a group characterized in the genus *Euxoa* by (1) bipectinate antennae in the ♂, (2) symmetrical ventral forks of the clasper, (3) cylindrical bursa copulatrix and (4) well defined stigmata. The

following about 40 names of different taxonomic value are included in the 3 subgroups under *aquilina*.

AQUILINA, Schiff., Vienna:—*vitta*, Esp.; *fictilis*, Hb.; *subuletorum*, Bd., S. Ural; *squalida*, Ev., S. Ural; *nigrina*, Stdgr.; *obscurior*, Stdgr., Amur; *oranaria*, B.H., Algiers; *wagneri*, Corti, Pyrenees; *distaxis*, Bours., Thibet; *actinea*, Koth., Naryn; *vinosa*, Schaw., Corsica; *punctifera*, Corti., S. Ural; *terrestris*, Corti., S. Ural; *rabiosa*, Corti; *quassa*, Corti., Anatolia; *schwingenschussi*. Corti., Pyrenees.

DISTINGUENDA, Ld., Alps:—*christophi*, Stdgr., Sarepta; *lugens*, Stdgr., Sarepta; *distincta*, Stdgr.; *siepii*, Obthr., Alps; *donzelii*, B.H., Alps; *provincialis*, Brs., Alps; *cleui*, Brs., Alps; *astfelleri*, Corti., S. Alps.; *uralensis*. Corti., Ural.; *praevisa*, Brs., S. Alps; *corporea*, Corti., Sarepta; *akshechirensis*, Corti., As. Min; *praedistincta*, Zerny, Lebanon.

RUGIFRONS, Mab., Algiers:—*bledi*, Christ., Algiers; *urbana*, B.H., Algiers.

MENDELIS, Fernadz, Udes:—*identata*, Frdz., Udes; *deleta*, Frdz.; *subdistinguenda*, Corti., Spain; *diluta*, Schaw., Aragon; *obscura*, Schaw., Aragon.

We are told that "investigation of the distribution of forms of each group has shown that a relation exists between the geograpical distribution and the characters erected for their determination." "One could accept them as subspecies of one and the same species" viz. ssp. *aquilina*, ssp. *distinguenda*, and ssp. *rugifrons* (with *mendelis*). The first is the most widely distributed and phylogenetically the oldest and is more natural to the lower areas; the second is a form natural to more elevated areas, mountains; while the third *rugifrons* is exclusively N. African, but its f. *mendelis* is a Pyrenean race where *distinguenda* does not occur.

Since there really appears to be no basis for uniting our so-called *aquilina* form of *tritici* with the Euro-Asiatic group of forms under *aquilina*, Schiff., with which it has probably been misidentified, readjustment is necessary.

There is little agreement as to what is the form *aquilina*. The more or less accepted view is that it is larger than ordinary *tritici* and of a generally brown coloration without undue emphasis of marking. No figure hitherto published in this country (we must ignore continental figures which appear to represent another species) agrees with this description. Of the specimens in my possession from various localities under the name *aquilina*, a selected series taken by Rev. C. R. N. Burrows in his garden at Mucking in Essex, come nearest. They are generally brown with no tendency of marking to be emphasized by black scales, are of medium size larger than ordinary *tritici*, taken in 1909 and 1910 in company with *tritici* of about the same size. They answer to no continental figure, nor can I match them from between 200 and 300 *tritici* and *aquilina* so called from many British localites. South's figures on plt. 106 (*M.B.I.* I) are much too dark and also have a suppressed red gloss of which the Essex specimens show no trace. This enigma may be solved if some one will breed *tritici* in quantity from many places, especially from the Essex area.

Agrotis, Ochs. (1816-25) Most authors. [*Eueretagrotis*, Smith (1890) : Warr.-Stz ; Corti.-Stz.] *agathina*, Dup. 1827.

Duponchel, *Hist. Nat.* VII. 360., says that Boisduval sent it to him under the name *agathina* ; it had been taken near Montpelier by Dr. Rambur.

Tutt, *Brit. Noct.* I. 58 (1892) : [Smith, *Bull. U.S. Nat. Mus.* No. 38, 47 (1890)] : Barr, *Lep. Br. I.* III. 359, plt. 133, f.2 (1896) : Stdgr., *Cat.* Ed. III., 138 (1901) : Hamp. *Lep. Phal.* IV. 644. fig. (1901) : Splr. *Schm. Eur.* I. 147. plt. 32. f. 25 (1905) : South. *Moths Brit. I.* I. 214. plt 107. f. 2, 3. (1907) : Warr.-Stz. *Pal. Noct.* III. 64. plt. 156 (1909) : Culot. *N. et G.* I. (1). 38. plt. 6. f. 6-10 (1909-13) : Corti-Stz. *Pal. Noct. Sup.* III. 91. plt. 13 (1934).

Dup. *Hist. Nat.*, VII. plt. 122 gives a very good figure of the type "of the colour of wine dregs, with undulated transverse lines."

Freyer, *Neu. Beitr.* VI. fig. 515, gives a rather dull form, with markings much too emphasized ; the ground colour is a lightish brown with a faint suspicion of rosy flush ; there is no differentiation of the costal streak.

The figure in H.-S., *Bearb.* II. plt. 1. f. 2, is quite good, a dark somewhat ruddy form.

Barrett, *l.c.* plt. 133. 3 figs. The figures hardly show the beauty of the British form of this species. The distinctness of marking is not shown.

Spuler., *Schm. Eur.* I. plt. 32. f. 25 (1905) is a very good figure, but rather abnormally large.

South, *Moths Br. I.* plt. 107, gives two fairly good figures, 2 a dark form from Scotland, 3 a slightly pinkish brown form.

Warren-Seitz., *Pal. Noct.* III. 64 plt. 15 (1909), gives a figure of a grey form, rather featureless.

Warren-Seitz, *l.c.* recognized only *hibridicola*, and *scopariae* and treated *lidia*, Bdv. (nec Cram.), *albimacula*, Steph. and *leucographa* as synonyms of the typical name.

Culot, *N. et G.* I. (1), plt. 6, gives 5 figures. (6) a typical form : (7) a var. *rosea*, Tutt : (8) a *provincialis* : (9) a dark form *infuscata* and (10) a very light form *hibridicola*. All very good figures.

Corti.-Seitz, *Pal. Noct.* Sup. III. 91. plt. 13 gives figures of *rosea*, Tutt, *turonica*, Culot, and *scopariae*, Mill. These figures are not over good : *scopariae*, has a black transverse band on the forewing wider on the costa than on the inner margin, with the prominent white dot in the middle ; *rosea* does not show the beautiful rosy tint ; and *turonica* is considerably larger but is rather featureless.

Barrett describes the Variation thus—

"Rather constant in colour and markings except for climatic variations. The colour is more richly pink in the South East of England. In the north, and especially in Scotland, it is intensified into a deep dark purplish-brown, or purplish-black, most of the markings thereby obscured, but the pale subcostal stripe conspicuous though narrower and more curved, uniting with the pale orbicular stigma : the reniform stigma is also paler. The dark race is found as far south as Delamere

Forest, Cheshire, and in some parts of Yorkshire. In the extreme north of Scotland, as at Stornoway, it disappears, and is replaced by pale colouring—pale purplish, pale lilac, or even purplish-white. Irish specimens are of rather full size, and usually of a greyer shade of rosy, but occasionally richly pink."

He reports one " Singularly pale in colour, almost yellowish with a pink tinge." Hill of Howth.

Another, " Of a rich crimson, with the subcostal stripe yellow and the markings very conspicuous." King's Lynn.

Another, " Of a curious pale lilac-grey."

Another, " Of a rich dark purple-brown, much clouded or streaked with deep black, and with the pale subcostal stripe cut short not far from the base."

The List of Forms and Names to be discussed are :—
agathina, Dup. (1827) *Hist. Nat.* VII. 359. plt. 122. 2.
f. *albimacula*, Steph. (1829) *Ill.* II. 137. plt. 19. 3.
f. *leucographa*, Steph. (1829) *l.c.* 199.
lidia, Bdv. (1829) *Ind. Meth.* 63.
ssp. *scopariae*, Mill. (1864) *Icon.* II. 151. plt. 67. f. 7-10.
r. *rosea*, Tutt. (1892) *Brit. Noct.* II. 59. Culot, *l.c.* plt. 6, f. 7.
r. *hibridicola*, Stdgr. (1901) *Cat.* IIIed. 138. Culot, *l.c.* plt. 6, f. 10.
r. *provincialis*, (1909-13) Culot. *N. et G.* I (1). 39, plt. 6, f. 8.
ab. *infuscata*, (1909-13) *l.c.* 40, f. 9.
f. *turonica*, Culot. (19[illegible]) [Corti.-Stz. *Pal. Noct. Sup.* III. 91. (1934), plt. 13.]

Tutt dealt with (1) the typical form of Duponchel. (2) *scopariae*, an almost black form, with small stigmata and with absence of the transverse line on the lower wings. (3) and *rosea*, the S. of England form with bright rosy tinge.

(f.) ab. *albimacula*, Steph., *Ill.*, II. 137 (1829).
Fig.—*l.c.* plt. 19. f. 3.
Orig. Descrip.—" Alis anticis fusco-brunneis purpureo-variegatis, vittâ costali pallidâ lineolâ basi atrâ, plagâ elongatâ centrali fusco-nigrâ, in quâ macula rotundata alba."

" Antennae griseous ; head cinereous with two black spots on the crown ; thorax griseous-ash, transversely streaked anteriorly with black and white : anterior wings shining fuscous brown, beautifully shaded with rich purple, with a pale reddish patch at the base, towards the costa ; a black streak at the base, with a subocellated purplish spot between its tip and the inner margin, having an ovate black stigmatiform mark adjoining, placed as in most of the Agrotids ; on the disc is an elongated fuscous-black patch, acute anteriorly, and truncated posteriorly ; in this the anterior stigma, which is round and white is placed, and the posterior one at the hinder extremity ; the ordinary strigae are rather obsolete ; but in place of the usual hinder one is a series of fuscous dots, united by an interrupted black longitudinal streak to the reniform stigma ; the posterior wings dusky ash, and glossy, with a faint transverse striga, and darker border." Whittlesea Mere.

(f.) ab. *leucographa*, Steph., *Ill.*, II. 199 (1829).

Orig. Descrip.—" Alis anticis fusco purpureis albo adspersis-maculis ordinariis albidis."

" Head and thorax fuscous, with a mixture of fulvous or rufescent; the latter with a transverse dusky streak, followed by a reddish brown one; anterior wings reddish-brown, varied with white and ochraceous-yellow, with fine purplish or coppery shades; at the base is a slightly bifid black streak, reaching nearly to the second striga, which is rather indistinct and very irregular; the third is considerably bent behind the posterior stigma, and is united to the second by a small black hook on the inner margin; between the posterior striga and the hinder margin is a very faint interrupted pale waved striga, bearing a row of elongate-triangular spots on its anterior edge; the space between this striga and the posterior margin is plain purplish-brown, with the nervures slightly ochreous; and on the margin are some indistinct black dots; cilia reddish-ochre; stigmata whitish placed in a dusky or black patch; posterior wings ochreous-white, with a central lunule and two transverse strigae fuscous." nr. York.

Note :—" Hübner seems to have figured two very distinct insects under the above name."

lidia, Cr. (Bdv.) *Ind. Method.* 63 (1829).

Bdv. places this name as of a var. of *agathina*, Dup. But drops the *agathina* altogether in the *Index*, 1840 including only the *lidia*, Cr. p. 110.

r. *hebridicola*, Stdgr. *Cat.* IIIed. 138 (1901).

Fig.—Culot. *N. et G.* plt. 6. f. 10 (1909-13).

Orig. Descrip.—" Al. ant. pallidioribus, grisescentibus, fere non rufo-inspersis." Hebrides.

r. *provincialis*, Culot (Gn.) *N. et G.* I(1). 39 (1909-13).

Fig.—*l.c.* plt. 6. f. 8.

Orig. Descrip.—" Distinguished by its small size, and sombre coloration, and the absence of the transverse line of the hind wing." Provence.

The original specimens were in the Gn. collection and bore his labels.

ab. *infuscata*, Culot (Gn.) *N. et G.* I(1). 40 (1909-13).

Fig.—*l.c.* plt. 6. f. 9.

Orig. Descrip.—" It is distinguished by a larger size, and its hind wings crossed by a very pronounced band on the light ground." Scotland.

The original specimen was in the Gn. collection and labelled by him " *infuscata*."

Of *scopariae*, Mill., Stdgr. says *l.c.*, 138, " Al. multo obscur., fere nigricantibus."

f. *turonica*, Culot. [Corti.-Stz. *Pal. Noct.* III. 91 (1934)].

Fig.—Seitz. *l.c.* plt. 13a.

Orig. Descrip.—" Is a very large, brightly marked form from France." The figure is far from being brightly marked.

Agrotis, Ochs.-Treit. (1816-25). Many authors. [*Euxoa*, Hb. (1822) Hamp., Warr.-Stz., Meyr.], *corticea*, Schiff. (1775).

Tutt gave Hübner's figure 154 as the type of *corticea*. This was not so; the general opinion is that Schiffermüller's description is the original.

corticea, Schiff. *Verz.* 81 (1775).

Orig. Descrip.—"Larvae terricolae. Noctuae rusticae. With black neck-streak. With pale or distinct orbicular and reniform. The bark-coloured small-streak."

Illiger and Haf. confirm this as *corticea*, *Sys. Verz. Wien. Gegend.* I. 263 (1801).

Tutt, *Brit. Noct.* II. 59 (1892): Barr. *Lep. Br. Is.* III. 295. plt. 126. 1 (1896): Stdgr. *Cat.* Illed. 151 (1901): Hamps. *Lep. Phal.* IV. 172 (1903): Splr. *Schm. Eur.* I. 162. plt. 35. 16 (1905): South. *Moths. Br. I.* I. 203. plt. 105. 7-8 (1907): Warr.-Stz. *Pal. Noct.* III. 26. plt. 5f. (1909): Culot, *N. et G.* I(1), 83. plt. 13. f. 13-16 (1909-13): Corti.-Stz. *Pal. Noct, Supp.* III. 44. plt. 5g. (1932).

The two fig. 447 in Ernst. and Engram. *Pap. d'Eur.* (1790), are quite recognizable as *corticea*, but are named *valligera* (?).

Hübner's fig. 154 belongs to the reddish brown group of Tutt, and is uniform in coloration without any irroration.

Haw. *Lep. Brit.* 114 (1806) described both *clavigerus* and *subfuscus* in *Bombyx* at first because of their pectinated antennae. Subsequently when considering the *Noctuae* he included them: see p. 219 (1809).

Treit. *Schm.* V(1). 158, points out that Illiger, *Verz.* (1801). 259 considered *corticea* as a var. of *ravida* and the same as Borkhausen's *assimilans* (*augur*, Hb.), but says that appearance and comparison dispel this view. Subsequently Treit. *l.c.* 159, points out that Esper. *Abbild.* (*Bombyx.*) III. plt. LXIV. f. 1 (1783) figures the species under the name *exclamationis*.

Godt. *Hist. Nat.* V. plt. 68. 3-4 (1824), gives 2 good figures of dark grey ground.

Wood, *Index.* 33. fig. 127 (1834) is hardly recognizable as *corticea*.

H.-S., *Sys. Beatb.* II. 354. figs. 537, 538, figures two specimens sent to him under different names, the ♂ as *profuga* and the ♀ as *fuscata*, but concludes they are *corticea*. The figure 538 much resembles the *obscura* form of Frr. plt. 628(1).

Freyer. *Neu. Beitr.* VI. Plt. 544, *sincerii*, is very crude and hard; it shows a form with a wide dark central band and no irrorations but with the stigmata and with very conspicuous double transverse lines. On plt. 628 in vol. VII, are two figures, *obscura*. (1) has the whole area from the elbowed line to the base very dark, but the basal half is slightly lighter in shade. (2) has an extremely dark central band. In both the usual stigmata are completely effaced. On the same plate, fig. 3 has the whole of the usual marking strongly emphasized, and fig. 4 is a red brown example with white costal ends of the 3 transverse lines. Plt. 627 has two good typical figures ♂ and ♀; plt. 629. fig. 1 has the four transverse lines white, and fig. 2 is a fuscous form with fuscous markings outlined in black.

Barrett, *l.c.*, plate 126 gives 6 figures including 1b, ♂ with very perfect and emphasized outer transverse line of deep lunules; 1c a black

form, markings obsolescent, base of fore-wings and an outer marginal wide line light grey in contrast; 1d, ♂ light grey, transverse lines obsolescent, 3 stigmata very dark in contrast; 1e, ♀ mottled, outer transverse line double with wide interspace, 2nd line very thick.

South. *Moths Br. I.* I. 203. plt. 105. 7-8 (1907) has two very good figures ♂ and a dark ♀.

Warr.-Stz. *Pal. Noct.* III. 26. plt. 5f. (1909) considers *transversa*, Walk., *fraterna* and *amurensis* as synonyms; he includes most of Tutt's forms and allows the use of *transversa* to one of Tutt's forms. His figures ♂ and ♀ are fairly good and he also figures one of the forms of *obscura*, a dark one but not very dark with a somewhat lighter, subterminal area (*cf.* Frr.)

Culot, *N. et. G.* I(1). plt. 13. figs. 13-16 (1909-13). The ♂ 13 is hardly typical as the transverse lines are totally absent, more like *clavigerus*, Haw., but well irrorated with black markings especially along the costa, His fig. 15 is that of *irrorata-fusca* and 16 is of the small *corsa* the identity of which as a *corticea* form he appears to query.

Corti-Stz. *Pal. Noct. Sup.* III. 44. plt. 59 (1932), considers *sincerii*, Frr. as a synonym with *transversa*. Walk. and *fraterna* but places *amurensis* as "certainly a genuine sub-species." He figures *amurensis* from China.

Of the Variation Barrett says:—"Variable in the ground colour from very pale brown to ashy-brown, reddish-brown, and smoky black-brown; far more so in the degree of dusting of black scales, which in some specimens is almost totally absent, in others suffuses the whole costal region or even more or less the entire surface of the fore-wings, sometimes forming large blackish clouds, or entirely concealing the brown ground colour; but in almost every instance one of the stigmata, or more particularly the reniform stigma, is conspicuous. Usually the blackness extends in an equal degree to the thorax, but there are striking exceptions.

"The curious whiteness of the shoulder lappets is sometimes observable in paler brown specimens, and of these some have the three stigmata pale and only faintly outlined with black, while others are nearly devoid of the usual transverse lines. These forms seem to occur most frequently near the sea; in Ireland there is sometimes a tendency to more reddish-brown colour. A series from the north-east of Scotland, of beautiful pale grey and brown-grey colour, with the markings unusually distinct—the females darker and much mottled with black."

Barrett describes a Norfolk example, "The forewings are almost wholly black-brown, while the thorax is almost entirely pale brown, except the shoulders which are nearly white."

Other similar specimens in which "the thorax is dark with the shoulder lappets pale and conspicuous."

Also a ♂ "with the fore-wings smoky black, except the hind-margin where is a pale grey stripe, and in which the thorax is black with pale grey shoulders."

An Isle of Wight example "has one half of the fore-wings nearly black, the other—the dorsal half—brown."

Another of a second generation taken in September is of a clear, pale, smooth grey-brown, with sharply dark stigmata."

A Warwickshire example is "pale ochreous-brown, with a strong clouding of deep velvety black, neatly stippled and placed in blotches, throughout the middle of the fore-wing."

On p. 63. *Brit. Noct.* Tutt refers to his *nigra-virgata*. It seems that he should have written *brunnea-virgata*, as the parallel form in the "black" ground forms to that in the "reddish-brown ground" forms.

The Forms and Name to be considered are as follows.—
corticea, Schiff. *Verz.* 81 (1775).
corticea, Hb. *Saml. Noct.* 145 (1802).
ab. *sordida*, Hb. *l.c*, 154.
f. *clavigerus*, Haw. *Lep. Brit.* 114 (1806).
ab. *subfuscus*, Haw. *l.c.*
ab, *sincerii*, Frr. *Neu. Beitr.* VI. 101. plt. 544.2 (1852).
ab. *obscura*, Frr. *l.c.* VII. 51. plt. 628. 1-2 (1858).
ssp. *fraterna*, Moore. *Lep. Atk.* 116 (1882).
ssp. *amurensis*, Stdgr. *Rom. Mem.* VI. 421 (1892).
ab. *irrorata-pallida*, Tutt, *Brit. Noct.* 62 (1892).
ab. *virgata-pallida*, Tutt, *l.c.*
ab. *obsoleta-fusca*, Tutt, *l.c.* 63.
ab. *irrorata-fusca*, Tutt, *l.c.*
ab. *brunnea*, Tutt, *l.c.*
ab. *suffusa-brunnea*, Tutt, *l.c.*
ab. *brunnea-virgata*, Tutt, *l.c.* 64.
ab. *venosa*, Tutt, *l.c.*
ab. *transversa*, Tutt, *l.c.*
ab. *nigra*, Tutt, *l.c.*
ab. *costa-irrorata*, Tutt, *l.c.* 62.
r. *neocomensis*, Roug. *Cat. Lep. Jura.* Plt. I. (1903) [Vorb. *Schm. Schw.* I. 279 (1911)].
ab. *strigosa*, Strnd. *Arch. Math. og. Nat.* XXV. (1903).
ssp. *corsa*, Püng. *Iris*, XXI. 286, plt. IV. 2 (1908).
ab. *obsoleta*, Md.-Wald. *Ent.* XLVIII. 225. fig. (1915).
ab. *orbiculella*, Strnd. [Hamp. *Lep. Phal.* IV. 172 (1903)] *Arch. Naturg.* LXXXI. A. 12, 143 (1915),
ab. *nigrovittata*, Hanel, *Int. Ent. Zt.*, XIII. 185 (1925).
ab. *nigrescens*, Hanel. *l.c.*
ab. *mulleri*, Hanel. *l.c.*
ab. *unimaculella*, Masl. *Pols. Pismo. Ent.* II. 130. fig. (1923).
ab. *pallida*, Schawrd. *Zts. Oestr. Ent.* XV. 9 (1930).
ab. *obscura*, Schawrd. *l.c.*
} These are forms of the ssp. *corsa*, Püng.

Tutt dealt with the forms
A. Ground colour whitish-grey.
1. Transverse lines more or less obsolete, sometimes entirely so, stigmata distinct, not irrorated with black scales = *clavigerus*, Haw.
2. Trans. lines distinct, stigmata distinct, much irrorated with black scales especially along the costa = *irrorata-pallida*, Tutt.
3. Basal and outer areas black, central area (containing stigmata) pale whitish-grey = *virgata-pallida*, Tutt.
4. Basal and outer areas pale grey, central area black = *sincerii*, Frr.
B. Ground colour fuscous or smoky-grey.

1. Trans. lines more or less obsolete, sometimes entirely so, stigmata distinct, not irrorated with black scales = *obsoleta-fusca*, Tutt.

2. Trans. lines and stigmata distinct, much irrorated (especially costal area) with black scales = *irrorata-fusca*, Tutt.

3. Trans. lines and stigmata suffused and almost lost in the unicolorous ground colour = *subfuscus*, Haw.

C. Ground colour reddish-brown.

1. Trans. lines and stigmata distinct, slightly irrorated with black scales = *brunnea*, Tutt.

2. Trans. lines and stigmata distinct, ground colour pale brown, costal area dark reddish-brown = *corticea*, Hb. (the type).

3. Much suffused with black scales, trans. lines and stigmata very indistinct = *suffusa-brunnea*, Tutt.

4. With brown basal and outer areas and black central band = *obscura*, Freyer.

D. Ground colour black.

1. Black, with pale brown extreme outer margin = *brunnea-virgata*, Tutt.

2. Black, with paler veins = *venosa*, Tutt.

3. Black, with pale trans. lines = *transversa*, Tutt.

4. Entirely black, with still more intense stigmata = *nigra*, Tutt.

ssp. *fraterna*, Moore. *Lep. Atk.* 116 (1882).

Orig. Descrip.—" Near to *A. corticea*. Male differs in the forewing having a darker costa, darker striae, a more prominent subbasal and antemedial transverse waved black line, and a shorter pointed mark below the cell, a less-defined transverse discal sinuous line, and no submarginal fascia, but a more distinctly formed marginal brown border; and the hindwing is generally paler.

" Female differs in having the medial area between the transverse lines and the outer margin either brown or dark slaty grey, the basal and submarginal areas being much paler."

Darjiling; Punjab Hills.

ssp. *amurensis*, Stdgr. *Rom. Mem.* VI. 421 (1892).

Orig. Descrip.—"My Amur specimens are darker than the European, both females in particular have a wholly dark (wide) middle area of the fore-wing, this is not the case in the dark European examples. One ♂ sent me by Graeser is quite similar to my Vladivostock ♂, only on the costa it is not very dark, and can be included in race *amurensis*."

Stdgr. *Cat.* IIIed. 151, describes it " Obscurior, saepius al. ant. area media nigricante."

race *necomensis*, Roug. *Cat. Lep. Jura.* Pl. I (1903).

Vorbrodt *Schm. Schw.* I. 279. " More robust, almost unicolorous, only the three stigmata remain out of the fore-wing markings." Dombressan, Zermatt, Bul.

ab. *strigosa*, Strand, p. 10. *Arch. Math. og Nat.* XXV (1903).

Orig. Descrip.—" The form of this species figured is peculiar in that the transverse line known as the waved line is wholly wanting. Among the 43 specimens in the Christiana Museum there is not a single

one in which this is the case. All have the transverse lines margining the central area not only distinct, but mostly sharply defined. Another constant divergence from the form figured by Hübner, is, that the hindwings do not have the outermarginal band so clearly defined ; in the Norwegian examples also the paler basal half becomes so gradually that no constant divisional line can be defined. The hindwings are very commonly equally dark throughout and very seldom as pale as figured in Hübner."

ssp. *corsa*, Püng. *Iris.* XXI. 286 (1908).
Fig.—*l.c.* plt. IV. f. 2.
Orig. Descrip.—" Vein 1 and the middle vein with its branches are all more or less distinctly outlined by lighter colour, and the stigmata are not filled in with dark coloration. In ground it is much greyer than in the type, but there are paler and darker forms of this variation." Corsica.

ab. *obsoleta*, Md.-Wald. *Ent.* XLVIII. 225. fig. (1915).
Fig.—The figure is very obscure.
Orig. Descrip.—" The claviform and orbicular stigmata almost absent." Hever, in a light trap.

ab. *orbiculella*, [Hamp. *Lep. Phal.* IV. 172 (1903)] Strand : *Arch. Naturg*, LXXXI. A. 12. 143 (1915)
Orig. Descrip.—" Fore-wing, with the orbicular large, quadrate, open above."

ab. *nigrovittata*, Hanel. *Int. Ent Zt.* XIII. 185 (1920)
Orig. Descrip.—" Ground colour yellow brown, area between the inner and outer waved lines dark brown. The darkening reaches the inner margin ; the area beyond the subcostal vein before it is yellowish." Dievenow.

ab. *nigrescens*, Hanel. *Int. Ent. Zt.* XIII. 185 (1920)
Orig. Descrip.—" General colour of the fore-wings black-brown with the exception of a fine clear yellow surround of the orbicular and reniform, as well as the submarginal line." Dievenow.

ab. *mülleri*, Hanel. *Int. Ent. Zt.* XIII. 185 (1920)
Orig. Descrip.—" Distinguished by the complete absence of the inner and outer transverse lines on the forewings." Dievenow.

ab. *unimaculata*, Maslow., *Pols. Pismo Ent.* II. 130. fig. (1924).
Fig.—*l.c.* plt. 2. fig. 11. An unrecognizable figure.
Orig. Description.—" Alae unicoloriter obscuratae macula reniformis unica." (" New Forms of Macrolepidoptera" in Polish by Maslowsky).

ab. *pallida*, Schawd. *Zts. Oestr. Ent.* XV. 9 (1930) [of the ssp. *corsa*]
Orig. Descrip.—" A wholly clear brown, but not yellow, ♂ from Monte Oro. Corsica. The markings are normal, but the specimen stands out from the row by its brown and dark brown appearance."

ab. *obscura*, Schawd, *Zts. Oëstr. Ent.* XV. 9 (1930) [of the ssp. *corsa*]
ORIG. DESCRIP.—" The black brown example in which the lighter transverse lines are wholly obsolescent, might bear the name ab. *obscura*." Corsica.

Agrotis, Ochs. (1816-25). Many authors. [*Graphiphora*, Ochs. (1816-25), Steph., Meyr.: *Rhyacia*, Hb. (1822), Warr.-Stz.; Corti.-Stz.: *Noctua*, L., (1758) Gn.; Barr.; South: *Coenophila*, Steph.: (1829) South.] *subrosea*, Steph.

Tutt, *Brit. Noct.* II. 59 (1892): Barr. *Lep. Br. I.* IV. 81. plt. 144. 3 (1897): Stdgr. *Cat.* IIed. 80 (1871): Stdgr. *Cat.* IIIed. 135 (1901): Hamp. *Lep. Ph.* IV. 364. fig. (1903): Splr. *Schm. Eur.* I. 143. plt. 32. 6 (1903): South. *Moth. Br. Is.* I. 217. plt. 108. 1 (1907): Warr.-Stz. *Pal. Noct.* III. 36. plt. 7i (1909): Culot. *N. et G.* I(1). 30. plt. III. 12-13 (1909-13): Corti.-Stz. *Pal. Noct. Sup.* III. 63: plt. 8i (1933).

Stephens, *Ill.* II. 128 (1829), described this species under the name *rhomboidea* with a query that it was identical with the *rhomboidea*, Esp. But on p. 200 at the end of Vol. II. he is convinced that it is a new species and gave it the name *subrosea*.

Stephens figure *Ill.* II. plt. XIX, 1, is a very poor representation of the description. At the first glance the rosy colour is conspicuous by its absence.

Wood's *Ind. Ent.* f. 153 (1834), has a very featureless figure, with scarcely a suspicion of the rosy colour.

Humph. and West. *Brit. M.* I. plt. 25 (1842) gives an extraordinary figure, which is strongly erroneous both in colour and shape.

H.-S., *Sys. Bearb.* II. f. 516 (1846) gives a very good figure of the continental blue tinted *subcaerulea* as *subrosea* and in f. 622 gives a figure of the rosy tinted *subrosea* (English), which seems rather too dark generally.

Stdgr. *Cat.* IIed. 80. (1871), named this fig. 622 to be *subcaerulea* and not *subrosea*. He spelt the name *subcaerulea* and not " coe " as quoted by numerous authors.

Barrett, *l.c.* plt. 144. gives 3 figs.

The figures have very little if any " rosea " colour about them. 3b is a rich mahogany brown, large in size, with a pale subterminal line, a post-discal crenulated fine line, and light surrounds to the orbicular and reniform; the hind wing also partakes of the rich brown colour.

Spuler. *Schm. Eur.* I. 143. plt. 32. f. 3 (1903) gives a very fair typical figure.

South's fig. on plt. 108. is apparently from an old and faded example. He puts the species in the genus *Noctua* with alternative *Coenophila*.

Warr.-Stz. *Pal. Noct.* III. 36. plt. 7ik. places *rhomboidea*, Steph. as a synonym, and states that the species is extinct in Britain, but that the bluer-grey form occurs in Sweden, Prussia, Russia and Amurland, named ssp. *subcoerulea*, by Stdgr. The colours of the figures are not good. The general brown colour of the plate is too apparent. Warr.-Stz. *l.c.* places this species in the genus *Rhyacia*, Hb. and recognized only the form *subcoerulea*, Stdgr. On plt. 7i he figures a British ♀

which has a partial reddish brown suffusion, and a *subcaerulea* which is a grey form. (Note the discrepancy of the spelling).

Culot, *N. et G.* I(1) plt. 3. figs. 12, 13 (1909-13) gives a typical figure rather too brown rosy and a figure of f. *subcaerulea* hardly blue enough. The hind wings are naturally large, a feature omitted in some cases. Otherwise the figures are excellent.

Corti-Seitz, *Pal. Noct. Supp.* III 63 (1933), places *subrosea* in the Genus *Rhyacia*, Hb. He recognizes three forms :—a local form *kieferi* from Styria ; ab. *latefasciata*, a banded form ; and ab. *decipiens*, a melanic form, besides the *subcaerulea* continental bluish grey form.

These authors *l.c.* plt. 8i. figure (1) a British ♂ certainly not rosy in any way. (2) *subcaerulea*, a grey, not blue form. (3) a small very dark form with light transverse lines.

Of the Variation Barrett says—" Slightly variable in the intensity of the ground colour and in the consequent distinctness of the markings. The rosy purple brown colour seems to be a characteristic of British specimens ; those obtained from Livonia and Finland, where the species still occurs, being of a pale lilac-grey or purplish-grey, sometimes almost tinged with bluish, hence the varietal name *sub-caerulea*, Stdgr." (H.-S.)

Barrett records an example " Of unusually large size ; its fore-wings deep rosy-purple tinged with brown and grey, the clouding before the hind margin forms a conspicuous dark purple band and the stigmata are both distinctly pale ; its hind wings are also strongly clouded with grey-brown before the hind-margin."

The Forms and Names to be considered are
subrosea, Steph. (1829), *Ill.* II. 128. 200. plt. 19, 1.
rhomboidea, Steph. (1829) *l.c.*
ssp. *subcaerulea*, Stdgr. (1871), *Cat.* IIed. 80. [H.-S. II. 622. fig.]
ab. *latefasciata*, Huene, *Berlin Ent. Zt.* 311 (1901).
r. *kieferi*, Rbl. (1912), *Verhand z-b, Gess. Wien.* LXII (118).
ab. *decipiens*, Warnk. (1924), *Int. Ent. Zt.* XVIII. 181.
ssp. *rubrifera*, Warnk. (1930), *Verhand. Hambg.* XXII. 137.

Tutt dealt with (1) the type form, that taken formerly in England, of a slightly rosy tint, and (2) the darker continental form *subcaerulea*, with a slight blue tint.

ab. *latefasciata*, Huene. *Berl. Ent. Zt.* 311 (1901).

Orig. Descrip.—" Very striking is the form of *subcaerulea* in which the central area of the forewing is darkened, the whole width between the praediscal transverse line and the post-discal one and from the costal margin to the inner margin appears as a brownish band, which is so dark, that the brown pyramidal spot between the stigmata is only very slightly apparent." Estland.

var. *kieferi*, Rebel, *Verhand. z.-b. Gessl. Wien.* LXII. (118) (1912).

Orig. Descrip.—" Herr Kiefer sent two specimens of an Agrotid obtained in August at Admont at the electric light. The larger specimen was much worn, the wings somewhat shorter (broader) than in the English typical form and the var. *subcoerulea*. The ground of

the forewing in the fresh (smaller) specimen is tolerably bright red grey and only along the costa slightlv dull grey powdered, and agrees better with the typical form than with the northern variety *subcoerulea*. The underside of the two Admont examples differs from both of these forms as it shows no emphasis of the outer curved lines on all the wings, which in *subcoerulea* are particularly distinct."

f. *decipiens*, Warnk. *Int. Ent. Zt.* XVIII. 181 (1924).

Orig. Descrip.—"The forewings are wholly suffused dark red-brown, so that they become unicolorous. The bands and stigmata are only slightly represented, the stigmata as grey scaling. The orbicular lies in a black brown wide longitudinal streak extending to the reniform as it appears in *triangulum* and *ditrapezium*. The hindwings are—at least in the ♀—strongly blackened to the base. The underside of all the wings, especially on the costal margins, is dark red-brown with black suffusion. Thorax the colour of the forewings. Abdomeu grey-black." A melanistic form from Hamburg. Bred.

ssp. *rubrifera*, Warnk. *Verhand. Hambg.* XXII. 137 (1930).

Orig. Descrip.—"In comparison with the feebly red English *subrosea*, and the strongly blue suffused eastern *subcaerulea*, the distinctive character of this Lower Elbe (and Holstein) form lies in the more red colour of the forewing, which by a brown ground colour gives it an especially saturated tone. The surround of the orbicular and reniform stigmata is, according to Rebel in his writings on it, filled with black-brown to black. Also the thorax and the sides and termination of the abdomen are as red as the forewings."

"The hindwings are shining, whitish yellow; a blacker marginal shade gives the appearance of a banded hindwing."

Agrotis, Ochs. and Treit. (1816-25), many authors, Meyr. (1897), Corti-Stz. [*Euxoa*, Hb. (1822) Warr.-Seitz, Meyr. (1928): *Feltia*, Wlkr. (1856) Hamp.] *exclamationis*, L. (1758).

De Geer, *Insectes*, II(1), 406 (1771) describes *murina* as follows—

"Phalene à antennes filiformes, à trompe, à ailes croisées d'un gris de fouris avec 4 taches irrégulières noires; à aiies inferieures en partie blanches."

In the German edition this is identified with Schaeffer's plt. 112, f. 1-2 = *exclamationis*.

clavus, Hüfn. *Berl. Mag.* III. p. 298.

Orig. Descrip.—"Brown, grey, with a dark-brown reniform and a nail-shaped spot, which together depict a keyhole." Rottemberg, *Naturf.* VIII. 109 (1766), identifies this as *exclamationis*.

Hüfnagel had named an insect, *l.c.* II. 426, as *clavis*, which was thought to be the ♂ of *clavus*. This, Rottemberg, *l.c.* 109, definitely shows is incorrect. There are two species of different genera. See Goeze, *Beitrage*, III.(3), 46.

Tutt, *Brit. Noct.* II. 64 (1892): Barr. *Lep. Br. Is.* III. 309, plt. 127 (1896): Stdgr. *Cat.* IIIed. 148 (1901): Hamp. *Lep. Phal.* IV. 353 (1903): Splr. *Schm. Eur.* I. 158, plt. 34, f. 24 (1905): South,

Moths Br. Is. I. 208, plt. 105, figs. 3-6 (1907) : Warr.-Stz. *Pal. Noct.* III. 34, plt. 7d. (1909) : Culot, *N. et G.* I.(1), 70, plt. 11, 5-8 (1909-13) : Corti-Stz. *Pal. Noct. Sup.* III. 49, plt. 7a (1933).

Schaeffer. *Icones*, II. plt. 112. figured the species poorly (1769).

Esper. *Abbild.* III. 321. plt. 64. f. 2. (1782) names this figure *exclamationis* var. It is very crude and doubtful. Fig. 1 he also calls *exclamationis*, but it is generally considered *corticea* and fig. 2 may be a form of this latter. They both occurred together at the same place. It was treated as a *Bombyx*.

Ernst and Engr. *Pap. d'Eur.* VII. 55. fig. 442 (1790) give 8 figures of *exclamationis*, mostly quite recognizable as that species.

Fab. *Ent. Sys. Emend.* III(2). 70. (1795), in his description says " posticis atris," possibly a slip of the pen, it should read " posticis albis," as pointed out by Esper, etc. and as in Fab. *Spec. Ins.* II. 225. and *Sys. Ent.* 605 previously published.

Hübner's *l.c.* fig. 149 is too blue-grey and as H.-S. says, II. 326, often much yellower. Certainly in the nearly a hundred specimens before me there is a decided generally yellow brown tint throughout. Hübner's fig. 544. *unicolor* is a strikingly yellow-red, sandy form shading to dark at the base, with the claviform absent, the other stigmata unicolorous but outlined by darker lines. No other markings. Treit. *Schm.* V(I). 163 doubts its union with *exclamationis*, or even with *corticea*. I have not met with a specimen in any way resembling it.

Godt. *Hist. Nat.* V. plt. 67. figs. 3-4, show ♂ and ♀ quite well but dark in colour.

Newman, *Brit. M.* 326. f. 2, is the only author which notes the extraordinary aberration which Tutt named *lineolatus*. He did not figure any ordinary forms.

Barrett, *l.c.* plt. 127. 12 figs. 1b. normal coloration with a wide, nearly black, submarginal band, a dark basal area costally : 1c. so dark as to make the black stigmata, etc., almost obsolescent : 1d. generally of a brown somewhat lighter than normal and with markings correspondingly lighter, orbicular very indistinct : 1e. of still lighter ground, reniform and orbicular light centered, top of black claviform united to bottom of reniform by a black connection : 1f. usual ground with all three stigmata united in an irregular black blotch having a light irregular streak internally : 1g. nearly normal with white hind-wings : 1h. somewhat darker ground with all markings except the black claviform outlined in thin lines, hind-wings as dark as the fore-wings : 1j. similar but with absence of about half the normal marking : 1i. normal ground with an excess of clouding around and about most of the markings, hindwing with clouded disc and hind marginal band : 1k. like 1c but with very dark hindwings.

Spuler. *Schm. Eur.* I. plt. 34. f. 24 gives a good figure of the ♂.

Warr.-Stz. *Pal. Noct.* III. 34. plt. 76, treats *pallida*, Tutt, as the same as *serena*, Alph. which he figures. The ♂ is very pale ochreous and the ♀ is pale mouse grey with slight dusky shade in the outer marginal area. Two other figures show a ♂ and a ♀ but the lower wings are too dark, especially of the ♂.

Culot, *N. et G.* I.(1), plt. 11, figs. 5-8, figure 5 a ♂ with only the claviform black, the reniform outlined and the orbicular absent ; 6 a ♂ with black claviform, reniform with centre darkened, orbicular scarcely

traceable ; 7 a melanic form, *posteli* ; and 8 a fine *cuspidata* form with sagittate discal markings.

Corti-Stz. *Pal. Noct. Sup.* III. 49 (1933), is of opinion that *cuspidata* Culot, should be placed under *plaga*, Steph. and he figures, on plt. 7a, the *serena*, the pale eastern form, which " occurs in similar coloration as an ab. *pallida* in Spain, England, etc.:'

Of the Variation Barrett says—" Variable in almost every respect —in the ground colour from pale drab or pale brownish-grey to deep dark red-brown or even smoky-black. A Cheshire form is almost black, and a Yorkshire form of an extremely dark purple brown. In the grey brown forms there is not unfrequently a mottling of whitish clouds in the middle area of the forewings and a yellowish spot between the two upper stigmata. In all the varieties of ground colouring the transverse lines are usually indistinct, often obsolete ; but occasionally very sharply distinct, and when so, they seem to present a most curious appearance of the profile of a sordid and brutalised human face, whereof the claviform stigma is the mouth, the reniform the eye, and the orbicular the nostril. A far prettier variety is produced when the second line is placed somewhat far back and the hind marginal space behind it is clouded with black. The three stigmata, which ordinarily are the only conspicuous markings, are in some instances, in females more particularly, rendered quite obscure, or even almost obliterated ; or some are so obscured, leaving only the reniform, or the claviform distinct. A variety (*plaga*) is produced by the union of the black stigmata by means of a black bar or streak, or a black cloud, but this even varies greatly ; sometimes a black line connects along the lower edge of the latter to the claviform, in others it passes below the orbicular, uniting the other two ; more rarely the orbicular and reniform are fused together, or united higher up, and the claviform left conspicuously separate. The black bar which unites the stigmata in these specimens takes other forms ; sometimes it is a small black streak just above the top of the claviform, in others it unites with that stigma only, and broadens or extends it in various ways ; or other streaks appear above it, uniting the two upper stigmata as already described, or altering their shape and forming rayed or grade black blotches.

He records a male " Having the transverse lines strongly marked, in which also are three black longitudinal stripes running along nervures, one from the claviform stigma and two from the reniform, all of them very conspicuous and attaining the second transverse line."

Another specimen has " Two large parallel black elongated blotches in the forewings totally concealing the stigmata."

Another " Of a uniform brownish white, without trace of either transverse lines or stigmata, and with scarcely a trace even of the black bar across the front of the collar."

Another " Has its R. forewing extended laterally to double the normal width, the markings thereby rendered smeared and indistinct."

Another " Has an elongated blunt blackish blotch on each side of the median nervure and the subterminal line shifted out of its normal position."

Another " In which the basal portion and the whole space beyond

the second line are dark brown, while the central area is of the usual pale brown."

The Names and Forms to be considered are—
exclamationis, Linn. *Sys. Nat.* Xed. 515 (1758).
clavus, Hüfn. *Berl. Mag.* III. 298 (1766).
murina, De G. *Insectes.* I(1). 406 (1771).
unicolor, Hb. *Saml. Noct.* 544 (1808-18).
picea, Haw. *Lep. Brit.* 220 (1809).
plaga, Steph. *Ill.* III. 388 (1829).
ssp. *serena*, Alph. *Mem. Rom.* V. 137 (1889).
ab. *rufescens*, Tutt (Haw.) *Brit. Noct.* (Lep. Brit.), 66 (220), 1892 (1809).
ab. *brunnea*, Tutt (Haw.) *l.c.*
ab. *pallida*, Tutt *Brit. Noct.* 65 (1892).
ab. *costata*, Tutt (Haw.) *Brit. Noct.* (Lep. Brit.), 65 (219), 1892 (1809),
ab. *obsoleta*, Tutt *l.c.* 66.
ab. *juncta*, Tutt *l.c.* 67.
ab. *lineolatus*, Tutt *l.c.*
ab. *dufranei*, Lamb. *Rev. Mens.* VII. 26 (1907).
ab. *cuspidata*, Culot. *N. et G.* I(1). 70. plt. 11. f. 8 (1909-13).
ab. *posteli*, Culot. *l.c.* figs. 5, 6.
ab. *conjuncta*, Hirsche. *Verh. z. b.* LX. 416 (1910).
ab. *quadrimaculata*, Wehrli. (Vorbt.) *Schw. Schw.* II. 622 (1914).
ab. *wehrlii*, Vorbrdt. *l.c.*
ab. *invertilinea*, Charles. *Cat. Lep. France*, 155 (1926): *Am. Pap.* III. 128. plt. 2. f. 5 (1916).
r. *schwingenshussi*, Corti. *Schw. ent. Anz.* 3 (1926). Corti subsequently treated this as a good species near *wagneri* and *aquilina* (Continental). See Seitz. *Pal. Noct. Supp.* III. p. 27. plt. 3i. ♂ type. (Spain).

Of these Tutt dealt with—
A. Ground colour (1) pale whitish grey, distinct marking=*pallida*.
(1a) grey, distinct reddish costa=*costata*.
(2) clear fuscous, central area paler=*exclamationis*.
(3) black grey, markings distinct=*picea*.
(4) clear reddish grey, markings distinct=*rufescens*.
(5) dark reddish brown, markings distinct=*brunnea*.
B. Stigmata. (1) entirely or almost entirely absent=*obsoleta*.
(2) orbicular absent, others distinct=*unicolor*.
(3) orbicular and reniform united=*plaga*.
(4) all united=*juncta*.
(5) See Newman, *Brit. Mths.* p. 326. fig. 1=*lineolatus*.

ssp. *serena* (Stdgr.) Alph. *Rom. Mem.* V. 137 (1889).
Fig.—Corti.-Stz. *Pal. Noct. Supp.* III. plt. 7a.
Orig. Descrip.—"Of a number of *A. exclamationis* collected at Osch by M. Groum-Grshimailo nearly three quarters belong to this form, which differs from the type by its distinct colour, of a cinereous-grey not suffused with brownish or brown. This form varies much in the distinctness of the marking; while very often the elbowed line is very distinct, very black, or on the other hand, it is only slightly indicated

definitely decide whether they are two species or only sub-species, before having established the constancy of these differences. M. Beuret of Bâle has written to me lately he, too, has found differences, which have, however, left him, equally, in doubt as to their systematic value. Probably this is very much a matter of personal opinion, depending on what one considers a species. My own view is it can only be determined by sterility and that cases of this sort are more likely to stand just below the specific rank and to belong to the highest grades of subspecies I designate by the term of "exerges," because they are already very different from the rank I call "races," which is usually lumped with them as subspecies. The genitalia of *berisalii* are thinner and frailer than those of *dejone*, just as its wings are more elongated and weaker in texture, so that one seems justified in considering it a result of frigoripetal variation, which has taken place comparatively recently, after the Glacial Periods, a colony of *dejone* having pushed northward during some warmer period and got isolated in the cul-de-sac of the Valais, where conditions have not been fully suited to its particularly southern constitution. The general facies of the other races of *dejone* from the southern watershed of the Alps, described by Fruhstorfer, have, in fact, been transformed very much less.

✓ *Argynnis* (*Brenthis*) *selene*, Schiff. race *selene*, Schiff. :—I have not come across this species, which is very local in the Rhone valley: Wheeler reports it from the Grangettes, between Villeneuve and Bouveret on 19th May (males only) and on 7th June (both sexes), from the banks of the Rhone at Bouveret, from Revereulaz, above Vouvry on 30th May, from Vouvry, in the Vaud, and from Loèche-les-bains, Zermatt and Bérisal in the Valais. The second generation is said to occur in August and September, but I find no actual record of it from the Rhone valley. The race can only be the nominotypical Vienna one, which as I have noted in my monograph on *selene* in the *Bull. Soc. Ent. France*, 1933, p. 116, maintains a remarkable similarity of aspect all over central Europe, only exhibiting geographical variations on the southern watershed of the Alps, except for the mountain race *montana*, Meyer-Dür=*hela*, Stdgr., found also in the Swiss ones of the north side. The second generation is usually the very small *selenia*, Freyer=*angustipennis*, Fuchs.

✓ *Argynnis* (*Brenthis*) *euphrosyne*, L. race *euphrosyne*, L. and race *nestonclara*, Vrty. :—There are two distinct races in the lowlands of the Rhone valley; the nominotypical one is presumably proper to the damper localities, such as those I have found it in, on the outskirts of the woods at Bex, in June, already in a worn condition, and as late as the middle of July, the other to the drier and hotter ones, such as the foot of the cliffs from Vernayaz to Martigny, where even males were still quite fresh at the end of June. The latter differs from the former by its much lighter and clearer yellowish fulvous ground colour on both surfaces and in both sexes and by the considerably thinner black markings, together with the nearly total absence of the black suffusion at the base of the wings in a male and a very limited one in the female. It thus corresponds to the race I have described from central Europe under the name of *nestonclara*, selecting my types from Berlin, in the *Ent. Rec.* 1932, p. 112, and which is so similar to the *neston*, Frhst. of Tessin, except for its paler and less bright colouring, that I considered it as having originated from the same strain as this

race, *i.e.* as belonging to the Central exerge, which has spread northward. The nominotypical *euphrosyne* belongs, on the contrary, to the Northern exerge and has spread southward to the largest mountain ranges. This would account for two such sharply different races being found together, and not far from each other, in the Rhone valley. What might have seemed rather surprising is that at the Pont de Nant, 1400 m., where most species produce dark races, I should have found a perfectly characterized *nestonclara* one, but on the other hand, Fruhstorfer has described *densoi* from the Dent du Midi, on the opposite side of the Rhone, as being similar to *neston* too, but larger, with more elongated wings and with a remarkably broad yellow band across the underside of the hindwing, so that forms of this sort do exist also at high altitudes. At Javerna, 1700 m., on the mountain which rises between the Pont de Nant and Bex, the race I collected on the damp alpine meadows, is a small and dark nominotypical *euphrosyne* and a single female, I came across at Bérisal on 20th July, is of the same kind, as well as specimens I have from the Turtmanntal and from the Lötschental with other transitional ones.

Both Wheeler and Vorbrodt speak of a second generation in August and in July and August, respectively, as being quite a normal occurrence in Switzerland, but they furnish no actual records of it and I am quite convinced it was not produced in the Rhone valley in the two unfavourable and backward years, 1932 and 1933, in which I was there as late as 21st August.

Argynnis (*Brenthis*) *dia*, L. race *dia*, L., with II and sometimes III gen. *postdia*, Vrty. :—In 1933 I actually found both sexes of the first generation, unmistakably recognizable by their facies, emerging as late as the 27th June in a meadow on the Gryonne. I did not see the species during June, in any other locality, except one very fresh female, clearly of the II generation, on that same day at St. Triphon, by the tower, so that evidently there, at Bex and in the other localities, the I generation had been on the wing at its usual season of April and May. In fact, at Bex the II generation began to emerge in that year, as it had done in 1932, about the 5th July ; it soon became abundant on the golf-links, till about the 20th, after which it disappeared in this locality, except for a few laggard females in August ; on the 18th and 21st of this month I found, however, both sexes were represented by old and by fresh individuals on the banks of the Gryonne, below Bouillet. I think this can only have been the II generation, which had emerged, there, later than at Bex and that the III, occasional one, occurring, according to Wheeler, in favourable years (1934 must have been one, for, after a warm, sunny spring, I found the II generation emerging at Bex, in numbers, as early as 20th June), does so in September, when Bainbrigge Fletcher reports it from St. Maurice, on the 10th, and common around Montreux.

As I have mentioned it in my little monograph on *dia* in the *Bull. Soc. Ent. France*, 1933, p. 74, this race of the Vaud, as well as that I found in the driest and hottest spots of the Valais, at Martigny, the Follaterres and Sierre, belongs constantly to the widespread race of Central Europe, described from Austria and extending as far as Catalonia. I have not even detected signs of transition of its II generation to the well characterized race *leonina*, Frühst. of the Geneva district, so that, as I have remarked in the aforesaid paper, it makes

one suspect very much the latter cannot be produced simply by the direct influence of a drier climate, but is more probably a synexerge between the nominotypical race *dia* of the Northern exerge and the Italian race *flavens* of the Central one, which has spread as far as the S.-E. of France and produced also *diniensis*, Obth., in whom the latter strain is in a larger proportion than in *leonina*.

✓ *Argynnis* (*Brenthis*) *amathusia*, Esp. race *serena*, Frhst.—Wheeler confers to *amathusia* the qualification of "a mountain species," practically of the fir region, and mentions 870 m. as the lowest altitude known to him for it; Vorbrodt does not mention its lowest limits and I have found no records of its existence in the plains of the Rhone valley. I was thus rather taken by surprise, when I met with it, in the park of the Hôtel des Salines, at Bex, on the outskirts of the woods, by the gardener's house; it emerged in 1934 on 22nd June and in 1932 and in 1933 much later, from 6th July to 11th; a female was still in the act of drying its wings, so that it had obviously developed on the spot. These specimens are quite alike those which are abundant in the mountains above, at Javerna, 1700 m., and Pont de Nant, and therefore belong to the usual race, described from the Simplon and Zermatt, and spread all over the mountains of the Upper Rhone region, as well as in the hottest valleys of the Upper Adige; individually *serena* exists also in the Western Alps of Piedmont, mixed with *titania*, Esp., as I have made it out in the *Ent. Rec.*, 1933, p. 90, where I have illustrated the races of that region.

✓ *Argynnis* (*Issoria*) *lathonia*, L. race *postlathonia*, Vrty. and race *maximemaculosa*, Vrty., with I gen. *lathonia*, L.:—The I generation was still on the wing at the beginning of June, 1933, in the meadows of the Vaud and exhibited the spring features to the highest degree. A few individuals, which went on emerging till the end of the month, showed signs of transition to the aspect of the summer generation or generations and so did several fresh ones I found, there, at the end of June 1934, after a hot spell, but one can scarcely suspect them to be already the offsprings of early-spring females and they are more likely to be late emergences of the same spring generation; at Martigny I found one in 1933, which was very worn, as late as 10th July. The II generation of this species therefore seems always to appear late in the year, and Wheeler seems to be right in giving August as its time: my earliest date is 24th July, on the Gryonne, below Bouillet, when several were out, and I saw no more, there, in August; on the golf-links of Bex it was to be seen from 28th July to 4th August and these days were, it is to be noted, exactly the same in 1932 and in 1933; at the Follaterres I found it, in very fresh condition, on 31st July. These dates make it clear that the two "fresh broods," reported by Bainbrigge Fletcher, in the *Ent. Rec.*, 1927, p. 87, from Montreux, as having appeared, respectively, at the beginning of September and on 21st October, in 1925, were actually a III generation and a IV, partial, autumnal one, exactly corresponding to those produced in Peninsular Italy, where the IV, occasional, emergence has the same facies as the spring one; Montreux, however, has an exceptionally warm exposure for a Swiss locality.

In my survey of the geographical and seasonal variations of *lathonia*, I made in the *Ent. Rec.*, 1933, p. 56, I restricted the specific name to the spring generation and to the single one of Scandinavia, Linnaeus's

type being from Upsala, as stated by himself; I named the most common and widespread form of the summer generation or generations, when there are two of these, of Central Europe *postlathonia*, selecting as holotype a male from Hilversum, in Holland, of 21st July. I have already remarked, there, that the form of the driest spots in the Valais and the Vaud only produce this form and not the more extreme one, I have called *nigroprivata*, on account of its considerably reduced black markings, which is quite racial in the Geneva district and in other dry and hot regions of Central Europe. On the contrary, in the damp meadows of the Vaud and typically at Bex, variation in the opposite direction, of a striking increase in the extent of all the black markings, reaches the highest degree I have seen from any European locality; I have described it, in the aforesaid paper, as recalling the general facies of the Asiatic *issaea*, Gray, in this respect and by the dull and dirty look of the fulvous colour; the latter, striking feature, is found also in *attenuata*, Sagarra; I have given the name of *maximemaculosa* to this culminating grade in the development of the black pattern, taking as typical my specimens of the II generation of Bex. This insect seems scarce in the region we are dealing with.

A strong contrast to the small and dully coloured *lathonia* of the Rhone valley is afforded by the much larger and more richly tinged II generation of the southern watershed of the Alps, I have named *magisnigrata* from the Anzasca valley, where it swarms, and by the III generation of the latter, which is perfectly identical with the bright and warm fulvous *emiflorens*, Vrty. of Tuscany.

Argynnis ino, Rott. (=*dictynna*, Schiff.) race *ino trans. ad adula*, Rott.-Frhst.:—The only localities, in the plains of the Rhone valley, mentioned by Wheeler are: "between Villeneuve and Bouveret" and "Lavey, at the beginning of June." Apart from the mountains, I too have only met with it in that zone and namely: on the left bank of the Rhone, at Bouveret, on 2nd July; both sexes in fair numbers in the meadows to the north of the St. Triphon hill, on 28th June, 1934; one on the golf links of Bex on 22nd; in 1933 one just below Bouillet, near Bex, on 21st August, but worn or very worn in all these cases. These specimens and some fresh ones from Villeneuve, of 20th June, sent to me by Bainbrigge Fletcher, all belong to a form which is neither the nominotypical one, as I have made it out, in an exact way, in the *Ent. Rec.*, 1933, p. 91, nor *adula*, Frhst. I have pointed out, there, that the latter name cannot be restricted to the race of the Engadine, whence it was described, because individuals exactly like it are found as far as northern Germany, quite frequently, mixed with the darker and more saturated nominotypical form, and racially in many localities of the south, such as the Geneva district and the Cottian Alps. The aforesaid examples of the Vaud do not seem to reach either of the extreme forms, but to be transitional, with a greater tendency to vary in the *adula* direction, whilst some, I have from the Lötschental, are, instead, more on the *ino* side and an exceptionally dark form, which is so frequent that it is "considered rather a local race than an ab.," as noted by Wheeler, is well known to exist on the left bank of the Navigenze, nearly opposite Zinal, 1800 m., in the Val d'Anniviers, and has been named *zinalensis* by Favre; this form stands opposite *adula* by the extreme degree in the greater extent of the black markings; the more saturated fulvous and the sombre underside are the other features of nominotypical *ino*, as compared with *adula*.

Argynnis daphne, Schiff. race *nikator*, Frhst. :—My earliest date is 20th June at Vernayaz ; on 4th July both sexes were emerging on the well known slopes above Lavey-les-bains and by the 25th there were only old females left at the La Bâtiaz tower of Martigny ; the other known localities of this very local species are the Follaterres, Saillon and, according to Favre, as far up the valley as Sion and Niouc, above Sierre. In the *Ent. Rec.* of 1933, p. 106, I have pointed out that Frühstorfer's name of *nikator*, to be quite exact, must be restricted to this race of the valley, which was his typical one, and, curiously enough, to that of the Coast Range of Northern Calabria, which exactly agrees with it in aspect. The race of the Upper Adige, which Frühstorfer included in his *nikator*, is, in reality, decidedly different and precisely intermediate between it and the nominotypical Austrian *daphne*, so that I have named it *praenikator*, and the race of the Maritime Alps, to which Turati and I had applied the name of *nikator*, is, instead, a degree of variation in the opposite direction to the preceding, as it is quite like *tenuitermaculosa*, Vrty. of Central Italy, with the thinnest markings and the lightest colouring on both surfaces. All these races consist in grades, which are sharply distinct from each other and scarcely overlap at all individually, in a way quite unusual in most species.

Argynnis aglaja, L. race *locupletata*, Vrty. (*locuples*, Vrty., homonym) :—I have shown, in a little monograph on the geographical variations of this species (*The Entomologist*, 1935, p. 189) that the familiar name of *aglaja* is unfortunately a primary homonym in Linnaeus's genus *Papilio* and would, hence, be invalid, according to the International Rules of Nomenclature ; Haworth's *charlotta*, which he described from England as a distinct species from *aglaja*, would become the specific name, now we know it applies to a slightly abnormal individual form of the latter, with some of the basal silver spots on the underside of the hindwings merged into three little bands near their root. I have, however, suggested that the change of the name, by which the species has always been known for the last 200 years, should be avoided by submitting the case to the International Committee.

As to the races here concerned, I have remarked that the very distinct *locupletata*, chiefly characterized by its giant size, as compared with the other European ones, but also by its reduced black markings and by its clear, bright colouring in most individuals, has probably originated from the Mediterranean strain and thus belongs to the Central exerge, as it is only found in the western portion of the Alpine region and thence it spread to Catalonia, where it has been renamed *montesignum* by Sagarra, but it is absolutely identical with my typical series of *locupletata* from the Baths of Valdieri, in the Maritime Alps. In my original description I also mentioned some specimens I have from the Simplon, which is the most eastern locality known to me, and I must now add that the race of the Rhone valley, in the plains and at low altitudes belongs to it too. It began to emerge, in the meadows between Bex and St. Triphon, in the last days of June 1932 and 1933 (a week earlier in 1934, *i.e.*, about the 20th), and went on till the middle of July, after which only a few females remained on the wing till the end of this month.

At the Pont de Nant, 1400m., above Bex, this species was much

more abundant than at lower altitudes and exhibited a distinctly different facies by its smaller size, thicker black markings, more extensive suffusion at the base of the wings and duller and more saturated fulvous colour : in other words it belongs to the *emilocuples*, Vrty., race of Central Europe in general and of most of the localities in the Alps. This is presumably of northern origin and has spread southward into the larger mountain masses, as in the case of many other butterflies, in which the difference between the exerges is more obvious. In the Anzasca Valley, at Vanzone, 700m., as well as at Macugnaga, 1300m., there is a remarkable race, in which the males are small and dark *emilocuples*, whereas the females are large and bright *locupletata*, so that I presume the two exerges have met there and interbred so thoroughly that sex is sufficient to develop and reveal either one or the other of their opposed features and the synexergic race must be designated by the joint names of *emilocuples-locupletata*.

Argynnis niobe, L. synexergic race *alpiumsisenna-alpiumlaranda*, Vrty., race *alpiumsisenna*, Vrty., and race *herse*, Hüfn. :—The hypothesis of an origin from two stocks and more exactly from both the Northern and the Central exerge, we have just made in connection with the preceding species, is suggested still more strongly in this one by the extremely broad and conspicuous variations it exhibits in the Rhone valley and particularly in the plains. I witnessed its emergence in the meadows of the Vaud from the last days of June 1932 and 1933 or earlier in the forward year 1934, when females were then already emerging abundantly and most males were worn, to about the 20th of July and in the Pfynwald of Sierre I still found both sexes, in worn conditions, on the 29th, in 1932.

These two races have an entirely different look : that of the hot and dry Pfynwald is small and dully coloured and the black pattern tends to be rather extensive, so that it gives one the impression of being a pure strain of the Northern exerge, referable, on the whole, to the most widespread race of Central Europe, to which Hüfnagel's name of *herse*, given to the *niobe* of Berlin, should be applied, but with a considerable number of such small and pale individuals that they are a near approach to nominotypical *niobe* of Scandinavia, as well as to its near allies *alpiumstricta*, Vrty., and *obscura*, Spuler, from the highest Alpine haunts of the species. The former is, no doubt, the race of altitudes of this sort also in the Upper Rhone basin : the second, with very melanic females, is probably peculiar to the Eastern Alps. Apart from these extreme local conditions, the next grade *herse* of development and colouring is no doubt the most usual mountain form and race in this region : it is the one I found emerging at Bérisal on 20th July and at Javerna, 1700 m., above Bex, and which I have from St. Luc, 1800 m., in the Val d'Annivers, from the Lötschental and other localities; these series are, however, not entirely similar to those of *herse* from Germany, because they contain a good many specimens, which are transitional, or which belong, to *alpiumsisenna*, Vrty., a form, and very often a race, standing between *herse* and the large, highly coloured and boldly spotted *sisenna*, Frhst., of Carniolia ; these usually have also a broader black suffusion at the base of the wings, above, and more russet patches on the underside of the hindwings than the German *herse* in my possession. The Pont de Nant, 1400 m., above

Bex, shows, furthermore, that there exist, in the Rhone Basin, mountain localities where *herse* either does not exist at all or is nearly entirely replaced by *alpiumsisenna*.

As to the race of the plains, in the Vaud, mentioned above, I have already remarked, in a paper on *niobe* in *The Entomologist*, 1933, p. 243, that it consists of a mixture of two very distinct forms: one is the aforesaid *alpiumsisenna*, belonging together with all those I have just spoken of, to the Northern exerge; the other strongly recalls the *alpiumlaranda* race of the Central exerge, I have described from the southern watershed and notably from the mountains above Lake Maggiore, on account of their larger size in both sexes, their clearer, warmer and brighter tone of fulvous, their thinner black pattern on both surfaces of both wings, including the lighter and less extensive basal suffusion of upperside, and the reduction and paleness also of the russet patches on the underside of the hindwing, which give it a lighter and yellower aspect. In 1932 I had been struck by the fact that these two forms kept very distinct from each other, as I had, then, found no transitional individuals between them. In 1933 I was on the look out for them and I did meet with a few, but this does not alter the interesting fact that most individuals give one the impression of descending either from one or from the other of the two strains, as though they usually did not interbreed or as though their hereditary factors kept separate and followed Mendelian laws: in my Bex series they actually stand in both sexes as 3 : 1, *alpiumsisenna* being, by far, the prevalent form of the two.

As a contrast, in the Anzasca valley, on the southern watershed, there is a race which seems to have been produced by a complete blending of *sisenna*, Frhst. with a *laranda*, Frhst. strain, because it maintains a perfectly intermediate facies in all its individuals; the females of the lower altitudes (Vanzone, 700 m.) are very much larger than they ever are in the Rhone valley and reach, very often, the enormous size of *laranda*; hence, I have named this race *alpiumlata*, in my survey of the races of *niobe*, in the *Bull. Soc. Ent. France*, 1929, p. 242.

✓ *Argynnis adippe*, Rott. (nec L.) race *mainalia*, Frhst. and race *baiuvarica*, Spuler:—I need not repeat what I have said on various occasions about the specific name of this species, concluding, in the *Ent. Rec.* 1930, p. 150, that its discoverers have been Rottemburg and Schiffermüller, in 1775, and that the name of *adippe*, they have given it, is perfectly valid, according to the modern International Rules of Nomenclature, because Linnaeus had only used it for an individual form of *niobe*, as a substitute of his previous name of *cydippe*, given to a female with 23 silver spots, still existing in his collection and only differing from his *niobe* in that the latter has no silver; the Rules of Nomenclature explicitly consider names given to individual forms as non-existing and, therefore, both *cydippe* and *adippe* were quite available for a species or a subspecies. Rottemburg has precedence over Schiffermüller on the strength of the exact date of the 24th March of his paper, whereas the latter author's book bears no further date than 1775 and must be considered published on 31st December for purposes of priority, according to modern Rules. The former writer, therefore, being the author of the name, the nominotypical race is that of Berlin. What I wish to add here is that the race of Scandinavia, as it is

represented in my collection by a series of specimens from Scania (mostly of Bökeberg), and evidently also of the same latitudes in Russia, for I have a still more highly characterized one from St. Amata, in Lettland, is distinctly different from the usual race of Central Europe, to which that of Berlin belongs: the aforesaid more northern one is, in fact, smaller, its forewing only measuring, in both sexes, 25 to 27mm. from root to apex, instead of 29 to 30 or more, and it is of a much duller and paler tone of fulvous, which, in the female, often acquires quite a peculiar whitish hue; I suggest distinguishing this little race by the name of **neclinnaei,** nov., to recall the fact it is the one Linnaeus was wrongly supposed to have known and named.

In the plains of the Vaud the males appeared at the beginning of July in 1932 and in 1933 and on the 20th June in 1934, and the females towards the middle of July and at the end of June, respectively; some of the latter were still to be found in good condition by the middle of August. The race was the usual, very large and fine one, of the warm valleys in the greater part of the Alpine region, which Frühstorfer has described under the name of *mainalia* in the *Ent. Zeit.*, XXIV. p. 37 of 21st May. 1910, and again in the *Internat. Ent. Zeit. Guben*, 4, p. 48, of 28th May, 1910, selecting specimens from Chiusa (Klausen) in the Upper Adige as "types" and including others from the Jura, near Biel, Geneva, mountains around Pralognan, Arcine and Brides-les-Bains in Savoy, Carniolia and Agram. My specimens of the Vaud correspond exactly with those of the Isarco Valley and of Chamonix and with the original descriptions: "sister race" of *baiuvarica*, of a deep, saturated, colour on both surfaces, but with a little less russet colour and more green covering the underside of the hindwings, especially in the female, and of a larger size. I have not met with a single individual of the form *pseudocleodoxa*, Vrty., wrongly known as *cleodoxa*, O., in the Rhone Valley.

On the southern watershed, the race, which swarms in the Anzasca valley, at all altitudes, corresponds to *mainalia* by its large size, but the average is just below that of the Vaud one and the colouring is not the saturated *baiuvarica* tinge on either surface, being clearer and not as warm on the upperside and lacking the russet patches on the underside: these are nearly entirely replaced by green in the individuals which exhibit a well developed pattern, whilst $\frac{1}{3}$ of the males and $\frac{2}{3}$ of of the females are *pseudocleodoxa*, a good many of which have all the dark pattern, including the streaks, extremely effaced and the wing very uniformly yellow, as it is, characteristically and prevalently, in most of the southern races; connection with the latter is also revealed by the markedly thinner black markings of the upperside, together with the aforesaid tone of fulvous. I take this race to be a synexerge, due to the crossing of the Northern exerge with the widespread Italian *clarens*, Vrty. of the Central one, which I have described from Central Italy, but which is very common also in the dry regions of Northern Italy. I consider the synexerge of the Anzasca valley should be distinguished by the name of race **alpiummixta,** nov.

Further east, on the northern boundary of the *clarens* area, which includes the Upper Adige (I have it, for instance, from Vatriolo) one finds another synexerge between it and *mainalia*, such as the one I have, myself, collected at the Mendola Pass, on 21st July, 1921, when both sexes were already worn; the size of the insect, the tone of colour

on both surfaces and the extent of the markings, including the russet shadings of the underside are quite intermediate.

To the west, in the S.-E. of France, one meets with a further lot of handsome forms and races, most of which convey the impression of being synexerges too: Race *adelassia*, Frhst., of the coast region, whence it was described from the Moulinet, above Mentone, and whence I have it from Levens, above Nice, is probably a pure southern race of the Northern exerge, as it is of large size, of a deep, rich, reddish, fulvous; it has large black markings and the silver markings of the underside are usually well developed.

In the drier regions one finds a race of the same size, but of a paler and yellower fulvous, with smaller black spots and with a very clear, yellow underside ground-colour (no russet and no green), less rarely devoid of silver markings. It looks perfectly intermediate between the nominotypical form of the Northern exerge, as figured by Bergsträsser, pl. 42, figs. 5 and 6, and *clarens* of the Central exerge. I propose naming it **magnaclarens,** nov. and I select, as its holotype, a male, in my collection, from La Valboune, near Pont-St.-Esprit, in the Gard, captured by Gaillard on 11th July, 1926, and very kindly presented to me; others are from Gémenos, on the Sainte Beaume chain, near Marseilles. Specimens, from the Mardérique Valley and from the Vallon des Eaux Chaudes, near Digne, are distinctly different and can be described as transitional from *adelassia* to the following.

In the Cévennes (Hospitalet, 800m., in the Causse du Larzac; Concoules; Obs-Aigoual) there is a near approach to *clarens* of Italy: small size; fulvous light and cold in tone; markings of both surfaces rather thin; silver ones nearly always absent; all these features are, however, less accentuated than in *clarens*, and the race could not bear this name; I, therefore, propose that of **semiclarens,** nov., as well appropriated to it.

As to the race of *adippe* in other localities of the Upper Rhone valley, all I need say is that, according to the materials I have seen, it constantly is a perfectly characterized *baiuvarica*, Spuler, everywhere, from the Pfynwald, where both sexes were abundant on 29th July, to the mountains of the Valais and of the Vaud, where I found it at as high an altitude as 1700m., which surpasses the limits given by various authors for this species. All these *baiuvarica* are smaller than the average *mainalia*, of a more saturated and red tone of fulvous, and more abundantly covered on the underside by a deep, brownish, or, in some females, even blackish, russet colour, mixed with no green at all, as it is, on the contrary, in the *vulgoadippe*, Vrty. race of Central Europe, which intergrades with the further degree of reduction of the nominotypical form, exhibiting neither russet nor green, to any extent, on its clear yellow ground-colour.

Argynnis (*Argyronome*) *paphia*, L. race *paphia*, L.:—In the late years 1932 and 1933 a few males appeared early in July, but the mass and the females were only on the wing at the beginning of August. In the forward year 1934 a long spell of warm spring-weather brought out the first males at Bex on 21st June, and I saw the first females in that same month, on the 26th.

I was rather surprised to find, as I have already stated in my article on this species in *The Entomologist*, 1934, p. 78, that everywhere, in the Valais and in the Vaud, the small, nominotypical, form decidedly

predominated and I never met with any of the largest *magnata*, Vrty., such as are quite common in most regions of Central Europe and very often locally racial. On the opposite watershed of Mt. Rosa, I had, on the contrary, in previous years, collected, in the Anzasca valley, where it is extremely abundant, the largest *magnata* race I have seen; the latter is also remarkable by the proportion of two *valesina* to one fulvous female, so that by both these features it recalls the Chinese races. On the contrary, in the Rhone valley *valesina* evidently occurs so occasionally that I did not meet with a single one, out of hundreds of females I have seen, although Wheeler says "it is not very scarce," there some years and Frey reports it even as common one year at Stalden. In the Bex district the females usually belong to the dark form, with a greyish-brown shading covering most of the fulvous and with large black markings, but in drier localities, such as the "grands rochers," on the Sépey road, above Aigle, and at Martigny, by the La Bâtiaz tower, there exist more lightly coloured ones, with smaller spots and a more golden-brown basal suffusion, transitional to the most extreme form, in this direction of variation, I have described from Digne and other southern parts of the area of the Northern exerge, designating it by the name of *revelata*. As I have shown in my paper, mentioned above, the Central exerge, in the case of this species, far from having extended north of the Alps, has not even reached the Po basin, in Northern Italy, and stops short on the waterparting of the Apennines, where the zone of the olive-tree ends northward, on the boundary of Tuscany.

✓ *Argynnis* (*Argyronome*) *maja*, Cr. (=*pandora*, Schiff.) presumably race *dellabeffae*, Rocci:—Reported from several localities of the Vaud (Aigle, on 6th July; at Charpigny, between the Châlet and Les Saves, on 23rd September, quite fresh according to Fison) and of the Valais (Fully; Pfynwald; Miouc; lower Valais, collected by Gaggi, according to Vorbrodt) as very scarce. Wheeler's qualification of "accidental" does not seem very clear nor appropriate and Vorbrodt's suggestion that *maja* flies over, now and then, from the Val d'Aosta sounds decidedly fantastic to whoever is acquainted with the very local habits and the usually sluggish behaviour of this species, although it can fly vigorously, and Warren has observed one on the top of the Simplon Pass. One sees no reason for looking upon it differently from many other species, which are quite as scarce and only met with singly in certain regions. Another colony, furthermore, exists in the Engadine. Dr. Rocci in his original description (*Boll. Soc. Ent. Ital.* LXI., p. 153, of 1929) of race *dellabeffae* from the Val d'Aosta (Parleaz) and Val Susa (Beaulard), at 1200 to 1500m., rightly suggests that, "probably, the specimens recorded from the Valais (Martigny) can be referred to it too." It is small in size and remarkably dull in colouring, on both surfaces, with a pale, yellowish, ground-colour above and the markings reduced in extent on the upperside, as well as on the underside of the forewings, which are of a dull, brownish red.

✓ *Araschnia levana*, L. race *levana*, L., with II. gen. *prorsa*, L.:—The localities mentioned by Wheeler are, in the Valais, the foot of Mt. Chemin and near Sierre, esp. in the Pfynwald, and in the Vaud, "the Rhone Valley up to Martigny and from the district bordering on the Lake of Geneva." Vorbrodt gives mid-April to the end of May as the time for the butterfly of the I, nominotypical, generation and mid-July to mid-August for that of the II generation *prorsa*, L. I have seen nothing of it.

Vanessa cardui, L. race *universa*, Vrty. :—The scarcity of this species, during all the time I collected, was striking: I only met with a few individuals, here and there, in July, some of which had evidently just emerged, but not one was to be seen in June or in August. They all belonged to a form which can be described as a rather small and heavily marked *universa*, with a bright and saturated colour, as distinguished from the nominotypical northern race, which has considerably more extensive black markings, a paler colour and a brownish underside on the hindwings, instead of grey, from *carduelis*, Cr., which is very much larger and not so heavily marked, and from the very small, pale and scantily marked *inops*, Vrty. of the driest southern localities and especially of N. Africa. Wheeler remarks that "the principal brood emerges in late summer" and Bainbrigge Fletcher writes, in the *Ent. Rec.*, 1927, p. 86, that "fresh specimens appeared at Bérisal on 24th August and 1st September" and that it was "common and fresh around Montreux on 9th and 10th September, 1926," whereas not a single example was seen there at that season in 1925. Vorbrodt says, of Switzerland in general, that the I generation is on the wing from April to June. There, as elsewhere, it is still unknown whether they are hybernated butterflies, or they emerge from hybernated larvae, or chrysalids and how many generations there really are.

Vanessa atalanta, L. race *atalanta*, L. :—A few individuals in excessively bad condition, were still on the wing at the beginning of June; the emergence took place at the beginning of August and, after that time, examples in good condition were to be met with singly, more or less in every locality. It is queer Vorbrodt should speak of two generations, the first of which is, according to him, on the wing from 15th May to 15th July; the latter date evidently applies to mountain localities, but there seems to be no doubt left that, even in the south of Europe, there is only one real generation, which emerges, there, in June and lives till the following May; only a very small number of larvae is found again in September and give an excessively partial second generation in October; in Switzerland the later date of the normal emergence makes it still more unlikely any second, exceptional, emergence should occur.

Aglais urticae, L. race *urticae*, L. :—Both sexes were emerging and abundant during all the first half of June, after which it rapidly disappeared, in the meadows of the plains. The II generation suddenly appeared, in a mass, from about the 12th to the 18th of July and a few laggards were to be met with, in perfectly fresh conditions, till the end of the month, but in August nothing more was to be seen of this species in the lowlands. At the Pont de Nant, 1400 m., it was emerging on the 13th and Bainbrigge Fletcher states it was common at Bérisal, 1600 m., from 18th August, so that, at those sort of altitudes, the emergence is evidently a month later. Wheeler reports that a III generation is, occasionally, produced in October, just as it is even as far North as England, but Bainbrigge Fletcher informs me that this species was not to be seen around Montreux in September and October 1925. Vorbrodt had not made out that in Switzerland there are two or three generations, which are quite as definite as those Tutt, Rühl and others had made out, long before his time, in Central Europe generally.

In a little survey of the races of *urticae* and their presumable origins,

I made in the *Ent. Rec.* 1933, p. 123, I have already remarked that, from the Upper Rhone valley eastward, one always meets, in the region of the Alps, with a perfectly characterized nominotypical race, in the same way one does all over Central Europe, whereas in the western Alps, from the Cottian to the Maritime ones, there exists another race, I have named *opima*; it is similar to that of Peninsular Italy, which belongs to the Central exerge of *urticae* and which connects its race *turcica*, Stdgr., of the east, to *teruelensis*, Sheldon, of the western, Atlantic-coast, regions of France and Spain. This Central exerge has, according to the general rule in most species, not reached the Upper Rhone valley, like we have just seen it, apparently, has in the particular cases of some *Argynnidi* and *Melitaeidi*.

Nymphalis polychloros, L. race *pulchrior*, Vrty.:—I saw several in most of the localities I visited, but all in the last days of July and at the beginning of August, when it was evidently emerging; it then entirely disappeared, no doubt, in its aestivating and hybernating quarters. In the autumn it is in the habit of leaving them for a few flights and, in fact, also in this region Bainbrigge Fletcher has seen a rather worn one at Blonay on 3rd September. The partial second generation, on the Lake of Geneva, mentioned by Vorbrodt, can only have been suggested by this autumnal period of flight, for it seems quite established, nowadays, that *polychloros* is strictly monogeneutic everywhere.

As to the race, there is very little to be said about it, except that it is the usual one of nearly the whole of Europe, which only varies in certain regions of the extreme south, by producing the more warmly coloured *rubens*, Vrty., and of the north, or in particularly cold mountain localities, by retaining prevalently the small size and the lightly coloured and thinly marked underside of the nominotypical form; as a rule, this form is produced exceptionally and the mass of the race consists in the larger and finer form *pulchrior*.

Nymphalis antiopa, L. race *creta*, Vrty. (=*major*, Esp., prim. homonym).—Like the preceding, but in lesser numbers; at the same time, but, besides, a few hybernated individuals were to be seen about in the first half of June. Here, again, Bainbrigge Fletcher reports one, around a plum-tree with ripe fruit on 5th September at Blonay. In this case, Vorbrodt states there exists one generation only.

Here, too, there is, as I have pointed out in the *Ent. Rec.*, 1916, p. 101, a distinct difference, chiefly of size and in the breadth of the marginal band, between the northern race and the more usual European one, so that I have named the latter *creta*. Subsequently I sunk this name as a synonym of *major*, Esp., having found this author had made the same distinction, but, according to modern Rules of Nomenclature, his name is invalid for a race, because it is a primary homonym in the Linnean genus *Papilio* and Esper himself had already used it racially in *hermione major*; my name must therefore replace it in this sense.

Nymphalis io, L. race *io*, L.:—Much more abundant than the two preceding and to be met with ubiquitously in this region; it emerged, with them, at the end of July and at the beginning of August, when more were to be seen in the plains than later on, but some went on flying till I left and Bainbrigge Fletcher observed it in numbers at Montreux in September and, in 1925, also in October. It is strange Vorbrodt should make the blunder of explicitly stating there are two

generations, the first of which is on the wing from April till June. Even those authors who believed, like Rühl, Berge-Rebel and Spuler, in two normal generations, thought they emerged in June and in the autumn, but it can now be considered quite established there is only one normal and full cycle and that the second, autumn, generation is a partial one, produced in particularly favourable years, which joins the majority of the individuals of the first in hybernating and living till May, or even June, of the following year. In Peninsular Italy all the three species of this genus emerge about six weeks earlier (middle of June) than in the Upper Rhone valley and, yet, the whole lot estivate, hybernate and reproduce in April and May, no second generation being produced at all.

✓ *Polygonia c-album*, L. race *c-album*, L., with I gen. *hutchinsoni*, Robson (=*pallidior*, Tutt, nec Petiver):—I have already insisted, in the *Ent. Rec.*, 1919, p. 199 and 1933, p. 126, on the fact that the two generations are constantly and markedly different in aspect and that the name given by Robson to the first one, in general, must be used in that sense and not restricted to its more extreme, light ochreous, individuals, as some authors have been doing.

All I have to add here is that what I have seen in the Rhone valley coincidss in a remarkable way with the facts I had observed at Oulx, in the Susa valley, and described in the second of my papers mentioned above. Here, as there, the I generation was, in the plains, in perfectly fresh condition at the end of June (I had seen no *c-album*, before that time, in any locality, so that the hybernated individuals must have all died in May) and was on the wing, in more and more worn condition, till the beginning of August, when I caught the last one, at Bex, on the 8th. In the mean time, in this locality, I witnessed the emergence of the II generation, with its characteristic, hybernating, black and gray underside, from 27th July to 1st August, when individuals with their wings still quite soft were collected day by day. It is most remarkable that these were the very days in which the same thing had happened at Oulx in 1925; here, as there, the *c-album* then retired to estivate and nothing more was seen of them before my departure, but Bainbrigge Fletcher furnishes the information that around Montreux they were on the wing and common, in 1925, from 14th September to 11th October, when they are well known to take a few flights, before disappearing definitely into their winter quarters. The behaviour of this species is thus a very regular one and our knowledge of it can, now, be considered satisfactory. Nothing need be said of its aspect, as it is, geographically, more or less, invariable all over Europe, except for race *pictior*, Vrty. of the far north, with very broad black markings.

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CORRECTION.—In dealing with *Iolana iolas*, O. in the text I have overlooked the name of *wullschlegeli*, which Oberthür had given to the race of the Valais in *Ét. Lép. Comp.*, X., p. 392 (1914), so that Frühstorfer's *eurysthenes* of 1917 is either a synonym or must be restricted to that of the "S. Tyrol," included in his original description and perhaps answering more fully the features he mentions.

The Lowland Races of Butterflies of the Upper Rhone Valley.

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