

THE
ENTOMOLOGIST'S RECORD
AND
JOURNAL OF VARIATION

EDITED BY

G. T. BETHUNE-BAKER, F.Z.S.,
F.L.S., F.E.S., *Chairman.*
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and
HENRY J. TURNER, F.E.S.,
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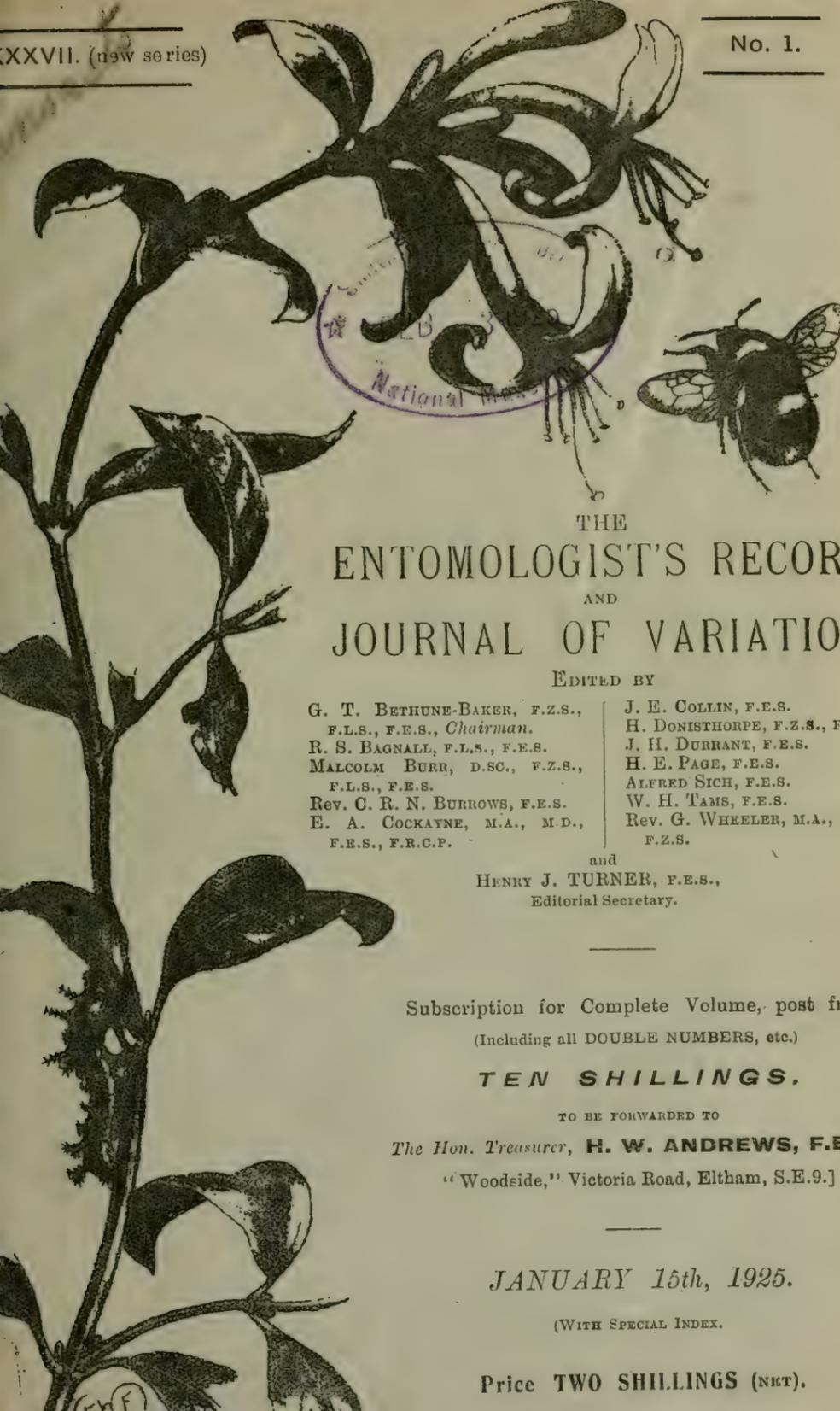
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F.N.F.

“ Behold ! ye pilgrims of the earth behold !
See all, but man, with unearned pleasure gay ;
See her bright robes the butterfly unfold,
Broke from her wintry tomb in prime of May !
What youthful bride can equal her array ?
Who can with her for easy pleasure vie ?
From mead to mead with gentle wing to stray,
From flower to flower on balmy gales to fly,
Is all she hath to do beneath the radiant sky.”

THOMSON.—“ Castle of Indolence.”



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May.		2. (<u>australis</u>) grey; pattern scarcely visible; v. limited white fascia.	
June.			
July.		3. (<u>emilyllus</u>) light tawny; prominent pattern; large ocelli.	
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Sept.		5. (<u>murina</u>) just as in 1; i.e. spring form.	
Oct.			

del. H. J. T.

The Entomologist's Record

AND

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VOL. XXXVII. No. 1.

JANUARY 15TH, 1925.

Editorial.

January 1st, 1925.

The sole financial responsibility of Mr. H. E. Page, F.E.S., for this magazine, since the death of its revered founder, the late Mr. J. W. Tutt, is relinquished with the issue of the last number, December, 1924.

Several of the associated editors and others have agreed to take up the responsibility for the future of the magazine, and have asked Mr. H. W. Andrews, F.E.S., to join them as Hon. Treasurer.

It is trusted that all old subscribers will loyally continue not only to support the magazine in faithful remembrance of its founder and late editor, but will induce others to subscribe.

It is also hoped that all will unite in furnishing entomological matter, particularly that relative to Variation, for the especial study of which the *Record* was primarily established.

Although resigning his responsibility for the continuance of the magazine Mr. Page has kindly consented to join the associated editors and thus will still remain in touch with his colleagues of so many years.

The Editors have asked Mr. H. W. T. Tams, of the British Museum Staff, to join them, and he has kindly consented to do so. In welcoming him to our staff, it is probably unnecessary to remind our readers of his many qualifications. He has had experience on the other side of the water, and since his advent to the British Museum he has struck out his own line and is working much on the structure of insects, which he finds an important aid. He is also Hon. Secretary of the British National Committee on Entomological Nomenclature, whilst his genial and ever ready assistance to students, who visit the Museum, has endeared him to the hearts of many.

SUBSCRIPTIONS and all business matters should in future be sent to Mr. H. W. ANDREWS, F.E.S., "Woodside," Victoria Road, Eltham, London, S.E. 9.

The two supplements which have been running for the past two years will come to an end in January and February respectively. In their place there will be, as a supplement, a long paper by Captain Kenneth J. Hayward, "Notes on Egyptian Lepidoptera at Aswan." Our con-

tributor spent some years at the Reservoir as engineer, and caught, bred, and observed the Lepidoptera very thoroughly.

As another supplement, a shorter one, there will be a LIST OF BRITISH GEOMETERS, based on the revised arrangement and nomenclature of Mr. L. B. Prout, as given in *Seitz's Palaearctic Lepidoptera*, with synonyms occurring in the "Entomologist List," *Meyrick's Handbook*, and *South's Moth's of the British Isles*, II. This should prove of great use to British Lepidopterists, as it will contain the names of all aberrant forms and races which have been recognised.

It is intended to keep in view the object for which the *Record* was established and expressed in its second title, *The Journal of Variation*. The following paragraph, which was drawn up some time ago, will explain the project.

"THE BRITISH NOCTUÆ AND THEIR VARIETIES."—FOR some time past a mass of references to the literature dealing with the British Noctuæ has been accumulating, and very shortly it is proposed to commence in the pages of the *Entomologist's Record* a series of notes, summarising the results of the impetus given to the study of variation through the issue of the *British Noctuæ and their Varieties* by our late editor. In the quarter of a century which has elapsed since the publication of those four most useful volumes a deal of study has been spent on this great family, and a number of important works have been published, most of them comprehensive and expensive, but all treating of variation as one of the main features of their subject matter.

First of all came Staudinger's *Catalog*, iii. ed., in 1901, an encyclopedia of references, each of which when looked up usually affords many others. In 1907 the portions of Spuler's *Schmetterlinge Europas* dealing with European Noctuæ was completed. This work is really an expanded Staudinger, treating of the species confined only to the strictly European area. Then in 1916 the third volume of Seitz' *Gross-schmetterlinge* was completed, and this deals with the Palaearctic Noctuæ, and was written by the late Wm. Warren, of Tring. While since 1898 Sir Geo. Hampson has been compiling a series of volumes, and only recently completed *The Catalogue of the Lepidoptera Phalaena of the British Museum*. Only quite recently M. Jules Culot has completed his *Noctuelles et Géomètres d'Europe* with its splendid figures of many forms. Memoirs have also been issued on various separate groups of species, such as the *Contributions to our knowledge of the Noctuidæ*, by the late J. B. Smith, of the U.S. National Museum, and the most elaborate work of M. Oberthür in the *Lépidoptérologie comparée*, published at Rennes.

It is proposed to give the original descriptions of the various forms named and indicated by these authors, and to add any further forms which may have been announced in the literature of Entomology, or omitted in the above works. To do this is rather a herculean task, as many of such forms were originally differentiated by workers in more or less remote areas, and announced in magazines of limited and local circulation and, may be, not exclusively devoted to Entomology. Thus correspondents would be rendering much aid if they would indicate where such records occur, and notes on the variation of any species would be very useful to incorporate. It is evident that as our space is limited much contraction will have to be made, but it is hoped that the matter will be concise and to the point, as a useful

summary of the variation of each Noctuid species to aid the ordinary worker to classify the series of forms of any particular species in which he is interested, and to emphasise a stage in the advance of our study of variation.—H.J.T.

In addition to the above there is much further matter in hand, with promises of several plates, and subscribers are asked to further the interests of the magazine in all ways in their power and opportunity.

Myrmecophilous Notes for 1924.

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

The greater part of my work with ants and myrmecophiles this year was taken up by my investigations into the habits of the tree-ant *Acanthomyops* (*Donisthorpea*) *brunneus*. A complete account of this has already been published in three of my last papers—Nos. 122, 123 and 124.

The following notes and observations still remain, however, to be put on record.

FORMICIDAE.

Myrmica laevinodis, Nyl.—In June, many old and hollow willow trees on Sunbury Island harboured colonies of this ant; the ♀ ♀ hunting all over the trunks, and as high as it was possible to see them up the branches.

M. ruginodis, Nyl., *M. laevinodis*, Nyl., and *M. scabrinodis*, Nyl., were all common in Wicken and Burwell Fen in May. The first named species does not appear to have been recorded from Cambridgeshire before.

Acanthomyops (*D.*) *niger*, L., and *A.* (*C.*) *umbratus*, Nyl.—Marriage flights of both these species occurred in Putney on the afternoon of September 5th. At 5 o'clock, summer time, in a road near my house, a dealated ♀ *umbratus* was captured running on the path with a dead *niger* ♂ in her jaws. She would not let go of her captive even after she had been placed in the killing bottle. This curious proceeding was first pointed out, I believe, by Mr. Crawley [*Ent. Rec.*, 27, 205 (1915)]; and as he, no doubt correctly suggested, it is to enable the *umbratus* ♀ to more easily find her colony in a *niger* nest. I have twice before the present record noticed and published occurrences of this phenomenon [*Ent. Rec.*, 29, 49 (1917): 30, 24 (1918)].

On October 12th another marriage flight of *A.* (*D.*) *niger* occurred at Putney at 3.30 p.m. Sparrows and starlings were "hawking" the winged ants in the air, and some of the former were jumping off the ground and catching the ants as they came out from the brick work of a wall.

Marriage flights of *Acanthomyops* species were noticed in August—at Box Hill, on August 6th, several colonies of *A.* (*C.*) *flavus* were swarming in the station at 4.45 p.m.

Formica rufa, L.—On September 7th, at Abbots Wood near Eastbourne, several nests of this ant were investigated and the following myrmecophiles noted:—*Leptothorax acervorum*, F., small colonies and a few specimens in every nest; *Thiasophila angulata*, Er.; *Clythra* *4 punctata*, L., larval cases, a naked larva being found at large and

unhurt in one nest; the little spider *Thyreosthenius bivovata*, Camb., occurred in all; ♂♂ of the Dipteron *Ceratopogon myrmecophilus*. Egg., were hovering over the hillocks; and a number of the small mite *Laclapsis oophilus*, free in the nests. Earlier in the year they would be found in the egg-masses of the ant.

INTRODUCED SPECIES.

Camponotus (Camponotus) herculeanus, L., subsp. *pennsylvanicus*, Retz.—On July 25th Mr. Saunt sent me a number of live ♂♂, winged ♀♀, and ♂♂ of the above subspecies from a timber yard at Coventry, together with some large pieces of wood in which the ants had been found. I fixed the ants up in 2 "Janet" nests, feeding them on flies, honey, etc. On October 7th Mr. Saunt again sent me a large colony of the same ant—this consisted of very many ♀♀ and ♂♂, two dealated ♀♀, and a few larvae. Having found that the old colony readily accepted ♂♂ from the new lot, I placed the "Janet" nest in a large zinc tray with a water trough all round it, and dumped all the new ants on to the tray. During the night the latter joined forces with the older colony, all the ants entering the nest through a hole which I had bored in the side. Subsequently they made other holes, which they excavated right through the plaster sides, with their mandibles. The ants were fed with raw meat, cake, fruit, honey, etc., and they usually come out at night to feed. The larvae have grown and the colony is doing well, but no eggs have been laid yet. From the above account two points stand out—(1) that both colonies must have sprung from a common stock, and (2) that the larvae had been bred in this country.

It seems curious that this ant, which has frequently been found in this country in introduced timber, in timber yards (see *British Ants*, p. 848) and dockyards, etc., has not established itself at some time or other with us. I can only think that it is our wet winters which have prevented this. This ant occurs in Canada and extends to Texas and Louisiana. The ♀ after the marriage flight gets rid of her wings and selects a hole, or the empty cocoon of a Longicorn beetle, etc., under the loose bark of a tree or stump, in which to found her colony. As we have seen, ♂♂ and winged ♀♀ occurred in plenty, and there would seem nothing to prevent a ♀, after her marriage flight, from flying to the nearest wood, or forest, and founding a colony.

COLEOPTERA.

Thiasophila inquilina, Märk.—On July 3rd this insect was taken in the nest of *A. (D.) fuliginosus* at Woking, which I have been visiting ever since August 27th, 1915, when the colony was first discovered in the act of taking possession of the birch tree they still inhabit (see *Ent. Rev.*, 35, 3-5 (1923)). This is the 36th species noted to date. Mickleham and Oxshott are the only two other records that I know of for this beetle in Surrey.

Atheta brunnea, F. (*deprassa*, Gr.).—Over a dozen specimens of this species were taken in company with *Drusilla sanaliculata*, F., in the runs of *A. (D.) fuliginosus* in a hedge-row at Wickham on May 21st. Though not usually taken with ants, on this occasion they were evidently quite at home with the *fuliginosus*. Moreover Rouget has

taken it with the same ant in France [see *André Rev. Mag. Zool.* (S.3) **2**, 210 (1874)].

Staphylinus latebricola, Gr.—On July 10th a fine specimen of this beetle was taken, right among the ants of a strong colony of *Myrmica ruginodis*, inhabiting a partly rotten log in the New Forest. This beetle no doubt preys on ants as does its near ally *S. stercorarius*, Ol. Other records of its capture with ants known to me are as follows:—Märkel [*Zeit. f. Entom. Germar*, **5** (1844)] records it with *Formica rufa* in Germany; it was captured by E. W. Janson with ants on the Surrey Hills above Mickleham and Reigate [*Ent. Week. Intell.*, **2**, 85-6 (1857)]; Blatch [*Brit. Assn. Handbook*, Birmingham, 298 (1886)] records it in nests of ants at Sutton Park and Bewdley; Fowler [*Col. Brit. Isles*, **2**, 251, (1888)] writes—sometimes in company with *Formica rufa*. Finally on August 4th, 1918, the late W. E. Sharp captured a fine specimen at Crowthorne, which had emerged from a hole in the lawn, whence a number of winged *A. (D.) umbratus* had been pouring [see Donisthorpe *Ent. Rec.*, **31**, 3 (1919)].

HYMENOPTERA PARASITICA.

The following captures of Hymenoptera taken with ants have not been recorded before. I am indebted to Messrs. L. A. Box, and Claude Morley for their names.

Conostigmus testaceipes, Kief.—Specimens were taken in company with *A. (D.) fuliginosus* at Weybridge, on August 18th and 20th, and September 8th, 1914.

Conostigmus alutaceus, Thoms., with *A. (D.) brunneus* in Windsor Forest, September 3rd, 1924.

Ceraphron spinifer, Kief., with *A. (D.) fuliginosus* at Weybridge, August 20th, 1914.

Ceraphron abdominalis, Thoms., with *F. rufa* at Westerham, September 17th, 1921.

Aclista scotica, Kieff., and *Diapria aequata*, Thoms., ♂, ♀, with *A. (D.) brunneus* in Windsor Forest, September 3rd, 1924.

Proctotrypes fuscipes, Hal., with *A. (D.) fuliginosus* at Weybridge, August 28th, 1914.

Loxotropa subregonensis, Box, with *A. (D.) fuliginosus* at Weybridge, August 20th and September 7th, 1914.

Gonatopus distinguendus, Kief. with *A. (D.) niger* at Cumnor, September 6th, 1923.

Kleditoma psiloides, West with *A. (D.) fuliginosus* at Weybridge, August 20th, 1914.

Bracon anthracinus, Nees, in the Woking *fuliginosus* nest, July 3rd, 1924. The 37th species of myrmecophile from this nest.

DIPTERA.

Pseudacteon formicarum, Verr.—On July 3rd a colony of *Myrmica ruginodis* was found in the partly rotten stump of a tree in Windsor Forest. On breaking open the stump many of the ♂ ♂ rushed out, and immediately a number of this little fly put in an appearance and hovered over the ants. It will be remembered that Father Wasmann in a paper on *P. formicarum* [*Biol. Zentralb.*, **38**, 317-29 (1918)] gave it as his opinion, that *A. (D.) niger* was the real host of this Dipteron.

Recently Father Schmitz has described another species—*P. lundbecki* (*Natuurh. Maandb.*, 13, 138-42 (1924)]—and he suggests that perhaps some of the various specimens, taken by Donisthorpe with different species of ants in England, belong to the new species.

The following is a list of the different occasions (and ants) when I have taken what I have believed to be *P. formicarum*.

HOST.		LOCALITY.		DATE.
<i>A. (D.) fuliginosus</i>	...	Wellington College	...	19.vi.09.
<i>F. sanguinea</i>	...	Bewdley	...	21.vii.09.
<i>A. (D.) niger</i>	...	Bewdley	...	21.vii.09.
<i>A. (C.) flavus</i>	...	Bewdley	...	21.vii.09.
<i>A. (D.) niger</i>	...	St. Helens, I. of W.	...	23.viii.09.
<i>A. (D.) fuliginosus</i>	...	Darenth Wood	...	24.ix.09.
<i>F. sanguinea</i>	...	Weybridge	...	22.vii.11.
<i>A. (C.) umbratus</i>	...	Weybridge	...	22.vii.11.
<i>M. lobicornis</i>	...	Weybridge	...	22.vii.11.
<i>F. sanguinea</i>	...	Woking	...	21.v.13.
<i>F. sanguinea</i>	...	Weybridge	...	29.vii.13.
<i>A. (C.) flavus</i>	...	Weybridge	...	29.vii.13.
<i>Tapinoma erraticum</i>	...	Weybridge	...	29.vii.13.
<i>A. (D.) niger</i>	...	Shanklin, I. of W.	...	19.viii.13.
<i>A. (D.) niger</i>	...	Blackgang, I. of W.	...	26.viii.13.
<i>A. (D.) niger</i>	...	Weybridge	...	10.viii.14.
<i>A. (D.) alienus</i>	...	Weybridge	...	20.viii.14.
<i>F. sanguinea</i>	...	Woking	...	14.viii.20.
<i>M. ruginodis</i>	...	Windsor Forest	...	7.vi.24.

Aphiochaeta aequalis, Wood.—Many specimens of the imago, and also puparia, of this little Phorid, were taken in two nests of *A. (D.) brunneus* in Windsor Forest on September 3rd. I am indebted to Mr. Collin for its identification. There is no doubt that this species is, to say the least of it, strongly attracted to ants' nests. I have previously found it in numbers, and also the puparia, with *A. (D.) fuliginosus* at Darenth Wood, 6.vi.09 and 2.iv.10; Wellington College, 17.iv.20; and Woking, 19.iii.20 and 20.vi.20.

Scatopse transversalis, L.—This little Dipteron occurred freely at Commander Walker's *fuliginosus* nest at Tubney on July 16th. Mr. Edwards tells me that the specimens I have previously taken in various nests of *A. (D.) fuliginosus* and have always recorded as a var. of *S. transversalis* (teste Verrall), as well as those taken with *F. rufa*, are all the true *S. transversalis*, L.

HETEROPTERA.

Pilophorus perplexus, D. & S.—On July 3rd I observed several small *Pilophorus* larvae dodging about among the ♀♀ from a colony of *A. (D.) fuliginosus* on an oak tree at Woking. These larvae were identical with those found with *A. (D.) brunneus* in Windsor Forest, and which eventually proved to be *P. perplexus* [see *Ent. Rec.*, 36, 136 (1924)].

Mr. E. A. Butler, having also found young forms of a *Pilophorus* in company with *A. (D.) niger* on oaks at Tooting-Bec Common,

asked me to go there later and see if I could get the adult forms. This I did on July 30th, and again they proved to be *P. perplexus*.

APHIDIDAE.

Stomaphis quercis, L.—On July 16th I found several examples of this rare Aphid on an oak tree at Tubney attended by ♂ ♀ from a colony of *A. (D.) fuliginosus* inhabiting the tree. I have previously found it at Woking and Wimbledon Common, but always attended by the same ant.

COCCIDAE.

Ripersia tomlini, Newst., and *R. subterranea*, Newst., occurred together in nests of *A. (D.) niger* situated under stones at Eastbourne on September 6th. This is a new county record for both species. *R. tomlini* was not, as is sometimes supposed, first described from British specimens, but from examples taken by Miss Tomlin in ants' nests at Moulin Huet, Guernsey, in 1891. It was first captured in Britain by me on April 19th, 1901, in nests of *A. (D.) niger* on the Isle of Portland [*Ent. Rec.*, **14**, 40 (1902)].

COLLEMBOLA.

Cyphodeirus albinus, Nic., occurred in nests of *A. (C.) flavus* at Hayburn Wake and Stanton Dale in Yorkshire on May 31st.

ACARINA.

Trachyuropoda excavata, Wasm.—On September 6th I captured a number of examples of this small mite in nests of *A. (D.) niger* at Eastbourne.

CRUSTACEA.

Platyarthrus hoffmanseggi, Brdt., was observed in nests of *A. (D.) niger* at Eastbourne on September 6th.

Lake Maggiore in Early August of 1923.

By O. R. GOODMAN, F.E.S., F.Z.S.

Having sampled the interesting Lepidoptera of the Pyrenees in July, 1922, my son and I decided that our next holiday must be spent in the Italian Lakes and the Engadine, conjuring up thoughts of *Neptis lucilla*, *Heteropterus morpheus* and *Erebia flavofasciata*, localities for which had been very kindly given us by the Rev. G. Wheeler. Business, however, unfortunately detained us until the end of July so that the two first mentioned insects were practically in rags, and the last, entirely over.

Leaving London on July 28th, travelling *via* Paris, we woke up at Lausanne, and the ladies of the party much enjoyed the lovely views obtained whilst passing up the Rhone Valley, and we pointed out to each other the favoured and famous localities of former years, such as the Cliffs of Vernayaz of *Polyommatus amandus* fame, the Tour de Batiatz for *Melitaea deione* var. *berisalensis*, and the noted Pfynwald. After passing through the Simplon Tunnel, we soon arrived at our

destination, that jewel of the lake, Baveno, Italy, situated on the south shore opposite Pallanza. Our hotel (Beau Rivage), selected at random, proved excellent, and tea in the garden surrounded by oleanders and magnolias would have proved delightful, but for the presence of a small but voracious species of *Musca*, whose bite instantly brought blood, even through the blouses of the ladies. After an evening walk by the side of the brilliant, blue, mountain-fringed lake, in which the far-famed Boromean Islands are seen at no great distance, we retired to bed.

The next day we left by the early train to the little station of Fondo Toce, situated at the extreme S.W. corner of the lake and forming the point of access to the railway for Pallanza with which it is connected by a tramway.

Fondo Toce had been mentioned by the Rev. G. Wheeler as a locality for *H. morpheus*, but may I say at once we did not come across "Le Miroir" here. However, we were soon amongst the butterflies, taking the path at the side of the Power Station that leads over the railway-bridge crossing the river, and thus to a scrubby copse skirting the stream and the meadows beyond. The weather was very hot, but relieved by a breeze. *Papilio machaon* was present, but in no great quantity. Of the Pierids in addition to *Pieris brassicae* and *P. rapae*, there were one or two worn specimens of *P. manni*. Amongst the Argynmids, *Brenthis selene* and *B. euphrosyne* were fresh, evidently a second brood, a few *Melitaea didyma* and a small race of *M. phoebe*. By beating in the thicker parts of the copse a few fine ♂s of *Satyrus dryas* were disturbed. Both *Colias croceus* and *C. hyale* were in numbers careering over the meadows. A curious aberration of the former (*C. croceus*), which had a distinct black spot in the anal angle of both hindwings, was taken.

The most interesting species noticed were:—First, a very large form of *Plebeius argus (aegon)* having great similarity to *argyrognomon* in both sexes. Upon examination at home I found that these nearly approached the species described by Dr. Chapman as *ligurica*, and I submitted them to Mr J. J. Lister who after microscopic examination and comparison with specimens of *ligurica* in the Henshaw Collection at Cambridge, expressed an opinion that they could not be *ligurica*, but certainly did not agree with the typical *argus (aegon)*. The second species of interest was our old friend *Coenonympha pamphilus*, clearly of the summer brood. In these, the upper sides were much more darkly marked on the margins and apical spot than is usual, and the underside hindwings were of a unicolorous deep plum brown with hardly any indication of the median bar. This form has been named *marginata* and comes out as a summer brood in Southern Europe. Amongst other commoner things the moths, one *Theretra porcellus* and numerous *Euclidia glyphica* were noted.

After a truly Italian "al fresco" lunch at the station restaurant, during which the ladies were somewhat disturbed by the dozens of active lizards (*Lacerta muralis*) basking on the walls, we returned by the palm-planted Pallanza and crossed by steamer to Baveno to dinner.

After a sight-seeing day at the Boromean Islands, inspecting the lovely gardens in which tropical trees and shrubs from all parts of the world are growing with the utmost luxuriance, we traversed by steamer the whole length of this lovely lake, arriving at the comfort-

able "Hotel Belvedere," situated half-way up the funicular railway from Locarno to Madonne del Sasso.

In the night we were treated to a heavy thunderstorm which rendered the morning misty, but after lunch we ascended the funicular to the old Monastery of Madonne del Sasso, perched on a rock high above Locarno, and wandered amongst woods and vineyards along the mountain-side road to Brione. We had not proceeded far when one of our desiderata appeared, *Neptis lucilla*, sailing majestically along the road and settling on a branch out of reach, as so frequently does our humbler *sibilla*. He, however, succumbed to our blandishments, but was found to be very worn, probably having been on the wing at least three weeks to a month. The other insects of interest were *Papilio podalirius*, quite fresh, and a number of *Euvanessa antiopa* and *Polygonia c-album* var. *hutchinsoni* in perfect condition; *Leptosia sinapis* in both sexes; *Epinephele jurina* and *E. tithonus* quite typical, and a few *S. dryas* both ♂s and ♀s. The Hesperids included *Angiades sylvanus* worn, and single specimens of *Urbicola comma*, and *Hesperia sao*: *C. pamphilus* were also common with numbers of *M. phoebe* of a very light form, which had a tantalising habit of sitting in the road until one was just within reach. A few fresh *Syntomis phegea* and many *Zygaena filipendulae* (?) and *Z. carniolica* comprised the moths.

August 2nd was devoted to an excursion to Reazzino of *Melitaea britomartis* fame in hopes of *H. morpheus* . . . this time rewarded. The weather was very hot, as it can be here in August, but the meadows in the wide valley were full of flowers. The ladies lunched in the vineyards whilst we climbed the mountain side, by steps cut in the rock, to the village, and then mounted a steep path through field and grassy banks to a glade above the sluice of the water supply, at a height of about 1000 feet above the valley. The slopes of a special species of grass on the ascent provided *Scolitantides orion* in numbers, of very varying size, but all of the typical form and rather larger than specimens of var. *ornata* I had taken in the spring on the Riviera. The glade itself provided butterflies in great abundance and variety. First and foremost *H. morpheus*, mostly very worn, but very difficult to follow on account of its dark colour and curious flipping method of flight. Of second interest, *N. lucilla* in fair numbers, but all the worse for wear. Of the Argynnids, *A. cydippe* type and var. *cleodoxa*; *A. aglaia* and *Dryas paphia* were all worn, and *Brenthis dia* and *B. selene*, *M. phoebe* and *Issoria lathonia* were all fresh. The Vanessids, *V. io*, *Pyrameis atalanta*, *E. antiopa* and *Polygonia c-album*, were present and one specimen each of *Erebia neoridas* and *E. ligea* just emerging, were flying with *Satyrus hermione (major)*. Of the *Lycaenidae*, *Polyommatus icarus*, *P. hylas* ♂ and ♀, and *Cupido minimus* were present on the mountains, and the same large form of *P. argus (aegon)* as at Fondo Toce, in the fields. Single specimens of *Nisoniades tages*, *Urbicola comma*, *Erynnis althaeae* and *Hesperia alveus* (? *armoricanus*) were also taken. Our return was enlivened by the presence of a large dark green snake about four feet long crossing the path.

On August 3rd we accepted our host's offer to accommodate us for a day at his mountain Hotel at Bignasco without extra charge, and we travelled by mountain railway to that summer resort through the beautiful Val Maggia, passing between the chestnut and silver-birch covered mountains, and the valley, mostly cultivated into vineyards,

and what the Englishman described as "the waving fields of macaroni." My son and I had decided to alight at the half-way station of Riveo and we walked up the valley from that little village to our destination. The most abundant insects were *Polyommatus (Agriades) coridon* ♂s only, and *Epinepheletithonus*, collecting which caused serious damage to our nets amongst the buckthorn bushes in the river bed. *P. machaon* was common in the fields and in excellent condition. A curious dwarf specimen of *Colias croceus* was taken flying in company with many others of this species and *C. hyale*. The other species taken were similar to those at Reazzino excluding *E. ligea*, *H. morpheus* and *N. lucilla*, but in addition *Heodes alciphron* var., *gordius* ♂ and ♀, *H. dorilis*, *H. virgaurae* ♂ and ♀, and *Rumicia phlaeas*.

We found the ladies already in the plain, but comfortable, Hotel du Glacier, having held an animated conversation with the hotel porter in which neither understood a word of the other's language.

Bignasco, noted for its two beautiful bridges, is situated at the bifurcation of the Val Maggia into, on the east, the Val Broglio, draining the snow-fields of Campo Lungo (the locality for *Erebia flavofasciata*), and on the west, the Val Bavano, terminating in the huge Mt. Barodino with its two snow-fields and glacier gleaming in the sun. The afternoon being cloudy few insects were flying, but a very dwarfish *Lycaenopsis argiolus* was taken whilst we were strolling along the wild and beautiful Val Bavano. The proprietor of the Hotel was interested in our entomological pursuits having pleasant recollections of Lord Rothschild and Dr. Jordan's visit some years ago.

August 4th broke fine and bright and we were soon on the road up the Val Broglio, wishing we had time to proceed to Fusio and try our hand at *E. flavofasciata*; however there were any number of insects flying in the meadows and woods above the gorge, and in the valley below the beautiful waterfall, the most noticeable of which were the Satyrids. *S. dryas* in both sexes, just out, and one very large ♀ *S. hermione (major)*. Numbers of *E. neoridas* were flying slowly in the woods and two *N. lucilla*, in the fields this time, in much better condition. At this higher altitude, *D. paphia* occurred in some numbers with two var. ♀ *valesina* having very green undersides. *A. cydippe* and its var. *cleodora* were practically over. Of the number of species observed the only others worth recording were *Pararge hiera* a few, *Adopaea flava (linea)* and two specimens of *Strymon ilicis* var. *cerri* very worn, with a solitary *Pontia daplidice*. On our return homewards my son varied the monotony of butterfly hunting by catching a large male green lizard *Lacerta viridis* in his net, and it was, in due course, dispatched to a friend in England.

Returning by the afternoon train to Locarno we spent our last day at this lovely town in the Swiss Canton of Ticino in a most enjoyable motor drive to a little Alpine village Vergeletto, situated at a height of 3000 feet above sea level. The road took us past Pontebrolla and up the mountain on the North side of the Val Orsernone, amongst larch and silver-birch forests, passing many beautiful waterfalls, and mounted up to our destination by a succession of sharp lancets, which caused the ladies much trepidation on the return journey. We found a typical Swiss Hotel, scrupulously clean and inviting a longer stay. However, tea being served, we walked a little along the valley by an alpine path and were rewarded by many *D. paphia* absolutely fresh and

very large. Two characteristics noticeable at this altitude, were, firstly all the females were of the variety *valesina*, and secondly 25% of specimens had very intense green on the undersides. Other insects of note were a *Parnassius apollo*, a *Brenthis amathusia*, both worn, and two *Glaucopsyche cyllarus* in rags. This locality would have repaid the trouble of a longer stay if time had permitted, but as we were departing the following day on our way to the Engadine we could not thus indulge ourselves.

The following is the list of species observed, all of which occurred in the Swiss Canton Ticino, those also occurring in Fondo Toce (Italy) are marked with an asterisk:—*Papilio podalirius*, *P. machaon*,* *Parnassius apollo* (1), *Pieris brassicae*,* *P. rapae*,* *P. manni** (Fondo Toce only), *Pontia (Leucochloë) daphidice*, *Gonepteryx rhamni* ♂ s, *Colias hyale*,* *C. croceus*,* *Leptosia sinapis*,* and var. *diniensis*,* *Erebia ligea* (1), *E. neoridas*, *Melanargia galathea*, *Satyrus hermione* (major), *Hipparchia semele* (1), *S. dryas*,* *Pararge egeria* var. *intermedia*, *P. megera*,* *P. hiera*,* *Epinephele tithonus*, *E. jurtina** (type), *Aphantopus hyperantus** (Fondo Toce only), *Coenonympha arcania*, *C. pamphilus*, *C. pamphilus* var. *marginata*,* *Neptis lucilla*, *Pyrameis atalanta*,* *P. cardui*,* *Vanessa io*, *Eurvanessa antiopa*, *Polygonia c-album* var. *hutchinsoni*, *Melitaea phoebe*,* *M. didyma*,* *M. athalia* (1), *Brenthis euphrosyne** (Fondo Toce only), *B. selene*,* *B. dia*, *B. amathusia* (1), *Argynnis aglaia*, *A. cydippe*, with var. *cleodoxa*, *Dryas paphia* and var. *valesina*, *Issoria lathonia*, *Strymon ilicis* var. *cerri*, *Heodes (Chrysophanus) virgaureae*, *H. alciphron* var. *gordius*, *R. phlaeas*,* *H. dorilis*,* *Plebeius aegon** (*argus*), *Polyommatus icarus*,* *P. hylas*, *P. escheri*, *P. thetis* (*bellargus*) (1), *P. corydon*, *G. cyllarus* (2), *S. orion* var. *nigra*, *L. argiolus* (2), *Cupido minimus*, *E. althaeae*, *Hesperia alvens*, *Augiades sylvanus*,* *H. sao*, *A. flava* (*linea*), *Nisoniades tages*, *Heteropterus morphens*, *Urbicola comma*, and *Hamearis lucina* (1).

SCIENTIFIC NOTES AND OBSERVATIONS.

“DIVERGENCE OF CHARACTER.”—In reply to Mr. H. J. Turner’s query in the last number of the *Record* (*ante* p. 156), as to the size of *Aglais (Vanessa) urticae* inhabiting the Isle of Man; I have in my collection half a dozen specimens received from that island in 1890, which are fully up to the average size of the species, measuring from 52mm. to 60 mm. in expanse. They were, I believe, part of a brood of some sixty specimens reared from larvae taken in the island, and I have no reason to suppose that my specimens are anything but an average of the brood in regard to size.—ROBERT ADKIN, Eastbourne. December, 1924.

ISLE OF MAN VANESSA URTICAE.—With reference to Mr. H. J. Turner’s note on the Isle of Man specimens of *Aglais urticae*, in the current number of the *Ent. Record* (p. 156), I can say that the species there is of normal size and appearance. The note in Wallace’s *Darwinism* no doubt refers to the fact that many years ago the late Edwin Birchall bred or captured (or both) in the Isle of Man, a large number of dwarfed specimens of the species, which he distributed (with a small round red label pinned beneath each specimen) through-

out the country, as the Isle of Man form, and one of which I still have in my own series. I believe that Birchall himself afterwards admitted that the form only occurred in one particular season, and which was probably an exceptionally dry one, thus causing the nettles to be less succulent than usual. I remember the circumstances very distinctly, although it must be well on to sixty years ago. There is an allusion to it in Newman's *British Butterflies*, and probably elsewhere.—GEO. T. PORRITT, Ehu Lea, Dalton, Huddersfield. November 18th, 1924.

NOTES ON COLLECTING, etc.

DISTRIBUTION OF *SYNTARUCUS TELICANUS*.—In my comment on the occurrence of *Syntarucus telicanus* on page 11 of the January number of last year of this magazine, Vol. XXXVI., I said, "the species is a purely Mediterranean one so far as its real habitat, its further remove being Aswan on the Nile, where Captain Hayward took it commonly in 1920-21." Captain Hayward has pointed out to me that Aswan is not its most southern remove as it has been reported from numerous places higher up the Nile. A little research soon showed the error. Dr. Longstaff says, *Trans. Ent. Soc. Lond.*, 1913, "Well known in Central and South Africa, as well as at Aden and is found in Northern India." Turning to Trimen's *South African Butterflies*, now a difficult and expensive book to obtain, in Vol. II., p. 71, I find the following Summary of the Distribution of this Lycaenid.

I. S. Africa:—Cape Colony, Western, Eastern, Basutoland; Kaffraria; Natal, Coast and Higher; Zululand; Delagoa Bay; Transvaal.

II. Other African Regions:—S. Tropical, W. Coast, E. Coast, E. Central; Eastern Islands, Madagascar, Bourbon, Mauritius, Comoro, etc.; N. Tropical, W. Coast, E. Interior; Extra-Tropical Africa, Mediterranean Coast, Egypt, Algeria.

III. Europe:—Spain, Italy, S. France, Corsica, Turkey, Central Europe.

IV. Asia:—W. Asia, Arabia.—HY. J. TURNER.

LARENTIA LUGUBRATA IN NORTH KENT.—I wish to record the taking of a *Larentia lugubrata* by my son in North Kent on June 2nd, of this year. W. F. Kirby in his *Butterflies and Moths of Europe* states that it "inhabits a great part of Europe and Western and Central Asia." but this pretty Geometer appears to be new to this country, as I can find no record of its previous capture.—F. T. GRANT, 37, Old Road West, Gravesend, Kent. December 1st, 1924.

CIDARIA (EUPHYIA) LUCTUATA, SCHIFF. (*LUGUBRATA*, STDGR.).—This Geometer has a more or less superficial resemblance to *Eulype hastata* and *Melanthia procellata* between which two species it is placed by Culot, *Noctuelles and Géomètres d'Europe*, in the genus *Larentia* following Staudinger. Prout in Seitz has used the prior name *luctuata* of the Vienna List, 1776. It was afterwards renamed *transversata* by Thunberg. It is said to be very distinct on account of the sharp contrast of the black and white colouring; the brown colouration of the

forewing extends from the base to the elbowed line, without spots or white bands. It is a very variable species, as to the relative extent of the markings rather than to suppression by too great increase or decrease. The larva feeds on species of *Epilobium*, and sometimes hibernates. There are two broods, May and August. The species is found in Central and N.E. Europe, Central Asia, Siberia and N. America; it is even reported from Kamtschatka, Sajon and Labrador.—H.J.T.

MANDUCA (ACHERONTIA) ATROPOS IN SHOREHAM, SUSSEX.—A living specimen of the "Death's-head" Moth was presented to me by the proprietor of the *Dorothy Café* here on October 5th. It had been found two days previously at rest on the flagstaff in his garden. In spite of its captivity of some forty-eight hours in a shallow cardboard box, it was in fine condition and the skull-like markings on the thorax were clearly defined. When taken in the hand the moth squeaked freely, but I noticed the sound was only produced, when it raised and deflected its wings. Hence would the squeaking sound be emitted mechanically by the moth in flight?—L. H. BONAPARTE WYSE, Oxford Lodge, Shoreham-by-Sea.

CAPTURES AT GODALMING ELECTRIC LIGHTS IN LATE SEPTEMBER, OCTOBER, AND NOVEMBER, IN THE YEARS 1921-1924, INCLUSIVE.—The majority of these captures were made on the street electric lights which are of the usual pattern. The collector had only two nights per week available in which to make his captures out of doors. *Agrius (Herse) convolvuli*: 1 flew into illuminated room late September, 1922. *Ptilophora plumigera*: 3 November, 1921, recorded *Ent. Record*, 36, 1 flew into lighted room, November, 1924. *Poecilocampa populi*: swarming, 4 on a lamp, 1921; 1 female at light; rare 1922, 1923; very common 1924. *Sarothrips revayana*: 1 specimen in lighted room, October, 1923. *Agrotis puta*: 1 ♂ lighted room, 1921. *Noctua c-nigrum*: 1 or 2 specimens in bad condition. *Noctua plecta*: 1 or 2 specimens in lighted rooms. *Eumichtis protea*: fairly common late September. *Diloba coeruleocephala*: common 1924, sits high up on standard. *Polia flavicincta*: about $\frac{1}{2}$ dozen every year, but irregular in appearance, late September; 1 dark variety, 1924. *Asteroscopus (Brachionycha) sphinx*: 1 specimen October 16th, 1924. *Tapinostola fulva*: 1 into lighted room, October, 1924. *Epirrita (Oporabia) dilutata*: v. common. *Ennomos abniaria*: 1 late September, 1924. *Himera pennaria*: very common; 1 very light yellow and 1 darkish suffused, 1924. *Hybernia defoliaria*: v. common.—H. B. D. KETTLEWELL, Godalming, 1924.

CURRENT NOTES AND SHORT NOTICES.

We hear from Dr. Karl Jordan (Tring) that Preliminary Arrangements are being made to hold the 3rd International Congress of Entomology at Zurich in the the second half of July, 1925, with Dr. A. v. Schulthess as President. Had it not been for the gross blundering of politicians, the 3rd Congress was to have taken place at Vienna

in 1915, with Custos Anton Handlirsch as President. The Executive Committee is at work and further details are promised shortly.

The *Canadian Entomologist* for October contains an interesting series of observations on Climatic Variations and Moth Flight in Montana, from 1917-1923, with elaborate tables of temperature, and other climatic data as affecting the different groups, *Agrotinae*, *Hadeninae*, *Cucullinae*, *Acronyctinae*, etc., in different years at various seasons. Light was used a portion of the time. The locality, Bozeman, was 4,900 ft. up, and east of the Continental divide. The species were considered as Eastern, Pacific, Prairie (plain), and Mountain, and the results, the two former (intruders) to be increasing, the Prairie group decreasing, and the Mountain species to be holding their own.

The *Internationale Entomologische Zeitschrift* for November 15th, published in Guben, has a lengthy account of our own Magazine, mentioning the chief writers and their articles during the last few months, especially describing the work of Mr. Alfred Sich on *Teichobia verhuehella*, and that of the Rev. C. R. N. Burrows on the Psychides.

Part 3 of the *Annales de la Société Entomologique de France* has just appeared. It contains an interesting obituary of the late M. Charles Oberthür, with a eulogy of his life's work in Entomology, and a list of his writings and of the contents of the two magnificently illustrated serials, the *Études d'Entomologie* and the *Études de Lépidoptérologie comparée*. The notice includes an admirable portrait. Up to the time of his death, at the age of 80, he was actively engaged in finishing Fasc. XXII. of the latter. The last words he penned were, "Puisse-t d'autres Entomologistes plus favorisés poursuivre, mieux que je n'ai pu le faire moi-même, la plus noble étude, la plus digne de préoccuper l'esprit humain et dont l'objet se condense en ces deux mots: opera Dei."

The following Fellows will be the Officers and Members of Council of the Entomological Society of London, for the Session 1925-1926:—*President*, Professor E. B. Poulton, M.A., D.Sc., F.R.S. *Treasurer*, W. G. Sheldon, F.Z.S. *Secretaries*, S. A. Neave, M.A., D.Sc., F.Z.S.; H. Eltringham, M.A., D.Sc., F.Z.S. *Librarian*, H. J. Turner. *Other Members of Council*, W. A. F. Balfour-Browne, M.A.; Prof. W. Bateson, M.A., F.R.S.; G. C. Champion, F.Z.S., A.L.S.; J. E. Collin; J. C. F. Fryer, M.A.; E. E. Green, F.Z.S.; Prof. T. Hudson Beare, B.Sc., F.R.S.E.; K. Jordan, Ph.D.; R. W. Lloyd; G. A. K. Marshall, C.M.G., D.Sc., F.R.S.; W. Rait-Smith; H. Scott, M.A., Sc.D.

The following are the Officers and Council of the South London Entomological Society for the Session, 1925-6.—*President*, T. H. L. Grosvenor, F.E.S. *Vice-Presidents*, E. A. Cockayne, M.D., F.E.S., N. D. Riley, F.Z.S., F.E.S. *Treasurer*, A. E. Tonge, F.E.S. *Librarian*, A. W. Dods. *Curator*, S. R. Ashby, F.E.S. *Assistant Curator*, T. L. Barnett. *Hon. Editor of Proceedings*, H. J. Turner, F.E.S. *Hon. Secretaries*, Stanley Edwards, F.L.S., etc. (Corresponding), H. J. Turner, F.E.S. *Recorder of Attendances*, L. E. Dunster. *Hon. Lanternist*, A. W. Dennis. *Council*, J. H. Adkin, H. W. Andrews, F.E.S., S. A. Blenkarn, F.E.S., E. J. Bunnett, M.A., F.E.S., F. B. Carr, C. Craufurd, A. W. Dennis, E. Step, F.L.S., H. Worsley-Wood.

The great work, *Genera Insectorum*, published by an association of entomologists, under the direction of Mr. P. Wytsman, at Tervueren, Belgium, continues slowly: the most recent part just published deals with the *Formicidae*. It contains 5 plates.

REVIEWS AND NOTICES OF BOOKS.

PROCEEDINGS OF THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—1923-24. 153+XIX. pp. 1 plate.—The number of members of this Society is, we are pleased to read, still steadily increasing, rising from 223 in the last *Proceedings*, to 237 in this, and there have been only two losses by death. The financial conditions are also in a healthy state, although careful management is still required in order to cope with the rising expenses, particularly on account of the doubling of the rental of the premises occupied by the Society, and also of the cost of printing. To the latter cause we ascribe the shortage of illustrations. This very serious problem remains to be faced, and solved, as it would appear that unless the cost of illustrating Scientific Works is shortly, and satisfactorily, reduced in this country, there will be an increasing temptation to resort for the purpose to the Continent, where the prices are, we believe much more reasonable.* We note a lessened, though yet not negligible number of those "slow payers" whom we have had reason to mention in previous years.

Besides the Presidential Address, seven papers are printed in full.

The Address, by Capt. Riley, is devoted to the subject of "Age and Area and Rhopalocera" and deals with Butterflies, their spread, and localization, including very interesting tables of their distribution, and its connection with that of their available food.

Dr. Waterston narrates his observations on the lonely island of S. Kilda during several visits, especially as to Bird-life. He gives a list of some of the more recently published papers upon the island, which should be useful to intending visitors.

Col. Rattray contributes "Notes upon the Cuckoos of Northern India," the result of recent investigations, conducted patiently and methodically by several competent persons, concluding with a list of such species (10) as are now definitely known, with descriptions of their habits and eggs.

Mr. Robert Adkin writes on "Some Ancient Naturalists, and their Work" from Herodotus (B.C. 484) to Gilbert White of Selborne. We are glad to see here references to the Ray Society, which was founded in 1844 in memory of John Ray "the Father of Natural History in Britain." We earnestly commend Mr. Adkin's remark that "The Ray Society, deserves the support of every naturalist worthy of the name." We may perhaps be allowed to add to this comment the fact that according to the latest published list of members of this Society, there are at the present time just 100 private, and 130 public (Libraries, etc.) subscribers. This should not be, considering the extreme value, and small price of the publications, and according to Mr. Adkin's estimate very much limits the number of "Naturalists worthy of the name."

Coenonympha pamphilus, by Mr. H. J. Turner is a very complete conspectus of the range of variation, and the bibliographical history of this species from 1602-1919. It is supplied with a list of references occupying 5 pages of the *Proceedings*, and by a table (plate) of the races of the species found near Florence. (This table is reproduced by permission with this review.)

* A handsome donation has recently been made to the Society's Funds, and this has been invested for the purpose of providing illustrations in future *Proceedings*.

Mr. Adkin treats of *Diacrisia lubricipeda* and *D. lutea*, summarizing the facts as to the respective identification of the names, so often confused, and describing the recognised varieties and aberrations, of both species. Mr. Grosvenor deals with his natural history experiences and observations, in N.W. India during his service in that district.

Mr. E. H. Ellis gives a short paper on "Mosses."

Amongst the more striking items to be found in the "Abstract of Proceedings" are shorter notes upon a number of interesting exhibits, and kindred subjects. We select but a few of these for comment on account of space limit.

Mr. Adkin calls attention to the quasi-scientific manufacture of varieties of Lepidoptera on the Continent. "They appear," he says, "to have reduced the experimental work of some 40 years ago, to a fine art." The art appears to consist in the application of abnormal conditions, of heat, cold, and moisture, at a critical stage, the products being generally such forms as are, or have been, taken in a state of nature. Moreover they do not appear to know exactly what forms their treatment will produce, nor what proportion of their specimens will survive the treatment to which they are submitted.

Mr. K. G. Blair exhibited the two forms of *Anaitis* which Dr. Jordan had separated. This subject has been further looked into, and the second insect has been conclusively separated from *A. plagiata*, whatever its name may prove to be.

Mr. Blair also points out the distinctive features of three species of "stick-insects" which are being confused.

Mr. Prior states that of the 2,000 species of Bees recognised in the World, over 200 are indigenous to this country.

Mr. Goodman has an extremely interesting paper upon the "Three Larger British Argynnidæ," especially in respect to their variation in the matter of Melanism, Albinism, and extent of, or absence of the normal metallic markings.

We have not before noticed any publication of Mr. Worsley Wood's success in cross-pairing *Xanthia ocellaris* and *X. fulvago*.

The Annual "Exhibition of Orders other than Lepidoptera" included a series of specimens taken by Mr. Blair on the sand-hills near Tenby in June and July, comprising Hymenoptera, Diptera, and Coleoptera. He notices two points about these insects—their rapid flight over the heated sand, and their prevailing black colour. This latter feature has also been noticed by Dr. P. A. Buxton in beetles inhabiting Deserts.

The volume includes, as usual, a very extensive Index of nine pages. We do not wish to appear unduly censorious but cannot pass over the very obvious "lapsus" at the end of the Index where we find amongst "species not placed," *Petrobius lapidus*. This would appear to be our old friend of Quekett, and *Science Gossip* days. It appears in Murray's *Aptera* as *Petrobia lapidum*, surnamed the "stone mite." Probably this has like many other creatures changed its name, for we cannot find it in more recent writings, but nothing could ever turn it into a "Woodlouse." Its eggs used 50 years ago to be very favourite objects for the Microscope. This is the only fault which this critic can find in a very interesting volume.—C.R.N.B.

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Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. January 21st, February 4th, 18th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. January 22nd, Annual Meeting, February 12th, Exotic Insects Exhibition.—*Hon. Sec.*, Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

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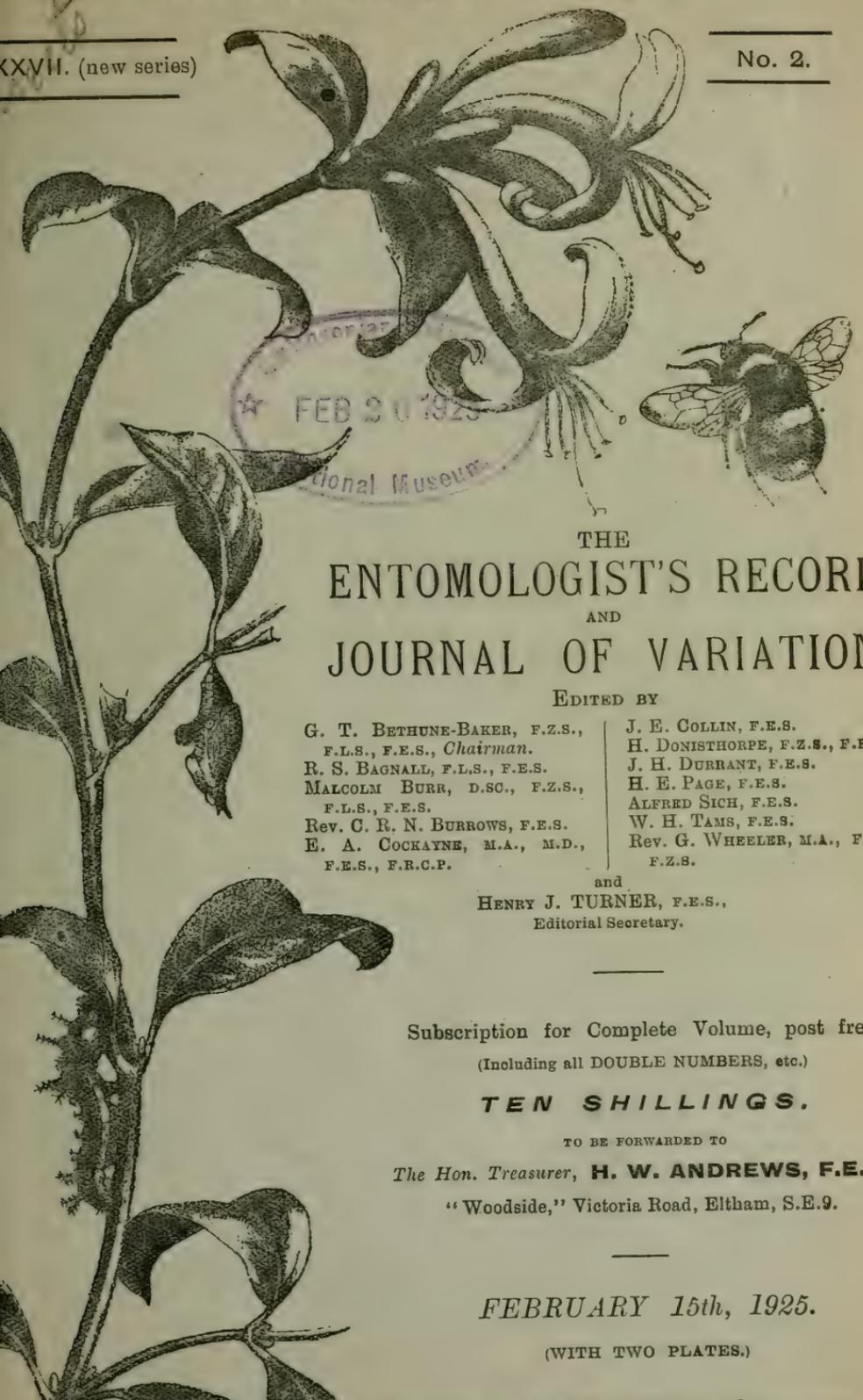
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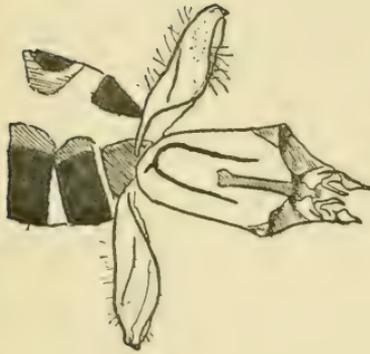
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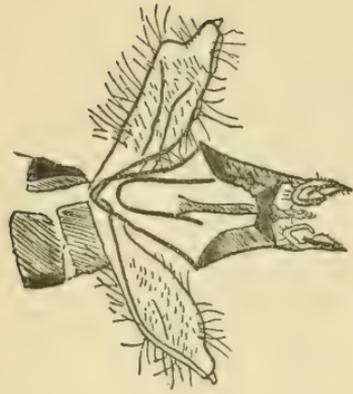
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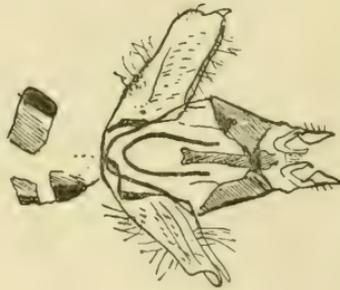
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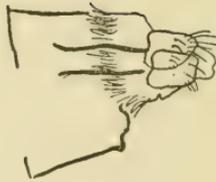
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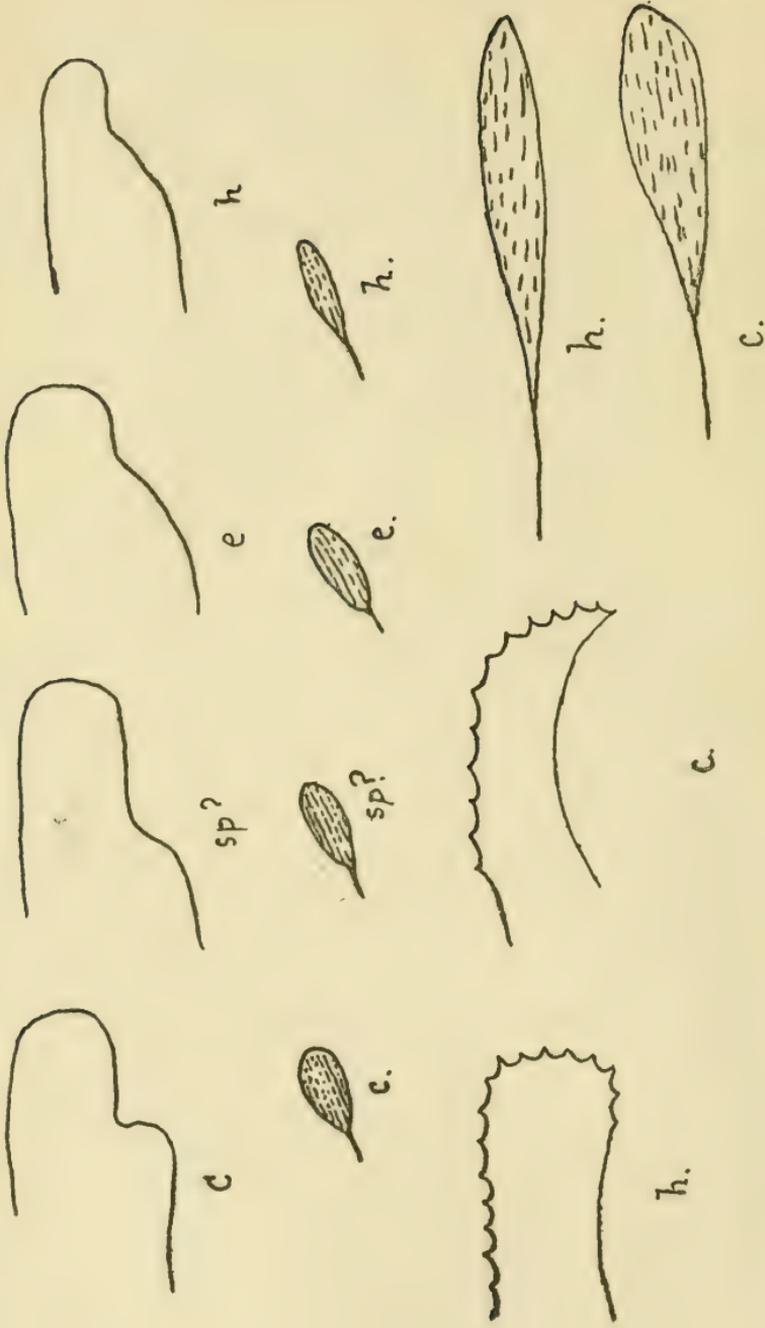


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The Entomologist's Record.

det. A. de B. Goodman.

SUPPOSED HYBRID POLYOMMATUS.
FROM SLIDES BY F. N. PIERCE.



The Entomologist's Record

SUPPOSED HYBRID POLYOMMATUS.
CLASPS AND ANDROCONIA.

del. F. N. Pierce.

Notes on the Psychides.

By REV. C. R. N. BURROWS, F.E.S.

In the July-August number of this magazine (pp. 97-99) I have recorded observations, which I had been making, as to the continued survival of some Psychid larvae, without food, for what appears to me to be an unusually long period.

The larval cases had been sent to me by Dr. P. A. Buxton, from Palestine, where he had collected them from about April to July, 1923. They had, when I wrote the note, remained obstinately within their cases, neither feeding, nor exhibiting a desire to feed.

I stated that on March 25th (1924) I had opened those cases, which when I last investigated their contents contained living larvae, and that I had found four of these still alive.

I have to-day (November 20th, 1924) again opened these cases, and find that two larvae still survive, but naturally more emaciated than when I saw them last. The other cases show that their inhabitants had actually succeeded in pupating. I found that one of these pupae had completely dried up, but the other contained a fully formed female, still flaccid, and therefore quite recently alive. The pupa shell is delicate, pale in colour, distinctly segmented, and was not protruded from the case. The abundance of "fluff" within the pupal shell shews that the insect had struggled to release herself, but there were no ova. These cases, which have certainly been cut open three or four times previously, have been neatly, and completely repaired, so perfectly that I find it impossible to discover where the openings had been made.

I need scarcely repeat that during this long period, of perhaps as much as 20 months, these larvae have never (so far as I have perceived) opened their cases, and that they have certainly eaten nothing. The surviving larvae still retain sufficient vitality to jerk their cases as they lie on the table before me, and are probably already at work repairing the damage which I have done with my scissors.

I am not going to make a guess at the identity of these insects, for I believe that I am right in thinking there may still be large numbers of Psychides, large and small, existing in the Palaearctic Region, which are practically unknown and unnamed. This is not to be taken as a retraction of my previously expressed opinion, that some Psychides have probably been very largely overnamed.

Judging by the cases alone, there may be five or six species in Dr. Buxton's collection, but it does not appear to me to be very profitable to name, or attempt to name, Psychides, from their cases. It may well be that the material of which the cases are fabricated depends upon the supply to hand, and climatic conditions may require differences in structure, and therefore in the appearance of the case. I have also found it impossible to make certain about the identification of cases sent to me, with the species to which they are credited.

Until the study of these species has been taken in hand seriously, doubts and mistakes in identification are unavoidable.

I feel very certain, after my disappointing experiences, that this will have to be carried out by resident investigators. There are evidently conditions, perhaps largely of temperature, humidity, or special food requirements, which would seem to prevent the rearing of these insects away from their particular habitations, and that unless

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at the time of collection they be full grown, it would appear to be a hopeless task to attempt to carry them through.

Yet another difficulty arises from their habit of retiring into their cases, and remaining within for an indefinite period, whether for hibernation, aestivation, or what not, but which probably reflects their habit when at home. This may well be the cause, when the habitat is a desert, mountain, torrid or frigid district, or, where there are regular alternations of wet and dry seasons. It will therefore not be safe to conclude that because a case is closed, the contained larva is necessarily full fed.

There are amongst the larger Psychides at least two forms of pupa. Probably both sexes of a species are much the same in facies. Without plenty of identified material, it is not possible to do more than infer this to be the fact. The male pupal shell being generally left projecting from the larval case at emergence, will serve as a sort of guide to the structure of that of the female.

The pupa shells of the Palestine specimens immediately under observation are somewhat delicate in structure, pale in colour, and more or less slender. So far as Psychid pupae conform to the general rule for other lepidoptera, they are what I may perhaps call pupa-like. We have so few of the large species in Britain, that it is not easy to make a comparison, but perhaps *Acanthopsyche atra*, and *Pachythelia villosella* conform to this pattern, by reason of their delicate structure, and obvious segmentation.

The only specimens of this form, which I have been able to study alive, are some of a number collected by Mr. F. M. Jones in deserts in Texas, and Arizona, in 1923, and left in my custody during his visit to the Continent this summer. From two of these females emerged, dropping from the larva cases, and leaving the pupa shells entirely within the larval case. I found the pale yellow females* upon the bottom of their cage, but careful examination was necessary in order to discover from which case each had come. This emergence may be, as has been observed in other Psychides, the usual habit after oviposition, or failure to attract a mate. I did not investigate to discover whether any ova had been laid. One of these cases contained a living larva, which at times came out of its case, and ate sparingly of foliage, roots and fruit.

The other form of pupa, so far as the material at my disposal serves to show, is hard, dark, and tipped with dull red at either extremity, the details of imaginal structure very much obscured by rugosity. I have found this form chiefly in the genus *Psyche*, but it is certainly not confined thereto. I have these hard dark pupae sent to me as those of *Psyche viciella*, *P. stettinensis*, *P. viadrina*, *P. constancella*, *P. turatii*, and *Sterrhopteryx standfussi*. To these Tutt (who gives

* I ought to mention that when one of these American females was placed for observation upon the table before the window, she seemed to be able to discern the light, and helpless though she appeared to be, she wriggled towards it. I watched this effort for some time, and satisfied myself not only as to her power of motion, but also that she possessed the sense of sight, though it may be to a very limited extent.

precise details of the structure)* adds *S. hirsutella*, and I find that Dr. Strand (Seitz *Macrolepidoptera of the World*, Vol. II.), also makes the same statement as regards the female pupae of *Arctus bruandi*, *A. graslinella* and *A. calberlae*. But mention of the female pupae of the Psychides is very meagre, so far as I am able to discover. The genera mentioned all belong to the Psychinae, div. Psychidi of Tutt's work, of which we have but one representative in Britain, *Sterrhopteryx hirsutella*.

It is, thanks to Conte E. Turati, of Milan, that I am indebted for the opportunity of studying these pupae, he having sent me a very generous supply of living larvae of *Psyche turatii*, collected from marshes. From these I bred a number of male imagines. Here also the female pupal shell is not protruded from the case, and further there is no emergence of the female herself. I had not before this specially interested myself in these pupae, but having now a sufficient supply, I thought it advisable to examine the Italian specimens. Surprised that I had not reared a single female, I investigated some of the cases which appeared to have produced nothing. On opening these I found my previously well known hard, dark, object with red ends, within which was the very delicate almost colourless female, which had not emerged from the pupal shell, although allowed to die undisturbed.

I am therefore quite assured that these females do not leave their pupal shells.

I should have expected that these females, which thus remain within the pupal shell, to belong to the males which have extensile bodies, and long segmental rods, but the genera have only short rods, and further they possess no anterior tibial spur. This information is however explained by the fact that all the cases of the species named are short.

CORRIGENDA.—I have not felt it necessary to refer to, or correct, the few errors which have crept into my previous papers upon the Psychides, as they have been so obvious that they could not mislead.

I cannot however avoid acknowledging a very careless slip of my own, which appeared in my last instalment. I there substituted my own Christian name for that of M. Constantin Dumont, of Paris, to whom I tender my sincere apologies.

* Tutt p. 428, quotes Dr. Chapman's description of the pupa of this female, pupa. "The female pupa has the head and thoracic segments, and half of the 1st abdominal segment, of the usual pupal brown colour, the 8th, 9th, 10th abdominal segments also, the intermediate position black; certain chitinous waves look like labrum, labium, etc., but these and the leg covers, are very indefinite, and reduced to mere chitinous irregularities of surface; the wings are marked by similar but more distinct waved lines laterally; the scars of the prolegs are very marked, being great hollows with raised margins, etc."

Grimaldi, the Clown, an Entomologist.

(1779—1837).

A few weeks ago I came across a little known, and probably almost forgotten work, *Memoirs of Joseph Grimaldi*, edited by "Boz," 1878. Grimaldi was a famous clown during the last decade of the 18th century

and the first quarter of the 19th century. The book had its origin in an extensive MS. left by Grimaldi, which Dickens "materially abridged, altering its form throughout and improving the narration of the facts." The interest to us as entomologists, is that Grimaldi was, besides being a breeder of pigeons, also a collector of insects, which latter amusement he pursued with such success, as to form a cabinet containing no fewer than 4,000 specimens of flies collected, he says, "at the expense of a great deal of time, a great deal of money, and a great deal of vast and actual labour," for all of which, no doubt, the entomologist will deem him sufficiently rewarded. He appears in old age to have entertained a peculiar relish for the recollection of these pursuits, and calls to mind a part of Surrey where there was a very famous fly, and a part of Kent where there was another famous fly; one of these was called the Camberwell Beauty (which he adds was very ugly), and another the Dartford Blue, by which Dartford Blue he seems to have set great store; and which were pursued and caught in the manner following, in June, 1794, when they regularly make their first appearance for the season.

"Being engaged nightly at Sadler's Wells (Theatre), he was obliged to wait till he had finished his business upon the stage; then he returned home, had supper, and shortly after midnight started off to walk to Dartford, fifteen miles from town. Here he arrived about five o'clock in the morning, and calling upon a friend by the name of Brooks, who lived in the neighbourhood, and who was already stirring, he rested, breakfasted, and sallied forth into the fields. His search was not very profitable, however, for after some hours he only succeeded in bagging, or bottling, one Dartford Blue, with which he returned to his friend perfectly satisfied. At one o'clock he bade his friend good bye, walked back to town, reached London by five, washed, took tea, and hurried to Sadder's Wells. No time was to be lost—the fact of the appearance of the Dartford Blues having been thoroughly established—in securing more specimens; so on the same night, directly the pantomime was over, and supper over, too, off he walked down to Dartford again, found the friend up again, took a hasty breakfast again, and resumed his search again. Meeting with better sport, and capturing no fewer than four dozen Dartford Blues, he hurried back to the friends; set them—an important process, which consists in placing the insects in the position in which their natural beauty can be best displayed—started off with the Dartford Blues in his pocket for London once more, reached home by four o'clock in the afternoon, washed, took a hasty meal, and then went to the theatre for the evening's performance.

"As not half the necessary number of Blues had been taken, he had decided upon another visit to Dartford that same night, and was consequently much pleased to find that, from some unforeseen circumstance, the pantomime was to be played first. By this means he was enabled to leave London at nine o'clock, to reach Dartford at one, to find a bed and supper ready, to meet a kind reception from his friend, and finally to turn into bed, a little tired from the two days' exertions. The next day was Sunday, so that he could indulge himself without being obliged to return to town, and in the morning he caught more flies than he wanted; so the rest of the day was devoted to quiet sociality. He went to bed at ten o'clock, rose early next morning, walked com-

fortably to town, and at noon was perfect in his part, at the rehearsal on the stage at Drury Lane Theatre.

“But his love of entomology, or exercise, was not the only inducement in the case of the Dartford Blues; he had, he says, another strong motive, and this was, the having promised a little collection of insects to ‘one of the most charming women of her age’—the lamented Mrs. Jordan, at that time a member of the Drury Lane Company.”—*Hx. J. T.*

A supposed Hybrid Polyommatus (*coridon-hylas*). (*With two plates.*)

By O. R. GOODMAN, F.Z.S., F.E.S.

At the South London Entomological Society's Meeting on May 8th, 1924, I exhibited a male Lycaenid butterfly taken on July 21st, 1922, in the Val d'Ossoue, Gavarnie, Hautes Pyrenees, France, which I have been unable to identify with any certainty.

I submitted the specimen to Mr. Tonge for his opinion; he compared it with the two hybrid *coridon* × *thetis* males *polonus*, which he exhibited a little time ago, and he came to the conclusion that it could not be a *thetis* hybrid. I then searched my notebooks and ascertained, without doubt, that *thetis* was entirely absent from Gavarnie during our visit. *Coridon*, however, was in great abundance and was of the very constant form found in the Pyrenees; it flew in company with a rather small form of *P. hylas*, which it greatly resembles in the tone of the underside, and also in company with *P. escheri*, from which it differs in many characteristics. An examination of the specimen exhibited reveals that the blue scaling of the upper side partakes both of the silvery blue of *coridon* and of the brilliant sky-blue of *hylas*, being almost intermediate in shade. The underside also resembles both species in different characteristics, namely:—

Coridon:—1. In the presence of dark crescentic markings on the marginal band of the forewings.

2. In the position, arrangement, and shape of the discoidal and other spots in the central area of the forewings.

3. In the heavier dusting of blue scales at the base of the wings.

Hylas:—1. In the browner tone colour of all the wings.

2. In the larger size of the spots in the central area of the forewings.

3. In the presence of an extra spot near the costa (absent in *coridon*).

4. In the absence of a basal spot (present in *coridon*).

These resemblances seem to indicate that it is possibly a hybrid *coridon* × *hylas*, which cross I believe has not been previously recorded.

A supposed Hybrid Polyommatus (*coridon-hylas*).

By *Hx. J. TURNER*, F.E.S.

The insects in question were passed on to me for my opinion after they had been submitted to Mr. F. N. Pierce for morphological examination. Before reading the opinions of Mr. Pierce, based upon his preparations, I thought it better to examine the specimens in

detail. This I did and the following is a category of the observations I made.

1. *P. escheri* may at once be ruled out. Its colour, shape, and underside markings both in general and in detail at once decide its exclusion.

2. SHAPE AND SIZE.—The specimen is the size of a somewhat small *coridon*, and resembles *coridon* not *hylas* in general shape. The apex of the forewing favours that of *coridon* rather than *hylas*. The very slight incurve above the middle of the hind-margin of the forewing is exactly as occurs in most *coridon*, but which is never present in *hylas*. The costa is straighter as in *coridon* and there is not the curvature present in *hylas*.

3. GENERAL COLORATION OF THE UPSIDE.—A comparison was made with a very large number of *coridon* ♂ and about 70 *hylas* ♂. The colour is between that of normal *coridon* and normal *hylas*, but much nearer that of *hylas* with the silkiness and somewhat of the "changing colour" of *coridon*. This impression is heightened by the absence of the outer marginal, wadish band of dark suffusion, present in *coridon*, but absent in both *hylas* and the specimen.

[NOTE.—In conjunction with Mr. N. D. Riley, Mr. W. H. T. Tams and my son, I endeavoured to match the colour with Ridgways *Color Standards*, but had to abandon the attempt, as we all materially differed in our opinions, no doubt owing to the colours of the book being "flat," whereas the Lycaenid blues are mainly what may be called "changing colours" depending on the angle of view, incidence of light; etc. It was suggested that in the *Lycaenidae* a special code of colours might be adopted for comparison, e.g., *coridon*-blue, *icarus*-blue, *hylas*-blue, etc.]

It was suggested that the specimen might be one of the blue *coridon* forms with which the late Dr. Chapman made us familiar some years ago. Mr. Goodman and I compared these ab. *lilacina*, etc., and at once saw there was no conformity with the specimen.

4. MARKINGS OF THE FOREWINGS. The veins in the specimen are slightly emphasised near the outer margin just as in *hylas*, but this emphasis does not extend half-way across the wing as is the rule in *coridon*. The dark marginal line is wider somewhat than in an average *hylas* and not the extended cloud which is invariably more or less present in *coridon* as a conspicuous character. This cloud in *coridon* contains at least traces of a row of eyespots, which traces are not found in any *hylas*, nor has the specimen any such traces and thus is conformable to *hylas*.

5. MARKINGS OF THE HINDWING.—On the hindwing the marginal line is very fine and sharply expressed and there are internally to this line a series of unattached round black spots, well-defined. Between these spots and the marginal line are patches of white scales. Such black spots, with light scaling even extending all round them as a ring are the regular markings of *coridon*, in fact a strong feature. Black spots occur very occasionally in *hylas* in this position, but always more fuzzy and indefinitely separated from the marginal line, with never the slightest trace of lighter scaling around them. The spot in the anal angle of the specimen is a distinct double one just exactly as is present in normal *coridon*, with the white edgings of the double spot united in both. The 3rd and 4th spots from the anal angle are

somewhat less in size, but such disalignment cannot be traced in spotted *hylas*.

6. MARKING OF THE FRINGES.—The fringe of the forewing of the specimen is marked with dark fanshaped chequers opposite the ends of the veins, not very prominent, but clear, exactly as in many *coridon*. On the hindwing the chequers are represented by two or three dark hairs per vein. Such chequering never appears in any form in *hylas* even under a lens. *Hylas* has the base of the fringe of the forewing of a brown colour, a character which one cannot trace in *coridon*, nor in the specimen.

7. GENERAL COLOUR OF THE UNDERSIDE.—The striking characteristic contrast of light fringe and marginal area with the rest of the ground colour of both wings in *hylas* is in no way even suggested in the specimen. There is the usual contrast such as occurs in *coridon* between the ground of the fore and the hindwing, a contrast which scarcely exists in *hylas* underside.

8. MARKINGS OF THE FOREWING BELOW.—The discoidal spot has the same shape as that of *coridon*, sharpened at one or both ends, not rounded at both as always happens in *hylas*. The basal spots are absent in the specimen as they are normally in *hylas*. In *coridon* there are generally two, but sometimes only one. The transverse row of eyespots, have the double spot of the inner margin small and well-defined as in all *coridon*. In *hylas* this double spot is always larger and more diffuse in definition. The spots of this row are about the average size of those of *coridon*, whereas in nearly all specimens of *hylas* they are larger and the second from the inner margin is quite out of alignment, whereas in *hylas* the second spot is either in the alignment or only slightly out of it as a rule. The spots of this row appear more prominent because they follow *hylas* in being surrounded by a ring of pure white. There is not so much suppression of definiteness in the marginal spots, chevrons and rings as often occurs in *coridon*, and which ends in practically total suppression in *hylas*.

9. MARKINGS OF THE HINDWING BELOW.—Marginal and submarginal markings in the specimen are as well developed as in average *coridon*, but in no way suppressed as they are in most *hylas*. The white discoidal blotch has a dusky centre like many *coridon*, which centre in most *hylas* is absent. (The Gavarnie *coridon* generally have the white blotch large without the dusky centre.) The shape of the red chevrons on the margin of the hindwing is that of *coridon* and not the sharp-pointed wedges as in *hylas*, and of the dull orange of average *coridon* and not the bright orange of *hylas*, where the chevrons always show more prominently than in *coridon*. In *hylas* the marginal black dots are a very deep black and very clearly and sharply defined. They are not so in this specimen but favour those in the average *coridon*. The double spot at the marginal end of the transverse row is just as expressed in *hylas*.

The great preponderance of the above facts seem to suggest an aberrant form of *coridon* with a leaning towards *hylas*, which may, or may not, have been caused by irregular copulation of *coridon* with *hylas*; the probability is opposed to the hybrid origin.

A supposed Hybrid *Polyommatus* (*coridon*-*hylas*).

By F. N. PIERCE, F.E.S.

The specimen is interesting, in so much as it does not exactly follow any of the other species. This may be due to assumption that it is a hybrid. In the various forms of hybrids that I have examined, I find the male generally adopts a new form of genitalia unlike the males of either parent. In the females the genital organs usually produce a mix-up. Now the male genitalia of the "Blues" run very close to each other. In our examination of *coridon* and *thetis*, it was not until we had prepared some dozen specimens of each species, that we were enabled to detect a constant difference. All other differences broke down *inter se*, therefore it might be reasonably expected that a cross between species, so closely resembling each other, would not produce anything really abnormally different, but would reproduce the parents' form with minute differences, possibly tending towards one parent.

GENITALIA.—With regard to your specimens, I have made a preparation of each of the species adding the ♀ where possible, and I find that we can at once exclude *hylas*, as being quite a distinct species from the others. The costa of the genitalia is squared, in the other three specimens it is curved and acuminate. Pl. II.

Then again the androconial scales are quite different from the others, those of *hylas* being long and narrow. As the specimen does not show either of these forms I think we can safely exclude it from the list. Pl. III.

Escheri has minor differences, which seem to eliminate it also, although this species is much more the common *coridon-thetis* type, leaning towards *thetis*, with which it has much in common.

The whole genitalia shows in point of size *coridon* largest; sp. ? next; *escheri* next and *hylas* the smallest. In this the sp. ? is nearest to *coridon*.

Again the penis is longest in *coridon*; sp. ? next; whilst *hylas* and *escheri* are both shorter. In this the sp. ? is nearest to *coridon*.

The tip of the costa is acutely pointed as it also is in the sp. ? whereas in *escheri* the tip is less acute and is (as stated) squared in *hylas*. In this the sp. ? is practically the same as *coridon*. Pl. III.

It was in the uncus, in which we found the most constant form of difference in *coridon* and *thetis*. In *coridon* it is roughly dentate; in sp. ? it is dentate perhaps not quite so roughly as in *coridon*; but in *hylas* it is almost plain (*thetis* form) and in *escheri* it is similar. Again the sp. ? approaches nearest to *coridon*.

The tip of the valvule in *coridon* is long before it breaks away almost at right angles. In the sp. ? it is long, but the break away is not quite so angular. In *escheri* the break away is a gentle curve from a shorter tip. In *hylas* the tip is much narrower, and the break away is a gentle curve. Pl. III.

In this the sp. ? comes nearest to *coridon*.

SCALES.—The blue scales contribute not a little to the whole question. In *coridon* the colour by transmitted light shows the scales bluish-purple. In the sp. ? they are orange-bluish. In *hylas* they are yellowish-orange with a tinge of blue. In *escheri* they are bright-yellow with just a tinge of blue towards the base. In this

respect the scales seem to be really intermediate between *coridon* and *hylas*, again approaching *coridon*.

The androconials are difficult to compare individually and vary *inter se*. At the same time there is a general type to each species. In *coridon* the androconial is a broad battledore, with a fairly long handle.

In the sp.? the scales are similar. In *escheri* the handle is considerably shorter. In *hylas* the scales are long and narrow with a long handle. Pl. III.

In this feature I should have no hesitation in placing the sp.? down to *coridon*.

A new race of *Cidaria* (*Thera*) *variata*, Schiff.

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

Two series of *T. variata*, the species attached to spruce, lie before me.

The first series bred from larvae taken at Klosterneuberg near Vienna, by Herr Carl Höfer, consists of 8 examples typical of the district, 5 of the dark form *obscura*, Höf., which was long confused with the var. *scotica*, Stdgr., of *T. obeliscata*, 2 of a brown form of *variata* suggestive of some *obeliscata* in a way, and 1 of a somewhat semitransparent form of an albino character.

The second series bred from larvae taken near Southampton, by Mr. Wm. Fassnidge, consists of 12 specimens including one or two dark somewhat unicolorous examples for which the name *obscura*, Höf., may be adopted, and 2 of the semitransparent form suggestive of the similar form from Vienna.

These two races when compared show decided general differentiation, although the specific markings are all present and remarkably similar, yet there is not a specimen in one series, which can be found duplicated in the other, unless it be the so called "albino" forms which are remarkably similar, and dwarf in both series. Whereas the term "brown" at once comes into one's mind on looking at the Austrian race, the predominating grey being on the brown-gray side, it is not so with the British race of *variata*, which are of a beautiful, soft, delicate grey of quite a different appearance, only the two darker examples of the ab. *obscura* form indicating a slight tendency to brown. In the British series there seems less contrast between the band and the general ground than in the Austrian race, where the band is emphasised by a clear white edging on both sides. The latter series also shows less individual variation.

In assessing the "general coloration" one's mind is always influenced by the ground colour of the hindwing, which is, as a rule, when not obscured by designs, indicative of the general ground colour of the whole wing surface, which underlies the markings of the forewings.

This British race, as exemplified by the Southampton specimens, I propose to name **britannica** n. race. I may say that Mr. Prout has been able to see both series and to note the marked racial difference of our British form.

Short notes of collecting in Spain in 1924.

By O. QUERCI and Dr. E. ROMEI.

During 1924 we made several trips to collect Lepidoptera. In March Dr. Romei and our pupil Sig. Ederli went to Tripoli, in Northern Africa, a country where no entomologist had collected until now. Dr. Romei returned to Italy in May and he then went to get a few *Parnassius apollo* and *P. mnemosyne* on the Aspromonte, in Calabria. Sig. Ederli remained to collect in Tripoli till September. The African captures were numerous and good: more than 5000 Rhopalocera, Heterocera and Micros, about 260 species, have been caught, and it seems that several new species have been discovered.

The study of the Lepidoptera from Tripoli will take a long time to work out. Dr. Romei will publish later on the result of his collecting.

In the month of May Orazio Querci and his wife Clorinda went to Albarracin, in Aragon. The spot seemed so favourable that Dr. Romei, with his wife and baby came there one month after.

Clorinda Querci with her daughter remained to collect at Albarracin; Dr. Romei and O. Querci went on to the highest top of the "sierra." The collecting in the plateau and on the high mass of Aragon has been successful, but as rains were quite missing in that district the Lepidoptera began to be scarce as time went on so that Dr. Romei went to Asturias. On the first days of September the weather was so cold in Aragon and Asturias that we all were obliged to go to Catalonia, where we remained to collect till October, after which we returned in Italy.

About 18,000 Rhopalocera and Heterocera were caught by us in Spain; it is impossible in such a short time to give news about all the species we have found. But we will summarise the most interesting things we have observed on the field.

Cocomyzephyra pamphilus of Aragon is different from all the specimens from Peninsular Italy. A yellow line occurs between the brown suffusion and the margin. This form, which we have collected also in Sicily, is the one named *lyllus* by Esper, but in Aragon it not only occurs in summer, but also the vernal and autumnal specimens are *lyllus*; not even one *C. pamphilus* has been seen by us at Albarracin, Tramastilla and Noguera. In Asturias, about 400 miles away from Albarracin, we found the common *C. pamphilus* mixed with *lyllus*. In Catalonia we collected *C. pamphilus* only. I conclude that *C. pamphilus* and *lyllus* are two different species, as in Aragon one can see *C. lyllus* in May and September and in Asturias one can identify the two species, living together, at first glance.*

Powellia sao emerges in a variable, but quite definite, form in Asturias and Catalonia, while in Aragon we found three forms so different,

[* The bulk of experience and observation so far seems to indicate that *C. pamphilus* and the form *lyllus* are but one species, *lyllus* being the hot dry season form. Where no *C. pamphilus* were found but only *lyllus*, it was in the abnormally dry and hot area of Aragon, where probably *C. pamphilus* was over and gone before Signor Querci arrived. The season also was an abnormally early and hot one. It is not unusual to find both spring or summer forms intermixed in ever varying proportions from spring predominance to summer predominance. The whole question can only be settled by some one in the respective areas breeding from the egg. Mr. Bethune-Baker says that from his morphological examination he is influenced to suggest two distinct species.—Hy. J. T.]

that we suppose they are three different species. The most common form of Aragon is *P. sao*, the scarcest form, with tawny underside and different pattern is perhaps *P. orbifer*. We do not dare to give our opinion on the third large form but it much strikes us.

At Orihuela, 5000ft., we found the usual *Hyponephele lycaon*. All specimens from Catalonia we have seen in the the Museum of Barcelona belong to the above named species, but at Albarracin, 3000ft., *H. lycaon* lives together with *H. lupinus*, Costa. It is very easy to separate the two species looking at the androconia, and this confirms Count Turati's opinion that *H. lupinus* is not a form of *H. lycaon*, but a quite different species. It seems that till now these two species have never been found living at the same spot.(†)

On the high mass of Aragon we found a few individuals of *Strymon ilicis* with a very large fulvous spot on the forewings. This beautiful insect is quite similar to those from Valais, which Dr. Verity named "*inalpina*."

At Albarracin our wives took a few specimens of the form *aesculi* also with a large fulvous spot, which are perhaps "*maculatus*, Gerh." *Strymon ilicis* is quite wanting at Albarracin, but in the Museum of Barcelona we have seen large series of *S. ilicis* and of the form *esculi* which one can identify at first glance; no doubt *Strymon ilicis* and *S. aesculi* are two different species according to Mr. Oberthür's views.(‡)

Plebeius (Aricia) medon emerges at Orihuela in a form like that which Oberthür named *nevadensis*. The shape of the wing is elongated, the fulvous spots of the upperside are reduced in extent and often missing on the forewings of the male, while they are small but always forming a complete crescent in the female. By that character the males of *P. medon* of Orihuela can very easily be separated from the females. The underside is grey in the males and pale fulvous in the females. The form which we caught at Tramacastilla, 10 miles away from Orihuela, is quite different: smaller, with a rounded contour of wings and with a complete marginal crescent of fulvous spots reaching to the upper margin of the forewings in both sexes; not only in the female, but also in the males. The underside is much darker than in the Orihuela form. It is very difficult to differentiate sexes in the Tramacastilla form.

Looking at the series of *P. medon* from Puerto de Orihuela and Tramacastilla one might believe that the high mountain form, 5000ft., is different from the one lower down, 4000ft., but while we collected those two different forms on the mountain mass, our wives were getting both forms which were flying together in the Aragon plateau. At Albarracin, 3000ft., Clorinda Querci and her daughter Erilda Romei

[† *Hyponephele lycaon* frequents more elevated regions, while *H. lupinus*, although occurring towards the west, is a more southern and eastern species. The separation of the two was suggested by Count Turati on the morphological difference of the genitalia. (Count Turati called *lupinus* by the name *rhannusia*.) Dr. Chapman, at my request, went over the ground with specimens sent to me from Cyprus, where only *H. lupinus* occurs, and the mounts are still in my possession. The androconia, the shape of the androconial patch, the contour of the wings, the area of the distribution, etc., all combine with the genitalia to show the complete differentiation of the two species.—Hy. J. T.]

[‡ This is another case where to prove the assertion, breeding from the egg is needed. The Rev. G. Wheeler thinks this has already been done.—Hy. J. T.]

collected a fine series both of the form like that of Orihuela and the other from Tramacastilla. This on the same days and at the same spot. I conclude that in Aragon, and perhaps in most of Europe, two different species have always been considered as to be simple geographical forms of *P. medon*. I agree that such an opinion is very bold, because save the shape of wings, the extent of fulvous spots of the upperside and the ground colour of the underside, the two forms are very alike, having a quite identical disposition of black spots on the underside. The study of genitalia is necessary but we are not able to do it. (†)

[† This is another case where to prove the assertion, breeding from the egg is needed.—Hy. J. T.]

NOTES ON COLLECTING, etc.

UNUSUAL FOOD-PLANT OF *DICRANURA VINULA*.—In a sheltered corner of a garden near the sea at Bridlington, E. Yorkshire, in August-September, 1917 and 1918, but near which there were no trees of any description, there grew a mass of '*Convolvulus major*' on a rockery. This was mostly eaten by the larvae of the "Buff Ermine," but I observed a good many larvae of the "*Puss Moth*" (*vinula*), feeding on this same plant, and on which I bred several. When the time of pupation arrived, they found their way up the side of a brick wall and made their cocoons in the depth of the ivy that grew there, so that the only way to discover their whereabouts was to pull back the ivy, which exposed the shining undersides of the cocoons. Surely this is a very unusual foodplant?—H. B. P. KETTLEWELL, Pageites, Godalming.

SIREX GIGAS IN PERTHSHIRE.—I have received a fine specimen of *S. gigas* taken on September 1st, at Aberfeldy by Mrs. James Haggart.—W. BOWATER (F.E.S.), 23, Highfield Road, Edgbaston, Birmingham.

LATE EMERGENCE OF *PLUSIA GAMMA*.—On December 12th, 1924, I took a freshly emerged male of *P. gamma* on the wooden railing of the station here.—HERBERT MASSEY (F.E.S.), "Ivy Lea," Burnage, Didsbury, *January 8th, 1925*.

DEATH'S-HEAD MOTH, *ACHERONTIA (MANDUCA) ATROPOS*.—I am desirous of obtaining, for statistical purposes, as complete a series of records of the capture of this species as possible. If any readers of this Journal who possess examples or records of the larva, pupa, or imago from any part of the British Isles would favour me with the exact date and precise locality of their specimens, stating whether in larval, pupal, or adult stage, I should be greatly indebted.—PERCY H. GRIMSHAW, Royal Scottish Museum, Edinburgh, *January 16th*.

EARLY APPEARANCE OF *H. LEUCOPHÆARIA*.—I saw a specimen of *H. leucophaearia* on January 23rd, at Crohamhurst near Croydon.—H. J. T.

SCIENTIFIC NOTES AND OBSERVATIONS.

In his "Myrmecological Notes for 1924" Mr. Donisthorpe, speaking of finding dealated ♀♀ of *Lasius* (otherwise known as *Acanthomyops*) *umbratus*, after a marriage flight, carrying dead ♂♂ of *L. niger* the

host species, says he believes that I first recorded this phenomenon and its explanation in 1915. Six years before this, however, I had recorded the killing and devouring of the host ♂♂ by the parasitic ♀ and her subsequent acceptance by the host colony (*Ent. Mo. Mag.*, 2 Ser. XX. 1909, p. 96). It was in 1896 that I first observed this occurrence, though I omitted mentioning it in the more or less popular account published in 1900 (*Science Gossip*, May, 1900, p. 369). It was not until 1913 that I suggested the probable explanation (*Ent. Rec.*, XXV., No. 5, p. 135). I have observed this phenomenon very many times, both in the field and under captive conditions. After décalation the newly fertilised ♀ wanders about in an agitated manner and pounces on the first *niger* ♂ she meets, carries it to a secluded spot and devours it. Her aggressive manner then disappears, and she is perfectly friendly to the next ♂♂ she comes across in her search for a colony. Even when fiercely attacked she continues her friendly overtures. There was certainly a difference to be noticed between the behaviour of a host colony to a "blooded" ♀ and to one that had not acquired the nest "odour" by devouring a ♂. It would be interesting to know whether this preliminary slaughter of a host ♂ has been observed in other parasitic ants.—W. C. CRAWLEY.

CURRENT NOTES AND SHORT NOTICES.

Another of Tutt's old helpers has passed away in the death of C. C. Griffiths, of Clifton, Bristol. He had been unwell for the past twelve months and succumbed finally to an attack of pneumonia, which caused his long-affected heart to give way. The Bristol Society has been exceptionally unfortunate of late, for it has lost quite half-a-dozen of its members. Griffiths became a Fellow of the Entomological Society in 1883 and was also a Fellow of the Zoological Society.

We understand that on account of the extremely interesting results of their trip to Tripoli last year, Dr. Romei and his wife have already gone again to that country, particularly to study the question of *Anthocharis belemia* and its summer form *glauce*.

The "Verrall Supper" took place on the evening of January 20th, at the usual place, the Holborn Restaurant, London, and was a very successful event. Although a considerable number of old faces were not present the large number of 131 sat down. The following is a list of those present:—B. W. Adkin, J. H. Adkin, R. Adkin, H. W. Andrews, E. B. Ashby, S. R. Ashby, Rev. C. Ash, G. H. Ashe, J. H. Ashworth, H. F. Barnes, Dr. Wm. Barnes (U.S.A.), E. C. Bedwell, G. T. Bethune Baker, K. G. Blair, S. F. Blenkarn, S. F. P. Blyth, Ed. Bostock, R. T. Bowman, L. A. Box, H. Britten, C. J. Brooks, A. S. Buckhurst, Dr. M. Burr, B. D. Burt, H. S. Bushell, G. R. Baldoek, J. E. Campbell-Taylor, G. C. Champion, H. G. Champion, C. A. Cheetham, Dr. E. A. Cockayne, J. Collins, G. H. Corbett, B. H. Crabtree, Capt. Crocker, F. H. Day, Dr. F. A. Dixey, A. W. Dods, H. Donisthorpe, C. A. W. Duffield, L. E. Dunster, J. H. Durrant, J. E. Eastwood, H. M. Edelsten, F. W. Edwards, Stanley Edwards, H. Willoughby Ellis, E. B. Ford, L. T. Ford, G. F. W. Fox-Wilson, H. S. Fremlin, F. W. Frohawk, J. C. F. Fryer, F. T. Gilliatt, C. T. Gimmingham, A. de B. Goodman, O. R. Goodman, E. E. Green,

T. H. L. Grosvenor, R. Hainitsch, A. Hall, H. M. Hallet, A. H. Hamm, G. L. R. Hancock, B. Harwood, P. Harwood, T. F. P. Hoar, H. Hodge, H. C. Huggins, Prof. S. Image, O. E. Janson, C. F. Johnson, Dr. K. Jordan, Dr. N. H. Joy, W. J. Kaye, F. Laing, C. G. Lamb, H. A. Leeds, G. C. Leman, G. B. C. Leman, R. W. Lloyd, G. E. Lodge, T. A. Lofthouse, W. J. Lucas, A. H. Macmurdo, H. Main, W. Mansbridge, A. W. Mera, Rev. F. D. Morice, Dr. S. A. Neave, L. Nell, L. W. Newman, C. Nicholson, J. Omer-Cooper, F. N. Pierce, Prof. E. B. Poulton, R. M. Prideaux, W. Rait-Smith, Col. R. H. Ratray, N. D. Riley, A. H. Ruston, L. G. Saunders, J. W. Saunt, H. Scott, E. P. Sharp, W. G. Sheldon, P. F. Skinner, H. D. Smart, Dr. H. Smith, R. Stenton, E. Step, E. A. C. Stowell, E. E. Symes, G. Talbot, W. H. T. Tams, Rev. J. E. Tarbat, M. L. Thompson, J. C. B. Tomlin, A. E. Tonge, Rev. J. E. Tottenham, H. J. Turner, C. J. Wainwright, Comm. J. J. Walker, J. H. Watson, Col. R. M. West, Rev. G. Wheeler, B. S. Williams, H. B. Williams, C. B. Williams, H. Worsley-Wood, L. H. Bonaparte Wyse, Col. J. W. Yerbury.

We regret to note the deaths of two eminent Italian entomologists. Car. Enrico Ragusa of Palermo, Sicily, was a most notable lepidopterist and coleopterist, and the author of numerous publications on the Fauna of Sicily. Prof. Giovanni Gribodo was a great student of the Hymenoptera, particularly the Aculeata. He published many papers describing new species, and possessed a rich collection as well as having a considerable library. Both were members of the Società Entomologica Italiana.

The *South-Eastern Naturalist* has just been issued and is, as usual, a very useful record of the activities of the South-Eastern Union of Scientific Societies. The matter is not all natural history by far, but is a fair indication of the matters dealt with in the various affiliated Societies. Our own subject of Entomology was to the fore in the Zoological Section; Prof. Poulton, F.R.S., has contributed a summary of his address "Some Modes of Protection in the Pupal Stage of Butterflies and Moths," and the paper read by Mr. Ray Palmer is printed in full, "Observations on the Communal (or Social) Life of Humble-Bees."

Messrs. Hutchinson and Co. announce the publication of the long projected *Natural History of British Butterflies* by F. W. Frohawk, F.E.S. The work consists of two folio volumes with 60 coloured and four plain plates. These plates are reproductions of some 1500 coloured drawings and paintings by the author, and do ample justice to the exquisite and delicate touch, for which Mr. Frohawk is so famous. The reproduction, exemplified by the sample plate issued with the prospectus, is executed in such perfection of style and finish, as is rarely seen in works brought out in this country. And since Mr. Frohawk knows the insects practically in every detail of the entrancing life-histories, we have the rare combination of an accomplished artist and an eminent nature-student in an author, a guarantee of a work of far more than usual elegance and yet of strict scientific accuracy. It should appeal to the lover of nature and the scientific worker, as well as to the lover of aught that is beautiful in nature and art. There are figured more than 150 of the choicest aberrations selected from the richest collections, as well as full details of all the pre-imaginal stages of each species.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

November 5th, 1924.—ELECTION OF FELLOWS.—The following were elected Fellows of the Society:—Brig.-Gen. B. H. Cooke, C.M.G., C.B.E., D.S.O., Inniserrone, Datchet, Bucks; A. Dutt, B.A., B.Sc., Dept. of Agriculture, Baghdad (Iraq); E. B. Ford, Wadham College, Oxford; F. M. Jones, 2000, Riverview Ave., Wilmington, Delaware, U.S.A.; C. F. C. Riley, University of Manitoba, Winnipeg, Manitoba, Canada; Brig.-Gen. Casimir H. C. van Straubenzee, 3, Sussex Mansions, Sussex Place, S. Kensington, S.W.

GIFT TO THE SOCIETY.—The Treasurer stated that a portrait of Mr. J. G. Children had been procured through the kindness of Mr. H. Willoughby-Ellis.

EXHIBITIONS.—Dr. S. A. Neave, on behalf of Dr. G. A. K. Marshall, F.R.S., exhibited examples of a new island race of a Cerambycid beetle, *Xicuthrus heros*, Heer, collected by Dr. E. Sylvester Evans on the Island of Taveuni, Fiji.

Mr. H. Donisthorpe exhibited a colony of *Camponotus herculeanus*, L., subsp. *pennsylvanicus*, Retz.

Professor E. B. Poulton, F.R.S., exhibited a leaf-like moth observed in Trinidad by Dr. C. L. Withycombe, and also discussed some examples of the action of light on the pigments of Lepidoptera.

Mr. H. M. Edelsten exhibited examples of *Nonagria sparganii* from Sussex.

Mr. R. Stenton exhibited examples of *Aphelinus mali*, Hald., a Chalcid parasite of the Woolly Aphis and gave some account of the work of the Ministry of Agriculture in introducing this beneficial insect.

Rev. F. D. Morice, who illustrated his remarks with lantern slides, gave an account of two unrecorded British sawflies, *Pteronidea spiraeae*, Zadd. & Brischke, and *Pteronus similis*, Hartig.

PAPEES.—The following papers were read:—1. "A preliminary report on the Dragonflies (Odonata) of Samoa," by Major F. C. Fraser. 2. "New species and Subspecies of Trinidad Rhopalocera and Heterocera," by Mr. W. J. Kaye. 3. "Notes on Insect Migration in Egypt and the Near East," by Mr. C. B. Williams.

November 19th.—ELECTION OF FELLOWS.—The following were elected Fellows of the Society:—Amirbalingan, Ent. Dept., Imperial College of Science, South Kensington, S.W.; Mrs. M. D. Brindley, 25, Madingley Road, Cambridge; G. H. Corbett, Broomwood, Reigate Road, Reigate; C. Farmiloe, Kingsley, Shiplake, Oxon; J. C. Hale, 5, Upper Park Road, Bromley, Kent; C. G. Lamb, B.Sc., M.A., D.Sc., 65, Glisson Road, Cambridge.

EXHIBITIONS.—Dr. H. Eltringham gave an interesting account of various illustrative processes and exhibited a number of examples of various stages of them.

Mr. W. J. Lucas exhibited an example of a rare British Neuropteran *Drepanopteryx phalaenoides*, L.

Professor E. B. Poulton, F.R.S., exhibited the results of breeding experiments by Dr. W. A. Lamborn and Dr. V. G. L. van Someren proving that *Danais chrysippus* and *D. dorippus* are the same species.

Mr. J. H. Durrant (on behalf of Mr. E. G. R. Waters) exhibited *Phalonia gilvicomma*, Z., rediscovered in England.

Dr. N. Joy exhibited *Laemophloeus turcius*, a new British beetle taken at Twyford in a flour mill.

Mr. H. Steven (introduced by Professor Lefroy) exhibited a day-light lamp for special colour identification at night.

PAPERS.—The following paper was read:—"On an abdominal scent organ (?) in *Sabatinca*, and other primitive genera of Lepidoptera," by Mr. A. Philpott.

December 3rd.—ELECTION OF FELLOWS.—The following was elected a Fellow of the Society:—Mr. A. R. Hayward, Misterton, Somerset.

EXHIBITIONS.—Mr. H. J. Turner exhibited and made remarks upon a long series of *Larentia (Thera) variata*, Schiff., containing both Continental and British specimens, many specimens coming from the Oberthür collection at Rennes.

Mr. G. Talbot exhibited and made remarks upon numerous specimens exhibiting resemblances between species of the Nymphaline genus *Phyciodes (Fresia)*, and those belonging to other groups associated with them.

Mr. W. J. Kaye exhibited a long series, arranged geographically, of *Heliconius* of the *silvani*-form type.

Professor E. B. Poulton, F.R.S., exhibited:—(1) A group of beetles collected on the shrub *Angophora cordifolia* near Sydney.

(2) A series of specimens showing that the likeness of the male *Acraea althoffi*, Dew., is closer in the female than in the male of the Uganda mimetic form *dolabella*, Hall, of *Pseudacraea dolomene* race *albostrigata*, Lathy, and discussed the complexity of the association to which these species belong.

(3) He also discussed the hypothesis that the protective resemblance to the characteristic conspicuous details of one out of many different appearances which the same object may assume is only to be expected in rare species.

Mr. E. B. Ford exhibited specimens and made remarks on the resemblance of *Araschnia levana* var. *prorsa*, and *Neptis lucilla* to *Limenitis sibilla*.

Mr. H. M. Edelsten exhibited examples of *Hydrilla palustris* from the Cambridge Fens and a teratological specimen of *Lygris testata*, with both hind wings missing.

Mr. G. T. Bethune-Baker, who illustrated his remarks with lantern slides, gave an account of the "scent sacs" in Lepidoptera.

PAPERS.—The following papers were read:—(1) "On some Fulgorids from the Island of Rodriguez (Hemiptera-Homoptera)," by Mr. F. Muir. (2) "Notes on the habits of Insects and Spiders in Brazil," by Mr. W. T. Bristowe, B.A. (communicated by Dr. H. Scott). (3) "British Fungus Gnats (Diptera *Mycetophilidae*)," by Mr. F. W. Edwards. (4) "On the abdominal brushes in certain Noctuid Moths," by Dr. H. Eltringham, M.A. (5) "On a new organ in certain Lepidoptera," by Dr. H. Eltringham, M.A. (6) "On the source of the Sphragidial fluid in *Parnassius apollo* (Lepidoptera)," by Dr. H. Eltringham, M.A. (7) "The Rhopalocera and Grypocera of Palestine and Transjordan," by Mr. P. P. Graves.

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MEETINGS OF SOCIETIES.

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The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. January 22nd, Annual Meeting; February 26th, Lantern Evening; March 12th; March 26th.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

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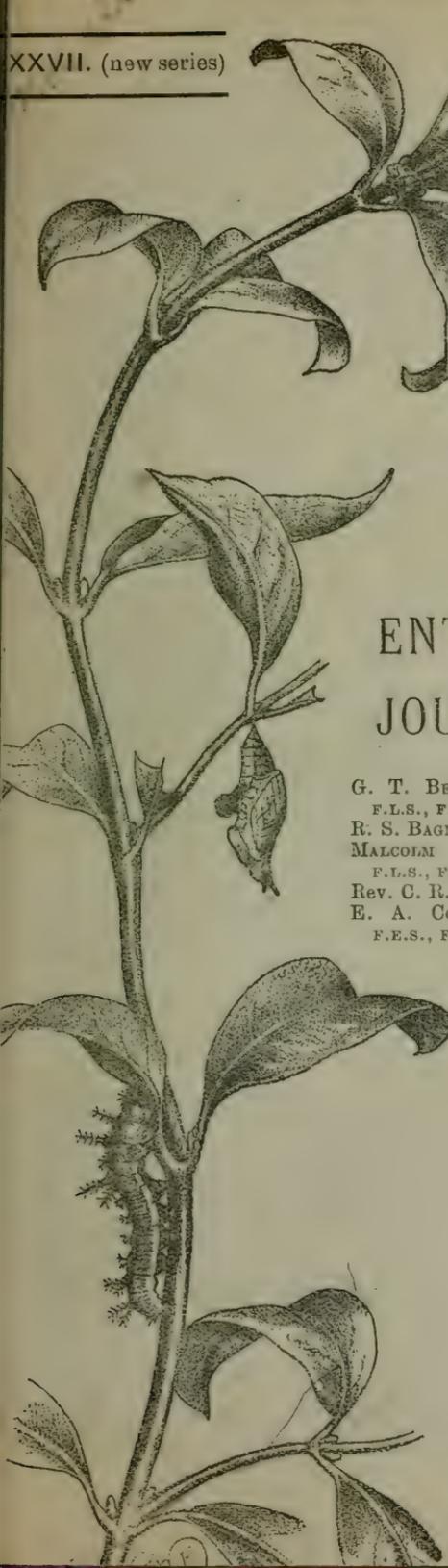
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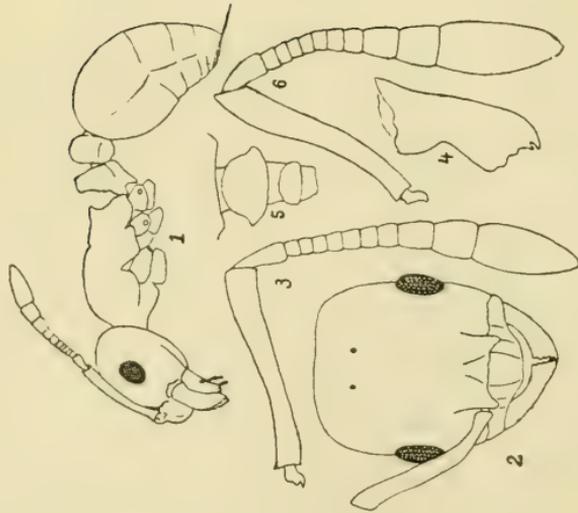
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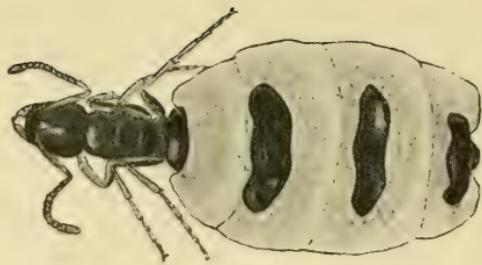
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MYRMETAERUS MICROCELLATUS, n.sp.

1. Profile of the ♀.
2. The head of the ♀.
3. Antenna of the ♀.
4. The mandible of the ♀.
5. The pedicel of the ♀.
6. Antenna of the ♀.

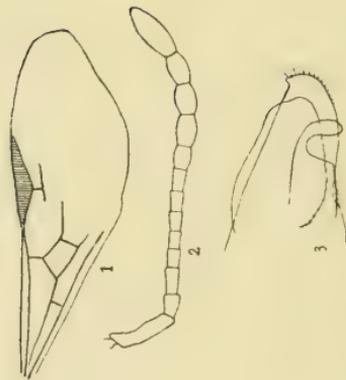
The Entomologist's Record.



BOTHRIOMYRMEX MERIDIONALIS
RACE GIBBUS, Sdk.

The Physogastric female.

del. Dr. S. Soudék.



MYRMICA MORAVICA, Sdk. ♂.

1. The wing.
2. Antenna.
3. The genital appendices.

Four New European Ants.

BY STEPAN SOUDEK, PH.D., BRNO (CZECHOSLOVAKIA).

I report here two new ants from Dalmatia and two from Czechoslovakia.

Myrmetaerus, n.g.

♂ The head is edgeless quadrangular, the epistom is vaulted, the front-margin roundish, in the middle is a large glossy smooth field *without any carina*. The mandibles are wide with 5 teeth, of which the two in the front are large and sharp, the others small and blunt. Palpi maxillares are of 5, labiales of 3 joints. The laminae frontales are very short, scarcely extending over the antennal pit. The area frontalis is large, indistinctly defined, the antennae are thick enough, of 12 joints, the 3 last forming a distinct club, which is longer than the other part of the funiculus. The eyes are in the middle of the head. On the forehead there remain *signs of the ocelli* in the form of 2 or 3 dots. The thorax is wide in the forepart, slender in the middle, and has a distinctly impressed mesoepinotal suture. The epinotum carries two short spines. The petiolus has a very short pedicel, is very high and steep, angular, in the part below is a great squamoid blunt appendix. The postpetiolus is large, extended in the transversal axis into two corners, in the part below there is *no appendix*. The 2nd and 3rd pair of legs are without spurs. The whole body is covered with strong hair. The abdomen is glossy and shining.

♀ Except for the common characteristics of a female it quite resembles the worker. The wings are unknown.

♂ Unknown.

Myrmetaerus microcellatus, n.sp.

♂ Monomorph, 2.4-2.5mm. (fig. 1). The colour of the body is yellow or yellow-brown, the funiculus and the teeth are darker in colour, the hindpart of the first abdominal joint is dark brown. On the whole in colour this resembles the *Leptothorax nylanderii*.

In addition to the characteristics of the genus the mandibles (fig. 4) are sleek and grown all over with hair. The antennal scapes do not reach the edge of the head as the first joint of the funiculus is nearly as long as the four following together (fig. 3). The last joint is longer than the two others of the club. The whole antennae are covered with small pressed hair. The eyes are in comparison large enough, on the forehead there are 2/, in one exemplar 3/ black dots (fig. 2), which are the remaining parts of the ocelli. The spines are short with a wide basis (fig. 1).

The sculpture of the body on the whole is very fine. The upper part of the head, the whole thorax, petiolus and postpetiolus, is superficially reticulated. On the side part of the clypeus and on the forepart of the head there are to be seen some longitudinal wrinkles. The abdomen is glossy without any structure.

♀ 2.75mm. The colour is black-brown, the mandibles and legs are yellow-brown, the antennae brown. The head is on the front and on the genae longitudinally wrinkled, in the other part reticulated. The thorax is glossy with a few superficial longitudinal wrinkles, petiolus and postpetiolus coriaceous and reticulated. The long hair covering the whole body is fine and thin.

♂ Unknown.

I have found this ant under a stone in the leafy wood at the Savina Monastery, near Erceg Novi (Castelnuovo), in the Gulf of Kotor (Cattaro), in Dalmatia. It was a mixed colony with *Leptothorax nylanderii*, Förster, where the workers of *Leptothorax* were predominant. I have observed only at home, examining my material from Dalmatia, that there were two species mixed, because the superficial likeness of *Myrmetaerus* with *Leptothorax* was so striking. Therefore I do not know anything about their relationship.

The nearest relationship of *Myrmetaerus* are *Myrmoxenus*, Ruzsky,*

* M. Ruzsky, "Neue Ameisen aus Russland," *Zool. Jahrb., Abt. f. Syst.*, Bd. XVII., 1902.

and *Chaleporenus*, Menozzi,† which have both been found also with the *Leptothorax*.

The similar morphological features of *Myrmetaenus* and *Myrmoenus* are: The same form of the 12-jointed antennae, the short laminae frontales, similar form of the thorax with a mesoöpinotal suture and short spines, the short and steep petiolus with a squamoid appendix below. The differences are in the structure of the clypeus, in the mandibulae different toothed, in the structure of the postpetiolus in the under part, and the presence of the degenerated ocelli in *Myrmetaenus*. The differences between *Chaleporenus* and *Myrmetaenus* are of a greater degree. Except those just mentioned parts of the body, still the laminae frontales and the petioli are dissimilar.

But in spite of them I do not doubt, that after the material have been compared and the generical definition enlarged, that all these three genera could be considered as one genus. The biological chief characteristic—the alliance-life with *Leptothorax*—some similar morphological marks (the similarly jointed antennae and palpi, the similar form of the thorax with small spines, the petiolus with an appendix) allow us to believe that the phylogenetic origin of all these three genera is the same, and the mentioned forms could be considered as different species of the same genus. In this sense my description of this ant as a new *genus* is to be considered as a provisional arrangement.

The type and the cotypes are in my collection.

Cardiocondyla elegans var. *dalmatica*, n.var.

♂ This form differs from the type through the superficial structure of the head and thorax; the small pits in the head are more sparse than in the type, and the surface between them is shiny, and therefore the head is glossy, against which the very dense pits and the rough surface between them in the type, make the head lustreless. The same is on the thorax concerning the sculpture. In these things var. *dalmatica* resembles the var. *inbarica*, but it differs in the colour of the body.

The colour is dark brown as in the type. The petiolus is a little more slender than in the type, it is narrower than the half of the postpetiolus against which, in the type, it is wider.

I have found one colony of this ant at Erceg Novi (Castelnuovo), in the Gulf of Kotor (Cattaro), Dalmatia. The nest was in a sand-field, only 50m. from the sea. Around the crater-shaped mouth of the nest there were densely strewn the remains of many hundred workers of *Tetramorium caespitum*.

The cotypes are in my collection.

Myrmica moravica, Sdk.

Worker and female of this ant have been already described in Bohemian.* I repeat here shortly the description and adjoin the description of the male not yet published.

† C. Menozzi, "Nota su un nuovo genere e nuova specie di formica parassita." *Atti della Soc. Ital. di Scienze Naturali*, Vol. LXI., 1922.

* S. Soudek, "Myrmica moravica n.sp., relict fauny praeglaciali." *Cas. mor. zem. musea (Acta Musei Moraviensis)*, Brno., Vol. XX.-XXI., 1922-3, p. 106, with 6 figs.

♂ 5.6-5mm. Besides the marks of the genus the most characteristic are: The antennae 12-jointed. The antennal scapes are rectangular, bowed or broken at the bottom, and carry a sharp tooth on the summit of the curve. The antennal clubs are slender, uncertainly 3-4 jointed because the 9th joint of the funiculus is distinctly longer than the 8th. The thorax is wide, compact, moderately vaulted and without any mesoepinotal suture or impression. The epinotal spines are firm and short, shorter than the space between them. The epinotal field is glabrous and shining. Petiolus is distinctly pedunculate, in the profil roundish without any angle in the upper front part. The sculpture of the body on the whole is rough and strong. The wrinkles in the postpetiolus are parallel and leave a small glabrous field in the middle. The pilosity of the whole body is pretty dense. The colour of the head is dark reddish-brown, the clypeus, front and vertex, are black-brown, the mandibles and antennae reddish-brown, the thorax and pedicel brownish-red, reddish-brown, even dark brown. The appendages are light or dark red-brown, the tarsal-joints always lighter.

♀ 7mm. The female resembles, on the whole, the worker. The thoracic dorsum is superficially striate. The spinotal spines are short, of the same relative length as in the worker. The spinotal field is glabrous and shining. The postpetiolus is entirely striate without any distinctly glabrous field in the middle. The head is red-brown, the clypeus, front and vertex, black-brown, the mandibles and antennae red-brown. The thorax and pedicel are red-brown with some black spots on the sides of the mesonotum, on the scutellum and metanotum. The abdomen is red-brown, shining and smooth, lighter than in the worker.

♂ 6mm. The antennae are in proportion short, of 13 joints. The antennal scapes are straight, as long as the two following joints of the funiculus together (fig. 2). The funiculus is slender, its 1st and 2nd joint are of the same length, the 3rd is a little shorter. The five last joints form the slender club, which is of a lighter colour than the other part of the antenna. The mandibles are wide, but with two teeth only.

The head is coriaceous and very little wrinkled. The thorax is slim and shiny, the pronotum and mesonotum is wrinkled longitudinally and superficially, the scutellum a little stronger.

The epinotal tubercles are low and the space between them is glabrous and shining. The petiolus is slender, wrinkled at the sides, glabrous in the upper part like the whole postpetiolus. The abdomen is glabrous and shining.

The whole body is covered with bristles, the antennae and the legs are only pubescent. The wing is limpid, of the typus *Myrmica*, the cubital field, however, is open, because the 2nd cross-vein is not developed (fig. 1). The genital appendices (vagina externa, media and interna) are to be seen in fig. 3.

I have found this ant in Pavlovské kopce, the Jurassic lime-stone terrain in South Moravia (Czechoslovakia).

In Central Europe the *Myrmica scabrinodis* race *lobicornis*, Nyl., approaches in some measure to the *moravica*, the nearest relations, however, are the East Russian and Siberian forms, *M. scabrinodis* race *stangeana*, Ruzs., and *M. lobicornis* var. *deplanata*, Ruzs. *M. moravica*, striking by its large size, I could not believe that it has been overlooked till now, if being spread over a larger area, I accepted as true, that it was an isolated form. Concerning the natural conditions of the locality (geological, climatological, and floristical), I concluded that *Myrmica moravica* could be a relic of the praeglacial period.

The types and cotypes are in my collection.

Bothriomyrmex meridionalis sub sp. *gibbus*, Sdk.

This new subspecies has been published in Bohemian. I repeat the description and adjoin a very interesting new discovery.

* S. Soudek, "*Bothriomyrmex meridionalis gibbus* n.ssp., nový mravenec z Moravy." "*Cas. mor. zem. museu*" (*Acta Musei Moraviensis*), Brno., Vol. XXII., 1924, p. 1, with 10 figs.

♂ 2.2-2.8mm. Dark brown, the thorax is a little lighter. On the whole this ant in regard to colour is similar to a worker of *Lasius niger* race *alienus*. The tibia, femur and the antennal scape is yellow brown to gray brown, the mandible (except the black brown teeth), funiculus and the tarsal joints are yellow. The head is oblong with roundish sides, straight on the vertex, hollowed, however, in the occiput. The mandible is wide, bristly, with 2 great and 8-9 little, unequal teeth. The maxillar palps are 4 jointed, the labial 3 jointed. The feelers are 12 jointed, the scapes longer than the head, the first joint of funiculus is a half longer than the 2nd, and this is longer than the 3rd. The eye is composed of 42-45 facets and comparatively large enough. The thorax is wide, the mesoepinotal suture distinct, *epinotum* is vaulted in the form of a low hump. The body is glabrous. The pubescence is microscopical, not very dense, so, that the chitinous ground remains shiny. On the upper part of the 2nd, 3rd, and 4th, abdominal joints are 6 long bristles regularly placed. The long bristles are to be seen also on the lower part of the abdomen, on the sides of the petiolus and on the coxae of the legs. On the head there are 4 short bristles: one on the edge of the antennal pit and one above.

♀ 4.3mm. The whole body is black brown, shining, femur, tibia and the whole feeler is brown, the mandible, except the black brown teeth and the tarsal joints yellowish brown. The head is oblong, narrowed in front, and the cheeks a little fallen in. The vertex is straight and the occiput hollowed. The eyes are large, the ocelli distinct, the feeler comparatively short, the first joint of the funiculus longer than the second and this longer than the third. The mandibles as in the worker. The thorax is flat, the pubescence is still finer and shorter than in the worker, the surface of the body is microscopically coriaceous and therefore the brightness a little feeble. The long bristles are only on the 4th abdominal joint. Short bristles are on the sides of the petiolus and on the corner of the epinotum.

♂ 1.5mm. Is black, glossy, the appendages are lighter, black gray, pubescence is fine as in the female, the bristles are only on the back on the last joint of the abdomen. The feelers are 13 jointed. The scapus is as long as the two following joints of funiculus together. The 1st joint of the funiculus is conical, the 2nd cylindrical and longer than the first. The wings are limpid, the cubital field is open, the veins are not so strong and take partially another course than in the typical form of *Bothriomyrmex meridionalis*.

I have found this ant in Moravsky Kras, the well known Devonian lime-stone terrain with many cavities (f.i. Macocha) in Moravia (Czechoslovakia). The discovery of *Bothriomyrmex* in Czechoslovakia was very interesting, because it was the only known locality in Central-Europe. Suspecting the probability of a wider spread of this ant I promised in my Bohemian publication to look in suitable localities for this ant. I have really discovered this ant again in the eastern part of Czechoslovakia at Plesivec, in the Slovakian triassic lime-stone terrain, westward from Kóšice. Probably this ant is continuously spread from the centre of its area (Mediterranean) as far as to our country. In the only colony I have found in the Slovakia the female was *physogastric*, (fig. 1.) It is a new case known of *physogastry* in ants. The first and only female I have found in Moravia was quite normal, perhaps very young, because it was in April, the colony was still mixed with *Tapinoma erraticum*, the number of all workers was about 300, of which a third part were *Tapinoma*. The colony of Plesivec was found in August, it was very great and contained about 4-5 thousand workers with at least the same number of eggs and young brood, downright *Bothriomyrmex*.

Physogastry has never been observed in *Bothriomyrmex*. It is the question of further exploration to find out, in what conditions this phenomenon appears.

The types of normal female and male are in the collection of Mr. C. Emery, prof. of univ. in Bologna, the *physogastric* female and the cotypes of workers are in my collection.

At the end still one remark. In order to look for *Bothriomyrmex*

I made a short trip of two days, 400 km. eastward from Brno (it is the first locality of *Bothriomyrmex*), and by chance I found this ant on my first excursion, at Plesivec already mentioned.

When I found *Myrmica moravica* 4 years ago, I could not believe, that this striking species could have been overlooked by the entomologists, if being wider spread, so f.i. in the Danubian valley by the Hungarian myrmecologists. I considered, that this new species was an isolated form and explained it as a relic.

But now after having discovered *Bothriomyrmex* in my first excursion at random in the Slovakia, the part of ancient Hungary, 200 km. from Budapest, I think, that I have over-estimated the myrmecological exploration of the Pannonian valley. In conclusion I believe, that *the origin of Myrmica moravica must interest me still farther.*

Further Notes on *Polyommatus (Agriades) coridon* and allied species.

By ORAZIO QUERCI.

In volume 29, p. 241, of the *Entomologist's Record* of the year 1917, I published a few notes on *P. coridon*. Since that time I have been studying the problem, and I have made many attempts to get specimens from different countries of Europe.

The individuals which have most struck me were the Spanish ones, but as the insects I received from Spain had no exact data I was not able to come to a definite conclusion. I wanted to go and collect in Spain, but I met with many financial difficulties owing to the big expenses of such a trip.

At last, in May, 1924, I was able to go to Catalonia and Aragon with my wife; one month after also my son-in-law, Dr. Romei, came to Aragon with my daughter and granddaughter.

As soon as my whole family was at Albarracin, in the Province of Teruel, we arranged to collect at the same time in different surroundings; Dr. Romei and myself went to the high mountain mass near the boundary, between Aragon and Castille, while our wives remained to collect at Albarracin, which is on the plateau of Aragon.

To understand what I am writing it is necessary that I should give a name to the single forms which I have observed. I cannot enter in the embroiled and litigious question of nomenclature, and therefore I will use the peculiar names which have been applied to the local forms of Catalonia and Aragon.

After having caught an immense number of specimens, after having observed on the field the insect life, I have come to the conclusion that in Spain there are four different species, which have till now been considered to be simple forms of *P. coridon*. In this paper I shall name:—

P. (A.) hispana, H.S., the lowlands species from Catalonia, of which we have either collected, or seen in the Museum of Barcelona, a large number of specimens caught in May, in August, and still later in October. I believe that the smallest individuals of the second brood of that species seem to be identical with Herrich-Schäffer's figure of his "*hispana*."

P. (A.) arragonensis, Gern., is the most common blue which flies

near Albarracin, and of which we collected a large number of specimens, first in June-July and later in September.

P. (A.) caeruleescens, Tutt, is the scarce but striking species of which we caught specimens at Albarracin and Tramacastilla.

P. (A.) caelestissima, Vrtý., the *thetis*-like insect which is very common in a few spots of alpine surroundings of the Sierra de Albarracin. Dr. Verity applied the name of "*caelestissima*" to the blues, which I received from Dr. Selgas, who lived at Valdemoro de la Sierra, in Cuenca. Valdemoro is not far from Noguera, where we have found an immense number of specimens of *P. (A.) caelestissima*; the insects from Valdemoro are identical with those from Noguera.

On the first days of June, 1924, as soon as my wife and myself arrived at Albarracin, we caught one male and one female of what I name *P. (A.) caeruleescens*; the two specimens are now in the Museum of Barcelona. After that the species disappeared from Albarracin, and I suppose that all the pupae, being ready to emerge, were killed by a storm of hail, which destroyed also most of the *Zygaena* in Albarracin valley. In our first day's collecting the ground was full of larvae of *Lycaena* and *Zygaena*; after the hail we saw no more of them.

On June 24th, 1924, *P. (A.) aragonensis* began to emerge at Albarracin. My wife and daughter saw at least 700 specimens of them and collected about 300 males, but only 33 females, which sex seems to be very scarce. They caught also 30 males of *P. (A.) caelestissima*, which at first we supposed to be a simple aberration of *P. (A.) aragonensis*.

At Puerto de Orihuela, 5,000ft., 18 miles from Albarracin, 3,000ft., Dr. Romei and myself collected 24 males of *P. (A.) caelestissima*, but not even one specimen of the species of the *thetis*-like insect. We were surprised to find only the aberration, while the most common form was absent. We began to explore everywhere to find the spot where the blue might be less scarce.

After many and many attempts, on July 25th, 1924, in a small field near Noguera, 4,200ft., and 16 miles from Albarracin, we saw on the wing both males and females of *P. (A.) caelestissima*. On the following days the ground was full of those nice insects, while all the other blues, save *P. icarus*, were quite absent. In eight days we caught 400 males and 100 females of *P. (A.) caelestissima* and not even one *P. (A.) aragonensis*. At the same spot we found also five blue females, which are very different from "*syngrapha*," because the shape of wings, the ground colour of upperside, and the underside pattern is that of *P. (A.) caelestissima*, and not at all that of *P. (A.) coridou*.

We then began to understand that *P. (A.) caelestissima* is not the same species as *P. (A.) aragonensis*, and we went on to explore many other surroundings in order to find the two species flying together.

A stroke of luck led us to find a path, near Tramacastilla, 3,900ft., between Noguera, 4,200ft., and Albarracin, 3,000ft., where not only did we meet *P. (A.) caelestissima* and *P. (A.) aragonensis*, but also many specimens of *P. (A.) caeruleescens*. Most *P. (A.) caeruleescens* were already worn and we were able to get only ten males and nine females in perfect condition, about 80 males and 20 females of *P. (A.) caelestissima*, and 80 males and 10 females of *P. (A.) aragonensis* were also caught on the same ground.

The above numbers amounting to about 220 specimens of three

different species were taken during one week. We made our collecting at sunset, when returning home from Noguera. Most blues were taken with the pincers and not by the net, because *P. (A.) caeruleus*, *P. (A.) caelestissima*, and *P. (A.) aragonensis* were then sleeping on the stems.

Before taking the specimens we had time enough to observe them living, in their natural position; we noticed and discussed about the specific differences. We caught also several paired insects, and by this way we have learned to perceive specific differences between *P. (A.) caeruleus* and *P. (A.) aragonensis*.

P. (A.) caelestissima is out of discussion; it is so different an insect that we cannot understand why such a clever naturalist as the late Dr. Chapman should consider it to be a simple form of *P. (A.) coridon*. The differences between *P. (A.) aragonensis* and *P. (A.) caeruleus* are on the contrary less striking. When I saw my first individual of *P. (A.) caeruleus* sleeping on a stem amongst many specimens of *P. (A.) caelestissima* and *P. (A.) aragonensis*, I said to Dr. Romei: "This is a different species." After that we always observed with greatest care any individual before getting it; we had time enough to do so because the insect was at rest, and very rarely did it escape.

We named any single species looking at the underside and then took the individual; our own opinion was always confirmed by the ground colour of the upperside. After setting the lepidoptera our conviction is the same; at Tramacastilla are three *coridon*-like species with not even one doubtful or transitional specimen.

During the month of August, owing to the lack of rain and the damage made by the June hail, all insects were very scarce in Aragon, so that Dr. Romei went to Pajares, 4,000ft., in Asturias, on the Cantabrian Mts., 400 miles from Albarracin.

Besides many other species of Lepidoptera he caught also a *coridon*-like blue, which, at first glance, we were not able to identify. When we arrived home and had set those *Lycaenae* we noticed that they were intermediate between *P. (A.) caelestissima* from Aragon and the "blue" from the Sibillini Mts., in Italy, which till now we have named *A. coridon* race *sibyllina*, Vrtý.

We set out in one box a large series of similar insects from Noguera, Pajares, and Sibillini Mts. During three months we looked every day at those *Lycaenae* and, at last, we observed that the palest specimens from Noguera were rather like the most vivid blue specimens from Asturias, and that the palest blue individuals from Asturias are almost identical with the ones from the Sibillini. We observed also that the shape of the wings, the underside pattern, and both sides of the females were always the same in the three above named localities.

The boldest idea arose in my mind, and I dare to conclude that the species, which is so common at Noguera, lives not only in the high Aragon mass but also in alpine surroundings of Asturias, Apennines, and no doubt in all the high mountains of Southern Europe.

I do not know if the name of *P. (A.) caelestissima*, Vrtý., is suitable for that new species; I compared the specimens from Noguera with a few *Lycaenae* from Asia Minor, which are in Florence in the Rühl collection, and which Herr Rühl named *L. corydonius*, but, as I have said, I will not enter into a question of nomenclature because I am not able to do it.

According to my views, in Aragon live three different species of *coridon*-like butterfly; the fourth species of that set is *P. (A.) hispana*, of which we have either collected or seen many specimens from lowlands in Tuscany, Riviera, and Catalonia.

I was doubtful whether *P. (A.) aragonensis* was the mountain form of *P. (A.) hispana*, but when Mr. Ball paid me a visit at Florence I gave him a few specimens, and now he writes me from Bruxelles that *P. (A.) aragonensis* and *P. (A.) hispana* can never be the same species because the androconial scales are very different.

I feel sure that my own opinion of four species will not be easily admitted. I have however to remark that we have not drawn our conclusion on specimens of collections, which might have mistaken data, but we have observed natural phenomena in the field, and we have had to handle many hundred specimens.

Formicidae. A new genus.

By W. C. CRAWLEY, B.A., F.E.S., F.R.M.S.

Sub-fam. *Myrmicinae*, Lep.

Tribe. *Myrmecini*, Ash.

Sub-tribe. *Myrmecini*, Em. (sens. str.)

Genus. ***Pseudopodomyrma***, gen. nov.

Between *Podomyrma*, Sm., and *Dacryon*, For. General appearance of *Podomyrma*, but the clypeus quite distinct.

♂. Monomorphic. Antennae 11-jointed, club 3-jointed.

Mandibles as in *Podomyrma*, thick, dentate, widely grooved along the inner border. Central portion of clypeus arched posteriorly, descending abruptly over the mouth, as in *Dacryon*. Lateral portion rises from the base of the mandible to a point a short distance from the frontal carinae; from this point it descends in a sharp curved ridge, rising again to join the frontal carinae, and limiting the antennal fossa in front. Beneath this ridge it is excavate. The points thus dividing the two halves of the lateral portion give the clypeus, viewed from in front, the appearance of being dentate. Frontal area indistinct. Head thick and massive.

Anterior angles of pronotum dentate, promesonotal suture absent; there is a moderately deep impression between the mesonotum and the epinotum, where the thorax is constricted.

Petiole as in *Podomyrma*, with an elongate node; postpetiole rounded. Declivity of epinotum with a flange on each side of the insertion of the petiole.

Pseudopodomyrma clarki sp. nov.

♂ L. 4.4mm. Dark reddish brown; dorsum of head and gaster almost black; mandibles, lateral portions of clypeus, neck, articulation of pedicel, and legs (sometimes also the sides of pronotum), dark castaneous.

Terminal and outer border of mandibles with a few long yellowish hairs, a pair of fairly long blunt hairs close together at the centre of the anterior border of clypeus, one each side of the central portion, one at each tooth of the lateral portion, and one above the antennal sockets; a pair on the occiput, a pair at the junction of pro- and mesonotum, a pair at posterior border of postpetiole, and a few on the apical borders of the gaster. All these hairs are of the same character, of even thickness and blunt at apex. Antennae feebly pubescent, the joints of the funiculus, except the apical, with a few blunt hairs; legs and gaster with a scattered pubescence.

Mandibles with five teeth, the two apical large and pointed. Clypeus with a faint carina reaching from the posterior border to the centre, the anterior border depressed in the middle and emarginate, the border convex on each side of the emargination. (For rest of clypeus see characters of genus). Frontal carinae short, wide apart. Scapes slightly curved, swelling to the apex where they are nearly twice as broad as at base. They reach to rather less than twice their

breadth from the occipital border; the latter concave, marginate. Eyes slightly behind middle of sides, moderately large and prominent. Head, excluding mandibles, a shade longer than broad, broader at base of mandibles than at occiput, thickest at vertex, the sides convex, the occipital angles evenly curved from the eyes.

Promesonotum broader than long, the anterior border sinuate, the lateral angles with a small sharp tooth, the sides convex, narrowing rapidly from the commencement of the mesonotum to the suture, where it is about $\frac{2}{3}$ as broad as in front. In profile the promesonotum is evenly convex, widely and shallowly emarginate at the meso-epinotal suture. Base of epinotum nearly twice as long as the declivity, feebly convex, the angle joining the two rounded.

Petiole from above nearly twice as long as broad, the sides almost parallel, narrowing slightly at the anterior $\frac{1}{3}$, in front of which the sides expand into two small projections. In profile it forms an oblique angle at the centre of the upper surface, and is slightly thicker behind; beneath it is feebly concave except in front, where it forms an angle but not a tooth. Postpetiole from above $\frac{2}{3}$ as long as broad, nearly 3 times as wide behind as at its junction with the petiole, the posterior border transverse. In profile it rises to its highest point $\frac{1}{3}$ from the posterior border. Beneath in front is a blunt process. First segment of gaster $\frac{2}{3}$ as long as broad, broadest behind, the anterior border concave. The remaining segments are almost entirely concealed beneath the first.

Moderately shining. Mandibles strongly striate at base, feebly elsewhere, with a few small scattered points. Clypeus microscopically reticulate with one or two shallow indistinct punctures at the sides of the central portion, and one or two strong lateral ridges running parallel to the frontal carinae. The lateral portions finely reticulate. Scapes with minute points. Between the frontal carinae is a short longitudinal impression. Whole of head above and below covered with small round clean-cut punctures, and in addition the surface, particularly at the cheeks and between the frontal carinae, is microscopically reticulate.

Dorsum of thorax punctured similarly to the head, but not quite so densely. Sides of pronotum superficially reticulate only, rest of sides with widely-spaced punctures. Pedicel covered with punctures smaller than on rest of body, and in addition has a denser ground reticulation. Legs smooth, tibiae with a few points. Basal border of first segment of gaster edged with extremely short longitudinal striae, the rest microscopically reticulate.

Swan River, West Australia. (J. Clark, no. 488) Type in my collection.

The formation of the clypeus is curious, and separates the insect from the sub-tribe *Podomyrmini*, though its general facies is extremely like *Podomyrma*. The dense puncturation is unlike that of any *Podomyrma* with which I am familiar.

New races and forms of Palaeartic Grypocera.

By ROGER VERITY, M.D.

Erynnis lavatherae, Esp., race **australissima**, mihi.—Oberthür in his *Ét. Lep. Comp.*, IV., p. 372 (1910), points out the striking difference of aspect between the race of the mountains of Central Europe and the Pyrenees and that of Spain, Sicily, Algeria and Syria: smaller size, dark markings larger, giving it on the whole a much darker appearance; females, especially, of a reddish brown; on the underside of the hind-wings bands similar to those of *E. marrubii* (*boeticus*) are more or less plainly discernible. This race, in some specimens so much approaches the latter species, that Oberthür, who at that time did not know the *genitalia*, concluded it was impossible to draw the line between them. In Vol. V. (1911) he again returns to this subject in *part 1st*, p. 194, and in *part 2nd*, p. 99, quoting Charles Lecreuzé's conclusions on the *genitalia*. On pl. XLIV. he figures the race I have mentioned from

Sebdou (fig. 603) and Lambèse (fig. 604) in Algeria. In Vol. X. (1915) he describes, figures and names *rufescens* (fig. 4133) a peculiar female form from Algeria (Sebdou) with forewings of a bright, clear, fulvous tinge. This individual form, however, is quite different from the average aspect of the race, as in fig. 603 and 604. I propose taking the latter as "types" of the race and naming it *australissima*, it being a more extreme grade along the same line of variation as my *australior* described from Tuscany in *Ent. Rec.*, 1919, p. 27.

Erynnis marrubii, Rambur, *Faune Andal.*, II., p. 323 (1840) = *boeticus*, Rambur, *l.c.*, pl. 12, fig. 3-4, and foot note to p. 323, stating the latter name "is borne by the figure by mistake." There is in connection with these names a mystery which baffles me and of which I would be glad to get an explanation. Boisduval in his *Genera et Index Meth.*, of 1840, gives the specific name correctly as *marrubii*, followed by *boeticus* as *in litt.* Herrich-Schäffer, in 1843, figured it very well under the name of *marrubii*, although he attributes the name to Boisduval, and he considers it a variety of *malvarum* (= *altheae*). Why then does Rambur himself in the *Catalogue Léop. Andal.*, p. 80 (1858), adopt the name of *boeticus* and only mention *marrubii* as *in litt.*? Why do all subsequent authors take up *boeticus* and always quote only the figure of the *Fauna*, completely ignoring the text, and referring to that of the *Catalogue* as if it were the original description? Staudinger goes so far as to state pages 305 to 336 of the *Fauna* were never published. The same thing has been done by himself, Kirby, Oberthür, and others, in connection with the species of *Hesperia* discovered by Rambur. In the case of the *Erynnis* in question here, it seems to me the Rules of Nomenclature oblige us to go back to the original name of *marrubii*. Also on this species Oberthür makes many remarks in the volumes quoted and he gives figures of its variations, to which he adds in Vol. XVI. (1918) some on pl. 50 illustrating an important paper by Gédéon Foulquier, p. 255. No attempt is made, however, to fix by names and to classify the geographical and and seasonal variations. The following is a brief summary of my own conclusions, which quotations of Oberthür's and Reverdin's beautiful figures will, I hope, make quite clear:

Race *octodurensis*, Obth., *l. c.*, V., 1st part (1911), p. 195, pl. 64, fig. 611-12; Reverdin, *Bull. Soc. Léop. Genève*, 1913, pl. 21, figs. 6 and 13: the dwarf race produced in the Valais, the most northern locality of the species.

Race *fulvescens*, mihi: I. gen. *grisea*, mihi; II. gen. *fulvescens*, mihi; III. gen. *aegra*, mihi.—This is the race of Rognac, near Marseilles, which Foulquier, *l.c.*, has carefully worked out. He has found the I. gen. from the beginning of May to the beginning of June; the II. at the end of June and beginning of July; the III. in September and October. He makes out four generations, but the very facts he describes show it is impossible and that *marrubii* has exactly the same three emergences as *alceae* and *altheae*. At page 261 he describes the features characteristic of these three emergences, which are quite obvious in the specimens he has sent me and correspond exactly to his figures. The I. gen. has a cold tone of grey on both surfaces and in consequence also the bands on the underside of the hindwing are of a cold iron grey, as well shown by Oberthür's figure

4162; this author had already figured a similar May specimen from the Pyrenees (fig. 610); Reverdin, *l.c.*, figures one from Granada in Andalusia. This generation does not seem to vary geographically, much the same as in *alveae* and *altheae*. The II. gen. of Marseilles has a decided tinge of fulvous on both surfaces, although the dark patches of the upperside are as broad as in the I. gen.; the bands of the underside are described in French as "sombre yellowish," which I should convey as light tawny, very well reproduced by Culot in Oberthür's figure 4165; the III. generation's chief feature is its small size; in tone of colour it is intermediate between the two others on both surfaces (fig. 4164 and 4166). For these three generations I propose the names given above; I have chosen descriptive and not local names, because in other localities *marrubii* varies broadly individually and produces these forms commonly; for instance, in more southern races *fulvescens* often appears amongst the late individuals of the I. gen.; others contrast with them by being patched on upperside with moss-green (form *viridescens*, mihi).

Race *fulva*, mihi: I. gen. *grisea*, Vrty.: II. gen. *fulva*, mihi; III. gen. unknown: In Spain one meets with a race which in the II. gen. accentuates very much the intensity and brightness of the fulvous tinge, so that on the upperside it is of a rich chestnut colour and the bands of the underside are of a clear tawny or sometimes even of a pale salmon tinge. The August male from Ambouilla (Pyrénées Orientales) figured by Oberthür (fig. 609) approaches this form, but some specimens from Cuenca in Nueva Castilla reach a brighter tone. At this altitude of 1200m. the I. gen. goes on emerging as late as the middle of July and it is then overlapped by the beginning of the II. gen. Having thus drawn out the variations of this species, I must confess I do not feel equal to placing exactly Rambur's typical figure: it is a female; the upperside by its cold gray colour with a slight tinge of violet on forewing suggests the I. gen., and so does his description; the bands of the underside of the hindwing are represented somewhat roughly by a mixture of yellowish and of grey patches, which does not convey well anything seen in nature; in the text they are described as fulvous. Probabilities seem to be that it is one of the individuals of the I. gen. which approach *flavescens*, as one might expect to find particularly frequently in such a southern region as Andalusia.

Race *rostagnoi*, Vrty., *Ent. Rec.*, 1919, p. 27: I must pass a severe judgment on myself for describing the race of Central Italy from a single specimen collected on August 4th, at Oricola in the Abruzzi. Until more materials are procured we will not really know its characteristics. This specimen has a remarkably faint tinge of fulvous on both surfaces for such a late date. What strikes one particularly about it is the extent and sharpness of the white spaces on the upperside. It is, anyhow, unquestionable it belongs to this species.

Erynnis stauderi, Reverdin, *Bull. Soc. Léop. Genève*, 1913, p. 225, pl. 21, fig. 5 and 12, II. gen.? *fulvissima*, mihi, and *E. oberthüri*, Vrty., *Ent. Rec.*, 1919, p. 27, race *ambigua*, mihi.—In my paper just mentioned, of 1919, I named *oberthüri* the very striking insects, which Oberthür had in 1911 figured in his Vol. V., 2nd part, pl. 64, fig. 605-6 as a Sicilian couple of *boeticus*. I however overlooked the

remark Oberthür had made about his specimens from Sicily, Syria and the Taurus in 1915, Vol. X., p. 409, suggesting they were probably specifically distinct, both from *boeticus* and from the newly discovered *stauderi* of Africa. His figures certainly suggest something very different. Reverdin, *l.c.*, p. 229, had already pointed out that the Syrian example of Oberthür's fig. 607 must be a *stauderi* rather than a *boeticus* or a *lavatherae*. Since then he has distinguished *l.c.* 1915, p. 203, a new species from Asia Minor (*tauricus*). The connection between these *Erynnis* will have to be settled by an examination of the genitalia and other points in their structure. Anyhow the Syrian (*Akkès*) race of fig. 607 differs prominently from all its allies and a name is necessary to designate it; *ambigua*, mihi. I regret I cannot, myself, clear up its exact position and give a full description. The *stauderi* I possess from Algeria, dated August, is quite different in colouring from the typical specimens of May figured by Reverdin, by being saturated on both surfaces with bright fulvous, very reddish in tone; on the upperside of the forewing there are no greenish gray suffusions; these are replaced by chestnut and the black patches by deep chestnut on both wings; on the underside the black of the forewing is not mixed with greenish but with reddish scales and the hindwing is, especially in the female, of a beautiful warm salmon colour. The May specimen figured by Oberthür (fig. 608) as *boeticus*, but obviously a *stauderi*, differs less from mine, but it is much less reddish. Mine, no doubt, is the generation which grows up in the parched summer season: *fulvissima*. The extreme opposite colouring is to be seen in some spring examples, which are of a cold, dark gray tone with a slight violet sheen (form *obscurata*, mihi.).

Erynnis altheae, Hb. race *floccifera*, Z.: I. gen. *floccifera*, Z., *Isis*, 1847, p. 286; II. and III. gen. *australiformis*, Vrtý., *Ent. Rec.*, 1919, p. 27.—Reverdin, *l.c.*, p. 285, very rightly points out that Zeller's *floccifera*, described from April and May specimens of Syracuse and also one female of August 27th from Rome, is nothing but *altheae* and not *marrubii*, as supposed by Standinger, followed by other authors. The name should thus be revived for the I. gen. of Sicily, which spreads also to the whole of Peninsular Italy. It differs from the Alpine *altheae* by being a little smaller, the black markings are less deep in tone and lesser in extent, so that the general aspect is lighter and more variegated; there is often a slight fulvous tinge on both surfaces, especially in the female sex, and the tuft of hair on the underside of the male is nearly always partly fulvous and often entirely so, as described by Zeller. A Sicilian specimen is figured by Oberthür, pl. 64, fig. 613.

(To be continued.)

Notes on a Brood of *Parasemia plantaginis*, L., and var. *hospita*, W.V.

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

Looking through my diary for 1901 I found I had made careful notes of a brood of *Parasemia plantaginis*, the offspring of a female with yellow hindwings and red abdomen taken at Rannoch earlier in the year. The brood consisted of 30 females all with yellow hindwings, 26 of which had red abdomens and 4 yellow abdomens, and 27 males,

21 typical and 6 var. *hospita*. Three were found dead inside their pupa cases, 2 typical males and 1 *hospita*. If these be added, there were 30 males, 23 typical and 7 var. *hospita*, roughly 3:1.

In the British Isles there are, putting aside variations in the black markings, three female forms, one with red hindwings and red abdomen, one with yellow hindwings and red abdomen, and one with yellow hindwings and yellow abdomen. Females with red hindwings do not correspond with *hospita* males as Barrett appears to think, nor do those with yellow bodies. I have bred the latter, in a brood in which all the males were typical, from Berkshire, where *hospita* does not occur.

It is the only lepidopteron known to me, which appears to have a recurrent form peculiar to the male as well as one peculiar to the female, although *Abraeus grossulariata* is reputed to be another. It has been stated that radiation of the hindwings in var. *varleyata* is sex-linked with maleness, and that it is associated with a lethal factor. Porritt however has bred radiated females, and also finds that the two sexes are equal in numbers, if the broods are large.

Careful breeding experiments are greatly needed to explain how this can happen in *plantaginis*. 'Notch' wing in *Drosophila melanogaster* is a character only found in females, and there are many in this species found only in males. In this case the explanation is that 'notch' is sex-linked, dominant in its effect on the wings and recessive in its lethal effect. Therefore every female heterozygous for 'notch' has families with twice as many females, half of which are 'notch,' as of males. The other half of the males, which would have 'notch' wings die during development. The equality of the sexes in my family of *plantaginis* is against the view that a lethal factor is operating. It may be that males and females with the same genetical constitution are different in their outward appearance, as Gerould has shown to be the case in *Colias*. In this genus males heterozygous or homozygous for white, which is a dominant character, develop yellow pigment just like those homozygous for yellow. Gerould considers, that the more rapid development of the male prevents the change from yellow to white pigment from taking place, but his explanation cannot apply to *plantaginis*, in which the more slowly maturing female sex fails to form a white pigment.

Gerould, J. A. *Genetics*, 1923, VIII., pp. 495-551.

Morgan, T. H. Carnegie Institution of Washington. Publication No. 278, p. 345.

Experiments in Inheritance of Colour in Lepidoptera. Report of the Committee, British Association, 1921.

Porritt, G. T. *Ent. Month. Mag.* 1922, LVIII., pp. 131-134.

NOTES ON COLLECTING, etc.

NOTES ON EARLY APPEARANCES IN 1925.—In spite of the appalling weather I have been out once or twice. On February 1st I beat a few small larvae of *Thera variata*, and on February 11th I found an example of *Asphalia flavicornis* on a tree trunk: surely a very early date. On February 18th I beat the spruce in Cranbury Park and got, not only larvae of *T. variata*, but one pupa of that species, as well as three *Sarothrips rearyana*, and *Tortricodes tortricella* (*hyemana*). On the 21st

I had a day at Lyndhurst Road, in Church Place, and Ironshill Enclosures. From Douglas Fir there I got quite a few larvae of *T. variata* and four pupae, one was crippled. I was surprised also to beat one *Panolis piniperda* and to find a single specimen of *Tephrosia biundularia*. I also beat in Ironshill a stone-fly that I do not know. I am keeping these larvae separate and giving them various kinds of fir to eat, in the hope of throwing some light on the food-plant of *T. variata* both in nature and in confinement. Does anyone know when the eggs hatch and how the species hibernates? I also am trying to obtain eggs of *S. revayana*. Can anyone tell me when they pair? I have put males and females together with oak twigs and syrup, so that I can hope for the best.—W.M. FASSNIDGE, 47, Tennyson Road, Southampton, February 27th.

REMARKS TO NOTES ON COLLECTING IN SPAIN.—Mr. Hy. J. Turner has been so kind as to add a few notes at the end of what we have published at pp. 26-28 of the *Ent. Rec.*, February 15th, 1925. We have to thank him, because by this way he has engaged us to supply some further information which we forgot to write in our article.

The Aragon summer in 1924 has been dry but mild. In Peninsular Italy summer is almost always hotter and drier, but here we never met with any single *Coenonympha lyllus*. During the whole month of May, 1924, at Albarracin, the season was cold and damp; when we arrived there, on June 3rd, it was still cold and the ground was full of water, but also the earliest emerged *Coenonympha* we were able to get were *lyllus*, nothing else than *lyllus*.

In Asturias it was raining during the whole summer, but *C. pamphilus* and *C. lyllus* were flying together in two quite different forms.

For *Strymon ilicis* and *S. esculi* it is useless to prove assertion by breeding from the egg, because the two species are too different to be confused. Not only on the field did we see at once the specific characters, but also in the Museum of Barcelona, Sig. Sagarra and ourselves separated with no difficulty at least 300 specimens of *S. ilicis* and *S. esculi*, which had been collected at the same spot and on the same days. We have met with not even one doubtful individual.

The questions of *Pyrgus sao* and *Plebeius (Aricia) medon* are not so simple, and, as we said, further researches are indispensable to prove the assertion. We hope to do this in the next collecting season.—O. QUERCI and Dr. E. ROMEI, Via Bolognese, 49, Firenze, February 20th.

YELLOW FORMS OF *PIERIS NAPI* IN IRELAND.—Mr. Frohawk F.E.S. (*Natural History of British Butterflies*), figures a canary-yellow male of this species from Co. Donegal. This yellow form has never been taken in a wild state; but a large number were bred a few years ago by Mr. Head, of Scarborough, who received pale yellow females from Co. Donegal in 1908 and 1909; and by careful selection and inbreeding for several generations, this yellow form was evolved. This form differs from var. *flava*, Kane, the colour of which is a deep ochreous yellow above, with discal area of forewings on underside white; whereas in the Donegal form the underside of all wings is of the same canary-yellow as the upperside. Pale primrose-yellow males are not uncommon at Tempo, Co. Fermanagh, where Sir C. Langham has captured and bred a number.—THOMAS GREER, Stewartstown, Co. Tyrone, February 28th, 1925.

CURRENT NOTES AND SHORT NOTICES.

The III. International Congress of Entomology will take place at Zurich from July 19th to 26th, 1925. President, Dr. A. von Schulthess-Schindler; General Secretary, Dr. Kutter, Zolliker-Str., 76, Zurich 8. Members, £1 1s., Associates in company of members, 10s. 6d. Membership, 25 Swiss francs, Associates accompanying members 12.50, Life-membership 250.00. Informal reception on Sunday evening, July 19th; distribution of programmes, etc. Entomological Societies, Institutions, and Departments of Zoology, Forestry, Agriculture, Horticulture, and Hygiene are invited to send Delegates. Notifications of papers and exhibits should reach the General Secretary before July 12th. Applications for accommodation in Hotels, etc., should be sent as early as possible. All communications to be addressed to the General Secretary, Dr. Kutter, Zolliker-Str. 76, Zurich 8, Switzerland. For estimate of cost, inclusive of return ticket, apply to Dr. K. Jordan, Zoological Museum, Tring.

The British Association for the Advancement of Science has just distributed its annual List of Papers bearing upon the Zoology, Botany, and Prehistoric Archaeology of the British Isles. It is compiled by T. Sheppard, M.S., of Hull, and consists of about 64 closely printed pages of titles of papers alphabetical under authors.

The *Entomologisk Tidskrift*, the entomological Journal of the Stockholm Entomological Society, consists of 208 pages, with many figures and one plate. This plate illustrates an article on *Oporinia* species by F. Nordström, of which the following is a summary:—"According to Prout (in *Seit*;) it is questionable whether *Oporinia dilutata* occurs in Scandinavia. During the last years, however, I have established that *dilutata* is to be found in the southern third of Sweden and in the environs of Kristiania in Norway. *O. christyi* is also very likely to be found in Sweden, I think I have found some specimens in the environs of Stockholm. *O. autumnata* occurs in all Scandinavia; in the North of Lapland there flies a smaller very *jiligrammaria*-looking *autumnata*, form, whose ♀s often appear with the whole central area darker than the ground; **latifasciata**, n.ab. Other new *autumnata*-aberrations: **undulata**, which on a whitish-grey ground has all the lines at about the same distance and of about the same strength: and **coarctata**, central area narrow, the lines bounding it closely approximated (analagous to Prout's aberration of *dilutata* with the same name). Not only in the ova, larva, and imago stages the two species *dilutata* and *autumnata* are different; there is difference in their pupae too." There is also a very useful article on the *Heodes* (*Chrysophanus*) species in Scandinavia, *hippothoë*, *virgaureae*, *phlaeas*, and *amphidamas*.

The *Bolletino Lab. di Zool. Gen. e. Agr.* from Portici, Italy, is again a portly and worthy tome. Some 320 quarto pages, with many figures, give a record of very useful and interesting work for the past year by Signors Silvestri, Grandi, Emery, Arcangeli, and others. One of the most useful probably is "A contribution to our knowledge of the Tortrix of the oak (*Tortrix viridana*)," of which the figures and life-histories of all the parasites are by no means the least important. It is comprised in 52 quarto pages. A further 15 pages is devoted to a consideration of *T. loeflingiana* and its parasites, another but less destructive pest on oak.

We have just received, through the kindness of Count Turati, a series of pamphlets published by him quite recently, by which we see that he is continuing his excellent faunal work with great energy and success. The results of Expeditions to Cirenaica in 1921-22 occupy nearly 200 pages, with six plates, all coloured, and deals in detail with all the lepidopterous families. Another of 75 pages with two plates one coloured, deals with five years of researches in the lepidopterology of the Modena Apennines. Further, several smaller excerpts add details in the lepidopterology of the Italian fauna. The figures in illustration are most effective.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

October 23rd.—NEW MEMBERS.—Sir Chas. Langham, Bart., F.E.S., Co. Fermanagh; Mr. J. J. Lister, F.R.S., Cambridge; Mr. F. Atkinson, 4, Melrose Road, Wandsworth, S.W. 18; Mr. C. N. Hawkins, 23, Dalebury Road, S.W. 17; Mr. K. P. Keyward, Kneller Road, Twickenham; and Mr. W. H. Storey, 31, Burton Street, W.C. 1, were elected.

Mr. Tonge, a *Manduca atropos* from Deal. Other specimens were reported from E. Kent.

Mr. Enefer, abnormal growths of Michaelmas Daisy, and a portion of *Sigillaria* from coal.

Mr. Hy. J. Turner, a collection of Lepidoptera from Brazil, sent him by Mr. F. Lindeman, including *Papilio ascanius* (near Rio), four other species of *Papilio*, *Opsiphanes quiteria*, etc.

Capt. Crocker, a long series of very varied *Melitaea aurinia*, bred from Dorset, compared with last year they were much more variable; also a *Hamearis lucina*, recently emerged from a spring larva.

Mr. R. Adkin, an addition to his paper of last year, reporting that four specimens of ab. *unicolor*, Homb., of *Diacrisia lutea* were in Mr. Porritt's collection, without locality.

Capt. J. Ramsbottom, M.A., gave a lantern lecture on "Fungi."

November 13th.—NEW MEMBER.—Miss F. E. Bird, of Streatham.

EXHIBITS.—Mr. A. E. Tonge exhibited a *Euranessa antiopa* taken this autumn in a Reigate garden.

Mr. E. J. Bunnett, series of (Col.) *Endomychus coccineus* and *Pyropterus affinis* from Surrey, and *Dibolia cynoptossi* from its only British locality, in Sussex. He also showed shells of the Mollusc, *Littorhina rudis* var. *variabilis*, from its only known locality in Sussex.

Mr. K. G. Blair, for Mr. A. M. Stewart, the cockroach *Blaberba cubensis* and its egg mass, deposited when placed in a cyanide bottle. A West Indian species.

Mr. Hy. J. Turner, a box of Lepidoptera, mainly Rhopalocera, sent from Chili by a correspondent, including *Papilio archidamas*, *Tatochile autodice* (common "white"), *Colias vautieri*, etc.

Mr. A. A. W. Buckstone, heavily marked second brood *Pieris napi* from Chiddingfold.

Mr. H. W. Andrews read a short paper "Flies and Disease," exhibiting Diptera of the genera *Gastrophilus*, *Lucilia*, *Cephenomyia*, *Oestrus*, *Tannia*, *Malophagus*, *Hippobosca*, and *Ornithomyia*.

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MEETINGS OF SOCIETIES.

Entomological Society of London. 41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. March 4th, March 18th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. March 12th; March 26th.—*Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.*

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. *Hon. Sec., W. E. GLEGG, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.*

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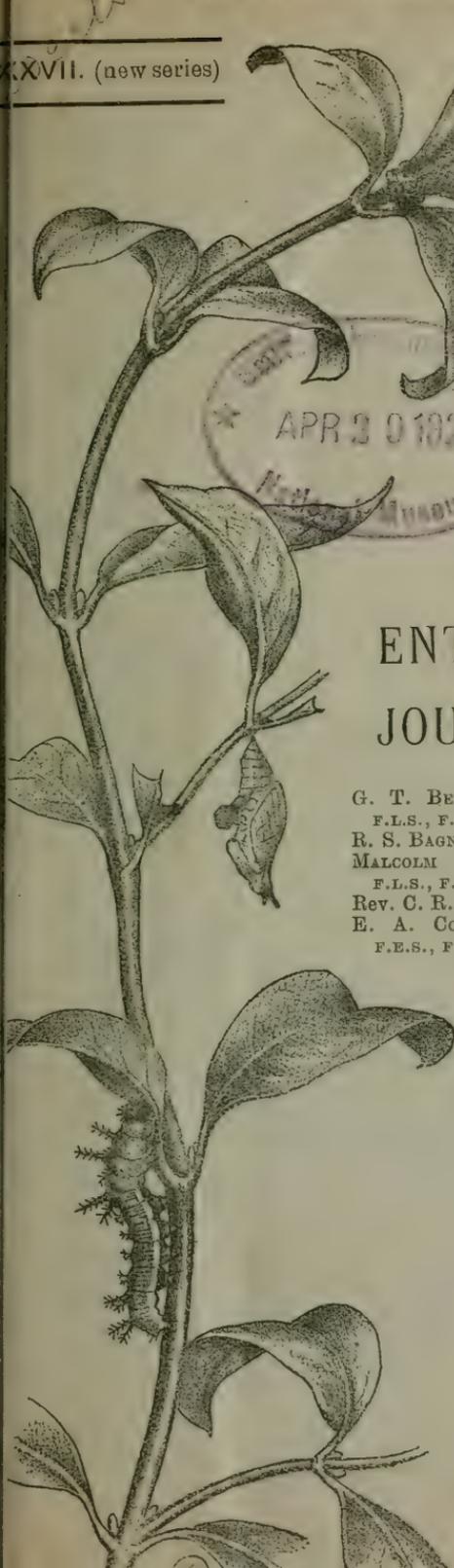
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A Review of Mr. Pierce's Volume on the Genitalia of the Tortricidae.

By ALFRED SICH, F.E.S.

All students of the Tortricina, but especially the British, owe a deep debt of gratitude to Mr. F. N. Pierce and to the Rev. J. W. Metcalfe, for the pains they took in the preparation of the volume on the *Genitalia of the Tortricidae*. If we remember that our *Tortricidae*, or as I prefer to call them, Tortricina, to avoid confusion with the more restricted family *Tortricidae*, musters nearly 350 species, we can better appreciate the labour entailed in the preparation of the microscopical mounts and in the detection and record of specific differences, mostly if not entirely original work. Then the figures of the mounts, with all their marvellous details, had to be most carefully drawn.

We now have a work of great value to the scientific naturalist and of practical use to the collector, a volume to which he can appeal with strong probability of success for the identification of specimens, which, through the want of the more usual recognisable characters, baffle correct determination. I will mention one instance of this. When Mr. Huggins, in 1922, took a moth in a salt marsh no one was able to recognise it, and this was not surprising considering the situation in which it was caught and its colour, but when it was submitted to Mr. Pierce the genitalia proved it to be *Cydia aspidiscana*, Hb.,* and it was subsequently located as the salt marsh frequenting variety *rubescana*, Constant, of which little seems to be known. I have been studying Mr. Pierce's text and Mr. Metcalfe's drawings, and have found them of far greater interest than I imagined. I propose to mention here some of the observations I made during the perusal of the volume.

Our British Tortricina, and I think we can say the same of the whole Palaearctic group, form a rather compact body. It is true that there are wide differences between such species as *Cacoecia podana*, *Hemimene petiverella*, and *Phalonia roseana*, but there is no doubt about them, they are all Tortricids. If in contrast we look at the huge group of species gathered under the title of Tineina we find there is more difference between, for example, a *Gelechia* and a *Nepticula*, than there is between a *Noctua* and a *Papilio*. Of all the classifications of the Tortricina that I know, that portrayed by Mr. E. Meyrick in his most excellent volume, *A Handbook of British Lepidoptera*, attracts me more than any other. It is founded not on the British species alone, but on all the then known species of the group. Mr. Pierce boldly states that he finds his classification of the British species on the genitalia alone, and this fact forms one of the great features of the volume. Had he taken account of other structures or of biological factors, we should not have had such a clear issue. It is a satisfaction to note at how many points this special classification of the comparatively few British species comes into agreement with a world wide classification, based, almost entirely, on other characters. I propose, however, returning to this part of the subject later. Mr. Pierce's first three groups represent the family *Tortricidae* (sensu strict.) or Tortricinae of some authors. Here the valvae of the males are wide, rather flat in appearance with more or less parallel margins.

* *Entom.*, Vol. LVII., p. 13, 1924.

They spread horizontally, not with the ends upcurved. The large genus *Tortrix*, which never appeared to be really homogeneous, has been split up in a striking manner, some elements going to the *Cacoecia-Pandemis* group, and others are shown to belong to the *Peronea*.

In the first Group the valvae are short and subtriangular, though a few are more elongate. Here we have the genus *Archips* with *picana*, L., as the type. This comprises the genus *Cacoecia*, but Mr. Pierce refuses admittance to five species and introduces *Tortrix diversana*, Hb., which has no costal fold. Then follows *Pandemis* with type *corylana*, F. Into this genus *Tortrix dumetana*, Tr., and *Cacoecia lafauryana*, Rag., are brought, neither of these have the notch in the antenna of the male. Of the latter species Mr. Pierce says, it shows affinity in the female with the genus *Archips*, but the cornuata of the male point to the genus *Pandemis*, and therefore he places this species in *Pandemis*, but according to my view it should be placed at the lowest point in *Archips*. Its uncus also appears to be more akin to this genus than the other. I cannot now refer to Hübner's diagnosis of *Pandemis*, but think one of the characters must be the notch in the antenna of the male. *Lafauryana*, as far as I know, does not show the notch and therefore, if I am right in my surmise, it cannot belong to this genus of Hübner's. Besides this it possesses a small costal fold. When an author erects a genus he must define it, or at least name some species as the type of it, or some one must fix the genus in this way later. When this is once done, we may or may not accept the genus, but we cannot force into it species which do not conform with its definition or with its type. I am glad that Mr. Pierce has revived a special genus for *Cacoecia lecheana*, L., which always seemed to stand rather alone, and its genitalia prove it to be so, at least among its British congeners. The genus *Clepsis* here contains *rusticana*, Tr., and *Cacoecia costana*, F., the former without and the latter with a costal fold. This feature does not possess the systematic value that was once assigned to it, but the genitalia of these two species, judging from the figures, appear to be too widely divergent to be congeneric. For the absolutely pure collector, if such an one really now exists, the only interest in this first group lies in the difference between the uncus of *Amelia palleana*, Hb., and that of *A. viburniana*, F., which offers an easy means of recognising doubtful specimens. For the student, whether he be systematist or morphologist, this group, like all the others, is full of interest. The fact that here species on the formation of the genitalia alone are removed from one genus and placed in another, irrespective of any other specialized developments, which they may exhibit, or lack, affords an illustration of the apparently wayward manner in which development usually progresses. There can, I suppose, be little doubt that *Cacoecia*, *Pandemis*, and certain species of the genus *Tortrix*, had a common origin at a period not far distant, geologically speaking, for they are still close together, and Mr. Pierce gives us additional evidence of this by including them all in his group *Archipsidii*. They have progressed in the same major direction, but each species on its own line, some further than others. *Cacoecia lafauryana* has the fold on the costa, and shows in its genitalia a high development in its hair scales, but it lacks the notch in the antenna, while *Pandemis ribeana* has the notch, but has not made much progress with its hair scales, no

further, in fact, than has *Cacoecia crataegana*. *Tortrix dumetana*, without fold or notch, has developed a most beautiful example of Pandemic genitalia, even to the broad uncus. *Cacoecia unifasciana*, *C. costana*, *C. semialbana*, *C. lecheana* have all drifted on their own lines further apart from the others. Before leaving this group I may refer to *Tortrix pronubana*, which displays a remarkable symmetry, even for a lepidopteron, it might serve as a model for a free-hand drawing.

The genitalia of most of the members of Group II., containing the *Cnephasias*, may be recognised by the wide, flat, elongate valves, in which the sacculus runs like a rod along the lower margin, while the ovipositor is clothed with long, often bent, hairs instead of short bristles. Here we find a further portion of the genus *Tortrix* and a few outlying genera.

In the *Tortricina* there has always been a difficulty about the use of generic names, some authors employing one name, other writers a different one for the same group of species, while in some works we find several groups, perhaps not of easy definition, all under the same generic denomination. This difficulty is not of course confined to the *Tortricina*, but seems to me more conspicuous here. In the work under consideration we are told that the generic names are worked out with the aid of Mr. C. H. Fernald's *The Genera of the Tortricidae and their Types*. Although this author's name is familiar to me, I have not seen this work, but I trust it may be the means of bringing about a universal recognition of the rightful names to be employed.

The conception and extent of a genus will always be a matter of opinion, while our knowledge remains in the present fragmentary condition. We are not all in the same agreement as to what value should be given to the different characters. Nevertheless there is no doubt that in nature groups of still very closely allied species now exist and will so exist for thousands of years, and it is convenient to have for each of them a name of universal acceptance. It is agreeable to note that our author uses the old name, *Cnephasia* for the *virgaureana* group, which in late lists has been swamped in the genus *Tortrix*. By the way, he will be amused if he turns to Vol. II., p. 364, of *Die Schmetterlinge der Schweiz*, by K. Vorbrodt and J. Müller-Rutz. It is really a most interesting work and indispensable to the student of Swiss lepidoptera, or to anyone studying the altitudes at which lepidoptera occur, but somehow the *Cnephasias* here escaped a special study. We have now a foundation on which to work at these hitherto little understood species, and we must not forget that the author has added one more to be dealt with. *C. incertana* and *C. virgaureana* are common, and it is remarkable how little we know of their earlier stages. It would not surprise me if it should be discovered that *C. incertana*, with its extensile ovipositor, lays its eggs low down in a rosette of leaves, such as we find several plants form, especially when growing in meadows. Here the larva on hatching would find itself at the base of a tender leaf, into which it would mine and perhaps pass the winter. On the other hand, those species with a floricomous ovipositor more probably place their eggs low down on the stalks of plants, such as docks and nettles, or even on the bark of hedge stems, and possibly cover them with scales from their wings or elsewhere. Under this protection they may pass the winter, and in early spring the larvae may hatch and wander off to adjacent plants, in the leaves of which

they probably mine in their early stages. I have bred *C. virgaureana* from a larva I found mining in a leaf of *Primula veris*, and I believe I bred another from a mine in *Plantago major*. It is well known that many Tortrices mine in the early stages. I once found a larva mining under the bark of an oak twig, and of this I took great care, but it only produced the common *Capua angustiorana*. What we require now is the help of the collector. We want notes in our magazines on the habits and situations in which such species occur, as *Cnephasia abrasana*, *C. communana*, and *C. genitalana*. Notes on the better known species are also still desirable. The author includes *Oliodia ulmana* in this group, and other writers place it here, that is at the end of the *Tortricidae*, but Mr. Meyrick allots it to the *Phaloniidae*. I presume therefore that it has vein 2 of the forewing arising from the cell close to vein 3, which is a more primitive position than is occupied by this vein in any *Cnephasia*, or indeed in any other species included by the author in his first three groups. In these this vein arises from about the middle of the lower margin of the cell. It has, I think, some further primitive feature in its neuration which I cannot now recall, but believe it is mentioned as a note in Dr. A. J. Turner's paper on the neuration of the *Cossidae* (*Trans. Ent. Soc. London*, Parts I. and II., 1918). Its genitalia do not appear to be akin to any of our *Phaloniidae*, but have a resemblance to those of *Isotrias rectifasciana*. This species also has a primitive feature in the strong median vein with the upper as well as the lower branch in the cell of the hindwing. These two species must be placed somewhere in the list, but they are evidently on an older branch of the stem than are the *Cnephasias*. *O. ulmana* is now one of those isolated species that is difficult to place in a book or a list, which unfortunately we cannot write in the form of a tree with many branches. Our only hope with these forms lies in the possibility of the discovery of connecting links which will give some clue as to how they may have arisen. Ancestors they must have had, some of these may still exist, or it may be all have died out or have now developed beyond recognition.

Group III.—The most conspicuous feature in this group is shown in the valvula, that is the middle part of the valva which lies between the costa and the sacculus, and here runs out into a blunt point at its margin. In some species the enormous erect socii are very striking, but these do not persist throughout the family. It consists of the old genus, *Peronea*, and strangely the last remnants of the genus *Tortrix*. That *T. bergmanniana*, with its gentle habits and delicate larva, reminding us of *P. logiana* and *P. variegana*, Schiff., should belong here is not surprising, but that *Tortrix viridana* is also one of this family is astonishing. It is a more robust insect and never in any of its stages reminds us of a *Peronea*. From the figures and the text, however, we may draw the conclusion that a species very like *T. viridana*, but with vein 7 of the forewing still running to the costa, may have given rise to both branches of the *Peroneas*. The author seems inclined to bring those *Peroneas* with drooping socii into the genus *Tortrix*, but they and *T. viridana* are now too far apart for such treatment. It is interesting to note that in *T. bergmanniana* the vein 7 of the forewing has fallen to the termen, in *T. forskaleana* it stopped at the apex, while in the other *Argyrotoxa*, *Eclectis*, and *Peronea*, it still runs to the costa. This costal position of vein 7 I consider an early feature, where the

peripheral veins are separate. *T. schalleriana* and *T. comparana*, which I looked on as the same species, show some difference in the outline of the costa, the sacculus and the ostium plate, but whether these hold good in a long series we do not know. It would be interesting to test the point by breeding from parents of the two forms. Long ago that excellent field entomologist, the late William West of Greenwich, proved by breeding the moths from the egg that *Leptomermis boscana* was the summer brood of *L. scabrana*, which emerges in autumn and passes the winter as an imago. Mr. West told me he had recorded his successful experiment, and I read his account of it. It is possibly in one of the earlier volumes of the now defunct *Zoologist*. These earlier volumes of the various magazines are well worth reading in the winter evenings.

Apparently the author was unaware of the above mentioned experiment, as he makes the instructive remark on *L. scabrana*: "Appears to be a variety of this species (*boscana*). We can find no difference in the genitalia." (p. 21.). The two species, *P. lipsiana* and *P. rufana*, Schiff., always seemed to be a closely allied pair, but their genitalia show them to belong to different sections of the genus. *P. fissurana*, Pierce and Mercalfe, is quite distinct from *P. ferrugana*; a glance at the uncus and socii is quite sufficient. From a remark made in *Practical Hints* (Vol. III., p. 41), it would seem to be a more variable species. The late Mr. Tutt there writes: "Females of *Peronea ferrugana* taken in March are well worth retaining for ova, the moths appearing in July being more given to variation than those of the autumnal emergence." I doubt if this hint was ever taken by anyone, but it would be interesting to discover whether the July moths that Mr. Tutt had in mind were *P. fissurana* or really *P. ferrugana* which may of course have a small flight in July. With the exception of *D. loellingiana* this group is remarkably uniform. That species is possibly an older form that went on its own way before the *Peroneas* were developed. The larva and larval habits are still exceedingly close to those of *T. viridana*. These three Groups which we have been considering are closely allied, the *Peroneas* being a little further apart from the other two. We will now discuss the position the author gives them with regard to the phylogeny of the whole of the Tortricina. Broadly speaking his classification of these three Groups does not differ essentially from that which has been already arrived at. It is true that his discoveries have almost demolished the genus *Tortrix*, as far as names go, unless there may be exotic species which are really congeneric with *T. viridana*. But in the face of the form the genitalia display in, for example, *Tortrix dumetana*, no one can doubt that it is closely allied to *Pandemis*, nor is there any doubt that *T. viridana* itself, *T. bergmanniana* and *T. forskaleana* must be placed among the *Peroneas* and do not naturally belong to the same group as the *Cnephasias* and their allies.

(To be continued.)

New races and forms of Palearctic Grypocera.

By ROGER VERITY, M.D.

(Continued from page 44.)

Erynnis alceae, Esp., form **fulvocarens**, nubi, and race **tripolina**, nubi. On July 12th, 1923, Querci met, in the Tenna Valley, 1200m., under the Pizzo Tre Vesuvi, in the Sibillini Mts. of Central Italy, with a single individual of this species, which he failed to recognise at the time and which it took some attention to classify. The reason of this is that it entirely lacks every trace of fulvous on both surfaces, so that one can mistake it for an *altheae*, but it does not resemble any other *alceae* I have ever seen, because in the latter the fulvous is quite a constant specific character. In that specimen, now in my possession, the tone of colour is of a cold, pale, slate-gray both above and below with the usual pattern in darker grey and black. There remains to be seen whether it is a high-mountain race or simply an abnormal individual.

The race *alceae* from North Africa is always referred to as *australis*, Z. Last spring Dr. Roulet collected on the Garian plateau, 700m., south of Tripoli a large series, from May 1st to 7th. I have unfortunately not got any Algerian specimens to compare with it, but this race is certainly quite distinct from nymotypical *australis* of Sicily. On an average, it is still smaller than the latter and it is quite different in colouring, because there is a marked contrast between the dark bands and the pale tawny ground-colour; the former stand out sharply upon it, partly in deep chestnut and to a greater extent in blackish; their outlines are much sharper than is ever seen in Europe, so that a striking striate aspect ensues, running across the whole wing; the general tone is of a brighter and warmer fulvous. The underside is much lighter than is ever the case even in the most extreme *australis*, being of a bright, clear fulvous, with no mixture of black either on fore- or hindwing, whereas *australis* is always either of a chestnut tinge on that surface, or of a faded tawny tone, veiled with grey.

Mischampnia proto, Oehsenh. (nec Esper!), race **nigrita**, nubi, and race **fulvosatura**, nubi. From Cuena, in Nueva Castilla (Spain), 1200m., I possess a series of specimens, collected on July 7th, which surprise one by their very different features from the *proto* of Albarracin, although these two localities are comparatively so near to each other. The date of capture and the colour of the underside suggest the 1. gen., which at Albarracin emerges till about July 10th, whilst the second only begins at the very end of this month. In size they are the smallest *proto* I have seen, varying from 20 to 25mm. from tip to tip, whereas the other races vary from 25 to 30mm. A large couple from Armenia in my collection, resembling the female from Yakouren figured by Oberthür, Vol. VI., fig. 1268, and quite identical with the Albarracin 1. gen. *arvaminensis*, Sag. measures 28 and 30mm., and thus gives the impression of being double the size of *nigrita*. The latter also has an unusually sharp apex and a straighter outer margin to both wings in the male.

The upperside is of a deep black uniform tinge, with a shiny surface, which recalls *P. sao*, rather than the other *proto* races; these are usually veiled with white and only the females tend to uniform black-

ness. In *nigrita* even the series of submarginal whitish lunules shows so faintly, that at first sight it seems entirely abolished in most specimens. All the white spaces are reduced in extent. The underside of the hindwings has a faded and dirty appearance, being of a pale yellow tinge, mixed abundantly with black scales and slightly greenish in some cases. The couple of *prato* figured by Hübner resembles *nigrita* by the uniform black upperside, but it is larger, the white spaces are more prominent and the underside is of a bright clear tawny. This might be the nymotypical race described by Oechsenheimer. The summer generation of Algeria, as figured by Oberthür, l. c., fig. 1266, from an August male of Sebdou, seems to need a name to designate it: size large; the upperside is washed over with fulvous scaling, covering even the, usually, white spaces; the underside of the forewing is of a pale tawny, a black patch only subsisting in the middle; that of the hindwing is of a warm tawny: II. gen. *fulvosatura*, mihi. Oberthür, l. c., XIX, p. 119-22 fig. 4435-6 and 4441-2, describes and figures a gigantic race from Azrou and the Great Atlas, in Morocco, which I propose calling *gigas*, mihi. Specimens from the Bouches du Rhône (10th to 25th of July) in my possession are evidently the second generation, but their features are identical with those of the III. gen. of Albarracin, so that Sagarra's name of *fenestrata* can quite well be used for them.

Hesperia alveus. Hüb., race *accreta*, mihi and race *grandis*, mihi. — Hübner's figures do not represent the average form in the variation of the species. The male, especially, is very small and it has a dull greenish underside, dusted with black scales. This form prevails particularly in high and cold mountain localities, but, as a rule, one meets with it individually mixed with transitions to the races I am about to point out. I have it from the Simplon village, from Dombresson in the Jura, and from Gédre in the Hautes Pyrénées. Oberthür's figure 1856 represents one from Larche (Basses Alpes). His other male 1855 from the same locality is transitional to the following and so is the La Rippe (foot of Jura) one figured by Reverdin in *B.S. Lép. Gen.*, II., pl. 4, fig. 10. Oberthür seems right in his conclusion that the Larche race and those similar to it can on the whole be called race *alveus*. In other regions, on the contrary, one meets prevalently or exclusively with a form which contrasts markedly with Hübner's by its larger, and in some individuals very much larger size, and by the bright, clear yellow underside with white spaces standing out sharply on it. It is well represented by Oberthür's figures 452-3, from the Pyrenees, but some of the specimens I possess from Gédre are larger and most of them have a pure yellow underside (less greenish, clearer and lighter). The latter I take as my "types," naming them *accreta*. As stated, other specimens from the same neighbourhood, but collected the preceding year and evidently in some other locality are similar to nymotypical *alveus*. The females of *accreta* do not increase in size proportionately to the males, so that they do not, on the whole, contrast as much with Hübner's figure and with the females of his race in general, but some of them do correspond well with the male features. The race recorded by Oberthür, Vol. XIX, 3, p. 78 from the North of France (Vernon in the Eure) corresponds to *accreta*, according to his description. I possess two specimens

from Dombresson which come very near *accreta*. I propose the name of *granis* for the remarkable race figured by Oberthür (figs. 1877-8) from Saint Martin de Vésudie (Maritime Alps Department) of very large size and dark-looking on the upperside, whilst the underside resembles *accreta*. But it is rather darker on the forewing and greener and dusted with black on the hindwings. That author states he has it also from Germany. Examples I have from Oulx (Susa Valley) and from Dronero (Piedmontese Maritime Alps) seem to belong to the same race.

Form *accreta* spreads also to Central Spain, but there it is found mixed with another form of the same large size and with bold white spaces above, but characterised on underside by its pale tone of colour. The forewings are pale gray, considerably variegated with white, and the hindwing has very pale green markings, in some cases looking rather dirty on account of a few black scales dusted over them, and broad white spaces. The general appearance of this form rather suggests a transition to the African and Andalusian *numida*, Obth., Vol. IV., fig. 484-6, and phot. pl. I, in vol. XVII, but I have only seen in one female, the little streak protruding in the cell from the central white space, as in *omporai*: whereas Reverdin gives it as the constant characteristic of *numida* in both sexes. This Spanish form is well worth designating as **centralhispaniae**, mihi.

Hesperia ryffelensis (Obth.), Rev., race **albans**, mihi.—I possess from Olmütz, in Moravia, a form which I do not hesitate to refer to this species and not to *alveus*, owing to the elongated shape of the wings, to the very small white spaces on the forewing and to the underside dull green tinge and other features. It differs however from all the *ryffelensis* I have seen by the pale and the dull tone of the upperside, so that from the aspect of that surface one would think it a *caecilias*, Rbr., and it is well worth recording and naming, especially as the distribution and variation of this newly discovered species are scarcely known at all. I can also contribute the information that I have collected *ryffelensis*, apparently quite similar to the nymotypical Zermatt race, in the Valley of Sullen, 1800m., on the Ortler in S. Tyrol. It flew from August 3rd to 10th, 1920, in company with *serratulae* and with an *H. bellieri*, Obth., which also seems quite similar to the Zermatt one and which also it is interesting to record from the Ortler.

Hesperia serratulae, Ramb., *Faun. Andal.*, II., p. 318, pl. 8, fig. 9, race **planorum**, mihi, race **fragilis**, mihi, and form **latealbata**, mihi.—This species exhibits individual variations to a considerable extent, but local characteristics are quite prevalent enough to confer different aspects to series from different localities and to constitute well defined races. As they do not seem to have been worked out yet by any author, I will make the following attempt:

Race *serratulae*, Rbr.—In high mountain localities one usually finds a form which is small, which has short, broad wings and which is of a deep black tone above. The white spaces vary considerably on both surfaces. The specimens I have from Gèdre in the Pyrenees have large ones, and so have most of those I have collected at the Baths of Valdieri in the Maritime Alps. Instead, those from the

Ortler in S. Tyrol have very minute ones and might well be separated as a distinct race, also on account of their smaller size. This probably is race *caccus*, Freyer, described from the "Alps of Tyrol," although his figure is very rough. As to the underside white spaces, Rambur figures a specimen in which they are very reduced, the central band of hindwing being interrupted as it is in *H. carlinae*. Reverdin, in *Bull. Soc. Lép. Genève*, II., pl. 4, fig. 6, figures a "mountain form," from the Schynige Platte, Oberland, with very broad continuous band-like spaces (form *lateralbata*, mihi). The same author figures (fig. 13) as "plain form" from La Rippe, pied du Jura, a larger insect with wings narrower and more pointed, a less deep tone of black above, and of a warmer tone of green on the underside. My specimens from Friedland in Mecklenburg, exhibit all these features very distinctly and I notice the white spaces of the underside give a very characteristic impression of rows of regular oval white spots. This race I should call *planorum*. The series collected by Querci in the Sibillini Mts. in Central Italy and at Albarracin in Central Spain are so variable that they contain both the forms described above, but the first prevails. A gigantic and highly differentiated race of *planorum* from the Vouvans Forest in Vendée (N.W. of France) is figured by Oberthür (fig. 480-1) and by Reverdin (fig. 7) as race *occidentalis*, Lucas. Finally, the extreme opposite of this race is produced in the neighbourhood of Vienna; race *fragilis*, mihi, very small and frail, wings narrow, long and pointed, tone gray, rather than black, white spaces very variable on both surfaces, and unusually reduced in some cases.

Hesperia carlinae, Rbr., *Faun. Andal.*, II., p. 314 (footnote), pl. 8, fig. 11, race **atrata**, mihi. —On August 4th, 1921, I collected a series of this species, which was just emerging together with *cardiae* at the foot of the great Frua waterfall, 1400m., in the Formazza Valley, situated between the Rhône Valley and the Tessin. This valley is beaten by glacier winds and all the butterflies belong to high alpine races: *A. lineola* race *ludoviciae*, Mabille, *Urbicola comma* race *alpina*, Bath, etc. So different however, were these *carlinae* from those I had collected at the Baths of Valdieri in the Maritime Alps that I failed to recognise the species on the field. At Valdieri the form figured by Rambur was prevalent (Oberthür has figured it from Larche, Basses Alpes, fig. 499-501 and Reverdin, *l. c.*, fig. 4, from Bérisal), but there occurred also the smaller Larche form of Oberthür's fig. 1869-71 and occasionally also form *olivacea*, Obth., as in his fig. 498. The Val Formazza race is much smaller; the upperside and the underside of the forewing are of a deeper and colder black tone; the white spaces are much reduced in extent, being often on the verge of obliteration in the male and entirely so in most females except those nearer the costa of forewing; the underside of hindwing is reddish only in one less highly characterised male; in the others it is of a greenish black with ochre coloured scales only along the nervures, so that it has a sombre appearance very different from the clear reddish fulvous of the nymotypical form. Oberthür's figures 496-7 from La Grave (Hautes Alpes) are evidently a transition to my more extreme Formazza race *atrata*.

(To be concluded.)

NOTES ON COLLECTING, etc.

EARLY SPRING DIPTERA.—The following notes are written, not so much as a record of species taken, but to give beginners and others, who may be inclined to take up the study of this order, some idea of the species that may be expected to occur in March and April. I hope that any subscribers who are Dipterists will contribute similar notes from time to time.

Work the willows and other early flowering shrubs; given a sunny day and a sheltered situation, many species may be obtained, especially *Syrphidae* and *Anthomyiidae*. Look along sheltered footpaths in wooded districts for the two spring *Bombyliidae*, *B. major*, and *B. discolor*, hovering and visiting primroses, etc. (these two species also occur in gardens at early spring flowers). Do not neglect to search the tree trunks; many species like to bask there in the warmth of the afternoon sun. Sweep heather for hibernated Trypetids and Acalypterates. The following lists of species are taken from my diaries for March and the first three weeks of April, but are very incomplete as favourable days for collecting at week-ends, etc., are few and far between in our English Springs.

STRATIOMYIIDAE:—*Sargus cuprarius*.

BOMBYLIIDAE:—*Bombylius major*, *B. discolor*.

EMPIDAE:—*Rhamphomyia cinerascens*, *Hilara pilosa*.

SYRPHIDAE:—*Chilosia pulchripes*, *C. variabilis*, *C. grossa*, *C. albipila*, *C. praecox*, *Platychirus discimanus*, *P. scutatus*, *P. albimanus*, *Melangyna 4-maculata*, *Melanostoma scalare*, *Syrphus torvus*, *S. ribesii*, *S. vitripennis*, *S. luniger*, *S. balteatus*, *S. lasiophthalmus*, *S. arcticus*, *S. barbifrons*. *Fristalis pertinax*, *E. arbustorum*, *Criorrhina ranunculi*, *Syritta pipiens*,

MUSCIDAE:—*Pollenia rudis*, *Musca corvina*, *Pyrellia cadaverina*, *Euphoria caesarion*.

ANTHOMYIIDAE:—*Phaonia lucorum*, *P. marmorata*, *P. variegata*, *Hylemyia variata*, *H. pullula*, *Chortophila bilbergi*, *Phorbia floccosa*, *P. muscaria*, *P. parva*, *P. neglecta*, *P. exigua*, *Fannia manicata*, *F. scalaris*.

ACALYPTERATA:—*Tephyochlamys rufiventris*, *Leria ruficauda*, *Elgiva dorsalis*, *Sepedon spinipes*, *Tephritis vespertina*.—H. W. ANDREWS, F.E.S.

A NOVEL METHOD OF COLLECTING.—One of the family washing-days happening to coincide last May with one of my off-days from business, it occurred to me, that as the day (17th) was sunny and warm, insects might be attracted to some large blankets hanging out in the garden to dry, especially as we are here on the borders of the country, with open fields and a wood behind us to the west and gardens on both sides. I therefore kept an eye on both surfaces of the blankets during the time they were on the lines with the following result: COLEOPTERA: 2 *Oxytelus nitidulus*, 5 *Homalium florale*, 3 *Chaetocnema concinna*. HEMIPTERA-HETEROPTERA: 1 *Piesma maculata*, 1 *Monanthia cardui*, 2 *M. ampliata*, 1 *Anthocoris nemorum*. HYMENOPTERA (Tenthredonidea): 1 *Monophadnus albipes*—in all 16 specimens belonging to 7 sections of 3 orders, and not a single uncommon species amongst the lot. It struck me as rather remarkable that there was no representative of the *Diptera*. Most of the insects were on the shady side of the blankets; probably the other surface was too hot for them. This method of

collecting is analogous to the "lamp and sheet" method so effective nocturnally in the Fens, and in a richer district might be productive of better results, both in quantity and quality, especially in June or July, and I have no doubt that sheets would serve quite as well as blankets. In this connection I may mention that I have several times noticed the tendency of insects to appear on one's clothes and on waterproofs spread on the ground to sit on, whilst lurching in the country, especially during bright but cool weather, such as we generally get about Easter and in September; evidently they come up from the surrounding herbage to enjoy the warmth reflected from the garments.

—C. NICHOLSON, 35, The Avenue, Hale End, E.4, *March 19th, 1925.*

ENTOMOLOGY AND THE LAW.—Can anyone give me particulars of the case which was decided by the identification of a fly found embedded in the paper in a legal document—I think possibly a will—the date of execution of which was a vital question?—C. NICHOLSON.

CURRENT NOTES AND SHORT NOTICES.

A most comprehensive volume has been just come to hand entitled *The Lepidoptera of New York and neighbouring States* from the Cornell University Agricultural Experimental Station, Ithaca, New York. Such a mass of ordered information has probably never been put together in 729 pages before. The volume commences with the Jugatae (*Micropterygidae*, etc.) and goes on to the Frenatae including all the families usually called Tinea, Tortricae, Pyrales, Saturniids, Bombyces, etc., the author promising to deal with the Noctuae, Geometers and Rhopalocera in a subsequent volume. So many have worked at the more highly developed groups of Lepidoptera that it is really a great advance to find the more primitive groups dealt with in such an encyclopedic way. Every known species in the area is dealt with, and so far as possible, data on its life-history are given. To the keys of genera and species especial attention has been paid, which is a new venture for American Lepidopterists. Where the author, Wm. T. M. Forbes, responsible for the work, felt that specialists on certain families could be called in, it has been done; Dr. Annette F. Brown is responsible for the *Nepticulidae* and the *Lithocolletis*, Carl Heinrich has dealt with the Coleophorids, and Mr. August Busek has collaborated on every single group of the Tineids. Conciseness without sacrifice of clearness has been the line taken, and appears to have been far more successful than is usual in such comprehensive works. All the latest lines of advance in our lepidopterological studies have been brought into use. In the classification we have divisions Jugatae and Frenatae, with and without general distribution of aculeae (spinules) on wing surface, arrangement of warts on larval segments, etc. The introductory portion deals succinctly with the principles of taxonomy; variation racial, seasonal, mendelian, aberrational, and sexual; phylogeny; the facts of distribution and suggested causes; the structure of all the stages particularly with details that may be useful taxonomically including venation, genital parts, and setal arrangement; and structure in both larva and pupa. All these details are sufficiently illustrated by diagrams to the number of nearly 500, many being

composite. Practically the whole book is printed in small type, and the pages, being between small quarto and large octavo in size, space is afforded for the enormous amount of matter this book contains. In all cases where future work is needed to elucidate groups or species, it is pointed out, and the family and generic characteristics have been most thoroughly dealt with. In concluding our remarks one must say that this book sets a line of excellence for future systematists, which **it will be hard to excel.**

The *Catalogue of Indian Insects* is gradually being issued. Parts 4 and 5 dealing with the *Trypetidae* (Dip.) and *Nitidulidae* (Col.) have just appeared. Each contains a very large amount of references, and workers must find these parts a great help to their studies. The whole is brought out under the auspices of the Government of India.

Another very useful publication from the same source is the *Annual List of Publications on Indian Entomology*, which is compiled by the Imperial Entomologist at the Pusa Agricultural Research Institute. The list for 1923 consists of 60 quarto pages.

The more important articles in *Iris* for the past year have been, Dr. Wehrli, "Nice—St. Martin Vésubie Digne," dealing with the Lepidoptera of the Alpes-Maritimes and the Basses Alpes; Prof. Strand, "Lepidoptera of S. West Australia"; Dr. Krüger, "The *Morphidae* of Columbia"; H. Stauder, "The *Syntomidae* of Eastern Europe and Trans-Caucasia"; etc.

The *Annual Report of the United States National Museum* is a record of progress year by year, by means of which the American public know that they are getting full value for the funds devoted to the advancement of science. Therein one reads details of all specimens and objects added to the museum, particulars of the original investigations carried out or in progress, the list of articles and works published during the year, the condition of various departments and sections, in fact a full detailed account of the activities of the staff. What do our public know of the activities of our national museum or of its condition. No report is ever distributed, if made, of the wondrous work done in the British National Museum. This is only known to the few, whom circumstances and chance put in the way of knowing. With a worthy report sent broadcast, as is done by the U.S. authorities, we should never have had a Director of the Museum during the war, sneeringly allude to the study of the micro-lepidoptera.

Fascicule 2 of Vol. V. of the *Bulletin de la Société Lépidoptérologique de Genève* has recently come to hand. Reports of the meetings during 1922 and 1923 occupy about 30 pages. There is a feeling obituary of the late M. Chas. Oberthür by Dr. Reverdin, a friend and colleague of many years, with an admirable portrait. Dr. Reverdin continues to report on his studies of the genus *Hesperia*, this time dealing with *H. cribellum*, illustrating his account with some of M. Culot's inimitable figures and a plate of structural details. M. Arnold Pictet discusses parthenogenesis in the Lepidoptera, reviewing past recorded facts and comparing the more recent observations of M. Seiler, M. Picard and others, and his own protracted experiments. The author proves that contrary to the long held view that the 3rd generation of parthenogenetic layings produced only males, that in the case of *Lymantria dispar* both males and females were produced. There is also a discussion on the substitution of the name *phaecorrhoea*, Don., for

chrysoorrhoea, Lin. We wish the Society well and congratulate its members on their admirably conducted Bulletin.

We must congratulate Dr. Walter Horn for his strenuous, almost single-handed, work in keeping together his Deutsches Entomologische Museum at Berlin-Dahlem, and also in his success with the *Entomologische Mitteilungen*, of which the first number of Vol. XIV. has recently come to hand, a number of more than 100 pages, with one plate of diagrams and text figures. There are thirteen original articles (Coleoptera, Diptera, Hymenoptera, Orthoptera, etc.), and a summary of new literature.

SOCIETIES.

THE ENTOMOLOGICAL SOCIETY OF LONDON.

January 21st, 1925.—ANNUAL MEETING.—Mr. E. E. Green, President, in the chair.

COUNCIL'S REPORT.—Dr. Neave read the Report of the Council, which was adopted on the motion of Mr. Stenton, seconded by Dr. Burr.

TREASURER'S REPORT.—Mr. W. G. Sheldon read his Report, and gave some details of the very satisfactory financial position of the Society. The Report and Accounts were adopted, on the motion of Mr. Main, seconded by Dr. Scott.

The President announced that the Fellows nominated as Officers and Council for the ensuing year had been duly elected in accordance with the Bye-Laws.

The President then read his Address on "Some Episodes and Aspects of Insect Life in Ceylon," and at its conclusion a vote of thanks to him, coupled with a request that it might be printed in the Proceedings, was moved by Mr. Willoughby-Ellis, seconded by Dr. Cockayne, and carried unanimously.

A vote of thanks to the Officers for their services was then passed on the motion of Mr. Bethune-Baker, seconded by Mr. Bedwell, and Mr. W. G. Sheldon, Dr. S. A. Neave, and Mr. H. J. Turner briefly replied.

February 4th, 1925.—Professor E. B. Poulton, M.A., D.Sc., F.R.S., President, in the Chair.

VICE-PRESIDENTS.—The President announced that he had nominated Professor W. Bateson, M.A., F.R.S., Mr. G. O. Champion, and Mr. E. E. Green, as Vice-Presidents for this year.

LIBRARY.—Dr. S. A. Neave announced that the Council had decided to discontinue the opening of the Library every Wednesday evening, and to revert to the old regulations in regard to the hours of the Library.

EXHIBITIONS.—Mr. W. J. Lucas exhibited and made remarks upon, the second British macropterous example of the Orthopteron, *Chorthippus parallelus*, Zett.

Mr. W. G. Sheldon, on behalf of Mr. W. G. Clutton, of Burnley, exhibited a number of Lepidoptera from Lancashire.

Mr. H. M. Edelsten exhibited a photograph of a moth from Central Asia supposed to be *Leucania brevilinea*.

Professor E. B. Poulton, F.R.S., who illustrated his remarks with

lantern slides, discussed "The butterfly and chrysalis as a symbol, the key to the understanding of certain Minoan beliefs."

He also exhibited some Anthiid beetles collected on the same tree with their ant-models in S. Nigeria by Mr. F. D. Golding.

Mr. C. S. Elton, a visitor, showed some lantern slides to demonstrate "The distribution of insects exemplified by observations made on the recent Oxford University Expedition to Spitzbergen (1924)."

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

November 27th, 1924.—ANNUAL EXHIBITION OF VARIETIES.—There was a record attendance, over 150 members and friends were present. As an innovation the exhibits were not passed round but placed on side benches after description by the exhibitor, thus giving a longer time for those present to examine them.

On behalf of Lord Rothschild, Dr. Jordan exhibited three examples of the Small Crested-Lark, to illustrate three of the local races of Algeria with specimens of the prevalent surface soils of the respective areas, which were resembled by the colour of the plumage; a series to shew the variation in *Lasiocampa quercus*, males with female coloration, females with male coloration, a pure yellow female, a sooty brown female and the rare ab. *roboris*; a long series of British *Cosmotriche potatoria* showing extreme variation as in *L. quercus* and a larva showing an extra proleg protruding from a spiracle; a long British series of *Dianthoccia carpophaga* showing every gradation between the dark inland race and the light sea coast ab. *ochracea*; the British series contained specimens of the larva at all stages, the pupa, imago set at rest and the parasites.

The President, a small selection of Rhopalocera collected by Major Hingston whilst on the Mt. Everest expedition in 1921, including rare forms of *Papilio*, of *Parnassius* and three *Aglaia urticae* forms, *chinensis*, *ladakensis* and *caschmirensis*.

Mr. W. J. Lucas, the uncommon Neuropteran, *Drepanopteryx phalaenoides* taken at Witherslack in May last, with *Drepana laevitula* for comparison.

On behalf of Mr. J. J. Joicey, Mr. Talbot, a long series of *Phyciodes* species with mimetic patterns with the butterflies of other groups with which they associated and resembled.

Mr. R. Adkin a series of mongrel *Diacrisia mendica* from the recrossing of the mongrel race *mistura* with typical *mendica*; aberrations of *A. urticae* approaching ab. *polaris* and ab. *connexa*; a *Pyrameis atalanta* with the red band twice broken; a specimen of the rare *Margaronia unionalis* taken at ivy on October 13th, near Eastbourne; and other aberrations.

On behalf of Mr. R. A. Adkin, a sinistral shell of *Helix aspersa* taken in Eastbourne town in 1924; and the recently differentiated *H. heripensis*, which occurred commonly on the Downs near Eastbourne.

Messrs O. R. and A. de B. Goodman, local forms and races of most of the indigenous species of butterflies found by them in Corsica in early July, 1924; examples of the Satyrid species taken by them in late July at Digne in the same year. Out of 37 days hunting only 2 were marked by wet weather.

Mr. Leeds, a long series of aberrations of *Polyommatus coridon*

designated by Courvoisier's terms and Tutt's names combined; aberrations of *P. medon*, *P. icarus* and *Plebeius argus* (*aegon*) similarly designated; and other aberrations of 1924.

Col. Rattray, butterflies from Equatorial Africa showing mould which was already on them while alive when captured; a series of aberrations of *Plebeius argus* (*aegon*) undersides; *costa-juncta*, *unipuncta*, *approximata-juncta*, etc.

Mr. A. A. W. Buckstone, xanthic *Aphantopus hyperantus* and *Epinephele tithonus*, very dark and pale straw-coloured *Pararge megera*, melanic *Tephrosia crepuscularia*, *Heodes* (*lumicia*) *phlaeas* varying from yellowish to dark red ground, one with a forewing partially white, etc.

Mr. Cox, *A. urticae* ab. *polaris*, and pink tinged specimens, confluent *Zygaena trifolii*, etc.

Mr. C. Craufurd, on behalf of Mr. F. Stevens a remarkable underside of *Ruralis betulae* bred, in which some of the markings were totally absent, others emphasised or reduced, and the ground more uniform, giving it a quite different appearance and not recognisable as *R. betulae*.

Mr. D. H. Pearson, a long series of extreme forms of *Abraxas grossulariata*, and a case of *Rhopalocera* from Ste. Baume, Provence, France.

Mr. Jacques, bred specimens of *Hyloicus pinastri*, one of a dirty cream colour the other suffused with black, etc.

Mr. and Mrs. S. G. Castle-Russell sent for exhibition aberrations taken in the season 1924. *Melitaea aurinia* (1) upper wings well suffused black, underside striated, (2) ditto but spotless underside with cream margin at base of hindwings, (3) ground light claret tint with pearly gray rays, hindwings nearly black, marginal spots white rays, below spotless, (4) fulvous ground, suffused black markings, absence of yellow, underside normal with four large black spots close to the inner margin; *Aphantopus hyperantus*, an extreme ab. *laucolata*, and one with large buff splashes on hindwings; a gynandromorph of *Polyommatus icarus*, L. forewing ♂, other wings ♀, Andover; *Coenonympha pamphilus*, forewings cream white, hindwings normal.

Rev. E. E. Frampton, an Orthopteron, the "Shok-Shok" from St. Vincent, which produces a sharp noise like two sticks struck together.

Mr. H. Worsley-Wood, a very long series of *Mellinia* (*Xanthia*) *ocellaris*.

Mr. A. W. Mera, the 2nd. brood of *Boarmia roboraria* from a melanic female; 5 larvae pupated and emerged, the rest are going over.

Capt. Crocker, for Mr. Percy Richards, varied series of *A. urticae*, *R. phlaeas* and *A. aglaia*.

Mr. Hy. J. Turner, Palaearctic *Rhopalocera* from the highlands of W. China, *Papilio tamerlanus* and 3 allied forms, *Parnassius imperator*, and 3 other species, *Amandia thaidina*, with various species of *Catocala*.

Mr. W. Rait-Smith, a number of fine aberrative specimens of British *Rhopalocera*, *P. icarus*, with red lunules replaced by yellow; *P. coridon*, with the rare ab. *obsoletissima*, *A. hyperantus* ab. *obsoleta* bred; *Epinephele jurtina*, a gynandromorph, L. side ♂, R. side ♀; *Leptosia sinapis*, a gynandromorph, a unique specimen, bred; *Heodes phlaeas* ab. *radiata* and ab. *alba*; etc.

Mr. T. A. M. Nash, a *Pyraucis cardui* with blue centres to marginal spots.

Mr. C. H. Williams, *P. coridon* aberrations and a black form of the male.

Miss Anderson (John Innes Horticultural Institution), Ferns raised under critical conditions illustrating Mendelian Segregation.

Mr. Tonge, a bleached ♂ of *Argynnis aglaia*, ab. *obsoleta* of *P. medon*, ab. *obsoleta* of *P. coridon* from Herts and Kent, etc.

Mr. L. W. Newman, *Abraxas grossulariata*, extremes of the ab. *varleyata*; *Pachys betularia*, mostly caught, with a good percentage of intermediates; a nearly black *Callimorpha dominula* with hindwing banded; melanic *Demas coryli*, etc.

Mr. E. P. Sharp, long varied series of *Cosmotriche potatoria* from Eastbourne.

Mr. W. G. Nash, leaden coloured *P. coridon* of both sexes, several ab. *inequalis*, *P. medon* ab. *obsoleta* and *Deiopeia pulchella* taken at Bedford in May last.

Mr. Priest, a drawer of British Vanessids including 2 *Euvanessa antiopa*.

Mr. E. J. Bedford, a water-colour drawing and two photographs of a var. of *A. cydippe* taken in E. Sussex in 1922.

December 11th, 1924.—Messrs. Hans Leonhardt, 45, Redcliffe Gardens S.W., and J. J. Grant, 37, Old Road West, Gravesend, were elected members.

The President read a note on the capture of the first *Ornithoptera titan*, and also on the custom of the native collectors to sew large specimens in folded leaves.

Mr. Couchman exhibited an aberrant *Hadena trifolii* (*chenopodii*), and from Middlesex a specimen of *Nonagria arundineta*.

Mr. Hy. J. Turner, a very long series of *Thera* (*Larentia*) *variata* and *T. obeliscata*, with many local forms from England, Scotland, France and Austria, including a very fine series from the Oberbürr Collection, with the specimens of the rare ab. *straginata* formerly in the collections of M. Bellier and M. Guenée, these were kindly lent by M. René Oberthur. Drawings of the genitalia of both *variata* and *obeliscata* were exhibited, sent by Rev. C. R. N. Burrows. Opinions differed as to the sufficiency of these to show specific difference. The differences are considered by many to be individual only.

LONDON NATURAL HISTORY SOCIETY.

Most of the exhibits of recent meetings have been other than Entomological, but some interesting specimens of Lepidoptera have been shown from time to time, such as *Bupalus piniaria* including two of the white form from Limpsfield, Surrey, and *Bomolocha fontis* from the same district, shown by Mr. R. W. Robbins (October 21st), *Oporabia dilutata* and *O. autumnata* from Limpsfield, with the former approaching the latter species in a banded form, and also some of a dull colour from Epping Forest, shown by Mr. R. W. Robbins, (December 2nd). *Emmalia trabealis*, *Mamestra glauca*, and *Abraxas grossulariata* with extra black spots on the hindwings, shown by Mr. Riches (January 6th).

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MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. May 6th, 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. April 23rd, Mr. O. R. Goodman, "Collecting in Corsica." May 14th.—*Hon. Sec.,* Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. *Hon. Sec.,* W. E. GLEGG, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to **Mr. J. TURNER, 98, Drakefell Road, New Cross, London, S.E.14**

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

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All communications should be addressed to the Acting Editor, H. J. TURNER, Drakefell Road, New Cross, London, S.E.14.

IMPORTANT TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXV.)

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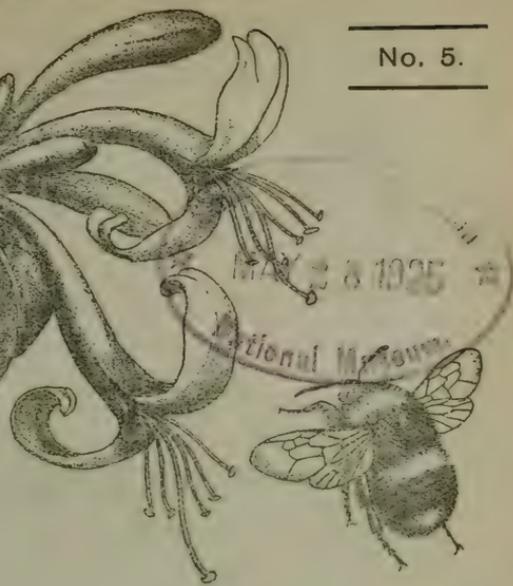
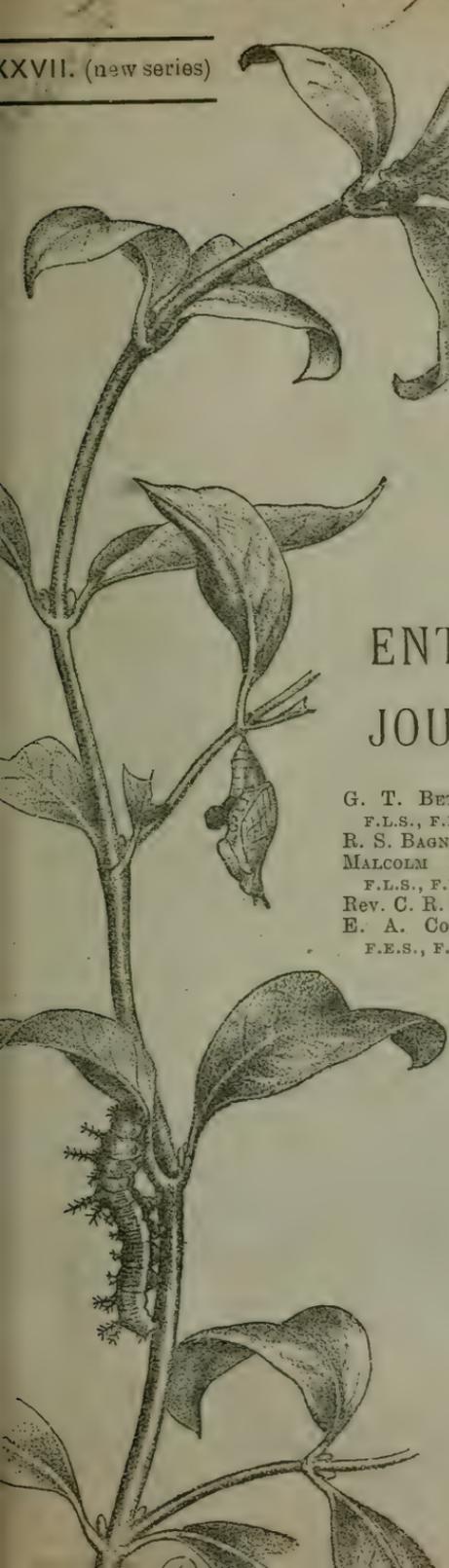
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Some Aspects of the General Ecology and Behaviour of the Water-Strider, *Gerris rufoscutellatus*, Latreille.

By C. F. CURTIS RILEY, A.M., M.S., F.E.S.

Assistant Professor of Zoology, University of Manitoba, Winnipeg, Canada.

One of the most interesting of the water-striders is the beautiful, brownish yellow species, *Gerris (Limnoporus) rufoscutellatus*, Latreille. Its position in the scheme of classification is as follows: order, Hemiptera; suborder, Heteroptera; family, Gerridae; and subfamily, Gerrinae. The writer first became familiar with this Gerrid in the early summer of 1911. From that time up to the late summer of 1919, observations and collections were made, and some experimental work was done on this species. However, these were of a rather desultory character, and they were not published, although a number of interesting facts were accumulated. Investigations on this species, from several different aspects, were seriously begun in the summer of 1920.

The writer has been working on the ecology, behaviour and life-history of *Gerris rufoscutellatus* for the past four years. Some preliminary investigation was done on this species as early as June, 1920. Observations and experiments have been continued, intermittently, from that time up to the present. With reference to the experiments on life-history, it should be stated that as early as the summer of 1922, six individuals were brought through the various instars to the adult stage. The life-history part of the writer's investigations were practically completed in the summer of 1923, more than fifty individuals having been brought to the adult stage. Many hundreds of water-striders were used in the life-history work. As these experiments progressed from instar to instar, each stage was represented by as many as one hundred normal young Gerrids. These numbers were used in order to allow for the large mortality, which was expected from the experience of the previous summer, when many hundreds of nymphs died.

In order to substantiate positively, in all of its details, the life-history work accomplished in the summer of 1923, similar investigations were undertaken, on a still larger scale, during the summer of 1924, when about one hundred individual water-striders reached the adult condition. On February 1st, 1925, fifty-five of these adults were still alive. The life-history results have not yet been published because of the fact that the behaviour of the different instars is being studied, and it is desirable to incorporate the behaviour, ecology and life-history in one account that will be more or less complete. A large amount of data have been accumulated, and it is the expectation of the writer to publish this as soon as certain experiments are concluded, so that there may be in printed form reasonably complete information on the biology of this species of water-strider.

Gerris rufoscutellatus is strongly positively phototactic in sunlight, which response makes it very difficult to keep this species alive in confinement. The Gerrids continually jump against the side of the vessel toward the light, and this behaviour, when persisted in for a long time, results in many of them becoming waterlogged and eventually drowned. Therefore, it was necessary to so arrange the aquaria

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containing the gerrids, that they were in diffuse daylight of moderate intensity. The vessels were covered with mosquito netting, which slightly shaded the surface of the water. This arrangement of the containers assisted in modifying the persistent positive phototaxis of the water-striders. Each gerrid was confined in a separate vessel, which was six inches deep and five inches in diameter and half filled with tap water. Although the water was changed daily, it was found very difficult to keep the developing gerrids alive. One great difficulty was the formation of a bacterial scum on the surface of the water. This would get on to the tarsi and tibiae of the water-striders and not only impeded their movements, but also resulted in so modifying the surface-film that many individuals broke through, and were either water-logged or drowned. There was no evidence that this scum was the stimulus of any disease, but as the gerrids are extremely cleanly creatures, and are constantly cleaning their legs and bodies, they appeared to be unable to tolerate it or to thrive when it was present. Another difficulty was the fact that the water frequently became semisolid, having much the appearance and consistency of thin glycerine jelly. On many occasions, there would not be more than an inch of water above this jelly-like substance. To what this was due, the writer has not yet been able to determine. It may have been the result of bacterial slime, or it may have been due to some chemical change in the water. This jelly-like material killed hundreds of the nymphs. Occasionally, a young gerrid was killed by a fungal growth, usually on the ventral side of the body. These various difficulties proved to be genuine obstacles to the progress of the life-history experiments, and a tremendous amount of time was consumed merely in the technique of the work. They were modified to some extent by placing the gerrids in larger vessels, but larger vessels made it more inconvenient to keep the water-striders under close observation, owing to the fact that the creatures had greater freedom of movement. Boiling all of the water used in the experiments and sterilizing all the containers proved to be of some assistance in reducing the effects of the bacterial slime. These methods were employed during the summer of 1924, and proved to be helpful.

Very little is known concerning the general "habits" and responses of the water-strider, *Gerris rufoscutellatus*, in its own environment. In fact, almost nothing is known in detail about this species. There is absolutely no information with respect to its behaviour under controlled conditions. Because of this paucity of information and also because this species is found in great abundance in the region roundabout Winnipeg, Manitoba, it has seemed worth while to assemble these notes preliminary to the more extended paper, to which reference has been made, that will be published later. De la Torre-Bueno (1911, p. 249), a careful observer in the field, states that: "It (*Gerris rufoscutellatus*) is a dweller in still waters of whose habits little is known beyond what is familiar of the other members of the genus, such as its carnivorous habits. Nothing is known of its life-history." The statement with respect to the life-history of *Gerris rufoscutellatus* must now be slightly modified, since Drake (1922, p. 80), in an annotated list of the Heteroptera of the Cranberry Lake region, in the state of New York, has made a few incidental observations on this phase of the biology of the gerrid. He refers to the situations in

which the eggs are laid, to the time of hatching of the eggs and also to the appearance of the first adults.

The usual habitat of *Gerris rufoscutellatus* is on the surface-film of small and medium sized temporary and permanent brooks. It is also found on small and medium sized creeks. Such streams, as have been mentioned, may be considered as its normal habitat. The water is generally clear, with the bed of the stream of silt, sand, gravel and rocks, and less frequently of mud. The current is of medium or slow velocity, as this species of water-strider tends to be an inhabitant of sluggish waters. In the water are found such aquatic plants as *Elodea*, *Vallisneria*, *Limnobia*, *Ceratophyllum*, *Myriophyllum* and *Proserpinaca*. In some of these waters are such plants as *Callitriche* and *Chara*. Frequently, near the banks and in the shallow water of riffles are found *Alisma plantago* and *Sagittaria* in great abundance. Not infrequently, this water-strider is present in great numbers among the two last named plants. This is the case should the riffles be impeded with rocks and driftwood, so that the current is moderated. Along the banks of streams of this character, there is usually an abundance of herbaceous and other vegetation from which insects drop, jump or fly into the water, and these are used as food by the gerrids.

Streams, of the character that has been described, have been examined by the writer in the States of Michigan, Wisconsin, Illinois, New York and in the provinces of Manitoba and Ontario. On the surface of a large number of these streams *Gerris rufoscutellatus* has been found. In general, it may be stated that brooks and creeks, and in some instances rivers, have been examined within a radius of thirty miles of the following places: Ann Arbor, Michigan; Milwaukee, Wisconsin; Urbana, Illinois; Winnipeg, Manitoba; and Kenora, Ontario. In none of the regions mentioned in the United States is *Gerris rufoscutellatus* abundant. During some summers not more than a half a dozen individuals were seen, while during other summers as many as twenty or thirty gerrids were observed. The species is widely distributed, but in the regions familiar to the writer, it has not been found to be abundant. Usually it has been observed singly and in pairs. It has also been seen in two's and three's, but never in large numbers. However, in the regions to which reference has been made, in Canada, this species is very abundant. Occasionally, on the surface of some of the brooks and creeks in the vicinity of Winnipeg, thousands of these gerrids may be observed, particularly during the months of June, July and August. During long, hot summers, hundreds of these water-striders may be found on standing and running waters in the Winnipeg region, almost any time between the middle of May and the beginning of September. One afternoon in the summer of 1923, the writer collected from the surface of one creek, three hundred and seventy-five individuals, indicating the great abundance of the species. This creek, known locally as Cat Fish Creek, during the summer months, consists of a series of large, more or less isolated pools, with little or no current.

While it is true that medium sized brooks and creeks form the optimum habitat of *Gerris rufoscutellatus*, it has been taken from the surface of rivers, the writer having collected it on the following: the Huron River, in the state of Michigan; the Milwaukee River, in the state of Wisconsin; the Spoon, Vermilion, and Sangamon rivers, in

the state of Illinois; and the Seneca River and Onondaga Creek, the latter being for all practical purposes a river, in the state of New York; and also from the La Salle, or Sale, Seine, Assiniboine and Red rivers, in the province of Manitoba; and the Winnipeg River, in the province of Ontario. Many observations of the waterstriders on the surface of these rivers indicate that they confine themselves, in the main, to the vicinity of the banks. In fact, it may safely be stated that this species of gerrid is not to be considered as an open water form. Even on the smaller brooks and creeks, they are generally found near the banks.

It has already been stated that *Gerris rufoscutellatus* is an inhabitant of sluggish waters. Therefore, it should be present on the surface-film of pools, ponds and lakes, and such is found to be the case. The writer has captured this species of gerrid on many bodies of standing water in the following regions: on the surface of Three Sister Lakes, near Ann Arbor, Michigan; on pools in the vicinity of Milwaukee, Wisconsin; on many small and large pools, ponds, ox-bow ponds or *bayous*, on the drainage ditch and on the surface of Crystal Lake, all being in the region roundabout Urbana, Illinois; on the surface of pools, ponds, swamps and on Lakes Oneida and Onondage, in the neighbourhood of Syracuse, New York; and also on the surface-film of pools, ponds—particularly two small ponds on the grounds of the University of Manitoba—and on Netley Lake and Lake Winnipeg, in the region of Winnipeg, Manitoba; and on the Lake of the Woods, near Keewatin and Kenora, Ontario.

The list of standing and running bodies of water, which has been given, indicates to some extent the wide distribution of this species of gerrid. It is very common indeed all through southern Manitoba. In fact, there is no region, known to the writer, where *Gerris rufoscutellatus* is found in such large numbers as in this province. Its geographical distribution, on the North American Continent, is one of the most extensive of the aquatic Heteroptera.

A brief statement should be given concerning the ox-bow ponds and the drainage ditch that have been mentioned. The ponds or *bayous* are situated at points near the bends of some river. The ones to which reference has been made were found along the course of the Vermilion and Sangamon rivers, in the state of Illinois. An ox-bow pond is the result of the cutting off of a meander. The neck of land between two loops or curves of a river becomes so narrow that eventually the stream cuts through it. The river then abandons its wide curve, which becomes an ox-bow pond. These *bayous* are often very rich in aquatic insect life. Water-striders are abundant on the surface, for there is generally a good supply of drifting insects, entangled in the surface-film, which serves as food for the gerrids. Therefore, such bodies of water are found to be very suitable for these semiaquatic forms. The body of water known as the drainage ditch is a government project, and is for the purpose of draining the excess water from low land. In a general way, this drainage ditch follows the course of West Branch, which is a tributary of Salt Fork, one of the affluents of the Vermilion River. The creek known as West Branch has been dredged, the result being that the stream is changed in character. In the vicinity of Urbana, its current is very sluggish. The bed of the drainage ditch is, in many places, of deep mud. It contains some sewage, and part of the year the water is turbid. The depth of the water varies

from two to fifteen feet, and the width of the creek is from about twelve to twenty five feet. Trees, grasses and herbaceous vegetation are found along the banks. Many soft-bodied insects reach the water from this vegetation and serve as food for the gerrids found on the surface film. The drainage ditch is an excellent breeding place for millions of mosquitoes, upon the pupae and adults of which the water-striders feed voraciously.

Gerris rufoscutellatus is frequently observed, on the surface of both standing and running bodies of water, in shaded situations. This is particularly the case when the temperature is high, during the heated periods of June, July, and August. It is not an uncommon occurrence for the temperature to reach ninety-five to one hundred degrees Fahrenheit in the vicinity of Urban, Illinois; and in the region of Winnipeg, Manitoba, the temperature, occasionally, may reach ninety-three to ninety-six degrees Fahrenheit during these months. From about eleven in the morning until about four in the afternoon, the open water on many streams, and standing bodies of water, is entirely free from these gerrids. If they are sought for diligently it will be found that they have not left their habitat, but that they are congregated in "concealed" situations. They will be discovered in such places as under the overhanging banks of brooks and creeks, where they are in the shade; in shaded areas near rocks and driftwood; in shaded regions made by aquatic and semiaquatic vegetation, such as *Alisma plantago* and *Sagittaria*; in the shade of trees and tree-roots, along the banks of streams and near the shores of ponds and lakes. They frequently remain quiet in these places for hours, the water surface being apparently deserted by these gerrids. It would seem that this form of behaviour was the result of a response to temperature, the water-striders moving into these shaded situations owing to a negative response to the hot rays of the summer sun. There is also the possibility that it may be the effect of a response to light, that is a negatively phototactic response. Experiments, under controlled conditions, are being conducted with the object of definitely proving this point. This much may be stated, that it has already been proved, in the laboratory, that *Gerris rufoscutellatus* is strongly positive to sunlight, moving rapidly toward the source of stimulation. In these experiments it was also found that, while the gerrids responded in a definite positive way to sunlight, when they wandered into the shade there was a tendency for them to remain there for some time, and that their activities decreased, until, eventually, they became very quiet. Such was the result in many instances. This sort of behaviour was in great contrast to their responses in sunlight, for when subjected to this form of stimulation they were extremely active. These points will be developed more fully in a later paper. De la Torre-Bueno (1911, p. 246) has noticed similar habitat response in the case of *Gerris remigis*, Say, a congener of *Gerris rufoscutellatus*. He states that: "They congregate in groups in shady, slow-moving parts of streams, at the tree roots projecting from banks into the water, in the shadow of bridges, and in general in almost any place where they have some shelter from the burning rays of the summer sun."

Gerris rufoscutellatus is responsive to moving objects and shadows. This form of behaviour is probably an adaptive response, and in certain instances may prove to be beneficial to the species. In general,

the response to large objects and shadows is a negative one, the gerrids moving rapidly away from the source of stimulation. Objects appear to produce a more definite response than do shadows. However, in a number of instances this was difficult to determine, and in other instances there was little or no difference either in the definiteness or promptness of the response. Rapid movements are more likely to produce responses than are slow ones. Moving objects of various kinds have been observed to serve as stimuli to the gerrids. They have been seen to respond to the following: a frog jumping into the water; fish leaping from and falling back into a stream; a bird flying near the surface-film, swallows and kingfishers particularly; branches of bushes and of trees tossing in the wind; pieces of driftwood and dead leaves drifting on the surface of a stream; leaves falling on to the surface of the water; snakes falling from the branches of trees into a brook; the swimming of a musk-rat near the shore of a lake; aquatic beetles, *Hydrophilus* and *Dytiscus*, emerging through the surface-film; and also the movements of the observer.

All large moving objects do not call forth vigorous negative responses. A piece of driftwood or a cluster of leaves, a foot or more in diameter, when drifting slowly downstream, does not always bring forth a very decided negative response from the gerrids. They may simply move to one side, dart out of the path of the object, and then stop, resuming their usual activities. Objects moving slowly and smoothly, as evinced by bodies drifting on the surface of a sluggish stream, are not nearly so effective in producing the negative response, on the part of the water-striders, as are objects that move more rapidly.

This enumeration indicates a great variation in the kind of objects that may act as stimuli to the water-striders. The response to all of these is a negative one; the gerrids dart away from the source of stimulation. This kind of behaviour is more or less of an adaptive character. The writer possesses evidence that frogs and fish, to some extent, feed upon *Gerris rufocinctellatus*. It is not improbable that some of the low-flying birds do so. In aquaria, the beetle *Dytiscus*, has been observed feeding on this water-strider, therefore, it is not unlikely that it does so in its own habitat. In this connection it is pertinent to direct attention to the observations of certain other investigators: Drake (1914, pp. 258, 259, 267) has proved that the frog, *Rana pipiens*, Shreber, feeds on the gerrid (*Gerris marginatus*, Say; from a statement made by de la Torre-Bueno (1917, p. 201), it is to be inferred that *Gerris remigis* forms part of the food of fish; and this investigator (1917a, p. 296) directs attention to the fact that frogs feed on the water-strider, *Gerris marginatus*. When all of the above information is taken into consideration, it is not unreasonable to believe that the negative response of *Gerris rufocinctellatus* to moving objects is more or less beneficial to this species of gerrid.

The stimulation of some moving objects does not call forth any negative locomotor response—that is movement away from the object. Certain small objects, when not larger than from, approximately, one-sixteenth of an inch to about two inches in diameter—dimensions not accurately measured drifting slowly on the surface of a sluggish stream may call forth positive responses. Small leaves, sticks, fragments of driftwood, particles of scum and foam generally bring about

a positive response on the part of the Gerrids. The water-striders may stride close up to these objects and then, in a few seconds, move away from them. Sometimes, the Gerrids move toward such drifting bodies, but after reaching a point within a few inches of them, the water-striders turn away. Such movements, as have been described, are suggestive of the feeding responses that are discussed later.

The response of *Gerris rufoscutellatus* to moving shadows is much like its response to moving objects, with the exceptions already noted. The water-striders will respond to the moving shadows of branches of trees, of low-lying clouds, of any high object drifting on the surface of the water, of large birds and of the observer. It is probable that the moving shadow of other objects will produce the negative locomotor response, and certain other observations have been omitted, as it was not possible to determine with definiteness whether the response was the result of the stimulus of the moving object or of the moving shadow. In this connection the observations of Whitman (1899, p. 293) on *Clepsine* should be recalled. The response of *Clepsine* to shadows is positive, and is probably adaptive and beneficial, as may be the case in the water-striders. The behaviour of *Gerris rufoscutellatus*, with respect to moving shadows, indicates that the decrease of the light-intensity—particularly a rapid decrease—as a result of these shadows, acts as a stimulus, the Gerrids moving away from the source of stimulation. This is an interesting fact when it is known that these creatures respond to a stationary shadow in a positive manner, frequently coming to rest in shady places. It is still more interesting when consideration is directed to the response of those Gerrids to sunlight and to other strong light, because their movements are towards the source of stimulation. Reference may be made at this point to the remarks of Holmes (1905, p. 344) on response to shadows. *Gerris orba*, Stal., a congener of *Gerris rufoscutellatus*, responds to moving objects and to moving shadows, the response evidently being a negative one, as observed by Essenberg (1915, pp. 398, 402).

Gerris rufoscutellatus is a carnivorous feeder, a fact that has been noticed by de la Torre-Bueno (1911, p. 249). The experience of the writer is that this Gerrid will feed on any sort of flesh food, with which it comes in contact, in its own habitat. Frequently, it feeds in a voracious manner, and the only requirement appears to be that the flesh must be of a sufficiently soft texture for the entrance of the mouth-parts of this water-strider. It feeds on decaying flesh as well as on fresh flesh. This species has been found feeding on the bloated dead bodies of crayfish, frogs and fish. Essenberg (1915, p. 399) has noted the scavenger-like food "habits" of the western water-strider, *Gerris orba*, found in the state of California, which evinces no discrimination between fresh insects and decaying matter as food. *Gerris rufoscutellatus* displays cannibalistic propensities from time to time. It will attack the weaker members of its own kind and suck out their body juices. It may be stated that the chief food of this species consists of the juices of soft-bodied insects, or of insects into which it can readily force its mouth-parts. The greater number of these are drifting insects that have become entangled in the surface-film, some of them being alive and others being dead.

For many years the writer has been collecting examples of the

food of this species of gerrid. Each food sample with the water-strider found feeding on it were placed in separate vials containing alcohol or formalin. The first food-collecting was done during a period extending from the early summer of 1911 to the late spring of 1913. Numerous bodies of both running and standing water were searched within a radius of thirty miles of Urbana, in the state of Illinois. A second collecting period extended the interval from the early fall of 1917 to the late summer of 1920. This collecting was done from water-strider habitats within a radius of thirty miles of Syracuse, in the state of New York. A third period of collecting food insects of *Gerris rufoscutellatus* was during the summers of 1921 and 1922, when water bodies within a radius of thirty miles of Winnipeg, in the province of Manitoba, were carefully examined.

(To be continued.)

New races and forms of Palaearctic Grypocera.

By ROGER VERITY, M.D.

(Concluded from page 57.)

Hesperia fritillum (Hb.) Rev., race *fabressei*, Obth., *Et Lép. Comp.*, IV., p. 412. fig. 518-520, and form **parafabressei**, mihi, and form **nigrocarens**, mihi.—Oberthür in 1910, figured and described under the name of *fabressei* three insects from the Lozère and from the Sierra Alta in Spain, which he took to be the southern race of *americanus*, Obth. Subsequently, however, he himself put this in doubt and in fact it is now quite clear that those specimens belong to the species Reverdin has perfectly established under the name of *fritillum*, Hüb. That of *fabressei*, notwithstanding, is not wasted, because, as Oberthür points out in Vol. VI., p. 99, Hübner's typical specimen (a female), as also the male figured by Herrich-Schäffer, belong to the subalpine race of the species, with a rather dull and very saturated tone of tawny or of chestnut, as in Lecrenze's figure in *B. Soc. Lép. Genève*, II., pl. 3, fig. 4, or even of chocolate brown, as in Hübner's figure, on the underside of the hindwing. These dark forms are met with everywhere individually, as shown by Oberthür's figure 1281, of a female from Saint-Zacharie, near Marseilles, where the race on the whole is distinctly *fabressei*, but that author states that they are frequent in the Basses Alps and that they constitute entirely a series he has from Arcine, near Geneva. I possess a similar one from Gex and Crozel, 650m., at the foot of the Jura, of August and September 8th. The name of *fabressei* can be used for the southern race, which in the II. gen. has predominantly a clear and often vivid fulvous underside. Oberthür's fig. 1280 shows that also at Digne, the II. gen. produces a *fabressei*-like form, but it differs from the nymotypical one of drier and hotter localities than the Alps, by its much darker forewing on underside and by the more saturated tone of red also of hindwing, revealing its closer connection with nymotypical *fritillum* of the same locality (see fig. 506). I should name it *parafabressei*. In Central Spain the II. gen. of July consists nearly entirely of *fabressei*, whereas the I. gen. contrasts with it by its constantly gray

underside, with no fulvous, so that Oberthür's name of *herrichii*, given to a Digne specimen, fig. 508, applies to it perfectly because in *fritillum*, as in *armoricanus*, the I. gen. does not seem to vary geographically. I find no evidence of the existence of a third generation. Oberthür has named *siciliae* in Vol. VI., p. 100, a small specimen from Sicily figured in Vol. IV., fig. 505, but it will be well to make sure that it is not an *armoricanus*. To the latter I am now convinced one must refer the females from Tuscany I mentioned in *Bull. Soc. Ent. Italiana*, XLV. (1914), p. 161, as having been named *fritillum* by Reverdin, with a doubt, owing to their sex. Thus, *fritillum* for the present has not been found in Italy. The specimen figured by Reverdin, *Bull. Soc. Léop. Genève*, II. (1910), pl. 4, fig. 11, from Tramelan (Jura Bernois), is remarkable by its very pale gray and cold tone of upperside, combined with a dull pale, tawny underside. It will be interesting to see whether this is a race; anyhow the form is worth naming *nigrocarens*; it stands opposite *parafabressei*, which is saturated with pigment. Finally, to complete this revision of geographical variation, I must mention the dwarf and dark (brown on underside) race of northern France named *cirsii* by Rambur in his *Faune Andal.*, II., p. 315, pl. 8, fig. 12 from Fontainebleau (Paris), August specimens and figured by Oberthür (fig. 1285-8) from particularly small and blackish brown ones. I must also mention form *iberica*, Gr.-Gr., *Horae S. P. Ross.*, 1893, p. 384, because Reverdin maintains, by the genitalia and other features, it is unquestionably a variety of *fritillum*. It is probably the most highly characterised form of the II. gen. of Spain, more extreme than *fabressei* by the intensity and warmer tone of the fulvous on underside. The race of Aragon and Castile should thus bear this name.

Hesperia armoricanus, Obth., form and race **rufosatura**. mihi.— This species does produce the form parallel to *fabressei*, which Oberthür meant to describe and it should be distinguished by a name, which I suggest being *rufosatura*, on account of the amount of fulvous on both surfaces. In Italy it never seems to predominate, although it is not rare, especially in the female sex, in particularly hot and dry localities, and in the III. gen. *fulvoinspersa*, Vrty. I take as "types" my male N. 133 (September 2nd) and my female N. 141 (August 24th) of series in glass-mounts from Fontebuona di Vaglia, 350m., near Florence. In Spain, around Barcelona, the September emergence consists nearly entirely in a form exactly similar to this one, so that the name *rufosatura* applies to the entire generation and, in consequence, to the entire race, to distinguish it from the Italian race *fulvoinspersa* and from the nymotypical northern race, which has two generations quite similar to each other (judging from the series from Brittany sent to me by Oberthür) and to the I. gen. of all these regions. There remains to be seen whether the II. gen. of Spain is the same as in Italy: *tersa*, Vrty., *Ent. Rec.*, 1924, p. 107.

Hesperia onopordi, Rambur, *Faune Andal.*, II., p. 319, pl. 8, fig. 13.

Race *onopordi*, Ramb. (Southern Spain, North Africa, and perhaps Southern Calabria): I. gen. *onopordi*, Ramb.; II. (and III. gen. ?) **venusta**, mihi, or (in secondary race) **nigrosatura**, mihi.

Race **pallidissima**, mihi (Mountains of Central Spain: Albarracin

Sierra): I. gen. *pallidissima*, Vrtv.; II. gen. **pallidissimefulva**, mihi.

Race *fulvotincta*, Vrtv. (Italy, France, Catalonia, and presumably the lowlands of other Spanish provinces): I. gen. **subconyzae**, mihi, or **tersissima**, mihi; II. gen. *tersior*, Vrtv., or **rubescens**, mihi; III. gen. *fulvotincta*, Vrtv., or (in secondary race) *nigrosatura*, Vrtv.

Secondary race *quercii*, Obth. (locally in Italy): generations not well known.

Race *conyzae*, Guenée (The Alpine region); generations unknown.

Rambur's figure unmistakably represents the I. gen. (the late autumn one is probably similar to it) of the race, which seems to predominate in Southern Spain and in North Africa (a single specimen collected by Querci on the Aspromonte, at 1,200m., in Calabria, differs from the other Italian ones and suggests this race also there); it is well figured also by Oberthür from Lambèse and Sebdoou (fig. 524-6). It is characterised by its saturated colouring: the underside of forewing is very black; the bands of hindwing are of a greenish gray, and they stand out sharply on the white, because their outlines are marked by capillary black streaks. The summer generation or generations correspond perfectly to it, with the difference that the greenish gray is replaced by tawny or vivid fulvous, or reddish fulvous as in *rubescens*, which show off the black capillary streaks, producing a more neat and pleasing effect to the eye than in any other form of the species; Oberthür's figure 527 gives a tolerably good idea of it (*venusta*, mihi). The fulvous is usually brighter and clearer in the female sex; in the male the black streaks tend to broaden and shade it over. I have a series from Fez, in Morocco, collected in August by D. Lucas, in which the fulvous bands are thickly dusted with black in the males, and even in the females they are veiled over (secondary race *nigrosatura*, mihi). In Central and Northern Spain variation is extremely broad and produces two extreme forms, which in some localities are quite racial. One is a giant as compared with the rest of the species, but it is exceedingly washed out in colour on both surfaces; in its I. gen. the bands of the underside of the hindwings are of such a pale green that their outlines would scarcely be visible if they were not marked off by sharp black streaks (*pallidissima*, mihi): in the II. gen. the same may be said of the pale fulvous (*pallidissimefulva*, mihi). It seems to be chiefly the mountain race in dry Sierras such as that of Albarracin, although Oberthür records specimens as large as his *H. numida* also from Africa, which may be like these Spanish ones. The other extreme Spanish form, such as exists in the neighbourhood of Barcelona is similar to the race of Peninsular Italy. I have named its summer generations *fulvotincta* in *Ent. Rec.*, 1919, p. 27. Subsequently, in 1924, p. 107, I pointed out that there exist three generations and I separated the II. under the name of *tersior*, restricting the one of *fulvotincta* to the III. I find that Querci has collected *fulvotincta* in large numbers in September at Barcelona and that Oberthür figures *tersior* most perfectly from Vernetles-Bains in the Pyrénées Orientales (fig. 528-9), so that evidently the race extends from Italy through the south of France into Spain. Now I have made out the features of nymotypical *onopordi*, as described above, it becomes obvious that the I. gen. of Peninsular Italy is not in the least identical with it, as I thought hitherto: on the whole it is smaller and frailer, the wings are narrow and more pointed, the colours

are paler and on the underside of hindwing there never are any distinct capillary black streaks marking off the outline of the white spaces. Individual variations are, however, considerable and they fall well into two series culminating in two extreme opposite forms, one of which is like the Alpine race *conyzae*, Guenée, *Petites Nouv.*, 1877, p. 145, figured by Oberthür from one of the types of La Charnée (Savoy) (fig. 530-1), and the other is like *tersior*. I think it is more correct and clearer to reserve the name of *conyzae* for the Alpine race and to introduce the name of *subconyzae* for the I. gen. of the plains, most individuals of which are rather larger and have the white spaces of the underside of hindwing more reduced and sharper in outline, and the bands with a more decided touch of yellow in most males and decidedly ochreous in all the females ("types" from Florence N. 1 and 24 in my series); Oberthür's figures 521-2 from the chalk plains of Central France resemble them, but they are colder in tinge on both surfaces. As to the other, *tersior*-like, form, it is larger, as a rule, than *subconyzae*, and it has broad bands of a pale ochreous colour (less warm and bright than in *tersior*), quite clear of black powdering and very sharp in outline; the upperside is usually washed over with a grey powdering as in Oberthür's figure 528, a feature which is not seen in the Italian *tersior* of the II. gen.; I should name the spring form *tersissima*, from the individuals which occur not uncommonly near Florence especially in very dry localities and late in the spring (N. 3, 7 and 24). A series of specimens, sent to me by G. Foulquier, from Septimes, near Marseilles, and collected on May 9th, consist nearly entirely of highly characterised *tersissima* and thus constitute a race strikingly different from the *subconyzae* one figured by Oberthür from Central France. Very probably the former is the I. gen. also at Barcelona. In Italy race *fulvotincta*, considered on the whole broadly as a primary race, produces, besides considerable individual variations everywhere, some remarkable local ones, which constitute what in dealing with other genera, I have called secondary races. Thus Oberthür has named *quercii* (Vol. VI., p. 107, fig. 1328-30) the one discovered by Querci in May at Polleca, 700m., in the Aurunci Mts. (prov. of Caserta) and found again, also in other generations, at Sefro in the Piceno and in the Lessini Mts. in the Venetian prov. of Verona. Its features are small size, upperside with a thicker white veil, than is seen in other forms, and the white spaces of the hindwing very broad and prominent on both surfaces. In another secondary race I collected in an exceedingly hot and dry locality by the sea at Quercianella, near Leghorn, during August it is the black pigment which is unusually increased on both surfaces, so that it is quite similar to the *nigrosatura* of Morocco. In a third race, found at Palazzuolo in Romagna on the Adriatic watershed of the Apennines at 700m, the II. gen. (middle of July to middle of August), scarcely produces any *tersior*, but resembles more the III. gen. *fulvotincta* by having the fulvous bands of the underside partly clouded, in patches, with gray; the chief local feature, however, is that the fulvous is often of a bright reddish tone, such as I have not seen in any other locality in this species; judging from other allied ones, it may be expected, especially in Southern France and in Spain; it can be recorded as *rubescens*, mihi.

Hesperia cacaliae, Rbr., *Faune Andal.*, II., p. 313, footnote, pl. 8, figs. 6 and 7.—"Types" collected in 1825 in the mountains above the

Grande-Chartreuse de l'Isere. I give this quotation of the original description of 1839 or '40 to complete those of the species discovered by Rambur. As I have observed at page 42, incredible as it may seem, no author has ever quoted their first description.

Hesperia sidae, Esp., race **occidua**, mihi=*occidentalis*, Vrty., *Ent. Rev.*, 1919, p. 27. - When I gave the latter name to the smaller, more lightly coloured and less boldly marked western race of this species to distinguish it from the giant nymotypical race of the Volga, I was not aware that it had been used by Lucas, *B. S. E. France*, 1910, p. 62, for a race of *H. serratulae*, Rbr., so that it must be renamed here.

ADDITIONAL NOTE TO *HESPERIA RYFFELENSIS* (OBTH.) REV.—I find Prof. Rebel, in a paper on these *Hesperia* in the *Verhandl. Zool.-bot. Gesellsch. Wien*, 1914, *Vers. Sek. Lepid.*, p. 191, claims the priority of his own name *alticola*, published in *Berge*, IX., *Aufl.*, p. 84 (May, 1909), from specimens of the Stelvio Pass (Stilfserjoch). The species should thus be called *H. alticola* (Rebel) Rev., instead of *ryffeleusis*.

Notes on Spanish Lepidoptera.

By Dr. ROGER VERITY, M.D.

The abundant material and the observations collected last year by Querci and Romei in Spain have been a valuable contribution to some interesting questions. A series of *Zygacnae* from Albarracin, which at first sight seem to belong to a single species, consists, on the contrary, in a mixture of *filipendulae* race *gemina*, Burgeff, and of *lonicerae*. When the former is eliminated the latter strikes one as a race different from any other Spanish race and I propose distinguishing it by the name of **intermixta**, mihi, which I will deal with at length very soon. Suffice it, in this preliminary note, to say it is intermediate in structure between *trifolii* and *lonicerae*; its structure thus brings it nearer the latter subspecies than are the other races of Spain; its tone of red is more crimson; the marginal band of hindwing more narrow; the spots of forewing are never confluent; the sheen is always indigo in both sexes and only slightly greenish in a few females.

There is in literature some confusion in connection with the name of *lorquinii*, H.S. Most authors consider it a geographical variety of *Cupido minimus*, Fuess. Staudinger in 1901 gives it as a species, but suggests it may be a variety of *sebrus*, B. The explanation of this is that there exist in Spain two species, as in other regions, one closely connected, if not co-specific, with *minimus*, the other with *sebrus*. The name of *lorquinii* has been applied to both. In reality the original figure and description clearly apply to the first, which I possess from Granada and Africa. Querci has collected at Albarracin the *sebrus*-like race, very different from it, by the features which distinguish the two species everywhere. The Spanish race of *sebrus* differs from the nymotypical one of France and Italy by its smaller size, darker tone on both surfaces and more prominent black spotting on underside. The central row is in most cases much straighter, precisely as in *lorquinii*, but individual exceptions are not rare. Tutt's *moreana* of Greece is probably a *sebrus* too. The Albarracin race I should call **pseudolorquinii**, mihi.

Preliminary description of a new Spanish race of *Powellia sao*.

By B. C. S. WARREN, F.E.S.

In view of the results of Sig. O. Querci's expedition to Spain last summer, the following brief description of a very interesting Spanish Hesperid may be of use. The full details of both structural and superficial characteristics of this insect were worked out long ago in the preparation of a monographic work on the Hesperids; but as for various reasons this work cannot be published for some time to come, I felt it desirable to publish a brief account of this form without further delay.

Powellia sao race **guadarramensis**, nov.—The largest known form of the species, averaging 30-31mm. (centre of thorax to tip of forewing $\times 2$). Very richly coloured; the light superscaling on the basal area of the upperside of the forewings, golden-yellow. On the underside of the hindwings the ground colour is vivid red, much deeper in shade and more brilliant than it is in Central European specimens. The average size of type *sao* is 26-28mm.

The type specimens of *guadarramensis*, which are in the Oxford University Museum, were taken at La Granja by the late Rev. F. E. Lowe.

The great size of this race, which is more remarkable than the measurements would lead one to suppose, is particularly interesting when one recalls that almost the commonest form of *sao* in Central Spain is the tiny race *gracilis*, Vrtz., which occurs with typical sized *sao* all over the country; yet in the central districts this great race is produced in company with the typical sized and very small races. Mr. Lowe suggested, in 1908, that *guadarramensis* was possibly a distinct species, which idea has recently been put forward again by Sig. Querci. Thanks to the kindness of Prof. Poulton, I was lent the whole series of Mr. Lowe's specimens, and allowed to dissect some of them; the resulting mounts showed, however, that these giant Spanish specimens are, anatomically, indistinguishable from type *sao*, and from the other forms of Spanish *sao* too. The type specimens of race *guadarramensis* will be illustrated later on.

A new form of *Sarrothripus revayana*. Race *columbana*, nov.

By Hx. J. TURNER, F.E.S.

Some time ago Mr. Wm. Fassnidge, M.A., of Southampton, sent me 2 specimens of a form of *Sarrothripus revayana* which he had obtained by beating at Le Chambon, Haute Loire, France, in August, 1924. As I could not trace the form in any work known to me and it was not included in the British Museum Collection, I referred to Mr. Sheldon, who has recently been working at the species and who is quite familiar with all the numerous forms hitherto described. He informed me that the form was quite unknown to him.

Appended is the description.

The forewings are of a beautiful uniform dove grey colour, with the whole of the usual markings so suppressed, as to be only suggested at certain angles of view, as being extremely faintly picked out in brown (?). The only noticeable marking, if at all, is a very ill-defined triangular costal

area of a suggested brown shade. Not a single one of these markings is emphasised, they can only be seen indefinitely when carefully looked for. None of the red, black, green, etc., definite markings, so prominent in the majority of the numerous forms of this protean species, are even suggested. The subterminal black blotches, which are a strong characteristic of most of the forms, are suppressed in the general scheme as described above. The row of black marks on the extreme outer margin in most forms is present in a much attenuated development and dull in colour.

The hindwings are grey, hardly pale, shading darker towards the margin (outer.).

Mr. Fassnidge has since sent me half-a-dozen more of this form and four other examples with more or less developed markings, but very different from each other. He says "The locality is Le Chambon de Tence, Haute-Loire. Altitude 3,000 ft. Foodplant, beech. There is not an oak in the district, nothing but beech and pine, and a very few birch and juniper. I took the specimens while beating beech for larvae of *Cerura bicuspis* of which I got some thirty odd. There were 21 of the grey form and only four other specimens. It is obvious that this grey form is the type in that particular locality, and I can assure you, that I missed a fair number of them, as you can imagine from the method of capture. One or two specimens only were beaten from Scots pine when beating for *Dendrophila pini* and *Sphinx pinastri* larvae."

Apparently this form is a local race and is quite as worthy of a separate racial name as some of those already possessing names. I propose calling it race **columbana**.

NOTES ON COLLECTING, etc.

AGROTIS SUBROSEA, STPHS., ON THE CONTINENT.—In August, 1923, I caught on a fen in the district of Soltau, Hanover, some specimens of an *Agrotis*, unknown to me by the light of my lantern. The specimens I caught were already rather worn, but I succeeded in getting at least a few, which were in good condition. While setting the moths the following day, I found them to be very similar in size and shape to *Agrotis subrosea* v. *subcaerulea*, Stgr., but for the colour of the wings. I was much surprised at the capture of these strange *Agrotis*, for I did not expect at all to find *Agrotis subrosea*, that famous unhappily extinct British species. And yet I could not doubt these to be of the genuine British type, though I read in our German text-books and in Tutt: *The British Noctuae and their Varieties* (vol. 2 p. 59) that the typical form is unknown on the Continent of Europe.

Comparing my specimens with var. *subcaerulea*, Stgr., I found very soon that there was a very large difference between them, my specimens being brown, the freshest dark red-brown and not ashy-grey as var. *subcaerulea*. Reading Tutt's description, p. 59, I was sure that my moths could only be identified as *Agrotis subrosea*. How glad I felt!

Not only in Hanover has *subrosea* been found. In the same year, 1923, the first specimens were caught by a Hamburg collector in the southern part of Schleswig-Holstein. Also near the town of Stettin, Pommern, some specimens had been captured some years ago and vaguely supposed to be *subrosea*. But near Stettin as well as near

Hamburg there were more or less *subcaerulea* among the *subrosea*, whereas, as yet, I have only found the type form.

In *Int. Ent. Zeitschrift*, 1924, p. 182, G. Warnecke describes a new form of the Hamburg *subrosea*, f. *decipiens*. "Forewings dark red-brown, lines and stigmata grey shades. Orbicular in a black-brown broad line touching the reniform as in *Noctua triangulum* and *N. ditrapezium*. Hindwings, especially in the female, up to the base strongly blackened. Underside of all the wings, especially near the costa, dark red-brown tinged with black. Thorax like forewings. Abdomen greyish black." The two bred and one caught specimens belong to this form. The author supposes this form to be a melanotic one.

But this is only one of the *subrosea* varieties, there are others as my specimens show. Before describing some other new forms I think it better to wait for more bred specimens. This year I hope to succeed in finding the caterpillar of *subrosea* which feeds on heath. I shall write some lines about the breeding results and the further variation of our species in this paper.—(DR.) VICTOR G. M. SCHULTZ, Soltau, Hanover.

COLLECTING DIPTERA.—During May and early June search sandy banks and similar localities frequented by *Andrenidae* and other burrowing Hymenoptera for species of the genus *Hylephila* (*Anthomyiidae*). These flies are reputed scarce, but it is more probable that they are very local and rarely stray from the neighbourhood of the burrows of the bees in which they breed. *H. obtusa*, Ztt., has been taken at Primrose Hill, London. *H. personata*, Collin, and *H. sponsa*, Mg., are recorded from scattered localities in the middle and south of England.—H. W. ANDREWS.

CURRENT NOTES AND SHORT NOTICES.

The Hon. Treasurer would be much obliged if those who have not already paid their subscriptions for the current volume would do so at their early convenience.—H. W. ANDREWS.

In reply to several enquiries for copies of the "List of Macrolepidoptera of Hampshire and the Isle of Wight" recently issued with the *Entomologist's Record* as a supplement, we wish to say that copies can be obtained from Wm. Fassnidge, Esq., M.A., 47, Teunyson Road, Southampton, at half-a-crown each.

Signor Querci writes that his daughter and her husband Dr. Romei have been collecting in Tripolitania during the last three months. They have made long trips over much of the region, and twice they have been on the Garian Mts. They did splendid collecting at Bu-Gheilun a distant and hitherto unexplored spot. The cold further south was so bad that a trip to Tarhuna and Ben-Ulid across 80 miles of desert, where a European woman has not before been, was unfortunately unsuccessful, the collecting being very poor. Rain and cold prevented a further trip to the Oasis of Ghadames, 400 miles S.W. of Tripoli. Still the results of the expedition were quite good scientific-

ally. In early May the whole Querci family again go to Spain for the whole summer.

The Council of the Lewes Scientific and Literary Society, is anxious to secure for the town of Lewes a portion of the Collections of the late Mr. J. H. A. Jenner, F.E.S., not only on account of their intrinsic value, but as a memorial to him and his work in the district.

The Collections were acquired during the past 60 years, many of the specimens being obtained in Lewes or its immediate vicinity—and it is thought that such an interesting Collection should not be allowed to leave the town.

A sum of £160 is required to purchase these and the Council ask in the first place for guarantees towards the sum required. Should the response be satisfactory they will be in the position to close with the offer, which they desire to do as soon as possible.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

January 8th, 1925.—The President in the chair.

Dr. Cockayne exhibited preserved larvae of *Habrosyne derasa* to show asymmetry of the spotting.

Mr. Vredenburg, a collection of Coleoptera from Zululand.

Mr. Newman, aberrations of *Arctia caja*, (1) Forewing mostly dark, hindwings banded, fringes black, (2) black veins running through the ground on both wings, (3) abnormally white.

Mr. Enefer, the "churchyard" beetle *Blaps mucronata* from Blackheath.

Mr. Hawkins, aberrations of *Camptogramma bilineata* from Herne Bay, (1) a banded form without waved markings, (2) very dark examples, (3) with much intensified waves and lighter middle band, etc.

Mr. H. W. Andrews, a number of species of Diptera carriers of disease, lent him by Dr. G. A. K. Marshall, to illustrate his paper "Flies and disease," of which he then read the concluding portion and subsequently exhibited a large number of lantern slides on the subject.

January 22nd, 1925.—ANNUAL MEETING.—The usual annual reports were presented and passed. From the Bequest of the late Lachlan Gibb, the donations of the Misses Chapman in memory of their brother the late Dr. Chapman, and other sources the Society now has considerably over £500 invested, with a membership of about 230. The names of the Officers and Council elected for the year 1925 were announced, the retiring President Mr. N. D. Riley, F.Z.S., F.E.S., read the annual address and then vacated the chair for the new President, Mr. T. H. L. Grosvenor, F.E.S. Votes of thanks were passed.

ORDINARY MEETING.—Mr. L. W. Watts, of Chiselhurst, Mr. J. Davis-Ward, of Grange-over-Sands, and Prof. Maxwell Lefroy, Imperial College of Science, were elected members.

Mr. Steg exhibited Indian moths sent to him by his son from Calcutta, attracted by light, viz., *Theretra pinastrina*, *Asota ficus*, *Othreis fullonica*, *O. materna*, and *Rhyncholaba acteus*.

Mr. Dennis, a spray of "butcher's broom" in fruit from Cambridge. It was remarked how seldom it was found fruiting in the wild.

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MEETINGS OF SOCIETIES.

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

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. May 14th. May 28th, Prof. Maxwell Lefroy, "The Balance of Nature," lantern.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., W. E. GLEGG, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.

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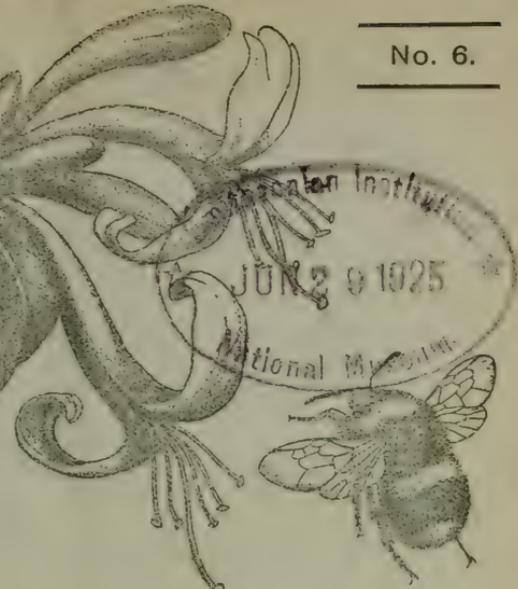
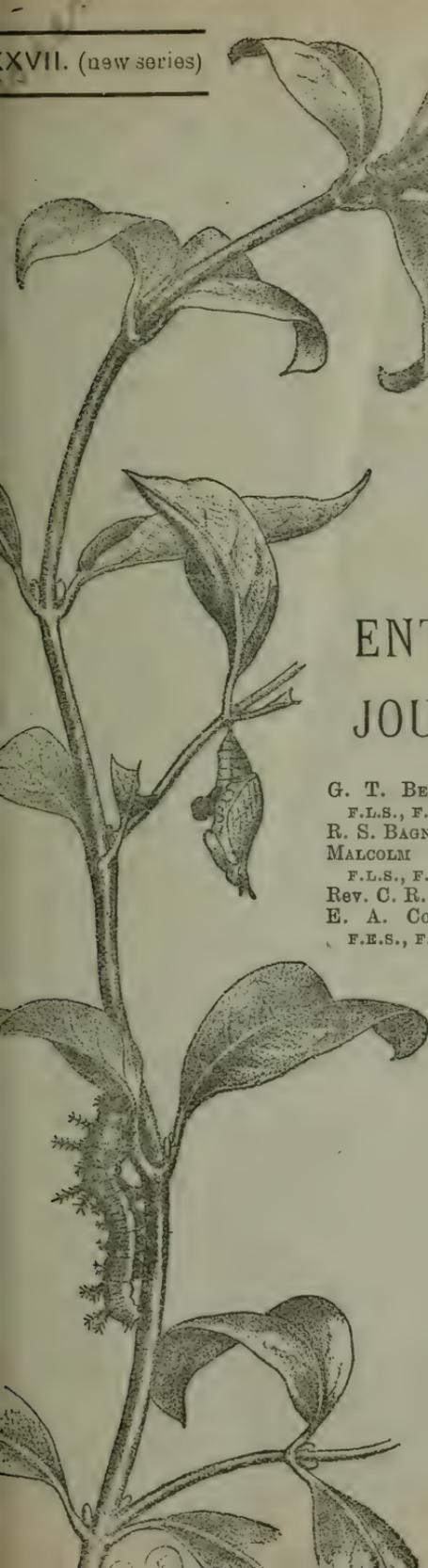
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Butterflies at Cortina in June, 1924.

By E. SCOTT, M.B., H. J. R. TWIGG, Major I.M.S. (Ret.), and
D. W. SETH-SMITH.

In June, 1924, the three of us visited Cortina and collected butterflies in the neighbourhood. Unfortunately the weather was far from ideal and two spells of soaking rain from June 12-14th and from June 20th-23rd did much to delay the emergence of species. Our departure on the 24th, coincided with the incidence of a spell of really hot days. Too late, alas! The general rule was fine mornings with dull windy afternoons. The inhabitants told us that June was always an uncertain month. However, the fine days or portions of days that we enjoyed were sufficient to give more than a glimpse of the possibilities of the insect fauna. The luxuriance and freshness of the vegetation after a prolonged winter did much to enhance the beauty of the scenery and may have been responsible for the generous size of many of the commoner species of butterflies.

Cortina itself is situated in the heart of the Dolomites at an altitude of 4000 ft.: it lies in a wide open valley watered by a river, the Boite, which flows north and south. The general trend of the valley is the line of the river, but it is also open to the east where it slopes gradually up to the Tre Croci pass (alt. 5500ft.) and to the west by a steep gap which leads to the Falzarego. Elsewhere the valley is surrounded by lofty mountains. Collecting grounds on slopes and meadows abound on all sides. A narrow gauge railway runs northwards to Schanderbach and Toblach (now renamed Carbonin and Dobbiacco) and southwards to Pieve di Cadore. This places somewhat inaccessible spots within easy reach of the visitor at Cortina. To the north it takes us to the somewhat gloomy pine clad mountains, which are the haunt of *Melitaea matura*, *Brenthis thore* and *Polyommatus (Vacciniina) optilete*, and to the south to Pieve and the Cadore Dolomites, where the scenery begins to assume a more Italian aspect.

Our favourite collecting grounds were.

(1) The meadows surrounding Cortina.

(2) The river banks northwards as far as Fiammes, the next stopping place on the railway.

(3) A rough stony area near the river south of Cortina sparsely covered with grass, flowers and dwarf willows.

(4) A patch of sloping Dolomite Scree, with trees and shrubs and meadows at Borca facing south. Borca is on the railway about 10 miles south of Cortina.

(5) A rough escarpment at Pieve di Cadore leading down to the River Pieve like an undercliff with meadows and marsh and woodland. Insects here were a fortnight in advance of these at Cortina.

Our visit was too early for the *Erebia*s for which the district is, I believe, justly famous. Well-known localities are the Falzarego and the Croda di Lago. Less accessible but no less promising I should expect to find the Val Travenanze of botanical fame. Who knows what rare and local species may wait to be discovered in the treasure house of this beautiful ravine.

Species taken or observed were as follows:—

Papilio machaon.—Not very common except among the pine trees
JUNE 15TH, 1925.

near the little station at Fiammes. There it was always to be found in abundance.

Papilio podalirius.—A few worn specimens were taken at Pieve di Cadore.

Parnassius apollo.—Locally common at Borca; all taken were ♂s and of large size spanning upwards of 80mm. The species in other places was widely distributed but scarce.

Aporia crataegi.—Fairly common.

Pieris brassicae.—Abundant everywhere.

Pieris rapae.—Fairly common.

Pieris napi.—Abundant from Cortina up to an altitude of 7,000ft. All taken were var. *bryoniae*. The ♂s with the nervures strongly marked and the ♀s of every degree of duskiness.

Pontia callidice.—Fresh and abundant at the top of the Falzarego Pass on June 20th. A stream was meandering through one of the alpine meadows and this was bordered along its course by a stretch of white stones. Here *callidice* was flying close to the ground in myriads, whereas the 'whites' flying over the grass were found in nearly all instances to be *P. napi*. The specimens taken were finely marked and large in size. The ♂s up to 50mm. Only two ♀s were taken.

Euchlōe (Anthocharis) cardamines.—Common.

Leptosia sinapis.—Common.

Gonepteryx rhamni.—Common.

Colias croceus (edusa).—Very scarce.

Colias hyale.—Abundant everywhere.

Limenitis rivularis (camilla).—A freshly emerged specimen was seen at Pieve on June 18th, and a pupa was found at Borca. The foodplant, the alpine honeysuckle, is common in the neighbourhood of Cortina.

Aglais urticae.—Common everywhere.

Pyrameis atalanta, P. cardui and *Vanessa io* were seen occasionally.

Euvanessa antiopa.—A few worn hibernated examples were seen along the river and a prolonged search was at length rewarded by the discovery of a newly hatched brood of larvae on a willow bush on the bank near Fiammes. These fed up very rapidly and produced imagines in August.

Eugonia polychloros.—A brood of half fed larvae was found on a willow at Pieve. The imagines that resulted were very deeply coloured.

Argynnis aglaia.—The ♂s were just emerging at Pieve on June 18th.

Argynnis niobe var. *eris*.—One fresh ♂ taken at Pieve on June 18th.

Issoria lathonia.—Not common.

Brenthis euphrosyne.—Abundant everywhere.

Brenthis thore.—Very local, 5 were taken at one spot near the river bank at Fiammes in a clearing among the pine trees. The first specimen was taken on June 13th, and the last on June 17th. The most diligent search in the neighbourhood failed to discover any others.

Brenthis amathusia.—Just emerging on June 21st, when it was fairly abundant and widely distributed. The specimens taken are all ♂s and large, 50mm., nearly as big as my ♀s from Switzerland. The black markings predominate and the row of black spots in the

hindwing, upper surface in most instances are joined to the marginal black Δ s.

Brenthis pales.—Began to appear at suitable spots at about 5,000ft. from June 16th. First seen in a sheltered meadow near the road from Schluderbach to Misurina. It was not out at the summit of the Falzarego on June 20th, but the turf there was swarming with nearly full fed larvae. I collected some of these and bred a few typical specimens. None of the larvae taken were ichneumonid so the number of imagines at this spot during July and August must have been amazing. Why, one sat on 50 larvae at a time! all rushing about in the sun in a tremendous hurry.

Melitaea aurinia.—One only taken at Pieve on June 18th. It is a fresh σ small, corresponding, I think, to var. *artemis*.

Melitaea maturna.—Fine and locally abundant among the clearings in pine woods and on the roads from Schluderbach to Misurina and from Schluderbach to Col Rosa. Not met with in the immediate neighbourhood of Cortina.

Melitaea didyma.—A few larvae were taken at Cortina. These produced typical specimens in July.

Melitaea athalia.—Not commonly met with. First met with on June 13th. It appeared to be widely distributed, but I do not think that it was properly out by the time we left.

Melitaea dictynna.—The commonest of the genus in June. First taken by the river on June 8th, afterwards it turned up in good numbers nearly everywhere. Specimens are of a good size. My largest ♀ spans 43mm. and my smallest σ 37mm.

Melitaea aurelia.—I have two specimens of a small *Melitaea* that I believe to belong to this species. They are certainly not *parthenie*. They are both σ s and span 31mm. One was taken at Borea on June 14th, and the other near Cortina. They probably belong to var. *rhaetica* as the black markings are narrow.

Hamearis (Nemeobius) lucina.—Scarce. Two ♀ s and one σ were taken at Pieve on June 11th. The ♀ s are remarkable for the darkness of the ground colour upper surface hindwings and the lightness of the streaks, which are white instead of fulvous.

Ruralis betular.—Larvae beaten from sloe at Borea produced typical imagines in August.

Strymon (Thecla) spini.—Four fresh specimens were taken at Pieve on June 18th. They were fond of settling on the leaves of the Acacia trees.

Callophrys rubi.—A few worn at Cortina.

Heodes dardis.—The only species of the family that we encountered. Along the banks of the Boite a few σ s were occasionally met with. They are large and of a unicolorous deep sepia, race *subalpina*.

Polygonmatas semiargus (acis).—Common everywhere. Large and brightly coloured.

Glaucopsyche cyllarus.—A few worn σ s and one fresh ♀ taken at Cortina. The latter was entirely brown on the upper surface. ab. *antereggii*.

Cupido minima.—Abundant.

Lycaena arion.—Very common in all meadows around Cortina

especially in the neighbourhood of streams. Varies from type to ab. *semiobscura*. Size from 35-42mm.

Polyommatus amandus.—Common in the meadows of Cortina and in the rough patch along the river south of the village. First appeared on June 17th. My largest ♂ spans 37mm. The ♀ is brown with very faint orange lunules upper surface, hindwing.

Polyommatus icarus.—Generally abundant, chiefly remarkable for the depth of ground colour in the ♀s. One beautiful specimen is almost black with faintly marked orange lunules edged with blue. The ♂s are large spanning up to 35mm.

Polyommatus hylas.—Only met with at Pieve, where it was fairly common. All specimens are very boldly spotted on the underside.

Polyommatus (Agriades) thetis.—Very common around Cortina. The ♀s are very distinctive. These possess no blue on the upper surface but the orange lunules are remarkably large. In some examples these lunules on the hindwings under surface appear as large vermilion blotches.

Polyommatus (Agriades) coridon var. *corydonius*.—One specimen of this beautiful variety was taken at Pieve on June 18th. The type *coridon* was not seen.

Polyommatus (Vacciniina) optilete.—Locally common near Fiammes. First taken on June 17th. Fond of damp places on sunny roads. Its foodplant vaccinium is common in the neighbourhood. All taken were ♂s.

Plebeius argus.—Very abundant on stony area along the river. A fine large race: the ♀s without any blue and with conspicuous lunules. The largest ♀ spans 34mm. the largest ♂ 33mm. Not met with elsewhere except by Major Twigg at Longarone, this type was very similar to that found at Cortina.

Plebeius aegon.—Only met with at Pieve where it was very abundant. The ♀s small without blue, the ♂s variable in size with very wide black border to the wings.

Plebeius (Aricia) medon.—Fairly common in most localities.

Plebeius (Albulina) pheretes.—One fresh ♂ taken on the Falzarego on June 20th.

Scolitantides orion.—This interesting species, of which only 4 were taken, was, apparently, widely distributed. The first example was taken at Borca on June 14th. Two were taken on the same sun-baked bank near Fiammes and one at Pieve. These 3 places are 10 miles apart from each other. The examples taken are well marked with blue.

Coenonympha pamphilus.—Was generally common especially on marshy ground. A distinctive feature is the under surface hindwings which are almost without markings and of a dull fawn colour.

Coenonympha arcania.—An interesting species which, in one of its many forms, was common everywhere. Var. *darwiniana* swarmed in the Cortina meadows. A magnificent form of the type was abundant at Pieve and at Borca midway in distance and altitude between the two places, both the type and variety were flying together. Here however the variety was of large size and only distinguishable by the dullness of the dark markings on the upper surface and the arrangements of the spots within the white band in the under surface hindwings. The largest ♀ from Borca spans 40mm. and the largest ♂ from Pieve spans the same.

Melanargia galathea.—Magnificent, fresh examples of var. *procida* were taken by Major Twigg at Longarone on June 11th. The species was not out at Cortina when we left.

Pararge maera.—Generally common. Fine dark specimens. The males in most instances possessed of a large apical eyespot with one pupil. The ♀s were grand creatures with a bi-pupillated eyespot and a small eye in the next interneural space above. They span up to 57mm.

Pararge hiera.—Common but worn at Cortina as soon as the pines are reached but fresh at Tre Croci at the beginning of June. The largest ♀ spans 45mm. and the smallest ♂ 38mm. There is considerable variation in the spots.

Pararge achine.—One ♂ was taken at Pieve on June 18th.

Pararge aegeria race *egerides*.—Occasionally seen but not common.

Epinephele jurtina.—Not emerged at Cortina when we left. One ♂ taken by Major Twigg at Borca on June 23rd.

Erebia medusa.—Immensely common everywhere around Cortina during our stay. Reminded one of *E. jurtina* in the meadows in England. The majority taken are poorly spotted and correspond with var. *hippomedusa*.

Erebia lappona.—Abundant on grassy slopes over 5,500ft. First met with at Tre Croci in June 10th, just emerging on a steep grassy bank facing north. Fine large specimens with the ♂s spanning up to 45mm. Transverse lines on under surface hindwings are in most cases well marked.

The black and white skippers were well represented and, although I do not profess to much skill in differentiating species and varieties in this difficult group, I think that the following particulars as far as they go are correct.

Hesperia malvae.—Generally distributed. The dark markings undersurface hindwings are greenish gray.

Hesperia sao.—Well distributed and typical.

Hesperia abens.—Very common and fresh at Borca on June 14th. A large form spanning up to 33mm. I have one specimen from Longarone and one from Cortina, but it was not common at the latter place.

Hesperia serratulae.—Very abundant in the Cortina meadows with considerable variation in the number and size of the spots on the upper surface of the forewings.

Hesperia cacaliae.—Several fresh specimens were taken in the alpine meadows at the summit of the Falzarego Pass on June 20th.

Nisoniades tages.—Common in the district.

Augiades sylvanus.—Common in the district.

Adopca lineola.—One fine specimen of var. *ludoviciae* was taken by Major Twigg at Longarone on June 11th.

Cyclonides palaemon.—This interesting butterfly was widely spread along the river bank near Fiammes and was also taken in a very restricted locality at Borca. Specimens varied greatly in size 24-31mm.

72 species in all.

Some Aspects of the General Ecology and Behaviour of the Water-Strider, *Gerris rufoscutellatus*, Latreille.

By C. F. CURTIS RILEY, A.M., M.S., F.E.S.

Assistant Professor of Zoology, University of Manitoba, Winnipeg, Canada.

(Continued from page 72.)

It is not the intention of the writer to give, in this paper, a complete list of all the food-insects that have been collected. A partial list will be recorded in order to indicate the great variety of insects used as food by *Gerris rufoscutellatus*. Among the food-insects collected in the vicinity of Urbana, in the state of Illinois, were the following: dragon-flies, *Sympetrum rubicundulum*, *Libellula pulchella*; white ants, *Termes flavipes*; red-legged grasshoppers, *Melanoplus femurrubrum*; grouse-locusts, *Tettigidea* sp., *Tettigidea lateralis*; short-winged grouse-locusts, *Tettigidea parvipennis*; crickets, *Nemobius fasciatus*, *Nemobius maculatus*; water-striders, *Gerris remigis*; lace-wing flies, *Chrysopa* sp., *Chrysopa oculata*; brown-tipped scorpion-flies, *Bittacus apicalis*; butterflies, *Lycaena comyntas*; skippers, *Epargyreus tityrus*; giant bee-flies, *Exoprosopa fasciata*; vertebrated robber-flies, *Promachus vertebratus*; flower-flies, *Allograpta obliqua*, *Mesogramma politum*; metallic milkweed-flies, *Psilopus siphon*; Conopid flies, *Physoccephala sagittaria*; ants, *Myrmica rubra*; wasps, *Odynerus vagus*, *Chlorion ichneumoneum*; and bees, *Melissodes obliqua*.

A partial list of food-insects collected in the region roundabout Syracuse in the state of New York, is as follows: May-flies, *Ephemera varia*; damsel-flies, *Argia violacea*, *Hetaerine americana*, *Calopteryx maculata*; dragon-flies, *Plathemis trimaculata*; stone-flies, *Perlidae*; alder-flies, *Sialis* sp.; lace-wing flies, *Chrysopa* sp.; crickets, *Nemobius* sp.; water-striders, *Gerris marginatus*; butterflies, *Neonympha* sp.; crane-flies *Chionea* sp., *Tipula abdominalis*; mosquitoes, *Aedes* sp., *Culex* sp., *Aedes canadensis*; midges, *Chironomus* sp.; robber-flies, *Dasyllis* sp.; flower-flies, *Eristalis bastardi*, *Eristalis compactus*; blue-bottle flies, *Lucilia caesar*; beetles, *Cicindela repanda*; and wasps, *Vespa maculata*, *Polistes variatus*.

Records from the field note-books of the writer indicate a great variety of food-insects collected from water-strider habitats in the region of Winnipeg, in the province of Manitoba. Some of the food-insects are given in the following list; May-flies, *Ephemera* sp.; Damsel-flies, *Lestes* sp., *Argia* sp., *Enallagma* sp.; dragon-flies, *Sympetrum obtrusum*, *Libellula pulchella*; stone-flies, *Perlidae*; grouse locusts, *Aerydium* sp.; meadow grasshoppers, *Orchelimum* sp.; crickets, *Gryllus* sp.; frog-hoppers, *Cercopidae*; leaf-hoppers, *Cicadellidae*; water-boatmen, *Arctocorixa* sp.; water-striders, *Gerris marginatus*, *Gerris rufoscutellatus*, *Gerris buenoi*; lace-bugs, *Acalypta* sp., *Galeatus* sp.; scorpion-flies, *Panorpidae*; caddice-flies, *Hydropsychidae*, *Neuronia* sp.; butterflies, *Phyciodes* sp., *Satyrus* sp., *Pieris rapae*; moths, *Deilephila intermedia*, *Samia columbia*, *Estigmene acraea*; crane-flies, *Tipulidae*; mosquitoes, *Aedes* sp.; midges, *Chironomus* sp.; flower-flies, *Eristalis* sp., *Syrphus* sp.; biting house-flies, *Stomoxys calcitrans*; house-flies, *Musca domestica*; horse-flies and deer-flies, *Tabanidae*; lady-beetles, *Coccinellidae*; wasps, *Vespa* sp.; and bees, *Bombus* sp.

Many of the insects, on which *Gerris rufoscutellatus* was feeding,

were dead when collected, while others were still living, the majority of the latter being small insects. Usually, this gerrid attacks the smaller living insects, with soft bodies, although, it has been found feeding on large living moths and butterflies, with water-logged wings. Most of the larger insects were dead at the time this water-strider was observed feeding on them. Insects with the harder exoskeleton were attacked through the sutures and softer parts of the body. In many instances, they were partially decayed and water-soaked, and frequently, the separation of the segments was evident.

The majority of the gerrids were observed feeding near the banks of brooks, creeks and rivers, and close to the shores of ponds, *bayous* and lakes. Records of feeding water-striders not captured indicate, that, when observed on roadside pools and ditches, they were near the shores. In the majority of instances, when *Gerris rufoscutellatus* was found actively feeding, there was vegetation in and in the vicinity of the habitat, from which many food-insects reached the water. In running water habitats, a large amount of food drifts downstream from points nearer the headwaters. *Gerris remigis* depends to a considerable extent on water currents to transport its food, although it is a fact that much insect food may be found in the immediate vicinity where the gerrids congregate. This species also responds strongly to water currents, probably the result of living in running water habitats. For further information on the response of *Gerris remigis* to water currents, attention is directed to an earlier paper by the writer (1921). *Gerris rufoscutellatus*, on the contrary, mainly inhabits sluggish or standing water bodies, and it is not so dependent on water currents for transporting its foods, neither does it respond to them with the vigor and precision found in the former species.

It has been stated that *Gerris rufoscutellatus* is neither so dependent on water currents for the transportation of food, nor so responsive to the stimulation of these currents as *Gerris remigis*. However, the former species does obtain some food through the action of water currents, and is to some extent influenced by their stimulation. This water-strider responds to moving objects, a fact to which attention has already been directed. When, in addition to the movements of the objects themselves, there is added the drift of the current of a stream, observation proves that this species of water-strider responds more readily to such moving drifting objects, than it does to moving but non-drifting objects. The response is usually a positive one, the gerrid striding toward, and, in many instances, up to these objects. In order to call forth a prompt positive response, it is necessary that these moving and drifting objects should be small in size. Many water-striders, on many different occasions, have been observed to respond positively to objects varying in size from one-sixteenth of an inch to an inch and one-half in diameter.

Many insects that serve as food to the gerrids are living when they reach the surface of the water. The movements of their bodies, when entangled in the surface-film act as stimuli, attracting the water-striders in close proximity. When a food-insect strikes the surface of the water, any gerrid in the immediate vicinity, particularly if it is hungry, will dart toward it, and the food-insect is seized by means of the front legs of the water-strider, which are of the raptorial type. A food-insect falling on to the surface-film, even if behind a gerrid, is sufficient

stimulation for the water-strider to orient itself in such a manner that its head points toward the source of stimulation. Usually the gerrid moves quickly toward the insect, which is seized, and then, by means of its beak-like mouth-parts, sucks out the body-juices of its victim.

Many different species of insects jump, fly, or fall into the water, where they become the prey of these gerrids. In standing waters, they simply float on the surface where any of their active movements may attract the water-striders in the neighbourhood. Hungry gerrids, actively striding about on the surface-film, frequently find these insects even when they are motionless. In running water habitats, the food-insects drift along with the current, unless they should reach a pool or other quiet area of water, where any gerrids congregated in the immediate vicinity may seize them. There is a considerable amount of evidence which seems to prove that attraction to food-insects in active movement is more common than is attraction to food-insects that are immobile; and also that the former precedes the latter. In this connection a statement by Cole (1907, p. 409) is of interest. In brooks and creeks, it is a matter of common observation to see water-striders, *Gerris rufoscutellatus*, stride along the surface-film toward small objects drifting in their direction. The response to these drifting bodies is a positive one. Frequently, indeed, the gerrids are attracted by such objects, whether they are food or not. A leaf, a small stick, a petal of a flower or a fragment of grass moving with the current, often serves as a source of stimulation, and the water-striders dart toward such drifting objects. In some instances, the gerrids move up to and in close contact with these bodies, when, after a few seconds, they turn away and continue their former activities. The response of the water-striders to floating food-insects is of the same general character. They do not, always, wait until the insect or other object drifts downstream to them, but, frequently, stride for a short distance upstream toward it. If the drifting body proves to be a food insect, the gerrids grasp it by means of their raptorial front legs and hold it firmly, while the mouth-parts of the water-striders are pushed into the soft tissues.

In running water habitats, the behaviour of *Gerris rufoscutellatus* shows, in the main, a positive form of response with respect to currents of water. An individual gerrid orients itself until its head is turned upstream, thus facing the current. On assuming such a position, the long axis of the body becomes parallel with the lines of force exerted by the current. This is the general form of response, but, frequently, there are many modifications of this assumed position. It is evident that the response is not a stereotyped, unchangeable reflex action, for the same gerrid may stride across the current and sometimes even move downstream. On a number of occasions this species appears to be indifferent to the current. When responding to the water current, it is a common occurrence to see water-striders remain for a considerable length of time, certainly many minutes, in about the same relative position with respect to objects on the banks of the stream. They continually stride upstream against the force of the current, giving themselves sufficient upstream movement to compensate for the downstream drift. Behaviour of this character has a direct relation to their food responses. Some of their food consists of insect material drifting with the current, and this rheotactic form of response appears to be

adaptive. The gerrids are so oriented that they can see the insects, on which they depend for food, floating towards them. This form of orientation, relative to the current, aids the water-striders in securing food, before it drifts out of their locality.

An interesting phase of the behaviour of *Gerris rufoscutellatus* is its response to winds. It will respond to winds of various character, to strong, medium and light winds. During strong wind storms, when the gerrids are on the surface of a moderately narrow ditch, pond or stream, they stride towards the bank or shore that lies to windward. This response has frequently been observed on pools and brooks not more than six or eight feet in width. When the bank or shore is within a few feet of the gerrids, such a response is probably due to vision. They crowd up close against the land, and remain there until the wind either ceases or moderates. Should the bank or shore be an overhanging one, they may crowd far beneath it. The water-striders often congregate in such situations during wind-storms. The open surface of a pond or stream may appear entirely free from gerrids during storms of this character, but on searching in such situations as have been described, many individuals may be discovered. On reaching a position close to the bank or shore, the water-striders anchor themselves to the land by means of the tarsal segments of the middle and hind legs on one side of the body. De la Torre-Bueno (1917a, p. 296) states that: "In strong winds it [*Gerris marginatus*] hugs the shore, particularly if it blows that way."

When a strong wind begins to blow suddenly and the gerrids on the surface of a stream are nearer to the bank which is to leeward, they may stride toward the bank and anchor themselves there. If the bank is low, level with or but a few inches above the surface of the water, the gerrids may leave the surface-film and move on to the land. On several different occasions such behaviour has been observed, when these bugs were found an inch or more away from the water. In general, these creatures tend to so orient themselves that their heads are directed against the wind, that is to windward and frequently they attempt to stride against the wind. In other words, they usually respond in a positive manner to wind stimuli. However, in a strong wind, the gerrids seldom move very far against it. When the wind proves too powerful for them, they cling to any solid support with which they may come in contact, and remain there until the wind moderates. In a number of instances, they have been seen to stride for a short distance against a strong wind, but soon they orient their bodies in the opposite direction and move with the wind, and in this manner find the leeward bank. During heavy wind storms, they frequently have been found on the windward side of rocks and driftwood in midstream; this suggests that they were caught by the wind on the surface of the open water, and then sought the nearest object for protection. On a number of occasions, when a strong wind arose, the gerrids did not orient themselves with their heads pointed to windward, but, if their heads were already directed to leeward, they moved in that direction until they came in contact with a rock, a piece of driftwood or some aquatic plant, when the thigmotactic response was invoked. They cling to or remained in contact with this object until the wind abated. Should there be no such object in the vicinity, the water-striders continued moving with the wind until they came in touch with the leeward bank.

The general response of these gerrids to medium and light winds is positive. When such winds are blowing, the direction of movement of the water-striders is against them, that is to windward. If the wind is very light, they may prove indifferent to it. When a medium or light wind blows against the side or posterior end of the body of a gerrid, the creature orients itself to the stimulus so that the head is turned toward the wind. On the completion of such orientation, the gerrid frequently strides toward the source of stimulation, that is toward the point of the compass from which the wind is blowing. In certain instances, a response of this character may prove to be beneficial to the water-strider from the standpoint of obtaining food, for it may bring the gerrid to the bank on the windward side of the stream, where food insects are being blown into the water from the bank and near-by vegetation. Often, while moderate and light winds are blowing, gerrids have been observed actively feeding in such situations.

The fact had been previously mentioned that the experimental garden, at the University of Manitoba, contained two small ponds. One of these was an artificial pond twelve feet in diameter. This was formerly the basin of an artificial fountain and it proved to be very convenient for certain kinds of observations. Water-striders have been observed to stride across the entire diameter of this pond in response to flurries of light wind that ruffled the surface of the water. Sometimes a gerrid moved across the surface-film against such a wind until it reached approximately the centre of the pond, when the wind suddenly died down. This brought about a change in the response, or rather a cessation of the response, as usually the forward movement of the gerrid ceased immediately. At other times, the water-strider continued to move forward for a few seconds and then locomotion stopped. There are a number of other interesting details in connection with the responses to wind currents which of a necessity require to be solved by means of laboratory experiments. Several of these have already received attention, and some experimental investigation has been done on them, but the results are not yet sufficiently complete for publication.

Gerris rufoscutellatus responds rather definitely to rain. Should the gerrids be on the surface of the open water of a large pond when the rain begins, they move quickly toward any solid object in the vicinity, such as a rock, a piece of driftwood, a dense growth of rushes, *Scirpus validus*, or other aquatic vegetation. On reaching such an object, they may either grasp it with their front legs, or anchor themselves to it by means of the tarsal segments of the middle and hind-legs on one side of the body. Should any part of such an object overhang the water, the gerrids, usually, move to this point and remain there until the rain ceases. Similar responses occur on the open water of a wide stream and frequently on the open water of brooks, if the rain is heavy and begins to fall suddenly.

When the rain is very light and lasts for a few minutes only, the water-striders may be practically indifferent to it. If the gerrids are on the open water of a small stream or within a few yards of the shore of a pond, at the time when a heavy rain begins to fall, they promptly move to the bank of the stream or to the shore of the pond. A common form of response is to stride to the nearest bank of a stream and remain there, anchored as previously described, until the rain

stops. Frequently, during heavy rains, they take positions under overhanging banks and crowd up against the land so that they are difficult to be seen. Often they leave the surface-film during severe rain storms, and move on to the land. Many times, they have been found by the writer in the interstices of the overhanging bank of a stream, in depressions in driftwood and even on the flat shore of a pond or bank of a brook. In none of these instances were the gerrids farther away from the water than five or six inches. In a number of cases, they were close to the water, or merely an inch or two from it. *Gerris remigis* evinces behaviour of a similiar character, which the writer has discussed in a former paper (1921a, pp. 265-266).

Frequently, as the result of heavy and continued rains, the water in a pond or brook rises and may overflow, a condition not uncommon in the spring and fall. As the volume of the water increases and the surface rises, the gerrids rise with it, and are found clinging to such objects or anchored in such situations as already have been described in their responses to rain. When the current in a brook or creek becomes very swift and powerful, owing to increased water volume, the gerrids are observed to move away from and keep away from the rapid water. At such times, they are found anchored to some solid object in the quieter water. These responses of moving into quieter water and of clinging to solid supports are undoubtedly of a beneficial character to the gerrids, and to this extent at least are adaptive. Such behaviour prevents the water striders from being swept downstream into larger streams and rivers, and thus saves the gerrid population for its normal habitat. Otherwise the smaller streams might, temporarily, be depopulated. This sort of behaviour also prevents the gerrids from being drowned, for they soon become water-logged, if the water penetrates the pubescent-like covering of their bodies, and this is likely to occur should they be swept along by the swift current.

The writer began to observe and to collect *Gerris rufoscutellatus* about fourteen years ago, and attention has been intermittently given to this species up to the present time. During this period, but two apterous examples have been found. Only one other wingless individual has been seen by the writer. This is in the collection of Mr. J. B. Wallis of Winnipeg, Manitoba, and it was taken by him in that vicinity. With these exceptions, all of the gerrids, that either have been captured or closely observed in their own habitat, were alate individuals. This proved to be the case with all the gerrids taken in the states of Michigan, Illinois, Wisconsin and New York, and also in the provinces of Manitoba and Ontario. The alate condition certainly appears to be general, even if not universal. De la Torre-Bueno (1911, p. 249) remarks on the alateness of this species, and states that, "unlike the other species, it is scarcely ever seen in the wingless form." *Gerris rufoscutellatus* is an active migrant. It is a very strong flier, on many occasions having been observed in the process of flight, particularly in the region round about Winnipeg, in the province of Manitoba. Presumably, one of the reasons for its activity is owing to the fact that it is so generally found in the winged condition. Another probable reason for its migrations is its ability to live on almost any sluggish body of water that is reasonably clear and on the surface of which there are found drifting insects to serve as a food-supply. Furthermore, the wide distribution of the species seems also to be an indication of its propensities.

Migration, either local or more distant, is a common occurrence on the part of these gerrids. They migrate by flight, as the writer has often witnessed. This response has been observed many times in the vicinity of Winnipeg, in the province of Manitoba, but it had not been seen prior to the summer of 1921, although the first observations on *Gerris rufoscutellatus* were made in the early summer of 1911. No direct observation of the flight of this species has been recorded in the literature, so far as the writer has been able to discover. Many of the observations on flight were made in connection with two artificial ponds on the grounds of the University of Manitoba. One form of stimulus that serves to bring about migration is the drying up of the habitat. This fact was first observed in the last week of May, 1921, when the first individuals of this species were seen by the writer in Manitoba. One day, during the week to which reference has been made, attention was directed to the smaller of the two artificial ponds. Four gerrids were on the surface of the water, which at that time was not more than one-half inch in depth and covered but a small part of the bottom of the pond. These water-striders were identified as *Gerris rufoscutellatus*. Two days later, all the water had evaporated with the exception of a small area about twenty inches in diameter and not more than a half inch deep. Only three of the gerrids were present, evidently one had migrated by flight. The pond was examined at short intervals throughout the day, with the hope of actually observing the migratory flight of the remaining water-striders. Early in the evening of the same day, just about dusk, but still sufficiently light to see small objects, the pond was visited again, and it was found that almost all of the water had disappeared. On stepping on to that part of the bottom of the pond that was dry, for the purpose of more closely examining the conditions, one of the gerrids rose slowly from the water and flew, with a slight buzzing noise, for about three feet over the surface of the pond, turned, and then alighted on the water. On moving toward it, for more accurate observation, the gerrid, after a few seconds, again slowly left the surface-film, flying just a few inches higher than the water. The creature rose so slowly and gradually that it barely cleared the side of the pond. It was seen distinctly as it flew away, until it reached a distance of some twelve yards from the pond. Up to the point, when it was lost to view, owing to the foliage of a clump of trees, it was not flying high, certainly not more than six to eight feet above the surface of the ground. The direction of flight was southwest against a light wind. A few minutes later, the two remaining gerrids flew away, in much the same fashion as did the first one, with the exception that they did not alight again on the water. These individuals also migrated south-west against the breeze. In a few hours the water in the pond would have disappeared entirely. In fact, the next morning at nine o'clock, the pond was dry. Essenberg (1915, p. 400) has directed attention to the fact that *Gerris orba*, under experimental conditions, produces a buzzing sound as it flies.

During the middle of June, similar behaviour was observed in several drying pools of sluggish streams. On these pools, small numbers of gerrids were present and they migrated by flight just before the water disappeared. In these instances, the migration took place at dusk, to the south and against a light breeze. The drying up of the

habitat was undoubtedly a factor in inducing migration. Furthermore, in none of these pools was insect-food found on the surface of the water. Lack of food was probably an additional stimulus in bringing about the migration response. Since these records were made, the flight of *Gerris rufescutellatus* from its own habitat has been observed on many occasions. Very frequently, when these flights occurred, either the water in the pool was almost gone, or there was no food on the surface-film; and on other occasions, both of these conditions existed. However, it must be stated that the flight of this species has been observed, when neither of the factors mentioned were operative. Some data have been assembled which seem to point to other stimuli, which may have a bearing on this problem, in addition to those to which reference has been made. But further consideration needs to be given to this subject before any categorical assertion can be made as a final explanation. Some additional support is given to the view that the lack of food and the drying up of the habitat are factors influencing migration, because of the fact that two related species of water-striders, *Gerris remigis* and *Gerris marginatus*, apparently migrate by flight under conditions of a similar character. For information on the migration of these two species, attention is directed to a discussion of this matter in a paper by the writer (1920, pp. 3-5, 7-8).

(To be concluded).

SCIENTIFIC NOTES AND OBSERVATIONS.

A SPARROW EATING A DISTASTEFUL BUTTERFLY.—While traversing a quiet road in Camberwell the other day, a sparrow with a conspicuously white object in its beak, attracted my attention. It flew down near me in the middle of the road and I then saw that it had a "white" in its mouth, and I stood still to watch the procedure. The wings were broken off by numerous blows on the hard road and the body parts were evidently consumed for the bird flew away with nothing in its mouth and only the wings remained behind. They were those of *Pieris rapae*.—Hv. J. TURNER, May 29th.

NOTES ON COLLECTING, etc.

SOME WARWICKSHIRE TENTHREDINIDAE, SIRICIDAE, ETC. (SAWFLIES).—For the past few years when collecting, I have paid attention to this group with interesting results including some captures, which may stimulate others to work for them in the county; my opportunities for collecting have been few and far between, and I suppose I should consider myself fortunate in having met with so many good things.

Warwickshire with its wealth of woodland, commons, and streams is a happy hunting-ground, and anyone with time to work the district in a systematic manner would no doubt be able to supplement this list considerably.

To the Rev. F. D. Morice I am deeply indebted for his ever ready assistance in the determination of my captures, whenever I have had any doubts in my own determinations he has kindly corrected or

confirmed them for me; those of the genus *Tenthredopsis*, with few exceptions, he has only named provisionally, being of opinion that when more is known of the early stages of this puzzling group, it will be found that many forms at present under different names will be brought together as merely forms of a few species.

Of the Siricids enumerated, possibly, and most probably, all have been imported in timber, with the exception of some of the specimens of *S. gigas*, and *S. noctilio*; these two species I feel sure, are indigenous to the county, especially the former, which I have seen on the wing in several wooded districts, as well as evidences of the work of their larvae.

I am grateful to several local Entomologists for their kindness in adding to my collection and I trust I have acknowledged them with the records.

TENTHREDINIDAE.—LOPHYRINAE.—*Lophyrus (Pteronus) pini*, L.—Stoneleigh *10.vi.1920, ♀ ♀. Coleshill Bog, larvae, 23.vi.1917.

TENTHREDINIDAE.—CIMBECINAE.—*Cimbex femorata*, L.—Bubbenhall, June, 1916, ♀, Hastrop. Corley, 29.v.1920, ♀, H. W. Mapleton Bree. Allesley, 25.v.1923, ♂, Dr. Newton. *C. femorata* var. *varians*, Leach.—Bubbenhall, 8.vi.1919, E. H. Sills. *C. femorata* var. *sylvarum*, F.—*Bubbenhall, 29.vi.1920. *C. femorata* var. *pallida*, Steph.—Coleshill, 28.vii.1922, Dr. Newton. *Trichiosoma lucorum*, L.—Bubbenhall, *27.iv.1916; 23.vii.1918; *27.i.1919; *11.v.1919. Wappenbury, *29.vi.1920, F. Pepper. Bubbenhall, 1920, E. H. Sills. *T. tibialis*, Steph.—Bubbenhall, 21.vii.1917. Baldwin, *14.vi.1918. Radford, 4.v.1919. Brandon, *1918. Stoke, *5.v.1919. Coombe, 29.v.1921. Ryton, 4.vi.1922.

TENTHREDINIDAE.—ARGINAE.—*Arge (Tenthredo) coerulescens*, Geoffr.—Coombe, 7.viii.1917, ♂; 9.viii.1917, ♂; 5.viii.1918, ♀. Waverley Wood, 9.viii.1917, ♀. Ryton, *9.viii.1919, ♀. *T. enodis*, L.—Coombe, 21.v.1923, ♂. *T. ustulata*, L.—Earlsdon, 1910, ♀, H. Caldwell. Coleshill Bog, 28.vii.1922, ♀, Dr. Newton. Bubbenhall, *12.v.1924; *9.vi.24, F. Pepper. *T. atrata*, Först.—Bubbenhall, 10.vi.1917, ♂, ♀. *T. ciliaris*, L.—Bubbenhall, 10.vi.1917, ♀. *T. pagana*, Panz.—Stoke, 19.vi.1924. *T. cyanocrocea*, Först.—Stoke, 1916. Bubbenhall, 10.vi.1918, ♂ ♂, ♀ ♀. Wyken, 16.vi.1917. Coombe, 30.vi.1918, ♂, ♀.

TENTHREDINIDAE.—PAMPHILINAE.—(LYDIDAE)—*Pamphilus betulae*, L.—Monks Kirby, 15.vii.1922, ♀, Dr. Newton. *P. gyllenhalii*, Dhlb.—Wyken, June, 1916, ♀. Ryton, 20.v.1923, ♀, F. Pepper. *P. hortorum*, Klug.—Bubbenhall, 4.vi.1922, ♀, F. Pepper. Kenilworth, 3.vi.1923, ♀ ♀. Brandon, 10.vi.1923, ♀. *P. pallipes*, Zett.—Bubbenhall, 14.v.1922, ♀, F. Pepper. *P. silvaticus*, L.—Stoke, July, 1916, ♀. Corley, 26.v.1917, ♂. Wyken, 4.vi.1917, ♀. Stoke, 8.vi.1917, ♂; 9.vi.1923, ♀.

CEPHIDAE.—*Cephus (Astatus) pallipes*, Klug.—Brandon, 17.vi.1917, ♀. Bubbenhall, 9.vi.1918, ♀. *A. pygmaeus*, L.—Coleshill Bog, 23.vi.1917, ♀. *Calamenta filiformis*, Ev.—Bubbenhall, 16.vi.1918, ♀.

SIRICIDAE.—*Sirex gigas*, L.—Coventry, 14.vii.1924, ♂. Kenilworth, 3.viii.1924, ♂, Dr. Newton, females are met with most years. *S. noctilio*, F.—Coombe, 1917, ♀, Baldwin. Coventry, 16.ix.1919, ♀, T. Bourne. *S. juvenicus*, F.—Coventry, 23.viii.1923, ♀ ♀ ♀; 31.viii.

1924, ♀, II. Price. *S. areolatus*, Cresson.—Coventry, 31.i.1924, ♀, M. Fellowes, see *E.M.M.*, Vol. LX, 80. *S. areolatus*, race *caeruleus*, Cresson.—Coventry, 31.i.1924, ♂, ♀; 26.xi.1923, ♀ ♀, M. Fellowes. *S. cyaneus*, F.—Coventry, 29.viii.1924, ♂, M. Fellowes. 23.viii.1923, ♀ ♀ ♀; 9.ix.1924, ♀, Hawkins. See *E.M.M.*, Vol. LIX, 15. *Sirex* (*Xeris*, A. Costa.) *spectrum*, L.—Coventry, 23.viii.1923, ♀, see *E.M.M.*, LIX, 15. (*To be continued.*)—J. W. SAUNT, 53, Enfield Road, Stoke, Coventry.

CURRENT NOTES AND SHORT NOTICES.

The decease is announced of Dr. A. G. Butler, who for many years was at the head of the Insect Department of the British Museum (Natural History). He was well-known to the older entomologists, for he retired a quarter of a century ago and had given up the study of entomology and devoted himself to the study of birds of which he had kept a large number at different times, working at them with his great friend, Mr. F. W. Frohawk, the natural history artist. Dr. Butler was the author of numerous works on the Lepidoptera and contributed many papers and memoirs to all our scientific periodicals, particularly describing many new species and forms. If we remember aright, he was, during the early portion of his official career known as a "splitter," but later became a "lumper," as the two sections of lepidopterists were called during the transition period of the appreciation of what "species" really meant in the modern sense. He was a genial helper even to those whose opportunities gave them only time to work intermittently at entomology. He was over 80 years of age.

The last number of *L'Amateur de Papillons* contains an account of the History of that wonderful Spanish (and now also French) Saturniid *Graellsia isabellae*, by M. Chretien, an account of the Lepidoptera met with during a two months holiday in the Vosges—Renairemont and Gerardmer, and an account of the Lepidoptera of the High Alps accessible from Briançon.

The Société Entomologique Namuroise is gradually regaining its pre-war activity, if we may judge from its monthly journal the *Revue Mensuelle*. The May number besides its usual matter gives a photographic plate of nine aberrations of Lepidoptera and a further fascicule of addenda to the "Catalogue des Lépidoptères de Belgique" published by the late M. J. Lambillon. The classification of the various forms of the "Argus" group of the *Lycaenidae* is discussed by M. Beuret. And two new aberrations are described, ab. ♀ *biligata* of *Pieris brassicae* in which the discal black spot is united to the apical blotch by two black lines, and ab. *binotata* of the *europome* race of *Colias palaeno*, in which the hind wings have twin spots on the disc. M. Cabeau is the describer. The April number also had a plate of aberrations.

The supplement to the *Entomologische Zeitschrift* of Frankfurt for 1924-5 contains some very interesting matter contributed by members of the Verein. There is an account of the Lepidoptera of the Volga

area near Chwalynsk in Saratow by C. Gross; G. Lederer gives an account of the entomological exhibits and work in the Frankfurt Zoological Garden with seven illustrations of the rooms used; an account of *Polygonia c-album* by P. Gönner, with a coloured plate of the main forms; and other useful matter.

SOCIETIES.

LONDON NATURAL HISTORY SOCIETY.

February 3rd.—ANNUAL EXHIBITION.—Series of lantern slides on various subjects were shown with descriptions and explanations by different members, amongst them being “Oak Galls of the *Cynipidae*” by Mr. Ross, and “Moths” by Mr. Colthrup. Mr. Aris showed a short series of *Abraaxas grossulariata*, second brood of 1924, of a light form, with eccentric marking which gave a clear space before the outer margin. The wings of this type of marking, although developing fully, failed to harden, whilst others of the same brood true to type did harden. One specimen of the variety was very diminutive in size. Mr. Aris also showed a dwarf specimen of *Polyommatus (Agriades) coridon*, and two specimens of *Arctia caja* in which the cream-coloured background of the forewings was almost obliterated by the darker markings. These were from a second brood in 1924. Mr. Riches exhibited a series of *Abraaxas grossulariata* with a number of varieties bred from North London larvae, and some *Euvanessa antiopa* bred from imported larvae. Mr. Mera showed some of the rarer British *Sphingidae*, and a specimen of *Nephele comma* taken at a lamp at the West India Docks. Also some hibernating larvae of *Boarmia roboraria* on a twig of Oak. Mr. Marshman Wattson exhibited selections from his collection of British Dragonflies. Mr. R. W. Robbins, a number of Lepidoptera from Limpsfield, including *Polyommatus (Agriades) thetis*, *P. coridon*, *Poecilocampa populi*, *Hydroecia micacea*, *Luperina cespitis*, *Noctua umbrosa*, *Acrionicta leporina*, *Pachnobia rubricosa*, with varieties, *Xylina semibrunnea*, *Plusia pulchrina*, *Bomolocha fontis*, *Geometra papilionaria*, *Acidalia ornata*, *Oporabia dilutata*, and *Bupalus piniaria*. Mr. J. C. Robbins, *Corynetes caeruleus* from Navestock church. Mr. Burkill, types of Plant-Galls caused by Midges, including one on the leaves of *Fagus sylvatica* resembling Dr. Howard's No. 1162, recorded from Asia Minor. The specimens shown were found near Virginia Water last summer. Mr. R. B. Lodge, paintings of Butterflies.

February 17th.—Mr. Burkill showed some Oak Galls with their flies, parasites, and inquilines; also flies and galls of *Lipara lucens*, and *Urophora solstitialis*.

March 3rd.—The President announced that he had accepted on behalf of the Society a valuable collection of Lepidoptera, Hymenoptera, and Diptera formed by the late Mr. Dowsett, and offered to the Society by Mr. F. A. Dowsett, who had helped his father to make the collection. Mr. R. W. Robbins exhibited *Polygonia c-album*, late brood bred from pupae found in Herefordshire, a variety of the “Ringlet” butterfly in which the rings were reduced in size to the central white dot, and some specimens of a bleached variety of *Epinephole jurtina*.

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Desiderata.—Muralis, Orion, Myrmicae, Lutosa, or pupae of S. ligustri.—G. Nicholson, 26, Lancaster Street, Newcastle-on-Tyne.

MEETINGS OF SOCIETIES.

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

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. May 14th. June 25th, Exhibits. July 9th, Exhibits.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., W. E. GLEGG, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.

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BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXV.)

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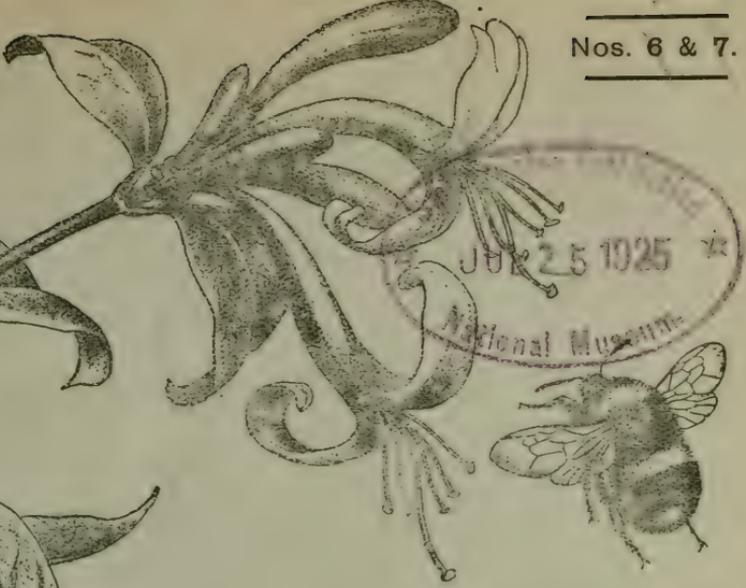
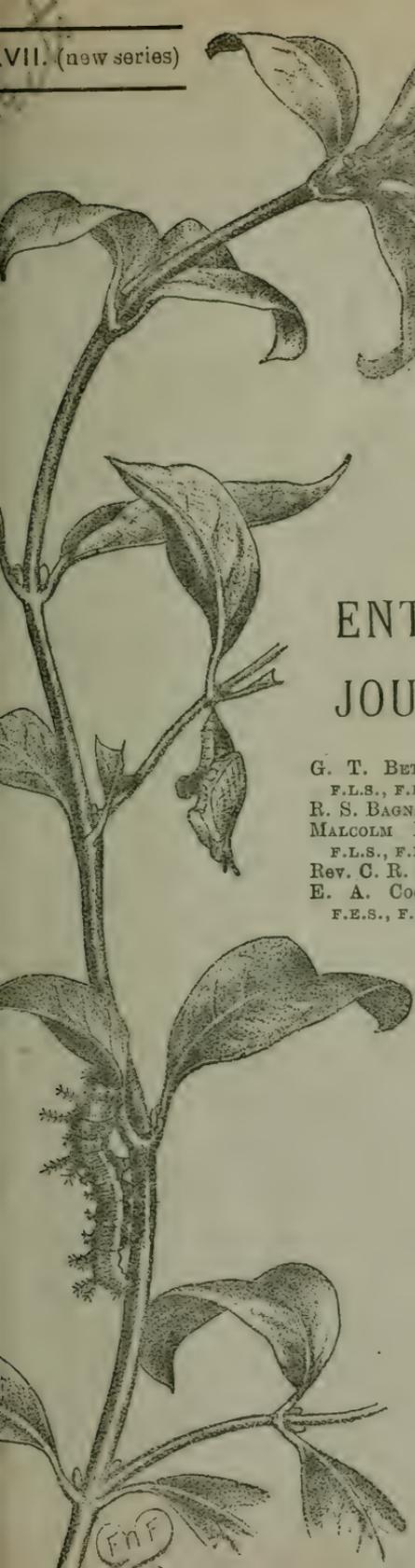
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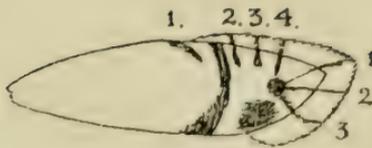
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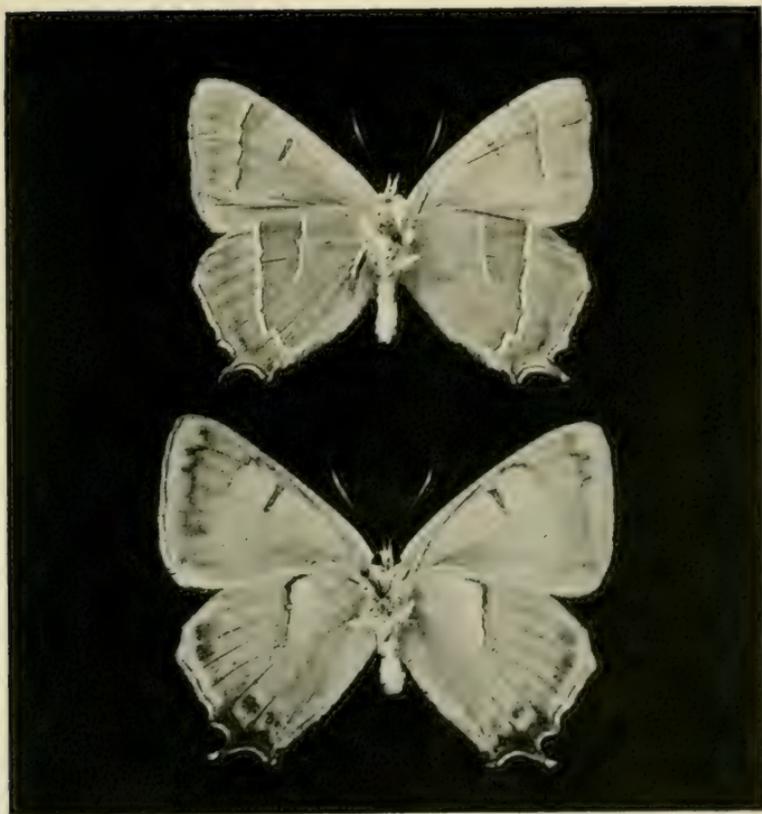
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The Entomologist's Record.

del. A. Sitch.

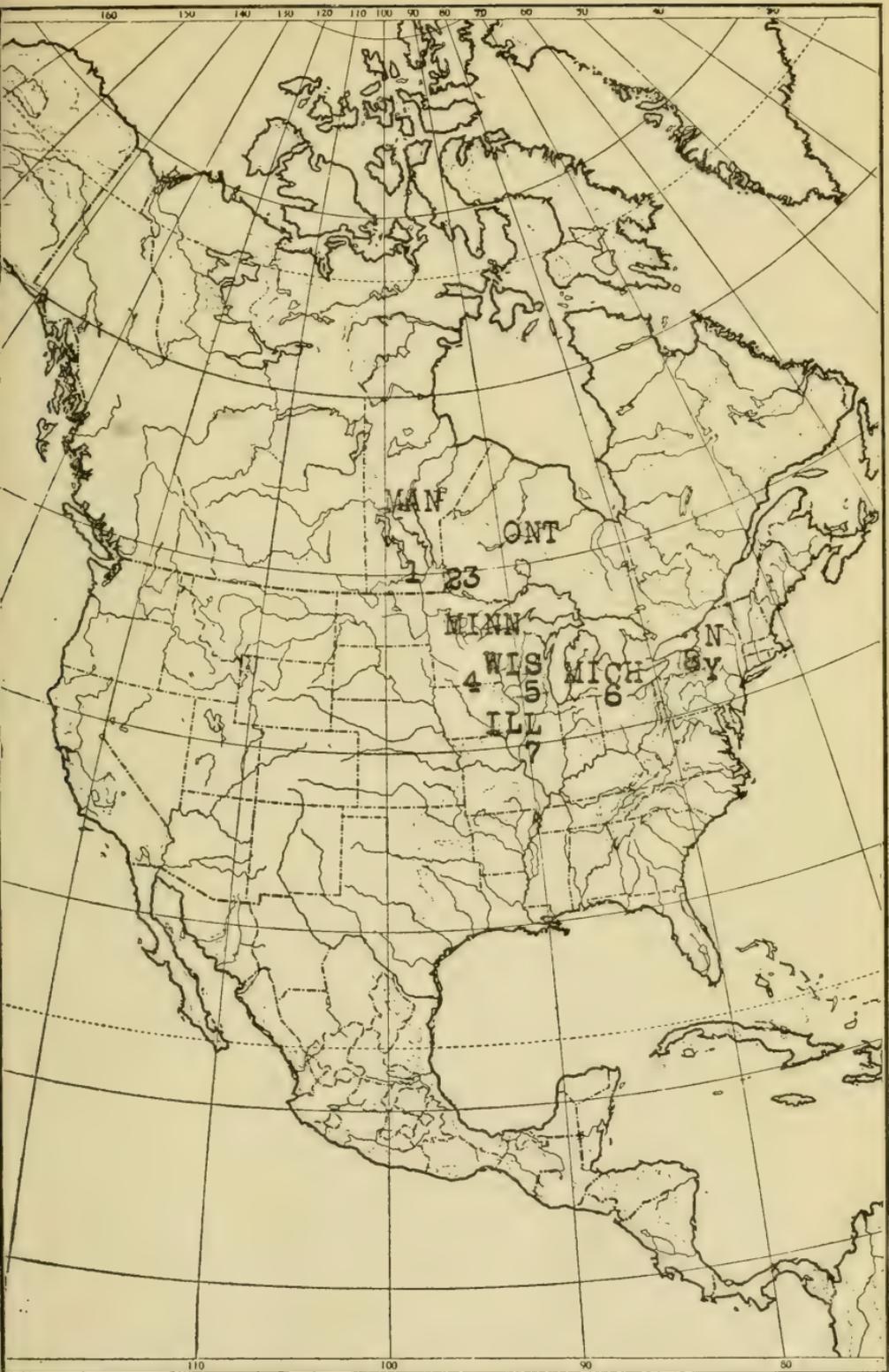
MINE AND WING-MARKINGS OF PHYLLOCNISTIS SORHAGENIELLA, LÜD.



The Entomologist's Record.

Photo. A. E. Tonge.

AN ABERRATION OF *RURALIS BETULAE*.
(With kind permission of the S. Loud. Ent. Soc.)



A note on *Phyllocnistis sorhageniella*, Lüders. (With plate V.)

By ALFRED SICH, F.E.S.

The genus *Phyllocnistis* does not appear to be very well understood. The singular larva and the pupa show that it does not belong to the *Lyonetiidae* and has nothing to do with the genus *Cemistoma*, Z. It belongs to the *Gracilariidae* and is not far from the genus *Lithocolletis*. Of the three species *suffusella*, Z., is the most common, though the typical form of this is rare. In this the wings are entirely suffused with pale yellow, hence the name. I have only seen three specimens. The usual form is white with a little dark cloud near the base of the forewing and another in the disc. This I called var. *nubilella*, I believe in a paper on *P. suffusella* I read before the City of London Entomological Society in 1902. This was afterwards printed in the Transactions of that Society. I think I have seen specimens of this species without these clouds on the forewing. The larval mines occur on several species of *Populus*, but I have never found them on *P. tremula*, the aspen. *Saligna*, easily distinguished from the other two by the two dark lines running from the base to the middle of the forewing, is more local, as osiers are more or less confined to damp places. In Chiswick its favourite food was a *Salix* with a soft leaf, the margin of which was entire. I do not know the name. I never found the mine on *Salix fragilis*, though *Nepticula* mines were frequent.

We now come to the third species, *sorhageniella*. Ever since I wrote the paper on *suffusella*, more than twenty years ago, I have examined any aspen that I came across in England and on the Continent in the hope of finding this species, but all in vain till last summer. Last June I was in a most delightful little country place in the South Tyrol (now Alto Adige), which used to be known as Sand-in-Taufers, but being now politically in Italy is called Campo Tures. It lies on a plateau, 2,900 feet. Here, on June 15th, 1924, I came on a small aspen tree containing perhaps thirty mines. Unfortunately all the larvae had either pupated or had died in their mines, but I was able to find several leaves containing cocoons. A week later I was in the same spot, and walking farther up the hill-side saw many more aspens and thousands of mines. There was one very large tree of which I could only see one side, but on that side there was scarcely a leaf unmined. Many leaves had two or three mines in them. All the smaller trees were nearly as badly attacked. The earlier larvae were able to pass probably through their stages successfully, but many of those that hatched later from the egg must have died from starvation. I saw many which had in some way or other come to grief. What the second generation was to feed on one could not imagine. In the woods on the other side of the river the aspens only contained a few mines per tree, so that here the species would be able to maintain itself. As is so often the case when the larvae of a species are excessively abundant, the imagines here were very scarce. If one beat the trees, instead of a cloud of white specks appearing only one or two would be seen. The first imago was bred on June 27th, and between this date and July 7th others were bred, and I found the moths among the aspen trees, and also one at rest on a large Lombardy poplar growing at some distance from any aspen. There is no doubt that *Populus tremula* is the special food-plant of this

JULY-AUGUST 15TH, 1925.

species. It will, however, feed on *P. pyramidalis*, as I found one mine certainly on this poplar. The mine is a gallery mine. The egg is laid on the upper or underside of the leaf, its position thus giving rise to an upper or underside mine. Both mines may be found in the same leaf. The mine begins at once as a whitish stripe, about 1mm. wide; as soon as the larva strikes a vein in the leaf it will continue mining close beside it to the mid-rib, then along the next vein, which it soon crosses. After running about 25mm. the mine becomes broader, showing that the larva has changed its skin. With a good lens the cast head may here be seen. This wider portion runs for about 40mm. At the end of this part the larva changes its skin for the second time, and commences its last and chief feeding stage, making a mine from 3mm. to 5mm. wide and about 170mm. long. The margins of this mine are irregular and often waved. Down the centre runs an often interrupted line of brown staining formed by the excremental juice of the larva. In the upperside mines this line is wider and mostly broken up into spots and streaks, but in the underside mines it is compressed into a very distinct thread-like line. The whole mine, when on the underside of the leaf, is more distinct and restricted than the less defined mine of the upperside, where the cuticle seems more easily separated from the cells. The colour of the mine is whitish grey, contrasting so strongly with the green of the aspen leaf, that the mines may be seen from a distance of several yards. In most old mines the work done by the larva in its first two stages is invisible, having been obliterated by the work of the larva in the third feeding stage.

The mine nearly always ends close to the edge of the leaf, and here the larva changes its skin for the third and last time. This being accomplished the larva, in its entirely new form, feeds no more, but commences at once to spin the cocoon, and while so doing draws the edge of the leaf over, forming a chamber 4-6mm. long, beneath the cuticle, in which it can pupate. Before the moth emerges the pupa shell is thrust partly out of the cocoon. The mine of *sorhageniella* is easily distinguished from that of *suffusella* by the dark line that runs down the centre of the mine. The mine is also narrower and of less extent. What I could see of the cast larval heads and of the dead larvae in the mines, leads me to think that the larva in all its four stages is very similar to that of *suffusella*. I believe there is one good point of difference in the pupa. In that of *suffusella* there is, if I remember rightly, a pair of long strong setae, arising from the dorsum of the thorax or from the 2nd abdominal segment, and curving backwards. In the pupae of *sorhageniella* that I examined, I saw some small weak setae, but with my strong lens I failed to find the stiff pair so conspicuous in *suffusella*. The imago of *sorhageniella* is very similar to that of the last mentioned species, that I need only describe the pattern of the forewing and point out the differences.

Forewings white, a nearly straight dark transverse bar at $\frac{2}{3}$ (or a little more) extended inwardly on the dorsum and inwardly suffused with ochreous. This bar is preceded by an oblique dark costal streak, and followed by three shorter costal streaks. Opposite these three streaks is an elongate ochreous suffusion on the dorsum. A large terminal black dot emits three dark streaks into the apical fringes. In some specimens the fourth costal streak is joined to the apical dot which then may be said to send four streaks into the apical cilia. In

comparison with *suffusella* this species is smaller, and appears to me to be less brilliantly white, but the chief point of distinction lies in the presence of a *fourth* costal streak. If a good series of each species could be compared no doubt other points of difference would be discovered.

Some Pyralids from Southern Palestine.

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

In one of several articles concerning collecting in various places during the Great War which appeared in the *Entomologist's Record* in 1919, I referred to some captures of "Micros" which had not then been determined (*Ent. Record*, 1919, p. 156). Most of the specimens of the *Pyralidae*, which I took, are now in the National Collection at South Kensington and have been determined by Mr. W. H. T. Tams and myself. Of the 28 species taken at Der-el-Belah and Umm-el-Kilab, almost all between the first week of September and the end of November 1917, quite a large proportion are not given in the Staudinger-Rebel Catalogue as inhabiting Syria or its southern extension Palestine. I therefore give a list of my captures, some of which are species which have hitherto only been taken in Palaearctic North Africa (Algeria, Tunis, Egypt, etc.).

Before giving the list, however, I feel that I should write a brief description of the terrain in which these insects were found. The ground was dry burnt-up steppe, a few bushes of a species of *Zizyphus* being the only shrubs of any size. About a mile N.N.W. from my collecting ground was the oasis of Khan Yunus, where there was a certain amount of fruit and garden cultivation. Almost on the Egyptian border near Rafa and about 2 miles S.E. of Umm-el-Kilab where I collected was a ruined garden where figs, pomegranates and tomatoes had been cultivated. The figs survived. Der-el-Belah was a small edition of Khan Yunus, a patch of oasis surrounded by sandy steppe. Near the sea, where I had no opportunity of collecting, were dunes covered with a flinty grass. Speaking generally the country though very bare was steppe, not true desert, being covered with a thin carpet of parched grass and low plants. True desert, *i.e.*, country where vegetation was only occasional and there was no carpet of grass, began just across the Egyptian frontier at Rafa, some $2\frac{1}{2}$ miles due S. of the camp where I was during most of the autumn of 1917, before the advance into Palestine. Owing to my work in connection with the Turkish order of battle, I could seldom spare any time to leave camp and collect. Most of my captures were made at night when moths came sometimes quite frequently to light in the mess tents. The day temperature was usually high, the nights cool, but not cold until about November 18th, when the rainy season set in and moths practically ceased to appear.

In the following list it will be noted that certain groups of the *Pyralides*, *e.g.*, the *Crambids*, were very scantily represented.

I have followed the order of the Staudinger-Rebel Catalogue of 1901, and give the reference number of those species mentioned in Part II. thereof in the list. All were taken at Umm-el-Kilab unless

otherwise mentioned. Months are given in Roman numerals, days in Arabic numerals. All captures were made in 1917. Species not mentioned as occurring in Syria-Palestine in the Catalogue are marked with an asterisk.

- *1. *Surattha endoleuca*, Hmps. (Not in Catalogue). At Umm-el-Kilab and Der-el-Belah 5-18.X. Also taken by Major Austin at D-el-Belah.
- *2. *Ancylolomia paraetoniella*, Trti. (Not in Catalogue) cf. *Att. Soc. It.*, 1924. A specimen taken 18.X, which I took to be *A. palpella* and wrongly recorded as such (*Ent. Rec.* 1919, p. 156) agrees exactly with Count Turati's figure of his new species in his list of Cyrenaic Lepidoptera (loc. cit., Pl. V. fig. 12.)
3. *Raphimetopus (Anerastia) ablutella*, Z. (203) IX. Frequent, also at Der-el-Belah.
4. *Ephestia niculella*, Gregs. (258) A damaged specimen 21.X, almost certainly of this species probably came from the fig-gardens at Khan Yunus.
5. *Syria pilosella*, Z. (314) Everywhere abundant at light from mid-IX to mid-XI.
- *6. *Syria niveicosta*, Hmps. (Not in Catalogue). Three specimens of this North African species were taken between 19.IX. and 18.X.
- *7. *Hypogryphia uncinatella*, Rag. (325). Another North African species of which two very recognisable specimens were taken 14, 15.IX.
8. *Heterographis hellenica*, Stgr. (341). One 14.IX.
- *9. *H. harmoniella*, Rag. (361). One 10.XI. slightly worn but quite recognisable. This is an Algerian species.
10. *H. samaritanella*, Z. (362). Frequent and variable, X. XI.
- *11. *H. ephedrella*, H-S. (369). 21.X. One only.
- *12. *Heterographis mabilletta*, Lucas. (Not in Catalogue). Yet another North African, of which I took a specimen on 14.IX.
13. *H. convexella*, Led. (377). One in good order 8.XI.
- *14. *Alispa angustella*, Hb. (393). One taken 17.IX. This species occurs in Central Europe and Dalmatia, but does not seem to have been taken in Syria-Palestine before.
15. *Psorosa dahliaella*, Tr. (402) 12.XI-
- *16. *P. nucleolella*, Moeschl. (403) 14.IX. My one specimen is certainly not *dahliaella*, having a perfectly recognisable and clear cut white submarginal line on the fore-wings. Mr. Tams believes it to be this species, which has been recorded from Asia Minor but not apparently from Syria.
17. *Euzophera osseatella*, Tr. (449) 1.XI.
18. *Ilithyia* sp. ? 3 specimens of an *Ilithyia* taken 14.21.IX. would pass for *I. (Salebria) morosulis*, a wide spread tropical species (*Cat.* II.628) which one might expect in Palestine, were it not for the fact that the subterminal greyish line reaches the anal margin of the forewing almost at the tornus instead of well basad from the tornus. More material is required before this insect can be determined.
- *19. *I. iberialis*, Swinh. (Not in Catalogue). One specimen 1.XI. A Palaearctic desert and tropical species.

20. *I. divisella*, Dup. (667). Abundant, IX-XI.
21. *Ortholepis brephiella*, Stgr. (613). Occasionally and also at Der-el-Belah 11.IX. to 1.XI.
22. *O. zohrella*, Obthr. (792). This Algerian species was very frequent from IX. to XI.
23. *Hellula undalis*, F. (1003). One very fresh ♂, 14.IX.
24. *Nomophila noctuella*, Schiff. (1039). Frequent, IX.
25. *Antigastra catalaunalis*, Dup. (1072) 5.X. One only.
26. *Cynaeda dentalis*, S-D. (1089). Frequent at Der-el-Belah VIII. and also at Umm-el-Kilab.
27. *Cornifrons ulceratalis*, Led. (1274). Frequent, XI.
28. *Noctuella floralis*, Hb. (1291). Der-el-Belah, VIII.

Remarks on the evolution of the Zygaenae and an attempt to analyse and classify the variations of *Z. lonicerae*, Scheven, and of *Z. trifolii*, Esp., and other subspecies.

By ROGER VERITY, M.D.

This wonderfully complex group of *Zygaenae* is of the greatest interest. One feels that the various problems in connection with it lie at the root of the mysteries of evolution and the origin of species, and that by solving them in a satisfactory way one might add a useful contribution to one's knowledge of the latter. That is why I have devoted particular attention to these *Zygaenae* and I have endeavoured to study them more minutely and exhaustively than it had hitherto been done. Some may have the impression that I have pushed analysis too far, but those who have the possibility of following me with adequate materials before their eyes will, I think, soon see that I have only been led to it by facts, and that it is necessary to set down things as they stand, complex as they may be, to attain a positive and true result. It is no use trying to simplify them and make them fit simple schematic views, or one reaches utterly incorrect results. Thus, to begin by the broadest question in connection with this species, that of the degree of distinctness between *lonicerae* and *trifolii* we find that all authors have persisted in keeping them separate from each other as two distinct species, but that all those who have gone into the subject thoroughly and expressed their impressions and views clearly, such as Barrett, Tutt and Oberthür, have had to conclude that it is impossible to draw the line between them. Also the male genital appendages are perfectly identical. This curious contradiction is instructive, because it shows how the usual simple and categorical conception of specific distinctness or non-specific distinctness will not apply to this case: on the one hand *lonicerae* and *trifolii* cannot be separated completely into two species, and on the other they do not constitute together a sufficiently uniform and compact group to be considered a single species. It seems to me that this difficulty has arisen, not so much from facts as from the defects of our mind, which is too absolute in its attempts to conceive them and classify them. If we remember the general law that "*natura non facit saltus*," and we admit that between simple racial differences and complete specific distinctness there is a series of intermediate grades, such cases as that of the *Zygaenae* in question fall in, very naturally, amongst the latter, and a most inter-

esting field is open to investigation. I have on several occasions mentioned in these columns examples of the same sort amongst the *Rhopalocera*, such as that of *Nytha fagi*, Scop., and *Erebia ligea*, L. Each of these consists of two groups, which have been considered for years as distinct species, although no one has been able to separate their variations in a satisfactory way. It seems as if one should conceive these two groups as consisting of two diverging series of races, which spring from an intermediate one and gradually get more and more distinct from each other, till the extreme races afford a degree equal to the specific one and they can inhabit the same grounds without intermixing. This phenomenon I have proposed calling "twin subspecies," and I have suggested it is a degree less than that of "twin species, such as is afforded by *Everes argiades* and *E. alcetas*, or of "twin genera," such as in *Polyommatus icarus* and *Agriades thersites*.

There is also another phenomenon which seems to fall in as a degree of distinctness intermediate between the full specific and the racial one. There exist groups of insects which stand so near each other that in many cases their distinctive characters had not been noticed till quite recently, when the study of their genitalia, found to be constantly different, drew attention to other features visible to the naked eye, just as it happened in some twin species. The groups I refer to now, differ from the latter in that they never fly together on the same grounds and they usually entirely replace each other in the whole of their areas. Reverdin has in late years worked out two such cases thoroughly in *Hesperia malvae* and *H. malvodes*, and in *Melitaea athalia* and *M. pseudathalia*. The *Zygaenae* afford several examples, which, no doubt, are exactly of the same sort. *Z. scabiosa* as compared with *Z. romeo* (including *orion* and *nevadensis*); *Z. sarpedon* as compared with *Z. punctum*; *Z. meliloti* as compared with *Z. charon*; *Z. rhadamanthus* as compared with *Z. oxytropis*. These have been dealt with as distinct species in some cases and as varieties in others, according to the first superficial impression of the authors of last century. Here again it seems to me it is quite hopeless to try and fit them to this indefinite and artificial distinction. What is important, because it leads to most interesting observations, is to recognise clearly the existence of this phenomenon and to make out correctly what cases of variation are referable to it. They are not species, because, if they were, they would overlap and mix in intermediate regions, without interbreeding, as one sees in the case of "twin species." On the contrary, Reverdin has found that in such regions the genital characters by which *M. athalia* and *M. pseudathalia* can usually be separated quite distinctly, exhibit intermediate gradations in some individuals, whilst in the case of *Z. rhadamanthus* and *Z. oxytropis* a transitional race exists in the Maritime Alps, where they meet. We could thus conclude that such cases are subspecies, but on the other hand this term would be wrong if it were taken in the sense of simple race or variation produced by the effect of surroundings, whereas we are now dealing with groups, which keep perfectly distinct from each other by hereditary characters, often affecting even the structure of the genitalia and other organs. In this respect it would be more correct to consider them as species, but evidently in respect of reproduction they are not distinct enough to be sterile, or at least to produce sterile hybrids after a generation or

two, so that they are not perfect species. They only keep distinct for the reason their soma react differently to surroundings and oblige them to live apart in different areas; where they meet they blend. One can presume that this sort of differentiation may not lead up to sterility. Instead, sterility must be at the root of the phenomenon, which leads up to the production of twin species, which live together in the same surroundings and do not interbreed. It seems to me obvious one should make a clear distinction between the two phenomena by restricting the term of species to the latter and calling the other by some such name as "**exergism**" (from the Greek radical *εξεργ*) or "**exclusivism**." As the variations produced by it are neither species nor races and the term "subspecies" is necessary in other cases, which must not be confused with this one, it seems to me there is nothing else but to designate them by the new term of "exerges" or "exclusives." Thus, for instance, one would say that species *athalia* consists in a nymotypical exerge or exclusive, in exerge *pseudathalia* and probably in others, such as exerge *kentana*, which has a third type of genitalia; the latter affords an example of "**seasonal exergism**" in its race *aureliaeformis*, Vrtý., which near Turin exists on the same grounds as *pseudathalia*, but cannot blend with it because they emerge at different times of the year. This existence of distinct hereditary morphological features without sterility has its counter part in many cases in which sterility exists without being accompanied by any strikingly morphological difference; such is the case of *loniceræ* and *filipendulæ*, which so often fly together, but vary geographically so exactly the same that many entomologists have declared they cannot separate all specimens satisfactorily; such is the case of the *Lycarnidi* allied to *coridon*, Poda, of which there are in Spain three, if not four, species so similar to each other that no constant character has yet been detected to separate all individuals with certainty.

Returning to the question of *Z. loniceræ* and *Z. trifolii* there are further facts to observe that makes it still more interesting. In my paper on *Z. filipendulæ* in *Ent. Rec.*, 1921, p. 107, I have already mentioned the general law, according to which in Lepidoptera, the same variations reproduce themselves in successive subdivisions of a group and are simply reduced in scale as the groups get smaller. Here we have a very striking example: *trifolii*, on the whole, stands to *loniceræ* as the *purpuralis* group of species, in the entire genus, stands to the opposite extreme of variation *caroliola* and to the less extreme *filipendulæ*. In *trifolii* the antennæ are shorter and thicker, the point beyond their club is reduced or nearly abolished, the wings are shorter and broader, their apex more rounded, the red spots of forewing tend to blend, first on the underside and then on the upperside, first transversally and then even longitudinally, as the result of reduction of the "primary pattern." All this points to the structure and pattern of the *purpuralis* group. But within the limits of subspecies *trifolii* we again witness a repetition of the same variation: the nymotypical race of *trifolii* and its nearest allies exhibit the characters just described to their highest degree for this species, whereas race *syracusia* and its group already drift considerably away from them and point distinctly to *loniceræ*. Again, in the races of central Europe, which on the whole belong to the nymotypical one, we often meet with individuals which are so distinctly different that they have been dis-

tinguished under the name of *orabi* by as early an author as Hübner : these are nothing but a tendency to the *syrcusia* characters, and through them to those of *loniceræ* and through these to *filipendulæ*. This persistence of variation along the same lines from the individuals to the larger groups is evidently a proof that it is due to an hereditary tendency to split up into two such groups, and that it originates from the very nature of organic constitution, far from being due to the effects of surroundings, as the first and primary cause. It will also be noticed that one of these two groups (*purpuralis* as compared with *filipendulæ* and *trifolii* as compared with *loniceræ*) is of a heavier and less robust structure and that it is correspondingly more sluggish. In my Introductory remarks to the List of Butterflies of Peninsular Italy, in *Ent. Rec.*, 1922, p. 199, I have pointed out the fact that most groups of Lepidoptera produce some species, or genera, or even larger divisions, as the case may be, which seem to have a sluggish, "anabolic" structure and constitution, recalling the female sex, as compared to others, which are active and "catabolic," recalling the male sex. The first react less vigorously to surroundings and in permanent conditions they are more apt to be gradually modified in their structure, so as to become more suited to them ; the second react actively and are either destroyed, if the strain is too great, or resist without modifying their organic balance. This hypothesis would explain how it is that the anabolic groups are more variable in the features of individuals and of local races : for instance in the larger sections, the *Lasiocampides* and *Bombycides* as compared with the *Sphingides* ; in the *Nymphalida* the *Satyridæ* as compared with the *Nymphalidæ* ; or, in the latter family, the *Melitæidæ* as compared with the *Vanessidæ*, etc. We thus see what fascinating suggestions can be drawn from an accurate study of the lowest groups of Lepidoptera, such as the *Zygænides*, with their simple patterns and uniform variations, evidently displaying in their simplest form the fundamental laws of variation.

(To be continued.)

An Aberration of *Ruralis betulae*, male underside. (With Plate VI.).

Mr. C. Craufurd exhibited, on behalf of Mr. Frank Stevens, at the Annual Exhibition of the South London Entomological Society, a most remarkable underside aberration of *Ruralis betulae*. The specimen is a male and is as large as a normal female. It was bred from a larva taken at Chiddingfold with many others in the early summer of 1924. Of the long series bred all the others were typical.

[Thanks are here recorded to the Council of the S. Lond. Entomological Society for kind permission to use the figure which appeared in the recently issued "Proceedings" of that Society.]

A. GROUND COLOUR.—The general ground colour is duller than in most males, and there is less contrast of general shades than usual ; hindwing of a warmer general coloration. There is a total absence of red or orange-red in the marginal area, except that there is a dull red shade behind the anal angle black marking, where usually the red is most intense in the female.

The black spot exactly in the anal angle is small and distinct as it

is normally. The two portions of the interneural spaces with the tail, near which they are normally red, are black with a few scattered white scales along the centre, which represent the white outside edging to the usual red area.

What, in all the specimens I have seen, is a very faint dusky shaded, narrow, indefinable band in the submarginal area of all the wings inside the usually red marginal band, is here a very irregular blackish band, diminished towards the inner margin of the forewing, darker in the hindwing but interrupted towards the anal angle by vein areas.

The ground of the hindwing is more uniform in colour, which is just that of the central band of the normal hindwing of the male, but slightly less intense towards the base and inner marginal area.

The ground colour of the forewing has two shades, which contrast, a narrow band from the base along the costa for about two-thirds, and then the whole area beyond to apex and anal angle is of the normal colour of the usual elongate inverted triangular character, except that it gets duller as it approaches the anal angle. The rest of the area of the forewing, more than two thirds of it, is paler in contrast, except near the anal angle where the two shades slide into each other.

The inner marginal area of the forewing which is covered by the costa of the hindwing when the insect sits at ease, has a larger and more slatey-blue smoother area than is found in normal specimens, which often show but slight traces of the slatey-blue tinge in this area.

The fringes are duller, *i.e.*, the basal portion is more widely black, instead of the usual fine-hair black line.

B. MARKINGS.—On the forewing the blackish brown discoidal line is well developed as in a normal female, *i.e.*, it is somewhat larger than in the males and more determinate.

The conspicuous, white, black-edged line from just below the costa, usually bordering on the outside the dull orange, elongate triangle, is totally absent, not the slightest trace remaining.

The very faint white, black-edged line on the inner side of this triangle remains, with a few white scales and numerous black traces, separating the two shades of the ground colour detailed above for about one-third across the wing.

Thus there is no elongated inverted triangle, suspended, as it were, below the costa, and one of the obtrusive recognition marks of the species is absent.

On the hindwing the usually conspicuous, long, white, black-edged, wavy, transverse line from the costa towards the anal angle is totally absent, no trace even remaining.

The usual inner white, black-edged border of the normal red band remains. The very fine black hair-line edge is now a black line, broad at the top end and bending at right angles it runs parallel to the costa ending in a fine point about half way to the base. The white line is represented by a white (blue) cloud of the shape of an inverted right-angled triangle, whiter (bluer) at the outer edge, but very gradually diminishing to obsolescence basally. This triangular area appears really to be covered by scattered light scales diminishing in density basally. Thus there is no band on the hindwing, and what is probably the most conspicuous recognition mark of the species is totally absent.

Where the black transverse line of the hindwing crosses the end of the cell, the upper separation of the diverging veins there is developed a black blotch with a distinct white centre. A break in the line sometimes occurs here in normal specimens and the continuation below is not in alignment.

The upperside has what appears to be a faint bleaching towards the outer base of the forewings.

NOTE. I have refrained from using any term to indicate the actual colour of this undersurface, for on consulting numerous "authorities," I was confronted with a surprising want of agreement. Stephens says orange-tawny; Godart, fawn-yellow; Newman, glowing fulvous grey approaching orange; Lang, reddish; Kirby, dull orange; Barrett, greyish-fulvous; Tutt, 1896, rich orange tawny; Rühl, more or less dull orange colour running to brownish or brown yellow; South, ochreous, female more orange; Tutt, 1907, orange yellow; Seitz, ochreous.—HY.J.T.

Lissodema kirkae n.sp. A species of Coleoptera new to Science.

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

Dark brown, shining, antennae, legs, and palpi, yellow, club of antennae and femora, darker, eyes black.

Head distinctly, but less closely punctured than in *L. 4-pustulata*, the punctures at the base near posterior border of thorax becoming confluent; antennae with very marked 3-jointed club, the last joint elongate, about as long as the two preceding joints taken together, these globular but about as long as broad; eyes prominent. Thorax subquadrate, strongly but less closely punctured than in *L. 4-pustulata*, the punctures not confluent; the sides are margined, and these are armed with four distinct teeth (which are considerably stronger and more prominent than those of *L. 4-pustulata*), the anterior pairs are blunt, situated close together and are smaller; the posterior pairs are sharp and strong especially, the one situated at the posterior angles of the thorax, and are wider apart, but the distance between them is less than that from the posterior anterior tooth, thus leaving a space in the centre of the margined sides, which is almost straight. There are two shallow punctured depressions one on each side of the base of the thorax; the posterior margin of thorax is margined and semicircular. Scutellum with a number of punctures at the base. Elytra elongate, parallel-sided, slightly narrowed at apex, distinctly punctured, the punctures becoming confused and confluent on the disc, and not forming striae, nor distinct rows of punctures. Legs medium, slender. Long 3.8 mm.

This insect is larger than either of our two known species and is abundantly distinct. From *L. 4-pustulata*, Marsh, apart from the difference in size and colour, it may be known by its very differently shaped thorax, stronger teeth, different puncturation, etc. From *L. cursor*, Gyll., by its darker colour, four-toothed thorax on each side, which are widely separated in pairs, instead of five as in *L. cursor*, three of which are larger being equally distant from each other and situated in the middle of the sides of the thorax, where in *L. kirkae* there is a clear space.

Besides our other two, there is only one other European species of *Lissodema*—*L. rosti*, Reitt. from Circassia, the description of which I have looked up, and which in no way agrees with our present insect.

I am naming this beetle in honour of my secretary, Miss Florence J. Kirk, who was present at the time of the capture, and to whom I am so much indebted for help in my Entomological work.

On June 25th last, I visited Windsor Forest for the purpose of

witnessing the felling of a partly decayed ash tree, which it was considered, it was necessary to have cut down. After it had fallen, when examining the topmost branches, some of which were nearly dead and considerably bored by insects, I observed a small beetle, which came out of a boring in the bark, and promptly bottled it. As I could not recognise it as anything we possessed, I told my secretary it was certainly new to Britain, and we tried very hard to find more, but without success. *Lissodema f-pustulata* occurred in some numbers in these branches, as also several examples of a *Cis* (*alni*?), not yet identified, and a number of a Thrips. Other species of Coleoptera I have found in this tree are -- *Eucnemis capucina*, only found in the New Forest in Britain before, *Plegaderus dissectus*, *Abraeus globosus*, *Xantholinus glaber*, *Quedius scitus*, *Homalium brevicorne*, *Puthia schaumii*, *Euplectus sanguineus*, *Enicmus rugosus*, *Sphindus dubius*, etc.

Some Aspects of the General Ecology and Behaviour of the Water-Strider, *Gerris rufoscutellatus*, Latreille. III. (With Plt. VII).

By C. F. CURTIS RILEY, A.M., M.S., F.E.S.

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There are several other points of interest in connection with the migrations of these gerrids to and from the artificial ponds on the grounds of the University of Manitoba. During the remainder of the summer of 1921 the ponds were not permitted to become dry, for as the water evaporated fresh water was added from the Winnipeg water system. Gerrids were on the surface of the ponds throughout the summer. There were many migrations to and from the ponds throughout this season. The migrations away from the ponds were not the result of the drying up of the water, and probably not the result of the lack of food, because there was generally a moderate supply of this in the form of drifting insects. The majority of the emigrations occurred at dusk and at night. There is no doubt about this, but the evidence is not so clear regarding the time, during the night, when these responses took place. Besides the instances to which reference has already been made, on a number of other occasions, gerrids have been seen to fly from the surface-film about dusk. But there were a great many emigrations that were not observed, despite the fact that the ponds were carefully watched for several hours on many different nights. A flash-light was used for the purpose of counting the gerrids on the surface of the ponds and also for identifying their position on the water. The observations were not continued throughout any one entire night. It is possible that many of these emigrations took place in the early morning, but this statement is not made categorically. The number of water-striders, on the surface of the ponds, was counted each evening just before dusk, and again each morning between eight and nine o'clock. In the evening, the gerrids on the surface of the water were captured, with as little disturbance as possible, and marked on the thorax with a small spot of white paint, and then they were carefully replaced on the surface-film. This made it possible not only to know the number that flew away from the ponds, but also to detect the number that migrated to them during the night.

The records in the field note books of the writer, indicate that on some evenings only two or three gerrids were on the surface of the ponds, and the next morning there might be as many as thirty individuals present, twenty seven or twenty eight immigrants having reached the ponds during the night. Some nights only one or two migrants arrived, while on other nights fifteen to twenty visitors came, or even a larger number. Occasionally, the number of gerrids on the pond was depleted without others taking the place of those that had emigrated. Then again, no water striders left the ponds during the night, but a number of new immigrants might be present the next morning. Some gerrids remained on the surface of the ponds for one day only, others for several days, and still others for two or three weeks, but the last were few. There were none that remained on these water bodies throughout the whole summer.

The writer has previously suggested that there were probably other factors, besides the drying up of the water and the lack of food, that influenced the migrations of these gerrids. The statements that are now to be made refer more particularly to dusk and night migrations. Without entering into a detailed explanation, some of these factors will be enumerated here. Apparently there must be a certain amount of light during these migrations. This is in agreement with the fact that this species of gerrid is positively phototactic. There is no evidence that they migrate on dark nights. There is usually moonlight or starlight. During the night many of the migrations occurred when there was some moonlight. The gerrids have been known to migrate when the atmosphere was dry, but more often at times when there was a considerable amount of humidity. They do not migrate during rains, but they may do so previously to such storms and after they are ended. They migrate both when the weather is clear and when it is partly cloudy. These migrations may take place when the air is still, but many occurred when there was some wind. At night it was not possible to know whether the gerrids migrated with or against the wind. In the daytime they have been seen to fly against light winds and with stronger winds. Their responses to wind currents on the surface of the water have already been described.

Migrations of *Gerris rufoscutellatus* do occur during the daytime, but the experience of the writer is that by far the greater number take place at dusk or during the night. On numerous occasions, the dusk immigrations, to the larger of the two artificial ponds on the grounds of the University of Manitoba, have been witnessed. These immigrations usually occurred when there was either a light or medium wind, and the gerrids flew against the wind. The directions from which the water striders emigrated was generally from either the south-west or the north east. The writer has frequently stood close to the water of the pond and counted, on some evenings, as many as thirty to fifty new arrivals in forty-five minutes. The gerrids were rather difficult to see at dusk, unless observed against the sky, which was often lighter than the immediate environment around the pond. However, they could easily be seen when they arrived at a point within one to three feet of the surface of the water. Many of the gerrids alighted on the surface film with the wings outspread. The wings were not closed against the body until the creature reached the water. Others apparently closed the wings just before they alighted on the surface of the

water. Perhaps this was the consequence of vision, owing to the dusk and resulted, possibly, in a "miscalculation," if such a term may be employed, as to the distance away from the water. The former ones alighted so quietly that they could not be heard. The latter ones could easily be heard as they plopped on to the surface-film. These slight plops of sound, frequently, followed each other at very short intervals. Many times, emigrations from this pond have been observed at dusk. Usually, there were fewer emigrations than there were immigrations. Occasionally, however, as many as twenty to thirty individuals have been seen to leave the pond in one and a half hours. It was necessary to observe the water-striders very closely, if they were to be seen as they rose from the surface-film. Generally, the gerrids flew from the water without making any audible sound. Sometimes a slight click was heard as they left the water, perhaps the result of spreading the wings. Frequently, after a gerrid had flown the distance of a foot or such a matter from the point where it left the surface-film, a slight buzzing sound could be heard. At other times no sound of this character was audible.

In the Winnipeg region, in the province of Manitoba, the writer has not been successful in finding *Gerris rufoscutellatus* in a hibernating condition. The hibernation quarters have not been discovered; neither has this species been observed leaving the surface of the water and entering its hibernation quarters in the fall; nor has it been seen leaving places of hibernation in the spring. Continued searching may result in finding the winter quarters of this species of water-strider, but since the writer began to give attention to this matter in the vicinity of Winnipeg four winters have passed without success. When it is recalled that many running and standing bodies of water, in the region round about Winnipeg, are, during the summer months, thickly populated with *Gerris rufoscutellatus*, it is rather disconcerting that the gerrids of this species have not been found in the fall either entering into or already in their hibernation quarters. The writer has been much more successful in determining the places of hibernation of other species of water-striders, especially *Gerris remigis*, in latitudes farther to the south. In the vicinity of Urbana, in the state of Illinois, *Gerris remigis* is very abundant on water bodies, particularly on the surface of streams. In fact its abundance is equal to that of *Gerris rufoscutellatus* in the Winnipeg region. *Gerris remigis* has been seen to leave the water in the fall, to stride on to the land and to crawl into places of hibernation. Large numbers of individuals of this species have been found, many times, in a condition of hibernation in their winter quarters. For additional information on the hibernation of this species of water-strider, attention is directed to a paper by the writer (1921a, pp. 241, 247-253).

In the spring, in the Winnipeg region, *Gerris rufoscutellatus* appears rather suddenly on many bodies of running and standing water. When these gerrids are first observed on the surface of ponds and streams, they are seen to be present in fairly large numbers. It is true that, in the beginning of some springs, a few early arrivals may first be seen before the full complement is found on the surface of the water. In warm springs, a few gerrids may be found in their aquatic habitats toward the end of April and during the first part of May. Usually, however, they are not present in numbers until the third or fourth week

in May, when they may be seen to be abundant on the surface of ponds and streams. In the fall, the gerrids disappear somewhat abruptly from their usual haunts. Some falls, there is a slight visible decrease in numbers at the end of August and early in September, suggesting the flight of pioneer individuals. About the end of the first week of September many gerrids are observed to have left the surface of the water; and usually, by this time, they have practically all gone from their usual haunts. Occasionally, in the fall, odd stragglers and sometimes a pair of tardy individuals may be found, by careful searching, as late as the beginning of the second week of this month, but generally they have all disappeared from the surface of the water earlier than this. This disappearance frequently occurs while there is still an abundance of water-strider food on the surface of streams and ponds, and from a month or six weeks to two months before the winter "freeze-up" begins.

The writer has been successful in finding hibernating gerrids of another species, *Gerris remigis*, in large numbers. Therefore, it may prove of interest to compare some of the observations, in connection with hibernation, made on this species with the observations made on *Gerris rufoscutellatus*. The most satisfactory work on the hibernation of *Gerris remigis* was done in the region round about the city of Urbana, Champaign County, in the state of Illinois. Much searching for hibernating water-striders was done in the close proximity of many brooks, creeks, and rivers, and also of numerous marshes, pools, ponds, and lakes, in the territory extending over a radius within, approximately, thirty miles of Urbana. The region where this study was made is situated, at a rough estimation, six hundred and fifty miles to the south and five hundred and seventy-five miles to the east of Winnipeg, according to map measurements.

In the spring of the year, the members of this species, *Gerris remigis*, appear little by little on the surface of the streams in the vicinity of Urbana. These waters are not abruptly populated by the gerrids. They leave their winter haunts by degrees, occasionally a few may be seen on brooks while the ice is still present on parts of such streams, and before the snow has entirely disappeared. As the weather becomes warmer and the season advances, more gerrids arouse from the lethargic condition assumed during the winter, and crawl from their hibernating quarters on to the surface of the water. The full complement only slowly emerges from the hibernating haunts, and moves on to the surface of brooks, creeks, and rivers, when, eventually, these habitats are well populated with gerrids. The writer has taken about eight gerrids, *Gerris remigis*, from the surface of a brook near White Heath, approximately eighteen miles south-west of Urbana, as early as the third and fourth weeks in February, while thin ice was still on parts of the stream. Generally, these water-striders do not appear so early as this, but gradually begin to show themselves on the streams round about Urbana during the second and third weeks of March. By the end of March and the beginning of April more gerrids are noticed on the surface of the water. From the second week in April until the end of this month they continue to increase in numbers on the surface of streams. About the latter date, or a few days later, the gerrids have all emerged from their hibernating quarters, and they are observed to be abundant on the surface of the various bodies of water in the

vicinity. The writer has frequently seen these gerrids as they left their hibernation places and slowly crawled on to the surface of the water. They have been observed to emerge from large bunches of dead leaves situated in close proximity to the bank of the stream.

In the fall the gerrids, *Gerris remigis*, enter their hibernation quarters gradually. They migrate from their aquatic habitats by degrees. They do not leave the streams suddenly, but they do so little by little, and gradually enter into their winter quarters. This emigration from the surface of the water extends over a considerable period of time, until all of the water-striders have deserted their summer haunts and settled down in their hibernation quarters for the winter. On a number of occasions they have been seen as they congregated near the bank of a stream, preparatory to leaving the water for their winter quarters. They have also been noticed in the act of leaving the surface of the water and of entering into various hibernation places. During the middle of October these water-striders are observed to be congregated in larger groups than at any other time during the year. Toward the close of this month, on the smaller brooks and creeks, the groups crowd up near to the banks. From about the third week of October until the first of November, the gerrids, by degrees, leave these groups and gradually stride from the surface of the water on to the land. They then crawl into various different situations, as, for example, holes in the banks of streams, holes on the land filled with dead leaves, cavities under roots of trees, depressions under fallen trees, bunches of dead leaves and into many other such places. This migration from the surface of the water on to the land continues gradually from the middle of October until the first week of November, the latter date finding many of the gerrids in their winter hibernation quarters. Usually by the middle of November all the water-striders have left the surface of the streams. Not infrequently, however, they have been captured from small brooks and creeks as late as the last week of November. One fact that always impressed the writer was the slow, gradual migration from the aquatic habitats on to the land and then into winter quarters.

Apterous water-striders, *Gerris remigis*, always hibernate in the immediate vicinity of their habitat. Some of the situations in which hibernating gerrids were found have already been enumerated. From the data available, apparently alate individuals of this species do not hibernate in close proximity to their own habitat. At different times, a total of seven hibernating alate gerrids have been found, and none of these were near bodies of water. Four individuals were in hibernating quarters situated from a quarter to a half mile from the nearest pond or stream. They were all isolated gerrids, each of them having been found as a solitary individual. One was hibernating among dead leaves, in the decaying trunk of a fallen tree; a second was discovered beneath a pile of brush consisting of branches cut from trees; another individual was found underneath a large bunch of dead leaves; and still another had gone into winter quarters in a large hole, filled with leaves, in the side of a hill. These four water-striders were all found in a forested area, in the vicinity of Urbana. The other three gerrids were captured in the region of Syracuse, in the state of New York. The situations in which they were hibernating will not be given in detail, except to state that they also were found in a forested area, at least one-eighth of a mile from any body of water. These winged

individuals are strong fliers, as is indicated by the fact of hibernating so far from water. De la Torre-Bueno (1917, p. 203) has directed attention to the fact that alate forms of *Gerris remigis* are often observed far from water. A part of his statement follows:—"These winged adults are generally found solitary in the most unlikely places— isolated little pools, springs, rock-holes, beach drift, far from the favourite haunts of this stream-loving bug."

Other hibernating gerrids that have been found by the writer, are *Gerris marginatus*, *Gerris buenoi*, Kirkaldy, and *Gerris conformis*, Uhler. *Gerris marginatus* has been observed many times, during hibernation, not only in the vicinity of its habitat, but also at considerable distances from any body of water. Those that were found far from water were macropterous individuals. Only two or three individuals of this form have been found by the writer in close proximity to a body of water. Many of the apterous and brachypterous forms have been taken from their hibernation quarters in the immediate vicinity of a stream or pond. *Gerris buenoi* has always been found in the macropterous form. Hibernating individuals have been captured at least four hundred yards away from any water. They may hibernate in close proximity to their habitat, but the writer has not found them in such a situation. Three hibernating *Gerris conformis* were taken in a hibernating condition from interstices under the bark of decaying, fallen trees, situated approximately a quarter of a mile from either standing or running water; they were all isolated gerrids. These were macropterous individuals, and are the only members of this species taken while in winter quarters. In connexion with this discussion of migration and hibernation it is, perhaps, pertinent to recall certain remarks made by Kirkaldy (1899, p. 110), in referring to the family *Gerridae* in general. He makes the following statement:—"As has been previously remarked, many of the *Gerridae* conceal themselves in fact 'hibernate' under moss, stones, etc., often far from water, during the winter." In so far as any conclusions can be drawn from the observations of the writer with respect to the method of disappearance from and return to aquatic habits, there appears to be some basis for the following statement:—The alate forms and species apparently, in the fall, migrate rather suddenly from the surface of water bodies; and in the spring, they appear in their accustomed haunts with a similar abruptness. On the contrary, the brachypterous and apterous forms and apterous species, in the fall, seem to disappear from the surface of ponds and streams by degrees; and in the spring, they show themselves on the surface of the water with equal slowness. All the above data, with reference to these three species of gerrids, refer to observations made in the region of Urbana.

All these records, with respect to migration and hibernation, indicate that there is a strong tendency for alate water-striders to migrate by flight. In the late fall and in the winter, they have been found in a lethargic condition, in various kinds of hibernation quarters, at considerable distances from any body of water. The recorded findings of hibernating macropterous gerrids show by far the greater number to hibernate away from the vicinity of water; while the recorded findings of hibernating brachypterous and apterous water-striders indicate by far the greater number to hibernate in the immediate vicinity of their habitat. All of these varied data concerning the fall and spring hibernation responses of macropterous, brachypterous, and apterous gerrids,

not only present the opportunity for comparison between the different forms, but also between the different species that have been enumerated, including *Gerris rufoscutellatus*.

It is probable that these water-striders, *Gerris rufoscutellatus*, either hibernate, in the Winnipeg region, at considerable distances from any body of water, or that they migrate to localities further south before assuming the lethargic condition of hibernation. After considering the different and varied responses relating to hibernation, it is at the present time the opinion of the writer, that in the fall, in the Winnipeg region, *Gerris rufoscutellatus* migrates by flight from the vicinity of its summer habitat to points away from water. Hibernating individuals have been sought for carefully in many different situations in close proximity to bodies of water, that were abundantly populated during the summer, but none have been found. Further, the writer is inclined to believe that this species of water-strider, in the fall, not only leaves the vicinity of its summer habitat, but also that it probably migrates to localities farther to the south and there enters into hibernation quarters. Much time and energy has been expended in searching for these gerrids in the vicinity of Winnipeg, in the late fall, early winter, and early spring, for four successive seasons without success: while six hundred and fifty miles to the south, in the Urbana region, large numbers of hibernating *Gerris remigis* were found during the second winter after searching was begun. Assuming that they, *Gerris rufoscutellatus*, do migrate farther south, it is probable that in more southern localities, they hibernate at some distance from bodies of water. The writer has found in fourteen years but three hibernating individuals of *Gerris rufoscutellatus*. One was in a large cavity in a decaying fallen tree, situated at least half a mile from water. The other two were taken in a forested region from under piles of brush, almost four feet high, formed of branches cut from lumbered trees. They were a quarter of a mile from any body of water. The three gerrids were found far to the south of Winnipeg, in the vicinity of Urbana.

The statements concerning the probable hibernating quarters, and the fall and spring migrations of *Gerris rufoscutellatus*, are not made categorically, for this species may yet be found to hibernate in the vicinity of Winnipeg. It is a long and tedious operation to discover the hibernation places of any species of water-strider in a region having such severe winters as are experienced in this latitude. Temperatures of minus fifteen to twenty-five degrees Fahrenheit are common; and temperatures of minus twenty-six to thirty-five degrees Fahrenheit are occasionally registered; while temperatures of minus thirty-six to forty degrees Fahrenheit are not unknown. To the sojourner in more southern latitudes, accustomed to climatic conditions of a less rigorous character, the surprising fact is that insect life is able to withstand these low temperatures. On recalling the fact that it is not uncommon to experience temperatures of ninety to ninety-five degrees Fahrenheit in summer and temperatures of minus twenty-five to thirty-five degrees Fahrenheit in winter, it is at least an interesting truth that protoplasm, as exemplified by that in the bodies of water-striders, under the natural conditions of the environment, evinces such adaptability to climatic extremes.

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ADDENDUM.

Hoffman (1924, pp. 427-230)* has briefly discussed the life-history of *Gerris rufoscutellatus*. He rather tersely describes the eggs and instars; records the number of nymphal stages and the number of days of each instar; and successfully rears four individuals to the adult stage.

*HOFFMAN, W. E.

1924. "The Life-Histories of Three Species of Gerrids (Heteroptera Geridae)." *Ann. Entom. Soc. Amer.*, Vol. XVII., No. 4, pp. 419-430.

PLATE VII.

Fig. 1.—Map indicating regions where writer collected and studied water-striders.

They were collected in aquatic habitats, from the following places:

1. Winnipeg, Manitoba, *Gerris rufoscutellatus*, *Gerris buenoi*, *Gerris marginatus*; 2. Keewatin, 3. Kenora, Ontario, *Gerris rufoscutellatus*; 4. Mankato, Minnesota, *Gerris rufoscutellatus*, *Gerris marginatus*, *Gerris buenoi*; 5. Milwaukee, Wisconsin, *Gerris rufoscutellatus*; 6. Ann Arbor, Michigan, *Gerris rufoscutellatus*; 7. Urbana, Illinois, *Gerris rufoscutellatus*, *Gerris marginatus*, *Gerris buenoi*, *Gerris conformis*, *Gerris remigis*; 8. Syracuse, New York, *Gerris buenoi*, *Gerris marginatus*, *Gerris remigis*, *Gerris rufoscutellatus*.

They were collected in hibernation quarters, from the following places: 4. Mankato, Minnesota, *Gerris marginatus*; 7. Urbana, Illinois, *Gerris rufoscutellatus*, *Gerris marginatus*, *Gerris remigis*, *Gerris buenoi*, *Gerris conformis*, 8. Syracuse, New York, *Gerris remigis*, *Gerris marginatus*

NOTES ON COLLECTING, etc.

A FEW GENERAL NOTES AND RECORDS OF COLEOPTERA.—*Cryptophagus pallidus*, Strm., was found in abundance on the flowers of *Salix pentandra*, L., at Burwell Fen on May 14th. This is interesting because Reitter especially mentions that the nearly related *C. dentatus*, Hbst., is found under bark and in old wood, but that *C. pallidus* occurs in flowers of trees (Auf blühenden Gesträuch). As far as I know this is the first time it has been recorded from its proper habitat in Britain.

Atomaria zetterstedti, Z.—I took this species in some numbers by beating ripe cottony seed heads of Willows on an island near Sunbury in June, 1924. It has not been found anywhere else before in Britain except in the Oxford district, where Mr. Collins first discovered it in numbers in seed heads of ♀ willows.

Maydalis carbonaria, L.—On June 25th, 1923, I beat this species off birch at Crowthorne; this is by far the most southern record in Britain, Chartley Moss, Staffs. and Sherwood Forest, Notts. (where I have taken it freely), being the only two English localities known to me south of Northumberland.

Alphitophagus bifasciatus, Say.—On September 3rd 1924, I found about a dozen specimens of this granary beetle under a board in Burwell Fen. Not only is this a very strange place for the insect, but several specimens presented a marked variety—instead of two black fascia being present on the light elytra, the latter are all black with one yellow uninterrupted fascia across them at the base. I propose to call this aberration ab. **unifasciatus**, n.ab.

Crypticus quisquilius, L., and *Hypera fasciculata*, Hbst.—Inland records.

The former of these two insects I captured in the sand-pits at Freckenham on September 5th, 1922. It has occurred at Tubney, but is of course chiefly a coast-insect. The *Hypera* I found in the same

locality on May 13th, 1925. There is *Erodium*, the food-plant of the beetle, growing in these sand-pits, but I have never heard of an inland record of this insect before in Britain. In the *Ent. Record*, 32, 153, 199 (1920), I drew attention to the fact that a number of coast species lived in the sand-pits at Freckenham.

The list up to date is as follows:—

Brosicus cephalotes, L.; *Harpalus serripes*, Schon., *H. anxius*, Duft., *H. picipennis*, Duft. (abundant); *Amara lucida*, Duft.; *Microzoum tibiale*, F.; *Crypticus quisquilius*, L.; *Hypera fasciculata*, Hbst.; and *Philopeton geminatus*, F.

Cis jacquemarti, Mel.—During the winter a number of specimens of this Scotch beetle bred out from a piece of polyporus (*Formes fomentarius*) taken from a standing beech tree in Windsor Forest. Unless Pool took this insect in the New Forest—I know he found another Scotch species there, *C. lineatocribratus*, but I cannot find his paper—it is the first record for England.—HORACE DONISTHORPE.

CURRENT NOTES AND SHORT NOTICES.

A Meeting of the Entomological Club was held at "Durandesthorpe," 19, Hazlewell Road, Putney, on July 17th, Mr. H. St. John K. Donisthorpe, F.Z.S., in the chair. The members present were Messrs Robt. Adkin, F.E.S., J. E. Collin, F.E.S., H. Willoughby-Ellis, F.Z.S. and Prof. E. B. Poulton, F.R.S. The visitors present were Messrs H. E. Andrews, F.E.S., W. J. Kay, F.E.S., F. Laing, F.E.S., C. K. Ogden, Hy. J. Turner, F.E.S. and Dr. Malcolm Burr, F.G.S. The guests were received by Mrs. Donisthorpe and tea was served, after which the chairman's collections and recent entomological work were inspected. In the study were a number of rare Coleoptera taken this season, and a large drawer of varieties of the British *Coccinellidae* were on view, together with the collection of Myrmecophiles arranged to show their functions, hosts and life-histories, the results of many years study and work in the field. The resignation of Mr. T. W. Hall, F.E.S. (1898) owing to ill-health was accepted with much regret. To fill the vacancy Mr. W. J. Kaye was proposed for membership and under the rules will offer himself for election at the next meeting of the Club. Supper was served at 8 o'clock and the guests dispersed at a late hour, after a most enjoyable evening had been spent.—H. W.-E.

Don Candido Bolivar, son of the doyen Ignacio Bolivar, who bids well to rival his father, is at present engaged in revising the *Eumastacidae* and in this connection recently paid a short visit to the British Museum (Nat. Hist.).—M.B.

The Moscow Entomological Society, which celebrated its tenth anniversary last summer, is now fused with the Russian Entomological Society as the Moscow branch. Its special sphere is Economic Entomology and the members are always glad to enter into correspondence with economic entomologists throughout the world.—M.B.

In the death of Mr. J. C. Stevens of the famous auction rooms of Covent Garden there passed away one who for many years has been indirectly connected with entomology. All the famous collections which have been sold of late years passed under his hammer. He was a man of robust health and his eighty-two years sat easy on him; he was in his usual chair above his audience only a few hours before he was taken with an attack of pneumonia, and passed away in less than a week later.

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MEETINGS OF SOCIETIES.

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

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, Exhibits. July 25th, Field Meeting at Horsley. August 13th, Exhibits. August 27th, Lantern Evening. September 6th, Field Meeting in Ashdown Forest. September 10th, Exhibits.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., W. E. GLEGG, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.

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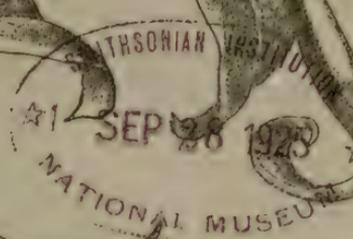
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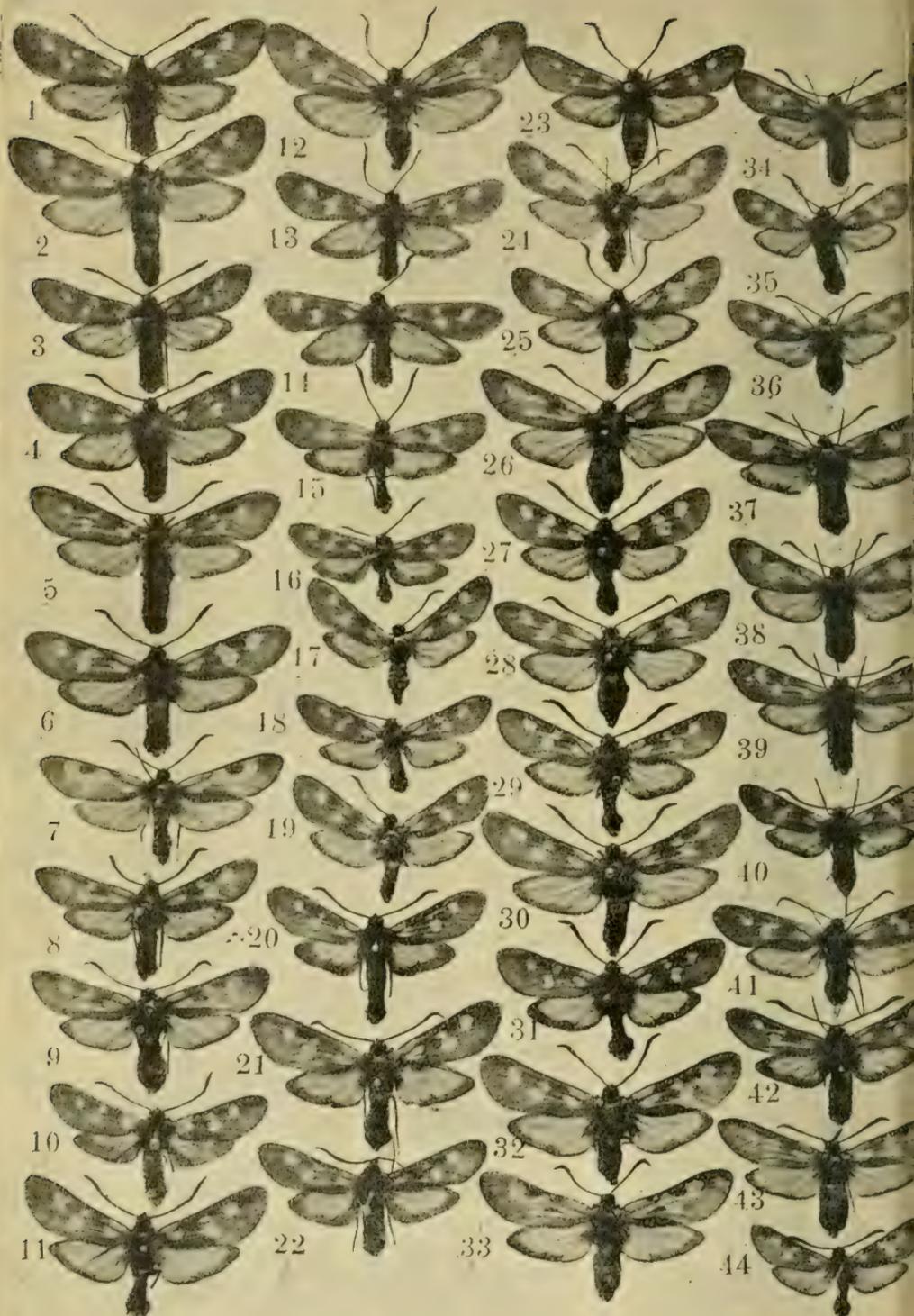
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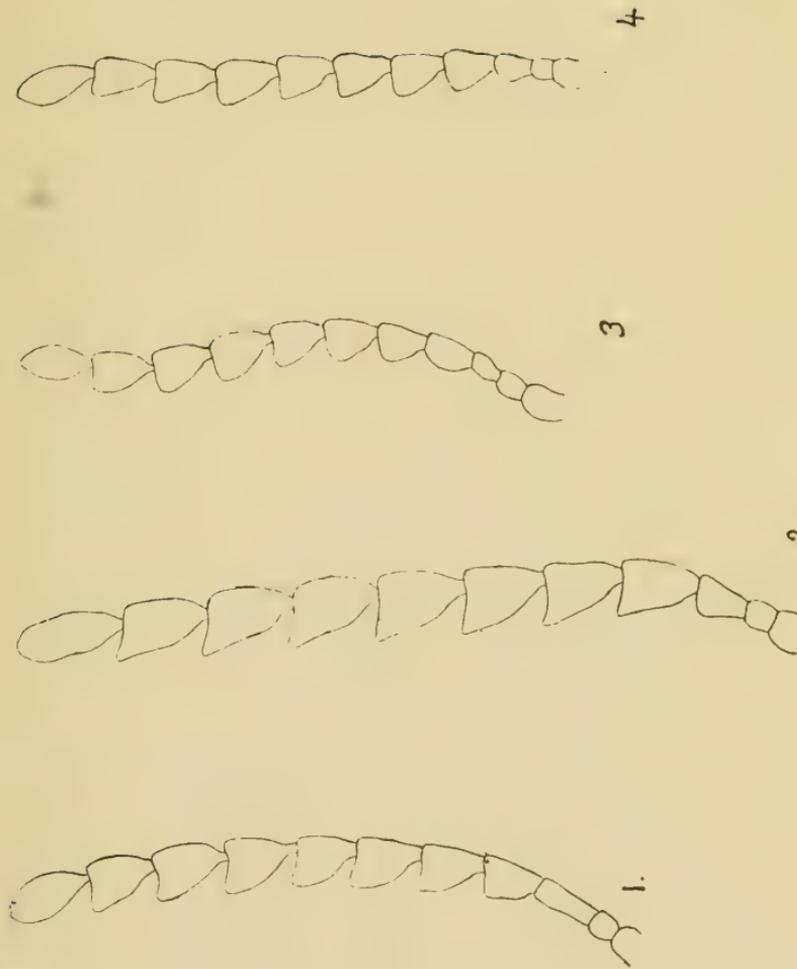
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2.

4

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1.

EXPLANATION OF PLATE. (VIII.)

(The specimens figured are in the Verity coll., except when otherwise stated.)

Subspecies *palustris*: 1: race *hibera*, Vrtý., ♂ (Oviedo, Asturias); 2: do. ♀; 3: do. form *hiberuncula*, Vrtý., ♂ (do.); 4: do.; 5: do. ♀; 6: race *palustris*, Obth., ♂ (Rennes); 7: do. ♀; 8: race *palustrella*, Vrtý., ♂ (Surrey); 9: do. ♀; 10:

Subspecies *seriziati*, Obth. ♂ (Algeria, Turati coll.); 11:

Subspecies *trinaeria*, Vrtý., ♂ (Lupo in Sicily); 12: do. ♀ (Turati coll.).

Subspecies *trifolii*: 13: race *siciliae*, Vrtý., ♂ (Sicily); 14: do.; 15: race *australis*, Obth., ♂ (Batna in Mauris. Turati coll.); 16: do. (Asia Minor, ex. Stlgr. in Turati coll.); 17: do. ♀ (Puta Rana in Africa, Turati coll.); 18: do. (Sicily); 19: do. (Sicily, Rocci coll.); 20: race *magnaustralis*, Vrtý., ♂ (Algeria, coll. by Faroult); 21: do. ♀ (do. Turati coll.); 22: race *xyracusia*, Z. ♂ (Barcelona); 23: II. gen. *secundogenita*, Vrtý. ♂ (Catania, Playa, in Sicily, coll. by Zickert, in Turati coll.); 24: race *trifolii*, Esp., form *minoides*, Sélys, ♀ (St. Come, Gironde); 25: do. form *glycirrhizae*, Hb. ♂ (Villemare, Gironde); 26: do. ♀ (St. Come); 27: form *trifolii*, Esp. ♂ (do.); 28: do. ♀ (do.); 29: do. form *orobi*, Hb. ♂ (do.); 30: do. ♀ (do.); 31: race *subxyracusia*, Vrtý., ♂ (Quiberon in Morbihan); 32: do. ♀; 33: do.; 34: race *decreta*, Vrtý., ♂ (Sussex); 35: do.; 36: do. ♀; 37: do. form *minoides*, Sélys; 38: do. form *basalis*, Sélys; 39: do. hybr. *decreta* × *tutti*, Rebel: *grossenori*, Vrtý., ♂; 40: do. form *longicornibus*, Vrtý., ♂; 41: do. ♀; 43: race *duponchelliana*, Obth., ♂ (Rognac, near Marseilles); 43: do. ♀; 44: do. II. gen. *duponchelliella*, Vrtý., ♂; 45: do. ♀; 46: race *albiana*, Obth., ♂ (Hyères, Var.); 47: do. ♀.

Subspecies *transferens*: 48: race *transferens*, Vrtý., ♂ (Tring. Hert.); 49: do. ♀; 50: race *intermixta*, Vrtý., ♂ (Orihuela, 1,700m. in Aragon); 51: do.; 52: do. ♀; 53: do.; 54: race *dimorphica*, Vrtý., ♂ (S. Fili, 900m. in Calabria); 55: do. ♀.

Subspecies *loniceræ*: 56: race *britanniae*, Vrtý., ♂ (Warthill, Yorks.); 57: do. ♀; 58: race *apenninica*, Rocci, ♂ (Calestano, Parma, Rocci coll.); 59: do. ♀ (Mt. Lipican, July 12th); 60: do. ♀ (Mt. Mosca, 1,300m.); 61: race *pauper*, Vrtý., ♂ (Pizzo Tre Vescovi, 1,300m., Piceno); 62: do. ♀; 63: *trifolii* form *centralitaliae*, Vrtý., ♂ (Fargno, m. 1,400, Piceno); 64: do.; 65: do. ♀; 66: do.; 67: race *pauperetincta*, Vrtý., form *autumnalis*, Vrtý., ♂ (Bolognola, 1,200m., Sibillini Mts.); 68: race *pauperetincta*, Vrtý., ♂ (do.); 69: do. ♀; 70: race *etruscae*, Vrtý., ♂ (Mt. Senario, m. 700, Florence); 71: do. ♀; 72: do., form *nigra*, Dz., ♂ (Abetone Pass, m. 1,300, Tuscany); 73: do., form *brevicornibus*, Vrtý., ♂ (Futa Pass road, m. 900, Tuscany); 74: do. ♀; 75: race *vicas*, Vrtý., ♂ (Mainarde Mts., m. 500, Caserta); 76: do. ♀; 77: do., form *posticoobscurata*, Vrtý., ♂ (do.); 78: race *magismaculata*, Vrtý., ♂ (Geneva); 79: do. ♀; 80: race *loniceræ*, Sch., ♂ (Dresden); 81: do. ♀; 82: race *minuens*, Vrtý., ♂ (Brandlberg); 83: do. ♀; 84: race *miseræ*, Vrtý., ♂ (Sussex); 85: do.; 86: race *glaciei*, Vrtý., ♀ (Formazza, 1,400m., Lepontine Alp.); 87: race *alpiannigra*, Vrtý., ♀ (Klausen, S. Tyrol); 88: *trifolii* form *alpiannana*, Vrtý., ♂ (S. Tyrol); 89: do.; 90: do. ♀.

Remarks on the evolution of the *Zygaenae* and an attempt to analyse and classify the variations of *Z. lonicerae*, Scheven, and of *Z. trifolii*, Esp., and other subspecies. (With Plate VIII.)

By ROGER VERITY, M.D.

(Continued from page 104.)

To better define what I designate as catabolic and anabolic constitutions, I must recall the latest discoveries of Physiology in the Vertebrates. It has been established that both their minutest features of structure and their behaviour are due to the proportion between the secretions of their endocrine glands, which are thus the cause of individual and racial differences. In dogs, the catabolic greyhound is a typical example of a thyro-centric (predominance of thyroid-gland), and the anabolic bull-dog of a pituitary-centered. All have been struck by the resemblance of certain men to these types, showing that the same combination of glands can reproduce them in the most different kind of species. In mankind the Caucasian race owes its superiority and adaptability, which have made it predominant, to a particular concentration and balance of hormones in its blood; the Mongolian is subthyroid; the Negro subadrenal. We are thus perfectly justified in assuming that similar phenomena take place also in the invertebrates, with the difference, that the latter are much more sensitive to surroundings and in consequence more markedly modified by them.

Returning to the species we are dealing with here, we must note in connection with the last remarks that subspecies *lonicerae*, although it does produce a series of variations parallel to those described in *trifolii*, produces them on a distinctly lesser scale, presumably because it is the active catabolic division of the species. Both individually and geographically it varies less broadly, and sexual dimorphism is less marked, because the female always keeps to a higher grade, nearer the male. Instead, in *trifolii*, and especially in its nymotypical race, sex anabolism adds itself to such a degree to that of the subspecies in some females, that most of their vitality is obviously absorbed by the genital function, and the somatic development is weak; the wings show signs of atrophy, their dark primary pattern is reduced and the red spots are consequently broadly confluent (forms *glycirrhizae*, Hb., and *minoides*, Selys.); even males of these forms are not infrequent in those strongly anabolic races whereas neither sex ever produces them in the comparatively more catabolic ones of the *syacusia* southern group, which in pattern, and to a slighter degree, also in other characters, points to *lonicerae*. There is another general remark to make about these subspecies of *Zygaenae* and that is that there exists, besides *trifolii* and *lonicerae*, a third group of races, which I think can only be dealt with as a third subspecies, although not quite equivalent to those two, because it is distinctly more closely connected to *trifolii* than to *lonicerae*. Still, Tutt in his *Brit. Lepidopt.*, Vol. I., already considered *palustris*, Obth., a subspecies of the former as compared with its other simple races. Now we know one more race. I shall describe from the south of Europe *libera* of Spain, which I think should be grouped with *palustris*; and this broader group has acquired a

more distinct aspect. The impression one has is that subspecies *palustris* is due to a repetition of the process by which *loniceræ* has separated from *trifolii*, but in a more feeble way, the catabolic factors having been thrown out and thus greatly diminished by the first division. What gives this impression is, that the races I group as subspecies *palustris*, exhibit a mixture of the *trifolii* and of the *loniceræ* features: the antennæ and wings are on an average intermediate in length; they are thicker than in *loniceræ*, but they often have, especially in *hibera*, a sharper point than is usual in *trifolii*; the wings are not as elongated as in *loniceræ*, and are in fact distinctly broad, but the apex is sharper than in *trifolii*; the sheen on the dark pattern is very vivid, the scaling being rather thicker than in most *trifolii*. These intermediate mixed characteristics are quite constant enough to make of *palustris* a separate entity, so that, although it stands between *trifolii* and *loniceræ*, it is not merely a grade of transition between the two. We shall see that real transitions occur very frequently, especially in Britain, but that they are much more variable and do not pass through *palustris*; they consist in series of individuals gradually passing from one subspecies to the other. If we take up again the examples of divisions in catabolic and anabolic groups, we invariably find that, besides the extreme opposite ones, there exist others not transitional, but intermediate, which seem to suggest successive divisions: thus between the *Lasiocampides* and *Bombycides* extreme anabolism and the *Sphingides* catabolism we find the *Saturniides* and the *Endromides* as two intermediate grades; between the *Satyridæ* and the *Nymphalidæ* we find the *Apaturidæ*; between the *Melitæidi* and the *Vanessidi* we find the *Argynnidi*. Whether all this can be worked out into a general law, which can cast light on the origin of variation will have to be looked into more thoroughly, but anyhow the case of *palustris* is evidently not an isolated example of its kind. It will be noticed that these intermediate groups always stand nearer to the anabolic than to the catabolic extreme ones, so that it looks as if the former had residues of potential energy left in it after the first division, and went on throwing out catabolic groups, till this was quite exhausted on that plane of organic vitality and structure, or perhaps in each case on planes already slightly less deep than the preceding case. The same process, presumably, then repeated itself in later epochs on planes still less deep, following the general law of evolution, according to which differentiation, specialisation and division of labour, as a result of co-operation and symbiosis, first affected the different parts of the cell structure, then passed on to cell aggregates or tissues, then to tissue aggregates or organs, then to organ aggregates or individuals, and finally to individual aggregates or societies. It seems logical to presume that this process of differentiation of successively broader (less minute) components and, thus, less deep planes of the organism also applies to the factors of divisions which lead to the living species. We can perhaps also infer from many observable facts that when the catabolic division has separated off with most of the somatic vitality, the anabolic division is left exposed to the effects of surroundings by its lowered power of reaction, and it will then exhibit broad individual, seasonal and geographical variations, till it evolves a new barrier of vital reaction on a plane less

deep than that of the preceding ; but no such balance can last, because life means perpetual change and every action must be followed by a reaction ; thus a new division in comparatively anabolic and catabolic groups must again follow. In this way we see the *Satyridae* split into the *Epinephilineae*, *Erebiinae* and other anabolic subfamilies as compared with the catabolic *Satyrinae*, and so on. It is during the periods, in which anabolic groups are particularly sensitive to surroundings, that special adaptations may take place by the acquisition of hereditary changes of structure, presumably by a selection of the individuals most suited. During the catabolic stage of great activity of the soma the group spreads as broadly as it can, in surroundings as varied as its powers of reaction will allow it to bear, whilst the germinal plasm, isolated from external influences by this protection, can perfect its structures by further, more minute differentiation on a new plane. It is thus prepared to meet some of the new and more varied surroundings into which the somatic activity has carried it, and to which it becomes exposed when the latter gives way under the strain, and must in its turn be relieved and protected by more permanent structural adaptation, if the organism is to survive in the new conditions. These alternate anabolic and catabolic phases explain, it seems to me, the reappearance of features characteristic of some groups in a few species or even in individuals, which are usually females, of other groups more evolved than they are. They also explain how most groups are so broadly spread on the face of the earth and even single species may have such vast habitats.

According to this hypothesis, in England, owing perhaps to insularity and other causes, the *loniceræ-trifolii Zygaenæ* would be at the present moment at a stage very unstable and variable, in which catabolic groups tend to separate from the mass, and strongly anabolic groups are thus left as a result. The continental races of Central Europe, which are most extreme in *loniceræ* structure and features and exhibit them very constantly, presumably separated at a very early date in the life of the species, on a plane deep enough to make an exurge of them, with an hereditary tendency to reproduce them constantly in all normal individuals (stunted aberrations, on the contrary, like *alpinumana*, Vrtv., can in any case exhibit a *trifolii* structure). What favoured and fixed this division was, that the catabolic group thrived in drier surroundings than *trifolii* can stand, so that the two groups keep separate from each other. In Peninsular Italy, which is very dry, *loniceræ* behaves like several species and races of Lepidoptera of Central Europe, being limited there to mountain localities, evidently more similar to conditions in the latter region. As to *trifolii*, it scarcely exists at all in Italy ; it only bursts out individually in the *loniceræ* race *pauper*, Vrtv., which very high altitudes have greatly weakened, and in Alpine surroundings very unusual for Peninsular Italy. We shall see a *trifolii*-like structure is exhibited also by the male of race *dimorphica*, Vrtv., inhabiting damp spots on the Coast Range of Calabria. On the other hand the *loniceræ* in general in Peninsular Italy, are rarely of the most highly characterised type and usually point slightly to *trifolii* form *syracusia*, especially in the male sex. In the Hispano-African region and in Sicily no races are produced which can be referred to subspecies *loniceræ* ; *trifolii* exists

in swampy localities and it shows a tendency to split again on the plan of races in two groups; the *australis* structure and variability of pattern corresponds to the more extreme anabolic races of Central Europe; the greater stability and the structure of race *syraeusia* evidently tends slightly more to *loniceræ* catabolism. I have already mentioned that *palustris* is also represented in Spain by *hibera*, Vrtý.; in Sicily *trinacria* is a near ally and in Africa *seriziati* approaches it considerably too; they are all much more catabolic than nymotypical *palustris* of the north, being more active, not confined to swamps and behaving much as *loniceræ*. As a matter of fact, all the southern *trifolii* are less highly characterised than those of Central Europe and they point distantly to *loniceræ* in build; in some cases, such as race *intermixta*, Vrtý., of the mountains of Spain, they even approach it markedly; presumably the hotter climate activates the vitality of the soma and partly counteracts the anabolic tendency, just as some surroundings of Italy, not quite suitable to *loniceræ*, lower, on the contrary, its vitality and give it an aspect pointing to *trifolii*. A proof of the effects of surroundings on the features of the soma independently of hereditary germ-plasm tendency, is afforded by the German second generation *gracilis* of *trifolii*, which strongly approaches *loniceræ* simply owing to the summer heat and drought on the Loreley rock, whilst the first generation is quite a nymotypical *trifolii*. These observations lead us to the important conclusion that stimuli, such as heat, from the surroundings, activating the soma, produce in the usually anabolic *trifolii* the same characters as those which are hereditary in the catabolic *loniceræ* and in prevalently catabolic *Zygaenæ* species. In the same way, but inversely in *loniceræ* and in the latter, unsuitable surroundings and other causes, lowering to the vitality, are often seen to produce individually or locally, the same characters as those of *trifolii* and of the anabolic species of *Zygaenæ*. On the whole these anabolic characters are, very probably, simply a lower stage of development, which the catabolic species surpass when they are still in the chrysalis; this is suggested both by the stunted antennæ and wings and by the existence of the "nervural pattern," alone or accompanied by an incomplete "transverse pattern" (see my article on *Z. pilipendulæ*), because in ontogeny, and presumably in phylogeny, the "nervural" pattern always precedes the "transverse" one, whether it afterwards disappears or not. There is also a reason to believe it in the fact, proved by experiments, that the distribution of the pigment in the wings and its gradation of colouring can be accelerated or retarded by heat or cold without affecting the development of the insect, so that when the latter emerges and dries its wings the wing-pattern can be at different stages; many individual variations are caused by this phenomenon and allied species with patterns similar to each other probably differ, in some respects, because they emerge when their pigment is at different stages of distribution and colour.

(To be continued).

A Review of Mr. Pierce's Volume on the Genitalia of the Tortricidae.

By ALFRED SICH, F.E.S.

(Continued from page 53).

In the first contribution of this paper there are two errors, both on page 53. Firstly, what I meant to say about *Peronea lipsiana* and *P. rufana* was not that they seemed to be a closely allied pair, but that in them the socii appear to be remarkable because, according to the figures on plate ix. they cross each other. The two species that always seemed to be a closely allied pair are *P. permutana* and *P. variegana*, but as we see from the figures they belong to different sections of the genus. Secondly, I think I wrote that (with regard to these first three families) "we will *not* now discuss the position the author gives them with regard to the phylogeny of the whole of the Tortricina." This discussion would take up too much space here.

The Phaloniidae:—The species belonging to this family differ from all our other Tortricina in having vein 2 of the forewing arising from the cell close to vein 3. This group contains some singular moths, and the author, by his researches, has shown us that many are more curious than we had imagined. It is here that we meet with the most strange forms of genitalia, and apparently without cause a species will show a type entirely different from those of its neighbours. The moths themselves are mostly quiet insects, and have to be searched for in their particular haunts. Some, however, are more active. It is pleasant to see the brilliant *Eucanthis aeneana* flying briskly in the full sunshine, or to watch *E. zoezana* in its more quiet flight at sundown. Mr. Waters, who haply rediscovered *Phalonia gilvicomana* last year, says, "The moths fly freely towards sunset, often rather high." (*Ent. Mon. Mag.*, Vol. LXI., p. 18). In this Group the costa of the valva is strongly upcurved, and the valva being short and elongated upwards, it appears to take a vertical direction. In many species the sacculus is divided and the socii take the form of two small horns. In general appearance many show a fanciful resemblance to a minute bat in flight. The most striking feature in the author's arrangement of this family is the position he gives to *Commophila aeneana* and the five following species, thereby separating *affinitana*, Dgls., and others, and his genus *Phalonia* from his genera *Aethes*, *Cochylis*, and others. All these appear to be more or less closely allied. If he had placed *Commophila* and the other five species directly after *Clysia* and then followed on with *atri-capitana*, Steph., *affinitana*, and all the others, I for one should have considered it more satisfactory. *Sparganotheris pilleriana* can scarcely belong to this family, though the male organs show some resemblance to it, while those of the female seem more akin to those of the *Cnephasias*. Though the gnathos appears to be absent I prefer the position assigned to it by Mr. Meyrick in the neighbourhood of the genus *Capua*.

That author suggests that *Hysterosia inopiana* indicates the line of ancestral connection with the typical *Tortricidae* (*Hanabook*, p. 559), and our author notes that some species of this group form connecting links with the *Cnephasiidae* (p. 24). The genitalia of *inopiana* and the three following species certainly show *Cnephasiid* affinities. In *Clysia ambiguella* and (*Euxanthis*) *angustana*, which appear to be congeneric,

the vesica has such a curious swollen appearance that almost suggests disease. *Phalonia atricapitana* exhibits one of those sudden departures from its allies that we meet with especially in this family. The female structure is as strange as that of the male. *P. nana*, which from its wide distribution must be one of the older species of the family, has habits so different from most of the other Phalonias that I expected some departure in its genitalia, but on the whole it is fairly typical. The two closely allied species, *badiana*, Hb., and *enicana*, Dbld., show, like their wing markings, slight but definite differences. *Dipoltella*, Hb., *rutilana*, Hb., and *aleella*, Schulz., though so different in their wing markings from the rest of the group, are also fairly typical except for the extraordinary forms of the bursa in the females; but even this is an especial characteristic of this family.

Phtheochroa rugosana is in many ways a curious insect, with its scale tufts and unusual food-plant, and its genitalia are also remarkable, perhaps the numerous hairs and long scales are more responsible for its odd appearance than is the actual shape of the valves. There is, however, no doubt about the strangeness of the genitalia in both sexes of *hamana*, L., and *zoeyana*, L. We cannot but wonder why such forms were developed, and it would be most interesting to accomplish the almost impossible feat of seeing them in use. I have seen many Tortrices paired, and in every case the sexes face opposite directions and the female partly covers the male with her wings. As far as I am aware, either from observation or from record, the male genitalia are alone employed during copulation and never thrust out in the face of a pursuer, nor used for combing out wet fringes of the wings. If we knew they were ever made use of in any other than the one essential purpose, we might better understand the curious development found in certain species.

The species the author gathers under *Athes* differ slightly among themselves in the neuration of the forewing, but are all nearly alike in that of the hindwing. The author shows that Wilkinson was quite right in separating *Chlidonia subbaumanniana* from *C. baumanniana*, though many lepidopterists had their doubts about the specific distinctness of these two species. Wilkinson's book on the Tortricina is now out of date, but is really interesting, as it contains some historical items concerning the British species and the collectors of those days. *Lozopera beatricella*, with its highly developed genitalia, would appear to be a vigorous species quite able to hold its own. It is strange that it was not discovered till a few years ago.

Phalonia degrayana is peculiar in its food-plants, in some of its very restricted haunts it prefers the seed heads of plantain and in others the yellow snapdragon, but its genitalia are astonishing, departing so widely as they do from those species usually associated with it. Its long uncus and simple valvae do not seem to belong to a species of this family, though it does show some affinity in its strong transtilla and in the aedoeagus. This species apparently shows some ancestral characters and has probably remained little changed in its chosen county. It probably at one time ranged over a greater area, but may have been unable to maintain itself in the competition with other more successful species. In the author's genus 16 (without a name) the position of the costa of the valve is most peculiar. It is almost separated from the valve and stands vertically above it, but in *rupicola*,

Curtis, the costa returns to a more usual position along the top of the valve. The high tegumen and deeply emarginate valves give to both *Phalonia roseana*, Haw., and *P. flavicilliana*, Wilk., a strange aspect. The frail little moths comprising the author's genus 18, are only separable on comparison, and he now offers us a further character to aid in their separation. From the synonymy he gives us we learn that we must substitute some other names for those we have hitherto made use of. In considering the genitalia of this family one point becomes quite clear, this is that the *Phaloniidae* have a much greater affinity to the *Tortricidae*, the author's first three groups, than they have to the *Epiblemidae*, which are contained in the author's last five groups. This family appears to represent the most primitive forms of the Tortricina now extant.

(To be continued.)

***Elater rufipennis*, Stephens, a distinct Species. (Plate IX.)**

By H. DONISTHORPE, F.Z.S., F.E.S.

Dr. Joy having told me that he had taken a red *Elater* in Windsor Forest, which did not agree with any species he possessed, I went with him, on January 16th last, to the tree—a fallen beech—where he had found it before. We dug out of the softer wood about a dozen more specimens; and a number of larvæ were also found, which we put back. After my return from Bordighera, I again visited the tree, on May 11th; but the perfect insect was very scarce, and only two larvæ were seen. This would appear to show that after the tree had been dug into and the softer parts exposed, birds must have got at and devoured a number. I have recently made a careful study of this beetle, and I consider that it is the *Elater rufipennis*, Steph.; which is a good and distinct species.

In 1858, G. R. Waterhouse in his catalogue of British Coleoptera gives *Elater rufipennis*, Steph., as a synonym of the *E. sanguineus*, L., and all the British Catalogues since have followed him, except that of Beare and Donisthorpe (1904), which gives—“*rufipennis*, Steph., *sanguineus*, Brit. Cat.” The European Catalogue (1906) does not mention the name *rufipennis* at all.

Fowler [IV. 89 (1890)] gives *rufipennis*, Steph., as a synonym of *sanguineus*, L., although he describes the latter insect as having the thorax with an impressed central line traceable throughout, whereas Stephens [Mand. 3 256 (1830)] distinctly says that *rufipennis* has the thorax obsoletely channelled behind!

Candèz in his monograph on the *Elateridae* (1857) evidently includes both species under *sanguineus*, L., as he says the thorax is channelled, or at least behind.

du Buysson (1896) queries *rufipennis*, Steph., as a synonym of *sanguineus*, L.

In the Stephensian collection there are five specimens standing under the name *rufipennis*, of which one is *præustus*, F., one *lythropterus*, Germ. and the other three agree with his description of *rufipennis*, and with the Windsor insect.

The insect described by Stephens as the *sanguineus*, L., is *E. lythropterus*, Germ.

I have examined the specimens of *Elater* in the Linnean Collection, but unfortunately the insect which bears a label *sanguineus* (which I am informed is in Linné's own handwriting) is a specimen of *E. sanguinolentus*, Schr. This label must have been taken from another insect at some time or other. There is however a red *Elater*, without label, which appears to have the thorax channelled throughout, and is probably the type. Being rather dirty and dusty, it is difficult to be sure of the colour of pubescence, length of channel in thorax, etc.

The original description of *E. sanguineus* is very brief; it might apply to several species (but not to *sanguinolentus*); and it makes no mention of a channel on the thorax. It is however accepted that it has this channel [Reitter. Fauna Germ. 3 238 (1911) says it has a long channel and he does not mention *rufipennis* at all], and the specimens in the general collection of Coleoptera in the British Museum under *E. sanguineus*, all have it. In the British Collection of Coleoptera there are five specimens under *sanguineus*, L., four of which have the thorax very distinctly channelled throughout (one being labelled from Salisbury), and the fifth, which has the thorax only obsoletely channelled behind, is undoubtedly *rufipennis*, Steph., and the same as the Windsor insect. There are three specimens labelled "sp?" from the New Forest, which are probably also the *rufipennis*, Steph.

E. sanguineus, apart from the channel, has a somewhat flatter and distinctly duller thorax than *rufipennis*.

The latter insect comes nearest to *E. pomonae*, Steph., but, it is of a more blood red colour, is larger on the average, and the antennae are very differently shaped—I give drawings of the antennae of both ♂ and ♀ *E. rufipennis* and ♂ and ♀ *E. pomonae*, for which I am indebted to the kindness of Mr. W. H. T. Tams.

Of course the serrations of the antennae are stronger in the males of both, and probably of all species, than in the females, but the shape of the serration in both ♂ and ♀ *rufipennis* differs in the same degree from the shape of the serration in the ♂ and ♀ of *pomonae*.

Both *E. rufipennis* and *E. sanguineus* are very rare insects in Britain (especially the latter, which I believe has not been taken for over 60 years or so). Fowler gives the New Forest for *sanguineus*, which probably refers to *rufipennis*, and Stephens for the latter gives, New Forest, West of England, and Bagley Wood, Oxon.

I have published several lists of my papers, notes, books, etc., on Ants and Myrmecophiles, the number of which now totals 127. It has been suggested to me that I should publish a list of my writings on Coleoptera and General Entomology. The following is the list of my non-myrmecophilous series, of which this paper is No. 234

1. "*Creophilus maxillosus*, Steph., var. *ciliaris*, Steph."
Ent. Mo. Mag. 26. 271 (1890.)
2. "*Stilicis fragilis* at Shirley."
Ent. Mo. Mag. 28. 161 (1892.)
3. "Rare Coleoptera in 1893."
Ent. Mo. Mag. 29. 63 (1893.)
4. "*Eumicrus rufus* near Shirley."
Ent. Mo. Mag. 29. 136 (1893.)

5. "Coleoptera in 1894."
Ent. Mo. Mag. **31.** 99 (1895.)
6. "Ten days in the New Forest."
Ent. Mo. Mag. **31.** 194 (1895.)
7. "Notes on a paper on the Coleoptera of the Vale of Belvoir," by the Poet, the Rev. G. Crabbe, 1795."
Trans. Leicester Lit. Phil. Soc. **4.** 198-200 (1896.)
8. "*Harpalus obscurus*, F., in Dorsetshire."
Ent. Mo. Mag. **32.** 281 (1896.)
9. "The Coleoptera of Weymouth and Neighbourhood."
Trans. Leicester Lit. and Phil. Soc. **4.** 330-337 (1897.)
10. "Notes on a few days' collecting at Wallasey (Liverpool), and in the Valley of the Dee above Llangollen." (with T. H. Beare).
Ent. Rec. **9.** 49-51 (1897.)
11. "The Coleoptera of a London Granary."
Ent. Rec. **9.** 77 (1897.)
12. "Paper as a Pabulum for the larva of *Tiresias serra*, F., with some notes on the Larva and its Pupation."
Ent. Rec. **9.** 162 (1897.)
13. "*Ptinus brunneus*, Duft., captured in Surrey."
Ent. Rec. **9.** 260 (1897.)
14. "*Asemum striatum*, L., a Southern Insect."
Ent. Rec. **9.** 276 (1897.)
15. "The Coleoptera of Wicken Fen and District."
Ent. Rec. **10.** 37 (1898.)
16. "*Hylastes angustatus*, Herbst., from Bournemouth."
Ent. Rec. **10.** 87 (1898.)
17. "A plan for Maturing Beetles."
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18. "*Quedius kraatzii*, Bris., a species new to Britain."
Ent. Rec. **10.** 196 (1898.)
19. "Notes on the British Longicornes."
Ent. Rec. **10.** 219-23, 246-49, 269-71, 299-03 (1898.)
20. "The Fourth International Congress of Zoology."
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21. "Parasites in Wasps' Nests."
Ent. Rec. **10.** 307 (1898.)
22. "All that is known of *Metoecus paradoxus*, L."
Trans. Leicester Lit. Phil. Soc. **5.** 183-86 (1899.)
23. "Melanic forms of *Carabidae* in the New Forest, including *Carabus nitens* ab. *niger*, Semenow, an aberration new to the British List."
Ent. Rec. **11.** 71 (1899.)
24. "Notes on the additions to the British List of Coleoptera since Canon Fowler's *Coleoptera of the British Isles*."
Ent. Rec. **11.** 137-38, 159-61, 184-86, 216-17 (1899.)
25. "*The Coleoptera of Suffolk*," by C. Morley. (Review.)
Ent. Rec. **11.** 196 (1899.)
26. "Notes from the New Forest."
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27. "Coleoptera in the New Forest in June."
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28. "Description of the Larva of *Quedius kraatzii*, Bris."
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29. "Coleoptera at Wicken in 1899."
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30. "Rare Coleoptera in 1899."
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31. "Notes on the *Dinoderus substriatus* of British Collections."
Ent. Rec. 12. 16-18 (1900.)
32. "*Anthonomus rufus*, Schoen, an addition to the British List."
Ent. Rec. 12. 159 (1900.)
33. "Coleoptera at Chiddingfold."
Ent. Rec. 12. 238 (1900.)
34. "Coleoptera of the Rochester District," by J. J. Walker. (Review.)
Ent. Rec. 12. 262 (1900.)
35. "Notes on the Copulation of *Hydrophilus piceus*, L."
Ent. Rec. 12. 291 (1900.)
36. "Notes pour la classification des Coleoptères," by A. Lameere.
(Review.)
Ent. Rec. 12. 322 (1900.)
37. "The Cry of *Acherontia atropos*."
Ent. Rec. 12. 350 (1900.)
38. "Cases of Protective Resemblance, Mimicry, etc., in the British Coleoptera."
Trans. Ent. Soc. Lon., 1901. 345-77.
39. "The Coleoptera of the Victorian History of Hampshire," by J. J. Walker. (Review.)
Ent. Rec. 13. 102 (1901.)
40. "*Trinimum brevicorne*, Reich. from Chiddingfold."
Ent. Rec. 13. 182 (1901.)
41. "A successful hunt for *Lytta vesicatoria*, L."
Ent. Rec. 13. 251 (1901.)
42. "The Variation and Distribution of the Genus *Aphodius*, Illiger." by F. Bouskell. (Review.)
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43. "Tracing *Velleius dilatatus*, F., to its haunts."
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46. "*Coccinella 11-punctata* var. *confluens* n. var."
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49. "Protective resemblance in Beetles."
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50. "A few notes on Coleoptera in the West Coast of Ireland."
Ent. Rec. 14. 239 (1902.)

51. "*A List of the Beetles of Ireland*," by Rev. W. F. Johnson and J. N. Halbert. (Review.)
Ent. Rec. **14.** 251 (1902.)
52. "*Dibolia cynoglossi*, Koch, a British Insect."
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53. "*Quedius obliteratus*, Er."
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54. "*Dorcatoma chrysomelina*, Sturm., etc., in Leicestershire."
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55. "*Larinus carlinae*, Ol., and other Coleoptera in the Hastings District."
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56. "*Quedius cruentus* var. *virens*, Rottbg."
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58. "*Quedius obliteratus*, Er., and *Quedius suturalis*, Kies."
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59. "Capture of *Meloë brevicollis*, Pz., and *M. cicatricosus*, Leach in April, 1903."
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60. "*Monohamus titillator*, F., and *Cerambyx heros*, Scop., taken alive in England."
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(To be continued.)

Some Observations on Dr. R. Verity's recent Article on Palaearctic Grypcera.

By B. C. S. WARREN, F.E.S.

In the April and May numbers of this Magazine, Dr. Verity describes numerous new races of various species of the genus *Hesperia*. A few further notes on his article, however, seem to be necessary, as some of the statements in it are not quite in agreement with the facts recorded by general observations, or the data I have collected on the subject, from many sources.

I do not propose, at present, to discuss the many points in connection with Dr. Verity's new races, which would seem to call for notice; but merely to draw attention to those which are actually incorrect, and which would become a source of future trouble if they were left as they stand. To ensure that I have understood Dr. Verity's notes correctly, I have corresponded with him on the subject, and am much obliged to him for his detailed answers, which have thrown much light on some rather puzzling points in his descriptions.

Hesperia alveus.—Dr. Verity describes three races of this species. It is with two of them, his *accreta* and *centralhispaniae*, that I am at present concerned. I was particularly interested in these two subspecies, having eighteen months ago, illustrated, and drawn up detailed descriptions of them, in the preparation of a monograph of the European *Hesperia*.

He applies the name *accreta*, to the magnificent subspecies of the

Pyrenees, but later states that *accreta* spreads to central Spain and occurs there with the form he names *centralhispaniae*. This is obscuring the true position. Spanish *alveus* does not constitute two distinct races. There is one subspecies occurring all over Spain, and one in the Pyrenees, the former very variable, the latter very constant (in its superficial facies). Dr. Verity, under the impression that *numida* (which is confined to Africa) occurred in Andalusia, did not recognise that Spanish *alveus* is distributed all over Spain, from Andalusia to the Pyrenees, and that the two forms he knew occurring together in central Spain were only the two extremes of one and the same subspecies, which is distinctly different from the Pyrenean subspecies. Of course certain specimens of either subspecies can approach the other closely, which is a common occurrence among all forms of Hesperids. Dr. Verity's *accreta* has to be restricted to the Pyrenees, his "types" coming from Gédre. This leaves his *centralhispaniae* to cover the Spanish subspecies. In his description of *centralhispaniae* he states that the underside of the hindwing is a "very pale green." This, doubtless, is because Dr. Verity, in giving two names to these Spanish *alveus*, took the extreme colour, as opposed to the brightish yellow of his *accreta*, for the type of *centralhispaniae*. As a matter of fact, it is impossible to define two such forms in Spanish *alveus*, for the ground colour of the underside of the hindwing is so variable that the two extremes could be connected by imperceptible degrees. One could not say where one shade of colour ended and the other began. It must be remembered also that this ground colour is of very uneven density, and mottled lighter and darker, not at all like the even coloration of Central European *alveus*, or even Pyrenean *alveus*. The most usual form is a pale yellowish-buff shade (somewhat like, but paler than, the colour typical of *H. carthami*). This varies to buff, and a fairly bright yellow (resembling *accreta* of the Pyrenees), or becomes a little paler, passing from a yellowish-white with a grey look, to a greenish-white (*centralhispaniae*). All these grades probably occur together, but the yellowish-white shades seem to be the most usual; and I should say the true greenish tinge was more aberrational than racial. In spite of the somewhat misleading statement in regard to colour, in the original description, it is best to accept "*centralhispaniae*" as covering the whole Spanish form of the insect; rather than restrict it literally to the green-tinged aberrations, and put forward another name for the insect in general. Such a course would obscure the common entity of all Spanish *alveus*, as would the addition of another name for the brightest yellow specimens which Dr. Verity took for *accreta*.

All forms of *centralhispaniae* resemble *H. carthami* to a greater or lesser extent, especially in the features of the hindwing; *i.e.*, the great extent of clear white on the upperside; and on the underside, the mottled ground colour, the more or less strong outlining in a dark shade, of the white markings; and the markings at the anal angle. The Pyrenean subspecies is very suggestive of *foulquieri*, and in consequence differs in many features from the *carthami*-like Spanish insects; being also usually the larger of the two. It is interesting to note that the largest *centralhispaniae* come from the South of the country, and some of the smallest from quite the North. In both cases I have known collectors mistake specimens of these two subspecies for the two previously mentioned species.

I must add that Dr. Verity is mistaken in saying that the ♀s of *accreta* do not, on the whole, correspond with the ♂s; he probably had no great number of the ♀s to judge from. Normally the ♀s agree perfectly with the ♂s in all respects. Typical *alveus* occurs in the lower levels of the Pyrenees, but *accreta* replaces it entirely in the higher zones, probably from about 3000 ft. There are many points of great interest attaching to this Pyrenean form, especially regarding anatomical questions, but these cannot be entered into here; I only want to prevent its being confused with other forms of *alveus*; and equally to establish the fact that *centralhispanica* stands for one, variable subspecies, occurring all over Spain.

H. alveus race *ryffelenensis*.—There remains little doubt that *ryffelenensis* is not a distinct species, but merely a race of *alveus*. All recent work seems to point to this conclusion. It is, however, a remarkable race, and by no means of frequent occurrence in the Alps, many specimens are called *ryffelenensis*, which have no real claim to the name. This is because of the unfortunate fact, that Oberthür's figures (*Lepidop. Comp.*, Vol. IV., p. liv., figs. 470, 471) through some mistake, are not *ryffelenensis*! His other figures (Vol. VII., pl. xcii., figs. 1859-64) are better, but some are decided transitions to *alveus* (figs. 1860-63). I have verified the above statements by having been able to examine and photograph some of Mons. Oberthür's own specimens of *ryffelenensis*, which were kindly lent to me by Prof. Reverdin. The photographs will I hope be published later.

In true *ryffelenensis*, the characteristic reduction of the white markings is as great on the underside as on the upper, which gives the insect a remarkable and readily recognised appearance, which is very striking on the underside. Many supposed *ryffelenensis* are only small *alveus* with reduced markings on the upperside, and normal or almost normal markings, on the underside. To this category belongs *alticola*, Rebel, from the Stilsferjoek, which were referred to by Dr. Verity. I have seen many of these small Stelvio specimens in collections (there are some in the British Museum collection), and they are not true *ryffelenensis*; indeed to my mind they are not worthy of a name, as there is no definable difference between them and *alveus*, the reduction both in size and markings having no constant development. Such specimens occur in every alpine locality where *alveus* is found. True *ryffelenensis* however, so far as is known, is a decidedly local insect in the Alps: the name remains unaffected by Prof. Rebel's name.

H. foulquieri.—In connection with *ryffelenensis*. Dr. Verity mentions a specimen of *bellieri*, which he says he captured on the Ortler. This record is based on Oberthür's record of the capture of *bellieri* at Zermatt. There is no doubt that this record of Oberthür's is a mistake of identification, and that neither *foulquieri* nor its form *bellieri* are found anywhere in Switzerland. Aberrations of *alveus* are, however, often found, which are so similar to *foulquieri* that they could easily be mistaken for it. Considering this, it seems probable, on account of the locality, that Dr. Verity's *bellieri* from the Ortler may only be a similar aberration.

H. fritillum.—Dr. Verity describes two forms of this insect, as being two broods. So far as all authentic records go, *fritillum* is a single-brooded species; occurring from mid-July to September according to the locality. Dr. Verity tells me that he described these forms because

Sig. Querci had seen some specimens of Oberthür's race *herrichii* and concluded they were the first brood, and that because he did not capture *fritillum* last year at Albarracin until mid-July (having arrived there in June), he assumed, without further proof, that the July specimens must be the second brood! So far only two authentic May *fritillum* are known; they were taken at Digne by V. Cott. The latter, however, never found any more, all other May specimens which I have had the chance to examine have proved to be some other species! I may add that the *herrichii* form occurs at Digne, and in the other localities, in August, with the type.

Without considering in detail the races of *fritillum* which Dr. Verity mentions, I may say that all the Spanish specimens which I have seen, belong to *iberica*, Gr.-Gr. Oberthür's *fabressi*, a slightly less deeply coloured form, might apply to those specimens which occur in southern France and which might be called transitional to *iberica*. I should, however, merely consider them as aberrations.

NOTES ON COLLECTING, etc.

The following record might be worth publishing. I observed *Polygonia c-album* in my garden here, two days ago, August 11th. I first noticed it flying round the garden, and it then settled on the garden hedge and allowed me to approach within a foot or two of it.—J. C. WOODWARD (Commander R.N.), Training Ship Cornwall, Purfleet, Essex.

CURRENT NOTES AND SHORT NOTICES.

Two Meetings of the Entomological Club were held at Oxford during the week-end July 4th to July 6th. Glorious weather prevailed and Oxford was looking at its best.

The Members present were Professor E. B. Poulton, F.R.S., Dr. Harry Eltringham, F.Z.S., Messrs. Robt. Adkin, F.E.S., Jas. E. Collin, F.E.S., Horace Donisthorpe, F.E.S., and H. Willoughby-Ellis, F.E.S.

The guests were Dr. F. A. Dixey, F.R.S., Dr. J. W. Munro, F.E.S., Dr. Guy A. K. Marshall, C.M.G., Commander J. J. Walker, F.E.S., Dr. R. Hanitsch, Messrs. E. Bolton-King, F.E.S., E. B. Ford, F.E.S., Hy. J. Turner, F.E.S., E. G. R. Waters, F.E.S., A. W. Pickard-Cambridge, F.E.S., W. J. Kaye, F.E.S., and W. H. T. Tams, F.E.S.

Accommodation was provided at Wykeham House, the residence of Professor E. B. Poulton, and in rooms in Wadham College by kind permission of the Bursar. The Members and Visitors met at the Hope Department, University Museum, during the afternoon of July 4th, and the collections were inspected and tea was dispensed by Mrs. Poulton in the new Annexe. A meeting of the Club was held at Jesus College in the evening, Professor E. B. Poulton, F.R.S., in the Chair. Members and visitors were entertained to dinner in the Hall of the College at 8 o'clock and a most enjoyable evening was spent. On July 5th, the Hope Department was again open for inspection, while some availed themselves of the opportunity to visit interesting places in Oxford. A collecting excursion was organised and joined by several of the party. Luncheon was provided at Wykeham House and Wadham College, after which the whole of the party joined in a

boating excursion on the River Cherwell, and a picnic tea was provided on the banks of the river. A meeting of the Club was held in the evening at Wadham College, Dr. Harry Eltringham in the Chair, and the company was entertained to Dinner in the College Hall (by kind permission of the Bursar, Dr. F. A. Dixey, F.R.S.), after which the business meeting of the Club was held in the beautiful gardens of the College. Mr. W. J. Kaye was elected a member of the Club and after the meeting, retirement was made to the Smoking Room, and a most enjoyable evening was spent. On the morning of the 6th, the Hope Department was again visited after which members and visitors dispersed, concluding a most interesting visit.—H.W.-E.

Messrs. Kegan, Paul, Trench, Trubener and Co. and George Routledge and Co. are shortly publishing a re-edition of "British Ants: their Life history and Classification," by H. Donisthorpe, F.E.S., F.Z.S. This will be followed by a book on the British Myrmecophilous Fauna by the same author. Mr. Donisthorpe will be grateful to anyone who will call his attention to any papers, notes or records on British ants and myrmecophiles that may have appeared since 1915 (excluding those which have appeared in the *Ent. Record*, the *Ent.*, and the *Ent. Mo. Mag.* all of which have been extracted already). Will other magazines please copy.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

February 12th.—Mr. R. D. Cox of Streatham and Mr. S. F. P. Blyth of Chiselhurst were elected members.

EXHIBITION OF EXOTIC INSECTS.—Mr. H. Moore, large Coleoptera to show the remarkable development of processes on the head and thorax and gradations of the same in one species.

Mr. Cheeseman, *Ornithoptera urvillianus* and *O. darsius*.

Mr. Tonge, a large Psychid case from a salt-lake area near Calcutta.

Mr. Ashby, bred examples of the Saturniid *Philosamia cecropia*.

Mr. Edwards, numerous large species of S. American Coleoptera to show the fantastic frontal appendages of the males.

Mr. Blenkarn, Longicorn beetles mainly from W. Africa, and specimens of a recently discovered new British species from Charmouth, *Trechus micros*.

Mr. Turner, numerous species of brilliant Heterocera from Indo-Malay, *Erasmia pulchella*, *Amesia sanguiflua*, *Callamesia midama*, *Celerena andamana*, etc.

Mr. Andrews, a *Saturnia pyri* taken in Palestine.

Mr. O. R. Goodman, examples of five out of the six groups of the genus *Parnassius* in the Palaearctic Region.

Mr. Enefer, a brood of young of the spider (*Lycosa narbonensis*) from S. France, etc.

Mr. A. de B. Goodman, some Thibetan butterflies.

Mr. Dannatt, numerous species of *Morpho* with the rare females.

Mr. Grosvenor, various butterflies from the Indian fauna to show shape and structure in relation to powers of flight. Remarks were made as to the habits of *Leptocircus* by Dr. Cockayne.

Mr. R. Adkin, examples of species taken at sugar in his garden at Eastbourne particularly noting the proportion of *Miana strigilis* and its ab. *aethiops*.

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Duplicates.—British butterflies and moths and good vars. or cash.—W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N.1.

Duplicates.—Several hundred species of Coleoptera (carded) from Hants and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Duplicates.—4 Valerianata, 7 Alchemillata, 3 Viminalis, 6 Protea, 1 Hastata, 6 Ocellata. Bred specimens, black pins, data and locality.

Desiderata.—Muralis, Orion, Myrmicae, Lucosa, or pupae of S. ligustri.—G. Nicholson, 26, Lancaster Street, Newcastle-on-Tyne

MEETINGS OF SOCIETIES.

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

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. September 24th, Exhibition of Orders other than Lepidoptera. October 8th, Lantern evening.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., W. E. GLEES, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.

CHANGE OF ADDRESS.—Dr. G. T. Randell, to Parkfield Park Crescent, Llanelly, Carmarthenshire.

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The Entomologist's Record and Journal of Variation.

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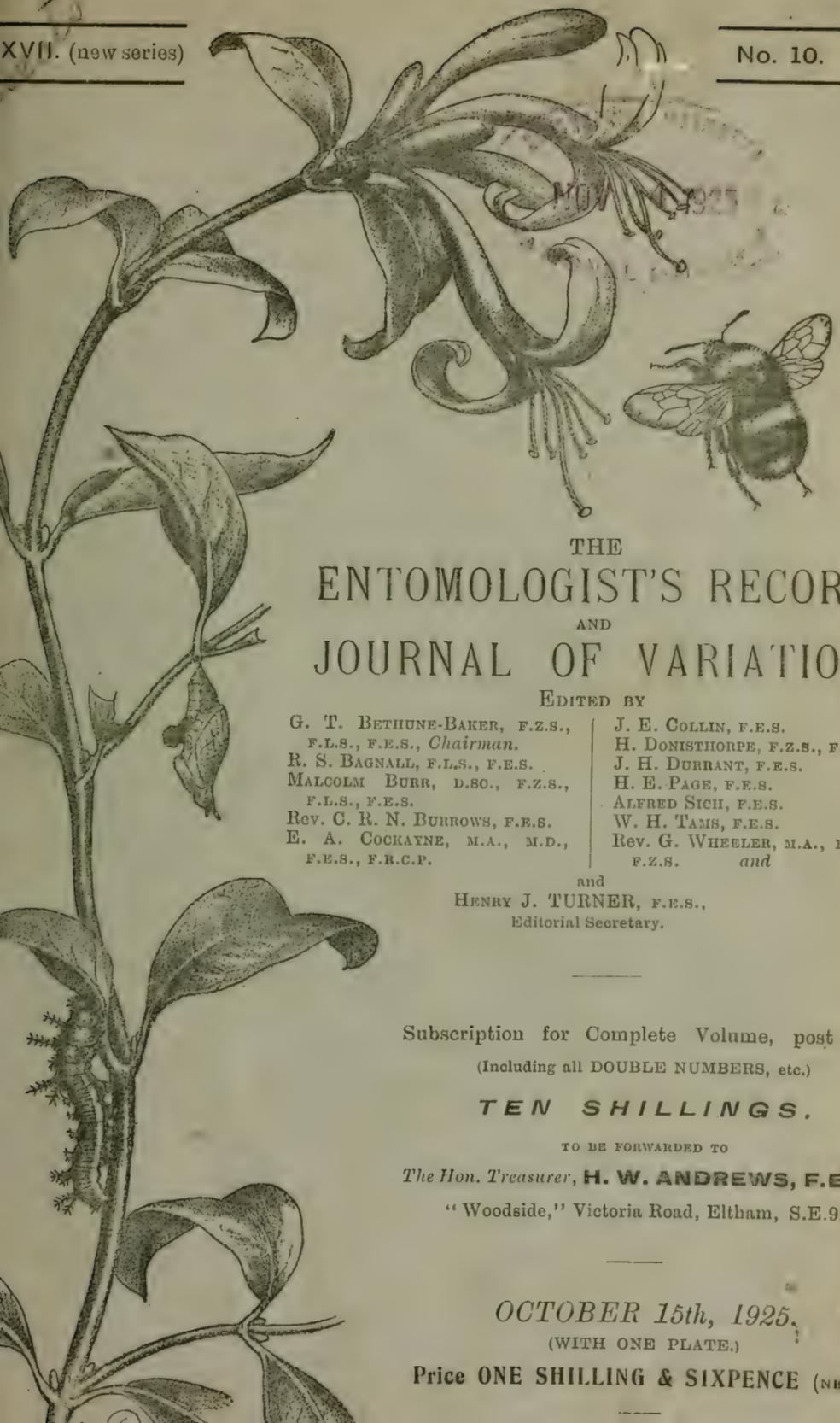
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The Entomologist's Record.

Photo. R. Hancock.

A NEW HYBRID. FURCULA ♂ × BICUSPIS ♀.

A new Hybrid, *Furcula-Bicuspis*. (With plate X).

By Brevet Colonel W. BOWATER, M.C., F.E.S.

At a meeting of our Entomological section in January, 1922, Professor Beckwith Whitehouse showed four cocoons of *Cerura bicuspis*, of Tilgate Forest origin, which he had obtained from a friend.

He gave two to our President, Mr. G. T. Bethune-Baker, one to my co-secretary, Mr. Grant, and one to me.

During the following June, three of the moths emerged; one pupa was ichneumonid. The cocoon which I had myself, produced a female on June 12th. On the following day, Professor Whitehouse and I took her alive to the old locality where he and Mr. Leslie Burt had so successfully assembled *bicuspis* a few years before.

We tried without success in this instance, however. I left the female with Mr. Burt, asking him to try her again the following night. On reaching home, he put her in a breeding cage containing various pupae. In the morning he found that a male *furcula*, which had emerged during the night, had paired with the *bicuspis* female, and they were still in cop. Forty ova were laid; and twenty of these, and the female parent, were posted to me.

In due course, the ova hatched except two. The larvae apparently did not eat their eggshells, and my batch refused birch and alder, and fed up on sallow. Mr. Burt's fed up on birch.

The larvae, in my opinion, were distinctly more like *bicuspis* than *furcula*, but unfortunately none was preserved. Several died in the first few days, and several more in the 3rd instar, in spite of unremitting attention. Finally eight spun up, the first on August 20th, and the last on September 10th.

Mr. Burt managed to get 10 pupae. During the winter, I bought 24 *furcula* pupae, in the hope that the hybrid might be induced to pair with *furcula*.

On June 20th, 1923, the first "furcuspsis" (a male) of my batch emerged; then four females on 24th, 25th, and July 3rd; then one male July 4th, and another July 7th, total seven.

I tried to pair the female hybrid with *furcula* males, and vice versa, but without result except infertile eggs, but the hybrid females and the *furcula* females all laid infertile eggs a few days after emergence, even if no attempt had been made to pair them.

A male and female of Mr. Burt's batch emerged about June 22nd, and one more soon afterwards, but by an accident the rest were unfortunately destroyed.

On June 5th, 1924, the last one of my batch emerged, having lain over a year.

I have submitted all the specimens, including the original *bicuspis* to Professor J. W. Heslop Harrison, and he replies that he has no doubt that they are genuine hybrids, and points out that there is a tone difference marking them off from *furcula*. The hybrids show more resemblance to *furcula* than *bicuspis*, but this is to be expected.

Quoting Professor Harrison:—"The superior influence of the male is noted in practically all of the hybrids I have reared, not only amongst the genus *Nyssia* and *Lycia*, but also in Ennomids and Larentiids likewise."

OCTOBER 15TH, 1925.

Plate X shows two males (figures 1 and 2), and two females (figures 3 and 4). The males are slightly affected by "grease."

On comparing the eleven hybrids with a series of *furcula* and a series of *bicuspis*, it is seen that most of the hybrids have the head, the hairs fringing the body, and the anal tuft snowy white as is characteristic of *bicuspis*.

Only one of the hybrids has the markings edged with orange as is usual in *furcula*, but this specimen (fig. 4) is particularly like *bicuspis* in general aspect.

Description of a New Species of "Lithocolletis" (Lep. Tin.).

4175-1 *Phyllorycter joannisella*, sp.n.

By the late LORD WALSHINGHAM.

(Edited by JNO. HARTLEY DURRANT; by permission of the Trustees of the British Museum.)

Antennae white, very faintly annulate. *Palpi* white. *Head* white posteriorly, golden yellow in front, face white. *Thorax* golden yellow, with white spots on the tegulae. *Forewings* bright golden, with shining white markings; a narrow streak from the middle of the base extends to half the wing-length, slightly in the direction of the costa, meeting at its outer extremity an outwardly oblique costal streak, narrowly connected with the base along the margin, also connected at an acute angle with a rather longer, wider streak arising from the middle of the dorsum, before which another broad dorsal streak, somewhat less oblique, arises at about one-fourth from the base, running into the basal streak on the fold; before the tornus is a white dorsal patch, and a costal spot, opposite to it, is succeeded by two others toward the apex, and one at the apex—one other dorsal streak is placed between the last two costal streaks; cilia corresponding in colour to the streaks at their base—thus alternately white and golden yellow. *Exp. al.* 10mm. *Hindwings* pale grey; cilia the same, with a slight yellowish tinge. *Abdomen* shining, pale brownish cinereous. *Legs* whitish.

Type ♂ (3385 Wlsm. Det. 1898), Mus. Joannis, 323.

Hab. FRANCE: ARDÈCHE: La Louvesc, slightly above 1100m., 22.VII.1895 (*J. de Joannis*). Unique. [Wlsm. 1898.]

The nearest ally to this beautiful and distinct species is 4175 *Phyllorycter* (= *Lithocolletis*) *tangerensis* Stn., from which it differs in the wider space between the first and second dorsal streaks, in the absence of a dark spot and dividing line in the cilia at the apex, and in the first costal streak being further removed from the base. It has so much the appearance of *Agropyresthia abdominalis* Z., that I had in the first instance associated it in error with that genus.

Two specimens from Soalheira (Portugal) (4275-6 Wlsm. Det. 1904) are extremely similar, but I am inclined to think that they represent still another species of the group attached to plants allied to *Genista*. [Wlsm. VII. 1906.]

[This distinct species was described by Lord Walsingham so long ago as IX.1898, and figured by me 14.X.1898. It has remained all these years unpublished. I am pleased to take the opportunity of making known a beautiful species named after its discoverer, M. l'Abbé J. de Joannis, the old friend of Wlsm. & Dnt. Dnt. 15.X.1925.]

Remarks on the evolution of the Zygaenae and an attempt to analyse and classify the variations of *Z. lonicerae*, Scheven, and of *Z. trifolii*, Esp., and other subspecies. (With Plate VIII.)

By ROGER VERITY, M.D.

(Continued from p. 124.)

If one considers the structural features in conjunction with the extent of the area of distribution, and with the kind of climate (latitude and altitude) inhabited by the various species, one can make some remarks and draw some inferences regarding the *Zygaenae*, which are of considerable interest from a general standpoint of evolution. To begin with it must be noted that the true *Zygaenae* are exclusively Palaearctic and that very few have reached Eastern Asia, and none have reached America, so that not only the genus must be a typically Palaearctic one, that is to say a result of the influence of the Glacial Epoch, but most species must be comparatively recent, on account of their limited habitats. Before that Epoch, when that zone had a tropical flora and fauna, as shown by the fossils, it is to be supposed it was inhabited by genera such as those which now represent the *Zygaenae* in the tropics, such, for instance, as the *Zutulba* of Africa or the *Epizygaena* of Southern Asia. When the Glacial Period set in, the more catabolic species must have resisted till they passed to an anabolic stage and transformed organically, so as to be exactly suited to the new surroundings. *Z. exulans*, still in existence in isolated colonies near the glaciers, from Scotland to the Pyrenees and the Abruzzi, and hence to Central Asia, is evidently one of the most highly anabolic species, and perhaps the only one which has remained unchanged since that Epoch, unless, possibly, *magiana*, *contaminei*, *anthyllidii*, and *corsica*, are nearly as old. When a more temperate climate followed on the glacial one, the various groups of *Zygaenae* presumably survived in their more catabolic species, and the heat stimulus gradually increased their vitality till they burst out at intervals into the numerous localised exerges and species we know, organically suited to the various surroundings, and thus they sunk once more, to a greater or lesser extent, into anabolic states. The following are broadspread in Europe and Asia, but are never found in the lowlands of the hottest countries, so that this fact, in conjunction with the fact that they each represent one of the chief groups of the *Zygaenae* which possess a nervural pattern and are thus completely Palaearctic in type, makes one believe they may be the nearest allies of the ancestors of these groups: *purpuralis*, true *scabiosae*, and *meliloti* (the two latter are also remarkable on account of their thin antennae, so that they differ in this respect from all the other species, and they recall the *Epizygaenae*, thus suggesting a primitive type). Near these may also stand *cynaræ* and *achilleæ*, although they have evolved races inhabiting hot localities, and they probably have not undergone the glacial influences as fully as the preceding. The others, on the contrary, are always replaced in hot regions by exerges or by allied, but distinct, species, as though their organic balance had been established for certain climates, and it could not stretch functionally further than a certain limit, beyond which an organic change seems to have become necessary to establish the balance on a new centre; anabolic exerges or allied species have thus been thrown out, strictly limited to special surroundings. Thus

the *purpuralis* group produced *brizae* and *zuleima*, and more recently the twin species *erythrus* and *rubicundus*; *zuleima* was probably evolved as an active catabolic species when N. Africa became temperate, but Europe was still under ice and snow during most of the year; now Africa has become too hot and dry for the organic balance of any *purpuralis*, and *zuleima*, its representative there, is on the verge of extinction, already sunk as it is in a weakly anabolic state; *brizae* can probably be considered the twin species of *purpuralis*, standing to it as *lonicerae* stands to *filipendulae* by the reduction of the red pattern on the outer part of the wing, but, as it is never found in high mountains or in the north, it must have separated under the influence of the return of temperate climates.

The little group of *Zyggaenae*, which seems to have evolved from *contaminici*, now surviving only at high altitudes in the Pyrenees, is most interesting, because it reproduces on a small scale some of the broadest variations of the genus, from *dystrepta*, resembling *purpuralis*, through the five spotted *punctum*, *dalmatina* and *sarpedon*, to the six spotted *favonia*, resembling *filipendulae*. It looks as if *favonia*, with its twin species *loyselii*, had been thrown out first, under the high catabolic strain, with which their ancestor was facing the return of temperate climate in N. Africa; the remaining an anabolic, and consequently, very sensitive group, then divided into the two exerges *sarpedon* and *punctum* with their numerous individual and local variations; *sarpedon* seems a push on the same line as *favonia*, but not too deep. *Z. scabiosae* gives the impression of not having had much capacity of adaptation, when heat and drought increased beyond certain limits; in Spain it has only survived in high mountains, where its weak anabolic exerge *neradensis* is on the verge of extinction; in Italy too, *romeo* (including *orion*) is a highly modified anabolic exerge, as shown by its stumpy antennae and wings (not a species, because in N. Italy it blends with true *scabiosae*).

The group consisting of *achilleae* and *cynarae*, which are unquestionably closely connected, gives the impression of being a highly anabolic one, both by its structure and by the great sensitiveness to surroundings it exhibits: not only does *achilleae* produce a large number of extremely different races, but we have observed, in the same locality near Florence, quite a change in the average aspect of the species in two successive years, one of which was dry and hot, the other cold and damp. The very small, thinly scaled and pale race of some Alpine localities (Susa Valley) and the similar one recorded lately from Scotland, may be its oldest (glacial form, but they are more likely to be recent degenerates; those of Central Europe would then be, as in other species, in a phase perhaps more catabolic than any other; with the increase of heat, a tendency to split into two types becomes striking: in dry localities the dark primary pattern becomes very reduced, and the red spots tend to blend into a *purpuralis*-like aspect, which in *phoenicea* actually reaches the extreme degree of *rubicundus*; in damp localities the red spots tend to become very small and on the Riviera a five-spotted form similar to *orion* is produced commonly by races *ligurica* and *wagneri*. An interesting fact is that these two races have an extraordinary resemblance to race *turatii* of *cynarae*, so that it is about impossible to separate all the individuals of the two species; considering *cynarae* in its six-spotted exerge *centaureae* resembles

filipendulae, whilst *achilleae* resembles *purpuralis*, this convergence of such different types is very remarkable and more surprising than the parallel case of the five-spotted *filipendulae* converging with *loniceræ*; I think there can be no doubt that the five-spotted forms are in these cases the most recent. In fact *achilleae* may be a branch of the *fraxini* group, which, spreading westward, has undergone a more Glacial climate and acquired a more Palaearctic aspect. The intermediate *Z. armena* suggests it, whilst the Persian *Z. ecki* looks like the eastern parallel of *wagneri*, so that the western branch *achilleae* seems to be reproducing on a lower racial scale the differentiations, which have led in the past to specific distinction.

The two following groups are connected in a remarkable way by *Z. ledereri* of Asia Minor, which stands nearest to *meliloti*, especially by the shape of its antennae, but which certainly also comes very near *filipendulae*. In *meliloti* the more robust and less variable five-spotted form, which spreads from Central Europe to E. Asia is presumably the oldest one and *niphona* is an exerge of it, whilst in S.E. Europe the dryness has sunk this species into the anabolic exerge *charon*, whose lowered vitality makes it very sensitive to surroundings and variable individually and locally; in Spain it actually does not exist, but, judging from *scabiosae*, it seems probable it existed there and it has become extinct.

The group *filipendulae*, *angelicae*, *loniceræ* is one of the most complex in its variation and difficult to make conjectures about; it gives the impression of being at the present day in an unstable state of fluctuation and transformation, especially in the races which are, presumably the last produced. The races which by their aspects and by their habitats seem to be the most Glacial, are found in *filipendulae*: *mannii* of Alpine glaciers, *arctica* from 68° N. lat.; with these must be mentioned the extremely interesting "seasonal exerge" *tutti*, Rebel. = *hippocrepidis*, Steph., of England, which emerges at a colder and damper season than *filipendulae* and which interbreeds frequently in nature with *trifolii*. On the other hand the very temperate climate of the Mediterranean shores seems to suit *filipendulae* so well that it has developed there the large and robust exerge *stoechadis*; this constructive tendency, its strong tendency to melanism in many localities, its great individual and geographical variability all point to anabolism; presumably between this "flourishing anabolic" stage and the poorer forms, which existed during the height of the Glacial period, a catabolic stage has intervened, now represented by the slim and not very variable races of Central Europe. In Central and Southern Spain, where several *Zygaenae* are lacking, *filipendulae* is reduced to small races of *stoechadis*, evidently weaklings, and what is interesting is that in such conditions the five-spotted form entirely replaces the six-spotted one, except in a few females, that this is quite independent of melanism, and thus obviously not due to it, and that it has very limited individual variations in race *gemina*, Burgeff., of dry localities. It would seem to be a fourth stage in the evolution of the species, returned to catabolism, after the third *stoechadis* one, so as to meet very hot and dry surroundings. As to *loniceræ*, it strongly gives one the impression of possessing a peculiarity of morphological adaption to surroundings rarely observable in other species: the study of this phenomenon is the chief object of this article. On the whole it needs more moisture

than *jilipendulae*, but the catabolic nymotypical subspecies *lonicerae* needs less than the anabolical *trifolii*; the former is more suited to cold, so that it spreads further north and higher in the mountains; the latter seems to have been evolved to stand more heat, so that it thrives even in the lowlands of Spain and Africa, whereas in our days *lonicerae*, in the south of Europe, is confined to mountains and even there its structure already approaches the *trifolii* one. It is noteworthy that there is no glacial form, as there is in *jilipendulae*. The utmost stimulants of surroundings for true *lonicerae* are the warm valleys of the Alps and the Pyrenees, where it is at the stage of giantism; a further increase of heat and decrease of dampness could evidently not be stood by that point of organic balance, so that southward races have been evolved with new centres approaching more those of *trifolii*, less sensitive to heat and thus less liable to be over stimulated by it. These geographical variations thus suggest alternate phases of catabolism and anabolism and seem to justify the hypothesis that these species undergo the same process through the effects of changes of climate with time. Possibly the return of a temperate climate, when the height of the Glacial Epoch was over, was a powerful stimulus, which produced changes on a far broader and deeper scale, so that twin species, such as *lonicerae* and *jilipendulae* then separated, just as now the former tends to separate in subspecies *trifolii* and *lonicerae*; a second weaker push in the same direction may have produced the intermediate *ongelicae* as a catabolic division, restricted at the present day to a limited area, where surroundings resemble those of the epoch which produced it.

(To be continued).

Elater rufipennis, Stephens, a distinct Species. (Plate IX.)

By H. DONISTHORPE, F.Z.S., F.E.S.

(Continued from page 106.)

61. "Synonymical note on *Lathrobium atripalpe* and *L. punctatum*, of the British List."
Ent. Rec. **15.** 180 (1903.)
62. "Coleoptera in Pamber Forest."
Ent. Mo. Mag. **39.** 205 (1903.)
63. "Coleoptera in Cumberland in June."
Ent. Rec. **15.** 262 (1903.)
64. "*Epicometa squalida*, Scop., at Weymouth."
Ent. Rec. **15.** 264 (1903.)
65. "*Aphanisticus emarginatus*, F.; a species of Coleoptera new to Britain."
Ent. Rec. **15.** 265 (1903.)
66. "*Scymnus limonii*, n.sp.—A Species New to Science."
Ent. Rec. **15.** 287 (1903.)
67. "*Forficula lesnei*, Finot, at Bradfield."
Ent. Rec. **15.** 331 (1903.)
68. "*Labia minor*, L., in October."
Ent. Rec. **15.** 331 (1903.)
69. "Frederick Bates, F.E.S., etc." Obituary.
Ent. Rec. **15.** 347-49 (1903.)

70. "Ten Years' Captures of New British Beetles."
Trans. Leicester Lit. Phil. Soc. **8.** 135-43 (1904.)
71. "The Coleoptera of Cambridgeshire."
British Association Handbook to the Natural History of Cambridgeshire, 155-60 (1904.)
72. "Catalogue of British Coleoptera." (with T. H. Beare.)
51 pages (1904.)
73. "*Omalium septentrionis*, Th., in Kent."
Ent. Rec. **16.** 149 (1904.)
74. "*Pevitelus griseus*, Ol., in Surrey."
Ent. Rec. **16.** 150 (1904.)
75. "Experimental Proof of the Distastefulness, or otherwise, of certain Coleoptera."
Ent. Rec. **16.** 150 (1904.)
76. "*Bembidium adustum* and other Coleoptera at Tewkesbury."
Ent. Rec. **16.** 206 (1904.)
77. "*Tachys parvulus*, Dj., in the New Forest."
Ent. Rec. **16.** 245 (1904.)
78. "A few notes on Water Beetles in 1904."
Ent. Rec. **16.** 245 (1904.)
79. "Rare or Doubtful British Coleoptera." (with T. H. Beare.)
Ent. Rec. **16.** 289 (1904.)
80. "*Cis bilamellatus*, Wood, at Shirley."
Ent. Rec. **16.** 300 (1904.)
81. "*Dorytomus melanophthalmus*, Pk."
Ent. Rec. **16.** 324 (1904.)
82. "Coleoptera in the New Forest in 1904."
Ent. Rec. **16.** 325 (1904.)
83. "Re-occurrence of *Quedius kraatzii* in 1904."
Ent. Rec. **17.** 18 (1905.)
84. "*Symbiotes latus*, at Palmers Green."
Ent. Rec. **17.** 18 (1905.)
85. "Coleoptera at Market Bosworth."
Ent. Rec. **17.** 18 (1905.)
86. "*Orchestes sparsus*, Fahr., in the New Forest."
Ent. Rec. **17.** 45 (1905.)
87. "Remarks on Mr. Newbery's final Article on some Doubtful or very Rare British Coleoptera." (with T. H. Beare.)
Ent. Rec. **17.** 20-22, 42-45 (1905.)
88. "*Oxyopoda sericea*, Heer—a Species of Coleoptera New to Britain."
Ent. Rec. **17.** 67 (1905.)
89. "Coleoptera in the Isle of Wight."
Ent. Rec. **17.** 68-70 (1905.)
90. *Melanophthalma transversalis*, Gyll., a species new to Britain."
Ent. Rec. **17.** 103 (1905.)
91. "*Nebria gyllenhali*, Sch., var. *rufescens*, Stroem., a British Variety."
Ent. Rec. **17.** 103 (1905.)
92. "*Ocalea latipennis*, Shp., in Surrey."
Ent. Rec. **17.** 103 (1905.)
93. "Notes on some interesting captures in a London granary."
Ent. Rec. **17.** 106 (1905.)

94. "The Coleoptera of the Victorian History of the County of Warwick," by H. W. Ellis. (Review.)
Ent. Rec. **17.** 165 (1905.)
95. "*Gramoptera holomelina*. Pool, a good Species."
Ent. Rec. **17.** 182 (1905.)
96. "The food-plant of *Dibolia cynoglossi*, Koch."
Ent. Mo. Mag. **41.** 256 (1905.)
97. "Coleoptera in 1905."
Ent. Rec. **17.** 291 (1905.)
98. "*Ptinus latro*, F., in London."
Ent. Rec. **17.** 333 (1905.)
99. "On a flight of *Rhizotrogus solstitialis*, L."
Ent. Rec. **17.** 333 (1905.)
100. "The Coleoptera of the Isle of Wight."
Trans. Leicester Lit. Phil. Soc. **10.** 3-23 (1906.)
101. "*Megacronus formosus*, Gr., as British."
Ent. Mo. Mag. **42.** 40 (1906.)
102. "*Cuboccephalus nigriventris*, Thoms., parasitic on *Tetropium*."
Ent. Mo. Mag. **42.** 41 (1906.)
103. "*Ptinus pusillus*, Stm., a species of Coleoptera new to Britain."
Ent. Rec. **18.** 45 (1906.)
104. "*Dromius agilis* ab. *bimaculatus*, Dej., a new ab. to Britain."
Ent. Rec. **18.** 75 (1906.)
105. "*Hydrochus nitidicollis*, Muls., a species new to Britain."
Ent. Rec. **18.** 133 (1906.)
106. "Coleoptera at Yelverton."
Ent. Rec. **18.** 134 (1906.)
107. "Trap for Coleoptera."
Ent. Rec. **18.** 186 (1906.)
108. "*Donacia obscura* in the Norfolk Broads."
Ent. Rec. **18.** 214 (1906.)
109. "Two excursions to North Wales for Coleoptera."
Ent. Rec. **18.** 241 (1906.)
110. "Coleoptera at Woodhay, Newbury."
Ent. Rec. **18.** 268 (1906.)
111. "*Mononychus pseudacori*, F., in the Isle of Wight."
Ent. Rec. **18.** 324 (1906.)
112. "*Henoticus serratus*, Gyll., at Newbury."
Ent. Rec. **18.** 325 (1906.)
113. "Distasteful Carabids."
Ent. Rec. **18.** 325 (1906.)
114. "*Cis dentatus*, Mellié, a species of Coleoptera new to Britain."
Ent. Rec. **19.** 136 (1907.)
115. "Coleoptera in Sherwood Forest."
Ent. Rec. **19.** 190 (1907.)
116. "A Fortnight in the Highlands."
Ent. Rec. **19.** 229 (1907.)
117. "*Xestophantes brevitarsis* and *X. potentillae*."
Ent. Rec. **19.** 260 (1907.)
118. "*Cephalonomia formiciformis*."
Ent. Rec. **19.** 260 (1907.)
119. "*Ocypus cyaneus*, Payk., in Scotland."
Ent. Mo. Mag. **43.** 275 (1907.)

120. "Coleoptera at Deal and St. Margarets Bay durin August and September, 1907." (with T. H. Beare.)
Ent. Rec. **19.** 292 (1907.)
121. "Coleoptera in the Handbook of Richmond Park."
pp. 39-41 (1908).
122. "*Bruchus affinis*, Fröhl., a British Insect."
Ent. Mo. Mag. **44.** 40 (1908.)
123. "*Anisotoma brunnea*, Stm., from the Isle of Wight."
Ent. Mo. Mag. **44.** 60 (1908.)
124. "*Xantholinus distans*, Rey., near Dumfries."
Ent. Rec. **20.** 184 (1908.)
125. "*Hydrobius fuscipes*, L., ab. *chalconatus*, Steph., at Tottenham."
Ent. Rec. **20.** 184 (1908.)
126. "Two New Localities for *Bledius femoralis*, Gyll."
Ent. Rec. **20.** 185 (1908.)
127. "Coleoptera at Kew."
Bull. R. Bot. Gard., Kew, **3.** 119-21 (1908).
128. "A few Notes on *Cryptocephali*."
Ent. Rec., **20.** 208 (1908.)
129. "*Rhytidosomus globulus*, Hbst., at Darenth."
Ent. Rec. **20.** 215 (1908.)
130. "*Notozus panzeri*, F., in Sherwood Forest."
Ent. Rec. **20.** 215 (1908.)
131. "Coleoptera, etc., in the Isle of Wight."
Ent. Rec. **20.** 229 (1908.)
132. "*Agrilus biguttatus*, F., etc., in Sherwood Forest."
Ent. Rec. **20.** 237 (1908.)
133. "A few additions to the Coleoptera of the Isle of Wight."
Ent. Mo. Mag. **44.** 255 (1908.)
134. "*Olophrum assimile*, Pk., an addition to the British List."
Ent. Rec. **20.** 255 (1908.)
135. "*Clambus punctulum*, Beck, a British Species."
Ent. Rec. **20.** 293 (1908.)
136. "Supplement to the Coleoptera of the Isle of Wight."
Morey's Guide to the Natural History of the Isle of Wight,
pp. 387-394 (1909.)
137. "*Trichopteryx intermedia*, Gillm., var. *thomsoni*, F. B. Ericson; a British Species."
Ent. Rec. **21.** 58 (1909.)
138. "A Coleopteron New to Science—*Anaspis hudsoni*, nov. spec."
Ent. Rec. **21.** 60 (1909.)
139. "*Adrastus limbatus* of British Collections."
Ent. Mo. Mag. **45.** 110 (1909.)
140. "*Coccinella 10-punctata*, L., ab. *confluens*, Haworth, at Darenth."
Ent. Rec. **21.** 136 (1909.)
141. "On Breeding *Phytodecta pallida*, L., from the larva."
Ent. Rec. **21.** 208 (1909.)
142. "*Trogophloeus subtilis*, Er., in Durham."
Ent. Rec. **21.** 231 (1909.)
143. "Wicken Fen re-visited."
Ent. Rec. **21.** 231 (1909.)
144. "The Genus *Apion*."
Ent. Rec. **21.** 231 (1909.)

145. "*Chaetocnema arida*, Foud., a species of Coleoptera new to Britain."
Ent. Rec. 21. 259 (1909.)
146. "Collecting in the Isle of Wight with some additions to the Fauna."
Ent. Rec. 21. 272 (1909.)
147. "Further additions to the Isle of Wight list of Coleoptera."
Ent. Mo. Mag. 46. 32 (1910.)
148. "*Ptinella britannica*, Matt., in a Mole's Nest."
Ent. Rec. 22. 116 (1910.)
149. "Recording Coleoptera."
Ent. Rec. 22. 116 (1910.)
150. "A Note on *Tychius haematopus*, Gyll., etc."
Ent. Mo. Mag. 46. 118 (1910.)
151. "A suggestion for future records of Coleoptera."
Ent. Mo. Mag. 46. 118 (1910.)
152. "*Olophrum nicholsoni*, n.s., a species of Coleoptera new to Science."
Ent. Rec. 22. 139 (1910.)
153. "Coleoptera at Braemar in June."
Ent. Rec. 22. 202 (1910.)
154. "The First International Congress of Entomology at Brussels."
Ent. Rec. 22. 228 (1910.)

(To be continued.)

SCIENTIFIC NOTES AND OBSERVATIONS.

A NOTE ON THE GENETICS OF *GRAMMESIA TRIGRAMMICA*.—In June, 1924, Mr. H. Worsley Wood sent me a large number of very young larvae of *Grammesia trigrammica*, the offspring of an extremely fine melanic female, var. *obscura*, Tutt, taken at Polegate. After feeding continuously for six months the survivors pupated and thirteen specimens emerged. Twelve were quite typical pale ones and one had a darker ground colour. Even this dark specimen must be regarded as a modification of the type, and differed much from the lightest *obscura*. We had expected that about half would be melanic, thinking that the melanic form of this species would prove to be a dominant like the melanic forms of *Triphaena comes*, and that the female parent would be heterozygous. The number bred is small, but sufficient to make it highly probable that var. *obscura* is a simple recessive to the type.—E. A. COCKAYNE (M.D., M.A.), 116, Westbourne Terrace, W. 2.

In the *Zeit. f. wiss. Ins.-biol.* for June, T. Esaki contributes an article summarising the observations of various writers, Wallace, Skortchley, Dean, etc., on the mimicry shown by the *Kallima*-species. He quotes Dean's remark, "The fact that a butterfly looks strikingly like a given dead leaf, is no adequate proof that it was evolved in mimicry—it must be proven a mimic in all details," *Science* XVI., 832, etc., 1902. The writer then gives a series of personal and quoted field observations on the habit of the *Kallima*-species, with the remarkable dead leaf like undersides, of settling among the bright green-leaf foliage of various shrubs, and not necessarily in close proximity to the dead fungus spangled leaves, which they so much resemble below.

This article would seem to suggest that the resemblance was a case of "mimicry out mimicked." It does not seem that the *Kallima* is any the less protected by its habit of sitting among the bright fresh foliage and being thus conspicuous by its dead leaf appearance. The wealth of tropical vegetation would necessarily produce a large quota of dead leaves with which pursuers would be more or less familiar. The rapid flight, and sudden pitch of the *Kallima*, changing the brilliant flash-like appearance in flight to a motionless dead-leaf appearance, would be quite sufficient to give adequate protection.—H. J. T.

NOTES ON COLLECTING. etc.

SPAIN.—*Ent. Record*, XIV. 70, etc: XV. 36, etc: XVI. 85, etc., June: XXI. 34, etc., June-July: XXV. 33, etc., July: XXII. 262, etc., May. *E. M. M.*, XXXII. 11, June: XXXIX. 54, Oct: *Ent.*, LVI. 52, etc.

ANDALUSIA.—*Ent. Record*, XXV. 220, March. *Ent.* XXXV. 228.

ALBARRACIN.—*Ent. Record*, XXVII. 173. *Ent.* XLI. 4, July-August: XLV. 110, July-August: XLVI. 283, etc., May-June.

ALGECIRAS.—*Ent.*, XLI. 213, April.

BARCELONA.—*Ent.*, XXXVIII. 250, May-June: XLI. 301, April.

CINTRA.—*Ent. Record*, XXI. 153, April.

CUENCA.—*Ent. Record*, XXV. 35, August.

LA GRANJA.—*Ent. Record*, XXI. 34, etc., June-July: XXV. 33, July: 278, June: XXXIV. 66.

GIBRALTAR.—*Ent. Record*, XXIII. 261, April: XXIV. 172: *E. M. M.*, XXIV. 175, etc.: XLIX. 117, etc.: *Ent.*, XVI. 240, etc.: XL. 214, etc.

GRANADA.—*Ent. Record*, XXV. 223, March. *Ent.*, XXII. 160, etc.

PAJARES.—*Ent. Record*, XXVII. 121., July-August.

RONDA.—*Ent. Record*, XXV. 223, April.—H. J. T.

COCCINELLIDAE AND VESUVIUS.—In the issue of *The Times* of August 21st. 1925, is an interesting account of a descent into the crater of Vesuvius, by a correspondent, who records the presence of Ladybirds in this unpleasantly warm spot. After reaching the bottom and traversing the first zone of lava (two years old), the correspondent reached the second zone of lava (eight months old), still warm to the touch, where "wicked-looking vents breathe out hot air, and offered a dry stick or some paper, lick it up greedily in fire." Progressing inwards he finds cakes of lava ejected but the day before, and adds: "There is life even in this burnt place. Dozens of red ladybirds close their pretty shell-like wings and settle upon the party as if glad of company; nor is it easy to shake them off. But no other living forms are visible in the scene of desolation. The incandescent vapour foaming now overhead, has turned a glorious orange that fills the heart with joy." It may have the same effect on Ladybirds, but this crater seems to be an unpleasantly warm spot for a joy-ride. Such a torrid place does not appear to offer much attraction to a Coccinellid.—G. C. LEMAN, F.E.S.

AESCHNA MIXTA IN PECKHAM.—I feel sure it will interest some of your readers to know that I have taken a male specimen of *Aeschna*

nicta in a Peckham garden. The specimen was caught by my wife on August 15th, as she thought it was a different dragonfly to any in my collection. I verified the name from *British Dragonflies*, by W. J. Lucas, to make sure it was not an immature specimen of *Aeschna cyanea*.—BERNARD C. COGGIN, 2, Allenby Road, Forest Hill, S.E. 23, September 9th, 1925.

(52) URGENT NOTES AND SHORT NOTICES.

A meeting of the Entomological Club was held at "Hodeslea," Eastbourne, on September 19th, 1925, by the invitation of Mr. Robert Adkin. The members present were:—Messrs. Robert Adkin, Horace Donisthorpe, H. Willoughby-Ellis, James E. Collin, and W. J. Kaye. The visitors—Dr. S. A. Neave, Messrs. T. H. L. Grosvenor, H. J. Turner, A. E. Tonge, Edward Step, A. L. Rayward, F. Playwright, and R. A. Adkin. Apologies for absence were received from Professor Poulton and Dr. Harry Eltringham (members of the Club). The guests were received in the morning by Mr. and Mrs. Adkin, and luncheon was provided, after which an entomological excursion was made to The Downs and Beachy Head. In the afternoon a meeting of the Entomological Club was held, Mr. Robert Adkin in the chair, and supper was served at 6.30. Mr. Robert Adkin's fine collection of Lepidoptera and comprehensive Library of scientific books were inspected with very great interest. A number of the guests returned to London by the evening train, but those who were able to accept the hospitality of the Host and Hostess remained at "Hodeslea" for the week end. On Sunday an Entomological excursion was organised to Abbot's Wood, and notwithstanding the somewhat inclement weather some good species of Coleoptera were captured. The remaining guests returned to London by the early train on Monday morning, after a most successful and enjoyable meeting.—H.W.E.

By error, the July number of this magazine was numbered 6-7, instead of 7-8. The June number was 6, and the September number 9.

In No. 13, Vol. II., of our contemporary *L'Amateur de Papillons*, P. Chetien writes a very delightful article "La Legende de *Graellsia (Saturnia) isabellae*," the history of the very striking Saturniid, which has quite recently been discovered in France, when hitherto it had only been taken in restricted areas in Spain, whence we have a series collected by the late Dr. Chapman.

In the *Zeit. f. wiss. Ins.-biol.*, for the present year, Dr. M. Hering of the Berlin Zoological Museum, has a series of articles on the mines, made by insects of various orders in the leaves of trees or herbs. The same author has a long "Contribution to the knowledge of the *Zygaenidae*" (sens. lat.) in the August issue of *Iris* in continuation of his previous articles in the *Deut. Ent. Zeit.*, and in the *Arch. f. Naturgesch.*, 1922.

Parts I.-II. of the *Trans. Ent. Soc. Lond.* have recently been issued and contain, as usual, a valuable contribution of original work, of 340 pages and 16 pages of proceedings with 45 plates illustrating the 12 papers printed. Ten papers deal with Lepidoptera, one with Rhynchota and one with insects in general. Dr. Eltringham contributes five papers dealing with various more or less obscure organs in the Lepidoptera, Abdominal Brushes in Noctuids, Abdominal Glands in *Heliconius*,

Ocelli in *P. gamma*, etc. Mr. Bethune-Baker treats of the Scent-sacs in *Rhodogastria* (*Arctiinae*), Major P. P. Graves gives an excellent critical account of the Rhopalocera of Palestine based upon his own long personal acquaintance of the fauna of the Eastern Mediterranean area. This paper has a coloured plate of new forms. Capt. Riley has a Revision of the genus *Artitropa* (*Hesperiiidae*). Mr. L. B. Prout describes a number of new *Geometridae* from Madagascar.

We have received several publications either edited or written by T. Bainbrigge Fletcher the Imperial Entomologist of Pusa, India. 4 parts of the great *Catalogue of Indian Insects*, pt. 6, *Staphylinidae*, by Malcolm Cameron, pt. 7, *Lasiocampidae*, pt. 8, *Amatidae* (*Syntomidae*), pt. 9, *Zygaenidae*, all by T. Bainbrigge Fletcher, and the *Report of the Fifth Entomological Meeting*, held at Pusa in 1923, a volume of over 400 pages and 37 plates, several of which are coloured. Sixty-one of the papers read are printed with summaries of the discussions. One of the most interesting papers is that by Y. R. Rao describing and figuring an extraordinary adjunct of the genitalia of certain Anthomyiid flies of the genus *Atherigona* (Rice-flies), consisting of a very peculiar bristle with a trifoliate tip, which the male flourishes before the face of the female in paying court to her.

The *Depart. Agric. India* has issued as a Memoir (VIII. 12), a 30 page pamphlet dealing with the "Nim" Mealy Scale (*Puinaria marima*), a devastating pest on the commonest shade tree of the country. There is one coloured and four other plates with numerous test figures.

The *London Naturalist* appears this year with a minimum of Entomology, and that only incidentally in a "Retrospect" of the first secretary of the Society some 60 years ago.

The fifty-fifth *Ann. Rep. of the Ent. Soc. of Ontario*, for 1924, is somewhat smaller than usual. It contains Reports of the Branches, Reports on the Insects of the Year, and some twenty of the thirty-one papers read at the annual meeting held on November 27th and 28th, 1925. Illustrations are confined to one article.

The *Report of the Hayling Island Mosquito Control* has recently come to hand. It is a very useful account of the ordinary mosquitoes and of the work of the Control. The Hon. Director and the moving spirit of the Establishment is Mr. J. T. Marshall, M.A., F.E.S.

We note that M. Lhomme, the Editor of the French Entomological Journal *L'Amateur de Papillon*, has been awarded the Constant prize by the Entomological Society of France for his work, the *Catalogue des Lépidoptères de France*, which is being issued as a supplement to that journal. We offer him our sincere congratulations.

The Società Entomologica Italiana since its removal to Genoa seems to have been quite resuscitated from its almost collapse of a few years ago. It now regularly issues its *Bollettino* and its *Memoires*; the former giving an account of the proceedings at the ordinary meetings and the latter containing special monographs of insect groups, or faunistic papers of more than local interest.

The *Entomological News* for July contains a coloured plate of several new aberrant forms of Rhopalocera of the United States, including an almost wholly black form of *Papilio eurymedon*, a *Junonia coenia* lacking the "eye" of the fore-wing, *Pieris napi* with the spot on the fore-wing much enlarged and produced, etc.

"Can Insects survive Freezing," is an interesting article in the

Can. Ent. for July. The question is answered thus: "Not all insects can endure freezing, nor can insects withstand it throughout the year, but in certain groups normally exposed to low temperature, there are insects that can freeze without dying."

The *Can. Ent.* for August has an article on "Entomology in the Fables of John Gay," and reproduces the four fables in extenso in verse. "The Lady and the Wasp," "The Butterfly and the Snail," "The Turkey and the Ant" and "The Man and the Flea."

The *Bull. Soc. Ent. Belg.* for June contains an obituary of Prof. Dr. Carlo Emery, the great Italian myrmecologist, by Dr. A. Forel.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

February 26th, 1925.—Mr. T. H. L. Grosvenor, F.E.S., President, in the chair.

Mr. Walter Dannatt, Guibal Road, Burnt Ash, S.E., was elected a member.

There was an exhibition of lantern slides by Messrs. W. J. Lucas, A. E. Tonge, A. Glegg, and A. W. Dennis.

March 12th.—The President in the chair.

Mr. A. A. W. Buckstone exhibited a remarkable *Xanthorhoë fluctuata* from Herne Bay, very uniformly mottled, the pattern being much suppressed.

Mr. Hy. J. Turner, *Zygaena fausta* race *junceae* from Vernet, and *Z. hilaris* race *felix* from Tripoli; *Papilio thoas* race *braziliensis*, the sexually dimorphic *P. hectorides*, and the tailless *P. polystichus* from Mr. Lindeman at Rio; and several *Noctuidae* from Tripoli.

Mr. T. H. L. Grosvenor, polymorphic females of *Papilio polytes* and *P. memnon* and the *aristolochia*-*Papilio*s they mimic, with the rare *P. mayo*.

Mr. E. J. Bunnett, stems of cow-parsley showing pupal chamber of *Depressaria heracleana*; the very local *Cis bilamellatus*; and partial life-histories of *Cionus serophulariae* and *Saperda populnea*, with a social chamber of an *Anaphe* sp.

Mr. Dannatt, *Heliothis peltigera* taken in a house at Blackheath; a silvery form of *Plusia chrysis* from Wicken; *Pyrameis trammeana* from Hawaii, and pupal chambers of *Dicranura bicuspis*.

Mr. Hawkins, a series of *Amorpha populi* including gynandromorphs, asymmetrical forms, ab. *pallida*, etc. One larva underwent four moults, the rest three.

Mr. R. Adkin, some artificially produced aberrations of butterflies, *Melitaea aurinia*, *Pyrameis atalanta* and *Vanessa io*.

REVIEWS AND NOTICES OF BOOKS.

REPORT OF THE SECOND IMPERIAL ENTOMOLOGICAL CONFERENCE JUNE, 1925. (published by H.M. Stationery Office, price 9d.). This Report is well worth perusal by all entomologists, who take an interest

in the economic side of Entomology. In addition to the leading economic entomologists of this country, twenty-one official delegates from various parts of the Empire were present, and at a number of meetings held from June 9th to 18th, a wide range of subjects dealing with different aspects of economic entomology were discussed. The papers read and subsequent discussions are summarised in Appendix II. of the Report.

At the final meeting a series of nineteen resolutions were passed (pp. 12-15). Three of these, Nos. 4, 17, and 18, are specially noted in the covering letter sent by Earl Buxton, the Chairman of the Conference, to the Secretary of State for the Colonies. No. 4 recommended that large planting companies and groups of farmers should be encouraged to engage permanent entomologists in their own employment. It had been brought out in the paper and discussion on "The Aims and Organisation of Economic Entomology" (p. 16), that the Government officials are apt to be called in too late, when pests are well established, and also that advice given free of charge was often apt to be disregarded. Resolution No. 17, dealt with the Tse-tse-fly problem, and urged that action should be taken on the lines contemplated in the recent Report of the East African Commission. Resolution No. 18, while thanking the Entomological Staff of the British Museum (Natural History), drew attention to the paucity of the permanent staff and the overcrowded state of the available accommodation at the Museum. This last resolution will be readily endorsed by other entomologists, but it is to be observed that in his letter of acknowledgment, while the Colonial Secretary is "in complete agreement" with resolution No. 4, and "hopes to avail himself" of resolution No. 17, he is only able to "take note of" resolution No. 18.

Among the remaining resolutions, No. 3 urges the desirability of periodical meetings of entomological and other scientific workers in each of the Dominions and Colonies; and No. 1 records the appreciation of the Conference of the working of the Imperial Bureau of Entomology, concerning which a most interesting memorandum by the Director (Dr. Marshall) is to be found in Appendix Ia.

This institution and its work is practically unknown to the general public, and not nearly as well known as it should be among entomologists. It was established in 1913 with the object of collecting and disseminating information with regard to injurious insects and it has more than justified its existence, although severely hampered in its early operations by the Great War. It has three objects

- (a) The publication of information regarding insect pests.
- (b) The identification and distribution of collections of pests.
- (c) The breeding and dispersal of beneficial parasites.

In regard to the first of these objects the Bureau issues a monthly *Review of Applied Entomology* in two series: A dealing with insects injurious to plants, and B dealing with insects harmful to man and domestic animals. These reviews contain abstracts of articles collected from periodicals in various languages from all parts of the world. In 1913—its first year—1037 abstracts were published and in 1924 no less than 2471: the average for the last five years being 2309 involv-

ing the searching of about 1200 periodicals. The Bureau also publishes an illustrated quarterly *The Bulletin of Entomological Research* dealing with technical and taxonomical papers on economic entomology. These publications are published at 12/- 5/- and 15/- per annum respectively. The Bureau has also undertaken the publication of the "*Insecta*" part of the *Zoological Record* and has practically cleared off the arrears that had occurred since the death of the late Dr. Sharp. In this connection it is proposed as an experiment to publish a certain number of copies in sections so that systematists can obtain the part bearing on their particular order without going to the expense of the whole volume. For other publications I would refer readers to the Report Appendix 1a, and would only add that the Bureau has a valuable and extensive library of reference and other works at its offices, 41, Queen's Gate.

The second object of the Bureau, *viz.*, the identification of insects, has grown in like manner, "during the last five years very nearly a quarter of a million insects have passed through the hands of the staff . . . compared with the previous five years the material received has nearly doubled and the identifications issued have considerably more than doubled" (Report p. 19). Named specimens of blood-sucking and other insects of economic importance have been distributed among some forty scientific institutions at home and overseas, and some 67,000 specimens including types of 903 species new to science presented to the British Museum (Nat. History), where this section of the Bureau is housed.

The third branch of the Bureau's activities, the export of beneficial parasites, is of later birth than the others, but a certain amount of work has been done and is noted in the director's memorandum (p. 20 of the Report). Here, however, the question of expense comes in, and a big advance in this direction would involve a larger outlay than can be afforded on the present estimates, for all the work of the Bureau is carried out on the modest sum—for these days—of £13,000 per annum. This is made up from contributions of varying amounts from the Dominions and Colonies, in curiously uneven proportions, judging from the table given on p. 21. The Imperial Government gives £1000 as its share, which may be compared with the "large sums amounting to about half a million sterling, placed at the disposal of the United States Bureau of Entomology" (Report p. 11).

The above brief summary may help to give some idea of the work of the Bureau, described by the chairman of the Conference as "a clearing house, through which may be made known to all those engaged in entomology, the results of work in this subject, which is being carried out in other parts of the world, and, further, as a central institution to which entomologists may send insects for identification, and to which they can look for advice and assistance in dealing with their problems." (Report p. 4).—H.W.A.

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MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. October 21st, November 4th, 18th.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. September 24th, Exhibition of Orders other than Lepidoptera. October 22nd, Exhibits. November 12th, W. J. Lucas, B.A., "The Orders of British Insects." (Lantern).—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., W. E. GLEGG, F.Z.S., The House, Albion Brewery, Whitechapel Road, E.1.

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The Entomologist's Record and Journal of Variation.

(Vols. I-XXXV.)

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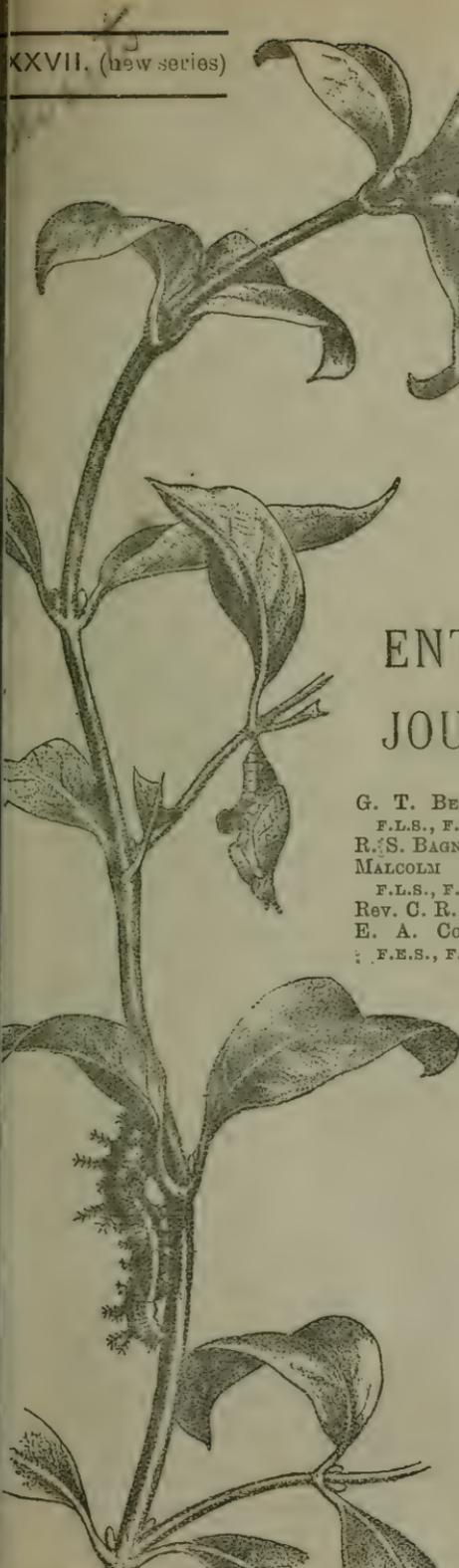
GENUS *Acronycta* and its allies.—Variation of *Smerinthus tiliæ*, 3 coloured plates—Differentiation of *Melitæa athalia*, *parthenie*, and *aurelia*—The Doubleday collection—Parthenogenesis—Paper on *Taeniocampidae*—Phylloxera—Practical Hints (many)—Parallel Variation in Coleoptera—Origin of *Argynnis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

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CHARLES OBERTHÜR.

Notice is hereby given to all Entomologists that I have returned to Rennes to continue the Sale of this Collection.

**M. C. Höfer, Rennes, Imprimerie
Oberthür, France.**

Hippodamia variegata, Goeze, and its aberrations.

By G. B. C. LEMAN, F.E.S.

1. With reference to my ab. *scutellopunctata*, (formula: $\frac{1}{2}$) described in *Ent. Rec.*, XXXIV, No. 2, p. 25 (1922), my friend Mons. Lestage has drawn my attention to a similar aberration described by Dr. G. Della Beffa in 1913 under the name ab. *scutellaris*, and as this latter has priority, my name sinks as a synonym.

I have, only after much difficulty and through the courtesy of Dr. G. Della Beffa, obtained a copy of his work (with plates), "Revisione dei Coccinellidi Italiani, Parte prima. Epilachninae Coccinellinae," published in separata form in 1913, in which his ab. *scutellaris* is figured on Pl. II., fig. 86.

2. ab. *beffae*, n.ab.

This aberration, included by Dr. G. Della Beffa in his group of var. *abbreviata*, Ws., has the formula of: 1, 3 + $\frac{1}{2}$, 4 + 5, 6.

It combines the two separate confluences found in ab. *abbreviata*, Ws. (1, 3, 4 + 5, 6, $\frac{1}{2}$) and ab. *donisthorpei*, Lemans (1, 3 + $\frac{1}{2}$, 4, 5, 6). It may be noted that ab. *abbreviata*, Ws. (B.T. 1879), has the distinct formula 1, 3, 4 + 5, 6, $\frac{1}{2}$.

I have named this aberration after Dr. G. Della Beffa, as a slight acknowledgment of his great work on Italian Coccinellids.

3. ab. *lestagei*, nov. nom.

I find the name of ab. *triangularis* given by me to the aberration with formula of 1, 2, 3 + $\frac{1}{2}$, 4 + 5 + 6 (in irregular blotch) in *Ent. Rec.*, XXXVI., No. 1, p. 12 (1924) is also pre-occupied by Dr. G. Della Beffa for his aberration with formula 1, 2, 3, 4 + 5 + 6 (in irregular blotch), $\frac{1}{2}$. I have therefore given my aberration the above new name after my friend, Mon. Lestage, whose work on Belgian Coccinellids is well known.

Ab. *triangularis*, Beffa, appears to be, however, a synonym of ab. *turmenica*, Zoubk.

4. Dr. G. Della Beffa in his same work describes the following four new aberrations, and as his work does not appear to be readily obtainable, it may be of interest to quote them here briefly:—

(a) ab. *ragusae*, Beffa. Formula—2, 4, 6, $\frac{1}{2}$.

(b) var. *8-punctata*, Beffa. Formula—1, 4 + 5, 6.

(c) ab. *piedmontana*, Beffa. Formula—2, 3, 4, 6, $\frac{1}{2}$.

(d) ab. *portae*, Beffa. Formula—(1 + 3 + 5) + (2 + 3 + $\frac{1}{2}$), 4, 6.

5. Dr. G. Della Beffa has also kindly sent me his separata on "Anomalie cromatiche osservate nello studio dei Coccinellidi" (24 figures), originally published in 1914 in the *Rivista Coleotterologica Italiana*, Anno XII, N. 8-12, which includes descriptions and figures (2-4) of three abnormal specimens of this species.

Fig. 2 shows on left elytra an additional spot near the suture between spots 5 and 6. Otherwise this specimen conforms to formula of ab. *similis*, Schr. (1, 2, 3, 4, 5, 6, $\frac{1}{2}$).

Fig. 3 shows on both elytra an additional spot near the margin a little brighter than spot 5. Otherwise this specimen also conforms to the formula of ab. *similis*, Schr.

Fig. 4 shows again on the left elytra only an additional spot near the suture just below where the $\frac{1}{2}$ spot would be if same were present. Otherwise this specimen conforms to the formula of ab. *6-punctata*, Fabr. (4, 5, 6).

NOVEMBER 15TH, 1925.

The yellow-spotted *P. apollo* from the Sierra Nevada, Spain.

By ORAZIO QUERCI.

Some time after the military disaster of Caporetto, Dr. Romei, who had remained longer at the front in the protection of the retreat of the Italian army, returned to Florence and came to pay a visit to my family. Volume VIII. of Oberthür's *Études de Lépidoptérologie comparée* was on my table, and Dr. Romei, while speaking with me about the war, observed the figure of *Parnassius apollo* race *nevadensis*. At that time he knew nothing of entomology, and I related to him that the *nevadensis* was an interesting butterfly, which for many years no collector had been able to get again. Very few, and not perfect, specimens were in the collections, so that none might say surely if the *apollo* from the Sierra Nevada is either yellow or red.

Dr. Romei told me that he would be pleased to solve the question, and I replied: "My boy, when we have won the war you shall go to Sierra Nevada to collect the *apollo*."

Italy won the war but, as a trip to Andalusia is not an easy task, we have been obliged to wait for seven years to carry out our purpose. In February, 1925, Dr. Romei went to Northern Africa with my daughter; the two young people made a nice collection from all over Tripolitania, and returned home in May. My son-in-law had decided to go to Andalusia, at any rate; he left Italy at once because he feared to arrive in Southern Spain too late in the season.

Dr. Romei arrived at Granada on May 15th, and he began to work out the toilsome paths of the Sierra Nevada to discover a spot where one might presume to find the *apollo*. From Granada he went to Guejar Sierra, Jerez, Aldere, Cadiar, Orgiva, Trevelez; several times he reached 8000ft.-9000ft., as in Puerto del Lobo, Oreajo de Trevelez and at the sources of the Rio Guadix and Rio Trevelez. The season was so cold and damp that my son-in-law was always obliged to carry his mantle and waterproof, because almost every day he was caught by a storm.

During the first month the collecting was discouraging; no more than three or four lepidoptera were seen daily, the rain often prevented Dr. Romei from going into the country. Notwithstanding the adverse conditions my son-in-law would not renounce his enterprise and, at last, on June 27th, 1925, he saw on the wing the first individual of *P. apollo*.

The spot where the *apollo* is living is a desolate land very far from any village; not even a shrub is on the ground, only some poor stems of grass and a few plants of *Sedum* lived amongst the white stones. Dr. Romei although living in a dirty hut on the high mountain was obliged to walk three hours every day to arrive at the spot.

Owing to the cloudy sky and the strong wind, the capture of the *apollo* was an easy matter from June 27th to July 4th; after this time, until July 10th, the sky was cloudless, and it was so hot that my son-in-law, although accustomed to the African "ghibli," was scorched by the sun.

The *apollo* from the Sierra Nevada differs from all the other races of the same species by the colour of the ocelli, which is always yellow-orange; not even one red specimen is in our long series. The males having some yellow spots on the forewings, as in the *pseudonomion*-

like form, are very rare. Some males are like the Oberthür's type, which I have handled at Vernet-les-Bains, when, last July, I paid a visit to Mr. René Oberthür; some other males have the antimarginal row of black crescents much more marked and the white pupils of the ocelli are smaller than in the type form.

I think that the female of this race of *apollo* was till now quite unknown; it is very variable, and in our series of females we have observed many individuals having some yellow spots also on the forewings; the hindwings are still more variable, because the ocelli and anal spots are often largely suffused with yellow-orange colour. On the whole the female sex is very dark.

The region of the Sierra Nevada, where Dr. Romei collected this year from May 15th to July 11th, has a very poor fauna; Dr. Romei remained there to catch because the clever Spanish botanist, Dr. Font Quer, had found there a quite peculiar flora and many botanical novelties. Not only the Rhopalocera but also the Heterocera have been scarce in that country; my son-in-law was collecting every night by lamplight, but the nocturnal captures have not been successful. At any rate we have till now neither set nor studied our Andalusian Lepidoptera, and we cannot say whether, besides the *apollo*, we have in our stock many other interesting things.

Miscellaneous Notes from Argentina. I.

By KENNETH J. HAYWARD, F.E.S.

The object of these notes is to record from time to time any observations that have been made bearing on the insect fauna of South America, especially that part comprising Northern Argentina to the East. The notes are as stated in the title, miscellaneous notes and nothing more. They are simply an attempt to bring together in one place, and without undue delay, notes that would otherwise be scattered, if indeed ever published.

The writer is one whose time and opportunities are limited, but whose work has again taken him into the backwoods of the world, in a place where every insect is a potential new species, and even the commonest are of interest.

Having introduced these notes one cannot now do better than introduce the locality they will cover in the main, the Argentine Chaco. Geographically this area is partly in the northern territory of the Province of Santa Fé and partly the southern portion of the Chaco proper, but to the Argentine all is "El Chaco." There is no natural division and no outstanding natural feature, other than the Rio Parana, that forms the Eastern boundary and separates these provinces from Corrientes. Civilization has scarce penetrated, and the few colonies that have grown up round the tannin factories, and in the few small tracts of agricultural land, are little else than villages. Of these four or five will figure constantly in these notes. Few maps will show them, and it may be of interest to give the reader an idea of their position. Commencing with Villa Ana—the writer's present home—located approximately 28° 30' S. Lat. 59° 35' West, we have to the north some 35 kilometres a larger town, Villa Guillermina, 30 kilometres to the south-east Tartagal, and about 110 kilometres further south La

Gallareta and the now abandoned Santa Felicia. The first four of these are tannin factories of the Forestal Company. This Company has also two large estancias, one just north of La Gallareta, and the other, an area approximately 430,000 acres, at La Aurora, to the north-east of Villa Guillermina. There is a small village known as Ocampo, about 25 kilometres east, and to the north of this the villages of San Antonio and Las Toscas, all centres of cultivated land. The area is served by the Ferro-Carril de Santa Fé, and there are a few small towns along its route, and one giant amongst the pygmies in Vera, a town in the neighbourhood of La Gallareta. Of the remaining places that are likely to be mentioned few will be other than temporary wood cutting stations, or loading points. The land itself is absolutely flat. There are naturally differences in levels, but they are so small and so gradual that they escape one's notice. The soil is heavy and for the most part clayey, and without one particle of stone deposit. At about 20 feet there is a substratum of sand, and one encounters back filtration from the Rio Parana. The soil I speak of here is that of the forests and I cannot say anything of the soil around the agricultural districts, as of this I have no experience. After rain, water lies on the surface for long periods and the forests are in places transformed into little better than swamps. The forest area may be roughly divided up into three types. Firstly the cañadas and esterros, low lying tracts containing lakes or river beds, dry or wet according to the time that has elapsed since the last rain, covered with coarse grass or reeds, difficult and unpleasant to traverse on foot when dry, and impossible when wet, and not of great interest entomologically, but of the greatest to any ornithologist, harbouring as they do a more wonderful collection of bird life than it has ever been my luck to previously encounter. Secondly, the forest proper. And lastly, the forest edges, in which one must include the forest glades and the rough grazing areas around the villages. This last area is for the most part covered with coarse grasses and weeds that from March till September wear a garb of brown, and awaking with the spring rains burst into flower about November, and from then till the end of February are a blaze of every colour, and swarm with insect life. The forest proper is in its virginity, dense with the undergrowth of ages; but in the nearer parts, where the quebracho tree has been cleared and carted to the factories to extract the tannin, there are numerous tracks large and small, and much of the undergrowth has been burnt or cut away. None of the trees are large as forest trees go, the forest edge reminding one strongly of the outskirts of the New Forest.

It was my intention to give a list of the forest trees, but now that I have reached the point where it is necessary to do so I realise its impossibility in such notes as these. The list that lies before me contains the local names of no less than 125 trees, and this list includes only those that are useful for their woods. There are many hundreds of smaller bushes, and it is on these that the greater number of larvae will be found to feed. Most of the trees are hardwoods, and let it suffice to mention only those that are commonest. Everywhere one sees quebracho colorado (*Schinopsis lorentzii*, Engl.), quebracho blanco (*Aspidosperma quebracho*, Schlecht), Urunday (*A. austronium*, Esp.), Ibirapitá (*Pectophonium vogelianum*, Benth.), Algarrobo blanco (*Prosopis alba*, Gr.), Algarrobo macha (*P. prosopis*, Kunt.), Cedro (*Cedrela fesilas*,),

Espinillo blanco (*Acacia aroma*), Espina corona (*Gleditschia amorphoides*), Guayacan negro, and blanco (*Leguminosae*), and the fruit-bearing yellow and white laurel (*L. helioido* and *C. preta*), Nangapirú (*A. pitanga*). A few of the pink flowered Lapacho (*T. florescens*, Benth.), worth travelling far to see when in flower in late August. In the open plains the useless but shade giving Ombu (*Phytolacca dioica*, L.), and many species of *Acacia*. Most of the trees and bushes are spine-bearing, and the life of a net is short, to say nothing of the joys of chasing a coveted specimen through such undergrowth. One of the commonest bushes in the immediate neighbourhood of Villa Ana is a *Ramnacia*, Coronillo (*Scutia buxifolia*, Reiss.). A larva which I have not at the moment identified strips large quantities of the bush twice yearly. Amongst the cultivated trees are a few species of Conifers, and one or two imported English Oaks, the usual fruit trees and vines, and all the village streets are lined with Paraiso (*Melia azadirachta*, L.), a tree reminiscent of the East, whence it has been imported in large quantities. A species of Palm that I do not identify is found commonly round Tartagal and Golondrina, and locally elsewhere, and the gardens contain several species of ornamental palms. In writing this note on the trees I would add that my source of information for the generic and specific names has been limited to certain notes, for the reliability of which I cannot vouch.

Of the land and water flowers and grasses I will say nothing here. Their name is legion, and they must prove their entomological value before we can bother about them. Many are probably still unnamed, and without the possibilities of reference to works on Argentine Flora, and such books are few, I have many times to put "unknown" to the food-plant of an insect and await with patience the day I can clear up the mystery through some lucky reference to book or botanist. Another factor that should find brief reference in this introduction is weather. Spring officially commences on September 21st, Summer, December 21st, Autumn, March 21st, and Winter, June 21st. In effect one must consider Spring as commencing immediately after the September rains, when everything again takes on the green freshness that the comparative cold of winter has turned to brown.

Winter at this spot is fairly mild, with a few days of frost when the thermometer drops to possibly one or two degrees below freezing-point on the ground, and when the wind blows cold and biting from the south. In summer the temperature may rise to 110°F., but rarely goes above 104°F. There is a fairly distinct cyclic movement about the summer temperature. It rises gradually from day to day till it reaches a comparatively high level, and remains about this point for a day or two till a thunderstorm, more usually than not of terrific proportions, breaks, and with it the heat, which, falling probably to about the 80° mark again commences to climb till another storm comes to relieve us. I have recently started keeping certain meteorological records, whereby it will later be possible to say something about the average monthly temperature, rainfall, etc., figures that at the moment are pure guesswork. As for rain, in the time I have been in this spot very little has fallen, but October till January, or later, appear to be months of potential rainfall, whilst practically none falls in the winter months. Since the country is so flat the winds are often of great strength, with prevailing northerly or southerly direction. Winds

from the east or west seem, in my experience, to be uncommon. The relative humidity per cent. of the air varies very greatly and very rapidly, and I have readings from 20% to 90%, though readings below 30% are rare and appear only to occur in the dry winter season.

It should be added that all the insects mentioned in the following notes are forwarded to the British Natural History Museum at South Kensington, and there absorbed in the National Collection.

In concluding this introductory note I would like to place on record my sincere thanks to the Staff of the Entomological Section of the Natural History Museum for their unfailing and very real assistance in identifying the insects sent them, and for advice freely given. Only those cut off from all sources of reference to libraries or collections can realise how valuable this assistance proves, and when one knows, as the writer does, how busy these gentlemen are, the fact that they find time to do all this, gives one the greatest encouragement.

(To be continued.)

Remarks on the evolution of the *Zygaenae* and an attempt to analyse and classify the variations of *Z. lonicerae*, Scheven, and of *Z. trifolii*, Esp., and other subspecies. (With Plate VIII.)

By ROGER VERITY, M.D.

(Continued from p. 138.)

Z. transalpina and *Z. ephialtes*, with the oriental *dorycnii*, seem to constitute another little group, which has developed from a common ancestor more recently than the preceding ones, so that its species have not undergone the same amount of cold. The Alpine race of *transalpina* is probably the oldest, which separated from *dorycnii* as a catabolic offshoot; it spread westward all over the south of Europe, but its power of adaptation was limited, as in the case of the other less ancient species, so that increasing heat restricted it in Spain, to a few high mountains, whilst northward it attempted to spread, but it degenerated into weakly anabolic *astragali* and *occidentalis*; on the contrary in the warm coast climate of S. France and Italy it settled down into *maritima*, and other races, certainly anabolic, because they are very variable and sensitive to surroundings and bulky in structure, and localised to the particular spots that suit them; in the drier surroundings of mountains and of the hinterland the slimmer and less variable *intermedia* holds its ground by being more catabolic, and at high altitudes it degenerates into the dwarf *altitudinaria*. At the extreme southern limit of the species (S. Italy) overstimulation produces such an increase of the dark primary pattern that even the hindwing is often entirely darkened over, whilst in some localities the red secondary pattern is in many individuals so retarded that it only reaches the yellow degree of oxydation, a phenomenon not observed racially in any other *Zygaena*, except *ephiates*. On the contrary at the extreme northern limits of the species (N. France) the primary pattern is often very reduced by the depressing effect of cold, and the red spots spread into large patches. As to *ephiates* it stands apart from the rest of the genus by the nearly total obliteration of the secondary pattern in the large majority of its races; it resembles *larandulae* by the specific entire blackening of the hindwing and its

variations consist of a few very definite and distinct forms, which interbreed freely, but never, as a rule, produce transitions; they must thus be due to various definite hereditary factors constantly transmitted in the germ plasma, some dominant and some recessive, which probably appear or not in the soma, according to Mendelian laws, and according to the effect of surroundings. These facts and the features of the wing-pattern, recalling exactly those of the distant genus *Syntomis* suggest that the red forms *puucedani* and *athamanthae*, similar to *dorycnii* and to other *Zygaenae*, are the oldest of the species now living and originated by the Glacial Epoch, whilst the abnormal-looking forms with no secondary pattern are a comparatively recent reversion, due to the return of the temperate climate, to a type of pattern existing in the genus which turned during the Glacial Epoch into the *Zygaenae*.

The group consisting of *rhadamanthus* with *oxytropis* and *graslini*, and of *lavandulae*, is probably closely connected with *anthyllidis*; the latter would be the most catabolic of the lot, with longer antennae and very limited variability; the others are distinctly anabolic, by their structure, their restricted habitats and their variability, but *lavandulae* is less so than the others; one can presume that *anthyllidis* in an early cold period and the other species in a later warmer one were broadly spread, and that they are dwindling because they were highly specialised to certain conditions which are now failing; the facility with which *loniceræ* turns into *trifolii* justifies the assumption that *anthyllidis* may have turned into *rhadamanthus*, the parallelism being obvious in some respects.

To the *fraxini* and to the *carniolica* groups most of the remarks made about *achilleæ* apply perfectly; like it, they are specifically anabolic, so that they produce a vast amount of races and exerges, only they resist hotter and dryer climates and they exhibit no race with Glacial features. *Z. magiana*, an ally of *exulans*, may be a remnant of the ancestor of *carniolica* during the Glacial Epoch, but the impression one has is that this group has originated in a way more similar to the one I am suggesting for the following.

The *cambysea*, the *curieri* and the *fausta* groups differ from the rest of the *Zygaenae*, except *fraxini* and *carniolica*, by their clean-cut wing-pattern, evidently consisting in the "transverse pattern" only, recalling roughly the *Arctia* one and that of many tropical genera. They thus seem to have undergone the effects of the Glacial Period to a lesser degree than the others; this may have happened if they never spread to the regions where it was at its height and they kept to the southern portion of the territory it affected. North Africa was at one time like the north of Europe is now, and it must then have been richly populated with *Zygaenae*, which the drought has destroyed or driven northward. *Z. ignifera* and *Z. laeta* were probably at their best at that time and joined through Africa; now the former only survives as an isolated colony in Central Spain, whereas the rest of its group is all in W. Asia, and *laeta* has only pushed itself as far W. as Austria. *Z. fausta* and *hilaris* no doubt have also spread in Europe from Africa through Spain, and stop short at the Alps, like a large number of the Lepidoptera of African origin. According to this assumption these groups would be the nearest allies of the oldest *Zygaenae* which inhabited the Palaearctic region before the Glacial Period reached its climax, and then produced more highly specialised ones, characterised

by the development of the "nervular pattern," either in prevalence, as in the *purpuralis* and *scabiosae* groups, or in conjunction with a prevalent "transverse pattern" as in the others. The *curvieri* group would be most similar to the ancestors of the *purpuralis* one, the *fraxini* group to that of *achilleae*.

It must however be born in mind that the Glacial Period has not been continuous; palaeontologists have detected four Interglacial Periods of temperate climate and these complicate very much the interpretation of the distribution of species and exerges.

Let us now pass to the second part of the subject of this paper and analyse the geographical variations of the species in question, attempting to group them so as to show their relationships. The following synthetic table will, I think, help to visualise it.

The names enclosed in brackets are those of forms, which are not known to be predominant in any locality, so that they are not racial, like the rest.

In this Table the races, which are so exactly intermediate between *trifolii* and *loniceræ* that they cannot be ascribed to either, are placed in the middle under the name of Subspecies *transferens*, Vrty. From it diverges a series of three grades of *trifolii* structure to the left and a similar one of *loniceræ* structure to the right, so that from left to right one passes gradually from the most highly characterised *trifolii* to the most highly characterised *loniceræ*. The races I have grouped as Subspecies *palustris*, Obthr., *seriziati*, Obthr., and *trinacria*, Vrty., are, to my mind, on the whole a third line of variation, which probably also springs from the *transferens* subspecies, and which exhibits, broadly speaking, grades parallel to the two other lines and similar variations also in other respects than structure, so that their positions should be parallel to them on a different plane. As this cannot be materially shown on the single plane of the paper, I have endeavoured to do so by placing them below the other Subspecies and repeating the corresponding figures of the grades and the lettering of the transverse series. Very probably they constitute three lines of variations or Subspecies, parallel to the three others, but the last word on this point I leave to future investigation, when their early stages and other features have been worked out.

It will be noticed that in each line of variation, or Subspecies, the races, divided into grades from the point of view of structure, fall into very natural groups also from those of pattern and colouring and from that of geographical distribution: grade or group II. inhabits the south of Europe and Africa, grade III. inhabits central and northern Europe.

In each of the columns corresponding to a Grade or Group, as described above, I have placed the races so that, broadly speaking, the dark pattern increases, in the average of individuals, from the bottom to the top of the Table and the extent of the red one decreases in proportion. In Subsp. *trifolii* the range of variation is much broader in this respect than in *loniceræ* and their resemblance in the same horizontal line is only comparative. The following features are also worthy of notice and show that the various Groups vary to a certain extent in the same way.

In A: Wing pattern very variable individually and locally; tendency of red spots to be large and irregular in shape; in Subsp.

trifolii they are more or less confluent in the majority of individuals of some races and especially in the female sex; marginal band of hindwing usually narrow and often very much so.

In B: Very small size; racially mostly from the British Islands; produced on the Continent chiefly in the II. generation and in late emergences.

In C: Scaling rather thin; colouring not very saturated in tone and more or less of a crimson hue; spots of forewing confluent only in the females of *dupouchelliana* and then not more than in Esper's fig. 5 of *trifolii*; marginal band of hindwing less broad than in the other southern races, which follow.

In D: Scaling thick; colours saturated and bright; spots of forewing never confluent in either sex; marginal band of hindwing usually broad and in some cases very much so.

In E: In male, antennae very thick down to their roots; general build of insect heavy; spots of forewing very small; marginal band of hindwing very broad. In females, *loniceræ*-like features, contrasting with those of male and producing a very pronounced sexual dimorphism.

Having thus dealt in a general way with the characters of the Subspecies and with their presumable relationship let us examine in detail the races they produce and their variations.

(To be continued.)

***Elater rufipennis*, Stephens, a distinct Species. (Plate IX.)**

By H. DONISTHORPE, F.Z.S., F.E.S.

(Continued from page 142.)

155. "The Sacred Scarab."
Marvels of the Universe. 3. 98-102 (1911.)
156. "*Anisotoma algirica*, Rye, as a British Insect."
Ent. Rec. 23. 44 (1911.)
157. "Tutt as I knew him."
Ent. Rec. 23. 112 (1911.)
158. "*Mycetoporus forticornis*, Fauv., in the Oxford District."
Ent. Rec. 23. 24 (1911.)
159. "Notes on *Liodes brunnea*, Sturm., and *L. algirica*, Rye."
Ent. Mo. Mag. 47. 256 (1911.)
160. "*Anaspis hudsoni*, Donisthorpe, ♀ bred."
Ent. Rec. 23. 300 (1911.)
161. "*Lestera luctuosa*, Fauv., a species of Coleoptera new to Britain."
Ent. Rec. 23. 301 (1911.)
162. "Coleoptera in the Highlands in June, 1911."
Ent. Rec. 23. 309 (1911.)
163. "*Eryx fairmairei*, Reiche; a Beetle new to Britain."
Ent. Rec. 24. 1 (1912.)
164. "Coleoptera on the Isle of Eigg."
Ent. Rec. 24. 13 (1912.)
165. "*Catops montivagus*, Herr, a British Insect."
Ent. Rec. 24. 71 (1912.)
166. "New British *Proctotrupidae*."
Entom. 45. 100 (1912.)

167. "*Strophosomus curvipes*, Bedel., captured near Bournemouth in 1905."
Ent. Mo. Mag. **48**. 197 (1912.)
168. *The Coleoptera of the British Isles*. Supplement. with W. W. Fowler. Vol. **6**. 1-351 (1918.)
169. "*Neuraphes nigrescens*, Reitt., a species of Coleoptera new to Britain."
Ent. Rec. **25**. 191 (1913.)
170. "*Cis dentatus*, Mellie, not a British Insect."
Ent. Rec. **28**. 155-6 (1916.)
171. "*Psylliodes cyanoptera*, Ill., ab. *tricolor*, Weise, an aberration new to Britain; and some notes on the species as British."
Ent. Mo. Mag. **52**. 204 (1916.)
172. "The Water Beetles of Wood Walton Fen."
Ent. Rec. **29**. 52-54 (1917.)
173. "A few Notes on *Rhynchites*."
Ent. Mo. Mag. **53**. 85 (1917.)
174. "*Elater praeustus*, F."
Irish Naturalist, **27**. 99-100 (1917.)
175. "The Original Capture of *Hydrochus nitidicollis* in Britain."
Ent. Mo. Mag. **53**. 112 (1917.)
176. "A note on *Cryptocephalus bipunctatus*, L., etc."
Ent. Mo. Mag. **53**. 128 (1917.)
177. "Coleoptera in the Worthing District."
Ent. Rec. **29**. 226-28 (1917.)
178. "Ichneumons versus *Apanteles*."
Ent. Rec. **29**. 231 (1917.)
179. "Attitudes of Wasps and Psocids in copulation."
Ent. Rec. **29**. 231-32 (1917.)
180. "Dates and Record."
Ent. Rec. **29**. 235-36 (1917.)
181. "*Cryptophagus loevendali*, Ganglb. in Richmond Park."
Ent. Mo. Mag. **54**. 14-15 (1918.)
182. "Coleoptera at Barton Mills."
Ent. Rec. **30**. 28-29 (1918.)
183. "*Caenocara subglobosa*, Muls., a species of Coleoptera new to Britain."
Ent. Mo. Mag. **54**. 55-56 (1918.)
184. "*Elater sanguinolentus*, Schr., retaken on Wimbledon Common."
Ent. Rec. **30**. 105 (1918.)
185. "On the Subspecies and Aberrations of *Coccinella 11-punctata*, L."
Ent. Rec. **30**. 121-128, 1918 (with plate.)
186. "On Gynarchy in Coleoptera."
Ent. Mo. Mag. **44**. 225 (1918.)
187. "A Fortnight in the New Forest."
Ent. Rec. **30**. 170-73 (1918.)
188. "The Red Admiral (in Soho) in London."
Ent. Rec. **30**. 176 (1918.)
189. "Hereward Chune Dollman, F.E.S." Obituary.
Ent. Rec. **31**. 39-40 (1919.)
190. "Wasps attacking Flies."
Irish Naturalist, **28**. 107 (1919.)
191. "Further localities for *Platypus cylindrus*, F."
Ent. Mo. Mag. **55**. 232 (1919.)

192. "A New County Record for *Zeugophora flavicollis*, Marsh."
Ent. Rec. **31**. 185-6 (1919.)
193. "A few Entomological Notes from Putney, for 1919."
Ent. Rec. **32**. 37-8 (1920.)
194. "A new locality for *Dryophilus anobioides*, Cherr., and some other Coleoptera from Freckenham and Barton Mills."
Ent. Rec. **32**. 153-4 (1920.)
195. "*Platyrhinus latirostris*, F., near Bristol and its larva." With Plate.
Ent. Rec. **32**. 157-8 (1920.)
196. "*Epuraea bickhardi*, Dev., a British Insect."
Ent. Rec. **32**. 167 (1920.)
197. "*Tiresias serra*, F., and its larva."
Ent. Mo. Mag. **56**. 206-9 (1920.)
198. "The Phoresy of *Antherphagus*."
Ent. Rec. **32**. 181-7 (1906.)
199. "Coleoptera at Freckenham and Barton Mills again."
Ent. Rec. **32**. 199-100 (1920.)
200. "Distribution of British Beetles. Some Notes on Recent Extensions of Range," I.
The Vasculum, **6**. 32-7 (1920.)
201. "Distribution of British Beetles," II.
The Vasculum, **6**. 65-72 (1920.)
202. "*Bruchus rufipes*, Hbst., ab. *apicatus*, Rey., a British Insect with some notes on the Type-form, and other aberrations.
Ent. Mo. Mag. **57**. 31-34 (1921.)
203. "*Cionus woodi*, a species of Coleoptera new to Science; with a table, and some remarks on the British Species of *Cionus*."
Ent. Rec. **33**. 64-67 (1921.)
204. "Addendum and a Correction."
Ent. Rec. **33**. 76 (1921.)
205. "A New Record for *Eriosoma lanigerum*."
Ent. Rec. **33**. 77 (1921.)
206. "Entomological Notes from Putney, in 1920."
Ent. Rec. **33**. 116-118 (1921.)
207. "*Gymnetron squamicolle*, Reitter, a Beetle new to the Britannic List."
Irish Nat. **30**. 135 (1921.)
208. "*Baris scolopacea*, Germ., in Sussex."
Ent. Mo. Mag. **57**. 153 (1921.)
209. "Entomological Notes from Putney, 1921."
Ent. Rec. **34**. 94-95 (1922.)
210. "A few notes on Coleoptera in 1921."
Ent. Mo. Mag. **58**. 52-5 (1922.)
211. "*Nebria iberica*, Oliveira, a British Species."
Ent. Mo. Mag. **58**. 92-3 (1922.)
212. "*Aulonium ruficorne*, Ob., and *Hypophloeus fraxini*, Klug., two species of Coleoptera new to the British List." (With T. H. Beare.)
Ent. Mo. Mag. **58**. 193 (1922.)
213. "A few Days' Hunt for Coleoptera in the Forest of Dean." (With T. H. Beare.)
Ent. Mo. Mag. **58**. 194 (1922.)

214. "Notes on a few species of Diptera bred from the larval stage."
Ent. Rec. **34**. 189 (1922.)
215. "Some Casual Notes on Coleoptera in 1922."
Ent. Rec. **34**. 202-3 (1922.)
216. "Lepidoptera attacked by birds."
Ent. Rec. **34**. 219 (1922.)
217. "*Leptura rubra* in Norfolk."
Ent. Rec. **34**. 219-20 (1922.)
218. "Entomological notes from Putney for 1922."
Ent. Rec. **35**. 64-65 (1923.)
219. "The Rev. Canon W. W. Fowler." Obituary Notice.
Nature. (1923.)
220. "A Biology of the British Hemiptera-Heteroptera." By E. A. Butler. Review.
Ent. Rec. **35**. 103 (1923.)
221. "*Oxyptoda nigrocincta*, Rey., a species of Coleoptera new to the British List."
Ent. Mo. Mag. **60**. 198 (1924.)
222. "*Taphrorychus villifrons*, Duf., a species of Coleoptera new to the British List."
Ent. Rec. **36**. 118 (1924.)
223. "A Note on *Cionus woodi*, Donis."
Ent. Rec. **36**. 60 (1924.)
224. "*Euplectus decipiens*, Raffr., a species of Coleoptera new to the British List."
Ent. Rec. **36**. 150-51 (1924.)
225. "Entomology at Wembley."
Ent. Rec. **36**. 170 (1924.)
226. "*Priobium eichoffi*, Seidl., a species of Coleoptera new to Britain."
Ent. Mo. Mag. **61**. 11 (1925.)
227. "A Remarkable Flight of Insects at Light."
Ent. Mo. Mag. **61**. 162 (1925.)
228. "*Lissodema kirkae*, n.sp., a species of Coleoptera new to Science."
Ent. Rec. **37**. 106 (1925.)
229. "A few General Notes and Records of Coleoptera."
Ent. Rec. **37**. 115-116 (1925.)
230. "*Dryophthorus corticalis*, Pk., a genus and species of Coleoptera new to Britain."
Ent. Mo. Mag. **61**. 182 (1925.)
231. "*Smicronyx serripilosus*, Tourn., a species of Coleoptera new to the British List."
Ent. Mo. Mag. **61**. 196 (1925.)
232. "*Agrius sinuatus*, Ol., in Surrey."
Ent. Mo. Mag. **61**. 206 (1925.)
233. "*Cis coluber*, Ab., a species of Coleoptera new to Britain."
Ent. Mo. Mag. **61**. 197 (1925.)
234. "*Elater rufipennis*, Steph., a distinct species," with plate and a list of papers to date.
Ent. Rec. **37**. 124-138 (1925.)
235. "Insects in the nest of the Grey Squirrel."
Ent. Rec. **37**. 163 (1925.)

NOTES ON COLLECTING, etc.

SOME WARWICKSHIRE TENTHREDINIDAE. (Continued from p. 95).—
 TENTHREDININAE—NEMATINI.—*Cladius pectinicornis*, Fourc.—generally distributed. *Trichiocampus viminalis*, Fall.—Stoke, common. *T. ulmi*, L.—Stoke, 22.v.1919, H. Cooke; 12.v.1921. *T. radiatus*, Htg.—Bubbenhall, 25.iv.1920, ♂. Ryton, 4.vi.1922, ♂. Stoke, 30.vii.1923, ♂, ♂; 8. viii.1923, ♂, ♂, ♂, ♀; 12.viii.1923, ♀. *Priophorus padi*, L.—Stoke, common. *P. tener*, Zadd.—Stoke, 29.v.1919, ♀; 5.vi.1921, ♀; 16.vi.1921, ♀; 26.v.1923, ♂. Brandon 12.v.1921, ♀. var. *tristis*, Zadd.—Stoke, 29.v.1919, ♂; 16.vii.1921, ♀. Frankton, 4.vi.1922, ♀. *Hemichroa alni*, L.—Frankton, 4.vi.1922, ♀. *H. crocea*, Geoff.—Stoke, 20.v.1920, ♀. *Leptocerus luridiventris*, Fall.—*Coombe 1924. Rev. F. D. Morice. *Dincura stilata*, Klug.—Stoke, 2.vi.1923, ♀. *Euura ater*, Jur.—Stoke, 20.v.1918. *Pontania scotaspis*, Först.—Stoke, 28.iv.1921. *P. leucosticta*, Htg.—Coombe, 3.vi.1922. *P. proxima*, Lep. (*capreae*, L.)—Stoke, common. *P. salicis*, Christ. (*viminalis*, L.)—*Stoke, 12.ix.1923, ♂, ♀; 3.x.1923, ♀, ♀. *P. pedunculii*, Htg.—Stoke, common. *P. femoralis*, Cam.—*Ryton, 20.v.1924. *Pteronidea ribesii*, Scop.—Common. *P. pavidus*, Lep.—Stoke, 10.ix.1917; 21.v.1918; 27.v.1918; 20.viii.1920. *P. nigricornis*, Lep.—*Stoke, 7.viii.1919. *P. myosotidis*, F.—Bubbenhall, 2.ix.1917, ♀, H. Cooke. Stoke, 10.ix.1917, ♂, ♂, ♂, ♂. *P. tibialis*, Newm.—*Stoke, 17.x.1920, ♀; 12.iv.1921, ♀. *P. melanaspis*, Htg.—Stoke, 28.v.1917; 5.vi.1919; 9.vi.1919; 10.vi.1919, ♂, ♀. *P. curtispina*, Thms.—Stoke, 13.vii.1920, ♀, 31.vii.1920, ♂, ♂; 28.viii.1920, ♀. *Brinklow, 17.v.1920, ♀. *Coleshill 6.iv.1920, ♀, ♀; 26.v.1920, ♀. *P. oligospilus*, Först.—Bubbenhall, 14.iv.1920, ♀. Brinklow, 22.v.1921, ♀. Frankton, 7.vi.1923, ♀. *P. hypocanthus*, Först.—Stoke, 9.viii.1920, ♀; 15.viii.1920, ♀; *23.viii.1923, ♀. *P. polyspilus*, Först.—Stoke, 7.iv.1920, ♂. Coombe, 15.viii.1920, ♂. *P. virescens*, Htg.—Bubbenhall, 16.v.1921, ♀, F. Pepper. *P. flavescens*, Steph.—Wyken, 20.v.1924. *Amäuronematus vittatus*, Lep.—*Coombe, 26. iv. 1923, ♀. *Nematus* (*Croesus*) *septentrionalis*, L.—Bubbenhall, 6.iv.1920, ♂; *14.iv.1920, ♂; 17.iv.1920 ♂. Stretton 18.iv.1923, ♀. *N. latipes*, Vill.—Stoke, 1916, 1917, Ilastrop. *Bubbenhall, 3.v.1923, ♀, ♀. *Holcoconeme* (*Nematus*) *lucida*, Pz.—Bubbenhall, 15.iv.1923, ♂; 11.v.1919, ♂. *H. caeruleocarpa*, Htg.—*Coventry, 18.vii.1921, ♀. F. Pepper. *Pachynematus flaviventris*, Htg. (*diaphanus*, Evers.)—Binley, 2.viii.1916, ♂. *P. clitellatus*, Lep.—Wyken, 30.v.1920, ♀. Coombe, 15. viii. 1920, ♂. Allesley. 31.vii.1920, ♀. *P. obductus*, Htg.—Stoke, 2.vii. 1918, ♀. *Lygaonematus compressicornis*, F.—*Cubbington, 11.iv. 1920, ♂, ♂, ♀. *Bubbenhall, 27.iv.1923. *L. laricis*, Htg.—Coombe, 5.vi.1923, ♀. *Pristiphora crassicornis*, Htg.—Stoke 1916, ♀; 19.viii. 1923, ♂, ♂, ♂, ♂. Coleshill, 23.vi.1917, ♀. *P. pallidiventris*, Fall.—Stoke, 20.v.1917, ♂; 1.vii. 1917, ♂; 14.vii.1917, ♂. *P. viridana*, Knw.—Frankton, 17.vi.1923, ♀.

TENTHREDININAE—HOPLOCAMPINI.—*Phyllotoma aceris*, MacLachlan.—Coventry, Mr. J. J. Ward has bred it. *Caliroa aethiops*, F.—Stoke, 22.v.1919. Coombe, 10.vi.1923, ♂. *Hoplocampa testudinea*, Htg.—Stoke, 3.v.1921. *H. pectoralis*, Thms.—Stoke, 5.vi.1924.

TENTHREDININAE—BLENNOCAMPINI.—*Periclista melanocephala*, F.—*Coombe, 28.iv.1923, ♀. *Ardis bipunctata*, Kl.—Wyken, 5.vi.1922, ♀. *A. sulcata*, Can.—Brinklow, 18.v.1924. Stoke, 30.v.1924; 3.vi.1924. *Tomostethus fuliginosus*, Schr.—Binley, 4.viii.1916, ♂, ♂. Ryton, 5.viii.1917, ♀. Stoke, 17.vii.1920, ♂. Allesley, 31.vii.1920, ♂. Bubbenhall, 7.vi.1919, ♀. *T. luteiventris*, Kl.—Brandon, 17.vi.1917, ♀. Bubbenhall, i.viii.1918, ♀. Kenilworth, 3.vi.1923, ♀. *Monophadnus albipes*, Gmel.—Bubbenhall, 19.v.1918, ♀; 21.v.1918; 30.v.1918, ♀. Corley, 29.v.1920, ♀. Stoke, 1.iv.1921, ♀. Binley, 22.v.1922. *M. geniculatus*, Htg.—Bubbenhall, 5.v.1918, ♀. Coombe, 3.vi.1922, ♀. Ryton, 25.iv.1921, ♂; 6.vi.1922, ♀. *Fenusa dohrni*, Fischb.—Bubbenhall, 1.ix.1919, ♀. Stoke, 27.v.1922, ♀. *F. pumila*, Klug.—Frankton, 17.vi.1923, ♀. (*To be concluded*).—J. W. SAUNT, (A.L.S.), "Epperstone," Bull's Head Lane, Stoke, Coventry.

INSECTS IN THE NEST OF THE GREY SQUIRREL.—On October 14th I found a large nest in the hollow of a felled ash tree in Windsor Forest. It was made of long grass stems, etc., and was very bulky. Having carefully sorted it out and sieved it all, I took the following species of insects:—*Ceratophyllus wickhami*, Baker, abundant (this is the flea parasitic on the North American Grey Squirrel and its first record as being found in Britain): *Microglossa suturalis*, Sahl., *Homalium deplanatum*, Gyll., and *H. concinnum*, Marsh., in some numbers: *Dendrophilus punctatus*, Ill.; *Hister merdarius*, Hoff.; and the puparium of a Dipteron which Mr. Edwards was unable to identify. I am indebted to Mr. Waterston for the name of the flea. It is curious that it has not been taken in Britain before.—HORACE DONISTHORPE (F.Z.S., F.E.S.).

MANDUCA (ACHERONTIA) ATROPOS AT CHICHESTER.—A fine *Manduca* (*Acherontia*) *atropos* was taken here on May 25th of this year.—JOSEPH ANDERSON, Chichester.

CURRENT NOTES AND SHORT NOTICES.

The continued pressure of more important matter on our space has caused our Reports of Societies to get woefully behind, and we fear that, for a time at least, we shall have to either omit these altogether or to give a precis of the more important items contained in them only as "Current Notes."

There should be another record Exhibition of the South London Entomological Society on the evening of November 26th (Thursday). The Meeting this year will take the form of a *Conversazione*, and will commence at 6.30 p.m., the chair being taken by the President at 7 o'clock, when the exhibits will commence. It is particularly stated in the circular that "No exhibits will be passed round." Will all those intending to exhibit send in particulars of their exhibits and the space they wish allotted to them in good time, so that sufficient table space can be provided. This arrangement will be much more satisfactory

than in late years, as practically the whole time can be spent in viewing and discussing the exhibits.

It is announced that the "Genera Insectorum" instituted and conducted, with the aid of a Committee of experts, by Mr. P. Wytzman, who died in March, 1925, is to be continued at the same address.

The H.M. Stationery Office publishes each month a list of the free Lectures, Tours, and Special Exhibitions in all the chief Metropolitan Museums, with full particulars as to subjects, lectures, dates, times, etc. These take place on every day of the week, morning and afternoon, including Sundays. The price of the pamphlet is four pence (net).

S O C I E T I E S .

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

March 26th.—The President in the Chair.

Mr. A. Simmons, 42, Loughboro Road, W. Bridgford, Notts., and Mr. J. S. Taylor, 24, Winchester Avenue, N.W.6. were elected members.

Mr. H. Main exhibited the Coleoptera, *Drilus flavescens*, bred from a larva found in a snail-shell in September, 1924.

Messrs. A. A. W. Buckstone, A. E. Tonge, T. L. Grosvenor, S. Abbot, etc., melanic forms of British Lepidoptera, and Mr. O. R. Goodman, melanic forms of European Rhopalocera with dark forms produced by temperature treatment, to illustrate the paper read subsequently.

Mr. R. Adkin read a paper "Melanism," which he illustrated with a number of lantern-slides, and a considerable discussion took place.

April 9th.—The President in the Chair.

Mr. D. H. Kimmins, 16, Montrave Road, Penge, was elected a member.

Mr. A. A. W. Buckstone exhibited a series of a small race of *Urbicula comma* from Shere, a series from Mickleham with dark and more prominent markings and some extremely pale small examples from Horsley and Betchworth, probably due to a very dry season.

Mr. O. R. Goodman, long series of *Polyommatus thersites* from Digne.

Mr. K. G. Blair, a specimen of *Prodenia litura (littoralis)* reared from a larva found among tomatoes purchased at a fruiterers.

Mr. A. Moore, specimens of *Eumæus atala* received from his friend Mr. Blatchley in Florida, U.S.A., who while taking them had met Mr. G. B. Pearson, a fellow member of the S. London Society.

Mr. Grosvenor, nearly twenty species of Indian *Papilio* and remarked on the scarcity of females of most species compared with the males. The reverse was the case, however, with the species of the *Ornithoptera* section.

Subscriptions for Vol. XXXVII. (new series), 10 shillings, should be sent to Mr. H. W. Andrews, Hon. Treasurer, "Woodside," Victoria Road, Eltham, S.E. 9.

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Duplicates.—The splendid Hamburg melanism Pal. or albingensis. Finest condition only.—Dr. V. Schultz, Soltau (Hann.), Germany.

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Duplicates.—British butterflies and moths and good vars. or cash.—W. G. Pether, "Thelma," 4, Willow Bridge Road, London, N.I.

Duplicates.—Several hundred species of Coleoptera (carded) from Hunts and Dorset, including several rare species from the New Forest, etc.

Desiderata.—Scarce and local British Coleoptera (carded).—A. Ford, 42, Irving Road, Bournemouth, Hants.

Desiderata.—The Leicester Museum has no British Diptera and requires a typical collection. Can any collectors help us? We offer European Butterflies in exchange.—"Entomologist," Leicester Museum.

MEETINGS OF SOCIETIES.

Entomological Society of London.—41, Queen's Gate, South Kensington, S.W. 7. 8 p.m. November 18th. December 2nd.

The South London Entomological and Natural History Society, Hibernia Chambers, London Bridge. Second and Fourth Thursdays in the month, at 7 p.m. September 24th, Exhibition of Orders other than Lepidoptera. November 26th, Annual Exhibition at 7 p.m. December 10th, Paper, Dr. A. B. Rendle, F.R.S., "Pitcher Plants," with lantern.—Hon. Sec., Stanley Edwards, 15, St. German's Place, Blackheath, S.E.3.

The London Natural History Society (the amalgamation of the City of London Entomological and Natural History Society and the North London Natural History Society) now meets in Hall 40, Winchester House, Old Broad Street E.C. 2, first and third Tuesdays in the month, at 6.30 p.m. Visitors welcomed. Hon. Sec., W. E. GLEGG, F.Z.S., The House, Abion Brewery, Whitechapel Road, E.1.

CHANGES OF ADDRESS.—J. W. Saunt, A.L.S., to "Epperstone," Bull's Head Lane, Stoke, Coventry.

S. G. Castle-Russell to "The Elms," Eastrop, Basingstoke.

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to H. J. TURNER, 98, Drakefell Road, New Cross, London, S.E.14

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

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

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All communications should be addressed to the Acting Editor, H. J. TURNER, 98, Drakefell Road, New Cross, London, S.E.14.

IMPORTANT TO ENTOMOLOGICAL SOCIETIES and MUSEUMS.

BACK VOLUMES OF

The Entomologist's Record and Journal of Variation.

(Vols. I-XXXV.)

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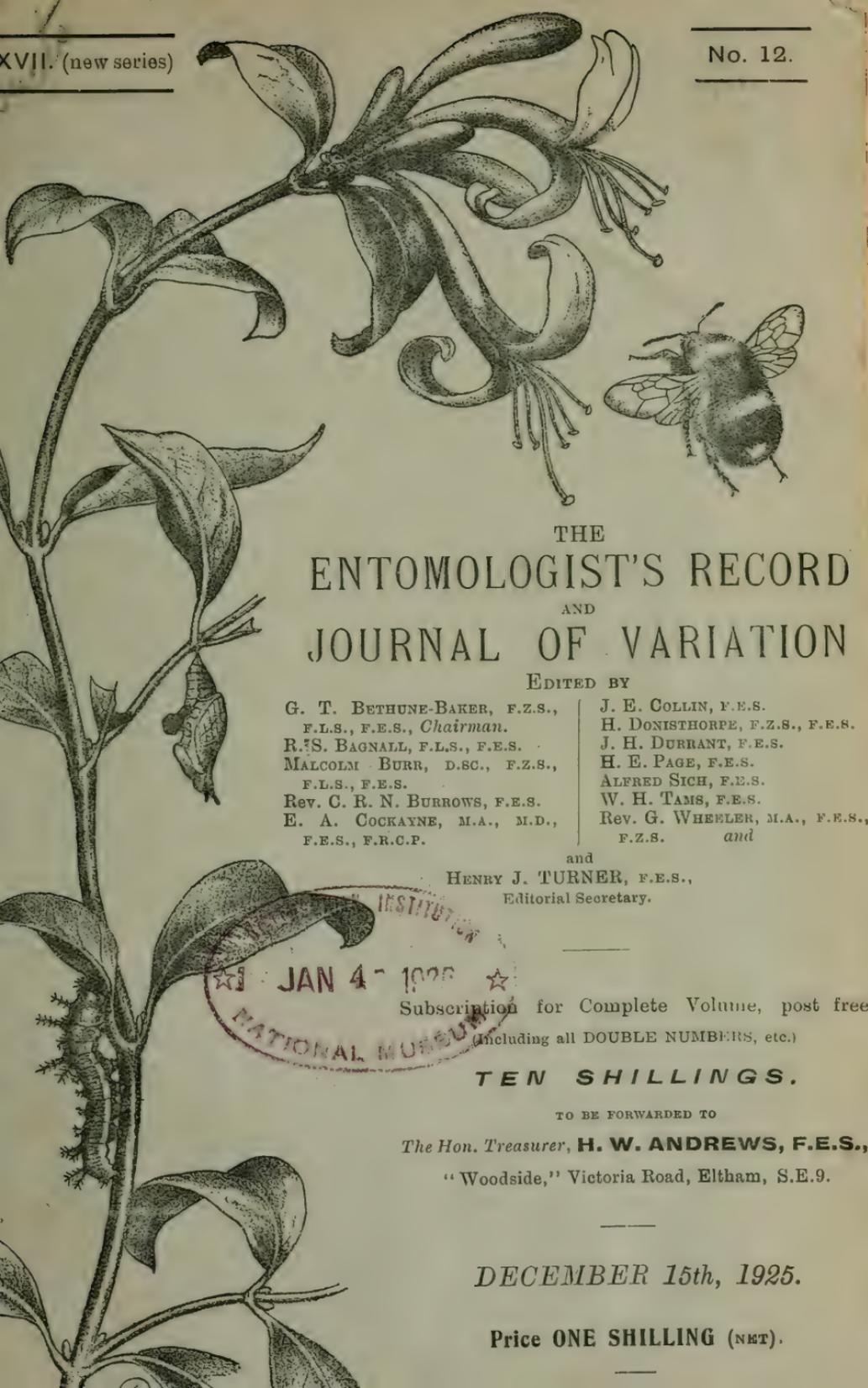
GENUS *Acronycta* and its allies.—Variation of *Smerinthus tiliae*, 3 coloured plates—Differentiation of *Melitaea athalia*, *parthenie*, and *aurelia*—The Doubleday collection—Panogenesis—Paper on *Taeniocampidae*—Phylloxera—Practical Hints (many)—Llel Variation in Coleoptera—Origin of *Argymis paphia* var. *valesina*—Work for the ter—Temperature and Variation—Synonymic notes—Retrospect of a Lepidopterist 1890—Lifehistories of *Agrotis pyrophila*, *Epunda lichenea*, *Heliophobus hispidus*—ures at light—Aberdeenshire notes, etc., etc., 360 pp.

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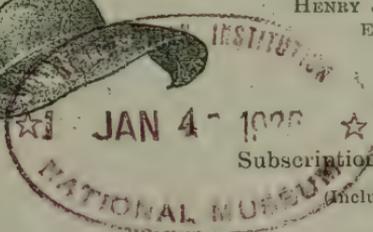
THE
 ENTOMOLOGIST'S RECORD
 AND
 JOURNAL OF VARIATION

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Two new Cicindelinae from Ceylon.

Described by Dr. WALTHER HORN, Berlin-Dahlem.

Collyris planifrontoides (n.sp.).

C. planifrons m. affinis differt labro longiore; fronte antica mediaque latiore; pronoto longiore, parte crassiore postica fere eadem, sed parte attenuata anteriore longiore et plerumque in forma colli angusti angustata; ultimo palporum maxillarium maris articulo paullo minus dilatato. Colore valde differente: corpore supra sub-tusque cyanescens nigrescente; 2 primis antennarum articulis pedibusque obscure metallescentibus; 8 ultimis antennarum articulis testaceis hinc inde brunnescentibus; 4 tibiis anterioribus plerumque maxima ex parte brunnescentibus; elytris sine vestigio fasciae medianae.—Long. $8\frac{1}{2}$ - $9\frac{1}{4}$ mm. (sine labro).

1 ♂ ♀, Anuradhapura 7.XII.1916; 1 ♀, Wellawaya XI.1905.

The flat excavation of the front between the eyes at once distinguishes this new species from *C. subtilis*, Chd., *linearis*, Schm.-G., *parvula*, Chd., *variitarsis*, Chd., etc. Anterior part of the frons between the eyes slightly carinate, posterior almost flat. The last joint of the maxillary palpi of ♀ is almost cylindrical, of ♂ largely dilated to the distal (apical) end, as in *C. planifrons*. The anterior part of the pronotum is generally very distinctly attenuated, but one female shows the whole pronotum almost conical (though equally as long as in the other females). The posterior lateral angle of the elytra is broadly rounded (♂ ♀); punctuation of elytra about like that of *C. parvula*, Chd., and subsp. *maindroni* (only perhaps a little less confluent); the meta-episterna are glabrous. The 2 dental processes at the posterior border of the 7th abdominal sternite of ♀ are parallel and separated one from the other.

Of *C. planifrons*, m., I only now know the antennae and hind tarsi of the male: the first 6 segments of its antennae are mostly yellowish and the first 3 segments of the hind tarsus are yellow, the last 2 being blackish.

Cicindela henryi (n.sp.).

Inter *C. dormeri*, m. et *waterhousei*, m.; differt (♂ ♀) ab illo (♂ ♀) statura magis elongata (fere ut in hac specie); pronoto longiore; elytrorum humeris (praecipue ♀) speculoque discoidali ♀ minus nitentibus (fere opacis speculoque interdum deficiente), margine (praesertim ♀) angustius laete-colorato, apice paullo longius angustato, sutura opaca, disco minus velutino, macula media perparum magis antice lateraliterque posita; meta-episternis abdomineque (hujus disco sparsim) piloso.—♂ differt a *C. waterhousei* ♂ labro obscure aeneo; maxima pronoti latitudine nec pone medium nec ante basim collocata; antennis brevioribus; mandibulis et praecipue dente ante-apicali forma ordinaria (nec deformata!).—♀ differt a *C. waterhousei* ♀ et *C. wileyi* ♀ labro aeneo obscuro; pronoto in medio et postice angustiore (magis parallelo); elytrorum humeris speculoque discoidali subopacis; a *C. waterhousei* ♀ extremo elytrorum apice minus late rotundato; a *C. wileyi* ♀ extremo elytrorum apice minus arcuato-prolongato spinaque brevioribus.—Long. 8-9 mm. (sine labro).

1 ♂, 2 ♀, Horawupotana 8-14.X.1924.

Unlike *C. dormeri*, m., etc., the humeral and marginal areas of the elytra are not of a lighter colour or more shining in the ♀ than in the

DECEMBER 15TH, 1925.

♂, both sexes having the shoulder and margin semi-opaque; there is at the shoulder only a kind of a lighter metallic maculation, as in *C. viridilabris* subsp. *labroaenea*, m. At the moment I do not know the male of *C. wileyi*. The male of the new species differs from the female, outside of the usual sexual differences, almost only in having the elytra slightly more tapering at the apex and slightly more dilated in the middle.

The two new species were (except the ♀ of *Collyris planifrontoides* from Wellawaya) in a small lot of Ceylanese *Cicindelinae* sent by Mr. G. M. Henry for identification to Dr. G. A. K. Marshall, who has forwarded them to me. As there are also some other interesting species with exact localities in this small collection, I give here the recorded data:

I. There are from Woodside (Urugalla): *Collyris plicatocollis*, Chd. (12-28.IV.).—*Collyris punctatella*, m. (19.IV.).—*Collyris planifrons*, m. (13.IV.).—*Derocrania gibbiceps*, Chd. (21.IV.).—*Derocrania nietneri*, Mtseb., (9-19.IV. and 16.IX.).—*Derocrania concinna*, Chd. (4.IV. and 19.IX.).—*Derocrania scitiscabra*, Walk. (21-26.IV.).

II. There are from Horawupotana (Horowapotam): *Tricondyla coriacea*, Chd. (11-13.X.).—*Derocrania scitiscabra*, Walk. (14-16.X.).—*Cicindela viridilabris* race *labroaenea*, m. (14.X.).—*Cicindela corticata*, Putz. (8-17.X.).

III. From single localities are: *Collyris saundersi* race *lactior*, m., from Deniyaya (19.IX.) and from Anuradhapura (9.XII.).—*Derocrania concinna*, Chd. from Lady Horton (29.VII.).—*Derocrania scitiscabra* from Badulla (14.IV.).—*Cicindela lacunosa* race *lacticolor*, m., from Trincomalee (8.X.).—*Cicindela sumatrensis* from Colombo (26.X., at light).—*Cicindela dormeri*, m., from Lady Horton (25.VII.).—*Cicindela distinguenda* race *lunatula*, m., from Elephant Pass (2.I.).

Two Species of Staphylinidae (Coleoptera) new to Britain.

By HORACE DONISTHORPE, F.Z.S., F.E.S., etc.

Phloeopora teres, Gr. (*corticalis*, Er., nec Gr.)

Phloeopora teres, Gravenhorst. *Coleoptera Microptera. Brunsvicensia* 79 (1802).

"*Aleochara teres*, gracilis, nitidissima, nigerrima, elytiis piceis centibus; pedibus testaceis."

This species differs from the *corticalis*, Gr., which is on the British list, in that the fine hairs on the thorax are directed from the apex to the base throughout; whereas in the former insect the hairs are directed outwards in part. Both species have the head and thorax shining, which separates them from the rest of the genus.

I am indebted to Dr. M. Cameron for the name.

I captured one specimen under oak bark in Windsor Forest on July 9th, 1925; and a second on October 14th, 1925.

The insect appears to be rare in Germany.

It seems probable that this beetle will be found mixed in British collections under *P. corticalis*, Gr.

Aleochara crassicornis, Lac.

A. crassicornis, Lacordaire, *Faune Entomologique des Environs de Paris* 1 531 (1835).

When hunting for beetles in decayed fungi in Windsor Forest on October 1st, 1925, I captured an *Aleochara* with red elytra superficially like a small *A. fuscipes*, Gr. As I was unable to name it, I sent it to Major Sainte Claire Deville, who has now returned it to me as *A. crassicornis*, Lac., a species which has not been taken in Britain before. The European catalogue gives Europe for its distribution, and Reitter says it is not rare in Germany.

In the former work it is placed in the subgenus *Aleochara* and next to *A. curtula*, Goeze (= *fuscipes*, Gr.); but in the latter it is considered to belong to the subgenus *Polychara*.

Sale of the Harpur-Crewe Collection.

By S. G. CASTLE-RUSSELL, F.E.S.

The first portion of this collection formed by the late Sir Vauncey Harpur-Crewe during the last 55 years, was offered for sale on October 25th last. Before the lots were offered Mr. Clive Stevens made some graceful references with regard to the relations between his father, the late Mr. Henry Stevens, and the buyers, and expressed the hope that these pleasant relations would continue, now that he had taken the vacant place in the rostrum. The writer has attended the sales for many years past, and cannot recall a single incident that indicated the least friction between Mr. Stevens and his clients, who invariably accorded him the greatest consideration and personal regard, and it will be some time before we become accustomed to his absence. It was undoubtedly a compliment to us all that he, the head of the Firm, almost invariably conducted the sales, for it must be realised that they are not, owing to the limited values obtained, of the most profitable nature. Mr. Stevens may rest assured, that his late father was highly appreciated by us all, and will always be remembered with feelings of pleasure.

Many well known Entomologists attended the sale. As the Auctioneer pointed out, this sale varied from the general run, inasmuch as no series of types were included, and the majority of the insects consisted of aberrations. It also differed in the way it was arranged, as instead of being in Cabinets, the insects, Butterflies and Moths of various species were contained in store boxes and no attempt whatever had been made to classify and arrange them.

It is impossible to deal separately with each lot and I will endeavour to select those that excited the most interest.

Lot

10. A fine *Dryas paphia* var. with spots united in pairs, in good condition, realised £4 10s.
14. An *Apatura iris* male, without white bands, fine condition, but without label, brought £1 15s., the poor price being due to the want of data.
16. A really nice *Euchloë cardamines* var. with only the middle half of the orange tips, made £7 10s.
19. Three striking vars of *D. paphia* and two nearly black *Limenitis sibilla* all in poor condition fetched £4.

The next dozen lots consisting of good moths and vars. of the same, realising each from 8s. to 16s.

30. A damaged, but very striking var. of *Argynnis aglaia* was bought for £2.
Bred *Manduca atropos* averaged 5s. each and *Laelia coenosa* 20s. per pair.
42. A *L. sibilla* var. with bands obscured, in good condition, was cheap at 18s. and the lot also contained some good things in the moth line.
50. Eight *Phibalapteryx polygrammata*—Vaughan coll., brought £2 5s.
51. Five *Aegeria scoliaeformis*, 24s.
60. *Aphantopus hyperantus* var. *lanccolata*, in fine condition, brought the very good price of £3.
- 72, 73 and 74. Three *Vanessa io* without ocelli 18s., 21s. and £4.
Vars. of *Aglais urticae* fetched in lots 8s., 60s., 5s., 37s. 6d. and 10s.
84. A nice *Pontia daplidice*—Folkestone, 1903, £1 12s. 6d.
89. A white var. of *Epinephela tithonus* in rather poor condition, 9s.
91. A black form of *Adscita statices*, 10s.
- 92 & 93. *Hylophila bicolorana* without silver lines and a fine black var. of *Palimpsestis or*, 16s.
96. 3 hybrid *zonaria-hirtaria*, 5s.
97. 3 hybrid *hirtaria-zonaria*, 10s.
111. A var. of *Abraxas grossulariata* figured in the *Entomologist's Record*, Vol. IV., p. 149—B. T. Hodges, £5.
136. A whitish var. of *Thevetra porcellus*, 50s.
- 141 & 142. 2 *Crymodes exulis* (*assimilis*), 27s. 6d. and 20s. each.
144. *Catocala electa*—Brighton, £3 5s.
146. A fine var. of *Pyramcis atalanta* with broad red band on forewings, £2 7s. 6d.
147. A rich brown var. of *Coenonympha pamphilus* and one pale buff, 18s.
151. *Lymantria dispar*, gynandromorph, L. side ♂, R. side ♀, 10s.
152. A var. of *Chrysophanus dispar* with black streak in right forewing, C. A. Sladen Coll., £10.
154. *Arctia caja*—forewings brown—hindwings deep yellow, New Forest, 1898, £11.
172. *Dryas paphia*—Male richly marked with black, £5 10s. Female, ditto, New Forest, 1901, £6 10s.
174. This lot was one of the prizes in the Collection. A *D. paphia* gynandromorph being ab. *valezina* on right side, ordinary male on left side—in good condition. A first and only bid of £15 was made and accepted. It was from the W. F. Urwick Collection when it was sold for £13. The writer knows of four other similar specimens.
189. A beautiful light var. of *Melanargia galathea* in prime condition, in the writer's view the gem of the collection, made £12 5s.
190. A var. of *P. atalanta* figured in the *Entomologist*, August, 1878, from the Stevens' Collection. £10.
191. *Colias edusa*, left side ♂, right ♀. in good condition, Steven's Collection, went cheaply for £5.
192. *M. galathea*, figured in the *Entomologist*, IX., p. 193, 35s.
194. *M. galathea*, dark var., and *V. io* without ocelli on hindwings, £1 12s. 6d. *V. io* without ocelli have collapsed from the high

prices formerly obtained owing to the many forms produced by temperature experiments.

197. *E. jurtina*, ♀, a fine white var. bred, with pupa-case, £9.
198. *T. quercus*, right side ♂, left ♀, 10s., a cheap lot.
199. *Pararge negea*, ♂, very light—dark markings obsolete, Steven's Collection, seemed overvalued at £5 10s.—but vars. of this species are rare.
206. A black var. *L. sibilla* in fair condition, 35s.
210. A dark ♂ *D. paphia*, £2 10s.
211. A dark ♂ *D. paphia*, with small spots, £2 10s.
212. A richly marked ditto ♀, £6 15s.
222. A *Gonepteryx rhamni*, with white hindwings, 50s.
225. A very pale male *Euchloa cardamines*, Bond and Webb collections, £3 5s.
226. A remarkable underside *P. atalanta*, Dover-Webb coll., £4 10s.
229. A cream coloured *Brenthis selene*, £2 5s.
238. *Plusia festucae* with united silver spots, and a fine black var. of *P. gamma* with others, 28s.
257. *A. caja* with dark forewings and black blotches and streaks on golden hindwings, £2.
- 260-271. Beautiful varieties of *A. grossulariata*. 10s., 14s., and 20s. each.
272. *C. hyale* var. figured by Barrett—T. E. Robson coll., £2 5s.
274. *Polyommatus icarus* underside var., Robson coll., £6.
284. A pale var. of *C. nupta*—Tutt coll., £2 5s.
285. *C. sponsa*, £2 5s.
304. Haworth's specimen of *C. chryseis* ♂, £2 5s.
305. Haworth's specimen of *Heodes virgaureae*, ♂ and ♀, £2 7s. 6d.
315. *G. rhamni*—Gynandromorph. New Forest, 1883, £2 10s.
316. *C. edusa*—forewings ab. *helice*, Brigg's coll., £3.
317. *Argynnis niobe*—New Forest, 1868, *Entomologist*, IV., p. 351, and XXIX., p. 192., £3 5s.
318. *P. adonis*=*thetis* black var., Folkestone, 1892, W. J. Austin, £5.
323. *E. tithonus*—white var. chipped, £1 10s.
325. *G. rhamni*—left ♂ right ♀, H. Goss, £4.
326. *D. paphia*, male var.—streaked, £4 5s.
327. A very pretty *B. selene* var. in fine condition. Goss, H. Sussex, striated on margins of all upperside wings with absence of spots in middle areas, £3 15s.
328. A beautiful *M. cinxia*, underside perfect, H. Goss, Isle of Wight, £2 10s.
329. *Zygæna filipendulæ* v. *chrysanthemi*, New Forest, 1890, H. Goss, £2 5s.
330. *Adopæa actæon* gynandromorph with lot 331, including *Ophiodes lunaris*, Norwich, F. D. Wheeler, 20/5/78, 22s.
332. *C. dispar* ♂ repaired, £1 15s.
333. *C. dispar* ♂, £5 5s.
366. Hybrid *neustria* × *castrensis*, 12s.
338. *M. galathea* with left hindwing duplicated, 50s.
348. *A. caja*, forewings entirely cream, Waterhouse coll., £9 10s.
349. *A. hyperantus* ab. *obsoleta*, a perfect specimen entirely spotless and and a *Urapteryx sambucaria* var. went cheaply for 8s.
357. A nice *Rumicia phlaeas* var. with streaked upper wings fig. *Entomologist*, V. 19, p. 191, I. A. Cooper coll., £5 15s.

369. A remarkable dark var. of *B. phlaeas*, C. G. Barrett, £10 10s.
 373. *Callinorpha dominula*—black var., Burney coll., £5 5s.
 344. *C. dispar*, male, large and perfect, Burney coll., £11.
 375. do. female £11.
 376. do. male var., left forewing shaded golden, F. O. Morris coll., £10.
 377. *C. dispar*, female var., fig. Morris, £5.
 378. *Polygona e-album* var., Farn. coll., fig. Frohawk, £3 15s.
 383. *E. cardamines* var., streaked orange on underside, Mason Coll., £2 5s.
 397. *A. aglaia* dark var., nearly all black, £1 12s. (damaged).
 400-401. Three bred vars. of *A. urticae* and a *B. selene* var. chocolate brown, £4 10s.

The total of the Sale realised roughly a little under £500 which did not come up to expectations; very many of the specimens, however, were in poor condition. The remaining portion of the Collection will be sold on November 24th, when the well known and much figured wholly black and wholly white vars. of *M. galathea* will be offered.

Two Myrmecological Notes.

By W. C. CRAWLEY, B.A., F.E.S.

I. SOUTH AMERICAN ANTS IMPORTED INTO ENGLAND. — Among some ants kindly sent me by Mr. H. Britten were the following:—

Holcoponera striatula, Mayr., var. *obscura*, Em., ♂.
Brachymyrmex heeri, For., var. *aphidicola*, For., ♂.

Both these species were found by Mr. H. Britten, Jun., in a hot-house at York, the former on August 19th, and the latter on October 19th this year.

II. FURTHER LIGHT ON TEMPORARY SOCIAL PARASITISM IN THE GENUS *LASIUS*. — Although it is well established that the ♀♀ of the *umbratus* group found new colonies by the aid of ♂♂ of the *niger* group, there is one point that has not been cleared up. Two years after the acceptance of a ♀ by the host workers, the eggs laid by the ♀ come to maturity. There is therefore a period (which, considering the long life of ants of this genus, should last more than a year) during which the colony consists of more or less equal numbers of both species. Nevertheless it is a rarity to find such colonies in nature. A possible explanation has occurred to me from the behaviour of the host species in one or two instances. In the very first case observed (1896-1900) it was significant that when the colony died, owing to the nest having become too dry, not a sign of any of the host ♂♂ could be found, though when last seen by me there were several hundreds, but there were hundreds of dead ♂♂ of the parasite species. One may rule out the possibility that the pugnacious *L. niger* ♂♂ had been devoured by the timid *umbratus*, and even if this had been possible, there would have been traces left. On the other hand the nest was in a box from which it was possible for ants to escape. In September, 1923, I picked up in a Kensington street a dealated ♀ of *L. umbratus*. This ant carried a dead ♂ of the host species, which she kneaded in the usual

way to obtain the odour of that species. I succeeded in getting her accepted by a colony of *L. niger* s.sp. *alienus*, and this summer the first *umbratus* ♂ ♂ hatched. The nest contained at least 300 ♂ ♂ of *alienus*, and until the *umbratus* ♂ ♂ numbered about 50 they carried on as before. Then, however, they began to become restless, found a crevice from which they could escape from the box, wandered long distances and seldom returned. By September there was only about a dozen left, and I removed the nest to a box from which they could not escape. Nevertheless they continued wandering about the box outside the nest until the cold weather drove them in, when they associated with the *umbratus* as formerly.

The habits of host species undergo certain changes owing to the presence of the parasite (*e.g.*, the killing of their own ♀ ♀ and ♂ ♂ by *Tetramorium caespitum*, when they have accepted a ♀ of *Anergates atratulus*, and I have observed something similar in *Lasius*), and, though further observation is required, I suggest that it is possible that in nature the host ♂ ♂ desert the nest as soon as the parasitic ♂ ♂ reach sufficient numbers to carry on without them.

Acalla reticulata, Ström.=contaminana, Hüb.—Its History and its Variation.

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

(Continued from vol. xxii., page 96.)

[NOTE.—This article was written and commenced publishing when there was a dearth of matter some five years ago. Matter coming in freely, its publication was suspended and forgotten (although in type).—Hy.J.T.]

It is thought that the following description relates to a form of *contaminana*. H.S. definitely says it is the *ciliana*, Hüb. and the opinion of such an authority must be considered.

Zetterstedt. *Tortrix cinereana*. Zett. *Ins. Lap.*, p. 978 [1840].

“Alis anticis griseo-cinereis, atomis fuscis, fascia obliqua maculaque costali pone medium, hepaticis; posticis cinereis. ♀.”

“♀ *Simillima larrigana*, Treit., seu *variana*, Fabr., sed alarum fascia media obscura determinatori, et alis posticis totis cinereis, nec dimidiatim flavis, ab illa distincta.”

“A *T. dumetana*, Fischer, *Micro.*, 4, p. 35, pl. 20, fig. 4, cui etiam valde similis, fascia alarum anticarum media in medio, nec antice, coarctata, fascia basali nulla, et alis posticis cinereis, nec griseis, facile dignota. Fascia media hepatica in medio ita coarctata est, ut cum macula costali quasi 3 maculas in triangulum depositas formet.”

However, Wocke (*Stettiner v. Zeit.*, 1862, p. 45), after seeing a specimen of this Lapland insect determined by Prof. Boheman as *cinereana*, Zett., does not even mention *contaminana* as an ally. Both these authorities must have been quite conversant with the *contaminana* forms and would undoubtedly have mentioned them in this connection were there any similarities, especially would Wocke have noted the sharp curved apex had there been one in *cinereana*. Staudinger (Wocke) gives *cinereana* (mis-spelt *cinerana*) as a good species in the genus *Dichelia*, *Cat.*, ed. III., 1901.

Westwood and Humphreys. *Brit. Moths*, p. 166, pl. 97, figs. 7-9. [1849.]

Figures very fair considering. The three forms. Very general, not clear enough to show the "spot."

Teras contaminana. Her. Schäf., *Sys. Bearb.*, iv., 153. [1849.]

Of Hüb., fig. 142, H.S. says, "Forewing too stumpy, marginal line not brought out."

Of Dup., fig. 244. 10, he says "Good."

Of Wood, figs. 1107-1109, he says "Recognisable."

"Outer half of the fringe white, at least for a moderate distance from the apex. Intermediates of both varieties are uncommon. I have them of both in the two sexes."

"Var. 1. Ochre yellow with rust yellow or violet brown markings which unite into a band, which starts from the middle of the costa and tends towards the anal angle, then a spot on the costa before the apex of the wing, which by union with the former mostly encloses a bright spot on the costa and then often forms a broad band extending to the inner margin. The rest of the forewings reticulated with dark. Hindwings pale yellow grey."

ciliana, Hüb. 171. of which H.-S. says is a "bad" figure of this form. "The wing is too long."

"Var. 2. Violet brown, only the costa rust yellow, interrupted by the dark ends of the nervures."

dimidiana. Froel. 27. H.-S. says Hüb. figs. 299-300 are "good."

The synonymy in Herrich Schaeffer is as follows:—*Teras contaminana*, Hüb. 142. Her. Schäf., *Sys. Bearb.*, Synonymie List, iv. 10. [1856?] = *ameriana*, W.V. = *centrana*, Fab.

var. *ciliana*, Hüb. 171. = *cinereana*, Zett., *Ins. Lap.*, 978.

var. *dimidiana*, Froel. Hüb. 299, 300. = *rhommana*, Wood. 1109. = *rosana*, W.V.

H.S., *Sys. Bearb.*, vol. vi., pl. 7, fig. 25. = Enlarged fig. of antenna joints. [1856.]

Lederer. *Teras (Peronea) contaminana*. Led. *Class. Eur. Tort.*, (Wien. Ent. Mon.) [1859.] = *centrana*, Fab., *Ent. Sys.*, no. 133?

var. *ciliana*, Hüb. 171. = Treit. x. (3), p. 260.

var. *dimidiana*, Hüb., 299-300. (non Tr.)*

Wilkinson. *British Tortrices* [1859], p. 150. Treats of *Dict. contaminana* recognising *ciliana* and *rhommana* as varieties. He is the first to note the following characters of the species—Head: slightly ochreous, or dusky yellow. Face: some colour, slightly darker. Eyes: intense purple-brown, with a velvety appearance. Palpi: above and at the sides pale ferruginous, beneath straw coloured at base, pale ferruginous at apex. Antennae: fuscous, with the basal and a few succeeding joints above ferruginous, basal joint beneath straw coloured. Thorax and patagia: pale ochreous, with ferruginous tint; the former with a simple carinated crest on the vertex. Reticulation: following the venation of the wing. Tufts: in fine specimens a few whitish minute tufts of elevated scales in the centre of the wing (*Cf.* Froel. *En. Tort. Wirt.*). Basal streak: angulated in the middle.

[* *domesticana* ? H.-S.]

The nearest approach to a description of the peculiar form mentioned by Mr. A. Sieh, *Ent. Record*, vol. xxix., p. 69, is given by Stainton in the *Manual* in form (3), below.

Stainton. *Dictyopteryx contaminana*. *Stain. Manual*, vol. ii., p. 227. [1859.]

The three following forms are given without names attached.

"Very variable."

"(1) Forewing straw colour, reticulated with brown, with a broad brown costal fascia uniting with the costal spot and forming a Y like mark.

"(2) or the forewings are reddish ochreous, reticulated with reddish brown, with the central fascia and the central spot indistinctly darker.

"(3) or the forewings are reddish ochreous, with a black spot on the fold near the base, and a large black cloud on the inner margin near the middle."

Herrich-Schaeffer. *Teras contaminana*. *H.-S. Corr.-blatt*, vol. i., p. 39. [1860.]

"The *fulviana* of the W.F. belongs along with *rosana* to *contaminana*."

There is nothing in the W.F. to indicate this remark, but H.S. no doubt based his note upon the specimen in the Schiffermuller collection to which he had access. The W.F. says, p. 128: "6. *Tortrices ferruginæ*. On *Lonicerae periclymeni*. Specklilien W."

Tengström. *Lep. Fn. Fenn.*, p. 329 [1869], includes *Teras contaminana* in his Catalogue as occurring in Alandia and Abo.

(To be concluded.)

NOTES ON COLLECTING, etc.

SOME WARWICKSHIRE TENTHREDINIDÆ (Concluded from p. 163).—

TENTHREDINIDÆ SELASDRINI. *Athalia lugens*, Kl. Coleshill, 29.vi.1922, ♀. *A. glabricollis*, Thoms.—Stoke, 10.viii.1917, ♀; 20.vii.1921, ♀; 8.viii.1921, ♀. Frankton, 4.vi.1922, ♀. *A. lineolata*, Lep.—Common. *Selandria serva*, F.—Common. *S. sicii*, Vollenh.—Stoke, 28.vi.1918, ♀. *S. stramineipes*, Kl.—Stoke, 24.vi.1920, ♀. Coombe, 29.v.1921, ♀. Packington, 4.vi.1921, ♀. Ryton, 10.vii.1921, ♀. Coleshill, 26.v.1923, ♀. Stoneleigh, 14.vii.1923, ♀, ♀. *S. morio*, F.—Ryton, 5.viii.1917, ♀. *Thrinax macula*, Kl.—Brandon, 29.v.1922, ♀. *Stromboceros delicatulus*, Fall.—Brandon, 7.viii.1917, ♀. *Strongylogaster cingulatus*, F.—Coventry, 5.vi.1919, ♀. Coombe, 9.v.1920, ♂, ♂. Corley, 29.v.1920, ♀. Packington, 4.vi.1921, ♀. Ryton, 10.vii.1921, ♀. Kenilworth, 3.vi.1923, ♂. *Empria abdominalis*, F.—Stoke, 26.vii.1921, ♀. *E. excisa*, Thoms.—Binley, 27.v.1916, ♀. *E. lugii*, Steph.—Whitley, 26.iv.1922, ♀, F. Pepper. *E. liturata*, Gmel.—Brinklow, 24.v.1919, ♂. *E. immersa*, Klug.—Bubbenhall, 1.v.1917, ♂. *Emphytus togatus*, Pz.—Brandon, 21.vi.1919, ♀; 11.vi.1922, ♀; 5.viii.1923, ♂, ♀. Coombe, 21.viii.1923, ♀, ♀. *E. cinctus*, L.—Binley, 2.viii.1916, ♀. Coombe, 15.viii.1920, ♂. Stoke, 1.v.1917, ♀; 26.v.1920, ♀; 21.v.1921, ♀; 6.v.1923, ♂. *E. calceatus*, Kl.—

Ryton, 5.vi.1921. *Stoke, 12.iv.1921, ♂, ♀; 13.viii.1922, ♀; 20.v.1923, ♀. *E. serotinus*, Müller.—Binley, 4.x.1917, ♂, ♀, ♀. Waverley Wood, 15.x.1917, ♀. *E. tener*, Fall.—Coleshill, 29.vi.1922, ♀. Coombe, 21.v.1923, ♂. *E. pallipes*, Spin.—Common some years, larvae feeding on pansy. *E. carpini*, Htg.—Brinklow, 18.v.1924. *Ametostegia (Taxonus) glabrata*, Fall.—Common. *A. equiseti*, Fall.—Bubbenhall, 22.vii.1919, ♀.

TENTHREDINAE—DOLERINI.—*Dolerus madidus*, Kl.—*Stoke, 20.v.1918, ♂. Bubbenhall, 7.vi.1919, ♀; 14.v.1922, ♀, F. Pepper. *D. ferrugatus*, Lep.—Bubbenhall, 18.v.1918, ♀. *D. aericops*, Thoms.—Kenilworth, 3.ix.1916, ♂. Coombe, 13.vii.1918, ♀. Stoke, 12.vii.1923, ♂, ♂. Stoneleigh, 14.vii.1923, ♂, ♂, ♀, ♀. *D. dubius*, Kl.—Brinklow, 30.iv.1921, ♀, Aldridge. *D. gonager*, F.—Generally distributed. *D. haematodes*, Schr.—Generally distributed. *D. nitens*, Zadd.—Corley, 29.v.1920, ♀. Coombe, 30.iv.1916, ♀. *D. anthracinus*, Ryton, 7.v.1922, ♀. *D. picipes*, Kl.—Generally distributed. *D. nigratus*, Müll.—Generally distributed. *D. aeneus*, Htg.—Generally distributed. *Loderus palmatus*, Kl.—Bubbenhall, 11.vi.1917, ♀. Wyken, 22.v.1921, ♂, ♀, ♀. *L. vestigialis*, Kl.—Wyken, 1.vi.1916, ♂.

TENTHREDININAE—TENTHREDININI.—*Rhyogaster viridis*, L.—Stoke, 1.vii.1916, ♀. Coleshill, 23.vi.1917, ♂. Bubbenhall, 6.vi.1919, ♀. Packington, 4.vi.1921, ♂. Kenilworth 3.v.1923, ♂, ♂. *R. fulvipes*, Scop.—Wolvey, 29.v.1917, ♂, ♂, ♀. Coombe, 21.v.1923, ♂, ♀. Stoke, 5.vi.1923. *R. aucupariae*, Kl.—Wyken, 14.v.1916, ♂, ♂, ♀, ♀. Corley, 26.v.1917, ♀. Stoke, 1.v.1917, ♂, ♀. Ryton, 3.iv.1921, ♂, ♀; 7.v.1922. *Tenthredopsis litterata*, Geoff.—Bretford, 2.vi.1918, ♀. Stoke, 30.v.1921, ♂; 7.vi.1921, ♂. Kenilworth, 3.vi.1923, ♂. Coombe, 10.vi.1923, ♂. Var. *varia*, ♀, Gmel.—Bretford, 2.vi.1918. Var. *thoracica*, ♀, Geoffr.—Coventry, 1915. Stoke, 6.vi.1920, H. Cooke. I have about ten other forms of the genus "*Tenthredopsis*," named at different times, but owing to the uncertain and ill-defined nature of the specific characters I think it advisable not to attempt to enumerate them at present. *Pachyprotasis rapae*, L.—Stoke, 16.vii.1917, ♀. Coventry, 26.vii.1919, ♂, ♀. Bubbenhall, 18.v.1919, ♂. Coombe, 26.v.1917, ♀. Allesley, 23.vi.1923, Dr. Newton, a curious ♀ with two tarsi on the right hind tibia, see *F. M. M. LIX*. P. 237. *Macrophyia rufipes*, L.—Bubbenhall, 7.vi.1919, ♀. Stretton, 6.vi.1922, ♀. F. Pepper. *M. 12punctata*, L. Allesley, 23.vi.1923, Dr. Newton. *M. annulata*, Geoff.—Wyken, 4.vi.1917, ♂. *M. albicincta*, Schr.—Coombe, 21.v.1923, ♂. Stoke, 2.v.1921; 10.v.1921, ♂, ♀; 25.v.1922, ♂, ♀; 2.v.1923, ♀. *M. ribis*, Schr.—Cubbington, 7.viii.1918, ♀. Coombe, 9.v.1920; 15.viii.1920, ♂, ♀. *Allantus scrophulariae*, L.—Binley, 5.viii.1916, ♀. Coombe, 5.viii.1918, ♂; 7.viii.1918. Brandon, 24.viii.1919. *A. arcuatus*, Forst.—Common. Var. *nitidior*, Kniv.—Common. *A. perkinsii*, Morice.—Bubbenhall, 9.viii.1919, ♂, H. Cooke. Brinklow, 2.viii.1920, ♀, ♀. Brandon, 24.viii.1919, ♀. *Tenthredella temula*, Scop.—Bubbenhall, 10.vi.1917, ♀. Ryton, 5.viii.1919; 6.vi.1920, ♂, ♂, ♀, ♀. Brinklow, 2.vi.1918, ♂. Frankton, 4.vi.1922, ♀. Allesley, 23.vi.1923, Dr. Newton. *T. mesomela*, L.—Common. *T. livida*, L.—Common. ♀, var. *dubia*, Strom.—Common. *T. atra*, L.—Coombe, 1.vi.1916; 26.v.1918. Ryton, 10.vi.1917, 6.vi.1920. Stoke, 10.vi.1920. *T. colon*, Kl.—Ryton, 6.vi.1920, ♀.—J. W. SAUNT, A.L.S., "Epperstone," Bull's Head Lane, Stoke, Coventry.

RECORDS FROM DERBYSHIRE in 1925. LEPIDOPTERA.—The following list of Lepidoptera obtained in this part of Derbyshire during 1925 you may find of sufficient interest for insertion in *The Record*. The list does not include a number of Micro-Lepidoptera yet unidentified. *Taenioecampa gothica*, *Tephrosia bistortata*, *T. crepuscularia*, *Drepana lacertinaria*, *Cabera pusaria*, *Barathra brassicae*, *Spilosoma lubricipeda*, *Plusia gamma*, *P. pulchra*, *Hepialus lupulina*, *H. humuli*, *H. sylvina*, *Abraaxas sylvata*, *A. grossulariata*, *Caradrina quadripunctata*, *Eupithecia subfulvata*, *Arctia caja*, *Leucania pallens*, *Xylophasia monoglypha*, *Cidaria fulvata*, *Crocallis elinguaris*, *Triphaena pronuba*, *Xanthorhoe fluctuata*, *Noctua (Segetia) xanthographa*, *Polia chi*, *Apamea secalis*, *Hydroecia (Gortyna) micacea*, *Miselia oxyacanthae*, *Amathes (Orthosia) lychnidis*, *Mamestra trifolii*, *Cheimabache jagella*.—K. E. KEYWOOD, 31, Park Avenue, Shirebrook, Derbyshire.

CURRENT NOTES AND SHORT NOTICES.

A Meeting of the Entomological Club took place at Lancaster Place, on November 3rd, Mr. H. Willoughby-Ellis being the host of the evening. There were present beside the host, who was in the chair, the following members of the Club: Robert Adkin, F.E.S., Prof. E. B. Poulton, F.R.S., H. St. John K. Donisthorpe, F.Z.S., F.E.S., James E. Collin, F.E.S., Dr. H. Eltringham, M.A., F.Z.S., and W. J. Kaye, F.E.S. The visitors were, K. G. Blair, F.E.S., Dr. E. Coekayne, M.A., F.E.S., J. C. F. Fryer, M.A., F.E.S., E. E. Green, F.E.S., Dr. K. Jordan, F.E.S., G. C. Leman, F.E.S., Dr. G. A. K. Marshall, C.M.G., F.R.S., The Rt. Hon. Lord Rothschild, F.R.S., Capt. N. D. Riley, F.E.S., W. Rait-Smith, F.E.S., H. J. Turner, F.E.S.

The attendance of members at this meeting apparently constitutes a record in the Club. If the member elect, who was also present, is included, the full membership of eight was represented. For an approach to this we have to refer to Mr. Verrall's meeting on January 22nd, 1907, when seven members were present out of the total membership of eight. Prior to this we have to go back as far as May 17th, 1865, at Mr. Sheppard's meeting when eight members were present out of a then permissible membership of nine.

The Meetings of the Entomological Society continue to be very well attended. Many London, Suburban and even some Country members make it almost a rule to attend. The exhibits are usually of great interest and frequently illustrated by lantern slides. Among the more important communications and exhibits this year before the summer recess have been, Mr. J. C. F. Fryer's account of the measures adopted by the Ministry of Agriculture to prevent the introduction of Coccid pests into the British Isles, Mr. C. F. M. Swynnerton's account of recent methods of controlling tsetse-flies in E. Africa, the President's notes on the researches in the phenomena of Mimicry in Central Africa by Dr. G. D. H. Carpenter, Dr. Van Sommeren, etc., Mr. F. W. Edwards' remarkable marine Chironomid sent from Samoa by Dr. P. A. Buxton, and Mr. N. D. Riley's elucidation of the seasonal forms of *Henetesia* spp., African Satyrids. Interesting demonstrations were made, of the scent glands in *Heliconius* by Dr. Eltringham, of the dispersal of insects to Spitzbergen by Mr. C. S. Elton, insect life of the

high alpine snows by Dr. Handschin, the scent sacs in *Rhodogastria* by Mr. G. T. Bethune-Baker, etc.

In the London Natural History Society, Ornithology has usually been the chief subject at recent meetings with Plant Galls and Botany from time to time. On the Bacot Memorial evening, however, the Entomologists listened with delight to Mr. Hugh Main, who lectured on "Photography as a help to Entomology," illustrating his remarks by a large series of lantern slides. Mr. Pether in May, read a paper on "Luminosity in Nature," dealing largely with insects. Mr. J. C. Robbins recently exhibited bred Sawflies, *Pteronidea spiraeae*, from Limpfield, and on October 6th, showed moths and cocoons of *Acrionicta aceris* with Dipterous parasites, *Compsilura concinnata* bred from the larvae. On November 17th, Mr. R. W. Robbins discussed the "Eritillaries," and on December 15th, Mr. A. W. Mera will read a paper on "The Increase in Melanism in the last Half-Century."

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.

September 10th.—Mr. Chas. Jarvis, 12, Claylands Road, Clapham, was elected a member.

Mr. R. Adkin exhibited living larvae of *Tortrix pronubana*, of the two forms of *Lycænoopsis argiolus* and of *Pachetra leucophaea*.

Mr. O. R. Goodman, a bred series of *Aglais urticae*, from Lewes larvae, pointing out two very dark examples in strong contrast to the remainder, which were unusually light.

Mr. Enefer, ♂ and ♀ *Asilus crabroniformis* (Dip); Carisbrooke, *Aeschna cyanea*, Bembridge, and the large water bug *Belostoma grisea*, Lake Fox, Illinois, U.S.A.

Mr. Vredenberg, a box of striking forms of Orthoptera from Zululand.

Mr. Priest, a box of his 1925 captures, including *Toxocampa pastinum* from Box Hill.

Mr. H. Moore, a series of the Nymphalids *Limenitis archippus* and of *L. floridensis*, and the Danaids with which they are associated, *Anosia plexippus* (*archippus*) and *Danaida berenice* respectively, and made remarks on the exhibit.

Mr. R. Adkin gave an account of the Meeting of the British Association at Southampton, and of the meeting of the delegates of the Corresponding Societies of the B.A.

REVIEWS AND NOTICES OF BOOKS.

EVERY-DAY DOINGS OF INSECTS. Evelyn Cheesman, F.Z.S., F.E.S. pp. 240. Figs. 158. 7s. 6d. net. G. C. Harrap & Co., Ltd.—This is a really good book, far above the average of works written for the many; the product of the combined efforts of several talented naturalists. The author is a writer whose knowledge of natural history is very extensive and thoroughly practical, and the scientific facts are consequently

correct and are tersely put. The publishers appear to be keenly alive to the value of illustration, a *sine qua non* in every book on natural history, which is to prove useful and attractively scientific. But this is not all, for the unusual quantity of illustrations, about 160 to 240 pages of letter-press, is remarkable, and they have been chosen with much success. When we say that more than half that number have been contributed by Hugh Main, it is a guarantee of capital execution and excellent applicability. Mr. Main's illustrations have largely been made in the field among natural surroundings and not, as is often done, rigged up in the home study with more or less artificiality and ignorance of field-work. The "Male cricket at mouth of burrow," for instance, was photographed in France in the country-side sacred to the illustrious Fabre. Other illustrations have been contributed by Dr. Shirley and are very efficient for their purpose. There are also a number of simple sketches of hidden structures, and to illustrate habits which would be obscured by surroundings in a photograph. The headings of the eighteen chapters tell their purport succinctly, indicating that the subject matter not only deals with facts as they are, but also with the scientific principles underlying those facts. "How Insects Grow"; "Why Insects Vary"; "The Meaning of Colour"; "The Meaning of Pattern"; "How Insects get their Colour"; and so forth, concluding with a chapter on "Social Insects" Caterpillars of some moths, Aphids, Gall-flies, Bees, Ants and their slave-keeping, Humble-bees, Wasps, and Termites, with remarks on the benefit to the *community*, attained by the social habit, rather than by the intensive protection to the *individual*. Dare we point out that the illustration on p. 73 is put in upside down? It is, we believe, the one and only slip, which probably the mass of the readers will not notice; so few beasties rest upside down as this one habitually does when not feeding. The book is well printed and the general get-up is attractively satisfactory.—Hy.J.T.

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LIST

OF

GEOMETERS of the British Islands

WITH

The Named VARIETIES and the Synonyms in general use.

CLASSIFIED

ACCORDING TO THE NOMENCLATURE AND ARRANGEMENT OF
L. B. PROUT IN SEITZ' MACRO-LEPIDOPTERA
(PALAEARCTIC GEOMETERS)

WITH

page references to Seitz, Meyrick, and South.

COMPILED BY

Hy. J. TURNER, F.E.S., for the *Entomologist's Record*.

Brephidae.

Brephinae.

BREPHOS, *Zinck*.

PARTHENIAS, *L.* 1,253.97.

ab. *indigena*, *Lambl.* [obscura,
Prout.]

ab. *nigra*, *Tutt.*

ab. *nigrobasalis*, *Splr.*

ab. *luteata*, *Hennin.*

ab. *passetii*, *Th.-Mg.*

ab. *sajana*, *Prout.*

ab. *muliercula*, *J.S.*

ab. *brunnea*, *Closs.*

NOTHA, *Hb.* 1,253.98.

r. *touranginii*, *Berce.*

ab. *laeta*, *Rbl.*

Geometridae.

Oenochrominae.

ALSOPHILA, *Hb.* [Anisopteryx,
Steph.; *Erannis*, *Hb.*]

AESCULARIA, *Schiff.* 3.252.294.

ab. *astrigaria*, *Rbl.*

ab. *brunnea*, *Hann.*

r. *urzhumaria*, *Krulik.*

r. *japonensis* *Warr.*

APLASTA, *Hb.*

ONONARIA, *Fuess.* [rubicaprarica,
Hb.] 6.252.101.

ab. *rubraria*, *Prout.*

ab. *blanca*, *Ribbe.*

ab. *sudataria*, *Hb.*

ab. *berytaria*, *Hb.*

ab. *trifasciaria*, *Staud.*

ab. *monotaria*, *Staud.*

ab. *squmata*, *Staud.*

a.g. *faecaturia*, *Hb.*

ODEZIA, *Bdv.* [Tanagra, *Dup.*;
aptria, *Hb.*]

ATRATA, *L.* [chaerophyllata, *L.*]
7.251.147.

- ab. nigerrima, *Th.-Mg.*
 ab. dalmatina, *Staud.*
 r. pyrenaica, *Gmppb.*

Hemitheinae.

PSEUDOTERPNA, *Hb.*

PRUINATA, *Hufn.* [*cytisaria, Schiff.*]
 13.250.101.

- ab. agrestaria, *Dup.*
 ab. fasciata, *Prout.*
 ab. grisescens, *Hann.*
 ab. candidata, *Staud.*
 ab. nigrolineata, *Schwing.*
 ab. albolineata, *F. Wag.*
 r. holosatica, *F. Wagn.*
 r. virellata, *Krul.*

HIPPARCHUS, *Leach.* [*Geometra, Treit. (L.): Terpne, Hb.*]

PAPILIONARIA, *L.* 17.250.102.

- ab. herbacearia, *Mén.*
 ab. cuneata, *Burr.*
 ab. subcaerulescens, *Burr.*
 ab. deleta, *Burr.*
 ab. subobsoleta, *Burr.*
 ab. alba, *Gillm.*

COMIBAENA, *Hb.* [*Euchloris, Hb.: Phorodesma, Bdv.*]

PUSTULATA, *Hufn.* [*bajularia, Schiff.*]
 19.248.104.
 ab. stigmatisata, *Staud.*

HEMITHEA, *Dup.* [*Nemoria, Hb.*]

AESTIVARIA, *Hb.* [*strigata, Müll.: thymiaria, Schiff.*]
 23.247.107.
 ab. alboundulata, *Hed.*

CHLORISSA, *Steph.* [*Nemoria, Hb.*]

VIRIDATA, *L.* 24.248.106.

- ab. caerulescens, *Burr.*
 ab. concavilinea, *Burr.*
 ab. olivaceo-marginata, *Burr.*
 ab. rufotincta, *Burr.*
 ab. mathewi, *Bnks.*
 ab. rosearia, *Culot.*
 r. melinaria, *H.-S.*
 r. insignata, *Stdgr.*

EUCHLORIS, *Hb.* [*Phorodesma, Bdv.*]

SMARAGDARIA, *Fb.* 27.249.105.

- ab. obsoleta, *Burr.*
 ab. alinea, *Burr.*
 ab. immaculata, *Thnby.*
 ab. unilinea, *Burr.*
 ab. caeruleo-viridis, *Burr.*
 ab. viridis, *Burr.*
 r. gigantea, *Mill.*
 r. castiliaria, *Stdgr.*
 r. prasinaria, *Fv. (?)*
 r. mongolica, *Stdgr.*

THALERA, *Hb.*

FIMBRIALIS, *Scop.* [*thymiaria, L.*]
 30.—.108.

- ab. albaria, *Esp.*
 ab. obsoleta, *Skala.*
 ab. moscovita, *Gmppy.*
 r. chlorosaria, *Graes.*
 r. magnata, *Fuchs.*

HEMISTOLA, *Warr.* [*Geometra, Bdv.: Euchloris, Hb.*]

CHRYSOPRASARIA, *Esp.* [*vernaria, Hb.*]
 30.249.103.

- ab. dentigera, *Prout.*
 r. lissas, *Prout.*

IODIS, *Hb.* [*Euchloris, Hb.: Thaleria, Hb.*]

LACTEARIA, *L.* [*aeruginaria, Hb.: vernaria, L.*]
 32.249.105.
 r. norbertaria, *Rössl.*

Acidalinae.

CALOTHYSANIS, *Hb.* [Timandra, *Dup.*]

AMATA, *L.* [amataria, *L.*] 47.246.134.

- ab. roseata, *Hirschke.*
- ab. bipartita, *Prout.*
- ab. latistriga, *Rbl.*
- ab. deleta, *Rbl.*
- ab. nigra, *Rbl.*
- ab. effusaria, *Klem.*
- ab. suffumata, *Prout.*
- r. grisearia, *Petersen.*
- r. comptaria, *Walk.*

SCOPULA, *Schnk.* [Eois, *Hb.* :
Acidalia, *Tr.* : Leptomeris,
Hb.]
(PYLARGE, *H.-S.*)

TERNATA, *Schnk.* [fumata, *Steph.*] 55.244.131.

- ab. simplaria, *Frr.*
- r. perfumata, *Reut.*

(ACIDALIA, *Tr.*) [Leptomeris,
Hb.]

IMMORATA, *L.* 56.248.126.

- ab. serenata, *Trti.*
- ab. albomarginata, *Habich.*
- ab. fuscomarginata, *K. Höf.*
- r. porosa, *Krulik.*

RUBIGINATA, *Hufn.* [rubricata,
Schiff.] 58.248.130.

- ab. scotica, *Bubbk.*
- ab. brunneomarginata, *Schaw.*
- ab. obscurata, *Skal.*
- r. ochraceata, *Stdgr.*
- r. halimodendrata, *Ersch.*

MARGINEPUNCTATA, *Goeze* [promu-
tata, *Gn.* : incanata, *Haw.* :
immutaria, *Hb.*] 63.241.125.
ab. griseofasciata, *Trti.*
ab. pastoraria, *Joan.*

- ab. mundata, *Prout.*
- ab. orphnaeata, *Fuchs.*
- ab. argillacea, *Prout.*
- r. britonaria, *Obthr.*
- r. subatrata, *F. Wag.*

FLOSLACTATA, *Haw.* [remutata
(aria, *Hb.*) *Schiff.* : lactasa,
Haw.] 66.241.124.

- ab. conjunctiva, *Prout.*
- ab. sublactata, *Haw.*
- ab. extirpata, *Fuchs.*
- ab. anastomosaria, *Preis.*
- ab. undularia, *Heilw.*
- r. claudata, *Prout.*

IMMUTATA, *L.* [sylvestraria, *Hb.*] 70.241.124.

- ab. myrtillata, *Dadd.*
- ab. atra, *Rbl.*
- r. syriacata, *Neubgr.*

VIRGULATA, *Schiff.* [strigaria, *Hb.*] 72.243.—.

- ab. nigerrima, *Rbl.*
- ab. albicans, *Prout.*
- r. parallelaria, *Warr.*

NIGROPUNCTATA, *Hufn.* [strigilaria,
Hb.] 74.243.127.
r. subcandidata, *Walk.*

EMUTARIA, *Hb.* [subroseata, *Haw.*] 75.242.128.

IMITARIA, *Hb.* 76.242.129.
ab. kesslitzi, *Hirschke.*
ab. rosea, *Trti.*

ORNATA, *Scop.* [paludata, *L.*] 79.242.128.

- r. subornata, *Prout.*
- ab. paucisignata, *Krausse.*

STERRHA, *Hb.* [Acidalia, *Tr.*]
(PTYCHOPODA, *Curt.*)

OCHRATA, *Scop.* [ochrearia, *Hb.* :
perochraria, *Dblidy.*]
r. sicula, *Zell.* 90.240.132.
r. albida, *Ribbe.*
r. cantiata, *Prout.*

- (PTYCHOPODA, *Curt.*) [*Hyria*,
Steph.: *Eois*, *Hb.*]
- MURICATA, *Hufn.* [*auroraria*,
Bork.] 99.235.109.
ab. *lutescens*, *Prout.*
ab. *totarubra*, *Lambl.*
ab. *maidorni*, *Hann.*
- DIMIDIATA, *Hufn.* [*scutulata*,
Schiff.] 99.239.121.
ab. *delictata*, *Prout.*
r. *roseata*, *Trti.*
- EBURNATA, *Wocke.* [*contiguaria*,
Hb.] 105.235.109,
ab. *obscura*, *Fuchs.*
ab. *fuscalata*, *Fuchs.*
ab. *dirutaria*, *Fuchs.*
ab. *pallidaria*, *Fuchs.*
- SERIATA, *Schrank.* [*virgularia*,
Hb.: *incanata*, *Schiff.*] 112.236.112.
ab. *cubicularia*, *Peyer.*
ab. *obscura*, *Mill.*
ab. *calcearia*, *Zell.*
r. *australis*, *Zell.*
r. *canteneraria*, *Bdv.*
r. *minuscularia*, *Ribbe.*
- SUBSERICEATA, *Haw.* 116.237.117.
ab. *obscura*, *Rbl.*
r. *manconiata*, *Knaggs.*
r. *asbestaria*, *Zell.*
r. *diaphanaria*, *Bng.-Haas.*
- SYLVESTRARIA, *Hb.* [*straminata*,
Tr.: *marginepunctata*,
Steph.] 117.236.113.
ab. *graciliata*, *Mann.*
r. *circellata*, *Gn.* [*obsoletaria*,
Westw.]
- HERBARIATA, *Fb.* 123.235.111.
a.g. *aestiva*, *Fuchs.*
r. *adherbariata*, *Stdgr.*
- BISELATA, *Hufn.* [*bisetata*, *Rott.*] 126.240.121.
ab. *fimbriolata*, *Steph.*
ab. *infuscata*, *Prout.*
r. *extincta*, *Stdgr.*
- TRIGEMINATA, *Haw.* [*scutularia*,
Hb.] 128.239.122.
- RUSTICATA, *Schiff.* 131.235.110.
r. *mustelata*, *Rubr.*
r. *vulpinaria*, *H.-S.*
- DILUTARIA, *Hb.* 132.237.116.
ab. *praeustaria*, *Lah.*
ab. *subfasciata*, *Prout.*
r. *holosericata*, *Dup.*
- FUSCOVENOSA, *Gitze.* [*ossea*
Haw.: *interjectaria*, *Bdr.*:
dilutaria, *Led.*] 133.237.114.
ab. *anastomosaria*, *Preiss.*
- HUMILIATA, *Hufn.* [*osseata*,
Schiff.] 132.237.115
- DEGENERARIA, *Hb.* 134.238.118.
ab. *depravata*, *Stdgr.*
ab. *floridaria*, *Püng.*
r. *erschoffi*, *Chr.*
r. *meridiaria*, *Mill.*
- INORNATA, *Haw.* 136.238.119.
ab. *agrostemmata*, *Guen.*
ab. *amoenata*, *Fuchs.*
- AVERSATA, *L.* 137.238.120.
ab. *lividata*, *Clk.*
ab. *remutata*, *L.* [*spoliata*,
Stdgr.]
ab. *fuliginata*, *Haw.*
ab. *effuscata*, *Galvag.*
ab. *atrata*, *Fuchs.* [*suffumata*,
Lmbl.]
ab. *aurata*, *Fuchs.*
ab. *latefasciata*, *Vor.-M.D.*
ab. *diluta*, *Hann.*
ab. *aurata-diluta*, *Hann.*
ab. *dilutata*, *Preiss.*
- EMARGINATA, *L.* 138.239.133.
ab. *mosquensis*, *Heyrle.*
- COSYMBIA, *Hb.* [*Zonosoma*,
Ld.: *Ephyra*, *Dup.*]
[*Cyclophora*, *Steph.*: *Leucoph-*
thalmia, *Hb.*]

NOTES ON EGYPTIAN LEPIDOPTERA

OBSERVED AT

RESERVOIR, ASWAN

Between OCTOBER, 1919, and APRIL, 1922.

BY

KENNETH J. HAYWARD, F.E.S.

ERRATA, ETC.

- page (14) line 6 from bottom, for *melanopyga* read *melanopyga*.
,, (15) line 11, for *Nadasia* read *Nadiusa*.
,, ,, line 23, read "and the clusters about 1.1mm × .6mm."

I. Notes on Egyptian *Rhopalocera* observed at Reservoir Aswan. October, 1919, to April, 1923.

By KENNETH J. HAYWARD, F.E.S.

INTRODUCTORY NOTE.—My collecting has been almost entirely confined to the immediate area of Reservoir, with the exception of occasional odd days at Maadi (near Cairo.) The period covered by these notes dates from my return to the country in October, 1919, with the exception of mid-September to mid-November, 1920, and June-September, 1921, during which periods I was on leave.

I have been unable to trace any record of previous resident collectors in the district, and consequently presume that I am the first person to examine it. The topographical situation of Reservoir is interesting from an entomological standpoint, particularly as regards its isolation, and the comparatively recent date of its cultivation.

Situated 600 miles South of Cairo, and 180 North of Wadi Halfa, it represents the fullstop to the line of Egyptian Nile-valley cultivation. The gross area of the colony is about 70 acres, roughly divided up into 30 acres of rock and otherwise un-cultivable land on which nothing grows, 5 acres of enclosed grounds—gardens and houses, 15 acres of terraces, etc., covered with trees and bushes, and the remainder under cultivation. It is divided from Aswan by some six miles of desert, but its Western boundary, the Nile, here a mile wide, is dotted with small islands throughout its length to Aswan, and as these islands have for the greater part some plant life, and the prevailing wind is from the North, much insect life probably finds its way into the Colony by this route. Beyond this Western boundary lies the sandy Libyan desert the nearest cultivation being at Kurkur*, where there is a small patch of scrub and some vegetation. East again is arid desert stretching to the Red Sea, with scattered patches of wild vegetation near the coast.

South, the first real cultivation is reached at about 80 miles. Between this and the Dam there is a little river-bank cultivation during flood when the reservoir is empty, but this only on low berms and mud banks. The remainder of this Southern area is composed of massive granite hills and sand. There is a narrow strip of cultivated land on the West bank directly opposite the colony, about a hundred yards deep and running North for perhaps half-a-mile. The colony has now been laid out and under cultivation for about seventeen years. Previous to this there were only a few date and dom palms and a few sycamore fig-trees on the site.

The climate is very dry, and the temperature is high.

* Distant some 40 miles.

In the following table I have given the approximate mean maximum sun and shade temperatures, the minimum temperature, and relative humidity, for the twelve months.

	Approx. SUN TEMP.	Approx. SHADE TEMP.	Approx. MIN. TEMP.	Approx. REL. HUM.
January	... 124.5	74.0	49.0	46
February	... 133.0	79.0	51.5	42
March	... 144.0	87.0	57.0	36
April	... 151.0	98.0	65.5	31
May	... 160.0	103.0	72.0	33
June	... 163.5	107.0	76.5	31
July	... 164.0	108.0	77.5	30
August	... 162.0	105.0	77.0	31
September	... 157.0	103.0	73.5	32
October	... 150.0	98.0	68.0	35
November	... 138.0	87.0	60.0	40
December	... 126.0	77.0	52.0	45

As regards cultivation, the main crop is berseem, and a small amount of barley is also grown in the winter. The usual Egyptian garden produce and flowers are produced in the gardens, and amongst the commonest trees are lebbak (*Albizia lebbek*), sycamore-fig (*Ficus sycamorus*), various date and other palms, and Citrus trees, oleander, several species of acacia, a few Eucalyptus, and many others.

Colocynth, (*Citrullus colocynthus*), dead sea fruit (*Calotropus procera*), and coarse grasses grow wild wherever they can find moisture.

Rhopalocera begin to emerge about the end of February, but some species are on the wing all the year. Moths are most plentiful from February till April, in June, and again in September, October, and November.

I took at Reservoir in all 16 species of Rhopalocera and 168 of moths. Considering the small area and isolated position of the colony this number appears large, but as time passes more species will probably find their way in and stay to breed.

Aswan must be considered the link between Egypt and the Sudan, for more than one species found in the latter reaches as far North, whilst several of the species common in Lower Egypt just reach Aswan.

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For the area South, round Khartoum and the Nile Valley to the equator, see those marked with *.

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Rhopalocera.

[Arranged according to Seitz, "Macrolep. Pal. Region," Vol. 1.]

Family 2, *Pieridae*.

Genus VI., *Pieris*, Schrnk.

P. rapae, L.—This insect is never common. I have taken a few of the spring brood, form *metra*, Steph. I first saw it on April 17th, 1920, a few further specimens that month and up till May 20th, when they became commoner till the 27th, disappearing after that date. A second brood emerged on June 25th, and were on the wing till the end of the first week of July, with one or two damaged stragglers up till the end of the month. A single freshly emerged specimen on August 15th. In 1921 it again made its first appearance on April 17th, when some half dozen were on the wing. I was absent from June 8th, till October, and saw nothing further of the species. One of my males has gray apical blotches and no discal spot above. Common at Maadi in April and May, 1920.

Genus VII., *Leucochloë*, Rob.

L. daplidice, L.—Another somewhat scarce insect. I first took it on one of the islands on April 16th, 1920. There was a single specimen flying on June 13th, and a pair on June 26th. Thereafter occasional specimens appeared until July 20th, when it disappeared except for one or two much damaged individuals at long intervals. I have one specimen perhaps referable to the gen. vern. *bellidice*, O. (that taken on April 16th, 1920), and one specimen of the ab. *raphani*, Esp. taken on July 7th, 1920.

I did not see the species in 1921, but it perhaps appeared when I was on leave.

Common at Maadi in April and May, 1920.

Genus XIX., *Catopsilia*, Hbn.

C. florella, F.—Taken on the following dates:—November 9th, 1919, July 3rd, 1920, and in 1921 on January 10th, March 29th, a series at the end of October, and on December 31st. In 1922 on January 1st, and later dates. The specimens taken prior to October, 1921, were all taken on the East bank and have the appearance of being immigrants. Those taken in October were taken on the patch of vegetation on the West bank and had certainly bred there as they were fresh specimens and further specimens kept appearing. I took about half a dozen specimens and left the rest to carry on the breed. There were possibly thirty or more in all. The two taken at the end of the year were worn, but differed in no way from the locally bred specimens.

In 1922 *C. florella* appeared with regularity in a corner of my

garden about every 21st, to 24th, day. Usually only a single specimen, but freshly emerged. It had apparently bred there but I could not trace its foodplant.

In the males the size of the brown markings on the costa and outer margin vary, as does the discal spot on the forewing. In one specimen all these markings are reduced to such an extent as to be hardly noticeable. The group of disco-cellular spots on the hindwing below also vary, my series including the following combinations:—Three separate spots, three united spots, and two separate spots, in addition to the usual (two spots united). In the females the sparrow-hawk marking varies in extent and intensity of colour.

Genus XXII., *Colias*, F.

C. croceus, Fourer. (*edusa*, L.).—A very common species. Occasional specimens appear in December and January, and in 1922 the first emergence took place on January 13th, but the more usual date is about February 21st. The early broods have a somewhat redder head and costa and beneath much more bluish green than the later broods and are referable to the gen. vern. *vernalis*, Vty. These early broods are always small and only a few specimens are to be seen about until mid-April, when they become common. They appear to be continuous brooded after this date until September. There is a noticeable increase in numbers during the first week of August and it is during this month that the species is commonest, and most repays close examination. After September only stray specimens come out and most of those on the wing will be found to be worn specimens of the summer broods. At the end of 1919, I found the white aberrations flying in the proportion of perhaps a half per cent. My first ab. *helice* in 1920 was taken on April 20th, when I got two, and then again on June 10th, after which date it rapidly became common, flying in about the same proportion as ab. *pallida*. In August the proportion of white aberrations to the yellow specimens probably rose as high as three, or even three and a half per cent, and I examined over 200 during the first three weeks, although my collecting times were much restricted by work. Ab. *helicina* is rare and I have taken only three specimens, on June 13th, 1920, a beautiful pale lemon coloured specimen that I at first mistook for *florella*, July 11th, 1920, and the other in October, 1919. In 1920 a very hot spell of weather that occurred (max. shade temp. for period 121 deg. F., max. temp. in sun 177 deg. F.) in August killed off all butterflies except a very few of the 'blues,' and as I went away shortly afterwards, I saw no more of the insect for that year. 1921 was remarkable for the comparative scarcity of *croceus* at Reservoir. I saw it only on Jan. 23rd (♀), Jan. 29th (♂ ♀), April 3rd (♂), and some dozen specimens including one ab. *helice* in October, some of which lingered on till December. I was of course away from June till September. I have on two occasions taken the female in my moth trap at light, whither it probably flew on being disturbed from its resting place. (June 22nd, 1920, October 6th, 1920.)

The following is a summary of the species as represented in my collection—all taken at Reservoir.

croceus, Fourer. gen. vern. *vernalis*, Vty.—Not uncommon. I have examined a good number of ♂♂ of this generation, and have noticed that the discal spot on the upperside of the forewing is, in a large percentage of cases, covered with yellow scales, and is much reduced in size, the reduction tending to make the spot lunule-shaped. I have not observed this occurrence in the later generations.

croceus, Fourer. gen. aest.—Common. One ♂ is of a more orange-yellow than usual, the discal spot on the forewing is reduced as is also the black marginal band of the hindwing above, and the nervures are not distinguishable on this band, which is dusted with yellow somewhat approaching ab. *velata*. One ♀ has all the spots on the marginal band reduced in size, and beneath is the bluish-green of *myrmidone*, Esp. Another ♀ has an enlarged and pear-shaped disco-cellular spot on the hindwing beneath.

croceus, Fourer. gen. aut. *autumnalis*, Roc.—Abundant.

ab. *deannulata*, Roc.—One female.

ab. *bimaculata*, Vrtv.—One male.

ab. *velata*, Rag.—One male I think referable to this ab.

ab. *minor*, Failla.—Two males.

ab. *atrofasciata*, Roc.—One male. One female.

ab. *semiobsoleta*, Roc.—One (also referable to ab. *bimaculata*, Vrtv.) Another taken January 15th, 1922, amongst *vernalis*.

ab. *suffusa*, Tutt.—I think one of my females might come under this heading, being very heavily dusted with black scaling over the base of the forewing above.

ab. *obsoleta*, Tutt.—One female with the spots in the marginal band very much reduced. In other specimens this is also the case to a slightly less marked extent.

ab. *ambuissoni*, Cdj.—I have a very worn female of which the forewings above were evidently a primrose, or light yellow, and the hindwings those of the white aberrations.

ab. *cremonae*, B-II.—Four primrose males, one taken on January 15th, amongst *vernalis*, Vrtv.

ab. *pallida*, Tutt.—A long series. The disco-cellular spot on the hindwing above varies from orange to pale yellow-green and is in some specimens ringed with white. One specimen is a bluish green beneath resembling the colour of *myrmidone*, Esp. One specimen has a black dash above the black discal spot on the forewing above. This dash joins the spot at the centre '▼'. One specimen is also ab. *deannulata*, Roc. and ab. *bimaculata*, Vrtv. Three are referable to ab. *obsoleta*, Tutt., whilst one of these has the disco-cellular spot on the hindwing above reduced to a pale mark merging into the ground colour.

ab. *helice*, Hbn.—A long series showing all shades of colouring between ab. *pallida* and ab. *helicina*. The disco-cellular spot on the hindwing above varies as in *pallida* (see above) and in one specimen is much enlarged and bright orange. In this specimen the spot on the forewing is also bigger than usual. Two specimens are ab. *bimaculata*, Vrtv. One specimen has the disco-cellular spot on the hindwing above merging into the ground colour as in ab. *pallida* above, and another has the white blotches in the black marginal band on both wings much enlarged, and occurring in every cell from the inner and anal angles to the costa.

ab. *helicina*, Ob.—I obtained three specimens which are noted in the text above.

ab. *taillae*, Stef.—Would most probably be turned up if all males were systematically examined, as I have seen specimens approaching very closely to this aberration, notably one amongst some *vernalis* taken on February 5th, 1922. In this specimen however the yellow veins do not quite unite with the yellow ground colour in the apical area.

In size my males range from 32mm. to 59mm. and females from 42mm. to 62mm. [It may be interesting to note here, that I took a ♀ at Bruton in Somerset in May, 1922, which had a wing expanse of 67mm.]

Family 3, *Danaidae*.

Genus 1, *Danais*, Ltr.

D. chrysippus, L.—Common all the year and is continuous brooded from November till June, and I am inclined to think for the remaining period also.

From April till November the broods are entirely *chrysippus* but from December till March a fair percentage of the ab. *eratippus*, Fldr., and other dark specimens are included. The maximum number of dark specimens are bred in January, the coldest month, and the percentage decreases with the rise of temperature. As many as 35% of a January brood are sometimes dark, and all my own experience points to the fact that cold has a considerable bearing on the coloration of this insect.

Specimens vary in size from males of 102mm. to dwarf males and females of 45mm. to 47mm. Females are usually very slightly smaller than the males, and the average span for all insects is about 78mm.

Specimens in my collection can be divided into three groups:—

(a) specimens corresponding to type.

(b) the aberration *eratippus*, Fldr.

(c) specimens entirely dark. (ab. *avantha*, Hay.)

The following is a summary of the species as occurring at Reservoir. *chrysippus*, L.—Very common, showing minor variation chiefly in the white markings in the apical area.

ab. *eratippus*, Fldr.—Common during the winter and varying as does *chrysippus*. I have never taken this ab. during the hot weather months.

ab. *avantha*, Hay.—A new aberration described in the *Ent.*, LV., p. 178, 1922. Bred sparingly during the coldest part of the winter. This insect has the ground colour entirely dark brown.

ab. *alcippus*, F.—I bred one specimen on February 24th, 1922, from wild larvae—a batch showing a strong tendency to white aberrations.

ab. *alcippoides*, Moore.—I bred a large number of specimens in February, 1922, and a few at other dates, and once caught a specimen, in which the insect showed slight white sealing along the nervules and nervures about the discal area.

ab. *candulata*, Hay.—A remarkable aberration described in *Ent.*, LV., p. 178, 1922, in which the ground colour is a pale whitish-buff, the dark brown of the costal area being replaced by gray, the black and white apical and marginal markings typical. The type and another specimen were bred in January, 1922, a third specimen was seen on the wing about the same time. As the two bred specimens

were from wild larvae, it is possible that all three may have come from the same parent.

Amongst other aberrations I mention the following.

(1). A male ab. *cratippus* taken at Maadi in which the width of the oblique white line of the apex above and below (measured along the nervures) is 8mm. at the costa increasing evenly to 12mm. in cell 5.

(2). Dwarf specimens of both sexes of less than 50mm. wing expanse.

(3). A curious pathological specimen taken at Reservoir on January 15th, 1922. In this specimen the left hindwing is toothed in the form of a tail between R5 and R6. There are no white markings on the black marginal band of the hindwing, and only a few pinpoints show on this band on the forewing, and the oblique white apical line is also very much reduced. (See *Ent.*, LV. p. 178, and fig.)

(4). Specimens (which occur very rarely) having chocolate coloured patches superimposed on the dark brown of the costal area, usually in the basal area; and radiating outwards from the base rather than in uneven 'blotches.'

(5). Specimens in which the dark brown colour of the costal area appears in streaks or patches on the black of the apical area either (or both) before or after the white oblique line.

I have specimens of both *chrysippus* and *cratippus*, in which the dark brown colouring of the forewing above is mottled or spotty in appearance, the ground colour appearing beneath it.

(6) Specimens—usually malformed—sometimes occur, in which the black colouring becomes a smoky grey. I believe this is mainly due to lack of sufficient or suitable food in the larval stage. These mainly occurred when I was experimenting with foodplants other than *Caloptropis procera* on which *chrysippus* here feeds.

I tried certain experiments in 1922 to see to what extent *chrysippus* could adapt its pupa to surrounding colours. When attached to the underside of the *C. procera* leaves it is, in my experience, invariably of a somewhat dark green, and when attached to the stalk of the plant, or to the dead leaves that usually lie at the foot of the stalk, it is always of a greyish-buff, the colour of the bark or dead leaves. In both cases it is highly procryptic and I have never found a brown pupa on a leaf, or *vice versa*. The inside of my breeding cage is plain pitch pine, having a colour slightly more reddish than the *procera* stalk or the dead leaves. This colour it is able to imitate very closely, the pupa being tinged with a sort of flesh pink at first. However, I have found that $\frac{1}{2}\%$ assume the green pupa when confined to the cage. This error may of course be repeated in the wild state, but my observations do not point that way.

I papered the inside of the breeding cage with various coloured papers. *Chrysippus* chose green and stuck to it when the small portion of the cage left unpapered was full up. (I had 1000 larvae in it.) Green it could manage, but reds, blues, bright yellows, violets, etc., were too much for him and he studiously avoided them. When pupating on the green paper the pupae were green; when compelled to pupate on a coloured paper the pupa was still green.

The hour of emergence varies very greatly. On three February days with the climatic and temperature conditions for the 24 hours cycle practically identical, the emergences took place as follows. First day at 12.0 noon, the following day at 10.30 a.m., and the next day at 12.30 p.m. Generally speaking the emergence took place in my breeding, which was a large gauze meat safe hanging right in the open, at 12.30 p.m. in December and January; noon in February; 11.30 a.m. in March; and about 8.30, to 9.30, in the summer months.

In all I have to date bred, or examined, over 6000 specimens of *chrysippus*, and nearly all my aberrations came from the last 500 bred in the early part of February this year (1922). *Chrysippus* is very much preyed upon by a parasite that I believe to be *Chalcis brevicornis*, Klug. (A specimen of this parasite sent to the Entomological section of the Ministry of Agriculture was doubtfully identified as such).

On one occasion I took a female carrying a dead male, death having evidently occurred whilst *in cop.*, and the female being unable to get rid of her dead spouse, had perforce to carry his corpse around with her. The male was quite dry so that death had in all probability taken place two days before the capture was made. This insect was taken at 11.30 a.m. during the hot weather.

Family 6, *Nymphalidae*.

Sub-family 'D,' *Vanessinae*.

Genus V., *Hypolimnas*, Hbn.

H. misippus, L.—A very rare migrant. I first took it on June 20th, 1920, a male now in the collection of the Ministry of Agriculture, Cairo. I have since taken further specimens of both sexes, the males much less damaged than would be expected of a species which soon tears itself to bits. Its habit of sitting on a coign of vantage and darting out at all other butterflies that approached it was noted.

Genus VII., *Pyrameis*, Hbn.

P. cardui, L.—Odd specimens from December till April amongst which an occasional fresh emergence is to be seen. It becomes more plentiful in May and June, the main brood emerging about the end of July. The species is then common till the end of November. As elsewhere a very level species not given to overmuch variation. It has twice come to light in my moth trap, on November 10th, 1920, and December 6th, 1920.

The following are very minor aberrations observed.

1. The marginal row of spots on the hindwing above, very much reduced.

2. The marginal spots heavily ocellated with light blue. (This is noticeable to a very small extent in a good number of specimens, but is very marked in the aberration mentioned.)

3. A specimen with a small ocellated spot beneath the third (the white) spot on the apex of the forewing beneath, and the ground colour above of a deeper red than usual.

Family 8, *Lycaenidae*.Genus XXIII., *Virachola*, Moore.

V. livia, Klug.—Feeds here on the pomegranate, and as there are not a great many trees, is not very common. (I have never found it on dates, but have examined dates that appear to have suffered from its ravages.) I found the species common on Kitchener's (Sirdar's) Island where the foodplant is more plentiful.

My notes for 1920 will serve to illustrate its times of appearance:—

Bred 2 ♀ ♀ and caught 4 ♀ ♀ June 27th. Onwards a few males and females daily till June 30th. A few bred in captivity after this date. A further brood flying from July 27th till August 10th. A third very small brood on August 27th till 29th. The June and July broods about equal in number, perhaps a dozen in the August lot. Females preponderated in the June brood in the proportion of 3 to 1, in the July brood 2 to 1, and in the August brood males and females were about equal in numbers.

My specimens vary only in size, males ranging from 22mm. to 31mm., and females from 25mm. to 31mm. I have been unable to trace any as occurring in the early spring. Best obtained by either breeding from infected fruit or by collecting the pupae.

Fruit infected has a small hole bored in it and a lump of frass exuding therefrom. Fruit, in which is a plain hole without frass, is unoccupied, the larva having left to pupate. I used to collect the fruit and stand the stems in water giving the larvae dead leaves to pupate in. The pupae are not difficult to find, being placed under loose bark or attached to the bark in crevices and at the foot of the tree amongst the dead leaves, etc. On occasions, when disturbed, the pupa in some way emits a squeak, not unlike the noise made by freshly emerged *V. io*, L., when annoyed.

Genus XXVI., *Lampides*, Hb. (*Polyommatus*, Latr.)

L. bacticus, L.—Always common everywhere, and is continuous brooded all the year, though the winter broods are very small. Varies considerably in size, being on the whole larger in the spring broods. My males range from 20mm. to 36mm., and the females from 25mm. to 36mm. They vary in colouring and marking but little, and from many thousands examined I have only one aberration of note, a male, above, normal, beneath, forewing having the outer marginal lines merged into a broad marginal band of light greyish brown, the line of white crescents appearing very faintly. Costa and basal area slightly tinged with light brown. The remainder of the wing a bluish grey, the nervures showing slightly brownish. Hindwing of the same light brown, and except for the line of crescents in the marginal band which appear faintly, almost entirely devoid of the usual white markings. The silver-green lower border to the spots at the anal angle almost suppressed, the black spots and inner border typical.

Genus XXIX., *Syntarucus*, Btlr. (*Tarucus*, Moore.)

S. telicarus, Lang.—Almost a plague from February till November, and common in December and January. Continuous brooded all the year. The females are usually well marked and very blue above. I

examined many thousands, and at times one can entrap from 20 to 30 in the net with a single sweep. The undersides vary slightly in depth of colour, but otherwise they show no aberration. I have two males with white patches on their wings above, the first with a round white patch on the fore- and hindwing on the right side, the other the central area of the forewing on the left side more or less white. This species also has twice come to light in my moth trap, on June 20th, 1920, and on April 7th, 1921.

Genus XXIX., *Tarucus*, Moore.

T. mediterraneus, B-B.—Very local even in the gardens here, and I have only taken it at four spots, three of which are patches of a coarse grass. Though I have taken specimens in January, its first real brood appears to be in March, and I have noticed broods in late May, late June, late July, and in September. Probably it is continuous brooded throughout the summer. The females are well marked and in most the blue basal area of the forewings is very bright. I have taken no aberrations amongst the five or six hundred I have examined.

Genus XXX., *Azanus*, Moore.

A. elousis, Deman.—Common on one of the islands in the cataract, but except for a few straying specimens, I have not seen it elsewhere. It possibly appears on other islands that I have not examined. March till November. I have always found it uncommon in June and July. No variations have occurred amongst the considerable number that I have examined.

A. ubaldus, Cr.—A species of *Azanus*, identified for me as *A. ubaldus* Cr., by the Entomological Section of the Ministry of Agriculture, Cairo. Verified at the Brit. Mus. Nat. Hist., South Kensington.

Taken sparsely around necia. The earliest date on which I have seen it is June 12th, and it flies till about November 20th, but is easily killed off by cold. I have found it rare till August. Probably the best spot for it is the patch of vegetation on the west bank alongside the North Canal.

Genus XXXI., *Zizeria*, Chap. (*Zizera*, Moore.)

Z. lysimon, Hbn., f. *karsandra*, Moore.—Specimens were identified by the Ent. Sect. of the Min. of Agriculture, Cairo, as *karsandra*, Moore. I cannot say if all Egyptian *lysimon* can be referred to this aberration which was described from a single female and is mentioned by Seitz, *Macrolep. Pal. Fauna.*, Vol. I., p. 295, as a "pale female form."

Always common and appears to be continuous-brooded all the year. Above it shows no variation. Beneath it varies in depth of colour and in size, etc., of the spots, the latter usually being much reduced in the female. My underside aberrations are as follows:—

ab. *mora*, Swin.—Two specimens.

ab. 1. Male. Ground colour beneath rather darker than usual, discal lunules brown and very prominent, marginal row of spots represented by one or two minute black specks that are only noticeable on close inspection, remainder of usual underside spottings absent.

ab. 2. Two males. Both wings uniform brown showing usual lighter markings very faintly, discal lunule on forewing brown, on the hindwings scarcely discernible. Black marginal spots on the forewing represented by the upper five spots only, a faint trace of the basal spots on the hindwing in one specimen, markings absent from the hindwing in the other.

ab. 3. Male. Upper five spots of marginal row of the forewing elongated and rather pearshaped. Lower spot very much reduced.

ab. 4. Two females. All the underside spots and markings prominent. The spots of the marginal row on the forewing enlarged, in the one specimen the third from the top outwardly, the remainder inwardly, in the other specimen the third and fourth outwardly, the others inwardly.

ab. 5. Female. The black spots beneath prominent, the forewing having on the left side three, on the right side four, small additional black spots between the discal lunule and the marginal row of spots.

Genus XXXII., *Chilades*, Moore.

C. trochilus, Fr.—Common on certain islands and along the Nile banks. Is apt to be overlooked. First emerges the first week of March, but is not common till May. Vary little and are of good size (on the whole a good deal bigger than my Cyprian examples.) I have examined between 1300 and 1500 specimens and have only one aberration which I herewith describe.

C. trochilus, Fr., ab. *albolunulata*, ab. nov.—♂. The ground colour of the crescent on the hindwings both above and below white. In all respects otherwise as in type.

Described from one ♂ in coll. auct. taken at Reservoir near Aswan, Upper Egypt, May 20th, 1920.

Section *Grypocera*.

Sub-family 3, *Pamphilinae*.

Genus XXXVII., *Gegenes*, Hbn.

G. nostradamus, F.—Common in October and November, 1919, and a few about in December. One at light in the moth trap (!) on February 19th, 1920, and one on berseem on February 20th. I next saw it singly on June 3rd, 11th, 14th, and 27th. Common from the second week of July till November. I saw only one or two specimens in 1921 prior to going away and it was not common on my return in October.

I found it common at Maadi in April, May, September, and November—the only months I have been there.

Genus XXXIX., *Parnara*, Moore.

P. mathias, F.—Not taken at Aswan. I found it common at Maadi in April, May, September, and November.

P. zelleri, Led.—Not taken at Aswan. I saw two specimens at Maadi in May, 1920, and captured one of them.

II. A short note on the Bombyces and Sphinges, etc., of the Aswan district of Egypt.

By KENNETH J. HAYWARD, F.E.S.

NOTE.—The following insects collected between September, 1919, and March, 1922, are now in the Natural History Museum, South Kensington.

Only nine certain local insects of this group could be found. A tenth *Hippotion celerio*, L., is most probably somewhere in the district, but must be somewhat uncommon. *Deilephila nerii* is a pest on the Oleander, and during one season, natives had to be employed to collect the larvae in baskets, and throw them into the Nile! Every bush was stripped bare.

Phalaenae.

[The Bombyces, Sphinges, etc., are arranged after Seitz, "Macrolep. Pal. Fauna." Vol. 2.]

Bombyces, Family 4, *Arctiidae*.

Sub-family 1, *Nolinae*.

Genus V., *Celama*, Walk.

C. squalida, Stgr.—Common from February till October and varies but little.

Sub-family 4, *Micrarctiinae*.

Genus XXXIII., *Utetheisa*, Hbn.

U. pulchella, L.—Emerges about the beginning of the third week of March, a few appearing before this date, and the insect being again scarce from about March 20th. An occasional specimen may appear at any time and one or two usually come out in October and November. In 1920 thousands emerged in the March brood and the place was alive with them whilst I saw less than two dozen specimens in the 1921 brood. In the great emergence of 1920 I examined many hundreds securing two ab. *pallida*, Spul., one ab. *melampyga*, Spul., and one dwarf of 25 mm. referable to ab. *tenuella*, Seitz. I was led to hope that so many thousands would yield me some striking aberrations, but beyond the specimens above mentioned and a fine range of upperside markings I was to be disappointed. The species does not seem to vary to the extent one would expect in an insect so marked.

The species is of good size here, the average being from 40 mm. to 41 mm., and my largest specimen is 45 mm. The forewing above varies in marking and colouring, spots becoming confluent, etc., and in some cases one or other of the colours will predominate, usually the red, the black tending to diminish. Beneath, the specimens generally are unusually heavily and darkly marked for *U. pulchella*.

Family 5, *Lymantriidae*.

Sub-family 1, *Areolatae*.

Genus V., *Orgyia*, O.

O. dubia, Tausch.—I have only seen two specimens at Reservoir, a male and a female, both taken at the end of November, 1921, and both were taken at light.

Family 7, *Lasiocampidae*.

Genus X., *Nadasia*, Walk.

N. undata, Klug.—Common all the year. Plays havoc with the acacia trees, but I have not found it breeding on the East bank as yet.

The males vary little, but the females vary in colour from dark to light grey and light brown.

A few specimens of this insect from Reservoir are now in the B. M. series.

I was preparing to work out the life-history of this insect and that of *Taragama acaciae*, Klug., which follows, but pressure of work caused me to postpone my observations till my return from leave. Having however resigned in the meantime, I give the few following facts in case they may be of interest.

The eggs are laid in large clusters on the slender outside twigs of acacia and are at first of a light peagreen colour, oval, and about 11 mm. × 6 mm.

During the heat of the day the larvae congregate on or near the main trunk where it is more shaded. A very large number of those on the outside branches drop off the tree and make their way to the trunk along the ground. The pupa is enclosed in a spun cocoon of 13.0 to 16.0 mm. length and about 4.0 mm. diameter, rounded at each end. This case is rarely attached to the branches or trunk of the tree, and is more usually found under flat stones under or close to the tree. The cocoon sometimes has bits of dirt, dead leaves, etc., spun into it, rendering it difficult to locate. From January-March its imagines emerged between 4.20 p.m. and 4.45 p.m.

Genus XXII., *Taragama*, Klug.

T. acaciae, Klug.—I overlooked this handsome moth till the autumn of 1921, when I found an old pupa case, which led me to search further acaciae with the result that I found eggs, pupae, and caterpillars in large numbers. The moth I have only once seen wild, a newly emerged ♀ drying its wings. It appears at present to be confined to the West bank as I have only found three pupae on the East. The larvae are so similar to the bark of acacia in colouring that often the most careful search will fail to reveal a specimen that is eventually

found by being touched. Whilst the pupae are generally attached to twigs and are conspicuous from their whiteness, they are in some cases attached to the trunk—usually in the fork of a branch, and are so covered over with bits of bark as to appear part of the tree.

All my specimens are bred. The males vary little, the females considerably, chiefly in the intensity and extent of the brownish grey suffusion over the discal area. This may be absent entirely (except along the costa), or entirely cover this area, giving the wing the appearance of having a dark ground colour and light markings. I have one specimen in which the whole of the forewing is of a rich brown, only the glossy white outer edge of the median band appearing light. The hindwings are also somewhat tinged with brownish, shading from the outer margin towards the base. The moth is common in all stages from September till March (and probably all the year), on acaciae. I have bred a few from larvae, and about 200 from wild pupae. The female I have found, lays on an average about 350 eggs (my actual figure is 347), laying them in clusters of an average of 12 eggs per cluster. Although I have on occasions found as many as 27 and as few as 1 egg per cluster, in 90% the numbers were between 8 and 16.

A long series of this moth that I brought home in papers are now in the National Collection at S. Kensington, together with a few specimens of the egg, etc.

Family 14, Saturniidae.

Genus III., *Samia*, Hbn.

S. pygmaea, Btl.—(Introduced by the Ministry of Agriculture from India but not acclimatised). I have bred this species in the open (with difficulty) on castor-oil plant. After pupating however it must be kept in an artificially moistened air, and even if all precautions are taken to prevent the pupae getting too dry, only a very small percentage of moths emerge in a perfect condition. The slightest temperature changes are harmful, and the insect is killed by the cold winters unless special care is taken. This moth was introduced with a view to starting a silk industry. It does not seem probable that it will ever be a success in Southern Egypt owing to the low relative humidity per cent.

Sphinxes, Sub-family 1, *Acherontiinae*.

Genus II., *Herse*, Oken.

H. convoluta, L.—March till September. Never very common. My specimens are very finely marked.

Sub-family 4, *Philampelinae*.

Genus XXVII., *Deilephila*, Led.

D. nerii, L.—Abundant from February till November, and common in December and January. I have taken the larva during every week of the year but it is not common in December and January. As in the case of *Danais chrysippus*, L., I have found that winter bred specimens are on the whole much darker than hot weather broods. The larvae of this species sometimes becomes a plague, stripping the Oleander bushes

LIST

OF THE

Hymenoptera

OF

Hampshire and the
Isle of Wight

COMPILED BY

H. P. JONES

(Reprinted from "The Entomologist's Record.")

LONDON

1925-6.

The Hymenoptera-Aculeata of Hampshire.

By HUGH P. JONES.

Of the 354 species at present known with certainty to inhabit the county, 31 belong to the Ants, 116 to the Fossores, 22 to the true Wasps, and 185 to the Bees. Doubtless a good many more of the last group remain to be discovered; certain genera of which (notably the *Andrenidae*) have so far received but little attention in Hampshire from Hymenopterists. I have been careful to exclude any doubtful record, and most of the species in the following list that have not actually come under my own observation in South Hants, are recorded as having been received from the New Forest within recent years by Dr. R. C. L. Perkins.

The classification of the Ants is that adopted by Mr. Donisthorpe in his fine monograph on the British species. Otherwise, allowing for recent necessary changes in nomenclature, I have mainly followed Saunders' 1902 Catalogue.

An asterisk in front of a particular record indicates that the species was first described as British from Hampshire.

HETEROGYNA-FORMICIDAE—ANTS.

PONERINAE.—*Ponera coarctata*, Latr.—New Forest (Hamm). I. of Wight: Ventnor (Dale); Sandown (Fowler).

P. punctatissima, Roger.—Portsmouth (Donisthorpe and Pool). An originally introduced species found mainly indoors.

MYRMICINAE.—*Myrmecina graminicola*, Latr.—Hurst Castle (Dale); Woodbay (Harwood). I of Wight: Blackgang Chine (Curtis); Luccombe and Shanklin (Fredk. Smith); St. Helens and Sandown (Donisthorpe).

Formicoxenus nitidulus, Nyl.—New Forest (Waterhouse); Bournemouth (Jackson). In nests of *Formica rufa*, and not uncommon.

Anergates atratulus, Schenck.—New Forest (Crawley and Donisthorpe). In nests of *Tetramorium caespitum*.

Monomorium pharaonis, L.—Winchester (Wakefield); Bournemouth (Barnes). I. of Wight: Ventnor (F. Smith coll.). An originally introduced species, and found indoors.

Solenopsis fugax, Latr.—I. of Wight; Sandown (Fowler); Blackgang (Donisthorpe). In nests of other species.

Myrmica laevinodis, Nyl., *M. ruginodis*, Nyl., *M. sulcinodis*, Nyl., *M. scabrinodis*, Nyl., *M. lobicornis*, Nyl., and intermediate forms all occur, most of them very commonly.

M. scabrinodis var. *sabuleti*, Meinert.—New Forest (Donisthorpe). I. of Wight; Landslip, near Shanklin (Donisthorpe).

Stenamma westwoodi, West.—New Forest (D. Sharp, Camb. Mus. coll.); Portsmouth (Reading, Brit. Mus. coll.). I. of Wight; Blackgang Chine (Curtis); Freshwater (Dale); Parkhurst Forest (Donisthorpe).

Leptothorax acervorum, F.—New Forest (Dale); Eastleigh (F. J. Killington); Bournemouth (Farren White); Harewood Forest (Harwood). I. of Wight: Parkhurst Forest (J. Taylor). Aldridge Hill enclosure in the New Forest is a good locality for this species, which occurs under the bark of old stumps. Well distributed and not uncommon.

L. nylanderii, Först.—Dibden (Crawley); Ryde, I. of Wight (Donisthorpe).

L. tuberculatum, F.—New Forest (Dale); Hayling Is. (Saunders). I. of Wight: Landslip (Lewis); Ventnor (Saunders).

**L. interruptus*, Schenck.—New Forest, where it was first discovered in England by Crawley and Donisthorpe, 23. vii. 12.

Tetranorium caespitum, L.—New Forest (Donisthorpe); Bournemouth (F. Smith); Hayling Is. (Saunders); Fleet (E. A. Butler). I. of Wight: Sandown, Shanklin and Luccombe Chines, the Undercliff, and Ventnor (F. Smith); Landslip (Fowler); Blackgang Chine (Donisthorpe). Not uncommon on sand, and evidently well distributed.

DOLICHODERINÆ.—*Tapinoma erraticum*, Latr.—New Forest (Hamm): Bournemouth (Dale); Harford Bridge Flats (E. A. Butler). I find this tiny black ant common in gravel pits on Setley plain, nr. Lymington, and elsewhere in South Hants. I. of Wight: Parkhurst Forest (E. A. Butler).

CAMPONOTINÆ.—*Donisthorpea (Lasius) fuliginosa*, Latr.—Somewhat local, but otherwise common, occurring mostly on trees.

D. nigra, L.—Abundant everywhere, nesting often under bark of old stumps.

D. aliena, Först.—New Forest (J. J. F. X. King); Bournemouth (Rothney); Hayling Is. (Saunders); Fleet (E. A. Butler). I. of Wight: Blackgang, the Landslip, Shanklin and Sandown (Donisthorpe); St. Helens (A. H. Hamm).

D. flava, F.—Abundant everywhere, but nests are usually small and underground.

D. umbrata, Nyl.—Bournemouth (F. Smith); Lymington (Donisthorpe); Hayling Is. (Saunders); Fleet (E. A. Butler). I. of Wight: Landslip (Fowler); Sandown (Donisthorpe); Luccombe Chine (J. Taylor); Blackgang Chine (Bedwell); Shide (Morey); Bonchurch (Morice).

D. mixta, Nyl.—The Landslip, I. of Wight (Dale coll).

Formica rufa, L.—Extremely common (in the New Forest I have had four nests in sight at a time) in planted pine, or "mixed" woods.

F. pratensis, Retz.—Bournemouth (F. Smith), and probably more generally distributed (Donisthorpe).

F. cesceta, Nyl.—New Forest (Bradley); Bournemouth (F. Smith);

Boscombe and Ringwood (Farren White); Parkhurst Forest, I. of Wight (E. A. Butler).

F. sanguinea, Latr.—New Forest (F. Smith); Cove, Hawley, and Blackwater (F. Smith); Selborne (Dale coll.); Fleet (E. A. Butler).

F. fusca, L.—Common almost everywhere. The var. *glebaria*, Nyl., is recorded from Bournemouth, and Hayling Is. (Saunders coll.); New Forest (Crawley) and I. of Wight. Var. *rubescens* For., from New Forest (Donisthorpe) and Landslip, I. of Wight (Donisthorpe).

F. picea, Nyl.—Matley Bog, New Forest (Arnold and Piffard); Bournemouth (F. Smith). I. of Wight (?) [F. Smith coll.].

FOSSORES.

MUTILLIDÆ.—*Mutilla europaea*, L.—Well distributed, and not uncommon. Perhaps most often met with in the New Forest where I have taken it, amongst other places, as follows: Aldridge Hill enclosure (including a pair *in copula*); Rhinefield (males fairly common on bramble blossom, etc.); Perry Wood, Irons Hill, near Brockenhurst; Matley Bog; Holmsley and Wootten enclosures; Norley Wood. The male appears very black in flight, and in my experience is more often met with than the female. Bournemouth (Harwood, and others); Southampton district; Sway; Milton (H. P. Jones).

M. rufipes, Latr.—Most often found on the coast, where it frequents the rough weedy ground at the foot of the broken sandy cliffs, which stretch between Milford and Bournemouth. Barton-on-Sea, Highcliffe, and New Forest (H. P. Jones); Bournemouth; Hayling Is.; Sandown, I. of Wight (Saunders).

Myrmosa melanocephala, Fab.—Milford (Jones); New Forest (R. C. L. Perkins). Locally common.

Methoca ichneumonides, Latr.—Fairly common in the New Forest. I. of Wight—Blackgang Chine and Sandown—is given by Saunders.

TIPHIIDÆ.—*Tiphia femorata*, Fab.—Blackwater (F. Smith).

T. minuta, V. de L.—New Forest; common (R. C. L. Perkins).

SAPYGIDÆ.—*Sapyga quinque-punctata*, Fab.—Lymington in garden (H. P. Jones).

POMPILIDÆ = PSANMOCHARIDÆ.—**Psammochares* (*Pompilus*) (subgenus *Wesmaslinus*) *sanguineolentus*, Fab.—Emery Down, New Forest (D. Sharp).

Ps. unicolor, Spin.—New Forest (R. C. L. Perkins); Steephill, Ventnor, I. of Wight (Rothney).

Ps. bicolor, Lep.—Common in the New Forest where I have taken it at Balmer Lawn (Brockenhurst), Setley and Royden, Beaulieu, etc. Bournemouth (Saunders); Sway (Jones).

Ps. rufipes, L.—New Forest; fairly common. (Jones); Hayling Is. Bournemouth; I. of Wight (Saunders).

Ps. cinctellus, Spin.—Not uncommon in the New Forest. Hawley (Dale); Sway, etc., (Jones).

Ps. plumbeus, Fab.—Common on Coast, and inland at Setley (Jones), and New Forest generally.

Ps. niger, Fab.—Very common inland, and occurs on the coast at Milford, Highcliffe, etc.

Ps. viaticus, L.—This fine distinct species is common everywhere on sandy banks inland, and by the sea.

Ps. consobrinus, Dhlb.—Sandhills on the west of Hayling Is. (Saunders).

Ps. minutulus, Dhlb.—New Forest; common (H. P. Jones).

Ps. spissus, Schiödte.—New Forest (R. C. L. Perkins); Perry Wood, Brockenhurst (H. P. Jones), and probably fairly generally distributed.

Ps. chalybeatus, Schiödte.—New Forest (Perkins); Bournemouth (Saunders). I have taken it at Sway and Setley.

Ps. gibbus, Fab.—Common on sandy banks by woods, on heaths, etc.

Ps. unguicularis, Thoms.—New Forest; both sexes in abundance at flowers of spurge (H. P. Jones). Bournemouth; Hayling Is. (Saunders).

Ps. wesmaeli, Thoms.—Bournemouth (Saunders); New Forest (Perkins).

Ps. pectinipes, V. de L.—New Forest (R. C. L. Perkins); Perry Wood, Brockenhurst; fairly common (H. P. Jones); Bournemouth (Saunders).

Salix tuscus, L.—Abundant everywhere, and very variable in size, some females being comparatively enormous.

S. affinis, V. de L.—Not uncommon. New Forest (Perkins); Bournemouth (Saunders).

S. exaltatus, Fab.—New Forest, but not very common. I. of Wight (Saunders).

S. notatulus, Saund.—New Forest (Perkins); Bournemouth (Saunders).

S. obtusiventris, Schiödte.—New Forest (Perkins); Bournemouth (Dale); Ventnor, I. of Wight (Rothney).

S. pusillus, Schiödte.—Not uncommon in the New Forest.

S. parvulus, Dhlb.—Generally distributed, and often very abundant.

Calicurgys hyalinatus, Fab.—Fairly common in New Forest. Sandown, I. of Wight (Marshall).

Pseudagenia carbonaria, Scop.—Lyndhurst, New Forest (C. Morley).

Agenia hircana, Fab.—New Forest (Saunders).

A. variegata, L.—New Forest (Dale); Steep-hill, Ventnor, I. of Wight (Rothney).

Hypticeraeus (Ceropales) maculata, Fab.—Quite common, if rather local. In the New Forest I have taken it, amongst other places, on the railway banks at Wood Fildley.

C. variegatus, Fab.—New Forest (R. C. L. Perkins); Parley Copse (Rudd).

SPIEGIDÆ.—*Astutus boops*, Schr.—Setley (H. P. Jones); New Forest (R. C. L. Perkins). Common where it occurs.

A. stigma, Panz.—New Forest (R. C. L. Perkins); Hayling Is. (F. Smith).

Tachytes unicolor, Panz.—Hayling Is., Sandown Bay and Ventnor, I. of Wight (Rothney).

T. pectinipes, L.—Common about sandy patches on heaths.

Trypoxylon figulus, L.—Everywhere abundant.

T. clavicerum, Lep.—Common, and well distributed.

T. attenuatum, Smith.—Milford and New Forest; Matley Bog, etc.

(H. P. Jones).

Sphex (Ammophila) sabulosa, L.—Very common; usually on sandy banks in or near woods. Less frequently seen on heaths than the next.

S. (A.) campestris, Latr.—Well distributed, and abundant on the New Forest heaths.

Psammophila hirsuta, Scop.—In some seasons extremely common in gravel pits at Setley, and elsewhere in the New Forest. Also occurs on the coast at Milford, etc. I. of Wight (Saunders).

Ps. lutaria, Fab.—Saunders gives Hayling Is., and coast of Hampshire. I have, so far, only found *hirsuta* on coast between Milford and Bournemouth.

Spilomena troglodytes, V. de L.—New Forest (R. C. L. Perkins).

Stigmus solskyi, Moraw.—Not uncommon, and well distributed.

Pemphredon lugubris, Latr.—Extremely common.

P. shuckardi, Moraw.—Common.

P. wesmaeli, Moraw.—Not uncommon; Lymington and New Forest.

P. lethifer, Schuck.—Very common.

Ceratophorus morio, V. de L.—Quite common, and well distributed in my experience. Occurs frequently in gardens at Lymington and Brockenhurst.

Diodontus minutus, Fab.—Sand-banks on heaths generally.

D. luperus, Schuck.—New Forest (R. C. L. Perkins); Hayling Is. (Saunders).

D. tristis, V. de L.—Common, and well distributed.

Passaloeus corniger, Schuck.—New Forest (R. C. L. Perkins).

P. insignis, V. de L.—New Forest (R. C. L. Perkins); Lymington (H. P. Jones). I. of Wight (Saunders). Fairly common.

P. gracilis, Curtis.—New Forest (Perkins); Lymington. (H. P. Jones). No doubt common and well distributed.

P. monilicornis, Dhlb.—New Forest (R. C. L. Perkins).

Psen (Mimesa) shuckardi, Wesm.—Not uncommon in the New Forest (Jones). Parley Heath (Dale). I. of Wight.

Ps. equestris, Fab.—Balmer Lawn, Brockenhurst (H. P. Jones), and no doubt fairly generally distributed.

Ps. bicolor, Fab.—Very common in sandy places.

Ps. unicolor, V. de L.—New Forest (G. Arnold and others); Parley Heath (Dale). Fairly common in South Hants., and possibly more generally distributed.

Ps. dahlbomi, Wesm.—New Forest (R. C. L. Perkins).

Psenulus pallipes, Panz.—Common, and well distributed.

Pss. (Miscophus) concolor, Dhlb.—Brockenhurst, New Forest (G. Arnold).

Harpactus tumidus, Panz.—New Forest; common (R. C. L. Perkins).

Gorytes mystaceus, L.—Abundant in woods on *Umbelliferae*, *Euphorbiae*, etc.

Geropales (Hoplisis) laticinctus, Lep.—Brockenhurst (Arnold *vide* Piffard). I have recently taken this fine species at Royden, near Boldre, in the New Forest. It frequents rough brambly ground in wood-

clearings, and is probably not very rare, but overlooked. Shuckard recorded ♂ and ♀ from the New Forest in the past.

G. (H.) bicinctus, Rossi.—New Forest (Curtis). I once saw what I am fairly certain was this species on a bramble leaf at Lymington.

Nyssus spinosus, Fab.—Common in woods during spring at flowers of Spurge (*Euphorbia*), a plant peculiarly attractive to Aculeates.

N. interruptus, Fab.—Bournemouth and N. Forest (Dale).

N. dimidiatus, Jur.—Hayling Is. (Saunders). New Forest?

Didineis unicornis, Fab.—New Forest (R. C. L. Perkins).

Mellinus arvensis, L.—Often in extraordinary abundance in sandy situations both inland and by the sea.

M. sabulosus, Fab.—Christchurch (Dossetor); I. of Wight (Saunders). I have only found the preceding species on the coast between Lymington and Bournemouth.

Philanthus triangulum, Fab.—Heron Court. Sandown Bay, I. of Wight, in abundance (F. Smith). I have no recent records of this fine species.

Cerceris ornata, Schaeff.—Common on heaths.

C. arenaria, L.—Widely distributed, but apparently local in the New Forest. I have only recently found it there, burrowing into grassy paths near the cricket pitch in front of the Balmer Lawn Hotel, Brockenhurst.

C. interrupta, Panz. Local, but common enough on most of the New Forest Heaths. Parley Heath (Dale).

C. labiata, Fab.—Quite common, although rather local. Often very abundant in the gravel pits on Setley Plain, near Lymington.

Ocybelus unilunus, L.—Common in sandy situations everywhere.

O. mandibularis, Dhlb.—New Forest; not uncommon (R. C. L. Perkins); Bournemouth and Hayling Is. (Saunders).

O. argentatus, Curt. (*micronatus*, Fab.).—Sandhills on Hayling Is. (Saunders).

Crabro clavipes, L.—Common almost everywhere.

C. leucostomus, L.—Abundant.

C. nigritus, Lep. (*pubescens*, Shuck).—New Forest (C. Morley).

C. cetratus, Shuck.—Brockenhurst, New Forest; Lymington (H. P. Jones). No doubt generally distributed, as it is not really a rare species.

C. capitosus, Shuck.—Not uncommon; New Forest, etc.

C. podagricus, V. de L.—New Forest, etc. (H. P. Jones).

C. styrius, Kohl.—New Forest (Champion).

C. aphidum, Lep.—New Forest (R. C. L. Perkins); Herne (Dale). Apparently scarce and local.

C. gonager, Lep.—Not uncommon, New Forest (R. C. L. Perkins); Lymington in garden (H. P. Jones).

C. palmarius, Schreb.—New Forest (D. Sharp, and others, *teste* Perkins); Herne (Dale).

C. varius, Lep.—Common, New Forest, etc. I. of Wight.

C. ovalis, Lep. (*anxius*, Wesm).—New Forest (G. Arnold).

C. wesmaeli, V. de L.—Common in many places.

C. elongatulus, V. de L.—Abundant.

C. quadrimaculatus, Dhlb.—Local, but very common where it occurs, mainly in the neighbourhood of woods.

C. dimidiatus, Fab.—New Forest (R. C. L. Perkins).

C. signatus, Panz.—New Forest ; local, but not uncommon.

C. vagabundus, Panz.—Common, and well distributed.

C. cavifrons, Thoms.—Abundant on the coast between Milford and Higheliffe, but rather scarce inland. The presence also of an allied species is suspected in former area.

C. chrysostomus, Lep.—Very common.

C. vagus, L.—Common in woods and gardens.

**C. larvatus*, Wesm.—New Forest (F. D. Morice).

C. cribrarius, L.—Fairly common on heaths.

C. peltarius, L.—Not very common, and much more local than the last species.

C. scutellatus, Schr.—New Forest ; local, but not uncommon.

C. interruptus, De. G.—Very common in South Hants, particularly in gardens.

C. lituratus, Panz.—An abundant woodland species in the New Forest, the males swarming on *Umbelliferae*.

C. abilabris, Fab.—Common, and well spread.

C. panzeri, V. de L.—Locally abundant. New Forest (R. C. L. Perkins) ; I. of Wight (F. Smith).

Entomognathus brevis, V. de L.—Common, and generally distributed.

DIPLOPTERA=TRUE WASPES.

Vespa crabro, L.—Common. On warm autumn evenings in the New Forest the males and neuters often commandeer the Lepidopterist's sugar patches.

V. vulgaris, L.—Common.

V. germanica, Fab.—Common ; more so in cultivated areas than *vulgaris*.

V. rufa, L.—Abundant in Forest districts, and hardly less so in fields and gardens.

V. sylvestris, Scop.—Common in woods.

V. norvegica, Fab.—Not very common. I have only found it in numbers at Royden in the New Forest.

**Polistes gallicus*, L.—Chandler's Ford (R. B. Robertson).

Odynerus spinipes, L.—Common in most woods ; particularly abundant in the New Forest enclosures.

O. melanocephalus, Gmel.—New Forest (R. C. L. Perkins) ; Royden, near Boldre (H. P. Jones). Scarce and local in South Hants., but no doubt much overlooked. I. of Wight (Saunders).

O. laevipes, Shuck.—New Forest occasionally (D. Sharp teste Perkins) ; Several at Royden in 1922 (H. P. Jones) flying over the same ground on which *H. latieinctus* occurs.

O. reniformis, Gmel.—New Forest ; local, but not very uncommon (H. P. Jones).

O. callosus, Thoms.—Abundant everywhere.

O. parietum, L.—Widely distributed, but very much less common than the last.

O. pictus, Curt.—Not generally common. Occurs in gardens at Lyminster and Brockenhurst. I. of Wight (F. Smith).

O. trimarginatus, Zett.—Common at Lyminster, and all along the coast. Inland at Brockenhurst, and many other places.

O. trifasciatus, Oliv.—Not very common, but probably widely distributed inland. New Forest (Sharp, Perkins, and others). Brockenhurst (H. P. Jones).

O. parietinus, L.—Very common in woods and gardens.

O. antilope, Panz.—Common at Lymington, and in most other parts of South Hants. I frequently come across the females burrowing into the well-known banks surrounding the New Forest enclosures.

O. crassicornis, Panz.—Wood Fidle, New Forest (H. P. Jones). Has also been taken in the New Forest by G. Arnold.

O. gracilis, Brullé.—Locally common in woods.

O. sinuatus, Fab.—Rather local, but otherwise common.

Eumenes coarctata, Latr.—The well known "Potter wasp" is common throughout South Hants., but occurs only on heaths. I have taken it at Setley in the New Forest up to the end of September.

ANTHOPHILA = BEES.

Colletes glutinans, Cav. (*succincta*, L.)—Common on all heaths.

C. fodiens, Kirby.—Fairly common; chiefly near the sea, Highcliffe (Jones); Bournemouth (Saunders); Hayling Is. (Saunders).

C. picistigma, Thoms.—I find it common near the beach at Barton-on-Sea. Chewton (S. S. Saunders). No doubt occurs on most of the coast between Lymington and Bournemouth.

C. daviesana, Smith.—Common.

Hyleus (Prosopis) palustris, Perk.—New Forest (C. Morley).

H. cornuta, Smith.—Cove Common (F. Smith). The original specimen is now in the possession of Dr. R. C. L. Perkins.

H. spilota, Först. (*masoni*, Saund.)—Hayling Is. (Saunders).

H. dilatata, Kirb.—Blackwater (Smith); Bournemouth (Dale). Frequent in the New Forest, and no doubt generally distributed.

H. communis, Nyl.—Very common.

H. signata, Panz.—Lymington (Jones) and probably elsewhere.

H. hyalinata, Smith.—Abundant.

H. confusa, Nyl.—New Forest; common (R. C. L. Perkins). Perhaps generally distributed.

H. minuta, Fab. (= *brevicornis*, Nyl.)—Not uncommon in many localities.

H. pictipes, Nyl.—New Forest (R. C. L. Perkins); Hayling Is. (Saunders).

Sphecodes gibbus, L.—Very common on heaths.

S. reticulatus, Thoms.—Common locally in New Forest. I. of Wight (Saunders).

S. monilicornis, K. (*subquadratus*, Smith).—Generally distributed, and usually common.

S. rubicundus, V. Hag.—New Forest (Arnold and Sharp, *teste*, Perkins).

S. spinulosus, V. Hag.—New Forest (G. Arnold).

S. puncticeps, Thoms.—Locally common in the New Forest. Bournemouth (Saunders).

S. longulus, V. Hag.—New Forest (G. Arnold).

S. pellucidus, Sm. (*pilifrons*, Thoms.).—Common, and generally distributed.

- S. similis*, Wesm.—Locally abundant.
- S. ferruginatus*, Schenck.—New Forest (G. Arnold).
- S. hyalinatus*, Schenck.—New Forest (G. Arnold).
- S. dimidiatus*, V. Hag.—Common.
- S. affinis*, V. Hag.—Common. With the exception of *S. spinulosus*, *S. rubicundus*, and *S. ferruginatus*, I have taken all the above *Sphecodes* on Setley heath, south of Brockenhurst.
- Halictus rubicundus*, Christ.—Extremely common.
- H. maculatus*, Smith.—Blackwater (F. Smith).
- H. xanthopus*, Kirb.—Common in I. of Wight (Ventnor, etc.), but I have no certain record for the mainland.
- H. leucozonius*, Schr.—Very common.
- H. zonulus*, Smith.—Quite common, and well distributed.
- H. quadrinotatus*, Kirb.—Common.
- H. laevigatus*, Kirb.—Often very common in the New Forest (H. P. Jones); Ventnor, I. of Wight (Saunders).
- H. prasinus*, Smith.—Locally common in New Forest area.
- H. calceatus*, Scop. (*cylindricus*, Fab).—Very common. ✓
- H. albipes*, Kirb.—Abundant.
- H. malachurus*, Kirb.—Common in I. of Wight. Doubtfully recorded from mainland.
- H. paucillus*, Schenck.—New Forest (R. C. L. Perkins).
- H. fulvicornis*, Kirb.—Common. [*H. freygessneri*, Alfk. (= *subfasciatus*, Nyl., nec Saunders) I have not found this latter in Hants.] ✓
- H. villosulus*, Kirb.—Abundant.
- **H. brevicornis*, Schr.—Coast at Southbourne (E. Saunders).
- H. puncticollis*, Mor.—New Forest (G. Arnold).
- H. breviceps*, Saund.—New Forest (G. Arnold); Hayling Is. (Saunders).
- H. punctatissimus*, Schenck.—Quite common, if rather local.
- H. nitidiusculus*, Kirb.—Well distributed, but less common than the next species.
- H. minutus*, Kirb.—Common.
- H. minutissimus*, Kirb.—Plentiful in the New Forest.
- H. tumulorum*, L.—Very common.
- **H. flavipes*, Fab.—New Forest (R. C. L. Perkins). Probably not uncommon; see *Ent. Mo. Mag.*, 1922.
- **H. subauratus*, Rossi. (*gramineus*, Smith.)—Cove Common (F. Smith). I should say that Dr. Perkins casts some doubt on this record. ✓
- H. smeathmanellus*, Kirb.—Common and well distributed.
- H. morio*, Fab.—Abundant everywhere; undoubtedly the commonest in Hants of the "green" species.
- H. leucopus*, Kirb.—Common, but much more local than the last.
- Andrena albicans*, Kirb.—As elsewhere, extremely abundant, and often appears in extraordinary numbers on lawns.
- A. carbonaria*, L. (*pilipes*, Fab).—Common on heaths inland, and ✓ sandy banks by the sea.
- A. tibialis*, Kirb. (*atriceps*, Kirb.)—Not very common (at least, in S. Hants). L
- A. bimaculata*, Kirb.—Lymington district (H. P. Jones); Bournemouth (Saunders).
- A. rosae*, Panz. (1st brood *eximia*, Smith).—New Forest; not

uncommon, although many records undoubtedly apply to the next species.

A. trimmerana, Kirb. (1st brood *spinigera*, Kirb.)—The spring form *spinigera* is abundant at shallows in the New Forest, but the second brood is less easy to trace; it, however, apparently outnumbered *eximia*.

A. jacobii, Perk. (*rosae*, var. *trimmerana* of Saunders).—Common; particularly in the villages.

A. florea, Fab.—Well distributed, and not uncommon in S. Hants.

A. thoracica, Fab.—Abundant on heaths, etc; frequently nests in same situations as *carbonaria*.

A. nitida, Fourc.—Common in fields and gardens, but seems rarely, if ever, to occur on heaths with *A. thoracica*. At Lymington in some seasons almost every dandelion contains a specimen of this very handsome bee.

A. cineraria, L.—I have taken it commonly at Ventnor in the I. of Wight, but do not remember seeing it on the mainland.

A. fulva, Schr.—Well distributed, but usually scarce in S. Hants (This species in England seems most abundant in the midland counties). Common at Southampton (Wm. Fassnidge).

A. clarkella, Kirb.—Abundant in early spring about shallows, etc.

A. nigroaenea, Kirb.—Common everywhere inland, and by the sea.

A. gwynana, Kirb.—Very common.

A. angustior, Kirb.—South Hants generally.

A. praecox, Scop.—Common and widely distributed.

A. helvola, L.—Common in New Forest.

A. apicata, Smith. (*lapponica*, Zett.)—New Forest (E. B. Nevinson).

A. fucata, Smith.—Often extremely common in the New Forest.

A. nigriceps, Kirb.—Bournemouth (Saunders) and New Forest.

A. similima, Smith.—Bournemouth (Smith). Formerly abundant in I. of Wight, and probably still occurs there (R. C. L. Perkins).

A. tridentata, Kirb.—Locally common in New Forest (H. P. Jones); Christchurch (F. Smith); Bournemouth (Saunders).

A. fuscipes, Kirb.—A typical Hampshire species; occurs in myriads on all heaths.

A. denticulata, Kirb.—Common in S. Hants, and no doubt in the county generally.

A. flavipes, Panz. (*fulvicrus*, Kirb.)—Extremely common both inland and by the sea.

A. ferox, Smith.—New Forest (D. Sharp, C. Reuss and others).

A. bucephala, Steph.—Common about hedge banks in Brockenhurst village, and found singly elsewhere in New Forest (H. P. Jones).

A. hattorfiana, Fab.—Ventnor, I. of Wight (Rothney).

A. cetii, Schr.—Local, but often abundant in wood clearings and drives on scabious, etc.

A. marginata, Fab. (*cingulata*, Fab.)—Common at flowers of *Veronica chamaedrys*.

A. barbilibris, Kirb. (*albivrus*, Kirb.)—Well distributed, but not very common.

A. argentata, Smith.—South Hants generally, and locally abundant in the New Forest.

A. chrysoceles, Kirb.—A very common woodland species; often swarms at the flowers of Spurge.

- A. tarsata*, Nyl. (*analis*, Panz.)—In woods. Common and well distributed.
- A. coitana*, Kirb.—Abundant in woods.
- A. fulvago*, Christ.—Blackwater (Smith); Freshwater, I. of Wight (F. S. Saunders).
- A. humilis*, Imhoff.—Locally common; burrows in paths near woods.
- A. labialis*, Kirb.—Very common in forest districts.
- A. minutula*, Kirb.—Common.
- A. spreta*, Pérez.—New Forest (R. C. I. Perkins); Lymington (G. Arnold).
- A. saundersella*, Perk. (*nana* of Saunders).—Very common.
- A. proxima*, Kirb.—Blackwater (F. Smith).
- A. dorsata*, Kirb.—South Hants generally, and probably throughout county.
- A. similis*, Smith.—Very common in the New Forest area.
- A. wilkella*, Kirb.—Well distributed, but much scarcer in S. Hants than the last.
- A. oratula*, Kirb. (*afzeiella*, Kirb.)—Abundant.
- Macropis labiata*, Fab.—Many records from the New Forest where it is common at Beaulieu (E. B. Nevinson and others), and no doubt also occurs in north of county.
- Cilissa haemorrhoidalis*, Fab.—Bournemouth (Saunders).
- C. tricincta*, Kirb. (*leporina*, Panz.)—New Forest heaths; Hayling Is., and Bournemouth (Saunders).
- Dasypoda hirtipes*, Latr.—South Hants generally, but I have found it scarce in the New Forest of late.
- Panurgus calcaratus*, Scop.—Locally abundant, particularly on the coast between Milford and Bournemouth.
- P. ursinus*, Gmel.—New Forest, etc. Locally common.
- Dufourea vulgaris*, Schenck.—New Forest (G. Arnold).
- Nomada obtusifrons*, Nyl.—Fairly common in the New Forest.
- N. roberjeotiana*, Panz.—New Forest heaths, and quite common.
- N. rufipes*, Fab. (*solidaginis*, Panz.)—Swarms on all heaths with *Andrena fuscipes*.
- N. fucata*, Panz.—Sandown, I. of Wight (Saunders).
- N. serfasciata*, Panz.—New Forest (Dale). I find it not uncommon in some seasons at Setley, near Lymington.
- N. goodeniana*, Kirb. (*succincta*, Panz.)—Abundant everywhere.
- N. lineola*, Panz.—Setley occasionally, and elsewhere in the New Forest, but apparently uncommon in S. Hants.
- N. marshanella*, Kirb. (*alternata*, Kirb.)—Very common.
- N. flavopicta*, Kirb. (*jacobaeae*, Panz.)—New Forest; scarce and local. Bournemouth (Dale).
- N. lathburiana*, Kirb.—I. of Wight (Dale).
- N. alboguttata*, H. Schf.—New Forest; not uncommon (H. P. Jones): Bournemouth (Saunders). Probably occurs throughout S. Hants.
- N. ruficornis*, L.—Abundant everywhere (and variable!).
- N. bifida*, Thoms.—Common and well distributed.
- N. leucothalma*, Kirb. (*borealis*, Zett.)—Often extremely abundant. Abounds with the two preceding species and *M. goodeniana* at Sallows.

- N. hillana*, Kirb. (*ochrostoma*, Kirb.)—New Forest; fairly common. I. of Wight (Saunders).
- N. armata*, H. Schf.—Ventnor, I. of Wight (Rothney).
- N. germanica*, Panz. (*ferruginata*, Kirb.)—Locally very common about the burrows of *Andrena humilis*.
- N. fabriciana*, L.—Well distributed, and usually abundant.
- N. flavoguttata*, Kirb.—Abundant in woods, where it frequents the flowers of Spurge.
- N. furva*, Panz.—Common, but much less in evidence than the last.
- Epeolus notatus*, Chr. (*productus*, Thoms.)—New Forest (D. Sharp, teste Perkins). Uncommon, in my experience, south of Brockenhurst.
- E. cruciger*, Panz. (*rufipes*, Thoms.)—Very common around the burrows of *Colletes succincta* which *notatus* does not appear to affect.
- Chelostoma florissomme*, L.—Abundant; particularly in gardens.
- C. campanularum*, Kirb.—New Forest; fairly common (R. C. L. Perkins).
- Coelioxys vectis*, Curt.—Milford (H. P. Jones); Sandown, I. of Wight (Saunders).
- C. quadridentata*, L.—Uncommon. New Forest (R. C. L. Perkins).
- C. rufescens*, Lep.—New Forest (R. C. L. Perkins).
- C. elongata*, Lep.—Very common; abundant in gardens.
- C. inermis*, K. (*acuminata*, Nyl.)—Milford and New Forest (H. P. Jones). Not uncommon.
- **C. afra*, Nyl.—Burley, New Forest (Chawner, teste Morice).
- Megachile maritima*, Kirb.—Quite abundant on the coast.
- M. willughbiella*, Kirb.—Not uncommon, and well distributed.
- M. circumcincta*, Lep.—New Forest: fairly common. Lymington and Sway (H. P. Jones).
- (*M. erictorum*, Lep.—New Forest (Pelérin, Walcott coll.). A very old and perhaps doubtful record).
- M. ligniseca*, Kirb.—Very common in the new Forest, and often found on thistles. A large colony (if one may so describe it) of this fine "leafcutter" has existed for years in the decayed maple trunk in Boldre churchyard.
- M. centuncularis*, L.—Everywhere abundant.
- M. versicolor*, Smith.—Not uncommon. New Forest (R. C. L. Perkins); Bournemouth (F. Smith).
- M. argentata*, Fab.—Hayling Is; common. Sandown I. of Wight (Dale).
- Osmia rufa*, L.—Abundant.
- O. pilicornis*, Smith—Very common in the New Forest, and possibly wooded localities throughout the county.
- O. xanthomelana*, Kirb.—I. of Wight (Rothney); Sandown (Dale).
- O. caerulescens*, L.—Well distributed, and fairly common.
- O. fulviventris*, Panz.—Quite common.
- O. bicolor*, Schrank.—Parley Heath (Dale). Should occur not uncommonly on the chalk. Southampton district? (Fassnidge).
- O. aurulenta*, Panz.—I. of Wight (Rothney). New Forest?
- O. leucomelana*, Kirb.—Hawley (F. Smith). New Forest?
- O. spinulosa*, Kirby.—Lacombe Chine, I. of Wight (Saunders).
- Stelis aterrima*, Panz.—New Forest, and common in gardens at Lymington (H. P. Jones).

S. phoeoptera, Kirb.—New Forest; not uncommon (R. C. L. Perkins).

S. ornatula, Kl. (*octo-maculata*, Smith).—New Forest (R. C. L. Perkins).

Anthidium manicatum, L.—Common; particularly in gardens. The mention of this species in White's Selborne is probably the earliest record for the county!

Eucera longicornis, L.—Setley, and elsewhere in New Forest (H. P. Jones). Locally common.

Melicta luctuosa, Scop.—New Forest, near Lyndhurst (E. B. Nevinson).

M. amata, Panz.—Very common; occurring with either of the two following.

Anthophora retusa, L.—Locally abundant; in the New Forest, in my experience, it outnumbers *A. pilipes*.

A. pilipes, Fab.—Common and widely distributed.

A. furcata, Panz.—Fairly common in woods.

A. quadrimaculata, Panz.—New Forest; Parley Heath; Bourne-mouth (Dale).

Saropoda bimaculata, Panz.—Swarms on most heaths.

Psithyrus rupestris, Fab.—Abundant; the males, in common with those of other *Psithyri*, abound on the thistles in the New Forest drives.

Ps. vestalis, Fourc.—Very common; particularly in woods.

Ps. barbutellus, Kirb.—Less abundant than the two last, but more often found in gardens.

Ps. campestris, Panz.—Widely distributed, but uncommon, and often distinctly scarce in the New Forest.

Ps. quadricolor, Lep.—Common, and well distributed.

Bombus lapidarius, L.—Abundant everywhere.

B. terrestris, L.—Common, but much less so than the next species.

B. lucorum, L.—Occurs everywhere in profusion, but perhaps found in the greatest abundance on heaths.

B. pratorum, L.—Common in fields and gardens.

B. jonellus, Kirb.—Abundant on heaths, and well distributed.

B. ruderatus, Fab.—Not very common.

B. hortorum, L.—Extremely common everywhere (particularly in gardens), and swarms at *Rhododendron* flowers.

B. subterraneus, L. (*latrillellus*, Kirb.)—New Forest (R. C. L. Perkins). Uncommon in S. Hants in my experience, although undoubtedly much overlooked.

B. ruderarius, Müll. (*derhamellus*, Kirb.)—Very common.

B. sylvarum, L.—Local, but common where it occurs.

B. agrorum, Fab.—Everywhere abundant.

B. helferanus, Seidl.—Hardly less common than the last in woods, etc.

B. muscorum, L.—Apparently local. Woods and meadows by the Lymington River, near Boldre (H. P. Jones).

Apis mellifica, L.—Perhaps more often found wild in Hants, than elsewhere in England.

ADDENDUM.—*Crabro palmipes*, L.—Locally abundant. (Inadvertently omitted from the list.)

Hy. J. TURNER, F.E.S.

*List of Geometers of the British Isles
with their named Varieties.*

[Reprinted from *The Entomologist's Record*, Vols. XXXVII.-VIII.]

CORRIGENDA.

grossulariata, p. (17).

The following should not have been classed as "manufactured" forms. They were either captured wild, or bred from wild larvae, or from pairings of wild parents. See. *E.M.M.* (1920) pp. 99-102: (1921) pp. 128-135.

Albo-varleyata, nigro varleyata, sparsata-varleyata, lutea-varleyata, sparsata-hazeleighensis, lunulata, raynori, aureo-fasciata, oderofeltia, mixta, vauata, melan-apicata.

PENDULARIA, *Clck.* 142.245.139.

- ab. griseolata, *Stdgr.*
- ab. depulsa, *Bastel.*
- ab. decoraria, *Newm.* [subroseata, *Wdfd.*] [*janthinaria, Rbl.*]
- ab. subochreatea, *Wdfd.*
- ab. radiata, *Delah.*
- ab. nigrostriata, *Lutz.*
- ab. obsoletaria, *Lambl.*
- ab. linearia, *Lambl.*
- ab. unicoloria, *Lambl.*
- ab. brunnearia, *Lambl.*
- ab. flavescens, *Prout.*
- ab. impictaria, *Meres.*
- ab. orbiculoides, *Wdfd.*
- hyb. pendulo-orbicula, *Tutt.*

ORBICULARIA, *Hb.* 143.244.139.

- ab. namurcensis, *Lambl.*
- hyb. orbiculo-pendula, *Tutt.*
- hyb. brightoni, *Tutt.*
- hyb. headi, *Tutt.*

ANNULATA, *Schulze.* [omicronaria, *Schiff.*] 145.246.138.

- ab. obsoleta, *Riding.*
- ab. biobsoleta, *Riding.*
- g. ae. aestiva, *Prout.*

PORATA, *L.* [ocellaria, *Haw.*] 146.245.135.

- ab. visperaria, *Fuchs.*
- ab. ribearia, *Lambl.*
- ab. punctularia, *Lambl.*
- ab. linearia, *Lambl.*
- ab. marginaria, *Lambl.*
- ab. venata, *Prout.*

PUNCTARIA, *L.* 148.245.136.

- ab. naevata, *Bastel.*
- ab. foliata, *Fuchs.*
- ab. radiomarginata, *Joannis.*
- ab. subangularia, *Haw.*
- ab. infuscata, *Reut.*
- ab. arcufera, *Reut.*
- ab. communifasciata, *Don.*
- ab. cingulata, *Fuchs.*
- ab. pulcherrimata, *Fuchs.*
- ab. demptaria, *Fuchs.*
- ab. venata, *Prout.*
- ab. ochreifusa, *Prout.*

LINEARIA, *Hb.* [trilineararia, *Brkh.*] 149.245.137.

- ab. nigrospararia, *Fuchs.*
- ab. fasciata, *Prout.*
- ab. infuscata, *Prout.*
- ab. demptaria, *Prout.*
- ab. approximans, *Prout.*
- ab. trilineata, *Schwrd.*
- g. ae. strabonaria, *Zell.*

Larentiinae.

RHODOMETRA, *Meyr.* [Sterrha, *Hb.*]SACRARIA, *L.* 153.232.141.

- ab. labda, *Orm.* [saroathamnaria, *R.-Brn.*]
- ab. sanguinaria, *Esp.*
- ab. aucta, *Krauss.*
- ab. excaecaria, *Fuchs.*
- ab. desertorum, *Stand.*
- ab. minervae, *Gisl.*

LYTHRIA, *Hb.*PURPURARIA, *L.* 155.232.142.

- ab. conjunctiva, *Prout.*
- ab. abstinentaria, *Fuchs.*
- r. lutearia, *Vill.*
- r. ruginaria, *Costa.*
- r. deceptoraria, *Vill.*

LARENTIA, *Tr.* [Plerocymia, *Hb.*; *Eubolia, Dup.*]CLAVARIA, *Haw.* [cervinata, *Schiff.*] 157.227.148.

- r. pallidata, *Stdgr.*
- r. datinaria, *Obthr.*
- r. fumosata, *Trti.*

ORTHOLITHA, *Hb.* [*Eubolia, Dup.*; *Xanthorhoë, Hb.*]MUCRONATA, *Scop.* [plumbaria, *Fb.*; palumbaria, *Schiff.*] 158.227.143.

- ab. umbrifera, *Prout.*
- ab. nigrescens, *Ckll.*

- (ab. obscuraria, *Rothk.*)
 ab. luridata, *Hufn.*
 ab. extradentata, *Prout.*
 ab. pallidaria, *Lambl.*
 ab. approximata, *Prout.*
 ab. griseolineata, *Prüff.*
- CHENOPODIATA, *L.* [limitata, *Scop.:*
mensuraria, Schiff.] 159.227.144
 ab. monodii, *Th.-Mg.*
 ab. unicolor, *Th.-Mg.*
 ab. defasciata, *Rbl.*
 ab. obscurior, *Heinr.*
 ab. fumata, *Nitsche.*
 ab. violacearia, *Lambl.*
 ab. medioprieta, *Ribbe.*
 ab. plurimelinoata, *Staud.*
 r. sibirica, *B.-Hs.*
 r. griseescens, *Hormz.*
- MOENIATA, *Scop.* 159.228.145.
 ab. diniensis, *Neubgr.*
 r. lantoseana, *Wehrli.*
- BIPUNCTARIA, *Schiff.* 163.228.145.
 ab. fasciata, *Prout.*
 (ab. herborti, *Seitz.*)
 ab. obliterateda, *Prout.*
 ab. reversa, *Prout.*
 ab. griseescens, *Neubgr.*
 ab. gachtaria, *Frr.*
 ab. nigra, *B.-Hs.*
 ab. nigrifasciaria, *Trti.*
 ab. octodurensis, *Fawe.*
 ab. pallidior, *Th.-Mieg.*
 ab. erichi, *Schurd.*
 ab. unipunctaria, *Osthldr.*
 ab. albida, *Okl.*
 ab. confluens, *Wehrli.*
 ab. tangens, *Wehrli.*
 r. maritima, *Seeb.*
 r. sandalica, *Schawrd.*
 r. pallidata, *Vorb.-M.D.*
 r. jurassica, *Osthldr.*
- MESOTYPE, *Hb.* [Cataclysmo,
Hb.]
- VIRGATA, *Hufn.* [lineolata, *Schiff.*] 166.207.146.
 ab. impunctata, *Petersen.*
 ab. diluta, *Galvagni.*
- MINOA, *Tr.* [*Asthena, Hb.*]
- MURINATA, *Scop.* [euphorbiata,
Schiff.] 167.224.146.
 ab. italicata, *Mill.*
 ab. aterrima, *Staud.*
 ab. lactearia, *Staud.*
 r. amyalaria, *Lah.*
 r. cyparissaria, *Mann.*
 r. monochroaria, *H.-S.*
- LITHOSTEGE, *Hb.* [*Eucestia,*
Hb.]
- GRISEATA, *Schiff.* [nivearia, *Stain.*] 172.200.148.
 ab. duplicaria, *Hb.*
 ab. abatii, *Uhryk.*
 ab. obscurata, *Stdgr.*
 ab. brunnescens, *Skala.*
- ANAÏTIS, *Dup.*
- PLAGIATA, *L.* 177.200.149.
 ab. tangens, *W. Frit.*
 ab. fasciata, *Garbsk.* (conflua,
Hoffm.)
 ab. ruberata, *Rbl.*
 ab. suffusa, *Prout.*
 ab. kautzi, *Schurd.*
- EFFORMATA, *Gn.* 177.
- CARSIA, *Hb.*
- PALUDATA, *Thnbg.* 179.201.150.
 ab. obscurata, *Schöy.*
 r. labradoriensis, *Somm.*
 r. imbutata, *Hb.*
- CHESIAS, *Hb.*
- LEGATELLA, *Schiff.* [spartiata,
Hbst.] 180.199.150.
 r. capriata, *Prout.*
- RUFATA, *Fh.* [obliquaria, *Schiff.*] 180.200.151.
 r. occidentalis, *Delah.*

- r. cinereata, *Stdgr.*
 r. plumbeata, *Stdgr.*
 r. linogrisearia, *Const.*
 r. isabella, *Schwrđ.*
- ACASIS, *Dup.* [*Lobophora, Curt.:*
Trichopteryx, Hb.]
- VIRETATA, *Hb.* 181. 180. 153.
- NOTHOPTERYX, *Prout.* [*Lobophora, Curt.*]
 [*Trichopteryx, Hb.*]
- POLYCOMMATA, *Schiff.* 183. 181. 152.
 ab. prospicua, *Prout.*
 ab. albinia, *Tystr.*
- CARPINATA, *Bkh.* [*lobulata, Hb.*]
 184. 180. 153.
 ab. fasciata, *Prout.*
 ab. unifasciata, *Rbl.*
 r. obscurata, *Sp.-Schn.*
- LOBOPHORA, *Curt.*
- HALTERATA, *Hufn.* [*hexapterata,*
Schiff.] 185. 182. 156.
 ab. rudolphii, *Lampa.*
 ab. zonata, *Thnbg.*
- MYSTICOPTERA, *Meyr.* [*Lobophora, Curt.*]
- SEXALATA, *Retz.* [*sexalisata, Hb.*]
 185. 181. 156.
- OPEROPHTERA, *Hb.* [*Cheimatobia, Steph.*]
- FAGATA, *Scharf.* [*boreata, Hb.*]
 193. 222. 157.
 ab. fasciata, *Petersen.*
- BRUMATA, *L.* 194. 222. 156.
 ab. huenei, *Prout.*
 ab. unicolor, *Lambl.*
 r. myrtillivora, *Hoffm.*
 r. myricaria, *Cooke.*

- OPORINIA, *Hb.* [*Oporabia, Steph.:*
Epirrita, Hb.]
- DILUTATA, *Schiff.* 195. 224. 188.
 ab. obscurata, *Stdgr.*
 ab. melana, *Prout.*
 ab. fimbriata, *Haw.*
 ab. pallida, *Prout.*
 ab. tectata, *Fuchs.*
 ab. coarctata, *Prout.*
 ab. latifasciata, *Prout.*
 ab. precursaria, *Gregs.*
- CHRISTYI, *Prout.* 195. —. 188.
 ab. oblita, *Allen.*
 ab. latifasciata, *Prout.*
- AUTUMNATA, *Bork.* 196. 224. 189.
 ab. sandbergi, *Lampa.*
 ab. approximaria, *Weav.*
 ab. schneideri, *Lampa.*
 ab. intermedia, *Clark.*
 ab. uncinctata, *Strand.*
 ab. latifasciata, *Vrbdt.*
 ab. schimae, *Schwrđ.*
 r. guenéata, *Prout.*
 r. tunkunata, *B.-Hs.*
 r. filigrammaria, *H.-S.* 190.
- TRIPHOSA, *Steph.* [*Hydriomena,*
Hb.]
- DUBITATA, *L.* 197. 215. 158.
 ab. cinereata, *Steph.*
 ab. fasciata, *Schwing.*
 ab. punctigera, *Strand.*
- CALOCALPE, *Hb.* [*Eucosmia,*
Steph.]
- CERVINALIS, *Scop.* [*certata, Hb.:*
cervinata, Hb.] 199. 201. 159.
 ab. griseata, *Bastelb.*
 ab. rubescens, *Rbl.*
 ab. infuscata, *Rbl.*
 ab. variegata, *Schwing.*
 ab. unicoloraria, *Schwing.*
 ab. atra, *Kiefr.*
 r. hawelkae, *Schwrđ.*
 r. simplonica, *Wack.*

UNDULATA, *L.* 201. 201. 160.
 ab. culoti, *Bryk.*
 ab. malaisi, *Bryk.*
 ab. nordstroemi, *Bryk.*
 ab. quinqueundulata, *Bryk.*
 ab. septemlineata, *Bryk.*
 ab. divisa, *Heinr.*
 ab. octolineata, *Bryk.*
 ab. paucilineata, *Ijdl.*
 ab. subfasciata, *Raut.*
 r. sajana, *Bryk.*
 r. bluff, *Bryk.*

PHILERME, *Hb.* [Scotosia,
Steph.]

VETULATA, *Schiff.* 204. 222. 161.
 r. vetustata, *Stdgr.*

TRANSVERSATA, *Hufn.* [rhamnata,
Schiff.] 205. 202. 162.
 ab. mediofasciata, *Bubk.*
 ab. hastedonensis, *Lambl.*
 ab. depicturata, *Nplt.*
 r. japanaria, *Leech.*
 r. terror, *Schw.*

EUSTROMA, *Hb.* [Lygris, *Hb.* :
 Cidaria, *Tr.*]

RETICULATA, *Schiff.* 207. 203. 163.
 ab. ovulata, *Borgm.*
 ab. costimaculata, *Prout.*

LYGRIS, *Hb.* [Eustroma, *Hb.* :
 Cidaria, *Tr.*]
 [Hydriomena, *Hb.*]

PRUNATA, *L.* [ribesiarina, *Bdv.*]
 211. 203. 164.
 ab. digna, *Th.-M.* [ochraceata,
Lambl.]
 ab. schwederi, *Trich.*
 ab. constricta, *Strand.*
 r. annexa, *Schima.*
 r. arctica, *Strand.*

TESTATA, *L.* 211. 204. 165.
 ab. citrinata, *Mees.*
 ab. fuscata, *Mees.*

r. achatinata, *Hb.*
 r. insulicola, *Stdgr.*
 r. achatinellaria, *Obthr.*

POPULATA, *L.* 211. 204. 166.
 ab. dotata, *L.*
 ab. lutea, *Strud.*
 ab. circumscripta, *Strud.*
 ab. rufescens, *Gmpbg.*
 ab. musauaria, *Frr.*
 ab. fuscata, *Prout.*
 ab. binderi, *Marschr.*
 ab. trifurea, *Hann.*
 ab. tangens, *Hann.*
 ab. triangulata, *Hann.*
 ab. rubrovittata, *Hann.*
 ab. rubrior, *Hann.*
 ab. ruberrima, *Hann.*
 ab. schumanni, *Hann.*

MELLINATA, *Fb.* [associata, *Bork.*]
 212. 204. 167.

PYRALIATA, *Schiff.* [populata, *Clrek.*]
 213. 211. 168
 ab. deleta, *Strud.*
 ab. aurantio-deleta, *Schwrd.*
 ab. johansonii, *Lampa.*

CIDARIA, *Tr.* [Hydriomena, *Hb.* :
 Melanthia, *Dup.*]
 [Mesoleuca, : Coremia, *Dup.*]
 (CIDARIA, *Tr.*)

FULVATA, *Först.* 215. 211. 169.
 ab. lineata, *Wahr.*
 ab. degenerata, *Prout.*
 r. distinctata, *Stdgr.*

(LYNCOMETRA, *Prout.*)

OCELLATA, *L.* 216. 209. 203.
 ab. coarctata, *Prout.*

(PLEMYRIA, *Hb.*)

BICOLORATA, *Hufn.* [rubiginata,
Schiff.] 216. 205. 204.
 ab. parvula, *Retz.*
 ab. guttata, *Huene.*

- ab. scotina, *Bubac.*
 ab. brunneomarginata, *Schaw.*
 ab. obscurata, *Skala.*
 ab. bipunctata, *Hann.*
 ab. diadelphata, *Staud.*
 ab. peralbata, *Staud.*
 ab. fumosa, *Prout.* [plumbata,
Newm.]
 ab. completa, *Rbl.*
 ab. rosarium, *Staud.*
 r. maritima, *Straud.*
 r. dahurica, *Stdgr.*
 r. plumbata, *Curt.*

(THERA, *Steph.*)

- VARIATA, *Schiff.* 216. 210. 175.
 ab. nigrofasciata, *Gmptby.*
 (medionigricans, *Reut.*)
 ab. stragulata, *Hb.* [vitosata,
Frr.]
 ab. reducta, *Höfer.*
 ab. obscura, *Höfer.*
 ab. albonigrata, *Höfer.*
 ab. interrupta, *Schaw.*
 ab. costimaculata, *Höfer.*
 ab. dissoluta, *Höfer.*
 ab. griseescens, *Höfer.*
 r. cembrae, *Kitt.*
 r. britannica, *Turn.*

- OBELISCATA, *Hb.* 217. 210. 175.
 ab. tristrigaria, *Don.*
 ab. mediolucens, *Rössl.*
 ab. obliterated, *B. White.*
 ab. scotica, *Styr.*
 ab. reducta, *Höfer.*
 ab. herrichi, *Höfer.*

- COGNATA, *Thnbg.* [simulata, *Hb.:*
 coniferata, *Curt.*]
 217.110.176.
 ab. griseata, *Fuchs.*
 ab. perversa, *Hirschke.*
 ab. nigrofasciata, *Hoffm.*
 r. geneata, *Fristh.*

- JUNIPERATA, *L.* 218. 210. 177.
 ab. divisa, *Strud.*
 r. scotica, *B. White.*

- FIRMATA, *Hb.* 219. 230. 176.
 r. ulicata, *Rbr.*

(CHLOROCLYSTA, *Hb.*)

- SITERATA, *Hufn.* [psittacata, *Hb.*]
 220. 212. 173.
 ab. phaiolata, *Schwerd.*

- MIATA, *L.* 220. 212. 174.
 ab. clara, *Th.-Mg.*

(DYSSTROMA, *Hb.*)

- TRUNCATA, *Hufn.* [russata, *Bork.*]
 221. 213. 170.

- ab. centumnotata, *Schultz.*
 ab. saturata, *Steph.*
 ab. perfuscata, *Haw.*
 ab. schneideri, *Sndbg.*
 ab. rufescens, *Ström.* [comma-
 notata, *Haw.*]
 ab. mixta, *Prout.*
 ab. nigerrimata, *Fuchs.*
 ab. olivescens, *Warr.*
 ab. albata, *Culot.*
 ab. nigro-albata, *Culot.*
 ab. fumata, *Lange.*

- CONCINNATA, *Steph.* 221. —. 170.

- CITRATA, *L.* 221. 213. 171.

- ab. punctumnotata, *Haw.*
 ab. immanata, *Haw.*
 ab. simplicidata, *Walk.*
 ab. thingvallata, *Stdgr.*
 ab. griseonotata, *Lange.*
 ab. unicolorata, *Stdgr.*
 ab. nigerrima, *Schwerd.*
 ab. ferruginea, *Prout.*
 ab. tysfjordensis, *Strand.*
 ab. tricolorata, *Culot.*
 ab. omicronata, *Don.*
 ab. nigricans, *Prout.*
 ab. amoenata, *Steph.*
 ab. unifulvata, *Culot.*
 ab. passeraria, *Frr.*
 ab. insolida, *Prout.*
 ab. fusca, *Prout.*
 r. krassnojarscensis, *Fuchs.*
 r. acutata, *Gn.*
 r. pythonissata, *Mill.*

(XANTHORHOË, *Hb.*)MUNITATA, *Hb.* 222. 230. 180.

- ab. algidata, *Stdgr.*
- ab. infusata, *Prout.*
- ab. strigata, *Pack.*
- r. hothlandica, *Prout.*
- r. labradorensis, *Pack.*
- r. pauperrimata, *Chr.*

FLUCTUATA, *L.* 223. 231. 194.

- ab. ochreata, *Prout.*
- ab. costovata, *Haw.*
- ab. immaculata, *Tutt.*
- ab. abstersata, *H.-S.*
- r. thules, *Prout.*
- r. sempionaria, *Rätz.*

MONTANATA, *Schiff.* 225. 230. 193.

- ab. fuscomarginata, *Stdgr.*
- ab. continuata, *Krulik.*
- ab. degenerata, *Prout.*
- ab. costimaculata, *Rbl.*
- ab. limbaria, *Hb.*
- ab. unicolor, *Rbl.*
- ab. albicans, *Strand.*
- r. iberica, *Stdgr.*
- r. lapponica, *Stdgr.*
- r. shethlandica, *Weir.*

QUADRIFASCIATA, *Cl.* 226. 230. 179.

- ab. thedenii, *Lampa.*
- ab. brunneofasciata, *Hoffm.*
- ab. reduplicata, *Heinr.*
- ab. dissolutaria, *Petersen.*
- r. ignobilis, *Btlr.*
- r. tannuensis, *Prout.*

SPADICEARIA, *Schiff.* [ferrugata,
Stdgr.] 226. 229. 182.

- ab. confixaria, *H.-S.*
- ab. griseocamparia, *Vrbdt.*
- ab. emutata, *Wagn.*
- ab. georgi, *Meissl.*
- ab. deletata, *Fuchs.*
- r. livinaria, *Lah.*
- r. tromscoensis, *Fuchs.* [alpinata,
Hoffm.]

FERRUGATA, *Clerck.* 227. 229. 181.

- ab. unidentaria, *Haw.*
- ab. obscura, *Dahlstrm.*
- ab. violacearia, *Vorbdt.*

- ab. boyeri, *Prüff.*
- ab. coarctata, *Prout.*
- r. bilbanensis, *Fuchs.*
- r. inclinataria, *Walk.*

(OCHYRIA, *Hb.*)DESIGNATA, *Hann.* [propugnata,
Schiff.] 227. 229. 183.

- ab. coarctata, *Prout.*
- ab. interrupta, *Hann.*
- ab. bindereri, *Staud.*
- ab. hefneri, *Staud.*
- ab. inversa, *Vorbrodt.*
- ab. suffusa, *Hann.*
- r. islandicaria, *Stdgr.*

(ORTHONAMA, *Hb.*)OBSTIPATA, *Fb.* [fluviata, *Hb.* :
gommata, *Hb.*] 228. 220. 258.

- ab. marginata, *Math.*
- ab. ♂ obsoleta, *Math.*
- ab. interrupta, *Schurd.*
- ab. ♀ olivacea, *Math.*

LIGNATA, *Hb.* [vittata, *Bork.*]
228. 226. 257.

- ab. nigrofascia, *Rbl.*

(CALOSTIGIA, *Hb.*) [Malenydris,
Hb. : Amoeba, *Hb.*]OLIVATA, *Schiff.* 229. 231. 184.

- ab. desolivata, *Schurd.*
- ab. semisuffusa, *Ckrl.*

PECTINITARIA, *Knoch.* [viridaria,
Fb.] 229. 232. 185.

- ab. constricta, *Prout.*
- ab. rosea *Culot.*

SALICATA, *Hb.* 231. 231. 186.

- ab. nigrotaeniata, *Schurd.*
- r. probaria, *H.-S.*
- r. ablutaria, *Bdv.* [ruficinotaria,
Gn.]
- r. ochracearia, *Stdgr.*

MULTISTRIGARIA, *Haw.* 231. 228. 186.
 ab. nubilata, *Tutt.*
 ab. virgata, *Tutt.*
 r. olbiaria, *Mill.*

DIDYMATA, *L.* 231. 228. 187.
 ab. ochroleucata, *Auriv.*
 ab. nigrofasciata, *Rbl.*
 ab. nigra, *Prout.*
 ab. cuneigera, *Balf.*
 r. hethlandica, *Rbl.*

(LAMPROPTERYX, *Steph.*)

SUFFUMATA, *Schiff.* 232. 214. 178.
 ab. piceata, *Steph.*
 ab. porrittii, *Robb. and G.*
 r. defumata, *Stich.*

OTREGIATA, *Metzlf.*

(ENTEPHRIA, *Hb.*)

CAESIATA, *Schiff.* 235. 215. 191.
 ab. annosata, *Zett.*
 ab. infrequentata, *Haw.*
 ab. nigricans, *Prout.* (ab. hethlandicaria, *B.-Hs.*)
 ab. constricta, *Prout.*
 ab. epixantha, *Stich.*
 ab. divisa, *Lange.*
 ab. atrata, *Lange.*
 ab. paradoxa, *Lange.*
 ab. lacteofasciata, *Lange.*
 ab. insignata, *Schwerd.*
 ab. conspicuata, *Prout.* [gelata, *Var. A. Gn.*]
 r. calcarata, *Vorb. and M.-R.*
 r. norvegica, *Strand.*
 r. glaciata, *Germ.* [gelata, *Gn.*]
 r. inpallescens, *Chr.*
 r. inventaria, *Grote.*

FLAVIOINCTATA, *Hb.* 235. 215. 192.
 ab. grossi, *Hoffm. and Klos.*
 ab. hilarciata, *Schwing.*
 ab. flavopriva, *Schwerd.*
 r. ruficinctaria, *Gn.*

(COENOTEPHRIA, *Prout.*)

BERBERATA, *Schiff.* 243. 216. 218.
 ab. elutata, *Favre.*
 ab. semifasciata, *Prout.*
 ab. hellwegeri, *Rbl.*
 ab. schultziaria, *Heider.*
 ab. constricta, *Vorb.*
 ab. carolinata, *Culot.*
 ab. sineliturata, *Culot.*
 ab. grisescens, *Wehrl.*

DERIVATA, *Schiff.* [nigrofasciaria, *Goeze.*] 243. 216. 219.
 ab. ludovicata, *Mill.*

SAGITTATA, *Fb.* 243. 211. 172.
 ab. interrupta, *Hirschke.*

(EUPHYIA, *Hb.*)

OCULATA, *Hufn.* 246. 217. 216.
 ab. circulata, *Rbl.*
 ab. anerythreia, *Rbl.*

UNANGULATA, *Haw.* 247. 217. 199.
 ab. angustifasciata, *Prout.*
 ab. triangulata, *Wagn.*
 r. gracilaria, *B.-Hs.*
 r. luctuosaria, *Obthr.*
 r. cineraria, *Btlr.*

PICATA, *Hb.* 247. 212. 200.
 ab. albofasciata, *Gauck.*
 ab. lacteomarginata, *Rayn.*

LUCTUATA, *Schiff.* [lugubrata, *Stdgr.*] 248. . . .
 ab. denigrata, *Gillm.*
 ab. wendlandti, *Fuchs.*
 r. albidior, *Alph.*
 r. borealis, *Petersen.*
 r. obductata, *Möschl.*

BILINEATA, *L.* 248. 220. 212.
 ab. dumetata, *Schr.*
 ab. infuscata, *Gmpby.*
 ab. illineata, *Prout.*
 ab. fuscifasciata, *Meves.*
 ab. insignata, *Kautz.*
 ab. brunneata, *Kautz.*
 ab. coffeata, *Kautz.*

- ab. andemica, *Kautz.*
 ab. pbneotaeniata, *Kautz.*
 ab. bubacoki, *Kautz.*
 ab. stygiata, *Kautz.*
 ab. margaritata, *Kautz.*
 ab. uniformis, *Kautz.*
 ab. virgata, *Hawkins.*
 r. testaceolata, *Stdgr.*
 r. subgriseata, *Stdgr.*
 r. hibornica, *Prout.* [infusata,
Kanc.]
 r. atlantica, *Stdgr.*
 r. bohatschi, *Aign.*
 r. pallida, *Prout.*
 r. isolata, *Kanc.*
 r. balearica, *Schurd.*

- POLYGRAMMATA, *Bork.* 249.221.256.
 ab. fuscata, *Hann.*
 ab. triangulata, *Heinr.*
 r. conjunctaria, *Led.*

- SILACEATA, *Schiff.* 250. 214. 162.
 ab. insulata, *Haw.*
 ab. deflavata, *Stdgr.*
 r. umbrosaria, *Motseh.*
 r. oblongata, *Gn.*
 r. angustaria, *Leech.*

- CORYLATA, *Thnbg.* 251. 214. 169.
 ab. ruptata, *Hb.*
 ab. glaucata, *Meres.*
 ab. alboeremata, *Curt.*
 r. fabrefactaria, *Obthr.*
 r. granitalis, *Btlr.*

- RUBIDATA, *Schiff.* 252. 216. 218.
 r. fumata, *Fv.*

(MESOLEUCA, *Hb.*)

- ALBICELLATA, *L.* 253. 217. 202.
 ab. suffusa, *Carrington.*
 ab. philippsi, *Closs.*
 ab. vestata, *Dadd.*
 r. casta, *Btlr.*

(MELANTHIA, *Dup.*)

- PROCELLATA, *Schiff.* 253. 220. 204.
 ab. infumata, *Rbl.*

- ab. fasciata, *Hoffm. and Klos.*
 ab. extrema, *Schurd.*
 ab. infusata, *Prout.*
 r. inquitata, *Btlr.*

(EULYPE, *Hb.*)

- HASTATA, *L.* 254. 205. 201.
 ab. laxata, *Krulik.*
 ab. demolita, *Prout.*
 ab. albopunctata, *Lange.*
 ab. moestata, *Nolek.*
 ab. nigrita, *Rbl.*
 ab. hofgreni, *Lampa.*
 ab. undulata, *Strand.*
 ab. fuscifasciata, *Walk.*
 ab. infumata, *Prout.*
 ab. islandica, *Gmphy.*
 ab. clara, *Prout.*
 ab. semifusca, *Wagn.*
 r. chinensis, *Leech.*
 r. gothicata, *Gn.*
 r. subhastata, *Nolek.* [hastulata,
Hb.]
 r. hecata, *Btlr.*
 r. thulearia, *H.-S.*
 r. nigrescens, *Okrll.*

(EPIRRHOË, *Hb.*)

- TRISTATA, *L.* 256. 205. 198.
 ab. kerteszi, *Aign.*
 ab. nigrata, *Rbl.*
 ab. pseudoluctuata, *Vorbtt.*
 ab. continuata, *Fuchs.*

- GALLATA, *Schiff.* 257. 206. 195.
 ab. chalybeata, *Hb.*
 ab. unilobata, *Haw.*
 ab. emina, *Schawerda.*
 ab. quadriannulata, *Haw.*
 r. orientata, *Stdgr.*

- RIVATA, *Hb.* 257. 206. 196.
 r. inexpectata, *Krulik.*

- ALTERNATA, *Müll.* [sociata, *Bork.:*
 subtristata, *Haw.*]
 257. 206. 197.

- ab. degenerata, *Haw.*
 ab. cingulata, *Tengstr.*

- ab. eulampa, *Hantz.*
 r. obscurata, *South.*
 r. islandica, *Prout.*
 r. dubiosata, *Alph.*
- (PERIZOMA, *Hb.*) [*Emmelesia*,
Steph.]
- TAENIATA, *Steph.* 258. 218. 211.
 ab. latefasciata, *Strand.*
 ab. angustifasciata, *Strand.*
 r. saxea, *Wileman.*
- AFFINITATA, *Steph.* 260. 219. 205.
 r. rivinata, *Fisch.-R.* [*turbaria*,
Steph.]
 r. magistraria, *Trti.-Vrty.*
- ALOHEMILLATA, *L.* [*rivulata*, *Schiff.*]
 260. 219. 206.
 ab. unicolorata, *Lange.*
 r. peterseni, *Prout.*
- BIFACIATA, *Haw.* 261. 218. 209.
 ab. unifasciata, *Haw.*
 r. euphrasiata, *Mill.*
- MINORATA, *Tr.* 261. 218. 209.
 ab. monticola, *Strand.*
 r. ericetata, *Steph.*
 r. norvegica, *Prout.*
- BLANDIATA, *Schiff.* [*adaequata*,
Bork.] 262. 218. 210.
 ab. coaretata, *Prout.*
 ab. costimaculata, *Wagn.*
 r. perfasciata, *Prout.*
- ALBULATA, *Schiff.* 262. 220. 208.
 ab. griseata, *Stdgr.*
 ab. thules, *Weir.*
 ab. hebudium, *Weir.* [*niveata*,
Steph.]
 r. subfasciaria, *Boh.*
 r. dissoluta, *Strand.*
- FLAVOFACIATA, *Thuby.* [*decolorata*,
Hb.] 262. 219. 207.
- (HYDRIOMENA, *Hb.*) [*Ypsi-*
petes, *Steph.*] 263. 212. 213.
- FURCATA, *Thuby.* [*elutata*, *Hb.*]
 ab. cinereata, *Prout.*
 ab. sordidata, *Fb.*
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 ab. fuscoundata, *Stdgr.*
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By HY. J. TURNER, F.E.S.

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

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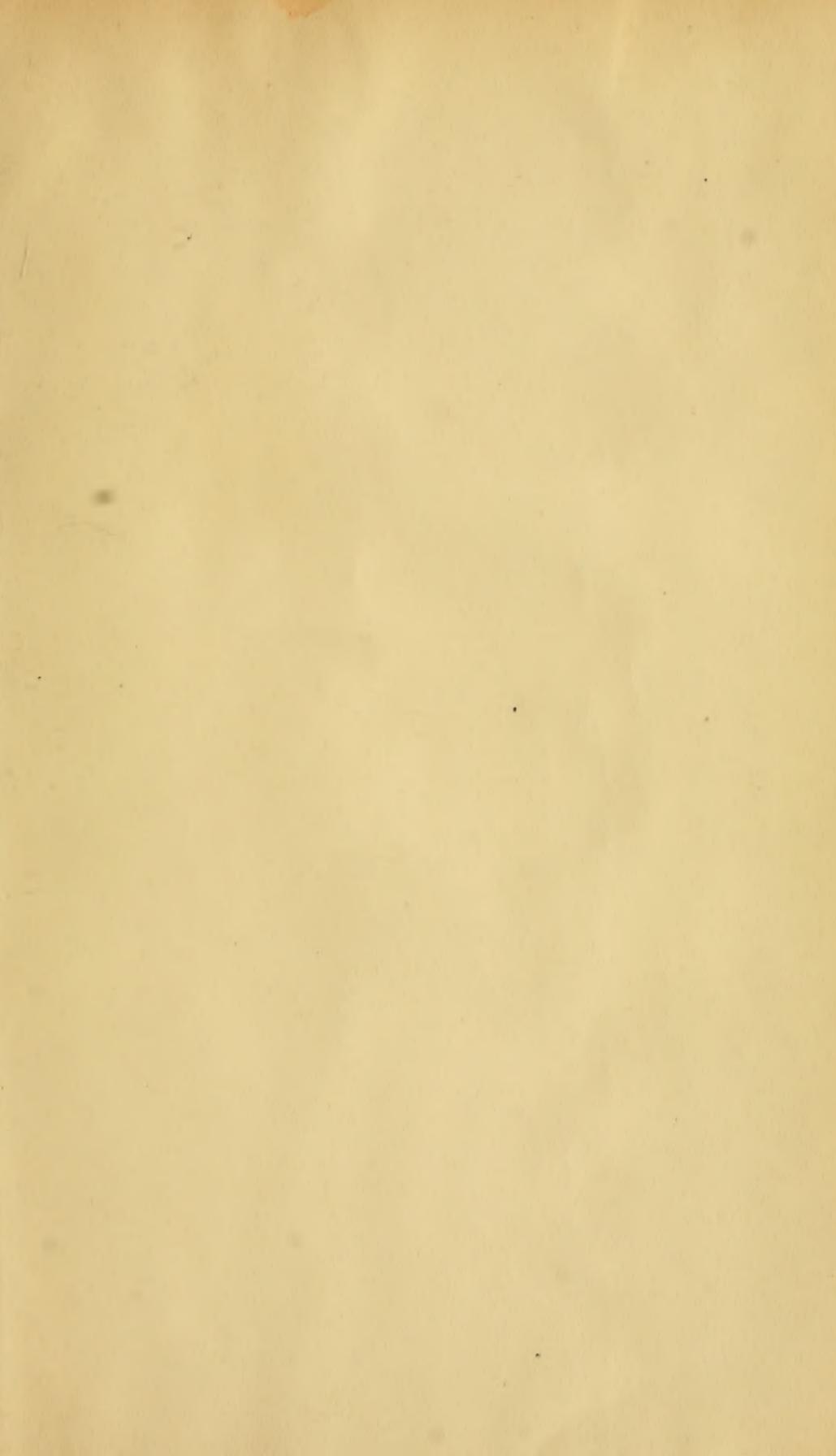
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