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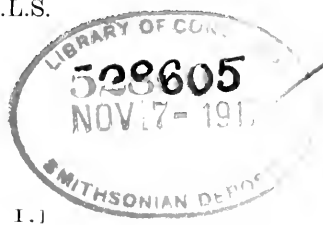
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J. J. WALKER, M.A., R.N., F.L.S.



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“J’engage donc tous à éviter dans leurs écrits toute personnalité, toute allusion dépassant les limites de la discussion la plus sincère et la plus courtoise.”—*Laboulbène.*

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- „ II-VI.—Larva of *Everes argiades* (see pp. 35-38).
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- „ XIX.—New Species of *Pselaphidae*, sub. fam. *Clavigerinae*
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- „ XXII.—*Chiropteropsylla brockmani*, sp. nov. (see p. 304).



ERRATA.

- Page 21, line 7 from top, for "*laevana*" read "*levana*."
- „ 41, „ 6 „ bottom, for "is essential" read "is not essential."
- „ 44, „ 17 „ „ for "*gyssellinella*" read "*gysseliniella*."
- „ 140, „ 14 „ „ for *Tenebrionidae*, but he"
read "*Eucnemidae* and"
- „ 145, „ 21 „ „ for "*sylvaticns*" read "*sylvaticus*."
- „ 202, „ 9 „ top, for "1" read "2."
- „ 214, „ 16 „ bottom, for "2 rounded at apex" read "rounded
at apex."
- „ 217, „ 9 „ „ for "three" read "these."
- „ 222, bottom line, for "*Hamemalis*" read "*Hamamelis*" (see p. 269).
- „ 288, „ 12 from bottom, for "nos" read "nov."
- „ 311, line 12 „ top, for "Bradfield" read "Bradford."
- „ 311, „ 18 „ „ for "Mr. Huxley" read "Mr. Haxley."
- „ 312, „ 12 „ „ for "we" read "I."
- „ 313, 2 „ „ for "dorsale" read "dorsalis."



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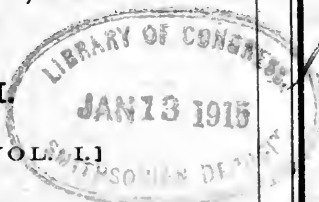
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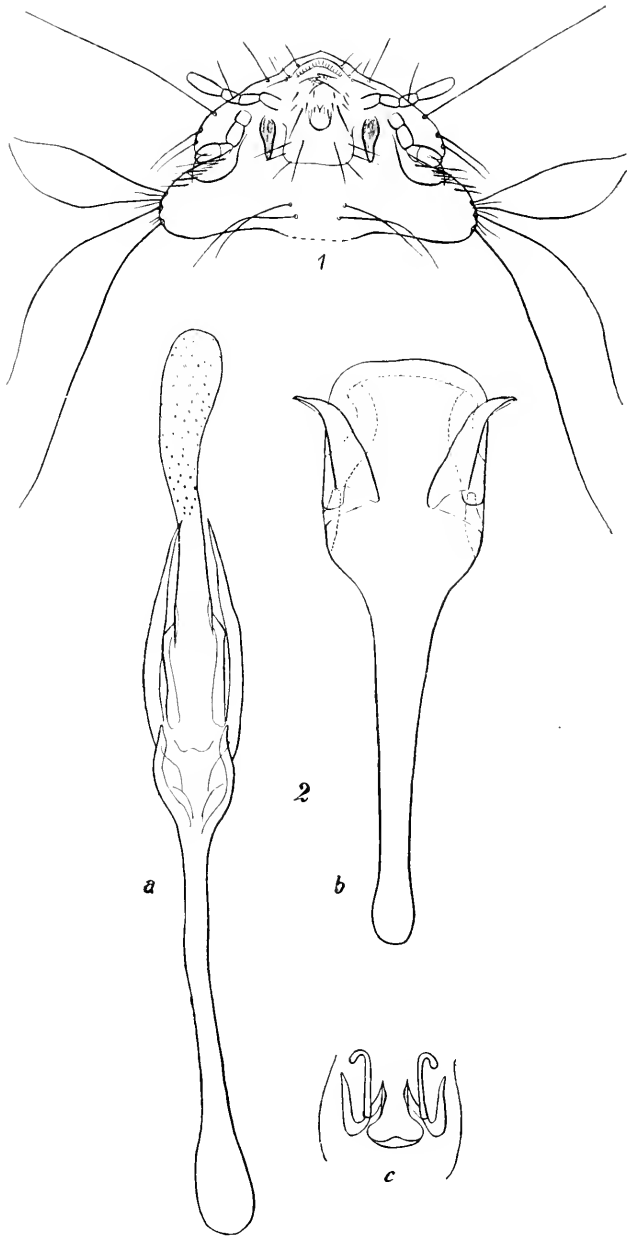
Jan. 5th, 1915—Presidential Address, Mr. L. B. PROUT, F.E.S. Jan. 19th—“Store-breeding Birds,” W. E. GLEGG and P. J. HANSON. Feb. 2nd—“Botanical and Tramping Reminiscences of a Lakeland Holiday,” E. B. BISHOP.

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MENACANTHUS BALFOURI AND MYRSIDEA VICTRIX.

THE
ENTOMOLOGIST'S
MONTHLY MAGAZINE:

VOLUME LI.

[THIRD SERIES, VOL. 1].

Editorial.

The present number of the "Entomologist's Monthly Magazine" is the first of a nominal THIRD SERIES. As was briefly announced in the Editorial notice in our "Jubilee Number" of June, 1914, no change in the constitution or form of the Magazine is contemplated, beyond certain slight alterations in the printing of scientific names, in accordance with modern practice; the chief of these changes is the disuse of "digraphs," which are found by experience to be a fruitful source of minor errata.

While the Editors are able to congratulate themselves on the successful completion of fifty annual volumes of this periodical, they trust that in spite of the stress and anxiety of the present time of national trial, the New Series enters on its career with the prospect of serving its purpose in the cause of Entomological science with at least as much efficiency and success as was attained by the two first series. To the new generation of Entomologists, equally with our present contributors, they look with confidence to a continuation of the support which has been so heartily accorded to their predecessors as well as to themselves, throughout the half-century of the existence of this Magazine.

STUDIES IN *HELOPHORINI*.

BY D. SHARP, M.A., F.R.S.

1. THE GENERA.

In the valuable catalogue of *Hydrophilidae* recently published by M. Ph. Zaitzev (Horae Soc. ent. Ross., xxxviii, 1908), *Helophorini* is very judiciously treated as a separate sub-family consisting of three genera, *Helophorus*, *Fahrea*, and *Prosthetops*. Ganglbauer had, however, previously pointed out that *Fahrea* is not a Hydrophilid at all, but probably a Scarabaeid. Although I have never seen the genus I have no doubt that he is correct in this opinion, and that the insect will prove to be an aberrant member of the *Aphodiini*.

M. A. d'Orchymont has recently (Ann. Soc. ent. Belgique, lvii, 1913, p. 315) rejected *Prosthetops* from the *Helophorini*; and this is also, I have no doubt, a correct course, the species being clearly more nearly allied to *Hydrochus*; in fact, *Prosthetops* has only retained its position in the *Helophorini* from the time when *Hydrochus* was also considered a member of the sub-family I am treating of, and it should have been rejected when *Hydrochus* was.

M. d'Orchymont had, shortly before (*l.c.*, p. 94), described a new genus, *Horelophus*, and placed it with some hesitation in the *Helophorini*.

Horelophus is an extremely rare insect, discovered by Commander Walker in New Zealand, only two specimens having been procured. One of these, kindly lent by its generous discoverer, is now before me, and I find that I cannot confirm the view of M. d'Orchymont; I have, indeed, little doubt that *Horelophus* will prove to be more nearly allied to *Ochthebius* than to *Helophorus*.

This reduces the members of the sub-family *Helophorini* to the one genus, *Helophorus*, of the Russian cataloguer. That genus, however, must, it is quite clear to me, be dismembered. The family *Hydrophilidae* is remarkable from the fact that it includes both aquatic and terrestrial members. And this paradoxical fact occurs in two distinct parts of the family, viz., among the Hydrophilid-Sphaeridiid combination, and amongst the *Helophorini*. Outside the *Helophorini* the aquatic and terrestrial members are treated as separate sub-families, but in the *Helophorini* the water-dwellers and the land-dwellers are placed in the same genus. This is not a correct course. The terrestrial members of *Helophorus* are, it is true, treated as a distinct sub-genus,

Empleurus; when, however, these terrestrial Helophorids are compared with the aquatic ones, so many points of distinction emerge that it becomes certain that *Empleurus* is at least a distinct genus.

I find also that the differences amongst the aquatic *Helophorini* are of sufficient importance to warrant their treatment as distinct genera. The sub-genera of M. Zaitzev's catalogue are, in fact, more naturally treated as distinct genera.

These sub-genera are *Trichelophorus*, *Meghelophorus*, *Cyphelophorus*, *Atractelophorus* and *Rhopalhelophorus*. *Rhopalhelophorus* should retain the name *Helophorus*, with *H. griseus* as type, the types of the other genera being *Trichelophorus alternans*, *Meghelophorus aquaticus*, *Cyphelophorus tuberculatus*, and *Atractelophorus arvernicus*.

I adopt this course because it is the one that involves the least change. It is, in fact, the legitimate line of development if continuity of nomenclature be considered as of greater importance than artificial laws, which in many cases contravene the very object for which they are instituted! Fabricius founded the genus *Elophorus* (Syst. Ent., p. 66, anno 1775) for two species, *Silpha aquatica* L. and *E. minutus* sp. n. There are many who would argue that I ought now to obliterate the interval between my writing and Fabricius, forget all that has occurred in this long period of 160 years, and adopt the *Silpha aquatica* L. = *Elophorus aquaticus* Fabr. as the type of the genus *Helophorus* in the combination I propose adopting. To do so would involve the reversal of the existing application of the names, and require that I should increase the burden of our already too great synonymy.

For a similar reason I use *Helophorus* instead of *Elophorus*, though I do not myself approve of the change. Still it was made many years ago and has been universally adopted, and so I continue it in spite of the illegitimate breach of continuity which was introduced a century ago. But I may here say that had the change been recently proposed I should reject it for two reasons, viz.: (1) that it is a change; and (2) that it is an incorrect change, for the Greeks did not indicate the aspirate by a letter, and arranged the aspirate and silent letter *e* in one alphabetical system.

When I come to treat the individual genera I intend to discuss in detail their characters and relations; till then the following table will be found adequate for their separation, the characters used in it being selected on account of their convenience rather than of their importance:—

- Abdomen destitute of minute pubescence *Empileurus*.
- Abdomen with dense minute pubescence.
- Elytra with punctures intercalated at base between series
 1 and the suture—
- Elytra with numerous raised tubercles *Cyphelophorus*.
- Elytra without raised tubercles—
- Pseudepipleuron broad..... *Trichelophorus*.
- Pseudepipleuron absent (or narrower than true
 epipleuron) *Meghelophorus*.
- Elytra without intercalated punctures—
- Last joint of max. palpi oval *Atracthelophorus*.
- Last joint of max. palpi asymmetrical..... *Helophorus*.

As the structure of the elytron is of great importance in the taxonomy of the *Helophorini*, and as it is not generally understood by entomologists, I will now give some brief particulars about it.

If we take off the elytron of a *Helophorus* (for example *H. laticollis*) and examine it carefully, we find that there are ten series of punctures, the outer one of which is placed very close indeed to a raised elevation; beyond this raised elevation there exists an eleventh series of punctures placed very close to the fine but raised outer margin of the elytron, and on turning the wing-case on to its edge we find beyond the outer margin another part covered with a very dense fine pubescence; this part is rather broad at the shoulder, and becomes backwards gradually narrower, ceasing altogether at about one-fourth or one-fifth of the length of the elytra from the tip.

If we treat *Empileurus rugosus* in a similar manner, we find the ten series of punctures, and outside the tenth a projecting ledge, the tenth series being not close to this ledge, which is flat and shining, and is limited externally by a fine margin forming the edge of the wing-case as seen from above. Turning over the elytron we find the eleventh series of punctures placed on a broad shining space. At first sight there seems to be no band of pubescence to correspond with that so conspicuous in *H. laticollis*, but careful examination shows this band to exist in a very reduced form just behind the shoulder, and much concealed by being turned inwards.

The pubescent band in *H. laticollis* is indisputably the epipleuron. The distinction between the two insects we are comparing may be summed up by saying that the tenth interstice (not counting the sutural interval) is in *laticollis* a small insignificant raised area, placed so as to look outwards; while in *rugosus* the tenth interstice is a very

large area, placed so that one half of it is exposed upwardly, while the other is turned to the under-side. The difference between these two elytra is in fact very strong, and may be expressed in various ways. But from the facts I have mentioned it is clear that Ganglbauer and others are wrong in saying that the epipleuron is large in *rugosus*, for it is really reduced and replaced in appearance by the tenth interstice, which forms a pseudepipleuron.

I should mention that I am not the first to take this view, as it was pointed out by Seidlitz many years ago in his "Fauna baltica."

The other genera I have adopted show important modifications of these points of structure, and prove amongst other things that the symmetrical form of the last joint of the maxillary palpi (which appears at first of infinitesimal importance) is an indication of real affinity, it being common to all the genera except *Helophorus* and *Meghelophorus*. In fact it shows that *Atracthelophorus brevipalpis* is naturally generically distinct from the forms with which it has hitherto been always associated—indeed, has been often considered merely a specific variation. The epipleuron of *brevipalpis* is much reduced as compared with the forms with which it is confounded. I am here anticipating what I shall have to point out later for the reason that I fear I shall be prejudiced because many will think it impossible that two insects they have failed to distinguish as species can be correctly placed in different genera.

(To be continued.)

COLEOPTERA IN HEREFORDSHIRE (V).

BY J. R. LE B. TOMLIN, M.A., F.E.S.

The preceding paper of this series appeared in the Ent. Mo. Mag., 1911, pp. 271-273.

In the following list all are additions to the county list with the single exception of *Bembidium fluviale*, which is recorded in the "Victoria County History" for Herefordshire without more exact locality.* I am able to say that the locality was Eardisley.

Many of the records now given are due, it will be noticed, to the late Dr. J. H. Wood of Tarrington, and I cannot refrain from endorsing

* In the "Entomologist's Annual" for 1872, p. 47, Mr. E. C. Rye records the capture by Dr. Power of "*Bembidium fluviale* on the banks of the Wye (a new locality)."—J.J.W.

what has already been said in this Magazine as to the loss he will be to Entomology. To those who had the privilege of knowing him personally, his keenness, his wide general knowledge and pleasure in imparting it, his camaraderie and hospitality will be an evergreen memory. I may add that he was essentially a man who attracted younger men.

Mr. E. A. Butler spent August, 1913, in the county, and collected a number of interesting species west of Hereford in a quite unexplored part. I have also received valuable help from Mr. A. J. Dyson Perrins, and his capture of *Cryptohypnus sabulicola* is particularly notable.

Other noteworthy species are *Scraptia fuscula*, *Platycis minuta*, *Trechus discus*, *Homalium gracilicorne*, *Euplectus duponti*, *Smicrus filicoruis*, and *Melolontha hippocastani*.

Badister sodalis Duft., one in flood refuse at Mordiford; *Amara bifrons* Gyll., common as a rule in Mathon sandpits; *Anchomenus gracilis* Gyll., not uncommon at Mathon, Colwall, and on the Monnow; *A. thoreyi* Dj., Kenchester (Butler); *Bembidium riparium* Ol., common and widely distributed, in fact it rather seems to replace *biguttatum*, which is distinctly less common; *B. fluviatile* Dej., not uncommon on the River Teme at Whitbourne in September, 1913: this discovery is due to Professor Beare, who joined me at Whitbourne with a view to capturing *Macronychus*—the latter occurred in great abundance, in fact one small submerged log was tenanted by several hundreds; *Trechus discus* F., not very uncommon by the River Wye at Breinton, where Mr. Butler discovered it and introduced me to it in September, 1913; *T. micros* Hbst., one under a stone at Hardwick, 28.8.09.

Dromius quadrinotatus Pz., Ledbury, Mathon and Kington; *Haliphus cinereus* Aubé, Kenchester (Butler); *Hydroporus dorsalis* F., Breinton (Butler), West Malvern (Perrins); *H. angustatus* Stm., Ham Green, 15.8.08; *H. longulus* Muls., Cusop Dingle, rare; *H. memnonius* Nic., Ledbury and West Malvern; *Copelatus agilis* F., Moccas Pool, August, 1913 (Wood); *Philhydrus coarctatus* Gredl., Mathon, in wet moss, Breinton (Butler); *Limnebius papposus* Muls., Kilpeck and Ewias Harold; *Chaetarthria seminulum* Pk., West Malvern, Mathon and Ledbury; *Helophorus griseus* Hbst., not uncommon.

Aleochara cuniculorum Kr., Mathon sandpits; *A. mycetophaga* Kr., Seager Hill, in fungus, 12.8.10; *Microglossa pulia* Gyll., one swept at Kington; *Oxyptoda spectabilis* Märk., Stoke Edith district, in carrion and in moles' nests, in each case in January; *Ischnoglossa prolixa* Gr., Moorhampton (Butler); *Ocyusa maura* Er., Ledbury, common on Wall Hills; *Ocalea latipennis* Shp., several in Cusop Dingle; *Notothecta anceps* Er., scarce in *F. rufa* nests on the Great Doward, April, 1910; *Homalota insecta* Th., Cusop, August, 1913 (Butler); *H. luteipes* Er., with the last; *H. melanocera* Joy, Whitbourne; *H. malleus* Joy, Ewias Harold and Devereux Pools; *H. tomlini* Joy, several by the River Monnow, 21.8.10; *H. palustris* Kies., Breinton (Butler); *H. oblita* Er., Breinton (Butler);

H. pygmaea Gr., Mordiford, in flood refuse; *Gyrophacaena fasciata* Marsh., West Malvern; *G. laevipennis* Kr., Colwall in fungus on elm; *Conosoma immaculatum* St., Breinton (Butler); *Megacronus cingulatus* Mann., Stoke Edith, April, 1912 (Wood); *Mycetoporus splendidus* Gr., Fownhope in flood refuse; *Quedius cruentus* var. *virens* Rott., this variety has occurred singly on Seager Hill in a rotten beech, at Mordiford in hedge clippings, and at West Malvern in garden rubbish and amongst rotten apples; *Q. fumatus* St., West Malvern, common in dead leaves, Mordiford, in flood refuse; *Ocypus compressus* Marsh., rare at Kington and West Malvern; *Philonthus longicornis* St., Colwall and West Malvern; *P. discoideus* Gr., Ledbury in fungus; *Gabrius nigrutilus* Gr., common throughout the county; *G. pennatus* Sharp, Breinton, not uncommon (Butler), common on the River Monnow, and in Cusop and Olchon Dingles; *G. stipes* Sharp, Colwall, Mathon, Haugh Wood and Seager Hill, always rare; *Medon obsoletus* Nordm., West Malvern, not rare in garden refuse, December, 1909; *Evaesthetus scaber* Gr., Colwall, not uncommon; *E. ruficapillus* Lac., Mathon, common; *Stenus morio* Gr., Breinton (Butler); *S. fuscipes* Gr., Credenhill (Butler); *S. picipennis* Er., Kenchester (Butler); *S. picipes* St., of general occurrence; *Oxytelus sculptus* Gr., Colwall and West Malvern, rare; *O. inustus* Gr., Holme Lacy and Seager Hill by sweeping; *O. clypeonitens* Pand., one swept at West Malvern, September, 1911; *Trogophloeus corticinus* Gr., common; *T. elongatulus* Er., not uncommon at Stoke Edith, Whitbourne, Mordiford, and Devereux Pools; *T. tenellus* Er., one swept on Seager Hill, 15.9.12; *Lesteva sharpi* Rye, Cusop and Olchon Dingles, rare; *Homalium caesum* Gr., Stoke Edith, West Malvern and Whitbourne, not common; var. *tricolor* Rey, West Malvern and Stoke Edith, occasional; *H. gracilicorne* Fairm., one swept at Hardwick, 27.8.09; *Megarthrus affinis* Mull., West Malvern, rare; *M. hemipterus* Ill., Haugh Wood, not uncommon in fungi in September; *Prognatha quadricornis* Kirby, Eastnor Park, not uncommon under oak bark, 22.3.14.

Agathidium laevigatum Er., Colwall and Mordiford, very rare, August, 1912; *A. globosum* Muls., Haugh Wood, one in fungus, 15.9.12; *Cyrtusa pauxilla*, Sch., rare at Mathon, Stoke Edith, Coddington, Breinton (Butler), Whitbourne and Abbeydore; *Colenis dentipes* Gyll., Mordiford, swept by the River Pentelaw, 3.8.09; *Necrophorus ruspator* Er., West Malvern, Colwall and Stoke Edith; *Necrodes littoralis* L., one by the Leech Pool, 29.8.09; *Choleva cistloides* Pz., Cusop (Wood), and Stoke Edith, rare; *Neuraphes angulatus* Müll., West Malvern, by sweeping; *Bythinuscurtisi* Denn., fairly common; *Euplectus duponti* Aubé, two examples occurred in rotten beech on Seager Hill, August, 1911, which Dr. Joy considers to be the true *duponti*; *Smicrus filicornis* Fairm., Cusop (Butler); *Nephanestitan* Newm., West Malvern, several in a hotbed, September, 1910; *Orthoperus atomus* Gyll., abundant in haystacks at Mathon; *Dacne humeralis* F., Cusop, in *Boletus*; *D. rufifrons* F., Eaton Bishop, common in *Polyporus squamosus*; *Hister neglectus* Germ., Cusop, one in moss, 11.9.12; *Gnathoncus nannetensis* Mars., one in carrion at Stoke Edith (Wood); *Cartodere elongata* Curt., Eaton Bishop with *Dacne rufifrons*; *Loemophloeus ferrugineus* St., common under bark at Ledbury and Stoke Edith; *Cryptophagus setulosus* Stm., of general occurrence by sweeping; *C. punctipennis* Bris., Eaton Bishop, with *Dacne rufifrons*; *C. dentatus* Hbst., common; *C. distinguendus* Stm., West Malvern, scarce in apple room; *Atomaria nigriventris* St., West Malvern, Coddington and Devereux Pools; *A. barani* Bris., West Malvern; *Mycetophagus quadripustulatus* L., very common in fungi at Eaton Bishop and Whitbourne; *Florilinus muscorum* L., Tarrington (Wood).

(To be continued).

DESCRIPTIONS OF THREE NEW SPECIES OF BRITISH
TORTRICIDAE.

BY F. N. PIERCE, F.E.S., AND THE REV. J. W. METCALFE, F.E.S.

In working through the genitalia of the British Tortrices we have had the pleasure of discovering three hitherto unrecognised species. They were found, in the numbers given below, in various collections, and we now publish a detailed description of each (together with a description of two varieties of other species), with the view, not only of establishing the species, but also of eliciting further information about them from collectors who may find that they possess them in their cabinets.

TORTRICIDAE.

CNEPHASIA Curt. = *Tortrix* L., Meyr., Wlsm.

Cnephasia genitalana sp. n.

Expanse 15-22 mm.

Antennae light grey brown; palpi, head, and thorax, dull olive white; abdomen olive white.

Fore-wings rather narrow, costa gently and evenly arched, apex bluntly rounded, hind margin oblique. Normally unicolorous, dull white with faint olive brown tinge, without markings, except a few scattered black dots. Occasionally, however, the markings are visible, brown, edges sparsely dotted with black; the margin of basal patch indicated by a narrow elbowed band *almost reaching the dorsal margin*; inner edge of central band twice bluntly angled (below the costa and in the middle); outer edge shaded off; apical area with a few faint clouds; hind-wings smoky brown. Under-side of fore-wings smoky brown, *a pale even white line running along the costa*. Under-side of hind-wings shining smoky white. One specimen is considerably darker and of a beautifully soft slate grey tinge, hind-wings darker smoky brown.

The female has not yet been detected.

♂ genitalia. Valva abruptly tapered, costa almost straight, valvula fused to costa in longitudinal fold; sacculus larger than valva, set with short bristles from the centre, curved towards the tip; uncus long, set with short spines; socii long, drooping; gnathos atrophied, tip rounded, free; aedoeagus cardinate, slender; vesica scobinate; saccus rounded, not deep.

Type, ♂, Coll. Pierce.

The only locality definitely known is that of Mr. Robert Adkin's specimens from Folkestone, but it probably occurs on all the chalky portions of the coast of Kent. The insect was found in various collections amongst series of *conspersana*.

In dried examples the *♂ genitalia* are clearly visible from beneath, and the long curved arms of the sacculus at once separate it from all other species of the group.

Specimens examined, 35: Pierce Coll., 19; Metcalfe Coll., 2; Adkin Coll., 2; Whittle Coll., 5; Vine Coll., 1; Atmore Coll., 1; Mainsbridge Coll., 1; Studd Coll., 1.

We add here the description of two varieties of other species which might possibly be confounded with the above:

Cnephasia conspersana Dougl., *albo-conspersana* var. n.

♂. Unicolorous chalky white.

♂ *genitalia*. Valva tapered, costa gently arched; sacculus about half the length of valva, free from outer margin of valvula, not protruding, curved, set with short bristles from two-thirds to the tip; uncus long, set with short spines; socii long, drooping; gnathos atrophied, tip rounded, free; aedoeagus cardinate, slender, set with two rose thorn spines before the apex; vesica scobinate; saccus rounded, not deep.

Type, ♂, Coll. Pierce.

In dried specimens the male genitalia are clearly visible from beneath. The attachment of the sacculus is only to be seen towards the base of the valva, whilst the free arm of the sacculus is not as a rule externally visible.

Specimens examined, 9: Pierce Coll., 4; Metcalfe Coll., 1; Whittle Coll., 1; Harwood Coll., 2; Atmore Coll., 1.

Cnephasia octomaculana Haw., *albo-octomaculana* var. n.

♂. Unicolorous bright opaque chalky white.

♂ *genitalia*. Valva hardly tapered, costa straight, valvula fused to costa in longitudinal fold; sacculus short, half as long as valva, fused to valvula except the tip, which is free and spined with bristles; uncus long, set with short spines; socii rather short, drooping; gnathos sharply narrowed, tip rounded; aedoeagus cardinate, slender, tip pointed; saccus small, rounded.

Type, ♂, Coll. Pierce.

In dried specimens the ♂ genitalia are clearly visible from beneath; the attachment of sacculus is strongly visible to half the length of the valvula, terminating in a thick stumpy point, bent at right angles, and *nearer to the base than the corresponding point in chrysanthemana*.

Specimens examined, 9: Pierce Coll., 6; Whittle Coll., 1; Harwood Coll., 1; Atmore Coll., 1.

EPIBLEMIDAE.

POECILOCHROMA S.=EUCOSMA Hb., Meyr., *Argyroploce* Hb., Wlsm.

Poecilochroma pomedaxana sp. n.

Expanse 17-20 mm.

Antennae brown; palpi *snow-white on the inside*, on the outside, grey; *face white*; head and thorax grey brown; crest divided, very dark brown. Fore-

wings broad, pale grey brown or pale reddish brown; basal patch dark brown but only visible on the dorsal margin, where its outer edge is angulated and outlined with deep black brown; this is followed on the dorsal margin by a white forked blotch, the two forks being oblique in opposite directions and *outlined with silvery white*; the inner and larger branch is constricted at the middle of the wing, and the apex contains a dark brown horizontal streak or a dot; both branches are more or less filled in with steel blue grey; central band dark rich brown, oblique, narrow on the costa, its outer margin sharply indented and *outlined with pure silvery white*; the apical area contains a rounded dark brown patch; the costal streaks, gemminated yellowish white, are continued round the apical patch; cilia brown tipped with white. Hind-wings smoky brown. Female similar, rather stouter, the markings and hind-wings darker.

This species unlike *profundana* seems to be quite constant.

♂ *genitalia*. Valva long, curved, costa angulated, spines denser towards the base; sacculus not free, long, before reaching the spines it is truncate, the apex set with a patch of fine spines, outer margin rounded towards the base; uncus not produced, rounded; socii long, slender, drooping, in-curved; aedeagus cardinate; sacculus small, curved.

♀ *genitalia*. Lobes of ovipositor rather narrow; ostium with narrow rounded plate on either side, set with fine hairs; bursa sub-globular, with two deep, long, curved signa.

Type, ♂ and ♀, Coll. Pierce.

Specimens examined: 3 ♂♂ and 3 ♀♀; Pierce Coll., 9; Studd Coll., long series.

This species, the name for which has been suggested by Mr. E. F. Studd, has been bred by him for a number of years in succession from larvae found feeding upon old apple trees, and once upon oak at Oxtou, S. Devon. He reports that it is confined to these particular trees and is therefore extremely local, that it is absolutely constant, and that *profundana* is rare in the district. Mr. Studd has long been of the opinion that it was a distinct species, but Mr. E. R. Banks considered that it was only a food form of *profundana*. However, the structure of the genitalia, which is perfectly distinct from that of *profundana*, proves it to be a good species. It has also been taken by the late Dr. Ridgway at Buckerell, Devon.

Such a striking form may possibly have received a varietal name. If this is the case, the name now suggested will fall and the varietal name become specific.

LIPOPTYCHA Ld. = *Dicrorampha* Gr., St., South.

Lipoptycha aeratana sp. n.

Expanse 14-15 mm.

Antennae shining slate-brown; palpi, head, thorax, and abdomen, dull fuscous.

Fore-wings rather broad behind, *costa without fold*, almost straight, apex bluntly rounded, hind margin slightly oblique; fuscous brown, thickly dusted with small yellow scales, giving a distinctly yellow brown appearance to the whole wing; dorsal blotch, when visible, faintly paler than ground colour, *pyriform*, the apex pointing to the third costal spot from apex of wing, its *inner margin being well rounded, its outer margin at first straight, then slightly hollowed to apex*; costal dots seven, yellowish white, short, not produced, inter-spaces dark fuscous; three or four round black dots before hind margin, of which two are usually more conspicuous; cilia shining, whitish, darker tipped; hind-wings fuscous, cilia pale. Under-side of both wings leaden-white, costal dots dull white.

This species may most easily be distinguished from *plumbana* by the absence of leaden metallic lines round the ocellus, and from *saturnana* by the dorsal blotch, which in that species is wider on dorsal margin and definitely constricted on both sides beneath the apex.

♂ *genitalia*. Valva short, with large rounded cucullus heavily folded vertically; costa in-curved; sacculus not free, deeply emarginate before the cucullus; uncus not produced; tegumen pointed, gnathos and socii absent; aedoeagus cardinate, slender; cornuti about 12, sheddable, long tapered studs with long heels, socketed into the vesica; anellus lobes large, ovate, spatulate, set on inner margins with strong scobinations which gradually diminish towards the outer (ventral) edges.

Type, ♂, Coll. Pierce.

Specimens examined 2: ♂; Pierce Coll., 1; Pierce Coll. ex Coll. Threlfall (under the name *tanacetii*) 3; Metcalfe Coll. ex Coll. Threlfall, 4.

The insect belongs to a difficult group, and one hard to describe. Only two other species with an unfolded costa have been recognised in Britain, from both of which the genitalia prove the present one to be perfectly distinct. Specimens will probably be found in many collections under the name of *plumbana* or of *saturnana*.

The following description of the larva of *pomedaviana* was made by Messrs. Studd and Bower in 1902:—

About $\frac{5}{8}$ inch long; dark green. On the 4th and 5th segments are two black spots forming a colon, and beneath them two smaller spots placed transversely; on all other segments except the anal are two large black spots like a colon with one small spot beneath. Head yellowish-green; plate on 2nd segment of a colour between that of the head and body, slightly darkened on each side and a black spot (sometimes absent) on the front of the plate; legs black; claspers unicolorous with the body, the last pair having, in some cases, a black spot. A few pale hairs are emitted from each segment except the head. Larva rolled in cigar-shaped leaves on both apple and oak.

December 16th, 1914.

ON TWO NEW SPECIES OF MALLOPHAGA (MENOPONIDAE):
MENACANTHUS BALFOURI N. SP. AND *MYRSIDEA VICTRIX* N. SP.
 FROM COLOMBIA.

BY JAMES WATERSTON, B.D., B.Sc.

(Imperial Bureau of Entomology)

PLATE I.

During a visit to Colombia in May of this year, Dr. Andrew Balfour, director, Wellcome Bureau of Scientific Research, secured several Mallophagous parasites on a "black and yellow billed Toucan." * These examples have been handed to me for report, and they are of special interest as coming from a host genus of whose parasites little is known.

Two species, both Menoponids and apparently new, are represented in Dr. Balfour's gatherings. Till recently, many genera and possibly even sub-families have been confused under *Menopen*. In 1912, Neumann (Archiv. de Parasitol., p. 353) proposed the name *Menacanthus* for those forms which are provided with a pair (or more) of heavy peg-like spines on the inferior surface of the head. This excellent character, however, seems to me to have more than generic value, and *Menacanthus* bringing together as it does parasites of woodpeckers, fowls and dogs, has still too wide a scope, and is neither natural nor convenient. The genus should be further sub-divided, and might well be restricted to those species with spines on the underside of the head, which when flattened out is slightly pointed anteriorly, the flap across the ocular emargination rounded off before the eye, and separated from it by a slit-like incision above the last joint of the antennae, the temples evenly rounded, the thorax normal, small, not markedly separated from the abdomen, which is without pleural incrassation of any kind, and the abdominal chaetotaxy simple.

This definition would include the first four species of Neumann's list and, of course, many others. The genus *Menacanthus* thus narrowed is specially characteristic of the Passerine order of birds.

At least one other genus is found on the same hosts. It may be defined as follows.

MYRSIDEA gen. nov.

Head and thorax broad and large in proportion to the abdomen. No spines on ventral surface of head. Flap across ocular emargination continuous with eye. Temples large, reclined towards the occiput. Forehead flatly rounded

* Probably *Rhamphastos tocard* Vieill. A.B., *in litt.*

anteriorly. Meso- and metathorax separate from one another. Metathorax separated from 1st abdominal segment by a membranous area. Sternal markings well defined. 1st abdominal sternite reduced, 2nd different in size, shape or chaetotaxy (sometimes in all these respects) from the others. Pleurites well developed, but with no internal thickening.

♂ with characteristic genitalia—a moderately long basal plate, continuous distally with a broad truncately rounded lamina at the base of which the stout apically recurved paramera are set.

♀ sometimes with simple transverse abdominal tergites, but quite as often the sexes are dimorphic here, one or more of the tergites being backwardly produced.

Hosts—Passerines, especially the more advanced groups, *e.g.*, crows.

Genotype: *M. victrix* sp. n.

The above complex of characters sufficiently indicates one of the most interesting Menoponid groups. A number of species have been described by various authors as *Menopon* or *Colpocephalum*.

Myrsidea may ultimately have to be further split up. Possibly the sexually dimorphic should be separated from the simpler forms. The genotype is one of the most specialised of the group, as the 2nd sternite bears strong processes with heavy asters of spines, and no fewer than four of the tergites are modified. *Myrsidea* and *Menacanthus* occur together quite often on the same individual host.

MYRSIDEA VICTRIX sp. n.

♂. *Head*. 4 long bristles on the temples, 2 rather short at the middle of the occiput. 1 minute bristle where the occiput crosses the prothoracic edge, and another pair of similar bristles a short distance from the edge. On each side of the quadrate posterior ventral sclerite are 4 bristles, 1 strong and long below the occiput and 3 much weaker and shorter in front. 6 short bristles in 2 parallel rows (3, 3) in the space between the antennal grooves.

Thorax. Pronotum, 3 short spines at lateral angle. On the posterior edge a row of stout elements, viz., a spine, 4 bristles and a spine. Mesonotum bare, save for a minute spine posteriorly on each side of the median line. Metanotum with two such spines on each side, separated by a narrow unchitinized belt from the mesonotum and almost straight across the abdomen. 1-2 spines and a long bristle at the angles, and about 12 long bristles on the posterior edge. Prosternum bare, with a pear-shaped mark. Mesosternum and metasternum with large quadrate marks sending out arms between the coxae. The mesosternum bears anteriorly 6 short spines, and 8 longer bristles.

Abdomen. Tergites, pleurites and sternites well developed. The sternites bear 5-8 spines or bristles. On the anterior segments are chiefly short spines,

while posteriorly they weaken and lengthen so that the 8th pleurite bears 3 very long and strong bristles with 3 much shorter and finer ones. Tergites with 1 row of bristles (12-18) of which the last on each side is long. The 9th tergite bears 2 long bristles at each side and 2 medianly, and there are half a dozen slenderer bristles along the edge of the corresponding sternite and 2 on the under surface. The other sternites except the 2nd bear at each side a larger or smaller patch of short spines with a row of single bristles (up to a dozen) stretching between. The 2nd sternite bears one row of bristles with a short thick process bearing an aster of 5-6 heavy spines on each side.

On the under surface of the σ -apparatus, just before the broadening out of the basal plate, are the chitinized parts figured. Their homology is uncertain (figs. 2 *b* and *c*).

♀ closely resembling the σ , but longer, with more pronounced chaetotaxy and the usual sexual differences in the terminal segments. Of the abdominal tergites 1-4 are more or less modified on the posterior edge. Tergite 1 is produced from each side backwards coming to a broad rounded point beyond a line connecting the anterior angles of the 3rd pleurites, *i.e.*, extending nearly $1\frac{1}{2}$ segments beyond the normal transverse line. Tergites 2 and 3 trespass about the breadth of the following pleurite. The posterior edge of tergite 4 is convex instead of straight. From 5-8 the posterior edge of the tergite is again normal and straight.

Colour. σ and ♀ pale brown to chestnut, darker round the antennal sulcus, along the occipital edge, and on the legs. σ . In the completely adult condition the abdominal segments are crossed by simple, pale bands which are darker at the sides. ♀ . On the first 5 abdominal segments the darker lateral marks are more extensive and wedge-shaped, those on 4 and 5 being drawn out.

MEASUREMENTS.

	σ .		♀ .	
	Length.	Breadth.	Length.	Breadth.
Head .. . . . . .	.38	.55	.40	.61
Prothorax .. . . . . .	.20	.32	.23	.38
Meso- and Metathorax...	.29	.50	.34	.68
Abdomen.....	.87	.67 (3 and 4)...	1.28	.9 (3 and 4)
Total.....	<u>1.74 mm.</u>		<u>2.25 mm.</u>	

Holotype: a σ in *Brit. Mus.* Reg. No. 1914-535. (Presented by The Imperial Bureau of Entomology).

Described from 5 σ σ , 5 ♀ ♀ , and 11 immature examples.

From a "Yellow and black-billed Toucan," from COLOMBIA, Boca de Arguía, Atrato Valley (*Dr. A. Balfour*, v. 1914).

MENACANTHUS Neumann.

MENACANTHUS BALFOURI *sp. n.*

A pale form with no definite markings.

♂. *Head.* About twice as broad as long. On the ventral aspect on each side of the median line are: 1 short hair behind the mandible, 1 longer opposite the middle of the heavy spine, and 3 in a row alongside the spine. Near the inferior edge of the occiput are two long hairs (see fig. 1). There are 4-5 long hairs superiorly on the temples, and 4 along the occiput.

Thorax. Pronotum almost bare, a short spine well inside the lateral angle, where there are a spine on each side with a long bristle between them; 11 strong long bristles on posterior edge. Meso-metathorax short—nearly spanned by the long bristles of the pronotum. Metanotum with 2 short spines on the surface, on each side, near the edge.

Owing to the crop the exact outline of the metathorax over the abdomen cannot be determined. It appears to be somewhat convex. At the posterolateral angles 2 spurs, and thereafter a straight row of long bristles, about 12, with a spine between the 2nd and 3rd on each side. These long bristles span tergites 1 and 2. No bristles between the fore-coxae, but on each, near the inner angle, is a conspicuous pair. 6 bristles between the mid-coxae and rather more behind the meta-coxae.

Abdomen. Oval, with sub-equal tergites, 1 and 2 being a little shorter than the others. Each bears a simple transverse posterior row of hairs which are stronger and longer on the hind segments. The rows increase from 12 to 18 (3rd segment), after which they decrease again. At the sides of the anterior tergites are a few short spines. On tergites 7-8 the row is sparse medianly. The 9th tergite bears posteriorly a pencil of 14 hairs—the outermost being strongest.

The pleurites bear from 3-6 bristles or hairs. The sternites have two rows of hairs neither of which is quite continuous mesially. At the sides also one or two additional short bristles occur.

Genitalia. Basal plate exceedingly long and slender, expanded and rounded proximally. Paramera elongate, finely and gradually pointed. Mesosome oblong. The endomera ending obliquely. Telomera reduced to a chitinous edging of the long, slightly roughened sac. (fig. 2a).

MEASUREMENTS. ♂.

	Length.	Breadth.
Head .....	.31	.58
Prothorax .....	.23	.43
Mesothorax .....	.19	.49
Abdomen	1.15	.79 (4 and 5)
Total.....	1.88 mm.	

Holotype: a ♂ in *Brit. Mus.* Reg. No. 1914—535. (Presented by The Imperial Bureau of Entomology).

From a "Yellow and black-billed Toucan," from COLOMBIA, Boca de Arguia, Atrato Valley (*Dr. A. Baltour*, v. 1914).

Menacanthus balfourii is evidently close to *Menopon* (*Menacanthus*) *exasanguis* Paine and Mann, described from a Brazilian woodpecker (*Campephilus melanoleucus* Gm.). It differs from that species, however, in size, in being much less setose, and in the form of the genitalia, so far as the description allows one to judge (*Psyche*, XX, 1, p. 19, fig. 20).

London: December, 1914.

THE BRITISH SPECIES OF *ANEURUS* CURT.

BY DR. E. BERGROTH, C.M.Z.S.

In 1903 the Swedish entomologist E. Mjöberg described, under the name *A. tuberculatus*, a new species of *Aneurus* from the island of Öland in the Baltic Sea, and in 1909 he more fully pointed out the differences between it and *A. laevis* Fabr., the only European member of the genus previously known. The two species have since been found to possess nearly the same geographical distribution, and both of them occur in Great Britain. Fabricius described *laevis* from England, and his well preserved type specimens (two males) are still in Banks's old collection in the British Museum, where I have examined them. They belong to *A. tuberculatus* Mjöb., and *this* species must therefore bear the name *laevis* Fabr., whilst the insect described by Mjöberg as "*laevis* Fabr." must be called *A. avenius* Duf., of which I have also seen a type specimen. *A. avenius* seems to be common in England, where the true *laevis* is a very much rarer insect. *A. laevis* has been taken near Woking by Mr. Champion, and in the British Museum I saw examples of it from Power's collection, taken by the late George Norman. These specimens have no locality label, but there can be little doubt that they are from Scotland, where Norman lived continuously from the time he began to study *Hemiptera*, collecting chiefly in Perthshire. Yet a corroboration of the occurrence of *A. laevis* in Scotland is desirable, as this would be the northernmost known locality for the species, apart from the Swedish one. In all faunistic works (Fieber, Puton, etc.) the description of "*laevis*"

contains only characters common to both species, but Saunders's figure (Hem. Het. Brit. Isl., pl. xiii, f. 2) seems to represent the true *laevis*. In a recently published paper on the genus *Aneurus* (Ann. Mus. Nat. Hung., xii, pp. 89–108) I have given in detail the distinctive characters of the two European species, but as this periodical is not easily accessible to British Hemipterists, and as the two insects at first sight are very much alike and possibly confused in British collections, I here give the salient points in which they differ:—

A. laevis Fabr.

Spiracles of the 4th, 5th, and 6th abdominal segments placed in the lateral margins.

♂.

Oblong-sub-ovate, $2\frac{1}{2}$ times longer than broad.

4th dorsal abdominal segment with a high conical tubercle in the middle.

♀.

6th ventral segment terminating in the middle in two sub-triangular or apically obtuse lobules, which are shortly produced beyond the apical margin of the genital segment.

A. avenius Duf.

Spiracles of the 4th and 5th abdominal segments considerably removed from the lateral margins, those of the 6th segment placed in these margins.

♂.

Ovate, very little more than $\frac{3}{4}$ longer than broad.

4th dorsal abdominal segment with no trace of such a tubercle.

♀.

6th ventral segment terminating in the middle in one transverse lobule, which is slightly produced beyond the apical margin of the genital segment.

The tubercle on the 4th dorsal abdominal segment of the male of *laevis* is so high that it effects a boss on the membrane somewhat behind its middle, and the presence or absence of the tubercle can therefore usually be ascertained even if the hemelytra are closed. The scutellum is also less parallel, and apically more narrowly rounded in *laevis* than in *avenius*, the surface of the membrane is differently sculptured, and the 6th connexival segment is otherwise shaped in each sex; but the characters tabulated above will suffice to distinguish the two species. It is somewhat difficult, however, to ascertain the position of the very small spiracles, especially in carded specimens, and a good lens is required for the purpose.

Turtola, Finland:

November, 1914.

A side-light on Kirby and Spence's "Introduction to Entomology."—The following extract from a letter proved by internal evidence to have been written early in 1845—probably from London—will no doubt interest many readers of this Magazine.

"My dear Mrs. Wood,—A succession of very pressing engagements must be my apology for not having been able before to-day to give directions to Longmans to send you a copy of our book, which you will probably have to-morrow or next day, and which pray oblige me by honouring with a niche in your library, and I shall be very glad if it afford you any amusement. As it may serve to this end before insects appear if you make use of it as a sort of riddle-me-ree and guess at our different shares, I will give you a clue by telling you that the Preface (which as I originally suggested the work itself and its popular plan, my excellent friend and partner wished me to write) is mine, except two paragraphs with reference to religion at pages ix and x inserted by Mr. K., and that letters xi—xv (both inclusive) of vol. I, and letters xxv to xxvii (also both inclusive) of vol. 2 are also mine, as well as nearly all the long notes to this last Edition; while, on the other hand, the two introductory letters i and ii (except from page 21—46 of the last by me) and letters xvi—xxiii (both inclusive) are by Mr. Kirby. I leave you to guess as to the rest from this sample if you think it worth while * * *. Believe me, my dear Sara, in haste, yours very truly, W. SPENCE. *March 3rd.*"

Mrs. Wood was a niece by marriage of Mr. William Spence, one of the joint authors of the classic "Introduction to Entomology." The aged Mr. Kirby entrusted his colleague with the task of editing the sixth edition of Vols. I and II, which appeared early in 1843.—G. B. LONGSTAFF, Highlands, Putney Heath, London, S.W.: *December 15th, 1914.*

A food-plant of Orthochaetes insignis Aubé.—In his paper introducing this species to the British List (*Ent. Mo. Mag.*, 1912, p. 211) Dr. Joy mentions having seen specimens of my collecting from South Wales. These were taken on the Glamorgan sandhills by general sweeping fifteen or more years ago. A visit to old haunts last June, in company with Messrs. Hallett and Perrins, gave an opportunity for detailed search for this species, and it occurred in numbers to all of us on *Viola curtisii* Forst., on the Kenfig Burrows. This violet is locally abundant on the Glamorgan sandhills, growing in small clumps on the bare sand, and its flowers are indifferently yellow, blue or parti-coloured. It was formerly confused with *Viola lutea* Huds., the mountain pansy, and recorded as such by Dillwyn from the Crwmlyn Burrows about seventy years ago.—J. R. LE B. TOMLIN, Lakefoot, Hamilton Road, Reading: *December 12th, 1914.*

Note on the food of Ptinus tectus Boield.—This beetle seems, like *Anobium paniceum* L., to be able to adapt itself to food of the most varied character. My friend Mr. H. Britten recently showed me a tin of chocolate powder brought from Thame, Oxon, which was swarming with the *Ptinus* in all its stages; and a few days ago I received a specimen from the Rev. A. Thornley, one of a

colony found in a chemist's shop at Carrington, a suburb of Nottingham, breeding in and thriving on so unlikely a pabulum as Cayenne pepper.—JAMES J. WALKER, Oxford: December 14th, 1914.

Two unrecorded captures of Criocephalus fesus Kraatz.—During the year 1913, my friend Mr. J. F. Rayner sent me a female example of *Criocephalus fesus* for identification, informing me that it had been given to him by Mr. B. Piffard, who had found it on the pavement at Pokesdown, Hants, in June, 1909 or 1910. Recently he wrote to say that he had just received a fine male example from Mr. S. Dale, which had flown into a sitting-room in Southampton, in August, 1914.—H. BRITTON, 2, Hope Villas, High Street, New Headington, Oxon: December, 1914.

Pyrameis cardui in Co. Donegal.—In view of the notes on this butterfly in the December number of this Magazine, it may be of interest to record that I saw a fine fresh specimen of *P. cardui* at Coolmore, Co. Donegal, on September 21st. It was a beautiful sunny day, and Mrs. Johnson and I were rambling over the fields, when the butterfly came along and obligingly settled on the head of a Scabious and spread its wings to the sunshine, so that I had a perfect view of the lovely creature. Curiously enough I did not see a single *P. atalanta* either in Donegal or here this autumn.—W. F. JOHNSON, Poyntzpass: Dec. 4th, 1914.

Late larvae of Pieris brassicae.—Larvae of this butterfly have been feeding very late this season in my garden. At the beginning of November they were abundant on Brussels sprouts, and were at that time little more than half-grown. About the middle of the month there were three nights' sharp frost, and on the 22nd several hours' snow, but some of the larvae, at any rate, survived the inclement weather, as I noticed full-fed ones still about on the 28th. I put about two dozen in a box in an outhouse, and the last of them pupated to-day, December 8th. A point of some interest is that these larvae were entirely free from ichneumonids. Usually a large percentage are "struck." Some years ago 95 per cent. of some I was attempting to rear were infested with *Apanteles glomeratus*. This immunity from attack seems to suggest that the parasite's career for the season has ended with the previous brood.—F. H. DAY, 26, Currock Terrace, Carlisle: December 8th, 1914.

Reviews.

"MANCHESTER ENTOMOLOGICAL SOCIETY: ELEVENTH ANNUAL REPORT AND TRANSACTIONS. 1913." Manchester: Printed by W. F. Jackson & Sons, The Manor Press, Salford; published by the Society.

The report for 1913 of this flourishing Society includes, in addition to the usual reports of meetings and excursions, some papers of more than local

interest. The Presidential Address by Mr. W. Buckley on "Collecting and Breeding *Acidalia contiguaria*" gives in detail the author's observations on this pretty and very local little Geometer extending over a number of years, with valuable results, from the Mendelian point of view, of his experiments in pairing and breeding the moth, and is illustrated by an excellent half-tone plate. We would also call attention to the beautiful plate which accompanies Mr. J. H. Watson's paper, "New Hybrids and Races of *Philosamia* and *Antherea* (*recte Antheræ*)" and exhibits the now familiar "three-colour" process at its best. The list of local records of *Lepidoptera* is of considerable interest, though one or two serious misprints have escaped correction.

"A MONOGRAPH OF THE GENUS 'TERACOLUS.'" By EMILY MARY BOWDLER SHARPE. 4to pp. 56, 44 plates. London: L. Reeve & Co., Ltd., 6, Henrietta Street, Covent Garden. 1914.

The handsome quarto volume now under notice consists of the eleven parts, published between 1898 and 1902, of Miss Bowdler Sharpe's revision of the exceedingly beautiful and interesting Pierine genus *Teracolus*, the members of which form so conspicuous and beautiful a feature of the butterfly fauna of Africa and South-Western Asia. These are now issued with title-page and index, and although professedly incomplete—some of the more remarkable members of the genus, such as the large and fine *T. protomedia*, not being dealt with—and lacking the very considerable accessions to our knowledge of the life-history and seasonal forms of numerous species, which since the appearance of the final part have resulted from the researches of many able workers in Tropical Africa and elsewhere, the book is of great value to all serious students of butterflies. The descriptions of the 51 species included in the volume are carefully drawn up, with full synonymy and particulars of the seasonal and geographical variation as were known at the time of writing, as well as long lists of localities and such bionomic details as were then available. A general introduction to the volume might with advantage have been added. The chief feature of the work is the extensive series of plates, executed in chromo-lithography, and including no fewer than 450 figures. The butterflies lend themselves excellently to this method of illustration, and though in a few of the figures a certain lack of finish is perceptible, and those of the magnificent "purple-tipped" species scarcely do justice to the opalescent beauty of the insects—such a feat of colour-work is perhaps hardly possible—a high standard of excellence is on the whole maintained. We would add that the work is issued at a price considerably less than the original cost of the parts.

Societies.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY: Meeting held at the Royal Institution, Colquhoun Street, Liverpool, Monday, October 19th, 1914.—Mr. R. WILDING, President, in the Chair.

This being the opening meeting of the Society it was, as usual, devoted to exhibits of the season's work.

Mr. F. N. Pierce showed *Carterocephalus paniscus* from Northants, and a large number of *Micro-Lepidoptera*, including *Laspesyesia gemmiferana*, *Penthina gentianana*, and *Leioptilus microdactylus* from Devon, also *Dicrorampha saturnana*. Mr. A. W. Hughes brought a long series of *Vanessa c-album*, including var. *hutchinsoni*, also *V. laevana* from Herefordshire; he reported that the latter insect seemed to be establishing itself there. By the same member, a long series of *Lycaena astrarche* and its var. *semi-allous* from Silverdale. Mr. Buckley had a fine series of *Odontopera bidentata* var. *nigra* from Birmingham, also the local form of the same species from Urmston, varied series of *Agrotis ashworthii* and *Boarmia repandata* from North Wales, *Dianthoecia nana* from Anglesey and *D. capsophila*, pale forms, from Eastbourne. Mr. R. Tait, jun., brought three large cases containing the results of his holiday in South Devon; these included *Leucophasia sinapis*, *Syrictus malvae* var. *taras*, *Cidaria russata* and var. *centumnotata* as well as varieties of *Lycaena icarus*. From Penmaenmawr, the following taken at heather bloom: *Agrotis ashworthii*, *A. lunigera*, *A. lucernca*, and *Mamestra furva*; he also found *Acidalia contiguaria*, and for the first time captured wild the local melanic form of *Boarmia repandata*. From Huddersfield, a very fine lot of varieties of *Abraaxas grossulariata*, which included a grand series of var. *nigro-sparsata*, and one remarkable specimen having the left side wings black with a few marginal streaks on the hind-wing, while the wings on the right side were typical. Dr. J. Cotton brought a fine specimen of *Acherontia atropos* captured at light, at Knowsley, early in October. Mr. R. Wilding showed fine series of a number of *Rhopalocera* from the New Forest, Silverdale, and Ireland; noteworthy among these was a fine row of Irish females of *Lycuena icarus*. Mr. W. Mansbridge brought a long bred series of *Aplecta nebulosa*, the progeny of Delamere parents: these included the local type form, var. *robsoni* and a scarce leaden-grey variation, also a short series of *Abraaxas grossulariata* from Huyton, of which a number were var. *lacticolor*, dark *Polia chi* from Hebden Bridge, and *Odontopera bidentata* var. *nigra* from wild larvae beaten on Simonswood Moss, in which locality, although of rare occurrence, it appears to be increasing.—WM. MANSBRIDGE, *Hon. Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, November 4th, 1914.*—
Mr. G. T. BETHUNE-BAKER, F.L.S., F.Z.S., President, in the Chair.

Mr. Alleyne Leechman, M.A., F.L.S., F.C.S., of Corpus Christi College, Oxford, and St. Hubert's, Main Street, Georgetown, British Guiana; Dr. T. Miyaké, the Agricultural College, Tokyo Imperial University, Komaba, Tokyo, Japan; and Mr. George W. Murray, Dirimu Estate, Binaturi River, Duru, Papua, were elected Fellows of the Society.

The President said that he had received a letter from Prof. Poulton saying that the reply made by many of the British University Professors to the declaration against England issued by German Professors, was being

brought before the various Scientific Societies in England with a view to its being formally endorsed by them. He read in full both the Declaration and the Reply, and proposed the following motion:—"That the Officers, Council, and Fellows of the Entomological Society of London, assembled at their meeting on November 4th, 1914, desire to be associated with the statements and expressions of opinion by certain scholars and men of science as published in the *Times* of October 21st, 1914, and that notice of this resolution be sent to the Press." He added that this motion had already been placed before the Council, which had unanimously recommended it for adoption by the Society. Prof. Poulton seconded the motion, which was supported by Dr. Malcolm Burr and Mr. H. Rowland-Brown, and carried unanimously. The Rev. F. D. Morice then proposed the following resolution:—"That all members of recognised Entomological Societies in the countries of our Allies, residing in or visiting this Country, be invited during the continuance of the War to attend the Ordinary and Annual Meetings of the Society, and to make use of the Society's Library, in the same manner as though they were themselves Ordinary Fellows, except as to the right of voting." This was seconded by Dr. Burr, and carried unanimously.

Commander Walker exhibited, on behalf Dr. R. C. L. Perkins, specimens of *A. trifolii* and *P. plantaginis* showing the effects of isolation; also, on behalf of Mr. Morris N. Watt, of New Zealand, a photograph of a "Weta" (*Deinacrida* sp.) fully winged, the species being usually apterous. Mr. A. H. Jones, a series of *Colias erate*, from Sarepta, and its supposed hybrids, with *C. hyale* and *C. edusa*; also from Sarepta a large form of *Anthocharis cardamines*, with an expanse of 56 mm., to which Mr. Sheldon has given the name of var. *volgensis*, and a diminutive British specimen about half the size, taken by himself at Burston, Norfolk; also *Plebeius pylaon*, showing the two forms of the male, and *Lycæna arion* having pronounced black dashes on fore-wing, also from Sarepta, with the Asiatic form var. *cyanecula* Ev., of the latter species for comparison. Dr. G. B. Longstaff, a fine series of *Meneris tubaghia* L., a large and handsome Satyrine butterfly having much the appearance and habits of a Nymphaline. Prof. Poulton read a letter from Mr. T. R. Bell, Karwar, N. Kanara, in the Bombay Presidency, and pointed out the extremely interesting difference between the proportions of the female forms of *Papilio polytes* observed by Mr. Bell and those obtained by Mr. J. C. F. Fryer in Ceylon; also a letter from Rev. K. St. Aubyn Rogers, Sagalla, near Voi, British East Africa, who had observed a pair of *Acraea chilo* Godm., in copula, the female being of the form long known as *A. crystallina* Gr.-Sm., confirming Mr. Neave's discovery that these forms are the ♂ and ♀ of the same species. Prof. Poulton also exhibited specimens of *Ceratopogon formicarius* and *Formicoxenus nitidulus*, found on the hillock of *Formica rufa*, near Bournemouth, by Mr. A. H. Hamn. Mr. G. Talbot, on behalf of Mr. J. J. Joicey, specimens to illustrate a paper by Messrs. Joicey and Rosenberg, on new species of *Catantacta*, and a few new species of Lepidoptera in the collection of Mr. Joicey.

The following papers were read:—"Notes on the Life-History of *Polyommatus eros*," by T. A. Chapman, M.D., F.Z.S., F.E.S. "Note on the Manubrium of

the ninth sternite in the male Earwig," by Malcolm Burr, M.A., D.Sc., F.E.S., etc.; "The Opisthomeres and the Gonapophyses in the Dermaptera, by the same; "On the Male Genital Armature of the Dermaptera"—Parts I, III by the same.

Wednesday November 18th, 1914.—The President in the Chair.

Messrs. Harry George Champion, B.A., *c/o* U. S. Dept. of Agriculture, Entomological Bureau, Washington, U.S.A.; J. J. Lister, St. John's College, Cambridge, and Merton House, Grantchester; and Rev James Waterston, B.D., B.Sc., 22, Blandford Road, Bedford Park, W., were elected Fellows of the Society.

The President announced that the Royal Society had awarded the Darwin Medal to Prof. E. B. Poulton, a former President of the Entomological Society.

Mr. E. E. Green exhibited two specimens of an *Anthroceera* from Camberley, taken August 20th, 1914, which appeared to be *A. meliloti*, though South states that "the only part of Britain that the species inhabits is the New Forest, Hampshire"; also a specimen of the rare Hyphenid *Parascotia fuliginaria* taken at light at Camberley, July 21st, 1914. The President said that he should have named the specimens *meliloti* without hesitation, and Mr. Jones concurred. Mr. E. B. Ashby, on behalf of Mr. Dickinson, a few butterflies from *Hinterzarten* in the Black Forest and from Pontresina. Amongst them was a ♀ *Colias palaeno* var. *europomene*, of the large form of the lower levels, and another which was possibly a hybrid between *C. palaeno* and *C. hyale*. Mr. Prideaux, a cocoon of *Bombyx quercus* with the dead, shrivelled larva inside, together with the empty puparium of a dipterous parasite, which, with the wings unexpanded, lay beside it, imprisoned within the cocoon of its host. Mr. Simes, a series of *Agriades thersites*, *Plebeius zephyrus* var. *hesperica*, and *Melitaea desfontainii* from Albarracin, taken at the end of May and the beginning of June, 1914. The ♀♀ of *A. thersites* were strongly marked with blue, and amongst the ♂♂ was a specimen, the underside of which had only the discoidal and marginal spots.

The following papers were read: "A Revision of the Mexican and Central American *Telephorinae* (Fam. *Telephoridae*), with Descriptions of New Species," by George Charles Champion, A.L.S., F.Z.S., F.E.S. "Descriptions of two new Genera and new Species of *Mymaridae* from Tasmania," by Chas. O. Waterhouse, I.S.O., F.E.S.—GEO. WHEELER, *Hon. Secretary*.

SOME OBSERVATIONS ON THE LIFE-HISTORY OF SNAKE-FLIES
(*RAPHIDIA*: ORDER *PLANIPENNIA*).

BY HERBERT CAMPION.

During May and June, 1913, Mr. R. South kindly gave me several living imagines of *Raphidia notata*, from Brockenhurst, Hants, which he had either taken himself, or received from correspondents. These I kept alive for varying periods, the greatest longevity being attained by two males. One of them, taken by Mr. South on May 30th, lived until July 8th, while the other, received on June 11th, did not expire until July 10th. I fed all of them upon various insects of small or moderate size, but, as they manifested reluctance to attack living flies, the *Diptera* which formed a considerable portion of their diet were usually quieted with the forceps before being presented. It was found, however, that Aphids, upon which the *Raphidia* fed largely, were seized and eaten quite readily without being previously killed.

In the early summer of the same year Mr. G. C. Champion was good enough to give me two larvae from Woking, Surrey. They had not, however, been kept apart from each other during captivity, and when I received them they were in a moribund condition, from which they never recovered. Possibly, in default of proper food, the larvae had bitten and fatally injured one another. But on July 21st the same entomologist handed me a large and healthy larva (referred to herein as No 1) which he had got at Woking two days previously, while searching for *Coleoptera* under the bark of Scots Fir. On July 28th, two more larvae (Nos. 2 and 3) were found by Mr. Champion at Woking, beneath a heap of decaying Sphagnum moss which had been removed from a small pond and thrown down upon ground strewn with the needles of Scots Fir. At Wisley, Surrey (August 4th), Mr. Champion discovered another larva (No. 4) of large size, under pine bark.

All these larvae came into my possession, and it was noticed that Nos. 2 and 3 were considerably smaller than Nos. 1 and 4, and, apart from size, could be distinguished from them by the uninterrupted condition of the mid-dorsal buff-coloured line on the abdomen. In the larger larvae this line was interrupted and reduced to spots, one of such spots being placed at the apex of each segment. Nos. 2 and 3 were bred through, and proved to be a ♂ and ♀, respectively, of *R. maculicollis*. Unfortunately, Nos. 1 and 4 died before pupating, but it is almost certain that they belonged to the larger species *notata*.

THE "VERRALL SUPPER" ASSOCIATION OF ENTOMOLOGISTS.—
The annual reunion of Entomologists, known as the "Verrall Supper," will be held
as usual at the Holborn Restaurant, on Tuesday, January 19th, 1915.

AUTHORS requiring separate copies of their papers (which can be supplied at
a small cost) are requested to mark the number wanted on their MS.

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ing Mixture, ready for use, 1/9 per tin; Setting Hoses, 9/6, 11/6, 14/-; Glass
Topped and Glass Bottomed Boxes, from 1/- per doz.; Zinc Killing Boxes, 9d., 1/-;
Coleoptera Collecting Bottles, 1/6, 1/8; Collecting Box, containing 26 tubes (very
useful for Coleopterists, Microscopists, &c.), 4/6; Brass Chloroform Bottle, 2/6.

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MONTHLY MAGAZINE.

EDITED BY

G. C. CHAMPION, F.Z.S. J. E. COLLIN, F.E.S.

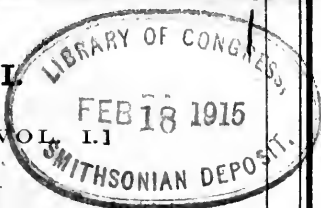
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VOLUME LI

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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Wednesday, February 3rd, 1915.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m. on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

Feb. 2nd—Pocket Box Exhibition. Visitors specially invited to attend and exhibit. Feb. 16th—"A Month amongst Spanish Butterflies," J. A. SCORES, F.E.S. Feb. 20th—"Winter Tramp from Loughton," Leader: A. B. HOENBLOWER. March 2nd—"The Botany of the District," C. S. NICHOLSON, F.L.S., R. W. ROBBINS, and L. B. HALL, F.L.S.

Hon. Sec.: J. ROSS, 18, Queen's Grove Road, Chingford, N.E.

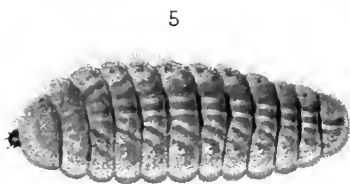
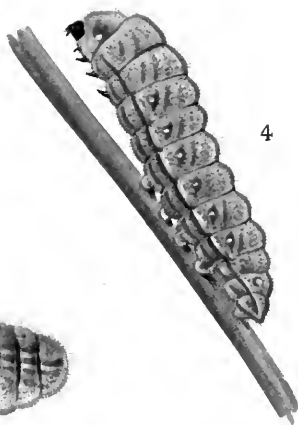
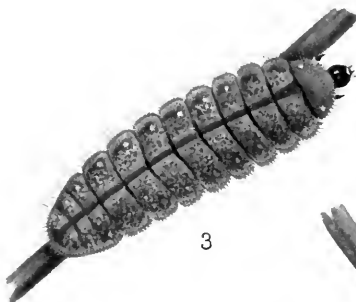
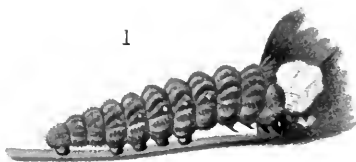
Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

Chingford Branch. The Chingford Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the second Friday in each month.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meetings: the Third Monday in each Month, October to April. Hon. Sec., WM. MANSBRIDGE, 4, Norwich Road, Wavertree, Liverpool.

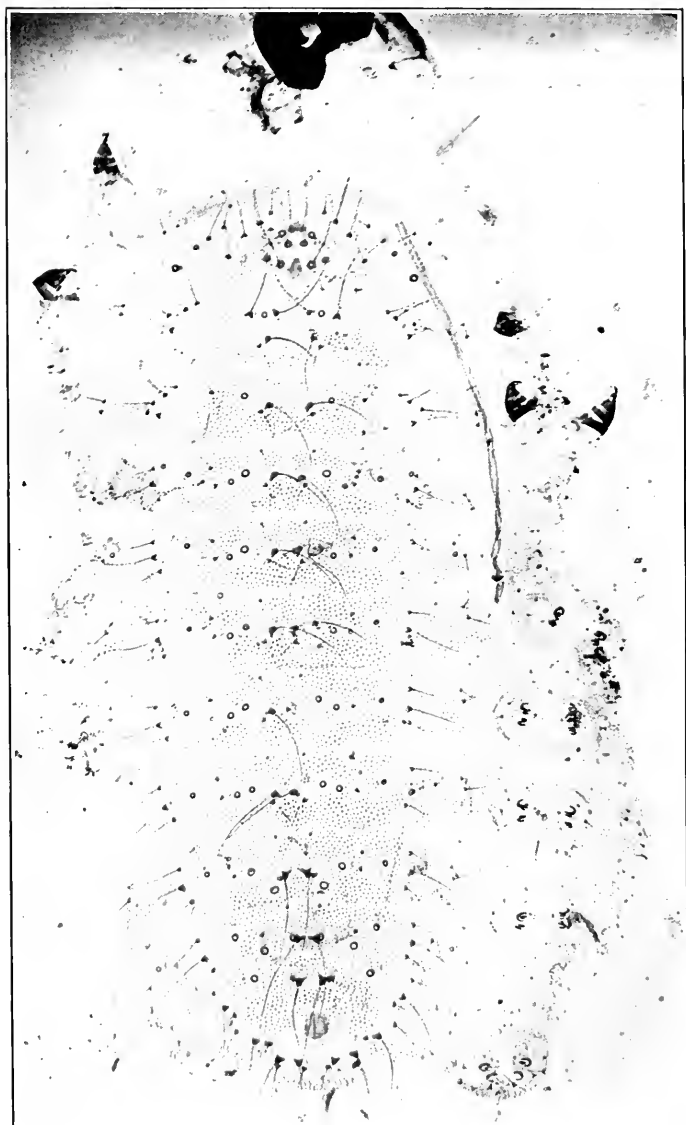
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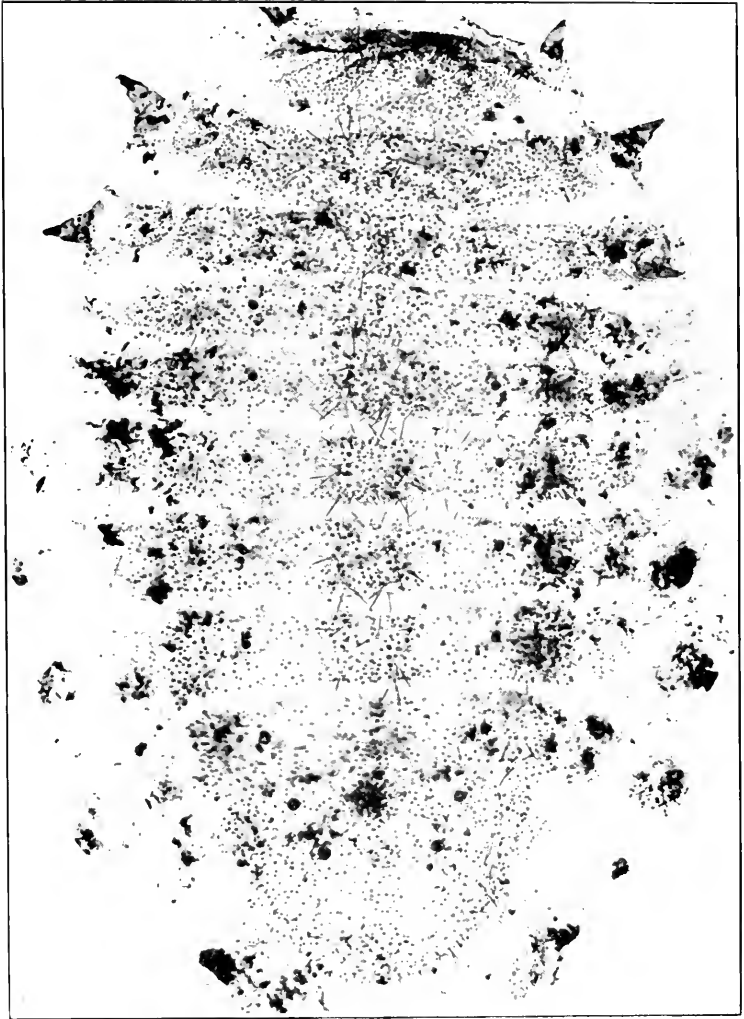
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LARVAE OF EVERES ARGIADES.



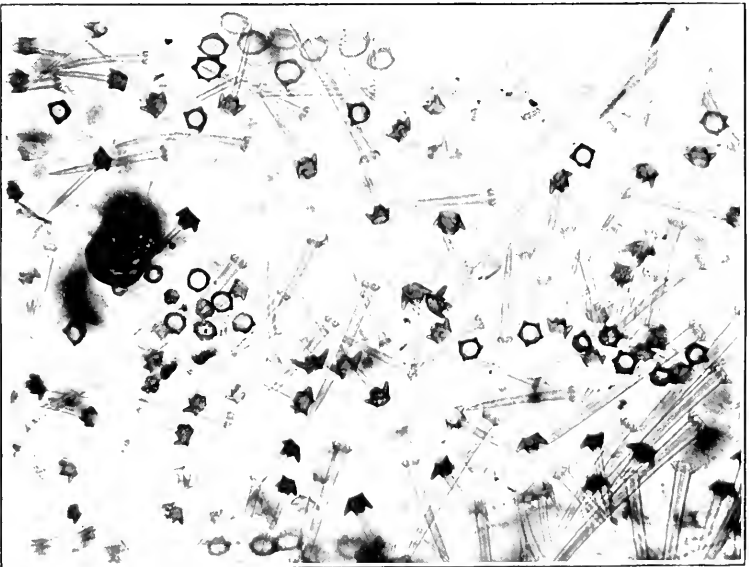
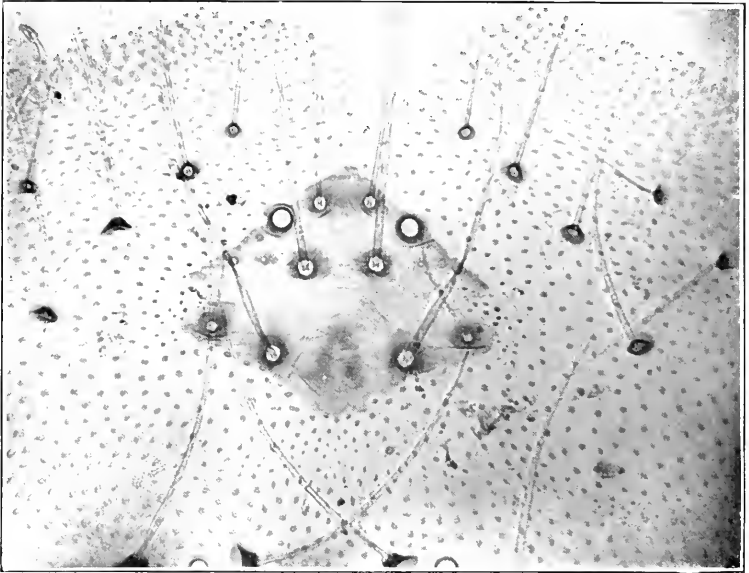
[Photo: F. N. CLARK.]

Skin of larva of *E. argiades* in first instar $\times 60$.



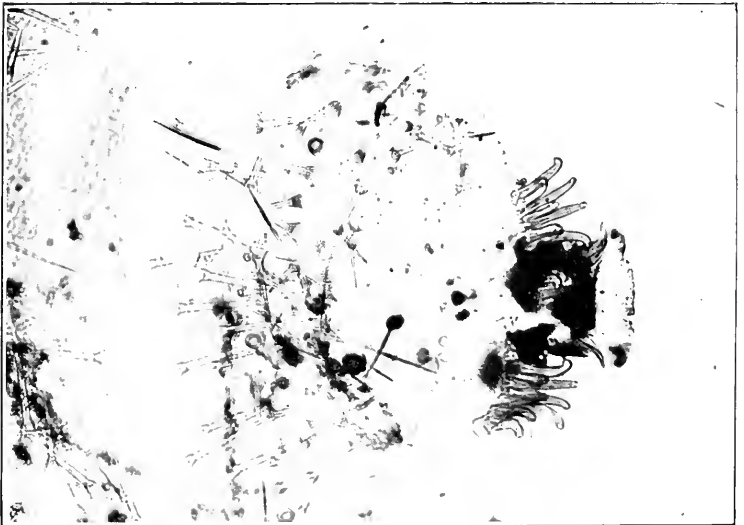
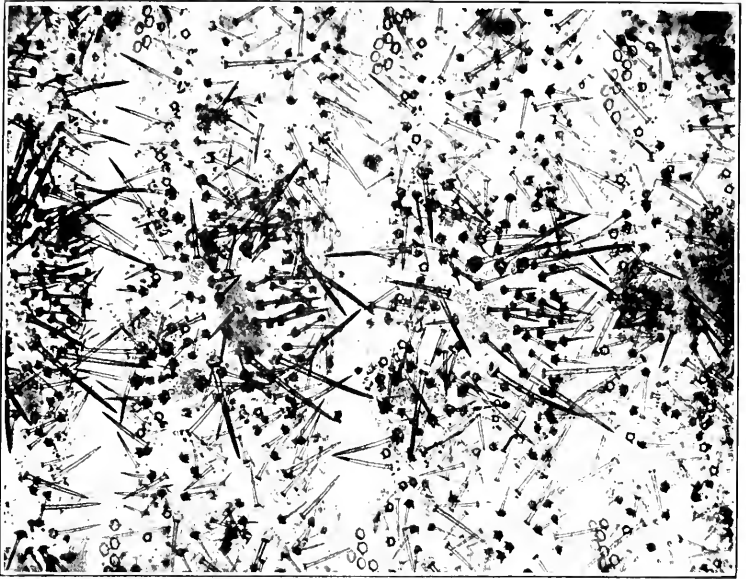
[Photo: F. N. CLARK.

Skin of larva of *E. argiades* in last instar, X 16.



[Photo: F. N. CLARK.

Larva of *E. argiades*, prothoracic plate, first instar, $\times 250$;
spiracular region, last instar, $\times 100$.



[Photo: F. N. CLARK.

Larva of *E. argiades*, last instar, dorsal region, $\times 40$; pro-legs, $\times 100$.

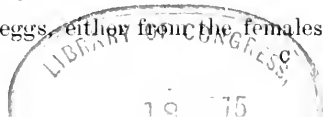
A very interesting point disclosed by my observations was the fact that both the specimens of *maculicollis* hibernated as pupae, whereas both the presumed *notata* continued their larval existence throughout the winter months. Mr. Claude Morley has already recorded the case of a larva of *notata* taken on November 5th not pupating until April 20th in the following year (Entom. xlii, p 143, 1909), and this difference in the period of pupation is, perhaps, characteristic of the two species under consideration. But I do not share the views expressed by Mr. Morley on the same occasion, that larvae of *notata* are probably not carnivorous insects, but are addicted to a ligneous diet. Until the end of October, at least, my larvae were observed to feed with great relish upon living Aphids, and upon the carcasses of such *Muscidae*, *Tipulidae*, and other *Diptera* as were offered to them; but, although living flies were eventually consumed, I never saw a larva killing one for itself. On one occasion a small living spider was introduced into the box containing larva No. 1, but its presence caused so much consternation that I soon withdrew it, and the experiment was not repeated. The same larva, however, would feed on killed spiders. But it must be remembered that Mr. Morley's remarks apply to a time of year when my own *notata* larvae had ceased feeding altogether. My presumed *notata* specimens were provided with pieces of dry soft wood after they had ceased feeding, and they quickly made channels in the under surface of the wood, and rested motionless in them, back downwards. Throughout their existence the larvae of both species were given scraps of bark or wood beneath which they might lurk, for, as was to be expected of subeortical insects, exposure to strong light caused them considerable distress.

In rearing my larvae of *maculicollis*, at all events, I did not experience the necessity for moisture insisted upon by Mr. C. B. Williams (Entom. xlvi, p. 6, 1913), and all my specimens were kept quite dry in glass-bottomed boxes throughout the period of their captivity.

All the larvae were evidently fully grown on the dates when they reached me, as no larval moults whatever were observed.

The curious ability of running backwards, proper to larval *Raphidia*, was displayed repeatedly, and a certain amount of prehensile power seemed to be possessed by the terminal segments of the abdomen. In movements, as well as in appearance, these insects are very ophidian, and the popular name of Snake-fly applies equally well, if not better, to the larva than to the imago.

I did not succeed in obtaining any eggs, either from the females



of *notata* received from the New Forest, or from the bred female of *maculicollis*. On May 10th, 1914, the last-named was shut up for several hours with the bred male of the same species, but pairing was not observed to take place. Indeed, the insects took very little notice of each other, and, whenever a confrontation took place, the female, especially, manifested great alarm, and at once began to run backwards.

A few details concerning the life-histories of these larvae are appended:—

No. 1 (? *notata*).—Obtained at Woking, July 19th, 1913. Continued to feed until October. Provided with a piece of soft wood, December 26th; rested on under-surface of wood throughout the winter. Found lying on its side, on floor of box, partly coiled up and very inactive, April 14th, 1914. Still showed faint traces of life as late as May 4th, but expired shortly afterwards, finishing its existence in the larval state.

No. 2 (*maculicollis*, ♂).—Collected at Woking, July 28th, 1913. Ceased feeding early in October, and remained resting on its side, in a semi-circular position, on the floor of the box. Re-examined on October 17th, after an interval of two days, by which time it had moulted and pupated, disclosing the rudimentary wings. On April 23rd, 1914, 6 p.m., pupa quite active and crawling about the box; by 8 p.m., the final moult had been completed. Imago found dead, July 3rd.

No. 3 (*maculicollis*, ♀).—Caught at Woking, July 28th, 1913. During October became quiescent, lying upon its side. Re-examined on November 2nd, and found to have pupated since last observation, a day or two before. Pupa running about actively on April 23rd, 1914; ovipositor noticed for the first time, carried on dorsum of abdomen. Imago emerged between 10 p.m., April 23rd, and 7 a.m. April 24th. Found dead, July 5th.

No. 4 (? *notata*).—Taken at Wisley, August 4th, 1913. Continued to feed until the end of October, at least. Remained a more or less active larva until May 4th, 1914; during this period of hibernation the larva was, for the most part, resting on the dark under-surface of a large chip of wood. After May 4th, life gradually became extinct, without the final metamorphosis taking place.

58, Ranelagh Road,
Ealing, W. :
November 19th, 1914.

STUDIES IN HELOPHORINI.

BY D. SHARP, M.A., F.R.S.

2.—AN ACCOUNT OF THE AEDEAGUS.

The description here given of the aedeagus is taken from *Meghelophorus aquaticus*; in its main features it applies also to the other forms of the sub-family, as in this group there is much less diversity than is the case in many sub-families of the *Coleoptera*. On dissecting specimens it will be found that there is no external feature by which the sexes can be distinguished; there is a concealed internal segment of large size, with dorsal and ventral plates differing little in colour and texture from the other ventral plates, though not quite so strongly chitinised. The dorsal plate—or tergite—is rather longer and narrower than the sternite, and this is the case in each sex. There is a spiracle between them. The aedeagus is quite small and remarkably simple in structure; of the trilobe form. Its basal sclerite is very large, longer than the rest of the aedeagus; it begins in front as a rather small triangle or point, rapidly broadens, and in the middle of its length extends over rather more than the half of the circumference of the tube, the other portion of which is delicate transparent membrane, the membranous portion being the dorsal aspect. This basal sclerite is not very hard except near the line where it becomes membranous, and the hard part connects with the base of the lateral lobe and a little overlaps it; in the middle, behind, the chitinisation becomes feeble so as to leave a broad, short triangular space in front of the base of the lateral lobes, transparent.

The lateral lobes are elongate; they are quite similar one to the other, pointed at the extremity, with the outer margin slightly sinuous, and (except for this sinuosity which is confined to a few species) almost parallel-side externally; the pointed tips are not hard, but rather delicate even in perfectly mature specimens; at the base on the ventral aspect the two sclerites forming these lobes are contiguous, but almost immediately diverge a little, and then, continuing backwards, leave an almost parallel space between them for quite one-third of their length, when they diverge more strongly, continuing thus to the tip, and leave a broad space in which the median lobe is exposed, and their shape on the dorsal aspect is the same as on the ventral.

The median lobe is remarkably short and broad, though it extends forwards as a pair of long calliper-like struts, which struts are even longer in the anterior direction than the base of the lateral lobes. The median lobe forms a sort of triangle between the lateral lobes, from which in this species (*M. aquaticus*) it is very distinct; but little more than the struts being embraced by the lateral lobes. Its dorsal sclerite is longitudinally depressed along the middle and terminates as a blunt point extending not quite so far back as the tips of the lateral lobes. The ventral aspect is strongly chitinised along the middle in a rod-like manner, and extends forwards so as to form a sharp-pointed process in the middle of the arch formed by the calliper-like struts; at the termination there is a fine transverse chitinisation with only an obscure appearance of ring structure, though it forms one lip of the median orifice. This structure is, as I have previously said, remarkable for its simplicity and symmetry.

There is no sac; the ejaculatory duct runs through the aedeagus to its termination, and by holding open the median orifice one can look down the duct. A little distance before entering the median lobe the duct has a dilatation which ceases considerably before the apex—the duct becoming again quite slender—but this dilatation has in no way the nature of a sac. It is surrounded by a very strong muscular coat and cannot be everted.

Although the above is a fairly complete account of the aedeagus itself, yet if we wish to form a conception of it as a mechanism we must take into consideration the parts adjoining it as well as the musculature.

The freedom of movement between the various parts of the aedeagus is extremely slight. There is some flexibility at the junction of the basal sclerite with the parts beyond it, and there is a small movement, required of the upper and lower lips of the extremity of the median lobe so as to open the median orifice, but the median lobe itself has very little capacity of movement independent of the lateral lobes; it can indeed by pressure be diverted a little to one side or the other, and an extremely small backwards and forwards motion can be produced by drawing on, or by pushing out, the struts; the lateral lobes can be made to approximate a little at their tips, or to diverge a little; but all these movements are very light, and, except in the case of the opening of the lips of the median orifice, appear to be due to elasticity of the parts.

But the aedeagus as a whole is capable of great movement. In repose when contracted it is contained not only within the lumen of the internal segment described at the beginning of this account, but is also retracted within another part, which I will call the encasement; and it is, when fully extended, found to be connected with this encasement only by a delicate and very short part of the genital tube forming a connecting membrane.

It has happened in two or three cases that, when preparing a specimen for examination of these parts, we have found what I have described as the ventral aspect of the aedeagus to be uppermost. This I believe to be not a morphological deviation, but purely accidental, and in all probability due to a half-twist of the connecting membrane having occurred at some moment when the aedeagus was fully extended; if then suddenly withdrawn the part would be found in the encasement with the orientation reversed. This point is of some importance as showing how easily a change can be made as to this feature of the orientation, although extreme importance has been attached to it by some morphologists. My colleague F. Muir and I in our paper on the comparative anatomy of the genital tube (Tr. Ent. Soc. London, 1912) had occasion to mention (i.e., pp. 549, etc.) cases of reversed orientation, more particularly in the *Heteromera*, which we could not very well understand, and I therefore add that I (and I believe from a letter I have had from him I may also say my colleague) now attach but little importance to these cases. For even if some of them should prove to be normal, they may be due to a half-twist of the genital tube occurring during the metamorphosis, in which case their morphological importance would be comparatively slight.

The encasement consists of two plates, a dorsal and a ventral, each with remarkable chitinisations—or better—darker areas. The two plates have no lateral continuity except by membrane, though they are in very close correlation. The alimentary canal enters the encasement and there terminates. The encasement is therefore a highly modified body segment, not only because of its relation to the alimentary canal, but also because of its definite division into tergum and sternum. The parts of the genital tube in *Coleoptera* frequently exhibit a segmentation (exemplified in *Helophorus* by the relation of the basal sclerite to the parts beyond), but this pseudo-segmentation does not exhibit the distinction of individualised tergum and sternal parts that is invariably the case with the chröotic somites. This is one of the reasons for deciding that the parts considered by Muir and myself as phallic are

absolutely distinct from the body parts. They are not a somite, neither can they be a sternal portion of a somite, because they form a continuous tube. The basal part of the genital tube, to those who desire to consider it a modified part of the true body, can only be of the nature of an appendage or a modified pair of appendages.

In the *Helophorus* encasement, the orientation cannot be reversed, as it can in the case of the aedeagus. The tergum is much shorter than the sternum, the latter being a little the longer in front and considerably the longer behind. The dark chitinisations consist of a median large, longitudinally somewhat pyriform area, and a transverse basal area; this latter is reduced in length in front, where it is joined by the pyriform area, but extends backwards on each side of the latter for a considerable distance. The dark chitinisations of the sternal plate are a median longitudinal one extending the whole length; the sides of it part or diverge in front in a V-like fashion; the arms of the top of the V are quite horizontal in each direction and each arm connects with a slender longitudinal very hard band. This latter hard band connects behind with the extremity of the external anterior part of the curved base of the tergum, and by this means a very beautiful arrangement of the nature of a spring is produced. The concentration of the chitinisations to form this spring is highly remarkable, and is well displayed in specimens that have been submitted to the action of caustic potash to an extent sufficient to make the parts transparent, but not to destroy any of the outline.

The whole of the structures at the apex of the abdomen, with the aedeagus form a very simple but perfect mechanical arrangement. The anal orifice is occluded by the falling of the posterior part of the pyriform area of the tergum of the encasement, but is freed, when necessary, by the action of the springs of the encasement. In a similar manner, when the genital tube is extended, no matter can pass through it until the pyriform area is lifted, and until the lips of the median orifice are opened. This latter is pretty certainly effected by the agency of the struts and the pressure of the lateral lobes on these.

I hope that later on we may be able to give some illustrations that will render my account of the aedeagus more easily comprehensible.

(*To be continued.*)

A NOTE ON *CARABUS CLATHRATUS* L.

BY JAMES EDWARDS, F.E.S.

In preparing the last quinquennial supplement to my list of Norfolk *Coleoptera*, published by the Norfolk and Norwich Naturalists' Society, it became necessary to examine Mr. Morley's paper on *Carabus clathratus* (*antea*, pp. 97-103), more especially with regard to the author's attempt to confute the record of its occurrence in England. His general attitude towards the question may be gathered from the first paragraph on p. 102; he has not the least hesitation in stating it to be absolutely certain that the insect does not now occur in East Anglia; and, because he has collected in Suffolk for over twenty years and has published a statement with regard to the total number of species of beetles recorded for Essex, Norfolk, and Suffolk respectively, the supposition that it could have been overlooked is unthinkable. But it is conceivable that this would depend to some extent upon the thinker. His reasoning, what there is of it, is unfortunately very diffuse; but we are, in effect, asked to believe that Leach, Spence, and the entomologists of that day did not know *Carabus clathratus*.

Leach, writing to Robert Scales under date of September 30th, 1810, says: "You was good enough to give me a specimen of *Carabus clathratus*; if you have any duplicates I shall be much obliged for another to compleat the pair; a female will be most acceptable, but if you have not a duplicate female, a male will do as well, as I can procure a female for it from a friend." Spence, in a letter to Scales, dated November 4th, 1810, writes: "Having just received the box of insects . . . I write . . . to announce its arrival. *Carabus clathratus* is a most beautiful species which I am much pleased to possess; and all the rest are interesting to me." In a letter to Scales, dated Barham, May 3rd, 1811, Kirby says: "Many thanks for . . . your kind intention to give me *Car: clathratus* when you meet with another." Wilkin, writing to Scales on January 20th, 1812, says: "Leach has repeatedly teized me about *Carabus clathratus* fem. promised him by you, and which he supposed was committed to me; I have therefore sent him my ♀ trusting to you for another." The letters from which the foregoing extracts are made were printed in Vol. IV of the Transactions of the Norfolk and Norwich Naturalists' Society, pp. 97-109; the originals I had before me when I assisted in preparing for their publication in 1885. Mr. Morley correctly cites the reference to these letters, but makes no use of the evidence which they afford. Robert Scales was a merchant from the Hull district, who turned farmer

in Norfolk. He was a Vice-President of the old Entomological Society of London, of which his brother-in-law, Haworth, was President. This was the Society founded in 1806 in succession to the Entomological Society, 1805, and the older Aurelian Society, 1801. Haworth doubtless found *Carabus clathratus* for the first time in England when on a visit to Scales at the latter's then recently-acquired farm at Halvergate in April, 1809.

To the general accuracy of Mr. Morley's picturesque description of the Halvergate marshes I can bear personal testimony, having lived for many years within easy distance of that classic spot. From the list of his captures on the occasion of his visit it would appear that he did everything except search for *Carabus clathratus*, an insect which few persons would expect to find by the most assiduous sweeping, either in marsh dykes or elsewhere.

C. clathratus does not appear to be exclusively confined to considerable altitudes; for instance, in Holland, as I learn from Jkr. Dr. Everts, the author of "Coleoptera Neerlandica," it is widely distributed, especially in marshy places, under moss on the roots of willows, but usually rare; it is most frequently met with in the neighbourhood of Amsterdam, particularly where the hayfields are lower and humid, as in the neighbourhood of Broek, in Waterland, on the north side of that city; and in the latter part of the summer it is common on the island of Texel in low-lying, damp hayfields, under haycocks. A competent Danish Coleopterist residing in Copenhagen, of whom I recently inquired as to his experience of the species, writes:—"With regard to *Carabus clathratus*, it is widely distributed here in Denmark but not quite common. It is found (1) on marshy commons, especially near the sea-coast; (2) in sandy places; (3) at the shore of lakes. My own specimens I have taken on a marshy place at the shore of a lake or pond here in Nordsjaelland; at this place I took the species both in ♂ and ♀, and also several larvae under moss." It would appear, therefore, that *C. clathratus* is still found in Holland and Denmark in stations precisely similar to those in which it was said to be found in Norfolk and Suffolk rather more than a century since. The occurrence of this insect in Norfolk would not prove that the species reached Donegal and the Hebrides *via* East Anglia; but if we accept the geological evidence of the land-connections existing in later Pleistocene times, such a thing would appear quite possible.

Colesborne, Cheltenham:

December 18th, 1914.

COLEOPTERA IN HEREFORDSHIRE (V).

BY J. R. LE B. TOMLIN, M.A., F.E.S.

(continued from p. 7).

Onthophagus coenobita Hbst., Stoke Edith (Wood); *Aphodius lapponum* Gyll., not uncommon on the Black Mountains at about 2,000 feet; *A. foetidus* F., with the last; *A. nitidulus* F., one on Seager Hill, 25.8.11; *A. luridus* F., West Malvern, rare, 22.4.10; *Aegialia sabuleti* Pk., banks of River Monnow, near Llangua, 10.8.11; *Hoplia philanthus* Füssl., Great Doward, River Monnow, near Llancillo (Wood); *Melolontha hippocastani* F., one taken on the wing at West Malvern about mid-day, 4.8.12.

Cryptohypnus sabulicola Boh., this remarkable addition to the list was made by Mr. Perrins, who took several specimens on the banks of the River Monnow, near Pontrilas, 28.6.14; hitherto it has only been known from the River Nith in Scotland; *C. dermestoides* Hbst. and var. *quadriguttatus* Lap., both abundant in shingle by the River Monnow, the variety being if anything the commoner: also at Ewias Harold (the variety only); *Elater ballteatus* L., swept in Mainswood (Wood); *Corymbites aeneus* L., Rough Hill Wood near Storridge (Perrins).

Hydrocyphon deflexicollis Müll., rare under stones by the River Monnow; *Platycis minuta* F., breeds every year in a sodden log near Mordiford: one specimen taken in September, 1913, has three perfect tarsi on one hind-leg; *Telephorus paludosus* Fall., two swept in marshy ground at Trumpet, August, 1913 (Wood); *T. thoracicus* Ol., not uncommon at Moccas Pool (Wood); *Ernobius mollis* L., West Malvern and Seager Hill, rare; *Dorcetomus flavicornis* F., Credenhill (Butler).

Aromia moschata L., Ledbury, on osiers (Wood); *Tetrops praeusta* L., Eastnor Park, not uncommon on hedges (Perrins).

Donacia crassipes F., one at Eastnor (Perrins); *Chrysomela orichalcea* Müll., one at Mathon, 17.8.10; *C. menthastris* Suffr., several on *Mentha viridis* on the banks of the River Monnow, August, 1910 and 1911; *C. hyperici* Forst., West Malvern, not uncommon on *Hypericum* in 1912 (Perrins); *Gastroidea viridula* De G., on *Rumex obtusifolius* at Kerne Bridge, Huntsham, and on the Great Doward; *Hydrothassa aucta* F., Huntsham, 8.8.09; *Lochmaea suturalis* Th., abundant in the Stoke Edith neighbourhood and the Woolhope district, on heather; *Galerucella nymphaeae* L., Devereux Pools (Wood), Canonbridge (Butler); *Longitarsus holsaticus* L., Cusop Dingle (Butler); *L. membranaceus* Foudr., Haugh Wood, common on *Teucrium scorodonia*; *L. jacobaeae* Wat., on *Senecio jacobaea*, banks of River Monnow; *Phyllotreta flexuosa* Ill., not uncommon in moss on the Cusop Dingle, August, 1911; *P. exclamationis* Thunb., Mathon and Westhild, rare; *Aphthona atrocoerulea* St., widely distributed in woods on *Euphorbia amygdaloides*; *A. atrovirens* Först., not uncommon at West Malvern, Cusop, Ledbury, Symond's Yat, and in the Woolhope district; *Aptero-peda orbiculata* Marsh., common throughout; *A. globosa* Ill., Cusop Dingle, not

very uncommon in moss, Olchon Dingle (Dutton) *Crepidodera helveticus* var. *cyanea* Marsh., Haugh Wood, rare on aspen.

Scaphidema metallicum F., Mathon, occasionally in some numbers; *Tetrotoma fungorum* F., common but very local in fungi at Eastnor Park (Perrins), Devereux Pools and West Malvern; *Orchesia micans* Pz., abundant in *Polyporus* on Tarrington Common and in Moccas Park; *Scryptia fuscula* Müll., one swept at Kenchester (Butler); *Mordellistena humeralis* var. *lateralis* Ol., Stoke Edith on *Angelica*, August, 1907 (Wood); *M. neuwaldeggiana* Pz., Breinton (Butler); *Xylophilus populneus* Pz., West Malvern, at light, 8.9.11.

Choragus sheppardi Kirby, one swept by the River Monnow near Altyrhynys, 10.8.11; *Rhynchites minutus* Hbst., West Malvern; *R. nanus* Pk., Stoke Edith (Wood), Mordiford; *R. sericeus* Hbst., one swept in Stoke Edith Woods, June, 1911 (Wood); *Apion fuscirostre* F., Breinton (Butler); *A. spencei* Kirby, Olchon Dingle, 13.8.11; *A. marchicum* Hbst., not uncommon at St. Devereux, Kington, Hoarwithy, Whitbourne, the Leech Pool, and by the River Monnow; *Trochyploeus aristatus* Gyll., banks of the River Teme, near Whitbourne, several, 1.9.10; *Exomias pellucidus* Boh., Kington, very rare on hazel, August, 1912; *Barynotus elevatus* Marsh., rather scarce at Colwall, West Malvern, Stoke Edith, and Cusop; *Orchestes stigma* Germ., rarely swept at Whitbourne, Ashperton and Stoke Edith (Wood); *O. salicis* L., local, but not uncommon: has occurred at Devereux Pools, West Malvern, Stoke Edith, and Mordiford; *Grypidius equiseti* F., Symond's Yat, by the River Monnow and Cusop Dingle, rare; *Thryogenes nereis* Pk., Mathon, River Monnow near Llangua, and Devereux Pools on *Scirpus palustris*; *Dorytomus tortrix* L., one in Eastnor Park (Perrins); *D. maculatus* Marsh., Mathon, rare on *Salix cinerea*; *D. pectoralis* Gyll., Colwall and Stoke Edith, on willows; *Anoplus plantaris* Naev., very local: West Malvern, Stoke Edith Park, and Haugh Wood, on birch; *A. roboris* Suffr., one swept at Stoke Edith, May, 1912 (Wood); *Sibinia primita* Hbst., one swept at Abbeydore, 10.8.11; *Gymnetron beccabungae* L., on *Nasturtium officinale*, at West Malvern, Stoke Edith, Mordiford, Abbeydore, Llancillo, and Kington, always sparingly; *G. melanarium* Germ., one in flood refuse at Mordiford, 7.9.12; *G. pascuorum* Gyll., one swept at Abbeydore, 10.8.11; *Anthonomus pedicularius* L., Eastnor (Perrins), West Malvern and Whitbourne on hawthorn; *Nanophyes lythri* F., rare on *Lythrum salicaria* on the Great Doward, August, 1909; *Acalles roboris* Curt., one swept in Stoke Edith Park, 19.9.08; *Coeliodes cardui* Hbst., Breinton (Butler); *Ceuthorrhynchus cochleariae* Gyll., Cusop Dingle, August, 1909; *C. ericae* Gyll., Stoke Edith district, on heather; *C. melanostictus* Marsh., Holme Laey (Butler), Devereux Pools, Stoke Edith, and by the River Monnow, never common; *Ceuthorrhynchidius pyrrhorhynchus* Marsh., common and occurring wherever *Sisymbrium officinale* grows; *C. nigrinus* Marsh., swept in Moccas Park (Wood); *C. terminatus* Hbst., one at Abbeydore, 10.8.11; *Balaninus nucum* L., one on hazel at Mathon, 14.8.12; *Calandra oryzae* L., Clencher's Mill, Eastnor, 22.3.14; *Nyctoleptes hispinus* Duft., common in dead *Clematis* twigs at Mordiford.

Lakefoot, Hamilton Road, Reading:

December, 1914.

THE LARVA OF *EVERES ARGIADES* PALL.

BY T. A. CHAPMAN, M.D., F.Z.S.

PLATES II—VI.

The account of this larva given by Tutt in the tenth volume of his "British Lepidoptera," is fairly good and complete, thanks to the labours of Zeller, Frohawk, and others. My contributions thereto were meagre, chiefly due to the circumstance that I had only had the larva when from home, which renders both the rearing and taking of notes difficult, which in my case at least usually results in less, instead of greater, attention being given to it. The chief item that I was unable to supply, and which I regard as of some importance, was a figure of the skin of the first-stage larva, showing the armament of hairs, lenticles, &c. I have wished to supply this defect, but not so strongly as to make me specially hunt for *E. argiades* for the purpose, so that it so happened that it was not till August 25th, 1913, that I met with a butterfly at Grenoble, that supplied me with a few, too few, eggs. For want of abundant material, I failed to secure some desired observations, but managed to get a first-stage skin, and some drawings of the larvae by Mr. E. C. Knight.

The latter are reproduced here and give a very accurate idea of the appearance they present in their later stages. I think no such drawings of the larva of *argiades* exist in any English medium, nor, so far as I have ascertained, elsewhere. No doubt the Entomological world will at some future date be rejoiced by Mr. Frohawk's presentation of this species in his monumental work, which however, I have given up hope of seeing during my sublunary existence.

Mr. E. C. Knight's figures seem therefore well worthy of publication, as well as the other items submitted, incomplete though they may be.

Plate II shows the larvae magnified nearly five times. Figs. 1 and 2 show the larva in its penultimate instar, and 3 and 4 when full grown. In the summer broods the larva maintains this appearance (with little change) up to pupation, but the autumn larvae, which hibernate, assume, in order to do so, the coloration shown in fig. 5. This change of colour for hibernation was described by Zeller in 1849 (Stett. Ent. Zeit.).

I may quote the following from my notes:—

"September 9th, 1913. The first-stage larva when a little grown,

about 1.5 mm. long, is, when sufficiently magnified, rather handsome. It has a dark green dorsal line (dorsal vessel and food mass beneath), paler green elsewhere, with a series of horse-shoe-shaped red marks (opening upwards) round the spiracles. Seen dorsally, there are oblique green lines (downwards and backwards) from the dorsal line, ending in a pink-red line about middle of slope with another just below spiracles. Seen laterally, there is a dorsal pink-red line (the food beneath makes this green on dorsal view) then a marbled green one, and then the broad pink band above and below spiracles.

In the second instar, the oblique lines are plain enough. In the first instar, it is remarkable that one sees them, but on further magnification to make them plainer, they are not visible. The colour scheme is much as in the first instar, but when magnified is seen to depend on irregular patches not easy to describe. This larva was hatched on August 28th, and is now (in 2nd instar) 3.3 mm. long.

September . In its fourth (penultimate) instar the larva is handsome, with a very definite dark green dorsal line, bordered by paler, that is almost yellow. The lateral line on flange has a very bright reddish-pink colour; between these the almost yellow oblique lines are very marked, four on each segment, the lowest close to flange, rather obscure, and may not be observed. Each oblique streak therefore appears to be complete, downwards and backwards, across four segments. The red lateral line is red from the 2nd to the 7th abdominal segments. For the other segments it is at first rather yellow; as the larva grows the red becomes rather rusty, the yellow becomes whitish, and continues as a border along the upper margin of the rusty-red.

In the last (5th) instar, the red lateral line is dull rusty in colour and the oblique lines are pale, but not yellow; the spiracles are orange and rather conspicuous. Of the hair-bases some are black, some yellow, the latter more dominant dorsally and about the middle of each segment. They are rather brilliant and sparkling in direct sunlight. The larger, pale rufous hairs, are still rather abundant dorsally and laterally.

On October 2nd, the largest larva was 10 mm. long, and though still eating, was assuming a much darker tone, the ground-colour being a rich but pale pinkish brown, on which the pale, hardly yellow, oblique lines are very distinct. Being now more obvious than at any other stage, it is easy to see that on each segment, the most dorsal of these is the pale border of the dorsal band, now much of the general

ground colour, which, at its posterior extremity, bends downward a little, so as to curve in line with the second oblique line of the following segment, which again is in line with the third oblique line of the next segment, and is continued by the fourth line of the next, which is the pale band below the spiracle and above the lateral flange, which appears inclined upwards at the front of the segment so as to fall into alignment. It might be said that if the upper and lower of these four lines be regarded as flange lines, faintly bent, then there are only two oblique lines, that is, the two middle ones.

On October 6th this larva appeared to have definitely attached itself, as if for pupation, and is now very dark, having passed through a red-brown stage in which the oblique lines were especially conspicuous.

On the 15th it is noted that this larva had moved several times since the 6th, and had become smaller and perhaps a little darker; it is now found to have made a nest at the bottom of the tin under a leaf, with enough spinning to be almost entitled to be called a cocoon. This proved, however, to be without any view to immediate pupation, but as a hibernaculum.

On the 16th another larva is undergoing the same colour changes, the dorsal line is noted as deep red-brown, and the pale yellow-green lines (oblique) are more conspicuous by a certain amount of red tint along their borders. On the 17th it is darker, the general tone is olive-green, with reddish dorsal line, and oblique lines of the same colour (really the space between the pale oblique lines) crossing several segments and joining the red lateral line. By the 22nd this larva had assumed much the same coloration as the other one.

The photographs of the larval details (pls. III-VI) may be regarded as supplementing those I contributed to Tutt's "British Lepidoptera" (Vol. X, pls. VIII, IX, X), and may be compared with those in the same volume of *C. minima*, our only other British species of the Everid tribe.

The larva of *E. argiades* in its first stage is nearly colourless, with black head and legs. It reaches about 2 mm. in length, when full-fed and stretched out, but is much smaller when first hatched.

The photograph (pl. III) will give some idea of the distribution of hairs and lenticles which conform to the general Lycaenine type. Comparing pl. III with pl. XI of Tutt's Br. Lep., Vol. X. the first-stage larva of *C. minima*, one might at first glance take the two larvae to be much less alike than they really are: that of *minima* being from a

larva recently hatched and before the skin had stretched out, and therefore smaller and photographed with a larger magnification; that of *argiades* is from a larva nearing its first moult. As a matter of fact the size of the head and diameter of the prothoracic plate of the two larvae are nearly the same. Still, in all stages *minima* has a shorter and thicker larva, in accordance with its being an internal feeder, in pods (*Phaca alpina*) and flower heads (*Anthyllis*); *argiades* feeding externally in the ordinary way, is more extended and slender. As differences, the dorsal hairs of *argiades* are longer than those of *minima* as 0.2 mm. against 0.18 mm. on the thorax, and 0.28 mm. to 0.19 mm. on the abdomen. On the other hand the supra spiracular pair of hairs (III ?) are longer in *minima*, the anterior about 0.06 mm., the posterior 0.02 mm.—in *argiades* the anterior is about 0.016 mm., the posterior evanescent. The seventh abdominal segment has two lenticles in *minima*, only one in *argiades*. The special angular hair of the prothoracic plate is more fully developed and obvious in *argiades* (pl. V, fig. 1).

Comparing pl. V, fig. 2, with fig. 2, pl. XVIII, in Tutt (l.c.), it appears that the hair bases and especially the lenticles, have the stellate spicules more developed in *argiades*. Pl. VI, fig. 2, shows the prolegs to be very similar to those of *minima*. Pl. VI, fig. 1, gives the dorsal surfaces almost from spiracle to spiracle of the 3rd, 4th, 5th and 6th abdominal segments of the last stage larva, and shows the general distribution of hairs and lenticles.

EXPLANATION OF PLATES.

- Plate II.—Figs. 1 and 2.—Larva in penultimate instar.
 „ 3 and 4.—Larva full grown in last instar,
 Fig. 5.—Larva in hibernating plumage.
 „ III.—Skin of larva in first instar, $\times 60$.
 „ IV.—Skin of larva in last instar, $\times 16$.
 „ V.—Fig. 1.—Prothoracic plate, first instar, $\times 250$.
 „ 2.—Spiracular region, last instar, $\times 100$.
 „ VI.— „ 1.—Dorsal region, last instar, $\times 40$.
 „ 2.—Prolegs, $\times 100$,

Betula, Reigate:

December 15th, 1914.

NOTES ON THE BRITISH SPECIES OF *OCHSENHEIMERIA* Hb.
DESCRIBED BY HAWORTH.

BY ALFRED SICH, F.E.S.

When, a few years ago, I was particularly interested in the species belonging to the genus *Ochsenheimeria* Huebner, I unfortunately discovered that one of our British species was not bearing its earliest name. I say unfortunately, because it appeared to me also that it was my duty to call attention to the fact, and I, like many other entomologists, have no desire to substitute less well-known names for those with which we are familiar. In this case, however, as I shall show later, I merely wish to revive the name which was formerly in use. The species in question is that now known as *O. birdella* Curtis, but I maintain it should bear the name of *mediopectinella* Haworth. In 1828 Haworth (*Lep. Brit.*, part IV, pp. 545-546) published descriptions of two moths, which he named *Ypsolophus mediopectinellus* and *Y. taurellus*. These two descriptions taken together can hardly point to any two British moths more directly than to the two species which we know as *Ochsenheimeria birdella* Curtis and *O. bisontella* Zeller. Any doubt, however, that might attach to this conclusion can at once be dispelled by referring to Haworth's types in the collection at the British Museum. The specimen labelled "*mediopectinellus*," in Haworth's own handwriting, is without any doubt the same species which Curtis named *birdella*. This species varies somewhat in ground-colour, but Haworth's specimen is of the same ochreous form as that figured by Curtis. The specimen labelled "*taurellus*" is not the *taurellus* of Schiffermüller, but the *bisontella* of Zeller. It was not till three years later that John Curtis published the description of his *birdella* (*Brit. Ent.*, VIII, Pl. 344, Feb. 1st, 1831). He probably had some slight acquaintance with Haworth's insect, as he gives a description of *mediopectinella* and compares it with his own *birdella*. From what he says I gather that his specimens and Mr. Bird's were in a better state of preservation than were Haworth's. This would account for the head and antennae appearing less scaly, as Curtis says. The other slight points of difference that he mentions are of little account with a variable species. Stainton, in his account of the genus *Ochsenheimeria* (*Nat. Hist. Tin.*, XIII, p. 2, 1873), states that on Aug. 24th, 1845, he found a field swarming with a little moth that he had never seen before. He writes: "I caught a few, and then finding it was what we in those days called *Lepidocera mediopectinella*, I revisited

the field the next day to obtain some more." In the same volume (p. 24), after stating that *O. birdella* was first described by Curtis in 1831, he says: "It is probable that Haworth intended this insect by his *Ypsolophus mediopectinellus*, and *Y. taurellus*, but the descriptions are too meagre to be of more than antiquarian interest." Yet twenty-eight years before writing this, Stainton and others knew the moth by the name of *mediopectinella*, although Curtis' name for the insect, *birdella*, was then fourteen years old. I think it has now been shown that Haworth's name for the insect under discussion has priority over that of Curtis; that the *mediopectinellus* of Haworth, and the *birdella* of Curtis, are one and the same species, and that the name *mediopectinellus* was formerly made use of by entomologists for this species.

The following correction should be made in our Lists: -

(1) *Ochsenheimeria mediopectinella* Hw. *Ypsolophus mediopectinellus* Hw, Lp., Br., 545-6 sp. 25 (1828), = *Lepidocera birdella*, Crt., Br. Ent. VIII, Pl. 344 (II, 1831). *Ochsenheimeria birdella* Stgr.-Rbl., Cat. Lp. Pal. II, 232 sp. 4469 (1901).

(2) *Ochsenheimeria bisontella* Z. = *Ypsolophus *taurellus* Hw., Lp. Br. 546 sp. 26 (1828) [nec *taurella* (Schiff.) Hb.]. *Ochsenheimeria bisontella* Z., Isis 3, XXXIX: 1846, 274 (1846); Stgr.-Rbl., Cat. Lp. Pal. II, 232 sp. 4468 (1901).

December 12th, 1914.

ADDENDUM TO OBSERVATIONS ON THE LIFE-HISTORY OF
METHOCA ICHNEUMONIDES LATR.

BY H. G. CHAMPION, B.A., F.E.S.

In the paper recently written by my brother and myself in this Magazine (Ent. Mo. Mag., 1914, pp. 266-270) was recorded what we had been able to observe of the habits of *Methoca*. We remark in the course of it on the work of "two Swedish investigators, Adlerz and Bouwman," referring to their papers as written in Swedish and thus unattainable to us. Dr. Bergroth has drawn my attention to the fact that Bouwman is of Dutch nationality, his paper [Tijdschrift voor Entomologie, 52, p. 284, 1909] being written in German, whilst Adlerz, a Swede, has given a resumé of his work in German, as well as a preliminary note in French [Arkiv för Zoologi, Bd. I, pp. 255-8 (1904)]. These papers I have now been able to consult, and through

the good offices of Dr. Boying, of the U.S. Bureau of Entomology, have also been able to decipher Adlerz's main paper [loc. cit. Bd. 3, No. 4, pp. 1-48, with interesting plate (1906)].

Bouwman was only able to observe two encounters and remarks that "the first sting entered the thorax from below and paralysed the dangerous mandibles," but he does not give precise details of this part of the story. His paper contains a valuable series of photographs of the development of the *Methoca* larva on its host.

Adlerz observed some ten acts of oviposition (at least in the earlier stages) on the part of each of two ♀ ♀, and I now find that his results differ from ours in one important point concerning which I give a translation from his resumé: ". . . the *Methoca* begins to manoeuvre round the snapping larva, till she gets an opportunity to slip on to the lid (i.e., the cephalothoracic shield of the larva, at the top of the burrow) from the dorsal side. Instantly her head or the front part of her thorax is grasped by the sickle-shaped mandibles of the larva, and as the latter raises its head in so doing the *Methoca* is given the opportunity to sting the larva in the throat or between the front coxae. The larva is at once paralysed, and the *Methoca* rests at the edge of the burrow till the poison works its full effect. After a short time, the *Methoca* pushes past the head of the larva down into the burrow. These operations were followed by the repeated stinging of the ventral thoracic segments, as also seen by Bouwman and ourselves; but the simultaneous biting with the mandibles Adlerz finds to puncture the skin at least at a point near the hind coxae, where the ovum is subsequently laid in such position that the head of the young parasite is directly against the ruptured surface and its nutrition thus facilitated.

Adlerz also observed cases in which the *Methoca* attacked the larva down its burrow, and has evidence that here also the procedure is very similar; but it is interesting to note that she will use various methods to tempt the larva to come up to the opening. It would seem from the fact that when the larva is attacked outside the burrow the sting in the throat is omitted, that this latter is essential to the preparation of the victim for the offspring of the parasite, and that, as it produces general relaxation, it reaches, not the ganglia, but the circulatory system. The subsequent stings are undoubtedly in the thoracic ganglia. He further suggests that the external form of the ♀ *Methoca* is specially adapted to enable it to escape injury from the embrace of

the mandibles of the *Cicindela* larva. Finally, Adlerz suggests that the genus *Methoca* should be removed from the *Mutillidae*, and given an independent position, or perhaps placed among the *Thymidae*.

Washington, D.C., U.S.A.:

December, 1914.

“*A Natural History of British Butterflies.*”—Under this title a series of articles by the well-known Entomological artist, Mr. F. W. Frohawk, F.E.S., to be eventually published in book form with a very large number of illustrations in colour, is appearing weekly in the “Field” newspaper. To quote from the introductory remarks this work “embodies a new idea in that it contains a complete series of drawings of every phase of the life-cycle of all of our sixty-eight British butterflies.” These drawings are the outcome of a study of our butterflies extending over 24 years, during which period no fewer than 900 figures, of their early stages only, have been made by the author direct from the objects themselves, the material in the case of our rarities and casual visitors having been procured from Continental sources. The life-histories are very clearly and carefully drawn up, and these, when published, will embody a larger amount of first-hand work than has yet appeared in any single volume devoted to our butterfly fauna. The figures as reproduced in black and white are masterpieces of graceful and accurate drawing, and we would call special attention to those of *Papilio machaon* and *Vanessa antiopa* (at rest), accompanying the first article, which appeared on December 26th last.—Eds.

The British species of Haliptus related to H. ruficollis De Geer.—As Mr. F. Balfour-Browne’s very interesting paper on these insects [Ann. and Mag. Nat. Hist. (8) xv, pp. 97-124, pls. vii, viii, Jan., 1915] may, perhaps, be overlooked by some of our Coleopterists, we give a brief extract from it, mainly to call attention to the subject. He recognizes seven species, of which only three were known in our islands until a few years ago: 1, *apicalis* Thoms. (= *striatus* Sharp; 2, *fluvialtilis* Aubé; 3, *nomax* Balf.-Browne, with a var. *browneanus* Sharp; 4, *wehncke* Gerh.; 5, *ruficollis* De Geer; 6, *heydeni* Wehneke; 7, *immaculatus* Gerh. The paper includes an excellent description of the general structure, ♂ armature, &c., of all of them; and there are also some remarks on *H. fulvicollis* Er. and *H. furcatus* Seidl., neither of which is recorded as British. The subject is divided into eight chapters: General form; The elytral striae; The puncturation of the elytra in the female; The prosternum; The prothoracic striae and sculpture of the thorax; The characters of the male; The Britannic species; Bibliography. The structure of the aedeagus, of which a greatly enlarged figure is given on p. 109, is described at length, and some new terms are used for various portions of the structure, such as “saccular region,” “tongue,” “wing,” “hood,” &c., and a collective term for the whole, “Aedeagophore. On the plates the aedeagus of each of the seven British species mentioned is figured, as well as that of the Continental *H. fulvicollis* and *H. furcatus*.—Eds.

List of generic names used in Scolytidae.—Under the title "List of generic names and their type-species in the Coleopterous super-family Scolytoidea," Mr. A. D. Hopkins (Proc. U. S. Nat. Museum, vol. 48, pp. 115-136, Dec., 1914) gives a complete enumeration of all the names hitherto used for the genera of this group of beetles, numbering 212 in all, including synonyms. The list, which is alphabetically arranged, shows: 1, generic names; 2, the author; 3, the original reference; 4, the type-species, the author of the species, and, if not monobasic, the authority for the designation; 5, the locality or country from which the type is described. If neither monobasic nor designated, the type is selected by the author of this list. Emendations are treated as other genera. So far as the British genera are concerned, the only changes would be that *Myelophilus* Eichh. becomes *Tomicus* Latr., type *Dermestes piniperda* L., and *Tomicus* Latr. = *Ips* De Geer, type *Dermestes typographus* L.—Eds.

Oxyomus porcatus F., in Scotland.—I swept up a fine specimen of this species in Craigentiny Meadows, near Edinburgh, on May 9th, 1908. At the time I noted that Canon Fowler stated that the species had not been captured in the North of England or Scotland, but I omitted to record the above capture. As the species is not included in Mr. Fergusson's recently published "Supplement to Dr. Sharp's *Coleoptera* of Scotland," I think it is desirable to publish this note.—T. HUDSON BEARE, 10, Regent Terrace, Edinburgh: January 11th, 1915

Homonotus sanguinolentus F., in Surrey: a correction.—In the two notes on the capture of this species in Surrey (Ent. Mo. Mag., 1914, pp. 270, 290), a previous record of the capture of a ♂ by Mr. C. H. Mortimer (*op. cit.*, 1907, p. 211) at Holmwood was overlooked. I am much indebted to him for calling my attention to it.—R. J. CHAMPION, Horsell, Woking: December, 1914.

Societies.

YORKSHIRE NATURALISTS' UNION: ENTOMOLOGICAL SECTION.—The Annual Meetings of the Entomological Section of the Yorkshire Naturalists' Union were held at the Leeds Institute on October 31st last, Mr. G. T. PORRITT, F.L.S., in the Chair.

At the Afternoon Meeting, Dr. W. J. Fordham, F.E.S., was elected President of the Section for the ensuing year, and the other Officers were also appointed.

Reports on the work done in the various orders of insects were read by the Secretaries of the different Committees. That on *Coleoptera* by Mr. E. G. Bayford, F.E.S., showed the following twenty-two additions made to the county list in 1913 and 1914: *Laemostenus complanatus* Dej., Middlesbrough, 1912; *Anacaena bipustulata* Marsh., Thorne, 1914; *Ceryon depressus* Steph., Filey, 1911; *Ocyusa incrassata* Muls., Askrigg and Kildale, 1914; *Atheta triangulum* Kr., Skipwith, 1913; *Ischnopoda umbratica* Er., Redear, 1913; *Gyrophæna*

laevipennis Kr., Glaisdale, 1914; *Heterothops dissimilis* Gr., Spurn, 1911, Middlesbrough, 1914; *Gal'rius splendidulus* Gr., Doncaster, 1914; *Haploderus caelatus* Gr., Thorne, 1907, 1914, Bubwith, 1910; *Phyllodrepa ioptera* Steph., Kildale, 1914; *Catops sericatus* Chand., Escrick, 1911; *Pseudopelta sinuata* F., Doncaster, 1904, Escrick, 1912; *Cryptophagus pallidus* Sturm, Selby, 1914, *saginitus* Sturm, Doncaster, 1907, Bubwith, 1912; *Meligethes ovatus* Sturm, Great Ayton, 1914; *Aphodius granarius* L., Escrick, 1910; *Cyphon nitidulus* Thoms., Bubwith, 1912; *Galerucella pusilla* Duft., Bubwith, 1912; *Sitones waterhousei* Walt., Doncaster, 1914: this confirms the previous doubtful and ambiguous record; *Bagous limosus* Gyll., Thorne, 1914; *Xyloterus quercus* Eichh., Doncaster, 1914; *Xyleborus dryographus* Ratz., Doncaster, 1914; besides a number of new Kiding records which had been made or identified during the year.

That on *Lepidoptera* was given by Mr. B. Morley. It stated that the season had been a fairly good one, but that the *Hybernidae* had but little recovered from their almost complete extermination two years ago, owing to the immense numbers of larvae then having eaten everything green before full growth, and then perished. *Cloantha solidaginis* had been exceedingly abundant, as many as half a dozen being counted on a single flower head of *Juncus*; *Sphinx convolvuli* had occurred at Cumberworth on August 29th; *Xanthia aurago* still held its own at Skelmanthorpe; and Dr. G. W. K. Crosland had found *Tinea fulvimitrella* in Lepton Wood, new to the Huddersfield district. Mr. Porritt had found the melanic form of *Venusia canbricaria* abundant in its locality near Sheffield, and had noted that *Polia flavocincta* at Bridlington was of the ordinary pale Southern form, in contrast to the South-West Riding form which was always dark. Reference was also made to the abundance of *Pyrameis cardui*, *P. atalanta*, and *Plusia gamma*, both on the coast and inland this year. For the Cleveland district, Mr. T. A. Lofthouse reported for the years 1913 and 1914. *Cemiostoma vailesella* at Saltburn; *Micropteryx sangii* at Kildale; and *Cedestis gysseleinella* at Great Ayton, were new to the Yorkshire list. His other records included *Tinea fulvimitrella* at Ingleby Greenhow, and Northallerton; *Argyresthia atmoriella* at Redcar; *Dicrorampha herbosana* at Redcar, Saltburn, Sandsend, and Middlesbrough; *Amphysa gerningana* and *Cemiostoma spartifoliella* at Lealholm; *Cerostoma sequella* at Kildale and Sleights; *Ephippiphora similana* at Eston; *Nemotois cupriacellus* and *Incurvaria oehlmanniana* at Great Ayton; *Brachmia mouffetella* and *Bucculatrix cristatella* at Kildale.

The Report on *Hymenoptera* and *Diptera* was given by Mr. Rosse Butterfield as follows: Mr. W. Denison Roebuck reported that the Ichneumonid *Phygadeuon rusticellae* Bridgm., had occurred in numbers in his bedroom at Leeds for some weeks in May and June; only one locality being mentioned for the species in Claude Morley's "British Ichneumons," Vol. II. *Tryphon trochanteratus* Holmgr. was taken by Mr. G. T. Porritt in his garden at Huddersfield. This, together with three species captured in the neighbourhood of Keighley by Mr. Rosse Butterfield, are new to the county records. The newly recorded bees *Andrena labialis* Kirb., and *A. thoracica* Fab., were captured near Keighley in May. *Nomada lathburiana* Kirb., appears to have been parasitic on the latter. The *Andrenidae*

with their inquilines are now well represented in the records. Two sawflies from the Keighley district are additions, both being well distributed, while several interesting species have been found in new localities. In the November number of "The Naturalist," Mr. Percy H. Grimshaw, F.L.S., gives a detailed account of a new Yorkshire gall-midge, *Oligotrophus centricolus* Rüb., bred from gall-like swellings found at the bases of leaves of purple heath grass (*Molinia caerulea*) obtained on Slaithwaite Moors, near Huddersfield, by the Rev. T. A. Jefferies. Examples of the growth were kept under observation at the Biological Laboratory at Huddersfield, and by Mr. E. G. Bayford. The species was added to the British list of *Diptera* two years ago. Mr. Grimshaw also records another new Dipteron, *Acetoxenus formosus* Loew, from Barley-in-Wharfedale. *Chrysotoxum arcuatum* L., and *Empis tessellata* Fab., have occurred at Keighley.

Mr. G. T. Porritt's report on the *Neuroptera* included two new records for the county, *Taeniopteryx trifasciata*, taken commonly on the River Nidd at Knaresborough at Easter, and *Nemoura inconspicua* commonly, at Filey at Whitsuntide, both by himself.

The exhibits were numerous and interesting, and included in *Coleoptera* *Notiophilus biguttatus* F., alpine form, non-metallie, by Mr. W. Falconer; *Anchomenus versutus* Gyll., Ryhill reservoir, *Lesteva* ? sp., by Mr. J. W. Carter, F.E.S.; and from the Doncaster district, *Acupalpus exiguus* Dej., *Anacaena bipustulata* Steph., *Homalota cuspidata* Er., *Philonthus splendidulus* Grav., *Haploderus caelatus* Grav., *Bagous limosus* Gyll., *Hylastes palliatus* Gyll., *Trypodendron domesticum* L., *T. quercus* Eichh., and (?) *Xyleborus dryographus* Ratz., by Dr. H. H. Corbett, M.R.C.S. From the Cleveland district: *Haliplus striatus* Sharp, *Cercyon nigriceps* Marsh., *Ocyusa incrassata* Muls., *Homalota eremita* Rye, *Gyrophana laevis* Kraatz, *Myllaena elongata* Matth., *Heterothops dissimilis* Grav., *Quedius auricomus* Kies., *Lesteva punctata* Er., *Homalium iopterum* Steph., *Choleva morio* F., *Neuraphes elongatulus* Müll., *Scydmaenus scutellaris* Müll., *Bythinus puncticollis* Denny, *Ptenidium intermedium* Wank., *Eparaea florea* Er., *Meligethes oculus* Sturm, *Chalcoides helxines* L., v. *fulvicornis* F., *Rhynchites cupreus* L., *Anthonomus conspersus* Desbr., by Mr. M. L. Thompson, F.E.S. *Monochamus sartor* L.: ♂, taken alive in a shed at Keighley Railway Station, by Mr. Rosse Butterfield; ♀, dug from a stump in a garden at Middles-town, near Wakefield; ♀, ex. Coll. the late W. Talbot of Wakefield, without locality, but probably local; ♀, taken alive at Carlton Main Colliery, near Barnsley, by Mr. E. G. Bayford, F.E.S.

Those in *Lepidoptera* included a series of remarkable varieties of *Spilosoma lubricipeda*, bred from a Scarborough female; buff males of *Spilosoma mendica*, very similar to the Irish (Cork) form, from Slaithwaite, Huddersfield, with a series of dark males of the same species, but with each fore-wing having a distinct white spot in the centre, from Kent; and a Yorkshire olive-banded *Bombyx quercus*, by Mr. B. Morley. Mr. Porritt, extreme forms of vars. *nigrosparsata* and *nigrocostata* of *Abraxas grossulariata*, bred from wild Huddersfield larvae this season. Mr. J. H. Stanger, a gynandromorphous *Oenocera dispar*. Mr. J. Hooper, varieties of *Boarmia repandata*, *Polia chi*, *Hybernia leucophaearia*

and *Amphidasys betularia*. In *Hymenoptera*, Mr. J. Hooper showed one of two fine female specimens of the true *Sirex juvenus*, taken at Middletown. Mr. R. Butterfield, *Mutilla europaea*, from Perthshire, &c. In *Neuroptera*, Mr. Porritt, series of the new county records, *Taeniopteryx trifasciata* and *Nemoura inconspicua*. In *Orthoptera*, Mr. R. Butterfield, *Periplaneta australasiae* and *P. americana*, from Keighley.

At the Evening Meeting a discussion was opened by Professor Garstang, M.A., F.Z.S., on "How best to induce young people to take interest in Entomology," in which a large number of the members joined, and in the course of which the present craze for incessant changes in nomenclature was strongly condemned, as being not only a deterrent to the beginning of the study, but in many cases the cause of abandonment by those who had already begun.—G. T. PORRITT.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY: Thursday, Nov. 12th, 1914.—MR. A. E. GIBBS, F.L.S., Vice President, in the Chair.

Mr. Sich reported having seen a *Pyrameis atalanta* in Holborn on that day, November 12th. Mr. H. Moore exhibited a small colony of the ant *Camponotus abdominalis* found in a banana from the West Indies. Mr. Step, abnormal catkins of hazel from Mickleham, probably due to the attack of the gall-mite *Eriophyes coryli*. Mr. Hall, a gynandromorphous specimen of *Agriades coridon*, essentially a female but with patches of blue scales and androconia on the right fore-wing. Mr. Curwen, a number of Geometers taken by him in France.

Thursday, November 26th, 1914.—MR. B. H. SMITH, B.A., F.E.S., President, in the Chair.

Mr. R. Adkin, long series of *Agriades thetis*, including ♂s of aberrant colour, often asserted to be hybrids with *A. coridon*; ♀s showing blue coloration of the ♂, and many underside varieties. Mr. H. Worsley-Wood, a bred series of *Callimorpha quadripunctata* (*hera*) and its aberration *lutescens*. Rev. G. Wheeler, series of *Plebeius argyrognomon* v. *armoricanus* from Brittany, with emphasised markings; series of *Hesperia malvae* ab. *taras* from the Rhone Valley; a gynandromorph of *P. argyrognomon*, right ♀, left ♂, etc. Mr. Prideaux, a gynandromorph of *Trichiura crataegi*, *Agriades coridon* with silver-tipped peacock eyes on hind-wing upper-sides, with albinistic and melanistic specimens of several species. Mr. Talbot, for Mr. J. J. Joicey, rare exotic *Rhopalocera*, including *Ornithoptera alexandrae* and *O. rothschildi*, with several rare and new species of *Papilio*; very fine species of *Hepialidae* from Australia, including *Charagia ramsayi*, and a Tineid which attacks the larvae, and some very fine Cossidae also from Australia. Mr. A. E. Gibbs, New World *Papilionidae*, including *P. ornythion*, *P. montezuma*, *P. gundlachianus*, *P. sesostris*, *P. lycimenes*, *P. torquatus*, *P. homerus*, *P. glaucus*, etc., with their various local races, and gave notes on each species. The Rev. A. T. Stiff, a series of *Epinephele tithonus* from Tavistock, showing much colour variation and con-

siderable aberration in the spotting, and a very varied series of *Ematurga atomaria*, including fine yellow forms and a female with male coloration. Mr. Ashdown, a series of *Aphantopus hyperantus* with aberrant and asymmetrical spotting on the under-sides including ab. *caeca*. Mr. Turner, an aberration of *Argynnis niobe* with the upper-side black spotting coalesced into an irregular band, and the under-side silver basal spots coalesced into three large blotches. Mr. Newman, a large number of Irish *Lepidoptera*, including *Pieris napi*, *P. rapae*, *Polyommatus icarus*, *Dryas paphia*, *Melitaea aurinia*, *Hipparchia semele*, *Neuria reticulata*, etc., all more or less of local forms, bred *Dianthoecia luteago* v. *barrettii*, *Pachnobia hyperborea* and *Callimorpha dominula* ab. *rossica* a long series of aberrations of *Agriades coridon*, two *Anthrocera filipendulae* ab. *chrysanthemii*, eight bred *Gastropacha iticifolia* from Cannock Chase, and many other striking forms and local species. Mr. A. H. Jones, aberrations of *Melanargia galathea*, ab. *pallida* of *A. coridon*, ab. *pallida* of *Coenonympha pamphilus*, and melanic examples of *Amphidasys betularia*, *Thera variata*, *Cidaria immanata* from Eltham. Mr. Schmassmann, a number of *Ornithoptera* and *Morpho*, including *O. lydius*, *O. croesus*, *O. bornemannii*, *O. poseidon* and its races, *O. paradisea*, *Morpho hecuba*, *M. justitiae*, *M. amphitryon*, *M. caecia*, *M. rhetenor*, and *M. aureola*. Mr. West, the reference collection of the Society, including the numerous additions made by the Dawson donation. Mr. Pickett, very long series of *Angerona prunaria*, the results of 17 years breeding and experiment, including many examples bred under varied colour conditions; he also showed long series of *Agriades coridon* with many aberrations and gynandromorphs. The Rev. F. D. Morice, a collection of British *Chrysididae*, and a collection of the more conspicuous species of Palaearctic *Chrysididae*. Mr. Curwen, series of the European *Parnassius*, *P. apollo*, *P. delius*, *P. mnemosyne* and *Doritis apollina*, and a series of *Lycæna*, *L. arcos*, *L. arion*, *L. alcon*, *L. euphemus*, and *L. iolas*, with several aberrations of *Apatura ilia*. Mr. Mera, a long varied series of *Psilura monacha*, including ab. *eremita*. Mr. Tonge, a male of *A. thetis*, 22 mm. in expanse, *Polyommatus icarus*, blue females, and ab. *icarinus*, ab. *stricta*, etc., with pink and melanic *Bryophila perla* from Deal. Mr. H. B. Williams, aberrations of *Euchloë cardamines*, *Coenonympha pamphilus* ab. *pallida*, *Aricia medon*, ab. *albimaculata*, *Rumiccia phlaeas* ab. *radiata*, ab. *obsoleta*, ab. *subobsoleta* and ab. *anticostrata*, *Amorpha populi* gynandromorphs, *Agriades coridon*, ab. *semisyngrapha*, ab. *obsoleta*, ab. *pallida*, and ab. *inaequalis*. Rev. J. E. Tarbat, a *Pieris rapae* measuring only 38 mm. in expanse. Mr. Brooks, an *Abraxas grossulariata* with pale orange ground colour and no bright orange on fore-wings. Mr. Piatt Barrett, the three Parnassiids of Switzerland, and noted the small amount of variation he had seen in the species this year. Mr. Stallman, a varied series of *Xanthorhōe fluctuata*, some very dark, and including ab. *costocata*, and aberrations of *R. phlaeas*, *N. augur*, *T. comes*, and of *M. circellaris* red and slaty forms, light orange ground and streaky forms. Mr. Edwards, many species of *Papilio* from the Indian and Austro-Malayan Region. Mr. B. S. Williams, a melanic *Biston hirtaria*, the rare form ab. *funaria* from Finchley, bred. Mr. Sheldon, the *Lepidoptera* taken by him in S.E. Russia during May and June, including local forms of western species and several more eastern species: *E. cardamines* var.

volgensis, *C. rubi* var. *schamyl*, *P. amandus* var. *lydia*, *M. aurinia* var. *sareptana*, *M. cinzia* var. *obscurior*, *M. phoebe* var. *aetheria*, *M. trivia* var. *fascelis*, *A. niobe* var. *kuhlmanni*, *M. iapygia* var. *sudarovius*, *S. hermione* var. *tetrica*, etc., and *C. erate*, *P. eriodes*, *S. anthe*, *H. cribellum*, *P. clymene*, *N. lucilla*, etc. Mr. Pearson, species and aberrant examples of Alpine butterflies taken this year, including *Brenthis pales* ab. *nuptea*, *E. medusa* ab. *hippomedusa*, *B. thore*, pale *E. lappona*, *E. ceto* ab. *obscura*, etc., from Engadine and Tyrol. Mr. T. W. Hall, his collection of *P. icarus*, *A. coridon*, and *A. thetis*, including many fine aberrations and several gynandromorphs. Dr. Cockayne, the series of *A. coridon* described in his paper in the "Ent. Record" on gynandromorphs and also two similar forms of *P. icarus*. Mr. H. E. Page, series of *Plebeius argus* from many Alpine localities, and also a series of var. *casaiicus* from Pajares, etc., in Spain.—HY. J. TURNER, *Hon. Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, December 2nd, 1914*.—Mr. G. T. BETHUNE-BAKER, F.L.S., F.Z.S., President, in the Chair

Prof. A. Lameere of Brussels was elected to the Honorary Fellowship vacant by the resignation (and subsequent death) of Dr. August Weismann.

The President announced that he had nominated the following Fellows to act as Auditors:—*On the Council*: Messrs. S. Edwards, G. Meade-Waldo, and H. Rowland-Brown. *Not on the Council*: Messrs. R. W. Lloyd, H. J. Turner, and C. O. Waterhouse.

The Rev. F. D. Morice exhibited a few *Hymenoptera* of various groups from Egypt, Algeria, etc., showing the silvery pubescence and pale colours frequently characteristic of Desert insects. Also a lantern slide showing the seventh ventral segment in *Prosopis communis* ♂. Mr. H. J. Turner, a striking aberration of *Argynnis niobe* with symmetrically coalescent dark markings on the upper side, and the silver spots on the under side of hind-wing forming a triple basal blotch and marginal streaks. Mr. S. A. Neave, a large series of insects, 1326 in all, forming the prey of a common Asilid, *Promachus fasciatus*. Mr. W. J. Lucas, a specimen of *Drepanopteryx phalaenoides* Linn., taken about the end of July, by Mr. E. A. C. Stowell, B.A., at Bexhill. Dr. H. Eltringham, a little machine of his own invention consisting of a mechanical stage specially adapted for the microscopical examination of pinned insects, and so contrived as to admit of the insect on its pin being turned completely round on both a vertical and horizontal axis, without its departing from centre of the field or the focal plane. Prof. Poulton, the flowers of an *Acacia*, probably *A. baileyana* F. v. Muell. together with a female Lycaenid, *Nacaduba biocellata* Feld., and the pupa-case from which it had emerged; the larva bore the most remarkable resemblance to the yellow fluffy balls of the inflorescence. The likeness, mainly due to the long yellow hairs with which the larva was clothed, was increased by its attitude, the body being rather strongly curved. Prof. Poulton also read notes on Dr. G. D. H. Carpenter's observation of the epigamic use of its anal brushes by the male *Amauris psyllalea*, and a record of Dr. Carpenter's further observations and conclusions as to the habits of the Driver ants of the islands in the N.W. of the Victoria Nyanza.

The following paper was read:—"Further Observations on the Structure of the Scent-organs in certain Brush-bearing Male Butterflies," by H. Eltringham, M.A., D.Sc., F.E.S.—GEO. WHEELER, *Hon. Secretary*.

EXCHANGE.

Duplicates: *Crepidodera impressa*, *Criccephalus ferus*, *Bradycellus distinctus* (true), *Bidessus unistriatus*, *Polydrusus chrysomela*, *Berosus spinosus*, *Gabrius keyisianus*, *Cryptobium fracticorne*, *Gymnusa brevicollis*, *Ocypus pedator*, *Paederus caligatus*, and many more.

Desiderata: British Coleoptera.

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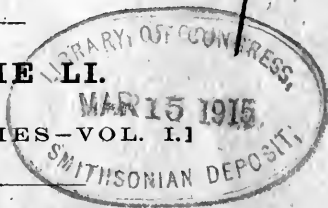
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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Wednesday, March 3rd, 1915.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m. on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

March 2nd—"The Botany of the District," C. S. NICHOLSON, F.L.S., and L. B. HALL, F.L.S. March 16th—"Parasites, Paying Guests and Mimics of Wasps," C. NICHOLSON, F.E.S. April 6th—"Hepatics," J. ROSS.

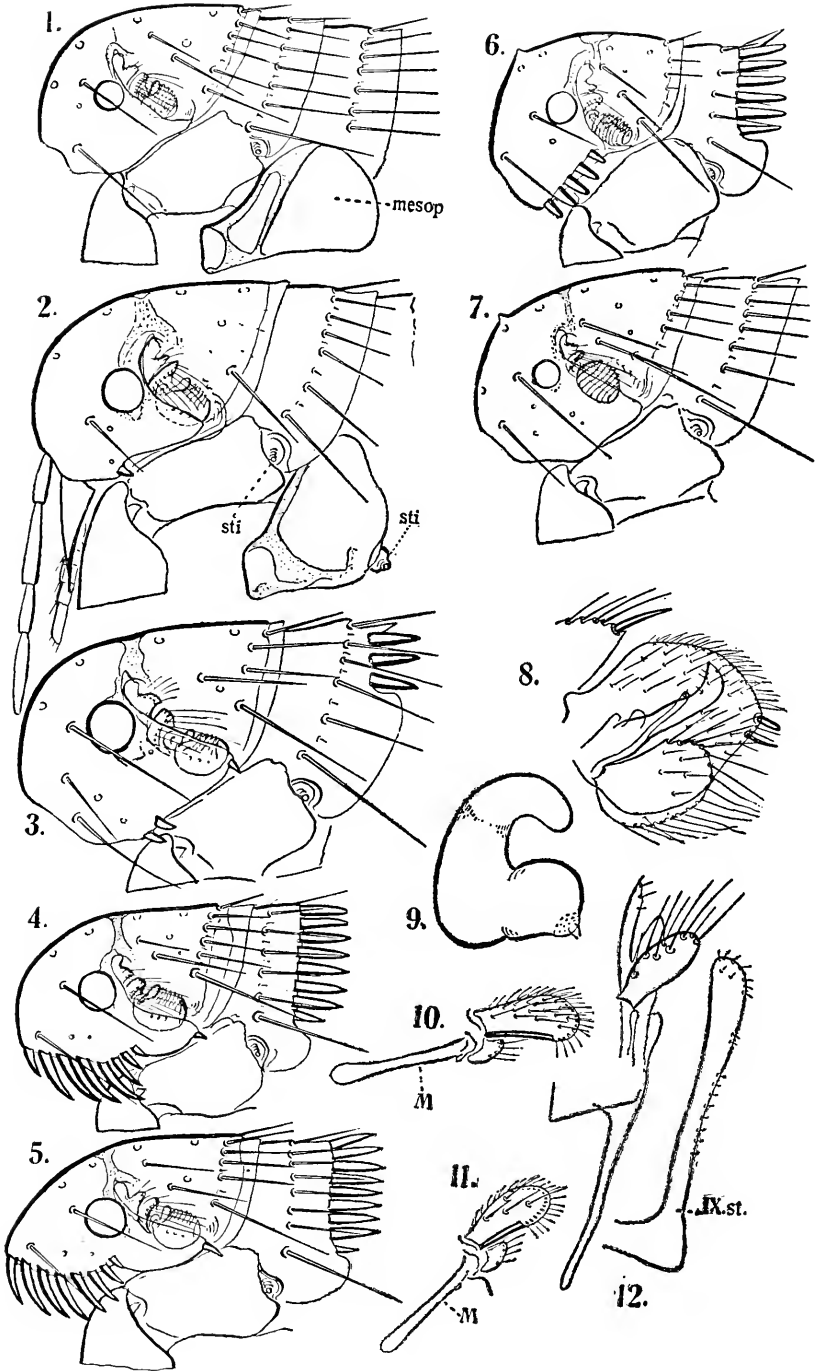
Hon. Sec. : J. ROSS, 18, Queen's Grove Road, Chingford, N.E.

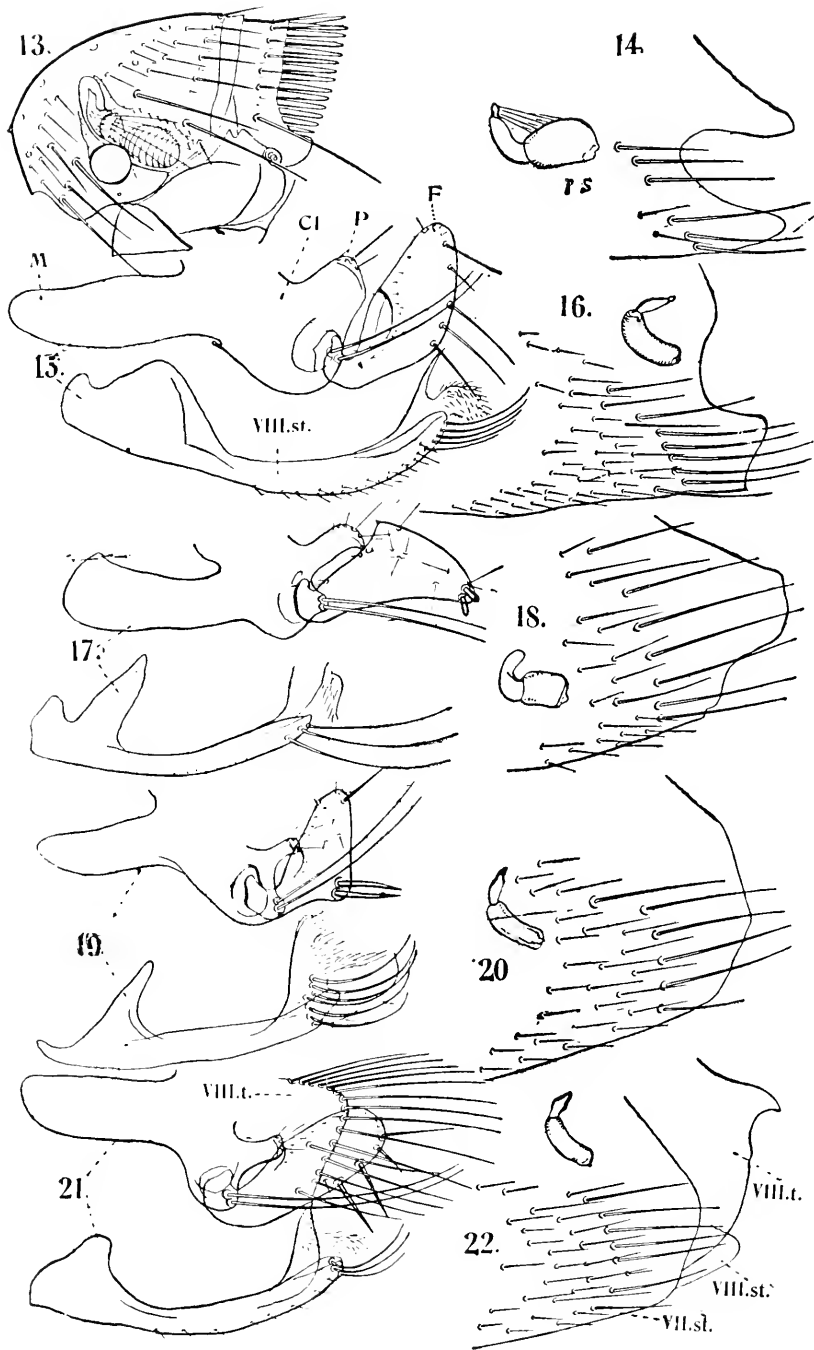
Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

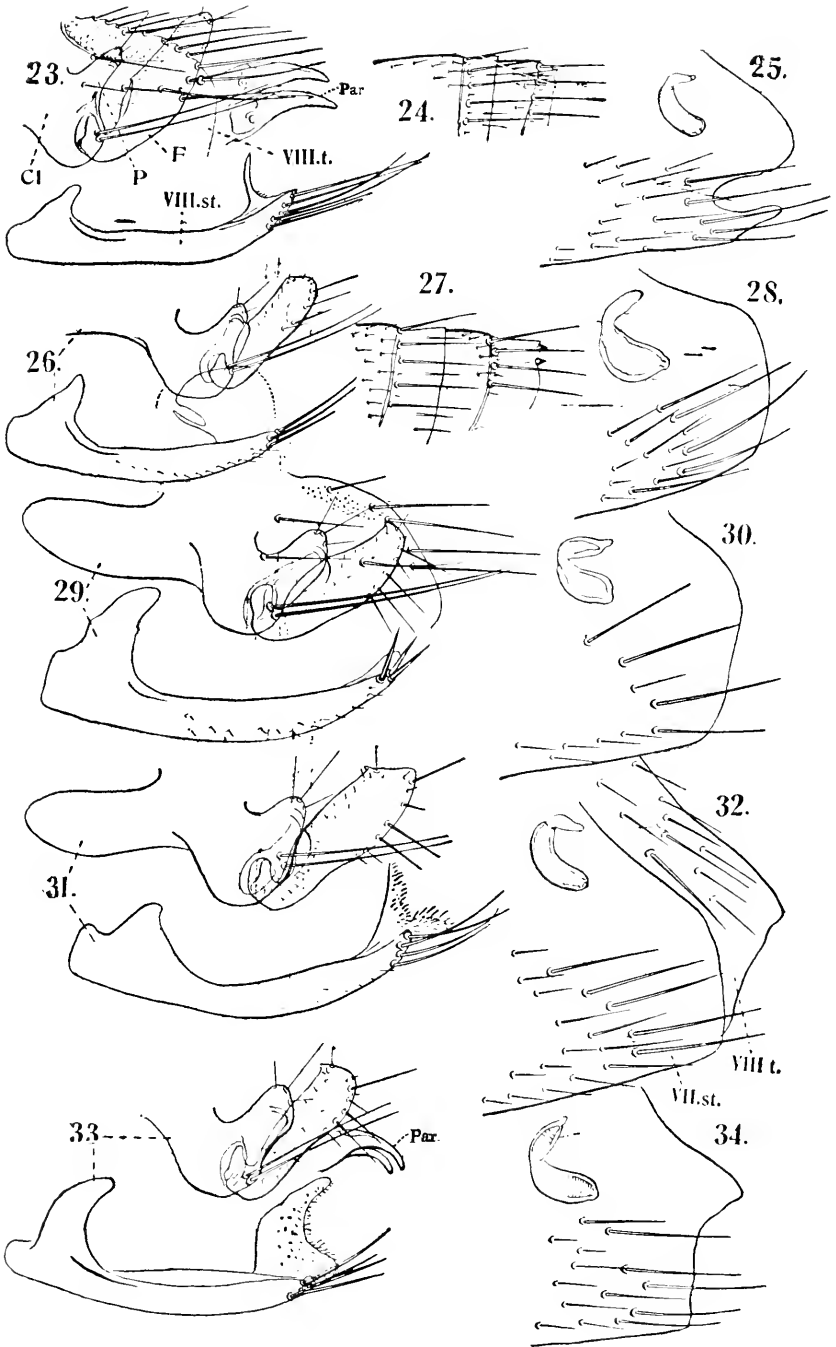
Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

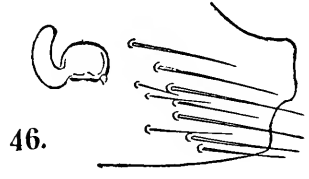
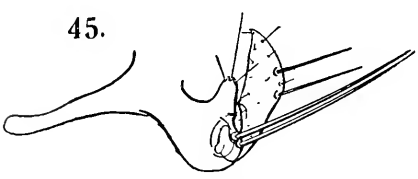
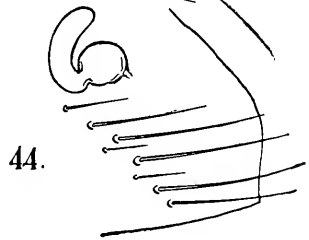
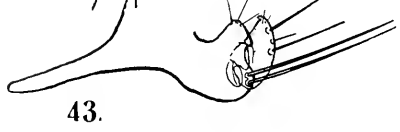
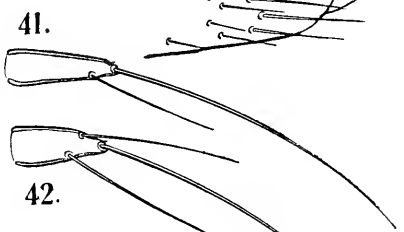
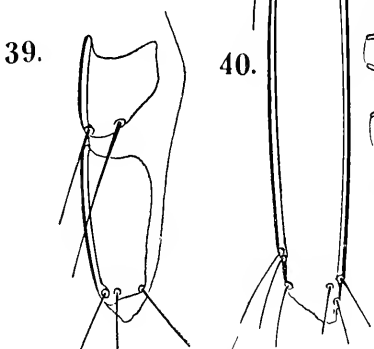
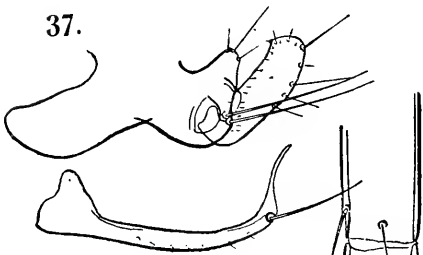
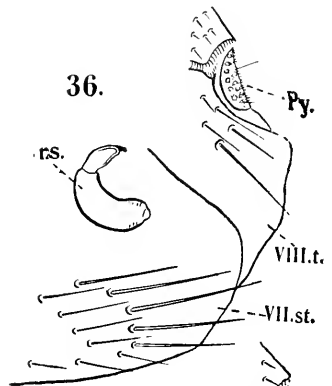
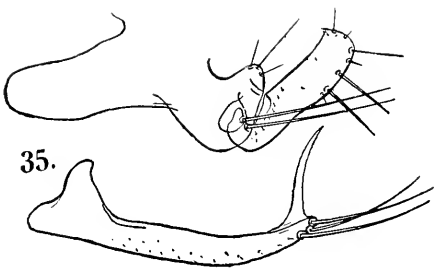
Chingford Branch. The Chingford Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the second Friday in each month.

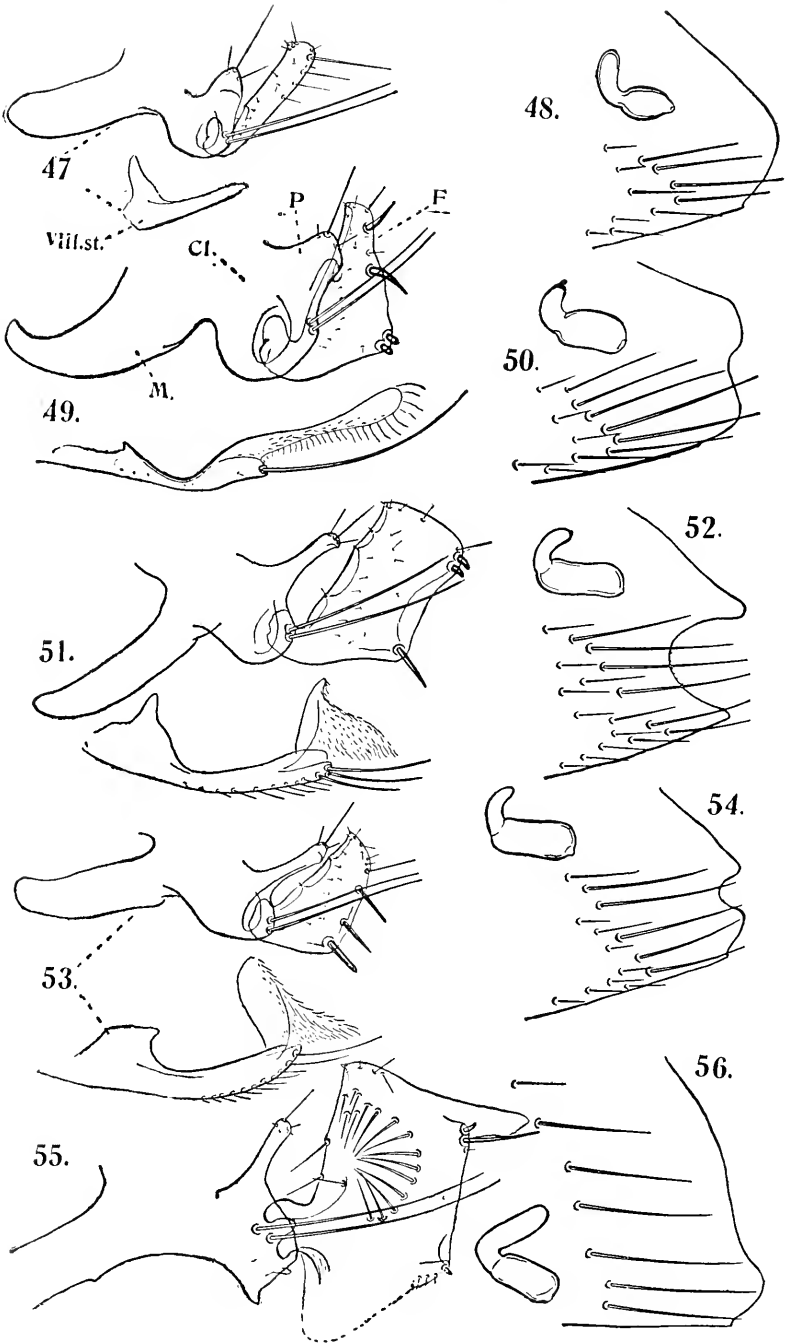
LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meetings: the Third Monday in each Month, October to April. *Hon. Sec.*, Wm. MANSBRIDGE, 4, Norwich Road, Wavertree, Liverpool.



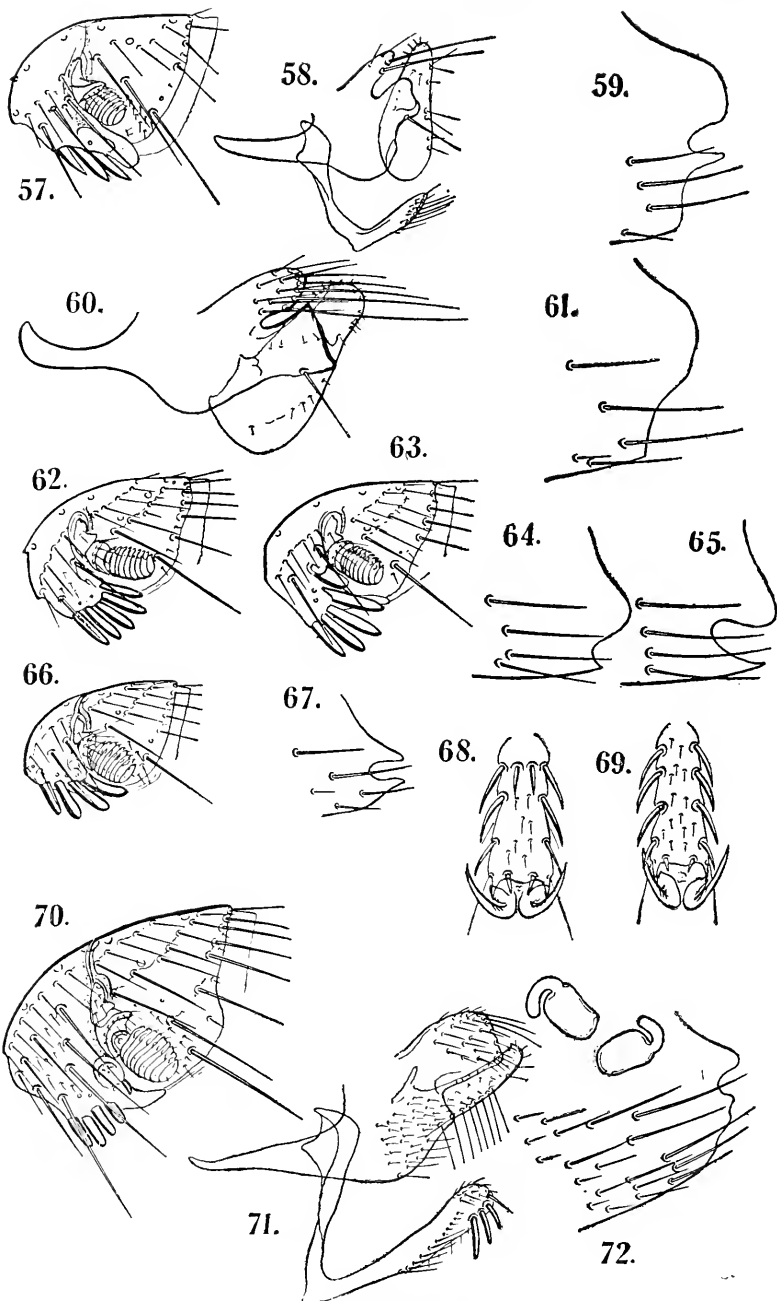


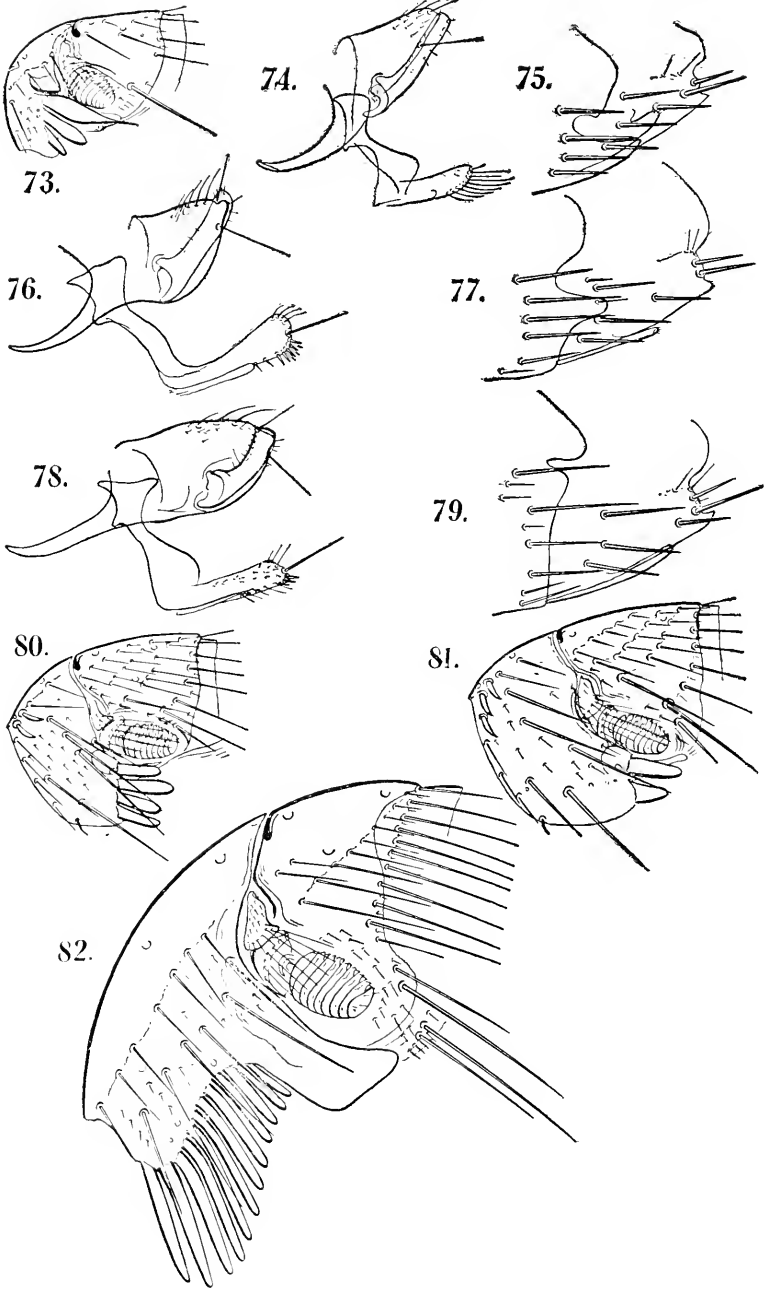


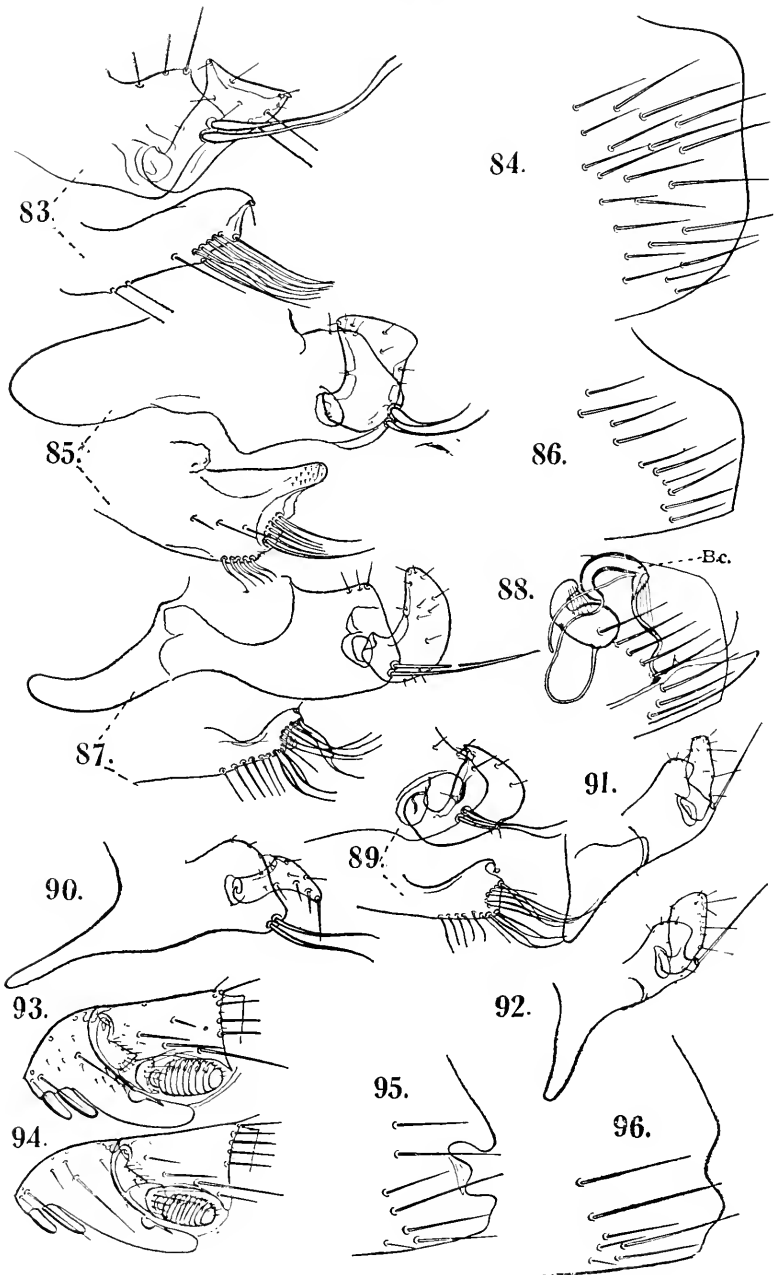




BRITISH SIPHONAPTERA.







A SYNOPSIS OF THE BRITISH SIPHONAPTERA.

BY THE HON. N. CHARLES ROTHSCHILD, M.A., F.L.S., Pr.E.S.

PLATES VII—XIV.

The Siphonaptera, or fleas, form a group of insects apparently not very closely related to any of the other orders of Hexapoda. The group is being more and more studied by entomologists here in England, and no publication exists for the ready identification of the British species. To supply this want the author has written the present article. Its object is explained by the title, i.e., to furnish a key, or ready means of identification of all the fleas so far recorded from the British Isles. The descriptions must not be regarded as full descriptions, but as merely a selection of those characters which afford an easy diagnosis of the various species.

Fleas are parasitic on mammals and birds, and the chief hosts of each species are given in this treatise, but it should be remembered that frequently a number of quite different animals harbour the same species of flea, and that predaceous animals often acquire, and apparently retain for some time, the fleas of their prey.

The classification and diagnoses given in the present article are as a rule valid for the *British genera and species only*. A general classification of the whole group based on all the known genera and species has not yet been satisfactorily attempted. The main division of the group, however, employed in the present article, into *Fracticipita* and *Integricipita* (Oudemans)* is a classification which seems to reflect the real phylogenetic relations of all the known genera.

The student who desires to identify a species should first examine the key to the genera and on deciding to which genus the insect in question belongs, he should confirm the identification by carefully comparing it with the diagnoses of the genera. When the genus has been determined with certainty the keys and diagnoses of the species should then be consulted. Before any of the keys or diagnoses can be used to advantage the student must familiarise himself with certain details of the chitinised external skeleton of the flea which are made use of in this article,

Antennal groove. The groove in the centre of the head in which the antenna lies when at rest, and which divides the head into an anterior (= frons) and a posterior (= occiput) portion (*cf.* pl. VII).

* Cf. *Novitates Zoologicae*, vol. xvi, pp. 133-158 (1909).

Thorax. The thorax of all fleas consists of three rings which are subdivided into separate parts. The first ring, or prothorax, consists of two parts forming a pronotum and prosternum. The second ring, the mesothorax, consists of a dorsal portion, the mesonotum, and a lateral and ventral portion which is subdivided into three parts, the mesosternum, the mesothoracic episternum, and the mesothoracic epimerum. The third ring, the metathorax, is again similarly divided.

Abdomen. The abdomen of all fleas consists of ten segments, each of which is divided into an upper and lower part known respectively as the tergite and sternite. The first sternite, i.e., the sternite of the first segment, however, is always missing. On each side at or near the apical edge of the seventh tergite there are usually one or more long hairs, known as the antepygidial bristles, which are of considerable taxonomic importance, but in some species these bristles are entirely wanting. The ninth tergite of the male is especially modified and is best studied and described if it is assumed that it is laid out flat in one plane. If this is done it would be observed that in the centre of the segment is a highly specialised sensory plate generally known as the pygidium; further, that the two sides form what is usually known as the clasper, bearing certain processes. In the fleas in which only one of these processes is movable this process is called the finger (fig. 15, F).

The females of all fleas possess a conspicuous receptaculum seminis and in some cases two. This organ, which is highly chitinised, can be easily seen in specimens which have been cleared in oil of cloves (fig. 14, r.s.)

The author desires to express his most sincere thanks to his friend Dr. Jordan for the drawings which illustrate this article.

Instructions for collecting the insects in question and notes on their permanent preservation for study are given. Appended to this article is a list—with full references—of all the genera and species which have so far been found in the British Islands.

INSTRUCTIONS FOR COLLECTING AND PRESERVING SIPHONAPTERA.

Fleas are found on mammals and birds, in the hair or feathers. They are also found in their nests or holes.

As soon as their host gets cold the fleas leave it.

Should the host be small, place it in a small box or linen bag, with a very few drops of chloroform or benzine. The fleas will then be found crawling on the bottom of the box or bag, or among the hair when the same is turned back.

If the flea be touched with a small brush, moistened with chloroform or benzine, it will stick to it readily, floating off in the tube of preservative. The best preservative is 50 % of alcohol.

Each tube of fleas should be labelled with the date, locality, and name of the host from which the fleas were taken. If the name of the host on which the fleas were found is not known to the collector, the host itself should be sent with the tube. A number corresponding to one on the host should be attached to the tube. If it is impossible to send the host, the name of the person possessing it should be given, in order to apply to him for the name. Each tube should contain the fleas from one host only. A good method of recording data is a label written in pencil and put inside the tube.

Large mammals cannot well be treated with chloroform or benzine. If the hair of these, however, be turned back shortly after death, the live fleas will be seen running about. These can be killed by touching them with a brush moistened with chloroform or benzine.

Small mammals can be treated in the same manner as large ones, if the first method is found to be too cumbersome.

Another very good way to catch fleas living on mice and other small mammals is to place the live mouse in a bag. The animal should then be killed by breaking its neck from the outside of the bag, and searched in the manner previously explained.

Traps should only be used in which the mice are caught *alive*.

Bats, rodents, and small mammals generally are all good hosts.

As many specimens as possible should be collected, there being frequently several species of fleas on one host.

To secure the fleas found on birds the following plan should be adopted:—

Take the nests of birds as soon as the young have left them. Place the nest in a box, preferably one lined with white paper, and with a glass top. From time to time the nest should be slightly damped. The fleas will frequently keep emerging from their pupae in the nests for six weeks or two months after the nest has been taken. The live fleas can be taken off the sides and top of the box with a camel's hair brush dipped in chloroform or benzine.

The student who desires to study the group under discussion should have examples preserved both in alcohol and mounted in Canada balsam for microscopical investigations. Fleas preserved in alcohol should be stored in small tubes and the preservative fluid should consist of three parts of absolute alcohol, two of water and one of glycerine, the measurements being by volume. The tubes should, of course, be carefully labelled both inside and out with the name of the host from which the fleas were taken and with full date and locality.

Specimens to be mounted as microscopic slides should not be treated with caustic potash, an antiquated method which rarely gives satisfactory results. They should be cleared in oil of cloves and then mounted in Canada balsam, as a rule without any more pressure than that of the cover slip. Specimens which are much contracted and therefore difficult to identify should be treated with peroxide of hydrogen (H_2O_2) in which fluid they expand.

KEY TO THE GENERA OF BRITISH FLEAS.

- | | |
|---|--------------------------|
| 1. Head with two ventral flaps anteriorly on each side
(figs. 93, 94) | 12 |
| Head without these flaps, but often with genal comb of
strongly chitinized spines (figs. 1—7, 13, 57, 62, &c.) ... | 2 |
| 2. Abdomen without apical spines on any segment | 3 |
| Abdomen with apical spines on some of the tergites | 6 |
| 3. No pronotal comb | 4 |
| With pronotal comb | 5 |
| 4. No vertical internal rod in mesosternite (fig. 2) | <i>Pulex</i> |
| With vertical internal rod, frons with tubercle (fig. 7)... | <i>Ornithopsylla</i> |
| With vertical internal rod, frons without tubercle (fig. 1)... | <i>Xenopsylla</i> |
| 5. Frons strongly angulate (fig. 6) | <i>Spilopsyllus</i> |
| Frons not angulate, without tubercle, 2 or 1 genal spine
(fig. 3) | <i>Archaeopsylla</i> |
| Frons not angulate, 8 (rarely 7) genal spines (figs. 4, 5) | ... <i>Ctenocephalus</i> |
| 6. Eye well developed, no genal comb (fig. 13) | <i>Ceratophyllus</i> |
| Eye somewhat reduced or absent, genal comb present (figs.
57, 62). | |

7. Labial palpus with curved bristle posteriorly at tip 8
 Labial palpus without curved bristle posteriorly at tip 9
8. 3 (or rarely 2) genal spines (fig. 57). Fifth hindtarsal segment with three lateral pairs of bristles, and a fourth pair on the ventral surface in between first pair (fig. 68)
...Ctenophthalmus
- 5 genal spines (figs. 62, 63). Fifth hindtarsal segment with four lateral pairs of bristles (fig. 69)*Rhadinopsylla*
9. Abdomen without lateral spines at apices of segments 10
 Abdomen with lateral spines or combs on some segments ... 11
10. Labial palpi 5 segments. Frons strongly curved or angulate, 2 or 3 spine-like bristles near the angle (figs. 80, 81) ...
Leptopsylla
- Labial palpus 4 segments, frons not angulate, without spine-like bristles, genal comb of 4 spines of almost equal length (fig. 66)*Doratopsylla*
- Labial palpus 5 segments, genal comb vertical, containing 4 spines, second from above longest and sharply pointed (fig. 73)*Palaeopsylla*
11. Genal comb of 5 or 6 spines (fig. 70). First midtarsal segment a little longer than the second, abdomen with lateral spines *not* forming conspicuous combs*Typhloceras*
- Genal comb of numerous spines (fig. 82). First midtarsal segment more than twice the length of the second, abdomen with three conspicuous combs. Largest British flea*Hystriehopsylla*
12. With 6 or 8 combs*Ischnopsyllus*
 With 5 combs*Nycteridopsylla*

I. SUBORDER: INTEGRICIPITA.

The anterior portion (= frons) of the head not overlapping the posterior (= occiput) dorsally.

A. FAMILY: PULICIDAE.

Eye well developed.* Antennal groove closed. Labial palpi with four or less segments, apex of terminal joint obliquely truncate (fig. 39). Central abdominal segments with one row of bristles. No spines on

* The definitions of the families, subfamilies and genera refer to British species only.

edge of abdominal segments. First segment of midtarsus always shorter than the second. Hindcoxa with a patch of spines on the inner side.

A¹. SUBFAMILY: PULICINAE.

Club of antennae asymmetrical, very slightly segmented on lower side, first segment of club lanceolate or spatulate; first midtarsal segment much shorter than second. In British species frons without tubercle.

I. GENUS: XENOPSYLLA *Glink.* (1907).

Mesosternite with internal chitinous rod from the insertion of the coxa upwards to the upper margin (fig. 1). Antepygidial bristle placed at some distance from the edge of the segment. Sexual organs of the male without large flap (fig. 12).

One species in Great Britain, introduced. The genus is abundantly represented in Africa, a few species also being known from Asia. One of the African species has been found in South America, and *X. cheopis* is almost cosmopolitan in warm countries.

1. XENOPSYLLA CHEOPIS *Roths.* (1903).

(Figs. 1, 9, 12).

A small pale species.

No distinct internal incassation of the head from the antennal groove upwards (fig. 1). Inner side of the posterior portion of the hindcoxa without any slender bristles. Fifth hindtarsal segment shorter than the second. Hindfemur with a ventral tooth at the widest point.

♂. Clasper with three small movable processes, of which the outer one is the largest, being sole-shaped and bearing at and near the upper edge a number of curved bristles (fig. 12).

♀. Dorsal edge of eighth abdominal tergite not projecting above the sensory plate. Receptaculum seminis (fig. 9) with almost globular head, the tail long and strongly curved, being wider at its base than the head.

A scarce vagrant to the British Islands, introduced by port-rats. Occurs on the black rat (*Epinys rattus*) and the brown rat (*E. norvegicus*). Recorded from Plymouth and London.

II. GENUS: PULEX L. (1758).

Mesosternite very narrow, without internal chitinous rod from the insertion of the coxa up to the upper margin (fig. 2). Head with internal incrassation from antennal groove upwards (fig. 2). Antepygidial bristles placed at some distance from the edge of the segment. Sexual organs of male with very large flap. A number of slender bristles on the inner side of the posterior portion of the hindcoxa.

One species.

2. PULEX IRRITANS L. (1758).

A large, compact, dark species. Hindfemur with a lateral row of seven or more bristles on the inside. Fifth tarsal segment widening towards apex, with very strong lateral bristles. This segment in the hindtarsus longer than second segment.

♂: Sensory plate very short. Two strongly chitinised processes forming a pair of nippers on inside of a large flap.

♀: Dorsal edge of eighth abdominal tergite projecting above the sensory plate. Head of receptaculum seminis nearly globular, less than half the length of the tail, which is slender.

Common on man, and often found on the badger (*Meles meles*); also on the fox (*Vulpes vulpes*).

III. GENUS: ARCHAEOPSYLLA Dampf (1908).

Genal comb with one or two spines (usually two) on each side (fig. 3). Prothoracic comb with six or less spines on the two sides together. One species.

3. ARCHAEOPSYLLA ERINACEI Bouché (1835).

(Fig. 3).

A large pale species. The race found in Great Britain and Northern and Central Europe is *A. erinacei erinacei*; a second race occurs in Portugal and North Africa (*A. erinacei maurus*).

A strong internal incrassation of the head from the antennal groove upwards. Abdominal sternites two to six with only one or two bristles on each side. The bristles on the other parts of the body less numerous than in all the other British *Palicidae*. Bristles at the posterior edge of the tibiae very slender.

In some examples the prothoracic comb is reduced to one spine on each side; it is therefore possible that examples occur in which the comb is entirely absent.

♂. Pygidium strongly convex. Clasper with a very large flap rounded dorsally and incurved ventrally, the upper edge bearing numerous short bristles. Manubrium very slender and nearly straight.

♀. Eighth tergite with several bristles placed at or near the edge, only one situated on the lateral surface. Receptaculum seminis broad, its head twice as long as the tail and, on the dorsal side beyond the centre, strongly incurved.

Common on the hedgehog (*Erinaceus europaeus*) and occasionally on the fox (*Vulpes vulpes*).

IV. GENUS: CTENOCEPHALUS *Kolen.* (1859).

Genal comb horizontal, consisting (in the British species) of seven or eight spines on each side and one spine at the apex of the genal lobe, the spines pointed and recurved (figs. 4, 5). A strong incrassation from the antennal groove upwards. Prothoracic comb of about 16–18 teeth.

Six species are known, four being purely Ethiopian, and two almost cosmopolitan.

4. CTENOCEPHALUS CANIS *Curtis* (1826).

(Figs. 4, 10).

Frons strongly rounded in both sexes. Stigmata large. Distance from frontal corner across eye to anterior edge of antennal groove equal to the distance from the eighth genal spine to the vertex.

♂. Clasper with one sole-shaped flap, beneath which there is a small triangular process (fig. 10). The flap bears numerous hairs along the edge, with the exception of the basal third of the dorsal margin and the basal three-fourths of the ventral margin, which are devoid of hairs and more strongly chitinised. Manubrium (M) straight and narrow, widened at the apex into a spatula.

Common on the domestic dog and cat, but far rarer than *C. felis*.

5. CTENOCEPHALUS FELIS *Bouché* (1835).

(Figs. 5, 11).

Previously usually confounded with *canis*, differs in its much longer head, the distance from the frontal corner across eye to the

anterior edge of antennal groove being almost one-fifth (σ) to one-third (φ) longer than the distance from the eighth genal spine to the vertex. The head is much more pointed; the spines of the genal comb and the spine at the apex of the genal lobe longer than in *canis*, especially the first spine of the comb. Abdominal stigmata smaller, hindtarsus slenderer, and the stylet also more slender. Bristles on metathoracic epimerum and on hindfemur fewer, while the prothoracic comb usually contains one or two spines more than in *canis*.

σ . The non-hairy portions of the margin of the flap are shorter, and the manubrium (fig. 11, M) is much less widened at the apex than in *canis*.

Very common on the domestic dog and cat, and abundant on many hosts in Zoological Gardens.

B¹. SUBFAMILY: SPILOPSYLLINAE.

Frons with tubercle. Club of antenna symmetrical, regularly segmented all round. First midtarsal segment very little shorter than second.

V. GENUS: SPILOPSYLLUS *Baker* (1905).

Frons strongly angulated, with tubercle. Labial palpi with two joints. Genal comb oblique, *not* horizontal, consisting of 4 to 6 spines. Prothoracic comb with fourteen to fifteen spines. Mandibles very broad and strongly serrated.

One species in Europe.

6. SPILOPSYLLUS CUNICULI *Dale* (1878).

(Fig. 6).

A stationary species, differing from all British fleas by the strongly developed mandibles. Labial palpi very weak. Tubercle of frons situated much nearer to the antennal groove than to the mouth-parts.

σ . Clasper bears a large flap, hairy at upper and apical margins, with a short obtuse spine at the apex. Two more processes on the inside of the clasper, which are short and form a pair of nippers, nearly as in *irritans* and *erinacei*.

φ . Stylet very short. Head of receptaculum seminis round, rather longer than broad, tail slender and much larger than the head.

Common on the rabbit (*Oryctolagus cuniculus*) and the hare (*Lepus europaeus*), especially on the ears. Also found on the wild

cat (*Felis silvestris*), and rarely on the cormorant (*Phalacrocorax carbo*).

VI. GENUS: ORNITHOPSYLLA Roths. (1908).

Labial palpus of four segments. Frons with tubercle. Incrassation of head from antennal groove upwards present. Genal and prothoracic combs absent.

One species.

7. ORNITHOPSYLLA LAETITIAE Roths. (1908).

(Figs. 7, 8).

A small pale species. Hindfemur without tooth on ventral edge. The patch of spines on inside of hindcoxa as pale as the bristles. Bristles at the posterior edge of the tibiae very short and dark.

♂. Clasper (fig. 8) with a large hairy flap which bears two spines at the apex, on the inside of this flap another smaller flap and two slender processes. Manubrium very broad and abruptly curved upwards.

♂. Seventh abdominal sternite sinuate; bristles on eighth tergite very numerous. Head of receptaculum seminis slightly longer than broad, gradually merging into the tail, which is about twice as long as the head.

Only recorded from the Scilly Islands, where it frequents the nests of sea-birds. The real host is probably the Manx shearwater, *Puffinus anglorum*. Not yet observed on the Continent.

B. FAMILY: CERATOPHYLLIDAE.

Eye generally well developed, sometimes vestigial. Antennal groove generally open, but entirely closed in females of blind forms. Labial palpi with five segments, apex symmetrical (fig. 40). Some of the abdominal segments with short apical spines, central abdominal segments with at least two rows of bristles. First midtarsal segment about as long as second. Hindcoxa *without* a patch of spines on the inner side except in *Rhadinopsylla*.

C¹. SUBFAMILY: CERATOPHYLLINAE.

Eye well developed. Antennal groove widely open in both sexes. No genal spines (*cf.* fig. 13).

VII. GENUS: CERATOPHYLLUS *Curtis* (1832).

Frons with tubercle (fig. 13). Antennal grove continued to the prosternum. No genal comb. Hindcoxa without patch of spines on inner side. Fifth hindtarsal segment with five lateral pairs of bristles.

The species of this genus are exceedingly numerous, particularly in the temperate zones of both the Eastern and Western Hemispheres.

- | | |
|---|--------------------|
| 1. Prothoracic comb of 24 or more spines. Bird- <i>Ceratophylli</i> | 2 |
| Prothoracic comb with less than 24 spines. Mammal-
<i>Ceratophylli</i> | 24 |
| 2. Males | 3 |
| Females | 14 |
| 3. Occiput with three complete rows of bristles (fig. 13)... <i>gallinulae</i> | |
| First and second row of bristles of occiput represented at
the most by two bristles | 4 |
| 4. Basal abdominal sternite with several bristles on the lateral
surface | <i>styx</i> |
| Basal abdominal sternite with one or no lateral bristles..... | 5 |
| 5. The bristles at the apex of the eighth sternite stout and
black, spiniform, not or but little longer than this
sternite is broad (fig. 29, 33) | 6 |
| These bristles much slenderer and longer | 7 |
| 6. Finger distinctly narrowed at apex; parameres slightly
curved (fig. 29) | <i>columbae</i> |
| Finger not narrowed at apex: parameres sickle-shaped and
strongly curved (fig. 33) | <i>borealis</i> |
| 7. Finger with two stout spines or bristles placed close together | 8 |
| None of the bristles of the finger prominently thick and
brown and always placed apart | 9 |
| 8. Finger widest at the apex, bearing two short blunt spines at
apex (fig. 17)..... | <i>rothschildi</i> |
| Finger widest in the centre bearing two stout brown bristles
at the widest point (fig. 19) | <i>hirundinis</i> |
| 9. Eighth sternite on each side with one long apical bristle
(fig. 37) | <i>fringillae</i> |
| Eighth sternite with four or more apical bristles on the
two sides together | 10 |

10. Finger gradually narrowed from before the centre to the apex, the latter obtusely pointed (fig. 23)*farreni*
 Finger of nearly even width from centre to apex or only the apex narrower..... 11
11. Eighth tergite with distal edge incurved, the upper portion of the tergite therefore projecting as a broad lobe (fig. 21)*rusticus*
 Eighth tergite nearly evenly rounded 12
12. Eighth tergite with more than fifteen bristles at and near the dorsal margin posteriorly to the stigma (fig. 31)...
vagabunda
 Eighth tergite with ten or less bristles at and near the dorsal margin..... 13
13. Finger measured from the most ventral point to the upper anterior angle has the notch of the anterior side in the centre; bristles of eighth sternite stiff and rather strong (fig. 26)*garei*
 Finger measured from the most ventral point to the upper anterior angle has the notch of the anterior side at $\frac{2}{5}$ from the bottom; bristles of eighth sternite slender (fig. 35)*gallinae*
14. Females—Occiput with three complete rows of bristles (fig. 13)
 ...*gallinulae*
 First and second row represented at most by two bristles... 15
15. Basal abdominal sternite with numerous lateral bristles*styz*
 Basal abdominal sternite with one or no lateral bristles..... 16
16. Eighth tergite with upper angle of widened portion produced as a sharp beak-like hook (fig. 22)*rusticus*
 Eighth tergite with upper angle of widened portion rounded off or obtusely angulate 17
17. Seventh sternite very deeply sinuate, the ventral lobe (in a lateral view) narrow and long (fig. 25)*farreni*
 Seventh sternite with upper angle only produced as a lobe (fig. 34)*borealis*
 Seventh sternite rounded or truncate or the sinus quite shallow..... 18

18. Head of receptaculum seminis shorter than tail and less than twice as long as it is broad (fig. 18) *rothschildi*
 Head of receptaculum seminis longer than the tail and at least twice as long as it is broad 19
19. A large number of bristles on eighth tergite below stigma ; sensory plate much shorter than its distance from base of stylet *hirundinis*
 Less than 12 bristles on eighth tergite below stigma ; sensory plate as long as its distance from stylet 20
20. Head and tail of receptaculum seminis almost equal in length (figs. 28, 30) 21
 Head of receptaculum seminis about twice as long as tail (figs. 32, 36, 38) 22
21. Stylet more than twice as long as it is broad *columbae*
 Stylet less than twice as long as it is broad *gareii*
22. Pale brown ; second segment of midtarsus without bristles on the basal half of the ventral surface *fringillae*
 Very dark brown, almost black ; second midtarsal segment with two or three bristles on the basal half of the ventral surface 23
23. Hindfemur on inner surface with a lateral row of four to six bristles ; apex of seventh sternite in a lateral view almost evenly rounded (fig. 36) *gallinae*
 Hindfemur on inner surface with a lateral row of seven or more bristles ; apex of seventh sternite almost truncate or slanting (fig. 32) *vagabunda*
24. Mammal fleas.—Forefemur with one or no bristles on lateral surface *melis*
 Forefemur with several bristles on lateral surface 25
25. Occiput with one bristle above centre of antennal groove ... 26
 Occiput with two or more median bristles 27
26. ♂: Finger with two stout bristles, upper one much nearer to lower bristle than to apex (fig. 45). ♀: Seventh sternite deeply sinuate ventrally (fig. 46) *londiniensis*

- ♂: Finger with two stout bristles, upper one halfway between apex and lower bristle (fig. 43). ♀: Seventh sternite *not* deeply sinuate (fig. 44) *fasciatus*
27. ♂: Finger long and slender, without black spines (fig. 47). ♀: Seventh sternite rounded, without sinus (fig. 48)... *sciurorum*
- ♂: Finger broad, with black spines. ♀: Seventh sternite with sinus 27
27. ♂: Finger widest proximally to middle, narrowing thence towards base and apex, with a long stout blunt spine at widest point and two stout pointed bristles further upwards (fig. 53). ♀: Seventh sternite with a small sinus (fig. 54) *mustelae*
- ♂: Finger broadest in centre, bearing two short blunt spines at widest point and two spiniform bristles further upwards; eighth sternite with one very long bristle (fig. 49). ♀: Seventh sternite with shallow sinus; stylet $\frac{1}{2}$ length of pygidium (fig. 50) *penicilliger*
- ♂: Finger broad, not narrower towards apex, with two short black spines apically, and one black spiniform bristle proximally (fig. 51). ♀: Seventh sternite deeply sinuate (fig. 52)..... *walkeri*

a. BIRD-CERATOPHYLLI.

Comb of pronotum with 24 or more spines. Second segment of antenna always with long bristles at apex, these bristles reaching to (♂) or much beyond (♀) the apex of the club. Stylet always with two fairly long bristles beside a long apical one, with the exception of *gallinulae*, in which one of the lateral bristles is short.

8. CERATOPHYLLUS GALLINULAE Dale (1878).

(Figs. 13, 14).

Head with three rows of bristles in front of eye and 3 rows on the occiput. Spines of the pronotal comb longer than the pronotum. Apical margin of seventh tergite distinctly incurved below the antepygidial bristles, these bristles being placed on a projecting lobe. The upper and lower antepygidial bristles minute in both sexes. The third

lateral pair of bristles of the fifth segment in all tarsi considerably moved on to the ventral surface. Hindfemur with one lateral bristle on the inner surface.

♂. Eighth tergite not rough with hair-like points along the dorsal margin of the widened portion on the inner side; it bears 4 long marginal bristles and 5 or 6 lateral ones on the outer surface. Eighth sternite small, the horizontal outer portion represented by a thin, pointed, fringed, pale process. Process P of clasper (fig. 13) twice as long as broad, measured from the pair of long bristles upwards to anterior angle, it resembles the side-view of a very stumpy thumb. Finger broad, very strongly dilated before the centre, and bearing at this point two stout bristles, of which the lower one is the largest, its apex being twisted and curved downwards; near these bristles, on the lateral surface, an obtuse spine; further upwards two short pointed bristles, and above the upper one of them a long bristle. Apex of parameres very obtuse.

♀. Seventh sternite very deeply sinuate, both lobes narrower than the sinus (fig. 14). Below stigma of eighth tergite one long and two short bristles. Stylet a little over twice as long as it is broad. Head of receptaculum seminis broad, elliptical, three times as broad as the tail and somewhat longer than it.

Widely distributed in the British Islands in the nests of birds such as the wren (*Anorthura troglodytes*), grouse (*Lagopus scoticus*), the moorhen (*Gallinula chloropus*), and many others.

9. CERATOPHYLLUS STYX *Roths.* (1900).

(Figs. 15, 16).

More hairy than the other Bird-*Ceratophylli*, the long bristles also being slenderer. Two rows of bristles in front of the eye, occiput with one or two bristles near base of antennal groove, two above middle of groove. Spines of pronotal comb shorter than pronotum. Second to fourth abdominal tergites with three or four apical spines; first sternite with a number of lateral bristles. Upper and lower antepygial bristles minute in ♂, in ♀ almost half the length of the median one. Hindfemur on inside with a row of 6 to 8 bristles. Longest apical bristle of first, second, and third hindtarsal segments reaching to or beyond the apex of the segment following.

♂. The bristles on the widened portion of the eighth tergite

very numerous and those placed at the edge mostly thin; eighth sternite long, rod-like, evenly curved, with a brush of long bristles ventrally at the apex, the proximal (internal) portion strongly rounded dorsally (fig. 15). Process P of the clasper broad and short. Finger (F) widest in the centre; its hindmargin evenly curved and bearing five or six bristles.

♀. Seventh sternite with broad ventral lobe (fig. 16). Bristles below the stigma of eighth tergite very numerous, as are those on the ventral portion of this tergite and on the sixth and seventh sternites. Stylet three times as long as broad. Head of receptaculum seminis sausage-shaped, three times as long as broad, nearly twice as long and a little more than half as broad again as the tail.

Very common in the nests of the sand martin (*Cotile riparia*); occasionally found in numbers in the nest of the dipper (*Cinclus aquaticus*). Not recorded from Ireland.

10. CERATOPHYLLUS ROTHSCHILDI *Waterst.* (1910).

(Figs. 17, 18).

Two rows of bristles before eye; one or two medium bristles on occiput; frontal tubercle very prominent. Pronotal comb in ♂ as long as pronotum, in ♀ somewhat shorter. Apical portion of metanotum nearly as much reduced as in the other fleas from martins, but bearing on each side three strongly chitinised apical spines; the distance of these spines from the row of long bristles equals the length of the spines. Sensory plate small, in ♂ very little longer than the first hindtarsal segment is broad at the apex, in ♀ half as long as the distance from the plate to the base of the stylet. Longest apical bristle of second hindtarsal segment reaching somewhat beyond the apex of the third segment.

♀. Eighth tergite with 9 or 10 long bristles at or near the margin, but on innerside without a rough area with hair-like points. Eighth sternite long, slightly curved, with some long apical bristles; widened proximal portion produced upwards as a triangular lobe, which leans towards the distal side. Process of clasper (fig. 17) club-shaped, with the apex produced into a beak-like projection on the posterior side. Finger triangular, widest at the apex, the apical margin being longer than the anterior one, the apical distal angle with two stout, black, obtuse spines. The ventral (horizontal) arm of ninth sternite

with a dense brush of slender hairs on the proximal lobe, some stout short bristles being intermixed with the hairs.

♀. Seventh sternite (fig. 18) produced into a broad truncate lobe, the lower angle of which is strongly rounded, the upper one much less so. Eighth tergite with seven or eight bristles below stigma. Stylet less than three times as long as it is broad at the base. Receptaculum seminis quite different from that of *hirundinis*, *rusticus*, and *farreni*, the head being shorter but much broader than the tail, with the upper and lower edges (in side-view) parallel in centre.

A very rare species apparently confined to Great Britain. A few examples were found by the Rev. James Waterston in the nests of the house martin (*Chelidon urbica*), in Kincardineshire.

II. CERATOPHYLLUS HIRUNDINIS Curtis (1826).

(Figs. 19, 20).

Two rows of bristles before the eye; occiput with two bristles above the middle of the antennal groove. Spines of pronotal comb slightly shorter than pronotum. The portion of the metanotum posterior to the row of long bristles quite short, almost membranaceous, without the short and strongly chitinised apical spines present on the metanotum of most other species of *Ceratophyllus*, but instead of these spines on each side with one or two long bristle-like spines resembling the mesonotal spines; apical portion of some of the abdominal tergites likewise reduced, but the spines distinct. Sensory plate of ninth tergite smaller than in the other *Ceratophylli*, being somewhat shorter than the third hindtarsal segment. Hindfemur with a lateral row of 6 to 9 bristles on inside.

♂. Rough area on inside of eighth tergite large, well defined; on outside of eighth tergite about 18 long bristles at and near the edge. Eighth sternite (fig. 19) long, nearly straight, widened at the apex and here excised, bearing 6 or 7 long bristles on each side; proximal portion of eighth sternite produced upwards into a slender process. Process of clasper shaped like a club. Finger widest in the centre, the hindmargin being obtusely angulate at this point and bearing here two long and very strong bristles, another long but thinner bristle being placed at the apex of the finger.

♀. Seventh sternite irregularly rounded (fig. 20); poststigmatal portion of eighth tergite likewise rounded, with more than 12 bristles

below the stigma and more than 30 on the ventral half. The stylet only half as long again as it is broad. Receptaculum seminis slender, the head more than three times as long as it is broad, half as long again and half as broad again as the tail.

Common and widely distributed in the nests of the house martin (*Chelidon urbica*). Not recorded from Ireland.

12. CERATOPHYLLUS RUSTICUS *Wagn.* (1903).

(Figs. 21, 22).

Head with two rows of bristles in front of the eye; on occiput one bristle behind the base of the antennal groove and two above the centre of the groove. Pronotal comb about as long as the pronotum in the ♂ and slightly shorter in the ♀, measured at the sides. Apical portion of metanotum reduced as in *hirundinis*, with the apical spines vestigial or absent.

♂. Apical margin of eighth tergite (fig. 21) vertical, but distinctly in-curved, the upper angle projecting as a strongly rounded lobe, at and near the margin about 16 to 20 very long bristles; the area of the inner surface bearing hair-like points extends more than half-way down to the ventral edge, but the points are less close together than is usually the case. Eighth sternite long, with about six long curved bristles at the apex on the two sides together; the proximal, widened, portion of this sternite rounded anteriorly, with the upper angle obtuse. Process P of the clasper three to four times as long (measured from the pair of long bristles) as it is broad at the narrowest point. Finger very much longer than P, anterior margin subangulate before the middle, posterior margin straight, except base and apex, where it is rounded, apical third with three rather stout and short pointed bristles and above them a thinner bristle.

♀. Seventh sternite (fig. 22) broadly rounded, slightly incurved but without sinus, bearing more than 30 bristles. Eighth tergite with more than ten bristles above the stigma and at least twelve below it, the ventral area bearing more than 30. The apical dorsal angle of the widened portion of the eighth tergite produced as a sharp beak. Head of receptaculum seminis slender, about three times as long as it is broad, and twice as long as the tail.

A more or less rare species found in the nests of the house martin (*Chelidon urbica*). Not recorded from Ireland.

13. CERATOPHYLLUS FARRENI Roths. (1905).

(Figs. 23, 24, 25).

Similar to *hirundinis*, but the modified abdominal segments very different. Pronotal comb as long as the pronotum measured in the centre of the side. Metanotum without spines at the apex, the apical area much reduced in width, but rather more chitinised than in *hirundinis*. Upper and lower antepygial bristles minute in ♂, the upper slightly longer than the lower in ♀, and less than one-fourth the length of the central one. Sensory plate of ninth tergite shorter than third hindtarsal segment.

♂. Poststigmatal portion of eighth tergite almost evenly rounded, with about 10 to 14 bristles at and near the margin and 3 or 4 on the side; the rough area of the inner surface narrow (fig. 23). Eighth sternite more curved than in *hirundinis*, pointed, with a long brush of apical bristles; widened proximal portion less produced upwards than in *hirundinis*, and anteriorly rounded-truncate. Process of clasper almost conical. The finger (F) broadest in the centre, its posterior margin being evenly curved and bearing two long bristles in the centre and a small one at the apex. End-piece of paramere (Par) long, slightly curved and gradually narrowed. Dorsal internal portion of ninth tergite forms with the manubrium an obtuse angle which is completely rounded off.

♀. Seventh sternite recalling that of *gallinulae*, being very deeply sinuate (fig. 25); the upper lobe broad, the lower one narrow. Post-stigmatal portion of eighth tergite with 6 or 7 bristles below the stigma and about 20 on the ventral half. Stylet twice as long as it is broad. Receptaculum seminis similar to that of *hirundinis*.

The British race is *C. farreni farreni*; in Algeria the local race *C. farreni meridionalis* Jord, and Roths. (1912) is found.

A fairly common species in the nests of the house martin (*Chelidon urbica*). Not recorded from Ireland.

14. CERATOPHYLLUS GAREI Roths. (1902).

(Figs. 26, 27, 28).

Frons with two rows of bristles, occiput with one bristle behind base of antennal groove and two above centre of groove. Pronotal comb about one-ninth longer than the pronotum measured in the

centre of the sides. Hindfemur with one or two lateral bristles on the inner surface. Apical area of metanotum not reduced (fig. 27).

♂. Eighth tergite without an internal area of sharp points, only a few such raised points being present at and close to margin; on outer surface about six bristles at and near margin, and a few on the sides. Eighth sternite (fig. 26) with broad and short membranaceous apical lobe, which is denticulated at the distal edge; upper margin of sternite almost straight, ventral margin convex, apex on the two sides together with 6 to 8 nearly straight bristles, of which the longest is about two-thirds the length of the finger; the proximal, internal, portion of the eighth sternite is boot-shaped with the toes turned upwards and slightly distad. Finger similar to that of *gallinae*, shorter, three times as long as broad, proximal margin angulate in centre, at apex evenly rounded on the posterior side, with two bristles near apex, of which the upper one is slightly the longer, being rather more than half as long again as the finger is broad at its widest point; in between these bristles a short one, and further down a slender bristle which is smaller than the lower apical one.

♀. Seventh sternite rotundate-truncate (fig. 28). Eighth tergite with two long and some small bristles below the stigma and ten or less bristles on the ventral area. Stylet at the most twice as long as broad. Head of receptaculum seminis nearly one-third longer than the tail, but twice as broad, the upper margin of the head slightly incurved or nearly straight, and the ventral margin evenly convex.

Very common all over England and Scotland in the nests of birds. Among the many hosts may be mentioned the lark (*Alauda arvensis*), the bearded tit (*Panurus biarmicus*), and several gulls (*Larus*). Also found in Ireland.

15. CERATOPHYLLUS COLUMBAE *Gervais* (1844).

(Figs. 29, 30).

Two rows of bristles in front of eye; on occiput one bristle above centre of antennal groove, but no bristles behind base of the groove (apart from minute hairs). Spines of pronotal comb much shorter than the pronotum measured in the centre of the sides. Hindfemur on inner surface with a lateral row of four to seven bristles.

♂. The rough marginal area of the inner side of the eighth tergite studded with hair-like points is narrow; the segment bears on

the outer surface about six long bristles at and near the edge and three on the sides. Eighth sternite (fig. 29) long, evenly curved, its armature very characteristic, consisting of about half-a-dozen very stout and pointed apical spiniform bristles; the internal dilated portion of this sternite boot-shaped with the toes pointing upwards and somewhat anad. The process P of the clasper twice as long as broad; the finger much longer than P, on the anterior side angulate above the centre, on the posterior side nearly straight from near base to near apex, more than three times as long as it is broad, with five marginal bristles in the apical half.

♀. Seventh sternite (fig. 30) not sinuate, but truncate, with margin slightly incurved and the upper angle more projecting than the lower. Eighth tergite with five to seven bristles above the stigma, a row of three below the stigma and less than twelve bristles on the ventral area of the outer surface, inclusive of the apical bristles. Stylet about three times as long as it is broad. Head of receptaculum seminis elliptical, twice as long as it is broad and as long as the tail, which is a little more than half the width of the head.

Not uncommon both in England and Scotland in the nests of both the wild and domestic rock dove (*Columba livia*). Not recorded from Ireland.

16. CERATOPHYLLUS VAGABUNDA *Boh.* (1866).

(Figs. 31, 32).

Pronotal comb one-third shorter than the pronotum measured in the centre of the sides. Apical area of metanotum slightly but distinctly shorter than of mesonotum, the edge minutely dentate and the spines much reduced in width, in ♂, if present, more like bristles in appearance. Hindfemur with a lateral row of six or more bristles on inner surface.

♂. First midtarsal segment on hindside with several long bristles, the apical bristle reaching to apex of second segment. Rough area on inside of eighth tergite a little narrower than the finger. On outside of eighth tergite are about 28 bristles on upper area posteriorly to stigma, of which about 18 are placed at or near the margin; on ventral area one long bristle. Eighth sternite (fig. 31) long, measured ventrally twice as long as the first hindtarsal segment; at apex on both sides together, about 8 slender curved bristles, which are less than half as long as the finger. Process of clasper short, obtusely tri-

angular; finger widest beyond centre, of the same general outline as in *gallinae*, but the apical margin very strongly slanting, therefore the posterior apical angle pointed; six bristles in apical half of posterior margin, first, second, and fourth short, the others nearly equal in length (being slightly shorter than the finger is broad). Apical portion of end-piece of paramere slender and scarcely at all curved.

♀. Apical margin of seventh sternite (fig. 32) oblique, some parts of it more rounded than others, the margin being ventrally less oblique than dorsally. Eighth tergite with five or more (usually 10 or 11) bristles below the stigma, the last bristle being placed proximally to the upper angle of the widened portion of the segment; on the ventral area about 18 bristles. Stylet twice as long as it is broad. Head of receptaculum seminis long, nearly three times as long as it is broad, and more than twice as long as the tail.

A rare species found in the nests of seabirds, such as the kittiwake (*Rissa tridactyla*) and the herring gull (*Larus argentatus*) in Scotland. Of doubtful occurrence in England, and not recorded from Ireland.

17. CERATOPHYLLUS BOREALIS *Roths.* (1907).

(Figs. 33, 34).

An almost black species. It resembles *gareii*, but the hindfemur has a row of only three to five bristles on the inner surface and the modified abdominal segments are different.

♂. Area of sharp points on inside of eighth tergite one-fourth narrower than the finger, this segment posteriorly to stigma with 12 bristles, of which four are placed at or close to the edge; there are two long lateral bristles towards the ventral margin. Internal proximal portion of eighth sternite (fig. 33) produced upwards into a lobe which is much longer than in *gareii*; the apical bristles are very stout, the longest being about half the length of the finger; the membranous apical flap triangular, its proximal edge being convex and its distal edge incurved. Process of clasper twice as long as it is broad in the centre. Finger three times as long as it is broad, widest at three-fourths, in apical half five marginal bristles, first and fourth small, fifth the longest, a little longer than second and a trifle longer than the finger is broad at its widest point; end-piece of paramere (Par) long, slender and strongly curved.

♀. Seventh sternite truncate, with the upper angle produced into a prominent lobe (fig. 34). Eighth tergite with two long and two small bristles below the stigma and about ten bristles on the ventral area. Receptaculum seminis similar to that of *gareii*. Stylet somewhat longer than in *gareii*.

A rare species, apparently confined to Great Britain and so far only recorded from Scotland from the nests of the rock pipit (*Anthus obscurus*), the gannet (*Sula bassana*), and some other birds.

18. CERATOPHYLLUS GALLINAE Schrank (1803).

(Figs. 35, 36).

Two rows of bristles in front of the eye, on occiput one bristle near base of antennal groove and a long and a short one above centre of antennal groove. Pronotal comb one-eighth shorter than pronotum. Apical area of the meta-notum one-third shorter than the corresponding area of the meso-notum and bearing on each side two short apical spines. Hindfemur with a lateral row four to six bristles on the inner surface.

♂. Rough area on inside of eighth tergite as broad as the apex of first hindtarsal segment; eighth tergite on outer surface with six or seven bristles at and near edge and a few on the lateral surface. Eighth sternite (fig. 35) evenly curved, on both sides together with four to six long bristles at apex, these bristles one-fifth shorter than the finger. Process P of clasper short, triangular; finger four times as long as it is broad, its distal margin slightly incurved before the centre, then feebly convex, the apex being rounded. The finger is of almost even width from the angle of the anterior margin to near the apex; in the apical half of its distal margin three long bristles, the upper one being thinner and shorter than the others: in between the upper one and the next a short thin spine-like bristle. End-piece of paramere twice as long as the finger is broad.

♀. Seventh sternite (fig. 36) strongly rounded, without sinus; eighth tergite with three to five bristles below stigma, of which one or two are long, on ventral area of eighth tergite about a dozen bristles. Pygidium as long as its distance from the stylet, the latter about three times as long as it is broad. Head of receptaculum seminis long and slender, nearly three times as long as it is broad, and twice the length of the tail, which is two-thirds the width of the head.

Very common in England and Scotland in the nests of most birds, and in hen-houses. Not recorded from Ireland.

19. CERATOPHYLLUS FRINGILLAE Walk. (1856).

(Figs. 37, 38).

Much paler than *gallinae*, which it resembles, smaller, the bristles slenderer, comb of pronotum with 29 or more spines, while in *gallinae* it contains usually less than 28. Apical portion of metanotum less chitinised than in *gallinae*, with one or no apical spines. Metathoracic epimerum with four or five bristles. Hind-femur with an inside row of usually more than seven lateral bristles. The bristles on the ventral surface of the segments one to four of all tarsi fewer in number.

♂. Rough inside area of eighth tergite much narrower than in *gallinae*, being only as broad as the apex of the fifth hindtarsal segment. The eighth sternite (fig. 37) with two or three apical bristles, which are shorter and thinner than in *gallinae*, being less than two-thirds the length of the finger. The membranaceous apical flap of the eighth sternite is narrower than in *gallinae* and forms a continuation of the sternite, being less directed upward than in *gallinae*. The bristles at the posterior edge of the finger are thinner than in *gallinae*; moreover, the upper one is longer than the other two, and the small one situated between the upper one and the next is much less spine-like than in *gallinae*, being in *fringillae* longer and thinner than in that species. The apical piece of the paramere is shorter than in *gallinae*.

♀. Seventh sternite (fig. 38) more strongly rounded than in *gallinae*, with thinner bristles. Upper and lower antepygidal bristles longer than in *gallinae*, lower one more than one-third the central bristle. Three or four small bristles on eighth tergite above stigma. Receptaculum seminis narrower than in *gallinae*.

Fairly common in the nests of the house sparrow (*Passer domesticus*), also on other passerine birds. Not recorded from Ireland.

b. MAMMAL-CERATOPHYLLI.

Prothoracic comb with less than 24 spines. Bristles of second antennal segment in ♂ much shorter than club (except *melis* ♂), in ♀ at most slightly longer than club. Stylet either with two long

lateral bristles (*sciurorum*, *mustelae*, *walkeri*), or with one long one (*fasciatus*, *londiniensis*, *peucilliger*, *melis*), besides the long apical bristle (figs. 41, 42).

20. CERATOPHYLLUS FASCIATUS *Bosc* (1800).

(Figs. 40, 41, 43, 44).

Rostrum reaching to apex of forecoxa. Occiput with one median bristle. Forefemur with six lateral bristles. Fifth segment of all tarsi slightly shorter than third hindtarsal segment. First pair of ventral bristles of fifth segment more distinctly curved inwards than the other bristles.

♂. Eighth tergite without hair-like points on inner side. Eighth sternite vestigial. Process of clasper short, broad, triangular. Finger as drawn in figure with two stout and long bristles (fig. 43).

♀. Seventh sternite (fig. 44), with apical margin slanting and slightly undulating. Lower antepygial bristle one-fifth shorter than central one. Stylet almost three times as long as broad; upper lateral bristle absent (fig. 41). Receptaculum seminis with nearly globular head, which is very much thicker and shorter than tail.

Generally common in the British Islands. The chief hosts are the Norway rat (*Epimys norvegicus*), and the house mouse (*Mus musculus*). More rarely examples have been found on several species of field mice and on the weasel (*Mustela nivalis*), as well as the stoat (*Mustela erminea*).

21. CERATOPHYLLUS LONDINIENSIS *Roths.* (1903).

(Figs. 45, 46).

Paler and smaller than *fasciatus*, to which it is allied. Bristles on outer side of hindtibia more numerous. Some of the bristles longer than in *fasciatus*, e.g., longest apical bristle of hindtarsal segment longer than the third segment.

♂. Shape of the finger different from that of *fasciatus*, cf. fig. 45, also arrangement of bristles. Eighth sternite absent.

♀. Seventh sternite produced into a broad truncate lobe (fig. 46).

A rare Mediterranean species, probably introduced by port-rats, has occurred on the house mouse (*Mus musculus*), and possibly on the brown rat (*Epimys norvegicus*), in London, Dover, and Aberdeen.

22. CERATOPHYLLUS SCIURORUM *Schrank* (1803).

(Figs. 42, 47, 48).

Two median bristles on occiput, the one nearest to the antennal groove being long, the other placed obliquely above the first. Lower antepygial bristle less than half the length of central one. Hind-femur with two and midfemur with one lateral subventral bristle on inner surface, besides a sub-apical one.

♂. Eighth abdominal sternite small (fig. 47), the proximal portion boot-shaped with the toe pointing upwards, and the horizontal outer portion linear. The widened portion of eighth tergite dorsally with about eight long bristles. Finger very characteristic, being almost linear and about five times as long as it is broad.

♀. Seventh abdominal sternite (fig. 48) almost gradually narrowed in a lateral aspect, with the apex nearly evenly rounded, without any sinus. Head of receptaculum seminis elongate-elliptical, less than twice as wide as, and only a little longer than, the tail. Stylet about twice as long as it is broad; both lateral bristles long.

Common in England, Scotland, and Ireland on the squirrel (*Sciurus vulgaris*), the dormouse (*Muscardinus avellanarius*), and occasionally on the pine marten (*Martes martes*), the stoat (*Mustela erminea*), and the weasel (*Mustela nivalis*).

23. CERATOPHYLLUS PENICILLIGER *Grube* (1852).

(Figs. 49, 50).

A median row usually of four bristles on occiput. Mid- and hind-femora with one lateral bristle placed in the basal fourth.

♂. First midtarsal segment with several long slender bristles, the longest apical one reaching nearly to the apex of the fourth segment. Eighth tergite with a narrow stripe of small hairs on inner surface along dorsal edge of widened portion, and a dozen long bristles on the outside. Eighth sternite narrow, slightly convex ventrally, and dorsally deeply concave, at apex with two very long bristles (one on each side) and two narrow fringed flaps (fig. 49). The finger is broadest in the centre, gradually narrowing from here to the apex; it bears two short obtuse spines close together at the widest point, a pointed spine-like bristle half-way to apex pointing downward, and a smaller one near the apex pointing upwards. The ninth sternite has

a short spiniform bristle near the apex and another on the proximal portion of the horizontal arm, besides numerous thin hairs.

♀. Seventh sternite with a shallow sinus, the lobe above the sinus projecting a little more than the ventral lobe (fig. 50). Eighth tergite with four or five bristles below the stigma, the latter of normal size. Stylet three times as long as it is broad at the base, upper lateral bristle absent. Head of receptaculum seminis about half as long again as it is broad, and much longer and wider than the tail.

A common species in England and Scotland; not recorded from Ireland. Has been found on many hosts; among them may be cited the bank vole (*Evotomys glareolus*), the Orkney vole (*Microtus orcadensis*), the long-tailed field mouse (*Apodemus sylvaticus*), the dormouse (*Muscardinus avellanarius*), and the stoat (*Mustela erminea*).

24. CERATOPHYLLUS WALKERI Roths. (1902).

(Figs. 51, 52).

Very dark, nearly black. Occiput usually with median row of four bristles. Stigmata larger than in the previously named mammal fleas, that of eighth tergite wider than foretibia. Upper and lower antepygidial bristles equal in length, in ♂ quite small, in ♀ one-third as long as the central bristle.

♂. First midtarsal segment with several long thin bristles, the apical one reaching a little beyond the second segment. Apical margin of eighth tergite subdorsally straight, slightly incurved, and strongly slanting, bearing here four long bristles and being excised subventrally. Eighth sternite (fig. 51) similar to that of *mustelae*, slightly broader apically, the upper angle of the widened proximal portion directed upwards. Process P of the clasper long, narrow; the finger broad, the posterior margin being widened before the middle, where it bears a stout bristle pointing downward, and again at the apex, where it bears two short, stout and obtuse bristles.

♀. Seventh sternite (fig. 52) very deeply sinuate, both lobes being narrow, apex of the upper one more or less rounded off, and of the lower one pointed. Eighth tergite with two long bristles below the stigma. Stylet three times as long as it is broad, both lateral bristles long. Head of receptaculum seminis more than twice as long as it is broad, and much longer than the tail, which is only half the width of the head.

A common species in England and Scotland, not recorded from

Ireland. Chief hosts are the stoat (*Mustela erminea*), the weasel (*Mustela nivalis*), and the bank vole (*Erotomys glareolus*). *C. walkeri* has not been recorded from the Continent.

25. CERATOPHYLLUS MUSTELAE Dale (1878).

(Figs. 53, 54).

Occiput usually with a median row of four bristles. Mid- and hindfemora with one lateral bristle. Stigma of eighth tergite broader than the tail of the receptaculum seminis.

♂. First midtarsal segment with a long and slender apical bristle reaching a little beyond apex of second segment. Wide portion of eighth tergite without hairs on inside at dorsal edge, and with five or six bristles on outside. Eighth sternite (fig. 53) resembling the runner of a sleigh, and only slightly curved, proximally widened, with the dorsal angle of the widened portion directed distad, not upwards. Along ventral margin of eighth sternite numerous thin and short bristles, and one long one on each side at apex. Apical lobes of eighth sternite broad, bearing short fringes. Process P of clasper long and rod-like. Finger widest near centre, the anterior margin nearly straight, the posterior margin convex; at widest point one stout obtuse bristle, and further upwards at about $\frac{1}{5}$ and $\frac{3}{5}$ from this bristle to apex two thinner pointed bristles, and a very thin one further upwards. Ninth sternite narrow. Apical hooks of parameres long and slender. The manubrium and internal dorsal portion of ninth tergite form an acute angle, the point of which is rounded off.

♀. Seventh sternite (fig. 54) with shallow sinus, upper lobe slightly more pointed but a little less projecting than lower lobe. Two long bristles and a short one below stigma. Stylet short, only half as long again as it is broad, both lateral bristles long. Head of receptaculum seminis much longer and broader than the tail.

Common in England and Scotland, not recorded from Ireland. Occurs on many hosts; among which may be cited long-tailed field mouse (*Apodemus sylvaticus*), bank vole (*Erotomys glareolus*), and the stoat (*Mustela erminea*).

26. CERATOPHYLLUS MELIS Walk. (1856).

(Figs. 55, 56).

The largest British species of this genus.

Rostrum reaches to the tibia, being longer than in any other British flea. Stigmata large. Forefemur with a single bristle on

lateral surface. Fifth tarsal segment in all tarsi much longer than third hindtarsal segment. First pair of bristles of fifth segment in all tarsi directed towards the sides.

♂. Second segment of antenna on lower side (= posterior) with some very long bristles. Second segment of hindtarsus with one thin apical bristle much longer than second segment; third segment with two similar apical bristles, which are longer than fourth segment. Dorsal part of enlarged portion of eighth tergite bears on inner surface numerous hair-like points, thus resembling most *Bird-Ceratophylli*. Eighth tergite reduced to a narrow strip widened at the apex on each side of the body into a large membranous flap bearing long fringes on the ventral side. Process of the clasper long, narrow, and straight. Finger very large, almost rectangular, the lower margins much widened, posterior apical angle produced into a lobe. Finger bears on inner surface a curved row of bristles (fig. 55).

♀. Seventh sternite (fig. 56) with apical margin slanting and slightly undulating. Stylet about three times as long as it is broad, upper lateral bristle absent. Head of receptaculum seminis slightly broader and much shorter than the tail.

A rare species, recorded from England and Ireland. The host is the badger (*Meles meles*).

D¹. SUBFAMILY: CTENOPHTHALMINAE.

Eye vestigial. Antennal groove closed, at least in ♀. Genal comb present.

VIII. GENUS: CTENOPHTHALMUS *Kolen*. (1856).

Frons with tubercle in a groove. Eyes vestigial. Antennal groove closed, especially in ♀. Genal comb of three (rarely two) spines on the ventral side (fig. 57). Labial palpi five-jointed, with a curved apical bristle at the hind edge of the fifth segment. Antepygidial bristles three in number in both sexes. Fifth hindtarsal segment with three lateral pairs of bristles and a fourth pair on the ventral surface in between first pair (fig. 68). Hindcoxa without patch of spines on inner side.

Only two species at present known from Great Britain, both of which have a prothoracic comb of sixteen teeth, and can only be distinguished with certainty by the modified abdominal segments. A third species, *assimilis* Tasch. (1880), may occur in this country.

The species of this genus are numerous in the Palaearctic and Ethiopian regions, a few being found in America.

27. *CTENOPHTHALMUS AGYRTES* Heller (1896).

(Figs. 57, 58, 59).

♂. Clasper divided by a sinus into two processes (fig. 58) ; upper process pointed, bearing two very long and one or more short bristles ; lower process truncate with the apex sinuate, one slender bristle on the under side. Finger almost pear-shaped, and much larger than the ventral process of the clasper.

♀. Seventh sternite (fig. 59) with a broad rounded lateral lobe, beneath which there is a more or less distinct short narrow lobe. Head of receptaculum seminis twice as long as it is broad, and longer than the tail.

Perhaps the commonest species in England and Scotland, also received from Ireland. It occurs on the brown rat (*Epimys norvegicus*), and the house mouse (*Mus musculus*) living in fields, and on the bank Vole (*Evotomys glareolus*), the common shrew (*Sorex araneus*), and others.

C. agyrtes exhibits in the British Islands great variation, especially in the shape of the seventh sternite of the ♀.

CT. AGYRTES ab. *NOBILIS* Roths. (1898).

Specimens from the water rat (*Arvicola amphibius*) occasionally lose a spine of the genal comb on one or both sides.

28. *CTENOPHTHALMUS BISOCTODENTATUS* Kolen. (1863).

(Figs. 60, 61, 68).

♂. Both processes of the clasper (fig. 60) much broader than in *agyrtes*. The upper one with a larger number of bristles, the lower one truncate, not sinuate, with the upper and lower angles acute. Finger not reaching further upwards than the clasper, broader than in *agyrtes* and less narrowing towards the apex.

♀. Seventh sternite broadly rounded (fig. 61).

Not common in England and Scotland, and unrecorded from Ireland. Occurs on, and in the nests of, the mole (*Talpa europaea*). Very rarely examples are found on the weasel (*Mustela nivalis*), and the polecat (*Putorius putorius*).

IX. GENUS RHADINOPSYLLA *Jord. and Roths.* (1912).

Frons with or without small tubercle not in a groove. Eye vestigial. Antennal groove closed, especially in female. Genal comb of five spines placed vertically (figs. 62, 63). Labial palpi as in *Otenophthalmus*. Male without antepygidial bristles, female with two long ones on each side. Hindecoxa with patch of short spines on inner side. Fifth segment of all tarsi with four lateral pairs of bristles (fig. 69).

The genus contains only two species, both being found in Great Britain.

29. RHADINOPSYLLA ISACANTHUS *Roths.* (1907).

(Figs. 62, 64).

Frons with tubercle. The five spines of genal comb of equal length. Prothoracic comb of 22 spines.

♂. Eighth sternite with a vertical row of bristles. Manubrium broader proximally and slenderer apically than in *pentacanthus*. Distance of base of finger from tip of manubrium half as long again as finger. Ninth sternite with about 20 small hairs or bristles. Apical edge of paramere not serrate.

♀. Sinus of seventh sternite (fig. 64) less deep than in *pentacanthus*; the lobes, therefore, shorter and the upper one much broader and more obtuse. Apical margin of poststigmatal portion of eighth tergite incurved below upper angle.

Very rare, and not recorded from Scotland or Ireland. A few examples were taken at Lyndhurst, New Forest, from the bank vole (*Evtomys glareolus*), and a few at Abinger Common, near Dorking, from the same host, and from the mole (*Talpa europaea*).

30. RHADINOPSYLLA PENTACANTHUS *Roths.* (1897).

(Figs. 63, 65, 69).

Frons without tubercle. Five spines in genal comb, of which the upper one is much the shortest. Prothoracic comb of fourteen spines.

♂. Eighth sternite with a ventral horizontal row of (usually) five long bristles. Manubrium fairly broad from base to beyond middle, then strongly narrowed. Distance of base of finger from tip of manubrium $\frac{1}{8}$ longer than the finger. Ninth sternite with more than 50 small hairs and bristles. Apical edge of paramere serrate.

♀. Seventh sternite with a deep sinus (fig. 65). Apical margin of eighth tergite entire.

Fairly common in England and Scotland. Not recorded from Ireland. The chief host seems to be the weasel (*Mustela nivalis*); it also occurs on the long-tailed field mouse (*Apodemus sylvaticus*), on the mole (*Talpa europaea*), and some other small mammals.

II. SUBORDER: FRACTICIPITA.

The anterior portion of the head overlapping the posterior dorsally. All with genal and prothoracic combs, in the bat fleas (*Ischnopsyllus* and *Nycteridopsylla*) the former replaced by two flaps.

C. FAMILY: LEPTOPSYLLIDAE.

Abdomen without lateral combs, fifth tarsal segment with 4 lateral pairs of bristles, and a fifth pair ventrally in between the first pair.

X. GENUS: DORATOPSYLLA *Jord.* and *Roths.* (1912).

Similar to *Palaeopsylla* except the four-jointed labial palpi. Genal comb subventral, the upper spine slightly longer than the others (fig. 66).

One species, which is purely Palaearctic.

31. DORATOPSYLLA DASYCNEMUS *Roths.* (1897).

(Figs. 66, 67).

The four genal spines with obtuse apices. Entire outer surface of hindtibia hairy.

♂. Clasper divided into a very short obtuse upper process and a much longer, nearly square, lower one. The upper process bears three bristles, of which one is very stout. Finger slender, slightly curved at the base.

♀. Seventh sternite (fig. 67) divided by a central sinus into two more or less pointed lobes. Head of receptaculum seminis much longer than the tail and not sharply separated from it.

Common in England and Scotland. Unrecorded from Ireland. The host is the common shrew (*Sorex araneus*).

XI. GENUS: PALAEOPSYLLA *Wagr.* (1903).

Eye vestigial. Vertical genal comb of four spines of which second from above is long and pointed (fig. 73). Labial palpi five-jointed. Some of the abdominal segments with short apical spines. No spiniform bristles on inner side of hindcoxa.

Three species are known from Great Britain, a fourth, *similis* Dampf (1910), which is found on the Continent on the mole (*Talpa europaea*), may be expected to occur.

The species resemble one another very closely, but can easily be recognized by the differences in the modified abdominal segments.

32. PALAEOPSYLLA SORECIS *Dale* (1878).

(Figs. 73, 74, 75).

♂. Finger of the clasper inserted near the base of the manubrium, slightly curved, with the apex truncate and rotundate. Horizontal arm of ninth sternite with several long bristles at the apex, which is rounded (fig. 74).

♀. Seventh sternite divided by a central sinus into a broad upper lobe and a pointed and much more projecting lower lobe (fig. 75).

Common in England and Scotland. Unrecorded from Ireland. Occurs on the common shrew (*Sorex araneus*).

33. PALAEOPSYLLA KOHAUTI *Dampf* (1911).

(Figs. 76, 77).

♂. Finger of clasper long, almost straight, rounded at the apex, and inserted at a considerable distance from the manubrium. Horizontal arm of ninth sternite much broader than in the other species, truncate-rotundate, one of the apical bristles long, and several of the short ventral ones spiniform (fig. 76).

♀. Seventh sternite produced into a short irregular lobe in the centre, above and beneath which the sternite is sinuate (fig. 77).

A rare species in England and Scotland, not recorded from Ireland. It occurs on the mole (*Talpa europaea*). This insect has been found in England at Rufford, Notts, and at Abinger Common, near Dorking; also in Scotland at Cromarty, Ballindalloch, and in several places in Aberdeenshire.

34. PALAEOPSYLLA MINOR Dale (1878).

(Figs, 78, 79).

♂. Finger of clasper much shorter and more strongly curved than in *sorecis* and inserted at a great distance from the manubrium. Horizontal arm of ninth sternite with one long bristle at the obtuse apex and several thin and short ones, two of them placed at the ventral angle being spiniform (fig. 78).

♀. Seventh sternite divided by a narrow sinus into a rounded upper lobe and a very much broader lower one, the edge of the latter lobe being slightly incurved (fig. 79).

Very common in England and Scotland, on the mole (*Talpa europaea*). Not recorded from Ireland.

XII. GENUS: LEPTOPSYLLA Jord. and Roths. (1911).

Head strongly angulated, with two or more spine-like bristles near angle of the frons (figs. 80, 81). Eye vestigial. Genal comb of four or less spines. No lateral spines on the edges of the abdominal segments. Hindtibiae with a comb of numerous bristles of the same length along the posterior side.

A genus of the Palaearctic and Ethiopian regions.

35. LEPTOPSYLLA MUSCULI Dugès (1832).

(Fig. 80).

Four genal spines. Two of the frontal bristles spiniform.

♂. Finger of clasper more than twice as long as it is broad, almost of even width from base to apex, slightly and nearly evenly curved.

♀. Stylet less than three times as long as it is broad at the base. Common in the British Islands on the house mouse (*Mus musculus*).

36. LEPTOPSYLLA SPECTABILIS Roths. (1898).

(Fig. 81).

Two genal spines. Three of the frontal bristles spiniform.

♂. Finger of clasper half as long again as broad, very strongly and almost gradually widened from the base to the apex.

♀. Stylet four times as long as it is broad at the base.

A fairly common species in Scotland, rare in England, and unrecorded from Ireland, perhaps confined to the British Islands. Specimens have been taken from the bank vole (*Evotomys glareolus*), the stoat (*Mustela erminea*), and other hosts, at Cheddington, Bucks, and in several Scotch localities.

This species may be identical with *L. silvatica* Meinert (1896).

D. FAMILY: HYSTRICHOPSYLLIDAE.

Abdomen with lateral spines or combs. Fifth tarsal segment with five lateral pairs of bristles. Two receptacula seminis in the British species.

XIII. GENUS: TYPHLOCERAS *Wagn.* (1903).

Eye present. Genal comb subventral, consisting of four or five spines of nearly equal length, a fifth (small) spine at the eye. Labial palpi of five segments. Pronotum with two to three rows of bristles. Three antepygidial bristles on each side, in male central bristle much the longest, in female central and lower one nearly equal. Bristles at hindedge of tibiae not forming a comb.

A Palaearctic genus, containing two species, of which one occurs in our fauna.

37. TYPHLOCERAS POPPEI *Wagn.* (1903).

(Figs. 70, 71, 72).

Frons with four rows of bristles. Outer surface of hindtibia very hairy. Thoracical and abdominal tergites also very hairy.

♂. Clasper truncate, very hairy; finger narrow, almost straight, slightly longer than the clasper; ninth sternite with several strong spines at the apex (fig. 71).

♀. Seventh sternite irregularly sinuate (fig. 72).

A rare species in England and Scotland. Also found in Ireland. The usual host is the long-tailed field mouse (*Apodemus sylvaticus*); but it has been found on the house mouse (*Mus musculus*) in the Shetlands.

XIV. GENUS: HYSTRICHOPSYLLA *Taschenb.* (1880).

Eye vestigial. Genal comb of numerous spines. Labial palpi of five segments. Three abdominal combs. Four antepygial bristles on each side.

A genus of the northern temperate countries.

38. HYSTRICHOPSYLLA TALPAE *Curtis* (1826).

(Fig. 82).

A very large and hairy species.

The bristles on the dorsal side of the tibiae very strongly developed, these bristles forming a regular comb round the apical and dorsal margins of the foretibia. Tarsi very long and slender.

A fairly common species in England and Scotland, but unrecorded from Ireland.

Commonly found in the nests of the mole (*Talpa europaea*), and on the bank vole (*Evotomys glareolus*). It also occurs on shrews and other small mammals.

E. FAMILY: ISCHNOPSYLLIDAE.

Bat fleas:—Head without genal comb, but with two ventral flaps anteriorly on each side. Eye absent or vestigial. In the British species with five or more combs on the thorax and abdomen.

XV. GENUS: ISCHNOPSYLLUS *Westw.* (1840).

Maxillae broad at the apex, not pointed; at least six combs on the thorax and abdomen in the British species. Antepygial bristles present.

KEY TO THE SPECIES.

- | | |
|--|-------------------|
| 1. With eight combs | 2 |
| With six combs | <i>hexactenus</i> |
| 2. Males | 3 |
| Females | 6 |
| 3. Dorsal bristles of meso- and metanotum not prolonged..... | 4 |
| Dorsal bristles of meso- and metanotum prolonged, forming
a mane..... | 5 |

4. A large species, finger widest at apex (fig. 83).....*elongatus*
 A small species, finger almost crescent-shaped (fig. 89)...*simplex*
5. Manubrium very broad, finger broad at apex (fig. 85)...
intermedius
 Manubrium slender, finger with posterior and apical margins
 one continuous arc (fig. 87).....*octactenus*
6. Females. Seventh sternite with about 20 bristles (fig. 84)...
elongatus
 Seventh sternite with a single row of bristles (fig. 86) 7
7. Size large. Eighth tergite with two bristles below stigma.
 Bursa copulatrix little longer than broad
intermedius
 Size small. Eighth tergite with four bristles below stigma.
 Bursa copulatrix long, shaped like a sausage (fig. 88)...
simplex and *octactenus*

39. ISCHNOPSYLLUS ELONGATUS *Curtis* (1832).

(Figs. 83, 84).

The largest species with eight combs. Comb on first abdominal segment (third comb) as large as the one on the metanotum (second comb).

♂. Eighth sternite (fig. 83) proximally with two ventral bristles and distally with a ventral row of about eight, of which the second, third, and fourth are widened in the middle. At apex a very short bristle pointing downwards. Clasper with two very long bristles of equal length, the bristles being longer than the finger. Apical margin of finger incurved, both the anterior and posterior angles being pointed.

♀. Seventh sternite on each side with about 20 bristles (fig. 84). Stylet very slender, four times as long as it is broad at the base.

Apparently confined to the noctule bat (*Nyctalus noctula*). It is common in England, but unrecorded from Scotland and Ireland.

40. ISCHNOPSYLLUS INTERMEDIUS *Roths.* (1898).

(Figs. 85, 86).

Nearly as large as *elongatus*, with eight combs. Comb on first abdominal segment (third comb) not as large as the one on the metanotum (second comb).

♂. Meso- and metanotum with mane. Eighth sternite (fig. 85) with a ventral row of four or five short bristles before the centre, and another row beyond the centre, apex obtuse, without terminal bristle. The two long bristles of clasper much shorter than in *elongatus*, the upper bristle shorter than the lower one. Apical margin of finger slightly convex, the posterior angle rounded.

♀. Seventh sternite (fig. 86) with a single row of ten or less bristles on each side. Stylet less than three times as long as it is broad at the base.

A rare species, probably confined to the serotine bat (*Eptesicus serotinus*). Only recorded from England, not from Scotland or Ireland.

41. ISCHNOPSYLLUS OCTACTENUS Kolen. (1856).

(Fig. 87).

A small species, with eight combs. Combs on first abdominal segment (third comb) much smaller than the one on the metanotum.

♂. Meso- and metanotum with a mane of bristles. Eighth sternite without apical hook (fig. 87); some of the bristles placed near the apex broadened. Finger much narrower and more regularly half-moon-shaped than in *simplex*. The long bristles of clasper not appreciably different in length and thickness.

♀. Seventh sternite with a single row of less than ten bristles on each side. Stylet nearly three times as long as it is broad at the base.

A common species, recorded from England, Scotland, and Ireland. The usual host is the pipistrelle (*Pipistrellus pipistrellus*), but it also occurs on the whiskered bat (*Myotis mystacinus*), Daubenton's bat (*Myotis daubentoni*), and the hairy-armed bat (*Nyctalus leisleri*).

42. ISCHNOPSYLLUS SIMPLEX Roths. (1906).

(Figs. 88, 89).

The smallest species, very pale, closely resembling *octactenus*. With eight combs.

♂ Without mane. Eighth sternite (fig. 89) broader at apex than in *octactenus*, from about centre to near apex with a row of slender bristles; then follow two broadened ventral bristles, and above these a curved

row of lateral ones, of which the last, which is placed at the apical margin, is also broad, apex with small pointed hook. Upper bristle of clasper slightly longer and proximally thicker than lower one. Posterior margin of finger very strongly convex beyond the centre, where the finger is broadest. Finger much wider than in *octactenus*.

♀. No differences from ♀ *octactenus* have as yet been discovered, except the slightly but distinctly smaller size of *simplex*.

A rare species, unrecorded from Scotland and Ireland. Has been found in several localities in England and Wales, always on Natterer's bat (*Myotis nattereri*), apparently its only host.

43. ISCHNOPSYLLUS HEXACTENUS Kolen. (1856).

(Fig. 90).

With six combs.

♂. Apical area of mesonotum reduced, the dorsal bristles of the sub-apical row long. Eight sternite short and curved, with a number of long and slender bristles. Both bristles of the clasper stout, and about as long as the finger (fig. 90). The latter shaped like a sock, with the toes pointing distad, the bristle placed at the distal angle being stronger and longer than the other bristles of the finger.

♀. Seventh sternite with about five bristles on each side, besides one or two small hairs. Stylet 3 times as long as it is broad.

A common species in England and Ireland, but not recorded from Scotland. The chief host is the long-eared bat (*Plecotus auritus*), but specimens have been found on other species of bats.

Ischnopsyllus unipectinata Taschenb. (1880) occurs commonly on the Continent on the horse-shoe bats (*Rhinolophus ferrum-equinum* and *R. hipposideros*), but has, so far, not been found in the British Islands. The rarer species of bats in Great Britain, such as the hairy-armed bat (*Nyctalus leisleri*), Daubenton's bat (*Myotis daubentoni*), and the whiskered bat (*Myotis mystacinus*), as well as the barbastelle (*Barbastella barbastellus*) would probably yield species of fleas new to Britain, if a larger number of specimens were carefully examined.

The larvae of bat fleas live in the dung of the bats, and if the same is placed in a suitable receptacle, such as a wooden box with a glass lid, the fleas can be easily brought to maturity.

XVI. GENUS: NYCTERIDOPSYLLA *Oudem.* (1906).

Maxillae triangular, pointed. Five combs on the thorax and abdomen. No antepygidial bristles.

44. NYCTERIDOPSYLLA EUSARCA MAJOR *Roths.* (1908).

(Figs. 91, 93, 95).

Head shorter than in *longiceps*, frons more rounded (fig. 93).

♂. Dorsal bristles on metanotum and first and second abdominal segments prolonged. Finger of clasper (fig. 91) three times as long as it is broad, its anterior edge being angulate at four-fifths from the base. Apex of ninth sternite pointed.

♀. Seventh sternite bisinuate, the lobe between the two sinuses triangular or rounded, and more strongly chitinised than the rest of the segment (fig. 95).

A rare species, not recorded from Scotland or Ireland. Has been found at Cambridge and at Yalding in Kent on the noctule (*Nyctalus noctula*).

N. pentactenus Kolen. (1856), has, so far, not been found in the British Islands.

45. NYCTERIDOPSYLLA LONGICEPS *Roths.* (1908).

(Figs. 92, 94, 96).

Frons of head with two long bristles, head very long (fig. 94).

♂. Finger of clasper very broad (fig. 92). Apex of ninth sternite very obtuse.

♀. Seventh sternite with a rounded sinus above the middle, the lobe below the sinus projecting more than the one above it (fig. 96).

An uncommon species, unrecorded from Scotland or Ireland. Specimens have been taken from the pipistrelle (*Pipistrellus pipistrellus*), and the long-eared bat (*Plecotus auritus*), in several localities in England.

CATALOGUE OF BRITISH SIPHONAPTERA.

I. SUBORDER: *INTEGRICIPITA*.A. FAMILY: *Pulicidae*.A¹. SUBFAMILY: *Pulicinae*.I. GENUS: *XENOPSYLLA* GLINK. (1907).Type: *cheopis*.*Pulex* Taschenberg (nec L., 1758), Flöhe, p. 64 (1880) (partim).*Xenopsylla* Glinkiewicz, Sitzber. Ak. Wiss. Wien., Math. Nat. Cl., CXVI, p. 385 (1907) (type: *pachyuromyidis* = *cheopis*).*Loemopsylla* Jordan and Rothschild, Parasitology, I, p. 15 (1908) (type: *cheopis*).*Xenopsylla* Rothschild, Nov. Zool., XVI, p. 132 (1909) (= *Loemopsylla*); Patton and Cragg, Textb. Med. Entom., p. 453 (1913).1. *XENOPSYLLA CHEOPIS* Roths. (1903).*Pulex cheopis* Rothschild, Ent. Mo. Mag. (2), XIV, p. 85, no. 4, pl. 1, figs. 3, 9, and pl. 2, figs. 12, 19 (1903) (Shendi, Sudan).*Pulex murinus* Tiraboschi, Arch. Parasit., VIII, p. 251, fig. 15, ♂ (1904) (Italy).*Pulex philippinensis* Herzog, Bull. Bur. Govmt. Labor. Manila, XXIII, p. 77, figs. 26, 27 (1904) (Manila).*Pulex cheopis* Rothschild, l.c. (2), XVI, p. 139 (1905) (Plymouth).*Xenopsylla pachyuromyidis* Glinkiewicz, l.c. (1907); Roths., Nov. Zool., XVI, p. 132 (1909) (= *cheopis*).*Loemopsylla cheopis* Jordan and Rothschild, Parasitology, I, p. 42, no. 6, pl. 1; pl. 2, fig. 8; pl. 4, fig. 8; pl. 6, fig. 1 (1908) (monograph); Shipley, Journ. Econ. Biol., III, p. 69 (1908).*Pulex tripolitanus* Fulmek, Zool. Jahrb., Syst. XXVIII, p. 289 (1909) (Tripoli); Roths., Ent. Mo. Mag. (2), XXI, p. 30 (1910) (= *cheopis*).*Xenopsylla cheopis* Rothschild, l.c. (2), XXII, p. 68 (1911) (London); id., l.c., p. 113 (1911) (London); Bacot, Journ. Hygiene, Plague Suppl., III, p. 449, pl. 28, figs. 3, 4 (1914) (bionomics).*Hab.*: Africa, Asia, now in nearly all warm countries. Hosts: rats.II. GENUS: *PULEX* L. (1758).Type: *irritans*.*Pulex* Linnaeus, Syst. Nat., ed. X, p. 614 (1758) (partim); Taschenb., Flöhe, p. 64 (1880) (partim); Jord. and Roths., Parasitology, I, p. 5 (1908).2. *PULEX IRRITANS* L. (1758).*Flea*, *Pulex* Hooke, Microgr., p. 61, pl. 32, ♀ (1665); Charlet., Exercit., p. 53 (1677); Leeuwenh., Arc. Nat., I, p. 20 (1695); Raius, Hist. Ins., p. 7 (1710) (*Pulex vulgaris*); Albin, Nat. Hist. Spid. and Ins., p. 69, pl. 41, ♀ (1736);

Adams, Microgr., pl. 47 (1743-46); Linn., Syst. Nat., p. 342, no. 1174 (1746) (*Pulex ater*, partim); Baker, Empl. Microsc., pl. 13, fig. 6 (1753); Yeats, Instit. Entom., p. 243 (1773); Martynn, "Flea" in New Diet. N. H. (1785); Fitzger., Surv. Nature, II, p. 268, fig. (1787).

Pulex irritans Linnaeus, Syst. Nat., ed. X, p. 614, no. 1 (1758) (partim); Barbut, Gen. Ins. Linn., p. 330, pl. 15 (1781); Shaw and Nodder, Natur. Miscell., V, text to pl. 178, nec figs. (1794); Sibly, Syst. Nat. Hist., XIII, p. 431 (1802) (partim, account of structure and habits); Stevenson, Elem. Nat. Hist., II, p. 232, (1802) (partim); Shaw, Gen. Zool., VI, p. 456, pl. 122, ♂, nec ♀ (1806); Stewart, Mem. Werner. Nat. Hist. Soc., I, p. 577 (1811) (Edinburgh); Leach, in Brewst., Edinb. Encycl., IX, p. 126 (1815); Samouelle, Entom. Useful Comp., p. 234 (1819); Kirby and Spence, Intr. Entom., I, p. 105; III, p. 471, pl. 5, fig. 2; pl. 7, fig. 8 (1826); Steph., Brit. Ins., p. 328 (1829); Wilson, Treatise Ins. (ex Enc. Brit.), p. 294 (1835); Westw., Introd. Classific. Ins., II, p. 489, fig. 123, and App., p. 124 (1840); id., in Gardener's Chronicle, p. 156, text-figs. (1848) (life-hist.) (repr. in Ann. Mag. N. H., I, p. 316, text-figs. (1848)); Walker, Dipt. Brit., III, p. 2, no. 1 (1856); Dallas, Elem. Entom., p. 381, fig. (1857); Barton, Entom., III, p. 316 (1866) (Ventnor); Cooke, Science Gossip, VII, p. 98 (1871); Dunc., in Figuiet, Ins. World, p. 27, fig. 17 (1872); Wood, Ins. at Home, p. 592, wood-cut 69, fig. 2, c.f. (1876); Dale, Hist. Glanvilles Woot., p. 290, no. 1 (1878); Taschenb., l.c., p. 64 (1880); Scott, Science Gossip, XVIII, p. 9 (1882); Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 29 (1892); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Mearns, Ann. Scot. Nat. Hist. Soc., p. 92 (1901) (Aberdeen); Evans, *ibid.*, p. 193 (1904) (Edinburgh); id., l.c., p. 88 (1906) (St. Kilda); Waterst., *ibid.*, p. 211 (1906) (Scottish records); Jord. and Roths., Parasitology, I, p. 7 (1908) (literat., etc.); Shipley, Journ. Econ. Biol., III, p. 70 (1908); Gibbs and Barraud, Trans. Herts. N. H. Soc., XIII, p. 250 (1908); Waterst., Ann. Scot. N. H. Soc., p. 227 (1909) (Glasgow); Roths., Bull. Entom. Research, I, p. 92, text-fig. 6 (1910); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 86 (1910) (Scottish records); Bacot, Proc. Ent. Soc. Lond. p. 6 (1911) (egg); Strickl. and Merrim., Parasit., VI, p. 13 (1913) (Suffolk and Essex); Russell, The Flea, pp. 62 and 110 (1913); Patton and Cragg, Textb. Med. Ent., p. 452, pl. 55, fig. 1 (1913); Waterst., Ent. Mo. Mag. (2), XXV, pp. 88, 90 and 162 (1914) (Scotland); Bacot, Journ. Hygiene, Plague Suppl., III, p. 449, pl. 28, figs. 1, 2 (1914) (bionomics).

Hab.: Cosmopolitan. Host: man; rarely on wild mammals.

III. GENUS: *ARCHAEOPSYLLA* DAMPF (1908).

Type: *erinacei*.

Ceratophyllus Curtis, Brit. Ent., IX, no. 417 (1832) (partim).

Pulex Bouché (nec L., 1758), Nova Acta Ae. Leop. Carol., XVII, 1, p. 507 (1835); Taschenb., Flöhe, p. 64 (1880).

Trichopsylla Kolenati, Hor. Soc. Ent. Ross., II, p. 32 (1863) (partim?).

Spilopsyllus Baker, Proc. U. S. Nation. Mus., XXIX, p. 129 (1905) (partim).

Archaeopsylla Dampf, Schrift. Phys.-ök. Ges. Königsb., XIV, p. 18 (1908) (type: *erinacei*).

3. *ARCHAEOPSYLLA ERINACEI ERINACEI* Bouché (1835).

Ceratophyllus erinacei Curtis, l.c. (1832) (nom. nud.).

Pulex erinacei Bouché, l.c. (1835); Walk., Dipt. Brit., III, p. 3, no. 7 (1856).

Trichopsylla cuspidata Kolenati, Hor. Soc. Ent. Ross., II, p. 33, no. 6, pl. 1, fig. 7 (1863).

Pulex erinacei Dale, Hist. Glanvilles Woot., p. 290, no. 3 (1878); Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, I, pp. 32 and 37 (1892); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Evans, Ann. Scot. N. H. Soc., p. 193 (1904) (Edinburgh).

Spilopsyllus erinacei Baker, l.c., p. 145 (1905).

Ctenocephalus erinacei Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Pulex erinacei Evans, Ann. Scot. N. H. Soc., p. 185 (1910) (Mortonhall, in moss).

Ctenocephalus erinacei Waterston, Proc. Roy. Phys. Soc. Edinb., XVIII, p. 86 (1910) (Scottish records).

Archaeopsylla erinacei Strickland and Merrim., Parasit., VI, p. 13 (1913) (Martlesham, Ipswich).

Ctenocephalus erinacei Waterston, Ent. Mo. Mag. (2), XXV, p. 88 (1914) (Scotland).

Hab.: Central and Northern Europe, Asia Minor. *Host*: *Erinaceus europaeus*.

IV. GENUS: *CTENOCEPHALUS* KOLEN. (1859).

Type: *canis*.

Pulex Linnaeus, Syst. Nat., ed. X, p. 64 (1758) (partim).

Ctenocephalus Kolenati, Jahresh. nat. Sect. mähr. schles. Ges. (1858), p. 65 (1859) (type: *novementatus* = *canis*).

Pulex Taschenberg, Flöhe, p. 64 (1880) (partim).

Ctenocephalus Baker, Proc. U.S. Nation. Mus., XXVII, p. 377 (1904).

4. *CTENOCEPHALUS CANIS* CURTIS (1826).

Pulex irritans Linnaeus, l.c. (1758) (partim).

Pulex canis Curtis, Brit. Ent., III, no. 114, figs. A-E, 8 (1826); id., l.c., IX, no. 417, fig. 1 d (1832); Walk., Dipt. Brit., III, p. 2, no. 2 (1856) (haec spec?).

(?) *Pulex martis* Walker, l.c., III, p. 3, no. 5 (1856).

Ctenocephalus novementatus Kolenati, Jahresh. nat. Sect. mähr. schles. Ges. (1858), p. 66 (1859); id., Hor. Soc. Ent. Ross., II, p. 45, pl. 4, fig. 14 (1863).

Ctenocephalus enneolus Kolenati, Jahresh. nat. Sect. mähr. schles. Ges. (1858), p. 66 (1859); id., Hor. Soc. Ent. Ross., II, p. 45, pl. 4, fig. 15 (1863).

Pulex serraticeps Gervais, Hist. Nat. Ins., Apt., III, p. 371, pl. 48, fig. 8 (1841); Taschenb., Flöhe, p. 77 (1880) (partim).

Pulex canis Dale, Hist. Glanvilles Woot., p. 290 no. 2 (1898); Verrall, List

Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 30 (1892) (partim); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Roths., Ent. Record, XIII, p. 126 pl. 3 (1901) (distinct from *felis*); Mearns, Ann. Scot. N. H. Soc., p. 92 (1901) (Aberdeen, dog and fox); Roths., Nov. Zool., XII, p. 192, text-fig. A (1905) (distinct from *felis*); Evans, Ann. Scot. N. H. Soc., p. 162 (1906) (Edinburgh distr.); Waterst., *ibid.*, p. 211 (1906) (Scottish records).

Ctenocephalus canis Shipley, Journ. Econ. Biol., III, p. 63 (1908); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Roths., Bull. Ent. Research, I, p. 93, fig. 12 (1910); Bacot, Proc. Ent. Soc. Lond. p. 6 (1911) (egg); Shipley, Journ. Econ. Biol., VI, p. 19 (1911); Strickl. and Merrim., Parasit., VI, p. 14 (1913) (Kesgrave, Tuddenham); Russell, The Flea, p. 70 text-fig. 7 (1913); Patton and Cragg, Textb. Med. Entom., p. 456, pl. 54, figs. 3, 13 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 88 (1914) (Scotland); Bacot, Journ. Hygiene, Plague Suppl., III, p. 449, pl. 29, figs. 1, 2 (1914) (bionomics).

Hab.: Europe, Africa, Asia. Hosts: Dog, cat, and occasionally other animals, as well as man.

5. *CTENOCEPHALUS FELIS* BOUCHÉ (1835).

Pulex irritans Linnaeus, Syst. Nat., ed. X, p. 641, no. 1 (1758) (partim).

Pulex felis Bouché, Nova Acta Acad. Leop. Carol., XVII, 1, p. 505 (1835).

(?) *Pulex irritans* Westwood, Entom. Text Book, p. 421, text-fig. (1838) (haec spec. vel *canis*?).

Pulex serraticeps Gervais, Hist. Nat. Ins., Apt., III, p. 372 (1844) (partim).

Pulex felis Walker, Dipt. Brit., III, p. 3, no. 4 (1856).

Pulex felis *ivale*, Hist. Glanvilles Woot., p. 290, no. 4 (1878).

Pulex parviceps Weyenbergh, Bol. Ac. Nac. Sci. Argent., III, p. 202 (1879) (*nom. nud.*).

Pulex serraticeps Taschenberg, Flöhe, p. 77, pl. 3, fig. 18 (1880) (partim).

Ceratopsyllus rufulus Weyenbergh, Period. Zool., III, p. 265 (1881) (= *parviceps*); Roths., Nov. Zool., XIII, p. 175 (1906) (= *felis*).

Pulex nasuae Weyenbergh, l.c., p. 272 (1881); Roths., l.c. (1906) (= *felis*).

Pulex obscurus Weyenbergh, l.c., p. 273 (1881); Roths., l.c. (1906) (= *felis*).

Pulex concoloris Weyenbergh, l.c., p. 274 (1881); Roths., l.c. (1906) (= *felis*).

Pulex felis Verrall, List Brit. Dipt., ed. 2, p. 7 (1901); Roths., Ent. Record, XIII, p. 126, pl. 3 (1901) (distinct from *canis*).

Ctenocephalus canis Baker, Proc. U. S. Nat. Mus., XXVII, p. 438 (1904) (partim); *id.*, l.c., XXIX, p. 131 (1905) (*canis* not distinct from *felis*).

Ctenocephalus serraticeps var. *murina* Tiraboschi, Arch. Parasit., VIII, p. 259, text-fig. p. 260 (1904).

Pulex felis Rothschild, Nov. Zool., XII, p. 192, text-fig. b (1905) (distinct from *canis*); Evans, Ann. Scot. N. H. Soc., p. 162 (1906) (Edinburgh district).

Ctenocephalus felis Rothschild, Nov. Zool., XIII, p. 175 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, 4, p. 250 (1908) (Tring); Shipley,

Journ. Econ. Biol., III, p. 68 (1908); Roths., Bull. Ent. Research, I, p. 93, text-fig. 13 (1910); Bacot, Proc. Ent. Soc. Lond., p. 6 (1911) (egg); Shipley, Journ. Econ. Biol., VI, p. 19 (1911); Russell, The Flea, pp. 66 and 71, text-fig. 7 (1913); Patton and Cragg, Textb. Med. Entom., p. 456, pl. 53, figs. 1-6; pl. 54, figs. 4, 9 11 (1913); Bacot, Journ. Hygiene, Plague Suppl. III, p. 449, pl. 29, figs. 3, 4 (1914) (bionomics).

Hab.: Cosmopolitan. Hosts: Cat and many other carnivora, occasionally on man and rodents.

B¹. SUBFAMILY: *Spilopsyllinae*.

V. GENUS: *SPILOPSYLLUS* BAKER (1905).

Type: *cuniculi*.

Pulex Linnaeus, l.c. (1758) (partim), Taschenb., Flöhe, p. 64 (1880) (partim).

Ctenocephalus Baker (nec Kolen., 1859), Proc. U. S. Nation. Mus., XXVII, p. 439 (1904).

Spilopsyllus Baker, l.c., XXIX, p. 129 (1905) (type: *leporis* = *cuniculi*).

6. *SPILOPSYLLUS CUNICULI* DALE (1878).

Pulex irritans Linnaeus, l.c. (1758) (partim).

Ceratophyllus leporis Curtis, Brit. Ent., IX, no. 417 (1832) (nom. nud.!).

Pulex cuniculi Dale, Hist. Glanvilles Woot., p. 291 (1878); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *goniocephalus*).

Pulex goniocephalus Taschenberg, Flöhe, p. 82, pl. 3, fig. 20 (1880); Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 32 (1892); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Evans, Ann. Scot. N. H. Soc., p. 193 (1904) (Edinburgh).

Ctenocephalus leporis Baker, Proc. U. S. Nation. Mus., XXVII, p. 439 (1904).

Spilopsyllus leporis Baker, l.c. XXIX, p. 145 (1905).

Pulex cuniculi Waterston, Ann. Scot. N. H. Soc., p. 212 (1906) (Scottish localities).

Pulex goniocephalus Malloch, Ent. Mo. Mag. (2), XVIII, p. 86 (1907) (Dumbartonshire).

Spilopsyllus cuniculi Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 86 (1910) (Scottish records).

Pulex cuniculi Evans, l.c., p. 184 (1910) (Argyllshire, ear of cat).

Spilopsyllus cuniculi Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 88 (1914) (Scotland).

Hab.: Europe. Host: Rabbit (rarely hare), accidentally on fox, cat, etc.

VI. GENUS: *ORNITHOPSYLLA* ROTHS. (1908).

Type: *laetitiae*.

Ornithopsylla Rothschild, Ent. Mo. Mag. (2), XIX, p. 231 (1908).

7. *ORNITHOPSYLLA LAETITIAE* ROTHS. (1908).

Ornithopsylla laetitiae Rothschild, l.c., pl. 2, figs. 1, 2 (1908) (Scilly Is.).

Hab.: Scilly Islands. *Host*: *Puffinus anglorum*.

B. FAMILY: *Ceratophyllidae*.C¹. SUBFAMILY: *Ceratophyllinae*.VII. GENUS: *CERATOPHYLLUS* CURTIS (1832).

Type: *hirundinis*.

Pulex Linnaeus, l.c. (partim).

Ceratophyllus Curtis, Brit. Ent., IX, no. 417 (1832) (type: *hirundinis*).

Ceratopsyllus Curtis, l.c., XV, Errata (1838) (emend. *Ceratophylli*).

(?) *Trichopsylla* Kolenati, Hor. Soc. Ent. Ross., II, p. 32 (1863).

Ctenonotus Kolenati, l.c., p. 34 (1863) (type: *octodecimdentatus* = *fasciatus*).

Pulex Taschenberg, Flöhe, p. 64 (1880) (partim).

Ceratophyllus Wagner, Hor. Soc. Ent. Ross., XXXI, p. 557 (1898).

Trichopsylla Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901)

8. *CERATOPHYLLUS GALLINULAE* DALE (1878).

Ceratopsyllus gallinulae Dale, Hist. Glanvilles Woot., p. 291, no. 1 (1878).

Ceratopsyllus turdi id., l.c., p. 291, no. 3 (1878) (partim).

Ceratopsyllus merulae pt., *garruli*, *pyrrhulae*, *citrinellae*, *pratensis*, *atricapillae*, *cinereae* pt., *caudati* Dale, l.c., p. 292 (1878), Roths., Ent. Mo. Mag. (2), XIV, pp. 145 and 146 (1903) (*gallinulae* = *newsteadi*).

Ceratophyllus newsteadi Rothschild, Ent. Rec., XIII, p. 284, pl. 7, fig. 1, ♂, 2, ♀ (1901) (Cheshire, Flintshire).

Trichopsylla newsteadi Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus newsteadi Evans, Ann. Scot. N. H. Soc., p. 162 (1906) (Edinburgh).

Ceratophyllus gallinulae Waterston, *ibid.*, p. 213 (1906).

Ceratophyllus newsteadi Evans, l.c., p. 241 (1906) (Forth district).

Trichopsylla newsteadi Malloch, Ent. Mo. Mag. (2), XVIII, p. 86 (1907) (Dumbartonshire, nests of grey wagtail).

Ceratophyllus gallinulae Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Shipley, Proc. Zool. Soc. Lond., p. 325, pl. 47, figs. 33, ♀, 34, ♂ (1909) (on grouse).

Ceratophyllus newsteadi Waterston, Ann. Scot. N. H. Soc., p. 228 (1909) (Scottish records).

Ceratophyllus gallinulae id., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 88 and 89 (1910) (Scotland); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 151 (1914) (Scottish records; Shetlands).

Hab.: Europe. *Hosts*: Passerine birds, also *Lagopus*, *Gallinula*, &c.

9. *CERATOPHYLLUS STYX* ROTHs. (1900).

(?) *Ceratophyllus bifasciatus* Curtis, Brit. Ent., IX, no. 417 (1832) (indescr.).

Pulex avium Taschenberg, Flöhe, p. 70 (1880) (partim).

Ceratophyllus styx Rothschild, Nov. Zool., VII, p. 543, no. 4, pl. 9, figs. 5, 7, 8, 16 (1900) (on sand martin).

Trichopsylla styx Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus styx Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh district); id., l.c., p. 163 (1906) (Edinburgh district); Waterst., ibid., p. 213 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 88 (1910) (Scottish records); id., Trans. Perth. Soc. N. Sci., V, 2, p. 48 (1910) (Perthshire); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 88 (1914) (Scotland).

Hab.: Europe. Host: *Cotile riparia*, rarely in other birds' nests.

10. *CERATOPHYLLUS ROTHSCILDI* WATERST. (1910).

Ceratophyllus rothschildi Waterston, Proc. Roy. Phys. Soc. Edinb., XVIII, 2, p. 80, text-figs. 1—6 (1910) (Kincardineshire, in nests of *C. urbica*); Russell, The Flea, p. 111 (1913).

Hab.: Scotland. Host: *Chelidon urbica*.

11. *CERATOPHYLLUS HIRUNDINIS* CURTIS (1826).

Pulex hirundinis Curtis, Brit. Ent., III, addenda (1826).

Ceratophyllus hirundinis Curtis, l.c., IX, no. 417, figs. A, D, E, 8 (1832).

Pulex hirundinis Walker, Dipt. Brit., III, p. 5, no. 12 (1856).

Pulex avium Taschenberg, Flöhe, p. 70 (1880) (partim).

Pulex hirundinis Theobald, Ace. Brit. Flies, I, p. 31 (1892) (partim).

Ceratophyllus hirundinis Rothschild, Nov. Zool., VII, p. 542, no. 3, pl. 9, figs. 4, 12, 15, 20 (1900).

Trichopsylla hirundinis Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus hirundinis Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh district); Waterst., ibid., p. 213 (1905); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, 4, p. 250 (1908) (Tring); Waterst., l.c., p. 228 (1909) (Scotland); id., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 88 and 89 (1910) (Scottish records); Strickl. and Merrim., Parasit., VI, p. 15 (1913); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 161 (1914) (Rannoch; Ayrshire).

Hab.: Europe. Host: *Chelidon urbica*.

12. *CERATOPHYLLUS RUSTICUS* WAGN. (1903).

Ceratopsyllus palumbi Dale, Hist. Glanvilles Woot., p. 293 (1878) (partim); Roths., Ent. Mo. Mag. (2), XIV, p. 146 (1903) (*palumbi* = *sciurorum* + *nov. spec.*).

Ceratophyllus rusticus Wagner, Hor. Soc. Ent. Ross., XXXVII, p. 288, pl. 3, fig. 6a, 6b, pl. 4, figs. 14a, 14b (1903).

Ceratophyllus dalei Rothschild, Entom., XXXVI, p. 297, pl. 5, figs. 1, 2, 3

(1903) (Dorsetshire); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, pp. 88 and 89 (1910) (Scottish records, nest of *C. urbica*).

Ceratophyllus rusticus Rothschild, Nov. Zool. XVIII, p. 73 (1911) (= *dalei*); Russell, The Flea, p. 111 (1913).

Hab.: Europe. *Host*: *Chelidon urbica*.

13. *CERATOPHYLLUS FARRENI FARRENI* ROTHS. (1905).

Ceratophyllus farreni Rothschild, Ent. Mo. Mag. (2), XVI, p. 255, pl. 8, ♂, ♀, (1905) (Suffolk; Berwickshire); Waterst., Ann. Scot. N. H. Soc., p. 213 (1906); Evans, *ibid.*, p. 241 (1905) (Forth); Waterst., *l.c.* p. 227 (1906) (Scottish records); *id.*, Proc. Roy. Phys. Soc. Edinb., XVIII, pp. 88 and 89 (1910) (Scottish records); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 161 (1914) (Rannoch; Ayrshire).

Hab.: Europe (alia subsp. in Algeria). *Host*: *Chelidon urbica*.

14. *CERATOPHYLLUS GAREI* ROTHS. (1902).

Ceratophyllus gallinae Rothschild (nec Schrank, 1804), Nov. Zool., VII, p. 540, no. 1, pl. 9, fig. 19 (1900) (partim).

Ceratophyllus garei *id.*, Ent. Mo. Mag. (2), XIII, p. 225, pl. 4 (1902) (Tring, nest of waterhen); Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh district); *id.*, *l.c.*, p. 163 (1906) (Edinburgh district, nests of watervole, lapwing, etc.); Waterst., *ibid.*, p. 213 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Shipley, Proc. Zool. Soc. Lond., p. 325 (1909) (on grouse); Waterst., Ann. Scot. N. H. Soc., p. 227 (1909) (on the Eye); *id.*, Proc. Roy. Phys. Soc. Edinb., XVIII, p. 87 and 89 (1910) (Scottish records); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 161 (1914) (Scottish records).

Hab.: Great Britain. *Hosts*: Birds (especially in nests in marshy places).

15. *CERATOPHYLLUS COLUMBAE* WALCK. and GERV. (1844).

Ceratophyllus columbae Curtis, Brit. Ent., IX, no. 417 (1832) (nom. nud.!).

Pulex columbae Walckenaer and Gervais, Hist. Nat. Ins. Apt., III, p. 375, pl. 48, fig. 7 (1844); Walk., Dipt. Brit., III, p. 5, no. 13 (1856).

Pulex avium Taschenberg, Flöhe, p. 70 (1880) (partim).

Pulex columbae Theobald, Acc. Brit. Flies, I, p. 31 (1892).

Trichopsylla columbae Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus columbae Rothschild, Nov. Zool., VII, p. 542, no. 2, pl. 9, figs. 3, 9, 11, 14, 18 (1900) (stacks of Cromarty); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 88 (1910) (Scottish records); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 161 (1914) (Scottish records).

Hab.: Europe. *Hosts*: Pigeons.

16. *CERATOPHYLLUS VAGABUNDA* BOHEM. (1866).

Pulex vagabunda Boheman, Öfv. Vet. Ak. Förh., XXII (1865), p. 576, pl. 35, figs. 1, 1a (1866) (Cape Thordson, Spitzbergen); Wahlgr., Ent. Tidskr., XXIV, p. 219 (1903) (= *digitalis*).

Pulex fasciatus Taschenberg (nec Bosc, 1800), Flöhe, p. 69 (1880).

Ceratophyllus digitalis Wahlgren, Arkiv Zool., I, p. 184, pl. 7, fig. 3 (1903).

Ceratophyllus insularis Rothschild, Ent. Mo. Mag. (2), XVII, p. 59, pl. 2. ♂ (1906) (Reading); Waterst., Ann. Scot. N. H. Soc., p. 212 (1906); id., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 89 (1910) (Kinneff, nest of *Larus argentatus*).

Ceratophyllus vagabundus Rothschild, Ent. Mo. Mag. (2), XXIII, p. 67 (1912); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 162 (1914) (Midlothian).

Hab.: Northern Europe. *Host*: Various birds, particularly sea-birds.

17. *CERATOPHYLLUS BOREALIS* ROTHS. (1907).

Ceratophyllus borealis Rothschild, Ent. Mo. Mag. (2), XVIII, p. 11, text-fig., ♀ (1907) (St. Kilda); Waterst., Ann. Scot. N. H. Soc., p. 256 (1908) (Berwickshire, nest of *Cinclus*); id., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 89 (1910) (Todhead, nest of *Larus argentatus*); Roths., Ent. Mo. Mag. (2), XXIV, p. 182, pl. 4, ♂ (1913); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 162 (1914) (Scottish records).

Hab.: Northern Europe. *Hosts*: Birds' nests in marshy places and at the coast, particularly of sea-birds.

18. *CERATOPHYLLUS GALLINAE* SCHRANK (1803).

Pulex irritans Linnaeus, Syst. Nat., ed. X, p. 614, no. 1 (1758) (partim).

Pulex gallinae Schrank, Fauna Boica, III, p. 195 (1803).

Pulex rufus Gravenhorst, Uebers. Arb. Veränd. Schles. Ges. vaterl. Kultur, p. 67 (1827).

Pulex gallinae Walker, Dipt. Brit., III, p. 2, no. 3 (1856).

Ceratopsyllus monedulae Dale, Hist. Glanvilles Woot., p. 291, no. 2 (1878) (jackdaw); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *gallinae*).

Ceratopsyllus turdi Dale, l.c., no. 3 (1878) (song-thrush); Roths., l.c. (1903) (= *gallinae*).

(?) *Ceratopsyllus visivora* Dale, l.c., p. 292, no. 4 (1878) (stone-thrush); Roths., l.c. (1903) (type lost).

Ceratopsyllus merulae Dale, l.c., no. 5 (1878) (blackbird); Roths., l.c. (1903) (= *gallinulae* and *gallinae*).

Ceratopsyllus cinereae Dale, l.c., no. 12 (1878) (white-throat); Roths., l.c., p. 146 (1903) (= *gallinulae* and *gallinae*).

(?) *Ceratopsyllus arvensis* Dale l.c., no. 13 (1878) (skylark); Roths., l.c. (1903) (type lost).

(?) *Ceratopsyllus trochili* Dale, l.c., no. 14 (1878) (willow-wren); Roths. l.c. (1903) (type lost).

Ceratopsyllus spini Dale, l.c., no. 16 (1878) (siskin); Roths., l.c. (1903) (= *gallinae*).

Ceratopsyllus aenas Dale, l.c., no. 17 (1878) (stock-dove); Roths., l.c. (1903) (= *gallinae*).

Pulex avium Taschenberg, Flöhe, p. 70 (1880) (partim).

Pulex gallinae Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 31 (1892) (partim).

Ceratophyllus gallinae Rothschild, Nov. Zool. VII, p. 540, no. 1, pl. 9, figs. 1, 2, 5, 10, 13, 17 (1900) (fig. 19 = *gareii*).

Trichopsylla gallinae Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus gallinae Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh); id., l.c., p. 163, note (1906) (Edinburgh distr., nest of stock-dove); Waterst., *ibid.*, p. 212 (1906).

Ceratophyllus fringillae Waterston, l.c., p. 213 (1906); id., l.c., p. 227 (1909) (correction of previous).

Ceratophyllus gallinae, Evans, *ibid.*, p. 241 (1906) (Forth, common).

Trichopsylla gallinae Malloch, Ent. Mo. Mag. (2), XVIII, p. 86 (1907) (Dumbartonshire).

Ceratophyllus gallinae Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Waterst., l.c., p. 227 (1909) (Scottish records, nests of birds); id., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 87 and 89 (1910) (Scottish records); Russell, The Flea, p. 111 (1913); Strickl. and Merrim., Parasit., VI, p. 14 (1913) (hosts); Waterst., Ent. Mo. Mag. (2), XXV, p. 160 (1914) (Scottish records).

Hab.: Europe. Hosts: Fowl and many birds.

19. *CERATOPHYLLUS FRINGILLAE* WALK. (1856).

Pulex fringillae Walker, Dipt. Brit. III, p. 4, no. 11 (1856) (nest of sparrow).

Pulex avium, Taschenberg, Flöhe, p. 70 (1880) (partim).

Pulex fringillae, Theobald, Account Brit. Flies, I, p. 31 (1892).

Ceratophyllus fringillae, Rothschild, Ent. Record, XV, p. 308, pl. 12 (1903) (Brit. localities); Evans, Ann. Scot. N. H. Soc., p. 162 (1906) (Edinburgh distr.); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 230 (1908) (Tring); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 87 and 89 (1910) (Scottish records); id., Ent. Mo. Mag. (2), XXV, p. 161 (1914) (Ollaberry).

Hab.: Europe. Host: *Passer domesticus*; occasionally in other nests.

20. *CERATOPHYLLUS FASCIATUS* Bosc (1800).

Pulex fasciatus Bosc, Bull. Sci. Soc. Philom., II, p. 156, no. 44 (1800).

Ceratophyllus fasciatus Curtis, Brit. Ent., IX, no. 417 (1832) (nom. nud.).

Ctenonotus octodecimidatus, Kolenati, Hor. Soc. Ent. Ross., II, p. 34, pl. 2, fig. 5 (1863).

Pulex furoris Dale, Hist. Glanvilles Woot., p. 291, no. 7 (1878) (ferret); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *fasciatus*).

Pulex fasciatus Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 33 (1892).

Trichopsylla fasciatus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus fasciatus Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh); Waterst., *ibid.*, p. 212 (1906); Roths., Journ. Hygiene, VI, p. 483 (1906); Shipley, Journ. Econ. Biol., III, p. 68 (1908); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Waterst., *l.c.*, p. 227 (1909) (Shetland, Edinburgh); Roths., Bull. Ent. Research, I, p. 94, text-figs. 18 and 20 (1910); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 86 (1910) (Scottish records); Bacot, Proc. Ent. Soc. Lond. (p. 6 (1911) (egg); Shipley, Journ. Econ. Biol., VI, p. 19, text-figs. 1 (♀) and 2 (♂) (1911); Roths., Ent. Mo. Mag. (2), XXII, p. 113 (1911) (London); Strickl. and Merrim., Parasit., VI, p. 8 (1913) (Suffolk and Essex); Nuttall and Strickl., *ibid.*, p. 18 (1913); Russell, The Flea, pp. 102 and 111 (1913); Patton and Cragg, Textb. Med. Entom., p. 456, pl. 54, figs. 10, 12, pl. 56, fig. 1, ♀ (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 91 (1914) (Scottish records); Bacot, Journ. Hygiene, Plague Suppl., III, p. 449, pl. 27, figs. 1, 2 (1911) (bionomics).

Hab.: Europe, now almost cosmopolitan. *Hosts*: Principally rats, but also on other rodents.

21. *CERATOPHYLLUS LONDINIENSIS* ROTHS. (1903).

Ceratophyllus londiniensis Rothschild, Ent. Record, XV, p. 64, pl. 3 (1903) (London).

Ceratophyllus italicus Tiraboschi, Arch. Parasit., VIII, p. 266, text-fig. 20, A ♀, B ♂ (1904) (Italy).

Ceratophyllus londiniensis Rothschild, Journ. Hygiene, VI, p. 483 (1906); Shipley, Journ. Econ. Biol., III, p. 68 (1908); Roths., Bull. Ent. Research, I, p. 94, text-figs. 17 and 19 (1910); Shipley, *l.c.*, VI, p. 19 (1911); Russell, The Flea, p. 111 (1913).

Hab.: Europe. *Hosts*: Rats.

22. *CERATOPHYLLUS SCIURORUM* SCHRANK (1803).

Pulex sciurorum Schrank, Fauna Boica, III, p. 195 (1803).

Ceratophyllus sciurorum Curtis, Brit. Ent., IX, no. 417 (1832).

Pulex sciurorum Walker, Dipt. Brit., III, p. 3, no. 6 (1856).

Pulex gliris Dale, Hist. Glanvilles Woot., p. 290, no. 6 (1878) (dormouse); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *Ceratophyllus sciurorum*).

Pulex sciurum (!) Dale, Hist. Glanvilles Woot., p. 290, no. 5 (1878).

Pulex sciurorum Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 32 (1892); Mearns, Ann. Scot. N. H. Soc., p. 92 (1901) (Aberdeen).

Trichopsylla sciurorum Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus (= *Trichopsyllus*) *sciurorum*, Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh).

Ceratophyllus sciurorum, Waterston, Ann. Scot. N. H. Soc., p. 212 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1903) (Tring); *id.*, Proc. Roy. Phys. Soc. Edinb., XVIII, p. 87 (1910) (Arniston, Midlothian, nest of *Syrnium aluco*); Evans, *l.c.*, p. 185 (1910) (Dunbar, in nest of squirrel); Russell,

The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 159 (1914) (Scottish records).

Hab.: Europe. Hosts: *Sciurus vulgaris*, *Muscardinus avellanarius*, accidentally on *Martes* and *Mustela*.

23. *CERATOPHYLLUS PENICILLIGER* GRUBE (1852).

Pulex penicilliger Grube, Middend. Sibir. Reise, II, 1, p. 500, pl. 32, fig. 9 (1852) (partim); Wagn., Hor. Soc. Ent. Ross., XXXI (1897), p. 569, pl. 8, fig. 6 (1898) (δ = *Ceratophyllus penicilliger*).

Trichopsylla penicilliger Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus penicilliger Rothschild, Victoria Hist. Engl., Herts., I, p. 170 (1902); Waterst., Ann. Scot. N. H. Soc., p. 212 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908); Waterst., Ann. Scot. N. H. Soc., p. 227 (1909) (Stromness); Roths., Bull. Ent. Research, I, p. 95 (1910); Shipley, Journ. Econ. Biol., VI, p. 19 (1911); Patton and Cragg, Textb. Med. Entom., p. 456 (1913); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 88 and 160 (1914) (Scottish records).

Hab.: Europe; Northern Asia. Hosts: Voles and field-mice, more rarely on rats and small carnivora.

24. *CERATOPHYLLUS WALKERI* ROTHS. (1902).

Trichopsylla lagomys Verrall (nec Wagner, 1897), List Brit. Dipt., I, ed. 2 p. 7 (1901).

Ceratophyllus walkeri Rothschild, Ent. Mo. Mag. (2), XIII, p. 225, pl. 4, figs. 4, 5, 7 (1902) (Kent, Sussex, Herts, Bucks); Waterst., Ann. Scot. N. H. Soc., p. 212 (1906); Evans, *ibid.*, p. 241 (1906) (Forth); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Waterst., *l.c.*, p. 227 (1909) (Berwickshire); Strickl. and Merrim., Parasit., VI, p. 13 (1913) (Suffolk and Essex); Russell, The Flea, p. 111 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 160 (1914) (Scottish records).

Hab.: Great Britain. Hosts: *Mustela erminea* and *nivalis*, *Erotomys glareolus*.

25. *CERATOPHYLLUS MUSTELAE* DALE (1878).

(?) *Pulex martis* Walker, Dipt. Brit., III, p. 3, no. 5 (1856).

Pulex mustelae Dale, Hist. Glanvilles Woot., p. 291, no. 8 (1878) (weasel); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *Ceratophyllus mustelae* Wagner, 1898).

Trichopsylla mustelae Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratophyllus mustelae Rothschild, Victoria Hist. Engl., Herts., I, p. 170 (1902); Godfrey, Ann. Scott. N. H. Soc., p. 119 (1906) (Orkneys); Waterst., *ibid.*, p. 212 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Strickl. and Merrim., Parasit., VI, p. 12 (1913) (Suffolk and Essex); Russell, The Flea, p. 111 (1913).

Hab.: Europe. Hosts: *Apodemus sylvaticus*, *Erotomys glareolus*, *Mustela erminea*.

26. *CERATOPHYLLUS MELIS* WALK. (1856).

Ceratophyllus melis Curtis, Brit. Ent., IX, no. 417 (1832) (nom. nud.).

Pulex melis Walker, Dipt. Brit., III, p. 5, no. 14 (1856) (badger); Verrall, List Brit. Dipt., I, p. 5 (1888); Theob., Acc. Brit. Flies, p. 32 (1892).

Trichopsylla melis Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Hab.: Europe, Northern Asia. Host: *Meles meles*.

D¹. SUBFAMILY: *Tenophthalminae*.VIII. GENUS: *CTENOPHTHALMUS* KOLEN. (1856).

Type: *bisectodentatus*.

Ctenophthalmus Kolenati, Paras. Chiropt., p. 33 (1856) (partim); id., Hor. Soc. Ent. Ross., II, p. 35 (1863) (type: *bisectodentatus*).

Typhlopsylla Taschenberg, Flöhe, p. 86 (1880) (partim).

Spulacopsylla Oudemans, Ent. Bericht., II, p. 22C (1907) (type: *bisectodentatus*).

Ctenophthalmus Rothschild, Nov. Zool., XVIII, p. 80 (1911).

27. *CTENOPHTHALMUS AGYRTES* HELLER (1896).

Typhlopsylla assimilis Saunders (nec Taschenb., 1880, err. determ.), Ent. Mo. Mag. (2), II, p. 170 (1891) (Sheffield, Woking, Ventnor); Theob., Acc. Brit. Flies, p. 35 (1892).

Typhlopsylla agyrtes Heller, Ent. Nachr., XXII, p. 97, text-figs. 1 and 2 (1896) (Borkum); Roths., Nov. Zool., V, p. 538, pl. 15a, fig. 2; pl. 17, figs. 12, 14, 17-25 (1898) (various places in England and Scotland); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Evans, Ann. Scot. N. H. Soc., p. 162 (1906) (Edinburgh distr.); Waterst., *ibid.*, p. 213 (1906); Malloch, Ent. Mo. Mag. (2), XVIII, p. 86 (1907) (Dumbartonshire, nest of field-mouse).

Ctenophthalmus agyrtes Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Waterst., Ann. Scot. N. H. Soc., p. 228 (1909) (Scottish local.; Orkneys); Waterst., Proc. Roy. Phys. Soc. Edinb., XVIII, p. 89 (1910) (Scottish records); Evans, *l.c.*, p. 184 (1910) (Loch Tay, water-vole); Roths., Bull. Ent. Research, I, p. 97, text-fig. 22 (1910); Shipley, Journ. Econ. Biol., VI, p. 20 (1911); Strickl. and Merrim., Parasit., VI, p. 11 (1913) (Suffolk and Essex); Nuttall and Strickl., *ibid.*, VI, p. 18 (1913) (Camb.); Patton and Cragg, Textb. Med. Entom., p. 457, pl. 56, fig. 2 (1913); Russell, The Flea, p. 111 (1913).

Ctenophthalmus (!) *agyrtes* Waterston, Ent. Mo. Mag. (2) XXV, p. 162 (1914) (Scottish records).

ab. *NOBILIS* Roths. (1898).

Typhlopsylla agyrtes nobilis Rothschild, Nov. Zool., V, p. 539 (1898) (Tring).

Typhlopsylla agyrtes var. *nobilis* Verrall, List Brit. Dipt. I, ed. 2, p. 7 (1901).

Ctenophthalmus agyrtes nobilis, Russell, The Flea, p. 112 (1913).

Hab.: Western and Central Europe. Hosts: Chiefly voles, but also on *Apodemus sylvaticus* and rats.

28. *CTENOPHTHALMUS BISOCTODENTATUS* KOLEN. (1863).

Ctenophthalmus musculi Kolenati (nec Dugès, 1832), Paras. Chiropt., p. 33 (1856).

(?) *Ctenophthalmus bisbidentatus* Kolenati, Jahresh. nat. Sect. mähr. schles. Ges. (1858), p. 65 (1859).

Ctenophthalmus bisoctodentatus Kolenati, Hor. Soc. Ent. Ross., II, p. 35, no. 12, pl. 2, fig. 6 (1863) (= *bisbidentatus* = *talpae* Bouché, Kolen.).

Typhlopsylla bisoctodentata Wagner, Hor. Soc. Ent. Ros., XXXV, p. 24, pl. 1, fig. 2 (1902).

Typhlopsylla orientalis Rothschild (nec Wagner, 1897, err. determ.), Ent. Record, XII, p. 19 (1900) (Brighton, Boxworth, Cambs, Nairn).

Typhlopsylla bisseptendecimata id. (nec Kolen., 1863, err. determ.), l.c., XIII, p. 362 (1901).

Typhlopsylla bisoctodentatus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Evans, Ann. Scot. N. H. Soc., p. 163 (1906) (Edinburgh distr.).

Ctenophthalmus bisoctodentatus Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Ctenophthalmus (!) *bisoctodentatus* Strickland and Merrim., Parasit., VI, p. 14 (1913) (Horksley, Bentley, Hollesley); Nuttall and Strickl., *ibid.*, p. 18 (1913) (Cambs., once).

Ctenophthalmus bisoctodentatus Russell, The Flea, p. 112 (1913).

Ctenophthalmus (!) *bisoctodentatus* Waterst., Ent. Mo. Mag. (2), XXV, p. 163 (1914) (Scottish records).

Hab.: Europe. *Hosts*: *Talpa europaea*, accidentally on other mammals.

IX. GENUS: *RHADINOPSYLLA* JORD. AND ROTHS. (1912).

Type: *masculana*.

Typhlopsylla Rothschild (nec Taschenb., 1880), Ent. Record, IX, p. 55 (1897).

Rhadinopsylla Jordan and Rothschild, Nov. Zool., XIX, p. 367 (1912) (*type*: *masculana*).

29. *RHADINOPSYLLA ISACANTHUS* ROTHS. (1907).

Typhlopsylla isacanthus Rothschild, Ent. Mo. Mag. (2), XVIII, p. 41, text-fig. 2 (1907) (Lyndhurst, *Microtus glareolus*).

Rhadinopsylla isacanthus Russell, The Flea, p. 112 (1913).

Hab.: England. *Hosts*: *Eutamias glareolus*, *Talpa europaea*.

30. *RHADINOPSYLLA PENTACANTHUS* ROTHS. (1897).

Typhlopsylla pentacanthus Rothschild, Ent. Record, IX, p. 55 (1897) (♀, Tring, *Mustela vulgaris*); *id.*, Nov. Zool., V, p. 541, pl. 15A, fig. 3, ♂ (1898); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Evans, Ann. Scot. N. H. Soc., 163 (1906) (Edinburgh distr.); Waterst., *ibid.*, p. 214 (1906) (Colinton); Roths., Ent. Mo. Mag. (2), XVIII, p. 41, text-fig. 1 (1907).

Otenophthalmus pentacanthus Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Otenophthalmus (!) *pentacanthus* Strickland and Merrim., Parasit., VI, p. 13 (1913) (Tuddenham, Walton, Boxford).

Rhadinopsylla pentacanthus Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 164 (1914) (Scottish records).

Hab.: Europe. *Hosts*: *Mustela nivalis*, *Apodemus sylvaticus*, *Talpa europaea*, etc.

II. SUBORDER: FRACTICIPITA.

C. FAMILY: Leptopsyllidae.

X. GENUS: DORATOPSYLLA JORD. AND ROTH. (1912).

Type: *dasycnemus*.

Typhlopsylla Rothschild (nec Taschenb., 1880), Ent. Record, IX, p. 159 (1897).

Doratopsylla Jordan and Rothschild, Nov. Zool., XIX, p. 62 (1912) (type: *dasycnemus*).

31. DORATOPSYLLA DASYCNEMUS ROTH. (1897).

Typhlopsylla dasycnemus Rothschild, Ent. Record, IX, p. 159, plate (1897) (*Tryphlopsylla* err. typ.; Tring, *Sorex vulgaris*); id., Nov. Zool., V, p. 540, no. 3, pl. 15A, figs. 4, ♂, 5, ♀ (1898).

Typhlopsylla dasycnemus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Typhlopsylla dasycanemus (!) Waterston, Ann. Scot. N. H. Soc., p. 214 (1906) (Hillend, nest of *Sorex araneus*?).

Otenophthalmus dasycnemus Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Doratopsylla dasycnemus Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 164 (1914) (Scottish records).

Hab.: Europe. *Host*: *Sorex araneus*.

XI. GENUS: PALAEOPSYLLA WAGN. (1903).

Type: *similis*.*

Typhlopsylla Taschenberg, Flöhe, p. 86 (1880) (partim).

Palaeopsylla Wagner, Hor. Soc. Ent. Ross., XXXVI, p. 137 (1903) (no type fixed).

Paleopsylla Baker, Proc. U. S. Nation. Mus., XXIX, p. 129 (1905) (type: "sibirica" error).

Palaeopsylla Oudemans, Ent. Bericht., II, p. 240 (1908) (type: *gracilis* Wagn.).

* *P. similis* Dampf (1911) = *gracilis* Wagn. (1903, nec Taschenb., 1880).

32. *PALAEOPSYLLA SOREICIS* DALE (1878).

Ceratophyllus sorecis Dale, Hist. Glanvilles Woot., p. 291, no. 6 (1878) (on shrews); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *gracilis*).

Pulcx gracilis Verrall, List Brit. Dipt., I, p. 5 (1888).

Typhlopsylla gracilis Theobald, Acc. Brit. Flies, I, p. 35 (1892); Verrall, List Brit. Dipt., I. ed. 2, p. 7 (1901) (partim).

Typhlopsylla gracilis Rothschild (nec Taschenb., 1880, err. determ.), Nov. Zool., V, pl. 17, fig. 16, ♂ (1898).

Typhlopsylla sorecis Waterston, Ann. Scot. N. H. Soc., p. 214 (1906).

Ctenophthalmus sorecis Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (partim; Tring).

Palaeopsylla sorecis Dampf, Zool. Jahrb., Suppl. XII, p. 620, text-figs. C, D, ♂ (1911); Jord. and Roths., Nov. Zool., XVIII, p. 85, no. 3 (1911); Dampf, Schrift. Phys.-ök. Ges. Königsb., LI, p. 326, text-fig. 2, ♂; p. 328, text-fig. 5b, ♀ (1911); Strickl. and Merriam., Parasit., VI, p. 15 (1913) (once on rat, Sweffling); Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 164 (1914) (Scottish records).

Hab.: Europe. *Hosts*: Shrews.

33. *PALAEOPSYLLA KOHAUTI* DAMPF (1911).

Typhlopsylla gracilis Kohauti (nec Taschenb., 1880, err. determ.), Allatt. Közl., II, p. 65, pl. 6, figs. 3 and 4, ♂ (1903) (Hungary).

Palaeopsylla kohauti Dampf, Schrift. Phys.-ök. Ges. Königsb., LI, p. 325, text-fig. 1, ♂, 5c ♀ (1911) (E. Prussia); Roths., Ent. Mo. Mag. (2), XXIII, p. 67 (1912) (Ballindalloch); Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 165 (1914) (Scottish records).

Hab.: Europe. *Host*: *Talpa europaea*.

34. *PALAEOPSYLLA MINOR* DALE (1878).

(?) *Ctenophthalmus bisbidentatus* Kolenati, Jahresh. nat. Sect. mähr. schles. Ges. (1858), p. 65 (1859) (very common on *Talpa europaea*, haec spec.?).

Ceratophyllus minor Dale, Hist. Glanvilles Woot., p. 291, no. 7 (1878) (mole); Roths., Ent. Mo. Mag. (2), XIV, p. 145 (1903) (= *gracilis*).

Typhlopsylla gracilis Taschenberg, Flöhe, p. 96, pl. 4, figs. 28, ♀, 29, ♂ (1880); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901) (partim); Evans, Ann. Scot. N. H. Soc., p. 194 (1904) (Edinburgh distr., on mole).

Ctenophthalmus sorecis Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (partim; Tring).

Typhlopsylla gracilis Evans, l.c., p. 120 (1909) (Scottish localities, nests of *Talpa*).

Palaeopsylla gracilis Dampf, Zool. Jahrb., Suppl. XII, p. 623, text-fig. E, ♂; p. 628, fig. J, ♀; p. 629, fig. L, ♀ (1910); id., Schrift. Phys.-ök. Ges. Königsb., LI, p. 327, text-figs. 3, ♂, 5a, ♀ (1911) (Germany).

Palaeopsylla minor, Jordan and Rothschild, Nov. Zool., XVIII, p. 84 (1911); Dampf, Schrift. Phys.-ök. Ges. Königsb., LI, p. 330 (1911) (synonymy); Strickl. and Merrim., Parasit., VI, p. 15 (1913) (rat and stoat, once); Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 165 (1914) (Scottish records).

Hab.: Europe. *Host*: *Talpa europaea*.

XII. GENUS: *LEPTOPSYLLA* JORD. and ROTHS. (1911).

Type: *musculi*.

Pulex Dugès (nec L., 1758), Ann. Sci. Nat., XXVII, p. 163 (1832).

Ctenophthalmus Kolenati, Parasit. Chiropt., p. 32 (1856) (partim).

Ctenopsyllus Kolenati (nec Kolenati, 1856), Hor. Soc. Ent. Ross. II, p. 37 (1863).

Typhlopsylla Taschenberg, Flöhe, p. 70 (1880) (partim).

Ctenopsylla Rothschild, Irish Natural., p. 265 (1899).

Leptopsylla Jordan and Rothschild, Nov. Zool., XVIII, p. 85 (1911) (n. nom. loc. *Ctenopsylli* praeocc., type: *musculi*).

35. *LEPTOPSYLLA MUSCULI* DUGÈS (1832).

Pulex pungens Walckenaer, Faune Paris, II, p. 354, no. 2 (1802) (partim).

Pulex musculi Dugès, Ann. Sci. Nat., XXVII, p. 163 (1832); Walk., Dipt. Brit., III, p. 4, no. 9 (1856).

Ctenophthalmus talpae Kolenati (nec Curtis, 1832), Parasit. Chiropt., p. 33 (1856).

Pulex musculi Dallas, Elem. Entom., p. 383 (1857).

Ctenophthalmus quadridentatus Kolenati, Jahresh. nat. Sect. mähr. schles. Ges. (1858), p. 65 (1859).

Ceratophyllus musculi Dale, Hist. Glanvilles Woot., p. 291, no. 4 (1878).

Typhlopsylla musculi Taschenberg, Flöhe, p. 92, pl. 4, figs. 25, 25a (1880); Verrall, List Brit. Dipt., I, p. 5 (1888); Saunders, Ent. Mo. Mag. (2), III, p. 67 (1892); Theobald, Acc. Brit. Flies, p. 34 (1892); Chitty, Ent. Mo. Mag. (2), IV, p. 20 (1893) (Forres, Scotl.).

Ctenopsylla musculi Rothschild, Irish Naturalist, p. 265 (1899); Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Godfrey, Ann. Scot. N. H. Soc., p. 119 (1906) (Orkneys); Evans, *ibid.*, p. 163 (1906) (Edinburgh); Waterst., *ibid.*, p. 214 (1905); Roths., Journ. Hygiene, VI, p. 483 (1906); Shipley, Journ. Econ. Biol., III, p. 69 (1908).

Ctenopsyllus musculi Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Ctenopsylla musculi Rothschild, Bull. Ent. Research, I, p. 97, text-fig. 28 (1910); Shipley, Journ. Econ. Biol., VI, p. 20, no. 23 (1911); Strickl. and Merrim., Parasit., VI, p. 13 (1913) (Suffolk); Patton and Cragg, Textb. Med. Entom., p. 458 (1913).

Leptopsylla musculi Russell, The Flea, pp. 103, 112 (1913); Bacot, Journ.

Hygiene, Plague Suppl., III, p. 449, pl. 27, figs. 3, 4 (1914) (bionomics); Waterst., Ent. Mo. Mag. (2), XXV, p. 165 (1914) (Shetlands).

Hab.: Cosmopolitan. Host: House-mouse and rats.

36. *LEPTOPSYLLA SPECTABILIS* ROTHs. (1898).

Typhlopsylla spectabilis Rothschild, Ent. Record, X, p. 250, text-fig. (1898) (N. Berwick); id., Nov. Zool., V, p. 536 (1898).

Ctenopsyllus spectabilis Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Roths., Ent. Mo. Mag. (2), XX, p. 184, no. 1, pl. 2, fig. 2 (1909) (♀ not distinguishable from *silvatica* Mein.); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Leptopsylla spectabilis Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 165 (1914) (Scottish records).

Hab.: Great Britain. Hosts: *Evtomys glareolus*, also *Apodemus sylvaticus* and other mice, accidentally on carnivora which prey on mice.

D. FAMILY: *Hystrichopsyllidae*.

XIII. GENUS: *TYPHLOCERAS* WAGN. (1903).

Type: *poppei*.

Typhloceras Wagner, Hor. Soc. Ent. Ross., XXXVI, p. 152 (1903); Roths., Ent. Record, XV, p. 196 (1903).

37. *TYPHLOCERAS POPPEI* WAGNER (1903).

Typhloceras poppei Wagner, l.c., p. 154, text-fig. 1, ♀ (1903) (Bremen); Roths., l.c., XV, p. 196, pl. 9 (1903) (British localities); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Russell, The Flea, p. 112 (1913).

Hab.: Europe. Hosts: *Apodemus sylvaticus*, also on *Mus musculus* and other mice.

XIV. GENUS: *HYSTRICHOPSYLLA* TASCHENB. (1880).

Type: *talpae*.

Pulex Curtis (nec L., 1758, err. determ.), Brit. Ent. III, no. 114 (1826).

Ceratophyllus id., l.c., IX, no. 417 (1832) (partim).

Hystrichopsylla Taschenberg, Flöhe, p. 83 (1880) (type: *obtusiceps* = *talpae*); Roths., Ent. Record, XII, p. 257 (1900).

38. *HYSTRICHOPSYLLA TALPAE* CURTIS (1826).

Pulex talpae Curtis, Brit. Ent., III, no. 114, fig. ♀ (1826) (Battersea Fields).

Ceratophyllus talpae id., l.c., IX, no. 417 (1832); Westw., Intr. Classif. Ins., II, p. 493 (1840).

Pulex talpae Walker, Dipt. Brit., III, p. 7, no. 8 (1856) (partim); Wood, Ins. at Home, p. 592, wood-cut 69, figs. 1, a-d (1876).

Hystrichopsylla obtusiceps Taschenberg, l.c., p. 83, pl. 3, fig. 21, ♂ (1880).

Hystrichopsylla talpae Verrall, List Brit. Dipt., I, p. 5 (1888).

Hystrichopsylla obtusiceps Theobald, Acc. Brit. Flies, p. 33 (1892); Chitty, Ent. Mo. Mag. (2), IV, p. 20 (1893) (Forres, Scotl.).

Hystrichopsylla talpae Rothschild, Ent. Record, XII, p. 257, pl. 10 (1900); Sharp, Camb. Nat. Hist., Ins. II, p. 523, text-fig. 250 (1899).

Hystrichopsylla narbeli Galli-Valerio, Arch. Parasit., III, p. 96 (1900); Jord., Ent. Mo. Mag. (2), XIX, p. 91 (1908) (= *talpae*).

Hystrichopsylla talpae Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901); Evans, Ann. Scott. N. H. Soc., p. 194 (1904) (Edinburgh distr.); id., l.c., pp. 163 and 241 (1906) (Edinburgh distr.); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Evans, Ann. Scot. N. H. Soc., p. 120 (1909) (Forth and Tweed); Waterst., ibid., p. 228 (1909) (Orkneys); id., Proc. Roy. Phys. Soc., Edinb., XVIII, p. 89 note (1910) (Orkneys); Strickl. and Merrim., Parasit., VI, p. 14 (1913) (Dedham, Hollesley); Patton and Cragg, Textb. Med. Entom., p. 458 (1913); Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 88 (1914) (Orkneys; Scotland).

Hab.: Europe. Hosts: *Talpae europaea* and *Sorex*, occasionally also on mice and other small mammals.

E. FAMILY: *Ischnopsyllidae*.

XV. GENUS: *ISCHNOPSYLLUS* WESTW. (1840).

Type: *elongatus*.

Ceratophyllus Curtis, Brit. Ent., IX, no. 417 (1832) (partim; type: *hirundinis*).

Ischnopsyllus Westwood, Ent. Mag., I, p. 359 (1833) (indescr.).

Ceratopsyllus Curtis, l.c., XV, Errata (1828) (emendation of *Ceratophyllus*).

Ischnopsyllus Westwood, Intr. Classif. Ins., II, App., p. 125 (1840) (*P. vespertilionis* and *elongatus*).

Ceratopsyllus Kolenati, l.c., p. 31 (1856) (partim); Roths., Nov. Zool., V, p. 542 (1898).

Ctenopsyllus Kolenati, Parasit. Chiropt., p. 31, note (1856) (partim; n.n. loco *Ceratophylli*).

Typhlopsylla Taschenberg, Flöhe, p. 86 (1880) (partim).

Ceratopsylla Wagner, Hor. Soc. Ent. Ross., XXXI (1897), p. 580 (1898) (partim).

Ischnopsyllus Jordan and Rothschild, Nov. Zool., XIII, p. 176 (1906); Roths., l.c., XVIII, p. 52 (1911) (type: *elongatus*).

Hexactenopsylla Oudemans, Ent. Bericht., p. 4 (1909).

Nycteridiphilus Dalla-Torre, Ent. Mitteil., III, p. 27 (1914) (n.n. loco *Ischnopsylli*).

39. *ISCHNOPSYLLUS ELONGATUS* CURTIS (1832).

Ceratophyllus elongatus Curtis, Brit. Ent., IX, no. 417, fig. (1832).

Ischnopsyllus elongatus Westwood, Intr. Classif. Ins., II, App., p. 125 (1840).

Pulex vespertilionis Walker, Dipt. Brit., III, p. 4, no. 10 (1886) (partim).

Typhlopsylla octaetus Taschenberg, Flöhe, p. 87 (1880) (partim); Verrall,

List. Brit. Dipt., I, p. 5 (1888) (partim).

Typhlopsylla octactenus Theobald, Acc. Brit. Flies, I, p. 34 (1892) (partim).

Ceratopsylla subobscura Wagner, Hor. Soc. Ent. Ross., XXXI (1897), p. 32, pl. 9, fig. 5 (1898).

Ceratopsylla elongatus Rothschild, Nov. Zool., V, p. 542, pl. 16, figs. 6, 8, 10 (1898) (Tring, Cambridge, Brighton).

Ceratopsyllus elongatus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ischnopsyllus elongatus Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Russell, The Flea, p. 112 (1913).

Hab.: Europe. *Host*: *Nyctalus noctula*.

40. *ISCHNOPSYLLUS INTERMEDIUS* ROTHS. (1898).

Ceratopsylla intermedius Rothschild, Nov. Zool., V, p. 543, pl. 17, fig. 15 (1898) (Brighton, Yalding).

Ceratopsyllus intermedius Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ischnopsyllus schmitzi Oudemans, Tijdschr. v. Ent., LII, p. 96 (1909) (♀; ♂ = *simplex*).

Ischnopsyllus intermedius Russell, The Flea, p. 112 (1913); Roths., Nov. Zool., XXI, p. 252 (1914).

Hab.: Europe. *Host*: *Eptesicus serotinus*.

41. *ISCHNOPSYLLUS OCTACTENUS* KOLEN. (1856).

(?) *Pulex pungens* Walckenaer, Faune Paris, II, p. 354 (1802) (partim).

Ceratopsylla octactenus Kolenati, Parasit. Chiropt., p. 31, no. 1, pl. 3, fig. 31, ♂ (1856) (partim); id., Hor. Soc. Ent. Ross., II, p. 42, no. 21, pl. 4, fig. 12, ♀ (1863) (partim).

Typhlopsylla octactenus Taschenberg, Flöhe, p. 87, no. 17, pl. 4, fig. 22, a, b (1880) (partim); Verrall, List Brit. Dipt., I, p. 5 (1888).

Ceratopsylla jubata Wagner, Hor. Soc. Ent. Ross., XXXI (1897), p. 584, pl. 9, figs. 20, 22 (1897); Roths., Nov. Zool., V, p. 544 (1898) (Ely, Tring).

Ceratopsyllus jubatus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ceratopsylla octactenus Rothschild, l.c., p. 543, no. 6, pl. 16, figs. 7, 9 (1898) (Tring) (partim).

Ceratopsylla jubata Evans, Ann. Scot. N. H. Soc., p. 163 (1906) (Edinburgh).

Ischnopsyllus octactenus id., l.c., p. 181 (1906) (*jubata* = *octactenus*); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Russell, The Flea, p. 112 (1913); Waterst., Ent. Mo. Mag. (2), XXV, p. 166 (1914) (Scotland).

Hab.: Europe. *Host*: *Pipistrellus pipistrellus*, also on other bats.

42. *ISCHNOPSYLLUS SIMPLEX* ROTHS. (1906).

Ceratopsylla octactenus Rothschild (nec Kolenati, 1856, err. determ.), Nov. Zool., V, p. 543, no. 6 (1898) (partim, on *V. nattereri*).

Ceratopsyllus octactenus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901).

Ischnopsyllus simplex Rothschild, l.c., XIII, p. 186, no. 2 (1906); Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Russell, The Flea, p. 112 (1913); Roths., Nov. Zool., XXI, p. 252 (1914).

Ischnopsyllus schmitzi Oudemans, Tijdschr. v. Ent., LII, p. 96 (1909) (♂; ♀ = *intermedius*).

Hab.: Great Britain. *Host*: *Myotis nattereri*.

43. *ISCHNOPSYLLUS HEXACTENUS* KOLEN. (1856).

Ceratopsyllus hexactenus Kolenati, Paras. Chiropt., p. 31, no. 2 (1856).

(?) *Pulex vespertilionis* Walker, Dipt. Brit., III, p. 4, no. 10 (1856) (partim).

Typhlopsylla hexactena Taschenberg, Flöhe, p. 89 (1880).

Typhlopsylla hexactenus Verrall, List Brit. Dipt., I, p. 5 (1888).

Ceratopsyllus hexactenus id., l.c., ed. 2, p. 7 (1901).

Ischnopsyllus hexactenus Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring); Roths., Nov. Zool., XVIII, p. 53, no. 2, and p. 88, no. 3 (1911); Russell, The Flea, p. 112 (1913).

Hab.: Europe. *Hosts*: *Plecotus auritus*, more rarely on other bats.

XVI. GENUS: *NYCTERIDOPSYLLA* Oudem. (1906).

Type: *pentactenus*.

Ceratopsyllus Kolenati (nec Curtis, 1832, err. determ.), Paras. Chiropt., p. 31 (1856) (partim).

Typhlopsylla Taschenberg, Flöhe, p. 86 (1880) (partim).

Ceratopsylla Wagner, Hor. Soc. Ent. Ross., XXXI (1897), p. 580 (1898) (partim).

Nycteridopsylla Oudemans, Tijdschr. v. Ent., XLIX, Versl. p. 58 (1906) (*type*: *pentactenus*); Roths., Entom., XLII, p. 25 (1909.)

44. *NYCTERIDOPSYLLA EUSARCA MAJOR* ROTHS. (1909).

Typhlopsylla pentactenus Verrall (nec Kolen., 1856, err. determ.), List Brit. Dipt., I, p. 5 (1888); Saunders, Ent. Mo. Mag. (2), III, p. 66 (1892) (Cambridge).

Ceratopsylla pentactenus, Rothschild, Nov. Zool., V, p. 542 (1898) (partim).

Ceratopsyllus pentactenus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901) (partim).

Ischnopsyllus pentactenus Gibbs and Barr., Trans. Herts. N. H. Soc., XIII, p. 250 (1908) (Tring).

Nycteridopsylla pentactenus Rothschild, Entom., XLI, p. 281 (1908).

Nycteridopsylla eusarca major Rothschild, Entom., XLII, p. 27, no. 26, pl. 1, fig. 2 (1909) (Cambridge); Russell, The Flea, p. 112 (1913).

Hab.: Great Britain. *Host*: *Nyctalus noctula*.

45. *NYCTERIDOPSYLLA LONGICEPS* ROTHS. (1908).

Typhlopsylla pentactenus Rothschild (nec Kolen., 1856, err. determ.), Nov. Zool., II, p. 66 (1895) (Harrow).

Ceratopsylla pentactenus id., Nov. Zool., V, p. 542 (1898) (partim).

Ceratopsyllus pentactenus Verrall, List Brit. Dipt., I, ed. 2, p. 7 (1901) (partim).

Nycteridopsylla longiceps Rothschild, Entom., XLI, p. 281, pl. 8 (1908) (Henley; Tring; etc.): id., l.c., XLII, p. 28, no. 3 (1909); Russell, The Flea, p. 112 (1913).

Hab.: Great Britain. Hosts: *Plecotus auritus* and *Pipistrellus pipistrellus*.

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STUDIES IN *HELOPHORINI*.

BY D. SHARP, M.A., F.R.S.

3.—REMARKS ON THE SYSTEMATIC CHARACTERS.

The *Helophorini* are admitted to be a neglected group, and one that has never received the careful attention that has been bestowed on several other divisions of the *Coleoptera*.

The principal writer about them is the late Herr A. Kuwert, who gave the group his attention for many years, and in 1885 and 1886 published a table for the determination of the European forms, which for the time was of considerable assistance. In 1890 he gave us a much more ambitious work (Verh. Ver. Brünn, xxviii) which, however, as explained by Zaitzev in the introduction to his catalogue, has given rise to great difficulties. It is in the form of a long table of 48 pages, and though the work of a clever entomologist who knew much of the insects he was dealing with, is executed in a manner so hasty and rash, that it can only be cleared up thoroughly by the aid of his collections and types. Ganglbauer has already done something towards correcting Kuwert's errors, and Zaitzev has treated the work in a judicious manner, but still it leaves many puzzles.

It will perhaps be of some assistance to future students if I make some remarks on the characters that have been made use of, or that appear to me to be available for the discrimination of the species and for the estimation of their relationships. Indeed, without such a sketch it will not be possible to understand the genera I shall propose, which will be more numerous than those briefly indicated in the key I gave in the first part of these studies. Kuwert made use of certain characters in an arbitrary and incomplete manner, due probably to his having failed to follow them out in a sufficient variety of forms. Great as are the natural difficulties of the *Helophorini*, they are, one may almost say, increased rather than diminished by the existing literature.

The palpi are important. The last joint of the labial palp is very remarkable as it exhibits the unusual character of bearing numerous very fine long hairs, which exist in all the genera except in the *Empleurus* forms, where they are completely absent, except in *Empleurus* proper which exhibits these hairs in a condition of minor development.

The maxillary palps—or at any rate their terminal segment—are

of great importance, although there appears to be considerable variation in length and stoutness within the limits of the same species. The two forms of greatest importance are those I have called symmetric and asymmetric. The Germans speak of the former as "spindel-förmig." In the asymmetric forms the outline of the segment is much less convex on its inner than on its outer aspect and the actual tip looks more or less blunt. The symmetric, or spindle shape, would offer a nearly circular outline of a transverse section, and the tip in most cases appears more pointed. The spindle in *Empleurus rugosus* is very slender and pointed, while in *Atracthelophorus arvernicus* it is short and thick. The genus *Meghelophorus* has a peculiar maxillary palp, in some respects intermediate in shape, but with the penultimate joint longer and thicker than in the other forms. Although it is very difficult to give an exact description of these three kinds of maxillary palpi, yet the difference to an educated eye is sufficient to enable one to give a good opinion as to the relations of the species or genus.

The prothorax is very important in *Helophorini*. The pleuron is joined to the notum by a distinct suture, as in the *Caraboidea*. This suture is very distinct in *Empleurus*, and is placed at a considerable distance from the raised margin that limits the upper surface of the notum. In *Helophorus* the suture is less distinct and is placed nearer to the notal margin. The pleuron is dull, being covered by a minute pubescence, but the area between it and the notal margin is generally highly polished. This space may be called the supra-pleural area.

The anterior coxal cavities are usually described as open in the *Helophorini*, but this arises from the examination of undissected specimens. If the front legs are extracted it is seen that the foramen is closed behind by the junction of a process of the prosternum with the pleuron, but not with the tip of the pleuron, which in fact projects as a large free process.

The shape of the pronotum exhibits characters that divide the *Helophorini* into two groups. In *Empleurus* the front margin is very irregular in outline, being convex in the middle, then concave on each side, then again sloped forward to the front angles. This peculiarity is accentuated by the surface being more or less arched perpendicularly over the head, so that the middle of the pronotum forms a sort of hood over the head. In other forms, such as *Meghelophorus*, this hooding of the thorax is only faintly indicated. The transitions between these two forms of pronotum are to be found in the genus *Eutrichelophorus*, a genus which till now has not been distinguished from *Trichelophorus*.

On the upperside of the thorax there exists some remarkable channels, one of the most characteristic features of *Helophorini*, which are very useful in the discrimination of the species. In some species seven of these channels are easily distinguished (*Trichelophorus alternans*, e.g.). I propose to call these channels "grooves," and the areas between them "intervals." The median groove is straight, but the juxta-median one is nearly always made irregular by the dilatation in its middle of the median interval; this dilatation is usually angular, but in *H. laticollis* and some others the angular prominence of this interval is absent, or nearly so. The area between the juxta-median groove, and the sub-external groove (*i.e.*, the groove next outside the juxta-median) may be called the sub-median interval, and it is more or less disturbed, or interfered with, by the angularity of the sub-median groove, from which there results, in the extreme case of *Empleurus rugosus*, the division of the interval into two elevations.

The sub-median groove is in its general direction parallel with the median one, but the sub-external groove tends to converge basally towards the median groove, in conformity with the lateral outline of the prothorax. The most remarkable feature of the sub-external groove is the presence in it of a small deep pit near the base. This pit is indistinct in the *Empleuri* where, indeed, it can only be seen when the surface is quite clean; it is, perhaps, best displayed in *Meghelophorus*. The sub-external interval is usually less definite than those nearer the middle, and the sub-external groove is consequently less definite than the median and juxta-median grooves. The external groove consists merely of the space between the sub-external interval and the more or less raised lateral margin of the thorax, and consequently varies in accordance with the modifications in shape of the sides thereof. The sculpture at the bottom of the grooves is always different from that of the intervals, being much finer, or even altogether obliterated, and the metallic coloration of the grooves is usually different from that of the intervals.

On the under surface of the prothorax there is a modification of structure of an interesting character, there being at the front angles a hollowed space, adapted to receive the back of the eyes when the head is retracted. The vicinity of this ocular cavity is furnished in the *Helophori* with more or less numerous flexile setae (well exemplified in *Meghelophorus aquaticus*). These setae exhibit various modifications, and in the *Empleuri* are quite absent. I briefly described the structure of the elytra, so far as the epipleuron is concerned, on page 4, and need

only now say that I consider it to be—though the seat of numerous modifications—among the most important of the systematic characters of the *Helophorini*. There are eleven striae—or at least series of punctures—on each elytron, and ten interstices, the first interstice being that between the first and second striae, the space between suture and first stria being the sutural interval. In many forms there are some additional punctures described by me previously as placed between series 1 and the suture. I find some difficulty in understanding these intercalated punctures. In many cases they look as if the sutural series (as traced from the apex forwards) was, when near the front, pushed towards the outside, and then prolonged to the base by means of additional punctures added close to the suture. This would make us treat the additional punctures as being inserted between the suture and the first series, as I have expressed it in the table of genera on page 4. In other cases the sutural series appears to be quite continuous from the apex to the base, and if this represents the true state of the matter the intercalated punctures are those between the first and second series. It should be noted that these punctures vary in number in the same species, and an aberration has been recorded in which they are present on one elytron and not on the other. My own opinion tends to the conclusion that these variable punctures are really those of the first series pushed out of place by punctures placed near the suture; and that they tend to disappear, while the sutural series is now completed by what are really intercalated punctures. The point cannot be decided, and the feature of interest really is the variability displayed by the punctures that are irregularly placed. The question is best exemplified by the species of *Meghelophorus*. The additional punctures appear to have a real importance, owing to their constant presence in a large number of allied forms and yet, though apparently important, they are very variable; this appears to be a difficulty: supposing that we adopt the view contrary to the one I favour.

In speaking of the labial palpi I described the existence of numerous fine hairs on them. Hairs that are apparently similar occur on other parts of the body and limbs. But before speaking of them I must emphasise the fact that in studying *Helophorini* it is necessary to have well cleaned specimens. These insects secrete on the surface of the body a peculiar exudation which dries, and obscures the smaller points of structure even in cases where the specimen has the superficial appearance of being quite clean; while in other cases it retains foreign bodies, so that the specimen is covered with a sort of incrustation, a

point that is very marked in the species of *Empleurus*. Specimens are best cleaned by soaking in very hot water, then washing them with soap and afterwards with benzine.

The fine setae are a very unusual occurrence in water-beetles. As already stated they occur only in some of the forms. In the *Empleuri* there are numerous stubby bristles, as also pointed bristles and curved stiff setae, but fine, flexible hairs are not to be found on any part of the body in most of this group. The bristles and curved setae are well known to entomologists, and are useful for distinguishing the species. But the fine silky hairs have hitherto escaped attention, except by Kuwert, who made use of them in so partial a manner as to be very misleading: those on the legs he called swimming-hairs, though it is not yet established that they have this function. One or two very fine hairs exist at the front of the pronotum near the angles; they are very delicate and difficult to detect, being very collapsible, but in *Meghelophorus* they can be found with comparative ease. Very long fine hairs, one on each joint, exist on the hind tarsi of various forms—*Trichelophorus* e.g.—the insertion being near the base, and near the upper margin of the inner face of the foot. Those on the tibiae may easily be found in *H. laticollis*. It must, however, be admitted that however important these flexile hairs may be, they are scarcely suitable for systematic purposes at present, owing to the difficulty of their demonstration.

The abdominal pubescence or clothing will no doubt prove to be important. Kuwert makes use of it in an unsatisfactory way in a few cases, while Ganglbauer goes so far as to give a "thickly pubescent" abdomen as characteristic of all the *Helophorini*. This, however, is erroneous. If an ordinary form, e.g., *Meghelophorus aquaticus*, be examined there will be found to exist a complex clothing on the abdomen, longish sub-erect hairs near the tip, marginal hairs on the hind-margins of the segment, scanty depressed hairs scattered over the surface, and a copious system of hairs so minute as to be difficult of definition with even a fairly high power of the microscope: hence the surface appears quite dull. Covered by the clothing there is an excessively minute sculpture, varying much according to the species, but often itself making the surface quite dull; so that from complete dullness of the abdomen we must not infer the existence of minute pubescence. *Empleurus* (*Megempleurus*) *rugosus* is instructive on this point. Of course we must be sure that the example we have under examination is perfectly clean; and in the species just named we shall then find that there are

really only a few very short bristles on the peculiarly sculptured surface, though, if we take off one of the hind legs, we shall find that the part concealed by it has a real minute pubescence. There exists in fact, a very great difference in this character between *aquaticus* and *rugosus*; and in the *Empleuri*, and the forms more or less related thereto, I attach great importance to it.

In the previous communication I have given an account of the structure of the aedeagus, and I will conclude these remarks by some observations of the bearing of this organ on the question of Helophorid affinities.

The aedeagus of the *Helophorini* is extremely similar to that of the *Hydrophilini*; indeed, if the structure be compared with that of *Anacaena* or of *Hydröus*, it will be found difficult to discover any distinction of importance between them.

Further, the structure is very homogeneous throughout the *Helophorini*; there are, it is true, slight differences in the relation of the lateral lobes to the median lobe that support the differentiation of certain of the genera—*Empleurus* and *Meghelophorus*: e.g.—but that is the most that can be said. Again, in many of the closely allied species the aedeagus appears to be quite similar, or at any rate so closely similar that it is hard to believe that the structures offer any bar to hybridisation. The difficulties that exist as to limiting some of the species of *Helophorini* on account of the variability of their slight differential characters are well known to Coleopterists, and it is not unreasonable to suggest that the variability may be due to hybridisation, as is now known to be the case in some genera of plants. Many of the species of *Helophorini* live in the most intimate association, and this is not infrequently the case with the most closely allied species; while copulation occurs apparently with great ease. In short, I do not know any beetles in which hybridisation appears *a priori* more probable than in the *Helophorini*. Whether it actually occurs is a matter for future observation, as I am not aware of any records of observations or experiments on this point.

(To be continued.)

EUTHIA FORMICETORUM REITT. :

AN ADDITION TO THE LIST OF BRITISH COLEOPTERA.

BY E. C. BEDWELL, F.E.S.

Early in July last I captured a single ♂ specimen of the above beetle whilst sifting some decaying wood removed from the interior of an old beech tree in the New Forest. The species was briefly characterised by Edmund Reitter in his table of the genus, in the "Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien," Band XXXI, Seite 546, as follows:—

EUTHIA Steph.

- 1.' Fühler mit stark abgesetzter dreigliederiger Keule.
- 2." Halsschild ebenso stark als die Flügeldecken punktirt.
- 4." Fühler der ♀ schlank, Glied 5-7 nicht, beim ♂ Glied 6-8 etwas quer.

Ziemlich schmal, einfarbig gelbroth oder hell bräunlichgelb, die ganze Oberseite mässig dicht, gleichmässig, deutlich punktirt.

Long. 1·2 mm..... *formicetorum* n. sp.

This may be translated thus:—

- 1.' Antennae with strongly discreted, three-jointed club.
- 2." Thorax as strongly punctate as the elytra.
- 4." Antennae of ♀ slender, joints 5-7 not, in ♂ joints 6-8 somewhat transverse.

Rather narrow, unicolorous yellow-red or light brownish yellow, the entire upper surface moderately closely, evenly, and distinctly punctate.

Reitter gives the distribution of the species as France, Dalmatia, and the Caspian Region; whilst Ganglbauer, subsequently, records it from France, Illyria (Goerz), and Mediterranean region, with *Formica rufa*.

A species of *Myrmica* was present in the tree, but very few examples occurred, and I quite failed to find the nest of the ant, and could not determine whether the *Euthia* or *Trichonyx sulcicollis* Reich., a few specimens of which also found their way to my bottle, was really associated with the *Myrmica*.

A visit to the locality a week later, and another in late autumn, failed to produce further specimens of the *Euthia*, and the *Myrmica* could not be found, although an additional example of the *Trichonyx* was revealed, after much search, together with *Quedius ventralis* Ahr.,

Q. manrus Sahlb., *Q. brevicornis* Th., *Scydmaenus collaris* Müll., *Bythinus curtisi* Denny, *Euplectus karsteni* Reich., *E. nanus* Reich., *Micromalus flavicornis* Hbst. *Plegaderus dissectus* Er., and *Abraeus globosus* Hoffm.

I am indebted to Mr. E. A. Newbery for assistance in identifying the *Euthia*, my specimen of which is a little broader than a ♀ from Goerz in Mr. Champion's collection, received from Reitter.

Coulsdon, Surrey :

January, 1915.

[I have taken three examples of this insect in the New Forest. These occurred (1) July 17th, 1907, in a dead oak bough at Ramnor; (2) June 27th, 1908, in dry débris of *Cossus*-oak, near Bank; (3) July 13th, 1912, in very rotten beech, Whitley Wood. The first two were some years ago submitted by Mr. Champion to a well-known Continental authority, and were returned as "probably *E. scydmaenoides* Steph., immature." To this species they bear little resemblance, except in size, and all three are apparently fully mature and hard; so they have remained among our "queries" up to the present time.—J. J. W.]

BRUCHUS PUSILLUS GERM., VAR. *SEMINARIUS* BAUDI, IN BRITAIN.

BY F. H. DAY, F.E.S.

In September last I found a number of specimens of a *Bruchus* in my greenhouse which I was unable to identify. They originated from a small bag of French beans (seeds) which had been left over from sowing in Spring, and allowed to lie on a shelf in the greenhouse. There were nearly a hundred seeds in the bag, most of which had been hollowed out by the larvae of the *Bruchus*. Enquiry from the firm from whom the seeds were obtained, brought the information that although they usually raised their own seeds of French beans in Essex, in this case, owing to shortage of crop the previous season, they had purchased a supply in the open market, and could not say if they were raised in this country or not.

Mr. Newbery, to whom I submitted specimens, informs me that the insect is *B. seminarius* Baudi, a species which occurs in the south of France, Italy, Dalmatia, Greece, Spain, &c., but not hitherto recorded from Britain. In the light of this it is probable that the beans were of Continental origin, and in view of the cosmopolitan

habits of many *Bruchi*, the present species can only be regarded as an addition to the long list of beetles which have been introduced to our country by commerce.

On the Continent it has been recorded as occurring on the flowers of *Viburnum lantana* and *Ligustrum vulgare*. In the second edition of the European Catalogue (1906), *B. seminarius* is given as a var. of *B. (Bruchidius) pusillus* Germ., and *Bruchus* is called *Laria*. The name *seminarius* has already appeared in our lists, but as a synonym of *atomarius* L., with which, however, the present species has nothing to do, belonging, in fact, to another sub-genus.

I have to thank Mr. Newbery for kindly giving me these details.

26, Currock Terrace, Carlisle :

January 26th, 1915.

A Catalogue of West Indian Coleoptera.—"A preliminary list of the *Coleoptera* of the West Indies as recorded to January 1st, 1914," has been published in the Bulletin of the American Museum of Natural History, vol. xxxiii, pp. 391-493. This list, commenced by Mr. M. L. Linell and continued after his death by Mr. E. A. Schwarz, and finished by Messrs. C. W. Leng and A. J. Mutchler, is stated to be substantially complete as far as the older records are concerned. Compared with the number of species recorded from Mexico and Central America in the "Biologia," upwards of 18,000, the preliminary West Indian list is a very meagre one, barely 2,900 species being enumerated. To judge, however, from the unnamed *Coleoptera* from these islands to be found in museums, the actual number existing there cannot be less than 5,000-6,000. An analysis of the list shows that the groups most numerous in species are:—*Rhynchophora* (533), *Phytophaga* (362), and *Longicornia* (242); and the genera best represented, *Cryptocephalus* (62), *Exopthalmus* (45), *Lachnopus* (43), *Anthonomus* (29), *Anchonus* (28), *Lema* and *Photinus* (26), and *Elaphidion*, *Lachnosterna* and *Cryptorrhynchus* (24). As no species of *Silphidae* (in the wide sense) appears to have been recorded, it may be stated that there are one or two *Aglyptonotus* (a genus related to *Liodes*) amongst the unnamed St. Vincent and Grenada insects in the British Museum. *Monoedus guttatus* Horn, recorded from Cuba in Trans. Ent. Soc. Lond., 1913, p. 73, is an addition to the list.—EDS.

The larva of Phyllotreta sinuata Steph.—Mr. E. M. Duporte (Canad. Entom., Dec., 1914, pp. 433-435) has described and figured the larva of this well known British insect, an introduced species in the United States and Canada. It was found in June, 1913, at Macdonald College, Quebec, mining the leaves of cress (which was practically destroyed by the beetle and its larvae) and feeding on the foliage of radish; and again in the following year, on radish, turnips and cabbage. "The larvae is a small eruciform grub, about 4 mm. long: the head

and pronotum are dark brown, the latter crossed by a pale median line; the second and third thoracic segments, as well as the first eight abdominal segments, bear several brown setigerous tubercles of various sizes; the last abdominal segment is deep brown or black, and fringed with pale setae; the general colour is green. The pupa is yellow and is to be found in a small cell in the soil around the affected plants." *P. sinuata* is said to be often associated with *P. vittata* F. Its distribution in the United States was recorded by Dr. Horn in 1889. According to Sanderson, the larvae also mine the leaves of wild pepper-grass (*Lepidium virginicum*). The Rev. W. W. Fowler has, during recent years, found *P. sinuata* in abundance on turnips in Cumberland, associated with *P. undulata* (cf. Ent. Mo. Mag., 1912, p. 286). Our most destructive turnip-flea, however, is *P. nemorum*.—Ebs.

The British species of Haliphus.—I should like to make one or two remarks as to Mr. Balfour Browne's valuable and interesting paper referred to by the Editors in the last number of this Magazine. He considers *H. apicalis* Th. to be the same as *H. striatus* Sh., giving the former name priority, and remarking that he does not know whether I had seen Thomson's description when I made mine. To that I can reply that I had not seen Thomson's description, but that had I done so I should not have withheld my own because the two do not agree. He assigns the date 1867 to Thomson's description, though the book bears on the title-page 1868 in large figures. It was not noticed in the "Zoological Record" till 1871 (Vol. VII, 1870), or more probably till 1872. As, however, my description did not appear till September, 1869, it is possible that Thomson has priority (though as a subscriber to his works I can say that they were usually behind their date), but I could not be expected to have seen it, even if it be really prior.

Now as regards the identification of *H. apicalis* Thomson. That author did not know (nor did anyone at that time) the difficulties attending the delimitation of these species, and his description is not decisive till the end, when the following occurs:—"Obs. Forma intermedia inter *H. lineatocollem* et *fluviatilem*, ab hoc coleopteris apice ovali-rotundatis, punctis in striis nigris minus profundis sed magis approximatis, antennis brevioribus, articulo ultimo fere toto nigrofusco, penultimo fere transverso discedens." These words do not agree with any *Haliphus* known to me.

Mr Browne frankly states that he makes the identification on the ground that Reitter and Ganglbauer both sent him specimens of *striatus* under the name of *apicalis* Th. Neither of these distinguished entomologists is an authority on this group—both, in fact, have meddled with it and muddled, and Mr. Browne had better have relied on his own opinion. It is certainly doubtful whether *apicalis* is *striatus*, *nomax*, or a Swedish allied species, and I think it cannot be settled till an examination of Thomson's types is made.

As Mr. Balfour Browne says in his paper, I differ from him as to *H. nomax* and *browneanus*. Although the two have a widely different distribution, he considers the latter only a variety on the ground that the aedeagus is similar

in the two. I cannot, however, admit that this has been demonstrated. I have, during the last two or three years, had occasion to examine the male characters in a great many obscure *Coleoptera*, and I find that the sac contained in the median lobe affords most important characters, though the lobe itself, or the accessory external parts, may not offer any distinction of importance. I need not ask reliance to be placed on my mere assertion of this, because I can point to the work of M. Jeannel, one of the most talented of living entomologists, who has established genera, and a classification of the *Bathysciinae* on this character. Now it has, up to the present, been entirely neglected in *Haliplidae*. Unfortunately it requires great skill and perfectly fresh specimens, for we have not yet succeeded in extroverting the sac in specimens that have been dried. My friend Muir, who has an anatomical skill and patience of the rarest kind, used to get at the sac by splitting the median lobe, or by injection, but this is most difficult to do in very small forms, and does not give such satisfactory results as may be obtained by extroversion by pressure in fresh specimens. Neither *nomax* nor *browneanus* occur here, but if anyone will send me fresh specimens we will see what can be done.—D. SHARP, Brockenhurst: Feb. 8th, 1915.

The British species of Haliplus.—Through the courtesy of Dr. Sharp I have received a proof-copy of his criticisms of my paper on some of the British species of *Haliplus*.

With regard to the specific identity of *H. apicalis* Thoms., and *H. striatus* Shp., I am in the same position as my critic in that neither of us has seen Thomson's types, but, curiously enough, the very words which Dr. Sharp quotes from Thomson's description, and which do not agree with any *Haliplus* known to Dr. Sharp, are just the words which first caused me to suspect the specific identity of *striatus* and *apicalis*!

As to *H. nomax* and *browneanus* I would point out that Dr. Sharp did not separate the latter from the former on the character of the internal sac, and I have endeavoured to show that, on external characters, there is no good ground for specific distinction.

If characters such as those of the internal sac, so difficult to determine even in fresh material, are to become a normal standard for specific distinction, we shall require some name for application to groups of species which are otherwise identical, as correct classification will become almost impossible. I look forward with anxiety to the time when the only true test of species will be by histological examination.—FRANK BALFOUR BROWNE, Cambridge: February 16th, 1915.

Notes on the two species of the Meloid-genus Hornia Riley.—Dr. Auguste Cros, of Mascara, Algeria, has sent me a copy of his interesting account of the life-history of *Hornia nymphoides* Escalera (Bull. Soc. d'Hist. Nat. Afrique du Nord, Nos. 2, 3, 5, 1913), a peculiar Meloid closely related to *Sitaris*. In the Ent. Mo. Mag., January, 1911, pp. 16, 17, I ventured to suggest that the genus *Allendesalazaria* Escal., type *A. nymphoides*, from Mogador, was synonymous with *Hornia* Riley, type *H. minutipennis*, from N. America; but this was dis-

puted by its describer (cf. *l.c.*, foot-note). Dr. Cros, however, after examining additional specimens captured by himself at Mascara, in nests of *Anthophora*, finds the two genera to be identical in structure. The minute, rudimentary, whitish wings, overlooked by Escalera, are present, as in *Hornia*. In December last my son sent me a living *Hornia* from Washington, taken from the nest of *Anthophora abrupta* (= *sponsa* Smith) on November 27th, with the following note: "The burrows of the *Anthophora* are about 6" deep and have a built-out clay entrance. At the extremity is a hard walled cell with polished inner lining and containing a single larva of bee or parasite well sealed up. The *Hornia* becomes adult in autumn, but remains quiescent enclosed in three membranous skins—one pupal and two larval—till spring. The specimen sent began to show signs of life after it had been kept in a warm room for a day. It is somewhat of a problem as to how the imagines manage to escape from the hard cell, the only suggestion being that they are weathered out—at any rate we found one specimen half protruding from a burrow which had been so exposed. The *Hornia* appears to complete its metamorphoses in one year, and is not to be found in the larval condition at this time of year." The N. African *H. nymphoides* was found in the nests of *Anthophora albigena* Lep. and *A. talaris* Pérez, by Dr. Cros.—G. C. CHAMPION, Horsell, Woking: February 6th, 1915.

Teratology in Triplax aenea Schall.—On November 7th, 1914, *Triplax aenea* Schall, occurred in considerable numbers, as it not infrequently does in this locality, under the bark of a moribund poplar in Ravensworth Woods, near Gateshead, associated with a few examples of *Tetratoma fungorum* F. Of the former species one specimen had three tarsi on the right anterior leg, the apical portion of the tibia being thickened and widened so as to bear them all at its extremity. The innermost one was normal in every respect; the middle one was slightly large, and the outermost one decidedly so. Both the redundant tarsi bore the usual four joints, but the basal ones were fused together so as to form one large one in which the two portions could, however, be clearly seen. In other respects the specimen was quite normal.—GEO. B. WALSH, 166, Bede Burn Road, Jarrow-on-Tyne: January 19th, 1915.

Coleoptera new to Cumberland.—The list of records of beetles for this county now extends beyond 1700 species, and it is becoming increasingly difficult to discover species hitherto unrecorded. Collectors have always been very few in number, the removal of Mr. H. Britten to the south making a marked reduction in the number of resident Coleopterists. Still, a few species of varying interest continue to be met with from time to time, and the following are among recent finds which have not yet been cited as occurring in Cumberland:—

Helophorus quadrisignatus Bach, Kingmoor, two specimens in a clay pool. *Oxyptodu amoenu* Fairm., Gt. Salkeld, in moss, 26.3.1913 (Britten). *Homalota subsinuata* Er., three specimens in my garden last spring. *Choleva coracina* Kell., Gt. Salkeld, Baron Wood, Geltsdale, scarce. *C. fuliginosa* Er., not uncommon, but formerly confused with *C. nigrita* Er., of which I possess only one Cumberland specimen taken by tuft-cutting at Orton, 26.xi.1899. I owe the

correct determination of these closely allied species to Mr. Britten. *Hister marginatus* Er., one specimen in a mole's nest, Gt. Salkeld, 21.x.1913 (Britten). *Monotoma quadricollis* Aubé, Carlisle, in garden and haystack refuse, May, 1914. *Cathartus advena* Waltl, Silloth, by the side of the dock, vii.1913. *Cryptophagus umbratus* Er., in my garden last spring, also taken by Mr. Britten at Gt. Salkeld. *Rhagonycha unicolor* Curt., Wreay, June, 1913, one specimen. *Phaedon concinnus* Steph., Silloth, 31.v.1914, one specimen. *Psylliodes affinis* Pk., Kingmoor Nature Reserve, common in August; Gt. Salkeld (Britten); Gelt (G. B. Routledge). *Apion genistae* Kirby, Kingmoor, abundant in May and again in August.—F. H. DAY, 26, Currock Terrace, Carlisle: *January 1st, 1915.*

Harpalus obscurus F., in Cambridgeshire.—I took a fine specimen of this insect at an old quarry near Fulbourn, Cambs, on June 23rd, 1914. It is interesting to find *H. obscurus* recurring after so many years, not many miles from where Dr. Power took it, at Swaffham.—N. F. MACHARDY, County Asylum, Cambridge: *February 16th, 1915.*

Lesteva luctuosa Fauv., in Yorkshire.—In July, 1913, I captured three specimens of a *Lesteva* which I found was not described in Fowler's "British Coleoptera," Vol. II, and not having access to the supplementary volume of that work, I sent one of them to Mr. J. R. le B. Tomlin. He returned it as an undoubted example of *Lesteva luctuosa* Fauv. I took these insects in a mountain stream near Malham, W. Yorkshire; they were found very firmly attached to the underside of stones, quite immersed in running water, in fact reminding one at once of the habit of *Dianous*.—J. W. CARTER, 15, Westfield Road, Bradford: *February 17th, 1915.*

Abundance of Pyrameis cardui in North Wales.—I did not notice the arrival of this species hereabouts last Spring, but in the Autumn freshly emerged specimens were abundant in the Conway Vale and on the northern shores of Cardigan Bay at Criccieth and at Towyn. *Plusia gamma*, its usual colleague in years of abundance, was observed, but not in unusual quantity.—WILLOUGHBY GARDNER, Deganwy, North Wales: *January, 1915.*

Pararge megaera and Chrysophanus phlaeas in 1914.—Referring to recent records of a third brood of *Pieris brassicae*, it may be mentioned that the prolonged Autumn sunshine of 1914 produced a third brood of *Pararge megaera* at Criccieth, where freshly emerged females were observed in three separate localities between the 2nd and 4th of November. A freshly emerged specimen of *Chrysophanus phlaeas* was also seen on November 4th. It is to be noted that these two species are evidently more hardy than *Pyrameis atalanta* and *P. cardui*; these butterflies were plentiful up to October 28th, when a colder night caused them to hibernate, and they did not appear again, though specially looked for, during the warm days at the beginning of November.—WILLOUGHBY GARDNER.

Pyrameis cardui in London.—A well preserved specimen of this butterfly was picked up from the pavement in High Holborn on November 12th, 1914. I fed the insect for two days and then set it at liberty, when it flew off briskly.—ALFRED SICH, Corney House, Chiswick, W.: *January*, 1915.

The British Lepidoptera of the Oxford University Museum (Hope Department).—The rearrangement of the *Macro-Lepidoptera* of this important collection was in 1913 kindly undertaken by Mr. F. C. Woodforde, F.E.S., who has now brought his task to a conclusion. The original "Hope-Westwood" collection, augmented more than twenty years ago by the Rev. F. M. Spilisbury's large collection of British *Lepidoptera*, includes fine series of several of our rare and extinct species, those of *Chrysophanus dispar* (now numbering 23 specimens), *Nomiades semiargus*, and *Noctua subrosea* being specially noteworthy, besides many specimens of historic interest and some good varieties. The work of rearrangement had become highly desirable by the gift of a large number of specimens of rare and local species by several of our prominent Lepidopterists, and by the presentation to the Museum in recent years of the fine collections made by the late Messrs. A. J. Chitty and H. S. Sellon. All these have now been incorporated; the insects have been "staged" where necessary to an uniform height, and special care has been taken to indicate by distinctive labelling the source of every specimen so far as it can be ascertained. The *Macro-Lepidoptera* now occupy 250 cabinet drawers, of which 48 are appropriated to the butterflies alone. The *Pyralses*, *Pterophori*, *Tortrices*, and *Tineae*, which in 1905 were enriched by the very fine collection of these insects generously presented by Mrs. E. C. Bazett, are contained in about 100 more drawers, and have also been recently arranged by the Museum staff. The entire series of British *Lepidoptera* in the Oxford University Museum, including the historic "Dale" cabinets (*cf.* Ent. Mo. Mag., 1907, pp. 93, 130, 154; 1909, pp. 106, 179), now forms one of the finest reference collections in existence, and is readily accessible to all students of the Order.—JAMES J. WALKER, Oxford: *February*, 1915.

Note on Kirby and Spence's "Introduction to Entomology."—The exact share which each author had in the production of this classic is detailed by Mr. Spence in the chapter (xv) which he wrote for Freeman's "Life of Kirby." The particulars given in the note (*ante*, p. 10) furnished by Dr. Longstaff are included.—E. G. BAYFORD, 2, Rockingham Street, Barnsley: *January 7th*, 1915.

Review.

"SOME SOUTH INDIAN INSECTS AND OTHER ANIMALS OF IMPORTANCE, CONSIDERED ESPECIALLY FROM AN ECONOMIC POINT OF VIEW." By T. BAINBRIDGE FLETCHER, R.N., F.L.S., etc., Imperial Entomologist to the Government of India. Madras: Printed by the Superintendent, Government Press. 1914. Price, 6 rupees (=9 shillings).

This handsome quarto volume is an important addition to the series of

valuable treatises on Indian Entomology as viewed chiefly from the economic standpoint, which in recent years have been issued under the auspices of the Government of India. The name of the author is a guarantee for the scientific soundness of the work, and the first nine chapters form a very clear and concise introduction to the general subject of Entomology. Chapters X–XXIII deal in considerable detail with the practical and economic aspects of the science and embody a large amount of interesting general information respecting the noxious and beneficial insects of the region, and incidentally of other animals by whose presence the operations of the agriculturist may be affected; a very complete and useful table of the usual Indian crops and their insect enemies being given on pp. 240–268. The second and larger half of the book is devoted to a separate detailed account, under the headings of Distribution, Life-History, Food, Status (as a pest or otherwise) and Control, of a very large number of insects affecting agriculture in South India. Every species referred to is illustrated by text-figures, the separate headings of these, mostly including two or more subjects, numbering 330, and the text-figures in the introductory part of the work bring the total up to 440. All these figures are very adequate, and in many cases, especially in the *Coleoptera*, are of high excellence. With one or two exceptions, the same may be said of the fifty plates by native artists, reproduced by the “three-colour” process. A number of these plates were already available from other Indian Government publications, and this fact has enabled this well-printed and well-written book, on which we heartily congratulate the author, to be issued at an exceedingly low price.

Societies.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY: Meeting held at the Royal Institution, Colquh Street, Liverpool, Monday, November 16th, 1914.—Mr. R. WILDING, President, in the Chair.

Dr. W. J. Fordham, The Villa, Bubwith, near Selby, was elected a Member of the Society.

The subject for the evening, entitled “The most interesting Field Observations made during the last Season,” gave rise to a discussion which was entered into by most of the Members present.

Mr. R. Wilding brought his collection of the genus *Bembidium* (*Coleoptera*) and made descriptive remarks upon the occurrence and peculiarities of each species, particularly mentioning the following, viz.:—*Bembidium* 5-striatum, *B. fumigatum*, *B. schuppeli*, *B. nigricorne*, *B. stomoides*, *B. lunatum*, *B. testaceum*, *B. anglicanum*, *B. fluviatile*, *B. prasinum*, *B. adustum*, and *B. argenteolum*. Mr. A. W. Hughes exhibited a yellow variety of *Euchelia jacobaeae*, a series of *Epinephile janira* including an example with strongly pupillate spots on the upper side of the hind-wings, also a specimen of *Agriopsis apritina* taken at sugar on the Crosby sandhills. Mr. W. Mansbridge, the following *Micro Lepidoptera*, viz.:—*Tortrix pronubana*, bred from larvae found in the palm-house

in one of the Birmingham parks by Mr. Bowater, the caterpillars there doing great damage to the acacias in the house; *Peronea variegana*, with vars. *albana* and *carrana*, bred from Wavertree larvae; *Mixodia schulziana*, a series from Delamere Forest, where it was plentiful, though not previously on record for the locality; *Paedisca solandriana*, selected varieties from Huddersfield and Hebden Bridge, W. Yorks; *Ephippiphora trigeminana* from the sandhills at Crosby, very small specimens; and a fine series of *Eupoecilia dubitana*, light and dark forms from the same locality.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY :
Thursday, January 14th, 1915.—Mr. B. H. SMITH, B.A., F.E.S., President, in the Chair.

Dr. Chapman exhibited an *Anthrocera exulans* with six wings, and an *A. anthyllidis* with three tarsi on the left mesothoracic leg, and an *A. achilleae* with symmetrical wing notches. He also showed exotic lattice-work cocoons, probably Syntomid or Lithosiid, and pupal burrows of *Scardia boleti*, showing the trap-door closing the cocoon proper. Mr. Moore, cases of *Psychidae* from the Island of Rhodes, cases of *Oeceticus kirbii* from Antigua, &c. Mr. R. Adkin, various cocoons of British species of *Lepidoptera*, and read a paper entitled "Some Pupal Habitations." Mr. Sich read an extract from the "Flora of Middlesex," Trimen and Dyer, 1869, giving an account of a Natural History field-meeting which took place in 1629 to Hampstead Heath.

Thursday, January 28th, 1915. The President in the Chair.

ANNUAL MEETING. The Balance Sheet and the Report of the Council were read and adopted. The President read his address dealing with the position and work of the Society during the past year, and with general entomology during the same period. The usual votes of thanks were passed. The following is a list of Officers and Council for the Session 1915-6: *President*: B. H. Smith, B.A., F.E.S.; *Vice-Presidents*: A. E. Gibbs, F.L.S., F.Z.S., F.E.S., and A. E. Tonge, F.E.S.; *Treasurer*: T. W. Hall, F.E.S.; *Librarian*: A. W. Dods; *Curator*: W. West (Greenwich); *Editor of Proceedings*: E. Step, F.L.S.; *Hon. Secretaries*: Stanley Edwards, F.L.S., F.Z.S., F.E.S., and H. J. Turner, F.E.S.; *Council*: R. Adkin, F.E.S., S. R. Ashby, F.E.S., J. Platt Barrett, F.E.S., Dr. T. A. Chapman, F.Z.S., F.E.S., B. S. Curwen, W. J. Kaye, F.E.S., D. R. Mordford, N. D. Riley, F.E.S., and W. G. Sheldon, F.E.S.

ORDINARY MEETING. Mr. Buckstone exhibited a bred series of *Bupalus piniaria* showing much variation; aberrations of *Hipocrita jacobaeae*, smoky, streaked with pink, and entirely smoky hind-wings; and *Spilosoma menthastri*, which on emergence had a pink flush which was evanescent. Mr. Edwards, living specimens of *Ephestia kuhniella* with pupae cocoons. Mr. G. T. Porritt, a fine series of ab. *nigrocostata* and ab. *nigrosarsata* of *Abraxas grossulariata* from Huddersfield, in 1914.—HY. J. TURNER, *Hon. Secretary*.

EXCHANGE.

Duplicates: *Pelophila borealis*, *Blethisa multipunctata*, *Badister peltatus*, *Calodera aethiops*, *Philonthus fumarius*, *Gabrieus trossulus*, *Stenus vafellus*, *Deliphrum crenatum*, *Euplectus ambiguus*, *Pentarthrum huttoni*, and many more.

Desiderata: British Coleoptera.—E. BULLOCK, Erin Hotel, Killarney.

CHANGE OF ADDRESS.

Mr. G. LEWIS, to 30, Shorncliffe Road, Folkestone.

Authors are requested to send their communications and proofs to either
J. J. WALKER, Aorangi, Lonsdale Road, Summertown, Oxford; or
G. C. CHAMPION, Horsell, Woking.

Those relating to Diptera, to

J. E. COLLIN, Sussex Lodge, Newmarket.

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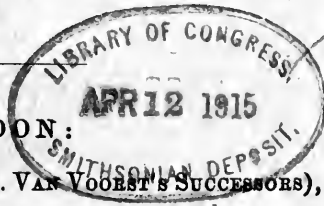
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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Wednesdays, April 7th, May 5th, June 2nd, October 6th and 20th November 3rd and 17th, December 1st, 1915. January 19th (ANNUAL MEETING), February 2nd, 1916.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m., on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

April 6th—"Hepatics," J. ROSS. April 20th—"London Clay and its Fossils," A. WRIGLEY. May 4th—"The Brent Valley Sanctuary: an Experiment in Bird Protection," WILFRID MARK WEBB, F.L.S., F.R.M.S.

Hon. Sec.: J. ROSS, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

Chingford Branch. The Chingford Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the last Friday in each month.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—Meetings: the Third Monday in each Month, October to April. Hon. Sec., WM. MANSBRIDGE, 4, Norwich Road, Wavertree, Liverpool.

A NEW CICINDELID FROM BORNEO.

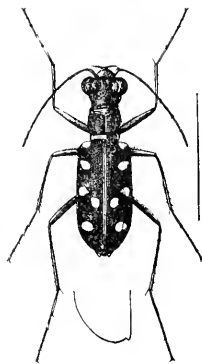
BY J. C. MOULTON, B.Sc., F.E.S.

(CURATOR OF THE SARAWAK MUSEUM).

On a recent expedition to the interior of Sarawak this Cicindelid was found in some quantities in one locality in the upper waters of the Baram River. At first I thought it was a local variety of the common *Cicindela aurulenta* F., but closer examination shows that it belongs to a different section of this extensive genus, and, as far as I can make out, it appears to be undescribed.

Cicindela beryllae sp. nov.

Similar in size and general appearance to the common *C. aurulenta* F.; labrum testaceous, narrowly margined with piceous; mandibles basally testaceous and black tipped; maxillary and labial palpi dark blue-green, metallic; head and pronotum metallic green; antennae violaceous; genae metallic purple, without hairs; head finely striate, longitudinally between the eyes, transversely at base; pronotum also transversely striate, but very faintly so; pronotum sub-quadrate, slightly narrower towards base, distinct setae at sides, base coppery; scutellum green, metallic; elytra at base nearly twice as broad as pronotum, towards apex just twice as broad, obliquely tapered at apex rather than gently rounded as in *aurulenta* (the female has no spine at sutural angle as in the Indian *C. intermedia* Chaud., and I can detect no difference in the shape of the elytra of the two sexes); suture coppery, upper surface dark velvety greenish-blue, with the base, apex and margins finely touched with metallic green; on each shoulder a round testaceous spot,* followed by another half-way between base and centre of elytron, then two more across the centre, that nearer the suture placed a little nearer the apex: a fifth spot close to the margin before apex: the spots are smaller than in *aurulenta*, and are more or less round, the two middle ones occasionally joined by a very fine testaceous line; underside bright metallic green-violaceous; well-developed white pubescence on the metasternum, on the anterior and middle coxae and femora, hardly any on the episterna of metasternum, and none on the abdomen as in *aurulenta*; legs brilliantly coloured: femora coppery, except apices which are rich violaceous like the tibiae and tarsi.



Length, 16—17 mm.

Allied to the Indian species *C. intermedia* Chaud., and *C. oberthuri* Fleut., but at once distinguished from both by its larger size, by the

* In Fowler's description of the Indian *C. aurulenta* these elytral spots are called "whitish." In *aurulenta* from Sarawak these spots are testaceous like the labrum; in the new species described above they are the same colour.

colour of the elytral spots, which are testaceous, not white, and by the absence of hairs on the genae. These last may have been rubbed off, but I am unable to detect any in the numerous specimens before me. It also appears to be closely related to *C. didyua* Dej., from Java, but differs from it in several points of structure.

Described from a series of twenty-six specimens collected between October 27th and November 5th, 1914, in small side streams off the Baram River, at Lio Matu, Sarawak, Borneo. Altitude approximately 700 ft. above sea level; distance by River from sea to Lio Matu approximately 220 miles.

Although the great Baram river is little more than a mountain stream at Lio Matu, where one can wade it waist-high, no *Cicindela beryllae* were found on the main stream; they appeared to be entirely confined to one or two smaller streams which flow into the Baram River at Lio Matu; some were taken quite close to the juncture of these small streams and the main river, but none actually on the main river. *C. aurulenta*, on the other hand, was common on the main river, but only once taken in a small side-stream. This latter species is about the commonest beetle in Sarawak, from coast to interior, lowlands to mountains; it ranges from Ceylon, all over India, Burma, South China to Formosa, and south to the Greater Sunda Isles.

I refrain from making any one specimen the type of this species; but out of the 26 specimens before me I distribute "co-types" as follows: a pair each to the British Museum, the Oxford Museum, the Raffles Museum, Singapore, and the Sarawak Museum.

Sarawak Museum:

January 26th, 1915.

STUDIES IN HELOPHORINI.

BY D. SHARP, M.A., F.R.S.

4.—THE EMPLAURI.

Before considering the species of *Helophorini*, I must give some explanation of the material on which my conclusions are chiefly based. Many years ago, I formed a considerable collection of *Hydrophilidae* of the world, and in the course of doing so the collection of Castelnau came into my possession, as well as the European collection of M. Laferté, this latter containing a series of specimens named by Mulsant. Some ten years ago this collection became the property of

the British Museum, but the *Helophorini* have been entrusted to me by the authorities, as well as many from the Fry collection and other sources, for study, many of the forms being unnamed. My chief object in these studies is, in fact, to bring order into this collection, and next, to elucidate our British species. Of the latter I have collected and examined many hundreds—I think I may say thousands—of specimens. Mr. Champion has entrusted me with his foreign collection of *Helophorini*, which contains several very interesting Mediterranean forms collected a good many years ago by Commander Walker, and he has also sent me some valuable British examples of the group. Mr. Balfour Browne has given me access to the charming collection he has formed, and Mr. Jas. Edwards, who has long been interested in *Helophorus*, has answered various questions I have addressed to him. To all these gentlemen, as well as to Commander Walker and others who have from time to time sent me specimens, I tender my sincere thanks.

In order to save space I shall not give references and synonymy that may be found in all the books, and that are accessible in Zaitzev's catalogue already referred to.

I have already stated (ante p. 3) that the non-aquatic *Helophorini* show so many points of distinction from the aquatic forms that they should form at least a distinct genus. Fuller investigation induces me to form them into several genera. Only five species of non-aquatic *Helophorini* are known to me, and they are so different among themselves that they form three genera and a sub-genus, together constituting the group *Empleuri*.

The characters of this group are as follows. Maxillary palpi with the terminal joint symmetric, nearly oval, but approximating to being pointed at the tip; labial palpi small, bare (except in *Empleurus* proper). Outline of pronotum very waved on the front margin in two directions. Elytra costate; pubescent epipleuron, very small; the 10th interstice broad and flexed to the underside, so as to form an extensive pseudepipleuron. Pubescence (as distinguished from setae) of abdomen, much reduced. Body and legs entirely destitute of flexible setae (the swimming hairs of Kuwert). Supra-pleural area large.

The genera are:—

Labial palpi setose*Empleurus* Hope.

Labial palpi bare:

Abdomen bare, wings well developed*Megempleurus* gen. n.

Abdomen with minute pubescence on basal

and apical segments, wings atrophied ...*Bradempleurus* gen. n.

The term *Empleuri* should not be used formally in a systematic manner, the reason being that the various features its members present (as given above) are all, when not merely negative, found in different degrees of development among the other *Helophori*. This fact, as well as the large proportion of negative characters, will probably suggest that the *Empleuri* are ancestral to the other *Helophorini*, and if we use the term ancestral in a vague sense this idea may prove to be correct.

The transitions from *Empleuri* to the aquatic *Helophori* are to be found chiefly in the genus *Eutrichelophorus*, the habits of which are quite unknown to me; until this gap in knowledge has been removed, it is unprofitable to consider general questions as to adaptation and phylogeny.

Thomson (in Skand. Col. X, p. 298) discussed *Empleurus* Hope, but did not consider it a valid genus because of difficulties in the case of *Helophorus fennicus*. He pointed out the difference of *Empleurus* from other *Helophorini*, as to the supra-pleural area, but he failed to observe other important characters of the *Empleuri*, and also that *fennicus* has a marked distinction in the structure of the part just mentioned. I may add that he calls this part "epipleuron of the prothorax," but this use of the term epipleuron can scarcely be justified while "supra-pleural area" is at any rate free from error.

MEGEMPLEURUS, gen. n.

Rugosus, the type of this genus, is the most advanced and distinct form of *Empleurus*, and is indeed the one that authors have most in mind when speaking of "*Empleurus*." The genus of which it is the type would therefore naturally itself take the name of *Empleurus*, but as Hope specially named *nabilus* as the type of his genus, it is better to continue to treat it as such, even at the cost of some temporary inconvenience.

The special characters of *Megempleurus* are:—

Body and legs destitute of flexible hairs; labial palpi quite bare; abdomen with minute pubescence only on the coxal band; front margin of pronotum very uneven; wing well developed.

The two species of the genus are not closely allied: though generally undistinguished in collections they form two sub-genera.

Clypeus broadly rounded in front, not margined *Megempleurus* i. sp.

Clypeus sub-truncate, raised and margined behind labrum...

Simempleurus subg. n.

1.—*Megempleurus rugosus* Ol.

This species needs no description, so far as the specimens known to me go, beyond the characters of the genus and sub-genus. But it is difficult to say anything exhaustive as to its distribution owing to *M. porculus* being confounded with it. The distinction between the sub-genera *Megempleurus* and *Simempleurus* as regards the form of the head appears hitherto to have escaped observation, so that I cannot say what species, real or supposed, may come under *Megempleurus*, proper, but I know only the one here under consideration, and have no acquaintance with the *siculus* or *pyrenaicus* of Kuwert. It occurs not only in Britain but appears to be widely distributed in the Mediterranean region. I have specimens before me from France (Alsace, Pyrenees, etc.), Spain (Albarracin), Algeria (Biskra, etc.), Tangier, Malta, Thaso Island, and Besika Bay. The variation is not very great. In our own country *M. rugosus* has been recorded from England, Scotland, Ireland, and Wales, and also has been described as injurious to turnips; but most of these records probably refer to the next species. Reitter does not distinguish the two as occurring in Germany, and mentions only *rugosus* "in Westdeutschland, sehr selten."

The aedeagus in *M. rugosus* is characteristic, the lateral lobes being rounded externally, pointed, extending considerably beyond the stout median lobe, and well separated at their tips.

It has been proposed to replace the well-known name of *rugosus* by that of *rufipes* on the ground that the species may be the *Opatrum rufipes* of Bosc. M. de Bosc's memoir has the distinction of being the shortest and worst I have yet become acquainted with; here is the whole of it: "Description d'une nouvelle espèce d'opatre par M. Bosc. —*Opatrum rufipes*, *Opatrum cinereum*, thorace tuberculato, elytris sulcatis, antennis pedibusque rufis. H. Parisiis, trouvé en mai." When we recollect that *Opatrum* belongs to a different primary division of the *Coleoptera*, I think we are not warranted in concluding that his species was *Helophorus rugosus*. M. de Bosc's description may be consigned to the oblivion from which it should not have been exhumed, after a century of peaceful repose. It was published in Bull. Soc. Philomat., Paris, 1791, p. 8.

2.—*Megempleurus (Simempleurus) porculus* Bedel.

This species has been, and still is, confounded in collections with *M. rugosus*, though the two are not really closely allied, *M. porculus*

being distinguished from *rugosus* and from all other *Helophorini* by the shape of the front of the head. In addition to this, and to the fact that the sub-median interval of the pronotum is not completely divided into two parts, there exists also a distinction in the supra-pleural area, which is narrower in *M. porculus*.

It appears to be a variable species, and far from abundant in collections. Kuwert distinguishes a variety, "*aper*" of Pandellé, said to be smaller and with a narrower thorax. I have specimens before me which I received from Pandellé many years ago. They exhibit the characters mentioned by Kuwert, and I find that in the male the median lobe of the aedeagus projects slightly beyond the lateral lobes, whereas in the other forms the three lobes are of equal length. I am not satisfied that this difference may not be merely that of position due to greater protrusion resulting from lateral compression of the lobe, and the body characters are too variable to rely on. If we treat the large broad forms, those which most resemble *M. rugosus*, as the typical condition, then most of our British specimens would have to be considered another variety with rather longer and more parallel after-body. Mr. Champion has, however, found specimens at Walton-on-Naze that differ but little from the broad typical form. There is considerable variation in the length of the maxillary palpi, but this does not appear to be correlative with the other variations, so that at present I consider all to be one species. *M. porculus* then extends from the north of Scotland to the Mediterranean (Gibraltar and Malta, Commander Walker), the var. *aper*—if it be such—being Pyrenean. Specimens from Volo in Thessaly (Stussiner) scarcely differ from those found in Scotland.

BRADEMPLEURUS gen. n.

Labial palpi bare; abdomen with minute pubescence on the basal segment and on the apical segment, the hind margin of the basal segment is, however, bare in the middle. Costae of elytra very strong. Wings atrophied.

The *Helophorus schmidti* Villa, constitutes this genus. It is usually considered to come very near to *E. nubilus*, but this is quite erroneous, and those objecting to numerous genera must associate this with *Megempleurus*, not with *Empleurus*. In the costation of the elytra it is the most remarkable of the *Helophorini*. The abortion of the wings is a very rare phenomenon in the subfamily and the shape of these organs is very peculiar; they being as broad as they are long and with a truncate extremity.

1.—*Bradempleurus schmidti* Villa.

This little insect is readily distinguished from all the other *Helophorini* by the sculpture of the elytra and the shape of the wings: the second (third of many authors) interstice commences at the base by being strongly elevated, but, coming to a deep transverse depression of the surface suddenly disappears, the elevation being resumed immediately behind the depression; the 4th interstice runs as a strong setigerous carina nearly as far as the apex of the elytron; the 6th commences at the base as a strong carina, but at one-fourth of the length of the elytron this carination ceases, and is only resumed for a short distance near the tip.

The localities given for this species are the Pyrenees, Alps, and Apennines. It has, however, been recorded from Spain (von Heyden's *Reise Spanien*, p. 50) and has been met with by Mr. Champion and myself in several localities in the Cantabrian Mountains, and also at Albarracin by Mr. Champion. The only Pyrenean specimen I have seen agrees with these Cantabrian examples, except that the post-scutellar depression is not quite so deep.

Villa described the species from Lombardy, whence I have seen only a single example (Little St. Bernard, Champion): it agrees with the Pyrenean specimen.

In Switzerland the species is considered to be rare; it was described by Heer as *H. alpinus*: and I have before me three examples with that locality and name from the Castelnau Collection. They are smaller than the more Southern examples, and Heer says that his species is $1\frac{1}{3}$ lin. long, and Stierlin gives $2\frac{1}{2}$ mm. as the length of Swiss examples, whereas those from the South are $3\frac{1}{2}$ mm. long.

In addition to the above there are two examples in the Castelnau Collection named "*Helophorus sulcatus* Dahl., Hongrie." The species does not appear to be recorded from that region, and I cannot find any reference whatever to "*sulcatus*" in the modern catalogues or literature. The name nevertheless had some currency of old, for "*sulcatus* Dahl." is named by Hope as probably a member of his genus *Empleurus*. The peculiar wings are of the same shape in a Spanish, a Swiss, and a Hungarian example.

Reitter (*Fauna Germ.*, II, p. 347) includes the species, but says of it: "in den Alpen; vielleicht in Bayern aufzufinden," so that its occurrence in Germany is not ascertained.

I have entered into these particulars, not only because *schmidti* is a remarkable species with peculiar distribution, but also because I find a want of agreement in the structure of the aedeagus, which if borne out by the examination of a greater number of examples may give rise to the discrimination of more than one species. The structure is quite of the *Empleurus* type, the lateral lobes being rounded externally, and the median lobe short and robust, overlapped till near its tip by the lateral lobes. In an example from the Cantabrian Mountains the median lobe is considerably shorter than the lateral lobes, but in a Hungarian example it is quite as long as the lateral lobes; while a Swiss example appears to be intermediate in these respects. Whether there is local variation, specific distinction, or merely difference of position or of shrinking, I will not venture to express an opinion on the inadequate evidence.

EMPLEURUS Hope.

Empleurus Hope, Col. Manual, Part II, p. 149.

Abdomen feebly pubescent, labial palpi setose, body without flexible hairs, supra-pleural area large.

Hope specially named *nubilus* as the type of his genus, saying of it "the type of my genus *Empleurus*; *Elophorus* may properly be divided into two subgenera: those with striate elytra, and those which have the wings deeply sulcated or porcate. *Nubilus* is often found at the roots and stalks of cabbages; the water held in the leaves of the plants being quite sufficient to saturate the ground around and satisfy the insects. I have watched the same insects for eight or nine weeks at the same plant, and never knew their numbers during that time increased or diminished."

The genus was thrown into complete confusion by Kuwert who united it with other forms, and proposed the new name *Trichelophorus* for his incorrect combination. Ganglbauer and Zaitzev have restored the name *Empleurus*, but Kuwert's taxonomy still exists in Zaitzev's catalogue, where *Empleurus* includes, besides the species I assign to it, those I place in *Eutrichelophorus*.

1.—*Empleurus nubilus* Fabr.

This species is the best known of the allied forms. Its individuals are always in a very dirty state. When thoroughly cleaned, the typical form has the head black, the thorax of a dark testaceous—somewhat reddish—colour, the elytra pale with a few dark marks on the posterior part; underneath it is dull reddish yellow, the legs being

entirely yellow except an infuscation of the apical part of the terminal segment of the tarsus. The upper surface bears an abundance of short curved setae. The grooves of the thorax are deep, the external one more definite than usual; the intervals are roughly granulate and setose, the median one extends quite to front margin, where it is a little broader and flatter; it is only a little broader in the middle, and not angularly prominent externally, so that the sub-median groove is not very irregular; the sub-median interval is rather narrow behind but considerably broader in front, so that its inner edge is sinuous, it does not reach to the front margin; the sub-external groove is well marked. The sculpture of the elytra is coarse, the costae strongly raised, and there is a slight transverse depression a little in front of the middle that gives rise to a slight irregularity there of the elevated second interstice.

Considerable variation occurs, especially as to colour. In a few the thorax is a good deal infuscated, and the elytra are more extensively maculate, and the sterna and base of the abdomen are also infuscate. In some cases the depression on the elytra is more marked.

Empleurus nubilus is widely distributed in the British Islands, and is no doubt common over much of Western Europe. French specimens from as far south as Lyons agree with the ordinary form found here. Mulsant says "common in France, but I have not seen any from the Mediterranean zone." In the Fry collection there is, however, an old and bad example labelled "Nice." Common in Germany, according to Reitter, and according to Ganglbauer over the greater part of Europe. Kuwert says "Northern and Central Europe," but he gives a var. *costatus* as to which cf. *E. hispanicus*.

2.—*Empleurus hispanicus* sp. n.

E. nubili proxime affinis; colore obscuriore, statura magis depressa, sulcis prothoracis minus argutis, aedeago longiore, etc., distinctus. Long. $3\frac{1}{2}$ —4 mm.

Extremely close to *E. nubilus*, but with the after-body more elongate and depressed and the colour not so pale as in the type form of *nubilus*, though somewhat similar to the dark var. There is considerable variation analogous to that of *nubilus*, but I have not seen an example that really agrees with any specimen of that species.

The aedeagus is larger and more elongate than that of *nubilus* with a longer median lobe, and the apices of the lateral lobes not quite so widely separated. We have mounted the structures of the two side by side, and I hope to have them photographed and illustrated.

Found by me in the Asturias and Guadarrama. I have not seen any other examples.

Kuwert mentions a var. *costatus* of *E. nubilus*, saying that it is so slight as scarcely to be a var.; and Ganglbauer treats the name as a mere synonym of *nubilus*. Kuwert considered *E. meridionalis* Motsch. to be the same as *costatus*, but Ganglbauer treats it in a different way, making it a slight variety. Motschoulsky's remark about his supposed species can scarcely give the name validity, all he says is "*Empleurus meridionalis*, Parreyss, ressemble entièrement à notre *Emp. nubilus*, mais ses élytres sont plus allongées et un peu plus étroites. Il habite les parties méridionales de la Russie, la Turquie et la Grèce." This remark does not lead me to infer that it may have reference to *E. hispanicus*. I cannot trace any other reference to "*meridionalis* Parreyss" in Entomological literature, and as Ganglbauer merely translates the four words of Motschoulsky, and as I have no knowledge of *nubilus* in South-eastern Europe, I can do nothing more to elucidate the matter.

(To be continued.)

NOTES ON MELANDRYIDAE.

BY G. C. CHAMPION, F.Z.S.

The following notes on synonymy, geographical distribution, &c., were made during a recent study of the fine collection of *Melandryidae* in the British Museum. I hope to describe some of the unnamed forms later on. The family is extremely well represented in Japan and New Zealand; and it may be noted here that the group *Scaptiides*, species of which have been found mixed with *Anaspides* in every collection I have examined, is of world-wide distribution. There are several undetermined *Scaptiæ* from New Zealand in the Museum; *Scraptogetus* Broun (1893), however, must be referred to the *Anthicidae*.

EUSTROPHUS Latr.

Seidlitz, in 1898, separated from this genus the Japanese *E. macrophthalmus* Reitt, under the name *Synstrophus*, and described various allied forms from South Africa and Brazil under the name *Eustrophinus*. The type of the latter is *E. axillaris* Seidl., from Natal, of which there are many specimens in the Museum.

EUSTROPHOPSIS Champ.

Various Tropical American species of this genus have been added since it was characterized in 1889. The type is *Orchesia 15-maculata*

Cast., and there are several very similar unnamed forms from Brazil in the Museum.

HOLOSTROPHUS Horn

The type of this genus is the N. American *Eustrophus bifasciatus* Say. *Holostrophus* is represented in Japan, Formosa, Sumatra, Borneo, Java, the Philippines, &c.

XYLITA Payk.

The type of *Xylita* is the holarctic *Serropalpus laevigatus* Hellenius (= *X. buprestoides* Payk.). Specimens from the United States in the British Museum, named by Horn, agree perfectly with others from N. Europe, but Kirby's *X. buprestoides* from Canada (Fauna Boreali-Americana, iv, p. 240), is a very different insect which I am unable as yet to identify. *Serropalpus barbatus* Schall. is another holarctic insect.

CAREBARA Lec.

Xylita parreyssi Muls. (= *revelierei* Muls. et Rey), from S. Europe, belongs to this genus, and it is very closely related to the N. American *C. longula*. Leconte's name *Carebara* is pre-occupied by Westwood in *Formicidae*, and the coleopterous genus was re-named *Rushia* by Forel in 1893; Reitter's name *Xylitella* (1911), therefore, falls as a synonym. Fall described two additional N. American species under *Carebara* in 1907.

ZILORA Muls.

Seidlitz and Reitter both refer the Scotch insect recorded by Sharp under the name *Z. ferruginea* Payk. to *Z. sericea* Sturm (= *ferruginea* Muls. and *eugeniae* Ganglb.). According to them, the true *ferruginea* has more depressed eyes and the groove behind them obliterated, &c. The few Continental examples of *Z. eugeniae* before me have the prothorax much more coarsely punctured than in our Scotch insect, but otherwise agree with it. Several N. American *Zilora* are now known.

DIRCAEA Fabr.

I am unable at present to separate *Dircaea* from *Phloeotrya* Steph. *D. dentato-maculata* and *D. flavitarsis* Lewis, from Japan, have a very sharply margined prothorax, and they may have to be removed; *D. vitalisi* Pic, from Cambodia, appears to be nearly related to these insects. *D. lignivora* Lea, from W. Australia, = *D. venusta* Champ., from Tasmania, the latter name having a few months priority. *D. holmbergi* Mann. (1852), from Sitkha, is a *Marolia* and

= *M. fulminans* Lec. (1859*). There is a long series of it from Queen Charlotte Island in the Museum.

ANISOXYA Muls.

There are two specimens of a species of this genus in Lewis's Japanese Collection at the Museum. It is related to the Mexican *A. vagans* Champ.

MELANDRYA Fabr.

M. ruficollis Lewis, from Japan, is a *Phryganophilus*, as stated by Seidlitz and Hubenthal. The last named author (*Deutsche ent. Zeitschr.*, 1905, p. 57) treats it as a form of the N. European *P. ruficollis* Fabr. and names it var. *rosti*.

STENOTRACHELUS Latr.

I am unable to detect any difference between the N. American *S. (Helops) arctatus* Say (= *obscurus* Mann.) and the N. European *S. aeneus* Fabr. There are specimens of the latter from N. W. Russia, Kamschatka, Lapland, and Hudson's Bay, in the Museum. *S. arctatus*, therefore, must sink as a synonym of *S. aeneus*.

DAPSILODERUS Fairm.

The type of this genus is *D. costipennis* Fairm. (1887) from Sumatra. *Hylotastes terminatus* Pasc. (1882), from Sarawak, figured in Waterhouse's "Aid ident. Ins., ii, pl. ciii, belongs here, and, to judge from Fairmaire's description of the former, the two insects are synonymous. Pascoe placed his species in the *Tenebrionidae*, but he used the name of a Eucnemid genus, *Hylotastes* de Bonv., for it; this latter has several similarly coloured forms in the same regions. There are two unnamed eastern *Dapsiloderus* in the Museum (one from Tenasserim and the other from Penang, &c.), and two or three Tropical American forms in the Fry Collection apparently belong to it. Fairmaire correctly referred the genus to the *Melandryidae*.

Horsell, Woking:

March, 1915.

BRUCHUS OBTECTUS SAY, IN BRITAIN.

BY JAMES EDWARDS, F.E.S.

I have lately received, under the name *Bruchus lentis* Boh., specimens of a *Bruchus* found feeding in dwarf bean seeds which had been obtained from various seedsmen in the United Kingdom; but although

* cf. *Canad. Entom.*, 1892, p. 299.

they run to that species in Fowler's table (Coleopt. Brit. Isl., IV, p. 260), it is nevertheless evident that they do not belong to the *Bruchus lentis* of current literature. The latter has the antennae black with the first five joints yellow-red; the thorax twice as broad as long, with a tooth near the middle of the sides, which are strongly rounded before the tooth and straight and nearly parallel behind it; the upper-side brownish-grey with whitish spots, a pair of oval brown spots on the pygidium; the fore and middle legs, except the femora of the latter, red, the hind legs entirely and the middle femora black.

My specimens, by reason of their conical thorax without lateral tooth, the absence of any tubercles at the base of the elytra, and their yellow-red pygidium, I regard as *B. obtectus* Say. The latter appears in Cat. Col. Eur., 1906, as *Acanthoscelides obtectus* Say, and is sometimes referred to as *B. irresectus* Fähr. *B. obtectus* has long been known as a pest of the seeds of *Phaseolus*.

According to specimens kindly sent to me by Mr. Day, the insect here dealt with is the same as that which he introduced under the name *Bruchus pusillus* Germ. var. *seminarius* Baudi, *antea* p. 120.

It is not easy to determine what *Bruchus lentis* Power really was; no characters were given for it by the latter, but to E. C. Rye, who may have seen Power's specimens, it seemed "nearest to *B. loti*, and to be somewhat depressed, with no tooth on the sides of the thorax, and with brownish-grey and white spots, the first four or five joints of the short antennae reddish, the anterior legs entirely and the tibiae and tarsi of the middle legs reddish-yellow." The *Bruchus lentis* of Fowler's table (l.c.) and description (t.c., p. 264) has no tooth at the sides of the thorax; but the insect figured under that name (Pl. 125, f. 12) has a more pronounced angle at the sides of the thorax than *B. rufipes* Herbst (f. 10), which is put in the section having a tooth at the sides of the thorax, and there are no spots on the upper-side. *B. lentis* Boh. will doubtless be found in Britain by anyone having the opportunity to search for it where lentil seeds are stored; but in the meantime the question whether Power's specimens really belonged to that species remains doubtful.

Colesborne, Cheltenham :

March 8th, 1915.

[Mr. Edwards has sent me the specimens he assigns to *B. obtectus* for examination, together with some received by him from Mr. Day. They all seem to me to be inseparable from the common North and

Central American species recorded by Dr. Sharp in the "Biologia," in 1885, under the name *B. obsoletus* Say (= *obtectus* Say, *pallidipes* Fähr., and *fabae* Riley), agreeing with it in having a conical laterally unarmed prothorax, a red apical joint to the antennae, and a yellow-red roughly sculptured pygidium. *B. pusillus* Germ. var. *seminarius* Baudi (det. Schilsky), from the Mediterranean region, has a smoother black pygidium, unicolorous dark apical joints to the antennae, &c. Say's names were published in 1831, those of Fähræus in 1839. The three specimens representing *B. lentis* Boh., from Gravesend and Birch Wood, in the Power collection at the British Museum, have the sides of the thorax toothed, and agree perfectly with typical examples of that species. It has been recorded as bred from imported Egyptian seeds by the Rev. W. W. Fowler, to whom I am indebted for specimens. A third species, *B. chinensis* L. (*♂ pectinicornis* L.), has also been found in imported lentils, and recently captured examples of it have just been given me by Mr. W. West. This last-named insect (which may be distinguished by the pectinate (*♂*) or serrate (*♀*) antennae, and by having the under-side of the hind femora grooved and bearing two teeth, of which that on the inner-side is the larger) has been found at large by Mr. West and other collectors at Dartford or Darenth Wood, by Mr. E. A. Waterhouse at Putney, and by Dr. Sharp in the New Forest. Commander Walker has met with it in various localities in China. The type of *B. irsectus* Fähr. was from Persia.—G. C. C.]

NOTE ON AN ANTHOMYID FLY, *PHAONIA* (*HYETODESIA*)

TRIMACULATA BOUCHÉ, NEW TO THE BRITISH LIST.

BY J. T. WADSWORTH.

In June, 1914, whilst collecting larvae and pupae of the "cabbage-root fly," *Chortophila brassicae*, at the roots of cabbages, I obtained a few larvae that were larger than those of this species. They differed also from the latter in possessing a smooth rounded posterior segment, whereas the last segment of the "cabbage-root" maggot is obliquely truncated, and possesses seven pairs of pointed tubercles, in addition to the projecting pair of posterior stigmata which are common to both types of larva.

The larvae pupated in early July, and adults emerged in fifteen to twenty-one days from the date of pupation. The actual dates of emergence of three specimens were July 20th, 23rd, and 24th.

I recently sent a pair of these flies to Mr. J. E. Collin, who informs me they belong to a species hitherto unrecorded from Britain, viz., *Phaonia trimaculata* Bouché. These specimens are now in his collection.

Curtis (Farm Insects, 1860, p. 142) refers to this species as being unknown to him, and he remarks that "it will, in all probability, soon be detected in this country."

Bouché (Naturgeschichte der Insecten, 1834, p. 80) who first described the species under the name *Anthomyia trimaculata*, states that it is fairly common in gardens and fields, and that the larvae, which destroy the roots of cabbages, are to be found in summer and autumn, in company with those of *C. brassicae*.

It is somewhat remarkable that this comparatively large species (examples with extended wings measure 16 mm. across) should have hitherto escaped observation in this country.

The larvae from which the flies were bred were obtained at Northenden, Cheshire. I take this opportunity of thanking Mr. Collin for identifying the examples sent to him.

Since the above was in type two more examples have emerged (on March 15th and 18th) from pupae collected on February 11th and March 5th.

Dept. of Agricultural Entomology.

Manchester University:

March 6th, 1915.

Hypophloeus linearis F. and *Cryptophagus cylindrus* Kies., in the Wellington College district.—I obtained a specimen of the former of these two species several years ago by evening sweeping near Wellington College Station, but last July it turned up not rarely in the burrows of *Pityogenes bidentatus*, together with a very few examples of *Cryptophagus cylindrus*. The latter species appears to have been taken only once previously in England, viz., at Chobham—there also in company with *Hypophloeus linearis* (Ent. Mo. Mag., 1907, p. 234). It needs much care and patience to uncover the burrows without destroying the inmates. — J. R. LE B. TOMLIN, Reading: March, 1915.

A note on the synonymy of Gnypeta coerulea Sahlb.—In the European Catalogue of *Coleoptera*, 1906, Norway and Finland only are recorded as the native countries of *G. coerulea* Sahlb., notwithstanding that the volumes of the Ent. Mo. Mag. previous to the date of the Catalogue contain many records of the capture, in various parts of Great Britain, of the little Staphylinid in question. The omission of the name of our country as a habitat of the insect is probably due to confusion of the synonymy of the species comprised in the genus

Gnypteta, as well as also to the reasonable conclusion on the part of continental authorities that *coerulea*, being a Scandinavian insect, would not be likely to occur in Britain. As a matter of fact, however, quite a number of northern and hill country species occur in the moorland parts even of Devonshire, the insect under notice being one of them. Fortunately I have the dictum of one of the highest authorities for stating that our insect is the true *G. coerulea* Sahlb. It is rather belated now, perhaps, to publish the facts, but it seems desirable to do so. In December, 1901, when communicating with Monsieur A. Fauvel, I asked him if he would accept a few specimens of *G. coerulea*. He replied: "*Gnypteta coerulea* Sahlb. est une espèce distincte de *ripicola* Kiesw. C'est *ripicola* que vous avez en Angleterre, et avec plaisir, j'en recevrais un ou deux exemplaires. La *coerulea* est propre à la Scandinavie et Finlande. J'ai publié une note à ce sujet." Having received the promised specimens from me he wrote as follows:—"Votre *Gnypteta* est *coerulea* Sahlb. (*ripicola* Ksw. est une espèce très différente). J'ai des types de Sahlb. et Kiesw." Sharp's *Homulota carbonaria* is therefore synonymous with *coerulea* Sahlb., and not with *ripicola* Kiesw. (Revision, p. 114). In Fowler's "*Coleoptera*," Vol. II, p. 143, *ripicola* Kiesw. should be deleted as a synonym of *coerulea* Sahlb., and in the European Catalogue, *carbonaria* Sharp should be deleted as a synonym of *ripicola* Kies., and be added to *coerulea* Sahlb. *G. ripicola* Kiesw. has not as yet, been found with us. The synonymy of our two species is as follows:—

carbonaria Mann. nec Sharp.

labilis Er.

coerulea Sahlb.

carbonaria Sharp.

I have taken *G. coerulea* in damp moss, etc., in many of the moorland streams in the Plymouth district, and sometimes in considerable numbers.—JAMES H. KEYS, Whimble Street, Plymouth: February 22nd, 1915.

[I captured six specimens of this species on the banks of the Inn, below Guarda, in the Lower Engadine, on July 21st, 1900. Switzerland may therefore be added to the distribution. *G. coerulea* is not mentioned by Ganglbauer in his work on the Central European Staphylinidae.—G. C. C.],

The distribution of Helophorus mulsanti Rye.—In Fowler's work this species is recorded as occurring in various inland localities near London. I have not seen any specimens except from the coast, and should be much obliged if anyone who has fresh-water examples of the species would let me see them. I should also be very glad of information as to the distribution of *nanus*, *dorsalis*, and *strigifrons*.—D. SHARP, Brockenhurst: February 5th, 1915.

Evetria buoliana Schiff., in America.—A few notes culled from the recently published "Bulletin No. 170 of the U. S. Department of Agriculture," concerning the appearance of this common and destructive European Tortricid, may be of interest to British Lepidopterists. Serious injury to European pines was reported from a nursery in Long Island, N. Y., early in the summer of 1914, and Mr. A. Busck, the writer of the Bulletin, and Mr. Heinrich undertook an

investigation. It was found that the species has been repeatedly introduced on European nursery stock, and that it was already established in nurseries and parks in some twenty localities scattered over nine States. Two native pines, *Pinus strobus* and *P. resinosa*, are known to serve as food-plants, but so far no case of an attack out in the forests has been recorded. There are several members of the genus *Evetria* indigenous to the U.S.A. closely allied to *E. buoliana*, and, like it, confined to pines, and some of these are already recognised as capable of doing considerable damage, but although they pass through two generations in a year, none of them is so destructive as the newly introduced species. The European pine-seedlings are imported in the colder months when the young larvae lie dormant within the buds, so that an infestation is easily overlooked; in consequence of this, it is recommended that it would be advisable to prohibit all importation of 2-leaved pines, even as the 5-needled are already excluded, for fear of introducing the destructive blister-fungus, *Peridermium strobi*, which has rendered it impossible to grow Weymouth Pine in Europe. However, such extreme measures have not been decided on, though it is urged that this unwelcome visitor be stamped out before it spreads to the forests, and while its extermination remains possible. The Bulletin is illustrated by a number of excellent photographs and drawings.—H. G. CHAMPION, Washington, D.C. : February 22nd, 1915.

Cumberland Hemiptera—Heteroptera.—Having, during the past two years paid some attention to this Order, I give a few notes on the more interesting of my captures, many of which have been identified by Mr. E. A. Butler. *Picromerus bidens* L., not uncommon at Orton, along with *Elasmostethus griseus* L. and *Scolopostethus decoratus* Hahn; *Drymus sylvaticus* F., var. *ryei* D. and S., by sweeping at Stainton; *Gerris lacustris* L., abundant on the ponds at Cummersdale; *Ploiaria culiciformis* De G., a single specimen on the wall of my house; *Nabis ericetorum* Scholtz, found in numbers on heather at Orton with others of the genus; *Salda littoralis* L., plentiful along the margin of Lake Ullswater, in company with *S. scotica* Curt. and *S. c-album* Fieb. At Grinsdale I captured *S. cincta* H.-S. and *Anthocoris gallarum-ulmi* De G., rare at Orton: all three species of *Miris* were common. *Megaloceraea psammaecolor* Reut., was swept on the sandhills at Silloth, with abundance of *Macrotylus paykulli* Fall.; *Bryocoris pteridis* Fall., was locally common, and the same may be said of *Calocoris sexguttatus* F. Of the rare *C. alpestris* Mey., I swept three specimens in Gelt Woods. *C. bipunctatus* F., was not uncommon on sallow at Orton and Combe Crag; *Plesiocoris rugicollis* Fall., also on sallow at Combe Crag on the River Irthing; *Lygus kalmii* L., at Orton and Durdar on Umbelliferae; *Dicyphus stachydis* Reut., at Gelt and Shawk Quarries; *Cyllocoris histrionicus* L., this fragile creature occurred very sparingly at Caldbeck and Combe Crag; *C. flavonotatus* Boh., was not uncommon at Gelt, where *Mecomma ambulans* Fall., was plentiful; *Harpocera thoracica* Fall., Sceughmire; *Phylus coryli* L., rare, Gelt. Five species of *Psallus* were found, but none abundantly: these were *P. betuleti* Fall., *P. varians*, H.-S., and *P. roseus* F., from Orton, *P. ambiguus* Fall., and *P. variabilis* Fall., from Gelt. *Plagiognathus chrysan-*

themi Wolff, on the sandhills at Silloth. *Asciodema obsoletum* D. and S., from Orton; *Notonecta glauca* L., was plentiful enough in Monkhill Lough, where also occurred *Corixa fallenii* Fieb., *C. pruensta* Fieb., and *C. bonsdorffii* Sahlb. In the ponds at Cummersdale I caught *C. sahlbergi* Fieb and *C. fossarum* Leach.—JAS. MURRAY, 2, Balfour Road, Carlisle: January 21st, 1915.

Diptera in 1913-14.—The following captures seem to be worthy of record: *Chloropisca rufa* Meq., July 18th, 1913, High Lane, Cheshire; *Tipula marginata* Mg., August 25th, 1913, Meole Brace, Salop; *Hilara anglodanica* Lund., June 2nd, 1913, Amberley, Glos.; *Myiospita mediatubunda* F., May 24th, 1914, High Lane, Cheshire (an unusual variety, lacking the central thoracic stripe); *Sciara rufiventris* Meq., August 26th, 1913, Church Stretton, Salop.

I am indebted to Mr. F. W. Edwards for kindly determining the above, and with reference to the last-mentioned, he says: "This was first recorded as British by Grimshaw in 1903, and has not been noted since."

Siphona geniculata Deg., Aug. 2nd, 1914, Bomere, Salop; *Meigenia bisignata* Mg., June, 1914, Whitechurch, Dorset (a curious dark form); *Lydella ferruginea* Mg., August 11th, 1914, Bomere, Salop.

Mr. C. J. Wainwright, who was kind enough to name these for me, says of the latter that it is so far very little known, and that he has only seen one specimen other than the example in his collection, and both came from the Western counties.

Rhypholophus haemorrhoidalis Ztt., Sept. 6th, 1914, High Lane, Cheshire; *Rhypholophus varius* Mg., Sept. 6th, 1914, High Lane, Cheshire; *Beris geniculata* Curt., August, 1913, Meole Brace, Salop; *Oxycera pulchella* Mg., August 20th, 1913, Meole Brace, Salop; *Ischyrosyrphus glaucius* L., August 12th, 1914, Bomere, Salop; *Didea fasciata* Meq., June 4th, 1914, Whitechurch, Dorset; *Syrphus albostrigatus* Fln., June 14th, 1914, High Lane, Cheshire, and August 14th, 1914, Meole Brace, Salop; *S. cinctus* Fln., September, 1912, High Lane, Cheshire; *S. umbellatarum* F., August, 1914, Meole Brace, Salop; *S. annulatus* Ztt., August, 1913, Ollerton, Cheshire; *Brachyopa bicolor* Fln., June 3rd, 1914, Whitechurch, Dorset; *Eristalis sepulchralis* L., August 14th, 1914, Meole Brace, Salop; *Sericomyia borealis* Fln., August 31st, 1913, High Lane, Cheshire; *Hybos culiciformis* F., August 10th, 1914, Atcham, Salop, and August 19th, 1913, Craig Breidden, Montgom.; *Melanochila riparia* Fln., August 8th, 1913, Meole Brace, Salop; *Borborus nigrifemoratus* Meq., March 24th, 1914, High Lane, Cheshire; *Sphaerocera subsultans* F., June 4th, 1913, Manchester.

These last, though not so interesting as the others, may be new for the localities given.—HERBERT BURY, Lomber Hay, High Lane, Cheshire: February 18th, 1915.

Stenophylax alpestris Kol., in Scotland.—Recently Mr. Bernard T. Harwood sent me for determination a number of *Trichoptera*, and among them was a very good specimen of *Stenophylax alpestris* Kol., taken by his brother at Nethy

Bridge in 1913. The species has not previously been recorded for Scotland, but there was every reason to expect its occurrence there, as its few known British localities are all in the north of England, and on similar ground to what pertains largely in the Highland districts. It is widely distributed on the Continent as an Alpine or sub-Alpine species, but has always been regarded as very local in Britain. Indeed, the only locality in which it can be relied on, is a wild moorland wood ten miles from Sheffield, where in a large open marshy place, it is abundant. A few specimens have been taken in different years at Dunford Bridge, West Yorks, and a single one at Huddersfield. — GEO. T. PORRITT, Huddersfield: *February 12th*, 1915.

Mutilla europaea in Dorsetshire, etc. (corrections).—Mr. R. Butterfield writes to say he regrets that, owing to a misunderstanding, he recorded the *Mutilla europaea*, exhibited at the meeting of the Entomological Section of the Yorkshire Naturalists' Union (Ent. Mo. Mag., February, 1915, p. 46) as from Perthshire, whereas the specimens were taken by Dr. Haines in Dorsetshire.

Mr. Lofthouse also writes, referring to the same report (p. 44), that the locality for *Argyresthia atmoriella* should be Kildale and not Redcar; and that *Tinea fulvimitrella*, at Ingleby, etc., should read *Adela rufimitrella*.—GEO. T. PORRITT, Huddersfield: *March*, 1915.

Entomology in Denmark.—The recently published parts of the "Entomologiske Meddelelser" contain articles of more than usual interest, several of which are written in English. The Danish Society is a small one, and would welcome English Entomologists as members. The annual subscription is 5/- including the cost of postage of the parts as issued, samples of which would be sent on application to C. Engelhart, Villa Cis, Callisensvej, 40, Hellerup, Denmark.—Eds.

Review.

"INSECTS AND MAN: AN ACCOUNT OF THE MORE IMPORTANT, HARMFUL AND BENEFICIAL INSECTS, THEIR HABITS AND LIFE-HISTORY; BEING AN INTRODUCTION TO ECONOMIC ENTOMOLOGY FOR STUDENTS AND GENERAL READERS." By C. A. EALAND, M.A., late Principal of the East Anglian College of Agriculture. Grant Richards, 12/- net

This book is written in a popular style throughout, and is evidently intended primarily for the general reading public, but it should also be very acceptable to those Entomologists who, while engaged in one special line of study, find it difficult to keep themselves informed of the general advance of the many-sided science of Economic Entomology. *Insects and Man* aims at covering the whole field of the relationships between man and insects, and deals with the enemies of plants and live stock, insects and human disease, beneficial and household insects, and human parasites. With such an extended scope, it would, of course, be impossible to give in a single volume detailed information concerning every

insect which affects man directly or indirectly, and the author has been wise in confining his attention to the more important species, particularly in the chapter on insects and plants.

In the chapter on human disease the recent work of Sambon on *Pellagra* and Townsend on *Verruga* is referred to, and there is an interesting account of the recent study of sleeping-sickness in Rhodesia; in the section on malaria, however, no mention is made of Ross's part in ascertaining the mosquito-borne character of this disease, nor is there any reference to anti-malaria work in India or Africa, nor to the hill malaria of the far east. The date of the proof of the connection between *Stegomyia fasciata* and yellow fever (1900) is referred to vaguely as "about that time" [1881], and the work of the U. S. Army Commission in Cuba is not directly mentioned. In one place it is correctly stated that yellow fever is only conveyed by the bite of this one species of mosquito, but on p. 101 is a reference to "some species of the yellow fever mosquitoes"; on p. 103 it is incorrectly stated that the eggs of the yellow fever mosquito are sometimes in rafts. On p. 159, through an amusing misprint, the capacity of a flea's stomach is said to be half a cubic centimetre!

It is a pity that for so high a price as 12/- the publishers should not have provided more uniformly excellent illustrations. Of many of these no complaint can be made, but others, to a Dipterist, are distressingly crude. In spite of these defects, however, the book is really valuable; it is in general reliable and up-to-date, and it is justly claimed that no other covers the same ground.

Societies.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY: ANNUAL MEETING held at the Royal Institution, Colquitt Street, Liverpool, *Monday, December 21st, 1914.*—Mr. R. WILDING, President, in the Chair.

Messrs. Vincent Fogarty, 56, Bolton Road, Ewood, near Blackburn, and Wm. Buckley, 59, Roseneath Road, Urmston, near Manchester, were elected Members of the Society.

The usual business of an Annual Meeting was transacted, and the following Members were elected as Officers and Council of the Society for the ensuing year, viz.:—*President*: Prof. R. Newstead, M.Sc., F.R.S. *Vice-Presidents*: R. Wilding, J. Cotton, M.R.C.S., etc., J. R. le B. Tomlin, M.A., F.E.S., and H. R. Sweeting, M.A. *Hon. Treasurer*: J. Cotton. *Librarian*: F. N. Pierce. *Hon. Secretary*: Wm. Mansbridge, F.E.S. *Council*: L. West, P. F. Tinne, M.A., S. P. Doudney, Wm. Webster, R. S. Bagnall, F.L.S., F.E.S., Chas. Frederick Burne, J. W. Ellis, M.B., Ch.B., F.E.S., Arnold W. Hughes, and J. Collins.

The retiring President, Mr. R. Wilding, read his address, in which he reviewed the entomological events of the past year in an able and interesting manner.

Mr. F. N. Pierce exhibited and described the hitherto unrecognised species of *Tortricidae* as follows, viz.:—*Cnephasia genitalana*, found in various collections

mixed with other species of the genus. *Hab.*: Kent and Essex. *Pocillochroma pomedazana*, an apple feeder until now considered to be a variety of *P. profundana*. *Hab.*: Devon and Herefordshire. *Lipoptycha aeratana*, for some time represented only by a single specimen in his collection, but lately found in Threlfall's series of *Dicrorampha tunaceti*. These have all been distinguished through examination of the genitalia, and full descriptions are published in the Ent. Mo. Mag. for January, 1915. Mr. W. A. Tyerman showed a fine series of *Sphinx ligustri*, most of which had laid over until the second year after pupation; a fine and long series of *Melanippe galiata* from Ainsdale (the ova were deposited in September by a very late female); also from Ainsdale, *Acronycta leporina*, *Cucullia chamomillae* and *Chariclea umbra*. By Mr. Wm. Webster, a large species of *Cicada* from India.

Meeting held at the Royal Institution, Colquitt Street, Liverpool, Monday, January 18th, 1915.—Dr. J. COTTON, Vice-President, in the Chair.

Mr. W. Mansbridge read a paper entitled "Silverdale as a Collecting Ground." Having given a brief survey of the geology and flora of the district, the author enumerated a large number of local species of *Lepidoptera*, generally rare in the North of England, but which had been recorded from this favoured area. Many of these, however, had not been reported for a couple of decades or longer, and members were urged to endeavour to confirm such records as *L. corydon*, *T. betulae*, *P. aegeria*, *E. hyperanthus*, *L. minima*, *S. malvae*, *S. anomala*, *A. marginepunctata*, *L. olivata*, and *E. taeniata*, all of which had been recorded some thirty years ago. He also referred to the two field meetings which had been held at Silverdale; gatherings which had been greatly enjoyed by all those who had attended. The author mentioned having taken a fine specimen of *Coccyx cosmophorana* on May 30th, 1914, in Gatebarrow wood, also *Adela fibulella* and *Eupithecia constrictata*.

Mr. A. W. Hughes exhibited *Lepidoptera* from Eastham as follows:—*Hybernia defoliaria*, *H. aurantiaria*, and a very long series of *Cheimatobia brumata* showing great variation from very pale to very dark brown, almost chocolate-coloured forms; the latter were scarce, forming only three per cent. of the number captured. *H. aurantiaria* had not been recorded previously for the locality. Mr. F. N. Pierce showed his extensive series of the genus *Cnephasia* (*Sciaphila*), containing all the British species except *wahlbomiana* and *abrasana*. With regard to these he stated that it was considered very doubtful whether they had any right to be included in the British fauna, or even to be ranked as good species at all. The variation was remarkable in that almost every species showed melanism and albinism, and it is only by a microscopic examination of the genitalia, which can easily be made without damaging the specimen, that the moth can be identified, especially when it approaches the extreme variation.

ENTOMOLOGICAL SOCIETY OF LONDON: Wednesday, February 3rd, 1915.—The Hon. N. CHARLES ROTHSCHILD, M.A., F.L.S., F.Z.S., President, in the Chair.

Mr. Adam Charles Smith, of Horton, Mornington Road, Woodford Green, was elected a Fellow of the Society.

The President announced that he had appointed Mr. G. T. Bethune-Baker, Mr. E. Ernest Green, and Dr. G. B. Longstaff to act as Vice-Presidents for the current session.

Mr. E. B. Ashby exhibited some Ruralids from Southern Europe. Mr. E. E. Green, specimens of the giant glow-worm of Ceylon (*Lamprophorus tenebrosus*), and its male—a large fire-fly. Dr. H. Eltringham, an instrument made to his instructions by the Cambridge Scientific Instrument Company, for cutting paraffin blocks perfectly square preparatory to placing them on the microtome. Prof. Poulton, specimens of the Australian Buprestid "Fire-beetle," *Merimna atrata* Lap. et Gory, and read notes. He also exhibited the male and female of *Stigmodera conspicillata*, and showed that the Australian Buprestid beetles, *S. conspicillata* White, and *S. cyanura* Hope, had been proved to be female and male of the same species. Prof. Poulton said that he had recently received notes upon the habits of the African ant, *Megaponera foetens* F., and its raids upon Termites, from three different observers. These notes gave rise to a number of interesting communications from various Fellows. The Hon. Walter Rothschild, F.R.S., a series of the four geographical races of *Cocytia durvillei* Boisd., and *Eucoctia meeki* Roths. and Jord. Mr. Lupton communicated notes on the life-history of *Agrotis lucerneae*, at Torquay. Mr. Talbot, on behalf of Mr. J. J. Joicey, a number of new forms of *Lepidoptera* to illustrate a paper entitled "New Butterflies and a Moth from Biak," by J. J. Joicey, F.L.S., F.E.S., and A. Noakes, F.E.S.

Wednesday, March 3rd, 1915. — Mr. G. T. BETHUNE-BAKER, F.L.S., F.Z.S., Vice-President, in the Chair

Prof. Wm. Blaxland Benham, M.A., D.Sc., F.R.S., University of Otago, Dunedin, New Zealand, was elected a Fellow of the Society.

Mr. P. A. Buxton exhibited a short series of *Brenthis pales* and *B. arsilache* from Lesjevaerk and Surendal, Central Norway. Dr. Cockayne (1) Gynandromorphous *Agriades coridon*, from Royston, August, 1914. The specimen was predominantly female, var. *semisyngrapha*; (2) Gynandromorphous hybrid, *harrisoni* (*Ithysia zonaria* ♂ × *Lycia hirtaria* ♀), bred in April, 1912, by Mr. Worsley Wood. The specimen resembled a female of this hybrid, but the left antenna was pectinated as in the male, the right was simple. Mr. J. Platt Barrett, a series of *Euchloe damone* from Mount Etna, and commented on their lack of variation; also a series of *E. cardamines* var. *turritis*, remarking on their small size. Comm. Walker, on behalf of Mr. B. G. Adams (a) a magnificent series of varieties of *Polygonia c-album*, including several strongly suffused examples, from the Forest of Dean; (b) two specimens of *Araschnia levana*, gen. aest. *prorsa*, from the same locality, taken in 1914; (c) a gynandromorphous *Urbicola comma*, right side ♀, left side ♂, from Box Hill; (d) a very fine melanic aberration of *Dryas paphia* ♀, taken by Mr. Rodney Wood in South Wales. Mr. F. W. Edwards, two species of apterous *Diptera*, one belonging to the *Borboridae*, the other to the *Ephydriidae*, both collected in the Falkland Islands by Dr. Malcolm Cameron, Fleet Surgeon, H.M.S. *Corwall*, on December 7th, the day before the naval battle. Both appeared to be new to

Science. Prof. Poulton exhibited a portion of a large family of *Acraea encedon* L. bred at Durban from a known female parent kindly sent to him by Mr. E. E. Platt. He also described the hibernation of vast numbers of *Musca corvina* in the cistern-loft of St. Helen's Cottage, St. Helen's, Isle of Wight. Mr. L. W. Newman, a living pupa of *Pyrameis atalanta*, and read notes on the copulation of *P. atalanta* in October, and the hibernating of the species in the pupal stage.

The following paper was read as a basis for a discussion on Mimicry:—"The Mimetic Theory—A Crucial Test," by Colonel N. Manders, F.Z.S., F.E.S. A most important reply was made by Mr. C. F. M. Swynnerton, which he has embodied in a paper entitled; "A Brief Preliminary Statement of a few of the Results of Five Years' Special Testing of the Theories of Mimicry." Prof. Poulton, Mr. G. Marshall, Mr. Neave, and other Fellows commented.—
GEO. WHEELER, *Hon. Secretary.*

NOTES ON *XANTHIA* (*MELLINIA*) *OCELLARIS* BORKH.

BY H. WORSLEY WOOD.

The following notes on **Xanthia ocellaris* and its varieties, with some consideration of certain allied species, form an attempt to co-ordinate and criticise matter at present to be found for the most part scattered through various Entomological publications, British and Continental.

I am under particular obligation to Herr Rudolf Püngeler of Aachen for many references to, and comments on, the Continental forms, and for the loan of his fine series of "*Xanthias*" which contained many remarkable examples of *ocellaris* from various localities

* The old generic name of *Xanthia* has been retained as being the only one available which includes *fulvago* L. in the same group with *gilvago*, *ocellaris*, and *cythrago*. The term is found in one recent British author (South, "Moths of the British Isles"), where it is used in a much restricted sense to include *lutea* Ström and *fulvago* L. The grounds on which it is applied are not stated. Hübner's genera have been used for others of the old genus, and if this is the *Xanthia* of the Tentamen, which belongs to *palaeacea* Esp., it is an error, and *Citria* Hb., Verz. 234 should be used. *Mellinia* Hb., the term now in common use, is unsatisfactory, since a knowledge of the life-history and structure of *fulvago*, *ocellaris*, and *gilvago*, make it difficult to understand the grounds on which they were separated. Grote in "A note on the use of *Xanthia*," Ent. Rec., VII, pp. 16, 17, after fixing the type of the genus *Citria* as *lutea*, writes "We have come to *Mellinia*, Verz. 235 for *palaeacea* = *gilvago* var. and *ocellaris* Bkh. If these two (or perhaps only one) species are generically identical with *Citria fulvago* (= *lutea*) the terms will of course fall." From this, assuming that *lutea* and *fulvago* are generically identical, we get:—

Citria lutea Ström.
fulvago L.
ocellaris Bkh.
cythrago Warren.
gilvago Esp.

The species have also been included in *Orthosia* by Meyrick, and in *Cosmia* by Hampson and Warren. *Orthosia* comprises 17 British species, many of which are obviously unrelated. *Cosmia* Tr., used by Warren, who takes *C. fulvago* L. as the type of the genus, is due to a confusion in the application of *fulvago* L. and *fulvago* Schiff. Herr Püngeler assures me that in Germany the older authors always used *fulvago* for *palaeacea* Esp., and Grote (*loc. cit.*) quotes Prout to the same effect. Cf. Hampson, Cat. Lep. Phal., VI, p. 502, "*C. fulvago* Linn. = *cythrago* Schiff. Type. Also of *Citria* Hb. and *Xanthia* Hb., Tent." Grote (*loc. cit.*) shows conclusively that the type of *Xanthia* of the "Tentamen" is *fulvago* Schiff. = *palaeacea* Esp.

in Asia, none of which were represented (April, 1914) in the National Collection at South Kensington. *Xanthia ocellaris* was first described by Borkhausen, "Naturgeschichte der europäischen Schmetterlinge," 1788—94, and Hübner in "Sammlung europäischer Schmetterlinge," I—VI, 1793—1827, gives the first figures: 192, ab. *palleago*; 193, *gilvago* = ab. *lineago*; 443, *gilvago* = ab. *intermedia*. This last figure is usually attributed to *gilvago* Esp., but Herr Püngeler considers it belongs here, and Treitschke, V. 2, 373—377, assumes that the three form one species, for which he retains the name *gilvago*.

It was not known to occur in Britain until 1893, when three specimens were captured, and from this date to the present time records are to be found in the Entomological journals, which afford valuable data for a study of the distribution of the species in this country. A life-history—the only one published—by Mr. H. O. Mills, may be found in the Ent. Mo. Mag. for 1908, pp. 267—9, and the same Journal (Sept., 1911) figured three forms of the insect without any attempt at fixing varietal names.

Barrett, "Lepidoptera of the British Isles," V, pp. 377—8, described and figured the first caught insect as ab. *lineago* Gn., and in discussing the other forms of the insect known to him writes of typical *ocellaris* as being similar to *gilvago* Esp. This is in accordance with his identification of the *gilvago*-like form taken by Mr. Guermontprez at Bognor in 1894 (Ent. Mo. Mag., 1895, p. 94) as *ocellaris* Bkh., and he here makes mention of another form—ab. *palleago*—to which the Rev. J. H. Hocking refers his two Ipswich specimens recorded in the same Journal on page 279. It is quite clear from Barrett's own descriptions and from information received from Mr. Taylor, the captor of the first *ocellaris*, who has recently compared his insect with bred typical examples, that all the early ab. *lineago* must be regarded as forms of *ocellaris* Bkh., an insect which varies a good deal in its ground-colour. The Ipswich captures must also be referred here. The Bognor specimen was an example of ab. *intermedia* Habich, and this, and not Borkhausen's insect, is the *gilvago*-like form.

The only other British author requiring consideration is Warren, who deals with the species in Seitz's "Macro-Lepidoptera," vol. III, at present only issued in parts to subscribers. He describes the better known forms and names a new one, but dismisses ab. *intermedia* with the statement that it "is said to be transitional between *ocellaris* and *gilvago*," an opinion which may still prevail abroad and among literary specialists here, but is one which certainly no British field-worker has

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The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m., on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

May 4th—"The Brent Valley Sanctuary: an Experiment in Bird Protection," WILFRID MARK WEBB, F.L.S., F.R.M.S. May 8th—Excursion to Nazing Common. Leader: R. W. ROBBINS. May 18th—"A Hawthorn Hedge in Middlesex," A. SICH, F.E.S. June 1st—"The Treatment of Nature in Gothic Design," Miss F. BAGUST.

Hon. Sec.: J. ROSS, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.

ever entertained. No figure is given, though there are fine bred examples of this form readily accessible in the Bankes Collection at South Kensington, and Staudinger gives a reference to the original description with figure by Habich. But Staudinger was not consulted, as is evidenced by the theory (based on sheer guess-work) that *intermedia* "may be, I think, the same as the yellower form of *palleago* (Hb. fig. 442), and if so would supplant the name *erythrago* for the preceding species." The two species are, of course, perfectly distinct, and, I think, have never until now been confused.

So much for our authorities; but in justice to Barrett it should be remarked that his errors in naming *ocellaris* appear to have arisen in part from the arrangement of the insects in the National Collection, for an account of which see Tutt's "British *Noctuae* and their Varieties," IV, pp. x et seq. This arrangement seems to have held good until quite recently, but in April 1914 they had certainly been re-grouped, for I found *ocellaris* represented only by ab. *lineago* which had its correct varietal name. Typical and lighter-than-type *ocellaris* were given specific rank as *palleago* (Hb. 192), though the *palleago* which appears in Staudinger's Catalogue (1901) as a species is Hübner's figure 442. Ab. *intermedia* boldly labelled '*ocellaris*' (? the cause of Barrett's error) found refuge in the series of *gilvago*, which series also harboured seven specimens of the true *palleago* (Hb. 442) = *erythrago* Warren and several examples of forms of *fulvago*, L.

Distribution. W. Central and S. Europe, W. and Central Asia to China, N. Africa (Algeria). Britain is on the western fringe of the area of distribution, and the species is at present confined to our E. and S.E. counties, with the exception of a solitary record from Coxhorne in Gloucestershire. The Thames Valley must be regarded as its headquarters, no other district offering anything in the nature of really consecutive appearances.

The first recorded capture in England was of a single insect taken on Wimbledon Common by Mr. E. H. Taylor, Sept. 27th, 1893; two others were taken at Twickenham in the same year. A few, generally not more than two or three, were recorded from widely separated localities every year after this (with the exception of 1897) up to 1900. From 1901 to 1906 I can find no records, but from 1907 to the present time the insect has appeared every year, the last published record (Entom., February, 1915) giving an account for the first time of the capture of any number from any locality outside the Thames Valley. Consecutive appearances seem to have been at Wimbledon, 1893-4

(1 in each year); Ipswich, 1895-6 (2 and 1); Wilmington, Kent, 1899-1900 (3 and 5); Market Downham, Norfolk, 1907-11 (4 in five years); Thames Valley, 1907-1914, the records for this period are consecutive only for the whole area covered by the term "Thames Valley," they are not consecutive for any one locality included therein.

The actual counties from which the species has been recorded are Sussex, Kent, Surrey, Middlesex, Essex, Cambridge, Suffolk, Norfolk, and Gloucester. Sussex and Gloucester records refer to single examples which were probably chance visitors. There is every probability that in all the other counties the species does or did breed.

Ocellaris Bkh., is the usual form of the insect taken here and on the Continent. *Ab. lineago* is of rare occurrence in England, but is taken more freely on the Continent; it is certainly not, as Barrett suggests following Staudinger, confined to the Altai Mountains. *Ab. intermedia*, first recorded from Bognor in 1894, occurs as about one to six or seven of the type and must be regarded at present as being almost confined to the Thames Valley, as only two appear to have been taken outside this district in 22 years. *Ab. gilvescens* is, so far, entirely confined to the Thames Valley; it was first recorded in 1910 when Messrs. Mills and Nevinson bred a few among the more usual forms of the species and since then five wild examples have been taken.

In the descriptions of the various forms which follow it will be seen that they fall readily into two groups:—(a) typical, and (b) *gilvago*-like. The first contains *ocellaris*, *abs. lineago*, *palleago*, *carneago*, and the Algerian forms; the second, *abs. intermedia*, *gilvescens*, and the *moneta*-like form from Russian Asia.

References are to figures in Ent. Mo. Mag., 2nd Series, vol. XXII, pl. iii (September, 1911).

Ocellaris Bkh., Ent. Mo. Mag., fig. 5. It has the size and form of *Taenio-campa miniosa*. The ground colour of the fore-wings is a mixture of red lead and grey, but paler than in *miniosa*, and the nervures stand out distinctly as light stripes. The transverse lines are very pale, darker margined (median shade dark grey, sub-terminal pale, edged with a row of blackish grey dots often faintly indicated or obsolete except the first above vein 6, fringe reddish ochreous); stigmata bordered by a mixture of grey and pale red lead colour, the lower end of the reniform with a white dot edged by black (dark grey). The hind-wings white (ochreous whitish, inner marginal third fuscous-tinged). Palpi grey (tinged with red). Head grey with pale reddish tinge. Antennae whitish above, below pale brown (red).

This is the standard description. Necessary additions have been given in brackets.

Variation is mainly in the ground colour, which may be pinkish, reddish-ochreous in all shades from pale to dark, or yellow-ochreous; all more or less tinged with grey. Markings vary but little. The transverse lines are rarely very pale in Britain, but usually of some shade lighter than the ground colour. The sub-terminal dots vary in number from 1 to 5; I have only seen one example with all 5 clearly indicated. I have seen one specimen with the white reniform dot obsolete.

Ab. lineago Gn. = *gilvago* Hb. 193 = *gilvago* ♀ var. Dup., VII, 1, pl. 129, fig. 6, has the fore-wings with the reddish tinge almost entirely replaced by dark grey; the terminal area is grey and the nervures stand out very prominently.

Variation. Extreme forms of a deep orange-brown occur on the Continent. I have only seen one British example. In the other direction those with paler grey suffusion merge into forms of typical *ocellaris* and no hard and fast line can be drawn between the two.

The figure of Duponchel is a good one.

* *Ab. palleago* Hb., fig. 192. "Paler than *ocellaris* without any tinge of red," is Warren's description in Seitz's "Macrolepidoptera." The figure given is probably copied from Hübner and shows a whitish insect with indistinct markings. Paler-than-type forms occur here very rarely. They occur more commonly

* Warren is right in fixing *palleago* Hb. 192, as a lighter-than-type form of *ocellaris*, but some further consideration of the term as used by earlier British authors in connection with this species and *gilvago* is necessary. Barrett (Lep. Brit. Isles, V, p. 378) mentions "the existence abroad of a pale yellow form . . . sometimes called *ab. palleago*," which would appear as it stands to refer to *palleago* Hb. 442; but if it is read in conjunction with a note by the same hand in the Ent. Mo. Mag. for 1895, p. 94, I think it is pretty clear that he had in mind some lighter-than-type form of *ocellaris* Bkh., and as such it may be allowed to stand.

The insect treated as a form of *gilvago* is *palleago* Hb. 442. Treitschke gave it specific rank, but Guenée deals with it as a variety of *gilvago* analogous to the *flavescens* form of *fulvago* L. In the Staudinger and Rebel Catalogue of 1901 it was again given specific rank, which is confirmed by Warren, who gives it a new name, *erythrago*. Tutt, in his "Varieties of British Noctuae," follows Guenée, and South, "Moths of the British Isles," II, p. 21, describes the insect and remarks, "this seems to be the *palleago* of Hübner which has been considered a distinct species; I think, however, it is only a form of *gilvago*." The two insects are perfectly distinct, and the use of *palleago* as a varietal name of *gilvago* should be deleted from Tutt and South; as both these authors give a description of the insect, none is necessary here, but it may be said that the few specimens I have seen could at once be separated from *gilvago* by the pale nervures, the pale grey reniform dot and the unicolorous fringes—all characters which they share in common with typical *ocellaris*. *Erythrago* does not share the wide distribution of its congeners, and appears to be both local and rare. Frankfurt, Budapest, Italy, and S. France are given as localities. Herr Püngeler's collection, rich in other species, contained only a single example, and his efforts to obtain others for me to work on the genitalia met with no success. Warren's suggestion that the Italian and S. French localities refer rather to *palleago* = *ocellaris* Bkh., looks like another guess, as there are two examples from the last-named locality in the National Collection. A further suggestion that all the poplar feeding *gilvago* will prove to be *erythrago*, supported by the statement that "*gilvago* in Britain feeds solely on elm," is another haphazard guess which should never have been made. It may not be generally known that *gilvago* does feed on poplar in Britain, but that it does so in Central Europe is supported by the evidence of recognized authorities in books, by no means difficult of access.

Fuchs "Stettiner entomologische Zeitung," XLIV., p. 264, states that he takes *gilvago* in the noted Poplar Avenue at Hamburg, and Tutt uses this quotation at least twice in his "British Noctuae," IV, 122, and in the Ent. Record (Vol. VIII). Dr. Wocke states that in Silesia young larvae of *gilvago* feed on poplar, and Dr. Rössler in "Lepidoptera of the neighbourhood of Wiesbaden," ISSI, p. 109, writes: "565. *Gilvago* Esp. Larva when young feeds on poplar." He later remarks that the moth is taken in all its varieties, which he describes, the last being referred to *palleago* Hb. This clearly means that the two insects occur together on poplar, and as Wiesbaden is only 20 miles from Frankfurt, which seems to be the headquarters of *erythrago*, nothing would be more likely.

A detailed knowledge of the early stages and an examination of the genitalia are wanted, to fix the position of this species in the genus.

in Europe, but the name should probably only be given to those Central Asiatic examples which agree with Hübner's figure in having a very pale ground colour with all the markings indistinct.

Ab. carneago Warren. A newly named form described as "pink, only basal and terminal areas faintly greyish, the markings very faint and the fringe pink." Not British and not represented in Herr Püngeler's collection. A figure is given, but as there is no indication as to whether it is a local form it is not much help; it would pass as typical *ocellaris*. It may refer to the Algerian "*ab. rubra*" mentioned below.

Algerian forms. In the early part of 1914 Messrs. Standinger and Bang-Haas sent me specimens of forms of *ocellaris* from Batna, which Herr Standinger subsequently stated had been carefully compared with the insects in his grandfather's collection from which his father had described them. The same insects appeared in Herr Püngeler's collection and in the National Collection under different specific and varietal names as set forth in the following table.

Staudinger.	Püngeler.	Nat. Coll.
1 <i>Ocellaris ab. lineago</i>		
<i>forma rubra</i> = <i>Ocellaris ab. rubra</i> .		Not represented.
2 <i>Ocellaris ab. lineago</i>	= <i>Palleago</i> 442 <i>ab.</i>	
	<i>austauti</i> form = <i>Palleago</i> 192 <i>ab. algerica</i> .	
3 <i>Palleago</i> 442 <i>ab. austauti</i>	= <i>Palleago</i> 442	
	<i>ab. austauti</i> = <i>Palleago</i> 192 <i>ab. austauti</i> .	

[*Palleago* Hb. 442 = *Erythrago* Warren, a good species.

Palleago Hb. 192 = *Ocellaris* type and lighter-than-type.]

Herr Püngeler was of the opinion that the three insects were forms of one species, which was not *palleago* = *erythrago*.

(To be continued.)

STUDIES IN HELOPHORINI.

BY D. SHARP, M.A., F.R.S.

5.—THE TRICHELOPHORI.

Eutrichelophorus, as constituted below, includes the forms approximating to the *Empleuri*; indeed, its species so resemble those of the terrestrial group as to have been confounded therewith. Unfortunately, we know nothing as to their habits, but their structures (like those of the genus *Empleurus*) would seem to indicate an amphibious life.

Trichelophorus is not really closely allied, and is apparently as aquatic in habits as any other of the *Helophorini*.

EUTRICHELOPHORUS gen. n.

Pronotum supra caput sublobatum, lateribus ante basin excisis, angulis posterioribus acutis. Corpus subtile parce pubescens.

The species of this genus are very readily distinguished from *Trichelophorus* by the form of the thorax, by the larger pubescent epipleuron, by the diminished pubescence of the under-surface, and the very slight development of flexible setae on any part of the body; while on the other hand the short, rigid, curved setae are finely developed and conspicuous. Although I originally intended to treat it as a sub-genus of *Trichelophorus*, the examination of a series of species convinces me that it is more natural to treat it as distinct.

It appears to be a genus of the Mediterranean basin, extending eastwards to Central Asia. The species are likely to prove numerous and extremely closely allied. The affinity with the *Empleuri* is seen at a glance. *E. bedelianus* was, indeed, in my old collection confounded with *Megemplerus rugosus*, to which it bears a remarkable resemblance.

1.—*Eutrichelophorus bedelianus* sp. n.

Latus, robustus, rufescens, capite superne nigro-subaenescente, elytris nigromaculatis; thorace profunde sulcato, lateribus ante basin excisis, angulis posterioribus acutis, dense sculpturato in elevationibus opaco et minute pubescente, elytris acute costatis, humeris acutis, productis. Long. 5½, lat. fere 3, mm.

Hab.: Gallia mer. (Montpellier, May, 1861, Hamlet Clark).

This insect has a great resemblance in size, form, and colour to *Megemplerus rugosus*, but it is a true *Eutrichelophorus*. The shoulders of the elytra are minutely acute, but project forwards rather than outwards, and the sub-median elevations of the thorax are not interrupted.

From *E. besicanus* the species is distinguished by its broader form, non-metallic thorax, the hairs more minute, the sides more deeply excised, the grooves less sinuous and less shining. I do not know the Algerian *H. oxygonus* Bedel, but from the description I anticipate that it will prove to be nearer *besicanus* than *bedelianus*.

I have named this interesting French species in honour of the esteemed French entomologist, M. Louis Bedel. I have seen only one example; though it was found more than 50 years ago, I believe the locality given to be correct.

2.—*Eutrichelophorus besicanus* sp. n.

Robustus, parum depressus, pronoto profunde sulcato, sulco mediano utrinque ante medium dilatato, intervallis evidenter villosis; prothoracis lateribus anterieus leviter curvatis, angulis prominulis. Long. 5½ mm.

A comparatively distinct species of this group, with broader head and stouter legs than usual. The palpi dark yellow, rather stout. Head slightly metallic, eyes continuing the outline of the clypeus. Thorax with the deep median groove very irregular, depressed and broadened just in front of the middle, sub-median groove very sinuous, sub-external groove also very distinct and sinuous, lateral margin a good deal raised, so that there is a definite appearance of a broad 4th or external groove, all the grooves slightly granular; lateral excision rather deep. Legs dark red, stout. Under-surface predominantly red.

Aedeagus stout, lateral lobes well surpassing the median lobe, slightly incurved, and with slightly sinuous outer margin; basal piece elongate.

Hab.: Besika Bay and Salonica (Commander Walker).

3.—*Eutrichelophorus baklarensis* sp. n.

Pronoto profunde sulcato, sulco mediano ante medium dilato et depresso, intervallis longius setosis, prothoracis lateribus anterieus leniter rotundatis, angulis prominulis. Long. 4½ mm.

Closely allied to *E. besicanus*, but smaller and less robust, with narrower head and longer hairs on the upper surface of the insect. The crenulation on the sides of the thorax is coarse, and the excision of the sides well marked. The upper surface of the head is metallic, but there is no similar appearance on the thorax. The elytra are dull yellow, and are marked with about 30 small dark spots.

These characters are deduced from a single specimen found by Commander Walker at Port Baklar, Gulf of Xeros, Turkey, in the spring of 1878; and I also assign to this species the second example from the Castelnau collection, labelled "*acutipalpis* Muls., Syrice." This specimen differs from the type in several minor peculiarities, but is, perhaps, not more than a variety or a local race.

4.—*Eutrichelophorus acutipalpis*, Muls.

In the Castelnau collection there were two specimens purporting to be *acutipalpis* Mulsant. They are probably two closely allied species, and I retain the name for the one that agrees best with the description in "Opusc. Ent.," 1, p. 165.

This insect is rather smaller than *E. besicanus*, and is readily distinguished from it by the broad shining thoracic grooves, the median one being straight-sided, not dilated in the middle. The head is smaller than it is in *besicanus*, and the whole insect less robust, with the ciliation of the surface feeble.

The locality given is "Turquie"; that mentioned by Mulsant being "Caramanie."

5.—*Eutrichelophorus ibericus* sp. n.

Supra sordide testaceus, elytris multi-nigromaculatis, capite nigro-aescente, prothoracis canalibus elytrorumque basi metallico-nitentibus, prothoracis lateribus ante basin parum excisis. Long. $4\frac{1}{2}$ mm.

Hab.: Transcaucasus (Faust).

Closely allied to *E. acutipalpis*, but easily distinguished by the excision of the sides of the thorax, which is less than in any other species of this genus. The median groove of the thorax is very broad, and is of an intermediate character between that of *besicannus* and *acutipalpis*, inasmuch as in front of the middle it is somewhat and vaguely broader so as to infringe on the median intervals. The metallic lustre is feeble, the intervals are moderately raised, coarsely granulate, with a moderately long pubescence. The elevation of the elytral interstices is strong, but there is no lateral expansion of the sides. The sordid yellow legs are moderately long and feeble.

I received many years ago two specimens of this insect from the late M. Faust of Libau. They are both in poor preservation, and I have no indication of locality more precise than "Transcaucasus."

6.—*Eutrichelophorus micans*, Fald.

I accept as this species a specimen received as such from Herr Reitter by Mr. Champion; it is in perfect condition, but on dissection proves to be a female. I distinguish it from *E. acutipalpis* by its larger size, more elongate form, and especially by its longer legs. The maculation of the elytra is very inconspicuous, and the humeral angle obscure though slightly prominent, the costae but little raised.

E. micans and *acutipalpis* are considered as one species by Zaitzev and Ganglbauer, and it is said to occur abundantly at Vienna. Faldermann's description is mostly applicable to the specimen before me, though it contains but little characteristic, and is probably erroneous in certain respects owing to his material not being properly cleaned. He says, however, "thorax quadratus, latitudine vix longior," and if this was not an error, his *micans* is not what it is supposed to be, as the thorax is strongly transverse. The Reitterian specimen is from the Armenian mountains.

As regards the *subcostatus* described by Kolenati in 1846 (Mel. ent. V, p. 65) from S. Russia, great obscurity that can only be removed by examination of his types, exists. Most authors treat it as a

synonym of *micans*, but Kuwert makes it a distinct variety, though the characters he gives are very unsatisfactory and appear, indeed, to be derived partly from the exudation with which his examples were covered.

I have before me three specimens from Merv (Hauser) sent to the late Mr. Fry as *H. micans*, var. *subcostatus*, by Reitter. They are extremely similar to the Armenian example I have above accepted as being *micans* Fald., and, relying on these, I should be inclined to conclude that *subcostatus* is merely a synonym. In view of the doubts as to the determination of my specimens this amounts to very little.

I have been able to examine the aedeagus of one of these Merv examples and find it to be peculiar, inasmuch as the lateral lobes and median lobe are less flattened than usual, resembling, indeed, three fingers, or toes; the lateral lobes are a little the longer and rather blunt. The distinction from the aedeagus of *E. besicanus* is sufficiently well marked to certify the two as species.

Besides these examples I have seen four from Mesopotamia (Millingen) which are so near to the Armenian insect that I think it well not to separate them on the authority of such scanty material, the chief distinction being that they are a little smaller and paler, and the thoracic grooves are a little less deep. An examination of the aedeagus shows these specimens to be immature, but the organ is sufficiently different from that of *besicanus* to make it certain that these two are distinct species, the aedeagus being more like that of *Trichelophorus*. It is not concordant with that of the Merv form, but as it is nearer thereto, and the material so scanty, and the general characters so close, I will not rely on it.

Two specimens from Persia from different sources are pretty certainly conspecific with the Mesopotamian examples, and a single example from Arabia (Hedjaz, Millingen) is also probably of this species.

My review of this inadequate material may be summarized by saying that *E. micans* may be a variable species, but it is probable also that more than one are mixed under the name. I regret that I have not seen any Austrian example.

TRICHELOPHORUS *Kuwert*.

True epipleuron small, false epipleuron large. Supra-pleural area rather broad and parallel. Setosity and pubescence of under-surface and hind feet well developed. Pronotum not hooded, hind angles obtuse.

Trichelophorus was established by Kuwert for a combination of the *Empleuri*, *Eutrichelophorus*, and the genus to which I propose to limit the name. It should not then have been proposed, as *Empleurus* was available. It is unnecessary to enter on a full consideration of Kuwert's confusion, further than to say that it probably arose from his not having consulted Hope's work in which *Empleurus* was established. Probably there are some who will consider that the name *Trichelophorus* should be abandoned altogether, but I prefer to retain it in a restricted sense with *alternans* Gené, as the type. It is well distinguished by the characters I give above. *T. oscillator* is exceptional on account of the epipleural structure approaching that of *Meghelophorus*.

1. *Trichelophorus alternans*, Gené.

This species is one of the commoner of the *Helophorini* in collections, and exhibits a good deal of variation. As found in England, it is a rather large form, about 4 or 5 mm. long, the elytra of a fuscous-yellow colour, much spotted with black and with rather numerous paler marks, the alternate interstices are a little elevated, the sixth rising into a strongly marked callosity at the shoulder which quite conceals the true humeral angle; these interstices bear numerous short, erect, stiff setae, and the lateral margin is rather strongly directed outwards, and it also is setose. The front of the pronotum is slightly emarginate behind the eyes, and the anterior angles are a little prominent, though very obtuse and rounded; the disc is broadly metallic, but the sides are yellow, and this yellow coloration extends along the front more or less distinctly all the way across; the seven grooves can all be distinguished, though only the median one and the sub-median are definite, the whole surface of the pronotum is uneven, and the raised portions bear a scanty pubescence; the lateral margin is a little turned upwards and is ciliate, but a little behind the front it ceases, and a vague transverse depression extends towards the middle, marking off the amount of prominence of the anterior angular portion. The under-surface is black, with the sides of the prothorax and the abdomen yellow.

In the south of Europe the colour is usually paler, so that the black marks on the elytra are more distinct, the pale marks more indistinct. The size of the punctures on the elytra varies much, as does also the amount of elevation of the interstices, which, however, is nearly always greater than in the English examples. The grooves on the thorax also exhibit a good deal of variation. In the Guadarrama

Mountains of Spain the species appears to be specially variable: one example from there is of such large size and dark colour as to simulate *T. oscillator*. An example from the Ionian Islands is of very pale colour, has the pronotal grooves unusually deep and definite, and the punctures of the elytra quite twice the size of those of the English specimens. Another from Smyrna is also highly aberrant; the general form approximates much to *T. mauritanicus*, and the median interval of the pronotum is on each side joined to the sub-median so that the sub-median groove is interrupted.

The distribution appears to be from England, south and east to the Mediterranean shores, but I have not seen any from N. Africa or Syria, and am not aware of any records from there or from Scandinavia. Ganglbauer only says "Mediterranean region abundant," and Reitter does not recognise its existence in Germany. Montpellier abundant and variable; Guadarrama the same; islands of the Mediterranean, Sicily, Majorca, Malta, Ionian Islands, Sardinia teste Gené.

It occurs both in fresh and salt water. Mulsant described it in the 1st edition of his "*Palpicornes* of France" under the name of *H. intermedius*, and stated that it is "southern"; in the 2nd edition he adheres to the name *intermedius*, and says that it is common in little streams throughout southern France. Gené's description and figure are extremely poor, but probably refer to this species, and they have several years priority to Mulsant.

Mulsant mentions a black individual found at Fort Queyras by Carret. This would probably be similar to the dark individual I have mentioned above from the Escorial.

2. — *Trichelophorus mauritanicus* sp. n.

Testaceus, elytris fusco-maculatis, capite thoracisque medio aenescens, subtus plus minusve late nigricans: elytris parum convexis, fortiter sculpturatis, callo intra-humerali bene prominulo, costis bene elevatis, longius setosellis. Long. 3½-5 mm.

Hab.: Africa bor.

Closely allied to *T. alternans*, and mixed therewith in collections. Rather smaller and more oval, the elytra being more pointed behind, the sculpture and setosity more marked, and the pseudopleura broader.

The species is easily separated, once it has been recognised, by the greater torsion of the elytra at the shoulders, the lateral margin springing out there with greater abruptness from under the callosity. A specimen in the Laferté collection was named by Mulsant "*Elophorus*

costatus Barbaria." I have seen no specimens from anywhere but North Africa, generally merely labelled "Algeria"; it has been found by M. Thery at St. Antoine and St. Charles. It varies a good deal in size. The aedeagus shows very little distinction from that of *T. alternans*, the lateral lobes are perhaps a little longer and more slender.

3.—*Trichelophorus oscillator* sp. n.

Nigricans, antennis, palpis, pedibus elytrisque fusco-testaceis, his nigro-maculatis, capite pronotoque aeneo-nigris, hoc latere externo obscure flavescente. Long. 6 mm.

Hab.: Aegyptus?

Rather larger and darker in colour than *T. alternans*, and with the epipleura differently formed, and making an approximation to *Meghelophorus* thereby. The palpi are normal for *Trichelophorus*. Thorax shaped as in *T. alternans*, but with the front angles more produced; the grooves as in *alternans*, but the setosity reduced. Elytra with the intra-humeral callus not very prominent, the alternate interstices elevated more distinctly behind than in front, setosity much as in *alternans* but shorter, accessory punctures three or four on each side. Under-surface black. I have seen only one example. In this interesting form the pubescent epipleura are long and intermediate between those of *Trichelophorus* and *Meghelophorus*, and the pseudepipleura are likewise intermediate.

The locality is a little doubtful. I received the specimen about forty years ago from Dr. Millingen in a box of pinned and mounted insects collected by him in Egypt, Mesopotamia and Arabia. A few of the specimens had come loose in the box, and I replaced them as best I could, labelling this one "Egypt?" If not from Egypt, it is from Mesopotamia or the Hedjaz. It is so very like the Hedjaz exponent of *Eutrichelophorus micans* that accompanied it as to suggest that it may have come from the same locality.

(To be continued.)

DESCRIPTION OF A NEW SPECIES OF *COELORRHINA*

(*CETONIIDAE*).

BY OLIVER E. JANSON, F.E.S.

COELORRHINA MUTICA n. sp.

♂. Narrow and nearly parallel-sided, moderately convex; bright green, the elytra pale straw-yellow with faint red and greenish tinges in certain lights, the suture narrowly bordered with green, the extreme outer margin and a small

spot on the humeral and apical callosities black; the knees, tibial spurs, and the claws also black.

Head sparsely punctured at the base, more coarsely and closely punctured and longitudinally convex in front; the clypeus almost quadrate, the side margins a little thickened, the apical margin narrowly reflexed and feebly arcuate. Prothorax one-third broader at the base than long, the sides margined and slightly sinuate behind the middle, the basal margin tri-sinuate with the outer angles rounded; the entire surface, as well as that of the scutellum, rather remotely and feebly punctured. Elytra one-third longer than together broad at the base, a little narrowed behind and separately rounded at the apex, where the margin is slightly serrate and a little produced, but obtuse, at the sutural angle; eight regular rows of very fine punctures on each and some scattered punctures in the interstices. Pygidium very convex, its apex sub-nodose, sparsely strigose at the base and slightly asperate towards the apex. Underside punctured and with sparse grey hair at the sides, smooth in the centre; sternal process large, the apical part beyond the transverse line triangular, with its apex somewhat obtuse and bent inwards; abdomen broadly and strongly impressed. Legs long and slender, the anterior coxae and femora fringed with brownish grey hair, anterior tibiae with two almost obsolete marginal teeth. Length 24-26 mm.

Dimbokro, Ivory Coast, West Africa.

This interesting species is remarkable in being devoid of any armature on the head of the male, and in this respect it differs from all the described members of the genus. In coloration it resembles *C. 4-maculata* Fab., but has the head, pygidium, and legs green as in *aurata* Westw. The aedeagus is very different from that of the allied species. Besides the puncturation described, the entire upper surface, when examined under a lens, is seen to have a secondary minute and dense alutaceous puncturation. The two specimens I have seen are males, the female being at present unknown.

Highgate, London, N.:

April 5th, 1915.

TEN NEW BRITISH DIPTERA (*NEMATOCERA*).

BY F. W. EDWARDS, F.E.S.

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The species to be mentioned have been known to the writer as British for some time, and as some of them are of considerable interest it may be worth while to place on record their occurrence in these islands. In the following notes I have refrained from mentioning any

Simuliidae, *Chironomidae*, or *Tipulidae*, as I hope to deal with these families in more detail at some future time.

1.—*SCIARA BICOLOR* Mg.

This is a large, conspicuously coloured species, with black thorax and red abdomen, resembling *S. rufiventris* Meq. (which was recorded as British by Grimshaw, in 1903), except in having yellow halteres. There is a male in the British Museum collection, from Llangammarch Wells, Brecknock, 27.vii.1913 (Lieut.-Colonel Yerbury), and I have seen another from Cambridge, 25.v.1905 (F. Jenkinson).

2.—*PLASTOSCIARA PERNITIDA* sp. n.

Head shining black; eyes with a few short scattered hairs; antennae in both sexes with the joints about as long as broad, and with the hairs about as long as the width of one joint; palpi very small, and consisting in each sex of two minute oval joints. *Thorax* black, brightly shining, with three longitudinal lines of black hair, and patches of black hair at the sides; scutellum with eight bristly hairs, and a few smaller ones on its posterior margin. *Abdomen* brownish, slightly shining; in the female long and cylindrical, nearly four times as long as the thorax; in the male much shorter, the hypopygium broad, its claspers short and broadly egg-shaped; on the inner side flattened and with a slight indentation near the tip; tip with a bunch of hairs but no spines. *Legs* brownish, tibial spurs yellow. Claws, empodium and pulvilli (or lateral divisions of the empodium) as in *Sciara*. *Wings* fully developed in both sexes; R1 reaching costa considerably before the fork of M; Rs arising about the middle of R1; tip of Rs slightly nearer the apex of the wing than that of M3; no bristles on the media or cubitus; wing rather longer in proportion to its breadth in the female than in the male. *Halteres* dark.

Length: ♂ body, 2.2 mm., ♂ wing, 2.5 mm.; ♀ body, 3.5–4 mm., ♀ wing, 3–3.5 mm.

10 ♂, 14 ♀, bred from larvae found feeding in a piece of rotten wood on Stanmore Common, Middlesex, 3.v.1914 (K. G. Blair). In the British Museum.

The genus *Plastosciara*, which has not hitherto been recorded from Britain, differs from *Sciara* proper in the greatly reduced palpi and the nearly bare eyes; and from *Peyerimhoffia* and other degenerate *Sciarinae* in the well-developed wings. *P. pernitida* differs from the only other species hitherto described (*P. pictiventris* Kieffer) in having the thorax shining black instead of brownish.

3.—*TRICHONTA FLAVICAUDA* Lundstr.

(Act. Soc. Fauua Fennica, 39, No. 3, p. 19).

Two males and one female from Nethy Bridge, Inverness, June, 1908 (D. Sharp). The species belongs to the *T. atricauda* group, but

is readily distinguished by the large yellow upper appendages of the hypopygium. A male presented by Dr. Sharp to the British Museum.

4.—*TRICHONTA SUBFUSCA* *Lundstr.*

1 ♂, 1 ♀. Logie, Elgin, 1913 (F. Jenkinson). In the Cambridge Museum.

5.—*TRICHONTA VERNALIS* *Landrock.*

(Zs. wiss. Ins.-biol. 1913, p. 88).

1 ♂, Felden, Herts., 23.ii.1899 (A. Piffard). In the British Museum.

6.—*RHYMOSIA TARNANII* *Dzied.*

1 ♂, Logie, Elgin, 1913 (F. Jenkinson). In the Cambridge Museum.

It may be mentioned here that *Rhymosia maculosa* Mg., may be re-instated in our list, as I have examined a male specimen collected by Mr. F. Jenkinson at Cambridge. The species identified by Walker as *Mycetophila maculosa* Mg. was really *R. fenestralis*, so that the present record practically amounts to a new one.

7.—*EXECHIA LIGULATA* *Lundstr.*

(Ann. Mus. Nat. Hung., 1913, p. 312).

Two males in the British Museum from Lelant, Cornwall, 22.vii.1912 (Lt.-Col. Yerbury), and New Forest, 25.x.1908 (F. C. Adams); a third in the Cambridge Museum from Crowborough, Sussex, 5.viii.1906 (F. Jenkinson).

8.—*EXECHIA MEMBRANACEA* *Lundstr.*

A male from Crowborough, 22.iv.1914 (F. Jenkinson), is in the Cambridge Museum.

9.—*MYCETOPHILA BIALORUSSICA* *Dzied.*

Two males from Logie, Elgin (F. Jenkinson), 4.ix.1909 and 1913, one in the Cambridge Museum, one presented to the British Museum by the collector.

This species is peculiar in having the front tarsi of the male thickened; otherwise it bears some resemblance to *M. bimaculata*.

10.—*CULEX HORTENSIS* *Ficalbi.*

1 ♀, Logie, Elgin, 11.ix.1911 (F. Jenkinson). In the Cambridge Museum.

The occurrence of this species in the North of Scotland is very surprising, as until recently it was not known outside the Mediterranean

region. In 1913, however, what is in all probability the same species was recorded from the neighbourhood of Bonn by Dr. P. Schneider (Verh. nat. Ver. Bonn, 70, pp. 1-54), so that the distribution is less discontinuous than might have been supposed a short time ago. Dr. Schneider determined his insects as *C. territans* (a North American species closely resembling *C. hortensis*), but this identification is probably not correct.

The Scotch specimen agrees closely with others from South Europe, except that the wing-scales are very slightly broader. From *C. pipiens*, the only other British species of the genus as now defined, it differs in having the white bands on the abdominal segments apical instead of basal, and in having broad flat scales on the prothoracic lobes.

April 6th, 1915.

On the food-plants of some British weevils.—Stray notes which I have made on this subject at various times are given below :

Alophus triguttatus F.—Fowler (Col. Brit. Islands, V, p. 212) says that this weevil occurs in moss, under stones, in flood-refuse, &c., but he does not mention any food-plant for it, neither does any Continental work I have been able to consult. Everts, one of the latest European writers, states generally that it is found "in pastures, at the roots of plants, and under stones" (Col. Neerlandica, II, p. 592 [1901]). My own experience with this species, however, has led me to associate it with the ribwort plantain (*Plantago lanceolata*). In May, 1902, I found several specimens of *Alophus* at the roots of this plant growing on the Culver Cliff near Sandown, I.W., but at the time I supposed these individuals to be merely sheltering, the locality being somewhat exposed. In April, 1910, however, and also in May, 1912, I again found the species in some small numbers at the roots of the same plant growing amongst thick grass in a marshy place on the banks of the Lea near Roydon, West Essex, and in September, 1912, I came across the elytra of a specimen while searching *P. lanceolata* on the cliffs at Walton-on-the-Naze in the same county. It would therefore seem probable, from its apparent association with *Plantago lanceolata* in three widely separated localities, that this is the food-plant of *Alophus*, or at any rate one of its food-plants. It would be well, however, to have this confirmed, if possible, by Coleopterists who may be living in other districts where *Alophus* has occurred. I may add that I have searched the greater plantain (*Plantago major*) in the Roydon locality without result.

Omius mollinus Boh., and *Barypithes pellucidus* Boh.—I have no doubt that these species are attached, at any rate in the localities in which I personally have found them, to the common buttercup (*Ranunculus bulbosus*). My principal locality for *Omius* was a small pasture at Enfield, in part of which was an extensive patch of buttercups; in May, 1911, I swept it from these buttercups

in the utmost abundance, getting as many as 30 in the net at a time, yet in parts of the field where buttercups were wanting, or were scattered singly at wide intervals, the weevil was absent. *B. pellucidus* occurred there also, but was very scarce. This species, however, I had previously obtained in satisfactory numbers in May, 1907, by sweeping buttercups in Bush Hill Park, Enfield. Stray examples of both species have several times occurred to me by beating hedges, but in every case the hedge bordered a field in which *R. bulbosus* was growing.

Everts (l.c., p. 575) records the occurrence of *B. pellucidus* in Holland in the nests of *Lasius niger* and *flavus*. An allied species, *B. tener* Boh., stated by him to be common in the Dutch province of Gelderland on beeches (*beuken*) and under fallen beech leaves, is also, he says, "very common near Doorn in the nests of *Formica rufa* and *Lasius fuliginosus*." These ants'-nest records seem somewhat remarkable, and I cannot find any similar instances amongst our British weevils.

Liophloeus tessulatus Müll. (*nubilus* F.).—According to Fowler (l.c., p. 192), ivy is the principal food-plant of this fine weevil, and he mentions its having been found in numbers at Long Benton, Northumberland, feeding on this plant. Bedel (Col. Bassin Seine, VI, p. 50) also associates it with ivy ("se trouve ordinairement en battent les lierres"). In some, at least, of its British habitats, however, it seems to prefer the large umbellifer, *Heracleum sphondylium*, as a pabulum, as in the Lea Valley I have found it almost exclusively on that plant. I have swept it on several occasions since 1898 from *Heracleum* at Edmonton, Cheshunt, and Broxbourne, though chiefly by single specimens; at Enfield, however, in June, 1911, I came across a considerable colony living on numerous plants of the umbellifer which were growing along the border of a cultivated field. I have beaten a single example of *Liophloeus* at Chingford out of a hedge containing ivy, but even then could not be certain that it had not come from an adjoining field in which *Heracleum* was growing.

Everts (l.c., p. 581) writing of it as a Dutch species, says that it occurs "on shrubs and on the ground; sometimes on *Rumex acetosa*."

Cneorrhinus (Philopedon) plagiatus Schall. (*geminatus* F.).—One usually associates this weevil with coast sandhills, where it is found abundantly about the roots of marram-grass or other low plants, or crawling on the sand, rarely occurring inland. In May, 1906, however, I met with it at Brandon, Suffolk, not only under plants in a sandy field, but also in numbers on broom bushes. I have not been able to find any other record of it from broom, but it may be recalled that there is an interesting note in this Magazine, Vol. XXVII, p. 333 (1891), of its having occurred in France in that year in large numbers on the vine; an allied species, *C. hispanus* Hbst., v. *ludificator* Gyll., being also mentioned as having appeared in great abundance in the same year on vines in Portugal. Mr. Champion has met with several species of the sub-genus *Atactogenus*, allied to *C. dispar* Graells, on broom-like plants, species of *Genista* and *Cytisus*, in Spain, while *C. (Atactogenus) exaratus* Marsh. lives on young trees (oak, &c.)

Everts, in his account of *C. plagiatus (geminatus)*, loc. cit., p. 588, has an interesting passage which, assuming that the information given in the latter part of it is authentic, throws further light upon it as an injurious insect, and also on its powers of adaptability. Referring to the species as a Dutch insect, he says that it is very common on the dunes, and that the larvae live at the roots of grass, adding that Perris has found the larva and pupa under grass-sods. He goes on to say that according to Ritsema Bos these weevils also attack firs (*dennen*), chiefly the "sea-pines" that are planted in the dunes. Young trees of a year's growth are those chiefly injured by them, but they also attack older trees, and do not spare those of from five to seven years' growth. The beetles feed chiefly on the cones (*eindknoppen*), and on the terminal shoots to which these are attached; they also eat the needles. Usually they feed in the cool of the morning and in the evening, while, during the heat of the day they hide in the ground.

Boris lepidii Germ.—Fowler mentions *Tanacetum*, *Nasturtium sylvestre*, and *Lepidium latifolium* as plants to which this root-feeding species is attached, but whether it has actually been found on any of them in this country is not quite clear. I have been acquainted with it as a Lea Valley species since 1901, but in all cases when I have found the insect at home (it occasionally turns up in flood refuse) it has been at the roots of the common winter-ress (*Barbarea vulgaris*), in which I have also found the little white larvae in the month of June. Mr. Champion tells me that he has taken *B. lepidii* freely at the roots of the same plant on the banks of the Mole at Mickleham, in the month of July.—F. B. JENNINGS, 152, Silver Street, Upper Edmonton, N.: March 30th, 1915.

Hypophloeus linearis F., in the New Forest.—Towards the close of last month we had the pleasure of discovering this elegant little beetle in the burrows of *Tomicus bidens* in a fallen branch of fir here. There were but few of the imago, but a good many of its larvae, the *Tomicus* being in profusion. Mr. Tomlin having discovered the species near Reading last year, it has now been found in the three contiguous counties—Surrey, Berks, Hants.—D. SHARP, Brockenhurst: April 5th, 1915.

Euthia formicetorum Reitt., in the Oxford district.—On April 14th I found two examples of a very small bright-looking *Euthia*, in damp rotten oak-boughs lying on the ground at Prattle Wood, near Islip, Oxon; no ants of any kind being present. These at once recalled to mind my New Forest specimens of *E. formicetorum* Reitt. (*ante*, p. 120), and on examination, proved to be identical with them in all respects. I may add that *E. schaumii* Kies. and *E. scydaenoides* Steph. have been taken in some numbers on the allotment grounds at Lower Wolvercote, Oxon., the former species chiefly by evening sweeping in late summer, and the latter in vegetable refuse and tufts of grass in winter and early spring.—JAMES J. WALKER, Oxford: April 19th, 1915.

Aëpophilus bonnairei Sign., at Sennen Cove.—I took a specimen of this curious insect at the beginning of April, at extreme low water-mark, in Sennen

Cove, Cornwall, in company with *Aëpus*. Both species were living under stones partially buried in muddy sand, together with such species of Mollusca as *Rissoa trifasciata* J. Ad., *R. semistriata* Mont., and *Alvania cancellata* da C. The *Aëpophilus* has, so far, been recorded from Jersey, Polperro, Mousehole, Falmouth, Lyme Regis, and the Isle of Wight. Mr. E. A. Butler has very kindly examined the specimen.—J. R. LE B. TOMLIN, Reading: *April 18th*, 1915.

Vanessa antiopa in Northern France.—It may interest you to know that there were a few specimens of *Vanessa antiopa* (the Camberwell Beauty) flying in the woods here on the 20th inst. I fancy the beautiful hot sun of that day may have caused their early appearance from winter quarters. Unfortunately I know little of French entomology, so am unable to say whether *V. antiopa* is rare in France, but I am well aware of its scarcity in the British Isles.—WILLIAM H. TAPP, Queen's Bays, No. 5 Cavalry Camp Dépôt, Rouen: *March 22nd*, 1915.

Thera variata Schiff. in S. W. Surrey.—Seeing that the true *Thera variata* Schiff. (as distinguished from *T. obeliscata* Hb.) has apparently been recorded, as a British insect, only from the New Forest, it may be of interest to point out that I have in my collection a number of specimens taken in S. W. Surrey between 1906 and 1914. The majority are from Milford, near Godalming, but one is labelled Hindhead. Nearly all were taken in the neighbourhood of spruce-trees. I had always kept them separate from the pine-feeding species (the old *T. variata*), but did not know till recently what else to call them.

It may also be worth noting that the moth has two broods a year in Surrey, May–June and August–September. It used to occur commonly at ivy-bloom.—E. G. R. WATERS, 40, Leckford Road, Oxford: *March 29th*, 1915.

A note on the oviposition of Simulium maculatum Mg.—On September 2nd, 1913, a very fine day after heavy rains, the river Eden at Great Salkeld, Cumberland, being over three feet above normal level, I saw a swarm of small flies, some hundreds in number, settling on the stems and leaves of the Reed Canary-grass, *Phalaris arundinacea* L., and creeping down below the surface of the water, appearing like globules of quicksilver from the air entangled on their hairy bodies. On withdrawing some of the grass leaves from the water, I saw that the flies were really crawling down into the water for the purpose of ovipositing, the eggs being laid in batches. In some cases each female had laid her batch of eggs quite separate, but the majority of the batches were joined together, forming a huge mass of eggs entirely covering the grass leaves.

Many of the flies were over a foot beneath the surface of the water, and all were at least nine inches down before commencing to oviposit. The eggs subsequently become encased in a jelly similar to frog-spawn, though I am afraid the flies had made a fatal mistake in ovipositing on these grass leaves when the river was in flood, as the Eden not only rises rapidly after heavy rains but also returns very quickly to its normal level, and the ova would be left high and dry in the course of one or two days, so that in all probability many, if not all of

them, would perish though, unfortunately, I did not again visit them to see how they fared.

Having recently sent some of these flies to Mr. F. W. Edwards, who has kindly identified them for me as *Simulium maculatum* Mg. of Verrall's list, and having mentioned the fact of my having seen them oviposit, he said that a note on the subject would be of interest, as apparently very little was known of their egg-laying habits.—H. BRITTON, Myrtle View, Windmill Road, Headington, Oxon. : April, 1915.

Societies.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY: Meeting held at the Royal Institution, Colquitt Street, Liverpool, Monday, February 15th, 1915.—Dr. J. COTTON, Vice-President, in the Chair.

The evening was devoted to a pocket box exhibition of Natural History objects. Mr. F. N. Pierce contributed a selection of "Insect Habitations," which included portable cases characteristic of *Psychidae*, *Coleophoridae* and the *Trichoptera*; he also showed the cases of the *Coleophoridae* under the microscope, and called attention to the character of the silk of which some of them were composed. Mr. R. Wilding exhibited a number of Tortrices collected in the neighbourhood of West Derby, including series of the following:—*Dictyopteryx holmiana*, *Catoptria rana*, *Orthotaenia striana*, and many of the common hedge-side species. Dr. Cotton, a box of *Triphaena fimbria* and *Carsia paludata* from near St. Helens. Mr. W. Mansbridge brought a specimen of the fungus *Polyporus betulinus*, which, when dried and cut into strips, he used for mounting *Micro-Lepidoptera*; also a series of *Mimaesioptilus bipunctidaetylus*, cinnamon-coloured form, from the Crosby sand-hills; and a short series of a melanochroic variation of *Ellopia prosapiaria* bred from a Delamere female; he stated that, although not usually so dark as the present family, the species is considerably darker at Delamere Forest than in the South of England.

Meeting held at the Royal Institution, Colquitt Street, Liverpool, Monday, March 15th, 1915.—Dr. J. COTTON, Vice-President, in the Chair.

Dr. A. Randell Jackson, M.D., M.Sc., Westcote, Hoole Road, Chester, was elected a Member of the Society.

Mr. Leonard West, M.I.M.E., read a paper entitled "A Short Account of some *Neuroptera*." The paper was fully illustrated by lantern slides of the principal species of the various orders. These were treated in a way specially designed to enlist the interest of the young entomologist, the metamorphoses and general economy of the Stone-flies, May-flies, and Caddis-flies being ably described by the author. At the close of the paper Mr. West also showed a number of beautiful slides of river scenery as examples of the breeding places of the insects, and as showing the loveliness of the natural surroundings the student would become familiar with in pursuit of these comparatively little known creatures.—WM. MANSBRIDGE, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY :
Thursday, February 11th, 1915.—Mr. A. E. GIBBS, F.L.S., Vice-President, in
 the Chair.

Messrs. E. J. Bunnett, M.A., of Forest Hill, and Gordon Fryer, of
 Twickenham, were elected Members.

Mr. L. W. Newman communicated a long record of the results of the October
 pairing of *Pyrameis atalanta*, and of his unsuccessful attempt to keep the
 fertile females alive through the winter. He felt convinced that we were almost
 entirely dependant upon immigration for our supply of this species. Mr. Fro-
 hawk said that *P. atalanta* was on the wing all the winter in suitable weather
 in the Scilly Isles. Mr. Barrett said that it occurred similarly in Sicily all the
 winter. Mr. R. Adkin exhibited photographs, highly magnified, of the silken
 thread construction of the cocoons of *Saturnia pavonia*, *Anthrocera filipendulae*
 and *Dicranura vinula*.

Thursday, February 25th, 1915.—Mr. B. H. SMITH, B.A., F.E.S., President,
 in the Chair,

A special exhibition of lantern slides by Messrs. W. West (Ashtead),
 A. E. Tonge, E. J. Bunnett, C. W. Colthrup, and by Mr. Colthrup on behalf of
 the members of the Nature Photographic Society, including Messrs. Bedford,
 Salmon, Sanders, Main, Hocking, Tonge, Irving, and Stanley Cook. Mr. New-
 man, a long series of *Celerio galii* bred from N. Cornwall ova. Mr. J. Platt
 Barrett, a series of *Euchloë damone* from Sicily, and remarked on the small
 amount of variation in the species. Mr. F. W. Frohawk, a series of yellow
 varieties of *Arctia caja* from the Scilly Isles, where this form was met with in
 some numbers.

Thursday, March 11th, 1915.—Mr. A. E. GIBBS, F.L.S., Vice-President, in
 the Chair.

Mr. Baumann exhibited a bred series of *Ephyra pendularia*, including a
 considerable percentage of ab. *subroseata*. They were a second generation from
 larvae beaten in Surrey. Mr. Gibbs, a specimen of the huge Noctuid, *Thysania*
agrippina, from Costa Rica, where it sits on tree-trunks as does a *Eupithecia*.
 Mr. Witcheer, a remarkable gynandromorphous hybrid *Smerinthus, ocellatus* ♂
 and *populi* ♀, in which the left side was ♂ and the right side ♀. The rest of the
 evening was devoted to exhibitions under microscopes. Mr. Adkin, the structure
 of the cocoon of *Dicranura vinula*, and antennal structure in *Lepidoptera*,
 Mr. Edwards, a species of *Nycteribia*, the parasite of the Fishing-bat. Mr. West
 (Ashtead), androconia of *Pieris brassicae*, and a cocoon found on bananas.
 Mr. Coxhead, a number of mites infesting a Brazil-nut. Mr. Ashdown, minute
 species of *Coleoptera* and *Hemiptera*. Mr. Bunnet, larva of a *Thrips* which had
 been attacked by a micro-fungus. Dr. Chapman, skins of the first and last
 stages of the larva of *Everes argiades*, with figures and illustrative notes on the
 same.—HY. J. TURNER, *Hon. Secretary*.

LONDON NATURAL HISTORY SOCIETY: Meetings held at Hall 20, Salisbury House, Finsbury Circus, E.C.

January 5th, 1915.—Mr. S. H. Archer of 52, Elsenham Street, Southfields, and Mr. A. E. Hodge of Southfields, were elected Members of the Society.

Mr. C. H. Williams exhibited a long series of *Dianthoecia conspersa* from the Shetland Isles, and a few specimens from Croydon.

Mr. L. B. Prout, the retiring President, read his Presidential Address

January 19th, 1915.—The Rev. C. E. Raven, of Cambridge, was elected a Member of the Society.

Mr. L. B. Prout exhibited two cabinet drawers containing a series of nearly all the British species of *Eupithecia*, including very variable *E. subfulvata* and its Scottish forms *cognata*, &c.: *E. pygmaea* captured flying over a hedge in the afternoon at Doncaster; melanic forms of *E. castigata*, *E. albipunctata*, *E. vulgata*, &c. Mr. H. W. Wood, *E. castigata* and its melanic form *ab. obscurissima* Prout, *E. innotata*, showing 1st and 2nd brood usual forms, and some without the usual markings also of both broods, from Durham; and *E. fraxinata* from Middlesbrough; also larvae of *Pieris brassicae* taken in a garden at Southfields on January 17th, several degrees of frost being registered that morning. Mr. Bernard Cooper, a varied series of *Mimas tiliac* bred from a Lyndhurst ♀, taken June, 1913.

February 2nd, 1915: THE ANNUAL EXHIBITION.—Dr. Cockayne exhibited an extreme specimen of *Rumicia phlaeas* *ab. eleus*, from Berkhamsted, 1911 (a very hot season); a specimen of *Agriades coridon* *ab. semisyngnapha* Tutt, from Royston, showing additional blue scales on inner margin of left fore-wing (a gynandromorph), also a photograph of the specimen, in which the gynandromorphic characters were clearly shown; also Mr. C. P. Pickett, long series of *Agriades coridon* from Royston, the result of four years collecting, including males and females with underside markings obsolete; *ab. inaequalis* Tutt, and certain gynandromorphic females with the wings on one side smaller than on the other, the smaller side having scattered blue scales; a specimen in which the male element was on the large side, and a female unequal on the two sides, the lunules larger and brighter on the right side, which was also of the *ab. parisiensis* from beneath. Mr. H. B. Williams, *Mimas tiliac*, and some of its commoner aberrations, including *ab. centripuncta* Clark, and a long series of *Amorpha populi*, including two gynandromorphs bred from one brood in 1914; also a drawer of underside forms of *Polyommatus icarus*, including *ab. obsoleta* Clark, *ab. antico-striata* Tutt, and others. Mr. H. W. Wood, *Larentia flavicinctata*, type from Rannoch, and a remarkable light local race from Ireland; three yellow abs. of *Brephos parthenias* from Surrey; *Nonagria neurica* and its abs. *fusca* and *rufescens* from East Sussex; *Acidalia inmorata*, bred as a 3rd brood, from Lewes, October, 1913; *Acidalia contiguaria*, and a melanic form, and a drawer of *Mellinia ocellaris*, and all its known British varietal forms, including abs. *lineago* Gn., and *intermedia*, also the allied species *fulvago* L., and *gilvago* Esp., and *gilvago* *ab. suffusa*; also drawings by Mr. Backlake of the

differentiated parts of the genitalia (penis with cornuti) of the allied species *ocellaris*, *gilvago*, and *fulvago*. Mr. S. Riches, a series of *Abraxas grossulariata*, bred from wild North London larvae, from 1905 to 1913, including abs. *nigrosarsata* and *deleta* (*lacticolor*), and one approaching *varleyata*; also, on behalf of Mr. Dewey of Eastbourne, eight *Chelonia caju* with yellowish hind-wings, and two *Arctia villica* with confluent markings, all bred in 1914, and nine *Brenthis euphrosyne*, with confluent markings, taken in Abbot's Wood in 1913 and 1914. Mr. G. T. Porritt, *Abraxas grossulariata* ab. *nigrocyclata* (a magnificent form), and five extreme ab. *nigrosarsata*, bred from wild Huddersfield larvae in 1914; also an extraordinary small 2nd brood specimen, bred from a wild larva. Mr. L. W. Newman, series of *Callimorpha dominula*, and its ab. *rossica* from Kent, of *Thecla pruni* bred 1914 from Hants, and of *Pieris napi* from Ireland, including strongly marked yellow females (2nd brood). Mr. A. W. Mera, series of *Coenonympha davus* and *C. pamphilus*, the latter including a female with a patch of upperside coloration, containing an eye spot on the underside of the left hindwing; also the British Acidaliids, including melanic forms of *V. cambrica* and *A. incanaria*. Mr. R. S. Benton, a specimen of *Crymodes exulis* ab. *assimilis*, taken at sugar at Braemar. Mr. W. E. King, a long and varied series of *Hybernia defoliaria* from Epping Forest, including a fine melanic ♂. Mr. N. E. Shaw, a series of *Cyaniris argiolus*, bred 1914, from Sandown (Isle of Wight) larvae; a long series of *Eupithecia extensaria*, bred May, 1914, from Norfolk larvae, and specimens of *Salebria semirubella* and its ab. *sanguinella*, from Dover, 1914. Mr. H. S. Payne, two drawers of Leucaniids, including *Nonagria cannae*, *L. arundinis*, and ab. *fraterna*, *L. sparganii*, *Tapinostola bondii*, *Leucania vitellina* and *L. brevilinea*. Mr. A. W. Buckstone, a specimen of *Brenthis selene*, with black markings obsolescent, from Guildford; *Thecla quercus* ab. *bellus*, from Oxshott; a specimen of *Euchelia jacobaeae*, with hind-wings smoky black and transparent, from Oxshott; a fine obsolescent underside of *Polyommatus icarus* from Sevenoaks, and several smoky females of *Bupalus piniaria*, bred from Oxshott.

February 16th, 1915.—Mr. W. E. King exhibited a series of undersides of *Hipparchia hyperanthus* from Horsley, including one ab. *lancoolata* and several ab. *coeca*. Mr. J. A. Simes, some Spanish butterflies, including *Thais rumina*, *Euchloe euphenoides*, *Zegris eupheme* var. *meridionalis*, *Charaxes jasius*, *Dryas pandora*, *Melanargia syllius*, *M. ines* and *M. lachesis*, *Agriades thersites*, *Nomiades cyllarus*, *Lycaena hylas* var. *nivescens*, *Coenonympha iphioides* and *C. dorus*, *Plebeius zephyrus* var. *hispanica* and var. *lycidas*. Mr. A. J. Willsdon, *Dasygampa rubiginea* from Bournemouth, Hereford, and Torquay; the Bournemouth specimens being lighter than the Hereford ones, and the Torquay more reddish; also a fine variety from Torquay.

Mr. J. A. Simes read a paper entitled "A Month amongst Spanish Butterflies."—H. B. WILLIAMS, *Hon. Secretary*.

OBSERVATIONS ON BRITISH COCCIDAE IN 1914,
WITH DESCRIPTIONS OF NEW SPECIES.

BY E. ERNEST GREEN, F.Z.S., F.E.S.

(PLATES XV—XVII).

I recently published in this Magazine (Vol. L, p. 197, 1914) the description of a new British Coccid, under the name of *Kuwania britannica*. I have since received, from Prof. T. D. A. Cockerell, photomicrographs of *Steingelia gorodetskia* of Nasonow, which have convinced me that my insect is identical with that species. I still maintain, however, that the species should be included in the genus *Kuwania*. The only possible excuse for separation is the number of antennal joints, which is 8 in *Steingelia gorodetskia*, and 9 in typical species of *Kuwania*. This difference appears to me to be of scarcely more than specific value or, at the most, might warrant the erection of a sub-genus. If this view is accepted, the name should now stand as *Kuwania (Steingelia) gorodetskia* (Nasonow).

Nasonow's specimens were taken in Russia, and this is the only locality quoted. The discovery of the insect in England is, therefore, still of considerable interest. It remains an addition to the British fauna, although its claim to scientific novelty must be abandoned.

ERIOCOCCUS DEVONIENSIS Green.

In the same paper I mentioned finding an *Eriococcus* on *Erica* that would probably prove to be *devoniensis*, hitherto recorded only from Budleigh Salterton. This supposition has turned out to be correct. At the time immature and early adult females only had been found. Even in this stage the characteristic distortion of the stems of the affected plants was noticeable. In fact, it was only by this symptom that the presence of the insect was detected. The white ovisacs were not commonly noticeable until well into September. The insect occurred both on the wild *Erica cinerea* and upon allied cultivated forms in gardens. In the latter case the insect was a veritable pest, some plants being so thickly infested that they had to be destroyed.

The nymphal insect is of a bright golden yellow colour, with glistening, short, glassy filaments. In the final stage the colour deepens to orange-red. In my Surrey examples all the dorsal spines are rather more acuminate than those of typical examples from Devonshire, in which the larger spines are markedly truncate.

Males commenced to appear towards the end of August. They are of the form normal to the genus, of a brownish purple colour, with a pair of long white caudal filaments. Antenna 10-jointed, 3rd joint longest, longer than preceding two joints together; subsequent joints decreasing in size to the tenth, which is the shortest. Apical half of terminal joint dense and opaque, with from four to five stout curved spines at its extremity; one or two long and slender knobbed hairs on each joint with the exception of the 1st and 2nd.

ERIOCOCCUS INSIGNIS Newst.

Occurs commonly on grasses (usually *Agrostis* sp.) in the Camberley district.

ERIOCOCCUS GREENI Newst.

This species, which was described from a single example taken at Budleigh Salterton in 1896, has now turned up at Camberley, where it occurs not uncommonly, in association with *E. insignis*. Owing to the difficulty (noted by Newstead) of distinguishing between the ovisacs of the two species, it is probable that *E. greeni* may be frequently overlooked. The ovisac of *greeni* appears to me to be proportionately slightly broader and rougher than the other. I find also that this species shows a distinct preference for constructing its ovisacs upon dry fallen leaves. The insects themselves are readily distinguishable by the arrangement of the spines, which in *greeni* are scattered thickly and more or less evenly over the dorsum, while in *insignis* they are confined to the margin where they form a conspicuous fringe. Newstead describes the type as having 6-jointed antennae, the 3rd joint very long. In my examples I find that the antennae are normally 7-jointed, the 3rd and 4th being longest and approximately equal. In only a single example have I found the typical 6-jointed form.

ERIOCOCCUS INERMIS nov.

Adult female elongate oval (fig. 1-a). Derm without spines, except on the anal lobes; but closely set with conspicuous thick-rimmed pores opening into tubular ducts (fig. 1-c), and some inconspicuous spiniform hairs. Anal lobes prominent; each lobe with a longish stout apical seta and two stout spines on its inner margin. Anal ring with eight stout setae extending almost to the extremity of the lobes. Legs moderately large; tarsus equal to or slightly longer than tibia; claw without denticle; digitules hair-like, dilated at extremity. Antenna (fig. 1-b) 6-jointed, the 3rd very long and usually broader than the 2nd; other joints short. Occasionally there is an incomplete division in the 3rd joint. Antennal formula 3, 6, 2(4, 5). Length ranging from 1.50 to 2.50 mm.; breadth from 0.75 to 1.20 mm.; average of fourteen examples, 1.97 by 0.94 mm.

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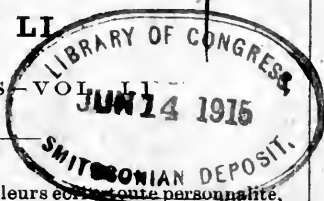
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ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. — Wednesdays, June 2nd, October 6th and 20th, November 3rd and 17th, December 1st, 1915. January 19th (ANNUAL MEETING), February 2nd, 1916.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m., on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary; Salisbury House, E.C.

June 1st—"The Treatment of Nature in Gothic Design," Miss F. BAGUST.

Hon. Sec.: J. Ross, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.

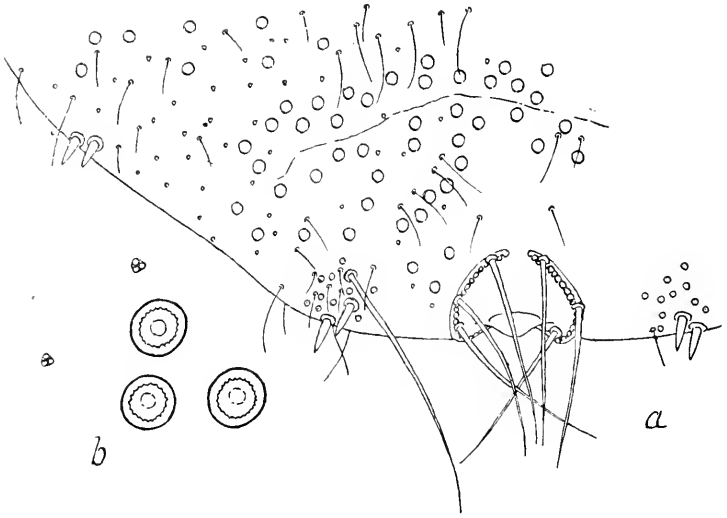


FIG. 2.

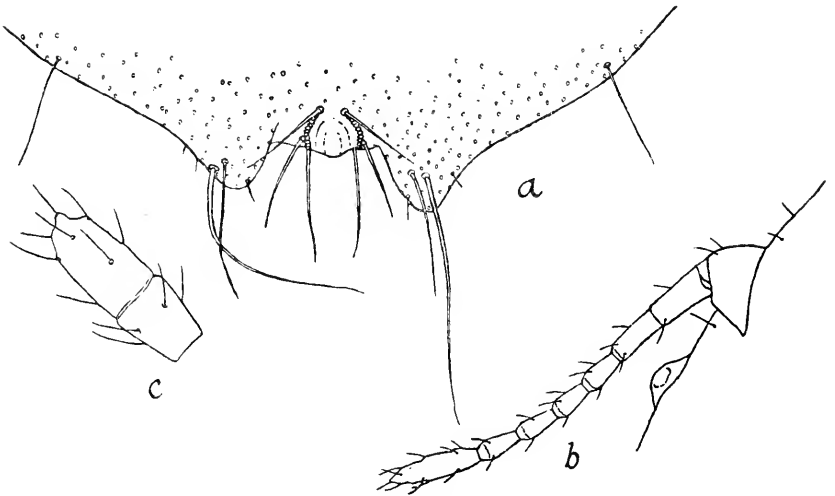


FIG. 3.

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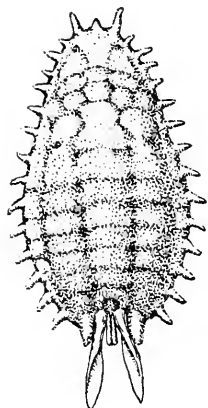


FIG. 4.

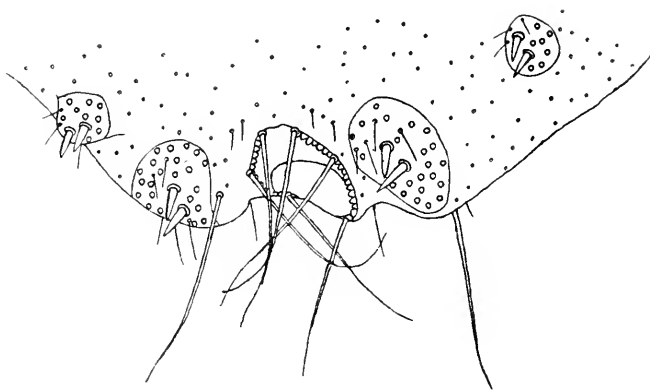


FIG. 5.

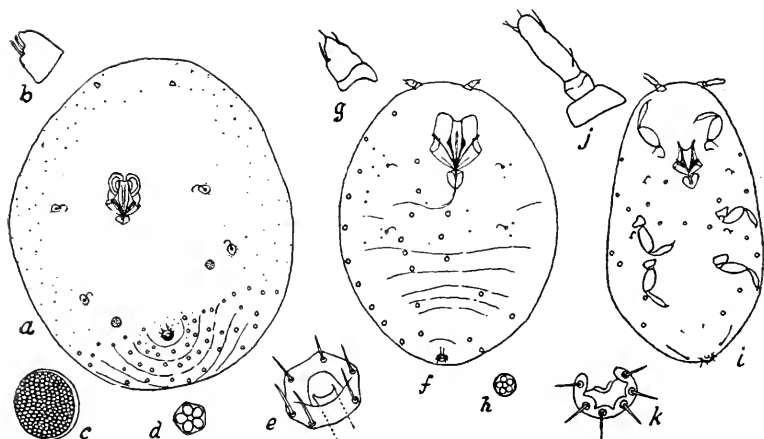


FIG. 6.

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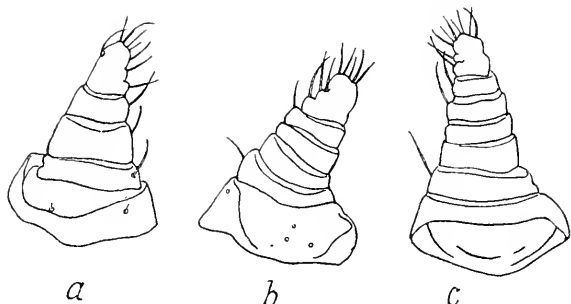


FIG. 7.

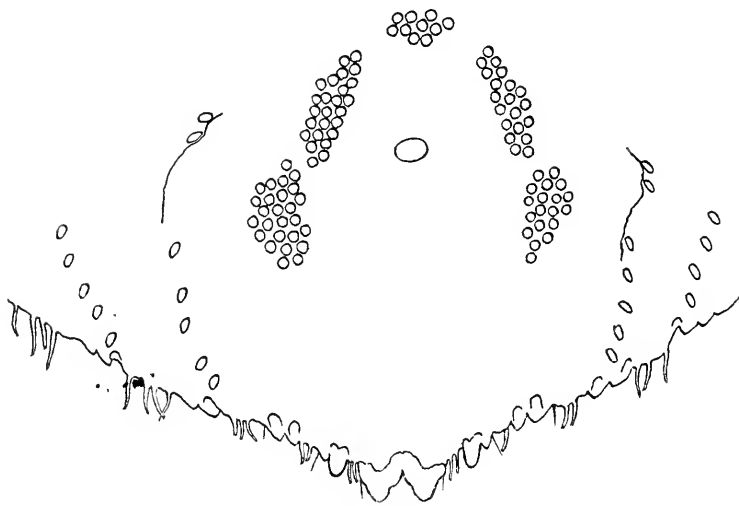


FIG. 8.

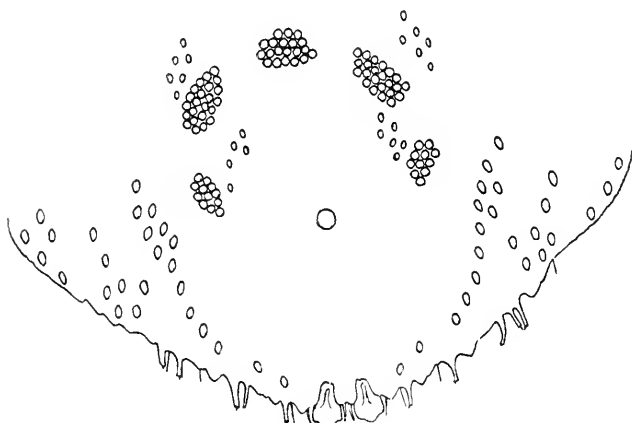


FIG. 9.

E. E. Green, del.

Ovisac white, slightly tinged with pale ochreous. Closely felted, comparatively smooth; sometimes with traces of transverse segmentation. Form very elongate oval; convex, depth at centre equal to breadth, from which point a profile view shows an even curve to either extremity. Average dimensions, 3 mm. by 1 mm.

Male puparium similar in colour and substance, but smaller and flatter.

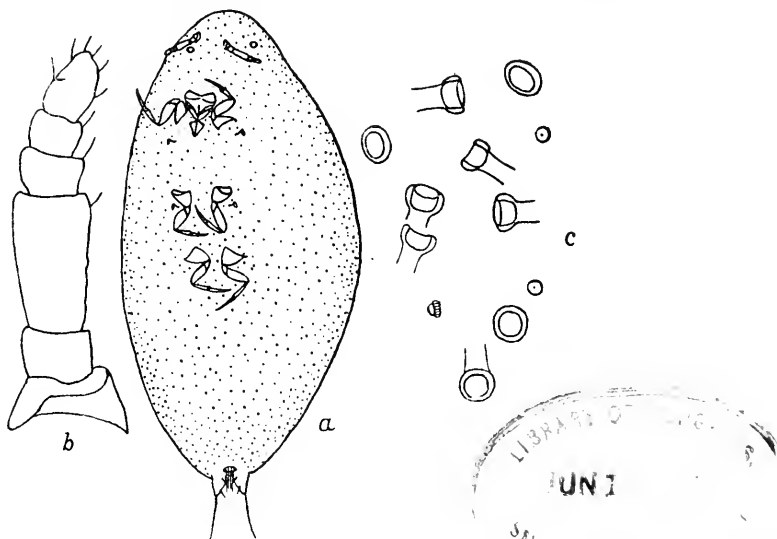


Fig. 1.—*Eriococcus inermis*.

a. Adult female, X 30. b. Antenna, X 280. c. Dermal pores, X 500.

Associated with the previous two species on a slender-leaved grass (? *Agrostis setacea*). The ovisacs are nearly always attached to dry and dead blades, seldom on the green parts. The support being extremely slender, the ovisac overlaps it.

Occurring abundantly on uncultivated land, often amongst heather: Camberley, Surrey, August, and September. Found also at Virginia Water, Surrey, September.

ERIOCOCCUS LAGERSTROEMIAE *Kuwana*.

Found by Mr. J. C. F. Fryer on *Lagerstroemia* (growing in the open) in a nursery garden at St. Albans, Herts.

The species may be recognised by the following characters:—Antenna 7-jointed, 3rd and 4th equal. Anal lobes rather small, but strongly chitinized. Tarsus markedly longer than tibia. Spines numerous, moderately large, sharply pointed, of equal size, in transverse series across the abdominal segments, irregularly crowded on the thoracic area.

The insect is a native of Japan. The present vogue in Japanese plants must inevitably lead to the introduction of species from that country, some of which may find, in the southern parts of England, climatic conditions sufficiently like their natural home to permit of their establishment here. Other instances of introductions from Japan are noted below.

PSEUDOCOCCUS PULVERARIUS Newst.

Beneath the sheathing leaves of grass (*Agrostis* sp.). Camberley, September.

My examples differ slightly from the type, as described by Newstead. The antennae and legs are proportionately longer and more slender. Newstead describes and figures the anal lobes as being "indicated by a single long hair surrounded by several spinnerets." In addition to these structures, my specimens show two conical spines and many shorter hairs on the anal lobes. There is also a pair of similar spines on the lateral margin of the penultimate segment, and an irregular transverse series of stout hairs across the venter of each segment (see fig. 2-a). The whole derm is closely sprinkled with minute trilocular pores, and many large circular pores (fig. 2-b) are distributed over the venter of the abdomen, more particularly on the posterior segments.

Examples taken at Budleigh Salterton (in 1896) appear to be intermediate, the antennae and limbs being comparatively short and stout, while the anal segments show the same characters as the Camberley specimens.

PSEUDOCOCCUS SPHAGNI nov.

Adult female pinkish (in alcohol). Form elongate oval: length approximately two and a half times the breadth. Anal lobes pronounced, each with a longish terminal seta, a second one of rather more than half the length of the first, and several very much shorter (see fig. 3-a). Antenna (fig. 3-b) normally 8-jointed, the 8th always by far the longest; 1st joint large and stout, length equal to breadth, approximately as long as the 2nd which is twice as long as it is broad; 3rd equal to or only slightly shorter than 2nd; 4th, 5th, 6th, and 7th shorter and approximately equal; 2nd and 3rd joints cylindrical, 4th to 7th fusiform. There are, in some individuals, indications of a sub-division of the 8th joint (fig. 3-c). Eyes somewhat prominent. Mentum rather short, scarcely longer than broad. Limbs moderately large; tarsus half length of tibia; ungnal digitules slender knobbed hairs, tarsal digitules apparently obsolete. Anal ring with six longish stout setae. The usual glandular pits on cephalo-thorax and post-abdomen are large but rather inconspicuous. Derm

with numerous minute circular pores, and scattered, short, fine hairs. There are some longer hairs on the venter, more particularly on the post-frontal area and in transverse series across the abdominal segments. A single longish hair projects from the lateral margin of each of the last three abdominal segments. Marginal grouped spines small and feebly developed, especially on the abdominal segments where they are obsolescent, but rather more conspicuous on the anterior margin. Length, 3.25 to 4.25 mm. Breadth, 1.50 to 1.75 mm.

Discovered by Mr. H. Donisthorpe, in nests of *Formica picea*, amongst sphagnum moss in swampy ground, Matley Bog, New Forest, Hants; July.

The character of the dermal pores suggests that the insect, in life, is very thinly coated with mealy powder. The very feeble development of grouped marginal spines points to a corresponding absence of waxy appendages.

Near *Ps. hibernicus* (Newst.), from which it differs in the absence of the intersegmental squamose structures described by the author of that species, and in the presence of a strong group of hairs on the under surface of the post-frontal area; also in the proportionately greater length of the first three antennal joints. In *hibernicus*, the first and second joint together are said to approximately equal the eighth; while, in *sphagni*, joints 1 and 2 approximately equal joints 7 and 8 together.

PSEUDOCOCCUS GAHANI *nov.*

Adult female thickly coated with greyish-white mealy secretion, which is thinner in the folds of the segments and in the depressed areas. These depressions are in four more or less confluent longitudinal series which are more marked on the posterior half of the body. The darker colour of the insect showing through the mealy covering at these spots, produces a distinct symmetrical pattern (see fig. 4). There is a complete marginal series of 33 short conical waxy processes, an anterior and posterior pair being usually larger than the others. On each side of the anal orifice is a much longer, broadly laminate process which is transversely curved and spirally twisted, and between these is a pair of shorter processes, which together form a tube. Antenna, 8-jointed, the 8th longest; first joint strongly developed, approximately as long as it is broad; antennal formula (excluding 1st), 8 (3, 2), (5, 4, 6, 7), the last four being only approximately equal and varying slightly in their relative positions in the series. Limbs well developed; tarsus approximately half the length of the tibiae. Eyes prominent. Mentum distinctly biarticulate; longer than broad; terminal joint longest, acutely pointed. Dorsal glandular pits present but rather inconspicuous. Anal ring large and conspicuous, with six long stout setae. Anal lobes broadly rounded; only slightly prominent; more strongly chitinized than the surrounding parts, the margins of the chitinous area sharply

defined; each with two stout conical spines, several fine hairs, some conspicuous circular pores, and a terminal seta which is approximately equal in length to those of the anal ring (see fig. 5). Margins of segments, each with a small protuberance, bearing similar spines, pores and hairs, all of which become smaller and less conspicuous as they approach the anterior extremity. Derm with scattered, small, and inconspicuous pores. Many longish stout hairs on under-surface of head. Length, 2.50 to 3 mm. Breadth, 1.25 to 1.50 mm.

Adult male similar in appearance to that of *Ps. citri*. Length, 1.50 mm.

Though the structural characters agree somewhat closely with those of *citri*, the general appearance of the living insect is strikingly different, and it is of a much more active habit.

Collected by Mr. C. J. Gahan, on *Ribes sanguinea*, in London: May, June. Males were on the wing in June. (Under date 20.iii.1915, Mr. Gahan writes that he has just found two females—one nearly full grown—on the *Ribes* in his garden. This suggests that the insects must exist through the winter, in the open).

Mr. Gahan observes that the insect, when irritated, exudes "a claret coloured liquid in round drops, two close to the head end and two at the tail end." The exudation evidently emanates from the glandular pits that are present in the positions indicated. He further remarks that the "dark-coloured secretion soon dries, looking like a small balloon. The liquid hardens into a solid substance which resembles lac or something of a similar nature."

PHENACOCCLUS ACERIS *Sign.*

This species was abundant on gorse stems in Camberley during the summer. The insects were fully developed by the middle of June, shortly after which date affected trees were conspicuous from a distance by reason of the masses of snowy white ovisacs. When constructing their ovisacs the insects often stray from the plant upon which they have been feeding and establish themselves upon the surrounding undergrowth, and even upon dead wood and palings.

CRYPTOCOCCLUS FAGI *Baerensp.*

This Coccid is to be found upon every beech tree in the neighbourhood of Camberley. I have seen trees in the woods the trunks of which appeared, at a little distance, to have been thickly coated with whitewash. In some places the insects and waxy deposit were massed to a depth of nearly an inch, harbouring numerous Hemerobiid, Psocid,

and Dipterous larvae. Some of the trees were evidently dying from the effects of such a concentrated attack. Both the ordinary beech trees and the bronze-leaved varieties appear to be equally affected.

FONSCOLOMBIA FRAXINI *Kalt.*

Abundant on the trunk of an ash tree, in Woking town: July. Examples were observed on a young ash at Goring-on-Thames, in March. I have found the same insect sparingly on the branches of ash trees, at Bearsted, Kent.

KUWANINA PARVUS *Mask.*

Examples of this insect have been sent to me by Mr. J. C. F. Fryer (of the Board of Agriculture), who found them on gnarled branches of cherry trees imported from Japan, in a nursery garden at St. Albans, Herts.

Maskell's description of *Sphaerococcus parvus* is meagre and poor, and his figures of the insect are quite useless. As the species does not appear to have been adequately figured, I give drawings of the three stages of the insect, and add a few notes of characters that appear to have been overlooked by Maskell.

Adult female (fig. 6-a). The antennae—as noted by Maskell—consist of a single-jointed conical tubercle, bearing one or two stout hairs on its apex (fig. 6-b). The dermal pores are of two sizes, namely, minute quinque-ocular pores confined principally to the marginal and sub-marginal regions, and others of very much larger size (fig. 6-d) usually confined to the abdominal segments, but sometimes extending on to the thorax. These larger pores are dorsally disposed. Situated on the venter, medio-posteriorly to the hinder spiracles, is a pair of circular cribriform plates (fig. 6-c). The anal ring (fig. 6-e) bears six short stout setae. Maskell distinctly states that the anal ring is “simple, hairless.” The organ is extremely small and the setae are frequently broken off, but their position is always indicated by the presence of the circular bases from which they spring. My examples of the adult insect average 0.75 mm. in length.

Nymph (fig. 6-f). The antenna, in this stage, is distinctly 2-jointed (fig. 6-g), with sometimes an indication of a third. The dermal pores are again of two sizes, but are comparatively few in number. The distribution of both the larger and smaller pores is curiously casual and asymmetrical, varying in different individuals. It seems possible that their incidence is determined by exposure, that part of the insect that is buried in the tissues of the bark being devoid of these structures.

Larva (fig. 6-i). My drawing shows the larva at an advanced stage. The antenna (fig. 6-j), as described by Kuwana, is 3-jointed, the 3rd joint elongated

The limbs, though small, are rather robust; the tibio-tarsal articulation obscure. The dermal pores are sparse and irregularly distributed. Anal ring (fig. 6-k) incomplete, with six short stout setae. There is a pair of moderately long caudal setae which, at this stage, are folded back upon the venter.

The "yellowish-brown, hard, semi-globular tests" described by Maskell, were more or less fragmentary in the examples under observation. The naked body of the insect was partially exposed and showed of a distinct deep red colour. The insects were clustered in crevices of the bark, which had assumed a marked rugose and gaurled character, which must be very prejudicial to the health of the plant.

Though interesting to the Entomologist, this is by no means a desirable introduction. It is apparently able to exist—and even thrive—in the open in this country. It is a native of Japan.

NEWSTEADIA FLOCCOSA *Westw.*

Common, under moss, amongst heather, and under the shade of pine trees, at Camberley. Females with well developed ovisacs were found as early as April.

PULVINARIA VITIS *Linn.*

I have found very fine examples of this species on young birch trees in Camberley. Male puparia were present on the stems in June. I have taken the same species on the stems of lime trees (*Tilia*), and on a *Camellia* plant growing in the open (Camberley, June). These two last mentioned plants appear to constitute new records for the species.

LECANOPSIS BREVICORNIS *Newst.*

This species occurs in some abundance at Camberley, on the grass *Agrostis setacea*. It may be found at the base of the tufts of grass, usually below ground level, where it is so well concealed amongst the closely packed leaves and stalks that the best way to obtain a supply of specimens is to pull up the grass by the roots and tear it to pieces over a sheet of white paper, when the insects drop out. My examples agree closely with Newstead's description in everything but colour. They are more orange-yellow than red, and the antennae and legs are of the same colour—not black. In all structural characters they conform exactly with the type, and are enclosed in the characteristic delicate glassy tests. Newstead at first described the antennae of the adult female as 7-jointed, but afterwards corrected

the number to six. In a series that I have examined, I find examples that have distinctly 7-jointed antennae (fig. 7-c.), and others in which 5 joints only are present (fig. 7-a). The 6-jointed form (fig. 7-b) is, perhaps, the most common.

A few paler and somewhat smaller individuals show more fully developed antennae and limbs. These are probably female nymphs. In place of the continuous lateral bands of ceriferous pores, found in the adult, these supposed nymphs have an isolated group of similar pores on each side of the prothoracic segment. The antennae, in this stage, appear to be normally 7-jointed.

I have also found still smaller examples that I take to be advanced larvae. They are characterized by slender 6-jointed antennae, the 3rd joint longest; a pair of longish caudal setae; and four isolated groups of ceriferous pores on each side, situated on the three thoracic and first abdominal segments.

ERIOPELTIS FESTUCAE *Fonscol.*

Found, in great abundance, on a hill-side at Arundel (Sept.). It occurs, but very sparingly, in the neighbourhood of Camberley.

CHIONASPIS SALICIS *Linn.*

Newstead gives broom (*Cytisus scoparius*) as an occasional host-plant of *Ch. salicis*. During the past summer, I found the stems of every broom plant over a large area, on Weybridge Common, thickly infested with the puparia of this species.

DIASPIS PENTAGONA *Targ.*

This species has been detected by Mr. Fryer upon cherry plants imported from Japan. *D. pentagona* is recognizable by the large and prominent median lobes, the bases of which are confluent (fig. 8).

DIASPIS PERSIMILIS *Ckll.*

On *Sideroxylon mermulana*, in plant house at Kew. Collected by Mr. F. Laing.

The species may be distinguished from *pentagona* (which it somewhat resembles) by the smaller median lobes, the bases of which remain separate and distinct. There are other differences that may be appreciated by a comparison of figures 8 and 9.

MYTILASPIS FICUS *Sign.*

Newstead does not appear to have found male puparia of this species in England. I find them occurring plentifully on twigs of edible fig, sent to me by Prof. Lefroy at the end of January. They are assembled more particularly on the younger branches. Newstead writes that "the puparium is said to resemble that of the female, but is smaller and whiter." This description is correct, the whitish male puparia being in conspicuous contrast to the bark-coloured females. The hinder part, posterior to the 'hinge,' is translucent. It is long and narrow, approximately parallel-sided, with an average length of 1.50 mm. Most of the puparia were empty. A few contained nymphs, but these dried up without producing adult males.

Signoret gives a misleading account of the male puparium, which he describes as "rounded and resembling the scale of an *Aspidiotus*, that is to say, rounded, with the pellicle more or less central." He also describes its colour as being "blackish grey." Leonardi sinks the name *ficus* as a synonym of *conchiformis*.

PARLATORIA PERGANDEI *Comstock.*

Newstead remarks of this species, "exceedingly common on imported oranges in this country," but I have never met with it on cultivated plants. Mr. Fryer has sent me specimens from Citrus plants growing in a nursery at Kingston.

EXPLANATION OF PLATES.

PLATE XV.

Fig. 2.—*Pseudococcus pulverarius*.

- a. Posterior extremity of adult female, $\times 280$.
- b. Dermal pores, $\times 1000$.

Fig. 3.—*Pseudococcus sphagni*.

- a. Posterior extremity of adult female, $\times 135$.
- b. Antenna, $\times 135$.
- c. Terminal joint of antenna, with incipient division, $\times 280$.

PLATE XVI.

Fig. 4.—*Pseudococcus gahani*.

Adult female from life, $\times 13$.

Fig. 5.—*Pseudococcus gahani*.

Posterior extremity of adult female, $\times 135$.

Fig. 6.—*Kuwanina parvus*.

- a. Adult female, optical section, $\times 52$.
- b. Antenna, $\times 400$.
- c. Cribriform plate, $\times 400$.
- d. Dermal pores from abdomen, $\times 400$.
- e. Anal ring, $\times 400$.
- f. Nymph, $\times 108$.
- g. Antenna of nymph, $\times 400$.
- h. Dermal pore of nymph, $\times 400$.
- i. Larva, $\times 108$.
- j. Antenna of larva, $\times 400$.
- k. Anal ring of larva, $\times 400$.

PLATE XVII.

Fig. 7.—*Lecanopsis brevicornis*.

- a, b, c. Different forms of antenna of adult female, $\times 280$.

Fig. 8.—*Diaspis pentagona*.

- Pygidium, $\times 280$.

Fig. 9.—*Diaspis persimilis*.

- Pygidium, $\times 280$.

NOTES ON *XANTHIA (MELLINIA) OCELLARIS* BORKH.

BY H. WORSLEY WOOD.

(Concluded from p. 156.)

I have not been able to examine the genitalia of *ab. austauti* (3), but it is no doubt a form of Staudinger's *ab. lineago* (2). A number of the male genitalia of the last named form have been mounted and examined this winter, and they are not to be distinguished in any way from those of typical *ocellaris*, so that the arrangement in the Museum which gives 2 and 3 to *palleago* Hb. 192=*ocellaris* Bkh. is probably right.

Ab. rubra (1) judged by its genitalia appears to be specifically distinct, but belongs to the group. Exact knowledge of the early stages of all these forms is wanted before the limits of the species can be exactly determined. Algerian forms of *gilvago* offer the same difficulties, as there were certainly two distinct species represented in Herr Püngeler's series of *gilvago ab. algerica* from Batna.

Ab. intermedia. Habich, "VI Jahresbericht des Wiener Entomologischen Vereines 1895," Vienna, 1896, p. 49 and figure, = *gilvago* Hb., 443 = Ent. Mo. Mag., fig. 7. Exactly of the size of *ocellaris* with the same wing shape, *i.e.*, the sharply arched wing tips, it bears in all details the markings of *gilvago* on the reddish grey ground colour which characterizes *ocellaris*, and has even further the speckled wing-fringes of *gilvago* which neither *ocellaris* nor its *ab. lineago*

has. (Nervures pale, white or grey reniform dot nearly always present, and in the hind-wings a fine short line near the discoidal, more or less clearly indicated. This last character is peculiar to this and the next form, and is not to be found in the typical *ocellaris* group or *gilvago*).

This is the original description with additions in brackets. Habich was doubtful whether the insect he described was a form of *ocellaris* or a hybrid *ocellaris* × *gilvago*, and the point does not yet seem to have been settled on the Continent.

Variation. Bred examples are generally darker in their ground colour, and the median band is darker and more clearly defined. Three examples bred in 1914 for the first time from a typical ♀ had all markings indistinct. In wild examples the ground colour may be ochreous grey, biscuit, or reddish ochreous, and sometimes there is a strong greyish suffusion. Markings vary in intensity of colour and extent of the median band and basal blotch on the costa. An extreme form in one direction is almost devoid of all markings, and is only to be separated from the *ocellaris* group by its wing fringes and discoidal line; in the other it has the median band much broadened below, and the basal blotch extended into a band. Both forms are at present unique among British examples.

Asiatic examples in Herr Püngeler's collection were generally larger and paler with the hind-wings white. Some remarkable *moneta*-like forms from the Alexander Mts. in Asiatic Russia, with dark veins and markings on a bright yellow ground colour, call for a varietal name.

Ab. gilvescens n. ab., Ent. Mo. Mag., fig. 6. As in *intermedia*, but with pale buff ground colour, and with the stigmata faintly indicated, the pale inner circumscription absent, and the outer dark line frequently incomplete. Thorax greyish yellow with dark crest.

Variation. Bred insects offered no variation. The wild vary only in markings and follow *intermedia*. The figure 6 must be regarded as an extreme form. A lightly marked example taken in 1911, though mistaken at the time for *fulvago* L., is hardly to be distinguished from some of the paler European forms of *gilvago*. The markings of the specimen bred in 1910 are disposed exactly as in *fulvago* L.

No intermediate forms have been found as yet between this and the preceding ab., but knowledge of *gilvescens* is at present confined to the few insects bred in 1910, and the five wild examples taken since that date.

A note on the principal points of difference between the *gilvago*-like forms of *ocellaris* and *gilvago* may be of service to anyone meeting with the rarer insects for the first time.

Taken over the whole area of distribution, there is, perhaps, no single character which can be used with certainty, but the presence in any insect of one of the following characters should be sufficient to fix the species, as, so far as I know, they never occur in *gilvago*:—in the

fore-wings, the pale nervures and the light reniform dot; in the hind-wings, the short fine discoidal line. The pale nervures and the line on the hind-wings are sufficient for British and continental examples, though the latter character is frequently indistinct in non-British insects. The reniform light dot is a good indication when present, but insects will be found not infrequently with the dot as dark as in any *gilvago*. Asiatic examples show a tendency toward a darkening of the nervures, and the Alexander Mt. specimens have them black. The outline of the insects affords but little indication, as many of the light European forms of *gilvago* are as sharply angled as any *ocellaris*.

In a short series of *gilvago* from Vienna, I have an insect which, in point of ground colour markings and the absence of any trace of the line on the hind-wings, is to be counted as this species; it has, however, the pale nervures of *ocellaris*, and the wing fringes are unicolorous as in the typical *ocellaris* group, and not speckled as in *gilvago* and ab. *intermedia*. Can this be the hybrid *gilvago* × *ocellaris* Bkh., so often the subject of speculation among continental authors?

Genitalia. As Mr. F. N. Pierce had no opportunity of including a description of this species in his "Genitalia of the British *Noctuidae*," I give the following, made from a British and a Continental insect mounted in 1912.

Mr. Pierce, in sending the description, remarks that "the difference in the three species, *ocellaris* Bkh., *gilvago* Esp., and *fulvago* L., is largely confined to one of the cornuti; the general build is very similar."

"Valva (harpe) with corona. Cucullus divided. Harpe (clasper) long and pointed. Ampulla short and thick, not smooth. Uncus narrower towards the tip. Vesica with bands of teeth, a long curved cornutus, a long bulbed cornutus."

The latter cornutus is the point of difference in the three species. In *gilvago* it is well bulbed, short, and curved; in *fulvago* the bulb is slight, the cornutus is straight and longer than in *gilvago*; in *ocellaris* it springs from a large bulb, is longer than in *fulvago*, and is very slightly curved.

This winter my friend Mr. Backlake has mounted a large number of all three species, and we have found that the relative sizes of the cornuti are constant throughout. In the Algerian insects already referred to the cornutus of the pale form (2) is not to be differentiated from British *ocellaris*, the red form (1) is more bulbed, and is short and thick as in *gilvago*, but not curved.

Life-history. Mr. H. O. Mills has already dealt with the early stages of the species in the Ent. Mo. Mag. for December, 1908, Vol.

XIX, 2nd Series, pp. 267-9. A few further notes may be of interest. Mr. Mills was in error in describing the ova as apple-green in colour; when laid they are creamy white, changing in the course of a few days through lemon-yellow to pale brown, in which state they pass the winter. The larvae do not hatch in nature before the end of March, they are full fed at the end of May or in early June, when they spin their cocoon and remain in the larval stage for a period of from six to eight weeks. Since Mr. Mills wrote in 1908 a small batch of ova has been found on a fallen poplar, seven wild larvae were taken in 1913 in the course of a two months' search, and a solitary pupa dug in August, 1914. The larvae probably wander a long way before spinning up. The food-plant in the Thames Valley is the male hybrid, *Populus serotina*. A note by Mr. Jones in the "Entomologist," February, 1915, suggests wych elm as another food-plant, and we can certainly accept it as such, as at the time of the publication of his note I had a small batch of larvae feeding well on common elm. Claims have been made for willow and aspen, which are not at present substantiated. Larvae in the breeding cages of a friend have at various times eaten apple, plum, red currant, and raspberry, but there is as yet no evidence that wild larvae feed here on anything but poplar (and elm?). Treitschke gives an interesting account of the gathering of wild larvae on *Artemisia campestris* and other low plants at Darmstadt; about six per cent. of the larvae produced *gilvago*, i.e., ab. *intermedia*, which is very much the proportion we should expect to get here if the larvae are ever found in numbers.

Attempts at getting fertile pairings of bred insects have so far met with no success. The following results from wild ova may offer some points of interest. Ova from *ocellaris* Bkh., with one exception have always bred true to the typical group: that is, there would be many *ocellaris*, one or two ab. *lineago* (not always that), and a few intermediate forms. The exception occurred in 1914, when a batch of ova produced 21 imagines, 5 *ocellaris* Bkh. and 3 ab. *intermedia*; the rest were so crippled that they offered no indication as to which group they belonged. These ab. *intermedia* differed from the usual heavily banded bred form in having all the markings lighter than in wild examples. A small batch from a type ♀ were forced in the late autumn of 1913, the larvae hatched in December, and 12 imagines turned out in May, 1914. Nine were ab. *lineago* Gn., and the other three agreed better with Borkhausen's description than any other British examples known to me. These, and these only, have the transverse lines very pale and

the pale nervures prominent; the ground-colour is greyish red and the terminal area is grey. It is interesting to note in connection with this appearance of so many ab. *lineago* from forced larvae, that in 1914, a dry and warm season, I caught 3 wild true ab. *lineago*, all males, and another, a ♀, was brought to me to identify. These are the only wild British examples I have seen.

Ova from ab. *intermedia* have produced equal quantities of the parent form and *ocellaris* Bkh.; in 1910 a few ab. *gilvescens* were produced (Ent. Mo. Mag., XXII, 2nd Series, p. 204), the proportion being, I believe, 3 : 3 : 1, the last figure representing ab. *gilvescens*. Abs. *lineago* and *gilvescens* have not as yet been bred from. Single ♀ examples of each were taken for the first time in 1914.

31, Agate Road,
Hammersmith, W.:
March, 1915.

HELP-NOTES TOWARDS THE DETERMINATION OF BRITISH

TENTHREDINIDAE, &c. (34).*

BY THE REV. F. D. MORICE, M.A., F.E.S.

In the list of British genera of Saw-flies given in No. 3 of these papers (Ent. Mo. Mag., May, 1903) the names, as explained at the time, were those employed at that date by Konow, and represented what was then the latest and most generally accepted nomenclature of the Sub-Order. But in the twelve years which have since elapsed much fresh work has been done by Konow himself and by other authors towards a revision of that nomenclature — especially by Mr. Rohwer of the U. S. A. Department of Agriculture, and Dr. E. Enslin of Fürth (Bavaria). Certain of Konow's views, also, as to the classification of the group have been generally abandoned, so that neither as to its arrangement, nor as to the names included in it, can my 1903 List claim any longer to be completely "up to date." Lastly, in collaboration with Mr. Durrant of the British Museum of Natural History, I have myself published in Trans. Ent. Soc. Lond., 1914 (Parts III-IV) certain further researches into the nomenclature of particular genera, which in part confirm and in part conflict with the conclusions reached by the authors above mentioned.

* No. 33 was issued in Ent. Mo. Mag., Vol. L., pp. 207-212 (October, 1914).

As to Konow's system of classification in general (*i.e.*, the families, sub-families, etc., in which he groups his genera), although I believe that some at least of the alterations which have been proposed in it will ultimately have to be adopted, I do not yet feel that I can recommend with confidence any more satisfactory substitute for it. I have no knowledge of any but Palaearctic genera, and without such knowledge I feel unable to form an opinion of any value as to the most natural classification of the Sub-Order as a whole. I propose, therefore, now merely to enumerate such names of British genera as I introduced into my List on Konow's authority but have since seen reason to abandon, and to state simply (*i.e.*, without argument to justify my statements) the names which I now think should replace them. Anything like a detailed argument on particular points would, I think, be out of place in this series of papers, and would certainly be of little use or interest to most of the readers† for whom they are intended. I may, however, say, generally, that I have been guided by two main principles: (1) to apply strictly the law of priority according to the rules now generally adopted by Zoologists; and (2) to cite names in the forms given to them by their original authors without attempting, as Konow and others have frequently done, to "correct" them according to the supposed requirements of philology.

The following, then, are the changes in my List (*Ent. Mo. Mag.*, May, 1903), which, as at present advised, I believe to be necessary:—

SUB-FAMILY 2.

For *Macrocephus* Schlecht..... substitute HARTIGIA Schiödte.
 „ *Astatus* Pz. „ EUMETABOLUS Schulz.

(Or else omit this genus altogether, for I now feel sure that it is not really British!)

For *Cephus* Latr. substitute ASTATUS Jur.
 „ *Trachelus* Jur..... „ TRACHELASTATUS M. and D.

SUB-FAMILY 8.

For *Arge* Schr. substitute TENTHREDO L.
 „ *Schizoceros* Lep. „ SCHIZOCERA Lep.

SUB-FAMILY 9.

For *Lophyrus* Latr. substitute PTERONUS Jur.

And add the name of a genus which was not known to me as British till 1913—viz., MONOCTENUS Dhlb.
 (cf., *Ent. Mo. Mag.*, 1913, p. 143).

† Those, however, who wish to know my reasons may consult Mr. Rohwer's work on "The Genotypes of the Saw-Flies," U. S. Dept. Agric., Washington, 1911, Bur. Ent., Tech. Ser. No. 20; and that of Mr. Durrant and myself on "The Jurinean Genera," *Trans. Ent. Soc. Lond.*, 1914 (especially pp. 371-386).

SUB-FAMILY 10.

Tribe a.—	For <i>Leptocercus</i> Thoms....	substitute	PLATYCAMPUS Schiödte.
	„ <i>Cryptocampus</i> Htg. ...	„	EUURA Newm.
	„ <i>Pteronus</i> Jur.	„	PTERONIDEA Rohw.
	„ <i>Croesus</i> Leach	„	NEMATUS Jur.
	„ <i>Nematus</i> Jur.	„	NEMATINUS Rohw.
Tribe b.—	„ <i>Eriocampoides</i> Knw...	„	CALIROA O. Costa.
Tribe c.—	„ <i>Phymatoceros</i> Dhlb....	„	PHYMATOCERA Dhlb.
Tribe d.—	„ <i>Poecilosoma</i> Dhlb. ...	„	EMPRIA Lep.
Tribe f.—	„ <i>Sciopteryx</i> Steph.....	„	SCIAPTERYX Steph.
	„ <i>Rhogogastera</i> Knw. ...	„	RHOGOGASTER Knw.
	„ <i>Tenthredo</i> L... ..	„	TENTHREDELLA, Rohw.

(To be continued).

TWO HERMAPHRODITIC SPECIMENS OF *ANDRENA**(A. DORSATA* K. AND *A. ALBICANS* L.).

BY R. C. L. PERKINS, M.A., D.Sc.

In this Magazine, Vol. XXV (1914), p. 218, I described two hermaphroditic bees of the genus *Andrena*. One of these, *A. flavipes* Panz. (*A. fulvicrus* K.) belonged to the class of hermaphrodites, which are conspicuously asymmetrical bilaterally, one half being ♂, the other ♀, at least to a large extent; the other, *A. bimaculata* K., to the class in which the bilateral symmetry is little or not at all impaired.

The two specimens now recorded belong to the same class as the *A. bimaculata*.

A. DORSATA.

This example was captured shortly after the note above referred to was written. The appearance is in general that of a female, the head, thorax, and their appendages being all ♀. The abdomen, except that its general form is robust, as in the ♀, is ♂ in clothing and structure. The 5th dorsal segment, however, bears conspicuous appressed hairs, forming an "anal fimbria" as in the ♀! The sixth ventral segment is ♂, the eighth, or rather its process, is well exposed, and the extreme apices of the stipites of the genital armature itself appear to be just visible. The specimen not having been pinned up till long after the time of capture was not dissected.

A. ALBICANS.

This example was captured on April 23rd, 1915, while it was resting in a dandelion. Its extraordinary appearance at once attracted my attention as I passed by, and even without stooping, I guessed at once that it was hermaphroditic.

Head and thorax, together with their appendages, all ♂, the antennae being 13-jointed. Abdomen normal for the ♀, with six segments only, and with the anal fimbria and pygidial area of the ordinary form.

Thus, while in this specimen the abdomen is ♀ and the rest of the insect ♂, in the former (*A. dorsata*) the abdomen is ♂, the rest of the body being ♀ in structure and appearance.

Park Hill House, Paignton:
April 25th, 1915.

CONWENTZIA CRYPTONEURIS SP. N.,

A NEUROPTERON (*CONIOPTERYGIDAE*) NEW TO THE
BRITISH FAUNA.

BY RICHARD S. BAGNALL, F.L.S., F.E.S.

To find a new Neuropteran is a pleasurable experience. In July, 1914, I discovered 2 ♀♀ and 1 ♂ of a species of *Coniopterygidae* whilst beating sawflies for *Psyllids* in the grounds of the Hancock Museum, Newcastle-upon-Tyne, which, whilst very different from *Conwentzia psociformis*, closely agreed with the description of a Continental species, *C. pineticola* Enderlein, the latter occurring chiefly upon larch. I have tried hard to regard the Newcastle captures as a form of *pineticola*, but feel that they must be accorded specific rank; an examination of the ♂ genitalia of fresh examples will decide the point.

Conwentzia cryptoneuris sp. n.

♀. Very like *C. pineticola*.

Head and thorax very dark blackish-brown, almost black (brown to dark-brown in *pineticola*); antennae and legs brown to dark greyish-brown (brown to black; brown in *pineticola*). Abdomen yellow, only lightly touched with grey; gonopods dark brown. Antennae 32-jointed.

Wings smoky grey-brown, lighter basally; veins mostly dark. Cubitus 1 of forewing dark and fumate on either side, and media with transparent white

or colourless line along upper side as in *pineticola*, but also with similar transparent elongated white patches in the three distal cells contained by radius 4 + 5 and media 1, media 1 and 2, and media 2 and cubitus 1 respectively.

The cross-veins connecting sub-costa and radius, radius and radial-ramus, and cubitus 2 and analis respectively, are not only weaker than the other veins but also, for the most part, white or colourless, and therefore very difficult to distinguish—a striking feature not described in *pineticola* and which suggests the trivial name. The second of these cross-veins does not strike the stem of the fork as in *pineticola*, but rather the fork-point (as in var. *tetensi*), or in one wing, the upper arm of the fork just above the fork-point.

I have made a few further remarks on this capture in "*The Vasculum*," a new quarterly magazine, to be devoted largely to the Natural History of our Northern Counties, and to illustrated articles on the more obscure and less studied groups.

South Hylton:

May 9th, 1915.

A new North-Country periodical.—The first number of *The Vasculum* is advertised to be ready for issue by June 1st. It is described as an illustrated Quarterly, dealing primarily with the natural history of Northumberland and Durham, and the tracts immediately adjacent thereto. As this magazine will deal largely with the obscure and "neglected" Orders of insects and other Arthropods we can commend it to our readers. The editors are the Rev. J. E. Hull, R. S. Bagnall, G. Bolam, and J. W. H. Harrison, and the annual subscription is 4/-, 4 parts to be issued in 1915.—EDS.

The food-plant of Philopodon geminatus F. (Cneorrhinus plagiatus Schall.).—With reference to the food-plants of this species, it may be of interest to record that in February of this year I received numerous specimens of the beetle from Guernsey, where it was said to be attacking "runner" beans in a glass house. In the "Review of Applied Entomology," Vol. III, Series A, p. 198 (April, 1915), an abstract of a report by Ritzema Bos states that in Holland it also attacks peas, rhubarb, and budded roses. Judging by this and other reports it appears that *P. geminatus* is a general feeder, and in this respect much resembles *Otiorrhynchus picipes* F.—J. C. F. FRYER, Board of Agriculture and Fisheries, Northumberland Avenue, London, W.C.: May 13th, 1915.

The food-plant of Chilosia variabilis Panzer.—A number of Syrphid larvae were found in September, 1914, feeding in the tuberous roots of *Scrophularia nodosa* Linn. at Warboys, Hunts. Owing to a series of accidents most of the specimens were destroyed, and only one larva pupated. This pupa produced an adult *Chilosia variabilis* Panz. on May 7th. Mr. Edwards, of the Natural History Museum, who kindly identified the fly, writes that *Chilosia gigantea*

Zett. has also been discovered in the roots of *S. nodosa* (Brischke, Ent. Nachr., VI, 56, 1880). The larva of a third species of *Chilosia*, *Ch. sparsa* Loew, is recorded by Carpenter (Econ. Proc. of the Royal Dublin Soc., Vol. II, p. 96) as attacking the roots of primrose. My material is hardly sufficient to admit of a description of the larva of *Ch. variabilis*, and an attempt will be made to collect further examples this year. — J. C. F. FRYER: *May 13th*, 1915.

Æpophilus bonnairei Sign., at Sennen Cove.—It may be of interest to supplement with further distributional details Mr. Tomlin's note under the above heading in the last issue of this Magazine. Sennen Cove is the southernmost part of Whitesand Bay, in West Cornwall, and therefore within about a mile of Land's End. It makes the fourth Cornish locality, and naturally the most westerly one, for this interesting Hemipteron. Thus far, the ascertained range of *Æpophilus* in England is as follows: Totland Bay, I. W. (*Champion*), the most easterly point: in Dorsetshire, Lyme Regis (*Kilburne*): in S. Devon, Plymouth (*Keys*): in Cornwall, Polperro, a little west of Looe (*F. Smith*); Falmouth (*Champion*); Mousehole, near Penzance, on the western side of Mount's Bay (*Marquand*); and Sennen Cove (*Tomlin*) as above, a total distance of about 200 miles as the crow flies. It has not yet been observed on the north coast of Cornwall, but has occurred in N. Devon, between Barnstaple and Ilfracombe (*Waterfall*). To complete the account for the British Isles, there must be added certain Irish records as given in the "Clare Island Survey" (*Halbert*), viz.: Dungarvan, co. Waterford (*Nichols*); Blacksod Bay, co. Mayo (*Kemp*); and two places on the coast of Galway (*Tattersall*). These latter form the most westerly limit of the species, not merely as regards the British Isles, but also for the whole of its area.—E. A. BUTLER, 56, Cecile Park, Crouch End, N.: *May 15th*, 1915.

Parasitism of Phygadeuon rusticellae on Tinea biselliella.—By some curious clerical or typographical error on p. 44 of the current volume of the Ent. Mo. Mag., this Hymenopteron is stated to have occurred in my bedroom. This is not so, it is my study on the ground floor, where I keep a photographic dish containing water on the floor close to a cupboard of odds and ends. In this water, throughout the whole of the late spring, summer and autumn of last year, these insects dropped in considerable numbers, and also a few of the moths on the larvae of which they are parasitic. Mr. Claude Morley was my authority for the name of the Ichneumon, and my object in writing the present note is to say that the insects began to appear again in quantity as regards the Ichneumon, sparsely as regards the host, the last few days, beginning about April 25th; also to say that I am indebted to my friend, Mr. G. T. Porritt, for naming the host-moth as *Tinea biselliella*.—W. DENISON ROEBUCK, 259, Hyde Park Road, Leeds: *April 29th*, 1915.

Abstracts of Recent Literature.

BY HUGH SCOTT, M.A., F.L.S., F.E.S.

GRAVELY, F. H., "THE EVOLUTION AND DISTRIBUTION OF CERTAIN INDO-AUSTRALIAN PASSALID COLEOPTERA." *Journ. and Proc. Asiat. Soc. Bengal*, Vol. 10, No. 6, pp. 201-210, pl. 24, 1914.

In two sub-families of these beetles, *Aceraiiinae* and *Gnaphalocneminae* many species are more or less asymmetrical in the form of the front of the head and dentition of the mandibles. The asymmetrical condition appears to have been evolved separately in the two sub-families, and in different divisions of the second, for five distinct types of asymmetry occur. These five types are characteristic of five groups of genera, which are quite distinctly separable from one another by other characters besides those liable to asymmetry. It is strongly apparent that in each group, whether of genera or species, *the most highly asymmetrical forms are the dominant forms*; e.g., in a group of species, the most highly asymmetrical species stands out by reason of its abundance, its occurrence over the whole area inhabited by the group, its variability in size (this usually exceeding that of the other species), and its gregarious habits: [it is usual in *Passalidae* for the larvae and both the parents to live together in a family; "gregariousness" here implies the living together of a number of such families]. Moreover, the different genera or groups of genera are with few exceptions confined to well-marked divisions of the region they inhabit; and a study of their distribution leads to the conclusion that the more highly specialised forms—i.e., in this case, the dominant forms—have migrated outwards radially from the distributional centres, driving before them the less highly specialised forms, which for the most part only maintain themselves in particular areas on the outskirts of the range of the whole group. The boundary-line between the Oriental and Australian regions separates the groups into two sets almost completely: and in *both* these regions there seems to have been an evolutionary and distributional centre, with subsequent radiating outwards of more highly specialised forms, driving the more primitive ones before them.

There is a curious similarity between these phenomena and those exhibited by two other groups of animals in the same region, namely, the *Thelyphoniidae* (curious Arachnids of the group *Pedipalpi*), and a marine group, the feather-stars or Crinoids. As regards the latter, the great difference lies in the fact that whereas in the Passalids the dominant species of a group is also the most highly specialised, in the Crinoids the dominant species falls in each group about midway between the most specialised and most primitive. The difference may, perhaps, be explained by the supposition that in the *Passalidae* the highly specialised forms are a *mature* fauna, while in the *Crinoids* the highly specialised genera are *senescent*, i.e., no longer dominant, but characterised by possessing but few species, which are very unlike one another, and which occur in widely separated localities.

CARPENTER, G. H. ; HEWITT, T. R. ; REDDIN, T. K. ; "THE WARBLE-FLIES : FOURTH REPORT ON EXPERIMENTS AND OBSERVATIONS AS TO LIFE-HISTORY AND TREATMENT." Irish Dep. Agric. Journal, Vol. 15, No. 1, pp. 105-132, 1914.

It is an old-standing question how the larvae of the ox-warble flies (*Hypoderma*) reach their situation in the "warbles" or abscesses under the skin of the backs of cattle. The matter is of biological interest and of practical importance. It has been thought that the flies laid their eggs directly on the cattle's backs, and that the new-hatched larvae bored their way in directly through the skin. Later, it was observed that the flies seemed to oviposit not on the backs but on the legs, and as second-stage larvae were frequently found in the walls of the beasts' gullets, it was supposed that the cattle licked the eggs into their mouths, and that the larvae made their way through the gullet-wall and wandered till they reached their final situation under the skin of the back. For some years experiments on calves have been carried on in Ireland, and this fourth report indicates that the first supposition is quite erroneous, while the second, though nearer the truth, is not entirely correct.

The flies lay their eggs almost exclusively on the legs of the cattle, preferably on the hock-joint of the hind-legs. *H. lineatum* lays its eggs in rows, a number on a single hair. *H. bovis* lays them singly and quickly, and causes the cattle to get very excited. Merely touching them with a stick on the parts chosen by the fly causes them to gad in a similar manner, whereas touches on the back create no excitement, and even the blood-sucking of *Haematopota* only makes them shake their skin.

Carpenter and Hewitt have already described the reproductive organs and first-stage larvae of the flies (Sci. Proc. R. Dublin Soc., Vol. 14, pp. 268-289, pl. 21-26, April, 1914). *The maggots bore in through the skin of the part of the body on which they are hatched, i.e., the legs*; this was actually observed in one case, and the entrance-holes were found in many. That the maggots reach the wall of the gullet by being licked into the mouth appears, therefore, almost disproved; experiments, which at one time seemed to support this idea, have, by continuance over a longer period, negatived it. But research on this point is still in progress.

The wanderings of the first-stage larvae after piercing the skin have not been followed. But the second-stage larvae are quite regularly found in the sub-mucous layer of the gullet-wall. They commence to appear there about August, their maximum numbers are reached in November, and by February or March they have disappeared from this part of the host's anatomy. During the later part of the time they are found further back towards the stomach, and a few have been discovered just outside the muscular coat of the gullet. Possibly they pass upwards to the back *via* the diaphragm. As is well known, the life-cycle is completed by the larvae becoming mature in the "warbles" on the backs of the cattle during spring and summer, and by their quitting the warbles when full-grown, and falling to the ground, where they pupate.

The facts of the flies ovipositing on the legs, and of the second-stage larvae appearing in the gullet-wall, have received confirmation by (*inter alia*) experi-

ments conducted in Canada: see Dr. Hadwen's work in British Columbia (Bulletin 16, Health of Animals Branch, Canadian Dep. Agric., Nov. 25, 1912). The great fact of practical importance is that it is useless to protect the backs of cattle against the flies, since nothing will induce the insects to oviposit there, not even when the legs are artificially covered up.

HADWEN, S., "A DESCRIPTION OF THE EGG AND OVIPOSITOR OF *CUTEREBRA FONTINELLA* CLARK." Proc. Ent. Soc. Brit. Columbia, Jan., 1915.

Mention was made in the preceding summary of Dr. Hadwen's observations on *Hypoderma*. The present paper deals with some points connected with another genus of *Oestridae*. The larvae of the various species of *Cuterebra* are found in the bodies of rodents—squirrels, rabbits, field-mice, &c. In some cases the full-grown larva seems astonishingly large in proportion to its unfortunate host. These larvae are situated under the skin (rather after the manner of full-grown *Hypoderma*) of various parts of the body. *C. fontinella* is a parasite of *Lepus artemisia* ("Cottontail"). Its eggs closely resemble those of the horse-bot, *Gastrophilus equi*, having a groove on one side for attachment to a hair of the host. These are probably the first eggs of the genus *Cuterebra* to be described.

Societies.

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, March 17th, 1915.*—The Hon. N. CHARLES ROTHSCHILD, M.A., F.L.S., F.Z.S., President, in the Chair.

Prof. Poulton exhibited a female Asilid, *Promachus* sp., captured with its prey, a male *Delias descombesi* Boisd., August 18th, 1914, at Takdah (5,000 ft.), Sikkim, by Major T. D. Broughton, R.E. Prof. Poulton, the specimen of the African Hesperid butterfly, *Ploetzia cerymica* Hew., referred to in the following note written December 26th, 1914, by Dr. G. D. H. Carpenter, from Kakindu, about 30 miles W. of the Victoria Nyanza and 500 ft. above it. "I send you a skipper of much interest. It came to light one night (December 23rd) about 9 p.m., and behaved much like a moth. The feature of interest is the large white patch on the antenna, which was *extremely* conspicuous and really *glistened* in the light almost as if it were phosphorescent." Prof. Poulton said that the species was usually diurnal. Commander J. J. Walker, on behalf of Mr. F. C. Woodforde, bred specimens of *Zonosoma pendularia* L. var. *subroseata* Woodforde, and var. *subochreatea* Woodforde, with the type-form of the species for comparison. Mr. W. C. Crawley, drawings of various species of ants, of two kinds of organs in the funiculi of antennae. They are often, if not always, in the living insects, filled with air, and may possibly be connected with the sense of hearing; also several drawings of the genital armatures of ♂ ants. Mr. H. Willoughby Ellis, two teratological specimens of *Coleoptera*, viz., a male specimen of *Carabus nemoralis* Müll., and a specimen of the dark variety of *Campylus linearis* L. Mr. Champion, on behalf of Mr. W. West of

Greenwich, specimens of *Bruchus chinensis* L. (*pectinicornis* L.), found in lentils in a London warehouse, also a male found at large at Dartford. Dr. F. A. Dixey made a communication on the nuptial flight of butterflies.

Wednesday, April 7th, 1915.—Dr. G. B. LONGSTAFF, M.A., M.D., Vice-President, in the Chair.

At the unanimous request of the Council, the Chairman proposed that a letter should be written to the President on behalf of the Society, offering condolences on the sudden death of his father, the late Lord Rothschild; the resolution was unanimously passed, the whole meeting rising in their places.

Mr. William Carr, B.Sc., Station Road, Bentham, Lancaster, and Dr. A. Eland Shaw, Samarai, British New Guinea, were elected Fellows of the Society.

The Rev. G. Wheeler exhibited a box of Algerian butterflies, of species treated of by Mons. Ch. Oberthür in the recently published fascicule x. of his *Lépidoptérologie Comparée*; many of the species were exhibited for the first time in England. Mr. O. E. Janson, a new species of *Coelorrhina* (family *Cetoniidae*) in which the cephalic male armature usual in this genus was entirely absent, and to which he had given the name *nutica*. Mr. H. Willoughby Ellis, a British variety of the Pentatomid bug, *Palomena prasina* L., differing from the type in its larger size and dark olive colour; it was taken on ivy at Torquay, May 25th, 1907. Mr. E. B. Ashby, several species of North American *Papilios*. Mr. H. St. J. Donisthorpe showed a chart of the names applied to the genital armature of male ants, and read notes. The Rev. F. D. Morice exhibited a series of lantern slides to show the structure of the ♂ genital armature and the ventral segments adjoining it in various groups of Aculeate *Hymenoptera*, and more particularly the characters exhibited by two of these segments (the 7th and 8th) in 35 Palaearctic species of the Genus *Hylaeus* F. (*Prosopis* of Jurine and most recent authors).

The following paper was read:—"Hymenopterous Parasites bred from the Pupae of *Chortophila brassicae* Bouché and *Acidia heraclei* L.," by J. T. Wadsworth, Research Assistant, Dept. of Entomology, University of Manchester; communicated by Dr. A. D. Imms, D.Sc., B.A., F.L.S., F.E.S.—GEO. WHEELER, *Hon. Secretary*.

STUDIES IN HELOPHORINI.

BY D. SHARP, M.A., F.R.S.

6.—GEPHELOPHORUS AND MEGHELOPHORUS.

GEPHELOPHORUS gen. n.

Prothorax area-superpleurali ad basin angustissima, ante medium sublata. Palpi maxillares crassiusculi, articulo ultimo sub-symmetric.

This is a very interesting genus as exhibiting a passage from *Trichelophorus*. Seidlitz placed the only species of it known to him

in *Trichelophorus*, but Kuwert said this was wrong, and classed it in *Meghelophorus*. It (*G. fennicus*) proves, however, to be a member of an East-Asiatic genus, distinct from the other two, but probably more allied to *Trichelophorus* (if we compare it with *T. oscillator*) than to *Meghelophorus*. The palpi are, as Kuwert says, not those of *Trichelophorus*, neither are they those of *Meghelophorus*, and the epipleura are also intermediate. The very peculiar form of the supra-pleural area is quite distinct from that of *Trichelophorus*, and is not found in *Meghelophorus*, but the minor characters are perhaps altogether most like those of *Meghelophorus*. The flexible hairs of the hind tarsi are well developed. Type of the genus *Helophorus auriculatus* Sharp. The last ventral plate is not serrate. The intercalated punctures at the base of the elytra are presented in a very interesting form, being more complete than they are in any other *Helophorini*. They are from 9—12 in number, and in some specimens of *G. auriculatus* the series traced from behind to the front is quite complete; the sutural series being towards the base a little diverted to the outside, and a short basal series grafted on at the point of diversion. This supports the view I have previously expressed as to the morphology of these punctures.

1.—*Gephelophorus auriculatus*, Sharp.

This species is easily distinguished from all others by the fact that the alternate interstices of the elytra are unevenly raised; they are only slightly prominent, but in some places are more elevated so as to form indistinct sub-tuberculiform swellings; there are four or five of these elevations behind the middle of each elytron. The sides of the thorax are very deeply sinuate-impressed behind the front angles. The last joint of the maxillary palp is almost symmetric.

G. auriculatus was described by me from a single specimen of a Japanese insect discovered by Mr. Lewis at Miyanoshta. I have now before me five examples from China that I treat as the same species as the Japanese type; though if they be so the species is a very variable one. Two specimens are of elongate form quite similar in facies to *G. sibiricus*, though a little smaller and readily distinguished by the sculpture of the elytra, and the situation near the front angles of the thorax. The other three are much less elongate, but they do not agree sufficiently to be treated as one species. The colour of the elytra varies from brassy black to ferruginous-testaceous.

The localities are: Miyanoshta in Japan (Lewis); Kiu-kiang in

China (Lewis), one specimen differing but little from the Japanese type; Da-laen-saen, Ningpo (Commander Walker), three specimens, two of them being of the elongate form, while the other departs but little from the Japanese type; Luhwang Island (Walker) one specimen; Tygosan Island, Chusan Archipelago (Walker), one specimen. These localities are all near to one another and not far from Japan. I have labelled the elongate form resembling *G. sibiricus*, var. *chinensis*, and I suspect that it will ultimately prove to be a distinct species.

2.—*Gephelephorus sibiricus*, Motsch.

This species has the elytra unusually long in proportion to width and pointed behind; the pronotum is nearly straight in front and not convex over the head; the sinuation of the sides near the front angles is not great, the grooves are narrow; and the intervals are rather coarsely granulate; the alternate interstices of the elytra are strongly raised. The aedeagus is not like that of *Meghelephorus*, but approaches that of the *Empleuri*, the lateral lobes being rounded externally so that their tips approximate beyond the extremity of the median lobe.

The species is better known under the name of *fennicus* Gyll., but as the prior *fennicus* of Paykull is understood to be a synonym of *E. nubilus*, the more modern name proposed by Motschoulsky has been adopted by Zaitzev, whom I follow.

The species extends from East Siberia to Norway, and Motschoulsky (Schrenk, Reise, p. 104) considered his species to be distinct from *fennicus* Gyll., but I fail to establish any valid distinction between specimens from Amurland and Norway. Though apparently a scarce species in Scandinavia it seems to be abundant in East Siberia. There is apparently no record for its occurrence in Europe south of the Baltic.

MEGHELOPHORUS, Kuw.

This includes the largest forms of *Helophorini*. The super-pleural area is narrow and parallel, its limit not easy to define on the pleural side; the palpi are thick, and though the terminal joint of the maxillary pair is stouter than in *Helophorus* it has not the regular shape of the symmetric palp of *Atracthelophorus*, etc.; the labial palpi are largely developed, their setosity very marked, and the flexible hairs on other parts are also present; on the hind tarsus of *M. aquaticus* there is one on the 2nd joint inserted near the base, one on 3rd and 4th joint, near apex, and one on 5th joint near middle; but I do not find

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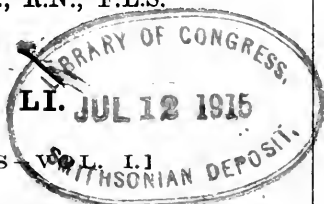
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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. — Wednesdays, October 6th and 20th, November 3rd and 17th, December 1st, 1915. January 19th (ANNUAL MEETING), February 2nd, 1916.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

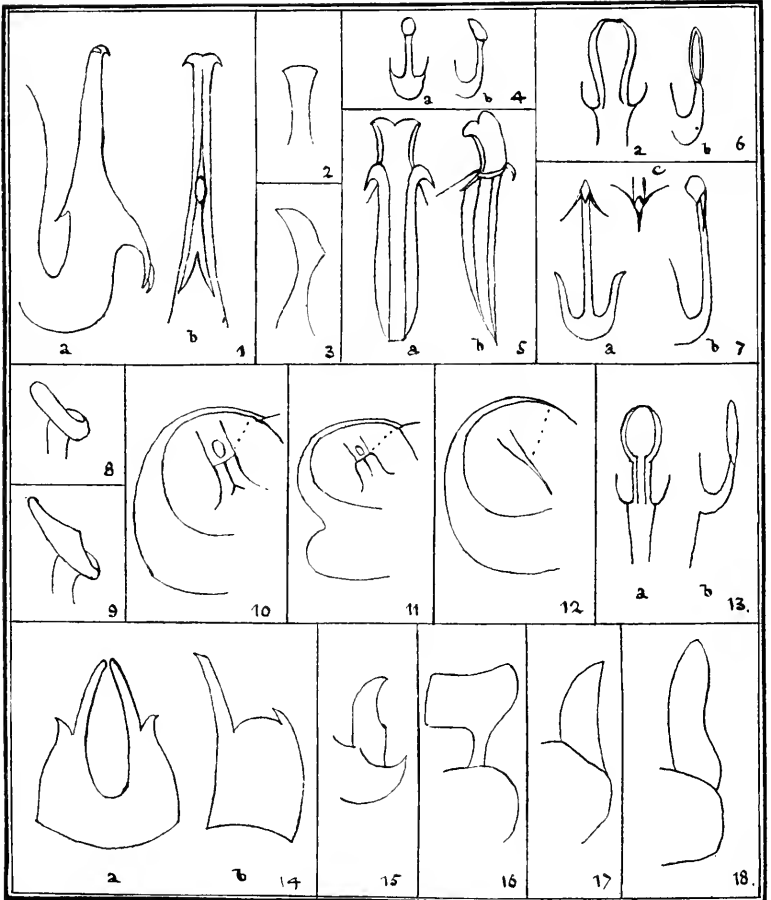
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Hon. Sec. : J. Ross, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

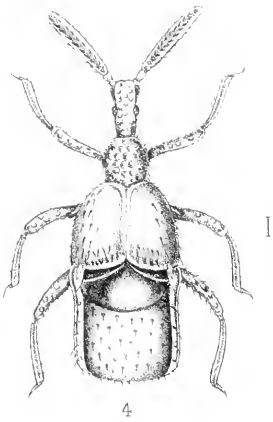
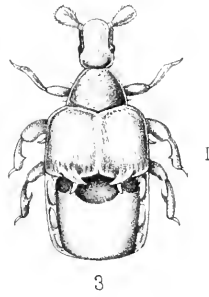
Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

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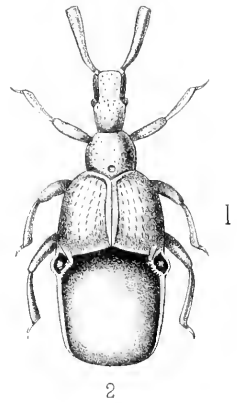


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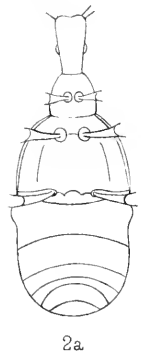
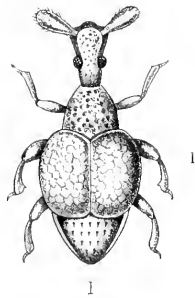
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West, Newman lith.

NEW CLAVIGERINAE.

any on the tibia. There is no false epipleuron, the true (pubescent) epipleuron is elongate and conspicuous, and is limited externally by the raised margin. The last ventral plate is set behind with very peculiar truncate teeth in all the species, and this character appears to be confined to the genus. In addition to the species mentioned below there are two others from W. Siberia—*bergrothi* Sahlb. and *niger* Sahlb. They are unknown to me, and it is somewhat doubtful whether they really belong to *Meghelophorus*: *parallelus* Motsch. from the Kirghiz steppes appears quite enigmatical; from the brief description the genus is uncertain, and until specimens are received from the same locality it must remain merely a name.

The colour of the pronotum in *Meghelophorus* is generally metallic, and M. Zaitzev has recently made use of the colour of this part for the separation of a sub-genus that he has named *Lihelophorus* (Annuaire Mus. Zool. St. Pétersbourg, XIII, p. 421, 1909). This character is not a satisfactory one. In *Helophorus* (s. str.) there are several species in which the colour of the pronotum is yellow without any metallic appearance; and in the genus *Trichelophorus* the colour of the pronotum is remarkably unstable; in many specimens it is not metallic, and in *T. alternans* this coloration is very variable, the pronotum being usually metallic on the disc, while in other cases this metallic appearance is nearly or quite absent. The other characters assigned to *Lihelophorus* are the presence of intercalated punctures at the base of the elytron, an asymmetric terminal joint of the palpus, and unelevated elytral interstices. As all these characters exist in the genus *Meghelophorus* I think it probable that *Lihelophorus* will prove to be a synonym thereof, though I am unacquainted with the two new Tibetan species which Zaitzev proposed to include in this sub-genus.

1.—*Meghelophorus aquaticus*, L.

One of the largest species of the *Helophorini*, but varying in size from $6\frac{1}{2}$ – $7\frac{1}{2}$ mm. in length. The stout maxillary palpi have the terminal joint about as long as the ante-penultimate one. The head is coarsely granulate, of an obscurely aeneous or bronzed colour. The thorax is dull, the median, sub-median, and sub-external grooves quite definite and moderately deep, but the external groove is represented only by a very fine channel, due indeed merely to the raising of the lateral margin; all the intervals are coarsely sculptured in a granular manner, and bear a little hair, which, almost completely absent on the median, is distinct, though fine, on the sub-external interval near the front. On the elytra the punctures of the series are moderately coarse,

the interstices broad, and flat, the 2nd, 4th, and 6th slightly convex: there is little punctuation on the interstices and a minute and scanty hairiness that is difficult to detect.

The species is common throughout Central and Northern Europe, but I have no evidence of its occurrence in the South: records of such may be found, but I suspect they all refer to closely allied forms. It (under the synonymic name *grandis*) is recorded by Motschoulsky as occurring in East Siberia, whether correctly I do not know.

1.—*Meghelophorus aequalis*, Thoms.

Closely allied to *aquaticus*, but on the average considerably smaller (length, $5\frac{1}{4}$ –6 mm.), with the sculpture of the head and thorax much less coarse and the colour of these usually more brilliantly metallic. The teeth on the hind-margin of the last ventral plate are extremely short.

M. aequalis is a very variable species, and being very closely allied to *aquaticus* may, as many believe, be proved to be not really distinct. When the variations of *aequalis* are examined it is, however, seen that there are but very few specimens that cannot be easily distinguished from *aquaticus*. The two forms live in intimate association here, and I have not been able to establish any difference in the aedeagus as constant, though I have examined it in many specimens; the more slender form of the organ in *aequalis* being the natural accompaniment of the smaller size and less robust build of the whole insect.

Varieties of slender, parallel form, with the thorax black in the middle, have been found at an elevation of 4–5000 ft. in the Tyrol by Champion (Campiglio and the Mendel Pass); and a similar, though not so strongly marked, variety was found by me at a similar elevation at Mont Louis, Eastern Pyrenees. These dark, slender specimens are of interest in connection with *H. frigidus* Graells.

Dark specimens have the elytra much infuscate, but often in an irregular manner so as to leave pale spots or areas.

A variety from Germany with this pale spotting, and with the thorax a little more sinuate at the sides than usual, was sent me by the late Herr Wehncke as "*splendens* n. sp.," but no description has been published, though the form is worthy of a name. There is another example of *splendens* from Germany (Maerkel) in the British Museum collection.

The distribution of *M. aequalis* appears to be much the same as that of *aquaticus*, and the form seems to be quite as common. As I have already said, at Brockenhurst the two live in the most intimate association, and yet they are in nearly all cases easily distinguished. This, however, cannot be the same in all localities, for a collection of 72 specimens made in Epping Forest by Mr. C. J. C. Pool proves to consist of 71 *aquaticus*, with very little variation, and 1 *aequalis*.

3.—*Meghelophorus manchuricus* sp. n.

Capite pronotoque viridis, hoc sulcis cupreo-auratis, parum profundis, antennis, palpis (?), pedibus elytrisque testaceis, his paululum nigro-maculatis; subtus nigricans, abdomine rufo-variegato. Long. 5½, lat. 2½ mm.

Extremely close to *M. aequalis*, especially to var. *splendens*, but with the sides of the thorax less sinuate and the front margin straighter, and distinguished by the brilliant metallic colour of the head and thorax. The sculpture of the latter granular, but very shallow, sub-effaced. The elytra are yellowish, with vague fuscous areas, with a few black marks across the middle. The under-surface black, with the sides and hind-margins of the ventral segments reddish. Legs very slender. I have seen only one example (probably a female), slightly immature and bereft of its maxillary palpi.

Manchuria (Adams, from the Fry collection).

4.—*Meghelophorus frigidus*, Graells.

This is closely allied to the small dark examples of *M. aequalis* I have mentioned as occurring in the Tyrol, but it is always distinguished by the greater smoothness of the median intervals of the thorax; in the smaller examples there is only a feeble punctuation on the middle of this interval, in the largest there is a very effaced granulation. The interstices of the elytra are flat, and their pubescence very minute. The length varies from 4–5½ mm. The lateral and median lobes of the aedeagus are shorter in proportion to the basal piece than they are in *aequalis*, the median lobe being especially short and broad. Graells' description and figure being very poor, this species has been quite misunderstood. Seidlitz thought that *frigidus* Gr. was the southern *M. milleri*, whereas it is a sub-alpine form. Kuwert believed it to be the same as *aequalis* (having apparently seen no example). Bedel

also considered *aequalis* and *frigidus* as synonymous, and the latter name having priority he adopted it for the combination; *frigidus* and *aequalis* are, however, more different than *aquaticus* and *aequalis*.

M. frigidus occurs in profusion at a considerable elevation in the Guadarrama range, and Champion has found it also in the neighbouring Sierra de Bejar and at Tragacete.

5.—*Meghelophorus milleri*, Kuwert.

Although this is treated by Ganglbauer and Zaitzev as a subspecies of *aquaticus*, there can be no doubt as to its being a distinct species. Of the size of *aquaticus*, it is distinguished by the deeper grooves of the thorax, and the diminished granulation of the median intervals, as well as by a greater development of the setosity of the upper surface, and numerous minor and more variable distinctions. It appears to be a Mediterranean insect extending from Montpellier and Marocco to Syria, and found also in Mesopotamia and Arabia.

Being somewhat variable in colour, and in the setosity of the elytra, several races have been supposed to exist, but I cannot perceive anything more than variation, a little exaggerated possibly, as to certain points in some localities.

The thorax is usually bright in colour, and is a little less strongly transverse than it is in *aquaticus*. Its yellow colour laterally extends along the front margin, the sub-external interval is separated from the lateral margin, so that there is an external groove, and the same interval is much interrupted in the middle, so as to be nearly divided into two parts. The colour is very variable, and in some localities the elytra are usually very pale. The villosity of the elytra is often worn off, but then the fine punctuation from which it arises is visible and sufficiently different from that of *aquaticus*. There is no constant difference in the aedeagus, though the lateral lobes are usually a little longer in *milleri*.

Montpellier, Malaga, Marocco and Algeria, Sardinia, Corsica, Sicily, Malta, Corfu, Greece, Smyrna, Syria, Mesopotamia and Jeddah, are localities from which I have examples before me.

(To be continued).

A NEW SPECIES OF *MEOTICA*.

BY D. SHARP, M.A., F.R.S.

In June, 1913, I mentioned the existence here of an undescribed *Homalota*, allied to *H. exilis* (Ent. Mo. Mag., xlix, p. 125). I have delayed its description because of a note by M. de Peyerimhoff (Bull. Soc. Ent. France, 1914, p. 250), in which he said that he, as well as Dr. Joy and Mr. Fenyés, was of opinion that the sub-genus *Meotica* has really 5-jointed anterior tarsi, and if so, is a valid genus. I have therefore obtained fresh specimens of my new species, and by means of mounts in balsam, have made it quite clear that the opinion of M. de Peyerimhoff is correct, and that *Meotica* must be treated as a distinct genus. The first four joints of the front feet are short and equal, the 5th being about twice as long as the 4th. The middle tarsi are a little longer, but the relative proportions of the joints are similar; the hind feet are also short, their basal segment $1\frac{1}{2}$ times the length of the second, the terminal joint short, but little longer than the basal one, and not twice as long as the 4th.

Meotica exillima sp. n.

Angusta, subparallela, subopaca, antennis extrorsum fuscis, basi, palpis pedibusque testaceis, capite abdomine nigricantibus, hoc apice dilutiore. Long. 1½ mm.

Hab.: Anglia mer.

Readily distinguished from *M. exilis* by the narrow parallel form, the more obscure colour, and less shining surface; the antennae shorter and thicker, and the thorax longer. The eyes are very small; the thorax almost as long as broad, distinctly narrowed behind; elytra narrow, slightly longer than the thorax; abdomen elongate and parallel, the apex a little paler. Punctuation very indistinct, but more marked than in *exilis*. Wings short and rather broad, rather longer than the thorax and elytra, the portion beyond the stigma about as long as the basal section. The male genitalia are peculiar and unlike those of any *Homalota* we have examined. The colour of the insect is a little variable.

M. exillima is found here in *Sphagnum* in the spring and autumn, and though local is by no means rare. It has been taken by Messrs. Champion, Willoughby Ellis, and Bedwell, as well as by Commander Walker, my daughter and myself. *M. exilis* is abundant here in flood-refuse but does not occur in *Sphagnum*.

Brockenhurst:

May 31st, 1915.

ON CERTAIN BRITISH HOMOPTERA.

BY JAMES EDWARDS, F.E.S.

(PLATE XVIII.)

Megophthalmus scabripennis sp. n.

Differs from *M. scanicus* in having the surface of the corium between the veins covered with closely-placed tubercles; the recurved barbs on each side of the upper edge of the mouth of the aedeagus more than half as long as the stem; genital style (fig. 9) with a broad angular tooth on the outer side about midway between the apex and the bend. In *M. scanicus* the surface of the corium between the veins is covered with a coarse, shallow, confused punctuation, the barbs at the mouth of the aedeagus are about one-fourth the length of the stem, and the style (fig. 8) is of nearly equal width from the bend to the apex.

I have seen *M. scabripennis* from Weston-super-Mare; Hope Hills, Colwyn Bay, Denbighshire; Symonds Yat, Credenhill, Herefordshire; Snowdon; Pendine, Carmarthenshire; and Sherwood Forest, Bulwood Forest, and Linby, Notts; twenty-one examples in all. The only species which I have hitherto found at Colesborne is *scanicus*; but Prof. J. W. Carr has taken both species on the same day at Linby, as did Mr. E. A. Butler at Pendine.

Idiocerus albicans Kbm. ab. *fusco-coeruleus* ab. n.

Head, pronotum and legs blackish-brown, with a deep blue tinge similar to that found on the elytra of the male of *Tettigonia viridis*; elytra fuscous, becoming gradually paler just before the apical areas.

One female off White Poplar in a garden at Norwich (*Thouless*).

Acocephalus trifasciatus Fourcr.

Nearest to *A. bifasciatus*, but has the elytra white at the apex; *i.e.*, the elytra are white with the base broadly, and two transverse bands, one near the middle and the other just before the apex, dark brown. The barbs of the aedeagus (fig. 1) are as follows: a small recurved pair at the apex, a small straight lateral pair behind the middle, and a large divergent dorsal pair, also behind the middle. On the aedeagus of *A. bifasciatus*, and *A. tricinctus* there are no apical barbs, and the large dorsal post-median pair are sub-parallel. I am not acquainted with any characters by means of which the females of *A. bifasciatus*, *A. trifasciatus*, and *A. tricinctus* may be distinguished with any degree of certainty.

I have only seen this species from Nottinghamshire, where it has been taken by Prof. Carr on Langford Moor.

Deltocephalus multinotatus Boh.

Having regard to the six dark spots on the crown, two (triangular) at the apex, two (transverse) in a line with the front edge of the eye, and two (transverse) at the hind margin, and the blackish spot on the elytra at the end of cell M3, this cannot be mistaken for any other British species of the genus. The veins are in greater part milk-white, and veins R1 and R2 + 3 each stand in a milk-white triangular spot. The pronotum has a dusky cloud on the disk and a black point on each side. The aedeagus (fig. 5) is long, strap-shaped, of three divisions, of which the two outer are more highly chitinised than the inner one; at about the apical fifth each lateral portion is produced outwardly into a recurved tooth, beyond which the remainder of the organ is bent over, in form somewhat like the lip of a jug; the bases of these two teeth are connected by an arch; on the front side opposite to this arch there are two long, straight, divergent spines, of which about the apical third is visible in the cephalad aspect.

I have called this species *multinotatus* Boh., in accordance with common usage; but I can only say with certainty that it is *multinotatus* Then (Mitt. Nat. Ver. Steiermark, 1898, t. II). It is evident from the latter's foot-note, *t.c.* p. 161, that he includes more than one Austrian species under that name, though he only figures the genitalia of our insect.

The macropterous form, of which I have only seen the female, is a most beautiful insect; the dark markings on the crown and pronotum are exaggerated, and the cells of the elytra are nearly all margined with blackish, the white markings becoming by contrast much more conspicuous.

Notts (*Carr*); N. E. Yorkshire (*Butler*).

Deltocephalus sursumflexus Then.

Similar in general appearance to *D. flori* Fieb., but the tendency to have black margins to the cells is less marked. The aedeagus (fig. 7) is long and slender, and on each side of the pointed apex there is a long curved horn directed outward and downward in the plane of the long axis of the stem; in the lateral aspect one sees at the apex an irregularly roundish membranous lobe, the distal end of which is strongly chitinised. The tooth on the distal third of the lower edge of the pygofer is small, straight, and not curved inward. The difference in the outline of the hind margin of the last ventral segment in the female does not furnish any reliable distinction between this species and *D. flori*.

I got *D. sursumflexus* from the herbage (rushes, sedges, *Vaccinium*, *Sphagnum*, &c.), at the edge of pools in the Delamere Forest district, at the end of August, 1914; it occurred much more sparingly than is usual with the *Deltocephali*.

Deltocephalus thenii sp. n.*D. striatus* Then (pars).

I give this name to the second species mentioned and figured by Prof. Then (t.c. 1899, p. 166, note 2, t. II, fig. 6a). It appears to me that we cannot do better than accept Then's definition of *striatus* L., though none can say with certainty whether this is or is not the kind of insect which was described by Linnaeus under that name; but no useful purpose is served by treating under one name what are obviously two species. *D. thenii* is best distinguished from *D. striatus* Then by the form of the aedeagus (fig. 6), the free portion of which consists of two chitinous branches, in shape somewhat resembling the frame of a lyre and connected by a transparent membrane. The aedeagus of *D. striatus* Then (fig. 13) resembles a spoon of which the handle is about equal in length to the bowl.

D. thenii is generally distributed and common in Britain, but I only know *D. striatus* from coast-marshes at Wells and Weybourne, Norfolk.

Deltocephalus normani Scott.*D. substriatus* Then.

This is not, as I formerly supposed, an uncommon form of *D. striatus*, but a distinct species, which was described by Prof. Then (op. cit. 1901, p. 186) under the name of *substriatus*. It is likely to be confused with *D. thenii*, from which it differs in being less strongly marked with black, and in its slender aedeagus with a small, oblique, slightly expanded mouth (fig. 4). The inner apical areas have a tendency to whiteness, and it was to specimens in which this feature is particularly well-marked that Scott gave the name *normani* in 1881. In fresh specimens the veins are decidedly yellow.

I have found this species just as common as *D. thenii*.

Limotettix atricapilla Boh.

Readily distinguished from *L. striola*, which it otherwise much resembles, by having the front edge of the elytra broadly pale. Genital styles acuminate and curved inward at the apex, on the outer side a little below the apex a strong triangular tooth (fig. 3). The concave hind-margin of the last ventral segment in the female has a feeble semi-circular notch in the middle.

Amongst low plants at the edge of pools, Newchurch Common, Delamere Forest district, September, 1910, and August, 1914.

Limotettix saturata sp. n.

Resembles *L. aurantipes* in having the upper-side and legs yellow, inclining to red, and the black spots on the crown small, or even absent, but the frontal black spots are roundish or obtusely trigonate, not wider than long. The genital valve is about twice as wide as high and the genital plates are transversely impressed across their apical third; the inner edge of each is sub-equal to its

greatest breadth. There is no lobe at the base of the aedeagus, and its apex is simply acicular (fig. 12).

In a marsh at Hoveton, Norfolk, September 2nd, 1911 (*Edwards*); Leith Hill, Gomshall, Chilworth (*Butler*).

Limotettix 5-notata Boh. *nee* Edw.

Resembles strongly marked examples of *L. 4-notata*, but has a closely-placed pair of short longitudinal black lines on the middle of the fore-part of the crown. The aedeagus (fig. 10) has its lower outline in the lateral aspect continuous (without the large rounded lobe found in *L. 4-notata* [fig. 11]); its apex obtuse, with an acicular spreading appendage at each outer angle, and in the middle a Y-shaped appendage. The genital plates are transversely impressed across the apical third, and their inner apical angle is sometimes sub-dentiform. The elytra are greenish-yellow with some of the areas, especially those near the suture, irregularly margined, or even filled up, with fuscous or black.

Paisley (*Morris Young*); Carmarthen (*Butler*).

I find that the insect which I formerly regarded as *L. 5-notata* is really *L. intermedia* Boh.; it may be distinguished from the former by the yellow elytra inclining to red and without dark markings, and the genital plates with an oblique somewhat curved impressed line running from the inner third of the base to a point on the inner edge just below the apex. The aedeagus is similar to that of *L. 5-notata*.

Typhlocyba callosa Then.

Upper-side pale yellow. Crown with a pair of sharply defined transversely-oval dusky spots in front. Scutellum with a pale red triangle on each side of the base. Elytra with a sharply defined, elongate-triangular, dark brown streak along the suture almost to the apex of the clavus; an oblique suffused fuscous band running backward from the apex of the clavus about half-way across the elytron; the second apical area sub-sessile; membrane very feebly infusate. Length (to tip of elytra) 4.9 mm.

The above particulars are taken from a single female captured by Mr. R. S. Bagnall on hawthorn at Egglestone, in the wilds of south-west Durham. The species is found on *Alnus glutinosa* from July to September, and has previously been recorded from Austria, Hungary, and France only.

Zygina mali sp. n.

Distinguished from *Z. alneti* and *Z. coryli* by its milk-white colour, which, except for a very slight fuscescence of the apical areas, is complete. Each upper angle of the pygofer (fig. 14) has a slightly incurved strap-shaped process almost as long as the remainder of the segment, and each lower angle has a small triangular tooth; the styles do not reach the half-length of the plates, and have at the base a large, flat, somewhat rounded lobe.

On October 3rd, 1913, whilst taking *Typhlocyba debilis*, of which both sexes were in swarms on apple trees at Colesborne, I got a male of this species; and fifteen days later, by assiduous working, two females, also from apple trees. I had no opportunity to search for it in 1914.

Z. alueti, *coryli*, and *mali*, by reason of their habitus as well as the form of the male genitalia, form a distinct section of the genus; and whether they be regarded as distinct species or as forms of one, separate names are necessary.

Psyllopsis discrepans Flor.

Forceps (fig. 16) in the externo-lateral aspect hatchet-shaped, the part corresponding to the blade large and broad, the stem short and slender. In the interno-lateral aspect the hinder half of the blade is occupied by a sub-quadrate space closely covered with black tubercles; from the base of the inner side of the stem there runs a membranous wing which ends, near the angle formed by the hinder edge of the stem and the lower edge of the blade, in a large claw-like black tooth; the upper front angle of the blade bears a bunch of straight black spines which are directed downward and backward; at the base of the hinder edge of the stem within there is a wide triangular membranous lobe. Otherwise similar to *P. fraxini*.

I found the single male from which the above particulars are taken amongst a number of *P. fraxini* beaten by Prof. Carr from ash at Upton, near Southwell, Notts.

Psylla subferruginea sp. n.

Similar to *P. melanoneura* Forst., but distinguished by the yellow-brown tendency of its coloration, the yellow-brown veins, concolorous stigma, and the absence of any darkening of the apical third of cell a2. The forceps (fig. 17) are about half as long as the anal valve, evenly narrowed from the base to the apex, the front edge moderately convex, the hinder edge concave, its curve less strong than that of the front edge. In *P. melanoneura* the veins on the outer two-thirds are black, the stigma and the apical third of cell a2 are darker than the remainder, and the forceps (fig. 18) are two-thirds as long as the anal valve, and distinctly sinuate in outline. In *P. nigrita*, which is also like *P. melanoneura*, the forceps (fig. 15) are two-thirds as long as the valve with their hinder edge straight in the basal half and excavated in the apical half.

P. subferruginea is common and generally distributed in Britain; it forms a small proportion of the *Psyllae* which one may beat from any coniferous tree at any time between October and April; but I believe that its food-plant is birch, as I have found it numerous on that tree in June.

Colesborne, Cheltenham:

April 23rd, 1915.

EXPLANATION OF DIAGRAMS.

- Fig. 1.—*Acocephalus trifasciatus*: *a*, aedeagus, lateral aspect; *b*, ditto, cephalad aspect.
- „ 2.—*Limotettix striola*: apical part of genital style.
- „ 3.— „ *atricapilla*: ditto.
- „ 4.—*Dellocephalus normani*: *a*, aedeagus, cephalad aspect; *b*, ditto, lateral aspect.
- „ 5.—*Dellocephalus multinotatus*: *a*, aedeagus, cephalad aspect; *b*, ditto, obliquely lateral aspect.
- „ 6.—*Dellocephalus thenii*: aedeagus, *a*, cephalad aspect; *b*, ditto lateral aspect.
- „ 7.—*Dellocephalus sursumflexus*: aedeagus, *a*, cephalad aspect; *b*, ditto, lateral aspect; *c*, ditto, dorsal aspect of the apex.
- „ 8.—*Megophthalmus scanicus*: genital style.
- „ 9.— „ *scabripennis*: ditto.
- „ 10.—*Limotettix 5-notata*: aedeagus, lateral aspect.
- „ 11.— „ *4-notata*: „ „ „
- „ 12.— „ *saturata*: „ „ „
- „ 13.—*Dellocephalus striatus*: aedeagus, *a*, cephalad aspect; *b*, ditto, lateral aspect.
- „ 14.—*Zygina mali*: pygofer, *a*, dorsal aspect; *b*, ditto, lateral aspect.
- „ 15.—*Psylla nigrita*: forceps, obliquely lateral aspect.
- „ 16.—*Psyllopsis discrepans*: forceps, lateral aspect.
- „ 17.—*Psylla subferruginea*: „ „ „
- „ 18.— „ *melanoneura*: „ „ „

NEW SPECIES OF PSELAPHIDÆ, SUB-FAM. CLAVIGERINÆ.

BY G. E. BRYANT, F.E.S.

(PLATE XIX).

This short paper deals with four new species of *Clavigerinae* collected by myself in Ceylon, Borneo, and Brazil. These curious and interesting insects are not easy to obtain in the tropics, as in thick jungle country ants' nests are difficult to investigate owing to the vast accumulation of dead leaves, and all the likely looking places, as a rule, swarming with ants and leeches, not to mention an occasional snake. Termites' nests, both under bark and when made of mud, also produced some very interesting forms. During my stay in Borneo I collected

about one hundred species of *Pselaphidae*, but only two of them belong to the *Clavigerinae*, which shows how rare they apparently are. No species of this sub-family has up till now been recorded from Borneo or Ceylon. Without the aid of the many fine works by Raffray on *Pselaphidae*, which I have consulted, this paper would never have been published. I am indebted to Mr. Donisthorpe for the names of the ants mentioned below, which have been determined by M. Forel. The types of these insects were from Sumatra.

Disarthricerus moultoni sp. n. (Plate XIX, figs. 1, 1a, b).

♂. Dark reddish brown, oval, rather convex, attenuated in front. Head longer than broad, sub-cylindrical, rounded anteriorly, convex, the underside dilated in an obtuse angle, with sides oblique; above, between eyes to apex, rugosely punctured, and with short golden setae; behind eyes to base smoother; eyes very large and prominent, placed a little behind middle. Antennae with two joints, about as long as head; 1st joint hidden, 2nd large, cylindrical, gradually widening from base to apex, with apex rounded, and with long pale pubescence. Prothorax widest at base, rather strongly punctured, angled at base. Elytra large, about as broad as long, rounded, and reticulate. Abdomen with first dorsal segment very large, the only one visible when viewed from above, narrower at base and shorter than the elytra, with the sides margined, oblique and rounded at apex, slightly depressed on each side at base, punctate, setose. Meso- and metasternum strongly punctured at sides. Ventral segment 1 short; 2 much longer; 3, 4, and 5 each shorter than 2, and about equal to each other; 6 a little longer. Legs short and broad; intermediate femora (see fig. 1b) dilated and armed on the under-side with a process bearing two spurs branching in opposite directions; tibiae narrowed at base, the intermediate pair with a small tooth near apex; tarsi three-jointed: 1 and 2 very short, 3 long and with single claw. Length 1.20 mm.

♀. Differs in having the intermediate femora less dilated and unarmed, the abdomen more rounded, and the sixth ventral segment more transverse.

Hab.: SARAWAK, Mt. Matang, alt. 1,000 ft. (1 ♂, 30.i.14; 1 ♀, 5.xii.13). In the nest of a small blue-black ant, *Prenolepis* (*Nylanderia*) *butteli* Forel, var., on the ground under dead leaves.

I have great pleasure in naming this species after Mr. J. C. Moulton, to whom I am greatly indebted for all the trouble he took to make my collecting expedition to Sarawak such a great success. *D. moultoni* differs from *D. integer* Raffr. (of which Mons. Raffray took a single ♀ at Singapore, on which he founded the genus) by the very different shape of the second joint of the antennae, the form of the thorax, and the less rounded abdomen. I have taken two specimens at Penang of another species very like *D. integer*, but with a somewhat differently shaped thorax; it is not advisable, however, to describe it without seeing Raffray's type.

Fustiger nitidus sp.n. (Plate XIX, figs. 2, 2a).

♀. Moderately wide, dark reddish brown, very shining and polished. Head twice as long as wide, quadrate in front, slightly attenuated behind, finely and thickly punctured. Antennae very little longer than head, with very short setae; 1st joint hidden, 2nd short and transverse, 3rd long and almost straight, widened towards apex, truncate at tip. Prothorax about as broad as long, rounded in front, very finely and thickly punctured, angled behind, and in middle near base with a deep fovea. Elytra lightly punctured, more thickly so near posterior angles, with short pubescence; sub-quadrate, with the sides slightly rounded at shoulders; suture depressed, and with a rather conspicuous stria; on the apical margin near posterior angles a tuft of hairs. Abdomen much longer and a little wider than the elytra, very smooth and shining, with the sides well rounded anteriorly, depressed at base, with golden pubescence at basal angles, very convex to apex. Legs rather long, with tibiae narrower at base; tarsi three-jointed, 1 and 2 very short, 3 long, and with a single claw. Ventral segment 1 short, 2 and 3 large and about equal, 4 and 5 very short, 6 larger. Length $2\frac{1}{2}$ mm.

Hab.: BRAZIL, Alto da Serra, São Paulo, alt. 2,500 ft. (9.iii.12, by beating in forest).

This species is allied to *F. gonnellei* Raffr. and *F. brasiliensis* Westw. It differs from *F. gonnellei* in its larger size, the deeper prothoracic fovea, and the lightly punctured elytra, which are not tri-impressed at the base, and have the apical margins tufted. *F. brasiliensis* has three foveae on the prothorax and two impressions on the head, the sides of abdomen rounded further from the base, and is also a larger insect.

Articerodes borneensis sp.n. (Plate XIX, figs. 3, 3a, b).

♂. Castaneous, shining, sub-parallel-sided. Head sub-cylindrical, short, a little longer than broad, with scattered golden setae, rounded in front, and a little broader than apex of prothorax; eyes rather large, placed a little behind middle. Antennae four-jointed, shorter than head; 1st joint hidden, 2nd and 3rd about equal, short and transverse, 4th large, cylindrical, narrow at base, truncate at apex, with short pubescence. Prothorax about as broad as long, widest at base, slightly rounded, narrowing to apex, sides margined and with three setae, angled at base, covered with small, shallow punctures. Elytra slightly broader than long, broader than base of thorax, with rather dense golden pubescence, shoulders well marked, with a distinct fold; apical margin with a pointed projection in middle of each elytron. Abdomen: first dorsal segment very large, convex posteriorly, smooth, and shining, about as long as elytra, with sides a little rounded to apex, truncate behind, sides well margined, each with three tufts of golden hairs; base divided into three rather deep excavations by two tufts beneath the elytral projections. Legs short and stout; the intermediate femora much dilated, and having below a long curved spur (see fig. 3b), the intermediate tibiae armed with a small spur towards apex, and the posterior trochanters armed with a spine, and the tibiae with a

rather long spur about middle; tarsi three-jointed, 1 and 2 very short, 3 long, and with a single claw. Ventral segment 1 short, 2 large, 3 shorter, 4 and 5 still shorter, 6 larger. Length, 1.20 mm.

Hab.: SARAWAK, Mt. Matang, alt. 1000 ft. (16.i.14).

Found in the nest of a small yellow ant, *Rhoptromyrmex rothneyi* Forel, var. *intermedia* Forel. I have placed this species in the genus *Articerodes* as it agrees with *A. syriacus* Saulcy, from Syria, and *A. quadriscopulatus* Sch., from Sumatra, in having four-jointed antennae, a projection on the apical margin of the elytra, and the first dorsal segment of the abdomen divided at base into three compartments. *A. punctipennis* Raffr., from India, is a much larger insect, and has the apical margin of the elytra entire. *A. borneensis* can be at once distinguished by the margins of the first dorsal segment of the abdomen bearing three tufts of hairs. There are now four Oriental and one S. African species included in this genus. Raffray (Ann. Soc. Ent. Fr., 1911, p. 450) says: "I think there is no advantage in splitting this genus, which as yet contains few species, and of which the slightly incongruous forms are related one to the other by the important common characters."

Articeropsis cingalensis sp. n. (Plate XIX, figs. 4, 4a).

♀? Deep reddish-brown, clothed with long golden pubescence; rather broad and slightly convex, attenuated in front. Head longer than broad, cylindrical, rugosely punctured; eyes rather large, not very prominent, placed about middle of head. Antennae four-jointed, as long as head and thorax combined; joint 1 hidden, 2 a little longer than broad, 3 about twice as long as broad, narrowed towards base, 4 very long, sub-cylindrical, with four longitudinal grooves, almost from base to apex, with rows of long golden pubescence, a little narrower to base, 2 rounded at apex. Prothorax rugosely punctured, about as broad as long, widest about middle, rounded to apex. Elytra a little broader than long, shoulders rounded, more shining and lighter in colour than head and thorax, with long golden pubescence, apical margin clothed with a broad band of denser pubescence, with a tuft of long hairs near posterior angles. Abdomen longer than elytra, slightly convex to apex; 1st dorsal segment very large, punctured and pubescent, depressed at base, 2nd segment visible from behind; lateral margins broad and well marked, with an oval palette at base fringed with golden pubescence on the inner margin. Meso- and metasternum strongly punctured, and ventral segments with scattered punctures; 1st segment short, 2nd long, almost equal to 3rd and 4th combined, 3rd much shorter, 4th and 5th about equal, each shorter than 3rd, 6th a little larger. Legs long and rather broad, with long golden pubescence; femora with very large scattered punctures; tibiae narrowed at base, and grooved longitudinally; tarsi three-jointed, 1 and 2 very short, 3 long, and with a single claw. Length, 2½ mm.

Hab.: CEYLON, Kandy; alt. 1900 ft. (25.v.08, by beating in jungle in evening).

The genus *Articeropsis* Wasm. has hitherto contained a single species, *A. sikorae* Wasm, from Madagascar. This one from Ceylon now added agrees well with *A. sikorae* in many points, but can be at once distinguished from it by the form of the fourth joint of the antennae. Probably when we have more knowledge of the Oriental species, it will require to be separated.

EXPLANATION OF PLATE XIX.

- Fig. 1.—*Disarthricerus moultoni* sp. n., ♂; 1^a ventral surface; 1^b intermediate leg.
 ,, 2.—*Fustiger nitidus* sp. n., ♀; 2^a ventral surface.
 ,, 3.—*Articerodes borneensis* sp. n., ♂; 3^a ventral surface; 3^b intermediate leg.
 ,, 4.—*Articeropsis cingalensis* sp. n.; 4^a ventral surface.

Esher:

May, 1915.

ANDRENA FALSIFICA N.N. FOR A. MORICELLA ♀, NEC ♂.

BY R. C. L. PERKINS, D.Sc., M.A., F.E.S.

In my paper on the *Andrena minutula* group published in this Magazine (April and May, 1914), I distinguished a new form, which I named *moriceella*, specially selecting the ♂ as type, since I felt uncertain whether the ♀ described under the same name really belonged to the same species.

This ♀, as I have now discovered, was not the other sex of *A. moricella*, and so I have named it *A. falsifica*, and the specific characters of its true ♂, previously unknown to me, are given below.

The ♀ which, as I now believe, should have been assigned to ♂ *moriceella* is excessively like that of *A. alfkenella*, so much so as to suggest to my mind that, in spite of the extreme dissimilarity of their ♂♂, these two forms may be spring and summer generations of a single species. As some of the characters given for ♀ *alfkenella* are not always distinct in *moriceella*, my table (*op. cit.*, p. 74) may be thus modified:—

- 8 (9) Basal abdominal segment excessively densely sculptured right up to the actual apical margin, so as to be quite dull apically; mesonotal puncturation closer.
- 8a (8b) Most or many of the flagellar joints of the antennae notably red beneath*alfkenella*.
- 8b (8a) Flagellar joints all dark, or at most with one or two apical ones more or less reddish beneath*moricella*.
- 9 (8) Basal abdominal segment along the apical margin less densely rugulose, so that in some aspects its apical portion appears shining; mesonotal punctures more remote.....*falsifica* n.n.
(= *moricella* ♀, p. 75).

The ♂ of *A. falsifica* in superficial appearance is extraordinarily like those of *A. minutuloides*, *saundersella*, and *alfkenella*. This is partly due to the pure white pubescence of the clypeus, while the hairs of the upper part of the face and of the thorax are also very pale or faintly yellowish.

The very short 4th antennal joint distinguishes it structurally from *saundersella*, and the rugulose surface of the two basal abdominal segments from *alfkenella*, so that in my table it would be included under the same heading as *minutula* and *minutuloides*. Fresh examples of the former are easily distinguished, superficially by the more brownish-haired face, and structurally by the closer mesonotal puncturation. In *falsifica* the basal abdominal segment always bears copious fine punctures amidst the rugulosity, and the following segments are notably punctured.

From *minutuloides* the duller surface of the mesonotum, which is never at all polished, with its less conspicuous puncturation, will distinguish it; the scutellum is rugulose and often dull all over, and never has a highly polished area as in *minutuloides*, while the clypeus on its anterior portion is much duller from the rugulosity of the surface between the punctures.

It would appear that the tubercle of the labrum is of different form from that which is normal in *minutuloides* and *minutula*, but the character is difficult to see and may be subject to variation.

I have examined a very fine freshly emerged series of about 40 examples of *A. falsifica*. Nearly all of these occurred in the same spot and the only other of the group that was found with them was a single ♂ of the very distinct species, *A. subopaca* Nyl.

Park Hill House, Paignton:

May 12th, 1915.

THREE ADDITIONS TO THE LIST OF BRITISH DIPTERA.

BY A. E. J. CARTER.

1.—*Trichopticus mutatus* Fln.

I have a ♀ taken at Stobo (Peebles) by the Rev. James Waterston, on August 13th, 1904. This differs from our other species of *Trichopticus* in having yellow legs. In general appearance it is rather like the ♀ of *Hyetodesia semicinerea* W.; or, because of the yellow legs, it might be taken at a first glance for a ♀ *Pegomyia*. It differs, however, from the latter genus in having four post-sutural dorso-central bristles, and a shortened anal vein. It comes very near *hians* Zett., in fact at first I thought the specimen belonged to that species, but Mr. Collin says that it is *mutatus*, according to the characters given by Stein.

2.—*Lasiops eriophthalma* Zett.

A fine ♂ of this species was taken at Blairgowrie (Perthshire) on May 11th, 1910. I noticed it resting on a low stone wall, and on looking closely would have passed it by as *Anthomyia radicum* L., but something in the appearance of the head attracted my attention; I placed a tube over it, and on examination saw I had secured something good. The long and dense pubescence covering the eyes accounted for the peculiar appearance of the head. The specimen agrees very well with Zetterstedt's description, and also with the description given by Kowarz in his Paper on *Lasiops* (Mittheil. d. Münchener Ent. Ver., 1880, p. 138). Mr. Collin kindly compared my specimen with Kowarz's type, and confirms my identification.

The species of *Lasiops* must surely be very rare, as the above specimen is the only one I have come across in ten years' collecting; and I can find only two species recorded from Scotland, viz., *roederi* Kow., and *ctenacnema* Kow., and three from Arran only (cf., Ent. Mo. Mag., 1883, p. 224.)

3.—*Eccoptomera pallescens* Mgn.

When the late Mr. Verrall published his List of British *Diptera* in 1901, no named representative of this genus was included. Since then four species have been recorded in the pages of this Magazine as members of our fauna. The present addition—*E. pallescens*—occurred at Musselburgh (Midlothian) on June 21st, 1906. The single specimen obtained, a ♂, is in good condition, and agrees in all respects with

the description given by Loew in his Monograph of *Helomyzidae* (1859). The species is very like *microps* Mgn., from which it differs in having *three* pre-apical bristles on the hind femora, the margin of the thorax and parts of the pleurae yellow, and the third costal segment—the space between Sc and Ri—distinctly longer. Loew records it from “Schlesien und anderwärts in Deutschland.” I do not find it recorded in more modern works accessible to me. I have to thank Mr. Collin for confirming my identification.

Monifieth :

June 1st, 1915.

Synchita juglandis F., etc., in the Oxford district.—On June 12th I was greatly surprised to find a fine living specimen of this rare Colydiid entangled in a cobweb on a standing dead birch tree near Tubney, Berks: a few days previously I had met with the same beetle in the New Forest in company with *Colydium*, *Trypodendron*, etc., in a large fresh birch log. So few localities in Britain are known for *Synchita*, that its occurrence in Berkshire is worth recording. *Dromicus 4-signatus*, taken on the same occasion under oak bark, is also an addition to the lengthy list of Berkshire *Coleoptera* in the “Victoria History” of that county.—JAMES J. WALKER, Oxford: June 14th, 1915.

Recent captures of Coleoptera.—*Carabus auratus* L.: a ♀ picked up at Deal, August, 1913; *Gymnusa brevicollis* Payk.: a ♀ from a dead crow, Compton Heath, near Guildford, April 21st, 1914; *Quedius longicornis* Kr.: ♂ and ♀ taken together under a stone on a mountain side, Strathyre, Perthshire, August, 1913; *Philonthus ebeninus*, Gr., v. *corruscus*: a ♀ from a dead crow, Shackleford, near Guildford, April, 1913; *Melasis buprestoides* L.: in abundance in a fallen decayed birch branch on Wimbledon Common, March 22nd, 1914. Larvae were also present in abundance, and were found sparingly (unaccompanied by the perfect beetle) in fallen decayed oak branches in various other parts of the Common; *Strangalia auralenta* F.: a ♀ example on *Umbelliferae*, at Looe, S. Cornwall, in August, 1914. The specimen was taken by Cadet C. H. Roberts, R.N. I am informed that it was one of two, both females, and that another was seen in the same place the previous year; *Rhynchites auratus* Scop.: a ♀ taken by A. C. Worthington, Esq., by beating oak in Charlton Forest, near Chichester, April, 1913.—MICHAEL G. L. PERKINS, 4, Dean's Yard, Westminster Abbey, S.W.: May 31st, 1915.

An addition to the Coleoptera of Leicestershire.—On May 29th, I made an interesting addition to the recorded *Coleoptera* of Leicestershire by capturing *Clytus mysticus* var. *hieroglyphicus* Hbst., near Leicester.—S. V. TAYLOR, 26, Nelson Road, Leicester: June 9th, 1915.

Swarm of Barypithes (Exomias) pellucidus Boh. in Cambridgeshire, and notes on its food-plants.—In the May number of this Magazine, among his notes

"On the food-plants of some British weevils" (pp. 167-9), Mr. F. B. Jennings mentions the finding of *Barypithes pellucidus* on buttercups. It may be interesting to notice the occurrence in Cambridgeshire last year of a great swarm of this weevil, which has been recorded by Mr. F. R. Petherbridge, of the Cambridge University Agricultural Department, in *Ann. Applied Biology* Vol. 1, Nos. 3-4, pp. 390-392, January, 1915 (from which the following particulars are extracted). The swarm occurred at Mr. Charles Townsend's nursery at Fordham, on May 13th and subsequent days; the insect was present in enormous numbers, it being quite easy to gather handfuls of specimens particularly from some rabbit-holes where the beetles congregated, apparently to shelter from the sun. A plan of the nursery is given. Plots of Thousand-head Kale, Kohl-Rabi, Paeony-flowered Poppy, and *Nemophila insignis* were eaten off so that the ground was quite bare. *Collinsia bicolor* and Candytuft were badly damaged, and specimens were also found feeding on the leaves of some trees (*Acer marginata aurea* and *Acer negundo*), and of a thistle. Leaves of cabbage and rhubarb were put down, and, when lifted a few hours after, were entirely covered beneath with the beetles. On the other hand, a plot of *Gypsophila elegans* escaped though situated in the midst of the worst-infested area, and potatoes, peas, and spruces were also free from attack. The beetles generally feed on the lower surfaces of the leaves (at any rate in sunlight), eating large holes out of them and pieces out of their edges; and many seedlings were eaten right off just above the ground. The nursery was treated with 75 bushels of soot and 30 bushels of lime: on May 16th and subsequently many of the beetles were found dead, and on June 17th only three could be found alive.

A sample series from the swarm was given by Mr. Petherbridge to the writer, and is now in the University Museum. The specimens all belong to the longer, more slender-legged form, that is to *B. pellucidus* as restricted by Mr. J. H. Keys in 1911 (*Ent. Mo. Mag.*, p. 128), when he separated and described the shorter-legged, stouter form as *B. duplicatus*. Mr. Keys states that the swarm found on the shore at Kingsgate, Kent, in 1886, and recorded as *B. pellucidus*, is really referable to *B. duplicatus*, and that the same thing probably applies to that recorded at Eastry, Kent, in 1872. In this case, both species are evidently liable to occur in extreme profusion at particular times and places. [In the Cambridge Museum the late G. R. Crotch's British collection contains two specimens without locality-data, determined as *B. pellucidus*, but evidently referable to *B. duplicatus* Keys].—HUGH SCOTT, University Museum of Zoology, Cambridge: June, 1915.

Philopedon geminatus F., as a general feeder.—Mr. Fryer (*antea*, p. 193) having called attention to the various food-plants of this weevil, it may be stated that on May 22nd I came across the species in numbers at Guildford in a sandy, uncultivated field. Specimens were found beneath *Lycopsis*, *Plantago*, *Stellaria*, *Silene*, *Viola*, &c., and the insect presumably was feeding upon more than one of these plants.*—G. C. CHAMPION, Horsell, Woking: June 12th, 1915.

* The field was again visited on June 19th, and but few living examples seen, though several dead specimens were noticed beneath *Silene*.—G.C.C.

Hemiptera-Heteroptera in South Devon and in the neighbourhood of Bath.—During the last twelve months my son, T. H. Edmonds, and I have been collecting and studying the British *Hemiptera*, and, having met with several rare and local species, we think a short record of our more noteworthy captures may be of interest. Our great catch was effected at Whitsuntide this year, when my son had the pleasure of taking, by sweeping near Totnes, a specimen of the rare *Peribalus vernalis*. We also obtained, on the 24th ult., by beating the sides of hedges near Dawlish, nine *Lasiosomus cnervis*; and at the same time and place a good series each of *Podops inuncta* and *Gnathoconus albomarginatus* and two *Beosus luscus*. We took several of the last-mentioned insect in the same locality in August last, some being then in the pupal state, and subsequently bred. Among the 19 species of Pentatomidae and Coreidae captured, I may mention *Eurygaster maura*, *Pentatoma baccharum*, *P. prasinum*, *Tropioris rufipes*, *Picromerus bidens*, *Podisus luridus*, *Acanthosoma haemorrhoidale*, *Syromastes marginatus*, *Verlusia rhombea*, *Coreus denticulatus*, *Stenocephalus agilis*, and *Corizus capitatus*, all taken more or less commonly near Totnes, and *Corimelaena scarabaeoides* and *Zicrona coerulea* found in some numbers by my son, near Bath, where he resides, except at holiday times. Three specimens of *Berytus montivagus* were obtained in August by searching at the roots of dwarf maritime herbage at the Warren, near Dawlish. A macropterous example of *Nabis lativentris* was taken by me at Totnes, and a series of *N. lineatus* (brachypterous form) was obtained by sweeping at the Warren in August. The Lygaeidae taken include *Aphanus pini* at Totnes, and *Heterogaster artemisiae* at Bath. The Capsidae, of which about 95 species were obtained, include *Calocoris seticornis*, several specimens by sweeping near Totnes in July and August; *C. alpestris*, of which my son has, within the last week, captured a dozen specimens near Bath; *Miridius quadrivirgatus*, found in some numbers by sweeping a grass field near Totnes in July; *Teratocoris antennatus* and *T. saundersi*, by sweeping rushes on the banks of the River Dart; *Orthotylus rubidus* var. *moncreaffi*, in the salt marsh at the Warren; and *Psallus vitellinus* on spruce fir at Bath. Two specimens of *Ranatra linearis* were obtained by my son from the Bathampton Canal.—T. EDMONDS, "Strathmore," Totnes: June 8th, 1915.

A melanic form of Cymatophora or.—Some time ago Professor Bateson called my attention to a paper, with figures, on a melanic form of *Cymatophora or*, which appeared in "Die Umschau," of November 29th, 1913, and as I have never seen any reference to such a form in any English journal, it may be as well to note that such a variety exists. The paper was written by Dr. K. Hasebroek, and states that the form was first noticed near Hamburg in 1904, and was then of an intense black, as black as the var. *doubledayaria* of *Amphydasis betularia*, and no specimen of an intermediate form had been previously noticed. The form increased in numbers, and in 1911 and 1912 it was said that from some lots of larvae as many as 90 or 95 per cent. were bred of it. The figures accompanying the paper represent, besides the type form (fig. 1), four distinct forms of variation. In fig. 2, all the wings, thorax, and body, are uniformly black, with the exception of the very pale (presumably white) stigmata; in fig. 3, in addition

to the pale stigmata, there is a pale band on the hind-margin of the fore-wings; in fig. 4 the pale marginal band is extended into a series of rays some half-way across the fore-wings, and which Warnecke designated as *ab. albingensis*; in fig. 5 the moth is uniformly black, without any trace of pale marking. Altogether the forms must be very beautiful and striking. Dr. Hasebroek considers the variation as probably due to smoke. Unfortunately *C. or* does not appear to occur in the chief areas of melanism in Britain, the smoky districts of South-west Yorkshire and Lancashire, or probably similar conditions would have produced these melanic forms in our own country.—GEO. T. PORRITT, Huddersfield: *June 3rd*, 1915.

Abstracts of Recent Literature.

BY HUGH SCOTT, M.A., F.L.S., F.E.S.

THOMPSON, W. R. (i) "THE CUTICULA OF INSECTS AS A MEANS OF DEFENCE AGAINST PARASITES." *Proc. Camb. Phil. Soc.*, Vol. 18, part 2, pp. 51-55, 1915.

(ii) "LES CONDITIONS DE LA RÉSISTANCE DES INSECTES PARASITES INTERNES DANS L'ORGANISME DE LEURS HÔTES." *C. R. Soc. Biol. (Paris)*, Vol. 77, pp. 562-4, December, 1914.

(iii) "SUR UN DIPTÈRE PARASITE DE LA LARVE D'UN MYCETOPHILIDE," *Op. cit.*, Vol. 78, pp. 87-9, 1915.

(iv) "SUR UNE TACHINAIRE PARASITE À STADE INTRACUTICULAIRE." *C. R. Ac. Sci. (Paris)*, Vol. 160, pp. 83-85, 1915.

The writer of these articles, who is at present working in the Zoological Laboratory of Cambridge University, is devoting much study to various biological questions connected with entomophagous parasites, in particular Tachinidae. The first paper commences with an allusion to certain views which have been expressed on the question at issue. Metchnikoff has suggested that the phagocytic reaction to parasites is rather feeble in Arthropods, and that this may be correlated with the presence of the chitinous cuticle, which prevents entry of internal parasites, and thereby renders unnecessary a strong phagocytic reaction. An opposite view has been taken by Cuénot, who has pointed out that, far from the chitinous cuticle preventing entry of parasites, Arthropods are the most heavily-parasitised group: he considers that the parasites escape destruction by the phagocytes of the host, not through the feebleness of the phagocytes, but by adapting themselves to resist them.

Thompson has collected certain data which appear to favour Metchnikoff's view to some extent, in that the chitinous cuticle of the host does prevent the entry of a large percentage of individuals of a parasite species. *Tachinidae* are very interesting in this connection, since they have not, like many parasitic Hymenoptera, a powerful ovipositor with which to introduce their eggs into the host, but their new-hatched larvae must make their own way from the exterior through the host's integument. In the case of a Tachinid parasitic on caterpillars of the Gipsy Moth in the United States, he has observed that the newly hatched larvae are sometimes quite unable to bore through the cuticle of the host; and though many of the caterpillars bear on their bodies

eggs of this parasitic fly, yet only a small percentage become parasitised. Another Tachinid, *Carcelia chelonae*, lays its eggs on the caterpillar of the Brown-tail Moth, but many of its eggs and new-hatched larvae are destroyed by becoming impaled on the bristles and barbed hairs of the caterpillar. Again, Datanid caterpillars have a hard head-capsule and a hard dorsal shield on the last segment; when disturbed they elevate their anterior and posterior extremities, so that the body is curved in a semi-circle, and consequently the two hard surfaces are the principal parts exposed to Tachinid flies hovering above. Hence the hard shields, which are impenetrable to new-hatched Tachinid larvae, are sometimes covered with eggs of these parasites, while the softer intermediate segments remain uninfested.

Even when the larvae of *Carcelia chelonae*, referred to above, have penetrated the cuticle of the host, they may still be cast out by the ecdysis of the caterpillar; for they remain with their posterior spiracles in the entrance hole, and while they are in this position, the hypodermal cells of the host proliferate and secrete chitin so as to form a chitinous sheath round the parasite. This sheath, with the contained parasite-larva, is sometimes moulted with the rest of the cuticle of the host, or it may snap off and slip down into the body-cavity of the host, where the parasite quickly perishes for want of air.

The second article is a short note propounding the question: How do internal parasites resist the action of certain secretions of the host? For example, some Oestrid larvae live in the alimentary canal of mammals: at least one Tachinid (*Compsilura concinnata* Meig.) passes its larval existence in the intestine of its host; other Tachinids, which oviposit on the food of the host, pass their egg-stage in the alimentary canal, the new-hatched larvae boring through the wall of the intestine into the body-cavity: the Hymenopteron, *Polygnotus minutus*, passes its larval life in the intestine of *Cecidomyia destructor*. How do such forms resist the action of the digestive juices? It has been experimentally shown by Hollande that the beetle *Galerucella luteola* contains in its blood a toxic substance, which, when injected into the Carabid *Procrustes coriaceus*, or into a lizard, rapidly causes death, yet a Tachinid (*Erynnia nitida*) flourishes in the body-cavity of this very *Galerucella*, feeding on the tissues and the toxic blood.

The third paper is a preliminary note on the finding of a first-stage parasitic Dipterous larva (probably Dexiid or Tachinid) in the body-cavity of another Dipterous larva (*Sciara* sp.). The writer states that he only knows of two other cases where one Dipteron has been found parasitising another Dipteron. One of these is the case of the Tachinid, *Siphona cristata*, parasitic in the larva of the aquatic *Tipula maxima*. But whereas the *Siphona*-larva attaches itself to the tracheal system of its host, the parasite here described lies quite free in the body-cavity of the *Sciara*-larva, without any connection with the tracheae. Possibly correlated with this is the fact that Thompson has been unable so far to discover spiracles or tracheae in the parasite.

The fourth article records the finding of first-stage larvae of an undetermined Tachinid (one of the Echinomyiinae) actually *between the layers* of the chitinous cuticle of a Noctuid caterpillar (*Hamemalis virginiana*). The

parasites had no communication either with the exterior (their entrance holes being blocked up), or with the body cavity of the host. They were, however, alive, and Thompson regards them as undergoing a certain phase—possibly a hibernation phase—of their life-cycle.

Obituary.

On April 15th *Mr. Edwin Wilson*, the well-known scientific draughtsman, died at his home at Great Shelford, Cambridge, at the age of 59. He was one of the sons of the first Principal of the Civil Engineering School at the Crystal Palace. He first entered a bank, but soon relinquished the idea of a business life, and directed his energies to drawing, and particularly to the figuring of scientific objects, in which he found his *métier*. Some of his earliest efforts in lithography appeared in *Phil. Trans.* in 1881, among the plates illustrating one of Professor W. K. Parker's works on *Batraehia*. In 1884 Wilson came to Cambridge as manager of a new lithographic department of the Cambridge Scientific Instrument Company. The Company sent him to Germany, where he for some time studied lithographic methods. On the lapse of this department soon after, he commenced an independent career as scientific draughtsman and lithographer in Cambridge. He never lacked work, and built up an establishment of considerable size, which was in 1913 amalgamated with the Cambridge University Press as a lithographic department of the latter, with himself as manager. His life was a toilsome one; he worked very long hours, and, until quite recently, never indulged in holidays. He always devoted a large part of his time to the making of original drawings. Though he drew objects of all kinds, it was the figuring of insects which became his speciality. He often noted points which had escaped the expert's observation, and excellent results were obtained by collaboration of expert and illustrator, combining the knowledge of the one with the draughtsmanship of the other. Wilson executed illustrations for works far too many to enumerate, but one may specially mention the "*Biologia Centrali-Americana*," for which he produced more than 100 plates. His name also appears, in conjunction with that of Dr. A. E. Shipley, as author of a paper "On a possible stridulating organ in the mosquito" (*Tr. R. Soc. Edinburgh*, Vol. 40, 1902, p. 367). He was a Fellow of the Entomological Society from 1894 to 1905.

Wilson's industrious habits left but little room in his life for pursuits outside his profession. He was however an active Church-worker and a churchwarden at Great Shelford. His refined and charming personality made him many friends. Having been severely attacked by influenza early in 1914, he was forced to make a voyage to the West Indies, but the same illness struck him down early this year, after which he swiftly fell a victim to tuberculosis. He leaves two daughters and four sons, three of whom are serving at the front.—H. S.

Societies.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY :

Thursday, March 25th, 1915.—The President in the Chair.

The evening was specially devoted to an exhibition and discussion of *Aphantopus hyperantus*, contributed to by Messrs. Frohawk, R. Adkin, Bright, B. Adkin, Edwards, Dennis, Turner, Curwen, Ashdown, Gibbs, and Leeds. Ab. *arete*, ab. *vidua*, ab. *ocellatus*, ab. *lanceolata*, ab. *minor* var. *bieti*, ab. *caeca*, ab. *obsoleta*, with numerous other forms were shown. Mr. Bright showed a fine *Argynnis aglaia* with numerous coalescent blotches of black, a *Polyommatus icarus* with extremely light ground on the underside, and a ♂ *Agriades coridon* of the form *suavis*, in which red scaling was developed, adjoining the eye-spots of the upper-side of hind-wings.

Thursday, April 8th, 1915.—Mr. W. J. KAYE, F.E.S., in the Chair.

Mr. Edwards exhibited the seasonally dimorphic forms of *Papilio ajax* from N. America. Mr. Schmassman, specimens of *Papilio homerus* from Jamaica with a ♀ having ♂ coloration, and the rare Pierid, *Hebomoia roepstorffi* from the Andamans. Dr. Dixey, F.R.S., read a paper on "Seasonal Dimorphism," and gave many lantern and other illustrations with his remarks.

Thursday, April 22nd, 1915.—Mr. A. E. GIBBS, F.L.S., F.E.S., Vice-President, in the Chair.

Mr. T. B. Foster, of Addiscombe, was elected a Member.

The evening was devoted to an Exhibition of Orders other than *Lepidoptera*. The Hon. Curator, Mr. West, exhibited eight drawers of the Society's reference collections which had recently been rearranged, and included the drawer containing the Diptera given by Mr. H. W. Andrews; also four drawers of his own collection of *Coleoptera*, including British examples of *Calosoma sycophanta*, *Carabus auratus*, a series of *Micraspis 16-punctata*, *Dytiscus circumcinctus* ♀s with smooth ♂-like elytra, and a series of forms of *Notiophilus 4-punctatus*. Mr. Edwards, cases of large and conspicuous species of *Coleoptera*. Mr. H. Moore, scorpions from various parts of the world: a *Mygale*, a large centipede from the Dardanelles, the pseudo-scorpion *Thelyphonus giganteus* from Florida. Mr. Ashdown, a series of aberrations of the earwig *Forficula auricularia*, mostly with aberrant size and form of forceps. Mr. W. J. Kaye, numerous large and conspicuous insects obtained by him in S. America and Trinidad, *Coleoptera*, Phasmids, a *Mygale*, *Cordiceps*, etc. Mr. B. Adkin, a "witches' broom" on larch formed by the fungus *Exorascus turgidus*, and examples of *Chermes pini*, the pine aphid, on Scots pine. Mr. Main, an example of the Neuropteran, *Nemoptera coa*, brought from Cintra by Mr. Bowman, and living larvae of the firefly, *Luciola italica*. Mr. R. Adkin, the nests of wasps found rolled up in bales of tobacco from the Levant. Mr. Platt Barrett, various conspicuous insects from Sicily and S. Africa, mantis, ant-lions, locusts, etc.—H. J. TURNER, Hon. Sec.

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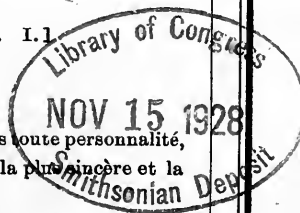
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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. — Wednesdays, October 6th and 20th, November 3rd and 17th, December 1st, 1915. January 19th (ANNUAL MEETING), February 2nd, 1916.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m., on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

Hon. Sec.: J. Ross, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, at 8 p.m., on the last Monday in each month. Room open at 7.30.

Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.

OBSERVATIONS ON SOME OF THE CAUSES DETERMINING THE
SURVIVAL AND EXTINCTION OF INSECTS,
WITH SPECIAL REFERENCE TO THE *COLEOPTERA*.

BY GEO. B. WALSH, B.Sc.

I.—INTRODUCTORY.

The larger part of my entomological experience has been gained in the neighbourhood of the great industrial and commercial rivers of North-eastern England—the Humber, the Tees, and the Wear and Tyne—three districts which offer exceptional opportunities to the student of certain branches of Entomology. Unfortunately for the subject of this paper, there are no local lists of any age in either of the Yorkshire districts. William Spence, the collaborator of Kirby in the famous "Introduction to Entomology," has a number of Hull records which are very useful, but the only attempts at compiling full lists here are those made by various members of the Hull Field Club, and these are quite modern. At Middlesbrough, owing to the very recent origin of the town, there are no old lists, and there again the local field club—the Cleveland Natural History Society—is doing valuable work in compiling records which will be of great interest when the town shall have much outgrown its present size. Durham and Northumberland, however, rejoice in records of some age; the first part of Bold and Hardy's list of the *Coleoptera* of the two counties, for example, dates back to 1848, and with this can be compared the records made in recent years by Mr. R. S. Bagnall and the present writer in the Newcastle area.

II.—GEOLOGY, SURFACE, AND OCCUPATIONS.

The Wear district falls naturally into the same division as that of the Tyne. Then the three areas mentioned above differ very widely in geology, surface features, occupations of the people, and character of the insect fauna.

(a.) The immediate neighbourhood of Hull and the whole of Holderness are almost wholly boulder clay, with occasional glacial sands and gravels; at no very distant date—certainly early in the last century—much of this plain was fenland, and even yet the enormous number of artificial drainage ditches and streams forms a noticeable feature of the countryside. Much of the land touching the Humber is alluvium of quite recent origin, and five miles west of Hull there commences the first uplift of the chalk of the Yorkshire Wolds.

Although much of East Hull is industrial, with important oil, paint, and cement works, flour and saw mills, etc., as a whole the city is commercial. Hence, there is little production of deleterious gases, and, for its size, comparatively little dust and smoke. As a result there is an abundant growth of vegetation right up to the city boundaries.

(b.) Middlesbrough also stands on the boulder clay, with brackish marshes by the river side, but a very short distance inland are the Jurassic rocks of the Yorkshire Moors, which are largely covered with heaths, heather, and grass, and in many places with bogs, mainly of a peaty character. The whole riverside is lined with iron and chemical works, which throw out enormous quantities of smoke, dust and noxious gases, the result being that, in the immediate neighbourhood of the works, vegetation has a hard fight to survive at all, and even at some distance, the struggle is frequently a severe one.

(c.) In the Tyne district the lower lands are again covered with boulder clay, but the surface is a very varied one, and there are many uplands of sandstone and magnesian limestone, with mountain limestone as we near the Pennines. The chief occupations are coal-mining, shipbuilding, and engineering industries, while chemical works of various kinds are not few, and at one time were much more important.

After this preliminary survey, it is possible to gain a better comparative grasp of the influences at work tending to the survival or extinction of insect life in the areas under consideration. It should be understood, however, that certain factors have intentionally been omitted, such as inclement weather of various kinds—drought, rain, late frosts, etc.—previous exhaustion of the food supply by other insects, migration, etc., my idea being rather to give examples of influences which are of a more local character and which do not therefore apply to the country as a whole.

III.—THE HUMBER AREA.

In the Hull district the insect fauna is comparatively poor in numbers, both of species and individuals; this is doubtless largely to be attributed to the clayey soil, but there is no doubt that in former times it was much richer. Here one potent cause of the reduction of insect life is undoubtedly the drainage, which has reclaimed the greater part of the marsh-land; hence the Swallow-tail Butterfly (*Papilio machaon* L.) is now extinct, though it was once found near Beverley,⁽¹⁾

(1). Haworth, *Lepidoptera Britannica*, 1803, p. 27.

and probably *Hydrophilus piccus* L. has disappeared for the same reason (2). There is also a record of *Pelobius tardus* Herbst from Withernsea, where it was taken in numbers in 1888,(3) but it has not occurred since, although it has been diligently searched for on many occasions, and I incline to the opinion that it was an immigrant species which succeeded in breeding for one year, but, for some reason or other, failed to make good its footing. Despite these losses, however, owing to the great number of slow-running streams and stagnant ditches and pools, water beetles are extremely common, if not very choice, and, in the case of the purely aquatic species at least, seem to have suffered very little, although some forms, e.g., *Donaciae*, and *Lepidoptera* such as *Nonagria typhae* Esp., have been badly hit, owing to the destruction of marsh vegetation, and seem now to be restricted to a few favoured spots, such as Hornsea Mere, Keyingham Drain, and the marshy part of the Kelsey Hill gravel pits. Some idea of what the marsh Coleopterous fauna used to be can be gained on the coast where each new fall of cliff exposes here and there the beds of old meres, in which may be found in abundance the elytra and other chitinous parts of *Dytisci*, *Donaciae*, etc.

Fifty years ago the Wolds were largely sheep-pastures, but now, under the encouragement of the Sykes family of Sledmere, the chief occupation is corn-growing; the whole of the lower land is either under grass or most carefully cultivated, with the result that, more almost than in any other part of the country with which I am acquainted, the district wears the appearance of a well cultivated garden. Weeds are cleared away, fields are ploughed right up to the hedgerows, and east of the Wolds at least, and largely to the west also, there are few woods, and these are mostly plantations of recent growth. There are a few oases of almost untouched land still left, such as Pulfin Bog near Beverley, Hotham Carrs near North Cave, and Skipwith Common near Selby; and these give some idea of what the original fauna of the land must have been, but unfortunately these oases are few, small, and far between. It is, however, from observations on these few patches, and in a few other favoured spots, and also from local records of some age that we learn that, among the *Lepidoptera*, the Large Heath Butterfly(4) (*Coenonympha darus* F.), the Marbled White(5) (*Melanargia galatea* L.), and the Dingy Skipper(4) (*Thanaos*

(2). Fowler and Donisthorpe, *British Coleoptera*, Vol. VI, p. 215.

(3). Yorks. Nat. Union Excursion Circular, No. 224.

(4). Trans. Hull Scientific and Field Nat. Club, 1899, p. 57.

(5). *l.c.* p. 56.

tages L.) have become almost or quite extinct in most of their haunts ; * and among the *Coleoptera* such insects as *Cicindela campestris* L., *Lochmaea suturalis* Th., and *Haltica ytenensis* Sharp, survive only in the uncultivated patches. Possibly, if the reduction of weeds, too, goes on apace, especially of nettles, the Small Tortoiseshell (*Vanessa urticae* L.) will also in time become a much prized local rarity. At the same time it is of course evident that the conversion of sheep pastures into cornfields must, of necessity, cause an increase in the numbers of insects that feed on crops, but on the whole, in East Yorkshire, phytophagous insects have been badly affected, while carnivorous ones are not touched to the same extent, since there is a greater possible variety in their diet.

The influence of dock-building in the neighbourhood of Hull is most interesting. Of course, as one would naturally expect, its effects have been largely for evil, since the homes of a number of local species have been destroyed in this way. *Nebria livida* F. has been quite cleared out, *Donacia braccata* Scop. is going, and if dock-building extends much further east, probably *Helophorus mulsanti* Rye (which has lately been taken in the district by Mr. T. Stainforth, of Hull) will go also. Certain species, however, especially of *Coleoptera* and *Diptera*, seem to have received added advantages from the neighbourhood of the docks. A considerable amount of refuse always finds its way into the river from the docks, to be thrown up later on the river banks by a tidal eddy, thus providing food and shelter for a great number of insects ; e.g., the only local records for *Carpophilus hemipterus* L., and *C. mutilatus* Er.,⁽¹⁾ are from the Humber bank at Marfleet, in rotten onions thrown up by the tide ; and the best local spots for *Bembidium lunatum* Duft., *B. varium*, Ol., *Cercyon littoralis* Gyll., and *Homalota vestita* Gr., are in tidal refuse quite close to the westernmost dock. (It is possible that this is due to the fact that the collector has less space to work over here and that the individuals are more crowded, but I strongly incline to the opinion that the increase is actual and not merely apparent.) Again, when the trawlers return from the fishing grounds the holds are swept out, and quantities of scales and fish offal are thrown on the river-side, thus forming ideal breeding spots for sarcophagous flies and beetles, such as *Musca vomitoria* L., *Creophilus maxillosus* L., *Corynetes coeruleus* De G., *Necrobiæ* and *Necrophori*. Incidentally, the timber docks as usual form good collecting grounds

* *Melanargia galatæa* is still common at several places on the Wolds near Sledmere ; and *Cinnamompha durus* occurs in one or two places on the East Yorkshire moors. — G. T. P.

(1). *L.c.* 1903, p. 107.

for wood-feeding beetles, such as *Astinomus aedilis* L., *Pissodes pini* L., *Pityogenes chalcographus* L., *Callidia*, etc., but they seem rarely if ever, to secure a foothold in East Yorkshire, and their effect on its insect fauna may be neglected.

A somewhat unusual factor in the destruction of insect life comes into play in Holderness. Coast erosion is more active here than any where else in the country, and if this continues at its present rate it will be only a comparatively short time to the complete disappearance of Spurn Point, with its rich store of sea-coast and sand-hill species, such as *Helops pallidus* Curt., *Notoxus monoceros* L., *Nacerdes melanura* L., *Anomala frischi* F., *Bembidium varium* Ol., etc., among the *Coleoptera*; and among the *Lepidoptera*,⁽¹⁾ *Tapinostola elymi* Tr., *Agrotis velligera* Hb., *A. cursoria* Hufn., *A. ripae* Hb., *Mamestra albicolon* Hb., *Leucania littoralis* Curt., etc., and later on, of Hornsea Mere, when almost the last of the great meres of the primeval fenland will vanish into the sea with all the local species which find their habitat round it.

IV.—THE TEES AREA.

In the Middlesbrough district the iron and chemical industries are extremely localised, being restricted to the banks of the river and its neighbourhood. The ironstone working, which takes place under much of the moorland, e.g., Eston Nab, Roseberry Topping, Easby Moor, etc., scarcely affects the surface at all, and hence even on the first of these, which has been the longest worked, the Fox Moth (*Macrothylacia rubi*, L.), the Oak Eggar (*Lasiocampa quercus* var. *callunae* Palmer), the Emperor Moth (*Saturnia carpini* Schiff.), and the Yellow Horned Moth (*Cymatophora flavicornis* L.) are still fairly common, despite other adverse influences. In a few cases on the Moors there has been, in connection with ironstone workings, some drainage of boggy patches, as, for example, on Eston Nab, where *Dytiscus marginalis* L. and *Acilius sulcatus* L. were swept away last year together with a number of species of rare spiders which Mr. J. W. H. Harrison has discovered there.

The moorlands, however, give interesting examples of increases in the local fauna, either in species or (more probably) in numbers. In many cases parts of the uplands have been afforested, mainly with pine and larch, but to some extent with spruce and birch. Either then by introduction or by numerical increase in native races due to increased food supply, there has been a great addition—certainly of individuals,

(1). Yorks. Nat. Union Excursion Circular to Spurn, No. 224.

and perhaps of species—to the pine-feeding fauna and their parasites, e.g., *Bupalus piniarius* L., *Ectropis binudularia* Bkh., *Trachea piniperda* Panz., *Eupithecia lariciata* Frr., and *Opisthographis liturata* Cl. among the *Lepidoptera*; *Curculio abietis* L., *Rhagium bifasciatum* F., *Anatis ocellata* L., *Mysiu oblongoguttata* L. among the *Coleoptera*; sawflies (*Lophyrus* spp.), and *Rhyssa persuasoria* among the *Hymenoptera*. This applies, however, only to the more open woods, for in the close plantations where the undergrowth is killed off and the lower branches of the trees are starved and die, there is extremely little insect life of any kind. It is obvious, of course, that where afforestation has taken place, the native fauna will in the end be destroyed unless, as is the case in the open woods, the original plant life still retains its hold on the soil; in no case in North Yorkshire that I am acquainted with—and I believe this is true of all parts—has there been sufficient planting to destroy any but a comparatively small part of the original flora (this statement does not apply, of course, to cases where the moor has been reclaimed and converted into pasture, meadow, or arable land), and hence, though there has been a certain amount of restriction of haunts, in no case has there been total annihilation of the original insect life.

A much more potent cause of local destruction is the prevalence of moorland fires; these are occasionally accidental, as was the big fire on Eston Nab two or three years ago, but more commonly they are intentional, their object being to destroy the old coarse heather and to replace it by fresh young shoots which can be eaten by grouse or browsed by sheep. There is here, of necessity, much direct destruction of animal life; but, further, as Mr. F. Elgee of the Middlesbrough Museum has pointed out, on these burnt-out patches or "swiddens" there is frequent change of plant association, bracken usually securing at least the first foothold on the new ground laid bare. This must necessarily cause a local alteration of proportions of animal life, although probably, seeing that the adjacent areas covered with grass, etc., are so vast, it makes little difference to the distribution in the long run.

As regards destruction of species in the immediate neighbourhood of Middlesbrough, there is no doubt that the blast furnaces are and will be the chief causes of loss. This is partly a direct result owing to the evil effect of injurious gases, but much more an indirect result owing to dust and smoke, the clouds of which are sometimes so dense that it is impossible to see more than a quarter of a mile

ahead, and so extensive that the whole town is invisible from the moorland just above it. That this must be having some effect is shown by the fact that, as my friend Mr. J. W. H. Harrison told me at the time, he found it necessary, during his researches on hybridisation among the *Bistoninae*, to obtain hawthorn four or five miles from the town, where the smoke is less frequent and much less dense. Fed on plants from near the town, the larvae sickened of a kind of diarrhoea and died. On the other hand there are several interesting points to consider.

In the first place, Lepidopterous larvae, especially of the *Noctuidae*, are by no means uncommon, and often abundant even within the smoke belt, e.g., *Noctua baja*, F., *N. xanthographa*, F., *N. brunnea*, F., *N. festiva* Hb., *Triphaena orbona* F. (*comes* Hb.), *T. pronuba*, L., *T. fimbria* L. It is impossible to say now whether any process of natural selection has taken place which has enabled these species to hold their own, but the fact remains that they feed freely on herbage that kills larvae from other strains. Again, the first British record for the beetle *Bledius defensus* Fauv.⁽¹⁾ (*guelmi* Sharp⁽²⁾), was made on the very edge of the built-up part of the town. Finally, some most interesting examples of insect survivals under unfavourable conditions occur on the banks of the Tees between Grangetown and Redcar. Near the railway station at Grangetown there is a huge slag heap flanked by a narrow strip of filthy grass, coltsfoot, moss, etc., and this is fringed by a foetid stream, stinking most abominably of hydrogen sulphide. A quarter of a mile away is a second slag heap, and between the two is a marsh through which the overflow from chemical works finds its way to the river. The air is redolent of the agreeable odour of rotten eggs, filled with gritty dust from calcining and blast-furnaces, and pierced by the shriek of engine whistles, the roar and rattle of the rolling mills, and the hiss of escaping steam. Nevertheless, in this most unpromising spot can be found, often in goodly numbers, some very local beetles. For example, the two moorland species, *Miscodera arctica* Payk. and *Pterostichus vitreus* Dej., occur here—the latter quite commonly, and the former in small numbers—every year since at least 1910, when I took it first. I suppose that these two species have been carried down in some way from the neighbouring moorland, possibly by a stream, but the interesting feature is that they have managed to maintain a footing here in surroundings so different from their native haunts.

(1). Ent. Mo. Mag., 1913, pp. 1 and 14.

(2). *l.c.* 1913, p. 256.

The weevil *Otiorrhynchus rugifrons* Gyll., too, occurs far more commonly here than anywhere else in the district, a dozen being sometimes found under one small piece of slag. Even *Lepidoptera* are not absent, there being present at least *Triphaena comes* Hb., *Noctua xanthographa*, F., and *Leucania* sp., while on vegetation in the untenable marsh the weevil, *Apion pisi* F., is very abundant. Other species of *Coleoptera* found in the same locality¹ are *Harpalus aeneus* F., *Pristonychus terricola* Hbst., *Laemostenus complanatus*² Dej., *Ocupus ater* Gr., *O. fuscatus* Gr., *Amara curta* Dej., *A. convexiuscula* Marsh., etc., while a little nearer the sea, but still in the furnace region, occur in numbers *Aëpus marinus* Ström, *Dichivotrichus pubescens* Payk., *Dyschirius globosus* Hbst., *Cercyon littoralis* Gyll., *Bembidium bipunctatum* L., *Haliphus striatus* Sharp, *Phytosus balticus* Kr., *Cafius xantholoma* Gr., etc. The survival of these species seems to show that insect life — largely carnivorous species and those which feed on rotting matter, although phytophagous species occur too, e.g., *Tapinostola elymi* — can adapt itself to what are apparently most unfavourable conditions if, presumably, the change is not a too rapid one. Of course, there is no doubt that many species must have been killed off in the smelting district, but, owing to the absence of records of any age, it is impossible to say how many; one certain example is *Philydrus maritimus* Th.,³ which occurred in one pool on the south bank of the Tees estuary about twelve years ago; this is now extinct, owing, however, not to any inability in the insect itself to combat unnatural conditions, but owing to the destruction of its haunts by molten slag. Incidentally, while we are considering the effect of dust on insect life, it would be interesting to know what has been the effect of dust, raised by motor traffic, on the plants and insects of our roadsides; perhaps others may have made some observations on this subject.

It is probable that the north side of the Tees, owing partly to the prevalence of south-west winds which blow the dust and smoke across the river, and partly to the greater number of chemical works on that side, will in the end suffer more than the south side, but concerning the effects up to the present I have no data.

¹ "Naturalist," 1910, pp. 339-40. Geo. B. Walsh, "*Coleoptera* of the Grangetown Slag-heaps."

² *l.c.*, 1915, p. 164. W. J. Fordham, "Additions to Yorkshire *Coleoptera* for 1914.

³ *ibid.*, Mr. M. L. Thompson.

(To be continued).

STUDIES IN HELOPHORINI.

BY D. SHARP, M.A., F.R.S.

7.—HELOPHORUS.

HELOPHORUS Fabr. (*Elophorus*).

Rhopalohelophorus Kuwert. Wien. ent. Zeit. v, 1886, p. 247 (this name is omitted from the Zool. Record and Index zoologicus).

It is in this genus that we encounter most of the difficulties that are connected with the study of *Helophorini*. It consists of a great many species, extremely closely allied, without any strong distinctive characters, while such as do exist are variable. The earlier writers on it treated it in so inadequate a manner that, their "types" not having been preserved, what they specially intended in any particular case is usually completely guess-work. The difficulties encountered in the study of *Helophorus* are of two kinds—natural and artificial.

Taking first the artificial we find they commence with the foundation of the genus by Fabricius (Syst. Ent., 1775, p. 66). He founded *Elophorus* on no characters that had any validity, and composed it of two species, *aquaticus* Linn. and *minutus* sp.n. I have already (*ante* p. 3) alluded to the nomenclatorial position, and need here, therefore, only elaborate it by remarking that "*aquaticus*" having become by Kuwert's proceeding the type of *Meghelophorus*, the second and only other species included by Fabricius should be the type of *Helophorus*. But this species is unknown and has disappeared from literature. Thus it actually happens that at this moment *Helophorus* is a genus without a type, though it includes a very large number of species. Under these circumstances it is highly desirable to ascertain what the lost *Elophorus minutus* of Fabricius really was. The type is not in the British Museum, and I can find nothing to rely on except the original description; there is no tradition or tacit agreement, as authors have always been contradictory and confused in their interpretation of the older descriptions of species of *Helophorus*. I give Fabricius' description herewith, *E. minutus*: "fuscus, thorace rugoso, aeneo, elytris pallidis. Habitat in Angliæ aquis stagnantibus. Forte *E. aquatici* varietas triplo minor. Statura et color exacte idem, exceptis solis elytris pallidis." It must be an English species with conspicuously pale elytra, therefore, and the name, I conclude, should apply to the species we call *griseus* Herbst. It is true that there are two other English species—*affinis* and *difinis*—that also accord with the

description, but they are both very rare, and, at the time of my writing this, are universally confounded in collections and literature with *griseus*. I conclude, therefore, that our most common species of *Helophorus* is the *minutus* of Fabricius and the type of the genus. I may add that, so far as tradition goes, from Olivier to Rey, it supports this view, the *minutus* of these authors being in all probability our common "*griseus*."

The natural difficulties in the delimitation of the species are nearly insuperable. I have, by adding to the characters hitherto used those derived from observation of the genitalia, been able to arrive at a conclusion in several cases, but there are others where uncertainty will, I fear, long continue to prevail. Kuwert called this genus *Rhopalhelophorus*, and his treatment of it is incomprehensible. I may remark in passing that he evidently reversed the application of the name. *Rhopalhelophorus* and *Atracthelophorus* were no doubt designed by him to represent the knobbed palpus and the prolonged palpus respectively. But, unfortunately, he applied the knobbed palpus name to the genus with drawn-out palpus and *vice versa*! Those to whom the names are not yet familiar will do well to recollect this curious error, especially as it is an instructive illustration of Kuwert's hasty work. He included 38 supposed species and numerous named varieties in *Rhopalhelophorus*, and a large proportion of these cannot be determined from his characters. As regards his nomenclature and synonymy I have in most cases adopted the interpretations of them given by Ganglbauer and Zaitzev.

The structure of the elytra that I have used as an important character has hitherto escaped observation, so that a few words of explanation of it are necessary. If a *Helophorus* be viewed from the ventral aspect, it will be found that in the majority of the species (e.g., *aeneipennis*, *minutus*, etc.) the outline of the body is defined by that of the epipleuron, which commencing from the shoulder extends to near the tip as a fine, raised, crenate line, that allows no part of the flank of the elytron to be perceived except at the extreme base, where a small portion of the prominent shoulder is visible in some species. If, on the other hand, *H. mulsanti*, or *H. championi*, or *nanus* is examined, it is found that when the crenate line reaches the metasternum it is twisted slightly towards the mesial line of the body, and that the outline is, beyond this, defined by an obscure line which is really a portion of the interstice above the epipleuron. Though this character is quite constant, and is important because it is an approximation to the condition that exists, in a more marked manner, in *Trichelophorus*, it cannot be treated as of the first importance in

classifying the species of *Helophorus*, for the various forms are not divisible into two groups on it, the conditions being really more complex than I have mentioned; sometimes the shoulder is visible as stated above in *H. aeneipennis*, while in others it is not, *H. minutus* (= *griseus*). My definition as to visibility of the flanks applies, therefore, only to the portion outside the metasternum, not to the portion outside the mesosternum. Moreover, the amount of visibility of the flanks differs in the various species in which it is present, being much in *H. nanus* and *championi* and only little in *H. mulsanti*.

Another character that is of importance in recognising the species is the length of the maxillary palpi. This has been used for formally tabulating the species by Seidlitz in his "Fauna baltica": unfortunately, however, this character is subject to sexual difference, the palpus being frequently longer in the male than in the female of the same species, and also, as has been already remarked by Rey, being somewhat variable even within the one sex.

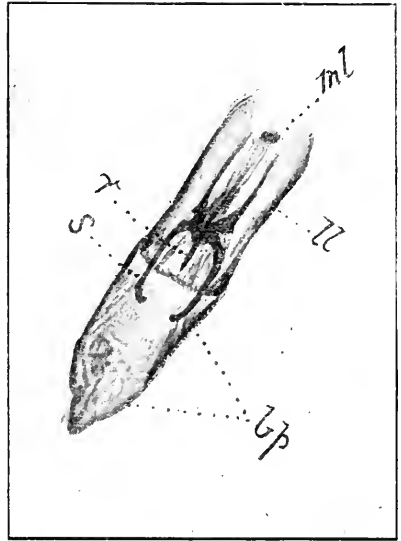
The form of the channel on the head appears to me to be on the whole the best for primary division of the genus, though it must be admitted that the distinction is not very great, and is in some cases difficult of appreciation, especially if the head is not well extended from the thorax.

Some of the characters made use of by Kuwert are fictitious, depending on whether the specimen is thoroughly cleaned or not.

To satisfy myself as to the reality of the species distinctions I have made several hundred dissections of the genital structures, and there is no doubt that these afford the most certain characters, although the differences are but slight, and are subject to a certain amount of variation—or, perhaps, apparent variation—arising from maturity or immaturity and from differences in attitude of the parts.

In addition to the remarks I have already made as to the aedeagus (*ante*, pp. 27-30) I must make a further explanation. The basal piece (bp) is to some extent elastic, and very much so when not quite mature. It, therefore, may be made longer or shorter, according to the tension it is subjected to. The median lobe (ml) is connected with the lateral lobe by a sort of gusset, and according to whether this gusset is extensively or minutely membranous depends the amount of protrusion of the lobe. In fully mature specimens the amount of possible protrusion is but slight, while in immature individuals it is greater, but never is it very great. The length

of the struts (s) of the median lobe is very constant, and they start from what I call the barrel (ml) of the lobe by a shoulder. It is about the point of divergence of struts, barrel, and lateral lobes that the greatest complexity of structure exists; but the details of this are only visible in a successful mount in Canada balsam: as this cannot easily be attained, this point is not suitable for practical determination of the species. A strong chitinisation, extending along the middle of the median lobe, projects forwards between the struts, and may be called the rod (r). There is a dorsal rod and a ventral rod.



Helophorus affinis: dorsal aspect of aedeagus: bp, basal piece; ll, lateral lobe; ml, median lobe; r, rod; s, strut of median lobe.

I have also made a study of the female genitalia; the parts are complex but very small, and though they exhibit some distinctions are not available for systematic work.

a. Channel of head narrow, not wider in front.

a'. Flanks of elytra visible beneath.

1.—*Helophorus championi* sp. n.

Latus, robustus, capite thoraceque nigro-submetallicis, elytris ferrugineis vage nigromaculatis, antennis, palpis pedibusque rufescentibus; thorace fortiter sculpturato; elytris sat profunde et fortiter crenato-striatis, interstitiis latis, margine laterali conspicuiter elevato. Long. 4½, lat. 2 mm.

? *H. strigifrons* Blackb., Ent. Mo. Mag., xiii, p. 40.

The broad form, robust build, and the fact that the flanks of the elytra are more broadly visible on the under-surface than in any of the allies, distinguish this remarkable species.

The palpi are rather short and stout, the terminal joint twice as long as the penultimate, slightly infusate at the tip. Head coarsely granulate, but the granules on the clypeus much effaced, very dark in colour, channel of vertex narrow, not broader in front. Thorax very broad, strongly convex from front angle to front angle, the surface coarsely granulate but the granules more or less effaced on the convexity of the disc, the colour very dark, the surface made uneven by convexity of the middles of the median and sub-median intervals;

median groove very narrow, sub-median one very narrow in front, but more or less broader behind, slightly sinuous, lateral margin faintly yellow in the middle; the front margin not sinuate behind the eyes, the sides somewhat convergent and straight behind. Sculpture of elytra strong, the interstices broad and almost free from punctuation; seen from the side the lateral interstices are wide, and the external one very strongly prominent, by which character the species is strongly separated from *H. laticollis*; the legs dark yellow inclining to brown, the hind femora not strongly punctured beneath.

Guildford (Champion), Thornhill (Sharp). If Blackburn's *H. strigifrons* be, as I suppose, this species, Killarney is also a locality for it.

This appears to have been first found by myself in 1868, and recently by Mr. Champion, who sent it to me as *H. strigifrons*. It seems to be excessively rare. I found only one or two specimens, and by error placed an erroneous number on the one now before me, but I have no doubt the locality is Thornhill. Mr. Champion found some five or six examples; all appear to be females.

I may mention that I think it is just possible this may be Rey's original *H. crenatus*, as I have a faint recollection of having sent a specimen to Pandellé, and Rey's original description of *crenatus* (as will be explained under that head) was made from an English specimen communicated by Pandellé.

2.—*Helophorus strigifrons* Thoms.?

I have seen only one specimen that I can refer to this species; it appears to come between *H. championi* and *laticollis*; it is smaller and narrower than the former, $3\frac{1}{2}$ by $1\frac{1}{2}$ mm., the palpi are rather longer and more slender, the interstices of the elytra rather narrow, the lateral margin less strongly set out, and the flanks less visible from beneath. A different shape of the thorax and a smaller head in addition to the distinct visibility of the flanks of the elytra distinguish it from our British *laticollis*.

Pommerin, Goeslin, Lüllwitz (in coll. Champion).

Whether this species is really the *strigifrons* of Thomson is doubtful. Thomson described it from a single example, and great doubt has always prevailed as to it. In any case it is no doubt near this German example, but he says of *strigifrons*: "Prothorax apice fere trisinuato," which does not apply to any member of this group known to me. The species mentioned as British by Blackburn (Ent. Mo. Mag., xiii, p. 40) is, I think, not this, as I have stated under *H. championi*.

3.—*Helophorus fallax* Kuwert?

Kuwert places at the head of his characters of *H. fallax*: "Endhälfte des letzten Palpengliedes scharf dunkel." That is not the case in any of the specimens I am referring to in his species (indeed, in some of them, there is no darkness of the palpus), but as the character is not of great importance, and I think it possible that they may be Kuwert's species, I treat them as such.

Of short form, broad (nearly $1\frac{1}{2}$ mm.), 3 mm. long, the channel of vertex linear and minute, the maxillary palpi only moderately long, the head and thorax of dark metallic colour, the elytra dark ferruginous, not marked with black, the sculpture of upper surface coarse, and the insect but little shining. The head small, thorax strongly transverse, hind angles very obtuse, grooves narrow, median one *not* broader in the middle, front part slightly flattened on the middle in front, everywhere strongly granulose, but on the most elevated part of the disc the granules sub-obliterated. Elytra deeply striate, the interstices rather broad, some of them slightly more elevated, the punctures somewhat large, sub-erect, the lateral margin strongly outstanding. Legs red, antennal club yellow, maxillary palpi but little infuscate at the tip. On the under-surface the flanks of the elytra are very distinctly visible.

Four specimens from the Castelnau collection, in which they were labelled "*H. nanus* Schüppel, Alsace," and four others from Pontarlier (Deville) in the Champion collection determined as *fallax* by Deville, indicate this as a somewhat variable species, the colour of the thorax varying from brassy to a dark steely-metallic tint, the legs and palpi varying a little in colour, and also the sculpture of the median intervals, which is sometimes much effaced. Kuwert is mistaken in supposing that the legs bear no hairs. The species is really closely allied to *H. nanus*, but the aedeagus, which is by one-half more elongate than in *nanus* or in *laticollis*, leaves no doubt as to it being quite apart from them.

(To be continued.)

Phyllotreta diademata Foudras, in England.—A little misunderstanding exists with regard to this insect. Foudras, in describing it, attached chief importance to the sculpture of the vertex, which he says is "impunctate, tenuissime granulato, separated from the forehead by a punctate line." Hence, no doubt, the name *diademata*. Weise in the "Ins. Deutschland" also makes of this almost the chief character of the species.

Newbery introduced the species as British in 1908 from Devonshire (Ent. Mo. Mag., p. 148), and also tabulated it relying on that character, but remarked that "the characters derived from the punctuation of the head do not appear to be sufficiently constant." C. G. Lamb shortly after found a specimen in

Cornwall that I considered to be this species; but when it was submitted to Mr. Newbery he pronounced it to be a variety of *P. atra*, and Mr. Britten who saw this example last autumn also considered that it was not *diademata*.

On the 1st June last, Commander Walker, my daughter and myself found a colony of a considerable number of black *Phyllotreta* on two or three very large plants of the somewhat local Crucifer *Senecioia didyma* Pers., at Milford-on-Sea, and I secured a score or two for study. I found there were three species among them, two being *atra* and *cruciferae*, and the third doubtful. A series of dissections has been made, and these show that the third species is *diademata*, and that it is distinct from the other two. Dissection of the Cornwall example proves that it is also *diademata* as I supposed.

The sculpture of the head is not to be relied on, but the sexual characters make the species easy of determination, the form of the terminal segments of the abdomen rendering this sex recognisable at a glance, owing to the large depression at the tip of the abdomen and the groove leading to it. The female is also easily distinguishable by the shape of the spermatheca, which is shorter and more dilated at one end than it is in *P. atra*. This sex also is usually larger than in *atra*, less shining, more convex, and with more rounded less parallel-sided outline, as well as a denser and more confused punctuation.

Since I captured the specimens at Milford I have also met with the species near Brockenhurst, in a very different spot; I have also found two other individuals, given me many years ago as *P. atra* by the late E. C. Rye. These two examples were no doubt found in the London district, and I infer from my experience that *P. diademata* is probably fairly common in England, at any rate in the south of the country.—D. SHARP, Brockenhurst: *June 25th, 1915.*

Creophilus maxillosus, v. *ciliaris*, at Chiswick.—I have a nice female of this variety, brought to me alive by Miss G. M. Shepherd. The specimen was found in her garden at Chiswick on June 9th.—EDWARD A. WATERHOUSE, 6, Avenue Gardens, Acton: *June 23rd, 1915.*

Ochthebius poweri Rye, etc., at Exmouth.—During a recent visit to Exmouth and Budleigh Salterton, I spent some time examining the fresh water trickles on the red sandstone cliffs, and, as might be expected, the species met with were mainly the same as those captured by the late P. de la Garde and myself at Shaldon, to the west of Teignmouth. The following may be noted: *Bembidium saxatile*, *B. stephensi*; *Luccobius purpurascens*, not rare, with one or two other species of the genus; *Ochthebius poweri*, a single example (the other Devonshire records are, one from Seaton and one from Bovisand, the latter taken by Mr. Keys in 1911); *Hydraena nigrita*; *Tachyusa atra*; *Lesteva fontinalis*, not rare, *L. pubescens*; *Dianous caeruleus*; *Stenus guttula*, *S. nitidiusculus*; *Actobius signaticornis*; *Ancyrophorus aureus*; *Lathrobium angustatum*; *Homalota gemina*; *Myllaena brevicornis*; *Helodes marginata*; *Barypeithes sulcifrons*; *Hypera pollux* and its var. *alternans*. *Bruchus rufipes* (*luteicornis*), one male, swept at Budleigh.—G. C. CHAMPION, Horsell, Woking: *July 7th, 1915.*

A list of the Coleoptera of Marocco.—Under the title “Los Coleópteros de Marruecos,” the Instituto Nacional de Ciencias Físico-Naturales of Madrid has recently published a list of the beetles of Marocco (Trabajos del Museo Nacional de Ciencias Naturales, Ser. Zool., Núm. 11, Nov. 1914) by Manuel Martínez de la Escalera. It is mainly based upon collections made by the author and his son Fernando during a residence of several years in the country, chiefly at Mogador, and, of course, includes a list of the *Coleoptera* previously recorded from Marocco. Nearly 3,000 named species or varieties are enumerated, some 200 of which are described as new by the author. The lists of *Cicindelidae*, *Carabidae*, and *Staphylinidae* (1898), and *Heteromera* (1891), of the Straits of Gibraltar, published by myself in the Trans. Ent. Soc. London, based upon the collections made by Commander Walker on the two sides of the Straits, have been drawn upon by M. Escalera for the Maroccan forms, though one or two conspicuous *Carabidae*, etc., such as *Casnonia olivieri* Buq. (*l.c.*, 1898, p. 83), from Tetuan, have been overlooked. The author, or his son, has visited various places south of the Atlas, etc., but not much has been done in the Atlas itself, owing to the impossibility of camping there. To describe such a large number of species or varieties while resident in Mogador, away from the necessary reference-collections and literature, must surely add to the synonymy? The author, however, states that he has constantly consulted M. Louis Bedel, of Paris, on these matters, and that this veteran Coleopterist has helped him throughout. The fauna of Melilla is said to have a marked Mediterranean character, while that of Tangier* shows a strong Andalucian affinity, though much less than might be expected, taking into account the short distance across the Straits. Starting from Larache southward the coast-fauna commences to acquire an exclusively Atlantic character, changing again at Mazagan, where very few of the forms common to Mogador and Tangier are to be met with. Of the species enumerated, upwards of 500 belong to the *Heteromera*, 450 to the *Rhynchophora*, 300 to the *Carabidae*, etc. The list runs to 553 pages, 13 of which are devoted to an index of the families, genera, etc.—G. C. CHAMPION, Horsell, Woking: July, 1915.

Coleoptera in the Plymouth district.—In March, 1902, at Whitsand Bay, near Plymouth, I captured a brilliantly metallic greenish-blue example of *Amara ovata* F. Having recently ascertained that this is a named variety—ab. *adamantina* Kol.—I think it worthy of record. It is apparently new to the British list. I should also have previously noted the occurrence of the var. *variegatus* Er. of *Cafius xantholoma* Grav., in the Plymouth district. It is sometimes found in numbers. I have known it for years, but have omitted to record it. In June last, I took seven examples of *Limnobaris T-album* L. in one of the creeks of the River Lynher. This is a new record for Cornwall. Several examples of *Polydrusus chrysomela* Ol. were also swept with it. This species is, however, already in the Cornish list, but on the evidence of a single specimen only—JAMES H. KEYS, 7, Whimble Street, Plymouth: July, 1915.

* During my very brief visit to Tangier in 1895, I was unable to add anything from this well known locality.

On Pancalia leuwenhoekella.—The affinity of this insect has always been puzzling, and I have lately made a fresh examination of it in the light of increased knowledge, with interesting results on points of structure hitherto overlooked.

The frenulum of the ♀ consists (instead of the ordinary penicillate arrangement from a point) of three fairly strong bristles, rising from distinct adjacent points in a line, and spreading fanwise beneath the forewings, the first alone entering the costal retinaculum; so far as my experience goes this is a unique structure, not observed in any other *Lepidoptera*. But in the *Heliodinidae* (of which the British representatives are *Stathmopoda*, *Heliodines*, *Augasma*, and *Schreckensteinia*) the ♀ frenulum shows unusual diversity, being sometimes composed of two diverging bristles (as *Euclimensia*), or two apparently soldered together (*Trichothyrsa*), or one strong bristle as in ♂ (*Heliodines*), or normal (*Stathmopoda*); this further diversity would therefore not seem out of place there. The frenulum of the ♂ is of the normal type, but has a minute accessory bristle preceding it at base, which would be very readily overlooked. The tarsi (especially the posterior) are furnished along their lower surface with rather numerous spines, longer at apex of joints, also an altogether exceptional, if not unique, structure in so small a species; spiny bristles at the apex of joints are not unusual, and in the *Heliodinidae* are constant and characteristic, but not evenly set along the lower surface; it would seem, however, that they might be not unreasonably regarded as an extension of the normal *Heliodinid* structure: in larger and heavier *Lepidoptera* they are of course the rule. In the rest of the structure of the species there is nothing discordant with the definition of the *Heliodinidae*, and I consider that *Pancalia* may therefore justly be referred to that family. The general disposition of authors has been to place it with the *Oecophoridae*, which would indeed seem to be the only other alternative; but apart from the two peculiar characters detailed above (to which I know no approximation in the 240 genera of *Oecophoridae*), it differs from that family in the complete obsolescence of the maxillary palpi (in the *Oecophoridae* very short and appressed to the base of the tongue). The ocelli are somewhat larger and more conspicuous than usual (in Stainton's "Insecta Britannica Tineina" inadvertently stated to be absent, though his figure displays them). The terminal joint of the labial palpi is, by a similar slip in my Handbook, given as shorter than the second; it is really longer, as correctly stated by Heinemann. The short, smooth metallic head and type of markings are quite as in *Heliodines*.

In my Handbook I have expressed the view that there is probably only one species in the genus; I have now ascertained that this view is erroneous. In *leuwenhoekella* the ciliations of the ♂ antennae are minute and difficult of observation, and I estimate them at $\frac{1}{4}$; in *latreillella* (which I have taken at Mentone in France) they are obvious, fully $\frac{1}{2}$, and towards the apex in consequence of the tapering of the antennae become 1. The forewings in *latreillella* are undoubtedly also relatively longer and narrower. These differences are conclusive; and I find the white band invariably present in true *leuwenhoekella* on the front of the antenna, whilst in *latreillella* ♂ it is entirely

absent. The back of the antennal stalk is more distinctly pubescent in *latreillella* than in *leuwenhoekella*. I am not acquainted with *nodosella*, which has been regarded by some as the ♀ of *latreillella*, perhaps correctly.

I should be glad to know if anyone takes the species, to which I have applied above the name *latreillella*, in England. Further, it is customary for the species of *Heliodinidae* to rest with the posterior legs not touching the ground, but commonly erected over the back, though some only display this habit occasionally (as *Schreckensteinia*); I have never noticed this in *leuwenhoekella* (which is common here, but now over for the season, though double-brooded on the Continent), but should be interested to learn if it has ever been observed; possibly the spinose under-surface of the tarsi may indicate a change of ancestral habit.—E. MEYRICK, Thornhanger, Marlborough: July 1st, 1915.

A rare sawfly in Epping Forest.—On May 16th, 1915, I was fortunate enough to obtain a few specimens of the interesting sawfly *Dolerus triplicatus* Klug, by sweeping *Juncus* in marshy ground near Loughton Camp, Epping Forest. In company with it was the commoner species *D. haematodes* Schr., which is known to feed on *Juncus* and other rushes. I identified the species provisionally as *D. triplicatus* from the material in the British Museum (Natural History), and through the kindness of Mr. G. Meade-Waldo, a male and female were submitted to the Rev. F. D. Morice, with the result that my identification was confirmed. Mr. Morice pointed out in 1910 (*Ent. Mo. Mag.*, XLVI, p. 154) that the only British males seen by him up to that time had the thorax entirely black, but the Epping Forest series have the thorax coloured red and black in both sexes alike. A pair (♂, ♀) are now deposited in the National Collection, and another individual remains in my possession. *D. triplicatus* is evidently an uncommon insect. It was stated by Cameron (*Monogr. Brit. Phyt. Hymen.* I, p. 163, 1882) that the only British example he had seen was a male captured by the Rev. T. A. Marshall, coloured like the female, and this specimen is now preserved in the British Museum. A female, captured by Mr. A. J. Chitty at Colechester, in May, 1907, is now in Mr. Claude Morley's collection (*Entom.* XLIII, p. 284, 1910). I should be glad to hear of any other captures of this insect.—HAROLD E. BOX, 88, Drury Road, Harrow, Middlesex: July 6th, 1915.

Abstracts of Recent Literature.

BY HUGH SCOTT, M.A., F.L.S., F.E.S.

KEILIN, D., "LES FORMES ADAPTATIVES DES LARVES DES ANTHOMYIDES; LES ANTHOMYIDES À LARVES CARNIVORES." *Bull. Soc. ent. France*, pp. 496-501, 1914.

The writer of this article has published several very interesting papers dealing with the early stages and biology of *Diptera* and *Hymenoptera*, principally the former, the larvae of which are the main object of his researches. The Anthomyiidae are regarded here in the wide sense given to the group by recent work. Their larvae can be divided, from an ethological point of view, into four categories: and the members of each, though of diverse systematic affinities, possess in common certain structural characters, which Keilin con-

siders to be adaptations to their manner of life. The categories are as follows: (1) *Saprophagous larvae*, those which feed on decaying vegetable matter, or the excrement of herbivorous animals: these have a buccal armature similar to that of *Calliphora* or *Lucilia*; the ventral surface of the basilar piece is feebly chitinised and has a number of longitudinal ridges projecting into the lumen of the pharynx. (2) *Phytophagous larvae*, which feed on living plants, as leaf-miners, root-miners, etc.: these have the bucco-pharyngeal armature more concentrated, the basilar piece more chitinised, with ridges feebly developed or absent, the mandibles modified as several-toothed scrapers. (3) *Parasitic larvae*: rare among Anthomyiids, there being only certain species of *Mydaea* parasitic on birds; their buccal armature resembles that of parasitic Tachinidae. (4) *Carnivorous larvae*. It is now known, from the researches of Portchinsky and, later, of Keilin himself, that a good number of larvae found in excrement are not really coprophagous, but live on other larvae or other small animals found with them in the excrement. These carnivorous larvae attack their prey, perforating its skin and sucking its contents. A number of examples are mentioned: for instance, the larvae of *Graphomyia maculata*, found in liquefied decomposing vegetable matter, feed on larvae of *Eristalis* and pupae of *Tipulidae*; those of *Calliophrys riparia*, found among moss, feed on small Oligochaet worms and larvae and pupae of Psychodidae. These carnivorous larvae have certain characters in common. Thus the mandibles are sharp, piercing hooks, and the basilar piece of the armature is very long, narrow, and strongly chitinised, and entirely without the internal longitudinal ridges.

BUSCK, A., and BØVING, A., "ON MNEMONICA AURICYANEA WALSINGHAM." Proc. Ent. Soc. Washington, Vol. 16, no. 4, pp. 151-163, pls. 9-16, 1914.

This little Eriocraniid moth appears to be the first American member of the Micropterygoidea whose biology has been at all completely followed. Its entire life above ground covers but a few weeks, all the rest of the life-cycle, more than eleven months, being spent beneath the soil in a cocoon. The imago emerges in April and lays its eggs singly in the opening leaves of chestnut, oak, etc. The larva makes a large blotchy mine in the leaf. In about a week or ten days it is full fed, and falls to the ground, where it burrows sometimes as much as a foot deep into the soil. It spins a very tough, close-fitting cocoon, in which it remains as a resting-larva all summer and autumn, and does not transform to a pupa till winter. Unlike Lepidopterous pupae in general, the pupa has all its appendages quite free and all its body-segments moveable. Contrary to what has previously been asserted, the large mandibles are movable, worked by strong muscles identical with the abductor and adductor muscles of insects with biting mouth-parts. The mandibles are capable of a strong outward swinging movement, by which means the cocoon is split open at the time of emergence. It is principally by movements of head, mandibles, and abdomen that the pupa then pushes its way to the surface, the legs not being used for this purpose as has been asserted. On reaching the surface the pupa remains immovable for some time; the last acts of transformation take place; the pupal mandibles become immovable owing to withdrawal of the imaginal skin, muscles, etc.; and finally the imago emerges.

The egg, larva and pupa are fully described and figured, particularly the head and mouth-parts of larva and pupa. Specially interesting are the observations in the concluding portion of the paper, on the mouth-parts of pupa and imago. The latter, as well as the pupa, has mandibles, not large and functional like those of the pupa, but unchitinised and rudimentary—nevertheless unmistakable, and in the pupal stage plainly visible within the base of the pupal mandibles. Thus the adult Erioceraniid, as well as the adult Micropterygid, possesses mandibles, only they are small and functionless in the former instead of large and functional as in the latter. Therefore the presence of mandibles in the adult Micropterygid has not the fundamental importance assigned to it by some writers. Yet Messrs. Busck and Bøving consider that differences in venation, mouth-parts, and larval characters quite justify separate family rank for Erioceraniidae and Micropterygidae, the latter being by far the more ancestral. The adult Micropterygid has not only large, firmly chitinised, functional mandibles, but all the other trophi found in insects with typical biting mouth-parts: maxillae with cardo, stipes, 6-jointed palp, galea, and lacinia; maxillular lobes on the hypopharynx; and a more primitive labium. On the other hand the adult Erioceraniid has the mandibles small and functionless, as described above; maxillae devoid of lacinia, and with the galea developed into the hollow sheath of a true proboscis (of which development there is no trace in the Micropterygid mouth); no maxillular lobes; and a less primitive labium.

HUDSON, H. F., "LUCILIA SERICATA MEIGEN, ATTACKING A LIVE CALF." Canadian Ent., Vol. 46, p. 416, December, 1914.

This brief note records the finding of masses of *Lucilia*-maggots round the anus and base of the tail of a calf in Ontario. Some of the larvae had eaten about a quarter of an inch deep into the flesh, and the calf was in a very sickly condition. It was killed, and the maggots were determined by breeding the fly. The flies had probably been attracted to oviposit in excrement, etc., clinging to the hind-quarters of the calf. The same species of *Lucilia* is stated to be the principal cause of the presence of maggots on the backs and hind-quarters of sheep in Great Britain.

HARRISON, L.: (i) THE MALLOPHAGA AS A POSSIBLE CLUE TO BIRD PHYLOGENY." Australian Zoologist, Vol. 1, part 1, pp. 1-5, June, 1914.

(ii) "ON A NEW FAMILY AND FIVE NEW GENERA OF MALLOPHAGA." Parasitology, Vol. 7, no. 4, pp. 383-407, pl. 26-7, March, 1915.

At an early stage of his study of the Biting Lice, the writer of these papers was struck by the remarkable manner in which definite species-groups of the parasites are confined to definite host-groups. What is meant can be best explained by citing certain instances which he gives, almost in his own words. Thus a species of *Philopterus* from a common Australian cuckoo (*Cacomantis flabelliformis*) is hardly to be distinguished specifically from the parasite of the common European cuckoo (*Cuculus canorus*). Yet, though the parasites are practically identical, the hosts have diverged very widely in their progress

from the presumably common ancestral stock. Moreover other kinds of *Philopterus*, found on other species of cuckoos from various regions, are all closely related. These cuckoo-parasites form a perfectly definite group of species within the genus *Philopterus*, so that an expert may say at a glance that any one of them has come from a cuckoo. Similarly, there is another definite group of species of *Philopterus* found on kingfishers of various genera and of world-wide distribution. Parasites of a number of other bird-groups (*e.g.*, hawks, ducks, pigeons) afford well-defined species-groups. To explain these phenomena the writer was forced to the conclusion that the parasites have tended to differentiate at a much slower rate than their hosts; or, to quote the words of Kellogg, who had previously arrived at a similar conclusion, "the parasitic species has persisted unchanged from the common ancestor of the two or more distinct but closely allied bird-species." Harrison suggests that the retardation of differentiation in the parasites may be due to the equable conditions of temperature and nutrition under which they live on the bodies of their hosts, and to the absence of any sharp struggle for existence among them. But, granted that the parasite-species has in many cases been handed down practically unchanged from the common bird-ancestor to the several specifically or generically distinct bird-descendants of the present day, may not this be a means of throwing some light on the vexed question of bird-phylogeny, of the inter-relationships of the various groups of birds? Such a way of attempting to indicate phyletic relationships may be unconventional, but Harrison considers it justifiable in a case like this, where all the ordinary embryological and morphological methods have failed. Important questions naturally arise. How far back does the retardation of differentiation extend? If it extend back as far as the point in time when the ancestors of *Mallophaga* first adopted a parasitic mode of existence, then when was that point? Harrison hazards the suggestion that it may have been as far back as late Mesozoic time, and gives his reasons for thinking this a possibility. But enough has been written to outline one of the ideas underlying the Mallophagan studies which the writer of these papers is undertaking. Part of the detailed results of those studies is contained in the second paper cited—a systematic work in which various characters previously ignored are called into use.

Societies.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY :
Thursday, May 13th, 1915.—MR. A. E. TONGE, F.E.S., Vice-President, in the
Chair.

Mr. Leeds exhibited aberrations of *Polyommatus icarus*, including ab. *obsoleta*, an asymmetrical specimen near *obsoleta*, one with a chocolate banded underside, and a ♀ streaked with blue: of *Agriades thetis*, including a ♀ without orange in margin and bluish clouded, ♂s with aberrant eye-spots below, etc.; of *A. coridon*, including dark suffused below, slaty suffused below, ♀s with "khaki-coloured" streaks above, and ab. *semisyngrapha*: of *Coenonympha pamphilus*, including

dark suffused below, and an underside with additional spotting: of *Pararge aegeria*, the British form *eyerides*, and Cornish forms much like the S. European form *aegeria*; of *Pieris brassicae*, a ♀ with a pale blue tinge throughout. Mr. Adkin, a short series of the hybrid *Biston hirtaria* ♂ × *Nyssia lapponaria* ♀ and gave notes on the mixture of the two specific series of characteristics. Mr. Moore, *Manduca atropos* from S. Africa. Mr. Curwen, long series of *Polyommatus eros* and *Laticorina orbitulus* from Saas-im-Grund and the Grisons respectively. Mr. B. S. Williams, larvae of *Odezia atrata* on *Cytisus*, and a very varied series of *Xanthorhoë fluctuata* with ab. *neapolisata* from Finchley. Mr. Cowham, cases of the large Psychid, *Ocketicus platensis*, examples of the Neotropical *Colias lesbia*, a large and conspicuously marked "skipper" *Pyrrhopyga* sp., and an Aretiid, *Ecpontheria* sp. Mr. Barrett, a large number of *Lepidoptera*, mainly from Sicily, and read notes on the variation; they included *Thais polyxena*, *Pontia daplidice*, *Anthocharis belia*, *Euchloë cardamines*, with their racial, seasonal, and aberrational forms. Mr. Dennis, photographs of the ant *Formica pratensis*, a species closely allied to *F. rufa*. Mr. Stallman, a *Taeniocampa gothica* ♀ with right hind-wing reproducing the markings of the fore-wing on the upper-side, from Holmwood. Mr. B. Adkin, *Lepidoptera* from Loch Lomond, dark suffused *Brenthis selene* and *Diacrisia sannio*, a white suffused under-side of *Coenonympha pamphilus*, etc. Mr. A. Sich read a paper, "Notes on *Tortrix viridana*," on which a short discussion took place.

Thursday, May 27th, 1915.—Mr. B. H. SMITH, B.A., F.E.S., President, in the Chair.

Mr. Sich exhibited ova of *Tortrix viridana*, laid in pairs on the bark of oak, and cases of a *Solenobia*, presumably *S. lichenella*, from Barnes. Mr. Moore, *Lepidoptera* from near Johannesburg, Transvaal, including *Hypolimnas misippus*, *Precis sesamus*, *Colias electo*, and var. *aurivilliusi* (comparable to *C. edusa* and var. *helice* of Europe), *Papilio demodocus*, *Pyrameis cardui* (the small Aethiopian race), *Hippotion celerio* and *Bosiothia media*, a small green Sphingid. Mr. B. S. Williams, larvae of *Xylophasia scolopacina* from Finchley, and a series of *Trichopteryx (Lobophora) polycommata* from Yeovil. Mr. Lachlan Gibb, on behalf of Mr. H. M. Simms, a fine suffused aberration of *Pyrameis huntera* from near Montreal, an ab. *bellus* of *Bithys quercus* from near Barmouth, and an aberration of *Pharetra (Acronycta) menyanthidis* in which the orbicular stigmata were absent, from near Sheffield. Mr. Priske, an example of the Tenebrionid Coleopteron, *Morica planata*, from Gibraltar. Mr. Bunnett read a short paper, "The Maple *Aphis*," illustrated with drawings and lantern slides.

Thursday, June 10th, 1915.—Mr. A. E. GIBBS, F.L.S., F.E.S., Vice-President, in the Chair.

Dr. Chapman exhibited a living specimen of *Polyommatus escheri* bred from ova from Gavarnie, Pyrenees. It was of the form *rondoui*. Mr. Hy. J. Turner, the whole of the coloured plates of the ten volumes of Herbst's *Natursystem Käfer*, 1783-1804, which he had bought for a few shillings from a street barrow. Mr. B. S. Williams, aberrations of *Selenia bilunaria (illunaria)*, a very strongly marked ♀ and a smoky ♂, larvae of *Anticlea badiata*, and aberrations

of *Agrotis nigricans*, a red-brown form from Wicken, and a black form from St. Annes. He also reported that he had heard *Hylophila prasinana* make a distinct peculiar buzzing noise when in flight at night as it came to his lantern light. Mr. Dennis, photographs with the stereoscope of *Hispa atra* and *Formica pratensis*. Mr. J. P. Barrett, a living specimen of *Strymon pruni* which had emerged on June 10th. It was considered an early date. Mr. Dunster, a series of *Brenthis euphrosyne* taken in Bucks in May. Mr. Bunnnett, examples of *Mygale avicularia* with photographs of the same. Mr. B. Adkin, series of local forms and aberrations of *Ruralis betulae* and *Pachygastris trifolii* and read notes on the exhibit. Of the former species he showed a unique aberration with an orange border to all the wings and much orange suffusion.

Thursday, June 24th, 1915.—Mr. B. H. SMITH, B.A., F.E.S., President, in the Chair.

Mr. Tagg, of Lewisham, was elected a Member.

Mr. Edwards, for Mr. Dawson, exhibited several remarkable aberrations of European butterflies, including *Polyommatus icarus*, with elongated marginal markings on underside; *Melitaea dictynna* with underside forewings, all markings blurred, and hindwing markings extensively radiated, the upper side almost wholly black suffused; a melanic *Brenthis pales*, a xanthic form of *Epinephele jurtina*, *Polyommatus hylas*, with very pale marginal area on underside, and *Melitaea didyma* with radiated undersides. He also showed nests of the humble-bee, *Bombus lapidarius*, with imagines from Worcestershire. Mr. West (Greenwich), the principal species of *Coleoptera* taken by him in late May and early June in the New Forest, including *Leptura scutellata*, *Mesosa nubila*, *Clytus arietis*, *Grammoptera praeusta*, *Elater sanguinolentus*, *E. miniatus*, *Agrilus viridis*, *Colydium elongatum*, *Aphodius niger*, etc. Messrs. B. Adkin, R. Adkin, Hy. J. Turner, A. E. Gibbs, and Cowham, series and specimens of *Lasiocampa quercus*, and Mr. B. Adkin subsequently read a paper on the species. Mr. Gibbs, a male with complete female coloration. Mr. Cowham, a female from Epsom, which was two years in pupa, and had emerged in May: it was of the var. *callunae*. Another example had the discoidal on the left forewing duplicated.—HY. J. TURNER, *Hon. Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON: Wednesday, May 5th, 1915.—The Hon. N. C. ROTHSCHILD, M.A., F.L.S., F.Z.S., President, in the Chair.

Following on his exhibit and notes of March 3rd last, Mr. Newman again exhibited living pupae of *Pyrameis atalanta*, and said he thought he might now fairly claim to have proved that this species can pass the winter in England in this condition. Mr. Talbot exhibited specimens of the genera *Hyades* and *Taenaris*, and read notes; also, on behalf of Mr. J. J. Joicey, some new *Lepidoptera* from the Arfak Mts., Dutch New Guinea, including a local race of *Ornithoptera paradisea*. The Rev. F. D. Morice drew attention to a paper in the *Trans. Ent. Soc.*

Lond., Vol. i (1836) by W. Spence, in which it was stated that flies were excluded even by large mesh netting over the windows, providing there was no through light. Prof. Poulton read further notes on the habits of the African ant, *Megaponera foetens* F., sent to him March 27th, 1915, by Mr. C. O. Farquharson at Moor Plantation, Ibadan, S. Nigeria; he also exhibited interesting butterflies from the East Coast of Madagascar, from a collection kindly sent to the Hope Department by Archdeacon G. K. Kestell-Cornish; also a pair of *Mononyx grandicollis* Germ. (*Cryptocerata*), captured *in cop.* on a bird-dropping on wet sand, Nsadi I., W. of Kome I., N.W. Victoria Nyanza, March 30th, 1914, by Dr. G. D. H. Carpenter. One of the two bugs was devouring a male *Lycaenesthes larydus* Cr., also exhibited to the meeting. He also read various notes from correspondents in Africa giving instances of *Lepidoptera* devoured by birds.

The following papers were read: "New *Lepidoptera* from New Guinea," by J. J. Joieey, F.L.S., F.E.S., A. Noakes, F.E.S., and G. Talbot, F.E.S. "Descriptions of South American *Micro-Lepidoptera*," by E. Meyrick, B.A., F.R.S., F.E.S. "Life-History of *Caligo memnon*," by F. L. Davis, M.D., F.E.S. "Some Palaearctic Species of *Cordulegaster*," by Kenneth J. Morton, F.E.S. "Experiments on some Carnivorous Insects," by C. F. M. Swynnerton, F.E.S.

Wednesday, June 2nd, 1915. — The President in the Chair.

Dr. A. B. Northcote, Blenheim House, Monkgate, York, was elected a Fellow of the Society.

Dr. Chapman exhibited some full-fed larvae of *Agriades escheri* bred from the egg. Mr. O. E. Janson, specimens of *Ornithoptera alexandrae*, selected from a series to show the extreme variations in the wing-markings; also a female example of *Morphotenaris kenricki*, all from New Guinea. Mr. C. B. Williams, a method of breeding *Psocidae* and other small insects which feed on fungi, etc. The Rev. F. D. Morice, a ♀ of the solitary bee *Andrena labialis* taken near Woking on May 19th, 1915, having attached to the disc of its clypeus a vegetable substance, apparently a pollinium of some orchid. Mr. Donisthorpe, specimens of *Anochetus cameroni* Forel, a new species taken by Dr. Cameron at San Roque, December, 1914, and *Cremastogaster inflata* F. Smith, taken by Mr. Bryant at Sarawak, December, 1913. The latter species has the thorax distended, which acts as a reservoir for honey, in the same way as the distended gasters of the true "Honey Ants." Prof. Poulton said that he had received another consignment of insects and further letters from Dr. Carpenter, who still remained in the same locality, viz, Kakindu, about 30 miles west of the Victoria Nyanza. Dr. Eltringham exhibited a family of five examples of *Acraea johnstoni* Godm., bred by the Rev. K. St. A. Rogers at Sagalla, B. E. A., together with the female parent. Commander Walker, living specimens of *Elater sanguinolentus*, beaten from *Pinus sylvestris* at Brockenhurst on the morning of the meeting.

The following paper was read: "What the larva of *Lycaena arion* does during its last instar," by T. A. Chapman, M.D., F.Z.S., F.E.S.—GEO. WHEELER, *Hon. Secretary.*

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September 7th—Holiday Exhibits and Notes. Special Exhibition of Holiday Captures, arranged by Lepidoptera Committee. September 21st—"Oology," S. AUSTIN; Exhibition: "The Burnets," arranged by Lepidoptera Committee. October 5th—"Points to Observe in Common Insects," G. B. LONGSTAFF, M.D., F.R.C.P.; Exhibition: "The Coast Agrotids."

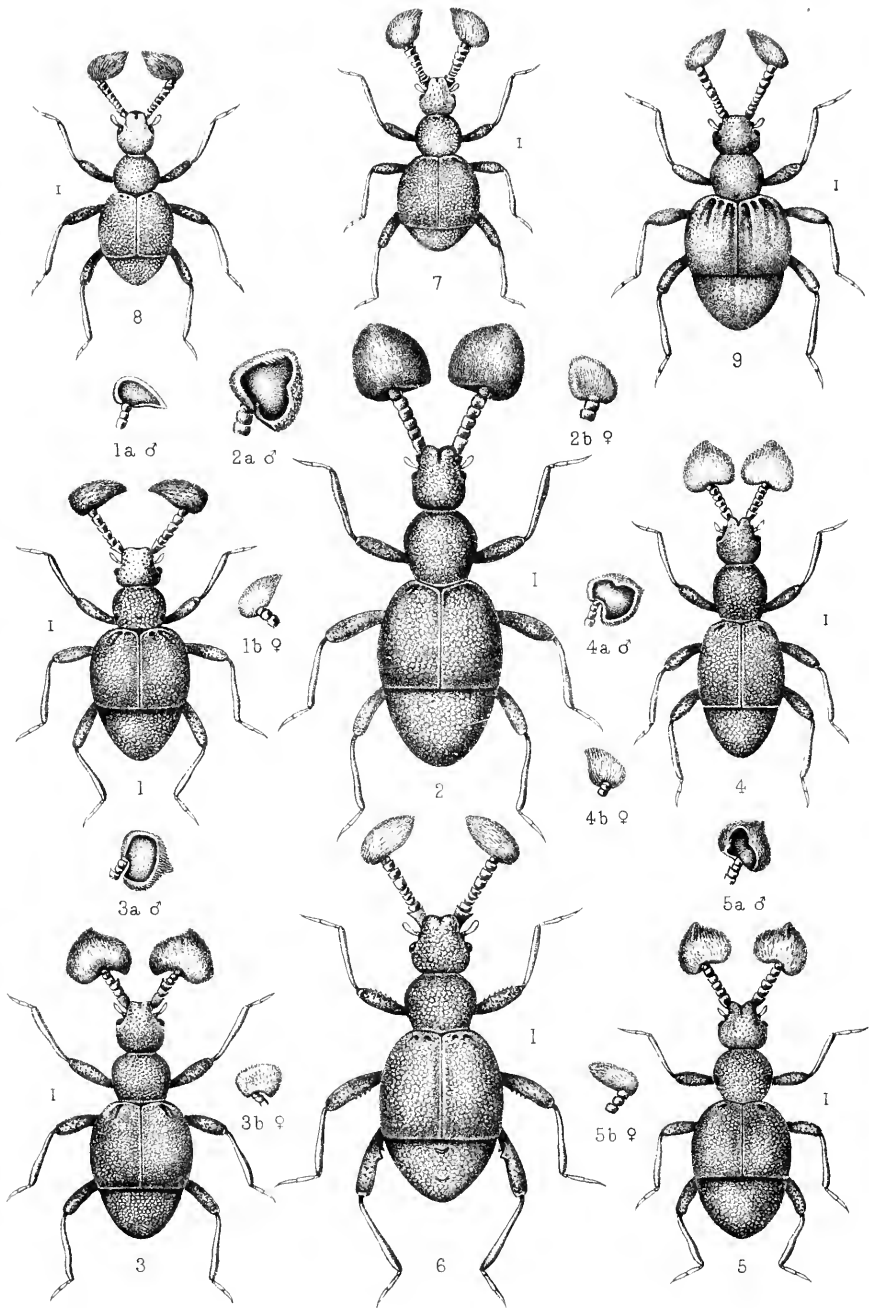
Hon. Sec.: J. ROSS, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, and commence at 8 p.m. The Meeting Room is open at 7.30 p.m.

Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.

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NEW SPECIES OF CYATHIGER

NEW SPECIES OF *CYATHIGER* (FAM. *PSELAPHIDAE*),
FROM BORNEO AND PENANG.

BY G. E. BRYANT, F.E.S.

(PLATE XX).

This paper deals with nine new species of *Cyathiger* from Borneo and Penang. This genus, so far as at present known, has a range from N. S. Wales to Sumatra, *viâ* New Guinea, Borneo, Singapore, and Penang. It is strange that no representative has as yet been recorded from Java, as a good many species of *Pselaphidae* are known from there; but it is possible that *Cyathiger* may not occur in that island, as I have noticed in working out my Bornean collection of *Coleoptera* how much more closely that island is related to Sumatra than to Java. The genus will undoubtedly prove to be a very large one, when the islands from Borneo to N. Queensland are thoroughly explored, and the Malay Peninsula and Siam will probably produce many species. The three described by Reitter from Borneo were apparently taken at light, and were all ♂♂. I never succeeded in capturing any at light, and mine were collected by sifting leaves in the jungle, with the exception of one species found under bark with ants. In sifting leaves they are difficult to see, as they always roll themselves up into a compact ball and remain motionless for some time, and the dead leaves in thick jungle are always wet, and they are apt to stick to them.

In Raffray's Groups I-V, the apical joint of the antenna in the ♂ is most remarkable, and he has suggested (Wytzman, Gen. Insectorum, p. 301) that the last joint of the ♀ fits into that of the ♂ at the moment of copulation, and I think his view will undoubtedly prove correct, as in all the species of which I have the two sexes, the joints will fit one within the other.

I have collected altogether 18 species from Borneo, Penang, and Singapore, and have taken *C. impar* Raffr., in the three islands—Borneo being a new record for it; also *C. cribratus* Raffr., at Penang, and *C. heterocerus* Raffr., at Singapore. The number of species described is now 34, and I have six more from Borneo, mostly ♀♀, which I am unable at present to determine. It may be of interest to give the number of described forms known from each island, and the number endemic to each:—Sumatra, 7: all peculiar; Penang, 7: 5 peculiar; Singapore, 5: 3 peculiar; Borneo, 12: 11 peculiar; New Guinea, 4: all peculiar; Australian, 2: both peculiar. For Raffray's Table and

figures of the genus, see Rev. d'Ent. XIV, pp. 47-60, plate II (1895); Ann. Soc. Ent. Fr., 1904, pp. 305-309.

Cyathiger myrmecophilus sp.n. (Plate XX, figs. 1, 1a, ♂; 1b, ♀.)

♂. Oval, slightly attenuate in front, convex, castaneous, finely and confluent punctured, with short, pale pubescence. Head broader than long, eyes situate behind middle and rather prominent, head widest near base and slightly rounded, narrower in front and nearly quadrate. Antennae equal in length to head and prothorax combined, with seven joints: 1 large and obconical; 2 and 3 shorter and transverse; 4-6 slightly longer; 7 large, transverse, with outer margin slightly rounded, thence acuminate within, its upper surface convex, covered with short, pale pubescence, beneath (see fig. 1a) concave, but not very deeply excavate. Maxillary palpi with last joint slightly fusiform. Prothorax a little longer than head and a little wider, almost gibbose, sub-quadrate, rounded in front, sides sinuate about middle, with a small fovea in middle near base. Elytra large, nearly equal in length to head and prothorax, nearly twice as broad at their widest, shoulders well marked, and sides rounded, with two basal foveae. Abdomen shorter than elytra, attenuate and rounded at apex, punctuation slightly stronger than on the elytra. Metasternum concave. Ventral surface of abdomen entirely excavate in middle, with margins feebly carinate. Femora broad. Anterior and intermediate tibiae narrower at base, and incrassate from before middle to apex; posterior tibiae incrassate to apex after middle. Tarsi with three joints: 1 short, 2 and 3 much longer and about equal, with single claw. Length, 1.30 mm.

♀. Head smaller and eyes less prominent; last joint of antennae (see fig. 1b) a very little smaller, but the same shape as in ♂, the under surface not concave, simply flattened, the upper surface convex; and the ventral surface of abdomen transversely excavate at base. Length, 1.30 mm.

Hab.: SARAWAK, Mt. Matang, alt. 2,000 feet (28.i.14, found under bark, with ants).

This species is evidently allied to *C. sylvestris* Raffr., from New Guinea. It belongs to Group I, as the ♂ has the apical joint of the antennae strongly concave on the underside.

Cyathiger mirandus sp. n. (Plate XX, figs. 2, 2a, ♂; 2b, ♀.)

♂. Oval, attenuate in front, convex, reddish-brown, strongly and confluent punctured, with fine golden pubescence. Head a little longer than broad, with sides rounded behind eyes, frontal tubercule prominent, almost bilobed in front, shortly sulcate in centre; eyes placed at about middle. Prothorax a little longer than head, about as long as broad, widest just before middle, attenuate and rounded in front, sides slightly oblique to base. Elytra longer than prothorax, a little broader than long, sub-quadrate, widest just before apex, slightly impressed at base near shoulders, the latter rounded. Abdomen a little shorter than elytra, rounded and attenuate to apex. Metasternum transverse and concave, with a blunt tooth at sides. Ventral surface

of abdomen with large excavation, margined at sides with obtuse tubercules, Femora stout. Anterior and intermediate tibiae incrassate from middle to apex; posterior tibiae bent outwards and incrassate to apex. Tarsi with joints 2 and 3 about equal in length, with single claw. Antennae with 7 joints: 1 large, longer than broad; 2—6 transverse and equal; 7 very large, above about as broad as long, with sides from base to middle about parallel, thence rounded to apex, with apex slightly acuminate, and covered with short pubescence; lower surface of 7 (see fig. 2a) deeply excavate and nitid within, the outer lateral margin obtusely angled at base, and with fringe of long pubescence from middle to apex, rounded at tip, the inner lateral margin dentate in middle, thence rounded to insertion of 6th joint. Maxillary palpi with last joint short and oval. Length, 1.60 mm.

♀. Slightly smaller; last joint of antennae (see fig. 2b), not excavate, sub-trapezoidal, base emarginate, anterior margin longer than basal, and rounded; eyes smaller, less conspicuous; elytra shorter, more attenuate at base; and ventral surface of abdomen transversely excavate at base. Length, 1.50 mm.

Hab.: SARAWAK, Mt. Merinjak, alt. 600 feet (24.v.14, 2 ♂♂, 1 ♀, found by sifting dead leaves in jungle).

This species belongs to Group IV. The excavation of the apical joint of antenna of the ♂ is less transverse and very different in shape from that of any of the other species, and the excavation is very deep.

Cyathiger dispar sp. n. (Plate XX, figs. 5, 5a, ♂; 5b, ♀.)

♂. Ovate, attenuate in front, convex, finely and confluent punctured, ferruginous, with short, pale pubescence; tarsi and palpi testaceous. Head about as broad as long, with sides rounded at base, slightly attenuate in front, frontal tubercle prominent, and strongly sulcate in middle, almost bilobed in front; eyes placed at about middle, not very prominent. Antennae with 7 joints: 1 large, narrowing to base, outer margin slightly rounded to apex; 2, 3, and 4 transverse; 5 and 6 narrower, not so transverse; 7 very large, transverse, sub-reniform, acuminate at apex, its upper surface covered with rather long pale pubescence; lower surface of 7 (see fig. 5a) with deep excavation, the apical margin oblique, dentate in middle and rounded to base, the outer lateral margin of excavation dentate at base, and furnished with rather long pubescence internally, and rounded at apex. Maxillary palpi with last joint short and somewhat oval. Prothorax about as broad as long, a little longer than head, rounded at sides, widest about middle, sides slightly sinuate about middle. Elytra sub-quadrate, longer than prothorax, attenuate and rounded at shoulders, with a basal depression and obsolete sulcate. Abdomen a little shorter than elytra, attenuate to apex. Metasternum transverse and concave; at each side, above posterior coxae, a blunt tooth. Ventral surface of abdomen entirely excavate in middle, margined on each side of excavation with small obtuse tubercules, and at base of excavation with two deeper round excavations. Femora broad and punctured. Tibiae narrower at base; anterior and intermediate pairs incrassate from middle to apex, posterior pair bent outwards from middle to apex. Length, 1.20 mm.

♀. Last joint of antennae (see fig. 5*b*) strongly transverse, inner margin rounded, anterior margin slightly curved, basal margin emarginate at the insertion of the 6th joint, and attenuate outwardly; elytra shorter, more attenuate at base; ventral surface of abdomen transversely excavate at base. Length, 1.20 mm.

Hab.: SARAWAK, Mt. Matang (8.xii.13, 3 ♂♂, 7 ♀♀, found by sifting dead leaves in jungle).

Belongs to Group IV, and evidently allied to *C. borneensis* Raffr. The excavation of the last antennal joint in the ♂ is somewhat similar, but the shape of the joint itself is very different, and it is a smaller insect. The ♀ has the last joint of antennae shaped very much as in *C. impar* Raffr., and more transverse than usual.

Cyathiger elongatus sp. n. (Plate XX, figs. 4, 4*a*, ♂; 4*b*, ♀.)

♂. Elongate-ovate, convex, ferruginous, sub-opaque, rather strongly and confluent punctured, with short, pale pubescence; tarsi and palpi testaceous. Head about as long as broad, attenuate in front, and rounded at base; frontal tubercle prominent, nearly bilobed, shortly sulcate in centre; eyes placed at about middle and rather prominent. Antennae with 7 joints: 1 large, longer than broad, with outer margin slightly rounded from base to apex; 2 transverse, narrower than 1; 3 more transverse, as wide as 1; 4, 5, 6 transverse, about equal to 2; 7 very large, irregularly sub-orbicular, convex above, coriaceous, with short, pale pubescence; lower surface of 7 (see fig. 4*a*) largely, but not very deeply, excavate, nitid within, the external lateral margin of excavation dentate in middle, the inner lateral margin entire, rounded, the basal margin emarginate. Maxillary palpi with last joint short and somewhat fusiform. Prothorax longer than head, a little longer than broad, with sides rounded. Elytra longer and broader than prothorax, about as long as broad, slightly attenuate anteriorly, impressed at base near shoulders, the latter well marked. Abdomen nearly one-half shorter than elytra, attenuate to apex. Metasternum concave in middle and transverse; on each side a large blunt tooth. Ventral surface of abdomen deeply and entirely excavate in middle, the excavation bounded on each side by a ridge of small obtuse tubercles. Femora broad and strongly punctured. Tibiae with outer margin incrassate from middle to apex. Length, 1.20 mm.

♀. Eyes less prominent; last joint of antennae (see fig. 4*b*) smaller, slightly transverse, with long, pale pubescence, and joints 2—6 about equally transverse; elytra shorter, about equal to abdomen in length; metasternum concave in middle, and with a large, slightly curved tooth on each side; ventral surface of abdomen deeply and transversely excavate at base. Length, 1.20 mm.

Hab.: SARAWAK, Mt. Matang, alt. 1,000 feet (16.xii.13—1.ii.14, 6 ♂♂, 12 ♀♀, found by sifting dead leaves in jungle).

Belongs to Group IV. This species is somewhat allied to *C. viduus* Raffr., in Group V, in the character of the apical joint of

the antenna of the ♂ having the excavation very open and occupying nearly the whole surface of the underside, and not very deep.

Cyathiger matungensis sp. n. (Plate XX, figs. 3, 3a, ♂; 3b, ♀).

♂. Oblong-ovate, convex, castaneous, finely and confluent punctured, with short, pale pubescence. Head a little longer than broad, convex, with sides rounded to base, attenuate in front, frontal tubercle slightly rounded and shortly sulcate in middle; eyes situate a little before middle, rather large. Antennae with 7 joints: 1 large, longer than broad; 2 and 3 transverse; 3 wider than 2, being produced inwards; 4—6 transverse, each about equal to 2; 7 very large, transverse and irregularly semi-orbicular; lower surface of 7 (see fig. 3a) with a very deep, transverse excavation, the apical margin of excavation nearly straight, the basal margin emarginate, the lateral margins sub-parallel. Maxillary palpi with last joint fusiform. Prothorax about as long as head, widest before middle; the sides very slightly sinuate towards base, and rounded in front. Elytra sub-quadrate, nearly twice as long as prothorax, rounded at sides towards base, with a rather strong basal depression near the shoulders, the latter well marked. Abdomen about half as long as elytra, depressed at base, attenuate to apex. Metasternum transverse, depressed in middle. Ventral surface of abdomen with large excavation, the sides of the excavation rugosely carinate. Femora rather broad; tibiae narrowed at base, and incrassate from middle to apex; posterior pair bent outwards from middle to apex. Length, 1.50 mm.

♀. Slightly smaller; eyes not so prominent; 3rd joint of antennae not produced inwards, apical joint (see fig. 3b) smaller, without excavation, transverse, securiform, with base emarginate; elytra shorter; ventral surface of abdomen transversely excavate at base.

Hab.: SARAWAK, Mt. Matang, alt. 1,000 feet (3.xii.13, found by sifting dead leaves in jungle).

Belongs to Group V. This species is closely allied to *C. cribratus* Raffr., from Penang (of which I took 1 ♂ and 4 ♀ ♀ at the same locality); but it differs in the ♂ having the 3rd joint of antennae produced inwards, and the apical joint larger and more transverse, the latter with the apical margin of the excavation straighter, and the sides differently shaped, and the base of the elytra not bifoveate.

Cyathiger sarawakensis sp. n. (Plate XX, fig. 6, ♂.)

♂. Ovate, attenuate in front, convex, castaneo-piceous, opaque, covered with round, shallow, confluent punctures, with short, golden pubescence; palpi and tarsi flavous. Head about as broad as long, widest behind eyes, which are placed at about middle; attenuate and sub-quadrate in front, sides rounded at base, frontal tubercle shortly sulcate. Antennae with ten joints: 1 longer than broad, narrowed at base, outer margin with apex acute; 2 much shorter than 1, transverse; 3, 4, 5 shorter, narrower than 2, transverse, equal to

each other and rather compact; 6, 7, 8 each about equal to 2; 9 narrower than 8; 10 very large, transverse, without excavation on under side, with 9th joint inserted near outer margin, the latter slightly rounded, the apical and basal margins meeting in a point within. Maxillary palpi with last joint oblong, sub-fusiform, rounded at apex. Prothorax gibbous, a little longer and wider than head, slightly broader than long, widest about middle, attenuate in front, with sides feebly sinuate posteriorly, a small fovea in centre near base. Elytra sub-quadrate, attenuate, and slightly rounded to base; nearly twice as long as prothorax, with two basal foveae. Abdomen much shorter than elytra, gibbous, attenuate to apex, punctuation a little stronger than on the elytra. Metasternum transverse, concave, with a blunt tooth on each side. Ventral surface of abdomen deeply excavate, the margins of excavation sub-serrato-carinate. Femora stout, narrowing to base; anterior and intermediate pairs irregularly dentate; posterior pair bidentate towards base. Tibiae broadening from about middle to apex. Tarsi with three joints: 1 very short, 2 and 3 about equal in length, with single claw. Length, 1.90 mm.

Hab.: SARAWAK, Quop (13.iii.14, 1 ♂, found by sifting dead leaves in low-lying jungle).

The species can be placed in Group VII, near *C. bironis* Raffr., from New Guinea, which was the first described member of the genus with 10-jointed antennae. *C. sarawakensis* is a larger insect, and can be distinguished by the dentate femora. Superficially, it is very like a large ♀ example of *C. impar* Raffr.

Cyathiger bulbifer sp. n. (Plate XX, fig. 7, ♂.)

♂. Globose, attenuate in front, castaneous, finely and confluent punctured, with short pubescence. Head a little longer than broad, slightly rounded behind to base, attenuate in front, feebly sulcate in centre; eyes placed at about middle. Antennae with ten joints: 1 large, about as broad as long, widest at apex; 2 transverse, narrower than 1; 3, 4, 5 transverse and compact; 6, 7, 8 transverse, each gradually wider, 9 narrower; 10 very large, transverse, outer margin rounded, apical margin slightly curved, and meeting basal margin in a point. Maxillary palpi with last joint large and rather oblong, rounded at apex. Prothorax very little longer than head, as broad as long, with sides rounded. Elytra large, nearly twice as long, and at their widest twice as broad, as prothorax; rounded at sides posteriorly, with a depression at base near shoulders. Abdomen very short, attenuate, and rounded at apex, with the punctuation a little stronger than on prothorax. Ventral surface of abdomen with large excavation. Femora stout, strongly punctured. Tibiae broadest a little beyond middle; posterior pair widening and bent outwards in apical half. Tarsi with three joints: 1 very short, 2 and 3 about equal in length. Length, 1 mm.

Hab.: SARAWAK, Mt. Matang, alt. 1,000 feet (23.i.14, 1 ♂, found by sifting dead leaves in jungle).

This species and the following belong to Group VII, on account of the 10-jointed antennae; they are more globose and smaller than *C. bironis* and *C. sarawakensis*. Unfortunately both are unique.

Cyathiger raffrayi sp. n. (Plate XX, fig. 8, ♂.)

♂. Sub-globose, attenuate in front, convex, rufo-castaneous, finely and confluent punctured, rather nitid, with very short pubescence. Head a little longer than broad, sides behind eyes rounded to base, attenuate in front; frontal tubercle rounded, shortly sulcate; eyes large, situate at about middle. Antennae with ten joints: 1 large, 2 transverse, 3, 4, 5 transverse and compact, 6, 7, 8 transverse, each gradually broader, 9 narrower, 10 large, transverse, with ninth inserted near the outer margin, the apical and basal margins meeting in a point within. Maxillary palpi with last joint large, almost oblong, rounded at apex. Prothorax a little broader than long, with sides rounded, attenuate in front. Elytra large, about as broad as long, slightly attenuate and rounded at base, with two basal foveae. Abdomen half as long as elytra, attenuate to apex. Femora stout, tibiae incrassate from about middle to apex. Length, 1 mm.

Hab.: PENANG, alt. 2,000 feet (4. xi. 13, 1 ♂, by sifting leaves in jungle).

Belongs to Group VII. Allied to *C. bulbifer*, but differs in the shape of the head, the less globose form, the larger eyes, and the more attenuate abdomen. I have much pleasure in dedicating this species to Mons. A. Raffray, to whom we are indebted for so much fine work on the Pselaphidae.

Cyathiger malayanus sp. n. (Plate XX, fig. 9, ♂.)

♂. Sub-ovate, attenuate in front, convex, ferruginous, very finely and confluent punctured, with rather dense pubescence. Head a little broader than long, attenuate in front and truncate, with sides behind eyes rounded to base; eyes placed at about middle, rather prominent. Prothorax a little broader than long, slightly longer than head, widest a little before middle, with sides rounded, and mesially sinuate; a small fovea in centre near base. Elytra twice as wide as prothorax, and nearly twice as long, rounded at shoulders, three basal foveae present; depressed at suture, and shortly sulcate. Abdomen shorter than elytra, with sides rounded to apex, feebly margined near base. Metasternum transverse and concave in middle, with a blunt tooth on each side projecting over the coxae. Ventral surface of abdomen entirely excavate in middle with the margins of excavation rugosely carinate. Femora stout. Tibiae incrassate from middle to apex. Antennae with ten joints, about as long as head and prothorax combined: 1 quadrate, 2 transverse, 3, 4, 5 transverse and very compact, 6-9 transverse, each about equal to 2, 10 large, strongly transverse, with the ninth joint inserted near outer margin, acuminate within. Maxillary palpi with last joint short, oval. Length, 1.30 mm.

Hab.: PENANG, alt. 2,000 feet (11.x.13, 3 ♂♂, found by sifting dead leaves in jungle).

Belongs to Group VII. This species differs from the others with 10-jointed antennae in having the head more transverse, the last joint of the maxillary palpi short and oval, and three foveae present at the base of the elytra.

After the Plate for this paper was finished, it occurred to me that *C. malayanus* may possibly prove to be the ♂ of *C. sericeus* Raffr., from Penang (Rev. d'Ent. XIV, p. 57, 1895) ; but *C. sericeus* has only 7 joints to the antennae. Raffray placed it provisionally in Group VI, next to *C. similis* Raffr., from Sumatra, in which the antennae are similarly formed in the two sexes. I have tried to correspond with Mons. Raffray about this matter, but have been unable to get any reply, probably owing to the war. If this Penang insect should prove to be the ♂ of *C. sericeus*, it will be most interesting, as up to now no ♀ ♀ are known for these forms with 10-jointed antennae.

EXPLANATION OF PLATE XX.

Fig. 1.—*Cyathiger myrmecophilus* sp. n. ;

1a, ♂, apical joint of antenna viewed from below ; 1b, ♀, apical joint of antenna.

Fig. 2.—*Cyathiger mirandus* sp. n. ;

2a, ♂, apical joint of antenna viewed from below ; 2b, ♀, apical joint of antenna.

Fig. 3.—*Cyathiger matangensis* sp. n. ;

3a, ♂, apical joint of antenna viewed from below ; 3b, ♀, apical joint of antenna.

Fig. 4.—*Cyathiger elongatus* sp. n. ;

4a, ♂, apical joint of antenna viewed from below ; 4b, ♀, apical joint of antenna

Fig. 5.—*Cyathiger dispar* sp. n. ;

5a, ♂, apical joint of antenna viewed from below ; 5b, ♀, apical joint of antenna

Fig. 6.—*Cyathiger sarawakensis* sp. n. ♂.

Fig. 7.—*Cyathiger bulbifer* sp. n. ♂.

Fig. 8.—*Cyathiger raffrayi* sp. n. ♂.

Fig. 9.—*Cyathiger malayanus* sp. n. ♂.

Esher :

August 3rd, 1915.

OBSERVATIONS ON SOME OF THE CAUSES DETERMINING THE
SURVIVAL AND EXTINCTION OF INSECTS,
WITH SPECIAL REFERENCE TO THE *COLEOPTERA*.

BY GEO. B. WALSH, B.Sc.

(Concluded from page 232).

V. THE TYNE AND WEAR AREA.

This district differs from the other two that I have mentioned in that it possesses local lists of *Coleoptera*, *Hemiptera*, etc., which are of some age, but unfortunately the industrialism of the two counties dates back to so remote a period (coal is said to have been first worked near Newcastle about 1300 A.D.) that it is probable they represent a state of affairs not widely different from those existing at the present time, except in the extent of land built on. In the part between Newcastle and Gateshead and the sea the riverside is flanked by town after town, with a semi-rural area behind them also thickly dotted with villages, largely in connection with collieries, and cut up in all directions by roads. The country is largely low fell land, covered with rough grass and mainly under pasture. Probably at no time have there been many trees on the fells, though the numerous valleys cut by the streams through the overlying clay were at one time thickly wooded with willows, alders, birches, etc., and even now contain the best-timbered parts of the district. A number of years ago the chemical industry was much more important on Tyneside than it is to-day, more particularly near Jarrow, and, before the adoption of more scientific methods of working, great quantities of injurious gases, especially of hydrogen chloride and chlorine, were allowed to escape into the air. These must have done great damage both to vegetation and to animal life, especially in the neighbourhood of this town—indeed, local tradition of no very great age asserts that the cattle died in the fields through eating the poisoned herbage. The objectionable chemical works have now, however, almost all vanished, and except for occasional faint chlorine smells, injurious fumes are a thing of the past. Consequently, fields are once more clothed with herbage, and insect life is common. Still, there is no doubt that when the nuisance was at its worst, insects must have suffered as did the higher forms of life; but since that time there has probably been a certain amount of repopulation, so that now phytophagous insects of common species can be found quite close to Jarrow, e.g., *Hadena pisi* L., *Rumia crataegata* L., *Heptalus lupulinus* L.; *Paraphaedon tumidulus* Germ., *Phyllobius pomonae* Ol., *Apion*

humile Germ., *A. violaceum* Kirby, etc. There are, however, a number of species occurring with us whose presence is somewhat difficult to explain on the score of repopulation during recent years; e.g., apterous and sub-apterous species, such as *Cychnus rostratus* L., which has occurred within a hundred yards of my house; *Pterostichus cristatus* Duft., which is even abundant in one or two places near Jarrow, and occurs almost as freely under cinders and bits of cold slag as under logs in a wood; and *Cheimatobia brumata* L., whose larvae are found on every bush that fumes and farmers have left to us. There seems little reason to doubt that these retained their hold on the district even during the days when acid fumes were drenching the soil; and this is more easily credible when one sees the conditions under which *Coleoptera* and even *Lepidoptera* exist in the inferno of the furnace region of Tees-side. Another interesting species which has occurred in Jarrow is *Ancistronycha abdominalis* F., of which a single specimen was picked up near my house in the early morning of May 24th, 1912. The nearest record given by Bold for this insect is the Derwent Valley, which is separated from us by two ridges of uplands, 700 and 500 feet high respectively, with a very deep valley in between. It is rather hard to believe that the insect could cover twelve miles of such difficult country; it is just possible that it may have come from the Wear Valley seven miles away, but Mr. Bagnall has no record of its occurrence there. Assuming, then, that it is an insect of local origin, this species also must presumably have survived under conditions which are generally regarded as very inimical to insect life. Water insects do not seem to have suffered to any great extent, probably because most of our streams are very rapid, and even in ponds the affected water would in time sink into the earth or be neutralised by chemical action with the soil, so that the contaminated water would never have an opportunity of becoming so strong as to destroy life. Hence we get in numbers *Brychius elevatus* Panz., *Hydroporus rivalis* Gyll., *H. darvsi* Curt., *Haliphus obliquus* F., *Dytiscus marginalis* L., *D. punctulatus* F., *Gyrinus natator* Scop., *Elmis aeneus* Müll., etc.

As regards coalpits, the balance of evidence seems to show that their *direct* effect upon the neighbouring insect fauna is almost negligible. Despite the growth of the coal industry and the opening out of new pits, many of them extremely close to, or even touching, our best collecting grounds, practically all the beetles given by Hardy and Bold in their list of the *Coleoptera* of Northumberland and Durham still occur in their original haunts, allowance, of course, being made for the

fact that certain localities have been destroyed by the builder, and that some of their species, e.g., *Tachys quadrisignatus* Duft., were undoubtedly foreign insects introduced in soil ballast and deposited on our river banks. For example, *Agabus uliginosus* L. occurs in the pit pond of Boldon Colliery; *Apion pallipes* Kirby, of which only three specimens were recorded by Bold, occurred to me in great numbers in Ravensworth Woods on October 17th, 1914; and in another part of the same woods, *Thymalus limbatus* F. was taken on February 28th, 1914, two living specimens being found in a *Polyporus* on a birch trunk, and several bred from larvae within it (Hardy records only one specimen from the same wood); *Stenostola ferrea* Schr., too, still occurs in Gibside Woods in small numbers.⁽¹⁾ Among the *Lepidoptera* three Fritillaries (*Argynnis aglaia* L., *A. euphrosyne* L., and *A. selene* Schiff.) are still very common not far from Gateshead,⁽²⁾ though during the last fifty years there has been apparently almost complete extinction of the Peacock Butterfly (*Vanessa io* L.). (Quite a number of butterflies disappeared, from some unexplained reason, from the two counties about the year 1863).⁽³⁾ It may here be mentioned that the Small Blue (*Polyommatus alsus* F.) and the Durham Argus (*P. aegestis* var. *salmacis* Steph.) have also both disappeared from a number of their haunts, although in this case there is no doubt that their destruction has been due to close cropping and to sheep.⁽⁴⁾

On the other hand, although the direct effect of coal-pits is probably small, their indirect effects are undoubtedly much more important. Near a pit village the most favoured haunts of insects are, of course, the haunts most beloved of humans, both children and adults. This is perfectly natural and in a measure praiseworthy, but the naturalist cannot but deplore the destruction of insect life which it entails; in this way, unfortunately, it seems probable that, owing to the opening of new coalpits on the Durham coast at Horden and Hesleden, the prolific collecting grounds at Castle Eden Dene and Black Hall Rocks will soon possess only a tithe of their former (and even present) riches. Landowners have so far met the difficulty by strict enclosure of their property, and this, though perhaps in a measure selfish, has certainly prevented a large amount of destruction of insect life in the district. If, however, land, and especially woodland, has then been utilised as a game preserve in addition, insect life has again

(1) *vide* Mr. R. S. Bagnall.

(2) Nat. Hist. Trans. of Northumberland and Durham, Vol. XV, p. 256.

(3) *l.c.* Vol. XII, p. 21.

(4) *l.c.* Vol. XII, pp. 11 and 13.

suffered in certain directions by serving as a source of food to pheasants, etc. ; for example, the gamekeeper at Ravensworth has pointed out to me the almost complete absence of ants in the woodlands there, these serving as food to game ; just as lately, Mr. Spiller has recorded the disappearance of *Argyannis adippe* L. from one spot in the Chilterns⁽¹⁾ ; on the other hand, this destruction of ants may actually lead to the preservation of other species, as there is no doubt that foraging ants cause the destruction of enormous quantities of insect life, especially in the larval stage.⁽²⁾

As regards the last cause which is often brought forward for the local disappearance of a species—that is over-collecting—it probably applies only to the *Lepidoptera*, and naturalists in the north are not so numerous that they have done very much harm here. Among the other orders, the insects are usually so difficult to find or to catch and collectors are so few and far between that insect life is not affected in the least. The only northern example I have come across is a statement on good authority that *Dytiscus marginalis* L. vanished from the neighbourhood of a certain northern town (not Newcastle), owing to the necessities of biological study.

CONCLUSION.

To sum up, then, it seems probable that the most potent *human* causes in the destruction of animal life are building operations, close grazing, clean agriculture and forestry, destruction of woodlands, heaths, commons, etc., and destruction of plant life by smoke, dust, and fumes ; the most potent human factor in its preservation is the establishment of preserves where conditions are like those of *primaeval* nature ; and then, besides this, there is apparently some power of adaptation of at least certain species of insect life which enables them to survive under most unnatural conditions.

In conclusion, may I point out that if we desire to gain any real insight into the sometimes obscure causes which determine the extinction or unusual abundance of insect species, it is necessary to make a systematic survey of the species of a given restricted area, say of a vice-county or even of a smaller district. This survey should embrace a list of as many orders as possible with their relative numbers each year, so as to show the relation, if any, between the abundance of one species and the scarcity of another ; it should also contain an account

(1) H. Rowland-Brown, "Butterflies of the Bucks. Chilterns," *Entomologist*, 1915, p. 120.

(2) *cf.* G. B. Oliver on *Araschnia levana*, *Entomologist*, 1915, p. 63.

of the weather experienced during the seasons in question, together with any agricultural changes which have taken place, such as afforestation, cutting of timber, change of crops, cleaner or dirtier farming and forestry, opening of new industries, etc. In certain districts, owing to the conversion of what has been a purely agricultural area into a colliery district, *e.g.*, Doncaster, Kent, and perhaps, shortly, Selby, there is an excellent opportunity to test the effect of smoke and dust on plant and insect life hitherto unaccustomed to it; here much good work has been done under the original conditions, to quote only cases within my own personal knowledge, by Dr. Fordham at Bubwith, near Selby, and Dr. Corbett, at Doncaster, but the scheme is too wide for one man and should be taken up in co-operation by as many workers as possible, and here great assistance can be given by the Field Clubs which are doing so much good local work throughout the country.

166, Bede Burn Road,
 Jarrow-on-Tyne:
June 10th, 1915.

PRELIMINARY NOTES ON BRITISH *CAMPODEIDAE* (*THYSANURA*),
 AND A PLEA FOR MATERIAL.

BY RICHARD S. BAGNALL, F.L.S.

For long Zoologists were content to regard *Scutigera immaculata* to be our only representative of the *Symphyla*, and, in the same way, *Campodea staphylinus* occupied that position in the *Campodeidae*.

We now know 14 different species of *Symphyla*, and in working at that group I became convinced that *Campodea* would similarly repay study. This has proved true, and in 1912 Silvestri* published an account of some European species, 15 in all, of which 12 (with three sub-species) are referred to the genus *Campodea*, and three to *Plusiocampa* Silv. Of these, *C. lubbocki* Silv. and *C. lankesteri* were described from British examples only, the former from Berkhamsted (Collinge) and Oxford (R.S.B.) and the latter from Berkhamsted (Collinge).

From the few specimens collected casually by myself I have identified the following, of which *C. fragilis*, *C. giardi*, and *Plusiocampa* sp. are additions to our known fauna:—

* Boll. Lab. Zool. Agr. Portici, VI, pp. 110-147.

Campodea staphylinus Westwood. Evidently widely distributed.

Campodea lubbocki Silvestri. Oxford, Newcastle, Gibside, and Fencehouses.

Campodea lankesteri Silvestri. London, Oxford, and Gibside.

Campodea giardi Silvestri. Typical examples from Gibside. I have specimens from Gibside and Lambton probably referable to a form of this species; the last two joints of the cercus are very long, probably representing the last four joints, reduced in number (and thereby lengthened) by fusion.

Campodea fragilis Meinert. Hartley (Northumberland) and Whitburn (Durham), both seaside localities.

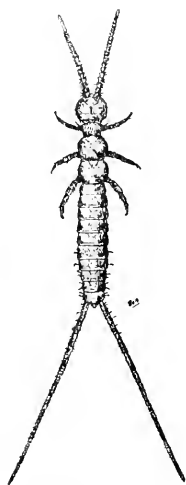
Plusiocampa sp. I took a species of *Plusiocampa* in a Dene near Fencehouses, in 1913; I do not know whether I still possess the specimens, but anticipate no difficulty in re-discovering it.

* * * *

The student of *Symphyla* will find much in common should he turn his attention to these insects; in fact, taxonomically, both groups may be regarded as studies of chaetotaxy *in excelsis*. *Campodea* may be easily recognised by the pair of long jointed "bristles" or cerci at the end of the abdomen, which are usually longer than the antennae and sometimes longer than the body.

The species of this group may be found under stones embedded in more or less loose earth, and are much more often seen than members of the *Symphyla*, usually affecting looser and drier material, such as dead leaves, decaying wood, peaty and loamy soils, ants' nests, etc. They are widely spread also, and exist from our shores to the heights of our mountains.

Dr. Sharp, in the Cambridge Natural History, Vol. V, p. 183, says:—"The creature itself is but little known even to entomologists, although it is one of the commonest of insects over a large part of Europe. It is numerous in the gardens and fields about London and Cambridge, and abounds in damp decaying wood in the New Forest; if there be only one species, it must possess an extraordinary capacity for adapting itself to extremes of climate, as we have found it at mid-summer near the shores of the Mediterranean in company with the sub-tropical white ants, and within a day or two



Campodea lubbocki
Silvestri. × 8.

of the same time noticed it to be abundant on the actual summit of Mount Canigou, one of the higher Pyrenees, where the conditions were almost arctic, and it was nearly the only insect to be found."

I now solicit material from all parts of the British Isles, and from as varied a habitat as possible, *e.g.*, from the base of cliffs around our coasts; from moors and the tops of mountains; from damp situations, from exceptionally dry places, from under stones in rich soil and gardens, and from greenhouses, moles' and ants' nests, etc. They should be collected into tubes of say 50 to 60 % alcohol, and as the cerci break off very readily the tube should not be allowed to be only partly full of liquid, thus causing the contents to be knocked about, but *quite* full, and, though extravagant, this is important, *please put one insect in one tube.*

I append my address, and shall be pleased to identify and report upon collections as early as circumstances permit, and to give any advice or suggestions.

Penshaw Lodge,
Penshaw, Co. Durham:
July 28th, 1915.

A SECOND BRITISH SPECIES OF *PLASTOSCIARA*.

BY F. W. EDWARDS, B.A., F.E.S.

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In a recent number of this periodical (May, 1915) I described, under the name *Plastosciara pernitida*, a fly new to science, the first of its genus to be found in this country. Hardly had this description appeared in print when I received from Mous. D. Keilin, of the Quick Laboratory, Cambridge, specimens of another British representative of the same genus, which also proves to be new to science. It differs from its congeners in size, coloration, and in the structure of the male forceps, and may be described in the following terms:—

PLASTOSCIARA KEILINI, *sp. n.*

Head black. *Antennae* alike in both sexes, not quite twice as long as the thorax; first joint of flagellum about half as long again as broad, next four joints about as broad as long, remaining joints about one-sixth longer than broad, except the last joint, which is about the same length as the first; hairs uniformly distributed, not quite so long as the width of the joints. *Palpi* short,

yellowish, two-jointed in both sexes. *Thorax* rather dark brownish, with a slight reddish tinge; membrane between mesonotum and pleurae whitish. Mesonotum with two longitudinal lines of hair, scutellum with eight or nine bristly hairs round its margin. *Abdomen* long and cylindrical in the female, shorter in the male, brownish with the membranous areas whitish; male hypopygium rather broad, its claspers large, thick, nearly cylindrical, and a little less than twice as long as broad, truncate at the tip, with one large spine at the inner apical angle. *Legs* uniformly brownish; tarsi of front and middle legs slightly longer, those of the hind legs as long as the tibiae; no combs of spines or bristles at tips of tibiae. *Wings* with a very slight brownish tinge, fully developed in both sexes, but a little shorter in the male. R_1 reaching costa considerably before the fork of M ; R_s arising about the middle of R_1 , but its basal section (the "cross-vein") is indistinct; tip of M_3 noticeably nearer the apex of the wing than that of R_s ; S_c nearly half as long as R_1 ; costa extending five-sixths of the distance from tip of R_s to tip of M_{1+2} ; no bristles on M or C_u . *Halteres* brownish yellow.

Length: ♂ body, 2 mm., ♂ wing, 1.6 mm. ♀ body, 2.7–3 mm., ♀ wing, 2.3–2.5 mm.

Type presented to the British Museum by Mons. Keilin.

Mr. W. R. Thompson found the larva of this species in large numbers in rotten wood, at Barton Mills, Cambs., on April 20th of this year. In Mons. Keilin's keeping, they pupated about May 1st, and adults hatched on May 6th and 7th; on May 8th all the females had laid fertile eggs, and they died on that day, the males surviving three days longer.

He is describing the larva in his forthcoming work. It is of special interest, he informs me, in possessing a pair of mandibular glands, which are atrophied in nearly all *Diptera*.

August 3rd, 1915.

The tarsi of Homalota (Meotica) exilis Er.—In confirmation of Dr. Sharp's statement in the July number of the Ent. Mo. Mag., that the anterior tarsi of this species are 5-jointed, I may say that in 1908 I made the same discovery, and to make the matter more certain asked my friend Mr. J. H. Keys to prepare some microscopic slides of the tarsi mounted in balsam; these were quite conclusive. I had shortly before this received from Mr. de la Garde a small narrow form which I thought might be specifically distinct from *exilis*, but Capt. Deville, to whom I sent the specimens, returned them as a small narrow form of the latter.—E. A. NEWBERRY, 13, Oppidans Road, N.W.: July 17th, 1915.

Psylliodes cyanoptera Ill., in Huntingdonshire.—Last year Mr. W. Holland, while collecting in Hunts for the Hon. N. Charles Rothschild, came across this Halticid and obtained a few specimens, mostly immature. This year Mr. Rothschild kindly promised to look for the species for me, and, after one or two unsuccessful attempts, he found the beetle just at the end of June: it occurs on *Sisymbrium sophia* (Flix Weed or Pine-leaved Hedge Mustard), a plant which is somewhat scarce, but very widely distributed in England, Scotland, and Ireland. The insect is extremely rare in Britain: in fact until last year I had not seen a British specimen. Stephens records it as "taken near London, in Suffolk, and about Bristol."* Typical specimens have the head and thorax clear red, but I have several specimens with the thorax dark, though reddish, and the head somewhat obscurely red.—W. W. FOWLER, Earley Vicarage, Reading: August 16th, 1915.

Triarthron maerkeli Schmidt, in Cumberland.—At the end of June and the beginning of July, 1913, I came across this beetle in a small pine copse on the banks of the Esk, in Eskdale, Cumberland. My son and I found about eighty specimens during our stay, although it was never plentiful on any one evening. This year I have tried to find it in the same locality, but, perhaps owing to the wet and cold evenings, have failed to do so. The species is not uncommon near Wellington College, Berks., but the weather must be exactly right (a warm evening, just after sunset, with the dew beginning to settle), or it will not put in an appearance.—W. W. FOWLER: August 16th, 1915.

Coleoptera, &c., in the Salisbury district.—During the fourteen weeks or so that I have been under canvas at Ludgershall, the following *Coleoptera* have come under my notice. Of course, my time has been very limited, and I have done practically nothing except on Saturday afternoons and Sundays, and then only when I have been unable to get away on leave. Among the *Geodephaga* the best species is a single example of *Lebia cyanocephala* found running over an oak stump, several *Pterostichus versicolor* running about in the lines, and *Amaras* of various species, which frequently came into the tents.

Water-beetles I have not worked for, but I heard of a *Dytiscus* in a horse-trough, and took a series of *Hydroporus marginatus* in a sheep-pond.

Staphylinus latebricola was an interesting capture. I got six specimens altogether, all of which were on the wing.

The early weeks were too dry for moss, bark, and fungi, but I got odd specimens of *Cyrtotriplax bipustulata*, *Neuraphes angulatus*, *Agathidium rotundatum*, *A. atrum*, and *Aspidophorus orbiculatus*, while *Ditoma crenata* and *Scaphidium 4-maculatum* were frequently met with. Two *Heptaulacus villosus* were taken crawling over the bare ground near the camp, where *Homaloptia ruricola* was very common for a few days; many flew into the trenches and were then unable to get out; the black form also was not rare. *Elater elongatulus* (2), *Molorchus minor* (1), *Strangalia 4-fasciata* (2), were all worth picking up. *Strangalia melanura* was in profusion at wood-spurge blossom, and I also saw

* Mr. A. J. Chitty has met with it at Wicken Fen.—G.C.C.

one *Cryptocephalus sexpunctatus* at the same flower. *Tomozia biguttata* was quite a good find. I do not think I found a single specimen on flowers, but all running over an old stump; but both *Mordella fasciata* and *M. aculeata* were about in flowers of various kinds. I also found *Platypus cylindrus* on the same stump as the *Tomozia*.

Last Sunday I saw a very fine ♂ *Apatura iris*; it settled in the road quite close to me. I also netted a *Limenitis sibylla*, *Argynnis adippe* and *A. paphia* are fairly common, and earlier, *Brenthis*, *A. euphrosyne* and *selene*, *Nemeobius lucina*, *Callophrys rubi*, *Nisoniades tages*, *Hesperia malvae*, and *Parasemia plantaginis* were all fairly common.—P. H. HARWOOD, 15th Platoon, 10th Royal Fusiliers, Ludgershall, Wilts: *July 20th*, 1915.

The food-plant of Philopedon geminatus F.—In view of the recent communications to this Magazine respecting the food-plant of *Philopedon geminatus*, it may be of interest to note that on April 27th, 1914, I found a ♀ actually eating a blade of ordinary grass, at Compton Heath, near Guildford. The place at which the insect was found could not by any means be called sandy, but a more or less sandy common is near.—MICHAEL G. L. PERKINS, Dean's Yard, Westminster Abbey, S.W.: *July 2nd*, 1915.

Rhynchites auratus: a correction.—I regret to state that the insect captured in Charlton Forest, and recorded as *Rhynchites auratus* ♀, at p. 218 of this Magazine, turns out to be merely a ♀ of *Byctiscus betuleti* with the hind coxae badly displaced, so as to be visible up to the side pieces of the metasternum.—MICHAEL G. L. PERKINS: *July 17th*, 1915.

Phyllotreta diademata: a correction.—In my notes on this species, p. 239 *ante*, in line 14, after "the abdomen," the words "of the male" are omitted.—D. SHARP, Brockenhurst: *August 7th*, 1915.

Xiphydria prolongata Geoffroy (=dromedarius Fabr.) in Cambridgeshire, and X. camelus Linn. in the New Forest.—A male of the interesting wood-feeding saw-fly *Xiphydria prolongata* was taken on July 4th, 1915, by Messrs. H. F. and J. C. F. Fryer at Holwoods, near Chatteris, Cambs. I am indebted to them for presenting it to the Cambridge Museum. It was found sitting on the green stem of a willow in a willow-bed. The red colour on the abdomen is not conspicuous but rather dull: it is present on a small area in the middle of the second dorsal segment, over the whole of the third, and on the basal portion of the fourth (the propodeum not being reckoned as part of the abdomen). I can find no record of the species from Cambridgeshire, though Mr. Morice tells me its occurrence in this county is quite as he should expect, and that he considers it might be found anywhere where willows abound. It is recorded from the London District, Norfolk, and the New Forest (Stephens, Ill. Brit. Ent., Vol. VII, 1835, p. 111, and Cameron, Mon. Brit. Phyt. Hym., Vol. III, 1890, p. 129). Both Stephens and Cameron refer to its attachment to willows, and Mr. Morice once discovered a number of males in the hollow interior of a half-

decayed willow near Ripley in Surrey (Ent. Mo. Mag., 1904, p. 33). But at Mildenhall, in Suffolk, whence it was recorded by Mr. Claude Morley in Ent. Mo. Mag., 1899, p. 190, a number of imagines were found, still in the larval tunnels, in an oak post. Besides the Chatteris specimen, the Cambridge Museum possesses only one other example, a female, without record of locality, from the old British collection of the Cambridge Philosophical Society.

While *X. prolongata* has generally been noticed in the Southern counties, most records of our other species, *X. camelus* Linn., are from Scotland or the North of England. But it also occurs in the New Forest. It was taken there by Dale on June 23rd, 1840 (see "Entomologist," 1901, p. 54). It was again obtained there in 1906, as recorded by Bloomfield in Ent. Mo. Mag., 1908, p. 137. Other examples have also been captured in that locality. The Cambridge Museum contains a male taken at Lyndhurst on July 22nd, 1903, by Mr. F. Jenkinson; this capture has, I believe, not previously been placed on record. Besides this specimen, the Cambridge collection has only two other examples, a male and a female, without data, from the old British collection of the late W. H. L. Walcott. *X. camelus* is said to be attached to the alder, and Cameron (*l.c.*) quotes Frauenfeld as stating that it was known (on the Continent) to have destroyed a young birch. Mr. Morice informs me that both species are distributed through all Europe, and *X. camelus* through Asiatic Siberia also.—HUGH SCOTT, University Museum of Zoology, Cambridge: July, 1915.

A note on Mr. Walsh's observations on the survival, etc., of Insects.—In reading Mr. Walsh's very useful contribution in regard to the survival and extinction of insects, commencing in this month's Ent. Mo. Mag., p. 225, I was struck by the concluding paragraph of his introductory remarks, which, at first sight, would seem to convey that the author and myself were the only two Coleopterists who had added to our knowledge of the Northumberland and Durham beetles. This allusion, I take it, however, refers only to such groups or species he deals with in his discourse. At the same time it is only just, though scarcely necessary, to draw attention to the pioneer work in *Coleoptera* of one of our foremost Entomologists, Mr. J. Gardner, F.E.S., who added considerably to Bold and Hardy's list, confirmed many old records, and made the coast near Hartlepool, Greatham Salt Marsh, and Egglestone, classic ground to North country naturalists.—R. S. BAGNALL, Penshaw Lodge, Penshaw, Co. Durham: August 17th, 1915.

Abstracts of Recent Literature.

BY HUGH SCOTT, M.A., F.L.S., F.E.S.

NEAVE, S. A. "THE TABANIDAE OF SOUTHERN NYASALAND, WITH NOTES ON THEIR LIFE-HISTORIES." Bull. Ent. Research, Vol. 5, part 4, pp. 287-320, pl. 27-31, March, 1915.

In addition to systematic descriptions, this work contains matter of more general interest. With regard to the habits of the adult Tabanids of this part

of Africa, not very much is added to the observations recorded in Neave's earlier paper in the same periodical (Vol. 3, 1912, pp. 279 seq.). But concerning the earlier stages there is much of importance. Thus many egg-masses of *Tabanus corax* were found on reeds and grasses overhanging mud. During oviposition the female of this species is not easily disturbed, and reed, eggs and fly may sometimes be removed bodily without the latter ceasing her operations. These egg-masses are of the usual Tabanid type, all the spindle-shaped eggs lying with their long axes in the same direction. They are covered with a cement which seems to be very waterproof and insoluble, as on one occasion some larvae succeeded in hatching from an egg-mass which had been in 70 % alcohol for two days. [This description of the egg-masses of *T. corax* recalls the descriptions and figures of those of two other species, *T. taeniola* and *T. ditaeniatus*, published by H. H. King in the same volume, part 3, p. 247, Dec. 1914]. In *T. corax* the process of hatching takes place with surprising suddenness. The egg-mass splits longitudinally down the middle line, and the little larvae emerge almost simultaneously, forming a big semi-viscous drop, which falls bodily from the reeds into the water or mud below.*

Neave found and bred larvae of various species of *Chrysops*, *Huematopota*, and *Tabanus*. They live in the mud on the banks and in the backwaters of rivers, or in isolated pools in the beds of dried-up streams. Those of one species of *Tabanus* are mentioned as being more usually found in the water itself among the roots of floating plants. The young larvae, after hatching, at first grow very slowly, and sometimes take six months to become full-grown. They then go through a resting-period, lying buried in mud or sand, sometimes at a considerable depth. In contrast to this long larval life the pupal period is short, from 10 to 18 days only. It appears that in this part of Africa the Tabanidae have only one brood in the year. But even in larvae from the same batch of eggs the rate of growth may be extremely variable, and adults may thus emerge from pupae at irregular intervals over a long period.

The writer describes his experiences in breeding the larvae. They were kept in clay basins of various sizes, containing mud or sand, and placed separately under cages made of mosquito-netting. One difficulty arises from the great activity of the older larvae, which can travel for considerable distances over perfectly dry surfaces; thus they are liable to leave their wet mud and to wander, getting lost, or mixed with those of other species, which, if the latter be smaller or weaker, they will readily destroy. The new-hatched larvae are more active than older ones, and swim more freely in water, lashing themselves along its surface. Half- to full-grown larvae were fed, in the case of smaller kinds, largely on immature Muscid larvae; in the case of larger species, on molluscs, fish-fry, or freshly killed tadpoles. Most species seem to be somewhat cannibalistic during part of their existence, but usually lose this habit as they approach maturity. The more mature larvae are principally nocturnal. When nearly mature they generally lie buried head downwards, with their siphons just projecting above

* This recalls an analogous, but not identical, phenomenon in certain *Trichoptera* which lay their eggs in masses of jelly-like spawn on the leaves of trees, etc., overhanging water. In some cases the larvae hatch from the eggs while still in this situation. When moistened by rain the jelly swells, and the spawn-masses flow slowly to the tips of the leaves and drop into the water beneath (see Wesenberg-Lund, Intern. Rev. Hydrob. Hydrogr., I, 1908, p. 869).

the surface-film of the wet mud or water. During the resting-stage prior to pupation they do not seem to use the siphons, but lie buried several inches deep for weeks or even months.

Pupation occurs an inch or more below the surface, the pupa standing upright in the mud, head upwards. As soon as the pupal case has hardened, the pupa works its way upwards by means of its spines, till the head is just below the surface. In fine weather the imagines of all species almost invariably emerge between noon and 3 p.m., but they are less regular in dull or rainy weather. The process is very similar in the different genera, the pupal head splitting along the mid-dorsal line. The abdomen is at first greatly elongated. The wings rapidly assume their full development and the insect is soon capable of flight.

Attempts were made to keep the adults alive in captivity. If the walls of the cage are at all resistant, the creatures knock themselves about and swiftly die. But in cages with loose net-walls they survived much longer, in some cases two or three weeks. It was not easy to induce the captives to suck blood. In some species of *Tabanus* both sexes fed greedily on honey and water. This attraction to sweet substances, whether honey or the honey-dew of Homoptera, has been previously noticed.

Structural differentiating characters are provided by the "aster," or group of hooks on the terminal segment of the pupa, and in the larvae to some extent by areas of pigmented hairs (in which are entangled small foreign bodies) on the last segment.

* * * A CORRECTION.—Mr. W. R. Thompson has called my attention to an error in my abstract of one of his papers, at the bottom of p. 222 of the present volume. It was stated that Tachinid larvae were found in "a Noctuid caterpillar (*Hamamelis virginiana*)."
This should have read "a Noctuid caterpillar on *Hamamelis virginiana*." *H. virginiana* is a bush, the witch-hazel, and the name of the genus is *Hamamelis*, not *Hamemalis*. The species of caterpillar was undetermined.

Societies.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY :
Thursday, July 8th, 1915.—Mr. B. H. SMITH, B.A., F.E.S., President, in the Chair.

Mr. G. B. Pearson, Russell Square, W., was elected a member.

There was a special exhibition of *Malacosoma neustria*, *M. castrensis*, and *Cosmotriche potatoaria* by Messrs. B. Adkin, R. Adkin, S. Edwards, A. E. Gibbs, Luis, Sperring, and Brooks, which included series of numerous local races and many aberrations. Mr. B. Adkin then read a series of notes on the variation attainable in the three species. Mr. B. S. Williams exhibited a bred series of *Bupalus piniaria* from Leith Hill. Mr. West (Ashtead), examples of *Triaena psi* and *T. tridens*, and asked if members could point out definite markings whereby the imagines could be correctly distinguished.—HY. J. TURNER, Hon. Secretary.

STUDIES IN *HELOPHORINI*.

BY D. SHARP, M.A., F.R.S.

8.—*HELOPHORUS* (*continued*).4.—*H. pumilio* Erichson.

The specimens purporting to be this species that I have seen in collections are all wrongly determined, so that *H. pumilio* is unknown to me. It is placed by both Kuwert and Ganglbauer next *H. nanus*, so that its position is probably here, though, as nothing is known as to the structure of the elytra, this is somewhat uncertain. I give below a translation of Ganglbauer's description, merely adding that the species probably exists in Britain.

"Like small *granularis*, differing by the curve of the thorax being simple as far as the very slightly projecting lateral margin, and by the close and strong granulation of all the dorsal intervals, the narrow and sharply defined dorsal grooves of this part, by the very large punctured striae and the narrow interstices of the elytra, these interstices being usually alternately different in elevation. Head and thorax dark bronze or dark metallic green; the elytra brown or yellow-brown, sometimes with a common dark mark behind the middle on the suture, or also with a blackish longitudinal mark on each side of it; the antennae, palpi, and legs brown-red, the tips of the claw-joints and maxillary palps blackish. Head closely granular; on the vertex with a narrow channel not, or scarcely, wider in front, often on each side near the eye with a shallow triangular impression. Thorax gently rounded at the sides, equally narrowed in front and behind, only moderately convex, but in a single curve to the side-margin, with slender, sharply-impressed dorsal grooves, and broad, flat dorsal intervals, on all the dorsal intervals evenly and closely granular. The inner dorsal grooves in or behind the middle only slightly bent outwards, the outer grooves in front much more widely separated from the inner than from the lateral margin, with which they are parallel. Elytra moderately narrow, very broadly and closely punctate-striate, between the striae with slender, convex interstices, of which the alternate are generally more elevated. Var. *redtenbacheri* Kuw., is founded on a more slender form. Long. 2.4—2.8 mm. Northern and Central Europe. Rare."

Kuwert gives 2 mm. as the length.

5.—*Helophorus nanus* Sturm.

This is the best known of this group. It is very variable, but may be identified by the shining surface, the thorax attaining a high polish and being often nearly destitute of sculpture. There is frequently a short impressed line on the vertex between the eye and the median channel, but this is a variable character. The size varies

greatly, 2—3 $\frac{1}{8}$ mm. long. The hind angles of the thorax are more definite than in the allies, and the elytra more narrowed towards the tips than in *H. fallax*; the coarse sculpture of the elytra is markedly crenate, and the interstices differ but little from one another. On the upper side the lateral margin of the elytra stands out less than in the allies, but the flanks are quite visible on the under-surface. Colour very variable.

Aedeagus short, median lobe broad, lateral lobes rounded externally, with slender and pointed tips.

The variation does not appear to be local, as very different individuals are found together. It is probably to some extent sexual, the female being larger and broader, with more sculpture on the thorax, and slightly shorter palpi.

The species is widely distributed from Scandinavia to Orenburg, but there are no southern records. In Britain it has not been found farther north than Lincolnshire.

6.—*Helophorus croaticus* Kuwert.

This was considered by Kuwert to be a variety of *H. strigifrons*, but it has been separated by Ganglbauer and Zaitzev.

The single example before me is very distinct from *strigifrons*. The palpi are unusually short for this group, yellow; head small, channel of vertex rather broader than usual; thorax not so convex, strongly transverse, coarsely granulate; elytra testaceous, much variegated with black, sculpture coarse, lateral margin rather strongly set out; flanks of elytra quite visible beneath; legs pale red.

Moravia (Reitter in coll. Champion).

This species in the form of the thorax, shorter palpi, and deeper channel of the vertex makes some approximation to the *aeneipennis* group.

7.—*Helophorus crenatus* Rey.

H. crenatus Rey, Rev. ent. franc. iii, 1884, p. 268; ? Rey, Col. Fr. Palp., 1885, p. 168.

Rey, in 1884, when he proposed this name, gave no description. All he said is as follows, translated: "*Helophorus crenatus* Rey: This species is near to *strigifrons* and *planicollis* Thomson. It is less compact in form than the former, and has the sides of the thorax more curved. It differs from the second by the channel of the vertex not

widened in front, and by its still more strongly crenate-striate elytra. Long. 3.7 mill. England (Pandellé)."

In the Col. France he gives a short description, which he commences by saying, translated: "This species, of which M. Pandellé communicated to me an individual from England, has been collected in fresh water, 5 kilometers from the sea, in the neighbourhood of Morlaix. I owe several examples to his generosity." Then follows his description.

We gather from this that Rey named his species from a single British example lent to him by Pandellé; that he returned this example, and subsequently obtained others from Morlaix in the extreme west of France; that, trusting to his memory, he believed them to be the same species as the British type, and made a description which now passes as the authorisation of the species. I conclude that he was mistaken in his memory of the British example: that his Morlaix specimens were a different species, and one that has probably not yet been found in England.

I have strong reason for believing that the Pandellé specimen was given to him by myself. Whether I am correct in these conclusions can only be ascertained by an examination of the type in the Pandellé collection, which I believe is still in existence at or near Tarbes.

My result amounts to this, that *H. crenatus* Rey is an English species, in all probability represented in my own collection, and, not having been described by Rey, his name has no validity until it shall have been proved that the English and Morlaix examples are of one and the same species.

Hence I have given the name *ganglbaueri* (postea *q.v.*) to a species passed under the name of *crenatus* by Ganglbauer and Edwards.

*a*². Flanks of elytra not visible beneath.

8.—*Helophorus laticollis* Thoms. ?

This is another of Thomson's species that has not been satisfactorily identified. He makes one of its chief characters that the prosternum is carinate in front of the anterior coxae. That is not the case with our *laticollis*, but if Thomson were mistaken as to this point, as his description accords in other respects, it was probably representative of this species. After much hesitation I have decided that he probably was mistaken, as I know of no *Helophorus* in which this

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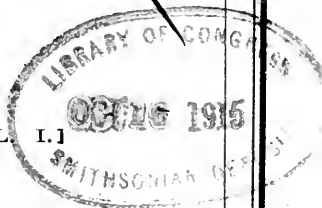
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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W. — Wednesdays, October 6th and 20th, November 3rd and 17th, December 1st, 1915. January 19th (ANNUAL MEETING), February 2nd, 1916.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m. on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

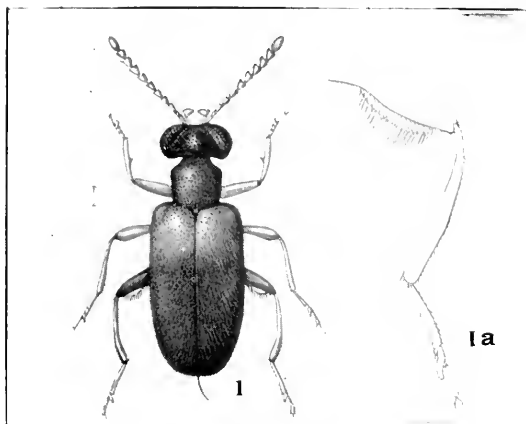
October 5th—"Points to Observe in Common Insects," G. B. LONGSTAFF, M.D., F.R.C.P.; Exhibition: "The Coast Agrotids," arranged by Lepidoptera Committee. October 19th—"Entomological Notes with a Camera in Switzerland," HUGH MAIN. November 2nd—Special Exhibition and Discussion: Fam. Pieridae. Short papers by J. A. SIMES, F.E.S., L. W. NEWMAN, F.E.S., and HAROLD B. WILLIAMS, LL.B.

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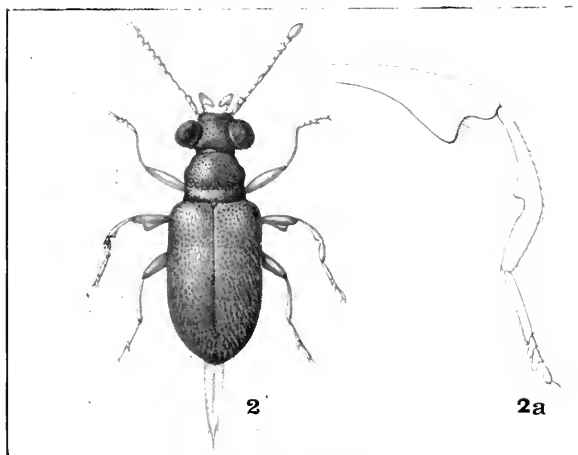
Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, and commence at 8 p.m. The Meeting Room is open at 7.30 p.m.

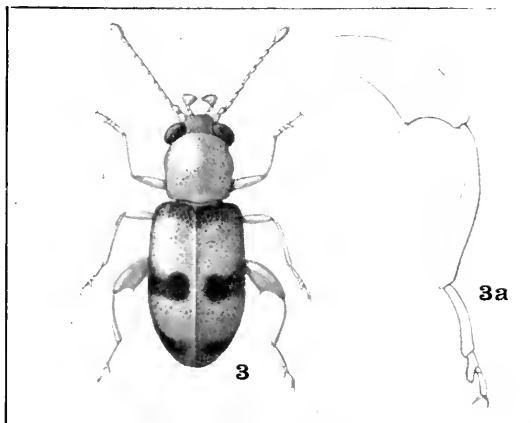
Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.



Xylophilus ciliatus ♂.



Xylophilus inaequipes ♂.



Xylophilus egregius ♂.

character exists, and, moreover, there is frequently in the genus an obscure elevation of the surface just in front of the coxae that may have misled him. Moreover, Ganglbauer in writing of the species does not allude to the character at all. Our British *laticollis* is very easily distinguished. It is convex transversely, and has the elytra narrow at the extremities; the channel of the vertex is linear and obscure; the maxillary palpi have the terminal joint rather long, very asymmetric and extensively infusate, the penultimate joint notched to an unusual extent on the inner margin. The thorax broad and a little peculiar in shape, the greatest width is just about the middle, and the hind angles are very obtuse; the median and sub-median grooves are very narrow, the latter but little sinuous, the sub-external groove rather broader and more irregular, the colour peculiar, the discoidal part steel-blue, the grooves golden, the sculpture at the sides strongly granular, much effaced on the discoidal portion. The elytra are rather dark in colour (in the New Forest examples), but black marks are almost absent, the sculpture deep and regular, the lateral margin distinctly outstanding in the middle. The under-surface very dark in colour, convex, the flanks of the elytra not visible, the pubescence copious, pallid; the legs a dark yellow. The delicate setae of the surface and legs are unusually well developed. The length $3\frac{1}{2}$ mm., and not varying a great deal. This description is made from New Forest specimens, of which I have been able to study a very large series, and it is there not a variable species. Some examples from Woking (Walker) have the elytra paler in colour, the general form a little broader, and the punctures of the elytra a little larger, but others are like the Brockenhurst individuals. The only other example I have seen is one sent by Sahlberg from Finland, and it has the characters of the Woking examples in a very exaggerated manner.

This appears to be a little known species. It is apparently rare in Scandinavia, and though it has been recorded in Germany Ganglbauer doubts the correctness of the records, but he admits its occurrence in Central Russia and Galicia. Reitter admits it as German apparently on the faith of the two records doubted by Ganglbauer. In Britain it is recorded from only three localities, in southern and central England (Brockenhurst, Woking and Horning). At Brockenhurst it is by no means rare; but it must be looked for in the early spring, March and April, or in late October. All the spots I know for it become dried up in the summer; they are very shallow small pools, or depressions, much choked with grass.

b. Channel of head broader in front.

b'. Flank of elytra visible beneath.

9.—*Helophorus borealis* Sahlb.

This little known species appears to be closely allied to *H. mulsanti*. It is of elongate form, with the head and pronotum metallic; the channel of the vertex is only narrowly open in front; the thorax being dark on the disc, but golden, or golden yellow, towards the sides, and coarsely granulate, the sculpture, however, not deep, except on the sub-external interval, the front margin unusually straight; the elytra are remarkably elongate, very coarsely and regularly sculptured, the interstices strongly raised and with only excessively minute punctation and setosity. The flanks of the elytra are visible on the under-surface, but are not so broad as in *oblitus*. In all these characters it is closely approached by some of the varieties of *H. mulsanti*; *H. borealis* has, however, a larger development of the labial palpi that distinguishes it beyond doubt, so far as the specimens before me go. These, however, appear to be of the larger form that Kuwert distinguished as var. *quadricollis*, and I entertain some doubt as to whether they are the same species as the original *borealis*. Sahlberg states that he found this large form in one locality only. My specimens were sent me by him before var. *quadricollis* was characterised. These specimens are 5 mm. long, while the length given (from numerous examples) by the original describer was $1\frac{3}{4}$ mm.

H. borealis is known only from Scandinavia, and the name is abandoned by Zaitzev in favour of *pallidus* Gebl., which was described from Siberia. As I do not feel convinced that this synonymy is correct, I do not adopt it. The uncertainty that exists as to these forms will be better realised by adding to the above remarks some I shall make under the next two species.

10.—*Helophorus mulsanti* Rye.

This is a very variable species, and one about which much obscurity still prevails.

At Dumfries the species used to be found abundantly in the brackish water pools of the Nith, and varies in my series from there from $3\frac{1}{2}$ to 5 mm. long, the smaller specimens being males. The palpi and antennae are yellow; the thorax but little convex longitudinally, moderately convex transversely, the front margin very little emargi-

nate behind the eyes, the grooves rather deep, the interval coarsely granulate and not shining; the median interval very little broadened in the middle externally; the colour variable, usually moderately metallic with the sides yellow, this colour extending inwardly along the front margin. The elytra dull yellow, but faintly marked with black, the only definite dark mark being the one behind the middle of the suture, and about this dark mark some others indefinitely paler than the ground-colour. They are coarsely punctured, the interstices being convex, the alternate obscurely more raised; there is a very feeble punctuation and setosity on the interstices. The legs are markedly elongate, and the hairs on the hind tarsus copious and long. The palpi are elongate, the mentum shining, with a few distant punctures. Specimens from Brighton, Lymington, and Deal, differ on the whole but little from the Dumfries examples. But individuals from Sheppey and Southsea are of average smaller size, and have the elytra more clouded with black, more shining, the punctures a little larger in proportion to the interstices, and the setosity a little more marked. But these distinctions are variable, and I am satisfied that all are one species.

The maxillary palpi are usually so much more elongate than the average as to afford valuable aid in recognising this and the allied species, but there occur specimens in which their length is considerably reduced.

The descriptions by Continental authors appear to indicate that usually they had a mixture of species before them. I have always felt much embarrassed as to this species, and at the time that Kuwert wrote his table I sent him specimens of it, one of which he returned to me labelled "var. *emaciatus* Kuwert." In his paper, *emaciatus* appears as a variety of *dorsalis*, and the localities given for it are Corfu, Savoy, Pyrenees!

The *dorsalis* of Marsham has, by many authors, been supposed to be our *mulsanti*, or at any rate something of the sort; this idea being based on Curtis having transmitted two specimens of some species of *Helophorus* to Mulsant named *dorsalis* Marsh. Curtis was not an authority on *Helophorus*, and it may be treated as certain that the *Hydrophilus dorsalis* of Marsham was not *mulsanti* Rye; the phrase, "elytra testacea, litura magna communi nigra, in qua maculae duae testaceae apicem versus positae sunt," is practically the whole of Marsham's description, and does not accord with *mulsanti*. I have seen no specimens of *mulsanti* from anywhere except Great Britain,

and I consider that most of the descriptions of "*dorsalis*" of foreign authors do not refer to *mulsanti* at all. Specimens in the Laferté collection named *dorsalis* by Mulsant are quite a different species; Bedel's description of *mulsanti* in Faune Col. Seine is probably correct, though in the catalogue he gave *fulgidicollis* Motsch. as a synonym, that being, however, a distinct species. Finally, I may remark that Sahlberg's original description of *H. borealis* applies well to *mulsanti*, and that I shall not be surprised if it prove to belong to our British species, which would then take the name of *borealis*; *quadricollis* being in that case applicable to the species I have designated as *borealis*.

11.—*Helophorus* sp. ?

Among the specimens of *H. mulstanti* found by me at Dumfries, is one that is so peculiar that I should not hesitate to treat it as distinct were it not unique. It is of elongate form nearly 5 mm. long, with large thorax, and very peculiar mentum, which is dull, rugose, and prominent, the broad reflexed sides rising steeply from the middle; the terminal joint of the labial palpus is perhaps rather more slender than in *mulsanti*. This specimen may be a remarkable aberration. It greatly resembles *borealis* var. *quadricollis*, but the trophi are different. I unfortunately selected this specimen for dissection when I commenced my examination of *mulsanti*, on account of its large size, so that it is now in fragments.

12.—*H. oblitus* sp. n.

Supra pallidus, capite aurato, prothorace rufescente, medio sub-metallico, elytris testaceis parum nigro-maculatis, fortiter punctato-striatis, interstitiis sat convexis, subtus niger, antennis palpis pedibusque flavis. Long. 3½ mm.

This appears to be a distinct species connecting *mulsanti* and *affinis*. It should not be difficult of recognition on account of the unusually great visibility of the flanks of the elytra on the under-surface.

Maxillary palpi elongate as in *mulsanti*, last joint of labial rather small as in *mulsanti*. Head moderately coarsely sculptured, channel of vertex open in front. Thorax shorter than in *mulsanti*, front margin rather deeply emarginate behind the eye, front angle therefore appearing prominent, grooves much as in *mulsanti*, sculpture much as in *mulsanti*; sculpture of elytra much as in *mulsanti*, though hardly as deep and coarse. On the under-surface the flanks of the elytra stand out very distinctly outside the epipleura, more so than in *mulsanti*; the abdomen reddish towards the extremity.

The aedeagus is very remarkable, but is nearest to that of *mulsanti* from which it is distinguished by the abbreviate median lobe.

Of this very distinct species I received one specimen many years ago from Prof. J. Sahlberg, without name, but labelled Paritkkala (in Finland, no doubt). There is evidently confusion existing as to the allies of *borealis*, and this unrecognised species may be one of the sources thereof. I may suggest that it is possible this may prove to be the true *borealis* of Sahlberg, sen., and the species sent to me as *borealis* by his son another (very distinct) species.

(To be continued).

A NOTE ON THE SMALL FORM OF *MEOTICA EXILIS* ER.

BY NORMAN H. JOY, M.R.C.S., F.E.S.

Mr. Newbery's note on *Meotica exilis*, in the current number of the Ent. Mo. Mag., p. 264, reminds me that some time ago I dissected out the aedeagus in a number of specimens of the large and small forms of this species, as I felt convinced, from external characters, that they were specifically distinct. This proved to be the case, but I did not publish a note on the subject at the time, as I felt doubtful as to its name. I have not since been able to carry the matter further, and have found it impossible to identify the smaller form for certain with any of the several species named by Mulsant and Rey, although it is probably included among them. I think now, however, that it is better to give it the name under which it has stood in my collection for two or three years, viz., *Meotica exiliformis*.

Meotica exiliformis sp. n.

Resembles *M. exilis*, but is on the average slightly smaller, narrower, and darker in colour; the head is less widened behind and the clytra are slightly longer and more strongly punctured; the aedeagus is bluntly pointed and simple at the apex (in *M. exilis* it is rather strongly bifid). The head is at least pitchy red, and often pitchy black, and the antennae are always fuscous towards the apex. Length, 1.4-1.7 mm.

My specimens are from Wells, Norfolk; Chesham; Berkshire; and Lundy Island. It is probably generally distributed. I have taken it in numbers in flood rubbish from the River Kennet, in company with *M. exilis*.

Bradfield, Berks. :

September 6th, 1915.

ON SOME NEW XYLOPHILI FROM BORNEO AND PENANG:

BY G. C. CHAMPION, F.Z.S.

(PLATE XXA.)

Mr. G. E. Bryant has submitted to me for description the interesting series of *Xylophili* captured during his recent expedition to Borneo, etc. There are 17 species in all, one (or two) common to both islands, two from Penang only, and the rest from W. Sarawak, Borneo, mostly from Mt. Matang. Some of them are nearly allied to forms inhabiting Ceylon and Tenasserim.* All appear to be undescribed, *X. egregius* and *X. melanosoma* representing peculiar types. Seven species have been previously recorded from the mainland of Borneo by Pic, viz., *pangaronus*, *subbrunneus*, *biimpressus*, *nigromaculatus*, *trimaculatus*, *martapuranus*, and *roberti* var. *borneensis*, the incomplete descriptions of which do not accord with any of Mr. Bryant's captures. The types of the new forms here described will be presented to the British Museum by the captor.

1.—*Xylophilus ciliatus* n. sp. (Plate XXA, figs. 1, 1a, ♂.)

♂. Elongate, narrow, robust, flattened above, shining (when denuded); piceous, the prothorax fusco-ferruginous, the basal third of the elytra obscure testaceous, the palpi, joints 1, 2, and 11 of the antennae, and the legs (the posterior femora, and the posterior tibiae in part, excepted) ferruginous; densely, finely, the elytra rather coarsely, punctate; thickly clothed with fine, greyish pubescence, the elytra with a slightly darker, broad, sub-median fascia. Head short, broad, narrowly extended on each side behind the eyes, the latter very large, feebly emarginate, separated by less than half their own width; antennae rather stout, long, joint 2 short, 3 much longer, 4-10 each a little shorter than 3, sub-triangular, about as long as broad, 11 acuminate-ovate. Prothorax broader than long, much narrower than the head, quadrate, abruptly, obliquely, narrowed in front, the anterior angles rather prominent, the disc with a deep transverse impression before the base. Elytra long, a little wider than the head, flattened, sub-parallel, the post-basal depression deep, oblique. Legs long, rather stout; anterior tibiae armed with a sharp triangular tooth at the middle within; posterior femora (fig. 1a) stout, curved, furnished with a rather long, prominent, arcuate, densely ciliate pad towards the apex beneath; posterior tibiae feebly curved. Length $2\frac{1}{2}$, breadth $\frac{1}{2}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak, alt. 1,000 feet [type] (*G. E. Bryant*, 28.i.14); PENANG (*G. E. Bryant*: 6.xi.13).

Two males, precisely similar. This species approaches *X. planipennis* Motsch., nec Pic, from Ceylon. A somewhat similar armature of the posterior femora of the male is to be found in various other

*The Ceylon Xylophilids have recently been revised by me in *Ann. and Mag. Nat. Hist.* (8), xvi, pp. 215-226 (September, 1915).

Eastern forms, the pad in *X. planipennis* being narrower and extending nearly the whole length of the femur. The portion of the aedeagus visible in the two males described is extremely slender and strongly curved, and very different from that of the allied *X. fimbriatus*.

2. — *Xylophilus fimbriatus* n. sp.

♂. Elongate, narrow, robust, flattened above, shining (when denuded); ferruginous, the elytra becoming slightly infusate beyond the middle, their inflexed outer margin to the apex, and the eyes, black; densely, finely, the elytra rather coarsely, punctate; thickly clothed with greyish pubescence throughout. Head short, broad, rather narrowly extended on each side behind the eyes, the latter moderately large, feebly emarginate, and separated by a little more than half their own width; antennae rather long, moderately stout, joint 2 short, 3 twice as long as 2, 3–10 sub-equal in length, sub-triangular, 11 acuminate-ovate. Prothorax broader than long, narrower than the head, quadrate, abruptly, obliquely narrowed in front, distinctly constricted at the sides just behind the rather prominent anterior angles, the disc with a deep transverse impression before the base. Elytra long, a little wider than the head, flattened, sub-parallel, transversely depressed below the base. Legs long, rather stout; anterior tibiae unarmed; anterior tarsi with joint 1 thickened; posterior femora stout, curved, furnished with a prominent, arcuate, densely ciliate pad along the outer half beneath; posterior tibiae straight from near the base. Length $2\frac{1}{5}$, breadth $\frac{5}{8}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 18.i.14).

One male. Extremely like the same sex of *X. ciliatus*, but separable from it by the slightly shorter, wholly ferruginous antennae, the smaller eyes, the distinctly constricted prothorax, the nigro-marginate, non-fasciate elytra, the unarmed anterior tibiae, the thickened basal joint of the anterior tarsi, the longer pad to the posterior femora, and the straighter posterior tibiae. If the ♂ characters were ignored, *X. fimbriatus* would probably be passed over as a variety of *X. ciliatus*, more especially as the type of the former was obtained at the same locality, but a few days earlier. The portion of the aedeagus visible in *X. fimbriatus* is very slender, almost straight, and blunt at the tip.

3. — *Xylophilus erythroderus* n. sp.

Moderately elongate, robust, flattened above, shining; head, and apices of the intermediate and posterior femora, black, antennae, palpi, elytra, and the rest of the legs, testaceous, prothorax rufous, the ventral surface rufo-testaceous; thickly clothed with rather long, pallid hairs; head and prothorax densely, the elytra a little more coarsely, punctate. Head broad, short, smaller in ♀, very narrowly, sub-angularly extended on each side behind the eyes, the latter large, somewhat depressed, rather deeply emarginate, and separated by less than half their own width; antennae (♂) moderately stout, not very long, joint 2 short,

3 a little longer than 2, 3-10 very gradually decreasing in length, 5-9 about as broad as long, 10 transverse, 11 stout, as long as 9 and 10 united, obliquely acuminate, (♀) a little shorter and more slender. Prothorax nearly as long as broad, much narrower than the head in ♂, parallel-sided, slightly narrowed in front, unimpressed. Elytra moderately long, a little wider than the head, very gradually narrowed from near the base, the post-basal depression oblique and rather deep. Legs long, comparatively stout; anterior tibiae mucronate at the inner apical angle, and feebly sinuate, in ♂; posterior femora strongly clavate and arcuately swollen in front in ♂, more slender and simply clavate in ♀; posterior tibiae stout and slightly bent outwards from about the middle in ♂; basal joint of posterior tarsi distinctly curved in both sexes. Length $2-2\frac{1}{5}$, breadth $\frac{1}{2}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 17.xii.13).

Two males and one female. More robust than *X. cribricollis** (= *mucronatus*) Pic, from Ceylon, the body similarly coloured, the antennae shorter and wholly testaceous, the prothorax longer; the anterior tibiae not abruptly bent, and the posterior femora stouter and greatly swollen in front, in ♂.

4.—*Xylophilus lentus* n. sp.

♂, Oblong, robust, shining; testaceous, the head and prothorax reddish in one example, the eyes black; densely, finely, the clytra a little more coarsely, punctate; thickly clothed with rather long, pallid hairs. Head short, broad, very narrowly extended on each side behind the eyes, the latter large, deeply emarginate, and separated by about half their own width; antennae stout, moderately long, joint 1 much thickened, 2 short, 3 scarcely longer, 3-10 very gradually decreasing in length, 11 acuminate-ovate. Prothorax considerably narrower than the head, transverse, sub-quadrate, convex, obsolete canaliculate down the middle behind. Elytra rather short, wider than the head, gradually narrowing from near the base, with an oblique intra-humeral depression. Legs unusually stout, rather long; anterior tibiae bowed inwards near the tip and armed with a rather long tooth at the inner apical angle; posterior femora strongly clavate; posterior tibiae rather broad and compressed. Length 2, breadth $\frac{1}{2}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 18.i.14, ii.1914).

Two males. Less elongate than *X. erythroderus*, wholly (the eyes excepted) testaceous or rufo-testaceous, the antennae stouter, the prothorax shorter; the anterior tibiae abruptly bent inwards near the tip and strongly mucronate at the apex, and the posterior femora not nearly so stout, in ♂. *X. ceylonicus* Pic, from Kandy, is a similarly coloured,

* Owing to some mistake in locality-labelling, the type, ♂, of *X. cribricollis* was stated to be from W. Australia: cf. *Ann. and Mag. Nat. Hist.* (8), xvi, p. 221.

still more nearly allied form, with shorter legs, more sparsely punctate elytra, a relatively shorter second antennal joint, and the anterior tibiae of ♂ widened, unbent, and armed with a long inwardly-directed spur at the apex beneath.

5.—*Xylophilus matangensis* n. sp.

♂. Oblong, narrow, somewhat depressed, shining; obscure testaceous, the eyes black; head rather sparsely, the prothorax densely, rugosely, and the elytra coarsely and somewhat diffusely, punctate; clothed with rather long pallid hairs. Head short, broad, very narrowly, sub-angularly extended on each side behind the eyes, the latter large, deeply emarginate, and separated by about half their own width; antennae long, not very slender, joint 3 slightly longer than 2, 3–10 very gradually becoming a little wider and shorter, 10 transverse, 11 stout, obliquely acuminate. Prothorax much narrower than the head, transverse, narrowed in front, parallel-sided behind, with definite basal depression. Elytra short, not much wider than the head, narrowing from a little below the base, with a deep, oblique, post-basal depression. Legs rather long; anterior tibiae feebly bent inwards at the apex, and mucronate at the inner apical angle; posterior femora stout, clavate; posterior tibiae somewhat dilated and compressed. Length (with head extended) $1\frac{2}{3}$, breadth $\frac{2}{3}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: I.ii.14).

One male. A small, unicolorous form, not unlike *X. lentus*, but with more slender limbs, a smaller, rugose prothorax, and coarsely punctate, deeply excavate elytra; the structure of the anterior and posterior legs is very similar in the males of these two insects.

6.—*Xylophilus acuminatus* n. sp.

♂. Moderately elongate, acuminate, robust, shining; rufo-testaceous, the elytra becoming slightly darker beyond the middle, the eyes and the apices of the posterior femora black, the posterior tibiae rufo-piceous; closely, finely, the basal portion of the elytra a little more coarsely, punctate; clothed with rather long pallid pubescence. Head convex, short, moderately broad, narrowly extended on each side behind the eyes, the latter large, deeply emarginate, and separated by about half their own width; antennae rather short, moderately stout, joint 2 short, 3 twice as long as 2, 3–10 very gradually decreasing in length, 11 acuminate-ovate, about as long as 9 and 10 united. Prothorax a little broader than long, narrower than the head, convex, sub-quadrate, unimpressed. Elytra not much wider than the head, rather long, somewhat rapidly narrowing from the base, with a deep, oblique, post-basal depression. Legs long, stout; anterior tibiae slightly sinuate within, feebly mucronate at the inner apical angle; posterior femora strongly clavate; posterior tibiae somewhat dilated, compressed; posterior tarsi with a very elongate basal joint. Length $2\frac{1}{5}$, breadth $\frac{1}{2}$ mm.

Hab.: PENANG (*G. E. Bryant*: 13.xi.13).

One male. Not unlike the Bornean *X. erythroderus*, but with more acuminate elytra, a shorter prothorax, a slightly smaller head, a narrower apical joint to the antennae, and a much longer basal joint to the posterior tarsi; the posterior femora of the ♂ not inflated anteriorly. The elytra jointly might be described as elongate-sub-triangular.

7.—*Xylophilus undulatus* n. sp.

Oblong, convex, shining; testaceous, the head, a common, narrow, undulate, median fascia on the elytra, and a space on the posterior femora towards the apex, black, the under-surface slightly infusate; densely, the elytra a little more coarsely, punctate; clothed with long pallid hairs. Head short, broad, rather narrowly extended on each side behind the eyes, the latter large, deeply emarginate, and separated by about half their own width; antennae short, moderately stout, joint 2 short, 3 a little longer, 4–10 very gradually becoming shorter and wider, 9 and 10 transverse, 11 acuminate-ovate. Prothorax slightly narrower than the head, transverse, somewhat rounded at the sides, unimpressed. Elytra oblong, wider than the head, convex, sub-parallel in their basal half, the post-basal depression oblique, shallow. Legs rather long; posterior femora strongly clavate; posterior tibiae widened and compressed. Length 2½, breadth ¾ mm. (♀ ?).

Hab.: PENANG (*G. E. Bryant*: 18.x.13).

One specimen. More elongate than *X. diversiceps* Pic, ♀, from Ceylon, the dark elytral markings reduced to a narrow, common, undulate median fascia, the legs and antennae longer and stouter, the posterior femora strongly clavate. *X. nigronotatus* Pic, from Ceylon, has the elytra similarly fasciate, but it differs in other respects. Very similar forms occur in Tropical America.

8.—*Xylophilus melanurus* n. sp.

♂. Oblong, depressed, rather broad, shining; ferruginous, the eyes, the apical half of the elytra (a common, large, indeterminate, sub-apical patch excepted), the terminal joint of the maxillary palpi, joints 4–10 of the antennae, and the posterior femora and tibiae in part, infusate or black; densely, finely, the elytra a little more coarsely, punctate; thickly clothed with very fine cinereous pubescence, the elytra with a common, well-defined median fascia of darker, brownish hairs. Head convex, short, broad, rounded at the sides behind the eyes, the latter large, not reaching the base, feebly emarginate, and somewhat narrowly separated; antennae short, rather stout, joint 2 short, 3 and 4 longer, 4–10 gradually decreasing in length, 9 and 10 transverse, 11 ovate. Prothorax small, quadrate, abruptly, obliquely narrowed in front, faintly bi-impressed before the base. Elytra a good deal wider than the head, sub-parallel, rather short, blunt at the tip, flattened, transversely depressed below the base. Legs long; posterior femora stout, clavate; posterior tibiae slightly curved. Length 2, breadth ⅔ mm.

Hab.: BORNEO, Mt. Matang, Sarawak, alt. 1,000 feet (*G. E. Bryant*: 16.i.14).

One male, as shown by the slender protruding apical portion of the aedeagus. An oblong, rather broad, flattened, ferruginous insect, with the apical half of the elytra in great part infusate, the latter sub-parallel, rather short, and blunt at the tip; the dense greyish vestiture modifying the ground-colour, and replaced at the middle of the elytra by a well-defined brown fascia.

9.—*Xylophilus inaequipes* n. sp. (Plate XXA, figs. 2, 2a, ♂.)

♂. Short, shining (when denuded); ferruginous, the elytra (the humeri excepted) slightly infusate, the eyes black; densely, finely punctate, thickly clothed with fine greyish pubescence. Head short, very broad; eyes large, distant, feebly emarginate, occupying nearly the whole of the sides of the head, the extremely narrow post-ocular portion of the latter appearing dentate externally as seen from above; antennae comparatively short, slender, joints 1 and 2 stouter, 3 a little longer than 2, 4 and 5 longer than 3, equal, 6–10 shorter and wider, sub-triangular, 11 stout, ovate. Prothorax short, broad, nearly as wide as the head, quadrate, abruptly narrowed in front, with a deep transverse basal sulcus. Elytra a little wider than the head, short, sub-parallel at the base, the post-basal depression deep, transverse. Legs rather short, the intermediate pair elongated; anterior tibiae feebly curved, somewhat widened, finely mucronate at the tip within; intermediate femora (fig. 2a) abruptly dilated into a large sub-triangular tooth before the apex, the outer face of the tooth excavate and pilose; intermediate tibiae (fig. 2a) long, strongly bowed, angularly dilated at the middle within; posterior femora slightly thickened, sub-angular in front; posterior tibiae feebly curved and sub-sinuate. Length $1\frac{1}{2}$, breadth $\frac{3}{8}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 30.i.14).

One male. The structure of the ♂-intermediate femora in this minute insect is unique, so far as I am aware, amongst the known *Xylophilids*; the intermediate legs, too, are much elongated, and the transverse basal sulcus of the prothorax unusually deep. The following is an allied species.

10.—*Xylophilus setiger* n. sp.

♂. Short, dull (till denuded); ferruginous, the eyes black, the antennae, palpi, and tarsi testaceous; densely, finely, the elytra a little more coarsely, punctate, finely pubescent. Head short, broad; eyes large, distant, entire, occupying the whole of the sides of the head; antennae short, slender, joints 1 and 2 stouter, 3 a little longer than 2, 3–5 sub-equal, 6–10 gradually becoming a little shorter and wider, 11 ovate, rather stout. Prothorax transverse, narrower than the head, somewhat rounded at the sides, with a shallow transverse basal depression. Elytra short, a little wider than the head, sub-parallel at the base, transversely depressed before the middle. Legs rather short, the intermediate pair longer; anterior tibiae mucronate at the tip; intermediate femora angularly dilated before the apex, the obliquely truncate, grooved outer portion furnished

with two long bristly hairs at the angle (one on each edge of the groove); intermediate tibiae curved at the base, and thence to the tip somewhat widened and almost straight; posterior femora strongly clavate; posterior tibiae short, bowed, widened on the inner side from about the middle to the apex. Length $1\frac{2}{5}$, breadth $\frac{1}{2}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 16.i.14).

One male. A little narrower than *X. inaequipēs* ♂, the head less developed, the basal impression of the prothorax shallow, the intermediate and posterior femora and tibiae very differently formed in the same sex.

11.—*Xylophilus scutatus* n. sp.

Short, broad, shining; ferruginous, the eyes black, joints 5–10 of the antennae infusate; densely, finely punctate, and thickly clothed with a fine greyish pruinose pubescence, giving an opaque appearance to the surface. Head large, broad, rounded at the sides behind the eyes, the latter not reaching the base, moderately large, entire, distant; antennae not very slender, comparatively short, joints 1 and 2 moderately stout, 3 much longer than 2, 4 slightly shorter, 4–10 gradually increasing in width, 10 transverse, 11 short ovate. Prothorax narrower than the head, strongly transverse, trapezoidal, bi-impressed before the base. Elytra short, broad, convex, rapidly narrowed from the basal third, appearing somewhat scutiform, transversely depressed below the base. Legs rather long, slender; posterior femora moderately thickened; posterior tibiae widening outwards, straight; basal joint of posterior tarsi very slender, almost straight. Length $1\frac{1}{2}$, breadth $\frac{3}{4}$ mm. (♀ ?).

Hab.: BORNEO, Mt. Matang, W. Sarawak, alt. 1,000 feet (*G. E. Bryant*: 4.ii.14).

One specimen. A short, broad, ferruginous, pruinose insect, with sub-scutiform elytra, a trapezoidal prothorax, a large head, which is rounded laterally behind the eyes, and rather stout antennae, with the outer joints (the eleventh excepted) infusate. It is much broader than *X. inaequipēs*, the antennae are stouter, the legs are more equal in length, etc.

12.—*Xylophilus caesius* n. sp.

Short, broad, convex, opaque (till denuded); black, the head (the eyes excepted) and prothorax, the base of the elytra indeterminately, and the tip of the antennae, rufous, the palpi, third antennal joint, anterior and intermediate legs (the tibiae in part of the latter excepted), and the posterior tarsi and the base of the posterior tibiae, testaceous; head and prothorax densely, minutely, the elytra rather coarsely, rugosely, punctate; thickly clothed with very fine, bluish-grey, pruinose pubescence. Head rather long, greatly developed behind the eyes, the latter small, prominent, distant from the base and feebly emarginate; antennae short, moderately stout, joints 2 and 3 equal in length, 3 not

so stout as 2, 4-10 gradually becoming shorter and wider, 10 transverse, 11 acuminate-ovate. Prothorax a little broader than long, narrow, not so wide as the head, sub-quadrate, narrowed anteriorly, the disc obsoletely canaliculate down the middle behind. Elytra short, broad, convex, slightly rounded at the sides, feebly, transversely depressed below the base. Legs short; posterior femora moderately incrassate. Length $1\frac{3}{4}$, breadth $\frac{9}{10}$ mm. (\varnothing ?)

Hab.: BORNEO, Quop, W. Sarawak (*G. E. Bryant*: 24.ii.14).

One very fresh specimen, almost certainly a \varnothing . Very near *X. laticornis* Pic, \varnothing , from Ceylon and Tenasserim,* and with similarly densely, rugosely punctate elytra; but with the antennae less dilated, the head, prothorax, and base of the elytra rufous, the prothorax a little longer, the eyes more prominent, the surface densely bluish-grey-pruinose.

13.—*Xylophilus immaculatus* n. sp.

Short, convex, shining; testaceous, the eyes black; densely, finely, the elytra more coarsely, punctate; clothed with rather long, pallid hairs. Head short, broad, narrowly, sub-angularly extended on each side behind the eyes, the latter large, deeply emarginate, and rather distant; antennae moderately stout, comparatively short, joint 3 slightly longer than 2, 4-10 very gradually becoming shorter and wider, 7-10 transverse, 11 obliquely acuminate. Prothorax short, narrower than the head, slightly rounded at the sides, unimpressed. Elytra wider than the head, short, a little rounded at the sides, the oblique post-basal depression shallow or wanting. Legs short; posterior femora clavate, stouter in σ , the posterior tibiae also wider in this sex. Length $1\frac{1}{2}$, breadth $\frac{2}{3}$ mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: xii.13).

Two specimens, assumed to be σ and \varnothing . Two others, imperfect, from Penang (*Bryant*: x and xii, 1913), also seem to belong here. This is one of many small, immaculate, testaceous, immature-looking Xylophilids, without pronounced σ characters. It is chiefly recognizable by its convex form, long, pallid vestiture, short prothorax, rather stout antennae, and the clavate posterior femora.

14.—*Xylophilus brevipilis* n. sp.

Short, convex, dull; rufo-testaceous, the eyes black; the entire upper surface very densely punctate, the punctures on the elytra somewhat coarse; clothed with short, fine, pallid hairs. Head short, broad, convex, narrowly extended on each side behind the eyes, the latter moderately large, deeply emarginate, and separated by about their own width; antennae short, stout, with sub-cylindrical joints, 2 short, 3 much longer than 2 or 4, 4-6 about as long as broad, 7-10 transverse, 11 acuminate-ovate. Prothorax short, narrower than

* Cf. Ann. and Mag. Nat. Hist. (S), XVI, p. 226.

the head, transversely sub-quadrate, unimpressed. Elytra short, convex, much wider than the head, slightly rounded at the sides, the humeri obtuse, the disc somewhat flattened anteriorly. Legs (posterior pair wanting), short, slender. Length $1\frac{1}{2}$, breadth $\frac{4}{5}$ mm. (♀).

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: i.1914).

One specimen. Separable from *X. immaculatus* by the very densely punctate, duller upper surface, the stout, sub-cylindrical antennae, and the broader elytra. *X. concolor* Ch., ♀, from Kandy, Ceylon, is a nearly allied broader form, with a less densely punctate upper surface (this being especially noticeable on the head), longer antennae, a more transverse prothorax, and more prominent humeri.

15.—*Xylophilus melanosoma* n. sp.

♂. Moderately elongate, rather broad, shining; black, the head between and in front of the eyes, and the base and tip of the antennae, obscurely rufescent, the elytra nigro-piceous, the palpi, anterior coxae (the rest of the anterior legs wanting), intermediate femora, and apices of the tarsi, testaceous, densely, finely, the elytra a little more coarsely, punctate; clothed with a very fine greyish pubescence. Head short, broad, convex, obliquely narrowed behind the eyes, the latter large, deeply emarginate, not reaching the base, separated by about half their own width; antennae long, joints 2 and 3 very small, short, equal in length, 4-10 triangular, rather wide, longer than broad, equal, 11 obliquely acuminate. Prothorax broader than long, narrow, quadrate, obliquely narrowed in front, with a deep transverse fovea before the base. Elytra moderately long, wider than the head, somewhat convex, sub-parallel, rounded at the apex, with a deep, transverse post-basal depression. Legs long, rather slender; posterior femora moderately thickened, simple; posterior tibiae almost straight, and a little widened. Length $2\frac{1}{10}$, breadth 1 mm.

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 17.xii.13).

One male, now wanting the anterior legs. Easily distinguishable by its black, serrate antennae, with minute third joint, the posteriorly narrowed head, the small, quadrate, deeply foveate prothorax, the sub-parallel, deeply impressed elytra, the feebly incrassate, simple posterior femora, and the almost black body. The slender projecting portion of the aedeagus is abruptly narrowed and hooked at the tip. *X. melanosoma* should perhaps form the type of a separate genus, on account of the peculiar antennal structure. An allied form occurs in Siam.

16.—*Xylophilus minimus* n. sp.

Oblong, narrow, convex, shining (when denuded); piceous, the head and prothorax fusco-ferruginous, the elytra with a broad basal fascia (including a small, dark juxta-scutellar spot), a large, common, sub-apical patch, and the

apical margin, and the antennae and legs, testaceous; densely, finely punctate, and thickly clothed with fine, greyish pubescence. Head moderately broad-short; eyes rather large, occupying the whole of the sides of the head, feebly emarginate, distant; antennae rather short, very slender, joints 1 and 2 stouter, 3-5 each slightly longer than 2, 6-10 gradually becoming a little shorter and wider, 10 transverse, 11 stout, ovate, obliquely acuminate. Prothorax transverse, convex, narrower than the head, bifoveate before the base. Elytra a little wider than the head, convex, rather short, somewhat rounded at the sides, shallowly, transversely depressed below the base. Legs comparatively short; posterior femora moderately thickened; posterior tibiae rather stout. Length $1\frac{2}{5}$, breadth $\frac{1}{2}$ mm. (♀ ?)

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 16.i.14).

One specimen. A minute, narrow, convex form, with very slender, sub-clavate antennae, pale limbs, obscure ferruginous head and prothorax, and the elytra in part piceous, the latter having a broad basal fascia and some other markings testaceous. The elytral markings resemble those of *X. subcrassicornis* Pic, from Ceylon, which is a much larger insect, with very differently formed head and antennae.

17.—*Xylophilus egregius* n. sp. (Plate XXA, figs. 3, 3a, ♂.)

Rather short, sub-cylindrical, dull (till denuded); testaceous or pale testaceous, darker beneath, the eyes black, the elytra with a common transverse scutellar patch, a post-median fascia (interrupted at the suture) and another fascia immediately before the apex, piceous or nigro-piceous; closely, minutely, the elytra more distinctly, punctate; thickly clothed with very fine greyish pubescence. Head short, broad, strongly deflexed, deeply sunk into the prothorax; eyes convex, transverse, rather small, distant, entire, occupying the whole of the sides of the head; antennae similar in the two sexes, moderately long, very slender, joints 1 and 2 stouter, 3 slightly longer than 2, 3-10 sub-equal in length, 3-5 narrow, 6-10 very gradually becoming a little wider, 11 stout, much longer than 10, sub-ovate, obtuse at the tip. Prothorax transverse, convex, as wide as the head (without the eyes), the sides distinctly constricted anteriorly and parallel at the base, the disc with two sub-obsolete, rather long, oblique impressions before the base. Elytra short, sub-parallel in their basal half, a little wider than the head, shallowly, transversely depressed below the base. Legs slender, moderately long; anterior tibiae finely mucronate at the inner apical angle in ♂; posterior femora (♂) (fig. 3a) strongly clavate, and armed with a short, slender, sharp tooth at the middle beneath, (♀) moderately clavate, simple; posterior tibiae feebly curved in ♂, almost straight in ♀ . Length, $1\frac{1}{4}$ - $1\frac{2}{5}$, breadth $\frac{2}{3}$ - $\frac{2}{3}$ mm. (♂ ♀).

Hab.: BORNEO, Mt. Matang, W. Sarawak (*G. E. Bryant*: 5.xii.13, 26.i.14).

One male and two females. A minute, delicate, pallid, oblong, convex insect, with fusco-trifasciate elytra; the antennae similar in the two sexes, very slender, with joints 1, 2, and 11 stouter; the posterior femora clavate and finely dentate in ♂; the eyes transverse, entire, convex, and rather small. The strongly deflexed head, sub-cylindrical body, etc., are suggestive of *Hylobaenus*, *Phytobaenus*, and *Notoxenglenes*, and it is probable that *X. egregius* may have to be separated from *Xylophilus* Latr., in which it can remain for the present. *X. biimpressus* Pic, from Pontianak, Borneo, may be an allied larger form, with larger and more approximate eyes, sub-filiform antennae, unifasciate elytra, &c.

EXPLANATION OF PLATE XXA.

Fig. 1.—*Xylophilus ciliatus*, ♂; 1a.—posterior leg.

Fig. 2.—*Xylophilus inaequipes*, ♂; 2a.—intermediate leg.

Fig. 3.—*Xylophilus egregius*, ♂; 3a.—posterior leg.

Horsell, Woking:

September, 1915.

ON SOME ADDITIONS TO THE BRITISH LIST OF COLEOPTERA.

BY E. A. NEWBERY AND W. E. SHARP, F.E.S.

In an Exchange List of the British species of *Coleoptera* compiled by us, which has just appeared, the names of certain species and varieties are inserted which have not as yet been brought forward as indigenous. It seems desirable that a short notice of these should be published.

Rhantus exoletus Forst., var. *nigriventris* nos. This variety differs from the type form by having the ventral abdominal segments black or pitch-black. This form is not referred to by either Seidlitz or Ganglbauer. It was taken in small numbers at Askham Bog, Yorks., by one of us in March, 1895.

Tachyporus macropterus Steph. (= *dimidiatus* Steph., *pusillus* var. *b*, Gyll.). This insect stands in most British collections as a dark form of *pusillus* Grav., from which it may be separated thus:—

Elytra distinctly longer than thorax, red or red-brown, with side-margins and a space round scutellum more or less infusate...*T. pusillus* Grav.

Elytra scarcely longer than thorax, black, with apex narrowly pale

...*T. macropterus* Steph.

Corticaria saginata Mann. This is a near ally of *C. serrata* Payk., belonging, like that species, to the group of small insects without distinct temples behind the eyes. It may be separated from *serrata* thus:—

Thorax transverse, somewhat heart-shaped, broadest before middle, with tooth-like projecting hind angles.....*C. serrata* Payk.

Thorax much broader than long, not heart-shaped, transverse-oval, hind angles very obtuse, almost rounded*C. saginata* Mann.

Two specimens taken in a dwelling house at Merton, Surrey, in May, 1884, were referred to this species by Capt. Deville, with a slight doubt.

Dasytes flavipes Ol., ab. *nigripes* Schilsky. Differs from the type form in having the legs entirely black. Several specimens were taken by Mr. Tomlin in the Scilly Islands, in 1913.

September 2nd, 1915.

NOTE ON THE TAXONOMY OF THE *HISTERIDAE*.

BY GEORGE LEWIS, F.L.S.

In the "Entomologische Blätter" of 1914, X, p. 306, Bickhardt has given a synopsis of a new systematic arrangement of genera which in my opinion is not one likely to be adopted by Entomologists generally. He places *Oonthophilus* early in the series close to *Trypanaeus*, and then follows *Saprinus*. *Acrilus minutus* Herbst has a more prominent position in the classification than *Hister maximus* Oliv. *Phoxonotus* (fig. 1) is associated with *Dendrophilus* (fig. 2), notwithstanding the very different structure of the sterna, as the outlines here given show, and the superstructure is, of course, based on the framework beneath; there cannot be any close affinity between the two genera. *Margarinotus* is interposed between *Hister* and *Epiglyptus*. I only refer to some of the more conspicuous innovations. Herr Bickhardt's original paper is advertised to appear in June, 1914, in Wytzman's "Genera Insectorum," but the publication is not as yet forthcoming.

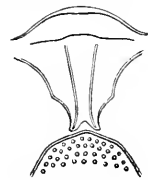


FIG. 1.—
Phoxonotus.



FIG. 2.—
Dendrophilus.

BRACHYARTHURUM LIMITATUM FIEB.:

A CAPSID NEW TO THE BRITISH LIST.

BY E. A. BUTLER, B.A., B.Sc., F.E.S.

On July 2nd, 1904, a single specimen of a Capsid, unknown to the British List, was taken by Mr. Claude Morley, in Cutler's Wood, at Freston, Suffolk (see Morley's "Hemiptera of Suffolk," Introd., p. x). No other specimens were then met with, and it has remained, until recently, unique and unidentified. But on July 3rd, this year, I found the same species in some numbers on aspen trees in Epping Forest. This larger supply has enabled me to identify the insect as *Brachyarthrum limitatum* Fieb.

Brachyarthrum, a genus erected by Fieber, is closely allied to *Phylus*, of which, in fact, it is by some authors considered a sub-genus. It differs from *Phylus* chiefly in the much stouter antennae, and in the fact that the sexes are somewhat dissimilar in both shape and coloration. Only one species is now contained in the genus, although Fieber originally included in it the insect now known as *Plesiodema pinetellum*.

B. limitatum Fieb.

Rather long, parallel-sided, slightly shiny, and closely covered with a pale pubescence. *Male*: head black, pronotum brownish-black with anterior margin narrowly yellowish; hemi-elytra blackish-brown, with base of cuneus yellowish and membrane fumose; wings fumose; antennae black with 4th joint brownish, 1st and 2nd joints stout, 3rd less so, 4th slender, 2nd joint longer than 3rd and 4th together, 4th much shorter than 3rd; legs orange-yellow, tibiae black-spined and fuscous at apex, tarsi fuscous, anterior margin of hind-femora fuscous; body black, segmental margins of abdomen ochraceous.

Female: shorter than male, and with rather shorter membrane and antennae; head black; pronotum and hemi-elytra brownish-ochraceous, cuneus clear orange-yellow, scutellum more or less fuscous, membrane fumose; wings, legs, antennae, and body as in ♂, save that the antennae are more slender throughout. Length, ♂ 5 mm., ♀ 4½ mm.

Scarcely anything seems to have been known thus far as to the habits of this Capsid. Reuter found it on *Spiraea salicifolia*, and Morley's specimen was taken on *Digitalis purpurea*. As above stated, my specimens occurred on aspen trees, on which their numbers and general distribution seemed to show that they were "at home"; such a habitat is more in accord with what might be expected, for its near allies in the genera *Phylus* and *Plesiodema* are all arboreal in habits. It was accompanied by great numbers of *Orthotylus bilineatus*, a well-

known inhabitant of aspens. These latter, however, were almost all in the larval condition, while *Brachyarthrum* was mature: it is, therefore, a somewhat earlier insect than the *Orthotylus*. It is very active and readily takes flight; when in the net, it might, but for this, and its somewhat larger size, be mistaken for *Plagiognathus arbustorum*. It has hitherto been recorded only from Scandinavia, Finland, and Bohemia.

56, Cecile Park,

Crouch End, N.:

September 3rd, 1915.

A NEW *OPOGONA* ATTACHED TO SUGAR-CANE.

BY E. MEYRICK, B.A., F.R.S.

The following moth has been sent me for identification by Mr. G. A. K. Marshall, Director of the Imperial Bureau of Entomology, and appears to be of economic interest.

OPOGONA GLYCYPHAGA n. sp.

♀. 15-16 mm. Head and thorax deep purple-bronze, face whitish. Palpi ochreous-whitish, terminal joint suffused with dark fuscous. Antennae ochreous-whitish, basal joint and extreme base of stalk dark purple-bronze. Abdomen whitish-ochreous. Fore-wings lanceolate, apex acutely produced; light ochreous-yellow; a deep purple streak along basal fifth of costa; a narrow purple-fuscous terminal fascia, widest on costa where it occupies nearly $\frac{1}{5}$, anterior edge forming two rounded convexities with a triangular indentation between them, both convexities suffused anteriorly with deep blue and margined on their upper portions with blackish: cilia light grey, basal fourth on termen bronzy-fuscous. Hind-wings bronzy-grey; cilia light ochreous-yellowish.

QUEENSLAND, Gordonvale, near Brisbane, bred in June by Mr. E. Jarvis, Queensland Government Entomologist, who calls it the "bud-moth of the sugar-cane," and will doubtless publish its life-history; two specimens. Type in British Museum. The species of *Opopogona* are fairly numerous in the tropics, and I am acquainted with about 70; the known larvae habitually feed on dry vegetable matter, such as dead leaves or refuse, in dry stems, or the interior of the nests of Termites. They are liable to artificial introduction in the larval state, and two or three have thus been extended in range, but are not usually injurious.

Marlborough:

September 15th, 1915.

Gabrius primigenius Joy: a correction.—Dr. Sharp pointed out to me, after I had published my note on *Gabrius primigenius* Joy (Ent. Mo. Mag., Vol. I, p. 258) as a British beetle, that this species is the one he named as *G. velox*, and that my illustration in the Ent. Mo. Mag., Vol. XLIX, p. 25, of the aedeagus of *G. velox* is incorrect. *G. primigenius* Joy, is therefore a synonym of *G. velox* Sharp, and Fig. 1 of my illustrations represents the aedeagus of the latter species, Fig. 6 being only a small example of *G. nigritulus*.

Dr. Sharp tells me that he regards *G. velox* as a very local species. He used to take it in numbers in flood rubbish at the sides of a small stream in the New Forest, but it has now disappeared from this locality. He believes it had originally been washed out of its natural habitat, which, from my experience, is probably in sphagnum, growing in woods.—NORMAN H. JOY, Bradfield, Berks.: September 6th, 1915.

A food-plant of *Orthochaetes insignis* Aubé.—Mr. J. R. le B. Tomlin's note in the January number of this Magazine (p. 18), on the association of *Orthochaetes insignis* with the characteristic Sandhill Pansy, *Viola curtisii* Först., prompted me to look for this beetle whilst at Porthcawl in June. There are on these sandhills, as Mr. Tomlin remarks, three forms of the Pansy: one with yellow flowers, one with blue, and a third with parti-coloured; and there are also large quantities of the Sandhill Violet, *V. ericetorum* Schrader. In searching these plants I soon discovered the beetle on those with the yellow flowers, but none occurred on the other two forms, nor on the Violet. I then went to the length of removing plants of these others, together with the sand surrounding them, and carefully sifting the whole through muslin, but still without finding the beetle.

Professor A. H. Trow, D.Sc., F.L.S., in the "Flora of Glamorgan," published by the Cardiff Naturalists' Society, considers the three forms of the Sandhill Pansy would repay experimental cultivation, and I think my experience with the beetle, whilst it does not prove its restriction to one form, at least seems to indicate a marked preference, and is an additional incentive to the working out of the pedigree of these pansies. The Hemipteron *Thyreocoris scarabaeoides* L., also occurred sparingly on the yellow form.—H. M. HALLETT, 64, Westbourne Road, Penarth: September 4th, 1915.

Meligethes brevis Sturm, in Co. Durham.—As, so far as I can discover, there has been no recorded capture of this beetle for many years, it may be well to state that two specimens of the var. *mutabilis* Rosenh., occurred to me on *Helianthemum vulgare* at Horden on July 21st. The variety is easily recognised in the field by its food-plant, its short, somewhat broad appearance, and by the red spot on each elytron. I took the specimens as soon as I reached the collecting ground, and more would doubtless have been captured had not sundry exciting adventures considerably restricted my collecting activities for the remainder of the day. The species was first taken on the Durham coast by my friend Mr. John Gardner, who sent it among a number of unnamed specimens to Mr. W. G. Blatch, by whom, I believe, it was recorded. It probably

occurs in many places on the Durham coast where *Helianthemum* is abundant.—
GEO. B. WALSH, 166, Bede-Burn Road, Jarrow-on-Tyne: *Sept.* 14th, 1915.

Abundance of Hermacophaga mercurialis F., near Oxford.—This Haltiid is sufficiently common in all the woods in this district where its food-plant grows, but this year it has appeared in quite unusual abundance. Yesterday at Wytham Park, Berks, in a somewhat open glade, where the undergrowth had recently been cleared, I found the once luxuriant *Mercurialis perennis* for many square yards together reduced to bare stalks and brown skeleton leaves, while half-a-dozen strokes of the sweeping-net brought up quite a handful of the pretty blue *Hermacophaga*.—JAMES J. WALKER, Oxford: *September* 16th, 1915.

Carabus arvensis in Yorkshire: West Riding.—A short time ago while looking through a collection of local insects taken by Mr. B. Morley of Skelmanthorpe, near Huddersfield, I noticed a specimen of this uncommon *Carabus*. It was taken at Birdsedge, on May 3rd, 1914, and is the only record I know of the occurrence of this species in the southern division of the West Riding. There are, indeed, but few records for Yorkshire; near Scarborough, Strensall Common, and Ingleton being all the localities previously noted. This new record for an additional locality, far removed from any of the others, is therefore extremely interesting.—E. G. BAYFORD, 2, Rockingham Street, Barnsley: *August* 21st, 1915.

Sphinx convolvuli in Yorkshire: West Riding.—On the 17th inst. a fine example of this species was brought to me. It had been found at rest on some iron in a foundry yard in Barnsley.—E. G. BAYFORD.

Larentia flavicinctata and Emmelesia minorata (ericelata), &c., at Grassington-in-Wharfedale.—I spent a few days at Grassington the first week in August, from the 1st to the 7th, and, although the weather was showery, I met with some interesting things. The first two or three days were spent in the woods. Here *Venusia cambrica*, *Lycaena astrarche*, and *Phothedes captiuncula* were getting worn and nearly over, while *Erebia blandina* was only just emerging; by the middle of the week the males were plentiful but females were scarce, and up to the end of the week I only took five.

August 7th was too dull for anything to fly in the wood; so a trial of the rocky terraces high up on the moor was made. Among the large masses of rock several *Gnophos obscurata* turned up with some *Melanippe galata*, and two small "rivulets" which, on comparison with my Scotch insects, proved to be *Emmelesia minorata*. On the grassy slopes two *Stilbia anomala* flew up and were secured.

In a rocky gorge by the side of a stream, where high walls of rock rose abruptly, a good many insects were found, chiefly *Larentia olivata* and *L. flavicinctata*. They flew off rapidly on my approach, and were very difficult to net. The latter were considerably worn, much past their best. Their habits were much like those of *L. caesiata*, and they delighted to rest in crevices of the rock. Very few females were taken, probably they did not fly as freely as the males, and it was almost impossible to see them, especially where the rocks were covered with

a greenish-grey lichen. The form is much lighter than that from the Highlands of Scotland, and may be nearer the type. No night work or sugaring was done, as the nights were cold and quite unfavourable, and scarcely any *Noctuae* were seen.—W. G. CLUTTEN, Burnley: August 27th, 1915.

Some of the foregoing records are most interesting. *Emmelesia minorata* is quite new to the County of Yorkshire; and of *L. flavicinctata* only a few specimens (usually single) had been recorded. The Grassington form (of which Mr. Clutten has very kindly sent me half a dozen), is very pretty and much paler and rather smaller than the Scotch insect. *G. obscurata* was previously regarded in the county as almost entirely an East Coast species, and of *S. anomala* we had previously only three other Yorkshire localities.—G. T. P.

The melanic form of Cymatophora or in England.—Apropos of my note "A melanic form of *Cymatophora or*" (Ent. Mo. Mag., July, 1915, p. 220), Mr. Arthur Horne, of Aberdeen, has very kindly given me a specimen bred this year, which agrees perfectly with Figure 2 of Dr. Hasebroek's paper on the Hamburg forms, *i.e.*, the form with all the wings, thorax and body black, with the exception of the pale clear white stigmata. Mr. Horne informs me that several specimens a year of this striking form have been bred during the past five years from larvae collected from a single aspen tree—the only one in the district—at Sunderland, or about 50 per cent. of the whole number of specimens bred, the other half being of the ordinary type of the species. None of the other three forms described and figured by Hasebroek have been noticed as yet, but it is very satisfactory to know that the melanic form does occur in Britain, and it is reasonable to suppose that when some spot is found where it occurs in greater numbers, the other forms will be found to accompany it.—GEO. T. PORRITT, Elm Lea, Dalton, Huddersfield: September 6th, 1915.

A note on the distribution of Danaida plexippus in Australia.—In my remarks on the occurrence of this butterfly on the Australian Continent, I stated (Ent. Mo. Mag., Vol. L, p. 192) that at the time of my voyage to the western and north-western coasts some 25 years ago, it had apparently not extended its range to this region. Quite recently I have come across a very interesting paper, entitled "A Scientific Trip to the North Coast of Western Australia," by J. Burton Cleland, M.D., and H. M. Giles, F.E.S., read before the Natural History and Science Society of Western Australia, on September 22nd, 1908. These gentlemen were detailed for duty to a camel quarantine camp on the Strelley River, in very sterile country sixty miles from its mouth, and approximately in lat. 21° S., long. 119° E., at the end of July, 1907, and they made considerable collections in Natural History during their stay of several months duration in this remote spot. Enumerating the *Lepidoptera* observed, the authors remark that "*Danainae* were represented by numbers of the common *Danais petilia* . . . and also to our bitter regret, three or four fine specimens of the scarce larger species *D. erippus*, which proved too shy and wary for capture." As there can be, I think, no possible error of identification in the case of this well-known

butterfly, this record gives an enormous extension to the range of *Danaida plexippus* in Australia. The lower course of the Strelley River is at least 1500 miles in a direct line from the nearest point of the Queensland coast, and over 1200 miles from Adelaide, S.A., where the butterfly was observed last year not rarely by Professor Poulton and other members of the British Association, but whence I had no previous record.—JAMES J. WALKER, Oxford: *September 16th*, 1915.

Reviews.

“AN EXCHANGE LIST OF BRITISH COLEOPTERA.” Compiled by E. A. NEWBERY and W. E. SHARP, F.E.S. 16-mo, pp. 56. Plymouth: J. H. Keys, 7, Whimble Street. 1915.

Our working Coleopterists will welcome this exceedingly handy and well-printed List, which is in all respects a great advance on anything of the kind that has previously appeared. As announced by the compilers, it is based on the European Catalogue of 1906, though the arrangement of the major groups follows that of our chief text-book on the Order, except that the *Heteromera* are transferred to the end, and *Cis* and the allied genera find a place in the *Clavicornia*. Many of the specific, and more of the generic names, will thus be somewhat unfamiliar in use at first, though as in most of these cases the synonymy is given, little inconvenience will result from the change. While the List does not profess to be a new catalogue of our native *Coleoptera*—which has by the mere lapse of time become a decided desideratum—it has the great convenience of including the names of practically all the species added to the British beetle-fauna since the publication of Messrs. Donisthorpe and Beare's Catalogue of 1903. The doubtfully indigenous and presumably extinct species, as well as introductions from abroad and possibly erroneous records, are indicated; though we are disposed to take exception to the inclusion of several species in the first-mentioned category. A few omissions and misprints will be remedied in succeeding issues of this list, which altogether appears to us admirably adapted to its purpose.

“REPORT AND TRANSACTIONS OF THE CARDIFF NATURALISTS' SOCIETY.”—Vol. XLVII, 1914. Cardiff: printed for the Society by William Lewis (Printers), Ltd., Duke Street. 1915.

In the current report of this flourishing Natural History Society our correspondent, Mr. J. R. le B. Tomlin, continues his list of the *Coleoptera* of the County of Glamorgan, and the instalment now given includes the groups from *Lamellicornia* to *Phytophaga* inclusive. The list shows a very good muster of species throughout, and some of the records are of considerable interest, notably those of *Trichius fasciatus*, *Ancistronycha abdominalis*, and others, by that renowned Naturalist the late Dr. A. R. Wallace, who in early life collected insects in the County, and has referred to the capture in 1846 of the first-named beetle in his autobiography. The occasional occurrence of *Lucanus cervus* so far west is also noteworthy. Mr. H. M. Hallett is, as before, responsible for further “Entomological Notes,” which once more include a number of very interesting additions to the list of *Hymenoptera Aculeata* of Glamorganshire.

Societies.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY :
Thursday, July 22nd, 1915.—MR. A. E. GIBBS, F.L.S., Vice-President, in the
 Chair.

Mr. Newman exhibited living examples of a species of Braconid which had just emerged from a batch of ova of *Macrothylacia rubi* found at Rutham in the autumn of 1914. Dr. Chapman, specimens of *Lutiorina pyrenaica*, the first that had been bred, from the Pyrenees, and also *L. orbitulus* var. *oberthüri*, from the same area, but found also in Switzerland. He also showed specimens of *Agriades escheri*, var. *rondoui*, bred from the egg, and pointed out their distinction from the form known as ab. *rondoui*, from Gavarnie. He showed living specimens of the Ichneumon *Aphidius ervi*, bred from the Aphis of *Ononis arcensis*. Mr. B. H. Curwen, some first brood females of *Polyommatus icarus* from Rammore Common, all much suffused with blue, and several underside aberration *melanoioxa* (*arcuata*). He also showed a series of *Syntomis phegea* interbred for the past four years. Mr. Sich, coloured drawings of the larvae of the British species of *Acronycta*, and pointed out the differences between the larvae of *Triaena psi* and *T. tridens*. Mr. B. Adkin, long series of *Apatura iris* from many British localities, and showed that the species was much more varied than it was usually considered to be. A considerable discussion took place on the occurrence and disappearance of the species in its localities near London. Mr. R. Adkin, living larvae, pupae, and imagines of *Ephestia kühniella* in rice flour. Several Members gave experiences of the present season, making remarks on *Agriades thetis*, *Polyommatus icarus* (abs. of ♀s), *Celastrina argiolus*, *Pyramæis cardui*, *P. atalanta*, *Lithosia complanula*, *Euchloë cardamines*, &c.

Thursday, August 12th, 1915.—MR. B. H. SMITH, President, in the Chair.

Mr. B. H. Smith exhibited a number of *Lepidoptera* from New Zealand, including Chrysophanids, Lycaenids, and species of the giant Hepialids. Mr. B. S. Williams, *Anthrocera trifolii*, var. *palustris*, with confluent forms from Somerset, and an aberration of *Xanthorrhoe sociata*, in which the usual dark band on the disc of the left fore-wing was reduced to a blotch on the inner margin. Mr. West (Ashted), the ova of *Chrysope perla*. Mr. Edwards, a living salamander (*Salamandra maculata*) found in a garden at Blackheath, and read notes on the family characteristics. Mr. Hy. J. Turner, examples of an excessively local form of *Brenthis pales*, var. *arsilache*, taken by him on one side of one small lake at St. Moritz, Engadine, at flowers of *Comarum palustre*, the Marsh Cinquefoil. He also showed a series of forms of *Parasemia plantaginis* from the Engadine, varying from the normal yellow and black males to the form with a much extended white ground on the one hand, and on the other hand, to the form with a much extended black area. Mr. Edwards read his report, as delegate, of the Congress of the South Eastern Union of Scientific Societies at Brighton.

NOW READY.

"AN EXCHANGE LIST OF BRITISH COLEOPTERA."—Compiled by E. A. NEWBERRY and W. E. SHARP. Based upon the European Catalogue of 1906, and including the names of all the species added to the British List since 1903. Price: 6½d. each, 6 for 2/3, or 4/9 per dozen, post free.

Plymouth: J. H. KEYS, 7, Whimble Street.

THE TRANSACTIONS OF THE LONDON NATURAL HISTORY SOCIETY contain the Presidential Address of Mr. L. B. PROUT, F.E.S., and papers on "Collecting and Breeding the Sesiidae," by L. W. NEWMAN, F.E.S., and "Gynandromorphism," by E. A. COCKAYNE, M.A., D.M., M.R.C.P., F.E.S. Price, 3/- Net.

A SYNOPSIS OF THE BRITISH SIPHONAPTERA, by the Hon. N. CHARLES ROTHSCHILD, M.A., F.L.S., illustrated by Eight Plates (issued in the Ent. Mo. Mag. for March, 1915, pp. 49-112), price 1s. 6d. Apply to the publishers.

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MONTHLY MAGAZINE.

EDITED BY

G. C. CHAMPION, F.Z.S. J. E. COLLIN, F.E.S.

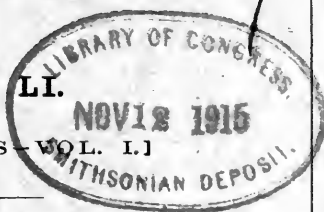
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VOLUME LI.

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ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Wednesdays, November 3rd & 17th, December 1st, 1915. January 19th (ANNUAL MEETING), February 2nd, 1916.

The Chair will be taken at 8 o'clock in the evening precisely.

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THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m. on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

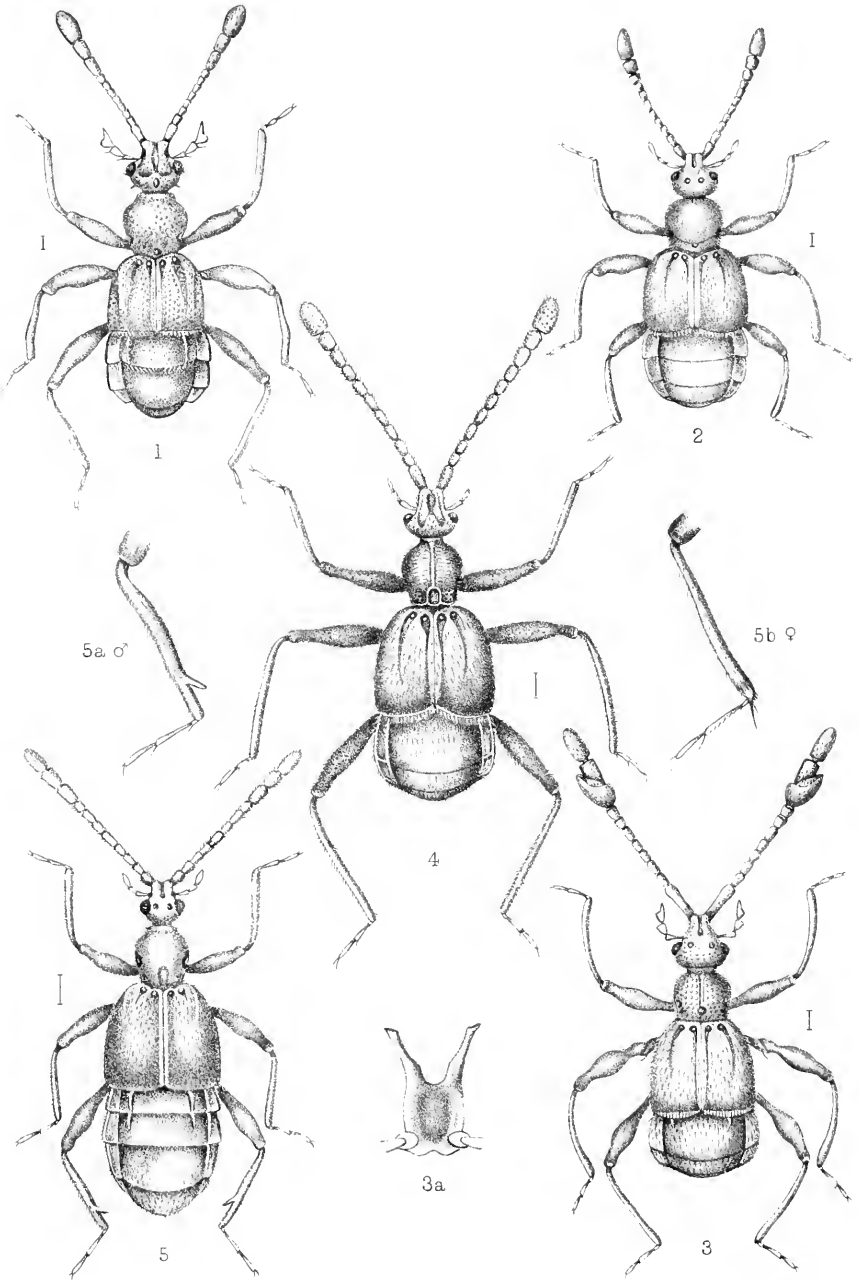
November 2nd—Special Exhibition and Discussion: Fam. Pieridae. Short papers by J. A. SIMES, F.E.S., L. W. NEWMAN, F.E.S., and HAROLD B. WILLIAMS, LL.B. November 16th—"Tramping and Botanical Reminiscences of a Lakeland Holiday," E. B. BISHOP; Exhibition: "Thorn Moths," arranged by Lepidoptera Committee, December 7th—Annual General Meeting.

Hon. Sec.: J. Ross, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, and commence at 8 p.m. The Meeting Room is open at 7.30 p.m.

Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.



G.E. Bryant del.

West, Newman lith

NEW PSELAPHIDAE.

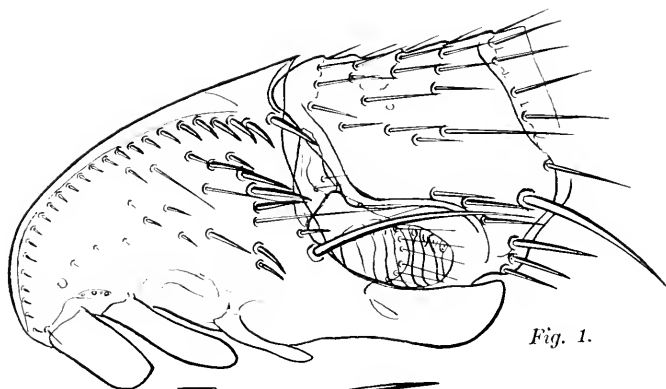


Fig. 1.

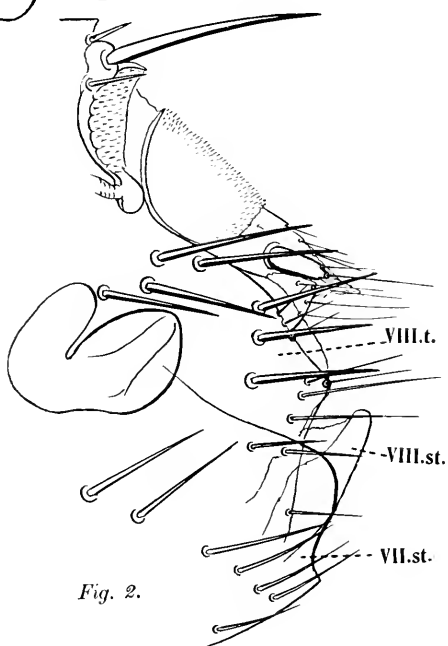


Fig. 2.

CHIROPTEROPSYLLA BROCKMANI.

NEW SPECIES OF *PSSELAPHIDAE* (GROUP *TYRINI*)

BY G. E. BRYANT, F.E.S.

(PLATE XXI).

The *Tyrini* appear to be rare, and I only succeeded in obtaining 14 species belonging to nine genera from Penang and Sarawak. Of these nine genera, five were found in the nests of ants and termites, and two were taken by beating dead branches in the jungle in the evening, which is probably a proof that they are myrmecophilous, as the *Clarigerinae* are sometimes met with in the same way. The remainder were collected by sifting dead leaves. It is highly probable that the great majority of the *Tyrini* are myrmecophilous or termitophilous, which would account for their apparent rarity. So far as present known, they are represented by fifteen genera in the Malayan region. *Eulasinus*, *Labominus*, *Pselaphodes*, and *Lasinus* are very closely allied, *Pselaphodes* being the Malayan representative, although one species occurs in Ceylon. *Eulasinus* includes one species from China; *Labominus* two species from India and Japan; and *Lasinus* two species from India and Japan. I now add a third, rather doubtfully, to *Lasinus* Sharp, as it does not seem to require a separate generic name. We already have over 488 genera for the *Pselaphidae*, for probably under 3,700 species. Among the species collected, which I am able to determine, are the following: *Taphrestethus hamotoides* Sch., Sarawak, Quop; *Pselaphodes villosulus* Westw., Sarawak, Mt. Matang and Mt. Merinjak; *Ancyrocerus punctatus* Raffr., Penang; *Tyrodex clavatus* Raffr., Sarawak, Mt. Matang (described from a specimen from Singapore); and *Pseudophanias cribricollis* Raffr., Penang.

Tmesiphorus matangensis sp. n. (Plate XXI, fig. 1.)

♂. Oblong, castaneous, rugosely punctured, and with short golden pubescence. Head about as long as broad, sub-triangular, attenuate in front, from eyes to base rounded; frontal tubercle sulcate in middle with a fovea at its base; two large depressions between the eyes, and a fovea in middle near base; eyes large and prominent; two sharp spines on each side of head, one projecting under the eye and another between eye and base. Maxillary palpi with joint 2 long and slender, slightly curved, with the apex broader, with a spine at apex on outer margin; 3 shorter, irregularly triangular, with a spine on outer angle; 4 with basal half rounded on outer side, inner margin straight from base to apex, with apex acute. Antennae rather stout, with a well-defined 3-jointed club; joint 1 long, cylindrical; 2 much shorter, sub-quadrate; 3—8 about equal, obconical, each shorter than 2; 9 much longer, broadening to

apex, nearly equal in length to the three preceding joints; 10 a little shorter, sub-quadrate; 11 longer, sub-ovate, truncate at base. Prothorax longer than head, cordate, gibbose, with sides before middle slightly rounded and thence compressed to apex; sides foveate behind middle, and a fovea in middle near base. Elytra transverse, very little longer than the prothorax, attenuate at base, with the sides rounded, bifoveate at base, with a strong dorsal sulcus. Abdomen large and convex, a little longer than the elytra, with the sides rounded and distinctly margined; the first two dorsal segments about equal; segment 1 bicarinate near sides from base to apex. Metasternum punctured, and with a strong longitudinal impression extending from middle to posterior margin. Ventral segments: 1 short; 2 and 3 large and equal; 4 and 5 short; 6 larger, oval. Femora incrassate in middle; intermediate and posterior tibiae slightly bent outwards from middle to apex; tarsi with joint 3 longer than 2. Length, 1.80 mm.

♀. Metasternum more strongly punctured, the impression feebler; abdomen broader, the 6th ventral segment more transverse; and club of antennae slightly narrower.

Hab.: SARAWAK, Mt. Matang, alt. 1,000 feet (29.xii.13, 2 ♂♂, 1 ♀, found under bark, with ants).

Belongs to Raffray's Group IX, and allied to *T. bispina* Raffr. and *T. squamosus* Raffr., from Sumatra; but readily distinguished by its much smaller size, and by the shape of the maxillary palpi. For Raffray's Table, see Ann. Soc. Ent. Fr., 1904, p. 377.

Tyrus myrmecophilus sp. n. (Plate XXI, fig. 2.)

♀. Oblong, attenuate in front, ferruginous, nitid, with short, grey pubescence, palpi and tarsi testaceous. Head about as broad as long, attenuate in front, sulcate in middle, antennal tubercle rounded, eyes large, two foveae between eyes. Antennae ferruginous, long, with the club of three joints well defined and almost black; joint 1 long, about twice as long as broad, cylindrical; 2 oblong and shorter; 3-7 obconical and equal to each other; 8 quadrate; 9 larger, about as long as broad, slightly obconical; 10 a little larger, obconical; 11 more than twice as long as 10, sub-ovate, acuminate at apex, and from apex to middle on outer side rather oblique. Maxillary palpi long; joint 2 long and curved, broadening to apex; 3 shorter, obconical; 4 a little longer, fusiform. Prothorax longer and very little broader than head, sub-cordate, convex; a deep fovea on each side behind middle connected by an arcuate sulcus, and on posterior side of sulcus in middle another fovea. Elytra sub-quadrate, very little longer, but much broader, than prothorax, slightly broader than long, somewhat attenuate anteriorly; two foveae at base; sutural stria well marked, discoidal stria short. Abdomen very little longer than elytra, about the same width at their widest; first three dorsal segments equal, broadly margined, with sides feebly rounded, very slightly attenuate to apex. Legs stout, femora incrassate in middle, tibiae slightly curved. Metasternum transverse, longitudinally and feebly grooved in middle. Intermediate trochanters

armed with two short spines. Six ventral segments visible: 1 short, 2 and 3 equal, 4 and 5 short, about equal, 6 triangular. Length, 1.50 mm.

Hab.: SARAWAK, Mt. Matang, alt. 2,000 feet (28.i.14, found under bark with ants).

Allied to *Tyrus corticalis* Raffr., from Singapore, but a much smaller species, and with the antennae differing in the shape of the joints and in the darker club; no carina at base of first dorsal segment, and abdomen less rounded and attenuate (see Raffray's figure in Rev. d'Ent., 1890, p. 215, pl. III, fig. 18).

Pselaphodes antennatus sp. n. (Plate XXI, figs. 3, 3a).

♂. Oblong, attenuate in front, rufo-testaceous, with the elytra brighter red and more polished, clothed with pale pubescence, palpi testaceous. Head sub-triangular, rugosely punctured, attenuate in front, shortly sulcate, with a fovea at its base; two foveae between eyes, the latter large and prominent, situate a little behind the middle. Antennae long; joint 1 very long, nearly as long as head; 2-6 about equal, slightly obconical; 7 and 8 a little shorter; 9 very large, much longer and broader than the two preceding, sub-triangular, with the outer margin long and rounded, the inner margin much shorter and slightly rounded, apex oblique and hollowed out within, with long golden pubescence; 10 somewhat oblong; 11 a little longer, oval, and truncate at base. Maxillary palpi with joint 1 very small; 2 long and slender, slightly curved at base, broader at apex; 3 about as broad as long, obtusely angled on outer margin; 4 a little longer, dilated and obtusely angled on outer margin, at base attenuate, and acuminate at apex. Prothorax a little longer than broad, slightly longer than head, attenuate in front, rugosely punctured, longitudinally sulcate in middle, the sulcus terminating in a fovea at a little before base, also a small fovea on each side behind middle. Elytra nitid and bright red, nearly twice as long as prothorax, and broader, attenuate at base, apex truncate, sides slightly rounded to base, two basal foveae, dorsal stria extending a little beyond middle. Abdomen large, but shorter than the elytra, a little broader than the elytra about middle; first dorsal segment large, with sides broadly margined and two short carinae at base. Metasternum (fig. 3a) concave, armed on the anterior margin with two long bent tubercles branching out behind the intermediate coxae. Ventral surface of abdomen concave. Legs long; intermediate trochanters bearing at apex on the under-side a short spine; femora incrassate in middle; anterior and intermediate tibiae curved, posterior pair straighter; tarsi with joint 2 a little longer than 3. Length 2.50 mm.

Hab.: SARAWAK, Quop, alt. 600 feet (14.iii.14, found by beating dead branches).

Allied to *P. heterocerus* Raffr. from Java, but differs, among other points, in colour and in the form of the antennae (see Raffray, Rev. d'Ent., 1882, p. 16, plate II, fig. 16).

Lasinus termitophilus sp. n. (Plate XXI, fig. 4).

♀? Reddish brown, clothed with long golden pubescence, depressed, femora and elytra redder, maxillary palpi flavous. Head sub-triangular, about as long as broad, pubescence long, somewhat obscuring the sculpture; attenuate in front and punctured, longitudinally sulcate from apex to middle, two obscure foveae between the eyes. Antennae long, reaching to the apex of the elytra; joint 1 long, cylindrical; 2-7 shorter, and slightly obconical; 8 more oblong; 9 and 10 slightly longer and broader; 11 sub-ovate, about twice as long as 10, broader and truncate at base. Maxillary palpi with joint 2 curved and slender, broadening to apex; 3 shorter, broadening to apex; 4 about equal to 3, acuminate at apex. Prothorax cordate, rugosely punctured, the sculpture obscured by the long pubescence; gibbose, and having the appearance of being longitudinally carinate in middle; the base with three depressions, the middle one being most marked, and rounded in front. Elytra sub-quadrate, brighter red, with the suture infuscate, with fine scattered punctures and long golden pubescence, two foveae at base, sutural stria well marked, discoidal stria curved and attenuate a little beyond middle. Abdomen shorter than the elytra, depressed at the base, segment 1 the longest; 5 dorsal segments visible. Metasternum quadrate, frontal half very convex, posterior half convex and hollowed out slightly under the base of the anterior half. Ventral segments: 1 short, with thick golden pile; 2 larger; 3, 4, 5 short; 6 transverse. Legs very long; femora incrassate in middle, intermediate pair very slightly curved; tarsi with joints 2 and 3 about equal, two equal claws. Length 3 mm.

Hab.: SARAWAK, Mt. Matang, alt. 1,000 feet (l.ii.14, in the nest of *Capritermes nemorosus* Hav., made of mud on the ground; the beetle was found in the bottom of the nest, and a great number of a very curious little species of *Staphylinidae* occurred with it).

I have placed this species provisionally in the genus *Lasinus*, but it differs slightly in the form of the maxillary palpi (a very important character), the 4th joint being about equal to the 3rd, but without being dilated or angled as in *Pselaphodes*; the present insect, therefore, is evidently more closely related to *Lasinus*. It also differs in the head being shorter, and the legs entirely unarmed. In *Lasinus* they are armed in the two sexes. *L. termitophilus* is such a fine, conspicuous species that it is advisable to describe it, in spite of the sex of the unique individual not having been ascertained.

Palimbolus doddi sp. n. (Plate XXI, figs. 5, 5a, ♂; 5b, ♀).

♂. Oblong, castaneous, with the elytra orange-red, nitid, and clothed with rather long golden pubescence. Head small, sub-triangular, eyes large, antennal tubercle slightly rounded, shortly sulcate in middle, with a fovea at base of sulcus, and two rather large foveae between the eyes. Antennae elongate, with short pubescence; joint 1 large, sub-cylindrical; 2 a little longer than broad

shorter and narrower than 1; 3 and 4 about equal, each a little longer and narrower than 2, and broadening slightly from base to apex; 5 a little longer than 4; 6 and 7 about equal to 3 and 4; 8 shorter, sub-quadrate; 9 broader and somewhat oblong; 10 shorter; 11 ovate, truncate at base. Maxillary palpi with joint 2 long and slender, broadening to apex; 3 much shorter; 4 larger and attenuate to apex. Prothorax longer than head, longer than broad, widest in front of middle, attenuate in front, with sides behind middle strongly sinuate; a strong medio-basal impression, rounded anteriorly. Elytra sub-quadrate, smooth and shining, clothed with long pale pubescence, suture infuscate; nearly twice as long as prothorax, attenuate to base, shoulders well marked, bifoveate at base, with dorsal sulcus short. Abdomen longer than the elytra, with the sides strongly margined; dorsal segments 1 and 2 about equal, bicarinate, the two carinae on second segment extending only to the middle; 3 larger; 4 rounded to apex; 3 and 4 strongly convex. Metasternum with a strong oval depression from middle to base. Posterior coxae and trochanters obtusely produced. Ventral segments: 1 short, 2-5 sub-equal, 6 transverse, 7 small, triangular; 4-6 strongly concave. Femora incrassate in middle; posterior tibiae (fig. 5a, ♂) slightly bent and swollen on inner margin, with a strong blunt spur a little before apex. Length 3.90 mm.

♀. Dorsal segments of abdomen not so convex, more attenuate and produced behind; fourth ventral segment larger and not concave; posterior coxae and trochanters simple; posterior tibiae (fig. 5b, ♀) rather more slender and without spur, but with a long stout seta at apex.

Hab.: N. QUEENSLAND, Herberton and Kuranda (4 ♂♂, 1 ♀, xi.1904 and iii.1911). Collected by F. P. Dodd.

This is a very fine and unusually large species sent to me by Mr. F. P. Dodd, after whom I have much pleasure in naming it. It is somewhat allied to *P. puncticollis* Raffr., but differs in many points, notably in the form of the prothorax and hind tibiae (see Raffray, Proc. Linn. Soc. N.S.W., 1900, p. 224, pl. X, fig. 37; Gen. Insectorum, pl. 6, fig. 2).

EXPLANATION OF PLATE XXI.

- Fig 1.—*Tmesiphorus matangensis* sp. n.
 „ 2.—*Tyrus myrmecophilus* sp. n.
 „ 3.—*Pselaphodes antennatus* sp. n.; 3a, metasternum.
 „ 4.—*Lasinus termitophilus* sp. n.
 „ 5.—*Palimholus doddi* sp. n.; 5a, posterior tibia, ♂;
 5b, posterior tibia, ♀.

* * * In the Ent. Mo. Mag. for September, p. 256, I stated that *Cyathiger malayanus* might prove to be the ♂ of *C. sericeus* Raffr., and also that no ♀ was known for the species with 10 joints to the

antennae. I have now had a reply from Mons. Raffray, and he informs me that he has a ♀ of *C. birouis* Raffr., and that the antennae are 10-jointed in the two sexes, a fact which I overlooked in his description [Ann. Mus. Nat. Hung. 1903, p. 91], so that *C. malayanus* will not prove to be the ♂ of *C. sericeus*.

Esher:

August 25th, 1915.

MYELOIS NEOPHANES, sp. n.: AN ADDITION TO THE BRITISH LIST.

(LEP. PYRAL.)

BY JOHN HARTLEY DURRANT, F.E.S.

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PHYCITIDAE.

125. MYELOIS Hb.

7821. *Myelois neophanes*, sp. n.

Antennae slightly dentate and shortly ciliate in the ♂; dark fuscous. *Palpi* curved, ascending, not roughly clothed; dark fuscous, sprinkled with a few whitish scales, especially toward the base of the terminal joint, and on the basal joint. *Houstellum* scaled, fuscous, irrorated with whitish. *Head* dark fuscous, the scales tipped with whitish. *Thorax* dark fuscous, some of the scales tipped with whitish. *Forewings* narrow, termen oblique, veins 4-5 stalked; dark fuscous, some of the scales being tipped with white give an irrorate appearance to the wing, except along the dorsum and on either side of the two transverse lines of white-tipped scales; the *first* line, slightly oblique outward from costa to dorsum, is almost interrupted above the fold, below which it is more conspicuously whitish (owing to the scales becoming entirely whitish)—in some specimens this whitish dorsal marking tends to become lunate; the *second* line, obliquely inward from costa to dorsum, somewhat indented inwardly above vein 5 and on the fold; the obliquely placed discal spots are slightly darker than the ground-colour, but sometimes ill-defined; cilia leaden fuscous, tipped with white and with two fine whitish lines running through them. *Exp. al.* ♂ 15.5—♀ 21 mm. *Hindwings* thinly scaled, shining, pale greyish, darker along the margins; cilia shining whitish, with a dark line along their base. *Abdomen* and *Legs* dark fuscous; tarsi pale-spotted.

Type ♂ (Drnt. 7235); ♀ (Drnt. 7236) E. R. Bankes Coll., BM.

Hab. DORSET: Norden Heath, Corfe, 1-6.VIII.1902, 24-30.VI. 1903 (E. R. Bankes); SURREY: Witley Common, 24.VII.1912 (E. G. R. Waters; Drnt. 7245). Eleven specimens.

This species has been confused with *Salebria fusca* Hw. (= *carbonariella* FR.), which it much resembles, but the termen of the forewings is more oblique, and veins 4-5 are stalked. The hindwings of *Salebria fusca* are conspicuously broader than those of *Myelois neophanes*, and the antennae of *neophanes* are simple in both sexes, while the ♂ of *fusca* has a sinuation above the base, filled with dense projecting scales. Mr. Bankes first met with this species on August 1st, 1902, and made the following note: "Hanbury and I worked Norden Heath from 5-7 p.m., and took . . . *P. carbonariella* (common on dead furze stems burnt last year: some ♀♀ still very fine)" — there are six specimens dated 1.VIII.1902 in the Bankes Collection; on August 6th other captures are noted thus: "*P. carbonariella* (only two good ones)" — one specimen is still in the collection. The species was taken again in the same locality in 1903, and the following note made on June 24th: "6.45-8.45 p.m., on the heath . . . took a few *Ph. carbonariella* (one, a ♂, was taken on wing in sunshine at 7 p.m. far away from any burnt furze; the rest among the burnt furze sticks)" — only two specimens are now in the collection with this date. *Myelois neophanes* was next met with in Surrey, at Witley Common, on July 27th, 1912, by Mr. E. G. R. Waters, who beat a single specimen from a burnt pine. The August records for this insect are probably exceptional, for Mr. Bankes made a general note on dates for the year: "1902 will be about as memorable for record late appearances of *Lepidoptera* as 1913 is for record early ones."

British Museum (Natural History):

September 23rd, 1915.

MYELOIS PHOENICIS, sp. n., BRED FROM DATES IN ALGERIA AND
IN ENGLAND. (LEP. PYRAL).

BY JOHN HARTLEY DURRANT, F.E.S.

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PHYCITIDAE.

125. MYELOIS Hb.

7741. *Myelois phoenicis*, sp. n.

Antennae, Palpi, Head, and Thorax chalky whitish. *Forewings* rather narrow, veins 4-5 stalked; chalky whitish, sparsely sprinkled with greyish scales which are somewhat concentrated to form an obscure *first* line, outwardly

oblique from costa to dorsum and somewhat angulate outward on the fold; the *second* line is only indicated by an obscure costal shade, with a few scarcely traceable spots below; the obliquely placed discal spots are also traceable, but very indistinct; some inconspicuous spots indicate the position of a subterminal line, and seven or eight indistinct grey dots occur along the termen; cilia chalky whitish, traversed by indistinct pale grey lines. *Exp. al.* 22-24 mm. *Hindwings* thinly sealed, chalky white, with a slight brassy sheen in some lights; cilia shining, whitish, with slight indication of a darker shade-line. *Abdomen* and *Legs* chalky whitish.

Type ♀ (98601, *Hamman-es-Salahin*) BM.

Hab. ALGERIA: CONSTANTINE: Hamman-es-Salahin, ⊕ dates, *ex.* 18.IV.1904 (*Lord Walsingham*): ENGLAND (*imported*): London, ⊕ dates, XII.1911, *ex.* 20.VII.1912 (*R. South*). Two specimens.

The markings are very indistinct, and not easily traceable; most nearly allied to *umbratella* Tr. and *unipunctella* Chrtn. This species, which will probably prove to be of economic importance, feeds on dates, and may be widely spread by commerce like *Elyhestia*, *Corcyra*, etc. *Myelois phoenicis* was first met with by Lord Walsingham, who bred it in Algeria in 1904; eight years later it was bred by Mr. South from dates purchased in London; during the present year dates infested by larvae which may belong to this species have been sent from France by Lieut. N. D. Riley, A.S.C., BM.(N.H.).

British Museum (Natural History):

October 13th, 1915.

A NEW AFRICAN BAT-FLEA.

BY THE HON. N. CHARLES ROTHSCHILD, M.A., F.L.S.

(PLATE XXII).

Chiropteropsylla brockmani sp. nov.

In Ent. Mo. Mag. (2) XIV, p. 83 (1903), I described as *Cerato-
psylla aegyptius* a bat-flea from Cairo, which has a comb of black spiniform bristles at the posterior edge of the metepimerum. In 1908 (Ent. Bericht., p. 102), Oudemans proposed for this species the generic name *Chiropteropsylla*.

The Imperial Bureau of Entomology has received a specimen of a second species, collected in Somaliland by Dr. R. E. Drake-Brockman. This example is a ♀ and differs considerably in the shape of the head from *Ch. aegyptius*, of which only one specimen, a ♀, is known.

In *aegyptius* the frontal portion of the head is short and strongly rounded, whereas it is much more elongate in *brockmani* (cf. fig. 1). The specimen bears on the left side of the head a small third genal spine (cf. fig. 1) which is absent from the right side. The false comb on the metepimerum contains 14 spines in *aegyptius* and only 9 in *brockmani*; and the hind-coxae are broader in *brockmani* than in *aegyptius*. Otherwise the two species agree very closely.

The modified abdominal segments of *Ch. aegyptius* are not well preserved. In *brockmani* the seventh sternite almost gradually narrows into a subventral lobe (fig. 2). The stigma of the eighth tergite is large and spinulose. There are four stout bristles below the stigma on this tergite, a row of three or four further down, and a row of four thinner bristles still further ventrally and apically. On the inside is a row of three short bristles and an isolated longer apical one. The receptaculum seminis is large, the tail being slightly longer than the head.

One ♀ from Burao, British Somaliland, April 20th, 1915, off a bat, collected by Dr. R. E. Drake-Brockman.

EXPLANATION OF PLATE XXII.

FIG. 1.—Head of *Chiropteropsylla brockmani*, ♀.

FIG. 2.—Posterior abdominal segments.

Arundel House,
Kensington Palace Gardens, W.:
September, 1915.

THE BRITISH SPECIES OF *SIMULIUM* (DIPTERA).

BY F. W. EDWARDS, B.A., F.E.S.

In the Bulletin of Entomological Research for June, 1915, the writer published a somewhat detailed account of the adult stages of the flies of this family to be found in Britain. It has been suggested that this publication may not be available to many British Entomologists who are interested in the subject, and on that account the following brief summary of the paper has been prepared. The opportunity is taken of stating that the writer is engaged on further work on the life-histories of these insects, and will be glad to enlist the help of other entomologists in this investigation—particularly in the case of the Scotch species.

In Verrall's "List of British Diptera," five species of *Simulium* are noted; a sixth (*S. hirtipes*) was recorded as British by Austen in 1906. The writer has increased this number to thirteen. The species may be separated into two distinct groups.

GROUP A.

Tibiae of front and middle legs with a large patch of silvery-grey dusting on the front or outer side; legs and abdomen with very fine hair-like pubescence; thorax and abdomen of the male usually with silvery markings; last three abdominal segments of female shining; front tarsi more or less thickened.

This group contains seven species, three of which (*S. variegatum*, *S. tuberosum*, and *S. reptans*) are confined to mountainous districts; two more (*S. morsitans* and *S. austeni*) occur mainly in the southern and midland counties of England, while the other two (*S. ornatum* and *S. argyreatum*) are common and widely distributed. *S. reptans* and *S. tuberosum* are habitual bloodsuckers, and are serious pests in parts of Scotland and the Lake District; *S. morsitans* and *S. argyreatum* also bite, but apparently *S. ornatum* and *S. variegatum* do not.

The species may be separated by means of the following keys.

Males:

1. Hind tibiae and metatarsi pale on the basal half2.
Hind tibiae pale only at extreme base, if at all3.
2. Front metatarsi about 5 times as long as broad1. *ornatum* Mg.
Front metatarsi about 6½ times as long as broad ...2. *variegatum* Mg.
3. Hind metatarsi mainly dark and more or less thickened4.
Hind metatarsi mainly pale and not at all thickened
.....7. *argyreatum* Mg.
4. Middle tibiae conspicuously yellowish or silvery on
the basal third or half3. *reptans* L.
Middle tibiae entirely, or almost entirely, black (for
distinctions between these three species, see
figures of genitalia)4. *morsitans* Edw.
.....5. *austeni* Edw.
.....6. *tuberosum* Lundstr.

Females:

1. Frons greyish, dull; claws toothed2.
Frons blackish, shining; claws simple3.
2. Fore and mid femora darkened on apical half1. *ornatum* Mg.
Fore and mid femora almost entirely yellow2. *variegatum* Mg.
3. Face dull greyish; paler species4.

- Face shining blackish like the frons; very dark
species6. *tuberosum* Lundstr.
4. Thorax somewhat shining, with scarcely a trace of
silvery-grey lateral patches towards the front ...7. *argyreatum* Mg.
Thorax scarcely shining, with coarser pubescence and fairly distinct silvery-
grey lateral patches towards the front.....5.
5. Pale markings of legs sharply defined; hind meta-
tarsi clear yellow on basal half3. *reptans* L.
Pale markings of legs less sharply defined; basal
half of hind metatarsus more smoky yellow (in-
sufficiently known for proper distinction).....4. *morsitans* Edw.
5. *austeni* Edw.

GROUP B.

Tibiae without any silvery-grey dusting; when the front tibiae are silvery, this is owing to the colour of the pubescence; thorax and abdomen of male with the silvery markings replaced by coarse pubescence, which is also present in the female; abdominal integument of the female entirely dull; front tarsi not at all thickened.

The six species in this group are not so closely allied as those in Group A. *S. latipes* is perhaps the commonest and most widely distributed species of the genus with us; *S. equinum* is also common in many parts of England; *S. hirtipes* is another mountain insect; the remaining three are more or less local or uncommon. *S. latipes* is apparently quite harmless; *S. hirtipes* and *S. equinum* are both blood-suckers, the latter having a partiality for horses' ears.

In my previous paper an error occurred in the tabulation of the species of this group, the females of *S. aureum* and *S. angustipes* being wrongly described as having the hind metatarsi dark. I therefore give the following fresh tables, based rather on obvious colour characters than on obscure, though important, details of structure.

Males:

1. Hind metatarsi largely pale and quite thin8. *equinum* L.
Hind metatarsi entirely dark and often more or less thickened.....2.
2. Hind metatarsi very much thickened, as broad as the tibiae3.
Hind metatarsi very little thickened, never as broad as the tibiae4.
3. Legs, especially the hind pair, densely hairy.....13. *hirtipes* Fries.
Legs not remarkably hairy9. *latipes* Mg.
4. Pubescence golden; legs not very hairy5.
Pubescence duller, yellowish, hind legs more hairy
than usual12. *subercisum* Edw.

5. Middle and often hind tibiae yellowish towards
 base (normally)11. *angustipes* Edw.
 Middle and hind tibiae not yellowish towards base...10. *aureum*, Fries.

Females:

1. Hind metatarsi at least partly pale2.
 Hind metatarsi entirely dark4.
2. Thoracic integument (normally) with three dark
 stripes on a grey ground-colour; legs for the
 most part black*S. equinum* L.
 Thoracic integument absolutely unstriped; legs largely yellow3.
3. Hind metatarsi clear yellow, with blackish tips ...10. *aureum* Fries.
 Hind metatarsi more smoky yellow, dark beneath
 and on the apical fourth or third11. *angustipes* Edw.
4. Pubescence golden9. *latipes* Mg.
 Pubescence dull yellowish or whitish5.
5. Radial sector of wings simple; claws bifid.....12. *subexcisum* Edw.
 Radial sector of wings forked; claws simple13. *hirtipes* Fries.

SUMMARY OF DISTRIBUTION.

Species new to the British List are marked with an asterisk.

1.—*S. ornatum* Mg. Common and probably generally distributed throughout the British Isles, though less frequent in the Scottish Highlands.

*2.—*S. variegatum* Mg. Gorge of Avon and Cleghorn, Lanarks.; Bonhill, Dumbarton; Forres; Kirkcudbright; Cowrie and Blairgowrie, Perth; various localities in Inverness; Dingwall, Cromarty; Loch Assynt, Sutherland. Cappoquin, Co. Waterford; Wexford; Newcastle, Co. Down. Aysgarth Force and Kirkby Stephen, Westmorland.

3.—*S. reptans* L. Only too abundant in the highlands of Scotland and the Hebrides; also Bassenthwaite, Cumberland; and in Ireland at Kennmare, Cappoquin, Newcastle and Louisburgh.

*4.—*S. morsitans* Edw. New Forest district; Enslow, Oxfordshire; Cambridge; Fakenham, Suffolk; Aviemore, Inverness.

*5.—*S. austeni* Edw. West Moors, Dorset; Rugby; near Oxford; Cambridge; Barnham, Suffolk; Felken, Herts.; Horley, Surrey.

*6.—*S. tuberosum* Lundstr. Loch Maree; Loch Assynt; Dingwall; various localities in Inverness; Bassenthwaite, Cumberland.

7.—*S. argyreatum* Mg. (Lundstr.) (= *S. nanum* Zett. of Verrall's list). Common in the East of England; also at Bonhill and Helensburgh, Dumbarton.

8.—*S. equinum* L. (Edw.) (= *S. maculatum* Mg. of Verrall's list). Probably common throughout England; has also been found in Ireland at Killaloe and Cappoquin, but has not yet been recorded from Scotland.

9.—*S. latipes* Mg. Common throughout the British Isles.

*10.—*S. aureum* Fries. (*angustitarsis* Lundstr.). Mildenhall and near Ipswich; Cambridge; Porthcawl.

*11.—*S. angustipes* Edw. Padstow, Cornwall; Wells, Somerset; Crowborough, Sussex; Harrow district; Cambridge; Barton Mills, Suffolk; Walton-on-Naze; Nairn; Logie, Elgin; Sligo.

*12.—*S. subexcisum* Edw. New Forest; Crowborough, Sussex; Harrow Weald, Middlesex; Tarrington, Hereford. Aviemore, Dunaughton and Nethy Bridge, Inverness; Nairn; The Mound, Sutherland.

13.—*S. hirtipes* Fries. Widely distributed in the Scottish Highlands, but not yet recorded from England, Wales or Ireland.

Harrow:

September 2nd, 1915.

Note on the habits, &c., of Ochthebius poweri Rye.—In the August number of this Magazine (p. 239) the capture of a single example of this species at Exmouth was recorded. During the past month I have had several opportunities of again searching for it in the same locality, at first without success, till the habits of the insect were discovered. As already stated, it lives on the face of the red sandstone cliffs in the earthy incrustation deposited by the constant trickling of water from above, in places just moistened by the fine spray; but it is not to be found amongst the slimy Algoid growth affected by the *Laccobii*, *Elmids*, *Hydraenae*, &c. The insect, when disturbed, immediately hides itself in any available crevice, evidently disliking the light, and at other times clings as tightly as an *Elmis* to the moistened face of the cliff. If the earth adjacent to the trickles of water is scraped away too freely, the locality is soon destroyed by the water carrying everything down to the beach below, where the insects are of course lost. Upwards of a score of specimens were eventually captured by the close examination of this moistened earth, the insect being often so encrusted with dirt that it is difficult to detect. The only other beetle occurring with it was *Georyssus pygmaeus*. The places mentioned are all above the reach of the highest tides, and Rye's statement that the species lives in brackish water (possibly based on information supplied by Dr. Power) can scarcely be correct. *O. poweri* Rye (1869), treated as a variety of *O. dentifer* Rey (1885) in our latest British Catalogue, seems to me to be inseparable (when cleaned specimens are compared) from the variable *O. metallescens* Rosenh. (1847), the only apparent difference being its small size and coarser elytral punctuation. These characters, however, will not even serve to distinguish British examples, as I have taken others exactly like them at Azazga, Algeria, from the bed of a nearly dried up stream. Ganglbauer gives a very extended distribution for *O. metallescens*, though Britain and Algeria are, of course, not included. Kuwert places *O. metallescens* next to *O. poweri*, in his sub-genus *Cheilochthebius*, figuring the head and prothorax of each of them, but the slight differences shown in his illustrations are probably due to the position from which these portions of the insect are viewed. The allied *O. foveolatus* Germ. and *O. dentifer* Rey have

slender tarsi, smoother elytra, and a smooth bare space down the middle of the metasternum. In *O. metallescens* (*poweri*) the tarsi are comparatively stout and the metasternum is closely pubescent throughout. Cleaned specimens of the latter show the rows of minute squamiform hairs on the elytra, which are indeed noticed by Rye, though he did not observe the uniform metasternal vestiture of the single example upon which his description was based. In all three species (*O. metallescens*, *O. foveolatus*, and *O. dentifer*) the anterior angles of the prothorax are sharp and prominent. Various other members of the genus have an equally wide distribution, our somewhat local *O. exoratus* Muls. and *O. punctatus* Steph., as well as the common *O. impressicollis* Lap., extending to the Mediterranean region and Morocco.—GEO. C. CHAMPION, Horsell, Woking: *October 12th*, 1915.

Xylophilus immaculatus Champ.: a change of name.—Since the publication of my paper on the Bornean *Xylophili* (*antea* pp. 278–288), the proofs of which were corrected in Devonshire, a preoccupied specific name, *immaculatus* (*i.e.*, p. 285), has been detected, Lea having already used the same name (under *Syzeton*, a synonym of *Xylophilus*) for an Australian insect: *immaculipennis* is here substituted for the Bornean species.—G. C. CHAMPION: *October*, 1915.

Prionus coriarius F., in *Epping Forest*.—On January 10th, 1915, while examining a log of oak in Epping Forest, I found a small larva of a Longicorn beetle in a burrow between the bark and the actual wood of the tree. Further investigation revealed the presence of three full-fed larvae, which, through the kindness of Dr. C. J. Gahan, were identified as *Prionus coriarius* F. Since then I have on four occasions taken larvae from oak logs in the same locality. In all, I took 20 specimens, 17 of which were quite mature. The burrows made by the larger larvae were about one inch in breadth, and directly under the bark, but those of the younger individuals were in the wood itself. The longest burrow I observed was more than two yards in length, and the larva was still boring. The galleries were simple, there being no ramifications, as is the case with the tunnels of the smaller Longicorn *Rhagium inquisitor* F., a beetle I have always taken from logs attacked by *Prionus*. In July, on revisiting the place where larvae had occurred, I found seven pupae. Some of these were in the log itself, and others in the ground immediately below the log. In both cases, however, a cocoon of chips of wood, etc., had been formed. The lining of the cocoons found in the ground was of clay. On September 5th I took a dead specimen of the imago under a hornbeam log lying in a dry ditch not far from the original locality; the specimen was a female and only slightly damaged. The particular part of the Forest in which I have taken larvae and pupae of *Prionus* is restricted to an area of less than one acre. Although there is here a preponderance of beech timber, only oak appeared to be attacked. My thanks are due to Mr. G. W. Thomas for rendering great assistance in collecting the larvae and pupae.—HAROLD E. BOX, 86, James Lane, Leyton, Essex: *October 12th*, 1915.

Patrobis septentrionis Dej., in Yorkshire.—Some time ago when looking over an old box of duplicate *Coleoptera*—a box which had been packed away with other things and forgotten—I noticed an insect which struck me as very unusual. On examination, I found it labelled “Frizinghall, Bradford, 1889.” About this time I was only just beginning to pay some little attention to the *Coleoptera*, and doubtless the specimen was then regarded as a somewhat immature example of the common *P. excavatus* Payk. After a more recent examination, however, I came to the conclusion that the insect was the much rarer *P. septentrionis*, and Mr. Tomlin has kindly confirmed my determination. There is only one previous Yorkshire record for the species, and this has always been considered doubtful by our Coleopterists.—J. W. CARTER, 15, Westfield Road, Bradford: October 14th, 1915.

Lesteva luctuosa Fauv., in Yorkshire.—During May last I had the pleasure of visiting the locality in N.-W. Yorkshire where I took, in July, 1913, three specimens of *Lesteva luctuosa* Fauv. (*Ent. Mo. Mag.*, March, 1915, p. 125). I am glad to be able to record this species as fairly common, but extremely local. All my examples were captured by shaking moss—since named for me by my friend Mr. Huxley, *Eurhynchium rusciforme*—which was growing on the submerged boulders in the mountain stream. Although so early in the season a large number, thirty to forty per cent., were imperfect, having lost portions of their legs or antennae, so that, presumably, they have some formidable enemy to contend with. *L. luctuosa* was introduced to the British fauna by Mr. Donisthorpe (*Ent. Record*, 1911, p. 301), on the strength of a single specimen taken by him “in the Isle of Eigg, a small island near the Isle of Mull, in the inner Hebrides, off the west coast of Scotland.” Other beetles which I noticed in company with the *Lesteva* were *Platambus maculatus* L., *Lesteva longelytrata* Goeze, one *L. pubescens* Mann., and an abundance of *Elmis aeneus* Müll.—J. W. CARTER.

Carabus arvensis Herbst, in Yorkshire.—In reference to Mr. Bayford’s note on the occurrence of *C. arvensis* in Yorkshire (*Ent. Mo. Mag.*, October, 1915, p. 293), I may say that the species is found on Baildon Moor, not more than two or three miles away from the City of Bradford. I have two specimens that were taken there, one labelled April, 1897, the other 1898.—J. W. CARTER.

Carabus arvensis in Yorkshire.—In reference to Mr. Bayford’s note on the occurrence of this species in Yorkshire (*antea* p. 293), the insect is apparently more widely distributed in the county than these records seem to show. Mr. M. L. Thompson records its occurrence on Stanghow Moor, near Saltburn (*Proceedings of the Cleveland Naturalists’ Field Club*, Vol. II, p. 186), and I have myself taken it in small numbers for several years in succession under stones on a grassy part of Eston Nab, an outlier of the Yorkshire Moors in the immediate neighbourhood of Middlesbrough.—GEO. B. WALSH, 166, Bede Burn Road, Jarrow: October 4th, 1915.

Criocephalus fesus Kr., at Godalming.—It may interest you to know that a specimen of *Criocephalus fesus* was taken on the school grounds here last Monday. Dr. Sharp identified it for us.—O. H. LATTEK, Charterhouse, Godalming: September 24th, 1915.

Scymnus arcuatus Rossi, in the Oxford district.—On July 29th the Rev. J. F. Perry very kindly sent me a pair of living specimens of this very rare *Scymnus*, which he had taken on ivy at Stonor Park, near Henley-on-Thames. The next day I tried some likely-looking old ivy at Godstow (on the Berkshire side of the Isis), and beat out a specimen almost at once. But many subsequent visits to the same spot by Mr. J. Collins and myself have shown that the insect is here decidedly rare, and only a very limited number of examples have so far been taken by us; neither have we met with the *Aleurodes*, on which the beetle was found feeding by Father Perry at Stonor Park, on the ivy at Godstow or elsewhere in the district. In the Dale Collection of *Coleoptera* in the Oxford University Museum there are three examples of this *Scymnus*, one of which bears a label in Wollaston's characteristic handwriting "(new to England) Shenton, Leicestersh.," and a second is marked "Shenton," under the card; these are probably some of Wollaston's original captures of the insect, as recorded by him in Ent. Mo. Mag., Vol. IX, p. 117.—JAMES J. WALKER, Oxford: October 18th, 1915.

Cyaniris argiolus abundant in Norfolk.—*Cyaniris argiolus* is recorded as having been abundant in the London district again this year. In a recent visit of a few days to Ormesby Broad at the end of August last, I found the species also abundant in the little village of Filby, adjoining the Broad, and where I was staying. It occurred all over the village, feeding on the blackberry blooms on the sides of the roads, and about the ivy which there largely covers the trunks of the older trees. This is about the only butterfly which seems to be increasing in numbers in Britain.—GEO. T. PORRITT, Elm Lea, Dalton, Huddersfield: October 7th, 1915.

[Both broods of *C. argiolus*, especially the first, have been exceedingly well represented at Oxford this year.—J. J. W.]

Hemiptera-Heteroptera, &c., in S. Devon.—The following *Hemiptera-Heteroptera* were noted by me during September: Budleigh Salterton—*Teratorcoris antennatus* Boh.,* sparingly, on the banks of the Otter, on *Scirpus maritimus*, the specimens captured (mostly ♀♀) varying in colour from bright green to ochreous, the dark markings, too, showing great variation in development, those with almost immaculate elytra looking very like *T. saundersi* D. and S.,* females of which were occasionally taken in the same sweep of the net; *Cytorrhinus caricis* Fall., with the preceding; *Lygus pratensis* F., a curious large, elongate, brightly coloured ♂; *Salda pilosella* Thoms. Woodbury Common—*Coranus subapterus* de Geer,* on the heath. Dawlish Warren—*Orthotylus rubidus* Fieb., var. *moncreaffi* D. and S., not rare, and *O. flavosparsus* Sahlb., by sweeping

salt-marsh plants along the banks of the estuary. Four specimens of a peculiar grasshopper, *Conocephalus dorsale* Latr., were also swept from the dense growth of *Scirpus maritimus* at Otterton. The species of *Hemiptera* marked with an asterisk are not given from Devonshire in Saunders' work.—G. C. CHAMPION, Horsell, Woking: *October 18th, 1915.*

Bothynotus pilosus Boh., near *Carlisle*.—On August 14th last, I captured one specimen, a fine male, of this rare Hemipteron. It was taken by general sweeping in a lane near here. Mr. E. A. Butler kindly identified it.—JAS. MURRAY, 2, Balfour Road, Carlisle: *October 6th, 1915.*

Stenamma westwoodi at *Gravesend*.—While walking along White Hill Lane on the 13th inst, late in the afternoon, a small insect settled on my face. It was a winged ant, and on examination proved to be a ♂ *Stenamma westwoodi*, a species I met with years ago at Maidstone. Mr. Donisthorpe has taken it at Darent Wood, but the insect, so far as I know, has not previously been recorded from Gravesend.—G. E. FRISBY, 40, Windmill Street, Gravesend: *October 15th, 1915.*

Occurrence of Dolerus triplicatus Klug, in *Norfolk*.—In reply to an enquiry made by Mr. H. E. Box, I beg to state that on May 18th, 1912, I had the good fortune to capture four males of this rare Tenthredinid about four miles from King's Lynn. All of them were netted whilst flying amongst species of *Juncus*. Subsequently, I submitted one of these specimens to the Rev. F. D. Morice, and to him I am indebted for its identification. This insect had not previously been known to occur in Norfolk.—E. A. ATMORE, King's Lynn, Norfolk: *September, 1912.*

Syrphus guttatus Fln., in *Cheshire*.—On the 3rd of July last I was fortunate enough to capture three females of *Syrphus guttatus* Fln., at the flowers of *Aegopodium Podagraria* (the "Goutweed") in a lane near my house. All three specimens have the two white marks on the thorax, just before the scutellum. I saw no other specimens, though I searched the likely spots near by, hoping to get the ♂. Verrall refers to *S. guttatus* as "this rare Syrphid," and it would be interesting to know if it is now more common.—HERBERT BURY, Lomber Hey, High Lane, Cheshire: *September 16th, 1915.*

Abstracts of Recent Literature.

BY HUGH SCOTT, M.A., F.L.S., F.E.S.

FROGGATT, W. W.: "SHEEP-MAGGOT FLIES." New South Wales Department of Agriculture, Farmers' Bulletin No. 95, pp. 1-52, 4 plates and other figures, March, 1915.

This work, while primarily concerned with applied entomology, contains much that is of biological interest. In it is brought up to date all information

concerning the sheep-maggot flies of Australia. These are a number of species of blow-flies and other Muscoid *Diptera* which have acquired the habit of laying their eggs, not merely in wounds and sores—as sometimes happens to domestic animals in other parts of the world—but on the surface of “live” wool (*i.e.*, wool growing on healthy sheep), when it is soiled with excrement, etc., or even when it is only wet. The parts of the sheep attacked are generally in the region of the anus, but if neglected the infestation spreads; fresh flies are attracted by the offensive smell of the damaged wool; the maggots working along the sheep’s back cause masses of wool to slough off, leaving the skin inflamed; and if still neglected, the sheep finally dies, probably from some form of blood-poisoning.

Sheep-maggots seem to have been first observed in Britain, and the first notice of them in print was in an old book published by William Ellis at Dublin, in 1749. At the present day they are found all over the United Kingdom, and in Scotland appear to have become a much more serious pest in the last few years. They are recorded from Holland and France. A similar kind of damage to wool has also been reported in recent years from New Zealand, New Hebrides, Molokai (Hawaiian Islands) and South Africa. Though it is not recorded from the East or from America, yet in parts of the latter continent an allied form, the “screw worm” (*Lucilia macellaria*), sometimes kills sheep, or even men, by entering the body through wounds, or even through the skin.

In Australia, where these insects are a most serious pest, the forms hitherto identified in healthy wool are: four native species of *Calliphora* and one of *Neocalliphora*; a native species of *Lucilia* and one of *Sarcophaga*; the wide-ranging *Ophyra nigra*; and the following almost cosmopolitan species, all common in Britain, and some of which may have been introduced into Australia at an early date: *Calliphora erythrocephala*, *Lucilia sericata* and *L. caesar*, *Musca domestica* and *M. corvina*, and *Stomoxys calcitrans*.

Sheep-maggot flies are recognised pests in all parts of Australia, the greatest damage caused by them having occurred in Queensland and New South Wales. But it is only about 18 years since they were first noticed attacking healthy growing wool, though some of them may have infested wounds and sores on the sheep at times much longer past. As stated above, several of the species are peculiar to Australia, and have therefore been present all along, while some of the imported species were probably introduced at a much earlier date than 18 years ago. Why, then, have such flies, normally carrion-feeders or saprophagous, recently acquired the habit of “blowing” live wool? Froggatt considers that it probably first arose from their earlier habit of laying eggs or living larvae (as the case may be) in the wool on carcasses of sheep that have died from drought. The similarity of the smell of soiled or damp wool on living sheep to that of the dead wool might easily attract the flies to lay on the live beasts; while the decomposition set up by the first larvae would attract flies of other species, and so on. Moreover, certain circumstances have caused a vast increase in the number of the flies. For instance, at about the time when this increase became very noticeable, war was being waged on the swarms of

rabbits which were becoming a serious plague. Stacks of dead rabbits were left to rot, and it is easy to understand how the presence of such carrion must have caused an increase in the number of flies, which again might tend to bring about the adoption of new habits. A Chalcid parasite (*Nasonia brevicornis*) of the blow-fly pupae, as well as other enemies of the flies, remedial measures, etc., are also discussed.

[NOTE: THE TERM "BLOW-FLY." In making the above abstract I became curious as to the history of the terms "blow-fly," "blown meat," etc. Finding no mention of the matter in Lowne's "Blow-fly," nor in several more general text-books, I consulted Murray's New English Dictionary. It is there stated that "blow-fly" is a recent popular name for the "flesh-fly," but that the term to "blow" in the sense of to "deposit eggs" is of considerable antiquity. It is probably needless to say that this old term had no connection with the notion of *inflating* meat, but simply meant to deposit eggs. Its origin does not seem to be explained. There was also an old word "blote" or "blot," possibly connected with "to blow" in this special sense, and meaning the egg or larva of flies or other insects. Many examples are given of the use of "blow" in this sense, of various dates in the 17th and end of the 16th centuries. Of these the following may be quoted here: from Shakespeare's "Tempest," Act 3, Sc. 1, "to suffer the flesh-fly blow my mouth"; from Samuel Purchas, "A Theatre of Politicall Flying-Insects," London, 1657, p. 48, "as the blotches of the flyes are nourished by the flesh wherein they are blown"; from Thomas Wagstaffe's "Vindication of King Charles the Martyr," 1692, "It is the Nature of Flies to be ever buzzing, and blowing upon anything that is raw."—H. S.].

Reviews.

"LEPIDOPTERA (MOTHS) AND OTHER INSECTS AT SCOTTISH LIGHTHOUSES, CHIEFLY IN THE FORTH AREA." By WILLIAM EVANS, F.R.S.E. (Reprinted from the "Scottish Naturalist," March, 1914—June, 1915).

Entomologists in general, and Lepidopterists in particular, will welcome this interesting and highly suggestive paper. It embodies the observations made by the writer on insects, mainly nocturnal *Lepidoptera*, received by him during the last few years from thirteen lighthouses on the Scottish coasts, most of them in the Firth of Forth, but ranging from Wigtownshire to the Butt of the Lewis and the extreme north of Shetland; and it is preceded by a valuable summary of the general question of insect migration. The amount of material supplied to the author by the hearty co-operation of the lightkeepers and others is very large, over 6,000 moths of 159 species—4,000 of these from one lighthouse alone—as well as a fair number of insects of other Orders, having passed through his hands. Many of the records are of great interest, either as showing an unexpected extension of the range of certain forms, or as indicating the comparative attraction for different species of a light of exceptional power; the somewhat uncommon Noctuid, *Dasyptilia templi*, would appear to have a special predilection in this respect, as it is reported from eight out of the

thirteen lighthouses, and to one of them no fewer than ninety specimens were attracted on three consecutive nights. We trust that these important observations will be continued, and that even more interesting results will be obtained.

“BRITISH ANTS, ETC.” By H. ST. J. K. DONISTHORPE, F.Z.S., etc. With 18 Plates and 92 Diagrams. Plymouth: William Brendon & Son. 1915.

We cannot hope in such space as is here at our disposal to do real justice to this important and handsome volume. But we can at least congratulate its author on having produced the most interesting, the most accurate, the best illustrated, and—beyond all comparison—the most complete account of the British ant fauna that has ever been published.

It commences with a minute and careful explanation, clear in itself and made still clearer by the help of diagrams, of the external and internal structure of an ant, and of the terminology applied to its various parts by the most recent myrmecological experts. It is not Mr. Donisthorpe's fault that this terminology should differ a good deal (and generally, in our opinion, for the worse) from that hitherto acquiesced in by most writers on other groups of *Hymenoptera*. Still, we regret his acceptance of “epinotum,” instead of the far older *propodeum*, and of “strigils” for the *colcarium antica*. (*Strigilis* was introduced by W. Kirby in 1802 to denote not the calcar, but the excavation in the metatarsus which faces it!) *Brachius* again is “an ill phrase” grammatically; and it seems unreasonable to call a nerve which is not in the “median area” at all “transversomedialis.”

Next, under the heading “Life History,” we come to a series of well-arranged and extremely interesting sections, dealing with the “matings” of the sexes, the foundation of new colonies—a most curious subject, till lately quite unexplored, but now to a great extent cleared up by researches in which Mr. Donisthorpe himself has taken a leading part—the development of the individual ant in all its stages from oviposition to the emergence of the imago, etc. The photographs from nature of eggs, larvae, and pupae, here introduced are truly beautiful, and worthy of the text which they illustrate. We can give them no higher praise.

Passing on to what Mr. Donisthorpe calls the “Polymorphism of Ants,” we must confess ourselves inclined to protest against his endorsement of the scheme and terminology which he quotes at length from the well-known work of Professor Wheeler. It seems to us altogether unreasonable to classify together as “phases” (*sic*) of a single phenomenon, to which the name “Polymorphism” is to be restricted, a series of phenomena so different in nature and origin as (1) the distinctions between normal ♂♂ and ♀♀; (2) the differences between perfectly and imperfectly developed females, “queens” and “workers”; (3) the differences between workers belonging to various “castes,” such differences being related to their different functions in the community; (4) pathological malformations caused by internal parasites; (5) monstrosities combining characters of different sexes; and (6) mere individual differences of size in individuals otherwise similar. To construct a kind of Table, bringing all these phenomena

into connection one with another, and to furnish each of them—even the normal ♂ and ♀ (!)—with a new Greek name to emphasize their supposed affinities. seems to us not only superfluous, but actually misleading. But in saying this we are reviewing not Mr. Donisthorpe, but the authorities whom he probably felt compelled to follow.

For lack of space we must here close our sketch of Mr. Donisthorpe's introductory matter. But we regret it, for the sections dealing with senses, faculties, etc., are extremely interesting, and it goes without saying, that on all such practical matters as collecting, preparing, and preserving specimens, keeping ants captive in observation nests, etc., he writes with the authority of an acknowledged expert.

On page 65 commences the actual Monograph, in which every form known to be indigenous, or at least thoroughly established in Britain, is described, classified, etc., with a complete account of, literally, *everything* yet discovered as to its habitats, instincts, life-history, and associations (friendly or hostile) with other ants or with various small creatures belonging to other families or orders. Such work as this cannot here be reviewed in detail. It must suffice to say that every section of it is a veritable monument of conscientious industry and unsurpassed knowledge of the subject in all its aspects. Yet one detail we must note for special approval. The original *author's* definition of every genus, species, etc., is given in his own words. What an infinity of misidentification might have been avoided if every monographer had done likewise!

A few changes in our hitherto received lists of British genera and species—but, happily, only a few—are made necessary by the appearance of this monograph. *Anergates* must be added to our genera, and *Prenolepis* rejected as an alien. Our lists of species in certain genera (especially *Myrmica*, *Leptothorax*, and *Formica*) will require considerable emendation. The author must be congratulated on his complete and interesting solution of the old puzzle about *Formica glabra* or *gagates* of British authors. The insect in question turns out to be one long ago described by Nylander under the name *picea*, which must be adopted for it. It has the singular habit of forming its nests only in bogs, their chief material being quite wet sphagnum!

After dealing with the really British ants, Mr. Donisthorpe gives us not, indeed, descriptions, but an annotated list of no less than 50 species or named forms, which have occurred in shops, conservatories, forcing-pits, etc., in various British localities, *e.g.* often in Kew Gardens, but are manifestly only accidental importations. Many of them were first detected in this country by the author himself. We were at first inclined to think this part of the work a superfluous luxury. But the reason given by Mr. Donisthorpe for introducing it (*vide* pp. 345, l. 20, *et seq.*) has quite converted us.

Obituary.

Colonel Neville Manders, A.M.S., F.Z.S., F.E.S. Born 1859. Died gloriously, 1915.—The death roll of British officers who have fallen in the Gallipoli Peninsula is long, and it contains the names of many friends who have given up their lives for King and country in a cause which we believe, and they believed, to be good and noble. Among them no name is better known to, or has been

more highly esteemed by entomologists than that of Neville Manders, long time a Fellow of the Entomological Society of London, and recognised also as an expert in our Science as well as the best of good comrades. He fell at the beginning of August, and although the official notification of his death, and the telegram from the General Officer commanding the Division with which he was serving at the time, does not inform us of the way in which he met his death, we have no difficulty in supposing that it was in the trenches where the wounded Australians and New Zealanders were his first and constant care. It is pleasant at least to reflect that he retained his interest in the wild life of that blood-stained field of many battles to the last, and that in his letters to his friends, down to within a few days of the end, he found time to observe the butterflies and birds haunting the limestone hills of the Peninsula, and to send home notes upon them. Undiminished, gay in life, even while the great guns were booming, and the air thick with the smoke of conflict.

Born at Marlborough fifty-six years ago, the youngest son of Major Thomas Manders, 6th Dragoon Guards (Carabineers), he was educated at the College which has given us at least another entomologist of the first scientific rank. I do not possess the Transactions of the School Natural History Society, but Colonel Manders often talked with me of his early love for the *Lepidoptera* of the neighbourhood, and how his first inclinations to entomology were fostered under the beech trees of Savernake. From Marlborough he proceeded to walk the London Hospitals, eventually qualifying as F.R.C.P. and M.R.C.S., preparatory to entering the Army Medical Service, being almost immediately ordered to the Soudan, where he served in the Suakin campaign, and was awarded the Khedive's Star, with medal and clasp. Thence he proceeded to Burmah where he was severely wounded, and at the close of the war which added Thebaw's country to the British Empire, received a second medal with two clasps. At the time of—and after—the South African War, he was in Ceylon and Mauritius, whence he began to write the series of interesting papers relative to insect migration and mimicry, published from time to time in the Transactions of the Entomological Society of London, his latest contribution appearing in the "Proceedings" of March 3rd, 1915.

His catalogue of the butterflies of Mauritius and Bourbon (1907) considerably enhances his entomological reputation, and our knowledge of the islands' fauna, and actually added a species, *Nacaduba mandersi* Druce; and a new subspecies, *Antanartia mauritiana* Manders, to the list. He was also a frequent contributor to the entomological magazines, even finding time for communications despite his multifarious duties in Egypt, where he was stationed when hostilities began, with the rank of Deputy-Director of the Medical Service. Here he was joined later, and after the declaration of war with Turkey, by Mr. P. P. Graves, and at the beginning of the present year published "The Butterflies of Lower Egypt" (*Ent. Record*, XXVII, pp. 60-65).

Colonel Manders was married. He leaves a widow and a daughter, to whom we offer our sincerest sympathy. Some idea of the reputation he held in his profession, and the respect with which he was held by the entire Command at the Dardanelles front may be gathered from the following telegram received

by Mrs. Manders from the G. O. C. the New Zealand and Australian Division—units of the immortal Anzac brigade: “On behalf of both myself and the New Zealand and Australian Division, I send our sincerest condolences. Your husband’s work here and devotion to duty make his loss irreparable both to me and to the Division.”

For him, as for the many thousand heroes who have perished in the great enterprise of freedom, may surely be reserved the glorious epitaph of Simonides upon the dead at Plataea:—“These men, having set a crown of imperishable glory on their own land were folded in the dark cloud of death; yet being dead they have not died, since from on high their excellence raises them gloriously out of the house of Hades.”—H. ROWLAND-BROWN.

Society.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY: Thursday, August 26th, 1915.—Mr. A. E. TONGE, F.E.S., Vice-President, in the Chair.

Mr. Main exhibited leaves of the sycamore, in which were the larvae of the sawfly, *Phyllotoma aceris*, and leaves of alder in which another species of *Phyllotoma* fed in a somewhat similar manner. Mr. S. Edwards, butterflies from S. America of the genera *Cybdelis*, *Cyclogramma*, *Catonephele* and *Myscelia*, showing marked seasonal dimorphism. Mr. Newman, a “Blue,” captured in Kent in July, which, from its colour and markings, he considered a hybrid between *Agriades coridon* and *A. thetis*. Mr. Bunnett, bunches of the ova of the lace-wing *Chrysopa flava*, each laid on a separate stalk. Mr. C. B. Williams, a box of *Lepidoptera* he had met with in the Italian Val Formazza, from Domodossola leading up to the Tosa Falls. Mr. Ashdown, two aberrations of *Coccinella bipunctata*, in which the spots were enlarged and united in a very unusual manner. Mr. West (Greenwich), a rare Coleopteron, *Scymnus arcuatus*, presented to the Society’s collections by the Rev. J. F. Perry. Mr. Sperring, extremely dark examples of *Boarmia gemmaria* (*rhomboidaria*) bred from ova, the female parent from Darenth. Mr. Tonge, confluent marked examples of *Anthrocera filipendulae* from Reigate. Mr. B. S. Williams, on behalf of Mr. Wanhill, a *Gonepteryx rhamni*, in which male and female colour were mixed on the fore wings, and several melanic specimens of *Hybernia defoliaria* from Epping Forest. Mr. Bowman, a very fine series of *H. defoliaria* from Epping Forest, including a dozen melanic examples, several light forms, strongly banded forms, mottled forms, etc. In nine years previous to 1914 he had only met with two melanic forms until 1914 in this locality.

Thursday, September 9th, 1915.—Mr. A. E. GIBBS, F.L.S., F.E.S., Vice-President, in the Chair.

Mr. Sano exhibited living larvae, pupae, and imagines of the Longicorn Coleopteron, *Rhagium inquisitor*. Mr. Leeds, under-side aberrations of *Agria-*

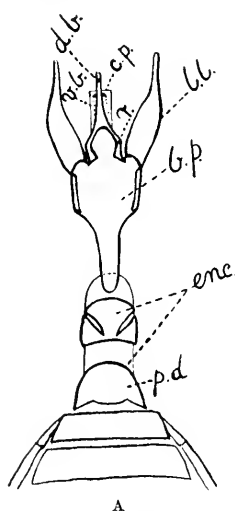
des coridon, ab. *semisyngrapha*, blue suffused females of *Polyommatus icarus* and an ab. *syngrapha* with very dark margins to the wings. Mr. H. Moore, imagines of the *pylades* group of *Papilio* from Africa, and read notes. Mr. West (Greenwich), the rare Coleopteron, *Athous rhombeus*, taken at Ascot during the field-meeting on July 3rd. Mr. B. S. Williams, an aberration of *Eupithecia subnotata* in which the mottled markings were absent, there being present on the sub-marginal area a series of quadrate light spots.—H. J. TURNER, *Hon. Sec.*

NOTES ON BRITISH *PHILYDRUS*.—No. 2.

BY D. SHARP, M.A., F.R.S.

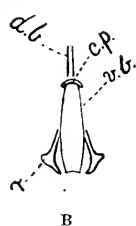
Since I wrote the notes published under this title last year (*Ent. Mo. Mag.*, L, p. 80) some additional and important information has been obtained, and the notes now offered are intended to set this forth.

As I have invoked the aid of the male genitalia, I will begin with an explanation of them which will, I hope, be made comprehensible by



A

the accompanying figures. The aedeagus of *Philydrus* is of the kind normal in the sub-family *Hydrophilini*, and when taken out it looks so much alike in the various species as to suggest that it is of little value for their discrimination. This, however, is not the case, as the median lobe affords important characters, though unfortunately these cannot be seen until it is dissected out from the lateral lobes, which are so voluminous as to enwrap and obscure the median lobe. A dissection is necessary to extract the lobe, and as this involves a somewhat delicate operation, the value of the structure for practical determination of species is somewhat detracted from.



B

The basal piece is large, and extends over more than one-half of the diameter of the tube, and has the anterior part of an unusual and rounded form, a peculiarity characteristic of all the members of the genus, and I believe found only in its limits. The lateral lobes are large and differ but little in the various species. The median lobe when extracted is found to consist of a dorsal and ventral blade, connected

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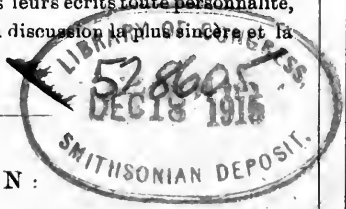
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MEETINGS OF SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Wednesdays, January 19th, 1916 (ANNUAL MEETING), February 2nd.

The Chair will be taken at 8 o'clock in the evening precisely.

The Library is open daily from 9 a.m. to 6 p.m. (except on Saturdays, when it is closed at 2 p.m.), and until 10 p.m. on Meeting nights.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge. The Second & Fourth Thursdays in each month, at 8 p.m. The lantern will be at the disposal of Members for the exhibition of slides.

THE LONDON NATURAL HISTORY SOCIETY which meets at 7 p.m., on the 1st and 3rd Tuesdays in each month, at Room 20, Salisbury House, Finsbury Circus, E.C., will be glad to welcome at its Meetings any French or Belgian entomologists now staying in this country, and to give them the benefit of its library and collections. Communications should be addressed to the Secretary, Salisbury House, E.C.

December 7th — Annual General Meeting. December 21st — Presidential Address: DR. E. A. COCKAYNE. Exhibition: Lycaenidae of 1915.

Hon. Sec.: J. ROSS, 18, Queen's Grove Road, Chingford, N.E.

Arrangements have been made by the Lepidoptera Committee of the above Society for a Member of the Committee to attend at Salisbury House at 6.30 p.m. on Meeting Nights (1st and 3rd Tuesdays in each month, except July and August), for the purpose of giving advice and assistance to young entomologists, whether members of the Society or not. A cordial welcome will be extended to any who care to avail themselves of this arrangement.

Woodford Branch. Meetings are held at the Wilfrid Lawson Hotel, Woodford Green, and commence at 8 p.m. The Meeting Room is open at 7.30 p.m.

Chingford Branch. The Chingford Local Branch meets at the Avenue Café, opposite Chingford Station, at 8 p.m., on the 2nd Friday in each month.

laterally by membranes of considerable extent; the dorsal blade commences as two fangs or roots, and behind these roots is gradually narrowed to form at the apex a process of very different elongation, according to species, and often perfectly transparent and colourless towards its extremity. The ventral blade, though hard (? chitinous), is transparent (like thin glass), sometimes colourless, but in other cases more or less pigmented; it is shaped very differently from the dorsal blade, being approximately parallel-sided, narrower in front where it articulates (or is continuous) with the roots of the dorsal blade, which in *P. maritimus* are largely dilated latero-ventrally; near its extremity it exhibits a stronger chitination, which is coloured and tawny, and therefore appears to form a cross-piece. There is no differentiated sac, the duct being traceable as a duct to the orifice, which lies just above the cross-piece.

P. MARITIMUS Th.

This is really a very distinct species. In addition to the peculiar livid yellow colour of the upper surface, and the yellow palpi and head, the aedeagus marks it off quite definitely from all the others I have examined: the dorsal lamina of the median lobe being prolonged at the tip, and consisting of a coloured portion that extends beyond the cross-piece about as far as the width of the latter, and a transparent terminal or appendicular portion of similar length. The laminar dilation at the base of the fang is greater than in the other species. The diagram gives a very fair idea of the structure in this species.

Some caution is necessary in deciding as to the colour of the clypeus and vertex in *P. maritimus*; the tegument being very transparent, the dark colour of the underlying structures often obscures the real paleness, and in addition to this the labrum is black in the female, though yellow in the male.

P. HALOPHILUS Bedel.

We are indebted to Mr. Newbery for the identification of this species, he having introduced it as new to Britain in the same number of the Ent. Mo. Mag. that contained my notes on the genus last year. The determination rests on an examination by Capt. Deville, who is so careful and competent an entomologist that we may accept it as correct, though I should not have arrived at the same conclusion from the descriptions, the species being very different from the *maritimus* with which Ganglbauer and others have confused it.

P. halophilus is far from being a novelty in Britain; it is, in fact, the basis of the "*melanocephalus*" of my own collection, and probably of others. I first met with it in the salt marshes at Rainham in Kent, in February, 1867; shortly afterwards specimens were given to me by Dr. Power as "*nigricans*," and labelled by me "*nigricans* J. A. P., ? nov. spec., *melanocephalus* var. ??". These examples still bear Dr. Power's registration mark, viz., "66,26," and specimens corresponding with them probably exist in the Power collection at the British Museum. Recently, the species has been found by Mr. C. J. C. Pool, rather freely at Southsea.

P. halophilus has but little resemblance to *maritimus* being of different shape, coloration, and sculpture. The head with the labrum is black, but the clypeus has a yellow mark on each side, and in the male this becomes more extensive so that the front of the clypeus is entirely yellow, though in specimens that have suffered some decomposition the yellow coloration may be much obscured. The palpi are entirely yellow. The dorsal blade of the median lobe of the aedeagus is shorter than it is in *maritimus*.

P. MELANOCEPHALUS.

This name must, so far as I know, disappear entirely from our catalogue; the remarks I made about it last year applying to *P. halophilus*. The specimen I there recorded from Horning is probably another species. The synonymy of the name *melanocephalus* is so complicated and doubtful that we may congratulate ourselves on losing it altogether. Bedel uses the name for *Enochrus bicolor*; and it is possible that Olivier's figure of *melanocephalus* may refer to that species, but I think it better to drop the name *melanocephalus* altogether rather than that of *bicolor*.

Our old *melanocephalus* has been supposed to be a synonym of *quadripunctatus* Herbst; but we have nothing that agrees with the descriptions of that form, so the name should not appear in our lists at present.

P. sp. ?

The example from Horning I referred to under *melanocephalus* last year may probably prove to be a new species, especially as it seems highly probable that *halophilus* is a salt-marsh insect. Unfortunately the specimen is a female; it greatly resembles *P. fuscipennis*, but the palpi are entirely yellow.

PHILYDRUS YTENENSIS, sp. n.

In writing of *P. fuscipennis* last year, I alluded to a specimen found in the New Forest as "most unsatisfactory." I have now, after a good deal of search, found the head-quarters of this form in a spot where it abounds, so that I have been able to examine some 200 examples, and have no doubt that it is a distinct species, for which I find no name in foreign literature. I therefore give it one.

P. ytenensis, sp. n. *Oralis sat convexus, dense, fortiter punctatus, elytris subtiliter, subdistincte serialim punctatis; capite nigro, clypeo utrinque plus minusve late flavo-signato; palpis flavis apicibus nigris; thorace testaceo disco plus minusve late infuscato; elytris pallidis, macula humerali signaturisque externis basalibus nigris; subtus nigricans, tibiis testaceis. Long. corp. 5 mm.*

The specimens found vary but little, except as regards the colour of the front of the head; the rule is that the labrum is black in the female, yellow in the male, and that the yellow colour of the clypeus is limited to a spot on each side in the first-named sex, but extends all over the front of the head in the male; there is a good deal of variation as to this sexual distinction, due, no doubt, partly to maturity, and partly to decomposition; and differences in the extent and intensity of the dark colour of the disc of the thorax are probably largely due to these causes; the black colour of the tips of the palpi is invariable, and is present even in immature specimens. The pale colour of the elytra is also constant, and is not due to immaturity; it is, however, often made to appear darker than it really is by the wings sticking to the elytra. When the elytra are opened out they are seen to be pale yellow, with delicate, fine shading along the series of punctures; the systematic punctures that distinguish the species from *P. frontalis* are easily detected: there is a black spot at the shoulder, and some black marks (as in most other species) at the basal margin and the front part of the lateral margin. The crest on the metasternum rises abruptly and forms a well-marked angle in front, this angle being slightly acute and distinctly prominent owing to a slight concavity of the edge behind it.

This species is readily distinguished from *halophilus* by the black tip of the palpi, and it is really very closely allied to *fuscipennis*, from which it differs by its pale elytra. The dorsal blade of the aedeagus projects beyond the cross-piece but slightly, and merely as a transparent appendage. It is extremely similar in *fuscipennis*, the only difference that I notice being that the aedeagus is rather larger and more robust in the latter, and the dorsal blade a little differently shaped.

P. MARGINELLUS and *P. SUTURALIS*.

Mr. Newbery has called my attention to the fact that in some specimens of *P. suturalis* there is a darkening of some parts of the maxillary palp, and as the species is usually distinguished in literature by describing the palp as entirely yellow, this darkening may give rise to doubts as to the validity of the species. It is desirable therefore to point out that it is the colour of the extreme tip of the palpus that is to be taken into account, and that this is invariably black in *marginellus* and pale in *suturalis*. Besides this the two are so distinct in other respects that confusion should not be possible. As regards the aedeagus: in *P. marginellus* it is remarkable by the great elongation of the dorsal blade of the median lobe at the tip, while in *suturalis* this part is quite short.

P. suturalis is considered to be the same as *coarctatus* Gredl. I am unacquainted with Gredler's description, but if the translation by de Marseul (Abeille, 8, p. 112) be correct, the tip of the palp is dark in *coarctatus*.

EXPLANATION OF FIGURES.

This is a diagram of the male genitalia of *Philydrus* based on *P. maritimus*, the structure of which it represents fairly well.

A.—Dorsal aspect, the lateral lobes being dissevered at their base, and forced somewhat apart so as to display the median lobe.

p.d.—penultimate dorsal sclerite; enc.—encasement=last body segment; b.p.—basal plate made to appear rather too broad owing to section of the tube at the bases of the lateral lobes; l.l.—lateral lobes; d.b.—dorsal blade of the median lobe; r.—root of median lobe; v.b.—ventral blade of the median lobe; c.p.—cross-piece of the median lobe at the orifice of the duct.

B.—Ventral aspect of the median lobe; lettering as above.

Brockenhurst:

October 2nd, 1915.

DESCRIPTIONS OF TWO FURTHER ADDITIONS TO THE
BRITISH *TORTRICINA*.

BY F. N. PIERCE, F.E.S., AND THE REV. J. W. METCALFE, F.E.S.

In working through the genitalia of the British Tortricina, a specimen was examined which was supposed to represent the spring brood of *Peronea ferrugana*. This proved to be not only distinct from

P. ferrugana, but a departure from the remaining *Peroneas*. Examination of further specimens revealed the fact that examples of this new species were mixed in many series of *P. ferrugana*; indeed, judging from the descriptions written by various authors, it is a question which species was before them. As the original type specimen of Schiffermüller is probably unavailable for examination, and as more recent authors have failed to confirm the Stephensian genus *Paramesia*, we have decided to leave the usually accredited *Peronea ferrugana* where it is, and to describe the present species under the name *Peronea* (? *Paramesia*) *fissurana*, a name suggested by its cleft aedeagus.

The second species was at once thought by Mr. Metcalfe to be distinct, and was submitted to one of the leading authorities, who pronounced it to be "*tetragonana*"; but examination of the genitalia has shown that it is not this species, which belongs naturally to a very distinct group differing structurally from *Halonota* in "having in the hind-wings of the male a deep sub-dorsal groove above, containing blackish hair-pencils" (Meyrick's Handbook), a group which forms Meyrick's genus *Notocelia* Hb. In *H. littoralana* these hair-pencils are absent, showing that the insect here described bears a close affinity to the species included in the genus *Halonota*.

TORTRICIDAE.

PERONEA.

Peronea Curt., Barr., Meyr. = *Paramesia* Stph., Stt., Wilk.

Peronea fissurana, sp. n.

Expanse, 16 mm.

Antennae brown, red towards base; palpi, head and thorax concolorous with fore-wings; abdomen silvery grey; anal tuft ochreous.

Fore-wings not elongated, truncate; costa much arched at base, then straight, apex squared, hind margin retuse; prevailing colour pinkish red, but ranging from pale yellow of the early brood through bright yellow to unicolorous red, generally strigulated throughout with deeper red and red-brown; on the costa a hollow red-brown triangle, the apex of which is often continued towards the base; near the base and towards the dorsum is a more or less developed small raised tuft of black scales, most marked in the early brood; at either side of this tuft, springing upright from the edge of the dorsum, is a short blackish streak. Cilia pale, with red bases forming a distinct hind marginal line. Hind-wings shining whitish grey, generally reticulated towards the apex, especially visible on the under-side; cilia white.

Very variable (see below).

The female is similar.

♂ genitalia. Valva rather short; costa thickened, straight; valvula small, pointed; sacculus almost straight, with small projection beyond half; socii large, partly erect. Aedoeagus curved, *a long spine branching from near the apex*; cornutus long, slender.

♀ genitalia. Ostium naked, curved lobes short; ductus bursae *wide, suddenly narrowed, set exteriorly with numerous dark bodies*, the duct thickened before the bursa; signum ovate, stellate.

Type, ♂ and ♀, Coll. Pierce.

The localities from which it has been obtained are Gloucester, New Forest, Lyndhurst, Exeter, Willesden (Middlesex), Morpeth, Darlington, Colchester, Thundersley, East Devon, Ayton, Hythe (Kent), Kildale, Teesdale, and Hartlepool.

It appears to be absent from the following localities, where *P. ferrugana* has been observed:—Surrey (*Vine*); Delunere and Horsham (*Mansbridge*); King's Lynn (*Atmore*); Tilgate and Oxshott (*Heath*); Romford (*Claxton*); Rannoch (*Pierce*).

The insect has been found in various collections amongst series of *P. ferrugana*. It is double-brooded, occurring in July and October, and probably hibernates. It has been bred from willow (*Whittle*) and beaten from birch (*Harwood*) and oak (*Metcalfé*).

In dried examples it is necessary to break open the 8th sternite in order to obtain a view of the aedoeagus, when the branched spine at once separates it from all other British species of *Peronea*. Freshly taken examples of the male should be set with the valvae open.

Specimens examined, 95: Pierce Coll., 29; Metcalfe Coll., 10; Harwood Coll., 5; Whittle Coll., 9; Atmore Coll., 2; Sheldon Coll., 1; Gardner (Hartlepool) Coll., 6; Lofthouse Coll., 11; Richards Coll., 22.

Var. I.—*multipunctana*, var. n. The whole surface of fore-wing speckled with black dots.

Var. II.—? *brachiana* Frr. Ground colour more or less yellow, with costal hollow triangle crimson red.

Var. III.—? *tripunctana* Hb. Costal triangle broken into three dark spots.

These varieties run parallel in *P. ferrugana*. In the early brood the markings are nearly obsolete, the inner edge of costal triangle, a few apical reticulations and a tuft of black scales towards the base alone appearing, ground colour very pale yellow.

EPIBLEMIDAE.

HALONOTA.

Halonota Stph.: Wilk.; Stt.; Barr.; = *Eucosma* Hb.; Wlsm.; = *Epiblema* Hb.; Meyr.

Halonota littoralana, sp. n.

Expanse, 14–15 mm.

Antennae pale brown, darker ringed; palpi white above, grey beneath; face yellowish white; head and thorax brown; abdomen paler brown. Fore-wings: costa folded and very slightly arched; apex squared; hind margin nearly perpendicular; anal angle full; brown, much mottled with deeper brown and red brown markings; basal blotch deep brown, with darker vertical striations, its outer margin distinct for *two-thirds* across the wing, *erect* and twice slightly indented. A large creamy-white dorsal blotch reaching *beyond the middle* of the wing, its *inner margin firm* and distinct, its outer margin indefinite, as though smeared off; ocellus large, white, with brown and dull leaden blue clouding, and containing two or three short black streaks or dots. The remainder of the wing much mottled with deeper brown, towards the apex with red brown, and leaden blue lines; on the costa are four, often five, short white geminated streaks; cilia pale with dark brown tips. Hind-wings dark fuscous brown.

Female similar, but more uniformly brown; fore-wings slightly longer and narrower; dorsal blotch smaller; ocellus less distinct; face brown; hind-wings deeper brown.

♂ genitalia. Valva narrow, with large ovate cucullus; costa only thickened at the base, rising directly in a short, well rounded arch, before sweeping upwards and encircling the cucullus, which is evenly spined along its margin with short stiff spines at regular intervals; sacculus not free, slightly emarginate before the cucullus *without producing an angle*; editum short, pointed, hairy. Uncus not produced; tegumen trilobed above; socii long, slender, drooping. Aedeagus cardinate, short, stout; cornuti about 15, sheddable, long, tapered, studs with rather short heels socketed into the vesica.

♀ genitalia not examined.

Type, ♂ and ♀, Coll. Metcalfe.

This species has been obtained during June on the undercliff at Totland Bay, Isle of Wight, and in a similar locality in East Devon. The insect should be placed after *Halonota trigeminana*. Specimens may have been overlooked amongst series of *H. trigeminana*, *H. cruciana*, and *Notorelia tetragonana*; but it is of such a distinct character that this is improbable.

Specimens examined, 5: Metcalfe Coll. 4 ♂, 1 ♀.

October 18th, 1915.

Ptinus testaceus Boieldieu : an old error corrected.—The insects standing under the above name in British collections must all be referred to *P. pusillus*, of the same author, which was described from a single specimen from Brazil. The possibility of the existence of a ♂ *testaceus* or a ♀ *pusillus* has, so far, been overlooked; and the object of this note is to prove that *pusillus* and *testaceus* are merely males and females of one and the same species, for which the name *pusillus* should stand. *P. pusillus* was added to the British list on the strength of examples taken in a corn shop at Edmonton, where *testaceus* was fairly numerous at the same time. I distributed a number of "*testaceus*" as *P. brunneus*, with which it is now confounded by Continental authorities. That it is quite distinct from that species may be seen by reference to the specimens in the Power Collection at South Kensington. *P. pusillus* belongs to the group of species in which the sexes may be easily distinguished by the elongate form and very long antennae of the males, compared with the globular form and short antennae of the females. These cosmopolitan insects, which are treated by our standard British authority as little short of nuisances, appear to have received little or no study, and although I have distributed some dozens of *testaceus* as *brunneus*, I have not yet been corrected by a single one of their recipients. If any student of the group is inclined to doubt the correctness of the connection of *testaceus* with *pusillus*, it would be of interest if he would kindly publish information regarding the existence of any specimens representing either *pusillus* ♀♀ or *testaceus* ♂♂ which do not form the same connection. There is one character in this group, viz., the general structure of the thorax, which, whilst separating the different species, will always easily connect the sexes of any one of them. Take for instance *P. fur* and *P. subpilosus*. I have presented both sexes of *pusillus* to the National Collection at South Kensington, where also may be seen a ♂, formerly mixed with the series of *P. fur*, and three females from Birdbrook from the Power Collection, which are erroneously placed under *P. brunneus* along with two specimens of the latter from Mickleham. During the present summer I have taken a number of females of *P. pusillus* in a room at the Zoological Gardens along with other members of the group, viz., *P. fur*, numerous females, but no males yet; *P. tectus*, a pair, and a few of each of *Niptus holotenus* and *N. crenatus*.—CHAS. J. C. POOL, Insect House, Zoological Society's Gardens, Regent's Park, N.W.: September 15th, 1915.

[Mr. Pool's note, as it stands, may lead to continued error. The *Ptinus testaceus* to which he refers is not the *Ptinus testaceus* of Olivier or Boieldieu, which is a species quite distinct from *P. pusillus* Sturm. = *P. pusillus* Boield., but is merely the species known to British collectors and writers as *P. testaceus*. Pic, in his recent Catalogue of the Ptinidae, rightly, I believe, places *P. testaceus* Oliv. (and Boieldieu) as a distinct species, of which he regards *P. brunneus* Duft., as a variety. What Mr. Pool has shown in his note is that the female of *P. pusillus* has been wrongly identified in British collections as *P. testaceus* or as *P. brunneus*.—C. J. GAHAN.]

Ochthebius poweri Rye: *synonymical note*.—A few years ago I had some interesting correspondence with Capt. Sainte Claire Deville, during which I sent him examples of all the then known British species of *Helophoridae*. With regard to *Ochthebius poweri* he made the following observation, which agrees perfectly with the opinion formed by Mr. Champion that *O. poweri* is a var. of *metallescens* Rosenh.:—" Cette espèce se rapproche singulièrement du *metallescens* Rosenh., et je crois bien qu'elle n'en diffère pas spécifiquement. Cependant aucun de mes exemplaires continentaux n'a les points des stries aussi profonds que le *poweri*."

In the Exchange List recently published the above note was forgotten, and the insect referred to a var. of *dentifer* Rey, evidently in error.—E. A. NEWBERRY, 13, Oppidans Road, N.W.: November 10th, 1915.

Pyrochroa pectinicornis L., at Nethy Bridge.—For several successive years I have found the larvae of this species commonly under the bark of birch stumps in the months of July, August, and September, during summer holiday visits to Nethy Bridge. In the early part of last May I spent a week-end with Mr. J. Black at the village, and on the 8th we made a special excursion to a birch wood to ascertain whether the perfect insect was to be found or, if not, whether pupae would be in evidence. The first stump examined produced pupae, and eventually sufficient were obtained to allow of the breeding out of a nice little series of the beetle. The perfect insects began to emerge within a week after the finding of the pupae; unfortunately the first two or three which emerged proceeded to attack and destroy some of the pupae in the same breeding box, so reducing my series. The red colour of this species is not nearly so bright as it is in the two other British forms; the insects, which are milk-white on emergence from the pupa skin, require to be kept alive for some time in a cage where they can run and fly about freely, in order to allow them to colour up properly.—T. HUDSON BEARE, 10, Regent Terrace: Nov. 15th, 1915.

Attagenus fuscus Ol. (= *A. megatoma* F.) in England.—During a recent visit to Manchester, Mr. J. Ray Hardy gave me some specimens of a beetle which I named tentatively as above, and Mr. Champion, who has kindly examined the species, confirms the naming. Mr. Hardy has received specimens from mills at Manchester, Liverpool, Oldham and Reddish, and it seems to affect pieces of old oily waste, such as are often used for stopping draught holes. The only other recorded occurrence in Britain, as far as I can ascertain, is the single specimen taken in Finsbury Circus, E.C., by Mr. Wollaston (*Ent. Mo. Mag.*, V, p. 101).—J. R. LE B. TOMLIN, Lakefoot, Reading: November 15th, 1915.

The spread of Criocephalus fesus Kr.—As illustrating this, I may mention having had two or three specimens brought me to name this summer—all picked up in Reading. The last one was found crawling up the wall of a house as recently as the second week in October. I also received a specimen from Pyrford Heath, Surrey, at the end of July.—J. R. LE B. TOMLIN.

Anchomenus quadripunctatus De G., at Wellington College, Berks. — On June 30th, owing to trains running awkwardly, I had an hour to wait at Wellington College Station, and in a wood close by I came across a few common beetles, and among them an immature and dilapidated specimen which was unfamiliar to me: I therefore took it for further examination. A short while ago Mr. Tomlin came to see me and told me that Mr. Cox of Reading, a successful beginner, had found a specimen of *Anchomenus quadripunctatus* near Wellington College, but had forgotten the exact locality; we then examined my insect, which proved to be the same species: it ought therefore to be found if searched for. There seems to be some connection between this beetle and burnt wood (as is the case with *Melanophila* and other beetles). As far as I know it has only been found in any numbers by Mr. Champion. Not far from the same place I once found a single specimen of *Anchomenus 6-punctatus*, but although several people have searched for it, it has never occurred again.—W. W. FOWLER, Earley Vicarage, Reading: November 10th, 1915.

Tenacity of life in an African weevil.—On September 27th, I received by post a small tin box, containing *Coleoptera*, kindly sent to me by Dr. George Prentice, of Kasimgu, Nyasaland, and was somewhat surprised when, on opening it, a specimen of *Brachycerus apterus* crawled out from the sawdust in which the beetles were packed. They had been sent away on July 24th. Regarding the *Brachycerus* as a possible entomological member of our "overseas contingent," I forwarded it to the Zoological Society's Gardens, London, and am pleased to hear from my friend, Mr. C. J. C. Pool, that it is now "doing its bit" in the Insect House there, and thriving well on bananas.—JAMES E. BLACK, No. 2 S. T. F. Coy., 4th Battn. Royal Scots, Hawick, N.B.: November, 1915.

Meotica exiliformis and *M. exillima*.—Dr. Joy and I are agreed that these names apply to the same species: the explanation being that he is so much occupied that he altogether overlooked the description of *exillima*.—D. SHARP, Brockenhurst: October 29th, 1915.

Aphelocheirus aestivalis Fabr. in Nottinghamshire.—In August, 1914, Mr. E. Stainton, of Doncaster, caught a specimen of this insect in the River Idle at Scrooby, near Retford. Hitherto, Mr. E. A. Butler tells me, it has not been recorded north of Norfolk.—H. V. CORBETT, 2nd Lieut., 1st Cambs. Regt., Halton Park, Wendover: November 10th, 1915.

Effect of environment on Stenobothrus bicolor.—As everyone knows, St. Anne's-on-Sea is a modern, and now very pretty, seaside resort, built upon the sandhills of the Lancashire coast. On the outskirts of the town there are often small sandy spaces left between the houses, and in some of these ashes and other rubbish from the houses have been thrown, the consequence being that the sand has become of dirtier and darker appearance. In such situations *Stenobothrus bicolor* still flourishes, but there is a very perceptible difference in the colour of the specimens as compared with the ordinary forms, the tendency to become darker being so marked that some of them are already absolutely black. On

the open sandhills, the colours of the species, though variable as usual, are quite normal. During my stay there last August I did little entomological work, and, owing to military restrictions, no night-work. But for a short time on each of my last two days I collected a considerable number of larvae of *Agrotis ripae*, which were most abundant just beneath the sand where *Salsola kali* grew. Almost every little scraggy plant had its larvae, which varied in size from quite small to full growth, so I was able to pick out the big ones and leave the smaller. As I lifted aside one of the plants to get at the sand beneath, a nice male specimen of *Luperina guenei* dropped out.—GEO. T. PORRITT, Elm Lea, Dalton, Huddersfield: November 2nd, 1915.

Simulium equinum L. (Edw.), and *Eurycnemus elegans* Mg., in Scotland.—Mr. F. W. Edwards has kindly examined a number of my Scottish specimens of *Simulium*, and finds among them two females of *S. equinum*, a species which he states in his paper in last month's issue of this magazine (p. 308) has not yet been recorded from Scotland. These two specimens were taken by myself beside the River Tyne at East Linton, Haddingtonshire, on April 21st, 1913. As more fully recorded in the "Scottish Naturalist" (1915, p. 287), I captured a female of the rare Chironomid, *Eurycnemus elegans*, in Glen Spean, West Inverness-shire, on July 23rd last.—WILLIAM EVANS, 38, Morningside Park, Edinburgh: November 5th, 1915.

Abstracts of Recent Literature.

BY HUGH SCOTT, M.A., F.L.S., F.E.S.

HARRISON, L.: (i) MALLOPHAGA FROM APTERYX, AND THEIR SIGNIFICANCE: WITH A NOTE ON THE GENUS RALLICOLA. Parasitology, Vol. 8, No. 1, pp. 88-100, June, 1915.

(ii) THE RESPIRATORY SYSTEM OF MALLOPHAGA. *T.c.*, pp. 101-127.

In a previous abstract (*ante*, p. 244) a short account was given of Harrison's paper on "The Mallophaga as a possible clue to Bird Phylogeny," in which was elaborated the idea that a study of these parasites may provide one source of light on the vexed question of the phyletic relationships of their hosts. The first of the two papers now under review is an example of the application of this idea. No Mallophaga have previously been recorded from the remarkable flightless nocturnal birds of the New Zealand genus *Apteryx*. Harrison has examined skins of five species and discovered on them three species of Mallophaga, all new to science, and placed in a new sub-genus *Aptericola* of the genus *Rallicola*. The latter contains compact and easily separable groups of species. Thus, those of the sub-genus *Rallicola* s. str. are confined to Rails, and are found on all sorts of Rails all over the world; while *Aptericola*, as stated above, is found only on *Apteryx*, and therefore only in New Zealand. Now *Apteryx* has generally been placed among the Ratitae, but the parasites of the remaining Ratitae (ostriches, emus, etc.) have nothing in common with those of *Apteryx*. Harrison states explicitly that he regards the evidence afforded by the parasites as only one source of information concerning bird relationships, and that the

conclusions derived therefrom must be confirmed or refuted by morphological study of the hosts. In the present case this evidence indicates that *Apteryx* is nearest akin, not to the Ratitae, but to the Rails, a view which has been foreshadowed in the writings of certain bird-morphologists. Furthermore, since the gigantic extinct New Zealand birds (Pinnithidae) are generally agreed to be closely related to *Apteryx*, *Aptericola* may possibly indicate one of the types of parasites which infested the Dinornithidae.

The second paper is a detailed study of the respiratory system in a large number of forms. Not only has this been hitherto much neglected, but the scanty statements published concerning it are by no means entirely correct. The writer attributes his own success in this study largely to the employment of special methods. Living material is essential for obtaining the best results. "If the living insect be killed and dehydrated by immersion in absolute alcohol for about ten minutes, and then cleared and mounted, the tracheal tubes remain filled with air, and are very easily followed. Such a preparation is, however, not permanent, as balsam gradually replaces the air; but it will usually keep in good condition for several days."* Or the living insect may be put in dilute glycerine under a coverslip; the glycerine infiltrates the tracheae much more slowly, and such preparations remain in good condition for weeks. Dissections and serial sections were also used. The results may be very briefly summarised as follows: (i) the tracheal system is disposed in two main trunks, with four narrow neural commissures in connection with the main nerve masses, and with a posterior abdominal commissure in primitive forms; (ii) the stigmata are typically 14 in number, one pair prothoracic and six abdominal, the latter usually dorsal, and typically present on segments 3-8; (iii) at least two types of occluding apparatus exist in the group, and these are described in detail; (iv) in the structure of the respiratory system the *Mallophaga* agree very closely with *Anoplura*, and in a more general way with the wingless *Copeognatha* (*Psocidae*); (v) the respiratory system being very uniform, such variations as do occur are of considerable taxonomic importance.

Obituary.

J. H. Fabre,† 1823-1915: *An appreciation.*—The readers of this Magazine have no doubt been made acquainted with the decease of this distinguished naturalist by means of the numerous notices of him that appeared in the journals when his death occurred about a month since. An attempt—however imperfect—to set forth his claims to our admiration and gratitude will therefore be preferable to a reiteration of the details of his career.

He was a man of very wide attainments, skilled in all the departments of science, as well as a perfect master of the beautiful language of France.

He produced a series of educational works of a very admirable character, and published them at a price that left little or no profit to the author, though

* The method of imprisoning air in the tracheae in order to trace them out to their finest ramifications can be used in other insects besides *Mallophaga*, i. e., in Dipterous larvae.

† Fabre's name appears in Hagen's "Bibliotheca entomologica" as "Joseph Louis Fabre." This is certainly erroneous: some of the obituary notices that have appeared speak of him as Jean Henri Fabre; my impression has been that his first christian name was Jules. He always signed as J. H. Fabre, and Jean is probably correct, as the son whose loss he deplores in the second volume of the "Souvenirs" was named Jules.

their success in other respects was very great, some of them having gone through many editions and having been adopted as the text-books of the French public schools. These works extend over the whole range of science—mathematics, physics, chemistry, astronomy, zoology, botany, geography, cosmography, mechanics. Besides these scientific books there were others on management—domestic and agricultural—as well as elementary works for young children. And whatever he treated he adorned with his inimitable simplicity and truthful language, so that the influence of these various educational series on the existing generation of our neighbours must have been very great. One of these elementary works is now before the writer, and is the most charming child's book he has ever seen, called "Les petites filles, premier livre de lecture"; this work is really perfect for its purpose, and the illustrations are wonderful; twenty years ago it was in the 13th edition. Naturally Fabre was appreciated by French ministers of education, and it is pleasing to find that they did something to alleviate the "grinding poverty" under which he laboured.

To us, as entomologists, Fabre is best known by his writings on the habits and instinct of insects; and considerable interest has been attached to these productions on account of the fact that he has been supposed to be an opponent of the doctrine of "Evolution." As to this, current ideas are not quite adequate.

The early "evolutionists" were, perhaps, a little too much satisfied with their position,* though the developments of modern science show that the ideas then prevalent were distinctly crude. This was largely due to imperfect notions as to the age of the earth and as to the rapidity of changes in the organic world. However little we know, even at present, on these points, there is no doubt whatever that post-Darwinian discoveries tend to teach us that important changes are very much slower than was at first realized.

Fabre opposes what he calls "transformism"—that is, the idea of rapid change. And in all probability he was right in his perception of the improbability of such changes. It is true that some of his arguments were futile; but still, his main position that we must not believe in "transformism" may be correct. The real state of the question being that, though change does occur as "evolution" postulates, yet it is so extremely slow that, in connection with current affairs, we may reason and act as if it were non-existent. Hence when Fabre concluded that the instinct of a *Sphex* is aetiologically a fixed quantity, he was right as to all the questions connected with it that we can deal with by observation and experiment.

This is a very inadequate view of Fabre's work in this department of science, but we hope it may suffice to remove the notion that his ideas were altogether erroneous. As a man Fabre can only be reproached with being too unselfish. Had he really tried to acquire funds for the purchase of a few books there is no doubt he would have succeeded; but he would sacrifice nothing of his unselfish ideas, and when we recollect that he was born amidst poverty so great that he had, as a child, to be sent from home so as to make one month less to feed, we may well believe that he fortified himself with the idea that he was doing fairly well, "passing rich on forty pounds a year." All honour to his name. Would that more of us resembled him.—D. S.

* The writer may count himself among their number, as he was greatly interested in the subject before Spencer, Darwin, or Wallace published their works on it.

Societies.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY: Meeting held at the Royal Institution, Colquitt Street, Liverpool, *April 19th, 1915*.—Dr. JOHN COTTON, Vice-President, in the Chair.

A paper by Mr. Joseph Collins, Oxford, entitled "Notes on the Family *Pselaphidae*" was read to the Society. Mr. Collins reviewed in a very interesting manner the literature of the family, and showed how his own work and that of Mr. Dutton of Helsby, had greatly assisted in clearing up many doubtful points in the determination of the various species; much of the material leading to this having been obtained in Delamere Forest and in Oxfordshire. The author drew attention to the obscurity which still invests the early stages in the life-histories of both the *Pselaphidae* and the *Euplectinae*, and although a very difficult task, he recommended it as a fruitful field for research. Mr. Collins' paper was accompanied by an exhibit comprising his collection of the family, in which nearly all the species were represented.—WM. MANSBRIDGE, *Hon. Secretary*.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY: *Thursday, September 23rd, 1915*.—Mr. A. E. GIBBS, F.L.S., F.E.S., Vice-President, in the Chair.

An evening for the Exhibition of Lantern-slides.

Mr. Tonge, the resting attitudes of the imagines of several *Lepidoptera*. Mr. Colthrup, the attitudes of living larvae of several *Lepidoptera*. Mr. Hugh Main, coloured slides of botanical and entomological subjects. Mr. Tonge, a series of *Boarmia repandata* reared from Norfolk ova, the *repandata*-form ♂ = 1, ♀s = 29, and *conversaria*-form ♂ = 0, ♀s = 39. He also showed a series of *Numeria pulveraria* reared from Abbot's Wood ova, the variation was practically nil, ♂s = 24, ♀s = 27. Mr. B. S. Williams, an aberration of *Crocallis elinguaris* in which the ground was heavily dotted with dark brown, and the central band sharply margined with white. Mr. Morford, the case of the Psyllid *Pachythelia villosella* from the New Forest. Mr. Buckstone, a bred series of *Lithosia deplana* from Mickleham, one example being very smoky with rich yellow costa and fringes. Mr. Priske, the large galls in the stems of thistles. Mr. Leeds, many aberrations of "blues" taken this season mainly in Herts, with an *Epinephele jurtina* having extra ocelli on both upper and lower sides, and an *Agricides coridon* ab. *semisygrapha* from Kent.

Thursday, October 14th, 1915.—Mr. A. E. TONGE, F.E.S., Vice-President in the Chair.

Mr. Sans exhibited a large number of lantern-slides illustrative of the life-history of *Geotrupes stercorarius*, and contributed a series of notes. Mr. Priske, the seven British species of the genus *Geotrupes*, including a coppery coloured aberration of *G. stercorarius*. Mr. Main, cages arranged by himself to watch the method of cell-making by these beetles. Mr. Newman, a long bred series

of *Aplecta nebulosa* from a pairing of v. *robsoni*; of 350 reared, 50% were *robsoni*, 24% *thompsoni*, and 26% typical; also a long series of *Boarmia repandata*, the result of crossing a ♂ *conversaria* with ♀ type—most of the brood were reared, every specimen was *conversaria* and everyone a ♀. Mr. Newman recorded the fact of the ab. *varleyata* of *Abrazas grossulariata* disappearing from a strain which contained it and reappearing after five years. Mr. P. A. Buxton communicated from his brother in the Dardanelles an instance of a bird, a young butcher-bird, attacking and capturing a large hawk-moth. Mr. Morford, a number of specimens of *Setina irrorella*, with *S. aurita* and its aberration *ramosa* sent to him by Prof. Morel, N. Italy. Mr. Ashby, a long series of the rare Buprestid beetle, *Agilus viridis*, from the New Forest. Mr. R. Adkin, specimens of *Anthrocerus filipendulae* reared from Otford pupae, including an aberration with only five spots on the fore-wings, upper-side. Mr. Newman recorded a number of similar specimens from near Brighton.—HY. J. TURNER, *Hon. Secretary*.

ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, Oct. 6th, 1915.*—The Hon. N. C. ROTHSCHILD, M.A., F.L.S., F.Z.S., President, in the Chair.

Messrs. Arthur Gibson, Entomological Branch, Dept. of Agriculture, Ottawa, Canada, and Harold Beck Williams, 82, Filey Avenue, Stoke Newington, N., were elected Fellows of the Society.

Captain Purefoy exhibited young larvae of *Lycaena arion*, with an accompanying ant. Dr. Chapman, drawings of various Lycaenid larvae with the Epidiascope. The Hon. N. C. Rothschild, four specimens of *Chrysophanus dispar*, taken this year in Holland, apparently identical with the British race. Dr. Chapman, a specimen of a Dipteron, a species of *Nemotelus* (Fam. *Stratiomyidae*), which was quite common where the cases of *Luffia ferchaultella* occurred, the cases of *Luffia* being imitated by a spider (*Cyclosa conica*). This Dipteron at rest also closely imitated the *Luffia* cases. Mr. G. Meade-Waldo, a new aberration of *Euxoa corticea*, Hb., taken in his light-trap at Hever, Kent, in July; the specimen, known as *obsoleta*, showing only the faintest trace of the orbicular and reniform stigmata. Mr. L. W. Newman, a very long and varied series of *Aplecta nebulosa* and its varieties ab. *robsoni* and *thompsoni* and intermediate forms. A pairing was obtained from male and female, both of the *robsoni* form, and the percentages were as follows:—*robsoni* (including intermediates), 50%; typical specimens, 26%; *thompsoni*, 24%. Also a series of *Boarmia repandata* var. *conversaria*, from a pairing obtained between a typical light Hunts ♀ crossed with a *conversaria* ♂; every specimen being var. *conversaria*, and every one a ♀. Mr. E. E. Green, specimens and drawings of a new British Coccid, discovered at Camberley upon grasses in uncultivated meadows referable to Signoret's genus *Fairmairea* (now known as *Parafairmairea*). The Rev. F. D. Morice, a gynandromorphous *Hylaeus* (*Prosopis*) *brevicornis*; a ♂ *Halictus laevigatus*, having only two cubital cells in each upper wing, as in *Dufourea*, *Halictoides*, etc.; also a larva (in spirit) and numerous

imagines—all ♀ ♀—of the sawfly *Pteronus (Lophyrus) sertifer* (= "*Tenthredo pectinata rufa*" of Retzius) with cocoons from which they emerged.

Prof. Poulton said that since the June Meeting of the Society, he had received several interesting letters and boxes of specimens from Dr. Carpenter, some of which he read and exhibited. Mr. Donisthorpe exhibited a colony of *Myrmecina graminicola* Latr., which he had kept in captivity for over five years; his object in showing this colony was to call attention to the number of winged females which had been reared in the nest this summer.

The following papers were read:—"Observations completing an outline of the Life History of *Lycæna arion* L.," by T. A. Chapman, M.D., F.Z.S., F.E.S.; "Further Observations on the last stages of *Lycæna arion*," by F. W. Frohawk, M.B.O.U., F.E.S.; "A Contribution to the Life History of *Agrïades escheri* Hb.," by T. A. Chapman, M.D., F.Z.S., F.E.S.; "On the early stages of *Latiiorina (Lycæna) pyrenaica* Boisd.," by the same; "Notes on the early stages of *Scolitantides orion* Pall." by the same; "New Lepidoptera from the Schouten Islands," by J. J. Joicey, F.L.S., F.Z.S., F.E.S., and G. Talbot, F.E.S.; "Some new *Parnassii*," by A. Avinoff, F.E.S.; "A new Micropterygid from Australia," by A. Jefferis Turner, M.D., F.E.S.; "Record of some new species of the genus *Teracolus* occurring in the Northern Territories of the Gold Coast, W. Africa," by G. C. Dudgeon, F.E.S.; "*Glossina morsitans* Westw., some notes on the parasitisation of its pupae," by Hereward C. Dollman, F.E.S.—GEO. WHEELER, *Hon. Secretary*.

Authors are requested to send their communications and proofs to either
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