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POPULAR AND PRACTICAL ENTOMOLOGY.

FROM THE EDITOR'S OFFICE CHAIR.

BY R. P. DOW, EDITOR OF THE BULLETIN OF THE BROOKLYN
ENTOMOLOGICAL SOCIETY.

Practically every periodical devoted to insect study (and there have been more than fifty such in North America) is the organ of some scientific society, and its mission is to bring to that society the credit of making permanent record of discoveries of lasting scientific value. No entomological magazine has been more than barely self-supporting, and few that much. The magazine is necessarily "dry" reading, its papers for the most part severely technical. The dyed-in-the-wool bug man rather resents popular articles dealing in generalities. The paper most esteemed is one making description of new species. Such is of value for reference so long as Science endures, but how many wish to read a minute description of the external anatomy of some insect he has never seen? Only the few specialists in that particular group. I do not believe that the average subscriber to our entomological journals finds an average of more than two interesting papers out of the dozen in an average number. The Lepidopterist does not care for a paper on *Thrips*, and so on.

It is the editor who has to read all papers. If he be "on the job" he takes down boxes of specimens and proves the correctness of every detail of synopses submitted to him. If he can understand, it follows that a specialist will have no difficulty. The editor reads painstakingly, glossary in hand. The casual reader gives two minutes, where he gives hours.

And yet every editor, while on the one hand trying to do his duty by strict Science (no matter how dry), makes his best effort

that the magazine be readable by the greatest possible number of subscribers. He tries to balance his subjects, so that there are no superabundance dealing with any one order. Most amateurs are interested in the Lepidoptera, but papers on this order containing new material are very scarce. The greatest number of students are collectors of the Coleoptera, but it takes a year to prepare a synoptic table of beetles which the reader disposes of in ten minutes. The additions to the sum total of human knowledge are more in the lesser known orders, Diptera, Hymenoptera and the minor ones. Of all these there are few amateurs to read. So, in the effort to please as many as possible, one succeeds in pleasing almost no one.

On this particular editor's desk there have lain letters from well over a thousand entomologists or collectors of insects. Less than one per cent. contain praise of some article. Fifteen per cent. come from professional entomologists, most of them demurring against further subscription. The leading authority on grasshoppers does not subscribe, because the few grasshopper papers are sent to him anyway by the friendly authors, and he does not wish to burden his bookshelves with matter concerning crickets or roaches. The economic entomologists are too intent on their own useful observation of some pest to read anything whatever, much less identify a species. They send to Washington to have that done. Eighty per cent. of the letters on the editor's desk are from amateurs. There are many of them, if only there was a way to reach and talk with them. In 1823 a list of butterfly collectors in Great Britain contained 18,000 names. Here in North America a popular, rather expensive, highly illustrated butterfly book has reached a sale of something like 90,000 copies. A few per cent. of these readers have come in contact with some entomological magazine. The burden of their speech is pretty much the same throughout. The Canadian Entomologist, the Brooklyn Bulletin, and all the rest, are too far above their heads, too technical, too hard to understand, containing too little to help them identify the species they have caught.

One cannot read without having learned the alphabet. How many of our collectors have more than a single book to teach

them the fundamental principles? In a magazine of few pages there is no room for repetition of the rudiments. We ourselves cannot comprehend how any one can be willing to stick a pin through an insect without possessing a short shelf of books to tell what it is, why it is, how its life is passed, what are its relationships. The writer recalls perfectly his own first entomological experiences. A little girl in frail health had been taught by an older brother to collect and try to study. To help her the writer took the net and pursued butterfly and dragonfly. The first evening came the first earnest perusal of the first book. It was Comstock's Manual. It gave the order and the family, and had wood-cuts illustrating typical forms. At each chapter there was a delightful essay by Anna Botsford Comstock in general terms that a child could understand. Long before there had come to hand books by a Brooklyn artist who used to love his daily walk behind the Flatbush waterworks, where the watershed was so protected that Nature found her free sway. Wm. Hamilton Gibson wrote most of his papers for Harper's Magazine, but all were subsequently reprinted in quarto book form with the hundreds of illustrations from thumb-nail sketch to full page plate. Most of these are probably out of print years ago, but every copy found in second-hand bookshop should be bought and treasured. The late Henry G. McCook many years ago wrote a duodecimo called "The Tenants of an Abandoned Farm." The wood-cuts were rough but they had their charm, telling of spiders, ants, and a host of others. A few years ago a new edition appeared, with some changes and a different title. All these preach the sermon of the infinite beauty of the great All Out Doors.

Every stranger who in the last two years has wandered into a meeting of the New York or the Brooklyn Entomological Society has been influenced thither by some book. Chief among them have been the volumes of the late J. H. Fabre, a Frenchman, now almost all translated into English. This wonderful man, overlooked by the world almost to the hour of his death in extreme old age, found and studied the infinities of animate creation in his own back yard. In a forty foot square countless creatures are born, married and died (just like humans). How much more did this impoverished Apostle of Nature accomplish than some

other enthusiast who searched the uttermost corner of the globe for some rarity of which he could know nothing except a scientific name applied by some subsequent taxonomist. Every human being conscious that God gave him eyes with which to see may well start his bookshelf with some volume of Fabre.

Sir John Lubbock kept for many years a little nest of ants between two sheets of glass until he learned to distinguish each individual by sight. His works, although severely scientific, read easily as fiction. Get, then, your library, your two-foot shelf of priceless books. Little by little pass from primer to second and third readers. A few good books are designed for young people, but are fully as interesting to grown-ups. Such a one is Beard's American Boys' Book of Bugs, Butterflies and Beetles. It can easily develop the collecting habit. Then comes a booklet published by the American Museum of Natural History in New York, How to Collect and Preserve Insects. It costs but ten cents. The work of almost every country collector is rendered almost valueless for scientific purposes by ignorance of simple methods of care.

To any one progressing thus far some text book on Entomology becomes a necessity. On the editor's table stand four such, each having some distinctive interest, although covering the same theme,—Guide to the Study of Insects by the late Asa Packard of Brown University, of which there have been many editions; Economic Entomology, by the late John B. Smith, of Rutgers College; Manual for the Study of Insects, by J. H. Comstock, of Cornell University; and Entomology with Reference to its Biological and Economic Aspects, by J. W. Folsom, of the University of Illinois,—Blakinson. There can be no choice between these four leading text books. All are most readable. *Chacun à son gout*. Differing very slightly, perhaps a little less comprehensive, but with more detail in spots is American Insects, by Vernon C. Kellogg, of the University of California. Of the Cambridge Natural History, volumes V and VI treat of Insects, by Dr. Sedgwick and Dr. David Sharp. In this the specific examples given are British or world-wide.

To fill even a two-foot shelf possibly next consideration should

be given to the economic aspect. Three cover much the same ground, all finding favour on the editor's table, for the independent illustrations glorify all of them:—Manual of Fruit Insects, Slingerland and Crosby, of Cornell; Insect Pests of Farm, Garden and Orchard, by D. Sanderson; and Agricultural Entomology by Herbert Osborn, of the University of Ohio. The New York State Museum issued two quarto volumes on Insects Affecting Park and Woodland Trees, by E. P. Felt, State Entomologist, with a wonderful wealth of illustration chiefly of beetles, by L. J. Joutel, but this monumental work may be now a little hard to procure.

Next on the shelf of working library comes works on particular groups. Most of these are somewhat expensive, for colour plates cost much to publish. Wright's Butterflies of the Pacific Coast is the best and most complete for its territory. The American Museum of Natural History booklet, Our Common Butterflies, is perfectly workable and costs only fifteen cents. The standard work on Butterflies of North America is by W. J. Holland. Its colour plates will serve for identification of species, except in the "skippers" and some of the more obscurely marked Nymphalidæ. The collector of Hesperiidæ must consult some specialist in the family or leading Museum to be sure of correctness.

The Moth Book, by W. J. Holland, is equally well illustrated and serves for final identification of all large or showy forms. The "millers" are represented by about half the number of distinctly known species (the whole being too voluminous) and from the book a perfectly good general knowledge can be gained. For exact identification, however, one must look farther. There are whole groups of Noctuid moths, scientific knowledge of which is still woefully incomplete. No good book exists on the thousands of species of the Microlepidoptera, of which probably one-half are not yet known to Science. A synonymical catalogue of all known American Lepidoptera was prepared by H. G. Dyar and staff of specialists, known as Bulletin 52 of the U. S. National Museum, but this wonderful work was treated as are most of the Government publications, sent to an army of legislators who cared nothing for them, and within a few months "out of print"

for the entomological students to whom the volume is of priceless value.

An "Insect Book," by L. O. Howard, U. S. Government Entomologist, with full quota of coloured plates, was published to include all orders except Lepidoptera and beetles. It is no reflection upon Dr. Howard to say that this work is unsatisfactory, since it had to be made uniform with others for the publishers, and so had to cover in the single volume a field requiring at least ten volumes to be essential to even a four-foot book shelf of working library of a Nature lover. However, it is well worth owning. As it covers a field in which many hundred thousand species exist, it is not a guide to identification even to the genera.

Uniform is the Spider Book, by J. H. Comstock, combining exact science and popular readability. Its illustrations are equal to the others of the series, and it serves well for identifications of species. A number of spider books by J. H. Emerton have mostly wood cuts, but well made, and with clearly written text. They are inexpensive. A work of highest scholarship and popular interest is the Ant Book, by Wm. Morton Wheeler. No work on the subject compares with it for completeness or offer of correct identifications. On the Diptera (the true flies) there is one good book, by S. A. Williston. In this enormous field final identifications are impracticable. A Catalogue of Described Diptera, by J. M. Aldrich, was a Smithsonian publication, remarkable for its accuracy in a little known field, but it suffered the same fate as Dyar's catalogue of Lepidoptera and second-hand copies command a large price.

There is no good work on the Hemiptera, or true bugs. The manuals of entomology give good chapters. An excellent checklist of the Hemiptera, by E. P. Van Duzee, has just been published by the New York Entomological Society, but, of course, a list does not contain facilities for identifying species. A definitive and popular work on the Hymenoptera is also impracticable since they are not easily pictured, and since the number of species is enormous, a large fraction of the smaller parasitic forms not yet being known.

Thus far there has been no mention of beetles, although that

order is the prime favorite among collectors. There are about 20,000 recognized forms in North America. To illustrate even a quarter of them in colour is a task that no publisher would risk. So many are monocolourous that exact drawings of structural characters would be needed in addition. The insects range in size from two inches to one-fiftieth of an inch. It has remained for the indefatigable W. S. Blatchley, formerly State Geologist of Indiana, to write the only practical work in the country,—The Beetles of Indiana. While it is confined to actual records from the State it is a fairly good workable list for all the country north of Florida and east of the Mississippi. It does not include the weevils, but a book is shortly to be published by Leng and Blatchley to cover this group of the Eastern United States and Canada. Identification of beetles must depend on the highly technical original descriptions and comparison with proved specimens. Even the checklist of them, Henshaw's Checklist of the Coleoptera, has been out of print for six years, and a successor volume is painfully slow in coming. American beetle study is at least fifty years behind Europe. The great work on classification by Leconte and Horn was published in 1833 and went out of print, *à la* Government publications generally, soon afterwards. It is too highly technical to be read without a glossary and deep pre-acquired knowledge of the subject.

Perhaps in the list of general works there might be included the Glossary of Terms used in Entomology, by John B. Smith, but this volume, while necessary to every advanced student or worker, is not really needed by those who wish to read (even exhaustively) the list of popular works quoted above.

Out of this list of about twenty volumes recommended as of prime importance or interest, one can get a splendid education by the possession of two, leaving the rest to be acquired at leisure, if at all. One must be a general Manual of Entomology, the other some volume devoted to the special field of one's choosing. Moreover no books can be more fascinating than these to any one who has love for the great All Out Doors. The more you have, the more you read diligently, the more enjoyment life shall have for you.

THE OCCURRENCE OF THE GENUS *ACHRYSO-
CHARELLOIDEA* GIRAULT IN NORTH AMERICA.

BY A. A. GIRAULT, GLENNDALE, MD.

This omphaline genus is characterized by the two grooves on the scutellum and the 4-jointed club. As regards the latter, there is uncertainty in the following new species; for the distinct terminal spine of the club, although "jointed" or constricted at about its middle, is not articulated, and the club must, therefore, be called 3-jointed with a terminal spine. This throws doubt on the genotype as regards this character. Its description should be verified. I had no opportunity to re-examine the type. The genus structurally is very similar to *Gyrolasella* of the Elachertini, but the body is metallic and the postmarginal vein is slightly longer than the stigmal but not nearly half the length of the marginal. Besides, its habitus is that of *Chrysocharis*; resembling also *Diaul'nopsis*. Marginal vein a little shorter than the submarginal or subequal to it.

***Achrysocharelloidea albiscapus*, new species.**

Female.—Length 0.75 mm.

Aeneous green, the fore wings lightly dusky throughout. Scape white, the legs golden yellow except the coxæ. Scaly-reticulated, the scutellum more finely so, the postscutellum and propodeum subglabrous, the latter with weakly indicated median and "lateral" carinæ ("lateral carinæ" just laterad of the small spiracle). Pedicel intermediate between the funicle joints in length, 1 a little longer than wide, 2, quadrate; club somewhat longer than the funicle, its joints no longer than the funicle joints. Mandibles 4-dentate. Marginal cilia of fore wing somewhat longer than usual (not extremely short, not a seventh of the greatest wing width). Stigmal vein with a distinct neck. Parapsidal furrows distinct, nearly or quite complete. Caudal wings with about seven lines of discal cilia where widest, their longest marginal cilia distinctly longer than those cilia of the fore wing. Pubescence very sparse. Caudal tibial spur single, small.

Described from one female taken in the woods at Hillmead (Glennedale), Maryland, Prince George County, April, 1916.

Type.—Catalogue No. 20298, U. S. N. M., the female on a slide.
October, 1916

DESCRIPTIONS OF AND OBSERVATIONS ON SOME
CHALCIDOID HYMENOPTERA—II.

BY A. A. GIRAULT, GLENDALE, MD.

Eurytoma pachyneuron, new species.

Female—Length 1.16 mm.

Agrees with the type of *crassineura* Ashmead except as follows: The legs are reddish brown except most of the caudal tibia dorsad and a spot on the caudal coxa, also most of the middle tibia and the caudal femur more or less centrally above; the marginal vein is somewhat longer; funicle 1 is much slenderer and longer, over thrice longer than wide at apex (in *crassineura* only over twice longer than wide); funicle 2 is twice longer than wide (only a third longer than wide in the other species); the size is smaller; the median channel of the propodeum is single (double and wider in the other, no median basin in either). Tegulae, ventral edge and proximal half of scape, reddish yellow. Umbilicately punctate. Petiole short. Abdomen polished above.

Described from one female reared in connection with *Isosoma*, Glendale, California (T. D. Urbahns).

Type—Catalogue No. 20321, U. S. N. M., the above female on a tag, the wings, caudal legs and antennae on a slide with an antenna of type *crassineura* female.

A second female from Halliday, Utah (C. W. Creel) but differing in having the sides of the median channel very finely punctate, the sculpture finer than in the types and the legs entirely reddish yellow.

Xanthosoma nigricornis Ashmead. Genotype.

This is merely an *Eurytoma* with a fine sculpture.

Eurytomocharis minuta Ashmead. Genotype.

Marginal, postmarginal and stigmal veins *subequal*, the stigmal long. Club *solid*. Funicle 1 a little longer than wide, 2 globular, 3-5 each a little wider than long. Caudal tibial spurs double. Otherwise as in *Eurytoma*. Generic characters are the *solid* club and not otherwise. Type examined.

Decatomidea cooki Howard.

This is a varicoloured species of *Eurytoma* and is characterized (besides colours) by bearing a rounded, densely, finely punctate

median basin without a median channel through it. Type examined.

Eurytomocharis eragrostidis Howard.

Congeneric with *minuta* but the venation as in typical *Eurytoma*; marginal vein a third longer than the stigmal, the latter somewhat shorter than the postmarginal. A varicoloured species. Funicle 1 one-third longer than wide, wider distad, 2 quadrate. Type examined.

Eurytomocharis triodii Howard.

A species of *Eurytoma*. Venation as in *E. eragrostidis*. Funicle joints subequal, each about two-thirds longer than wide, subequal to club 1. Abdomen lanceolate, its petiole very short. Propodeal basin finely, densely punctate and with a flat bifoveate median channel through; elsewhere, propodeum coarsely foveate. Type examined.

Eurytoma minnesota, new species.

Female—Differs from *illinoisensis* in having the median channel of the propodeum double for nearly the proximal half, the former is somewhat more slender and the abdominal petiole is longer, approaching quadrate. The species *solenozopheria* Ashmead has the abdominal petiole very short, the abdomen subsessile and the median channel of the propodeum is bifoveate at base only. The three species are very close. The species *solenozopheria*, however, has the median basin of propodeum distinct caudad, there bounded by a V-shaped carina. Petiole finely scaly, tricarinate.

The male has the cephalic tibiae more or less black; funicle 5-jointed.

Described from two males, six females reared from quack, Olmsted, Minnesota (C. N. Ainslie).

Types—Catalogue No. 20322, U. S. N. M., the above specimens, minutien-mounted.

Bruchophagus borealis Ashmead. Genotype.

The postmarginal vein is slightly longer than the stigmal, the latter than the marginal. Antennae as in *Eurytoma*, the club 2-jointed. Caudal tibial spurs double. Segment 2 of abdomen subequal to 4, longest, 5 a fourth shorter. Petiole much wider than long. Propodeum with a nonchanneled, large, concave

median basin which is finely, densely punctate. Otherwise as in *Eurytoma*. From the female type. The species *funebri* Howard differs in coloration but not much otherwise. In *mexicanus*, the marginal vein is distinctly longer than the short stigmal, but the abdominal segments remain about the same as in the genotype; the venation varies somewhat and *mexicanus* should be compared with *funebri* which it closely resembles. However, the scape is reddish at base and the legs differ a little in colour. Types examined.

The male funicle is 4-jointed and this fact with the *shape* of the abdomen are the true generic differentials.

Systolodes brevicornis Ashmead. Genotype.

The female type is missing, but some males (so identified by Ashmead) I am unable to separate from the males of *Brucho-phagus funebri* Howard and must conclude that the two are the same.

Specimens of *funebri* were found in the U. S. N. M. collections under the generic label, but they were from Washington, D. C. In the original description of *brevicornis*, Ashmead himself states that the two species are much alike. All other specimens placed under this genus by Ashmead were *funebri* or closely allied to it; none had the fourth abdominal segment greatly enlarged unless subjectively to some astigmatic observers). The genus *Systolodes* is a subjective abstraction!

Eurytoma binotata Ashmead.

The name of this Japanese species is preoccupied. The new name *nippon* is substituted for it.

Rileyia americana, new species.

Female—Length 2.75 mm.

Robust and resembling a large specimen of *Eurytoma*, the abdomen compressed as in the genus. Pronotum longer than the scutum.

Black, the wings hyaline, the venation brown, the legs (except coxæ), scape and tegulae reddish yellow, the tarsi, knees and tips of tibiae whitish; abdomen dark reddish except dorsad and the petiole. Flagellum dark brown. Like *cecidomyia* Ashmead but thrice larger, segment 4 of the abdomen is not nearly half the length of 5 as in that species, 3 is much curved circularly, not

transverse, 2 is a round, disk-like plate, the petiole is very short, subobsolete, while the coarse, isolated rugæ on the propodeum are entirely different. Differs from *piercei* in the colour of the legs, the venation is longer in *americana*, the size much greater, propodeum different and so on. Scutellum with a rimmed apex and an obtuse cross-ridge before the apex. Segment 5 of abdomen occupying over half the surface, the abdomen densely scaly except segments 2-3. Propodeum with a pair of coarse, median rugæ which are a little separated at base and parallel there for a short distance (joined by a cross-ruga a short distance out), then widely diverging to run disto-laterad (straight) then abruptly looped up toward the spiracle forming a large semicircle; from the point of change to this loop, a straight, short ruga runs to the apex at the side of the neck (and between the two, one on each side, of these, are about three straight rugæ; a V-shaped ruga runs cephalad from the apex of the loop). Propodeum densely scaly, punctate. Femora darker, reddish toward base. Club 3-jointed; funicle 1 somewhat longer than wide, 2, quadrate; ring-joint 1, quadrate, the others wider. Pedicel slightly longer than funicle 1.

Described from three females in the collection of the U. S. National Museum labelled "5140°. 9-7-91". U. S.

Types—Catalogue No. 20323, U. S. N. M., the above specimens on tags and a slide bearing a caudal leg, a fore wing and an antenna.

Rileya hegeii, new species.

Female—Length 1.00 mm.

Golden yellow, the wings hyaline, the venation yellow, the following black markings: Pedicel above at base, distal half of scape above, flageilum (brown), scutum (except lateral margins except distad), pronotum distad across meson for a width equal to the black of the scutum, upper centre of occiput, apex of ovipositor, scutellum except lateral and distal margins and the meson of the abdomen broadly from base to beyond middle of segment 5. Postmarginal vein nearly as long as the marginal, over twice the length of the stigmal. Abdomen as in *cecidomyia* but segment 4 transverse-linear, 5 occupying three-fourths of the surface, the petiole very short. Propodeum with a cross-carina between which run longitudinal rugæ from base and from apex. Ring-joints

all cross-linear, 3 widest; funicle 1, quadrate, 5 a little wider than long; pedicel as long as funicle 1. Pronotum shorter than the scutum.

From one female in the U. S. National Museum from Biscayne Bay, Florida (Ashmead).

Type—Catalogue No. 20321, U. S. N. M., the female on a tag, a fore wing, caudal leg and an antenna on a slide.

Microdontomerus anthonomi Crawford.

Lutesville, Mo., (G. W. Barber). Antennæ 13-jointed with one ring-joint; funicle joints subequal but 7 somewhat wider, each about twice wider than long, shorter than the pedicel. The median carina on the propodeum may be doubled or trebled. In three females from the above locality, it was single, double and treble. The propodeum is more or less glabrous along the meson; it was tricarinate at the meson with one of the type females. Fore femur compressed.

Asympiesiella india, new species.

Female—Agrees with the description of the genotype except that only the caudal coxa is metallic at its proximal half, the scape is brownish black except along the ventral margin, the propodeum is scaly, funicle 1 is only a third longer than 4 which is twice longer than wide, the mandibles are 7-dentate; and the male differs in having the caudal coxa (except at apex), the distal half of the caudal femur and the same of the caudal tibia, black; its scape is pale except at apex, the white on the abdomen is confined to the meson; and funicle 4 is not quite twice the length of the club, the latter subequal to funicles 3 and 5. Rami on funicles 1-3, from the base of each, same side.

Head and thorax in both sexes scaly punctate.

Described from two pairs of each sex reared from *Gracillaria soyella*, the Tar Leaf-folder, Pusa, Behar, India, (T. B. Fletcher).

Types—Catalogue No. 20325, U. S. N. M., the specimens on four slides with a female antenna of *Sympiesis dolichogaster* Ashmead.

This Indian species differs from the North American *Sympiesis dolichogaster* Ashmead most notably in having the median carina of the propodeum but half complete and the scape less coloured. The species are congeneric. The validity of *Asympiesiella* must

be left for later treatment. The genotype is shaped like *dolichogaster* and the generic differential may hinge on the greatly elongated abdomen, if the club of *Sympiesis* is not truly 3-jointed and the males do not differ generically. It will do no harm for the present to let them stand but if there is no *true* and *real* difference but only an arbitrary and dermal one, the two must be combined. Here are Australian, North American and Indian species which, superficially, are identical.

Pleurotropis longus, new species.

Female—Length 2.75 mm.

Characterized by the long abdomen which is depressed and conical, distinctly longer than the head and thorax combined; like *perdubius* but the abdomen is more slender and somewhat longer, its segment 2 is glabrous and somewhat longer, the tibiae are black to tips, funicle 1 is more slender, thrice longer than wide, 2, twice longer than wide. Otherwise the same.

Described from one female reared in connection with *Isosoma*, Lafayette, Indiana, (W. J. Phillips).

Types—Catalogue No. 20326, U. S. N. M., the specimen on a tag, antennae and a pair of wings on a slide.

Aphidencyrtus inquisitor (Howard).

Many females from *Myzus persicae* on peppers, Norfolk, Virginia, (D. E. Fink), October, 1915.

Asaphes americana Girault.

Norfolk, Virginia, September 3, 1915, from *Aphis rumicis* (D. E. Fink). The caudal coxæ may be suffused with yellowish.

Ormyrus unimaculatipennis, new species.

Note—In *Ormyrus* the parapsidal furrows are *distinct*, that is, easily seen but they are delicate, not deep. It is an error to say there are no parapsides. However, these furrows are sometimes subobsolete.

Female—Length 2.85 mm.

Dark metallic green, the scape (except a little at apex above) and legs (except the coxæ), reddish brown, the caudal tibiae black, the tarsi white. Fore wings hyaline but with a large, distinct, rectangular (a little longer than wide) fuscous spot under a little less than the distal half of the marginal vein and which touches the apex of the stigmal and extends to the middle of the wing;

postmarginal vein somewhat longer than the nonsessile, curved, stigmal vein. Pedicel twice longer than wide at apex, nearly twice longer than funicle 1, the latter a very little longer than wide, longest yet subequal to 2; 6, twice wider than long; club with the joints (or two divisions) subobsolete. Second ring-joint larger than the first. Head and thorax finely cross-lined, the lines on the thorax not raised. Axillæ, scutellum laterad and the propodeum longitudinally lined, the thorax dorsad (except the propodeum between the spiracles) with prostrate, long pubescence from scattered minute punctures. Propodeum with a pair of widely separated median carinæ. Abdomen glabrous at immediate base, roughly scaly elsewhere; line 1 of large punctures double mesad, base of segment 3; 2, base of segment 4, double; 3, base of segment; 4, inclined to be triple in places; no others; a median carina from base of segment 3 to middle of 5; segments 3-5 with a scalloped cross-ruga at about middle. Like the Australian species. The basal of the two lines of punctures on abdominal segments is at first of half-punctures but these become more complete distad, complete in line 3.

From one female on a tag in the U. S. National Museum from Louisiana (C. F. Baker).

Type—Catalogue No. 20327, U. S. N. M., the foredescribed specimen and a slide bearing a fore wing and an antenna.

Habrolepoidea depressa, new species.

Female—Length 1.15 mm.

Body depressed, the ovipositor a little extruded yet distinctly so. Dark metallic purple, the wings hyaline, the legs coloured as in *Aphidencyrthus aphidiphagus* (Ashmead) from which this species differs as follows: The mandibles have the third tooth small, subacute (bidentate but the broad second tooth is rather deeply concaved at apex), the frons is moderately broad, the form depressed, the marginal vein is subequal to the stigmal and postmarginal veins. Venation black. Body very finely, microscopically scaly, shining, the axillæ glabrous. Pedicel subelongate, much longer than any funicle joint; funicle joints subquadrate but enlarging distad. Club wider than the funicle and three-fourths its length, obliquely truncate from base of joint 3. Scape with a distinct ventral exfoliation but this is not greatly convexed.

In the male, the band on the middle tibia reaches to the middle, the scape has a distinct convex ventral exfoliation, the pedicel is globular, the marginal vein shorter. The funicle is clothed with rather long, soft hairs, 1 twice longer than wide, 6 somewhat longer than wide; club solid, ovate, somewhat longer than funicle 1, hairy.

Described from two males, three females, reared from the eggs of *Cyllene robinia*, Morristown, Illinois, December 8, 1914, (J. R. Malloch).

Types—Catalogue No. 20329, U. S. N. M., the above specimens on tags, a head and fore wing of each sex on a slide.

The species is like a *Zooencyrtus* except the shorter club in that genus. It may represent a new group. *Aphidencyrtus* Ashmead may be retained as a group distinct from *Habrolepoidea* only on the ground of a difference in mandibular shape.

***Syrpophagus quadrimaculatæ* Ashmead.**

A synonym of *mesograptæ*. Types compared.

***Habrolepoidea tarsalis*, new species.**

Female—Length 1.10 mm.

Like *depressa* but differing as follows: The scape is cylindrical, slender, the vertex not thin (cephalo-caudad), the form is narrower (moderate in width), the thorax convex, the postmarginal vein somewhat shorter than the stigmal, the scutellum finely longitudinally lined, the abdomen shorter, its ovipositor not extruded. Like *aphidiphagus* Ashmead but the mandibles with the third tooth acute, the scutellum with very fine longitudinal striation (instead of fine scaliness) and the venation is different. Funicle 1 a little longer than wide, 2 a half longer than wide, longest, 6 as long as 1 but wider. Club two-thirds or more the length of the funicle.

Described from two females in the collection of the U. S. National Museum labelled "*Encyrtus tarsalis* Ashmead. Type. Indiana." The species does not seem to have been described before.

Type—Catalogue No. 20329, U. S. N. M., the above females on tags, a head and fore wing on a slide.

REMARKS ON *LYGUS INVITUS* SAY, WITH DESCRIPTIONS OF A NEW SPECIES AND VARIETY OF *LYGUS*. (HEMIPTERA MIRIDÆ).

BY HARRY H. KNIGHT, ITHACA, N. Y.*

The writer has spent considerable time during the past three seasons making observations on the life history and food plants of many species of *Miridæ* and particularly in the genus *Lygus*. The writer is also concluding work on a monograph of the genus *Lygus*, but for the benefit of certain economic workers interested in the forms here considered this small contribution is published in advance.

In the past *Lygus invitus* Say has been the name generally applied to the members of a small group of species, which on careful study based upon distinctive structures furnished by the male genital claspers, are readily and consistently separated. Thomas Say described *invitus* in 1831 and in his usual style this early worker brought out certain characters that will distinguish the species from all others. After a careful study of some forty species of *Lygus*, I wish to point out a distinctive combination of characters mentioned by Say and not exhibited by any other form thus far brought to my attention. The following is taken from the original description: "*C. invitus*—Dark livid or blackish; beneath green with a blackish lateral vitta." "Head . . . with an impressed longitudinal line . . . scutell with a pale, obsolete vitta, beyond the middle . . . beneath green, with a broad lateral black vitta."

After careful search for food plants I find that *invitus* breeds only on the elm, preferring always the young, thrifty plants with succulent shoots. The nymphs are pale greenish, hatching soon after the leaves come out in the spring from eggs that were inserted in the twigs the previous July. One can scarcely distinguish the nymphs from those of the species described below and which is well known as a pest on the pear. The nymphs are, however, smaller and more slender than those of the false

* Contribution from the Department of Entomology of Cornell University, October, 1916

tarnished plant-bug. In a previous article, (Jour. Ec. Ent., vol. 8, p. 296, 1915) the writer described the manner of oviposition of the false tarnished plant-bug which is the same insect as *communis* described below, while the reference to this species breeding on elm refers to the true *invitus* of Say.



Fig. 16. *Lygus invitus* say, male genital claspers; a, lateral aspect of the sinistral forcep; b, sinistral forcep dissected, dorsal aspect; c, dextral forcep dissected, ventral aspect.

The male claspers of *invitus* show a close similarity to those of *communis*, but the practiced worker will note certain constant differences, and which are exhibited in the drawings (figs. 16, 17). The absence of a spine on the inner curve of the dextral forcep of *invitus* will distinguish this species

at once from *communis*.

Lygus communis n. sp. Easily distinguished from *invitus* by the two black rays on the disk of the pronotum and by reddish in the lateral stripe on the body. Differs structurally in not having the impressed longitudinal line on the vertex and in the form of the male claspers.

Male—Length 5.5 mm. *Head*: width across the eyes, 36*; width between eyes, 15; length (lateral measurement) 14; height at base, 22; yellowish brown or greenish marked with reddish; basal half of the tylus, arched portions of the juga, loræ, and bucculæ marked with reddish, also the front frequently marked with red in the form of transverse lines; apical half of the tylus dark brownish to fuscous; vertex full, without an impressed longitudinal line as in *invitus*, but having a slight triangular, flattened space just before the carina; eyes dark brownish, sometimes faded to pale on the

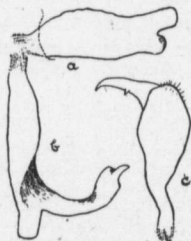


Fig. 17. *Lygus communis*, male genital claspers; a, lateral aspect of sinistral forcep; b, sinistral forcep dissected, dorsal aspect; c, dextral forcep dissected ventral aspect.

* Measurements for the head, antennæ and pronotum are given in micrometer readings which for comparison are more useful than figures given in millimeters. To reduce these measurements to millimeters multiply by .0254.

margins. Rostrum reaching to near the posterior margin of the hind coxæ, yellowish to brownish, the apex blackish.

Antennæ: segment I, length 20, greenish, frequently darkened with brownish; segment II, length 70, dark brownish to fuscous, sometimes basal half paler; segment III, length 42, dark brownish; segment IV, length 38, same colour as the preceding; all the segments with very fine, pale yellowish pubescence.

Pronotum: length 33, width at base 62, apex 32, width of collar 24; greenish, darkened with brownish on the basal half, two blackish rays on the disk, one behind each callus, in the darkest specimens extending across the calli, widening behind and nearly reaching the basal margin; coxal cleft marked with reddish, sides just posterior to this much darkened; disk shining, very finely and closely punctured, the punctures more or less transversely confluent especially on the basal half. Scutellum greenish darkened with brownish, transversely rugose; specimens maturing on *Ilex* and *Cornus* frequently have a longitudinal median fuscous line. Sternum pale beneath with the sides reddish as are the lateral parts of the meso- and metathorax.

Hemelytra: greatest width 2.3 mm., closely and minutely punctured, with fine yellowish pubescence; dark brownish to fuscous, darker on the apical half of the corium and across the tip of the embolium; embolium except the tip, the base and narrow lateral margin of the corium, pale greenish; cuneus clear, tinged with yellow, the very tip sometimes slightly darkened; membrane darkened with fuscous veins and narrow margin at the apex of the cells and bordering the cuneus, a spot along the margin beyond the apex of the cuneus and extending inward to the cells, clear, thus isolating a fuscous spot along the margin close to the apex of the cuneus.

Legs: coxæ pale, usually with a spot of reddish at the base, femora greenish to yellowish, the posterior femora and often the intermediate pair twice annulated near the apex with reddish, frequently the whole apical half quite reddish; tibiæ greenish, sometimes slightly darkened toward the tip, spines pale brownish, tarsi yellowish to brownish, darker at the apex.

Venter: pale greenish beneath, a broad lateral band and the genital segment, dark reddish with brownish. The male claspers

are distinctive for the species (fig. 17). The spine shown on the dextral forcep is not present in *invitus*, and is usually visible in pinned specimens without dissection.

Female—Slightly broader and more robust than the male, does not differ materially in coloration though usually paler than the male.

This is the species commonly known as the false tarnished plant-bug, and is a destructive species to the cultivated pear. For an account of the life history see Parrott and Hodgkiss 1913*. The species is found most commonly breeding on *Cornus*, particularly *C. stolonifera* and *C. paniculata*. I have also reared specimens from *Cornus alternifolia* and *Ilex verticillata*, and taken general specimens on the prickly ash (*Zanthoxylum americanum*).

The type specimens were collected by the writer on pear near Batavia, N. Y., July 4, 1914.

Paratypes: 67 specimens taken on pear, June 16 to Aug. 8, Batavia; 35 specimens from *Cornus stolonifera*, June 14 to Aug 6, Batavia; from *Cornus paniculata*, 5 specimens June 21, 10 specimens Aug. 1, 6 specimens Aug. 10, Batavia. From *Cornus alternifolia*, 16 specimens, June 25 to 29, Batavia; 3 specimens, June 25, Wyoming, N. Y.; 8 specimens, June 21, Portage, N. Y.; 3 specimens, July 27, McLean, N. Y.; from *Ilex verticillata*, 15 specimens, June 21; Batavia, N. Y. Miscellaneous specimens: 16 from near Batavia, N. Y., June 25 to 29; 7 specimens, June 27, Portage, N. Y.; 5 specimens, July 5, Four Mile, N. Y.; 2 specimens, June 13, and 3 specimens, July 24, Ithaca, N. Y.; 3 specimens, June 23, Conesus Lake, N. Y., all collected by the writer. Specimens from other collectors: ♀, June 25, Spring Brook, N. Y.; ♂, July 2, Hamburg, N. Y.; ♂ ♀, July 20, Salamanca, N. Y.; ♂, June 30, Bretton Woods, N. H., collected by Mr. E. P. Van Duzee; 2 ♂♂ June 22, Bennington, Vt.; ♂ ♀ July 15, Eastport, Me.; ♀, July 12, Capens, Me.; 2 ♂♂, July 15-24, Glen House, N. H., collected by Mr. C. W. Johnson. Male specimen from Fort Collins, Colo., Aug. 1, with an unusual amount of reddish on the body beneath.

* The False Tarnished Plant-bug as a Pear Pest, New York Agr. Expt. Sta. Bull. 368.

Lygus communis var. **novascotiensis** n. var. Paler and more slender than the typical *communis* but not differing materially in the male claspers. Breeds abundantly on apple in Nova Scotia; but in New York I have been unable to take any form of *communis* on the apple.

Length 5.3 mm., greatest width 2 mm., more slender and much paler than the typical *communis*; the two black rays on the pronotum small but distinct; hemelytra more yellowish brown than fuscous; lateral stripe of the body reddish or darkened with fuscous.

This is one of the varieties or races of *communis* which may be worked out from the forms inhabiting different plants, and perhaps influenced somewhat by different external conditions.

Described from several specimens received from Mr. Wm. H. Brittain, of Truro, Nova Scotia, collected from apple at Kentville, Wolfville, and Smith's Cove, Nova Scotia, July 6 to 28, 1915.

GEOMETRID NOTES.

ON THE GENUS *XANTHORHÖE* HÜB. (*PETROPHORA* HÜB.).

BY L. W. SWETT, WEST SOMERVILLE, MASS.

The names *Xanthorhœ* Hüb. and *Petrophora* Hüb. have been used interchangeably, but *Petrophora* Hüb. ("Tentamen," 1805) has priority over *Xanthorhœ* Hüb. (Verz. bek. Schmett., 1816). The majority of European specialists are dropping the use of the "Tentamen" as they regard it more or less in the nature of a circular letter of doubtful date and place. Those who care to go farther into the matter should consult the excellent work of L. B. Prout and C. D. Sherborn (Annals and Magazine of Natural History, ser. 8, vol. IX, Jan., 1912); also Scudder (Proc. Am. Acad. Sci., vol. X, pp. 91-293, 1875), C. H. Fernald (Amherst, Mass., 16 pp., 1905), and Sherborn and Durant (Ann. Mag. Nat. Hist., ser. 7, Vol. II, pp. 491-495, Dec., 1898.)

The first species I propose to consider is *defensaria* Guen. (Spec. Gen., vol. X, p. 411, 1857; also Packard, Monograph, p. 149, 1876). This species was described from a male taken in California. Guenée says "near *munitata* Hüb. and especially *convallaria*, but more obscure," etc. The form that agrees most closely with this description—and I have examined some 400

specimens, including those of my own collection, that of Mr. E. H. Blackmore, the Museum of Comparative Zoology, Cambridge, Mass., and the American Museum of Natural History, New York—is the male with a dark, greyish outer border on the fore wings and a rather indistinct, brownish median band, beyond which are rows of triple dots on the veins, with traces of wavy lines. The female differs from the male in that the band is of a solid, dark, reddish-chocolate colour, the outer border is dark fuscous gray, and the hind wings are darker basally and have several undulating lines but not so many as the fore wings. When these wavy lines are rubbed they show only as points on the veins, and it was doubtless a rubbed specimen that formed the basis of Guenée's description. Both the male and the female belong to what I term the normal summer form, occurring from July 3 to August 30, according to my series.

Xanthorhœ defensaria in all its forms can be separated from *convallaria* in that the basal line of the latter has a very strong, regular, outward curve, where in *defensaria* it runs almost straight, in a more or less shaded line, to the inner margin. They average between 20 and 25 mm. in expanse in my series, only one or two measuring below 20 mm. and about the same number over 25 mm., but none above 27 mm.

I think this typical, normal, summer form with the gray outer margin can be readily recognized by this description. I have specimens of it from British Columbia and California. This typical form represents the second brood, there being an early spring brood which I shall discuss later. There are several varietal forms of the summer brood. Packard (Proc. Boston Soc. Nat. Hist., vol. XIII, p. 398, 1871) describes "*Xanthorhœ (Coremia) californiata*, one female, Edwards, from California" as new. In the material studied there is a specimen bearing this label and a small, round, punch label, "No. 1385." Beneath this on a large label is written "figured in Monog." in Packard's handwriting. This is undoubtedly Edwards' female, from California, and is not a variety of *munitata* Hüb., but of *defensaria* Guen. (See Packard's Monograph, p. 137, 1876). He evidently mixed *munitata* Hüb. and *defensaria* together, as he remarks on the peculiarities of the Labrador specimens. The specimen of *californiata* Pack.

(pl. VIII, fig. 67) which is in the Museum of Comparative Zoology, and undoubtedly represents the type, is the bright, red-banded form with gray outer margin to the fore wings. Hulst (Can. Ent., vol. XXXII, p. 104, 1900) described a very similar form as *Xanthorh e* (*Hydriomena*) *amorata* from two specimens. Dr. Dyar (Proc. Ent. Soc. Wash., vol. VI, p. 223, 1904) refers *Hydriomena amorata* Hulst, male and female, to *defensaria* Guen. Mr. J. Grossbeck (Ent. News, pp. 147, April, 1907) states that there are two forms, probably both females, and although he refers both of these to *Xanthorh e* (*Petrophora*) he retains the female with the bright, red, central band as the var. *amorata* Hulst, in view of the fact that it was so distinct. Evidently Dr. Dyar was in error when he said "male and female." In this var. *amorata* Hulst, the fore wings have a bright, red-brown, central band and a normal gray, outer border. I see no reason why the name *amorata* Hulst should not fall before the older name *californiata* Pack. I have compared one of Mr. Grossbeck's specimens with the type and, except that the central band is not quite so bright, they are identical. It is a matter of individual opinion as to whether *amorata* is worthy of being retained to designate an intermediate varietal form, or fall into the synonymy of *californiata* Pack. I am inclined towards the latter view.

The next variety of the summer form to be considered is the melanic or black-banded form, which I previously described as *mephistaria* Swett (Can. Ent., vol. XLVII, p. 157, May, 1915). There are a few errors here that I must have made in copying the dates, and should be corrected, as follows:—

Line 23, for *Jan. 9* read *July 9*; line 24, for *Feb. 3*, read *July 3*.

I doubt if any of these forms are ever found at such early dates as are thus erroneously given in this connection.

This black-banded form is the same in size as the typical form and is represented in both sexes, whereas I have seen the bright, red-banded form, *californiata* Pack., only in the female, though I see no reason why males should not be found. I believe this range of coloration from reddish chocolate through light red to black occurs in nearly all species of *Xanthorh e*, e. g., *ferrugata* Clerc. and its black-banded var. *unidentaria* Haw.

Still another extreme form of the typical *defensaria* Gn. remains without a name, and I propose to describe it as follows:—

Xanthorhœ defensaria Gn., var. **conciliaria**, var. nov.

Expanse 23-25 mm. Wing pattern same as in normal *defensaria* Gn. except that the bands are a very deep reddish chocolate, the fore wings are basally yellowish and the outer margin is a reddish yellow or ochre. This yellow, suffused variety corresponds to the yellow variety of *munitata*, (*hethlandica* Prout). Doubtless this variation occurs in most of the *Cidaria* group allied to *munitata* Hüb. The white-banded spring form also shows this variation, but I think it does not differ sufficiently from *conciliaria* to receive a separate name. The dark-red, central band is lighter than normal and the wavy lines of the outer margin are present, but are reddish instead of fuscous.

This variety is very distinct. I have it only from Victoria, B. C., though no doubt it is common in Alaska. In some specimens the outer margin is entirely ochreous without markings except the marginal white line and two marginal white dots opposite the angle of the extradiscal line.

Holotype.—♂, Victoria, B. C., July 23, 1914, E. H. Blackmore; in my collection, received through the kindness of Mr. Blackmore.

Allotype.—♀, Victoria, B. C., Sept. 18, 1913, in collection of Mr. E. H. Blackmore.

Paratypes.—1♂ 6♀'s, Victoria, B. C., May, 14, 1914, to Aug. 26, 1914 and 1915, collection of Mr. Blackmore; also 5♀'s, Victoria, B. C., April 30 to Aug. 27, 1914 and 1915, Messrs. A. J. Croker and E. H. Blackmore, in coll. Swett.

There is a possible third brood which is found in the late fall up to October 1st. This is very small and stunted, and there is a tendency for the median band to be very narrow. The central band is of the same colour as in the normal male but is more solid and less distinct. This form is certainly worthy of a name and may be described as follows:—

Xanthorhœ defensaria Gn. var. **thanataria**, var. nov.

Expanse 18-20 mm. The bands are of the same shape as in the normal form but tend to be very narrow. Basally the male is pale ashen without lines, the central band dark and almost solid, in some specimens showing irregular lines. Outer margin very

pale ashen without lines, except the irregular scalloped marginal lines and black, twin spots. Hind wings somewhat semi-diaphanous, shaded with fuscous, with a pale extradiscal line basally. The females are of the same size and general appearance but the central band is lighter, being of about the same colour as in var. *californiata* Pack., sometimes with a yellowish tinge. Outer border light ashen, a little paler than the normal form, lines faintly discernible. I believe that a form corresponding to this is represented in the other allied *Cidarias*.

Holotype.—♂, Victoria, B. C., Aug. 1, 1915, E. H. Blackmore; in my collection, received through the kindness of Mr. Blackmore.

Allotype.—♀, Victoria, B. C., Sept. 9, 1914; in collection of E. H. Blackmore.

Paratypes.—3 ♂'s 1 ♀, Victoria, B. C., Aug. 26 to Sept. 25, 1913 and 1914, in collection of E. H. Blackmore; also 1 ♂ 1 ♀ from same locality, Sept. 5 to 25, 1913 and 1914, in my collection.

This form is easily distinguished by its small size, lack of markings and narrow median band besides the other points enumerated.

***Xanthorrhoe defensaria* Gn., var. *gigantaria*, var. nov.**

Under this name I propose to describe the typical early spring form, which may be easily recognized by its large size, heavy markings and wide bands.

Expanse 27-31 mm. The male has the general appearance of the male of the smaller summer form but differs in the following points:—Size much larger; median bands broader and heavier; basal line black or dark brown and very wide, in fact so wide that it generally merges with some part of the extradiscal line and gives somewhat the appearance of a more or less suffused median band. In the normal *defensaria* the basal band appears to start, as a rule, below the costa, but in the present variety it runs from costa to inner margin. The ♂ holotype has no lines on the outer border, merely a few black points on the veins. There is the usual irregular marginal white line, beyond which the outer margin is dark. In some of the other specimens, however, the outer border varies from the normal gray, with many wavy lines, to a slightly yellowish shade; but the latter is uncommon.

The female is as large and as striking as the male, the median

band is extremely wide and very dark and heavy. Between the basal band and the extradiscal the wing is so dark that only a broad, dark, intermediate band can be discerned. The median band is very deep reddish chocolate in colour. The outer border appears to be almost as in normal *defensaria* except that the lines are heavier. The hind wings of both sexes seem to have a slightly more yellowish shade than in the normal form, particularly in the female, which in normal *defensaria*, is quite dark ashen. Beneath there appears to be little difference except that the lines are heavier in the variety.

This form does not appear so commonly in collections as one might expect, possibly because collectors neglect to start their work early enough in the season.

One would hardly imagine this form was *defensaria* unless it were seen in series.

Holotype.—♂, Cowichan Bay, B. C., April 26, 1906, in my collection, received through the kindness of Mr. F. H. Wolley Dod.

Allotype.—♀, Victoria, B. C., May 10, 1914, collection of Mr. E. H. Blackmore.

Paratypes.—5 ♂'s, April 21 to May 8, 1914 and 1915, 4 of them in Mr. Blackmore's collection, the fifth (with a somewhat intermediate, reddish, outer border; without date of capture) in the Victoria Museum collection; 2 ♂'s, Duncan, B. C., April 22, 1914, Victoria, B. C., April 25, 1914, E. H. Blackmore, in coll. Swett; 2 ♀'s, Victoria, B. C., April 25 and 30, 1914 and 1915, E. H. Blackmore, in coll. Swett; 5 ♀'s, Victoria, B. C., April 22 to May 20, 1914 and 1915, in coll. Blackmore.

Another very interesting variety of this spring form, which I believe to be a case of melanism, is the following:—

Xanthorrhoe defensaria Gn., var. **suppuraria** var. nov.

Expanse 25-27 mm. The male has light ashen fore wings with very faint, wavy lines on the outer border and a very wide, black or reddish-black central band, nearly twice as broad as in var. *mephistaria* Swett. The female is similar to the male, except that the outer margin is of a pale, flesh colour with only the twin, black dots showing strongly. The hind wings are of rather a pale ashen colour and thin in texture, though not so much so as in var. *thantaria* Swett.

This appears to be a rare form and is much like *mephistaria* Swett except for the differences noted, viz., the wider, heavier median band and different shade of colour. In this variety, as well as *mephistaria*, the central band is solid black or reddish black, and the extradiscal and intradiscal lines can barely be seen.

Holotype.—♂, Victoria, B. C., April 25, 1915, E. H. Blackmore, in coll. Swett.

Allotype.—♀, Victoria, B. C., May 2, 1915, in coll. Blackmore.

Paratypes.—♂, Victoria, B. C., April 25, 1915, in coll. Blackmore; ♂, Victoria, B. C., June 2, 1914, E. H. Blackmore, in coll. Swett.

This includes all the forms of *Xanthorhœ defensaria* that might lead to confusion and they are connected by every intergradation, but I think it worth while only to describe the extreme forms, where I have a good series.

Summary of the varieties of *Xanthorhœ defensaria* Guen:—

	Time of appearance	Med. band of fore wing.	Outer border or outer third of fore wing.
<i>X. defensaria</i> Gn.	July 3—Aug. 31. (summer form).	Reddish chocolate (♀). Light brown suffused with blackish (♂).	Dark gray.
1. <i>Var. californiata</i> Pack.?— <i>amorata</i> Hulst.	July 3—Sept. (summer form).	4. Bright reddish brown (♀). ♂ unknown, probably like typical form.	Light gray.
2. <i>Var. conciliaria</i> Swett.	July 23—Sept. 18. (summer form).	Reddish cinereous, al- most blackish (♂ ♀).	Ochre yellow, (also basally).
3. <i>Var. mephistaria</i> Swett.	June 6—Aug. (summer form).	1. Solid black or reddish black (♂ ♀).	Light ashen gray.
4. <i>Var. thanataria</i> Swett.	Aug. 1—Sept. 25. (Chiefly Sept.—fall or late summer form).	25. Very narrow, lighter than typical, small sized (♂ ♀).	Pale ashen, almost without markings, more or less diaphanous.
5. <i>Var. gigantaria</i> Swett.	April 20—May 22. (spring form).	22. Very wide, dark reddish brown (♂), dark red- dish brown to cinereous (♀).	Dark gray.
6. <i>Var. suppuraria</i> Swett.	April 15—May (spring form).	2. Very wide black or reddish black (♂ ♀).	Pale ashen gray, some- times ochreous tinge.

These times of appearance are only approximate but give the dates of my series. Whether *thanataria* Swett is a late summer form or a third brood is a question which can only be answered by breeding.

I believe these forms will be easily recognized, and fewer mistakes will be made in the future. Packard evidently did not have a clear conception of *Xanthorrhoe munitata* Hüb., or *defensaria* Guen., for he mixed the species badly on plate VIII of the Monograph. Fig. 66 of this plate does not represent *munitata* Hüb., as Packard states, but male *defensaria* Guen. Fig. 67 of the same plate is not *munitata* var., as stated, but female *defensaria*, probably var. *californiata* Pack. *X. munitata* Hüb., has the intradiscal line strongly outcurved, where in *defensaria* it is nearly straight. Fig. 72, Pl. VIII, of the Monograph, appears very close to *munitata*, but there is always a doubt when figures are uncoloured.

Dr. Dyar discusses *X. defensaria* in Proc. U. S. National Museum, vol. XXVII, pp. 779-938, 1904. Mr. Wolley Dod compares *defensaria* and *munitata* in Can. Ent., vol. XXXVIII, p. 254, 1906.

In conclusion, I wish to thank Mr. E. H. Blackmore for the loan of specimens and valuable assistance, and Mr. H. Weiss for useful information and assistance in comparing *X. amorata* Hulst with *defensaria* Guen.

SOME MUSICAL ORTHOPTERA* AT CLARENDON, VIRGINIA.

BY H. A. ALLARD, WASHINGTON, D.C.

Miogryllus saussurei Scudd. In June, 1914, the writer captured several individuals of this small cricket in the short, matted grass of the dooryard of his home. These crickets appear very shy and are rather solitary in their habits. Their stridulation is a brief, rather faint, high-pitched, intermittent trill—tiii, tiiii, tiiii, tiiii—very much resembling the intermittent trills of some species of *Nemobius*.

Anurogryllus muticus DeGeer. In early June, 1914, the writer found great numbers of these crickets in a small pine grove on a hillside just behind Mr. Able's house near Vinson Station. These

* The Orthoptera listed in this paper were kindly identified by Mr. A. N. Caudell of the U. S. National Museum.
October, 1916

crickets appear to be somewhat arboreal in their habits, and were always seen upon the trunks of the pines from one foot to eight feet above the ground. They were never observed upon the ground, unless disturbed and forced to leap from the tree trunks. Very often several crickets could be seen upon the trunk of one small tree. The stridulations of these interesting crickets were heard about sundown and in the early part of the night. These crickets appeared to be very susceptible to weather changes and were heard only on very warm evenings.

The trill is loud, continuous, high-pitched, very much resembling the trill of *Aecanthus quadripunctatus* or *Aecanthus nigricornis*. In fact, when the writer first heard these crickets he was inclined to believe he was listening to some species of *Aecanthus*. Although in early June, 1914, *Anurogryllus muticus* appeared to be very common in the pine grove mentioned, none were heard a month later. They were not heard in this grove in 1915. This species appears to be very uncommon in this region and has not been located at any other point.

Nemobius carolinus Scudder. This tiny *Nemobius* is very common beneath the leaves and grass of the roadsides throughout the summer. Its stridulation is a weak, continuous trill indefinitely prolonged. Great numbers of these crickets were trilling everywhere beneath the herbage of the roadsides in 1915. They are persistent singers and may be heard throughout the night. In the coolness of the early morning they appear to be especially musical. They keep well concealed beneath the dead and matted herbage, and are exceedingly difficult to capture.

Neoconocephalus robustus crepitans (Scudder). This cone-headed grasshopper is a very common species around Clarendon, Virginia, in August. If the evenings are warm and humid, their stridulations may be heard from sundown until well into the night. The stridulations of this insect are somewhat puzzling. Two well marked notes may be identified. The stridulations of the majority of individuals around Clarendon and Washington consist of a rather weak, continuous, snappy z-z-z-z-z-z. Occasionally, however, other individuals produce an entirely different note which is exceedingly loud, penetrating, and continuous, with a

peculiar, droning, buzzing whirr, and may be heard for long distances. So different are these notes that the writer was convinced he had captured another species. During the summer of 1915, several individuals of both groups were taken. Although it was first thought that those individuals characterized by the stronger note were generally larger and possibly came closer to *N. robustus robustus*, it was finally decided to refer all to the form *N. robustus crepitans*.

The question is not solved, however, and needs further investigation. Such well marked differences cannot possibly be associated with temperature relations, as the two stridulations may be heard in the same vicinity at the same time. The stronger note is far less commonly heard. Occasionally, stridulations somewhat intermediate between the two extremes may be heard.

Rehn and Hebard* find that the *N. robustus robustus* and *N. robustus crepitans* intergrade within very narrow limits (Ocean View, New Jersey; and Philadelphia, Pennsylvania) although intermediate material has been found as far south as the District of Columbia. It is interesting to note that Davis has noted differences in the stridulations of the two forms; the stridulations of *robustus* appearing to be louder than the stridulations of *crepitans*. Rehn and Hebard have noted a day song, or "sleep-song", for *N. robustus robustus*. They say: "This day song, or what might well be termed, sleep song, is in reality a brief and drowsy impulse giving just sufficient energy to the act of stridulation to demonstrate the sound produced when the vibrations are not at full speed, the irregularity of the sound resulting from the same cause." The writer has noted a similar drowsy, half-hearted day song in the case of *Neoconocephalus retusus* (Scudder).

It would be very interesting to determine to what extent hybridization could be brought about between typical forms of *robustus* and *crepitans*. It is possible that hybrid material would throw much light upon the exact status of these forms.

* "A synopsis of the Species of the Genus *Neoconocephalus* found in North American North of Mexico." Trans. of the Am. Ent. Soc. Vol. XL, No. 4, p. 365-413.

NEW SPECIES OF NEW ENGLAND SARCOPHAGIDÆ.*

BY R. R. PARKER, BOZEMAN, MONT.

Sarcophaga bullata, n. sp.

1913. *Sarcophaga georgina*** Felt, N.Y. State Museum, Bull. 165, Rept. State Entomologist for 1912, pp. 80-82, pl. 7, figs., 1, 2 and 3†. Habitats; description of larval habits and of puparium.

1914. *Sarcophaga* sp., Parker, Can. Ent., vol. 47, p. 422. Related to *S. cooleyi* R. Parker.

Types—Massachusetts Agricultural College, one male, one female.

Paratypes—Massachusetts Agricultural College, 1 ♂, 1 ♀; United States National Museum, 1 ♂, 1 ♀ (No. 19167); American Museum of Natural History, 2 ♂, 3 ♀; Boston Society of Natural History, 2 ♂; Cornell University, 1 ♂, 1 ♀; collection of J. M. Aldrich, 1 ♂, 1 ♀; collection of writer, 6 ♂, 5 ♀.

(♂) Third antennal segment two and one-half to three and one-half times length of second; anterior portion of cheek clothed with black, posterior with whitish hair; hairs fringing calypters dark at fold, otherwise whitish except that those on inner portion of margin of upper (anterior) calypter are often dark; all tarsi shorter than their respective tibiae; anterior and posterior faces of posterior tibia with an equally strong beard of long, coarse, black hairs; hairy vestiture of lower surface of middle tibia increasing in length distally, short and not forming anterior and posterior beards; ventral surface of anterior coxa completely clothed with bristles that may be divisible into three irregular rows; only last two pairs of posterior dorsocentrals strong; except at sides, second and third ventral plates clothed with short, decumbent hair; genital segments dull orange, first either with hair-like, or weak marginal bristles.

* Contribution from the Entomological Laboratory of the Massachusetts Agricultural College.

** Provisionally determined.

† Figure 4, labelled as the genitalia of this species, is of *Phormia regina* (Meigen).

October, 1916

(♀) Third antennal segment two to three times length of second; anterior portion of cheek clothed with black, posterior with whitish hair; hairs fringing calypters dark at fold, otherwise whitish except that those on inner portion of margin of upper (anterior) calypter are often dark; ventral surface of anterior coxa with other bristles than those of the irregular rows at each side, sometimes more or less distinct row between them; only last two pairs of posterior dorsocentrals strong; abdomen clothed with short, reclinate bristles; genital segments slightly protuberant; the two broad, lateral lips of the first genital segment dull orange, near their edges usually turned abruptly backward (more protuberant), spiracles nearest to anterior margin: fifth segment not discernible, its spiracles when visible seem to open through lips of notum sixth (first genital segment); ventral plates of genital segments usually concealed.

Length—9 to 15 mm., average 12 to 14 mm.

(♂) *Head*—Viewed from side parafrontals and genæ, with dark reflections. Breadth of front at narrowest part from one-half to four-sevenths eye width; cheek height varies from one-third to one-half that of eye. Front rather prominent, sides of frontal vitta usually parallel but often slightly convergent backward or the sides effaced just below ocellar triangle (especially in large specimens). Second antennal segment brownish at tip, rarely blackish throughout; third two and one-half to three and one-half times length of second, its inner, basal portion often pinkish or salmon-coloured; arista plumose to beyond the middle. Back of head somewhat convex, typically with two complete rows of black cilia beyond eyes, sometimes with a partial third especially dorsally, otherwise clothed with whitish hair that completely covers metacephalon. Anterior portion of cheek clothed with black, posterior with white hair. Gena sparsely clothed with short hair or sometimes with three irregular rows on that half nearest eye orbit.

Chaetotaxy—Lateral verticals absent; vibrissæ inserted just above line of oral margin.

Thorax—Metanotum clothed with short, quite erect, close set bristles. Hairs covering anterior spiracle dark brown basally, at least their outer halves yellowish; those of anterior margins of

posterior spiracle either entirely dark brown or with yellowish tips, those of spiracular cover vary from brown with yellow tips to almost wholly yellowish. Epaulets dark.

Wings—Bend of fourth vein normally a strongly acute angle; anterior cross-vein more basal than end of first longitudinal; third vein bristly; costal spine vestigial; section III of costa equals approximately one and two-thirds times section V; posterior margin of alulae with or without fringe of hair; calypters whitish, fringe of hairs dark, otherwise whitish, but those on inner portion of margin of upper (anterior) calypter often dark.

Legs—Dark; all tarsi shorter than their respective tibiae. Posterior trochanter with well defined "brush," especially in large specimens: femur sub-cylindrical, clothed beneath with long hair that often becomes beard-like posteriorly; anterior face with three rows of bristles, those of intermediate row shortest and not developed distally; posterior face without ventral row of bristles; tibia sometimes slightly curved, anterior and posterior faces each with an equally strong beard of long, coarse, black hair: fourth segment of tarsus at least one-half fifth. Middle coxa with a single row of bristles; femur clothed beneath on posterior proximal half or more with long hair; anterior ventral row of short bristles complete, posterior row represented only by "comb" extending proximally to the long hair; hairy vestiture of lower surface of tibia increasing in length distally but short and not forming anterior and posterior beards; submesotibial bristle present. Ventral surface of anterior coxa completely clothed with bristles that are sometimes separable into three irregular rows, one at each side and an intermediate that is usually less complete and sometimes indistinct.

Chaetotaxy—Anterior dorsocentrals short, slightly longer than vestiture of praescutum but slightly reclinate and not projecting above it; acrostichals absent; inner presuturals, if present, very weak: last two pairs postsutural dorsocentrals strong, anterior to these three or four pairs that are weaker than those before the suture; praescutellar acrostichals present: scutellar apicals present: usually three sternopleurals, sometimes two but generally only on one side: lower sternopleura with a single row of bristles.

Abdomen—Oval or somewhat conical; nota clothed above with short reclinate bristles, beneath with slightly longer, almost erect hair. Ventral plates, as a whole, with their sides converging posteriorly; vestiture of first long and erect, that of second and third short and decumbent except at sides. Posterior margin of fourth notum dorsally, also sometimes ventrally, usually of same colour as genital segments, sometimes not so coloured.

Chaetotaxy—Second segment without marginal bristles; third with two, often very stout; fourth with complete row ending ventrally in long hairs.

Genital Segments—Prominent, often completely exposed, dull orange. First, (g. s.1) large, often partially yellowish pollinose, vestiture slightly shorter than that of second, "humps" almost bare, in profile weakly curved, marginal bristles weak or hair like; second (g. s.2) rotund, not flattened, anal area small and not extending above middle of posterior surface. Forceps (f.) darkened at least on distal half, in profile the fine, hairy vestiture is seen extending almost to tips of prongs, which are strongly curved forward and approximated almost to tips but latter slightly spread; base with upward flap-like extensions clothed with fine hair that is slightly shorter than vestiture of second segment. Base of fourth ventral plate usually shows as a rounded ridge the posterior extremity of which is slightly knobbed showing prominently in profile, inner portion of lamellæ at base thickly set with short, stubby bristles forming a "brush."

Genitalia—Distinctive. Accessory plates (a. p.) hairy; anterior claspers (a. c.) scarcely longer than posterior. (p. c. = posterior claspers; p. = penis.)

(♀) Females differ from males in the following important characters.

Head—Breadth at front at narrowest part varies from about five-sixths to same as eye width. Upper, inner orbits of eyes diverging downward.

Thorax—Bristly vestiture shorter.

Legs—All tarsi equal in length to tibiæ. Posterior trochanter with slender apical bristle: femur spindle-shaped; anterior face essentially with but two rows of bristles, those of lower row few and well separated, intermediate row may be represented by two

or three bristles proximally; posterior face with ventral row of long, well separated bristles on proximal half or slightly more. Anterior and posterior ventral rows of middle femur complete, but bristles weak and inconspicuous distally: submesotibial bristle very strong, sometimes a short bristle just above it.

Chatotaxy—Anterior and anterior postsutural dorsocentrals shorter: usually three sternopleurals, sometimes four on one or both sides: lower sternopleura with a single row of bristles, often with several others just anterior to its lower part, otherwise clothed with hair.

Abdomen—Oval; vestiture practically throughout of short, reclinate bristles.

Genital Segments—Slightly protuberant, visible only from beneath or sometimes bristles of first segment may be seen from above. The two broad lateral lips of the first genital segment distinctly separated dorsally, their edges usually abruptly turned backward and fringed with bristles that decrease in length and size ventrally, dull orange, often yellowish pollinose, spiracles nearer to anterior than posterior margin. Fifth segment not discernible as such, its spiracles rarely visible and apparently open through lips of sixth segment (first genital). Ventral plates of genital segments concealed.

Described from 15 males and 12 female specimens, 62 others examined.

Range—New England: MASS.: Woods Hole, Cohasset, Gloucester, Rockland, North Abington, Andover, Forest Hills, Wellesley, Amherst, Springfield; ME.: Fryeburg, Capens; CONN.: New Haven.

United States—N. Y., N. J., N. C., Ga., Fla., La., Ill., Ohio, Ind.

The fact that the vestiture of the anterior portion of the cheeks is black and that the posterior is white together with the two beards of equivalent value on the posterior tibiae is sufficient to distinguish males of this species from others known in New England at least. *Sarcophaga hæmorrhoidalis* Meigen and *S. dalmatina* Schiner while very distinct might possibly be confused with it by one not familiar with the group; the above characters will immediately differentiate them. Females of both these species

are separated from *S. bullata* by the character of the cheek vestiture and the notum of the first genital segment which is composed of one piece, as are the abdominal nota, and not divided into two lips. In addition, the female of *S. dalmatina* has one complete row of cilia behind the eyes instead of two.

In a discussion following the description of *Sarcophaga cooleyi* R. Parker (Can. Ent., vol. 46, pp. 417-423, Dec., 1914), known at present only from Montana, Wyoming and Utah, it was suggested that this species and *S. bullata* were close relatives. The genital segments of the females are very similar; those of *cooleyi* are interesting in that they show (at the sides) parts of a distinct fifth abdominal (sixth morphological) segment with its spiracles.

Among my material are several reared specimens of *S. bullata* which have light rather than dark palpi. The parts of the penis may be less compact and separated to a greater extent than figured in the drawing.

Felt (1913, see bibliography) described the larval and pupal stages from specimens reared on the head of a dead calf. From larviposition to adult was found to take from thirty-four to thirty-six days (Aug. 12 to Sept. 15 to 17). Dr. Felt very kindly sent

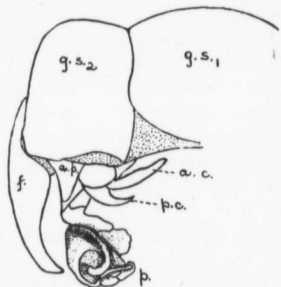


Fig. 19. *Sarcophaga bullata* n. sp., genital segments of male.

me six females from the specimens reared, which are unquestionably *S. bullata*. Metz (Station for Experimental Evolution, Cold Spring Harbor, Long Island), during the summer of 1914 reared this species on meat in several experiments. Undoubtedly it breeds in carrion. I also have records of its capture on cow dung, and at Springfield, Mass., captured it on human excrement. One specimen in the Massachusetts Agricultural College collection is labelled as caught flying around the "burrows of *Cryptorhynchus lapathi* (Linnæus)." A female received from C. H. Richardson was captured on cow dung. Specimens have also been reared from eggs.

(To be continued)

Mailed October 13, 1916