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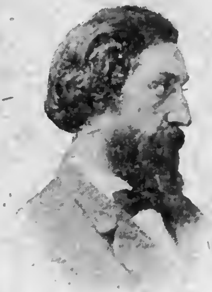

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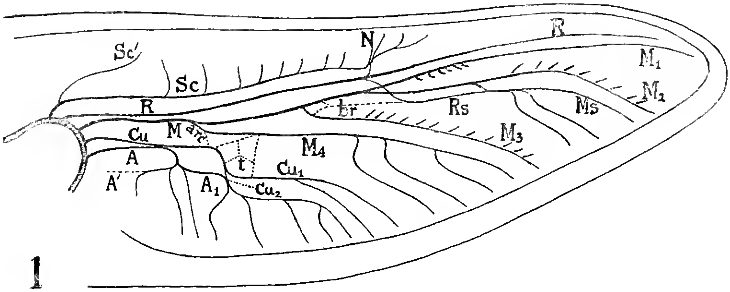

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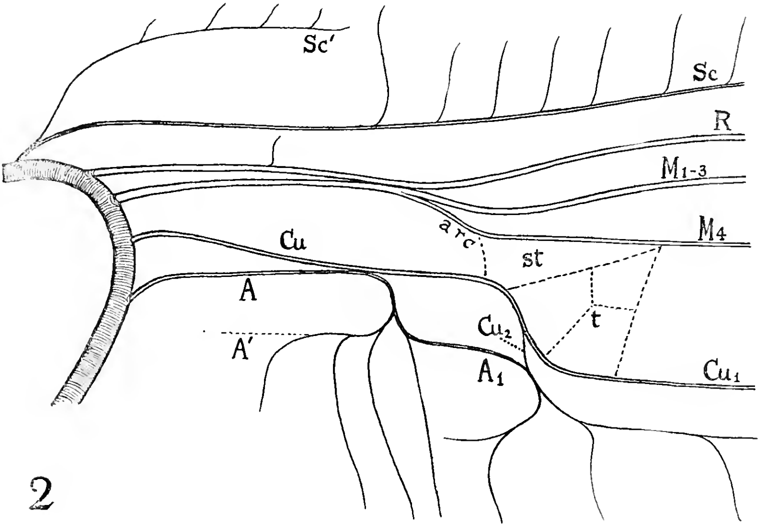

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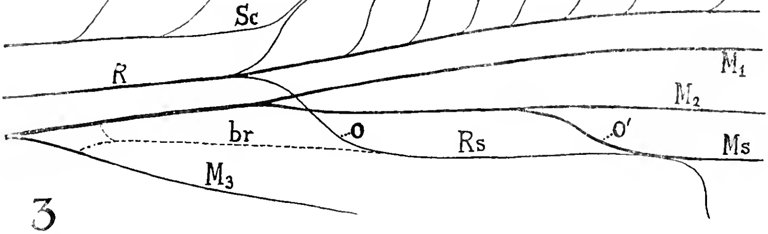

LARVAL TRACHEATION OF UROPETALA CHILTONI.—TILLYARD.

ENTOMOLOGICAL NEWS
AND
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CONTENTS

New Researches upon the Problem of the Wing-Venation of Odonata.

I. A Study of the Tracheation of the Larval Wings in the Genus Uropetala from New Zealand

By R. J. TILLYARD, M.A., Sc.D. (Cantab.), D.Sc. (Sydney), F.L.S., F.E.S., Entomologist and Chief of the Biological Department, Cawthron Institute, Nelson, New Zealand.

(With Plate I and three text figures)

In the Suborder Anisoptera the most archaic family still existing is probably the *Petaluridae*, containing only five genera, having a discontinuous palaeogenic distribution. These are: *Tachopteryx* in North America, *Tanypteryx* in North America and Japan, *Phenes* in South America, *Uropetala* in New Zealand, and *Petalura* in Australia. They are all dragonflies of large size; the greatest number of species in any one genus is three in *Petalura*; *Tanypteryx* and *Uropetala* have two species each, while *Tachopteryx* and *Phenes* are monotypic.

The family is characterized, amongst other things, by the presence of *two oblique veins* lying distad from the nodus, between *M2* and the next longitudinal vein below it. This latter vein is called by Needham and others *Rs*.[1] While accepting, in the past, this terminology, as far as the Anisoptera are concerned, I have pointed out that, in the Suborder Zygoptera, the trachea supplying this vein is a branch of *M*, and never has any connection with *R* at all. Hence I have claimed that the corresponding vein in the Zygoptera cannot rightly be called *Rs*, and I have suggested the name "Zygopterid Sector" for it, with the notation *Ms*.[2]

The full account of Needham's Theory of the crossing of *Rs* over two branches of *M*, viz. *M*1 and *M*2, is by now so well known to all Odonatologists that I shall save space by not recapitulating it here, and shall only refer my readers to Needham's very clear account of it (1). The chief point of importance to be noted is the claim that the oblique vein, of which there is only one present in most Anisoptera, represents the original position of crossing of *Rs* below *M*2, while all that part of the main vein lying below it basad from the oblique vein is a new formation, not represented in the original Odonate type, and designed to strengthen the wing for flight. This part is called by Needham the *bridge-vein*. In the larval wing the bridge-vein is formed by a pigment-band only, without any precedent tracheation, and it is this fact, more than any other, which has influenced Needham in forming his conclusions.

No satisfactory explanation has ever been offered of the condition of things in the *Petaluridae*, where two oblique veins are always present. For many years I have endeavored to find suitable stages of the larvae of *Petalura*, from which to solve this problem; but the search has been unsuccessful, owing to the draining and cutting up of the swamps on the Blue Mountains in which I originally found this larva.

In November, 1919, I visited New Zealand, where I stayed five months. While at Wellington at the beginning of De-

[1] Needham, J. G. "A genealogic study of Dragonfly Wing Venation." Proc. U. S. Nat. Mus., Washington, No. 1331, 1903, xxvi, pp. 703-761, 24 pl. (See especially Figs. 1-2, pp. 706-7, and 710-714.)

[2] Tillyard, R. J. "On the Development of the Wing-Venation in Zygopterous Dragonflies, with special reference to the *Calopterygidae*." Proc. Linn. Soc. N. S. W., 1915, xl, pt. 2, pp. 212-230. (See p. 224 and plates.)

cember, Mr. H. Hamilton, Zoologist, Dominion Museum, showed me a live specimen of the larva of *Uropetala carovei* White, sent in by Mr. Wilson of Bull's. This larva was handed over to me for study, and I dissected it and studied its wing-tracheation while staying at Mr. Hamilton's home at Karori. For his kindness and assistance in this matter I desire to thank Mr. Hamilton very much.

In January, 1920, I was the guest of Professor and Mrs. Chilton at Christchurch, and spent three days visiting the Cass Biological Station, in company with Professor Chilton and Mr. Chas. Lindsay, of the Canterbury Museum. During the first day's collecting, we located a large number of larval burrows of *Uropetala* in a small mountain swamp about two miles from the Station. The species to which these larvae belonged proved, on careful study, to be new, and has been described by me as *U. chiltoni*. The larva is not so fierce as that of *U. carovei*, and more resembles the larva of *Petalura*. It can be easily obtained by inserting one's fingers into the burrows, and working down to a depth of from ten to eighteen inches, when the larva will be felt as a hard object against the soft walls of the tunnel, and can easily be seized and drawn out. More than fifty of the larvae of *U. chiltoni* were thus obtained, and were brought back to the Station alive for study.

I wish here to thank Professor Chilton for his great kindness in allowing me the use of the Cass Biological Station, and in placing himself at my disposal during my short but fruitful visit there, and Mr. Lindsay for his help in the field.

The larvae, when examined, proved to belong to the last three instars. A number of dissections of both fore and hind wings were made. It was found that there was very little difference in the arrangement of the tracheae in the various instars, and the results also agreed entirely with those obtained from the study of the larva of *U. carovei* from Bull's, which was in the last instar.

In Plate I, fig. 1, I have shown the general scheme of tracheation for the hind wing in the penultimate instar. Points of interest to be noted are the following:—

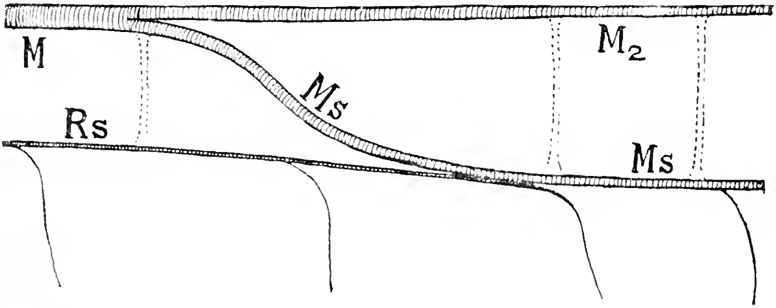
(1) The presence of a strong basal branch of *Sc*, which I have labeled *Sc'*. This would seem to be the homologue of the similar branch found in Plectoptera, from which the strong *humeral vein* of that Order is developed. Probably also a similar trachea originally underlay the anterior branch of *Sc* in the fossil Orders Paratrichoptera and Protomecoptera, both of Triassic age.

(2) The anal trachea, which is clearly the homologue of 1*A* in those insects in which more than one such vein is present, arises well below *Cu*, converges towards it, and finally touches it. It then bends away at the *anal crossing*, reaching again the level of the *anal vein* of the imago (*A'*), of which the basal portion is formed, like the bridge-vein, by a pigment-band only, without precedent tracheation. The main stem of trachea *A* passes on distad to a point just below the downward bend of *Cu*1, where it meets for a short distance with a very weakly formed trachea from *Cu*1, and then bends sharply away from it again towards the base of the wing posteriorly. We have been in the habit of calling this weak trachea *Cu*2. The formation seen in *Uropetala* strongly suggests, to my mind, that this supposed trachea *Cu*2 is in reality not the original *Cu*2 at all, but a new tracheal formation, which has succeeded in cutting off the distal portion of 1*A*, leaving only the turned back portions still attached to the anal trachea. If this is the true interpretation of these parts, it would follow that *Cu* in the Odonata must have been originally a simple trachea and vein. I shall show, in a later part of these researches, that *Cu* was such a vein in the Protodonata, and that all stages in the capture of the distal portion of 1*A* by a new branch descending from *Cu* are to be seen in the record of the Liassic Odonata.

Plate I, fig. 2, shows the base of the hind wing enlarged, to illustrate the characters described under (1) and (2) more forcibly.

(3) Turning next to the very important problem of the Radial and Zygopterid Sectors, Plate I, fig. 3, shows, greatly enlarged, the condition of the tracheation of *Uropetala* in the region of the two oblique veins for the *antepenultimate* instar, which was the earliest stage obtainable at Cass in January. The oblique vein *O*, it will be seen, is preceded by a very weak tracheal formation arising from *R* below the nodus, crossing *M*1 and *M*2 just distad of their origin from *M*1+2, and continuing beyond *O*, for only a moderate distance, along the line of the imaginal vein called by Needham *Rs*. It is clearly this formation which corresponds with the single oblique vein of other Anisoptera. Basad from *O*, the line of *Rs* is continued backwards by a pigment band only, without any tracheation. This band is connected more strongly with *M*3 than with *M*1+2, its connection with the latter appearing to be more in the nature of a cross-vein at this stage. It is this band which forms the *bridge-vein* of the Anisoptera in the imaginal stage.

Well beyond *O*, there is a second oblique *O'*. From Plate I, fig. 3, it will be seen that this is preceded, in the larval tracheation, by a very strong branch descending from *M2*, and then continuing the line of *Rs* distad. If we compare this formation with that found in the larvae of the Zygopterid family *Lestidae*, we shall see plainly enough that *O'* is the homologue of the oblique trachea in that family, and that the *long bridge* of the *Lestidae* is *not* the homologue of the *bridge* of Anisoptera, but comprises all that part lying basad from *O'*, along the line of the so-called *Rs*. To the trachea which arises from *M* to form *O'* I have already given the notation *Ms*, as well as to the vein that forms along it in the imago, so that we may now continue to apply this notation in the case of *Uropetala*.



Text fig. 1.—*Uropetala chiltoni* Till., antepenultimate instar, forewing, region of distal oblique vein, more highly magnified. (x 104.)

In text-fig. 1 I have shown, very greatly enlarged, the condition of the tracheation at the antepenultimate instar in the region of the origin of *Ms*. The difference in calibre between *Ms* and *Rs* is exceedingly marked. In the penultimate instar the calibre of *Rs* increases, while in the last instar the calibres of *Rs* and *Ms* are approximately the same, though *Ms* is usually still slightly the larger. In no case does *Rs* proceed beyond the position of the first descending cross-vein after *O'*; all the rest of the so-called *Rs* of Needham, together with the descending cross-veins and that portion of the *radial supplement* which carries tracheae is supplied entirely from trachea *Ms*.

We thus see that in *Uropetala* larvae, the single longitudinal imaginal vein *Rs* of Needham is formed from three distinct parts as follows:—

(a) A basal portion, arising from *M3* near its origin, having no precedent tracheation, and representing the *bridge-vein* of Needham in the Anisoptera.

(b) A middle portion, lying between *O* and *O'*, which is preceded by a trachea arising from *R* below the nodus, crossing *M1* and *M2*, running along *O*, underlying *Rs* between *O* and *O'*, then touching *Ms* and finally turning off to supply the first cross-vein beyond *O'*. This portion plus (a) represents the *long bridge* in the *Lestidae*.

(c) A distal portion, from O' onward, supplied by a true branch of M, viz., Ms, whose basal piece underlies O'. This portion is about as long, in *Uropetala,* as the other two portions combined.

Having completed this somewhat complicated analysis of the tracheation of this region, we may now proceed to solve the vexed question of the true homologies of the parts in question. Are we dealing with a single longitudinal vein of complex origin, whose evolution is to be traced out by reference to the courses of the larval tracheae underlying it; or are we not rather dealing with a single primitive longitudinal vein, whose larval tracheal supply has become more and more specialized during the evolution of the Odonata? If the former, then we cannot hope to find any simple notation which would correctly express the true structure of this vein. If the latter, we can ignore the tracheal specializations, and name the vein according to its true position as a simple longitudinal vein.

This problem is really quite easy of solution. For, if the vein called by Needham Rs is really complex, then we may expect to find, in the fossil record, some types at least in which the formation of the bridge-vein is not completed. But a careful study of the fossils shows that, both in the Protodonata and in all the Liassic Odonata, *this supposed Rs is a single complete vein, which arises from $M3$ near its origin, and runs parallel to and below $M2$, without any connection whatever with R.* In *Typus* and some Liassic fossils, such as *Heterophlebia*, an oblique vein is present in the position of O', thus showing a tracheational connection with $M2$. But, in all the rest of the Protodonata, and in most of the Liassic Odonata, even this is absent, and we find the same simple condition that is still to be seen in all the Zygoptera except the *Lestidae,* viz., that the supposed Rs of Needham is in reality a true branch of M, with no oblique veins above, and with absolutely no connection with R. This is, then, surely the primitive condition of this vein in the Odonata; and the specializations which have set in during the evolution of the Order are surely tracheational specializations only, which do not demonstrate to us the course of evolution of the vein, but rather serve to mask its simple origin, by the complexity of the changes that have taken place in the tracheal supply.

While admitting that, in most cases, the precedent larval tracheation may be profitably studied for the purpose of determining the homologies of the imaginal veins, it should be evident to everybody that larval wing-tracheation may be just as much subject to change, along its own evolutionary line, as is the imaginal wing-venation, or any other structure. In his work on the Odonata, Needham seems to have worked along the lines of assuming that, *in all cases,* the tracheation was to be relied upon to show absolutely the line of evolution of the venation. It is another instance of an attempt, of which there have been many, to apply Haeckel's Biogenetic Law in its entirety, without taking into account the possibility of larval structures, such as the wing-tracheation, undergoing lines of evolution of their own, so that they, in certain cases, may become far more highly specialized than the corresponding imaginal structures. It is certainly possible to prove, from the fossil record, that Needham's supposed bridge-vein was never formed backwards as a bridge-vein, but was always the basal portion of a strongly formed main longitudinal vein arising from *M3* (or sometimes *M*1+2, as in most recent forms) close to the point of separation of these veins. This proof I propose to give in another part of these researches, which will deal entirely with fossil forms. Meanwhile, for the further elucidation of the problem, I now propose to denote *this entire vein* by the notation *Ms,* as I have previously done for the Zygoptera. Logically, if we admit five branches of *M,* they should be called *M*1, *M*2, *M*3, *M*4 and *M*5, respectively, instead of *M*1, *M*2, *Ms*, *M*3 and *M*4, as at present; this I have already pointed out in a previous paper.[3] But, as a matter of fact, we have not come down to the true solution of the whole problem yet, and so I propose to let the notation *Ms* stand, seeing that it is at any rate now proved that this vein was originally a true branch of *M*. (To be continued)

EXPLANATION OF PLATE I.

Fig. 1. *Uropetala chiltoni* Till., penultimate larval instar, tracheation of hindwing. (x 13.)

Fig. 2. *Uropetala chiltoni* Till., penultimate larval instar, basal third of hindwing more highly magnified, to show tracheation. (x 45.)

Fig. 3. *Uropetala chiltoni* Till., antepenultimate instar, forewing, region of nodus and oblique veins. (x 38.)

[3] Tillyard, R. J. "The Panorpoid Complex. Part 3: The Wing-Venation." Proc. Linn. Soc. N. S. W., 1919, xliv, pt. 3. pp. 533-718. (See pp. 555-9 and text-fig. 41.)

Chironomus braseniae, New Species (Dip., Chironomidae).

By Adelbert L. Leathers, Agricultural College, North Dakota.

Chironomus braseniae n. sp.

♂. Head, proboscis, palpi and basal joint of antennae yellow, eyes black, antennal shaft and verticils brown. Antennae with 14 joints, the terminal joint two-thirds as long as the rest of the antenna.

Pronotum projecting laterally but not reaching the level of the mesonotum dorsally. Mesonotum greenish yellow, translucent and somewhat pruinose; vittae of a light buff color. Scutellum and halteres yellow; metanotum and sternopleura buff color. Wings white, longitudinal veins and cross veins not infuscated. Cubitus forking distinctly beyond the cross vein; the third and fourth longitudinal veins ending about equally distant from the apex of the wing. Legs whitish, fore tarsus not bearded, middle and hind tarsi densly bearded for their entire length. Tibial comb darkened on all legs; basal segment of fore tarsi more than one-half longer than the tibia, proportions as 47:30. Pulvilli well developed, empodium narrow.

Abdomen light green densely clothed with long yellow hairs. Segments without distinct fasciae.

♀. Antennae yellow, apical joint slightly infuscated. Posterior margins of the abdominal segments with a narrow whitish fascia. Otherwise like the male. Length 3.5 to 4 mm.

The *type* specimen is a male which was bred from a larva inhabiting the leaves of *Brasenia peltata*. The specimen was obtained from Spencer Lake near the village of North Spencer, New York, in July, 1915, and may be found in the collection of the New York State College of Agriculture, Ithaca, New York. The publication of this species at this time is due to the recommendation of Prof. O. A. Johannsen, under whom I did my minor work while at Cornell, 1915-1916.

The larva has the unique habit of cutting grooves in the foliage of a variety of aquatic plants, which have floating leaves. The specific name is the same as the generic name of the plant which the female seemed to favor. A more complete discussion of the ecology of this species will be found in a paper now in the hands of the Bureau of Fisheries, which should soon be available to the public, under the title of "An Ecological Study of the Chironomidae with Special Reference to Their Feeding Habits."

New Synonyms in the Noctuidae (Lep.).

By Wm. Barnes, M.D., and A. W. Lindsey, Ph.D.,
Decatur, Illinois.

The recent appearance in the *Insecutor Inscitiae Menstruus* of two articles by Dr. H. G. Dyar, describing new species of Lepidoptera, has led us to make a careful examination of our series standing as *Calophasia strigata* Smith and *Cerapoda oblita* Grote. We find that *strigata* has the front tarsi armed with curved, claw-like spines, though they are relatively a little smaller than those found in *oblita*. The species should therefore be removed to *Cerapoda*. We believe that *Calophasia* will drop from the North American fauna.

We regret to say that we must disagree with the synonymy proposed by Dr. Dyar for these species (Ins. Ins. Menst. ix, 63). The type of *oblita* is in the British Museum, and was figured by Sir George F. Hampson (Cat. Lep. Phal. B. M. vi, 181). Dr. McDunnough examined the type in person some years ago, and we have in our possession a specimen compared by him. This specimen was figured in the *Contributions* vol. ii, no. 1, pl. v, fig. 4. Our identification of *strigata* is also based on a specimen compared with the type, which is in the National Museum.

While the marks of *strigata* and *oblita* are similar, the former species is smaller, its primaries darker and more evenly gray, and the reniform entirely lacks the heavy white mark which characterizes *oblita*. The fact that Dr. Dyar has access to the type of *strigata* leads us to believe that it is this gray species which he treats as *oblita-strigata*. His description of *arrosta* bears this out, for this description, as well as fig. 17, pl. xx of Holland's *Moth Book*, comes well within the range of variation exhibited by our series of *oblita*. It seems that these species should stand as follows:

Genus Cerapoda Smith.

1. oblita Grote. 1877, Bull. Geog. Surv. Terr. iii, 117. *Oncocnemis*. 1906, Hampson, Cat. Lep. Phal. B. M. vi, 181. *Cerapoda*.

1913, Barnes & McDunnough, Cont. Nat. Hist. Lep. N. A. ii (i), 12, pl. v, figs. 3, 4. *Cerapoda (Oncocnemis)*.

†*strigata* Holland (not Smith). 1903, Moth Book 170, pl. xx, fig. 17. *Calophasia*.

deserta Grinnell. 1912, Bull. S. Cal. Acad. Sci. xi, 79. *Autographa.*
arrosta Dyar. 1921, Ins. Ins. Menst. ix, 63. *Cerapoda.*
2. STRIGATA Smith. 1891, Trans. Am. Ent. Soc. xviii, 107. *Calophasia.*
1906, Hampson, Cat. Lep. Phal. B. M. vi, 125. ?*Calophasia.*
1917, Barnes & McDunnough, Check List No. 2012, p. 56. *Calophasia.*
†*oblita* Dyar (not Grote). 1921, Ins. Ins. Menst. ix, 63. *Cerapoda.*

Another synonym appears in Dr. Dyar's *Schinia mclliflua.* This name applies to *Schinia niveicosta* Smith. *Niveicosta* was described from a single female, rather duller than most examples, which is in our possession. We have also a small series from Palm Springs, California, the type locality of *melliflua.* The species is very variable, but is unlike any other known to us and is very well characterized by Dyar's description of *melliflua.*

An Undescribed Species of Net-winged Midge from Argentina (Blepharoceridae, Diptera.)

By Charles P. Alexander, Urbana, Illinois.

In 1920 (Arkiv för Zoologi, Band 13, No. 7, pp. 1-4), the writer described a new genus and species of net-winged midge, *Edwardsina chilensis,* from southern Chile. As indicated in the original description, the fly exhibits some very unusual venational features. The discovery of a second species of this primitive genus of Blepharoceridae is of more than usual interest. The two specimens upon which the following description is based were collected by Dr. Carette along the Rio Diamante in southern Mendoza, Argentina, and kindly sent to me for determination by my friend, Dr. Charles Bruch, to whom I am indebted for many kind favors. The *type* is in the Museum of La Plata, the *allotype* in the writer's collection. Both of these types appear somewhat teneral and the wings are badly folded.

Edwardsina argentinensis, new species.

♂. Length about 8 mm.; wing 11 mm. ♀. Length about 8.5 mm.; wing 14 mm. The bodies of both specimens are rather shrunken, so a better idea of the size is conveyed by the wing measurements.

Mouth parts and palpi light yellowish brown. Antennae with the scapal segments and the base of the first flagellar segment obscure brownish orange; remainder of the flagellum dark brown; flagellar segments nearly globular. Front cream-colored; vertex dark brown.

Mesonotal praescutum silvery gray with three conspicuous black stripes, the broad median stripe divided by a slight carina; scutal lobes black, the median area pruinose; scutellum black, more pruinose basally. Pleura light gray. Halteres dark brown, the base of the stem obscure orange. Legs with the coxae and trochanters obscure yellow; remainder of the legs brownish testaceous, the terminal tarsal segments darker.

Wings grayish subhyaline; veins dark brown; wings very large and ample for the size of the insect; anal angle very conspicuous. Venation: *R1* thick with numerous short macrotrichiae; the section of *Rs* interpreted as being a spur in *E. chilensis* is here so long and of such a course that it appears to be the true base of the sector, although the extreme basal connection is atrophied; the vein that was interpreted as the base of the sector in *E. chilensis* would thus appear to be a crossvein, presumably *r; R2+3* short, about as long as *r-m; R4+5* parallel with *R3* basally but soon diverging, ending immediately behind the wing-apex which is very obtuse; *r-m* opposite the fork of *M*; no decided curvature on *M1* to indicate the position occupied by the atrophied *M2*.

Abdomen dark brown, the pleural membrane more grayish.

Habitat.—Argentina. *Holotype,* ♂, Rio Diamante, southern Mendoza, January, 1921 (Dr. Carette). *Allotopotype,* ♀.

Edwardsina argentinensis differs from the genotype, *E. chilensis,* in its larger size, dark coloration of the body, the slightly different wing-venation and the more conspicuous anal angle of the wing.

University of Michigan-Williamson Expedition to Brazil

A zoological expedition to the interior of Brazil has been organized at the Museum of Zoology, University of Michigan, through the interest and support of Mr. E. B. Williamson, Honorary Curator of Odonata. It is to be known as the University of Michigan-Williamson Expedition. The members of the expedition are Mr. Jesse H. Williamson and Capt. John Strohm, U. S. A. Both men have had wide experience in the tropics, and are outfitted in a most excellent manner for the prosecution of their work. They will leave New York on December 15, 1921, and will be in the field for about eight months according to their present plans. If particularly favorable conditions are encountered, a longer time may be spent in their explorations.

The region to be investigated is that of the Sierra de Parecis and the country westward toward the Bolivian frontier. The party will proceed directly to Manaos and then to Pt. Velho, which town will probably be their general headquarters for their explorations to the south and west.

The Odonata will receive the most detailed study, other groups to be collected are the Formicidae, Orthoptera, Lepidoptera, Diptera and Arachnida, and in addition to the Arthropoda mentioned much attention will be given to the reptiles, amphibians and shells.—Frederick M. Gaige, Ann Arbor, Michigan.

A New North American Psychid (Lep., Psychidae.)

By Frank Morton Jones, Wilmington, Delaware.

Oiketicus toumeyi n. sp.

♂.—Head, thorax and abdomen including the legs, tawny yellowish brown, hairy, the eyes black. The antenna with about 36 joints, brown, basally broadly bipectinate, the branches narrowing abruptly about three-fifths the length of the shaft from the base. The anterior tibia bears a slender, flattened, strap-like appendage, one-half as long as the tibia. The abdomen is long and slender, exceeding the wings by the width of the secondaries.

The wing veins are yellowish brown; the wings are glassy, as in *ephemeraeformis*, and are only very sparsely speckled with a few dark scales, which are more dense along the costa of the secondaries; the anal area of the secondaries is semi-opaque with brown hairs. The primaries are narrow and moderately acute, the costa almost straight, the outer margin oblique; the costa of secondaries is arched, the apical angle acute, the outer margin almost straight to the second cubital vein, below which the anal area is somewhat produced and the margin rounded. The primaries usually have 12 veins, the secondaries 8, with M2 and M3 (5 and 4) of both wings stalked to the cell; but M2 (5) is occasionally obsolete or partially so. The anal veins of primaries are as in *abboti* Grt. Wing expanse, 28 to 32 mm.

Type locality, Tucson, Arizona. Described from numerous bred specimens; the *type* is in the collection of the author, and paratype material will be distributed.

This is almost certainly the insect mentioned by Dr. J. W. Toumey (Bull. 9, Ariz. Ag. Exp. Sta., 1893) as "*Thyridopteryx* sp.," abundant on locust trees in the vicinity of Tucson; the general resemblance of its larval case to that of *townsendi* Ckll. has probably prevented its earlier recognition as distinct, though the moths of *toumeyi* and *townsendi* are very unlike.

Lice and a Horsefly Transmitting Disease (Dip., Tabanidae).

The United States Public Health Service announces that the researches of Doctors Edward Francis, Bruce Mayne and G. C. Lake show that the rodent disease, tularaemia, due to *Bacterium tularense* in the blood, which is very fatal to jack rabbits in Utah, is transmitted from rabbit to rabbit by their lice and from rabbits to man by the blood-sucking horsefly, *Chrysops discalis*.

Tularaemia is seldom fatal to man, only one death due to it being known. It is a septic fever, occurring in Utah, lasting 3-6 weeks, with slow convalescence. Its economic consequences, therefore, may be serious when it attacks farmers and lays them up in midsummer and in harvest seasons.

Libellulas Collected in Florida by Jesse H. Williamson, with Description of a new Species (Odonata).

By E. B. Williamson, Bluffton, Indiana.

Mr. Jesse H. Williamson collected dragonflies in Florida from March 1 to April 26, 1921. Localities visited and dates are as follows: Sebring, March 1; Fort Myers, March 3-7 and 10-19; Taxambas, Marco Island, March 8; Labelle, March 21-27; Moore Haven, March 29-30 and April 2; Palmdale, March 31 and April 3-8; enroute Moore Haven to West Palm Beach, across Lake Okeechobee, April 9; Miami, April 12; Enterprise, April 15-26. From April 29 to May 9 he collected at Kathwood, Aiken County, South Carolina, but on these dates most of the species observed were just emerging. Among the 4547 specimens collected, representing 65 species, are several new and many interesting things, the most remarkable and surprising of which is the fine *Libellula* described below. This Florida collection has been studied and arranged by J. H. W. and duplicates are being distributed to students and institutions.

Libellula jesseana new species.

Abdomen: ♂, 38-40; ♀, 35; hind wing, ♂, 41-43; ♀, 43; stigma, front wing, 6-6.8 mm.

♂.—Labium brown with a slight greenish cast; genae and mandibles similar, the latter more yellowish; labrum black; anteclypeus greenish brown; postclypeus, frons, antennae and frontal vesicle black, the latter nearly squarely truncate, the externoapical points shining; occiput black; rear of head brown with greenish or yellowish tinges and with a more or less distinct paler spot against the eye at midheight and another larger one below this.

Dorsum of prothorax and thorax black pruinose; mesepimeron and metepisternum similar but paler, more or less shaded, especially about the humeral and second lateral sutures, with greenish or yellowish brown; the metepimeron and thorax beneath this paler color.

Abdomen slender; above the lateral carina black; below the lateral carina brown to black with a greenish or yellowish cast and a more or less distinct yellowish area on either side posterior to the posterior transverse carina on each of segments 2-8; sterna brown to black; appendages brown to black.

Ventro-external face of the genital hamule roughly triangular in shape, the posterior edge nearly at right angles to the abdomen, the antero-dorsal edge relatively long, longer than in *auripennis*, so that the face of the hamule is relatively broader in *jesseana*. In *incesta* the anterior angle is obliterated in a curve joining the antero-ventral and the antero-dorsal edges, and the face is relatively slender as in *auripennis*.

In a younger male the labium, genae and mandibles are pale dull yellow, the postclypeus shades out to dark greenish adjacent to the eyes, and there is a green spot on the frons, against the eye, just above this. The dorsum of the thorax is brown with a purplish cast; the sides of the thorax are largely pale yellow with the posterior two-thirds of the mesepimeron and the upper part of the metepisternum darker, thus defining two more or less distinct pale stripes, one just posterior to the humeral and the other just posterior to the second lateral suture. Dorsum of abdomen similarly paler, 3-6 slightly lighter in color and yellowish adjacent to the lateral carina: 7-9 with a longitudinal dorsal black stripe occupying about one-third the area on each side between the middorsal line and the lateral carina (probably in younger individuals this dorsal black stripe is defined on more basal segments); 10 and appendages yellowish brown; abdomen beneath, between the lateral and ventral carinae, pale greenish or yellowish on 2 and 3, shading darker to greenish or yellowish brown on the segments posterior to 3, a more or less distinctly darker subapical area on either side of each segment; sterna at base of 3 and on 9 and 10 yellowish, otherwise dark to black.

Coxae pale yellowish to pruinose brown; legs brown to nearly black; femora paler at base and with the dorso-posterior surface pale yellowish to brown, darker apically.

Wings basally, posterior to *A* and proximal to the distal angle of the triangles, hyaline; remainder of wing reddish yellow, sometimes slightly more intense in the area between nodus and stigma, the extreme apex very narrowly and inconspicuously dusky tipped; the basal spaces anterior to *A* are not as deeply tinged as the apical portion of the wing. Venation basal to about the level of the triangles dark to black; distal to this point all the veins are reddish yellow excepting the veins on the anterior and posterior sides of the stigma and the posterior wing margin, which are black; stigma dragon's blood red (Ridgway). For venational characters see following the description of the female wings.

♀.—Labium pale dull yellowish brown; genae and mandibles greenish; labrum yellow with a large median basal rounded black spot which is joined basally on either side with a more or less extensive lateral spot which reaches and extends more or less along the anterior margin but does not attain the lateral margin above; anteclypeus greenish brown; postclypeus and frons brown to nearly black, each on either side in front, against the eye, with a greenish or bluish spot; occiput brown; rear of head brown, similar to that of the male.

Thorax as in the younger males, the sides more uniformly yellowish, the darker posterior areas on the mesepimeron and on the metepimeron and on the upper part of the metepisternum only slightly or not at all evident, so the pale stripe posterior to the humeral and to the second lateral suture are not as well marked as in the male or are wanting altogether, disappearing in the prevailing pale color of the sides.

Abdomen similar to younger males; the dorsal longitudinal black stripe described on 7-9 is faintly discernible as a darker stripe on 2-9 in the female; 8 perfoliate.

Wings hyaline, more or less yellowish tinged in the basal spaces anterior to *A*, and along the costal border, especially distal to the nodus and anterior to *R;* apex to level of stigma dusky, the inner edge diffuse; costa yellow except at base, clearest and brightest between nodus and proximal end of stigma, distal to which point it is black; nodus and subnodus more or less yellow; the other veins dark to black; stigma burnt sienna (Ridgway), apical fourth or third black; the dark color produced basally along the anterior and posterior borders, especially the former; enclosing veins black. Venational characters below. Legs as in the male.

Venational characters of both sexes.—Antenodals, front wing 17 to 19, usually 19; hind wing 13 to 15, usually 14; postnodals, front wing 11 to 14, usually 12 or 13; hind wing 12 to 16, usually 13 or 14; triangle front wing with 2 or 3 crossveins, usually 2; hind wing 1; crossveins in supertriangle front wing 0 to 2, usually 1; hind wing 0 or 1, usually 0; cells in subtriangle front wing 5 or 6, usually 5; cells in loop posterior to subtriangle, front wing, 2 or 3, usually 2; cubito-anal crossveins front and hind wings, 1; bridge crossveins front and hind wings 3 to 5, usually 4 or 5; triangle front wing followed by 4 or 5 cells, usually 4, then 3 or 4 followed by 4 increasing; 2 rows of cells between M4 and Mspl in front and hind wings; crossveins against the distal transverse side of the anal loop on its proximal side 4 or 5; crossveins against the proximal side of the anal loop on its distal side 9 to 11, usually 9.

Enterprise, Florida, April 22 and 26, 1921, 44 males, 2 females, collected by Jesse H. Williamson, for whom this handsome species is named. *Type* male and *allotype* female, taken in copulation, April 26, 1921, in coll. E. B. W.

Both sexes of *jesseana* are separated at once from those of *auripennis* by the darker face and frons, and dorsum of thorax and abdomen. In wing coloration the male differs from *auripennis* in the more intense reddish yellow of the wings posterior to *R*, the color in *auripennis* being more intense along the costal border. In the females of the two species there is little or no difference in the wings except that the costa basally is darker in both sexes of *jesseana* than in the sexes of *auripennis*. From the related species with dark colored bodies *jesseana* is separated at once by the reddish yellow unspotted wings of the male and the red stigma of the male and the burnt sienna stigma of the female. From *flavida*, *jesseana* is separated, among other characters, by the absence of dark colored basal wing markings.

About Enterprise are many small lakes, locally called ponds. Collections were made at eight of these, four north of the town and four east. All ponds are of the same general character, though some are more marshy than others. They lie about twenty feet below the general land surface among turpentine pine hammocks. The soil is sand and there are no inlets or outlets to the ponds. The water is clear and cold and fit to drink. Seven of the ponds were without any *Libellula* inhabitants. At the eighth pond *Libellula jesseana,* and no other *Libellula*, was taken. In J. H. W.'s notes this eighth pond, in the absence of any local name, is designated as Figure-8 Pond. It lies two and one-half miles (estimated) north of the town, going out the hard shell road past the cemetery. It is about a quarter of a mile east of the road and about half a mile due north of Buckeye Homestead Pond. The latter pond can be seen from the road. Gleason's Pond lies about three quarters of a mile east of Buckeye Homestead Pond. North of Gleason's Pond lies Wiley Pond.

Figure-8 Pond is about one-quarter of a mile long and one-eighth wide, shaped roughly like the figure 8. It has a solid sand bottom. deepening more rapidly than other ponds visited, being waist deep four or five feet from shore. Grassy sedges, shoulder high, grow from the water's edge out into the water for a distance of five or six feet. Then, within this zone, is a clear water zone eight to twelve feet wide, within which is another belt of vegetation several feet wide and rising above the water one or two feet. There are no bushes in the water and no marsh. The banks from the water's edge are steep sand with sparse dead grass and scattered young pines two to ten feet high. All around the pond the higher ground had been recently burned over but fire had reached the pond only at a few points, leaving some green pines near the water's edge.

Jesseana was usually over the shore-bordering zone of sedges, alighting on stems and leaves, and, when back from the water, on the bare twigs of the burned pines. It is very wary and difficult to approach, and is a good dodger either when at rest or on the wing. In general habits it mostly resembles *L. auripennis*. Other species associated with *jesseana* were *Tramea carolina, Coryphaeschna ingens, Anax longipes*, a *Progomphus*, and *Enallagma doubledayi*.

The question whether *jesseana* might not be a hybrid of *auripennis* and some other species naturally suggested itself. Libellulas generally are of wide distribution and their habits as imagoes render them conspicuous. No new species has been added to the eastern North American fauna in over fifty years, and the discovery of an undescribed species in Florida was a great surprise. At first I was inclined to regard it as a hybrid, but on farther study I have abandoned this opinion. Its general appearance, due to wing coloration, at once suggests *auripennis*. Dr. Calvert and Dr. Ris, writing independently, see something of *flavida* in it, but neither attributes this to hybridization and Dr. Ris especially is convinced it is not a hybrid. Dr. Kennedy also considers it specifically distinct and not a hybrid. In its restricted distribution and its suggestive synthesis of characters *jesseana* resembles another dragonfly in another subfamily which I know well. *Macromia wabashensis* is known only along two or three miles of the Wabash River near Bluffton, Indiana, where it has been found continuously from 1902 to 1921. In characters it is just what one might expect from the crossing of *M. taeniolata* and *M. pacifica*, both of which species, as well as *M. illinoiensis*, occur on the same stretch of river. If *wabashensis* is a hybrid it has certainly held its own for at least twenty years. It is possible that failure to record it elsewhere may be due to lack of collecting. This last factor can hardly be used to explain the limited known distribution of *L. jesseana*. It remains to be seen if *jesseana* maintains itself and is able to extend its range from the single small lake where it is now known to occur.

Other species of *Libellula* collected by J. H. W. are listed below. Species of *Ladona* are not included in this paper. A few specimens collected in 1904, 1906 and 1908, by Mrs. Stella Deam, and in 1911 and 1913 by L. A. Williamson are also recorded. All notes on habits and captures are from J. H. W.'s field notes.

Libellula auripennis Burmeister, West Palm Beach, February 24, 1904, teneral female (Deam); Salt Lake, near St. Petersburg, April 21, 1908, female (Deam); March 26, 1913, three teneral males (L. A. W.); Sarasota, April 4, 1911, two males, two females (L. A. W.); Taxambas, Ft. Myers, Labelle, Moore Haven, Palmdale, Miami and Enterprise, forty males and thirty-nine females, tenerals and adults at each location. Kathwood, South Carolina, a single teneral male.

Auripennis is found scattered over fields and pastures, often far from water. Adult males with red abdomens flew swiftly over or near open streams in fields. Adults difficult to catch. Some, but not all, of the males from Enterprise have the wings more extensively reddish yellow than any other specimens in the collection. In this character they approach but do not reach the intensity of *L. jesseana*. Otherwise they are typical *auripennis*.

Libellula incesta Hagen. Labelle, fifteen males, one female; Palmdale, thirty-six males, fifteen females; Enterprise, one male, one female. Found on wooded part of Pollywog Creek at Labelle and of Fisheating Creek at Palmdale, and seen nowhere else about these two towns.

Of the seventeen females in the collection all but two have a distinct dark postnodal streak between *C* and *R*. It is also present in about one-half of the males. In both sexes it varies from entirely absent, through faintly present to clearly present and, finally, in the most extreme cases, it becomes a continuous brown streak from nodus to stigma. The streak is darkest in tenerals of both sexes, but all tenerals do not have it; the darkest specimens seen are teneral females. This wing marking is not therefore entirely sexual or ontogenetic, though it tends to be both, being darker in females and in tenerals.

Libellula axilena Westwood. Daytona Beach, March 26, 1906, one female (Deam); St. Petersburg, March 13 and 22, 1913, one male and three females, all very teneral (L. A. W.); Fort Myers, Labelle, Palmdale and Enterprise, fourteen males and nine females.

All the specimens of *axilena* are young with the teneral body color pattern distinct, and the postnodal wing streak between C and R and nodal spots are present in every specimen. In every specimen but one the brown area about the metastigma is continuous with the brown area anterior to it. In every case the brown stripe on the second lateral suture is wider than in *vibrans,* and between this stripe and the dorsal thoracic dark area, on the side of the thorax above, is a triangular brown area which is entirely wanting in *vibrans.* In *vibrans* the postnodal wing streak is present in one female, faintly present in two males and two females, and absent in nineteen males and fourteen females. In every case the brown area surrounding the metastigma is separated from the dark area anterior to it, and the sides of the thorax above, between the humeral and second lateral sutures, are entirely pale.

The color pattern of the thorax as well as the pale face and frons thus separate *vibrans* certainly from *axilena.*

At Fort Myers, flying about and alighting on dried vegetation in the sun along a fence separating a cemetery and orange grove. This species and *vibrans* were not recognized as distinct when captured and it is impossible now to state definitely any difference in habitats. In L. A. W.'s material collected at St. Petersburg, March 22, a male of *vibrans* and a female of *incesta* are papered in the same envelope. His other specimens of *axilena* were taken on March 13, three and one-half miles southwest of St. Petersburg, while his twelve specimens of *vibrans* were taken on March 22, four miles southwest of town. J. H. W. collected *axilena* on thirteen days and *vibrans* on ten days in Florida. On four different days he took both species, on nine days he caught *axilena* and not *vibrans*, and on six days *vibrans* but not *axilena.* Both species certainly occurred in the same creek-enclosing woodlands at Palmdale and Enterprise, but were not found on the creeks themselves. Apparently *axilena* frequented more open spots and the edges of forests, while *vibrans* preferred denser forest.

Libellula vibrans Fabricius. St. Petersburg, March 22, 1913, five males and seven females, all teneral (L. A. W.); Port Orange, March 16, 1906, one male, one female (Deam); New Smyrna, April 24, 1906, one male (Deam); Fort Myers, Labelle, Palmdale and Enterprise, fourteen males and eight females; Kathwood, South Carolina, two males. For notes see above under *axilena.*

List of the Tachinidae (Diptera) of North Carolina.

By C. S. Brimley, Div. of Entomology, N. C. Dept. of Agriculture.

The following list includes all those species of Tachinidae which are known to us to have been recorded from North Carolina.

Most of them have been collected by members of the Entomological Division of the State Department of Agriculture, and the collector's initials follow the records attributed to each. The names of those contributing to the list are Franklin Sherman, Chief in Entomology for the last twenty years; G. M. Bentley, C. S. Brimley, J. E. Eckert, C. O. Houghton, R. W. Leiby, C. L. Metcalf, Z. P. Metcalf, T. B. Mitchell, and R. S. Woglum, his assistants at various periods. Other records have been contributed by Mr. C. W. Johnson, of the Boston Society of Natural History, and some by Mr. Max Kisliuk, Jr., now with the Federal Horticultural Board.

The flies of this family have been identified for us in the past by the late Mr. D. W. Coquillett, and by Professor O. A. Johannsen, and more recently by Prof. J. M. Aldrich, to all of whom our thanks are due. These gentlemen are responsible for over three-fourths of the names on the list, while I am accountable for the remainder, mostly conspicuous, well defined forms.

Several names in the list are given with the generic name only or as near such a species. These were all given by Prof. Aldrich as being probably new species.

Undoubtedly the list is far from complete, and it is quite likely that it is not wholly free from error, still we believe it to be a creditable beginning.

Acemyia dentata Coq. Raleigh, late March, 1913, CLM; Linville Falls, early June, 1920, FS; Onslow Co., late March, 1920, MRS.

Admontia degeerioides Coq. Raleigh, mid September; Swannanoa, Oct. 5, 1915; mid July, 1919, RWL.

Alophora fenestrata Bigot. Raleigh, early April, one, CSB.

Alophora fumosa Coq. Hot Springs, Mrs. A. T. Slosson.

Alophora grandis Coq. Raleigh, late March, mid and late October, four males; early May, 1920, one female, CSB; Laurinburg, Sept. 11, 1920, male, TBM; Elizabethtown, early November, 1920, three males, TBM.

ALOPHORA SPLENDIDA Coq. Blowing Rock, September 4, 1915, RWL.

ARCHYTAS ANALIS Fab. Whole state, May to early November; has been bred from army worm in Haywood and Beaufort Counties in August and September by Mr. Sherman and Mr. Leiby.

ARCHYTAS ATERRIMA Desv. Whole state, mid April to early November. Has been bred from fall webworm at Raleigh, July 25, 1907, CSB.

ARCHYTAS HYSTRIX Fab. Raleigh, Lumberton, Southern Pines, Thomasville, late June to early September. Has been bred from *Datana perspicua* at Raleigh, June 24, July 5, 1918, CSB.

ARCHYTAS LATERALIS Macq. North Carolina, Coquillett, Rev. Tachinidae, p. 143.

ATACTA BRASILIENSIS Schiner. Raleigh, July 25, 1906, CSB.

ARGYROPHYLAX (sp.). Raleigh, Sept., one, CSB.

BELVOSIA BIFASCIATA Fabr. Lumberton, Southern Pines, Raleigh, Hendersonville, and Lake Toxoway, mid May to late October. Has been bred from *Citheronia regalis, Basilona imperialis, Anisota senatoria*, and *Ceratomia undulosa.*

BELVOSIA UNIFASCIATA Desv. Lake Ellis, Terra Ceia, Raleigh, Crabtree, and Spruce, mid May to late October. Bred from army worm in Haywood (mid August, 1914, FS), and Beaufort (late August and early September, 1919, RWL) Counties.

BESKIA AELOPS Walker. Raleigh, June 15, 1906, CSB; Sept. 26, 1917, RWL; Stem, early October, 1908, ZPM.

BLEPHARIPEZA ADUSTA Loew. Raleigh, late March and mid April, CSB.

BLEPHARIPEZA LEUCOPHRYS Wied. Blowing Rock, Sept. 15, 1915, FS.

BOMBYLIOMYIA ABRUPTA Wied. Blowing Rock, Grandfather Mountain and Highlands, all in September, and Grandfather Mt., also in late July. Ranges to over 5,000 ft. elevation.

CHAETOGAEDIA ANALIS V. d. W. Grandfather Mt., August, 1906, RSW.

CHAETOGAEDIA CREBRA V. d. W. Raleigh, mid November, 1911, CSB.

CHAETOPHLEPS SETOSA Coq. Raleigh, late June, 1912, CLM.

CHAETOPLAGIA ATRIPENNIS Coq. Raleigh, late July, one, CSB.

CISTOGASTER IMMACULATA Macq. Raleigh, late April to early August, common, CSB; Charlotte, early June, 1902, FS; Fayetteville, late May, 1920, CSB; Jefferson, mid September, 1912, FS.

CLAUSICELLA USITATA Coq. Wilmington, mid May, 1905, FS.

CUPHOCERA FUCATA V. d. W. Raleigh, late June, 1920, CSB.

CRYPTOMEIGENIA THEUTIS Walker. Raleigh, April 5, 1901, FS; April 13, 1906, CSB; Black Mts., late May, 1911, FS.

DINERA FUTILIS Smith. Highlands, Sept., 1906, FS.

Distichona auriceps Coq. Raleigh, mid Sept., CSB; Blowing Rock, Sept. 9, 1909, ZPM.

Distichona varia V. d. W. Raleigh, late June to mid Sept., CSB; Charlotte, late June, 1902, FS.

Doryphorophaga aberrans Twnd. Swannanoa, mid July, 1919, RWL.

Doryphorophaga doryphorae Riley. Terra Ceia, Aug. 24, 1919, RWL.

Echinomyia dakotensis Twnd. Raleigh, late Sept., 1915, early Oct., 1919, CSB; Highlands, early and mid Sept., 1906, RSW; Yonahlosse Road, Sept. 10, 1908, ZPM.

Echinomyia florum Walker. Raleigh, late April, early May, Sept., CSB; Southern Pines, April, 1901, FS; Gibson, Oct. 12, 1920, and Elizabethtown, Nov. 5, 1920, TBM.

Epalpus signiferus Walker. Raleigh, early Aug, CSB; Norlina, late April, 1905, FS; Craggy Mt., June 8, 1916, RWL; Linville Falls, early June, 1920, FS.

Epigrymia floridensis Twnd. Raleigh, mid July, 1912, CLM.

Ervia triquetra Oliv. Raleigh, early Sept., 1916, FS; Southern Pines, June 6, 1906, RSW.

Eulasiona (sp.). Linville Falls, late May, 1920, FS.

Euphorocera floridensis Twnd. Terra Ceia, bred from pupae green clover worm, August and September, 1919, RWL.

Euthera tentatrix Loew. Swannanoa, Oct. 5, 1915, RWL.

Exorista boarmiae Coq. Plymouth, bred from *Acrobasis nubilella,* RWL; bred from green clover worm pupae at Terra Ceia (Aug.-Sept., 1919, RWL), and at Elizabeth City (Aug.-Sept., 1919, FS).

Exorista eudryae Twnd. Raleigh, bred from larvae *Euthisanotia grata,* June 14, 1907; from cocoon *Estigmene acrea,* May 8, 1918, and from larvae *Euthisanotia unio,* May 8, 1918, CSB: taken late June, 1915, CSB.

Exorista flavirostris V. d. W. Raleigh, bred from cocoon *Lagoa crispata,* June 6, 1906, CSB.

Exorista futilis O. S. Raleigh, late April, mid June, CSB.

Exorista griseomicans V. d. W. Raleigh, early June, 1904, bred from cocoon *Lagoa crispata,* FS; early Sept., 1912, bred from fall army worm, CLM.

Exorista lobeliae Coq. Raleigh, early July, 1907.

Exorista pyste Walker. Raleigh, late Oct., CSB; Millbrook, bred from *Acrobasis caryae,* June, 1917, RWL; Roper, June 5, 1917, bred from *A. caryae* and *A. nebulella,* RWL; Burgaw, June, 1917, and Plymouth, June, 1916, bred from *A. nebulella* at both places, RWL.

Exorista setinervis Coq. Raleigh, late July, FS.

Exorista slossonae Coq. Raleigh, mid July, 1914, CLM.

Exoristoides johnsoni Coq. Raleigh, May, Sept. 23, 1920, CSB; Hertford County, Coquillett, Rev. Tachinidae, p. 91.

FRONTINA ALETIAE Riley. Raleigh, July, Sept., bred from fall webworm, CSB; Terra Ceia, Aug.-Sept., 1919, bred from pupae green clover worm, RWL; Elizabeth City, mid Aug., 1919, FS.

FRONTINA near ALETIAE, but palpi black. Raleigh, June, CSB.

FRONTINA FRENCHII Will. Raleigh, common parasite of the overwintering cocoons of the Polyphemus moth, adults emerging from late April to early August, the maggots overwintering within the cocoon and boring their way out at various times during spring and summer to pupate; occasionally they pupate within the cocoons of their host and perish, CSB; bred from tent caterpillar at Millbrook, May, 1915, RWL; Blowing Rock, Sept., 1915, FS.

FRONTINA VIOLENTA Walker. Raleigh, bred from larvae of *Pholus achemon,* in late Sept., 1914, and early Oct., 1915, CSB.

GAEDIOPSIS OCELLARIS Coq. Early May and late Oct., 1920, CSB.

GONIA CAPITATA DeG. Raleigh, late March to early May, not uncommon, CSB; Southern Pines, March 20, 1905, FS; Southport, April 6, 1914, CLM; Lake Waccamaw, April 1, 1914, CLM.

GONIA SENILIS Will. Raleigh, June, Oct., FS and CSB; Kingsboro, early Oct., 1919, MRS.

GYMNOCHAETA ALCEDO Loew. Black Mt., late May, 1910, FS; Hendersonville, June, 1907, FS.

GYMNOSOMA FULIGINOSA Desv. Raleigh, Hillsboro, Blowing Rock, Swannanoa and Linville Falls, early May to mid November, not uncommon.

HEMYDA AURATA Desv. Raleigh, late Sept., late Oct., CSB; Linville Falls, early June, 1920, FS.

HILARELLA FULVICORNIS Coq. Murfreesboro, June 9, 1895, CWJ.

HYALOMYODES TRIANGULIFER Loew. Raleigh, Nov. 9, 1920, CSB; Highlands, Sept. 9, 1920, TBM.

HYPOCHAETA LONGICORNIS Schiner. Raleigh, Sept. 17, 1906, bred from *Melittia satyriniformis,* CSB; Sept. 29, 1920, CSB.

HYPOSTENA DUNNINGI Coq. Revision Tachinidae, p. 60.

HYPOSTENA FLAVEOLA Coq. L. c., p. 61.

HYPOSTENA FLORIDENSIS Twnd. L. c., p. 62.

JURINIA ADUSTA V. d. W. Blowing Rock, Aug. 24, 1902, FS; Waynesville, Sept. 9, 1919, JEE.

LESKIOMIMA TENERA Wied. Raleigh, June 14, 1906; late July, CSB.

LEUCOSTOMA SENILIS Twnd. Murfreesboro, early June, 1895, CWJ.

LEUCOSTOMA ATRA Twnd. Lake Waccamaw, Sept. 20, 1915, RWL; Highlands, Sept. 5, 1920, TBM.

LINNAEMYIA COMTA Fallen. Raleigh, early June to late Nov., not uncommon; also taken at Murfreesboro, Hendersonville, Blowing Rock, Swannanoa and Wilmington.

MACQUARTIA PRISTIS Walker. Spruce, June, 1911, several, FS.

MASICERA ALBIFACIES Twnd. Raleigh, Aug. 15, 1901, bred from *Loxostege mancalis,* CSB.

Masicera eufitchiae Twnd. Linville Falls, late May and early June, 1920, several, FS.

Masicera exilis Coq. Elizabeth City, bred from tortoise beetle larva (*Coptocycla clavata*), Aug. 22, 1919, FS.

Masiphya brasiliana B. & B. Raleigh, June 11, 1906, late June, 1920, CSB.

Metaplagia occidentalis Coq. Raleigh, July 26, Aug. 4, 1906, bred from boll worm (*Heliothis obscurus*), CSB.

Metopia leucocephala Rossi. Raleigh, mid Oct., 1904, GMB; Southern Pines, late April, 1905, GMB; Pendleton, early June, 1895, CWJ.

Microphthalma disjuncta Wied. Murfreesboro, June 9, 1895, CWJ; Greensboro, Aug. 25, 1902, FS; Blowing Rock, Aug., 1906, FS; Black Mts., July 18, 1919, RWL; Grandfather Mt., early Sept., 1915, FS; ranges up to 5,000 ft.

Myiophasia aenea Wied. Raleigh, Gibson, Elrod, Boardman, August, September and October; Charlotte, early June, 1902, FS; not uncommon.

Neophyto setosa Coq. Raleigh, mid April, CSB; Spruce, late May, FS.

Ocyptera argentata Twnd. Beaufort, mid June, 1903, FS.

Ocyptera carolinae Desv. Raleigh, Spruce, Swannanoa, Murfreesboro and Elizabeth City, early June to early September; not uncommon.

Oestrophasia calva Coq. Raleigh, May 25, 1905, FS; June, CSB.

Pachyophthalmus signatus Meigen. Raleigh, mid July, 1912, CLM; March 29, 1920, bred from mud cell of Eumenid wasp, MRS; Jefferson, mid Sept., 1913, CLM.

Panzeria ampelus Walker. Raleigh, early and mid April, CSB; Southport, April 6, 1914, CLM; Spruce, late May, 1912, and June, 1911, FS; Blowing Rock, Sept. 4, 1915, RWL; Highlands, Sept., 1906, RSW; Blantyre, Sept., 1906, RSW.

Parachaeta bicolor Macq. Spruce, June, 1911, FS.

Paradexodes (sp.). Swannanoa, mid July, 1919, RWL.

Paradidyma singularis Twnd. Raleigh, Oct. 9, 1920, CSB; Wilmington, April 15, 1919, MK.

Peleteria robusta Wied. Raleigh, June 13, 1907, CSB; Blowing Rock, late July, 1904, FS; Sept. 4, 1915, RWL; Sept., 1918, FS; Elizabethtown, Nov. 5, 1920, three, TBM.

Peleteria tessellata Fabr. Blowing Rock, late August, 1902, COH.

Phorantha purpurascens Twnd. Elizabethtown, Nov. 5, 1920, TBM.

Phorocera claripennis Macq. Has been bred at Raleigh from pupae of *Ceratomia undulosa* (Aug. 14, 15, 1911, CSB); *Datana integerrima* (Aug. 2, 1916, RWL; Aug. 16, 1920, CSB); *Melalopha inclusa* (Aug. 11, 1915, CSB); sawfly, *Lophyrus* (April, 1912, CSB); cutworm, *Feltia subgothica* (June 11, 1920, CSB); at Millbrook, from apple tree tent caterpillar, late May, 1915, RWL; at Crabtree from army worm (Aug. 15, 1914, FS); at Wilmington, from fall army worm (July 26-28, 1920, CSB); at Terra Ceia from army worm and green clover worm (Aug.-Sept., 1919, RWL), and from army worm at Neuse (mid Aug., 1914, FS). Also taken at Beaufort and Swannanoa in July and August.

PHOROCERA COMSTOCKI Will. Raleigh, bred from *Cossula magnifica*, June 19, 1916, RWL.

PHOROCERA EINARIS Smith. Elizabeth City, late August, 1919, FS; Spruce, late May, 1912, CSB.

PHOROCERA LEUCANIAE Coq. Raleigh, mid Aug., 1903, FS; mid June, 1914, CLM.

PHOROCERA TORTRICIS Coq. Raleigh, mid June, 1914.

PLAGIA AMERICANA V. d. W. Raleigh, Nov. 6, 1920, CSB.

PSEUDOCHAETA ARGENTIFRONS Coq. Raleigh, bred from *Loxostege mancalis*, Aug. 14, 1906, CSB.

PSEUDOTACHINOMYIA WEBBERI Smith. Linville Falls, late July, 1920, several, FS.

SCHIZOCEROPHAGA LEIBYI Twnd. Aydlett, Currituck Co., bred from sawfly larvae (*Schizocerus privatus*), July 31, 1915, RWL.

SENOTAINIA RUBRIVENTRIS Macq. Pendleton, June 7, 1895, CWJ; Charlotte, early June, 1902, FS.

SENOTAINIA TRILINEATA V. d. W. Raleigh, May, 1910, CSB; early and mid July, 1914, CLM; Elizabeth City, mid Aug., 1919, FS; Fayetteville, late May, 1920, CSB.

SIPHONA GENICULATA DeG. Hendersonville, July, 1907, FS.

SIPHOPLAGIA ANOMALA Twnd. Raleigh, early Oct., 1912; mid Oct., mid Sept., 1920, CSB; Elrod, Sept. 24, 1915, RWL.

SIPHOSTURMIA ROSTRATA Coq. Raleigh, Oct. 14, 1902, GMB.

SPALLANZANIA HEBES Fallen. Raleigh, late Sept., CSB; early Oct., FS; Swannanoa, July 10, 1913, CLM.

SPALLANZANIA HESPERIDARUM Will. Highlands, July 5, 1906, FS; Jefferson, mid Aug., 1907, mid Sept., 1912, FS.

STURMIA ALBIFRONS Walker. Raleigh, late June, 1907, ZPM.

STURMIA DISTINCTA Wied. Raleigh, July 11, 1913, bred from full grown larva *Phlegethontius quinquemaculatus*, mid July; bred from larva *Phlegethontius sexta*, Oct. 26, 1920, two males, CSB.

STURMIA FRAUDULENTA V. d. W. Raleigh, June 4, 1907, CSB.

STURMIA INQUINATA V. d. W. Raleigh, bred from larvae of *Phlegethontius cingulatus*, July 20, 1906, mid Aug., 1910 (42 from one larva), late July, 1910 (about 30 from one larva), and from pupa of *Ceratomia* (sp.), probably *undulosa*, May 8, 1918, CSB.

STURMIA PHYCIODIS Coq. Raleigh, mid July, 1912, CLM.

STURMIA PILATEI Coq. Lake Waccamaw, Sept. 20, 1915, RWL.

STURMIA STRIGATA V. d. W. Raleigh, July, August, bred from *Loxostege mancalis*, CSB.

Tachina mella Walker. Raleigh, April 8, 1908, CSB; Milbrook, late May, 1915, bred from apple tree tent caterpillar, RWL; Murfreesboro, June 9, 1895, CWJ.

Tachina robusta Twnd. Hendersonville, June, 1907, FS; Spruce, late May, 1912, FS; Linville Falls, early June, 1920, FS.

Tachina rustica Fallen. Blowing Rock, Sept. 9, 1909, ZPM.

Tachinaphyto variabilis Twnd. Swannanoa, July 10, 1913, CLM.

Tachinaphyto (sp.). Raleigh, Sept. 29, 1920, five, CSB.

Trichophora ruficauda V. d. W. Raleigh, Hendersonville, Hot Springs, Lake Waccamaw, Elizabeth City, late April to late October, rather common.

Trichopoda formosa Wied. Hendersonville, June, 1907; Aquone, mid May, 1901, FS.

Trichopoda lanipes Fab. Raleigh, mid June to early August, CSB.

Trichopoda pennipes Fab. Raleigh, Cranberry, Linville, Southern Pines, Lake Waccamaw, late May to September, common.

Trichopoda plumipes Fabr. Raleigh, late June, early Aug., CSB; late July, 1912, CLM; Kittrell, July 15, 1919, TBM.

Trichopoda radiata Loew. Raleigh, mid July and early August, CLM and CSB.

Winthemia quadripustulata Fab. Has been bred from army worm at Durham, Crabtree, Neuse, Terra Ceia, from fall army worm at Edenton, and from larva of *Perigaea sutor* at Raleigh. Other localities: Elizabeth City, Blowing Rock, Swannanoa, Black Mt., with a seasonal range of May to October.

Winthemia (sp.). Linville Falls, late May, 1920, FS.

Xanthomelaena arcuata Say. Hot Springs, Mrs. Slosson.

Xanthomelaena atripennis Say. Raleigh, early August, FS; late June, 1920, CSB; Blowing Rock, Sept., 1915, FS; Aug. 29, 1902, FS; Elizabethtown, Nov. 5, 1920, TBM.

Ypophaemyia malacosomae Twnd. Millbrook, bred from tent caterpillar, May, 1915-6, RWL.

Some Cases of Aberrant Oviposition in Butterflies (Lep.).

By W. Buthn, St. Clair Experiment Station, Port of Spain, Trinidad, B. W. I.

When in Ecuador in 1920, I was the puzzled observer of strangely perverted ovipositing habits on the part of three widely differing species of Butterflies; the abnormality of which I speak I had never noticed previously nor have I ever heard it remarked upon. In collecting wood-boring larvae I was examining some newly felled forest trees, locally called "karuni"; although recently felled, the bark of these trees came off easily in large slabs, exposing the inner surface, which was covered with stagnated sap which had attained a condition of slimy fermentation, emitting a strong, acrid odor; attracted by this a *Perodromia*, the pattern of whose wings resembled tesselae of malachite and turquoise irregularly veined with black, settled on the trunk and began to imbibe of the liquid sap; a few moments later there also arrived to the feast a stately *Prepona*, also of a species which I have been quite unable to find described; this butterfly, in contradistinction to the former, sat with its wings folded, displaying the undersides of rich and deep, yet delicate shadings of dresden brown, cinnamon, russet and olive-gray, pencilled with blue-black and smoky maroon; very soon these two first comers were joined by a butterfly which quickly flew away again and which I took to be a *Callithea*, one or two *Hesperidae*, a large *Callidryas* resplendent in orange red and orange yellow, and strangely enough a *Heliconius cyrbia* which, after taking a few sips, sailed around the spot a few moments displaying its lovely wings of azurite blue, shading to black with crimson bands and white edged hind margins and then, to my great surprise, again alighted on the wet trunk and deposited eight eggs on the viscous timber. Unfortunately a heavy shower of rain now came on and the butterflies were driven away by the downpour.

The next day, being still in the same locality, I stripped off some more pieces of the bark and again a rather diversified congregation of insects resulted—a *Zeonia*, with tails as long as its own iridescent, transparent, scarlet blotched wings; a few *Gynaecia dirce*, one or two Catagrammas in golden brown, garnet and carmine, a large *Adelpha*, which, like the *Callithea*, however, did not remain long; an *Evenus* (*regalis*?) displayed its glorious scintillating, golden-green, peacock-blue and purple banded under surfaces; one of the locally numerous and varied Morphos for a short while settled, slowly opening and closing its great wings of profound, yet radiant blue changing with position to purples, and silvery-green; and again two unlikely butterflies that strangely enough, oviposited on the tree trunk itself in spite of its utter unsuitability for larval existence; these were *Papilio epenetus* and what I took to be an *Agrias*, like the *Prepona*, the only one of its species I ever saw. In all instances the ova were deposited in a close group. I have seen the *Heliconius* and the *Papilio* ovipositing under natural conditions on *Passiflora* sp. and *Citrus decumani* respectively; the former deposits a single egg on the tip of a separate leaf; I never found more than one egg to a leaf. The *Papilio*, on the other hand, places its score or so of eggs in a close group; an *Agrias* of differing species, that I had been fortunate enough to observe, placed its eggs quite separately on the under sides of the leaves. In addition to the above perhaps interesting subject, I may be allowed to mention superficially one or two other insects attracted by the odor of the fermenting sap—two were very prominent—a fine Elater of silvery gray with a longitudinal red line at each side of the thorax and elytra, and black lines in centre and a lively Wasp with a sparkling green-blue body and shining bronze wings; early one morning a great "Harlequin" Beetle (*Macropus longimanus*) hanging on by its six-inch long forelegs after, presumably, a night's debauch, its grotesquely designed body markings of stripes and curved blotches in red, black and sage-green, making it a very conspicuous object. Another solitary and very large visitor was a giant locust of the genus *Tropidacris*; its crimson and black wings gave a spread of nine inches, with body and legs in proportion. In fair number, but making only a very short visit, came a colossal wasp, a *Sceliphron* (apparently near *nigripes*), but seeming to appreciate more the flowers of a *Caesalpina coriaria* nearby. In much larger numbers came the black stingless Bees and certain Sarcophagidae and Muscidae. Ants, strangely enough, were uninfluenced by the attraction.

On several occasions thereafter I tried the stripping of bark in places where Insect life was intensely abundant in numbers and very varied in species, but either the sap was not at the right stage of ripeness or the trees were not of the proper species, as all that resulted were Hesperidae, of course, and the equally expected Callidryas and Satyrinae.

I expect to return to the same localities again shortly and this time, having more fixed headquarters, I shall install a complete outfit of breeding cages for rearing the imagines and for making colored drawings of the metamorphoses of all procurable species of the splendid and little known Lepidoptera of this difficult, very unhealthy and therefore practically unmapped and entomologically unexplored country.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JANUARY, 1922.

The Boundless Field of Entomology

With the present number the NEWS begins its thirty-third annual volume and closely approaches its third of a century of existence. Many changes in entomological work and outlook have taken place in the years since the first issue of this journal. Like politics and trade, entomology has become more international and the insects of Asia and Africa intrude upon the American as do the wares of the Orient and measures for the relief of the Near East. We cannot shut out the rest of the world entomologically, even if we would.

Far from having catalogued the insects of the United States, we see an endless vista of new forms to be distinguished, even in parts of our country supposedly well known. "Species," which the entomologists of that day regarded as well established, have been split up into two or many forms. The limits of supposed intra-specific variation have been contracted and every difference between individuals assumes an importance which our predecessors disregarded or esteemed of little worth.

In every sub-division of our science the data are insufficient and the conclusions drawn from them of doubtful or temporary value. There is a superabundance of opportunity for him and for her who will study insects intensively and extensively.

The NEWS takes this opportunity of thanking all those who came to its aid by subscribing to the volume for 1921 at the increased price. While this price still holds for 1922, we think that signs are appearing looking toward a lessening of publication costs. When realized, this decrease will be placed to the advantage of our subscribers.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

10—Proceedings of the Entomological Society of Washington, D. C. **12**—Journal of Economic Entomology, Concord, N. H. **19**—Bulletin of the Brooklyn Entomological Society. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **36**—Transactions of the Entomological Society of London. **38**—Redia, Firenze, Italy. **41**—Bulletin de la Societe Entomologique Suisse, Bern. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **57**—Biologisches Zentralblatt, Leipzig. **59**—Journal of Agricultural Research, Washington, D. C. **61**—Proceedings of the California Academy of Sciences, San Francisco. **76**—Nature, London. **78**—Bulletin Biologique de la France et de la Belgique, Paris. **85**—The Journal of Experimental Zoology, Philadelphia. **96**—Physis. Revista de la Sociedad Argentina de Ciencias Naturales, Buenos Aires. **111**—Archiv fur Naturgeschichte, Berlin. **118**—Die Naturwissenschaften, Berlin. **128**—Zeitschrift fur Induktive Abstammungs- und Vererbungslehre, Leipzig. **129**—The Bulletin of the Hill Museum, Witley, Surrey, England.

GENERAL. **Bell, E. L.**—Collecting notes. **19,** xvi, 96-7. **Gifford, J. W.**—Bee-sting and eyesight. **76,** cviii, 370. **Hanna, G. D.**—Insects of the Priblof islands, Alaska. Introduction. **61,** xi, 153-5. **Sasscer, E. R.**—Important insects collected on imported nursery stock in 1920. **12,** xiv, 353-55. **Talbot, G.**—The Hill museum, Surrey, England. **129,** i, 1-15. **Van Duzee, E. P.**—Orthoptera, Neuroptera, Hemiptera and Lepidoptera from the Pribilof islands, Alaska. **61,** xi, 193-5.

ANATOMY, PHYSIOLOGY, ETC. **Butschli, O.**—Vorlesungen ueber vergleichende anatomie. III. Sinnesorgane und leuchtorgane. 643-931. Berlin. **Carpentier, F.**—Pterothorax et prothorax. Etude des segments thoraciques d'un orthoptere. **33,** lxi, 337-43. **Car-**

penter, G. D. H.—Experiments on the relative edibility of insects, with special reference to their coloration. **36,** 1921, 1-105. **Lenz, F.**—Alternative modifikationen bei schmetterlingen. **128,** xviii, 93-103. **Malloch, A.**—Metallic coloration of chrysalids. **76,** cviii, 302-3. **Middleton, W.**—Some suggested homologies between larvae and adults in sawflies. **10,** xxiii, 173-92. **Onslow, H.**—Metallic coloration of chrysalids. **76,** cviii, 366. **Rabaud, E.**—L'adaptation et l'instinct des Cassides. **78,** lv, 153-83. **Ruschkamp, P. F.**—Wheelers trophallaxis und ursprung der insektenstaaten. **57,** xli, 481-94. **Seiler, J.**—Geschlechtschromosomenuntersuchungen an Psychiden. **128,** xviii, 81-92. **Tanzer, E.**—Morphogenetische untersuchungen und beobachtungen an Culiciden-larven. **111,** 1921, A, 7, 136-82. **Terao, A.**—A preliminary note on the structure of Hancock's gland of Oecanthus. (Annot. Zool. Japon, x, 41-4.) **Zeleny, C.**—The direction and frequency of mutation in the bar-eye series of multiple allelomorphs of Drosophila. **85,** xxxiv, 203-33. Die ruckbildung der augen durch mutation bei Drosophila. **118,** xx, 648-50.

ARACHNIDA, ETC. **Berlese, A.**—Centuria quinta di Acari nuovi. **38,** xiv, 143-95.

NEUROPTERA. **Ulmer, G.**—Ueber einige Ephemeropterentypen alterer autoren. **111,** 1921, A, 6, 228-67.

Watson, J. R.—New Thysanoptera from New York. **19,** xvi, 78-86.

HEMIPTERA. **Doane, R. W.**—The Stanford collection of Coccidae. **12,** xiv, 306. **Parshley, H. M.**—On the genus Microvelia. **19,** xvi, 87-93. **Pennington, M. S.**—Notas sobre Coreidos argentinos. **96,** v, 28-39.

Knight, H. H.—A new species of Bolteria (Miridae). **19,** xvi, 73-4.

LEPIDOPTERA. **Engelhardt, G. P.**—Foodplant of Luperina passer. **19,** xvi, 86-7. **Giacomelli, E.**—Sobre un caso de albinismo (?) en "Dione vanillae." (Nymphalidae.) **96,** v, 64-6. **Hering, M.**—Die geographische verbreitung der Libytheiden. **111,** 1921, A, 4, 248-96.

DIPTERA. **Headlee, T. J.**—The mosquitoes of New Jersey and their control. (New Jersey Agr. Exp. Sta., Bull. 348, 229 pp.) **Hoffman, W. A.**—An early record regarding bot flies. **12,** xiv, 374. **Peryassu, A. G.**—Os Anophelineos do Brasil. (Arch. Mus. Nac., Rio de Janeiro, xxiii, 9-104.) **Shannon, R. C.**—A reclassification of the subfamilies and genera of the North American Syrphidae. **19,** xvi, 65-72.

Alexander, C. P.—Dipterous insects of the family Tipulidae from the Pribilof islands, Alaska. **61,** xi, 183-4. **Cole, F. R.**—Diptera from the Pribilof Islands, Alaska. **61,** xi, 169-77. **Felt, E. P.**—The number of antennal segments in gall midges and a new species. **19,** xvi, 93-6. **Johnson, C. W.**—New species of Diptera. (Occ. Pap. Boston Soc. Nat. Hist., v, 11-17.) **Malloch, J. R.**—Dipterous insects of the family Anthomyiidae from the Pribilof islands, Alaska. **61,** xi, 178-82. **Van Duzee, M. C.**—A new species of the dipterous family Dolichopodidae from the Pribilof islands, Alaska. **61,** xi, 167-8.

COLEOPTERA. **Banninger, M.**—Vierter beitrag zur kenntnis der Carabinae. **49,** x, 112-20 (cont.). **Craighead, F. C.**—Hopkins host-selection principle as related to certain cerambycid beetles. **59,** xxii, 189-220. **Kessel, F.**—Ueber die stellung der Passandridae im system. **111,** 1921, A, 6, 33-35. **Kleine, R.**—Ueber die stellung der Ulocerinae innerhalb der familie der Brenthidae. Bestimmungstabelle der gattung Estenorrhinus. **111,** 1921, A, 6, 268-74; 275-81. **Knisch, A.**—Hydrophiliden aus Matto Grosso. **111,** 1921, A, 6, 1-24. **Notman, H.**—Concerning species, with notes on Phytodecta affinis, and pallidus. **19,** xvi, 75-8. **d'Orchymont, A.**—Le genre Tropisternus. (Hydrophilidae.) **33,** lxi, 349-74. **Pic, M.**—Nouveautes diverses. (Melan. Exot.-Ent., xxxiv, 33 pp.) **Wehrli, E.**—Monographische bearbeitung der gattung Psodos, nach mikroskopischen untersuchungen. **41,** xiii, 143-75. **Weise, J.**—Amerikanische Hispinen. **111,** 1921, A, 5, 263-74.

Van Dyke, E. C.—Coleoptera from the Pribilof islands, Alaska. **61,** xi, 156-66.

HYMENOPTERA. **Frers, A. G.**—Notas himenopterologicas. **96,** v, 66-71. **Frison, T. H.**—Hymenopterous insects of the family Bremidae from the Priblof islands, Alaska. **61,** xi, 185-7.

Cockerell, T. D. A.—Some parasitic megachilid bees of the western U. S. The epeoline bees of the American museum Rocky Mountain expeditions. (Amer. Mus. Novitates, Nos. 21-23.) **MacGillivray, A. D.**—New saw-flies from the Pribilof islands, Alaska. **61,** xi, 188-92.

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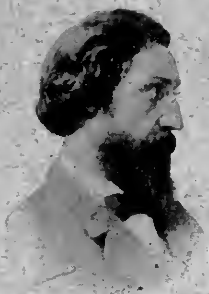

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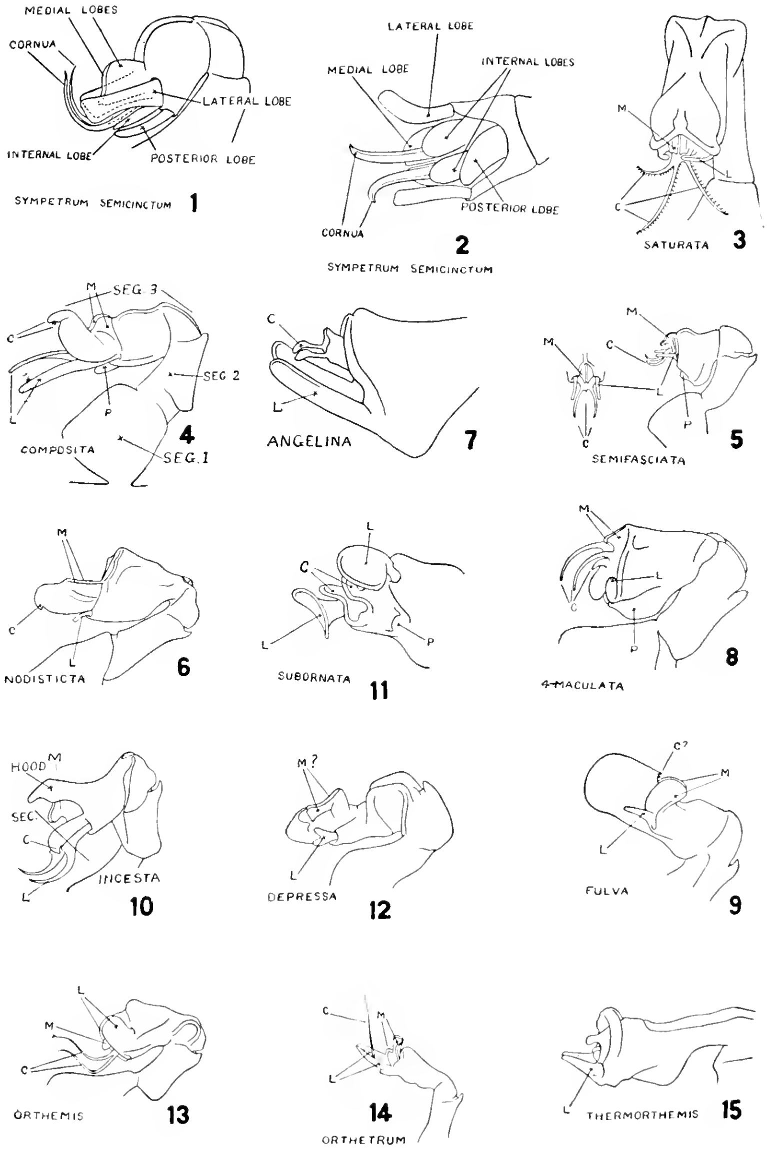

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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The Morphology of the Penis in the Genus Libellula (Odonata).[1]

By Clarence Hamilton Kennedy, Ohio State University, Columbus.

(With Plates II and III.)

The writer has just recently undertaken to trace out the phylogeny of the genus *Libellula* through a study of the penes. In this study it was found that this organ was more complex and varied than was generally supposed. It was found that the internal anatomy of the penis was different from the previously published ideas on the subject. This article will confine itself to the morphology of the penis and the homologies of its parts, while the phylogeny of the genus will be dealt with in the second article.

The leading articles on this subject are by Rathke, Goddard, Thompson, Schmidt and Bartenef.[2] Except the last author,

[1] Contribution from Department of Zoology and Entomology of Ohio State University, No. 65.

[2] See the bibliography at the end of this article.

these have attempted to cover too much ground, as the penis is very different from genus to genus.

Studies of the developing naiad [3] indicate that the penis in the Anisoptera is an outgrowth of the anterior end of the sternum of abdominal segment 3. It is flask-shaped. The inflated base attached to the sternum, represents the body of the flask, while the shaft and many lobed tip represent the neck of the flask. See Plate II, fig. 4, which is the penis of *Libellula composita*. The *Libellula* penis is divided into three segments by two flexible joints. Segment 1 is the inflated base, segment 2 the short shaft, which bears a short spur on its dorsal apical end, while segment 3 is the distal portion, which contains the seminal vesicles and meati and which bears at its apex an assortment of lobes. In the Libellulinae the apex of the penis may bear as many as nine lobes, which are so modified from genus to genus that it is difficult in some instances to figure out their homologies. The first half of this article will concern itself largely with these lobes.

THE EXTERNAL ANATOMY of the penis has been discussed by Miss Goddard, by Schmidt and by Bartenef. Schmidt did not name the parts. Miss Goddard named them but Bartenef's terms,[4] though later, are so much more apt that they have been followed in this paper. The latter author used the penis in his monographic revision of the genus *Sympetrum*, so the present writer has begun this study by showing how Bartenef's terms apply to the penis of our own *Sympetrum semicinctum*. See Plate II, figs. 1 and 2. In this species all the lobes are about equally developed, which may be a primitive character. The only species of *Libellula* in which a similar condition exists is *semifasciata* on account of which condition the writer has considered *semifasciata* to be our most ancient *Libellula*. The individual lobes will be discussed as follows:

Lateral lobes (marked *L* in all the figures). These are the outer and most conspicuous pair of lobes and are usually heavily chitinized. In *Sympetrum semicinctum*, Plate II, figs. 1 and 2, they are flattened cylinders as also in *Libellula angelina*, Plate II, fig. 7. In *semifasciata*

[3] Thompson, Backhoff.

[4] Bartenef. Fig. 9, p. 24, Libellulidae, Ins. Neur. Faune Russe.

they are linear, Plate II, fig. 5, in *depressa* forked, Plate II, fig. 12, while in *Orthemis* they are broad flat lobes, Plate II, fig. 13. These lobes are usually easily identified and are the starting point for the identification of the others.

Medial lobes (marked *M* in all the figures). These lie entad and cephalad of the lateral lobes, or dorsad from them if the penis is straightened out. These are usually unchitinized and are not always easily identified until the distal meatus of the seminal vesicles is located. These lobes are the two lips guarding the distal (or apical) meatus. In *lydia,* Plate III, fig. 16, there is a secondary or inner pair of medial lobes within the outer, larger pair. The medial lobes are usually unchitinized and are somewhat erectile. In *jesseana,* Plate III, fig. 26, they are covered with papillae when erect. In *depressa,* if correctly identified, they are chitinized with free ends, Plate II, fig. 12.

Cornua (marked *C* in all the figures). These are very conspicuous in many species of *Sympetrum* but are frequently highly modified in *Libellula.* In *Sympetrum* they are a pair, but in *Libellula* a third cornu may exist which then lies between the other two. These are unchitinized, except in 4-*maculata*, and arise at the extreme apex of the penis. The cornua are well developed in the primitive *semifasciata*, Plate II, fig. 5, where the median one is rudimentary, in *saturata*, Plate II, fig. 3, where the right one is asymmetrical, and in *Orthemis*, Plate II, fig. 13. In *Orthetrum,* Plate II, fig. 14, if correctly identified, there seems to be but one. In *composita*, Plate II, fig. 4, *nodisticta*, Plate II, fig. 6 and *incesta*, Plate II, fig. 10, they are probably represented by the apical tooth, as in *composita;* just under the apical tooth are two smaller teeth which may be homologous to the lateral cornua. In *jesseana*, Plate III, figs. 26 and 27, this median cornu is drawn out into a long tail. In *angelina*, Plate II, fig. 7, the cornua are flattened, which specialization is carried much farther in *Plathemis*, Plate II, fig. 11, and Plate III, fig. 16.

Internal lobes (marked *I* in all the figures). These occur in *Sympetrum* but are usually not conspicuous in *Libellula*, unless they are homologous with the part marked *I* in the figures of *jesseana*, Plate III, figs. 26 and 27. These parts are very erectile and are usually withdrawn quite completely in the dried penis.

Posterior lobe (marked *P* in all the figures). This is an unpaired, very erectile lobe arising on the posterior or ventral surface. It shows in cross section in Plate III, fig. 21. It is retracted and not visible in Plate III, fig. 16. It is fully erect in Plate III, fig. 26, of *jesseana.*

The least specialized penis in the genus *Libellula* is that of *semifasciata.* A comparison of Plate II, figs. 1 and 5, will show that it is remarkably like the penis of *Sympetrum.* However, in the various branches of the genus *Libellula* some very high specializations have come about. The cornua of the *saturata* group are fringed, while those of the two *Plathemis* are short and broad. The apex (cornua?) of the *fulva* penis is inflated, Plate II, fig. 9. The lateral lobes in *Plathemis* are paddle-shaped and the medial lobes of *incesta* and *jesseana* are covered by a prominent chitinous hood, Plate II, fig. 10, and Plate III, fig. 26. In the *composita* series, including *incesta, jesseana*, etc., the various soft lobes are very erectile and are covered with a plush of erectile hairs. See Plate III, fig. 26.

The homologies of these various lobes will be more apparent in the figures of the second article where a larger series of species is figured.

THE INTERNAL ANATOMY of the *Libellula* penis is illustrated in Plate III. The most of this part of the study is based on the penis of *Plathemis lydia* because the writer happened to have material of that species that could be sectioned. Fig. 16 shows the adult *lydia* penis in ventral and lateral views. Fig. 17 is a diagram, in shadows, of the penis of a last instar naiad, as this organ lies in its temporary, larval sulcus at the anterior end of the sternum of abdominal segment 3. In this stage the apex (penis segment 3) of the penis is fully developed but the shaft (segment 2) and the inflated base (segment 1) are still only partially developed and are wholly unexpanded. By comparing fig. 17 with fig. 16, the difference between the two stages can be seen. The vertical lines indicated by letters in fig. 17 locate the levels of the sections shown in figs. 18-25, each of which bears a letter to correspond with its level on fig. 17.

The internal anatomy of the *Libellula* penis is simple. In its adult condition it is merely a bag of cuticula lined with a layer of hypodermis and containing, besides two tracheae, the remains of the embryonic tissue which filled its cavity during its development. Apparently this tissue breaks down at the emergence of the naiad, so that in the imago the penis interior is a cavity continuous with the haemocoele of the body. Probably erection of this organ is due to a sudden surge of blood from the abdomen into this cavity. Fig. 25 is a cross-section through the embryonic penis shown in fig. 17 at the level H, and shows the connection of the embryonic tissue of the penis cavity and the haemocoele of the abdomen. This is before the embryonic tissue has disappeared.

The penis has two external openings, one at the apex, between the medial lobes, which I have termed the distal meatus, and one at the outer end of the penis, which I have termed the proximal meatus. See fig. 16, *dm* and *pm*. Williamson was the first to point out that the penis had two openings. He has figured these for *Desmogomphus*.[5] In the naiad both meat face ventrad, as shown in fig. 17. At the emergence of the naiad into imaginal life the penis bends at the level of the proximal meatus, so that this meatus faces cephalad in the adult. The distal meatus is guarded by the two medial lobes, but the proximal meatus lies fully exposed on the outer bend of the penis.

In *Desmogomphus*, Williamson uses the old terminology and calls the inflated base the "vesicle." Distad to this are three other joints, which he terms first, second and third, the apical segment being the "third." As the "vesicle" of the old terminology is merely the inflated base of the penis, this becomes segment 1, as I have named the parts in this article, so that the *Desmogomphus* penis has four joints where the *Libellula* penis has but three. The segments still homologize in the two penes. Segment 4 of the *Desmogomphus* penis is merely the region of the distal meatus drawn out into a small apical segment not found in *Libellula*. Segment 3 of the penis of *Libellula* equals segments 3 and 4 of the *Desmogomphus*.

The two meati are connected by a tube, which is marked *T* in fig. 17. At either end this tube is dilated into a vesicle. The distal vesicle, *dv* in fig. 17, lies just within the tip of segment 3. The proximal vesicle, *pv* in fig. 17, lies exactly in the flexible outer bend of the (adult) penis. In the *Libellula* penis these openings and vesicles do not connect with the cavity or inflated base of the penis. The true seminal vesicle is this pair of connected pockets in the apex of the penis and not the inflated base of it, as has hitherto been supposed. Just how these apical vesicles and meati function can be only surmised in our present ignorance of their action. No muscles or other structures inside the penis were found that might operate them. As the proximal vesicle, *pv*, lies exactly in the flexible bend of the penis, its action in filling and emptying is probably directly correlated with the motions of this joint. The distal vesicle, *dv*,

[5] A new Gomphine genus from British Guiana. Occ. Papers No. 80, Mus. Zool. Univ. Mich., 1920.

might be emptied by a crushing in of the erectile lobes on the end of the penis when this organ is inserted into the female. Because of the hard, heavily chitinized wall of the penis on the side opposite the lobes, any pressure on these would tend to flatten and empty the apical vesicle. The tube connecting the two vesicles suggests that one is efferent and the other afferent.

Because the penis of the adult dragonfly contains such flinty chitin, the sections of this organ were made from an individual in the last naiadal instar. By taking the naiad just before emergence, the outer cuticula peels off easily, leaving a soft insect that the razor can slice. While the embryology of the penis was not studied, it is probably true that the vesicles in the tip are invaginations of the body-wall of the penis tip. They are lined with chitin and in this final stage they each contain two cuticular exuviae, so that one may legitimately infer that the vesicles exist in the penis during the last three instars of the naiad. The sections figured on Plate III are all of *lydia* except figs. 28 and 29, which are of *incesta*. The figures are drawn to show only outlines and cavities. Each, to be understood, should be referred by the reader back to its proper level in fig. 17, where, as mentioned above the level of each section is indicated by a letter corresponding to that of the figure of the section.

Fig. 18 is section *A* through the bases of the cornua and the lateral lobes. The ridges on the outer sides of the cornua are the distal ends of the medial lobes.

Fig. 19 is section *B* through the bases of the cornua and the lateral lobes.

Fig. 20 is section *C* and shows the distal meatus and a small slice, *dv*, through the apical end of the distal seminal vesicle.

Fig. 21 is section *D* through the distal vesicle, *dv*, and the distal meatus, *dm*.

Fig. 22 is section *E* through the seminal tube, *T*, which connects the two vesicles. It shows also a thin slice across the proximal end of the distal vesicle, *dv*.

Fig. 23 is section *F* showing the seminal tube, *T*, and the tracheae, *tr*. This figure also shows a cross section of the inflated base, *bsc*, and a portion of the sulcus of the sternum. It shows also the ventral diaphragm which is muscular where it attaches to the body wall. This diaphragm is well developed in the region of abdominal segments 2 and 3 and may have to do with forcing the blood into the penis when the latter is erected.

Fig. 24 is section *G* through the proximal vesicle, *pv*, and the proximal meatus, *pm*. It shows also the wrinkled and unexpanded condition of the penis shaft.

Fig. 25 is section *H* through the proximal meatus and below the proximal vesicle. It also passes through the attachment of the penis to the sternum and shows the tissue of the body-cavity continuous with the penis cavity. The author has found no actual opening from the abdomen into the base of the penis but he has had only dried and poor material to work with. It is of course remotely possible that the Libellula penis is never truly erected, that the erections produced by boiling the specimens, as in fig. 26, may be wholly unnatural.

In the series of species beginning with the primitive *composita* and terminating in such specialized forms as *vibrans* and *incesta,* the softer parts of the penis are covered with a dense plush of hairs, which become erect when the penis is distended. These can usually be demonstrated by boiling the penis, if the material is not too old. Fig. 27 shows the penis of *jesscana* relaxed and fig. 26 the same organ after boiling, when it is supposedly erect. Fig. 28 is a cross-section through the penis of *incesta* at the line shown in fig. 10 and marked *sec.* Fig. 29 is the upper part of fig. 28 enlarged. The erectile hairs shown in these figures are hollow outgrowths of the soft cuticula and fill and become erect when the main organ is distended. At that time they are distended and their membraneous base is evaginated, so that the boiled *incesta* penis appears somewhat as does the erect *jesscana* penis. When the penis is relaxed these hairs are so completely withdrawn that their presence may be entirely unsuspected.

This paper has shown how little is known definitely concerning the genitalia in the Odonata. The next paper will show how useful the genitalia are in indicating the relationships within the genus *Libellula.*

BIBLIOGRAPHY.

RATHKE, 1832. De libellarum partibus genitalibus.

GODDARD, 1896. On the second abdominal segment in a few *Libellulidae.* Proc. Amer. Phil. Soc. XXXV, pp. 205-212.

THOMPSON, 1908. Appendages of the second abdominal segment of male dragonflies. Bull. N. Y. State Mus. No. 124, pp. 249-263.

BACKHOFF, 1910. Die Entwicklung des Copulationsapparates von Agrion. Zeitschr. wiss. Zool., XCV, pp. 647-706.

Schmidt, 1915. Vergleichende Morphologie des 2 und 3. Abdominal segment bei männlichen Libellen. Zool. Jahrb., Abteil. Anat. Ontog., XXXIX, pp. 87-200.

Bartenef, 1915. Libellulidae. Insectes Neuropteres in Fauna de la Russe., pp. 1-352.

Williamson, 1920. A new Gomphine genus from British Guiana with a note on the classification of the subfamily. Occ. Papers, No. 80. Mus. Zool. Univ. Mich.

Explanation of Plates II and III.

Plate II.

Figs. 1-2. *Sympetrum semicinctum* (Say). Sunnyside, Washington. Lateral and ventral views of the apical segment of the penis.

Fig. 3. *Libellula saturata* Uhler. Phoenix, Arizona. Penis, ventral view.

The following, except fig. 11, are lateral views of the penis.

Fig. 4. *Libellula composita* (Hagen). Laws, California.

Fig. 5. *Libellula semifasciata* Burm. Pungo Lake, North Carolina.

Fig. 6. *Libellula nodisticta* Hagen. Laws, Owens Valley, California.

Fig. 7. *Libellula angelina* Selys. Kioto, Japan. Coll. of Ris.

Fig. 8. *Libellula 4-maculata* Linn. Grodno Government, Poland. From Bartenef.

Fig. 9. *Libellula fulva* Muell. Arles? From Morton.

Fig. 10. *Libellula incesta* Hagen. (No locality). From O. S. U. coll.

Fig. 11. *Libellula subornata* (Hagen). Golconda, Nevada. Apex of penis viewed from the inner dorsal side with the lateral lobes spread. Enlarged. See Plate III, fig. 16 of *lydia*.

Fig. 12. *Libellula depressa* Linn. Lublin Government, Poland. From Bartenef.

Fig. 13. *Orthemis ferruginea* (Fabr.). Atoyac, Vera Cruz, Mexico. Coll. O. S. U.

Fig. 14. *Orthetrum caerulescens* (Fabr.). North Wales. From Morton.

Fig. 15. *Thermorthemis madagascarensis* (Ramb.). Madagascar. Coll. O. S. U.

Plate III.

Figs. 16-25. *Libellula lydia* (Drury). Columbus, Ohio.

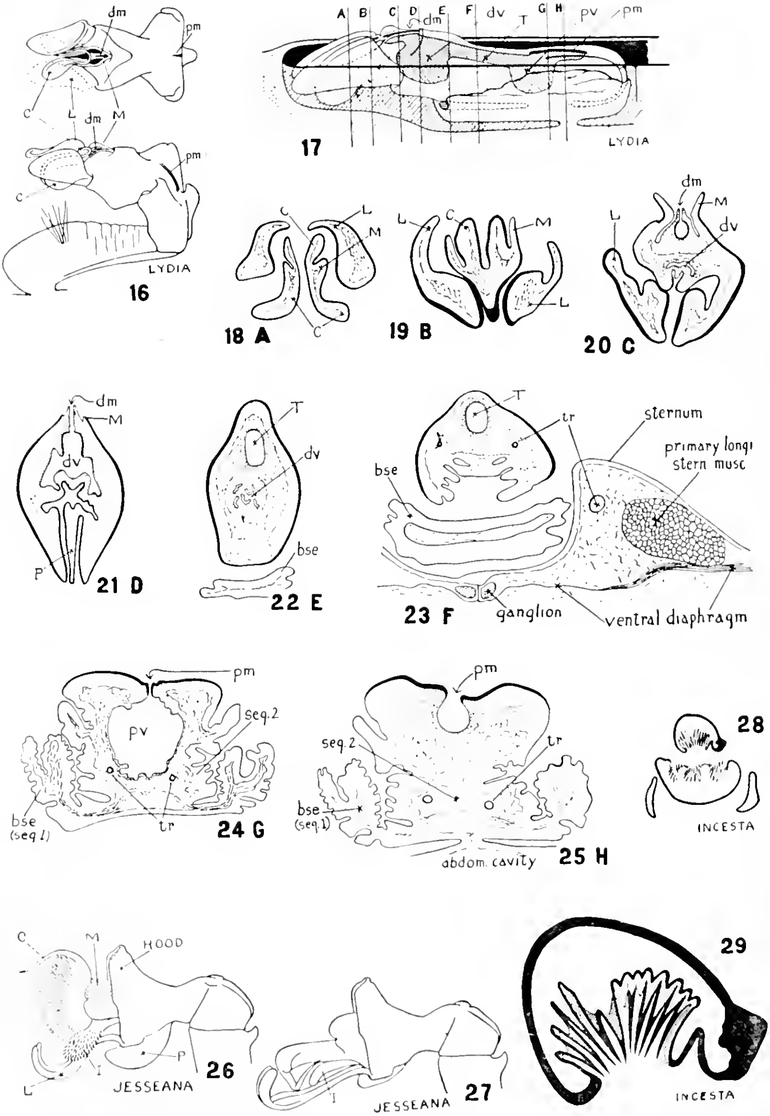
Fig. 16. Ventral and lateral view of adult penis.

Fig. 17. Lateral view of penis of the last naiadal instar drawn in shadow.

Figs. 18-25. Cross-sections at the levels indicated in fig. 17 by the lettered lines.

Figs. 26-27. *Libellula jesseana* Willsm. Enterprise, Florida. From coll. Williamson. Fig. 26 is erected by boiling.

Figs. 28-29. *Libellula incesta* Hagen. Kingsboro, North Carolina. Cross-section of penis showing the erectile hairs.



PENES OF LIBELLULA.—KENNEDY.

Hemipterological Notices.—II.[1]

By H. M. Parshley.

The Pentatomoidea of Illinois.[2]

For many years C. A. Hart devoted a great deal of attention to the Pentatomoid Hemiptera and had nearly completed his manuscript when death overtook him in the midst of his labors. His work has not been lost, however, for Professor J. R. Malloch, the dipterist, saw to its final preparation and publication, thus putting greatly in his debt all who take an interest in the group, and as editor he added a considerable amount of supplementary matter (always carefully indicated as such), which in the main possesses distinct value. The paper as a whole contains a great deal of new and important material, especially some excellent pioneer work in the neglected study of the nymphal stages, an introductory discussion of phylogeny, and generic keys which are not confined to the Illinois fauna, but embrace most of the North American groups. In going over the work I have noted a few matters which call for comment.

Page 180. The editor remarks on the curious results achieved by Hart in his effort to arrange his keys so as to indicate natural sequence. Such a plan usually results in defeating the prime purpose of a key, *i. e.*, ready identification, since obscure characters often have to be used. I think that the arrangement both of genera and higher groups should be ignored, in favor of that given in Van Duzee's "Catalogue."

Page 192. I am unable to accept Malloch's splitting of *Euschistus tristigmus* into two (or three?) species. Like some other Pentatomids, this species is variable in the form of the lateral pronotal angles and no line can be drawn distinctly separating the acutely angled forms (var. *pyrrhocerus* H.-S.), which become more frequent in the southern states. Possibly a tendency toward racial development may be found here when sufficient distributional data are made known. Similarly, fig. 79

[1] Contributions from the Department of Zoology, Smith College, No. 83.

[2] Ill. Nat. Hist. Survey, Bull. xiii, 157-223, pls. 16-21, 1919.

of pl. 21 probably represents the southern form of *Thyanta custator,* another variable species, and not *T. perditor,* which is a species of the tropical zone. Barber (*in litt.*) calls my attention to this point.

Pages 199-200. In Hart's treatment of *Apateticus* the species *crocatus* and *bracteatus* are confused. The facts will be correctly expressed if the names are transposed, except that Van Duzee is misquoted.

Pages 218-219. The editor contributes a supplement in which Stål's subgenera of *Apateticus* are elevated to generic rank. I am firmly convinced that a great deal of the modern multiplication of genera (by subdivision rather than by the discovery of new groups) is a detriment rather than an advantage to science, but aside from this general question it should be noted that in this particular case nothing can be settled properly without a study of the neotropical species. For instance, the type species of *Apateticus* Dall. is *A. halys* Dall. (= *lineolatus* H.-S.), a species which, as I have identified it, lacks the one character ascribed by Malloch to his *Apateticus.* This character, the presence of small pronotal spines near the basal angles of the scutellum, is not mentioned by Dallas[3] nor by Stål,[4] but it is found in *A. marginiventris*, to which reference is made below. In other words it seems unlikely that *Apateticus* Mall. is precisely equivalent to *Apateticus* Dall.

I think moreover that it is even very doubtful whether the generic separation of *Apateticus* and *Podisus* advocated by Van Duzee[5] is well founded, since the chief distinction between the groups lies in a secondary sexual character, the abdominal stridulatory areas which are more or less clearly developed in the males of *Apateticus, s. str.* I believe that the arrangement of Stål and of Schouteden[6] will be ultimately adopted, with possibly one modification, namely the foundation of a new subgenus for *A. marginiventris* Stål, a species which is unique in this group by virtue of its posterior pronotal spines and its very peculiar facies.

[3] List Hem. Brit. Mus. 1: 105, 1851.

[4] Bidr. Hem. Syst., Ofv. Vet.-Ak. Förh., XXIV, No. 7: 498, 1867.

[5] Can. Ent., XLI: 370, 1909.

[6] Wyts. Gen. Ins., Fasc. 52: 68, 1907.

An Omission.

In my "Essay"[7] on *Aradus* I have noted a few clerical errors, only one of which, fortunately, is of importance. On page 41 the Rhode Island and Connecticut records of *Aradus robustus* are omitted and the following should be inserted after line 9:

Rhode Island: Kingston, May (J. Barlow). Connecticut: Meriden, V, 10, 1910 (A. B. Champlain); New Haven, II, 26, 1911 (A. B. Champlain); Rainbow, V, 7, 1914 (M. P. Zappe); Stonington, V, 1914 (M. P. Zappe).

On page 29, line 16, for p. 17 read p. 50; and on pages 32, 66, etc., Ottawa is placed in Quebec instead of in Ontario.

Distributional and Taxonomic Notes.

Coreidae.

Namacus annulicornis Stål. Arcadia, Florida, November 23, 1919 (H. L. Johnson).

Aradidae.

Proxius gypsatus Bergroth. Manning, South Carolina, March 28-29, 1919 (E. R. Kalmbach).

Neuroctenus pseudonymus Bergroth. Clarksville, Tennessee, March 26, 1909 (S. E. Crumb).

Aneurus simplex Uhler. Proc. Boston Soc. Nat. Hist., XIV:196 1871.

Lectotype: ♂, Mass., U. S. N. M. No. 25213. This specimen bears Uhler's original label and should be formally designated as the type of the species, especially in view of the very inadequate original description, which refers only to the antennal structure and to the granulation of the surface. A female specimen with the same data is designated allotype.

A New Genus in the Gelechiidae (Microlepidoptera).

By Annette F. Braun, Cincinnati, Ohio.

STEREOMITA new genus.

Head smooth, antennae nearly equaling the fore wings, basal segment long, slender, stalk somewhat serrate toward tip. Labial palpi long, recurved, second segment thickened with scales beneath and slightly tufted, third segment equaling the second, thickened with scales in the middle and acute at extreme apex. Maxillary palpi short, appressed to tongue. Posterior tibiae with rough hairs above and in the middle beneath, middle spurs from before basal fourth of the segment.

Fore wings narrow, lanceolate-acuminate; 11 veins, 1b fur-

[7] Trans. Am. Ent. Soc., XLVII: 1-106, 1921.

cate at base, 2 and 3 coincident from the angle, arising nearly opposite 9, 4 and 5 connate, nearer 6, 7 and 8 out of 6, 9 distant, 11 from beyond middle. Hind wings ½, a little narrower in the male, with anal angle less distinct, termen emarginate, apex produced; all veins present, 2, 3, 4 and 5 remote, 5 nearest 6, 6 and 7 very short stalked.

Genotype: *Stereomita andropogonis* n. sp.

Allied to *Metzneria* and *Megacraspedus,* but distinguished by the absence of a vein in the fore wing, and by the thickened third segment of the labial palpi.

Stereomita andropogonis n. sp.

Head whitish straw-colored, palpi straw-colored, with a dark brown patch near apex of second segment outwardly, and a dark brown annulus around middle of third segment. Antennae pale ocherous, with a narrow brown annulus at the base of each segment, and four broader blackish rings on the outer half of the stalk, separated from one another by two or three pale segments. Fore wings pale ochreous, deepest toward apex, and dusted with dark brown scales, most densely on the costal and dorsal margins with a tendency to longitudinal streaking; at two-thirds of costa, the dusting usually forms two diffuse oblique streaks. Along termen, there is a series of indistinct brownish dots, and opposite extreme apex, in the cilia, a transverse brownish spot. Cilia brownish, except on costa before apex, where they are ocherous. Hind wings pale brown, cilia ocherous, with a faint reddish tinge. Legs ocherous, dusted with brown. Wing expanse: 8.5-9.5 mm.

Type (♂) and 32 paratypes, Miamiville, Clermont County, Ohio, August 19 and 25. Type and paratypes in the writer's collection; paratypes in the collection of the Academy of Natural Sciences of Philadelphia and in the U. S. National Museum.

The larvae feed in the inflorescence of *Andropogon scoparius* (bear-grass.) Their presence is indicated by yellowish patches in the flower spikes.

The moths are active in early morning and in the evening, flying at the top of the stems around the flower buds, and alighting head downward. During the middle of the day they rest amongst the basal leaves and are only disturbed with difficulty. In markings of wings, palpi and antennae, and in general appearance when at rest, this insect remarkably resembles some species of *Batrachedra.*

New Researches upon the Problem of the Wing-Venation of Odonata.

I. A Study of the Tracheation of the Larval Wings in the Genus Uropetala from New Zealand

By R. J. Tillyard, M.A., Sc.D. (Cantab.), D.Sc. (Sydney), F.L.S., F.E.S., Entomologist and Chief of the Biological Department, Cawthron Institute, Nelson, New Zealand.

(Continued from page 7)

We may now ask, what position does the family *Petaluridae* hold in the evolutionary line of the Odonata, and what are the successive stages in the evolution of the vein Ms? These questions can be very clearly answered, as follows:—

(A) The first true Odonata had entirely lost their original *Rs* as a distinct branch of *R*. I shall show later, from a study of the Palaeodictyoptera and Protodonata, that this original *Rs* arose from *R* close to the base of the wing, as in other archaic types of insects, and that it was captured and cut off from *R* by an upwardly arching branch of *M*, of the type found in many Palaeodictyoptera and in all Orthopteroidea. The vein so formed, after its severance from *R*, had the appearance of a *six-branched media*; but one of the original branches, *M1a*, has become degraded in the highest forms of Odonata, leaving us with only *five* recognizable main branches. The best designation for this composite vein would be the *radio-median*, with the notation RM; but I do not propose to adopt this new notation until I have fully established, from the fossil record, the proof of its complete nature.

(B) This original condition, which became established with the rise of the Protodonata, is continued to the present day, without change, into the whole of the Order Zygoptera, with the single exception of the *Lestidae*. In all living forms which have this primitive condition, *the larval tracheation of this portion of the wing agrees exactly with the subsequent imaginal venation;* and this, I take it, is additional proof, if such is needed, that neither the tracheation nor the venation of this portion of the wing, in these insects, has ever become specialized.

(C) Arising from somewhere low down in the Megapodagrionine stem, we find the first tracheational specialization still in process of becoming established, in the subfamily *Synlestinae* of the *Lestidae*. In these archaic insects, whose close affinity with the still more ancient *Megapodagrioninae* admits of no doubt whatever, we find that, *in most larvae* (the genus examined was *Synlestes*), there is a complete formation of long bridge and distal oblique vein *O'*. This has been brought about by one of the small tracheae descending from *M2*, far distad from the nodus, capturing the line of the vein *Ms*, so that the original trachea which supplied this vein from its base on *M3* outwards becomes withered, leaving the apparent *long bridge-vein* as the basal half of *Ms*. Also, *Synlestes* still shows the archaic position of the origin of *Ms*, viz., from *M3*, though most recent Zygoptera have *Ms* arising from *M1+2*. But, in a certain number of these larvae of *Synlestes,* one or more of the wings may retain the original Megapodagrionine condition, *i. e.,* there is no trachea forming the oblique vein, which, consequently, is absent in the imago.

In the subfamily *Lestinae*, the oblique vein and long bridge have become completely established. An exactly similar formation is to be seen in the *Epiophlebiidae*, and also in the fossil genus *Heterophlebia*, which is closely allied to this family. Both *Epiophlebia* and *Heterophlebia* are to be considered as belonging undoubtedly to Handlirsch's Suborder Anisozygoptera, the discovery of the larva of the former genus making the recognition of this Suborder a necessity, as I have shown in a previous paper.[4]

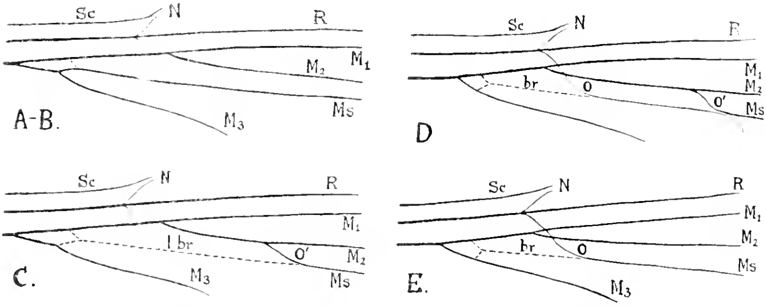
(D) For the next step, we must postulate an origin for the Suborder Anisoptera from forms among the Anisozygoptera in which the distal oblique vein and long bridge were fully established. *Heterophlebia* may not have been the true ancestor of the Anisoptera, but there can be little doubt that it represents very closely what that ancestor was like, at the stage of the first formation of the triangle in the hind wing. Starting

[4]Tillyard, R. J. "On an Anisozygopterous Larva from the Himalayas (Order Odonata). Records Indian Museum, 1921, xxii, pt. ii, no. 12, pp. 93-107, pl. xiii.

with an ancestral form of this type, the true Anisoptera began with forms in which the point of origin of *M2* became fixed close under the nodus. The small trachea beneath the nodus, arising from *R*, and supplying the subnodal vein, must next have grown out as a very slender branch beneath *M1* and *M2*, just beyond their point of union, and must have at last found its way down to the level of *Ms* at about the middle of the long bridge. There being no trachea supplying the long bridge, it is not difficult to see how this new trachea came to supply its distal half. With a very slight increase in the development of this trachea, we get the stage represented in the antepenultimate instar of the larva of *Uropetala*, in which the calibre of the new tracheal outgrowth is still much smaller than that of *Ms*. Further increase in calibre would give us the present condition in the last instar of *Petaluridae*, in which the trachea from the subnodus underlies the basal oblique vein *O*, and supplies also that portion of *Ms* between *O* and *O'*. I would suggest that the notation *Rs* for this trachea should be definitely abandoned. As it is a tracheal outgrowth from *R* below the nodus, it should be called the *subnodal trachea*, while the notation *Ms* should be kept for the whole vein. If it is desired to distinguish the three portions of the vein Ms in *Petaluridae*, we might speak of the *bridge* or *basal portion*, the *subnodal* or *middle portion*, and the *distal portion*, respectively.

Thus we see that the *Petaluridae* stand as the oldest type extant within the Anisoptera, possessing *two* tracheal specializations in the region of *Ms;* one, indicated by *O'*, being derived from Anisozygopterous ancestors, and being homologous with that seen in the *Lestidae* and *Epiophlebiidae;* while the other, indicated by *O*, is peculiar to the Anisoptera, and is to be considered as of later origin.

(E) If we examine the *Cordulegasteridae*, which show affinity with the *Petaluridae* on the one hand and with the *Aeschnidae* and *Gomphidae* on the other, we find occasional specimens in which the two oblique veins of the *Petaluridae* are present. But, in most cases, only the basal oblique vein *O* is present, with a short bridge-vein. Thus, in this family, we see the dying out of the original tracheal specialization indicated by O' and the long bridge; the trachea which first captured the line of *Ms* via O' becomes ousted by the subnodal trachea, and the result is that we get the formation seen in the larvae of almost all Anisoptera at the present day, viz., a single oblique vein O, placed not far distad from the level of the nodus, a short bridge vein, and *an apparent trachea Rs* supplying the course of the vein *Ms*.



Text-fig. 2.—Diagrams to show the evolutionary stages in the region of the nodus and oblique veins in Odonata. A-B, the primitive condition, in which the imaginal venation corresponds with the larval tracheation, and no oblique veins are present. C, formation of the long bridge and distal oblique vein, as in Lestidae. D, condition seen in Petaluridae, with short bridge and two oblique veins. E, condition present in the majority of Anisoptera, with short bridge vein and only the more basal oblique vein present.

Text-fig, 2 shows the tracheation of the larval wing for each of these evolutionary stages.

If this outline of the evolution of this portion of the larval and imaginal wings be accepted, we must recognize the Zygop tera and the Anisozygoptera as the first two Suborders to appear by differentiation of the original Odonate stock, and we must allow that the Anisoptera only arose later, from some of the more specialized types among the Anisozygoptera. That this was actually so, I believe can be fully proved by a careful study of the known fossil record, as I shall endeavor to set out in a later part of these researches.

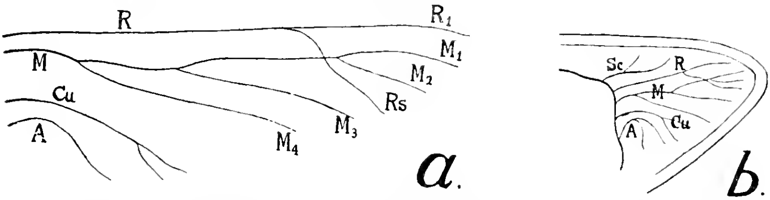
We have now to deal briefly with one line of criticism that will most certainly be levelled against the position taken in this paper. In his original paper (1), Needham gave drawings of the positions of his supposed trachea *Rs* in the developing stages of the larva of a species of *Gomphus*. No photographs were given of any but the last instar. In these drawings, it was shown that, in the very earliest stages, *Rs* lay in its normal position below *R,* without crossing *M* at all. At a somewhat later stage, *Rs* was shown crossing *M*1 only. Later still, *Rs* was shown crossing both *M*1 and *M*2.

If these drawings represent the correct postion of *Rs,* they do most certainly constitute a strong argument for Needham's view. Quite apart from the difficult question as to the actual possibility of both a vein and its precedent trachea shifting its position in this manner, it must be admitted that, if the larval wing shows the ontogenetic stages in correct order, it would be very difficult to avoid the conclusion that we were really dealing with the original trachea *Rs* in this case.

Now, I have repeatedly attempted to parallel these figures of Needham's, by dissecting off the earliest stages of the larval wings in various Anisopterous genera; but I have never succeeded in finding any other condition than that in which the supposed *Rs* crosses both *M*1 and *M*2, as it does in the last larval instar. The genera examined by me were *Aeschna, Hemicordulia* and *Diplacodes.* Dr. Ris has also examined the earliest stages of the larval wing in *Libellula,* and his results agree exactly with my own. One of his photographs shows such an early stage of the growth of the larval wing that the extreme length of it is barely half the breadth at the base; yet, in this case, as in the corresponding stages of those genera which I have examined, the supposed *Rs* descends almost transversely across the wing, crossing both *M*1 and *M*2, as in the last larval instar.

There were, therefore, only two possible conclusions to come to. Either the genus *Gomphus* presents a more complete ontogenetic series of the development of *Rs* than do the other genera studied, or Needham's drawings were incorrect.

Recently, during my tour round the world, I visited Ithaca and met Professor Needham. Together we collected larvae of *Gomphus* and *Hagenius* in the creek there, and I decided to dissect the wings of the earliest stages obtainable, and compare them with Needham's own drawings. I must admit that the result came as a great surprise. Text-fig. 3 shows the condition in the two earliest obtainable instars. The instar shown in Text-fig. 3, *a,* appears to correspond to that which Ris succeeded in obtaining for *Libellula,* and is certainly quite as early a stage as that figured by Needham in which *Rs* is shown not crossing *M* at all. The next instar to this is shown in Text-fig. 3, *b,* and this is certainly either earlier than, or as early as, that in which Needham figures *Rs* as crossing *M*1 only. Several larvae of *Gomphus* in these early stages were dissected, together with one larva of *Hagenius.* All agreed in having the



Text-fig. 3.—*a, Gomphus villosipes* Selys, early larvarl instar, tracheation of portion of forewing, greatly magnified. *b,* the same, next succeeding larval instar, complete tracheation of forewing less highly magnified.

supposed *Rs* in the position shown in Text-fig. 3. It is only possible to conclude that Needham's figures of these stages were incorrectly drawn, probably through displacement of the very delicate tracheae.

Thus we may now be sure that no ontogenetic stages of the supposed development of *Rs* really exist in the early larval instars of Anisoptera. The position of this trachea being the same in all instars from the earliest upwards is easily understandable on the theory that it is not the original *Rs,* but an extension of the subnodal trachea, as I have indicated in the argument presented in this paper.

A further objection which has to be met is this:—If this trachea does not represent the original *Rs,* where is the original *Rs?* I have already indicated that the solution of this problem depends upon a study of the known fossils of the Orders Palaeodictyoptera and Protodonata. The solution would take us far beyond the confines of this paper, and is left for a future part of these researches.

I have referred only briefly, in this paper, to the interesting problem of the cubital and anal veins in the Odonata. It is quite clear, from a study of the fossil record, that the present interpretation of the limits of these veins cannot stand. It has always been a serious difficulty, in studying the homologies of the wing-veins in different Orders, that the vein named *Cu*1 in Odonata was concave, whereas, in all other insects, this vein is a strongly convex vein; and it is equally difficult to explain how the vein called *Cu*2 in the Odonata should happen to be convex, when this vein is, in all other insects, the most concave in the wing, forming, in the Orthopteroid and Panorpoid Orders, the *vena dividens* separating the clavus from the rest of the wing. I hope to show that, in the Odonata, the true *Cu*1, which, in most insects, originates from a compound vein *M*5 + *Cu*1, is the vein which we now call *M*4; also that the vein which we call *Cu*1 in Odonata is in reality the homologue of *Cu*2 in other Orders; and finally that the single anal vein existing in the Odonata is 1*A*, and that it extended originally far along the posterior part of the wing, embracing all except the extreme base of the vein which we now call *Cu*2 in Odonata. Further, the presence of only one anal vein can be explained only by supposing that the original ancestors of the Odonata had a very narrowed base to the wing; and this also I shall be able to demonstrate from the fossil record.

Sufficient has now been said to make it evident that we require a complete re-study of Odonate wing-venation, in order to bring our notation into line with that used in other Orders. If it is found impossible to arrive at any general agreement in this matter, then it would be far better to go back to the non-committal names given by de Selys, rather than to continue to use a notation which gives an entirely false idea of the homologies existing between the veins called radial sector, media, cubitus and first analis in the Order Odonata and those carrying these same names in other Orders.

Entomological Losses by Fire

The home of Dr. Charles P. Alexander, Urbana, Illinois, was destroyed by fire on New Year's morning. The greater part of his collection of crane-flies was saved, this including all but a few types. Duplicate material, both of specimens and reprints, was largely destroyed by fire or water. Reprints that had been sent before by entomologists and can still be duplicated will be very gratefully received. Such may be addressed to him at the Natural History Building, Urbana, Illinois.

A New Cerambycid Beetle from Santo Domingo (Col.).

By W. S. Fisher, U. S. Bureau of Entomology.

Among a small collection of West Indian Cerambycidae received from Mr. J. J. Davis for identification, the following apparently new species was found.

Callichroma domingoensis new species.

♂.—Elongate, subcylindrical and attenuate posteriorly; head, pronotum, elytra and underside except abdomen dull metallic green with a slight violaceous tinge; antennae, tibiae, tarsi and abdomen black; femora entirely of a bright reddish-brown color, and somewhat opaque.

Head deeply longitudinally grooved on vertex. Antennae about one and one-half times as long as the entire body; joints three to eleven strongly, longitudinally carinated.

Pronotum with the medio-lateral tubercle well developed and acute at tip; antero-lateral callosity not strongly marked; strongly constricted anteriorly and along the base, the basal constriction being more shallow than one along anterior margin; disc on each side of median line with a feebly rounded gibbosity just behind the anterior constriction; surface strongly, transversely rugose, with a few distant punctures between the rugae, and sparsely clothed with short black hairs. Scutellum large, triangular, and longitudinally concave; surface smooth at middle and rather densely, finely punctate towards the sides.

Elytra two and one-half times as long as wide; sides very much narrowed from base to tips, which are rather broadly separately rounded; humerus well developed; surface rather deeply, densely and confluently punctate, becoming feebly rugose towards apex, and sparsely clothed with very short, inconspicuous, recumbent black hairs.

Abdomen rather densely, obsoletely punctate and densely clothed with a short, somewhat silvery pubescence; last ventral segment broadly rounded at apex without any trace of a notch.

Front and middle femora short and abruptly petiolate near apex; hind femora slender, compressed, gradually becoming wider to apex and reaching to the tip of the elytra. Front and middle tibiae about equal in length to the femora, slightly compressed and gradually enlarged anteriorly; surface longitudinally carinate, finely, irregularly punctate and clothed with long stiff black hairs. Hind tibiae not quite as long as the femora, moderately broad and strongly compressed; lower surface broadly concave with the inner margin densely clothed with a series of stiff black hairs.

Length 28 mm.; width 8 mm.

Type Locality.—"San Sidro, Santo Domingo." *Type*.—Cat. No. 24676, U. S. National Museum.

Described from a single male specimen received from Mr. J. J. Davis, and collected by Dr. Browne during April or May, 1919, at "San Sidro, Santo Domingo." [San Isidro?].

This species resembles *Callichroma plicatum* LeConte, to a certain extent, but is, however, easily separated from that species by the abdomen being entirely black, pronotum less densely punctured, and the femora being uniformly light reddish-brown in color, and not tipped with black as in *plicatum*.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., FEBRUARY, 1922.

Entomology at the Convocation Week Meetings, December, 1921

The meetings of the American Association for the Advancement of Science and of the Associated Scientific Societies, held at Toronto, Canada, December 27 to 31, 1921, were highly successful and interesting, well attended and took place under favorable weather conditions, the extreme cold which many feared not having been present. The arrangements for the meetings in the various buildings of the University of Toronto were, in nearly all respects, very convenient and satisfactory. Lunches and many dinners were held in Hart House, that magnificent home of the social activities of students and faculty. To the members of the Local Committees, especially those in charge of the entomological visitors, we extend our heartiest thanks.

Papers relating, in whole or in part, to the tracheate Arthropods were listed on the programs of

A. A. A. S., General Sessions	1
American Society of Zoologists (alone)	20
The same with the Ecological Society of America	2
Entomological Society of America (alone)	16
The same with the Entomological Society of Ontario	15
The same with the Ecological Society of America	18
Ecological Society of America (alone)	1
American Association of Economic Entomologists (alone, but including its Sections on Apiculture and Horticultural Inspection)	55
The same with the Entomological Society of Ontario	19
The same with the American Phytopathological Society, symposium	1
American Society of Naturalists	2
American Nature Study Society	1
American Society for Horticultural Science	1
Total	152

These 152 papers were concerned with the following subjects:

General Entomology 8
Methods 5
Cytology 4
Anatomy 8
Physiology 15
Ontogeny 4
Genetics 8
Taxonomy 6
Ecology 9
Relations to Plants (noneconomic) 2
Parasites (of animal hosts) 9
Relations to Man 5
General Economic Entomology 19
Insects Injurious to Plants 24
Insecticides and Fumigants 18
Apiculture 8
Other Special Insects 10

Araneina 1
Acarina 6
Myriopoda 1
Orthoptera 3
Isoptera 1
Ephemerida 3
Odonata 2
Neuroptera 1
Mallophaga 1
Anoplura 1
Hemiptera 16
Coleoptera 15
Hymenoptera (exclusive of *Apis*) 8
Apis 8
Lepidoptera 25
Diptera (exclusive of *Drosophila*) 19
Drosophila 6
Siphonaptera 1

Many of the figures in this second list are duplicated; thus a paper on the Genetics of *Drosophila* appears under both of these headings.

The paper credited to the general sessions of the A. A. A. S. was the address of the retiring President, Dr. L. O. Howard, entitled, "On Some Presidential Addresses: The War on the Insects," which has been published in *Science* for December 30, 1921.

The symposium of the Economic Entomologists and the American Phytopathological Society was on "Insects as Disseminators of Plant Diseases," in which Dr. E. D. Ball, of Washington, D. C., and Prof. L. Caesar, of Canada, represented the Entomologists.

Included in the above lists are also the Annual Address of the Entomological Society by Dr. Seymour Hadwen, of the United States Biological Survey, on "Northern Oestridae"; the Presidential Address before the Economic Entomologists by Prof. George A. Dean, of Manhattan, Kansas, on "How We May Increase the Effectiveness of Economic Entomology," and a paper read by Dr. L. O. Howard on "The Organization Meeting of the Association of Economic Entomologists, at Toronto, August, 1899." This was "saved" for the very enjoyable

Entomologists' dinner, at the Prince George Hotel, on Friday evening, December 30. At this occasion, Professors J. H. Comstock and Herbert Osborn, guests, with Dr. Howard, of the Association of Economic Entomologists, gave some very interesting reminiscences of early events in their respective careers.

Not included in the lists we have given, but of great interest to entomologists and biologists generally, were three symposia, one by the botanists, "The Species Concept"; one by the Naturalists, "Origin of Variations," and one by the Zoologists, "Orthogenesis." Here too we must mention the addresses by Prof. William Bateson, guest of the A. A. A. S. and of the Zoologists, on "The Evolutionary Faith and Modern Doubt" before a general session of the Association, and on "The Outlook in Genetics" at the Zoologists' dinner.

The total of 152 papers, although, as usual, not all of them were given, is, we believe, the highest ever listed for one of these meetings.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Mulford Biological Exploration of the Amazon Basin News Bulletin No. 5.

The arrival in Philadelphia of a second shipment of scientific specimens from the Mulford Exploration is announced. The H. K. Mulford Company has arranged for their clearance through Customs and, in accord with Dr. Rusby's instructions, has distributed them to specialists of the Universities and Museums who are co-operating in the work of this expedition.

The latest letters received from Dr. Rusby and his party, were written Oct. 21st, 1921, and mailed from Rurrenabaque, Bolivia. Dr. Rusby and his party had at that time started out on the trip to Lake Rocagua and surrounding territory, with the expectation of finding much that was new, including geographical facts as well as biological and botanical specimens. Although all the maps of South America show the Rio Negro as the outlet of Lake Rocagua, their information was that no connection exists between the lake and the river but that the river originated in a low range of hills situated near the lake.

Cable messages since received indicate the successful termination of their trip to Lake Rocagua and progress as far as Riberalta in Bolivia near the Brazilian border. All the members of the party were reported in excellent health and spirits except the director himself. Dr. Rusby has been suffering from infectious rheumatism brought on and heightened by the exposure and hardships of the life in the wilderness. It is probable that on account of the state of his health it may be necessary to abandon the second part of their trip up into Colombia, as contemplated in the original plans.—R. H. Hutchison, Secy., Philadelphia, Pa.

The Crop Protection Institute.

The first annual meeting of the Crop Protection Institute will have been held at Rochester, New York, in connection with the New York Horticultural Society's meeting, with a dinner on January 12th, at the Rochester Chamber of Congress.

It was announced that among those taking part on the program would be Professor W. C. O'Kane, of the New Hampshire Agricultural Experiment Station, and Chairman of the Board of Governors of the Crop Protection Institute, who was to talk on the ideals of the Institute; Dr. L. R. Jones, Chairman of the Division of Biology and Agriculture of the National Research Council, whose theme was to be the "Relation of Environment to Disease and Disease Resistance of Plants;" Dr. R. W. Thatcher, Director of the New York Agricultural Experiment Station, who was to speak informally on the "Need for Investigations in the Chemistry of Insecticides and Fungicides." From the standpoint of industry Mr. G. R. Cushman, of the General Chemical Company, was to give a brief talk. Professor P. J. Parrott, of the New York Agricultural Experiment Station, would also probably talk on Paradichlorobenzene.

The Crop Protection Institute, which has a membership of about three hundred and fifty (350) prominent entomologists, plant pathologists, agricultural chemists and manufacturers of insecticides and fungicides and others interested in the protection of all kinds of crops, was organized only a year ago, under the auspices of the National Research Council of Washington, D. C. The purpose of the Institute is not to duplicate the work of individuals or other organizations, but to bring about closer co-operation of effort, to strengthen the weak places and develop needed investigations that are not being pursued by other agencies.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

2—Transactions of the American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **5**—Psyche, Cambridge, Mass. **9**—The Entomologist, London. **12**—Journal of Economic Entomology, Concord, N. H. **15**—Insecutor Inscitiae

Menstruus, Washington, D. C. **20**—Bulletin de la Societe Entomologique de France, Paris. **22**—Bulletin of Entomological Research, London. **39**—The Florida Entomologist, Gainesville, Florida. **42**—Entomologiske Meddelelser udgivne af Entomologisk Forening, Kjobenhavn. **48**—Wiener Entomologische Zeitung. **49**—Entomologische Mitteilungen Berlin-Dahlem. **52**—Zoologischer Anzeiger, Leipsic. **54**—Proceedings of the Biological Society of Washington, D. C. **61**—Proceedings of the California Academy of Sciences, San Francisco. **64**—Parasitology, London. **68**—Science, Lancaster, Pa. **76**—Nature, London. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **85**—The Journal of Experimental Zoology, Philadelphia. **87**—Arkiv for Zoologi, K. Svenska Vetenskapsakademien, Stockholm. **90**—The American Naturalist, Lancaster, Pa. **91**—The Scientific Monthly, Lancaster, Pa. **99**—Bulletin du Museum National d'Histoire Naturelle, Paris. **102**—Broteria, Revista Lusco Brazileira, Serie Zoologica, Braga. **104**—Zeitschrift fur Wissenschaftliche Zoologie, Leipzig. **106**—Anales de la Sociedad Cientifica, Argentina, Buenos Aires. **111**—Archiv fur Naturgeschichte, Berlin. **119**—Proceedings of the National Academy of Sciences of the U. S. A., Washington, D. C. **130**—Revista Chilena de Historia Natural. **131**—Annales de Zoologia Aplicada, Santiago de Chile. **132**—Revista do Museu Paulista, Sao Paulo, Brazil.

GENERAL. **Bird, H.**—Soil acidity in relation to insects and plants. (Ecology, ii, 193 7.) **Cockerell, T. D. A.**—Dru Drury, an eighteenth century entomologist. **91,** xiv, 67-82. **Glendenning, R.**—Notes on the fauna and flora of Mt. McLean, B. C. **43,** No. 18, 39-44. **Hempel, A.**—As pragas e molestias do arroz no estado de Sao Paulo. **132,** xii, 147-50. **Howard, L. O.**—On some presidental addresses: the war against the insects. **68,** liv, 641-51. **Johansen, F.**—Insect life on the western arctic coast of America. (Rep. Canada. Arct. Exped., iii, K, 61 pp.) **Lucas and Strand.**—Jahresberichte uber die wissenschaftlichen leistungen im gebiete der Trichoptera, Mecoptera, rodentia, Odonata, Agnatha...Orthoptera. **111,** 1916, B, 1-19, 171. Neuroptera, Mallophags, Anoplura, Thysanoptera, Plecoptera, Cor-**Porter, C. E.**—Sobre algunos arthropodos colectados en diversas localidades del pais por los senores... Thomas, Campo., etc. **130,** xxiv, 153-60. **Serre, P. A.**—Insectes piquants et parasites au Costa-Rica. **99,** 1921, 170-2. **Weiss and West.**—Additional notes on fungous insects. **54,** xxxiv, 167-71. **Whiting, P. W.**—Rearing meal moths and parasitic wasps for experimental purposes. Heredity in wasps. (Genetics, xii, 255-61; 262-66). **Wildeman, E. de.**—A propos de myrmecophilie. **77,** lxxxv, 874-6.

ANATOMY, PHYSIOLOGY, etc. **Bertin, L.**—La bouche des insectes et leur alimentation. (La Nature, Paris, 1921, 323-28.) **Brocher, F.**—Etude experimentale sur le fonctionnement du vaisseau dorsal et sur la circulation du sang chez les insectes. **87,** lx, 1-45. **Courrier, R.**—Sur l'existence d'une secretion intranucleaire dans l'epithelium du spermatheque de la reine d'abeille sa signification. **77,** lxxxv, 941-3. **Crampton, G. C.**—Note on the surginopods of certain Mecoptera and Neuroptera. **5,** xxviii, 151. **Cunliffe, N.**—Some observations on the biology and structure of Ornithodorus moubata. **64,** xiii, 327-47. **Fraenkel, H.**—Die symbionten der blattiden im fettgewebe und ei insbesondere von Periplaneta orientalis. **104,** cxix, 53-66. **Fuhrmann, H.**—Beitrage zur kenntniss der hautsinnesorgane der tracheaten. Die antennalen sinnesorgane der myriapoden. **104,** cxix, 1-52. **Gerould, J. H.**—Blue-green caterpillars: The origin and ecology of a mutuation in hemolymph color in Colias philodice. **85,** xxxiv, 385-416. **Hollande, A. C.**—Reactions des tissus du Dytiscus marginalis. **87,** xlix, 543-63. **Lancefield & Metz.**—Non-disjunction and the chromosomes relationships of Drosophila willistoni. **119,** vii, 225-9. **Mallock, A.**—Metallic colouring of beetles. **76,** cviii, 432-3. **Monnot, E.**—Le mechanisme du saut chez les Elaterides. (Bul. Soc. Sc. et Med. Ouest, xxviii, 17-37; xxix, 19-28.) **Sturtevant, A. H.**—A case of rearrangement of genes in Drosophila. **119,** vii, 235-7. **Szymanski, J. S.**—Die sogenannte tierische hypnose bei einer insektenart. (Pfluger's Archiv..., clxvi, 528-30.) **Tanzer, E.**—Die zellkerne einiger dipterenlarven und ihre entwicklung. **104,** cxix, 114-53. **Wade, J. S.**—Notes on defensive scent glands of certain Coleoptera. **5,** xxviii, 145-9. **Zeleny, C.**—Decrease in sexual dimorphism of bar-eye Drosophila during the course of selection for low and high facet number. **90,** lv, 404-11.

ARACHNIDA, &c. **Brolemann, H. W.**—Clef dichotomique des divisions et des especes de la famille des Blaniulidae. **87,** lx, 1-10. **Emerton, J. H.**—Notes on Canadian and Arctic spiders. **5,** xxviii, 165-8.

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On January 14, 1920 (although dated 1919), there appeared the first part of CONTRIBUTIONS TOWARD A MONOGRAPH OF THE SUCKING LICE by GORDON FLOYD FERRIS, then Instructor, now Assistant Professor of Entomology at the Leland Stanford Junior University and published by that institution. It was announced to be the first of a series which, when complete, will constitute a monograph of the Anoplura, and that the sequence in which the various genera would be dealt with would be governed entirely by convenience and relative completeness of material. The collection forming the basis of the work, presumably that at Stanford, is stated to be without a doubt the largest and most comprehensive now in existence, containing approximately three-fourths of the described species. The most significant portion of it has been obtained by the examination of the mammal skins in certain museums. This first part consisted of 51 octavo pages and 32 text figures and treated of the genera *Enderleinellus* and *Microphthirus*. The second part appeared in 1921, as Vol. II, No. 2 of the Stanford University Publications, University Series, Biological Sciences. It occupies 76 pages, contains 57 text figures and is concerned only with the genus *Hoplopleura*. Part I states that all discussion of the group as a whole and all keys to the families and genera must of necessity be delayed until the final papers of the series, which will also contain a complete host list, a bibliography, acknowledgments of the sources of material and other matter of general interest.

OBITUARY.

VICTOR SZEPLIGETI.

Thanks to Dr. K. Kertesz, I am now able to contribute the following obituary of Victor Szépligeti. Born in Zircz (Hungary) August 21, 1855, he died in his 60th year on March 24, 1915. He studied at the University and Technical University at Budapest. He became professor of Natural History and Chemistry in 1877. He taught until 1912 when he retired.

First he was a botanist and had a very large and precious herbarium (now in the Botanical Department of the Hungarian National Museum.) Then he was interested in Aphids and galls. Later he began to collect and study the Braconidae and Ichneumonidae.

Up to the time of his death he had published sixty papers which, with but three or four exceptions, dealt with Ichneumonoidea.

He published one paper on Cecidomyidae (Diptera) in 1899.

From 1883 to 1895 he published three papers that relate to Diptera or other insects either wholly or in part.

In *Rovartani Lapok*, Vol. 22, 1915, pp. 141-147, is a portrait, obituary and bibliography. The latter lists his publications except the posthumous ones. The obituary notice of nearly two pages is in Hungarian.

H. L. VIERECK.

CAROLINE BURLING THOMPSON.

Miss Caroline Burling Thompson, professor of zoology at Wellesley College, Wellesley, Massachusetts, died at that place December 5, 1921. She was born in Germantown, Philadelphia, Pennsylvania, June 27, 1869, daughter of Lucius P. and Caroline Burling Thompson. She attended the University of Pennsylvania, receiving the degrees of B.S. in Biology in 1898 and of Ph.D. in 1901. Under the influence of the late T. H. Montgomery, Jr. (then Assistant Professor), she, as a graduate, took up the study of the Nemertean worms and published at least three papers on this group. One of them, her thesis for the doctorate, on the anatomy of *Zygeupolia litoralis*, appeared in the *Proceedings of the Academy of Natural Sciences of Philadelphia* for 1901.

In 1901 she was appointed Instructor in Zoology at Wellesley College and was subsequently promoted to be Associate Professor (1909) and Professor (1916) in that subject. It was while there that Dr. Thompson's entomological work began with her comparative study of ants' brains, a subject "suggested to me by Prof. W. M. Wheeler of Harvard University as one that needed investigation." Her detailed description of the structure of this organ afforded, she believed, additional evidence that the mushroom bodies are the chief motor and psychic centers and that the queen's brain seems to represent the generalized type from which the worker caste has departed. (1913.) Extending her studies to termites, to compare their brains with those of ants, she found that "The termite brain as a whole is very similar in structure to the brain of ants, with the notable exception of the mushroom bodies which are of a much more simple and primitive type" and suggested that the frontal gland, found in all castes of termites, "may have arisen phylogenetically from the ancestral median ocellus which is now lacking in the termites" (1916).

Her most important paper is that dealing with the origin of the castes of the common termite (1917). In it, after reviewing the views held as to the influence of food on differentiation of the various forms as well as the doubts expressed by others, she produced evidence that there are visible internal differences between the newly hatched young which are to develop into the reproductive and non-reproductive members of the community respectively, although externally they are all alike. "Therefore the fertile and sterile types are predetermined at the time of hatching," * * * * "My final conclusion is that all termite castes are predetermined in the egg." She was careful to point out the bearing of this discovery and the similar observations of Bugnion (1912, 1913) on "the greater question whether the heritable bodily structure is determined by extrinsic factors, such as food and environment, or by intrinsic factors within the germplasm." In two other papers (1919, 1920) additional confirmatory evidence in support of the germinal predetermination theory was furnished. In conjunction with Mr. T. E. Snyder, of the United States Bureau of Entomology, she discussed the question whether the phylogenetic origin of termite castes (1919) could be referred to continuous or discontinuous variations, without, however, reaching a definite conclusion.

Mr. Snyder has published a sympathetic notice of her abilities as a teacher and an investigator in *Science* for January 13, 1922, which the present writer heartily endorses. His acquaintance with her dates from her first appearance as a student at the University of Pennsylvania and he has followed her work on the termites especially with the greatest interest and pride in her achievements. Oh that she had lived longer and carried out her plans for similar work on the honey bee!

PHILIP P. CALVERT.

A list of Dr. Thompson's entomological papers follows:

1913. A Comparative Study of the Brains of three Genera of Ants, with special reference to the Mushroom Bodies. Journ. Comp. Neur., Phila., 23, 515-572.

1914. The Posterior Roots of the Mushroom Bodies in the Worker of *Bombus* sp. Op. cit. 24:283-289.

1916. The Brain and the Frontal Gland of the Castes of the "White Ant," *Leucotermes flavipes* Kollar. Journ. Comp. Neurol., 26:553-602.

1917. Origin of the Castes of the Common Termite, *Leucotermes flavipes*. Journ. Morphol., Phila., 30:83-106.

1918. Dual Queens in a Colony of Honey Bees. Science, N. York, 48:294-5.

*1919. The Question of the Phylogenetic Origin of Termite Castes. Biol. Bull., Woods Hole, 36:115-132.

1919. The Development of the Castes of Nine Genera and Thirteen Species of Termites. Op. cit. 36:379-398.

*1920. The "Third Form," the Wingless Reproductive Type of Termites: *Reticulitermes* and *Prorhinotermes*. Journ. Morph. 34: 591-632.

Papers marked with a (*) were written conjointly with Mr. T. E. Snyder.

Doings of Societies.

The Entomological Society of America.

At its recent meeting in Toronto in December, the Society elected the following officers and committees for 1922:

President, Arthur Gibson, Dominion Entomologist, Ottawa, Canada. *First Vice-President*, Dr. W. A. Riley, University of Minnesota, St. Paul. *Second Vice-President*, Professor R. A. Cooley, University of Montana, Bozeman, Mont. *Secretary-Treasurer*, Dr. C. L. Metcalf, University of Illinois, Urbana, Ill.

Additional Members of the Executive Committee—Dr. J. M. Aldrich, United States National Museum, Washington. Mr. Wm. T. Davis, New Brighton, N. Y. Dr. E. M. Walker, University of Toronto, Toronto, Ontario. Dr. O. A. Johannsen, Cornell University, Ithaca, N. Y.

Managing Editor of the Annals, Dr. Herbert Osborn, Ohio State University, Columbus, Ohio. *Assistant Managing Editor*, Dr. C. H. Kennedy, Ohio State University, Columbus, Ohio.

Editorial Board—Dr. W. S. Marshall, University of Wisconsin, Madison, Wis. Dr. Vernon L. Kellogg, National Research Council, Washington, D. C. Dr. F. E. Lutz, American Museum of Natural History, New York City. Dr. Wm. M. Wheeler, Bussey Institution, Boston 30, Mass. Dr. E. M. Walker, University of Toronto, Toronto, Ontario. Dr. S. A. Forbes, University of Illinois, Urbana, Ill. Dr. A. D. Hopkins, Bureau of Entomology, Washington, D. C. Prof. A. L. Lovett, Oregon Agricultural College, Corvallis, Ore. Dr. Frederick C. Muir, H. S. P. A. Experiment Station, Hawaii.

C. L. METCALF, *Secretary-Treasurer*.

MARCH, 1922

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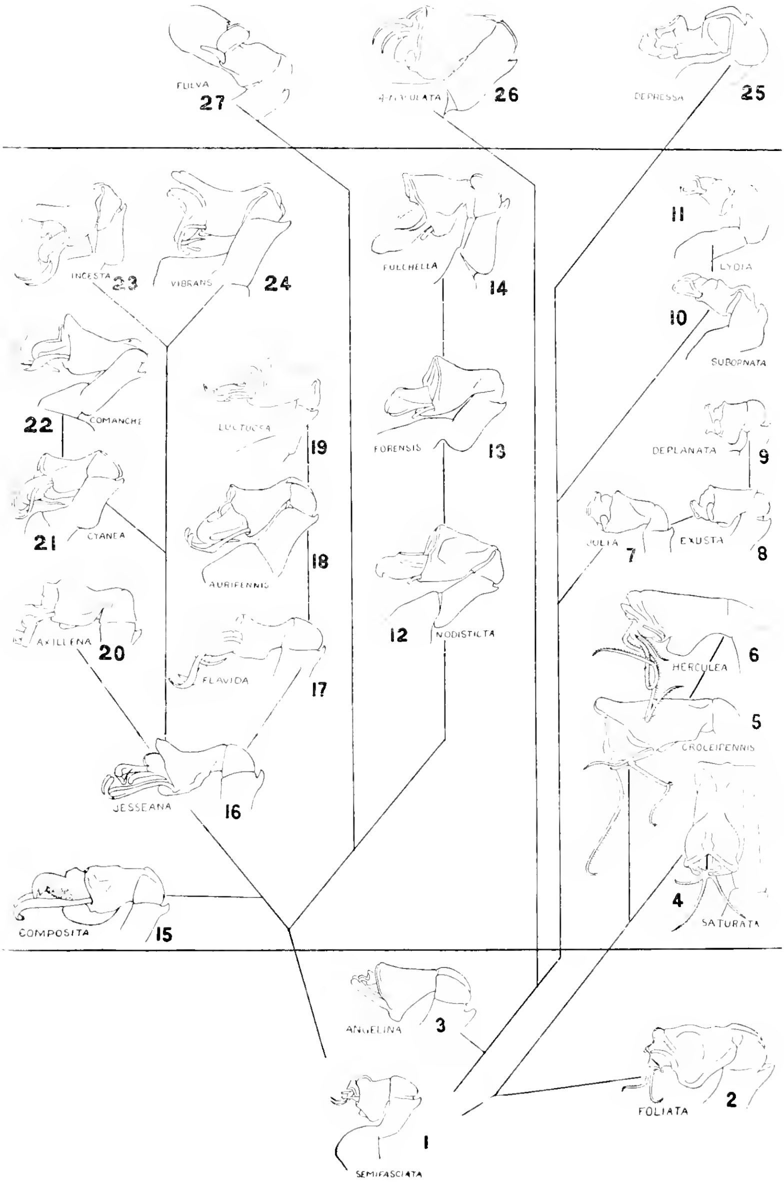

PHYLOGENY OF SPECIES OF LIBELLULA BY PENES—KENNEDY.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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The Phylogeny and the Geographical Distribution of the Genus Libellula (Odonata).[1]

By CLARENCE HAMILTON KENNEDY, Ohio State University, Columbus.

(Plate IV.)

In the first paper[2] was discussed the morphology of the penes in the genus *Libellula*. The various structures found in the penes were homologized and their usefulness in classification was pointed out. In this paper the writer wishes to show the value of these structures in a study of the phylogeny and distribution of the genus, for the penis characters divide the genus into distinct groups that are consistent with other characters and which appear to be consistent geographically.

Thanks to the generosity of Mr. Williamson, Dr. Calvert and Dr. Ris twenty-seven of the known species of *Libellula*

[1] Contribution from Department of Zoology and Entomology of Ohio State University, No. 68.

[2] Ent. News, vol. xxxiii, pp. 33-40, 1922.

have been examined. This article is an explanation of the accompanying plate.

If the reader will refer to the accompanying plate (IV), he will note that the genus falls into three levels of differentiation as indicated by the heavy horizontal lines. These are:

Level I. *Semifasciata, angelina* and *foliata*. By comparison with any of the other penes figured it is obvious that these are alike in that none of their parts are as much exaggerated or specialized as are one or more of the parts of any of the species figured in the two higher levels. By this same comparative standard, *semifasciata* is more generalized, hence older, than *foliata*, which has the cornua slightly specialized and than *angelina*, which has the lateral lobes lengthened and broadened. As will be shown later,[3] all three are probably pre-Miocene species.

Level II. This includes all the species lying *between* the two horizontal lines on Plate IV. These are all American and are species that probably date from the Miocene or later. Some of these groups are apparently at the height of their development.

Level III. This level includes the Eurasian species, less the primitive *angelina*. These are the most specialized of the genus and are the postglacial remnants of a Eurasian fauna that probably reached its climax in preglacial times.

The individual species and minor groups of the genus will be discussed as follows:

Group 1. **Semifasciata** Burm. Pl. IV, fig. 1. Maine to Florida, west to Michigan and Texas. A spring and early summer species found in woods swamps in the deciduous and southern pine forests.[4]

The primitiveness of this species seems to be confirmed by its isolated position morphologically, by its non-Libellula wing pattern, which has basal markings and color that recall *Celithemis* and *Perithemis*, by its less rugged build, which is very different from the husky proportions of many of the more specialized Libellulas, by its spring and early summer season which

[3] In the April number of the News.

[4] As far as possible the writer has tried to correlate the distribution of the species of *Libellula* with the plant formations of the eastern United States as worked out by Transeau. See "Forest Centers of Eastern America," Amer. Nat., xxxix, pp. 875-889, 1905.

is the season of many other primitive Odonata, and, perhaps, by its retiring habit of life in woods-swamps where are not found many of the more specialized Odonata which enjoy the fierce strife of open ponds. Its general distribution through the wooded Appalachian region agrees with the distribution of other very primitive Odonata (*Tachopteryx, Cordulegaster,* etc.).

Group 2. **Foliata** Kirby. Pl. IV, fig. 2. Mexico to Panama, in zone 4 of Calvert (B. C. A. Neur., p. xxiv). March to July in small swampy places.[5]

A casual inspection of the plate shows at once that this is the most primitive member of the line of species terminating in *herculea.* However, it is so little differentiated as compared to the other three members of this series that it has been placed in Level I. *Foliata* is primitive in its smaller size, its antehumeral stripes, its lack of a distinct red coloration and in its distribution, for in zone 4 as outlined by Calvert[6] are found such primitive Odonata as *Xanthostigma, Cora, Paraphlebia, Cordulegaster,* etc. These are temperate species that apparently cannot stand the winter temperatures of the same faunal zone farther north. Hill[7] and Bray,[8] as mentioned by Calvert, suggest that the islands of zones 3 and 4 were connected and supported a continuous fauna in the Tertiary. At that time Mexico was a peninsula that had not been connected with South America since the Cretaceous and with its stable climate it has harbored these early Tertiary species to the present time.

Group 3. **Angelina** Selys. Pl. IV, fig. 3. Japan. Habits unknown.

Angelina is primitive in its full quota of three spots in the wings and in its penis whose only specializations are the lengthened lateral lobes and widened cornua. Its distribution confirms this diagnosis as Japan contains several very old Odonates. Being an island in a great ocean stream, its climate has probably been very stable and mild. The nearest modern relative of *angelina* is 4-*maculata.*

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[5] From notes supplied by Dr. Calvert.

[6] Proc. Acad. Nat. Sci., Phila., Oct., 1908, pp. 475-478.

[7] Bull. Mus. Comp. Zool. xxxiv, pp. 205-207, 1899.

[8] Science, Nov. 9, pp. 709-716, 1900.

Group 4. **Saturata** Uhler. Pl. IV, fig. 4. Montana and Texas west to California and Baja California, occurring from sea-level up to 5000 ft.[9] This is a vigorous form of open muddy ponds, cattail swamps and sluggish streams.

Croceipennis Selys. Pl. IV, fig. 5. From sea-level in Texas and Baja California, to 4000 ft. elevation in Costa Rica, occurring in zones 3-4 of Calvert, but mainly in zone 4. Open swampy places and sluggish streams.[10]

Herculea Karsch. Pl. IV, fig. 6. Mexico to Ecuador and Paraguay. The "Biologia" records are from Calvert's zones 3 and 4. Usually found about brush piles in open muddy streams.[11]

Of this group, *saturata* appears to be the only species that can stand even light frosts. The other species occupy the Mexican and Central American highlands, though Dr. Calvert states in a letter that he found *herculea* at Guacimo, Costa Rica, at an elevation of less than 800 ft. The fact that this species has reached South America across the low Isthmus, shows that it can live also below the highlands. The climate of the Mexican and Central American plateau corresponds to that of the southeastern United States, except that the occasional winter frosts of the States are lacking. Because of the large number of species of *Libellula* occupying the southern states and this semitropical plateau, the climate of this region is probably the optimum climate for the genus.

This group has developed directly from the *foliata* stock of the Central American highlands (zone 4 of Calvert). Probably the present distribution of *foliata* is less than in former times as *saturata*, the most generalized species of group 4, has a distribution north of and not in touch with the present habitat of *foliata*. Dr. Calvert[12] describes individuals intermediate between *saturata* and *croceipennis*. It would be interesting to study the penes of these.

Group 5. **Julia** Uhler. Pl. IV, fig. 7. Maine to British Columbia. A species of northern coniferous forest swamps.

Exusta Say. Pl. IV, fig. 8. Maine to Wisconsin, south to Indiana and Ohio. A species of the deciduous forest.

[9] The higher records from Wyoming, etc., are probably from warm spring streams.

[10] In notes loaned by Dr. Calvert.

[11] Statements to the writer by E. B. and Jesse Williamson.

[12] B. C. A. Neur., p. 211.

Deplanata Ramb. Pl. IV, fig. 9. North Carolina, Georgia and Florida. Found by the writer about muddy ponds at Raleigh, N. C

The broad lateral lobes associate this with the *angelina*-4-*maculata* line. *Julia* appears to be the primitive species of this group in that specialization increases, from *julia* in the north to *deplanata* in the south, in the increasing length of the medial lobes and in the decrease in size, so that *deplanata* is the smallest species in the genus. This distribution and relationship to Eurasian species suggests an origin of this group in northern Eurasia and a migration to America later than the migration of the stocks of the *semifasciata, foliata, nodisticta* and *composita* groups which all show a preference for warmer climates than does *julia*. Geologists tell us that the opportunities for the migration of warm climate species existed largely before the Miocene, but that a migration of northern species came in the late Miocene and in the Pliocene. *Julia* and *exusta* at least are distinct species, probably also *deplanata*. Ris[13] states that "the habitus difference is greater between *julia* and *exusta* than between *exusta* and *deplanata*." This might be expected if *julia* is the most primitive of the three.

Group 6. **Subornata** Hagen. Pl. IV, fig. 10. Kansas and Texas to Nevada and southern California. Found about semidesert, alkali ponds.

Lydia Drury. Pl. IV, fig. 11. Newfoundland to British Columbia south to Florida and California. Any permanent pond.

These are a branch of the *angelina*-4-*maculata* line because of their widened lateral lobes. *Subornata* is the more primitive in the unfused wing-bands of the male, in the less broadened lateral lobes of the penis and in the less deeply divided fork on segment one of the male.[14]

In this series an adventitious wing-band has appeared. It is narrow and appears at the inner end of the stigma. In the female of *subornata* it is free; in the male of the same species it is fused with the nodal band by a paler area. In *lydia* it is more differentiated sexually. In the male it has become completely fused with the nodal band, thus giving the broad band

[13] Libellulinen, Coll. Selys, p. 259, 1919.

[14] Williamson. *Plathemis subornata*. Ent. News, Nov., 1906, p. 351.

of the male *lydia,* while in the female it appears only in rare examples.[15] *Subornata* should probably be associated with the group of southwestern primitives, *foliata, nodisticta* and *composita.*

Group 7. **Nodisticta** Hagen. Pl. IV, fig. 12. Montana and Washington[16] to the highlands of southern Mexico. A semidesert species taken by the writer on slow fresh streams at Oroville and Auburn, California.

Forensis Hagen. Pl. IV, fig. 13. Montana and British Columbia to Arizona and California. An alkali pond species, but may occur in fresh water also.

Pulchella Drury. Pl. IV, fig. 14. Maine to Washington south to Florida and California. A strictly fresh pond species.

The writer does not know the locality of the Washington record for *nodisticta,* but it must be near sea-level. The Montana record is probably from a warm, spring-fed stream, while all other United States records are from elevations of 500-3000 ft. Southward it is found at constantly increasing elevations until its southernmost authentic record is at 8000 ft. in Morelos, Mex. This would indicate that the Veneznelan and Colombian records in the earlier literature are questionable, for it is not probable that the Isthmus of Panama has been elevated enough to enable this species to pass into South America.

In this group specialization is towards a wing heavily spotted with black, alternating with areas of white pruinescence. It starts with the lightly marked wing of *nodisticta,* throws a species, *forensis,* more heavily marked, to the desert and reaches its apex in *pulchella* with three full bands in each wing. These species may not form a series as they have had to be arranged on the plate, but may be a group of mutations from some more primitive stock. The large size and the great development of wing color in *pulchella* indicate that it is the most specialized of the three. The distribution of *nodisticta* indicates that its naiad cannot endure heavy freezes, while the distribution of *pulchella* shows it to be almost as hardy as 4-*maculata* and *julia.*

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[15] Kennedy. Odonata of Kansas, Bull. Kans. Univ., vol. 18, pl. VII, 1917.

[16] Muttkowski. Cat. Odonata N. Amer., p. 138, 1910.

(To be continued)

Explanation of Plate IV.

A phylogenetic tree of the dragonflies of the genus *Libellula*, based on penes.

All figures are by camera lucida to the same scale. Because of the limits of the plate, species have had to be shown in series that should be on short lateral branches.

1. *Libellula semifasciata* Burm. Pungo Lake, Wenona, North Carolina.
2. *Libellula foliata* (Kirby), Cartago, Costa Rica, coll. Calvert.
3. *Libellula angelina* Selys. Kioto, Japan, coll. Ris.
4. *Libellula saturata* Uhler. Phoenix, Arizona.
5. *Libellula croceipennis* Selys. Cuernavaca, Mexico, coll. Williamson.
6. *Libellula herculea* Karsch. Santa Lucia, Guatemala, coll. Ohio State University.
7. *Libellula julia* Uhler. Kent, Ohio, coll. O. S. U.
8. *Libellula exusta* Say. Orono, Maine, coll. O. S. U.
9. *Libellula deplanata* Ramb. Raleigh, North Carolina.
10. *Libellula subornata* (Hagen). Golconda, Nevada.
11. *Libellula lydia* Drury. Sacramento, California.
12. *Libellula nodisticta* Hagen. Laws, Owens Valley, California.
13. *Libellula forensis* Hagen. Palo Alto, California.
14. *Libellula pulchella* Drury. (No label.) Coll. O. S. U.
15. *Libellula composita* (Hagen). Laws, Owens Valley, California.
16. *Libellula jesseana* Wllmsn. Enterprise, Florida, coll. Williamson.
17. *Libellula flavida* Ramb. Raleigh, North Carolina, coll. Williamson.
18. *Libellula auripennis* Burm. Kingsboro, North Carolina.
19. *Libellula luctuosa* Burm. Raleigh, North Carolina.
20. *Libellula axillena* Westw. Dunbrooke, Virgina, coll. Osburn.
21. *Libellula cyanea* Fabr. Kingsboro, North Carolina.
22. *Libellula comanche* Calv. Oroville, California.
23. *Libellula incesta* Hagen. (No locality.) Coll. O. S. U.
24. *Libellula vibrans* Fabr. Kingsboro, North Carolina.
25. *Libellula depressa* Linn. Lublin Government, Poland, from Bartenef.
26. *Libellula quadrimaculata* Linn. Grodno Government, Poland, from Bartenef.
27. *Libellula fulva* Müll. Arles (?), from H. K. Morton.

A Change of Name in the Saldidae (Hemiptera)

I have recently described a species of Saldidae as *Saldula comata* (Proc. Ent. Soc. British Columbia, No. 18, Syst. Ser., p. 21, 1921), but, as I am reminded by Dr. E. Bergroth, this name is preoccupied by *Salda comata* Champion (Biol. Centr.-Amer., Ins., Rhynch. II., p. 341, 1900). The two are undoubtedly congeneric and hence I would propose *Saldula comatula*, nom. nov., for my species.—H. M. Parshley, Smith College, Northampton, Massachusetts.

Host Records of Some Texas Tachinidae (Diptera).

By H. J. Reinhard, Entomologist, Texas Experiment Station, College Station, Texas.

Twenty-one breeding records of sixteen species of Tachinidae are given in this paper. Twelve of these, so far as the writer is aware, have not been previously recorded. Where there is a published record the reference is given in each instance. Six records included in this list were obtained from F. C. Bishopp, M. M. High, and S. W. Bilsing, and due credit for each record is given below. All other breeding records given were made by the writer at College Station.

Archytas analis Fabr. Host: *Cirphis unipuncta* Haw. Bred at College Station, from larva collected at Denton, Texas, by A. P. Swallow. 1 specimen issued June, 1919. Previously noted according to W. R. Walton.

Exorista ceratomiae Coq. Host: *Loxostege similalis* Guen. Bred from pupae collected at Laredo, and College Station. 4 specimens issued June 17, 1920.

Exorista confinis Fall. Host: *Uranotes melinus* Hubn. Bred at College Station, from larvae collected at the following localities in Texas: Oletha, Mart, Trinity, Gause, Lott, Grand Saline, and Brazoria County. 14 specimens emerging from June 20, to July 10, 1920.

Exorista flavirostris v. d. W. Host: *Megalopyge opercularis* A. & S. Bred at Dallas, Texas, by F. C. Bishopp, from pupae of host. Many specimens issued during August and September, 1920. Also bred at College Station, from a caterpillar collected locally. 1 specimen emerged August, 1920. *Cf.* Coquillett, Revision of Tachinidae, p. 14.

Exorista lobeliae Coq. Host: *Alabama argillacea* Hubn. Bred by S. W. Bilsing at College Station. 1 specimen issued October, 1920.

Exorista pyste Walk. Host: *Loxostege similalis* Guen. Bred from pupae collected at College Station. 2 specimens issued June 16 and 17, 1920. Previously recorded by T. H. Parks at Wellington, Kansas, according to W. R. Walton.

Id. Host: *Acrobasis caryivorella* Rag. Bred by S. W. Bilsing at College Station, from pupae collected locally. Many specimens issued June, July, 1918, 1919, and 1920.

Exorista loxostegeae Host: *Loxostege similalis* Guen. Bred at College Station from pupae collected locally. 23 specimens issued June 13-23, 1920. *Cf.* Ann. Ent. Soc. Amer., Vol. 14, No. 4, p. 332.

Metaplagia occidentalis Coq. Host: *Herse convolvuli* L. Bred by M. M. High at Kingsville, Texas. Flies issued November, 1919.

Ormia ochracea Bigot. Host: *Gryllus assimilis* Fabr. Three maggots issued September 22, 1920, from an adult host specimen, collected by A. R. Cahn at College Station. The maggots pupated September 22, but the adult flies failed to emerge. The puparia were identified by C. T. Greene. The habits of this genus are unknown and this appears to be the first record of a host relationship for this species.

PELETERIA ROBUSTA Wied. Host: *Cirphis unipuncta* Haw. Bred at College Station, from a larva collected in Wilbarger County, Texas. 1 specimen issued May 23, 1919.

PHOROCERA CLARIPENNIS Macq. Host: *Megalopyge opercularis* A. & S. Bred at Dallas, Texas, by F. C. Bishopp. 41 specimens issued during August and September, 1920.

ID. Host: *Laphygma frugiperda* A. & S. Bred at College Station, from larva collected in Hamilton County, Texas. 1 specimen issued June 4, 1919. This record previously noted according to W. R. Walton.

ID. Host: *Synchloe lacinia* Drury. Bred from chrysalides collected locally. 8 specimens issued August 1920.

PLAGIPROSPHERYSA PARVIPALPIS v. d. W. Host: *Loxostege similalis* Guen. Bred at College Station, from pupae collected at Laredo, Texas. 3 specimens issued June 14 and 15, 1920.

STURMIA ALBIFRONS Walk. Host: *Estigmene acraea* Drury. Bred at College Station, from larvae collected at Hempstead, and Bay City, Texas. 7 specimens issued June, 1918, and May, 1919. *Cf.* Coquillett, Revision of Tachinidae, p. 20.

STURMIA DISTINCTA Wied. Host: *Herse convolvuli* L. Bred at Kingsville, Texas, by M. M. High. Flies issued November, 1919.

TACHINA MELLA Walk. Host: *Apantesis rectilinea* French. Bred at College Station. 1 specimen issued June 7, 1918.

ID. Host: *Estigmene acraea* Drury. Bred from larvae collected at College Station. 2 specimens issued July 15 and 16, 1919. *Cf.* Coquillett, Revision of Tachinidae, p. 21.

TRICHIOPODA PENNIPES Fabr. Host: *Leptoglossus phyllopus* L. Bred at College Station, from adults collected locally. Flies issued June, 1919. *Cf.* Quarterly Bulletin, Fla. State Plant Board, Vol. 4, No. 3, p. 67.

ID. Host: *Nezara viridula* L. Bred from adults collected at College Station. Many specimens issued June, July, and August, 1919 and 1920. *Cf.* Loc. cit. and Bull. No. 689, U. S. D. A., p. 22.

Photographs Received for the Album of The American Entomological Society.

Since the last record (Ent. News, xxviii, p. 128), photographs for the album have been received, and acknowledged from the following, and the Society again wishes to thank the donors for their gifts which are much appreciated.

J. M. Aldrich, Charles P. Alexander, Karl W. T. Beling (from Dr. C. P. Alexander), Emil Bergroth, John J. Davis, William T. Davis, J. Henri Fabre (from Mr. Philip Laurent), G. F. Ferris, Morgan Hebard, Otto Heideman (from Mr. J. H. Paine), Herman Hornig, Herbert K. Morrison (from Mrs. Morrison), Emily L. Morton (from Mr. H. H. Newcomb), W. H. Patton (from Dr. L. O. Howard), Ottomar Reinecke (from Mr. Philip Laurent), Herbert H. Smith (from Dr. L. O. Howard).

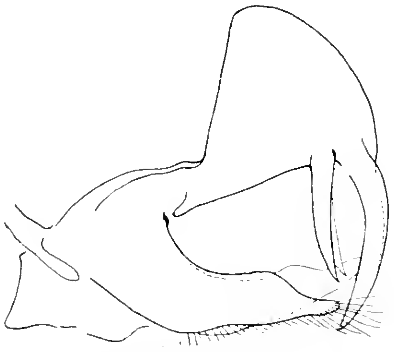
The Identity of Neominois ridingsi and N. dionysus (Lepidoptera, Satyridae).

By Henry Skinner.

Ridingsi was described from four females taken at Burlington, Boulder County, Colorado. The types of *dionysus* were taken in the Juniper Mountains, ~~on Mount Trumbull~~. This mountain is "sixty miles east of St. George" in southern Utah. *N. stretchi* Edw. is a synonym of *ridingsi* and the types were taken in Nevada. *Ashtaroth* Strecker is a synonym of *dionysus* and the type was a female from Arizona. The question is whether we have one or two species represented by these names.

Scudder in his description of *dionysus* says it differs from *N. ridingsi,* to which it is closely allied, by its larger size, its more cinereous tints, and by the much more produced serrations of the margins of all the banded markings of the hind wings. None of these characters appear to be differential and I have been unable to find characters that warrant the dividing these two forms into distinct species. There is a difference in size, but it only represents individual difference seen in many species. The males range from 20 mm. (one wing) to 25 mm., and the females from 24 mm. to 28 mm. The color varies considerably, but appears to be gradational and not differential. The serrations of the margins of the bands on the inferior wings are also gradational. The primary wings are identical in all the specimens I have examined. The series in the collection of the Academy of Natural Sciences of Philadelphia are from Whitehorn anad Glenwood Springs in Colorado; Beaver Canyon, Idaho; Medicine Bow, Wyoming, and Flagstaff, Arizona. The dates of capture vary from June 23rd to July 24th. Mr. W. H. Edwards gives an interesting account of *ridingsi* and says it flies from early June and also states that there is a late brood appearing in August and September. I have not seen any specimens with such late dates of appearance. Mr. Scudder says the types of *dionysus* were taken June 4th and June 7th to 10th.

David Bruce, who collected extensively in Colorado, states that the two exist at the same altitude and cites *ridingsi* as common near Denver and *dionysus* as abundant at Glenwood Springs, Colorado. He records both forms from Salida, Colorado. He infers that they are two species and that *dionysus* is found on sandy and desert tracts and *ridingsi* is found in the short grass. We have a series of specimens from him, doubtless from Glenwood Springs, but having only "Colorado" on the pins. A series of specimens taken by Prof. A. J. Snyder in Beaver Canyon, Idaho, July 24, 1895, shows very



Genitalia of *Neominois ridingsi*, male.

considerable variation and both forms may be picked from this series. The specimen from Flagstaff, Arizona, is a typical *ridingsi*. The variations in the species do not appear to be due to geographical variation or altitude.

There are not sufficient data to judge of the brood differences, but the first brood would be likely to be somewhat different from a late one. An examination of the genitalia of the males shows no difference. The genitalic figure was made by Mr. E. T. Cresson, Jr. The original description spells the name *dionysus* (Greek name of Bacchus). The lists spell the name *dionysius* (the elder Tyrant of Syracuse). The original spelling should be followed.

Notes on the Occurrence and Distribution of Antarctic Land Arthropods (Springtails and Mites: Collembola and Acarina).

By H. E. Ewing, Bureau of Entomology, U. S. Department of Agriculture.

Although vast in extent, the south polar region and more especially the Antarctic Continent itself, is remarkably devoid of any extensive land flora or fauna. Our knowledge of the occurrence of land arthropoda on this continent is in reality quite meager. Almost all of the land species so far discovered in this region belong to two orders, the Collembola and the Acarina.

Statements to the effect that winged insects do not occur in the Antarctic Region are not strictly correct, for Racovitza reported a dipteron taken by the Antarctic expedition of the "Belgica" (1897-1898), and Keilin has recently pointed out that Racovitza had not one but two species. One of these species, according to Keilin, belongs to the family Chironomidae and the other to the family Sciaridae. The reason for this apparent mistake by Racovitza was that he presumed that the larvae accompanying the adult, which he determined as *Belgica antarctica* Jacobs, were of the same species as the imago. Keilin has made a special study of *B. antarctica,* and states that it occurs along the strait of Gerlache between 64° and 65° 27′ south latitude. This is south and somewhat east of Cape Horn.

Several species of Collembola have been taken in the Antarctic, and one of these as far south on the continent itself as Granite Harbor, 77° S. lat. and 162° E. long., on the south-trending continental coast-line of Victoria Land. The significance of the distribution of the Collembola of the Antarctic Region has been very ably discussed by Carpenter, who notes, among other things, that the groups of springtails represented, that were at one time considered characteristically arctic or subarctic, are now known to occur in many places either on the American continents or adjacent islands. This would seem to indicate a former land connection between the Antarctic and South American continents. Carpenter states: "We cannot doubt that this affinity points to a former connection between the Antarctic continent of which the South Orkneys once formed part, and the northern continents."

The other group of terrrestrial Arthropods represented in the meager south polar fauna, the Acarina, have been studied by Trouessart and by Berlese. It is interesting to note that these two authorities on mites hold almost opposite views in regard to the significance of the geographical distribution of the Antarctic Acarina. It is largely because of noting this fact, but also because of the present writer's knowledge of the American Acarina, that these lines are written. A further incentive is found, however, in the recent acquisition of a mite collection from the Antarctic Region through Captain George H. Wilkins, of the British Imperial Antarctic Expedition of 1920-21.

The material left by Captain Wilkins consisted of a vial of insects and mites. Three species are represented, one springtail and two mites. The specimens were collected on March 27, 1921, from Port Lockroy, Weinke Island, lat. 64.50 S., long. 63.30 W. This island is just off the coast of Graham's Land. The material has been studied and slides made for the United States National Museum. A report is here given. Species found:

(1). A springtail, *Cryptopygus crassus* Carpenter. Many specimens, representing all stages, present. Specimens sent to Dr. Folsom for confirmation of determination.*

(2). A beetle mite, *Halozetes (Lucoppia) antarctica* (Michael). Many specimens representing various nymphal stages and both sexes of adult stage.

(3). A gamasid mite, *Gamasellus (Gamasus) racovitzai* (Trouessart). A single male specimen found.

Captain Wilkins made the following note in regard to local conditions, habits, etc., of the species found: "Local conditions: Exposed cracked granite boulders at few feet above sea level on which penguins make their nests. Black-backed gulls nest in

* Dr. Folsom writes that the specimens sent also agree with specimens which Wahlgren referred to *C. antarcticus* Willem. Folsom also states that he believes the correct name for this species is *Cryptopygus antarcticus* Willem.

near locality. Bases of rocks are covered with penguin guano. Insects are found beneath loose boulders in crevices sometimes in separate colonies, sometimes together. Insects are active at all hours of day during summer except when rain is falling, at such time they seem to be unable to move if exposed to pressure of moisture. The round-bodied species (*Halozetes antarctica*) build dome-shaped brown cells closely connected but only one story high. Other species apparently do not build any kind of extra shelter."

There are known up to the present at least fourteen good species of terrestrial Acarina from the Antarctic Region. These species are well distributed in the order belonging, as they do, to four different suborders and five different families. Since some of these species are almost, if not quite, identical with species occurring in the Arctics and others are of a wide geographical distribution, Trouessart came to the conclusion that the Antarctic continent had no distinctive acarid fauna.

Berlese, who worked with a much larger amount of material and at a later date, came to the conclusion that two of the beetle mite species (one of them *Halozetes antarctica*) were sufficiently distinct to be placed in a new genus. He, therefore, established in 1916 the genus *Halozetes*, having as its type *H. antarctica* (Mich.). This genus, according to Berlese, includes species exclusively of the antarctic fauna and have little of affinity with the others which belong to the arctic, or subarctic. If Berlese's contention is correct this is the only case of a strictly endemic genus of Acarina thus far known in the Antarctic Region.

When the writer first observed the specimens of *Halozetes antarctica*, left by Captain Wilkins, he was especially struck with its resemblance to species with which he was familiar from our own country and from Europe. A more careful study of this species has been made, and the writer must insist that it is in reality fairly near some of the temperate or tropical species of the genus *Lucoppia* Berlese (type *Zetes lucorum* Koch). When the type species of *Halozetes* is compared with that of *Lucoppia* the differences between them appear to be sufficiently distinct, but when the type species of *Halozetes* is compared with various other species of *Lucoppia*, one is at a loss as to where to draw the line of generic distinction. Certainly one would hardly conclude that *Halozetes* has *very little of affinity with other genera* known from arctic regions. Even the type of Berlese's genus *Lucoppia*, the old *Zetes lucorum* Koch, which occurs throughout all Europe and most of North America, is found in Spitzenbergen. The truth of the matter is that species rather closely related to *Halozetes antarctica* (Mich.) and *H. belgicae* (Mich.) are of practically worldwide distribution. The genus is practically cosmopolitan. The writer has described one species from decaying leaves and trash collected at Columbia, Missouri, another from decaying mushrooms at Jordan, Minnesota; another from moss, Nilgiri Hills, India, while our *Lucoppia pilosus* (Banks) is probably found throughout most of North America under a variety of conditions.

In closing these notes the writer wishes to state that according to his opinion, we are hardly justified in making any statement at present to the effect that the Antarctic Region supports a distinctive mite fauna that is of any significance whatever. Doubtless a more complete survey will bring more interesting and, very probably, quite remarkably distinct and characteristic mite species to our attention. At least we would expect so if we should draw any analogy from the bird fauna of this region, which is remarkably distinctive and characteristic in many respects.

Prosimulium fulvum Coquillett a Biting Species (Dip., Simuliidae).

In his report on the Black Flies, Mr. J. R. Malloch says* with regard to this species: "There are no records of whether or not it bites either man or animals." This being the case it seems desirable to publish some notes given by Mr. A. H. Twitchell regarding the species, specimens of which were collected by him along Fourth-of-July Creek, Alaska, July 20, 1921. He states: "They are not very common but I could get a hundred of them at that place in an hour. They bite horses about the ears, inside or out and at times they bite around the eye and also go into the mane. I have seem them on no other stock than horses, but one bit me on the ear."

Prosimulium fulvum Coquillett ranges from Alaska south to British Columbia, Montana and Colorado. It is the largest species of the family in this country and the only yellow species known to occur in Alaska.—W. L. McAtee, U. S. Biological Survey, Washington, D. C.

* Tech. Ser. Bul. 26, U. S. Bur. Ent. 1914, p. 18.

The Juniper Webworm, Ypsolophus marginellus Fabr. (Lepid., Gelechiidae).

By Harry B. Weiss and Ralph B. Lott, New Brunswick, New Jersey.

This European species was first recorded as occurring in America by Dr. E. P. Felt in the 26th Report of the State Entomologist of New York[1] where it is mentioned as having been collected at Tarrytown and Plandome, N. Y., the larva feeding on juniper. Smith in his New Jersey list[2] mentions the species but gives no localities. Britton[3] states that it occurs in Connecticut, giving Hartford, Meriden, Greenwich and Wilton as localities. In all cases, juniper is the recorded food plant.

During the past several years, this species has been increasing in several places in New Jersey and doing noticeable damage. At present it is known definitely to occur at Rutherford, Scotch Plains, Springfield and New Brunswick, principally in nurseries. The larval feeding appears to be confined to the foliage of *Juniperus communis* and such varieties as *aurea, horizontalis, depressa, hibernica,* etc. Overwintering takes place in a partly grown larval condition, one-half to almost full-grown caterpillars hibernating in the webbed-up foliage. In the northern half of New Jersey, the caterpillars become active early in May, feeding on the more or less dry leaves and becoming full grown and pupating in numbers from the middle of May on. Pupation takes place in whitish, silken cases found among the partly eaten and webbed-up needles. The first moths issue about the last of May or first of June after a pupation period of about fifteen days. On account of the difference in size of the hibernating larvae, the moths appear over a period of several weeks, the majority however emerging about the middle of June. At this time they can be noted in the field, flying in irregular dashes from one juniper to another if disturbed.

Eggs are deposited singly and can be found in numbers during the third week of June. As a rule they are laid on the new

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[1] Mus. Bull. 147, p. 35, 1910 (*Dichomeris*).
[2] Rept. N. J. State Mus. 1909 (*Dichomeris*).
[3] 15th Rept. State Ent. Conn. p. 137, 1915 (*Dichomeris*).

terminal growth, each egg being deposited in the axil formed by the stem and leaf. Many are found on the inner bases of the developing leaves near the shoot from which the leaves arise. Some are found on the surface of the shoots or stems. Usually they are deposited singly, rarely in pairs but an entire terminal shoot may bear several or more eggs. The incubation period is not definitely known but larvae 0.5 mm. in length were first found on July 8.

After hatching, the larvae feed on the upper epidermis of the small leaves, causing them to turn brown in spots and later entirely brown. About the last of July, when the larvae are about 2 mm. in length, the webs are plainly visible. As the larvae become older, their gregariousness becomes more pronounced and the foliage is webbed-up more compactly. At first the web includes the terminal shoot; later several inches behind the tip are included and such webbed-up shoots occur on different parts of the plant, spoiling its ornamental appearance. As the season progresses, the webs become larger, filled with more excrement and the leaves become dry and dead. Small junipers of the upright kind, such as *hibernica*, may be webbed-up solid from top to bottom. There appears to be only one brood each year, the caterpillars developing slowly during the summer and hibernating during the cold months. In the spring, when they become active, if no or little green food is available, they appear to develop as readily on the dried foliage. The webs vary in length from one inch to two or three inches and longer, depending on the manner of growth of the plant infested. Such nests contain from several to fifteen or more larvae.

Egg. Length 0.5 mm. Width 0.21 mm. Subcylindrical, with broadly rounded ends: ends almost flat; one end slightly narrower than the other; sides subparallel; whitish when first laid, later becoming pinkish or tinged with pink; chorion sculptured with numerous, longitudinal, irregularly parallel wavy ridges.

Larva. Length about 14 mm. Width of head 1 mm. Elongate, narrow, subcylindrical, slightly tapering at both extremities. Head and prothorax subequal in width, remaining thoracic and abdominal segments, except the 8th and 9th, slightly wider and subequal in length. Anterior dorsal half of mesothorax and metathorax with transverse plicae. Head and body segments each bearing several, short, white hairs, most of them arising from dark tubercles. Crotchets of prolegs biordinal, those of anal prolegs in two groups. Head dark reddish brown. Antennae yellowish brown. Thoracic shield broad, a variable brown; body light brown, longitudinally marked as follows: median stripe reddish brown, submedian stripes whitish, sublateral dark brown, lateral ones light reddish brown, all somewhat interrupted; thoracic legs dark brown, prolegs yellowish white, apically light brown; anal plate reddish brown, posterior margin dark.

Pupa. Length about 5.5 mm. Slender, reddish brown; wing cases extending to fourth abdominal segment; terminal segment subacute, narrowly rounded with a cluster of 5 or 6 irregular, long, slender, hooked spines.

Adult. This was described by Fabricius in 1781 (Spec. Insect. 2:307) as *Alucita marginella*, the original description being as follows: "alis fusco nitidis, marginibus niueis. Habitat in Juniperetis Angliae. Mus. Dom. Yeats. Media. Palpi carassi, bifidi, interne niuei, externe fuscae. Caput niueum, antennis fuscis. Alae anticae fuscae, nitidae margine interiore et exteriore late niueo. Posticae exalbidae immaculatae."

The adult is rather attractive. The forewings are brown with white front and rear margins, the white disappearing before reaching the apex of the wing. The hind wings are uniformly pearl gray above and below, shining and heavily fringed. The thorax and abdomen above and below are light brown with a tuft of creamy white hairs on the head and prothorax. The wing spread is about 15 mm., and length about 7 mm.

According to Rebel[4] this species occurs in Europe except the polar regions and Siberia. Meyrick[5] mentions several English localities, Central Europe and Northern Asia. He also lists another species, *Ypsolophus juniperellus*, as occurring in a web on juniper.

For the control of this species, it is recommended that infested plants be sprayed or dusted with arsenate of lead during the last of June or first part of July when the webs are small, weak and easily penetrated. Later a dust could not be used and a spray would be necessary to penetrate the more closely webbed foliage. On some varieties of juniper, the dried nests containing caterpillars could be cut and burned early in the spring.

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[4] Cat. Lepid. Palaearc. Faun. 2: 159, 1901 (*Nothris*).

[5] Handb. Brit. Lepid., pp. 607-608, 1895 (*Ypsolophus*).

A Correction and a Protest (Col., Carabidae).

By H. C. Fall, Tyngsboro, Massachusetts.

In the December, 1919, number of the *Journal of the New York Entomological Society*, Mr. Howard Notman concludes, after a somewhat elaborate argument, that Hayward, in his Review of the North American Species of *Bembidium*, was in error in suppressing the *B. arcuatum* and probably also the *incrematum* of LeConte as synonyms of the European *dentellum* Thunb. Mr. Notman's points would seem to the casual reader to be well taken, but unfortunately his conclusions rest almost solely on his interpretation of the descriptions of the species in question, while Hayward, as we know, had the LeConte types before him at the time of writing, and being notably conservative in his work it is fair to presume that he would not have suppressed these names without good reason.

During a recent visit to the Museum at Cambridge I took the opportunity to examine carefully the types of *arcuatum* and *incrematum*, and to compare them with a good and undoubtedly authentic European series of *dentellum* present in the Museum collection, which comparison quite satisfied me that Hayward's course was the correct one.

This incident is here mentioned, not so much to correct Mr. Notman's misapprehension in this particular case, as to express a protest against the custom, all too common of late, of creating so-called new species on differences evolved from a too rigid interpretation of the descriptions of the earlier authors. To cite a single instance out of many: There occurs on the Southern California seashore a rare and aberrant little Carabid, described by LeConte, under the name *Lymnaeum laticeps*, afterward referred to *Bembidium*. In the brief description the color is given as piceous tinged with rufous, and the thorax is said to be not wider than the head. In a recent paper Col. Casey describes as new *Lymneops angusticeps* from the same region and having the same peculiar characters, but held to be distinct because of the color being pale red brown with a discal fuscous cloud, and the head not as wide as the thorax. As a matter of fact the head is not as wide as the thorax in the type of *laticeps* and the color is substantially as described of *angusticeps*. In other words, Casey's description of *angus-*

ticeps fits LeConte's type of *laticeps* better than does the original diagnosis. I have in my collection specimens from San Pedro, California, the type locality of *angusticeps*, which are unquestionably the same thing, and which show conclusively that *angusticeps* is an absolute synonym of the LeContean species.

Here the responsibility for the synonym rests, I think, not so much upon the rather trifling inexactness of the old Latin diagnosis, as upon the failure to allow for this in the face of the *prima facie* probability that the San Diego type and the nearby San Pedro specimens were specifically identical. As a perfectly true generalization we may say that every description, no matter how carefully drawn up, is in some degree inadequate, or as my friend Banks more strongly put it during a recent conversation at the Museum,—"descriptions never can be relied upon." That there is a very large kernel of truth in this somewhat epigrammatic statement must be evident when we reflect that no two taxonomists would describe the same insect in the same way or in precisely equivalent terms; nor on the other hand would a given description convey precisely the same meaning to two different individuals, or even to the same individual under different conditions, the interpretation as well as the description depending upon general experience, degree of familiarity with the group in question, and that very real but indefinite bias known as the personal equation, not to mention certain other incidental factors which may further color the views of the individual.

All this of course is perfectly well known, and yet its entire disregard in some quarters coupled with a tendency to magnify into specific characters the inevitable more or less trifling individual or local variations to which all organic species are subject, is burdening our literature with a mass of useless names which serve only to further obstruct and befog an already difficult pathway. Since of the making of species as "of the making of many books there is no end," we should at least see to it that our creations rest on reasonably secure foundations, lest we give further cause for the mental reservation which a glance at the new check list excites in most of us, best expressed perhaps by the misquotation—of a truth there are fewer things in heaven and earth than are dreamed of in our philosophy.

A New Diplopod from British Guiana taken at Quarantine at Philadelphia.

By Ralph V. Chamberlin, Cambridge, Massachusetts.

A number of myriopods were found in soil around a potted palm from Georgetown, British Guiana, by Inspector Chester A. Davis who took the plant from a passenger on the American schooner "Rosalie Hall" at Philadelphia on May 23, 1921. Among these are two specimens of the chilopod *Mecistocephalus maxillaris* (Gervais) which, it may be noted, was first described at Paris in 1837 from a specimen apparently similarly immigrant. One symphylid occurs, this being the widespread *Scutigerella immaculata* (Newport). The diplopods represented comprise a female of the tropicopolitan *Orthomorpha coarctata* (Saussure), two very young spiroboloids probably belonging to *Rhinocricus,* and the interesting new nannolenid described below, this being represented by several males and females.

TRICHONANNOLENE, gen. nov.

Gnathochilarium as in *Epinannolene*. Ocelli present. Head and tergites clothed with numerous short hairs. Gonopods of male with telopodite presenting a slender branch ectal in position and fitting into a notch of the principal branch; the latter broad, not two-pronged as in *Epinannolene*. Posterior legs of seventh segment in male abortive. Genotype.—*T. guiananus*, sp. nov.

Trichonannolene guiananus, sp. nov.

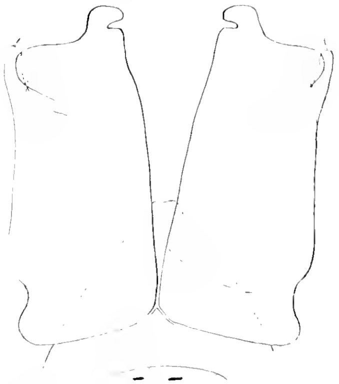
Dark brown, with head, antennae and legs paler.

Head proportionately broad; with no distinct median sulcus across vertex; clothed with numerous short, straight hairs. Antennae with second article narrower than the first, slender and widening distad, the other joints widening clavately distad to the fifth, the sixth cylindrical, the seventh short and narrower. Eyes widely separated; composed of comparatively few, small and often indistinct, ocelli which are normally in two series, or with one in a third; e. g., 2, 4; 3, 3; 3, 4; and 1, 3, 2.

Collum with caudal margin nearly straight, the anterior margin convex; lower ends inflexed beneath, rather narrowly rounded, the anterior margin flattened or slightly notched a little above the lower end; with four principal striae beneath on each side, these striae fine and curving upward anteriorly so as to parallel anterior margin for a short distance. With numerous regularly spaced setae similar to those of head.

Segments of body deeply constricted, with posterior division longer and somewhat thicker than the anterior. Pore well removed caudad from furrow. Tergites behind constricting furrow clothed conspicuously with numerous short straight hairs, similar ones also present on anal tergite and valves.

Last tergite widely rounded behind, equalled or a little exceeded by the valves. Valves weakly margined, flattened on each side. Anal scale with caudal margin nearly straight.



Trichonannolene guianauus gen. et sp. nov. Gonapods of male, posterior view.

The gonopods of male as shown in the accompanying figure. Behind the gonopods a pair of minute, conical appendages represent the posterior legs of the segment in abortive condition.

Number of segments in male, thirty-one to thirty-eight; in the female, to forty-four.

Length, to about 12 mm.

Type in the Museum of Comparative Zoology, Cambridge, Massachusetts.

Food during Captivity of the Water-Striders, Gerris remigis Say and Gerris marginatus Say (Hem.).[1]

By C. F. Curtis Riley, University of Manitoba, Winnipeg, Canada.

The writer has been giving attention to the general habitat responses of water-striders for the past ten years. In the course of these investigations, a considerable amount of data

[1] Certain phases of the food problem of aquatic Hemiptera have been discussed by me in another paper, in which reference is made to the food of water-striders: 1918. Riley, C. F. C. Food of Aquatic Hemiptera. Science, N. S., Vol. XLVIII, pp. 545-547.

has been accumulated in connection with their food habits. In this short paper it is the intention to direct attention to certain different kinds of food used by *Gerris remigis* Say and *Gerris marginatus* Say while in captivity in aquaria.

In my habitat studies of these two species, it has been noticed that *Gerris remigis* feeds on a variety of insect food, and the same is true with respect to *Gerris marginatus*. Additional information was obtained on this tendency toward omnivorous feeding, while studying water-striders during confinement in aquaria. Many observations were recorded with respect to the kind of food that was eaten.

It was found that both *Gerris remigis* and *Gerris marginatus* will feed on the pupae and adults of *Culex* sp., small and large species of Tipulid flies, Syrphid flies, *Musca domestica, Chironomus* sp., *Tabanus* sp., and *Drosophila ampelophila*.

Gerris remigis is a more vigorous and daring feeder than is *Gerris marginatus* and has been observed to feed on *Notonecta undulata, Chrysopa* sp., *Calopteryx maculata, Hetaerina americana,* and *Arctocorixa* sp.

My observations seemed to indicate that both species of water-striders are flesh feeders, but when they have been deprived of food for several weeks, they are, apparently, not particular as to the character of their food. Both *Gerris remigis* and *Gerris marginatus* were noticed as they were feeding on the soft parts of banana fruit and also on the inner softer portions of the skin. Several persons in the laboratory saw this unusual form of response. During confinement in aquaria, both species suck the juices of freshly killed snails, *Physa* sp. and *Planorbis* sp. and also small pieces of fresh beef.

Gerris remigis and *Gerris marginatus* display cannibalistic responses in their own habitat. When their brook habitat so shrinks in volume, during a drought, that there remain only a few small isolated pools in the bed of the stream, thus depriving the gerrids of food, they will attack members of their own species. This somewhat unusual response has been observed to occur in aquaria. *Gerris remigis* not infrequently seizes and sucks the body juices of weaker individuals of its own kind and also of *Gerris marginatus*. *Gerris marginatus* has been seen to feed on the weaker members of its own species.

These cannibalistic traits are more in evidence when the gerrids have been deprived of food for two or more weeks. This statement regarding the cannibalism of these two species of water-striders is somewhat at variance with the observations of McCook[2], who has not seen such food responses of gerrids.

While most of the observations on water-striders in captivity seem to indicate that they prefer fresh food, yet they have been seen to feed on recently dead insects and also on those that have been dead so long that they are beginning to decay. Both *Gerris remigis* and *Gerris marginatus* have been observed to use as food freshly killed and stale individuals of their own kind, also *Musca domestica* and *Drosophila ampelophila* in a similar condition.

These observations seem to indicate that both species of gerrids are indiscriminate feeders and apparently will use as food many kinds of animal bodies. Little choice appears to be shown, so long as it is possible to push their bill-like mouthparts through the exoskeleton into the softer tissues.

A Shower of Corixidae (Heter.).

In 1917 the writer published a Review of instances of "Showers of Organic Matter"* and genuine cases of insect rain were found to be few. This year the writer received, through the kindness of Dr. A. K. Fisher, a mass of Corixidae with the following note by Mrs. A. P. Bigelow, of Ogden, Utah, the collector.

"I am mailing you a box containing samples of a swarm of insects which fell near here last night. A few were dead and the living were unable to raise themselves from the ground though provided with tiny gauze wings. They fell in a thick swarm covering a space not to exceed six feet and pattered like hail on the straw hat of the farmer as he sat by his door about 9 P. M. They lay thickly covering the ground. I saw them this morning (August 3, 1921) still unable to fly and lying in thick heaps."

Subsequent inquiry developed the fact that there was no light which might have attracted the insects. This question, among others, asked for safety's sake, was really unnecessary since such small insects rarely if ever, come to light in numbers so great as to form "thick heaps."

These water boatmen (of the genera *Ramphocorixa* and *Corixa*) had a generally frayed appearance, and although no unusual wind was noted when they fell it is probable that somewhere on their journey they had encountered some destructive wind phenomenon that resulted in their precipitation to the ground.—W. L. McAtee, U. S. Biological Survey, Washington, D. C.

[2] 1907. McCook, H. C. Nature's Craftsmen. New York, p. 267.

* Monthly Weather Review, 45, pp. 217-224, May, 1917.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MARCH, 1922.

Those Incomplete Titles Again.

Several times in recent years we have had occasion to call attention to the derelictions of authors and editors in the matter of incomplete titles of papers. An editorial under this caption appeared in the NEWS for June, 1915, page 280. In a set of "New Year's Resolutions for the Entomologist," in our issue for January, 1920, page 22, was one reading:

6. Add the names of the Order and the Family, to which the insects treated belong, to the title of your paper.

It seems hardly necessary to point out again the reasons for this addition.

We lately had to sort out some publications of the Federal Department of Agriculture for definite purposes and to group them by orders and families. Here are some of the snags we struck:

Wade & Boving. Biology of Embaphion muricatum. 1921.
Beyer. Garden Flea Hopper in Alfalfa and its Control. 1921.
Snyder. Injury to Casuarina trees in Southern Florida by the Mangrove Borer. 1919.
Brooks. Spotted Apple-tree Borer. 1920.
Hofer. The Aspen Borer and How to Control it. 1920.

The list could be extended easily. In all of these cases it was necessary to hunt through the text to learn the family and order. A professional economic entomologist would probably not have had our difficulty, but presumably the publications in question are not intended for his use alone, and even the term "Borer" is, we observe, not co-extensive with the name of any one order. The Federal Government should set us a better example and help us to conserve our time as well as our foods.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Bird Lice (Mallophaga) Attaching Themselves to Bird Flies (Dip., Hippoboscidae).

Finding two instances of this phenomenon led the writer to look up previous records. In this he has had the help of Dr. Joseph Becquaert. The latter and Mr. J. R. Malloch named the bird flies concerned in the present cases and Mr. E. A. Chapin the bird lice. In each of the two instances the fly was *Ornithomyia avicularia* L. as our slightly differentiated form is still known, and it happened also that the louse in each case was the same, namely, *Degeeriella rotundata* Osborn. One collection was made at the mouth of the Macfarlane River, Lake Athabaska, Saskatchewan, Aug. 11, 1920, by Francis Harper, from what bird is not stated, and the other from a western crow (*Corvus brachyrhynchos hesperis*) taken near Ontario, Oregon, Sept. 30, 1920, by E. R. Kalmbach. In both cases the mallophagan had attached itself to the hippoboscid by biting the mandibles into the upper surface of the abdomen near the hind margin.

References in the literature to cognate observations are:

[Banks, Nathan.] Entomological Notes from the Museum of Comparative Zoology, Psyche, Vol. 27, No. 1, Feb., 1920, p. 20.

Two specimens of Mallophaga on an *Ornithomyia*, one on each side near the tip of the abdomen.

Forsius, Runar. Ueber den Transport von Mallophagen durch Hippobosciden. Meddel af. Soc. pro Fauna et Flora Fennica, 38, pp. 58-60, Feb. 3, 1912.

A mallophagan, probably *Nirmus quadratulus* Nitzsch, fastened at base of wing of *Ornithomyia avicularia* L. p. 58.

Two mallophaga, one on the hind tibia, one on the abdominal hairs of an *Ornithomyia avicularia* L., one of them being identified as *Nirmus uncinosus* Nitzsch. p. 59.

Jacobson, Edw. Mallophaga transported by Hippoboscidae. Tijds. voor Ent. 54, 1911, pp. 168-9.

"mallophagan clasped between the legs" of an *Ornithoeca pusilla* Schiner.

Mjöberg, Eric. Studien über Mallophagen und Anopluren. Arkiv. f. Zoologi, VI, No. 13, 1910, p. 10.

7 *Docophorus leontodon* Nitzsch on one, 3 upon another specimen of *Ornithomyia*, firmly attached to long hairs of abdomen.

[Sharp, David.] [Mallophagan on Ornithomyia.] Proc. Ent. Soc. Lond., 1890, p. xxx.

Dr. Sharp exhibited a specimen of *O. aviculare* L., collected at Dartford, England, "to which were firmly adhering—apparently by their mandibles—several specimens of a mallophagous insect."

Wanach, B. Transport eines *Philopterus* durch *Ornithomyia avicularia* L. Ent. Rundschau, 27, No. 17, Sept. 1, 1910, p. 121. "fest an den Hinterleib."

The extent to which the Hippoboscid genus *Ornithomyia* figures in the above records is rather surprising, certainly more than would be expected considering the abundance of flies of this genus relative to others in the family.—W. L. McAtee, U. S. Biological Survey, Washington, D. C.

Save the Zoological Record!

[We reprint the following note entitled "The Zoological Record' from *Science* for Dec. 30, 1921.]

"*The Zoological Record,* which was founded in 1864 by English zoologists, has been issued regularly ever since and contains each year a complete bibliography of all publications connected with zoology. It is now the sole work of the kind, and is invaluable to all workers in every branch of zoology.

"Previous to 1914 *The Zoological Record* formed part of the 'International Catalogue of Scientific Literature,' and was issued under the joint responsibility of the Royal Society and the Zoological Society. As the Royal Society found itself unable to proceed with the volumes of the 'International Catalogue' after the issue for 1914, the Zoological Society has undertaken to prepare and issue the volumes for 1915-1920, inclusive, at its sole financial risk.

"It is the wish of the record committee of the Zoological Society to continue the publication of this most useful work, but it is obvious that they cannot expect the Society to undertake the heavy financial liability involved in publication unless they receive reasonable support from working zoologists both at home and abroad.

"I hope, therefore, that all working zoologists who agree with me that the suspension of the publication of the *Record* would have a most disastrous effect on the progress of zoology, will either subscribe themselves or will urge the librarians of the institutions with which they are connected to do so.

"A prospectus and form of subscription either for the whole or separate divisions of the *Record* can be had on application to the Zoological Society. W. L. SCLATER, Editor.

"Zoological Society of London, London, N. W. 8."

The Mulford Biological Exploration of the Amazon Basin. News Bulletin No. 6.

It is with greatest regret that we have to confirm previous reports of the ill health of Dr. Rusby, the Director of the Mulford Exploration. Some of the earlier messages from the Exploration party indicated that Dr. Rusby was suffering from an infected tooth and from neuritis as early as last August. Although his suffering was continuous and unabating in severity, yet he could not be persuaded to give up nor to alter the plans which he had laid down for himself. He gamely continued to work strenuously at his botanical collection at every possible opportunity and he not only pursued vigorously his own department of the work, but set himself grimly to the task of directing, controlling and planning for the general work and progress of the expedition. With all this he found time to write many letters and to keep detailed records and accounts of many subjects outside of his own botanical work. By the middle of November, his condition had become so bad that he was compelled to give up, not because of the pain and suffering, which he seems to have borne with a remarkable stoicism, but because the crippling effect of his neuritis made it very difficult for him to get about and he decided that it would be better for him to come home rather than continue as a drag and hindrance on the work of the others. He expected to reach New York sometime before March 1.

This decision being taken, the duties of the Director of the Expedition were turned over to Dr. W. M. Mann, Assistant Curator in the Division of Insects of the U. S. National Museum, and a man of wide experience in tropical travel and collecting. Under his direction the party will continue its work in Bolivia and Western Brazil, making studies and collections in the valleys of the Rio Beni and some of its tributaries, including the Rio Negro and Rio Ivon. The trip into Colombia as originally planned, was modified, and the party will continue its work in Bolivia and Brazil until March or April. The botanical work of the expedition is being continued by Dr. O. E. White, a representative of the Brooklyn Botanical Gardens and Harvard University, assisted by Señor Cardenas, a young Bolivian botanist of promise, who was taken on as a member of the party at the request of the Bolivian Department of Agriculture.

In spite of the change of plans for the Colombian part of the journey and the early termination of Dr. Rusby's active work in the field, we feel confident that the results when ultimately gathered together will prove the expedition to have been well worth while and to have fully repaid expenditures made therefor. Before Dr. Rusby left the party they had collected over 3000 plant numbers and to this many more will be added. They have already shipped to this country many boxes containing specimens of economic importance. Other departments of the work of the expedition have been equally successful. Dr. Mann has collected over 100,000 insects, including 125 different species of ants. The collection of fish is also important and growing rapidly as they descend to the deeper and wider rivers.

R. H. HUTCHISON, *Secretary*, Philadelphia, Pa.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

7—Annals of The Entomological Society of America, Columbus, Ohio. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **21**—The Entomologist's Record, London. **24**—Annales de la Societe Entomologique de France, Paris. **30**—Tijdschrift voor Entomologie, The Hague, Holland. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **50**—Proceedings of the United States National Museum. **61**—Proceedings of the California Academy of Sciences, San Francisco. **68**—Science, Utica, Garrison & New York. **81**—The Journal of Parasitology, Urbana, Illinois. **85**—The Journal of Experimental

Zoology, Philadelphia. **89**—Zoologische Jahrbucher, Jena. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **110**—Naturwissenschaftliche Wochenschrift, Jena. **114**—Entomologische Rundschau, Stuttgart. **133**—Zoologica. Scientific Contributions of the New York Zoological Society.

GENERAL. Andreae, H.—Sammelgerate. **49,** x, 199-200. **Fox, W. H.**—Obituary. **10,** xxiii, 213. **Hoffmann, W. H.**—Ein denkmal fur Carlos Finlay in Habana. **49,** x, 194-5. **Phillips & Poos**—A lamp for taxonomic work in entomology. **12,** xiv, 504-6. **Seaver, F. J.**—Some wood-boring insects. (Amer. Forestry, xxvii, 769-72.)

ANATOMY, PHYSIOLOGY, ETC. de Baillon, P. C.—Note sur le mecanisme de la stridulation chez Meconema varium (Phasgonuridae). **24,** xc, 69-80. **Bodine, J. H.**—The effect of light and decapitation on the rate of CO_2 output of certain Orthoptera. **85,** xxxv, 47-55. **Forbes, W. T. M.**—The small primaries of lepidopterous larvae. **7,** xiv, 344. **Gerhardt, U.**—Neue studien uber copulation und spermatophoren von Grylliden und Locustiden. (Acta Zool. Stockholm, 1921, 241-327.) **Harvey, E. N.**—The nature of animal light. (J. B. Lippincott Company, 1920, 182 pp.) **Minnich, D. E.**—The chemical sensitivity of the tarsi of the red admiral butterfly, Pyrameis atlanta. **85,** xxxv, 57-81. **Pratje, A.**—Zur chemie des Noctiluca-zellkermes. Zeit. f. Ges. Anat., lvii, 170-32.) **Riley, C. F. C.**—Responses of the large water-strider, Gerris remigis, to contact and light. **7,** xiv, 231-89. **Whiting, P. W.**—Studies on the parasitic wasp, Hadrobracon brevicornis. **100,** xli, 153-55.

ARACHNIDA, ETC. Chamberlin, R. V.—The centipeds of Central America. **50,** lx, Art. 7. **Welsh, F. R.**—Poisonous spiders. **68,** lv, 49. **Wickware, A. B.**—An unusual form of scabies in fowls. **.81,** viii, 90-91.

NEUROPTERA. Folsom, J. W.—A new Entomobrya. **133,** iii, 237-8.

HEMIPTERA. Essig, E. O.—(See under Hymenoptera.) **McAtee, W. L.**—The periodical cicada, 1919; brief notes for the District of Columbia region. **10,** xxiii, 211-13. **Osborn, H.**—Two tachigalia membracids. **133,** iii, 233-4.

Hoke, G.—Observations on the structure of the Oraceratubae and some new Lepidosaphine scales. **7,** xiv, 337-43.

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CATALOGUE OF INDIAN INSECTS. Part I—ACRYDIIDAE (TETTIGIDAE), by T. BAINBRIGGE FLETCHER. Calcutta. Superintendent of Government Printing, India. 1921. 40 pp. 11 Annas.

This section of the proposed catalogue brings up to date the list of species of the Indian Acrydiidae, offering several very important improvements over the last comprehensive catalogue of this division of the Orthoptera. The most important* of these lies in giving, on the page margins, the exact localities given in the list of references, referring these to each reference by small numerals. In this way the localities originally given by each author can be determined at a glance.

Another decided improvement is the omission of numbers, which in Kirby's Catalogue were given even more than usual importance, as they were used for genotypic citations.

In the present Catalogue the genotype is in every instance cited and, if described from a locality outside of India, that locality is given. We believe the system would have been improved, had a reference to the original genotypic designation been given.

The present section is well handled and the Catalogue should be of the highest value to students of Indian Entomology.

We are, as a rule, not in favor of general catalogues and believe that, unless thorough and complete in every detail, they can be of real disadvantage to the student, who, relying on such, is sure to miss the literature overlooked. In the present case, however, it is evident that a general catalogue of Indian insects is greatly needed and the present section promises well for a thorough and satisfactory series.—M. HEBARD.

THE BULLETIN OF THE HILL MUSEUM. Vol. 1, No. 1. A magazine of Lepidopterology. Edited by J. J. Joicey and G. Talbot, with the assistance of L. B. Prout, A. E. Prout and W. Hawker-Smith. Issued October 17th, 1921, at the Hill Museum, Witley, Surrey, England. With 24 photographic plates of Lepidoptera and 8 photographs of other subjects. London. John Bale, Sons and Danielson. Oxford House, 83-91 Great Tichfield St., Oxford St., W. Price 30s. There are 200 pages including the index.

"This magazine has been established by Mr. J. J. Joicey for the purpose of giving to the entomological world the results of studies carried out at the Hill Museum, Witley." An interesting account is given of the museum and the personnel of the scientific staff, and the large and valuable collections it contains. A bibliography of the previous publications of the museum is given. The first paper in the new journal is by George Talbot and is entitled, "Euploeines Forming Mimetic Groups in the Islands of Key, Aru, Tenimber, Australia and Fiji." The other papers are as follows: "New Lepidoptera Collected by Mr.

* Kirby, Synonymic Catalogue of Orthoptera, III, pp. 1 to 62.

T. A. Barns, in East Central Africa," by G. Talbot. "Descriptions of New Forms of Lepidoptera from the Island of Hainan," by J. J. Joicey and G. Talbot. Judging from the first number this magazine promises to be of great value and interest to the Lepidopterist and we will look forward to seeing much scientific work come from the Hill Museum.—H. S.

Doings of Societies.

Entomological Workers in Ohio Institutions.

At the annual state meeting held in the Botany and Zoology Building, Ohio State University, Columbus, Friday, February 3, 1922, the following papers were read:

GENERAL. A. E. Miller.—Problem of a Collector. R. C. Osburn—The Tabulation of Specific Characters of Insects. Miss Mary Auten—Insects Associated with Spider Nests. T. G. Phillips—The Chemistry of some Common Insecticides. J. T. Potgieter and T. J. Naude—Economic Entomology in South Africa. E. C. Cotton—Notes of the Year on Inspection Work. J. W. Bulger—Control of some Greenhouse Insects.

EPHEMERIDA. F. H. Krecker—Emergence of a May-fly from its Nymphal Skin under Pelagic Conditions.

ODONATA C. H. Kennedy—The Origin of Put-in-Bay Dragon Fly Fauna.

COLEOPTERA. W. C. Kraatz—A New Feeding Habit of a Dermestid Larva. W. V. Balduf—Parasites of the Cucumber Beetle. J. S. Houser—The Apple Flea Weevil. C. R. Neiswander and R. F. Chrisman—Hibernation Responses of the Asparagus Beetle.

HEMIPTERA. C. H. Waid—Observations on the Potato Leafhopper. T. H. Parks—Experiments and Demonstrations in the Control of Potato Leafhoppers and Hopperburn. Herbert Spencer—Aphid Parasites and Hyperparasites. C. R. Cutright—Relative Efficiency of Some Aphid Predators. D. M. DeLong—The Genus *Deltocephalus*. Some Notes on the Ecology and Distribution of the North American Species. H. L. Dozier—Male Genitalia of Delphacids. H. E. Evans—Observations on San Jose Scale in Southwestern Ohio.

LEPIDOPTERA. E. W. Mendenhall—Observations on the European Corn Borer.

DIPTERA. H. A. Gossard—Hessian Fly Emergence at Sandusky, Ohio, in 1921. M. B. Jimison—Three Years of Hessian Fly Control Work in Erie County, Ohio. J. S. Hine—Syrphidae Common to Europe and America.

The following officers were elected for 1922: *President*, T. H. Parks; *Vice President*, J. S. Hine; *Secretary*, W. V. Balduf.

T. H. PARKS, *Secretary*.

APRIL, 1922

ENTOMOLOGICAL NEWS

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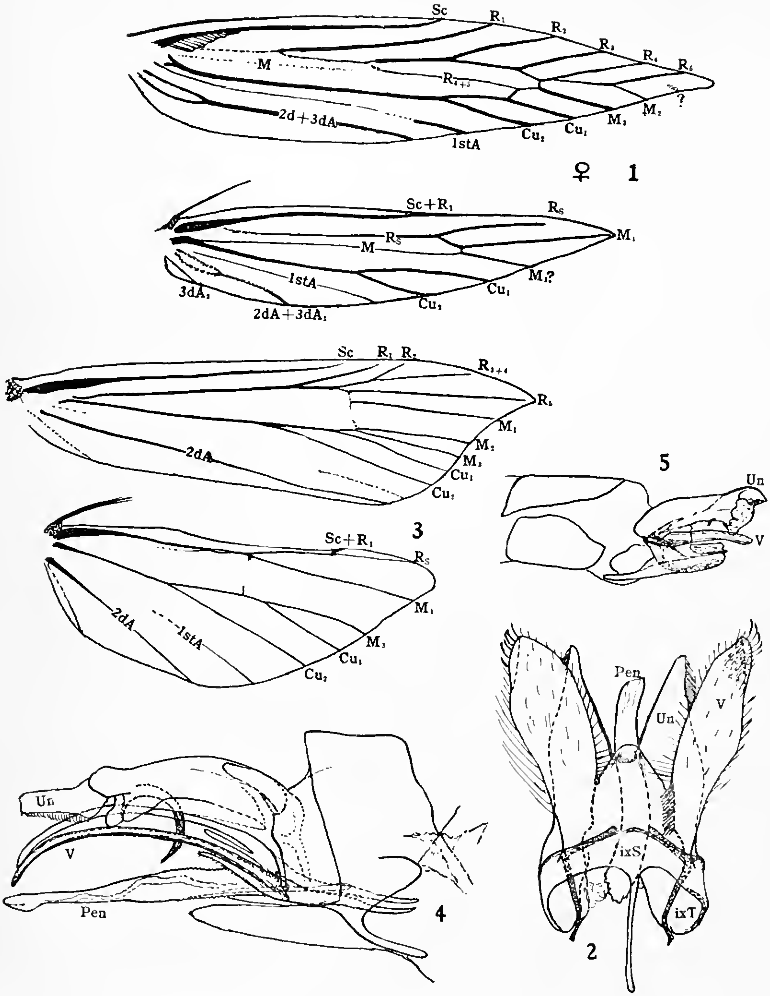

PHAEOSES SABINELLA, 1, 2; OXYELOPHILA CALLISTA, 3; GELECHIA ARENELLA, 4; G. PETASITIS, 5.—FORBES.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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Five Strange Lepidoptera (Oinophilidae, Noctuidae, Gelechiidae).

By WM. T. M. FORBES, Cornell University, Ithaca, New York.

(With Plate V)

The following Lepidoptera are described at this time because I would like to refer to them elsewhere, where there will not be room for a satisfactory description. The first one is thoroughly aberrant, but appears to belong better in the family Oinophilidae, which has not before been reported from the United States, than to the Tineidae, to which it also shows some affinity. The Oinophilidae are a family of somewhat special interest, as they appear to form a connecting link between a whole group of families of the lower Tineoidea, namely, the Tineidae, Lyonetiidae, Opostegidae and Gracilariidae, with the isolated and aberrant genera *Cemiostoma, Bedellia, Bucculatrix, Phyllocnistis*, and their relatives. Of these only the Gracilariidae have been lately revised by Meyrick. In larval habit, however, the known Oinophilidae contrast strongly with the Gracilariidae, Lyonetiidae and Opostegidae, feeding on decaying vegetable matter and fungi, like many Tineidae, while in appearance and structure the imagos are closely similar to the Lyonetiidae and Opostegidae. They are strongly flattened moths, with flat coxae closely appressed to the body, usually with smooth heads, rising to a rounded ridge between the antennae, but often with a loose tuft on the vertex, as in *Oinophila* itself, and rather small maxillary palpi of the folded type. The labial palpi have a well-set-off, fusiform, terminal joint as in the Tineidae, and are normally without bristles. The venation in the known genera is more or less reduced. Besides the well-known European and tropical genera *Oinophila* and *Opogona*, and the following genus, there are numerous less known tropical forms, gradually grading into the Lyonetiidae and the true Tineidae. As a rule nothing is known of the life histories of these and nothing has been published on several interesting points in their structure, so that it is impossible to say to which family they belong, unless the families be combined.

The present form may be characterized as follows:

PHAEOSES new genus (φαιός brown; σής moth).

Head smooth-scaled, as a rule slightly ruffled on the vertex, but without any definite tufting; eyes small, far apart; ocelli absent; front somewhat retreating, but convex, the rounded ridge between the antennae less prominent than in *Opogona*. Antennae three-fifths as long as fore wing, evidently turned back across the eye in repose; scape a little longer than width of eye, a little broadened, but without eyecap or pecten; shaft with a single whorl of appressed scales on each segment, with a few weak setae passing between their bases. Maxillary palpi small but folded, and stronger than in the Gelechiidae; tongue obsolete; labial palpi with basal joint short, second upturned, smooth and concave on upper surface, fitting the face, but normally drooping in death, lower edge rough-scaled; third segment short-fusiform, two-thirds as long as second, rough-scaled and flattened dorso-ventrally, commonly held porrect; no bristles visible. Body strongly depressed, the abdomen very flat; coxae and especially fore coxae broad and closely pressed to body; fore tibia very short and stout, with strong epiphysis; middle legs normal; hind tibia with spurs at a third its length.

with a fringe of long bristly hairs above; hind tarsus smooth, normal. Metathorax relatively large, as in *Opogona*.

Fore wing (Plate V, figure 1) lanceolate, not caudate, but distinctly curved down at the apex; cell narrow, with a broken dividing vein from base to apex, weakly connected with the front edge of the cell halfway between the origins of *R*1 (11) and *R*2 (10), probably representing part of the base of media and the stem of *R*4+5; *R*1 arising at one-third length of cell, *R*2 just beyond middle, the stem of *R* between them definitely angled at the point of separation of *R*4+5; *R*3 (9) arising shortly before end of cell, well separated from *R*4-*M*2 (5 to 8), which arise from a common stem at end of cell; *R*4 (8) given off before *M*2 (5), and *M*1 (6) practically obsolete, but I think traceable: *R*5 (7) running to costa; free parts of dorsal veins parallel, but *M*3 (4) strongly converging at origin to the stem of *R*4-*M*2; *M*3 and *Cu*1 (3) separated by a moderately long bent vein, which receives the dividing vein of the cell, *Cu*1 and 2 (3 and 2) by a long oblique vein; 1*st A* (1c) free, the outer part well chitinized; 2*ndA* (1b) distinctly forked at base. Hind wing two-thirds as wide, lanceolate, with the costa hardly at all concave at the middle; fringe 2; *Sc* (8) ending at two-thirds, running close to costal edge; *R* (7) moderately separated from *M*1 (6), running obliquely to costa; *M*1 (6) to apex; *M*2 (5) nearly connate with it, continuing the distinct base of *M*; cell open below *M*2; *M*3 (4) lost; *Cu*1 (3) and 2 (2) forming a strongly forked free vein; 1*stA* (1c) well developed; 2*ndA* (1b) short and obscurely forked; 3*rdA* (1a) practically obsolete. Frenulum simple in both sexes; frenulum-hook of male normal, of female made up of a series of hooked hair-scales, apparently without any membranous portion.

Fixed hairs are completely absent, except for the usual patch on the inner margin of the fore wing, even the small area over the base of *R*, which exists in *Opogona* and *Opostega*, being lost, and represented only by a group of weak transverse folds. The female ovipositor is membranous, slender and extensile.

The genus will run by Meyrick's key (Proc. Linn. Soc. N. S. W. 22: 298, 1897) to *Lozostoma* (*Opogona*), from which it differs in many particulars, especially the convex front, and nearly complete venation. Of more recent genera it shows a certain resemblance to *Hippiochaetes* Meyrick, which has a tufted head, and to *Amathyntis* Meyrick, which obviously differs in the bristled palpi, as well as markedly different venation. In North America the flattened body, smooth head and folded maxillary palpi will immediately distinguish it, save perhaps from a few Cosmopterygidae, which differ in their smooth, regularly tapering third palpal segment, and the sinuate costa of the hind wing. In my family key it will run to the Acrolepiidae, but is easily distinguished by the separate $M1$ and 2 of the hind wing, and completely smooth head. By Hampson's key (Nov. Zool. 25: 387, 393, 1918) it runs to the Lyonetiadae, family No. 84.

There is only the following species (*genotype*):

Phaeoses sabinella, new species.

Shining gray-brown (mouse gray); ridge between antennae, face and under side much paler, dirty white; outer side of fore coxae and femora, fore tibiae and tarsi, part of middle femora, especially toward the base and apex, and on the outer side, and shorter spurs of middle tibiae, brown; middle tibiae and shorter spurs of hind tibiae somewhat shaded with brown. There is little variation in a series of nearly fifty specimens of varying quality, but on account of the brilliant gloss it is impossible to form an accurate judgment of the shades of color, especially on the legs. Expanse 9 mm.

The male genitalia (Plate V, figure 2) are not unlike those of related forms. The part considered to be the *uncus* (*Un*) is a chitinization on each side of the anal opening, continuous with the *tegumen* (*ixT*), which is itself continuous with the *vinculum* (*ixS*). There is no chitinization at all in the mid-dorsal line, and the lateral suture is indicated only by the articulation of the *valve* (*V*). The valves are ankylosed with the *juxta* and cannot be opened beyond the position figured. The valve is provided on its inner face with a mass of basally directed hair near the apex, and a patch of spines near the base, which are indicated on the right side of the figure as visible by transparency.

Sabine River, Louisiana, opposite Orange, Texas, June 20, 1917: *holotype* and numerous paratypes; Biloxi, Mississippi, June 13, 1917, paratypes; Bay St. Louis, Mississippi, June 17, 1917, one paratype. Types Cornell U., No. 594.

The four species remaining are somewhat less aberrant in character, although each is so distinct from its relatives that some would consider it worthy of a genus. It seems best to describe the two Gelechiidae in recognized genera, as the groups of the family to which they belong are rather in need of revision as a whole.

XYLORMISA new genus (ξύλον wood and *Hormisa*).

Near *Hormisa*. Male antennae unipectinate and heavily ciliate at base, and bipectinate beyond the knot, which is about a third way out from the base, larger than is usual in *Hormisa*, and apparently not provided with curved spines; second segment of palpus more definitely upcurved, but not strongly so, the third short, and normally erect, as in *Hormisa*. Fore wing with well-marked apex; accessory cell obscure, very small and narrow, with *R*2 to 4 (veins 8 to 10) stalked from its apex.

This Noctuid genus is closely related to *Hormisa* and I might not separate it, save for the fact it will run to a different point in Schaus's Key (Proc. U. S. Nat. Mus. 50: 262). It will run to alternative 67, where it is separable by the pectinate antennae. In fact the pectinate antennae with a knot hardly occur save in *Hormisa*, which has a large normal accessory cell. The male fore legs are not unlike those of *Hormisa*, with trochanter very slender, and much longer than femur, and tarsus concealed.

Genotype: *Xylormisa louisiana* n. sp.

Xylormisa louisiana new species.

Ground light wood-brown, formed of dark brown dusting on a clay-colored base. Head and thorax paler; antenna concolorous, with the swelling somewhat darkened; palpus with second segment heavily dusted, except extreme apex, third segment dark brown, with apex more or less distinctly whitish; legs heavily dusted and shaded with blackish, especially the mid-tibia and tarsus. Abdomen lightly dusted with pale gray toward base, the apical segments of the male pale brown-gray with whitish margins, in the female not darkened.

Fore wing becoming darker at the margin; orbicular and claviform represented by vertically placed black points, reniform of two such points, with a third dot below them in the fold, postmedian line represented by a strongly outcurved series of four or five black dots between the veins, on the costal part of the wing; subterminal waved, pale, obsolete at the costa; a broken black terminal line; basal half of fringe dark gray, with pale bars in it corresponding to the black terminal bars.

Hind wing paler, being dusted with pale gray like the abdomen, with faint shaded pale postmedial and subterminal bands, parallel to the outer margin: terminal line black, continuous, followed by a pale line in base of fringe. In the allotype the markings are fainter. Wing expanse 18 mm.

Sabine River Ferry, Louisiana, June 20, 1917, *type* ♂; Schriever, Louisiana, June 17, 1917, allotype ♀. Types, Cornell University, No. 596. There is a female from Canada in the Barnes collection, but I have no notes on it.

ARGYRACTIS Hampson, **OXYELOPHILA**, new subgenus.

Similar to those North American species formerly in *Elophila*, which are now placed by Hampson in *Argyractis* (*fulicalis, bifascialis*, etc.). Fore wing (Plate V, figure 3) strongly falcate, hind wing with *M3* lost (as in other *Argyractis*), *M2* and *Cu*1 stalked. Labial, and in the typical species maxillary, palpi longer and more slender than in *Argyractis*, the maxillaries flattened, and acute only in side view. Mid and hind tibiae and midtarsi flattened and fringed with hair-scales in the female, as in *A. fulicalis* and *bifascialis;* spurs fully developed. Fore wing with *R3* typically lost, but distinct in *A.* (*O.*) *melanograpta*, from Demerara, which also has reduced maxillary palpi.

A. harpalis, lanceolalis, necomalis and *ticonalis* also obviously belong to this subgenus. None of the species have the ocellate spots on the hind wing present in all the Northern species of *Argyractis*.

Apparently Hampson had an aberrant specimen of *A. bifascialis*, as he indicates that it has *M2* and *Cu*1 stalked; in a considerable series that I have examined of both the type and the form *kearfottalis*, the veins are always separate.

Genotype: *Argyractis* (*Oxyelophila*) *callista* n. sp.

Argyractis (Oxyelophila) callista, new species.

Similar to *A. harpalis* Snellen, from Central America (Tijd. v. Ent. 43: pl. 17, f. 1). R3 lost (stalked in *harpalis*, according to Snellen). White; front with a black dot at base of antenna; abdomen with a black transverse band on base of second segment, nearly or quite interrupted in the middle; fore coxa and femur with brown streaks, tibia blackish, tarsus and middle and hind legs slightly infuscated.

Extreme base of costa with a black point; a black subbasal dot on fold, as well as the ones on costa and near inner margin; antemedial line practically complete, right-angled on *Sc* and oblique to inner margin, with teeth on cell and fold; preceded by a broad black-brown fascia, which runs through to the costa, obliterating the second antemedial costal spot; postmedial marks as in *harpalis*, but more suffused, with the yellow on the costa replaced by dull wood brown, and the white circle partly suffused with brown; a wood brown terminal band, representing the yellow and white one of *harpalis*, defined inwardly with a clean-cut black line, which runs out into the apex, and outwardly by a blackish shade. Outer half of fringe white, with fuscous scale-tips.

Hind wing with a complete irregular antemedian band, starting at *Sc*, preceded by some blackish scaling; *discal spot strong, yellow*, defined inwardly by a few brown scales, and outwardly by an incurved blackish line; postmedian line black, erect to discal fold, then right-angled and incurved in a regular sweep to anal angle, almost touching the discal dot; followed by a second weaker line, which does not reach the costa, and is interrupted at the angle. Fringe whitish, clay colored or light wood brown at base, with traces of a black terminal line. Wing expanse, 13 mm.

New Braunfels, Texas, June 26, 1917; *holotype*, six paratypes and three other specimens in poorer condition, all females. Cornell type No. 595.

Gelechia arenella, new species.

Clay color; third joint of palpus slightly darker, and second paler on sides, with a short, smooth and slightly divided brush; antennae fuscous, tips of tegulae pale. Fore and middle legs fuscous, the midfemora and tibiae obscurely mottled and tarsi ringed with whitish.

Fore wing with darker grayish shading between the veins, leaving the veins contrastingly pale; inner and outer discal points round, and a point in the fold before the inner one, all black; a few scattered black-tipped scales, gathering into faint antemedial dots in cell and above inner margin, and along the outer margin, and forming a streak below the basal part of subcosta. Fringe concolorous. Hind wing pale pearl gray. Wing expanse 20 mm.

Woods Hole, Mass., August, 1917; *type* and five paratypes ♂, Cornell type No. 518. Rockaway Beach, New York; paratypes in Barnes collection.

This is apparently the species on which the American records of *G. petasitis* are based, but it is not even closely related, as the figures of the genitalia (Plate V, f. 4, *arenella*, f. 5, *petasitis*, at the same scale) will show. It is much more robust, and the pale veins are distinctive.

Duvita (?) tahavusella, new species. (Tahawus is the Indian name for Mt. Marcy.)

Scape smooth, as long as the eye, with a single long bristle near the base, representing the pecten. Palpi with second joint smooth, but considerably thickened with scales, third noticeably longer, smooth and acute. Fore wing normal, as in *Duvita* and *Aproaerema,* with *M*1 well separated from *R*4+5. Hind wing with produced apex as in *Aproaerema; R* and *M*1 stalked a third way to apex, *M*3 and *Cu*1 hardly stalked, and *M*2 somewhat approximate. Penis a sharply curved spine, articulated at the base.

Dark smoky gray, slightly shining, under a lens with pale scale-bases and dark tips. Palpi concolorous; legs blackish, contrastingly ringed with clay color, the hind tibia with pale bands at both pairs of spurs; the hind femur and inner face of tibia and tarsus contrastingly pale.

Fore wing with pale spots three-quarter way out on costa and inner margin, the costal one much larger, and with an obscure black antemedian spot in the fold, followed by some pale scales. Hind wing gray, paler. Wing expanse 11 mm.

Uphill Brook, Mt. Marcy trail, Adirondacks, New York, July 10, 1918, *type*. Peru, Adirondacks, New York, June 8, 1916, 4 paratypes. Cornell U. type No. 519.

The Mt. Marcy specimen is fresher than the others in spite of its late date, but this is doubtless on account of the high altitude (3200 ft.). This species is the first really North American Gelechiid with a pecten on the antenna, as the genera *Sitotroga* and *Pectinophora* are introductions from the Old World. A couple of European species of *Aproaerema* (*Anacampsis*) are closely similar, but I have seen no specimens of any of them with a pecten, and all five of my specimens of *tahawusella* have preserved it.

The University of Michigan-Williamson Expedition to Brazil.

The expedition left New York on December 15, 1921, as forecast in the NEWS for January, page 11. From letters from Mr. Jesse H. Williamson to members of his family we are enabled to give the following outline of the progress made. On reaching Pará they took steamer up the Amazon to Manáos, arriving there on January 13. Here they saw Dr. Rusby, of the Mulford Exploration, on his return journey to New York (see the March NEWS, page 91), and Herr Fassl, the well-known collector of insects. On the 14th they left Manáos by steamer and proceeded to and up the Rio Madeira, collecting as the stops of the vessel permitted, and disembarked at Porto Velho, "Brazil's third largest city in the Amazon basin," January 21. Here they "secured fine quarters in Hotel Brazil—connecting rooms with electric lights, shower baths, cold drinks (iced) of all kinds available, etc., at about $1.75 per day each." At last writing, February 9, they were still at Porto Velho. Showers and cloudy weather had been frequent, the temperture about 78° F., altitude 60 meters, latitude 8° 46′ South, longitude 63° 55′ West.

From Porto Velho several trips into the surrounding country had been made, that of two days by motor car on the Madeira-Mamoré Railway to Guajara, its present terminus, some 350 kilometers, being the longest.

The Phylogeny and the Geographical Distribution of the Genus Libellula (Odonata).

By Clarence Hamilton Kennedy, Ohio State University, Columbus.

(Continued from page 70)

Group 8. (a) **Composita** Hagen. Pl. IV, fig. 15. Wyoming and Utah to southeastern California. A semidesert species of alkali sloughs. (?)

At Laws, California, August 20, 1915, in the very alkaline Owens Valley, east of the Sierra, this species was found ovipositing in a very alkaline seasonal or temporary, grassy slough made by waste irrigating water. No data were gathered as to whether the species succeeded in maturing in such a place.

This remarkable insect, which has spread probably from the dry areas of southern California, where there seems to have been a sanctuary for several primitive Odonates, stands intermediate between Group 7 and Group 8. In the penis, *composita* resembles Group 8, but in size and color of wings and body it is related to Group 7. The homologies of the parts of the penis in Group 8 were inexplicable until the penis of *composita* was examined. In it all the parts already found in the generalized *semifasciata* penis are recognizable. It is highly specialized in the large lateral lobes and the arched cornual base, but is very primitive in that the three cornua are still recognizable though rudimentary. The pattern of the wing markings suggests *nodisticta, Ladona* and the Eurasian species in which the wing markings are reduced or perhaps have never been greater. The insect is highly specialized in its pearly white eyes, the white costal border and perhaps in its curious habit of flying about in tandem with its mate. Its very restricted and erratic distribution shows it to be a relict. Just how it is related to the species of Group 8 is a question, but there is no doubt that it is associated with their ancestry.

Group 8. (b) **Jesseana** Williamson. Pl. IV, fig. 16. Enterprise, Florida, April 22, 1921. Known only from a single pond, where Jesse Williamson found these mating and ovipositing. (See Ent. News, xxxiii, pp. 13-17.)

This striking dragonfly has the coral-red wings of *auripennis* and the dark body of *incesta*. The arguments for its being a good species and not a hybrid between these species are as follows:

1. It has not been found elsewhere where the habitats of these species overlap.

2. It has the composite type one would expect in a species surviving from the Miocene times of Florida.

3. It is local in its distribution as relict species usually are.

4. It was breeding and ovipositing.

The writer is inclined to classify *jesseana* as another of the local Florida species. He believes that these originated in the Miocene when north central Florida was an island. As evidence of this, all of the half-dozen local Florida species are in northern genera because the Island of Florida was close to the Georgia coast and the Antillean lands had not yet appeared above the sea. The local Florida species of Odonata that the writer has examined are each among the primitive species of its genus, which again suggests an early origin for them. If these conclusions are true, *jesseana* gives us a fairly definite geological date for this horizon of the genus *Libellula*. *Semifasciata*, *foliata*, and *angelina* would be from below the Miocene, while Group 8 (c) and Group 8 (d) would have developed since the Miocene. The penis of *jesseana* has more of its characters like those of the species of Group 8 (d) than of Group 8 (c), but the bright red wings associate it just as much with the latter group. It is specialized in the curious supplementary lobe under the cornual base.

Group 8. (c) **Flavida** Rambur. Pl. IV, fig. 17. Atlantic and Gulf Coasts. Habits unknown.[17]

Auripennis Burm. Pl. IV, fig. 17. Atlantic and Gulf Coasts to Cuba and Mexico. A species of the ponds of the southern evergreen forest, which has penetrated the tropics as far as the Isle of Pines and Tabasco, Mexico.

Luctuosa Burm. Pl. IV, fig. 19. Maine and Florida to North Dakota and northern Mexico. A pond and sluggish stream species of the deciduous forest and prairie.

[[17] In the pine barrens in New Jersey.—P. P. CALVERT.]

This is not as compact a group as for instance the *nodisticta* group. *Luctuosa* is specialized in the broad, black base of the wings and in the black and yellow body-colors. *Auripennis* is equally specialized in its coral-red color. *Flavida,* perhaps, is more generalized in that it has the general color pattern of the species of Group 8 (d), but shows the reddish cast which is so much better developed in *auripennis.*

Group 8. (d) **Axillena** Westw. Pl. IV, fig. 20. Pennsylvania to Florida and Louisiana. A species of the southern evergreen forest usually found near small streams in woods.[18]

Cyanea Fabr. Pl. IV, fig. 21. New Hampshire to Indiana and Georgia. A species of the deciduous forests, usually found about inlets or outlets of ponds.

Comanche Calv. Pl. IV, fig. 22. Montana to Texas, Mexico and California. The writer has seen but one specimen of this in the field. It was along a swampy stream.[19]

Incesta Hagen. Pl. IV, fig. 23. Maine and Wisconsin to Missouri and Florida. A vigorous, wide flier, over open ponds and streams.[18]

Vibrans Fabr. Pl. IV, fig. 24. Maine to Missouri and Florida in woods swamps.[18]

Because of the great difference between the penis of *axillena* and that organ in the other species of this group, *axillena* may not belong in the group.

This group appears to be very modern in that the species are very close. While the penes show all of them to be good and distinct species, the writer has been unable to unscramble their relationships to his satisfaction. *Axillena* and *vibrans,* by penis characters, are very different, also by the same criteria *incesta* is closer to *comanche* and *cyanea* than to *vibrans* and *axillena.* Probably they are a complex of mutants with various combinations of a limited set of characters. The following four pairs of characters appear in the group:

1.1	Dark face	1.2	White face
2.1	Nodal spot	2.2	No nodal spot
3.1	Basal spot	3.2	No basal spot
4.1	Dark stigma	4.2	Pale stigma

[18] Jesse and E. B. Williamson to the writer.

[[19] Along the outlet of the sulphur springs at Santa Rosalia, Chihuahua, Mexico.—P. P. CALVERT.]

These combine as shown in the following lists:

axillena	*vibrans*	*incesta*	*cyanea*	*comanche*
1.1	1.2	1.1	1.1	1.2
2.1	2.1	2.2	2.2	2.2
3.1	3.1	3.2	3.1	3.2
4.1	4.1	4.1	4.1-2	4.2

By this scheme *comanche* appears to be a pale *axillena*. The other species are various intermediate combinations of these paired characters. *Comanche*[20] is also the only desert species of this group. Probably it has entered the desert from the east. This *axillena* group represents the very apex of North American Odonate evolution, if we consider the Libellulidae as the apical Odonate family.

Group 9. **Depressa** Linn. Pl. IV, fig. 25. England to Russia and Persia, south to Sicily. Ponds.[21]

This is definitely a European offshoot from the *Plathemis* stock. It may have been traded to Eurasia when 4-*maculata* came to America, but the difference between it and the two species of *Plathemis* is great enough to suggest that it branched off much earlier.

Group 10. **Quadrimaculata** Linn. Pl. IV, fig. 26. England to Spain, Kashmir and Japan. In America from Newfoundland to Alaska, south in the mountains to North Carolina and California. I cannot trace Muttkowski's[22] Arkansas record.

The nearest relative of this species is *angelina* of Japan. *Quadrimaculata* probably entered North America recently as it has no near relatives on this continent. It may have come in when the very modern *Enallagma cyathigerum* entered Eurasia, as the two have the same distribution. It is very modern and highly specialized in its intense activity.

Group 11. **Fulva** Muell. Pl. IV, fig. 27. England to Italy, Denmark to Transcaucasia. Moor swamps and slow-flowing brooks, more (often found) in the mountainous regions.[23]

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[20] Is it possible that our Odonata tend to form a pale desert fauna? Offhand the writer recalls *Ophiogomphus nevadensis, Gomphus nevadensis, Gomphus intricatus, Sympetrum madidum, Sympetrum corruptum, Libellula composita* and *Ischnura barberi*.

[21] Fröhlich in Die Odonaten u. Orthopteren Deutschlands, p. 13, 1903, states that this species is found from May to July, common about all smaller pools, swamp and peat ponds.

[22] Catalogue of the Odonata of North America, p. 140, 1910.

[23] Fröhlich, Odonaten u. Orthopteren Deutschlands, p. 11, Jena, 1903.

This is a remnant of the preglacial fauna of Eurasia, so that it has no near relatives. It is remarkably specialized in the penis which has a large inflated tip. *Pontia*, which Ris rates as a variety, the writer has not seen.

From the foregoing discussion the writer believes that this method of investigation as a preliminary to a study of the geographical distribution of a group of species is sound and furnishes data as to relationships not easily arrived at from other methods. The writer admits that he has used other characters very little, though they agree as far as he has checked them. To summarize:

1. *Semifasciata* is the most generalized living species and so probably the most primitive.

2. The genus *Libellula* originated in the eastern hemisphere because there we find the large genus *Orthetrum*, placed by many writers close to *Libellula*, in which the penis has the straight lateral lobes of the less specialized Libellulas. See the figure of an *Orthetrum* penis in the preceding article, Ent. News, vol. xxxiii, Pl. II, fig. 14, 1922.

3. Our southwestern species, *subornata*, *foliata*, *nodisticta* and *composita*, are the American species most nearly related to the Eurasian Libellulas. This taken in connection with the fact that the most primitive species, *semifasciata*, is in eastern America, might mean that the genus originated in America and spread to Eurasia, later sending northern species back to America.

4. These southwestern primitive species indicate a Mexico-California faunal centre, which with its long unaltered climate has been an asylum for various primitive Odonates, and from which developed Group 4, Group 7 and Group 8.

5. The species with broad lateral lobes comprised in Groups 3, 5, 6, 9 and 10 have probably been distributed to America from Eurasia. This is indicated by the fact that their connecting links are not in America, that three of these, Groups 3, 9 and 10, are Eurasian to start with.

6. *Depressa* and *fulva* are the most specialized away from the primitive *semifasciata* penis of any of the Libellulas. (The extreme specialization of *Plathemis* and *Ladona* suggests that their stock may have been developed in Eurasia.) It is of com-

mon knowledge to distributionists that the Eurasian fauna and flora are about one geological age in advance of the American.

7. The Palaearctic species, because of their lack of near relatives and because of their unrelatedness *inter se* are the remnants of a preglacial fauna, a fauna that was largely wiped out when caught between the ice and the southern mountains.

8. The holarctic 4-*maculata* originated in Eurasia as it has no near relatives in America.

9. The genus as it exists in America today represents at least three levels of development as are indicated by the horizontal lines on Plate IV.

10. The tropical Libellulas have probably entered the tropics from the north or have been developed from northern stock, also *Ladona* developed from the north to the south.

11. *Orthemis* with a penis that has broad lateral lobes may be an American offshoot of the Libellulas with broad lateral lobes.

12. *Libellula jesseana* gives us a Miocene date for its level in the genus.

From the foregoing it appears that the genus *Libellula* originated in a mild climate in premiocene times, but eventually developed species into both the Transition and Subtropical Zones; that its dominance is past in Eurasia but is at its height in North America.

One point of general interest is that in a species or series of species of *Libellula* extending from north to south, the southern individuals or species are small. Ris (Libellulinen, Coll. Selys) states that in *fulva* and *depressa* examples from the southern portions of their habitats are smaller. The same author states that the Cuban *auripennis* is smaller than the American, that the smallest examples of *herculea* come from Paraguay. However, in the last case the species is small in Mexico on the northern border of its range. In *Ladona* the northern species, *julia*, is largest, the southern species, *deplanata*, smallest.[24] Dr. W. T. M. Forbes has pointed out to the writer that the same is true in some North American Lepidoptera as they are usually smallest on the southern edge of their range. Probably

[24] The reverse is true, according to Dr. Calvert, in *Agrion maculatum*, *Gomphus dilatatus*, etc.

it means that they have spread into a region where life conditions are not optimum.

The primitive color in the genus appears to have been brown because, 1. *semifasciata* is brown; 2. the females of several of the species are brownish; however, the gray and yellow color pattern of the high Group 8 (d) is found also in the genus *Orthetrum*. Apparently the bright reds of *auripennis* and of *saturata* have developed independently of each other..

Probably the primitive wing had three broad spots or bands, basal, nodal and apical, but just how this pattern is handed down through the various lines is baffling. These bands in whole or in part may disappear in a series to reappear in some apical species. They may disappear in one sex, as in the female of *lydia*,[25] or may appear in individuals of a species usually without them, as in the form *praenubila* of 4-*maculata*. Perhaps their genes are always present but are inhibited at times by other factors.

The writer believes that the genitalia in this genus show relationships so clearly that the subgenera can be defined by them. They certainly can be lined up much better than they were by Kirby.[26] The writer's views are substantially those indicated in Ris' key to this genus in his *Libellulinen* in the "Coll. Zool. du Selys." The species fall into ten subgenera, as follows:

1. Eolibellula subgen. nov., type = *semifasciata*.
2. Belonia Kirby, type = *foliata;* includes also *saturata, croceipennis* and *herculea*.
3. Syntetrum subgen. nov., type = *angelina*.
4. Libellula Linn., type = 4-*maculata;* includes *praenubila* and probably *basilinea*.
5. Ladona Needham, type = *exusta;* includes also *julia* and *deplanata*.
6. Plathemis Hagen, type = *lydia;* includes also *subornata*.
7. Platetrum Newman, type = *depressa*.
8. Eurothemis subgen. nov., type = *fulva;* includes, probably, *pontica*.
9. Neotetrum subgen. nov., type = *forensis;* includes also *pulchella* and *nodisticta*.
10. Holotania Kirby, type = *axillena;* includes also *composita*, *jesseana*, *flavida*, *auripennis*, *luctuosa*, *cyanea*, *comanche*, *incesta* and *vibrans*.

[25] Kennedy, Odonata of Kansas, Bull. Kans. Univ., vol. 18, pl. VII, figs. 108-110, 1917.

[26] Kirby, Revision of the Libellulinae, 1889. Catalogue of the Odonata, 1890.

A Carbon-tetrachloride Killing Bottle.

By Gaylord C. Hall, New York City.

There has been a growing tendency for some years past to use carbon-tetrachloride as a killing agent for insects. The writer began experimenting with it several years ago and during the last summer tried out seriously a killing bottle using this fluid. The apparatus, which is shown in the accompanying sketch, consists of a bottle of convenient size, in the bottom of which is placed a piece of felt, which in turn is covered by a layer of cotton. Carbon-tetrachloride is poured in until the felt is saturated and the bottle is ready for use.

The fumes of the tetrachloride are very heavy and therefore have a tendency to stay in the bottle as long as it is not inverted. For this reason it is best to remove specimens from the bottle with forceps which reach the cotton and thus keep the bottle upright. Likewise in getting the specimens from the net into the bottle it is better to keep it as nearly upright as possible.

The effect of the tetrachloride upon Lepidoptera is surprisingly quick. Usually the insect has ceased struggling and is lying inert on the cotton (alas! with wings reversed) by the time the cork is replaced, that is, in a few seconds. Should it be desirable to bring the wings back to their normal position, the butterfly can be taken out, the wings reversed, and dropped back again as with a cyanide bottle. I have found that fifteen minutes is ample time for killing and prefer to take the specimens out after that period has elapsed. I always put them immediately into a metal box kept moist by means of wet blotting-paper or otherwise, as that treatment seems to prevent or at least minimize the rigor mortis. During the last summer I caught and set several hundred specimens, some set the same day as caught and many at a later date after the usual relaxing process, and have had practically no trouble from stiff wings.

In making up the killing bottle use a piece of felt at least a quarter of an inch thick. It can be bought under the name of laundry felt or moulder's cloth. It should be cut so as to make a tight fit in the bottom of the bottle. This can be done by the cut and try method, leaving the felt slightly larger than the inside diameter of the bottle so that it has to be forced down into place. The felt will then be tight and will not fall out when the bottle is inverted. Over the felt place a piece of cotton to the depth of at least one inch. In making this mat of cotton care should be taken that it makes a fairly tight fit against the sides of the bottle and that the edges are not rounded downward. This is important for if rounded, small specimens slide down, become wet with the tetrachloride and stick to the glass, and may be ruined in trying to remove them. The tetrachloride itself does not seem to harm the specimens. In pouring the tetrachloride, slightly part the cotton from the glass, using a pencil, as one is usually at hand, and pour the fluid down the side into the felt without wetting the cotton, tipping the bottle slightly to one side in the meantime.

The bottle properly prepared, *i. e.*, with the felt well wet, will last at least one day in active service. I used to carry a small bottle of the fluid in the field in order to recharge, but found that that was not necessary. The bottle when corked, will keep for months. The carbon-tetrachloride can be bought at any chemist's and there are also some cleaning fluids such as Carbona which seem to be composed largely of it and which answer the purpose perfectly.

The carbon-tetrachloride would seem to lend itself easily to other methods of killing insect and other pests, due to its extremely heavy vapor and absolute fire-proof quality, and we may expect development along this line in the future.

[*Note.* Very frequently boys and girls wish to collect insects and it has not been considered safe or wise to allow them to use cyanide bottles. At present it is difficult to purchase small quantities of cyanide, on account of the regulations in regard to the sale of poisons. Carbon tetrachloride would supply a harmless preparation for both children and adults. For certain insects that have long tarsal claws, it would be necessary to put something smooth over the cotton, with perforations, if necessary, to permit the gas to escape into the bottle. H. S.]

Enallagmas Collected in Florida and South Carolina by Jesse H. Williamson with Descriptions of Two New Species (Odonata, Agrionidae).

By E. B. Williamson, Bluffton, Indiana.

(Plate VI)

Mr. Williamson collected dragonflies in Florida from March 1 to April 26, 1921. Localities visited and dates are as follows: Sebring, March 1; Fort Myers, March 3-7 and 10-19; Taxambas, Marco Island, March 8; Labelle, March 21-27; Moore Haven, March 29 and 30, and April 2; Palmdale, March 31 and April 3-8; enroute Moore Haven to West Palm Beach, across Lake Okeechobee, April 9; Miami, April 12; Enterprise, April 15-26. From April 29 to May 9 he collected at Kathwood, Aiken County, South Carolina, but at this time most of the species observed were just emerging. Mr. Williamson has distributed his Florida dragonflies into twenty-five sets which he has donated to students of Odonata.

Dr. Calvert's recent paper, *Gundlach's Work on the Odonata of Cuba*, (Trans. Am. Ent. Soc., XLV, 1919) contains a careful study of certain Enallagmas, related to *Enallagma truncatum*, which may be designated as the *pollutum* group. This work of Dr. Calvert's has made possible the recognition of two undescribed species of the group from Florida. The following descriptions of these species follow the form of Calvert's descriptions and are supplementary to his paper.

Enallagma sulcatum new species (Pl. VI, Figs. 1-5).

♂. Superior appendages in profile view with the apical margin subequal to the inferior margin, produced; in dorsal view, the intero-inferior lamella reaching far beyond the level of the supero-internal apical hook.

Nasus shining black, with a small pale area on either side (similar to that of *truncatum* in Calvert's figure 1, except that the black extends nearly or quite to the anterior and lateral margins), to largely orange with a transverse bar across the base and another paralleling the anterior margin, these bars connected or not at their extremities and in the median line, and the anterior bar sometimes broken with orange.

Frons: pale color of the anterior surface not reaching the yellow or orange spot immediately anterior to the median ocellus; in some specimens the black anteriorly is slightly more reduced than in figure 4.

Pale postocular spots linear-cuneiform, not confluent with the pale color of the rear of the head, being separated therefrom by a broad bar of black across the rear of the head above.

Middle prothoracic lobe in dorsal view predominately black, a yellow or orange spot each side, no median twin spots or stripes.

Width of black middorsal thoracic stripe about .87, of pale antehumeral about .26, of black humeral about .55 mm.

Second lateral thoracic suture with a black stripe on about the upper five-sixths of its length, continued as a thread of black to the inferior end of the suture.

Abdominal segment 9 blue.

♀. Mesostigmal lamina largely black, with a pale stripe which includes the dorsal tubercle and extends downward and slightly forward; the posterior and inferior black portion of the lamina grooved (hence the specific name) to receive the dorsal branch of the superior appendage of the male; this groove produced dorsally and anteriorly across the pale stripe slightly below the dorsal tubercle, at which point the pale stripe is more or less interrupted.

Antero-mesal angle of the pale antehumeral stripe elevated and prominent, but not produced into a tubercle.

Width of the black middorsal thoracic stripe about .78, of pale antehumeral about .27, of black humeral about .5 mm.

Second lateral thoracic suture with a black stripe on slightly less than the upper five-sixths of its length, continued as a thread of black to the inferior end of the suture.

Black on dorsum of abdominal segment 9 with the sides nearly parallel or narrowing caudad, and extending from the base to from two-thirds to three-fourths the length of the segment.

Abdomen ♂ 27-28, ♀ 26.5-29; hind wing ♂ 16.5-17.5, ♀ 17-19; stigma front wing ♂ .6-.67, ♀ .67, of hind wing ♂ .67, ♀ .7-.83 mm.

Anal bridge separating from the hind margin proximal to Cu-A a distance about equal to to slightly greater than the length of Cu-A. M2 front wing arising at or near the fourth postnodal in 5 male wings, at or near the fifth postnodal in 5 male and 8 female wings; M2 hind wing arising at or near the fourth postnodal in 10 male wings and 8 female wings; M1a front wing arising at the seventh postnodal in 10 male wings and 2 female wings, at the eighth postnodal in 6 female wings; M1a hind wing arising at the seventh postnodal in 10 male wings and 7 female wings, at the eighth postnodal in 1 female wing.

Material examined: Gotha, Florida, June 23, 1898, through James Tough, ♂, coll. E. B. W.; Enterprise, Florida, April 18, 19, 21, 25 and 26, 1921, J. H. Williamson, 7 ♂, 4 ♀. *Type* ♂ April 26, *allotype* ♀ April 19, coll. E. B. W. This species was taken by Mr. Williamson at Gleason's Pond, Buckeye Homestead Pond, Quackenbos Pond, and a small swamp about a quarter of a mile east of Gleason's Pond.

The male of *sulcatum* runs out in Calvert's key to *truncatum* and *pollutum*, with the postocular spots more linear than cuneiform. From *truncatum* it is separated at once by the form of the appendages and by the more extensive pale areas on the head in dorsal view. From *pollutum* it is separated at once by having the ninth segment blue, not yellow or orange, and by the form of the appendages.

Writing of the males of *vesperum* and *signatum* Dr. Calvert (p. 376, loc. cit.) says he has found no constant color differences. I have seen many specimens of both species and in every case abdominal segment 9 of *signatum* has been yellow and of *vesperum* blue, but Dr. Calvert writes me that a specimen of *signatum* from Indiana seen by him had 9 blue. This coloration is certainly rare, and in the case of the specimen seen by Dr. Calvert may have been due to some adventitous cause. In the same way, all the males of *pollutum* seen by me have 9 yellow. The males of *vesperum* and *sulcatum* are alike in having 9 blue, and there is a superficial resemblance in the shape of the appendages. But *sulcatum* is at once separated from *vesperum* and from all other species of the *pollutum* group, by having the pale, less chitinized, intero-inferior lamella produced apically beyond the level of the darker, more chitinized, externo-superior branch of the superior appendages. In *vesperum* the mesal edge of the intero-inferior lamella is emarginate; in *sulcatum* it is entire and slightly concave as shown in figure 3.

In Calvert's key to the known females of the group, *sulcatum* runs out to *signatum* and *pollutum*, which are separated in the key by the presence in *signatum* and absence in *pollutum* of mesepisternal tubercles. *Sulcatum* seems more like *pollutum*, as contrasted with *signatum*, in this character, which, however, is not always readily recognized. It is variable (in *vesperum*) according to Calvert, and among specimens of all the known species, I have found the tubercle absent in at least some of the specimens of all the species except *signatum*.

The female of *sulcatum* is further defined in a brief key to the known females following the description of *E. concisum*.

Specimens of *sulcatum* have been studied by Dr. Calvert and in his opinion the species is distinct.

Enallagma concisum new species (Pl. VI, Figs. 6-10).

♂. Superior appendage in profile view with the apical margin about two-thirds as long as the inferior margin, oblique, nearly straight, and not bilobed but with the inferior apical angle of the intero-inferior lamella slightly enlarged. In dorsal view the intero-inferior lamella reaches the level or nearly the level of the supero-internal subapical hook but the dorso-apical portion of the intero-inferior lamella is produced obliquely apically to fuse with the externo-superior branch of the appendage, so the distinction between the externo-superior branch and the intero-inferior lamella is not well marked in the subapical part of the appendage as it is in corresponding parts of *pictum*. This results from the greater length of the externo-superior branch of the appendage in *concisum* as compared with *pictum*, and it is in *concisum* that the supero-internal subapical tooth is relatively more apical and therefore more reduced.

Nasus orange, a transverse basal black stripe and on either side, at mid-length, a small brown to black depression.

Frons: pale color of its anterior surface on either side reaching the level of the median ocellus, but the latter is bordered in front with a small pale area of varying size and an anteriorly projecting quadrangle of black, the latter often unsymmetrical, and in one case broken, so the small yellow area in front of and adjacent to the median ocellus is joined on one side with the anterior orange color of the frons.

Pale postocular spots linear cuneiform, widely separated by black from the pale color on the rear of the head below.

Prothorax shining greenish black, front and hind lobes broadly edged with orange; and sides of middle lobe paler orange; dorsum of middle lobe with a round orange spot, varying greatly in size on either side, and with a median orange geminate spot of varying size present or wanting.

Width of black middorsal thoracic stripe about .67, of pale antehumeral about .33, of black humeral about .43 mm.

Second lateral suture with a black stripe its entire length, widening posteriorly from a narrow line at its anterior end.

Abdominal segment 9 orange on the sides below, dorsum black except the apical membranous ring which is orange.

♀. Mesostigmal lamina largely pale, the upper half, anterior to the pale vertical posterior inflated carina, and a very narrow border, posterior to this carina, black.

The merest prominence and no trace of a tubercle on the anteromesal angle of the pale antehumeral stripe.

Width of black middorsal thoracic stripe about .7, of the antehumeral about .35, of black humeral about .44 mm.

Second lateral thoracic suture with a black stripe its entire length, widening posteriorly from a narrow line at its anterior end.

Black on dorsum of abdominal segment 9 of uniform width.

Abdomen ♂ 24.5-25.5, ♀ 26; hind wing ♂ 14.5, ♀ 17; stigma front wing ♂ .5-.53, ♀ .61, of hind wing ♂ .5-.53, ♀ .67 mm.

Anal bridge in front wing separating from the hind margin proximal to Cu-A a distance equal to about one and one-half times the length of Cu-A; in the hind wing a distance slightly greâter than the length of Cu-A. M2 front wing arising at or near the fourth postnodal in 2 male wings, at or near the fifth postnodal in 8 male and 2 female wings; M2 hind wing arising at or near the fourth postnodal in 10 male and 2 female wings; M1a front wing arising at the seventh postnodal in 6 male and 2 female wings, at the eighth postnodal in 4 male wings; M1a hind wing arising at the sixth postnodal in 3 male and 1 female wings, at the seventh postnodal in 7 male and 1 female wings.

Material examined: Buckeye Homestead Pond, Enterprise, Florida, April 21 and 26, 1921, J. H. Williamson, 13 ♂, 1 ♀; *Type* ♂ and *allotype* ♀, April 21, coll. E. B. W.

Mr. Williamson noted of this species on April 21; "Occurred at Buckeye (Homestead) Pond. Generally found resting in inner ring of vegetation where the water was about waist deep. Seen only at rest and hard to find."

(To be continued)

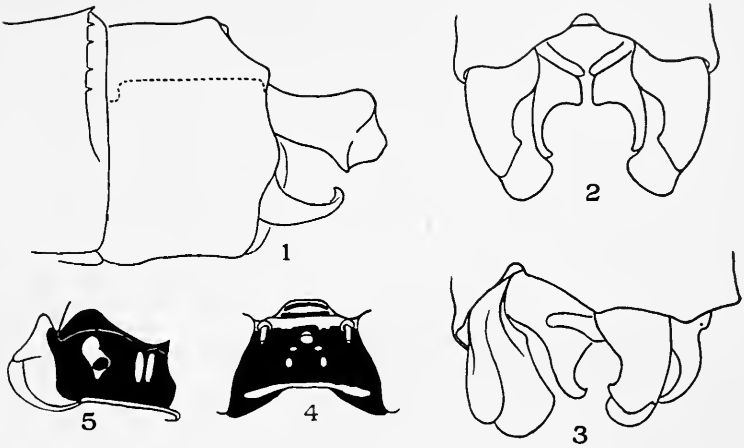
Explanation of Plate VI.

Figs. 1-5. *Enallagma sulcatum* n. sp. Figs. 1-3, appendages of the ♂ type in lateral, dorsal and dorso-oblique views. Fig. 4, dorsal view of head of ♂ type. Fig. 5, dorso-oblique view of middle lobe of prothorax of ♀ allotype.

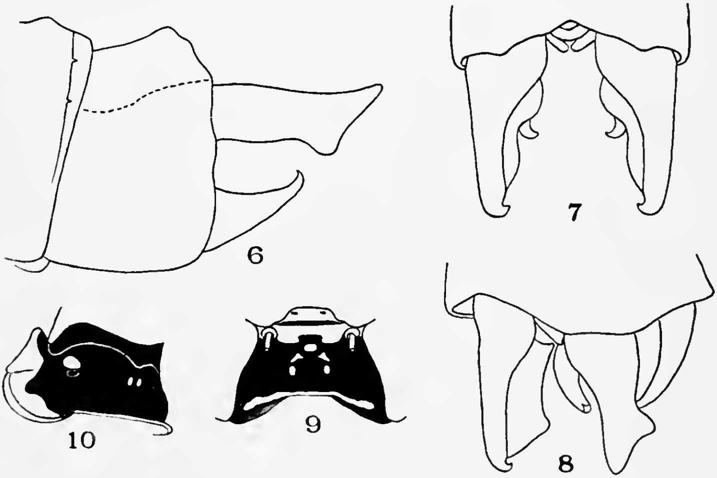
Figs. 6-10. *Enallagma concisum* n. sp. Figs. 6-8, appendages of ♂ type in lateral, dorsal and dorso-oblique views. Fig. 9, dorsal view of head of ♂ type. Fig. 10, dorso-oblique view of middle lobe of prothorax of ♀ allotype.

Information on Bibliographies and Catalogs Wanted.

The Division of Biology and Agriculture and the Research Information Service, National Research Council, are undertaking a canvas of manuscript and published bibliographies on plant and animal biology, and of manuscript of plants and animals (recent and fossil), with the view of relieving the needs of working biologists along these lines. Blank forms for reporting such information may be obtained from C. J. West of the Council, 1701 Massachusetts Ave., Washington, D. C.



Enallagma sulcatum n. sp.; figs. 1-4, male; fig. 5, female.



Enallagma concisum n. sp.; figs. 6-9, male; fig. 10, female.

FLORIDA ENALLAGMAS.—WILLIAMSON.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., APRIL, 1922.

Zoological Bibliographies

In the March number of the NEWS, page 91, we published a note headed "Save the Zoological Record!" Elsewhere in the present issue is a statement concerning resumption of publication by the Concilium Bibliographicum. Each of these bibliographical agencies appears to have its partisans who see nothing good in the other. Both have done good in the past and the plan of publication which each has followed has some advantages lacking in the other.

For individuals working in a limited field the cards of the Concilium are of very great assistance,* as they permit one to associate each year's cards relating to any given subject, or to the works of a given author, with similar cards of preceding years, according to the recipient's preferences and mode of work. This obviates the necessity of examining separate volumes each devoted to the literature of but a single year. Experience, too, has shown that the cards for limited groups are distributed at a shorter interval after publication of the literature than has been found practicable with the volumes of the *Record*.

For an institution including a number of investigators interested in different divisions of the animal kingdom and of Zoology, the book form is doubtless the better, since the immense number of cards (due to the extent of the whole field of this science and the quantity of papers published) demands constant service to sort and interpolate the cards and few establishments are able to supply this. The entire series of cards for even one year necessarily occupies a much larger space than a volume containing the same number of references. This, too, is an important consideration. But even when the

*See the NEWS for June, 1921, pages 182-3.

volume form is received by an institution, the cards relating to one or more taxonomic groups, or to one or more topics as physiology or anatomy, are often of great aid to an individual working therein.

The book form is furnished both by the *Zoological Record* and the *Bibliographica Zoologica* of the Concilium. Opinions doubtless vary as to which of these is more conveniently arranged. Both necessarily include many cross-references and their usefulness is measured, to a great degree, by the completeness of these. This also applies to the cards. No great research is required to discover, even in the latest issues of all three series, that the cross-references are by no means complete and that dependence on them will not furnish the reader with all the references on a given subject that each volume or set of cards contains.

It is a great pity that two distinct organizations exist for the same purpose and it would seem to be true economy, especially in these days, for the two bodies to combine their labors for the greatest benefit of workers in all branches of Zoology and, united or co-operating, continue to issue volumes (annually or oftener) and cards, to suit the different needs of institutions and individuals. Happily, we understand, negotiations with such an end in view are under way. But whatever may be their outcome, financial support from all using these bibliographies is an absolute necessity and we can not urge too strongly the duty of all Zoologists (including entomologists) to sustain and strengthen these publications.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Aphis-Lion Attacking Man (Neur., Chrysopidae).

The following observation may be of interest as a case of a predaceous insect attacking man without provocation.

With the exception of such insects which, like mosquitoes and blood-sucking flies, depend upon blood as food, insects will not generally attack man unless taken in the fingers or perhaps entangled in the clothing. Under such conditions practically all insects with biting mouthparts—beetles, grasshoppers, the larger caterpillars, and even Dipterous larvae (Tipulidae, Tabanidae)—will make use of their mandibles, but they will hardly ever attack spontaneously.

In August, 1918, at Princeton, New Jersey, I was frequently compelled, through asthmatic attacks, to sit down on certain low stone walls forming the border of the university campus and shaded by maple and sycamore trees which were badly infested with Aphids. On such an occasion I suddenly felt a painful bite or sting on the wrist of the left hand which was on the stone. Looking for the cause, I discovered on the hand the larva of the lace-winged fly, *Chrysopa* spec., commonly called Aphis-lion, which insect had sunk both its long, hollow mandibles deep into the skin, as if for sucking, and when being removed, was not at all willing to give up. The larva had, apparently, dropped from one of the trees, and finding itself hungry, proceeded, in the absence of aphids, to attack the next best living prey it could get hold of. A few hours later the same thing was experienced a second time. Again I had placed my hand on the stone; after a few minutes a painful prick was felt, the cause of which was found to be an aphis-lion sitting on the upper side of the hand, the mandibles deeply inserted. Whether it had climbed on the hand or dropped from the tree above I was unable to ascertain. The specimens were greenish with black markings, but were not preserved.

This observation appears to show that *Chrysopa* larvae will occasionally attack man spontaneously and thus assume the role of a facultative parasite.—WERNER MARCHAND, Mendham, New Jersey.

Note on Abundance of Mosquitoes (Dip., Culicidae).

Mr. George C. Shupee, Federal Game Warden, has sent in an interesting note on a plague of mosquitoes on the north Texas coast which should be made available to entomologists. His account dated High Island, Texas, Oct. 29, 1921, is substantially as follows:

Old residents say they never were so bad before, millions and millions of them; so many perched on the automobile that one could not tell there was a glass in the back of the car. They have killed lots of cotton-tail rabbits, and every now and then meadowlarks and other birds are found dead, apparently from the ravages of the mosquitoes. The stock have either gone to the high ridges or come to the gulf where they wade out deep. A large boar hog appeared to go crazy on account of their attacks; he ran into the gulf and swam out about 1½ miles, and was given up; he disappeared from sight time and time again in the surf, but finally he came back in. Those hunters who are going in after ducks surely earn them, wearing heavy leather gloves and stiff canvas coat, with mosquito net over head; despite all that the pests still bite, actually biting through the glove. I never experienced them so bad. Some days ago a norther blew them out into the gulf; they were drowned and washed into shore, and from Bolivar to Sabine, about 75 miles, a strip four inches wide and two deep was left along the beach. Notwithstanding this occurrence there remain apparently just as many of the mosquitoes as before.

Most of us have heard of windrows of brine-flies (*Ephydra*) being cast up on the beaches of certain western lakes, but probably few have imagined that mosquitoes ever figured in a similar phenomenon.—W. L. McATEE, U. S. Biological Survey, Washington, D. C.

To the American Subscribers of the Concilium Bibliographicum (Zurich).

The difficulties created by the war and after-war conditions and by the death of Director Dr. H. H. Field have interrupted, from 1917 until recently, the sending out of bibliographic cards and of the Bibliographia Zoologica. During this time, however, work has continued, although in restricted degree, on preparing references, and Vol. 30 of the Bibliographia Zoologica and certain cards have recently been sent out to subscribers.

The difficulties of the Concilium Bibliographicum caused by the war, the uncertainties of exchange since the war and, finally, by the death of Dr. Field have been so great as to threaten seriously the continuance of its existence. But arrangements are now in process of accomplishment by which the continued existence of the Concilium is assured and the maintenance and even gradual expansion of its bibliographic service provided for. These arrangements have been made possible by a co-operation of the Swiss Society of Natural Sciences, the National Research Council (Washington) and the Rockefeller Foundation (New York), by which all current obligations of the Concilium are paid, a certain sum is given to Mrs. Field in partial recognition of hitherto unpaid services of Dr. Field, and financial provision is made for assistance in meeting the current expenses of the Concilium for five years.

A provisional managing committee composed of representatives of the Swiss Society of Natural Sciences and of the National Research Council will assume the present control of the Concilium, with Prof. Dr. J. Strohl of the Zoological Institute of the University of Zurich as Director. Full details of the new arrangements for the reorganization of the Concilium and proposed plans for a possible extension of its work will be published as soon as the arrangements are formally and legally made.

In the meantime the making of the references and the preparation and printing of the bibliographic cards will be vigorously pushed and subscribers may be confident that they will again begin to receive cards regularly, and that references to papers which appeared during the war and in the first years after it as well as references to papers in current periodicals will be sent them. An energetic campaign for the confirmation of old and for obtaining new subscriptions will be begun at once. The campaign for American subscriptions will be undertaken by the National Research Council which will represent the interests of the Concilium in America. The campaign in Europe will be made by correspondence from Zurich and by personal visits to various countries by the Director of the Concilium. Special requests for information concerning the Concilium may be made by American subscribers directly to the National Research Council (Washington). Dr. Jean Strohl, Director of the Concilium Bibliographicum. Dr. K. Hescheler, Chairman, Committee on Concilium Bibliographicum, Swiss Society of Natural Sciences. Dr. Vernon Kellogg, Chairman, Committee on Concilium Bibliographicum, National Research Council. Zurich, February 1922.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

2—Transactions of the American Entomological Society, Philadelphia. **4**—Canadian Entomologist, London, Canada. **6**—Journal of the New York Entomological Society. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **16**—The Lepidopterist, Salem, Mass. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **28**—Entomologisk Tidskrift, Uppsala. **29**—Annual Report of the Entomological Society of Ontario, Toronto, Canada. **39**—The Florida Entomologist, Gainesville, Florida. **41**—Bulletin de la Societe Entomologique Suisse, Bern. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipsic. **58**—New York State Museum Bulletin, Albany. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **82**—The Ohio Journal of Science, Columbus. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **99**—Bulletin du Museum National d'Histoire Naturelle, Paris. **108**—Journal of Genetics, Cambridge, England. **109**—Annales Historico-Naturales Musei Nationalis Hungarici, Budapest. **110**—Naturwissenschaftliche Wochenschrift, Jena. **111**—Archiv fur Naturgeschichte, Berlin. **134**—Annales de Biologie Lacustre, Brussels. **135**—Schriften der Physikalisch-okonomischen Gesellschaft zu Konigsberg in Pr. **136**—Archivos da Escola Superior de Agricultura e Medicina Veterinaria, Nictheroy (E. do Rio de Janeiro). **137**—Zeitschrift des Osterreichischen Entomologen-Vereines Wien.

GENERAL. da Costa Lima, A.—Notas entomologicas. Technica para a preparacao e montagem de pequenos insectos para exame microscopico. **136,** v, 97-121; 123-26. **Fyles, T. W.**—Obituary by C. J. S Bethune. **4,** liii, 262-64. **Lucas, W. J.**—The order Neuroptera. [Answer to a question from G. V. Hudson.] **9,** 1922, 61-2. **Metcalf, Z. P.**—The age of insects. (Jour. Elisha Mitchell Sci. Soc., xxxvii, 19-53.) **Sladen, F. W. L.**—Obituary. **4,** liii, 240. **Smiths. Inst.**—Opinions (68-77) rendered by the International commission on zoological nomenclature. (Smiths. Miscel. Coll., lxxiii, No. 1.) **Tarbat, J. E.**—Non-attractiveness of electric light. **9,** 1922, 64-5. **Weiss & Dickerson**—Notes on milkweed insects in New Jersey. **6,** xxix, 123-45.

ANATOMY, PHYSIOLOGY, ETC. **Christeller, E.**—Untersuchungen an kunstlich hervorgebrachten hermaphroditen bei schmetterlingen. **135,** lix, 1-20. **Dampf, A.**—Uber innere begattungszeichen bei Tortriciden. **135,** lxi, 66-8. **Feuerborn, H.**—Das labialsegment, die gliederung des thorax und die stigmenverteilung der insekten in neuer beleuchtung. **52,** liv, 49-78, 97-111. **Harrison, L.**—Notes on the mouth-parts of lice. (Australian Zoologist, i, 214-16.) **Macfie, J. W. S.**—The effect of saline solutions and sea water on Stegomyia fasciata. **98,** xv, 377-80. **Meyer, R.**—Die pollensammelapparate der bauchsammelnden bienen (Gastrilegidae). (Jen. Zeit. f. Naturw., Jena, lvii, 229-68.) **Onslow, H.**—The inheritance of wing colour in lepidoptera. **108,** xi, 277-98. **Osorio de Almeida, M.**—Les reflexes musculaires. **136,** v, 127-41. **Schweizer, C.**—Der darmkanal des maikafers. **110,** xxi, 78-81. **Speyer, W.**—Die lokomotorischen extremitaten der larve von Dytiscus marginalis. **135,** lxi, 43-54. **Stumper, R.**—Nouvelles observations sur le venin des fourmis. **69,** clxxiv, 413-15. **Thienemann, A.**—Die metamorphose der Chironomidengattungen Camptocladius, . . . mit bemerkungen uber die artdifferenzierung bei den Chironomiden uberhaupt. (Arch. f. Hydrobiologie, Stuttgart, ii, Suppl., 809-850.) **Zavrel & Thienemann**—Die metamorphose der Tanypinen. (Arch. f. Hydrobiologie, Stuttgart, ii, Suppl., 655-784.)

ARACHNIDA, ETC. **Chamberlain, R. V.**—On some Chilopods and Diplopods from Knox Co., Tennessee. On some arachnids from southern Utah. **4,** liii, 230-33; 245-47.

NEUROPTERA. **Dohler, W.**—Beitrage zur systematik und biologie der Trichopteren. (Sitz. Naturf. Gesell., Leipzig, 1914, 28-102.) **Lestage, J. A.**—Etudes sur la biologie des Plecopteres. **134,** ix, 257-68. **Morstatt, H.**—Zur standischen gliederung und ernahrungsbiologie der Termiten. **41,** xi, 9-16. **Tillyard, R. J.**—Revision of the family Eustheniidae (Order Perlaria) with descriptions of new g. and sps. **29,** xlvi, 221-36. **Walker, E. M.**—The nymph and breeding place of Aeshna sitchensis. **4,** liii, 221-26.

Davis, W. T.—A new dragonfly from Florida. **19,** xvi, 109-11. **Howe, R. H.**—A new dragonfly from New England. (Oc. Pap. Boston Soc. N. H., v, 19-20.)

ORTHOPTERA. **Hebard, M.**—The janeirensis group of the genus Euborellia, with the description of a new species. (Dermaptera.) **2,** xlvii, 319-24. **Rehn, J. A. G.**—Studies in Costa Rican Dermaptera and Orthoptera. I. Two new genera and three new species of Dermaptera. **2,** xlvii, 307-18.

HEMIPTERA. **Correction.**—Under Hemiptera in the February number, the reference for Porter should be **131,** not 132. **Bergroth, E.**—The first heteropteron from Juan Fernandez. **28,** xlii, 41-5. **Hempel, A.**—Tres novos coccideos. **136,** v, 143-46. **Horvath, G.**—Genera duo nova Scutelleridarum. **109,** xviii, 145-6. **Hussey, R. F.**—Ecological notes on Cymatia americana (Corixidae). **19,** xvi, 131-36. **Jacobi, A.**—Kritische bemerkungen uber die Cercopidae. **111,** 1921, A, 12, 1-65. **Parshley, H. M.**—New England Hemiptera-Heteroptera. II. **4,** liii, 233-39. **Poppius und Bergroth**—Beitrage zur kenntnis der myrmecoiden heteropteren. (So. Amer.) **109,** xviii, 31-88. **d. l. Torre Bueno, J. R.**—Food plant of Cymus discors. **19,** xvi, 136. **Weiss, H. B.**—A summary of the food habits of N. Am. Hemiptera. **19,** xvi, 116-18. **Weise, J.**—Einige neue Promecosoma arten. **111,** 1921, A, 12, 313-15.

Drake, C. J.—On some North and South American Tingidae. **39,** v, 37-43, 48-50.

LEPIDOPTERA. **Bell, E. L.**—Notes on parasites of Epargyreus tityrus. **19,** xvi, 129. **Busck & Heinrich**—Life history of Ethmia macelhosiella. **10,** xxiv, 1-9. **Dyar, H. G.**—New American moths and notes. A note on Bellura gortynoides. **15,** x, 8-18; 50. **Griffiths, G. C.**—The pupal habit of Telea polyphemus. **9,** lv, 38-9. **Rebel, H.**—Eine neue Nymphalide aus Brasilien. **137,** v, 67-8.

Cassino & Swett—Some new species of the genus Pero. Some new Geometrids. **16,** iii, 135-44; 141-50. **Watson, F. E.**—Miscellaneous notes and records of local L. and descriptions of two new aberrations. **6,** xxix, 168-73.

DIPTERA. **Blacklock, B.**—Notes on an apparatus for the individual breeding of mosquitoes. **98.** xv, 473-77. **Bonne-Wenster & Bonne**—A new coloration key for the species of the genus Goeldia. **15,** x, 37-8. **da Costa Lima, A.**—Sobre os Streblideos americanos (Pupipara). **136,** v, 17-34. **Enderlein, G.**—Uber die phyletisch alteren Stratiomyiiden-subfamilien (Xylophaginae, Chiromyzinae, Solvinae, Beridinae und Coenomyiinae.) (Mitteil. Zool. Mus. Berlin, x, 153-214.) **Evans, A. M.**—Notes on Culicidae collected in Venezuela. **98,** xv, 445-51. **Levy, L.**—Contributions a l'etude des metamorphoses aquatiques des dipteres. **134,** ix, 201-28. **MacGregor, M. E.**—The structural differences in the ova of Anopheles maculipennis, A. bifurcatus and A. plumbeus. **98,** xv, 417-26. **Malloch, J. R.**—Exotic Muscaridae. V. **11,** ix, 271-80.

Curran, C. H.—A new western Syrphid. A genus and species of Syrphidae new to Canada. **4,** liii, 258-60; 260. **Dyar, H. G.**—New mosquitoes from Alaska. The American Aedes of the impiger (decticus) group. Note on the male genitalia of Culex coronator and allied forms. **15,** x, 1-3; 3-8; 18-19. **Felt, E. P.**—Mycodiplosis mozettei n. sp. **39,** v, 46. A study of gall midges. VII. **58,** No. 231, 81-240. **Garrett, C. B. D.**—New Tipulidae from British Columbia. **10,** xxiv, 58-64. **Parker, R. R.**—North Am. Sarcophagidae: A new genus and several n. sps. from the southwest U. S. **19,** xvi, 112-15.

COLEOPTERA. Boving & Champlain—The larva of the N. American beetle Zenodosus sanguineus of the family Cleridae. **10,** xxiv, 9-11. **Davis, W. T.**—Cicindela tranquebarica and its habits. Note on Cicindela tascosaensis. **19,** xvi, 111; 130. **Fleutiaux, E.**—Descriptions de deux generes nouveaux de Melasidae de la collection de Museum d'Histoire Nat. de Paris. **99,** 1921, 413-14. **Hopping, R.**—A review of the genus Monochamus. (Cerambycidae.) **4,** liii, 252-58. **Nicolay, A. S**—Corrections and additions to the Leng list of Coleoptera. Family Buprestidae No. 1. **6,** xxix, 173-78. **Pic, M.**—Coleopteres nouveaux de la famille des Hylophilides. **99,** 1921, 415-18. **Schwarz & Barber**—The specific names of two Otiorhynchid weevils of Florida. **10,** xxiv, 29-30. **Van Zwaluwenburg, R. H.**—External anatomy of the Elaterid genus Melanotus, with remarks on the taxonomic value of certain characters. **10,** xxiv, 12-29. **Weiss & West**—Notes on the dodder gall weevil, Smicronyx sculpticollis. **82,** xxii, 63-5. **Wilke, S.**—Beitrage zur systematik und geographischen verbreitung ungeflugelter Tenebrioniden. (Asidinae.) **111,** 1921, A, 12, 248-312. **Woodruff, L. B.**—Lathridiidae in the heart of New York City. **6,** xxix, 178-79.

Dawson, R. W.—New species of Serica (Scarabaeidae). **6,** xxix, 160-68. **Fall, H. C.**—The North American species of Gyrinus. **2,** xlvii, 269-306. **Garnett, R. T. de**—Tableau des especes du genre Buprestis, appartnant a la faune de l'Amerique du Nord et description d'un variete nouvelle. **20,** 1922, 9-13. **Loomis, H. F.**—New species of the coleopterous genus Trox. (Jour. Wash. Ac. Sc., xii, 132-36.) **Notman, H.**—Some new genera and sps. of C. collected at Westfield, Chautauqua Co., N. Y. **6,** xxix, 145-60. **Wolcott, A. B.**—A new sp. of Saprinus from Kansas. **19,** xvi, 119-20.

HYMENOPTERA. Cushman, R. A.—The identity of a hymenopterous parasite of the alfalfa leaf weevil. **10,** xxiv, 64. **Forel, A.**—Quelques fourmis des environs de Quito (Ecuidor). (Bul. Soc. Vaudoise des Sci. Nat., liv, 131.) **Strand, E.**—Zur kenntnis neotropischer Joppinen. **137,** vi, 51-3 (cont.).

Cockerell, T. D. A.—The fossil saw-flies of Florissant, Colorado. **9,** 1922, 49-50. **Gahan, A. B.**—A list of phytophagous Chalcidoidea with descriptions of two n. sps. **10,** xxiv, 33-58. **Rohwer, S. A.**—North American sawflies of the subfamily Cladiinae, with notes on habits and descriptions of larvae. By W. Middleton. **50,** lx, Art. 1.

OBITUARY.

Dr. Thomas Algernon Chapman died at Reigate, Surrey, England, December 17, 1921. He was born at Glasgow, June 2, 1842. He was an M.D. of the University of his native town and was resident physician at institutions at Glasgow, Abergavenny and Hereford until his retirement in 1897. His father, Thomas Chapman (1816-1879), was active in entomology and father and son contributed joint papers to the English entomological magazines in the sixties of the last century. Dr. T. A. Chapman's work was largely on the life-history and genitalia of Lepidoptera, especially the Lycaenidae (1910-1915), *Erebia* (1898), Scoparidae (1911) and *Acronycta*, but he also wrote on the habits and transformations of Diptera (*Atherix* 1866), Coleoptera (*Hylesinus, Aphodius, Scolytus*), Hymenoptera (Oviposition of Sawflies, Chrysids parasitic on *Odynerus, Abdera* and *Bombylius*), etc.

He was a Fellow of the Entomological Society of London since 1891 and many times a Vice President, but could never be induced to accept the Presidency. He was elected a Fellow of the Zoological Society of London in 1897 and of the Royal Society in 1918.

His biographer (W. G. Sheldon) in *The Entomologist* for February, 1922, considers that

Without doubt the late Dr. Chapman was one of the greatest and most scientific entomologists we have ever produced and one who in certain departments must be regarded as the greatest exponent Britain has given the science. . . . Foremost among his remarkable powers was his acuteness of observation; little facts that others would not have noticed were seized upon, their significance realized and important deductions made therefrom. His clear, logical mind and soundness of judgment were of the greatest importance and usually led him straight to the desired goal. . . . His entomological work was carried out in a thorough manner, and every detail carefully studied . . . it was always illustrated profusely with explanatory plates, many of them exquisitely drawn and colored. . . . He was one of the strongest exponents of the doctrine that we cannot satisfactorily classify species by one character alone, no matter whether it is by the ova, larva or pupa stage, or by the structure and markings of the imagine, but that we must take everything into consideration.

(There is also an obituary not'ce in *The Entomologists' Monthly Magazine* for February, 1922, by Mr. G. C. Champion, accompanied by a portrait.)

The Entomologists' Monthly Magazine for January, 1922, announces that *Entomologische Blaetter*, XIII, 1917, contains an obituary notice of Dr. Georg von Seidlitz, known for his writings on Palaearctic Coleoptera. He was born June 19, 1840, in Tschornaja Rjetschka, near Petrograd, and died July 15, 1917, at Irschenhausen, Oberbayern.

The same magazine for July, 1921, contains appreciative notices of Dr. George Blundell Longstaff, author of *Butterfly Hunting in Many Lands*, who died May 7, 1921, in his 73rd year, and who was a substantial benefactor of the Hope Department of Zoology (Entomology) at the University of Oxford.

Other entomologists whose deaths have occurred within the past twelve months but have not been noted previously in the News are Frederick William Lambert Sladen and the Reverend Thomas W. Fyles, obituaries of whom have appeared in the recently issued numbers of *The Canadian Entomologist* for October and November, 1921, respectively. Both men were immigrants to Canada, Mr. Sladen in 1912, Dr. Fyles in 1861. The former was on the staff of the Dominion Department of Agriculture, Division of Entomology, and was perhaps best known for his book, *The Humble Bee, Its Life-History and How to Domesticate it* (London, Macmillan, 1912); he was drowned off Duck Island in Lake Ontario, September 10, 1921.

Dr. Fyles was born at "The Hermitage," Enfield Chase, England, June 1, 1832, and died at Ottawa, August 9, 1921. He was rector and Immigration Chaplain in the Province of Quebec, 1864-1909. His collections were transferred to the Museum in the Quebec Parliament buildings in the latter year. He was the author of 76 papers in the *Reports* of the Entomological Society of Ontario and in other journals (*Canadian Entomologist* from 1882 on), dealing with various groups of insects.

MAY, 1922

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Vol. XXXIII No. 5

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PHILIP P. CALVERT, Ph. D., Editor.
E. T. CRESSON, JR., Associate Editor.
HENRY SKINNER, M.D., Sc.D., Editor Emeritus.

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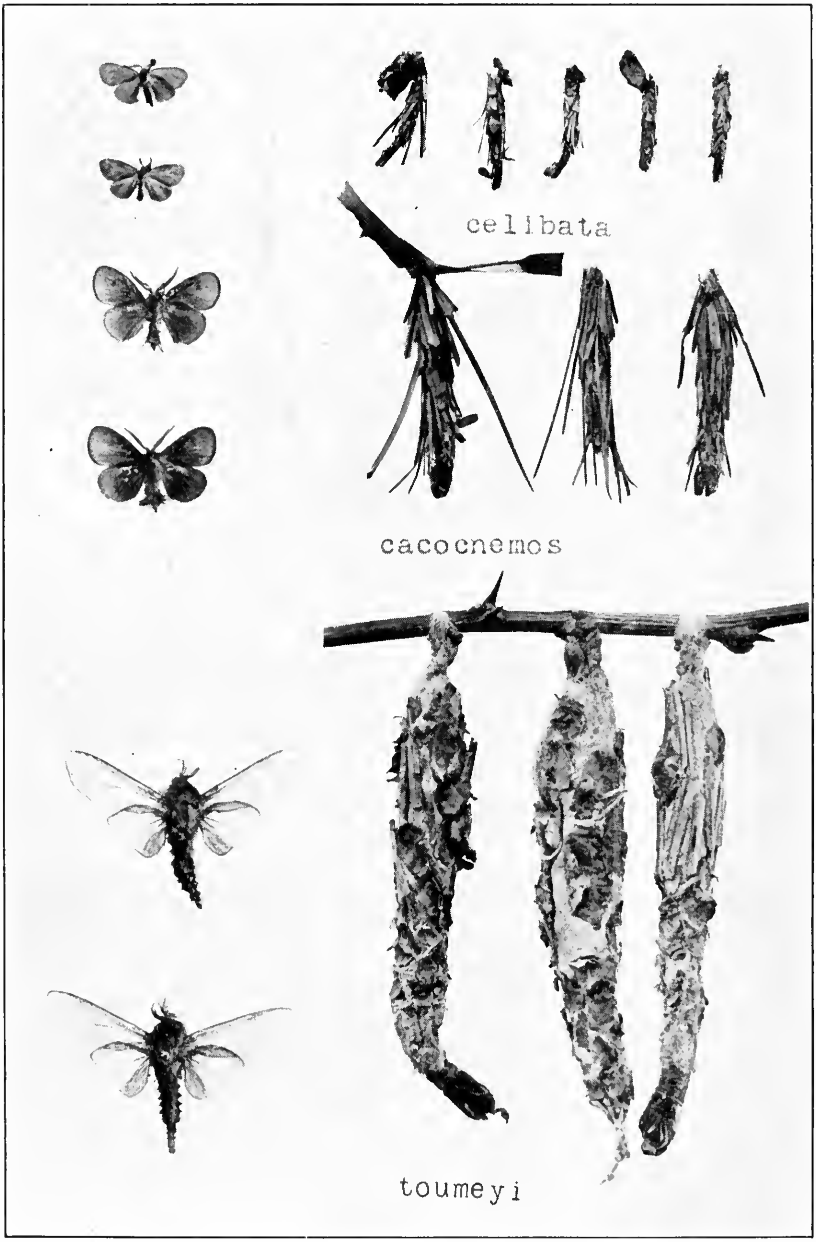


NORTH AMERICAN PSYCHIDAE.—Jones

ENTOMOLOGICAL NEWS
AND
PROCEEDINGS OF THE ENTOMOLOGICAL SECTION
THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

Vol. XXXIII MAY, 1922 No. 5

CONTENTS

Two New Psychids, and Notes on Other Species (Lepidoptera, Psychidae.)

By Frank Morton Jones, Wilmington, Delaware.

(Plates VII, VIII)

Of our North American *Psychidae*, four species, *confederata* Grt., *carbonaria* Pack., *fragmentella* Hy. Edw., and *tracyi* Jones have been referred to *Eurycyttarus* Hampson, originally created as a sub-genus of *Psyche* Schrank for the reception of an insect from the Nilgiri District, India. In this sub-genus the anal vein of primaries sends a single branch to the inner margin, "vein 6" is absent from both wings, and the anterior tibiae are not spurred; in the two species whose descriptions follow, however, and in *tracyi* Jones, the primaries lack even the basal portion of 1*c* (Comstock's 1st anal), a condition not shown in Hampson's illustrations of the venation of *Psyche* or of any of its sub-genera. Since, however, by Hampson's tables, and by that of Neumoegen & Dyar in our own literature, these insects run out to *Eurycyttarus*, and until a detailed comparison with the world-species permits their more accurate placing, it seems best, for the present, to leave them there.

In both 1919 and 1921 the larval cases of one of the new species were found in considerable numbers, attached to tree-trunks, at DeFuniak Springs, Florida. The life-cycle of this insect is apparently similar to that of *confederata* Grt., for in mid-May the larvae creep up from the ground and attach their cases to the bark, preliminary to pupation. Where oaks and pines grow together, oaks are preferred; and the cases are rarely found more than five feet from the ground. From numerous cases gathered about May 20, forty males emerged, but not one female; and since none of the remaining cases contained female pupae, the conclusion seems inevitable that the female larvae must have sought out other and different situations for the suspension of their cases. This habit does not seem to have been recorded for any of our North American *Psychidae*, though it has been noted at length (Hofman, Berl. Entomol. Zeitschr., IV) of European species. For this insect is proposed the name of

Psyche (Eurycyttarus) celibata n. sp. (Plates VII, VIII).

Larval case.—Roughly cylindrical, 15 mm. in length; of coarse texture externally, the material overlaid upon the silken tube consisting of thin flakes of pine bark, and a few short bits of dry pine-needles or fine grass-stems irregularly applied longitudinally and not usually projecting far beyond the extremity of the case.

Larva, just before pupation.—Length, 9 mm.; width of head, .9 mm. White; the chitinized areas of the thoracic segments dark brown, with the usual narrow longitudinal white lines. Head dark brown, almost black, with the front (or at least its upper portion) white; three oblique white bars on each epicranium, the upper and longest extending to the adfrontal sclerite; the frontal punctures inconspicuous, the frontal setae opposite them, and the 2nd adfrontals slightly higher. Prothoracic spiracle not regularly oval, almost as high as wide. Primary body-setae present, as indicated in the illustration.

Pupa of ♂.—Length 6 mm.; dull amber brown, darker dorsally, the eyes dark brown. Front smoothly rounded. The mesothoracic wings extend halfway across the third abdominal segment; the prothoracic legs and the antennae extend almost to the caudal margin of the wings; the mesothoracic legs reach the wing-margin, and the metathoracic legs slightly exceed the margin. Abdominal segments 8, 9 and 10 are curved ventrad; the two caudal hooks are large, each terminating in a sharp thorn. The dorso-cephalic portions of the abdominal segments are finely striated, and from the dorso-cephalic margin of segments 6, 7 and 8 projects a toothed ridge,—the teeth directed caudad,—successively more prominent in the order named, and forming a conspicuous comb-like projection on the 8th segment. The usual dorso-caudal row of fine short spines, their points directed cephalad, occur on abdominal segments 3, 4 and 5. The spiracles are raised above the body surface.

The pupal stage lasts about four weeks.

Adult ♂.—Expanse 10.5 to 12.5 mm. Brownish black, the wings broad and much rounded. Vestiture of head, thorax and abdomen rather long, hairy and erect, with an admixture of white hairs. In dried examples the abdomen rarely exceeds the margin of secondaries. The scaling of the wings is uniform and moderately dense, the costa of primaries narrowly darker. The primaries have 11 veins, the secondaries 7. The venation of ten examples was studied in detail, the primaries showing no significant variation, and the extreme range found in the secondaries is exhibited on Plate VIII, the first figure showing the more usual condition.

Described and illustrated from numerous bred examples; the *type* is in the collection of the author, and paratypes will be distributed. *Type locality*, DeFuniak Springs, Walton County, Florida. Larvae and cases apparently identical were also collected near Wilmington, North Carolina. Dates of emergence (1921) ranged from May 24 to June 22.

The larval cases and larvae of a second and larger species have been turned up at intervals throughout the last few years, from localities ranging from North Carolina to south and west Florida, and by several collectors including the author, who, however, did not succeed in breeding the moth until the autumn of 1921. It proves to be a close ally of *tracyi* Jones. An interesting difference between the two species is in the size of the legs of the adult males, shown, at the same scale, on Plate VIII. This seems to be correlated with a difference in the female cocoons, to which the males must cling in mating. That of *tracyi* (see Entomological News XXII, May, 1911, Plate VI) is wide and blunt at its extremity, while that of the new species is more slender,—or rather, the silken tube is almost bare of thatching material at its lower end. Because of this "weak-legged" condition, for this insect is proposed the name of

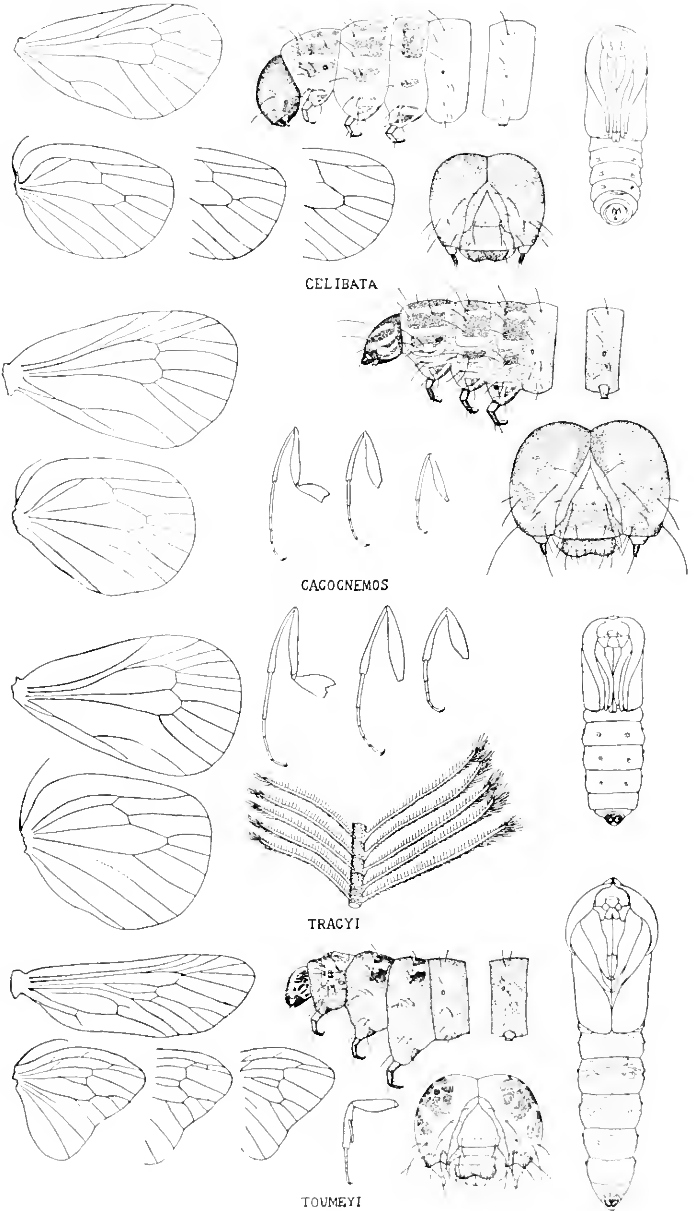
Psyche (Eurycyttarus) cacocnemos n. sp. (Plates VII, VIII).

Larval case.—Length, 25 to 30 mm. Similar in type to that of *tracyi*, but the thatching material,—flat bits of grass or sedge, sometimes slender rush,—is much less evenly arranged and the fragments are less uniform in size. Especially on the case of the ♂, a few much longer pieces, sometimes pine needles, are attached to its upper portion, often projecting beyond the lower extremity of the case. The lower half of the case bears fewer and shorter pieces, usually showing the silken tube in part; and the general effect is of a shaggier, more slender and tapering case than that of *tracyi.*

Larva, last stage.—Length, 15-20 mm.; width of head, 2.1 mm. Pale dull grayish brown; the head and the strongly chitinized portions of the thoracic segments are dark brown with white markings, which are continued less conspicuously on the setal plates of the immediately succeeding abdominal segments, fading out caudally. The pale markings of the thoracic segments consist of the usual narrow longitudinal lines and the margins of the chitinized plates. Though the proportion of light and dark is variable, the conspicuous head-markings usually consist of three oblique bars on each epicranium, in a symmetrical distribution of light and dark areas on the front, and in a horseshoe-shaped band whose arms reach the adfrontal sclerites between the adfrontal setae. The 2nd adfrontal, the frontal puncture, and the frontal seta are almost in line, the latter falling very slightly below a line drawn joining the other two.

Pupa of ♂.—Length 10-11 mm. Structurally similar to that of *tracyi*, but dark chestnut brown in color (*tracyi* is reddish amber), more rugose and less polished than that species. The mesothoracic wings overlap a portion of the third abdominal segment, ventrally; the mesothoracic legs and the broad antennae extend to the wing-margin, and the prothoracic legs almost reach the margin. The cephalic portions of the abdominal segments, especially dorsally, are striately rugose. A short spiny dorso-cephalic ridge, the teeth directed caudad, is present on segments 3, 4, 5, 6, 7 and 8, low and indistinct on 3, 4 and 5, thence progressively more prominent, on 8 expanding into a leaf-like appendage. Segments 3, 4, 5, 6 and 7 each bears a dorso-caudal row of fine short spines, their points directed cephalad. The caudal segments are curved ventrad, each caudal hook terminates in a single thorn, and the abdominal spiracles are raised slightly above the body surface.

Adult ♂.—Expanse, 17 mm. Blacker (less brown) than *tracyi.* The antennae are broadly bipectinate, with 30-34 joints (in the several species examined the number of joints proved variable, and the apparent 3rd joint bearing more than two pectinations was counted as a single joint). As in *celibata* and *tracyi*, the shaft and its pectinations are scaled on one side with semi-appressed hair-like scales. Compared with *tracyi* of approximately the same robustness and wing expanse, the legs are shorter and more slender, the primaries are apically more



NORTH AMERICAN PSYCHIDAE.—JONES.

acute, the secondaries are proportionately longer and narrower. The caudal segments of the abdomen are widely tufted laterally. The end of the cell of primaries is obscurely marked with a vertical black bar. In both species (*cacocnemos* and *tracyi*) the primaries have 11 veins, the secondaries 7, the anal veins of primaries as in *celibata;* the illustrated difference in the radial veins of primaries is not specific, but occurred in both species; in the limited number of examples available for detailed study the differences shown in venation of secondaries were apparently specific.

Adult ♀.—Of the usual grub-like form. Length, living, 11 mm.; the chitinized dorsal portions of the thoracic segments are pale straw-yellow, and the abdominal band of downy hair is very pale dull fawn-color.

Described and illustrated from 5 males and 1 female, bred from larvae collected near Jacksonville, Florida. The author has collected similar cases, some of them containing living larvae, near Wilmington, N. C.; at Summerville, S. C.; at DeFuniak Springs, Walton Co., Florida; other records include Tampa, Florida (E. L. Bell), and Lakeland, Florida (J. A. Grossbeck). The larvae of this insect are found feeding, in open and sunny places, upon sedges, grasses, rushes, sometimes on low growing herbaceous plants, occasionally on shrubs growing among these, and they reach their full growth in spring or early summer. Of 80 larvae brought from Florida to Delaware in early June and confined with growing plants out of doors, where they fed intermittently throughout the summer, only a few survived to pupate in September and October, the moths emerging the same season. *Tracyi*, as far as we have records, emerges in the spring.

The *types* and paratypes are in the collection of the author.

Oiketicus toumeyi Jones (Plates VII, VIII).

In Entomological News XXXIII, 1922, page 12, a new *Psychid* from Arizona was briefly described as *Oiketicus toumeyi*. In mid-April, 1918, the larvae of this insect were found in abundance on locust trees growing along the city streets of Tucson. Some had already spun their cases fast for pupation, others were about to do so, and no early stage larvae were observed. The foliage showed little signs of feeding, and these conditions were interpreted to indicate that this insect hibernates as a full-grown larva. Emergence of the moths took place from June 15 to July 3. It is now possible to publish illustrations of this insect, and some additional descriptive matter:

Larval case.—Length usually from 60 to 70 mm., but occasionally exceeding 100 mm.; diameter at widest part about 10 mm. For pupation usually suspended from a twig by a strong encircling band of silk, below which the case widens abruptly, thence of almost uniform diameter for about two-fifths of its length, then tapers to the lower extremity. It is composed of tough grayish-white silk, of which usually a considerable portion is bare of attached material; this may consist of bits of slender sticks or of leaf-stems, applied longitudinally, or of dry leaf-fragments, or of both of these materials in indiscriminate mixture.

Last stage larvae.—Length 40-60 mm.; width of head 3.9 mm. Dull brown; the head and the chitinized areas of the thoracic segments, less conspicuously the setal plates of the abdominal segments, almost white. The head and the thoracic shields bear foliated markings of dark brown, and most of the setae of the head and thorax arise from dark brown dots. The markings of the head are asymmetrical, though not always to the extent illustrated. A line drawn from the 2nd adfrontals through the bases of the frontal setae also touches the upper margin of the frontal punctures.

Pupa of ♂.—Length 21 mm.; chestnut brown, the head, thorax and wings lighter than the abdomen, which is more conspicuously and striately rugose, especially its dorsal portions. The front terminates in a sharp median ridge with flattened lateral expansions along the epicranial suture. The mesothoracic wings only slightly overlap the third abdominal segment ventrally. The antennae are broad and short, their apices reaching a point midway from the frontal crest to the caudal margin of the wings; the prothoracic and mesothoracic legs reach points respectively two-thirds and three-quarters the distance from the crest to the margin of the wings. The caudal segments are curved ventrad, and the caudal hooks are heavily chitinized, almost black, and bear single thorns. A dorso-cephalic spined ridge, its strong teeth directed caudad, occurs on each of abdominal segments 3, 4, 5, 6, 7 and 8; and a dorso-caudal row of fine bent spines, their points directed cephalad, on each of segments 2, 3, 4 and 5. The abdominal spiracles are produced beyond the surface of the body.

Adult ♀.—Length 24-30 mm. Of the usual form, more nearly resembling the ♀ of *abboti,* rather than that of *ephemeraeformis.* The crest-like medio-dorsal ridge of the thoracic segments is high and sharp, and caudally the body is truncated rather abruptly. The abdominal ring of downy hairs is less abundant in quantity, paler in color, and less evenly distributed than in *abboti.*

The wing-venation of 18 males of *toumeyi* was studied in detail and the more significant variations illustrated, together with the fore tibia with its strap-like appendage. The illustrations of this and other species (Plates VII, VIII) are almost self-explanatory, though it might be noted that no effort was made to indicate the very inconspicuous pupal setae.

The generic references of these four insects are admittedly unsatisfactory; but not only the literature of exotic species, but more complete knowledge and representative series of the insects themselves are requisite for a better understanding of this puzzling and interesting group. "One is compelled to conclude" (Tutt, British Lepidoptera, II, 127, 1900) "that the higher Psychids are almost unknown, so far as their relationships to each other are concerned."

Descriptions of New Genera and Species of the Dipterous Family Ephydridae.—V.*

By Ezra T. Cresson, Jr., Academy of Natural Sciences, Philadelphia, Pa.

Plagiops hinei new species.

Black; antennae, apices of tibiae and all tarsi, yellow. Halteres black. Wings yellowish-hyaline, with extreme base blackened. Sculptering of frons and face medianly, strongly granulose, that of mesonotum and scutellum in form of minute pits. Face with the broad parafacialia yellowish. Abdomen and face somewhat metallic green. Length 2.3 mm.

Type.—♀; Puerto Barrios, Guatemala, March 3-14, 1905 (J. S. Hine). [Ohio State University Collection.]

Peltcpsilopa schwarzi new species.

Black; antennae, including arista, tibiae and tarsi, yellow. Halteres black. Entirely highly polished, metallic blue, green or purple Wings yellowish; extreme base blackened. Length 2 mm.

Type.—♂?; Cayamas, Cuba, May 16 (E. A. Schwarz). [U. S. N. M., No. 25309.] *Paratype.*—1 ♂?; topotypical.

Ceropsilopa dispar new species.

Black; apices of tibiae and all tarsi yellow. Halteres white. Wings hyaline with pale veins. Shining species; face polished. Frons with a narrow transverse depression above antennae. Face weakly convex, not prominent medianly. Length 1.75 mm.

* For paper IV see Ent. News, xxviii, 340-341, 1917.

Type.—♀; San Diego County, California, March 12, 1907. [Washington State College Collection.] *Paratype.*—1 ♀; San Diego, California, June 30 (M. C. Van Duzee).

Ceropsilopa coquilletti new species.

Legs, including coxae and apices of tarsi, yellow. Shining to polished with little or no metallic tints. Face narrow, strongly, transversely convex, and transversely sculptured, especially on lower portion, giving it a subopaque appearance. Length 2.75 mm.

Type.—♀?; Pacific Grove, California, October 7, 1906 (J. C. Bradley). [Cornell University Collection.] *Paratypes.*—2 specimens; topotypical.

LEPTOPSILOPA new genus.

This genus is proposed for the reception of those *Psilopa*-like species having a sculptured, more or less transversely wrinkled face; facial bristles high, about middle of facial profile, and the black fore tarsi noticeably thickened.

Genotype.—*Psilopa similis* Coquillett, 1900.

Leptopsilopa lineanota new species.

Very similar to *similis* Coq. with its fore coxae, middle and hind femora pale, but differs from that species by the infuscation of the wings occupying the first posterior cell except its base. The wings are narrow, pointed. Length 2.25 mm.

Type.—♂; Paraiso, Canal Zone, Panama, February 7, 1911 (A. Busck). [U. S. N. M. Coll., No. 25310.] *Paratypes.*—1 ♂, 2 ♀; topotypical. 1 ♀; Corazal, Canal Zone, Panama.

Leptopsilopa subapicalis new species.

Very similar to *similis*, but the distal infuscation of the wings is confined to a narrow, subapical fascia at the tip of the second vein; fore coxae, middle and hind femora pale. Length 2.5 mm.

Type.—♀; Port of Spain, Trinidad (Ujhelyi). [Hungarian National Museum Collection.] *Paratype.*—1 ♀; topotypical.

Leptopsilopa nigricoxa new species.

Simulating *subapicalis*, but the fore coxae are black and the fore femora pale; wings distinctly maculate. Length 2.5 mm.

Type.—♂; Asuncion, Paraguay, 1905 (Vezenyi). [Hungarian National Museum Collection.] *Paratypes.*—1 ♂, 1 ♀; topotypical.

Psilopa skinneri new species.

Similar to *fulvipennis* Hine, but the head is not so broad, and the mesonotum and scutellum more convex and scarcely sculptured. Head, thorax and abdomen, coxae, femora and halteres black. Face flattened, not highly polished, with a sparsely polliniferous median stripe. Wings yellowish with dark base. Length 2.5 mm.

Type.—♀ ?; Guantanamo, Cuba, February 10, 1914 (Henry Skinner). [A. N. S. P., No. 6346.] *Paratypes.*—2 ♀ ?; topotypical.

Psilopa olga new species.

Very similar to *P. leucostoma* Meigen of Europe, which also occurs in our fauna. In the present species the antennae and legs except the tarsi are black. The wings have a distinct fuscous spot at the tip of the third vein and a faint one at the tip of the fourth.

Type.—♂; Olga, Washington, July 26, 1909 (A. L. Melander). [Washington State College Collection.] *Paratypes.*—2 ♂, 2 ♀; topotypical.

Psilopa dimidiata new species.

Very similar to *Psilopa olga*, but less polished; face more shining with scarcely noticeable white pollen, and in profile more convex; cheeks narrower; wings at most with traces of spots at tips of veins. Length 2 mm.

Type.—♂; Chatcolet, Idaho, August, 1915 (A. L. Melander). [Washington State College Collection.] *Paratypes.*—3 ♂, 6 ♀; topotypical.

Trimerina adfinis new species.

Black; antennae except third joint above and apices of tarsi, yellow. Middle and hind femora and hind tibiae somewhat brownish. Palpi brownish. Halteres white. Wings brownish; cross veins clouded, and brown spot at tip of submarginal cell. Shining, at most thinly grayish or brownish pruinose. Face subopaque, grayish white. Mesonotum and scutellum faintly and minutely punctured. Latter noticeably bronzed. Head in profile flattened, with frons and face nearly vertical. Face long; median area transversely convex, with two bristles each side. Mesonotum without prescutellars, but with setulae distinctly seriated. Abdomen with lateral margins revolute. Length 2 mm.

Type.—♀; Kaslo, British Columbia, February ? (R. P. Currie). [U. S. N. M., No. 21843.] *Paratype.*—1 ♀; topotypical.

Discocerina aliena new species.

Black, with bases of tarsi pale. Halteres white. Wings hyaline, with dark veins. Shining to polished; frons more obscured, brownish, becoming whitish anteriorly. Face opaque, silvery or white, flattened below, or with slight median swelling; foveae shallow; one bristle present at slightly below middle of profile; parafacials linear. Length 3 mm.

Type.—♂; Berkeley, Alameda County, California, February 23, 1908 (Cresson). [A. N. S. P., No. 6347.] *Paratypes.*—2 ♂, 1 ♀; topotypical.

Enallagmas Collected in Florida and South Carolina by Jesse H. Williamson with Descriptions of Two New Species (Odonata, Agrionidae).

By E. B. Williamson, Bluffton, Indiana.

(Continued from page 118)

The male of *concisum* runs out in Calvert's key to *pictum*, which species it resembles very closely, the only reliable character for their separation I have detected being in the distinctly longer and differently shaped abdominal appendages of *concisum*. A small color difference seems to be constant: in *pictum* the second lateral thoracic black stripe is abruptly narrowed at three-fourths or two-thirds its length to narrow line for the anterior fourth or third of its length; in *concisum* the stripe widens almost uniformly from its most anterior end to the posterior end.

In Calvert's key to the known females of the group, *concisum* has the wide black humeral stripe of his first division, but due to the shortening of the mesostigmal lamina (hence the specific name), the meeting of the black stripe and the lower end of the mesostigmal lamina is by a point only. *Concisum* would then run out to *pictum*, from which species it is separated in the following key which is supplementary to Calvert's key.

In *concisum* (and *pictum*) the pale colored legs of the female, with the femora conspicuously dark on the dorsum, are in marked contrast with the orange, and entirely unmarked, legs of the male. Also it is a curious fact that in *concisum*, where the male abdominal appendages are conspicuously longer than in its near ally, *pictum*, the female mesostigmal laminae, which these appendages grasp, in *concisum* are much shorter than in *pictum*, but in the single female of *concisum* I have seen there is on either mesinfraepisternum, near its upper edge, and below the lower edge of the mesostigmal lamina, a distinct small round contact point which, in all likelihood, is engaged, during mating, by the supero-internal subapical hook of the superior appendage.

Key to known female Enallagmas of the pollutum group.

1. Black humeral stripe not touching the lower end of the mesostigmal lamina, pale antehumeral stripe wider than the black humeral, second lateral thoracic suture with a black stripe on its uppermost fourth or fifth only. .... *vesperum*

1'. Black humeral stripe touching the lower end of the mesostigmal lamina 2

2(1'). Dorsum of segment 10 pale colored......................... 3

2'. Dorsum of segment 10 black; prothoracic dorsal pits small, each with a small pale area anterior and adjacent to it.............. 5

3 (2). Prothoracic pits large, situated near the anterior border of the middle lobe, a pale area posterior and external to each. Mesostigmal lamina black, a pale stripe from and including the dorsal tubercle downward and forward across the lamina; the lower end of the lamina deeply indenting the mesinfraepisternum, *signatum*

3'. Prothoracic pits smaller, situated at or near the mid-length of the middle lobe, pale color adjacent to each more extensive anterior to it or to its level, rather than posterior to it........................ 4

4 (3'). Mesostigmal lamina barely touching the mesinfraepisternum. Anterior end of the antehumeral pale stripe bordered with a broad stripe of black on the mesostigmal lamina, which black widely separates the antehumeral stripe from the pale vertical stripe on the lamina.................................... *sulcatum*

4'. Mesostigmal lamina slightly but distinctly indenting the mesinfraepisternum. Antero-mesal end of the antehumeral pale stripe very narrowly separated by black from the extensive pale area of the mesostigmal lamina................................ *pollutum*

5 (2'). Prothoracic dorsal pits situated anterior to the middle of the middle lobe. Dorsal tubercle of the mesostigmal lamina pale colored, from which a narrow pale stripe runs downward and forward across the lamina; posterior to this pale stripe the lamina is broadly black, grooved, and with its lower end very slightly indenting the mesinfraepisternum; the extensive black on the lamina widely separates the lower end of the pale antehumeral stripe from the pale stripe on the lamina, or, to express it in possibly a better way, the dorsal and humeral black stripes are broadly joined by a black bar across the mesostigmal lamina, *pictum*

5'. Prothoracic dorsal pits situated at about mid-length of the middle lobe. Dorsal tubercle of the mesostigmal lamina pale colored, from which a pale line extends downward to or nearly to the lower end of the lamina, the lower half of this pale line expanded to cover the lamina to its anterior border; apparently the mesostigmal lamina, the ventral mesostigmal plate and the mesepisternum converge to a point on the edge of the mesinfraepisternum (see paragraph, middle of page 374, Calvert, loc. cit.); dorsal and humeral black stripes narrowly joined by a black stripe on the mesepisternum-mesostigmal lamina suture .... *concisum*

Enallagma signatum Hagen. Fort Myers, Florida, March 4 and 11, 1921, 3 ♂; Enterprise, Florida, April 16 and 20, 1921, 2 ♂, 1 ♀, all by J. H. Williamson. At Fort Myers the specimens were collected on a small creek just west of a cemetery about half a mile east of town. At Enterprise the specimen taken April 20 was captured at a small swamp on the south side of the railroad one mile east of the station.

In these Florida specimens the male superior appendages are in every case slenderer than in all other specimens I have seen.

Enallagma pollutum Hagen. Miami, Dade County, Florida, Everglades, January 23, 1899, S. N. Rhoads, 3 ♂; Fort Myers, Labelle, Moore Haven, Palmdale and Enterprise, Florida, for dates see first paragraph of this paper, J. H. Williamson, 313 ♂, 104 ♀, a few tenerals and many pairs taken in copulation, most of the specimens taken at Fort Myers, Moore Haven and Palmdale, while at Labelle and Enterprise the total catch for both stations was 9 ♂ and 4 ♀.

At Fort Myers, Mr. Williamson noted: "Taken along shady stretches of a small, mucky-bottomed creek where it flows through orange groves. Easily caught as they rested on green vegetation at the water's edge." At Moore Haven he noted: "Taken in large numbers along sun-exposed drainage ditches; vegetation in water and on ditch banks scanty." And at Palmdale: "Frequented floating, grass-like vegetation in shallow, running water at shaded parts of Fisheating Creek." Generally the Enallagmas of the *pollutum* group are lake or pond species; *pollutum* however seems to prefer streams.

A pair taken March 30, 1921, at Moore Haven is preserved with the male appendages in position grasping the female. In these specimens, the apices of the male inferior appendages are just above the dorsal prothoracic pits of the female, and confirm Dr. Calvert's suggestion that the appendages, in copulation, engage the pits. The externo-superior branch of the superior appendage grasps the mesostigmal lamina of the female, the anterior raised border of the latter fitting in the concavity between the externo-superior branch and the internoinferior lamella of the superior appendage, the latter lamella of which overlaps and engages the anterior border of the mesostigmal lamina.

In tenerals of both sexes the yellow or orange color of adults is replaced by pale blue, yellowish appearing first on the face and frons. Abdominal segment 9 of the female has the dorsal black of nearly uniform width in nearly every case, rarely the apical third or fourth is abruptly narrowed and more rarely the dorsal black is triangular in shape, but, as indicated by Hagen's original description and contrary to Calvert's description (p. 378, loc. cit.), the black may not reach the apex of the segment by a distance of sometimes as much as nearly one-third the length of the segment, though usually the color is as described by Calvert. The pale postocular spots in both sexes are also not constant and I have seen males in which the spots might properly be described as more nearly linear than cuneiform.

In Hagen's original description of the male *pollutum*, abdominal segment 9 and the sides of 10 are blue. This is true only of very teneral specimens. Dr. Calvert arrived at his determination of *pollutum* by sending drawings and notes to Mr. Banks for comparison with the Hagen types. To further confirm the matter I sent specimens to Mr. Banks, who carefully compared the Fort Myers specimens, collected by Mr. Williamson, with the seven specimens in the Hagen collection. Mr. Banks not only compared the abdominal appendages but carefully checked the color patterns of head, thorax, legs and abdomen, and he writes that the two sets of specimens are identical, and that the "blue" of segment 9 is certainly an error.

In a letter of November 6, 1921, Dr. Calvert writes: "Laurent recently sent me some *E. pollutum* he took at Gunntown, Florida, last March, one male of which had a pair of orange stripes, transverse to the main axis of the body, on the disk of the nasus and orange twin spots on the dorsum of the mid prothoracic lobe as in the female; pale antehumeral and black humeral stripes each .37 wide at midheight. Abdomen ♂ 28, ♀ (in copulation therewith) 27; hind wing ♂ 17.5, ♀ 19."

Enallagma vesperum Calvert. Palmdale, Florida, April 7, 1921, 1 ♀; Kathwood, Aiken County, South Carolina, May 4 and May 5, 1921, 2 ♂, 1 ♀, all by J. H. Williamson.

The South Carolina specimens were sent to Dr. Calvert who pronounced them *vesperum*. The Palmdale female is certainly identical with the Kathwood female. Of one of the Kathwood males Dr. Calvert writes: "This male is a gynandromorph in so far as the mid prothoracic lobe is concerned, having asymmetrical pits."

Enallagma geminatum Kellicott. Kathwood, Aiken County, South Carolina, May 5, 1921, 22 ♂, 11 ♀, J. H. Williamson.

The dorsal prothoracic pits of the female first figured by Garman, but not mentioned in his text (Bulletin Ill. State Lab. Nat. Hist. Vol. XII, 1917), and first discussed by Calvert (Gundlach's Work on the Odonata of Cuba, 1919), are present, in addition to the species of the *pollutum* group, in *geminatum*, *hageni*, *recurvatum* and possibly in others, certainly, in a modified form, in others.

Enallagma divagans Selys. Kathwood, Aiken County, South Carolina, April 29-May 9, 1921, J. H. Williamson, 35 ♂, 7 ♀.

Enallagma exsulans Hagen. Enterprise, Florida, April 15, 1921, 2 ♂; Kathwood, Aiken County, South Carolina, April 29 and May 4-7, 1921, 41 ♂, 19 ♀; all by J. H. Williamson.

Enallagma doubledayi Selys. Enterprise, Florida, April 18, 19, 20, 21, 22 and 25, 1921, 178 ♂, 20 ♀; Kathwood, Aiken County, South Carolina, April 29, 1921, 1 ♂; all by J. H. Williamson.

At a five acre swamp, about three-eighths of a mile from Gleason's Pond, near Enterprise, Mr. Williamson noted: "Very abundant in a swampy tract, water and muck half-knee deep, grown up with scattered bushes, waist to shoulder high. This species and *Erythrodiplax minusculum* were so numerous they were a nuisance. *Lestes vidua* was hard to see." Elsewhere in his notes he remarks that *E. doubledayi* was much rarer at the four ponds about four miles east of Enterprise, and from a quarter to a half a mile north of the railroad, than at the ponds and swamps north of town.

Enallagma durum Hagen. Labelle, Florida March 25 and 26, and Enterprise, Florida, April 16 and 20, 1921, 8 ♂, 1 ♀, J. H. Williamson.

At Labelle Mr. Williamson noted: "Rested on reed tips in the river or flew swiftly over the river close to the water's surface." And at Enterprise: "Flies over Lake Monroe, close to the surface, and occasionally alighting on reeds." Crossing

Lake Okeechobee on motor launch on April 9: "Tenerals of *E. durum*, *E. pollutum* and *Ischnura ramburii* were found resting on railings and woodwork on the boat."

Enallagma cardenium Hagen. Miami, Dade Co., Florida, January 24, 1899, S. N. Rhoads, 5 ♂; St. Petersburg, Florida, April 16, 1908, Mrs. C. C. Deam, 1 ♂; Fort Myers, Labelle, Palmdale and Enterprise, Florida, for dates see first paragraph of this paper, J. H. Williamson, 111 ♂, 8 ♀; 75 ♂ and 6 ♀ of the above catch were taken at Ft. Myers.

The form of the male superior appendage is practically identical in all the Florida specimens I have seen. In supero-internal view the inferior lamella is about like Calvert's figure 40a while the superior branch is slender, like his figure 44a, but apically hooked as in figure 38a. Males vary in size from abdomen 26 to 30, and in some the wings are slightly brown tinged.

This species is dull and quite un-Enallagma-like in color. Moreover there is an almost universal loss or obscuring of color due to postmortem changes in preserved material. Mr. Williamson made the following notes on living colors: "Eyes largely black, paler beneath; postocular spots dull violet gray. Thorax dull violet, marked with dark stripes, the middorsal stripe metallic black. Abdominal pale markings same shade of dull violet as the pale color of thorax."

At Palmdale Mr. Williamson noted: "Frequented floating water hyacinths in running water, sandy-bottomed stretches of Fisheating Creek."

A male taken at Ft. Myers on March 4, 1921, has an ant's head firmly attached by the mandibles to the left middle tarsus at about one-third its length. This specimen was sent to Dr. F. M. Gaige, who reports that the head is a male *Pseudomyrma* species. Dr. Gaige informs me that the males are all winged and that most of the species are arboreal. It is possible the dragonfly may have seized the ant in the air or the attack may have been made when the ant was running about over vegetation. Dr. Gaige has also identified the head and thorax of another ant attached to the legs of a *Hetaerina laesa* from British Guiana. In this case the ant is a *Pheidole* species, and the head and thorax belong to a minor worker. Dr. Gaige writes that many species of *Pheidole* forage on vegetation to the height of several feet and that they are "pugnacious little devils." Such an ant might conceivably seize a resting dragonfly by its legs, but I have little doubt that the dragonfly was the aggressor and that it plucked the ant from its perch, and the ant retaliated by seizing a leg in a death grip. I have elsewhere recorded tropical dragonflies with heads of stingless bees attached to their legs.

New North American Coleoptera.

By A. B. Champlain and J. N. Knull, Bureau of Plant Industry, Harrisburg, Pa.

The following paper presents a number of apparently undescribed species in our collection. The specimens were not taken in any particular region, but represent material collected and received from various sources, as indicated in each description.

We are indebted to Prof. H. C. Fall, who has been of great assistance to us in examining specimens, and for his opinions in regard to the material; also to Dr. Henry Skinner and E. T. Cresson, Jr., for the use of the Horn collection.

Chrysobothris woodgatei n. sp.

Robust, depressed, piceous, elevated spaces shining, ventral surface with coppery bronze lustre. Head densely punctate and rugose, with long white pubescence. Clypeus broadly emarginate at middle, arcuate each side. Antennae coppery bronze, third joint longer than following joints, joints four to eleven, gradually narrowed.

Prothorax twice as wide as long, widest in front of middle, obliquely narrowed in front, arcuately narrowed toward base, surface convex, a deep median densely punctate sulcus; a broad, smooth, slightly elevated space on each side, a narrower sinuous elevated space nearer to the side, the surface otherwise coarsely and densely punctured, punctures with long white hairs. Scutellum small, triangular.

Elytra wider than prothorax, widest back of middle, sides parallel near base, sinuate in middle, rounded on posterior third to broadly rounded apices, lateral margin serrulate along its entire length, disk convex, first costa expanded into a smooth area on basal half, apical half a raised line, second and third costae somewhat interrupted into broad, smooth sinuate areas, fourth costa a raised line parallel to lateral margin, intervals very densely and finely punctate.

Prosternum lobed in front, pubescent, with median smooth area. Last ventral segment of abdomen serrulate along margin, submarginal ridge not well marked, abdomen densely and irregularly punctate.

Length 14 mm.

♂. Last ventral segment with a semi-circular emargination, anterior tibia arcuate, with a lamina on the inside near tip, forming an abrupt dilation, middle tibia similar to the first, but tooth not as pronounced, posteror tibia straight.

♀. Last ventral segment with a narrow emargination, anterior tibia arcuate, dilate at tip, but without a tooth.

Described from one male and two females collected at Jemez Springs, New Mexico, in July, by John Woodgate, in whose honor the species is named. *Type* material in authors' collection.

According to Horn's* table, this species would come near *C. quadrilineata* Lec.

Mastogenius castlei n. sp.

Head and prothorax bright metallic blue, elytra metallic green, cupreous along costal margin, a piceous spot in middle which extends posteriorly along suture, ventral surface including legs aeneous. Head convex, impressed in front, coarsely and densely punctate, eyes small, coarsely granulate. Antennae aeneous, serrate from the fourth joint, first and second joints globose, third joint narrow, elongate, shorter than the fifth and about half as long as fourth.

Prothorax wider than long, widest a little back of middle, sides arcuate, more strongly rounded anteriorly, surface convex, coarsely punctate.

Elytra as wide at base as basal line of prothorax, widest back of middle, side margins parallel at base, sinuate in middle, apices rounded, surface coarsely punctate.

Abdomen sparsely punctate. Posterior margin of hind coxal plate broadly emarginate.

Length 3 mm.

Described from one specimen collected at Miami, Florida, May 4, by Dr. D. M. Castle, in whose honor the species is named. *Type* in authors' collection.

According to Schaeffer's† key, this species should follow *Mastogenius puncticollis* Schaef.

Idoemea bicolor n. sp.

Slender, elongate, pubescent, testaceous; head orange in color. Head wider than prothorax, vertex impressed. Eyes large, coarsely granulate, narrowly separated on vertex, deeply emarginate, upper portion smaller than lower. Antennae eleven-jointed, nearly twice as long as body, covered with short dense pubescence which becomes sparse and

* G. H. Horn Trans. Amer. Ent. Soc. XIII, 1886, p. 85.

† Chas. Schaeffer—Jour. N. Y. Ent. Soc. V. 26, 1918, p. 214.

longer near base, scape stout, with small concave cicatrix near outer apical margin, second joint very small, remaining joints about equal in length and gradually tapering.

Prothorax cylindrical, dilate at middle, longer than wide, surface unevenly punctate, and with long pubescence, on each side, a dorsal smooth area, and two protuberances, one basal and one lateral.

Elytra wider than prothorax, three-fourths the length of the abdomen, narrowed posteriorly, apices rounded, surface coarsely and unevenly punctate, covered with fine pubescence.

Abdomen sparsely punctate, with short pubescence. Legs with long pubescence.

Length 9 mm.

Described from one specimen collected at Jemez Springs, New Mexico, in August, by John Woodgate. *Type* in authors' collection.

Elaphidion albomaculatum n. sp.

Form of *Elaphidion irroratum* L., brunneous, marked with dense patches of white pubescence. Head with front irregularly punctate, vertex transversely strigate, eyes prominent, coarsely granulate, emarginate, a patch of dense white pubescence in emargination, another patch beside each eye on vertex. Antennae about one-half longer than elytra in male, only slightly longer than elytra in female, eleven-jointed, third, fourth, fifth, sixth and seventh joints bearing a moderate spine on inside, outer joints finely pubescent, punctate.

Prothorax longer than wide, cylindrical, widened in the center, constricted at apex and base, surface irregularly punctate and pubescent, with an irregular smooth callus in center, and another on each side in front and to the rear, also three similar areas along each side; a round patch of dense white pubescence on each side back of anterior margin, another elongate downwardly deflected patch on each side at base, and a small patch in front of scutellum. Scutellum triangular, covered with dense white pubescence.

Elytra wider than prothorax, sides nearly parallel, apices truncate, spinose on the outer side, surface irregularly punctate, punctures becoming obsolete near apex, covered with short pubescence intermixed with longer hairs, marked with irregular patches of dense white pubescence.

Sides of meso, and metathorax, and segments of abdomen with patches of dense white pubescence; abdomen sparsely punctate, pubescent.

Length 13 mm.

Described from three males and one female collected at Miami, Florida, on April 2, by J. N. Knull. *Type* material in authors' collection.

Elaphidion (Anepsyra) delongi n. sp.

Form and color of *Elaphidion (Aneflomorpha) subpubescens* Lec. Head densely and irregularly punctate. Eyes prominent, coarsely granulate, emarginate. Antenna about a third longer than elytra in the male, slightly longer than elytra in the female, eleven-jointed, pubescent, pubescence longer toward base, third joint with a spine about half the length of the fourth joint, fourth joint with a shorter spine, fifth with small spine.

Prothorax cylindrical, longer than wide, surface densely and irregularly punctate, with a median smooth callus on basal half, long flying hairs numerous. Scutellum densely pubescent.

Elytra wider than prothorax, sides nearly parallel, apices bispinose, surface densely and regularly punctate, each puncture bearing a long white hair, punctures becoming less prominent posteriorly.

Abdomen finely punctate, pubescent.

Length 13 mm.

Described from a male and a female collected at Miami, Florida, on April 3 and April 12 respectively, by D. M. DeLong, in whose honor the species is named. *Type* material in authors' collection.

Anthophilax quadrimaculatus n. sp.

Brunneous, elytra ochraceous, with two piceous spots on each side. Head coarsely and irregularly punctate on vertex, more finely punctate on front. Eyes finely granulate, emarginate. Mandibles long, dark at apex. Antennae eleven-jointed, extending beyond two-thirds the length of the elytra, scape stout, second joint very small, third joint shorter than first, but longer than fourth, fifth joint longer than any preceding joint, remaining six joints approximately equal in length to the fifth.

Prothorax longer than wide, acute lateral tubercle at middle, a deep transverse depression near anterior and posterior margins, base trisinuate, surface deeply and irregularly punctate with median callus, and also a transverse callus near basal margin. Scutellum small, triangular, finely and densely punctate.

Elytra wider than prothorax, sides nearly parallel, rounded in apical fifth to obliquely truncate apices. Surface densely irregularly punctate on basal half, becoming extremely fine toward apex. Color ochraceous, a lateral piceous spot behind humeral angle, and another in middle of elytron.

Abdomen densely punctate and pubescent.

Length 16 mm.

Described from a female specimen collected at Rock Bridge, Ohio, in June, by Robert J. Sim and C. J. Drake. *Type* in authors' collection.

According to Nicolay's* key, this species would fall next to *A. subvittatus* Casey.

Atimia huachucae n. sp.

Piceous, legs and antennae brunneous, covered with coarse luteous pubescence, with some denuded spots on head, prothorax and elytra. Head convex, covered with luteous pubescence, with the exception of a median denuded stripe. Eyes finely granulate, emarginate. Antennae finely pubescent.

Prothorax wider than long, quadrate, disk convex, irregularly densely punctate, covered with luteous pubescence, which becomes sparse, forming a fine central dark area and two rather broad dorsal and lateral vittae. Scutellum quadrate, covered with dense luteous pubescence.

Elytra with sides gradually converging to obliquely truncate apices, surface irregularly punctate, covered with dense luteous pubescence, with numerous irregular smooth, round, denuded areas.

Ventral surface and legs with short luteous pubescence.

Length 9 mm.

Type and *paratype* collected at Cooney, New Mexico, and Huachuca, Arizona, respectively, in the collection of H. W. Wenzel. One paratype collected at Paradise, Arizona, by H. H. Kimball, in authors' collection.

This species resembles *Atimia confusa* Say, but can be distinguished easily from this species by the round denuded areas on the elytra.

Leptostylus floridanus n. sp.

Resembling *Leptostylus argentatus* Duv. in form and color. Head clothed with gray pubescence. Eyes coarsely granulate, emarginate. Antennae eleven-jointed, slightly longer than elytra, mottled between annulations.

Prothorax wider than long, with a well developed lateral tubercule, disk convex, with a median raised area on basal half, and two similar areas on each side, surface covered with dense silvery-white pubescence, pubescence darker in front of scutellum, and a faint line on each side. Scutellum densely clothed with silvery-white pubescence.

Elytra wider than prothorax, sides parallel near base, widened on basal half, rounded anteriorly to obliquely emarginate apices, each elytron with three somewhat interrupted raised lines bearing tubercules, and also a row along suture, surface deeply and evenly punctate, clothed with dense silvery-white pubescence on basal two-thirds, apical third and a small patch back of scutellum darker, a piceous stripe running parallel to costal margin from humeral angle to apex, deflected obliquely on basal

* A. S. Nicolay—Jour. N. Y. Ent. Soc. V. 25, 1917, p. 38.

half toward suture, on apical third a second oblique stripe running parallel to the first, and extending from costal margin to suture, a short oblique stripe in center diverging from suture to first raised line.

Femora strongly clavate.

Length 9 mm.

Described from one specimen collected on *Pinus caribaea* at Miami, Florida, on April 3, by J. N. Knull. *Type* in authors' collection.

Some Coccidae Found on Orchids (Hom.).

The following Diaspine Coccidae, found on greenhouse orchids, are of interest on account of the locality and, excepting the first, new host-plant records.

Aonidia pseudaspidiotus (Lindinger).

Parlatoria pseudaspidiotus Lindinger, Insekten Börse, XXII (1905), p. 131.

Female scale about 1.4 mm. diameter, circular or slightly oval, slightly convex; first skin a little to one side of middle, strongly green, varying to cream-color; second skin concealed, enclosing female, dense and chestnut red, but covered with pale secretion, so that in the scale the area around the first skin is whitish; outer part of scale purplish-black, but the thin margin whittish. No thick ventral film.

Female circular, without lateral incisions or projections; three pairs of well-formed lobes, and a fourth small tooth-like one; median lobes widely separated, trilobed; second and third lobes bilobed, the outer lobe small; spines ordinary, small; squames strongly fimbriate, those beyond the third lobe mostly very large, subtriangular; large transverse thickenings below the interlobular intervals; no circumgenital glands; anal orifice elongate, with thickened margins; mouth parts very large.

On stems of *Vanda teres* Lindley, found by Mr. S. Knudsen in a greenhouse at Boulder, Colorado. The orchid belongs to the Indian region, and the scale is undoubtedly an Oriental species.

This species appears to be closely related to *Aonidia crenulata* Green (*A. ebeni* "Green," Leonardi), and in spite of its great resemblance to such species as *Parlatoria pergandei*, I think it is properly an *Aonidia*. *A. pseudaspidiotus* was found on an orchid at quarantine at the port of San Francisco, several years ago.*

Chrysomphalus dictyospermi (Morgan).

On *Coelogyne cristata* Lindley, infesting the leaves. Greenhouse at Boulder, Colorado.

Diaspis boisduvalii Signoret.

On *Laeliocattleya* hybr. *victoriae* ("Queen Victoria," hort.) and *Odontoglossum rossii* Lindley. Greenhouse at Boulder, Colorado.—T. D. A. Cockerell, Boulder, Colorado.

* B. B. Whitney, Monthly Bull. Calif. Comm. Hort., July, 1913, p. 583. *Parlatoria mangiferae* Marlatt, apparently the same species as that from *Vanda*, was found on mango, not on orchids. Macgillivray places *mangiferae* and *pseudaspidiotus* (as distinct species) in his genus *Genaparlatoria*.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., MAY, 1922.

The Conservation of Natural Conditions.

The activities of many entomologists are directed toward the destruction of insects on as large a scale as their ingenuity and the material resources at their command will permit. When the insects so destroyed are operating against human life, health, food, clothing, shelter and enjoyment, we applaud the efforts of our economic colleagues. In earlier days in this country we generally approved of the killing of various reptiles, birds, mammals and men who similarly threatened our lives and our property. Later, a portion at least of the American people recognized that some of these animals, including the human species, were, for various reasons, worth saving, especially in those cases where their destruction touched our personal and financial interests. Similar reasons have very lately led to movements for the conservation of forests.

It is well worth considering whether many of our interesting insects are not being threatened with extermination as a consequence of the destruction of the environment on which their existence depends. The fate of some of the British butterflies is an indication of what may happen here. Various movements for the conservation of natural conditions are under way, without respect to financial or commercial considerations but with regard to our intellectual, recreational, esthetic, moral and spiritual advancement. To all such efforts, the support of entomologists should be forthcoming without delay.

Mulford Biological Exploration of the Amazon Basin. News Bulletin No. 7.

The safe return on Feb. 26th of Dr. H. H. Rusby, Director of the Mulford Biological Exploration, was an occasion for rejoicing on the part of his many friends throughout the country.

Cable messages have just brought the information that the other scientists of the Mulford Exploration, who have put in four months of hard work in the Bolivian and Brazilian forests since the time Dr. Rusby left them, are at last on their way home. They are expected to arrive on the Booth Line SS. Justin, at Brooklyn, on April 13th.

This party consists of Dr. W. M. Mann, assistant entomologist of the U. S. Department of Agriculture, who has been acting as director of the expedition since Dr. Rusby was compelled to leave them on account of ill health; Dr. O. E. White, assistant botanist at the Brooklyn Botanical Gardens and orchidologist of this expedition for Dr. Oakes Ames of the Bussey Institution of Harvard University; Dr. Everett Pearson, ichthyologist of the University of Indiana, who has been collecting fishes on this expedition for the forthcoming work on the fishes of South America by Prof. Eigenmann of Indiana University, reptiles for Dr. Noble of the American Museum of Natural History and batrachians for Prof. Ruthven of the University of Michigan.

Messrs. MacCreagh, Brown and McCarty, the motion-picture photographers, who accompanied the exploration, will remain until the latter part of May. In addition to photographic work, they are at present investigating a special problem for Dr. Rusby concerning the use of certain drug plants among the Indians of the lower Uaupes River and its tributaries near the Brazilian-Colombian frontier.

Dr. Mann reports that all members of his party are in good health and that they are bringing back with them about two and a half tons of scientific material. In addition to the preserved specimens, they have a small menagerie of living animals for the National Zoological Garden at Washington.

These collections, supplementing the very large amount already shipped home and brought home by Dr. Rusby, will form a very notable contribution to the scientific investigation of South America, notwithstanding that the entire period between the time of leaving and of returning to New York is less than eleven months.

Arrangements are being made for a reception to the scientists of this exploration, including a number of their friends and many prominent leaders in the various departments of scientific work represented.

R. H. Hutchison, *Secretary*, Philadelphia, Pa.

[The daily newspapers reported the arrival of Messrs. White, Pearson and Mann at New York on April 13.—Editor.]

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record. Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

4—Canadian Entomologist, London, Canada. **10**—Proceedings of the Entomological Society of Washington, D. C. **12**—Journal of Economic Entomology, Concord, N. H. **21**—The Entomologist's

Record, London. **54**—Proceedings of the Biological Society of Washington, D. C. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **82**—The Ohio Journal of Science Columbus. **90**—The American Naturalist, Lancaster, Pa. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **128**—Zeitschrift fur Induktive Abstammungs- und Vererbungslehre, Leipzig. **138**—American Museum Novitates, New York. **134**—Annales de Biologie Lacustre, Brussels.

GENERAL. Dean, G. A.—How we may increase the effectiveness of economic entomology. **12,** xv, 41-53. **Kelly, E. G.**—Cooperation of agricultural colleges with high schools and rural schools in economic entomology. **12,** xv, 54-62. **Robertson, C.**—The sunflower and its insect visitors. (Ecology, iii, 17-21.)

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Insect Transformation, by Geo. H. Carpenter, D. Sc., Professor of Zoology, Royal College of Science, Dublin; Sec. Royal Irish Academy. Methuen and Co., Ltd., 36 Essex Street, W. C., London. 282 pp., 4 plates and 124 illustrations in text.

Professor Carpenter's researches on various groups of insects are so well known to entomologists in general that a new book from his pen is sure of a cordial welcome from them. This work is, to use the words of his preface, "designed to serve as an introduction to the study of growth and change in the life of insects," and he hopes that it "may be of some service to serious workers in entomology as well as to beginners."

The plan of the book is a good one. The reader is first introduced to a few familiar examples of the changes that accompany growth in the lives of insects, and the morphology of the adult insect is fully explained before any attempt is made to classify the different types of change met with. Then, by the use of the Grasshopper, Dragonfly and Moth as examples, the reader is led to the generalized conceptions to which entomologists have come to apply the comparative terms "ametabolic," "hemimetabolic" and "holometabolic." Following Dr. Sharp's lead, the phenomena of metamorphosis amongst winged insects is then divided into its two main sections, the "open" type of wing-growth (Exopterygota) and the "hidden" type (Endopterygota), and examples are given illustrating the metamorphosis of each of the Orders of Insects that come under these two headings. This leads, in Chapter V, to the consideration of wingless insects and the effect of parasitism on the form of an insect, and this secondary winglessness is then contrasted with the primitive unaltered winglessness of the true Apterygota, the Spring-tails and Bristle-tails. The ground thus covered enables the author to give in Chapter VI a concise classification of the Insecta, in which twenty-three Orders are recognized. Chapter VII deals with the correlation between the growing insect and its surroundings, and we are here introduced to the secondarily aquatic larvae of certain Diptera (sandfly, mosquito, etc.), the habits of burrowing and sucking the juices of plants, the formation of galls, the parasitism of one insect by another, and finally the care of the helpless young by the adult, as in the case of ants. The last chapter deals with the general problems of insect transformation, and emphasizes the apparent paradox that, whereas, in other groups of animals, low-grade forms are found to undergo more profound changes than high-grade forms, yet in the case of insects the reverse is true, metamorphosis becoming more and more complete as we pass upwards to the more highly evolved forms. The reason for this is very clearly explained, and we can recommend this part (Chapter VIII) as the best in the book, particularly the illuminating discussion as to the probable primitive type of insect larva, the evolution of the two types of wing-growth, and the short but excellent summary of the palaeontological evidence.

Any book dealing with so large a subject can scarcely claim to be original, but the author certainly has as much claim as anyone to be considered an authority on his subject. Thus we note, as we should expect, that he has introduced illustrations and examples from a number of recent researches by modern authors, which greatly enhance the value of the book. While the general conception and detail of the book are alike excellent for the beginner, the more advanced student will note some omissions of considerable importance. For example, in dealing with the problem of wing-growth, no mention is made of the turning over of the wing-buds in Odonata and certain Orthoptera, in which the hindwing sheath comes to overlie that of the forewing. In dealing with the evolution of the pupal state (Chapter II) the author passes in review the various larval forms found in the Hymenoptera, but quite fails to mention the praepupal or subpupal stage, which is the most significant of all facts in connection with this problem, and so misses the clue to the explanation of the reduction of the number of instars, without which a true view of the meaning of the pupal state can scarcely be attained. Again, much has been written in late years on the internal changes accompanying metamorphosis, yet this fascinating and intricate subject is dismissed in ten pages at the end of Chapter IV. There are many students of insects at the present day who would be extremely grateful for a clear exposition of the stages by which the "imaginal buds" of Weismann as seen in the Dipterous maggot, have been evolved, and for an authoritative account of the definite changes undergone by the various internal organs and tissues of the insect body during the actual metamorphosis. Though we realize that these are difficult subjects and that more researches upon the older Holometabola are still needed, we may be allowed to feel disappointed that so little help in elucidating these problems is offered in the present volume.

The text and figures have been on the whole very carefully prepared, though there are a few errors that need to be corrected. On p. 16, fig. 7, the letters A, C, M are made to point to the wrong veins. On p. 106 we are told that "the ninth segment has a pair of stiff, bristly cerci"; the accepted definition of "cerci" makes this statement inaccurate. On p. 178 we read that, in the Order Orthoptera, "the female's ovipositor is well and typically developed"; but this is certainly not true of the Cockroaches and Mantids, included in the Order. On pp. 178-9 the definitions of the Orders Plecoptera and Isoptera leave much to be desired, while the Embioptera or Web-spinners are entirely omitted! A stereotyped error due to Alvah Peterson and others, is perpetuated on p. 185, where it is stated that "labial palps are absent" in the Diptera; the latest researches go to show undoubtedly that the labellum is formed from these palps. On p. 269 it is stated that the Coleoptera of the Trias include representatives of the Chrysomelidae and Weevils. This is incorrect; the only families which can be shown to have existed with any certainty at that time are the Cupesidae and Hydrophilidae, though there is a strong probability that other elytra belonged to the Carabidae, Tenebrionidae and Cerambycidae, together with a few more obscure archaic families.

In concluding this review we should like to congratulate the author on this his latest work, which is to be strongly recommended to all students who are interested in this fascinating subject.—R. J. Tillyard.

Doings of Societies.

Entomological Section, The Academy of Natural Sciences of Philadelphia.

Meeting of September 22, 1921. Thirteen persons present. Vice-Director R. C. Williams presided.

General.—Mr. Rehn gave a brief narrative of the summer field excursion taken by Mr. Hebard and himself in the western States. Mr. Hornig exhibited specimens showing an English method of interesting young people in nature, in this case entomology, and said that he thought such methods would be practical here in America. The exhibit consisted of a box of twelve micro-slides of parts of insecst, selling for about two or three shillings, also a book entitled "Butterflies and Moths at

Home," containing over fifty half-tone illustrations showing the commoner species. This, he said, sold for about sixpence.

COLEOPTERA.—Dr. Skinner exhibited specimens of a coleopterous insect which is reported to be seriously injuring the rose bushes about Philadelphia. It is a Chrysomelid, *Typophorus quadrinotatus* Say, and is apparently new as a rose-foliage pest.

HYMENOPTERA.—Dr. Skinner also exhibited a specimen of a male of *Pelecinus polyturator* Dru., captured by one of our contributors, Mr. A. R. Allen, at Northeast Harbor, Maine, August 10, 1921. He spoke about the scarcity of the males of this insect in the United States and said that Dr. Hagen, while on a visit to Philadelphia, asked to see the male, stating that he came to Philadelphia especially to see one.

ODONATA.—Dr. Calvert spoke briefly on the Costa Rican species of *Palaemnema*, stating that the six species which he had collected in that country differed from each other in the shape of the abdominal appendages of the males, as well as in slight color characters, but that in three species the penis was alike, while in the remaining three the penis differed in the shape of the tips of the terminal filaments from that of the first three. Thus on penis-shape there were two groups within the genus.—E. T. CRESSON, JR., *Recorder*.

Meeting of December 12, 1921. Eight persons present, including Mr. Theodore H. Frison, of Riverton Japanese beetle laboratory. Vice-Director R. C. Williams presided.

GENERAL.—The following report of the editors of the Entomological News was read:

The Entomological News has just completed a trying year. The cost of printing reached its maximum this year, compelling us to meet an increase of about $300 for the yearly edition. In order to balance this additional expense an increase in the subscription price was contemplated, but wishing to be reasonably sure that there would not be a great falling off of subscriptions, a vote was taken in the latter part of 1920 of the subscribers as to their willingness to continue with an increase of 50 cents. This resulted in sufficient votes to warrant the trial. The latest mailing list shows 407 subscribers, which is but slightly (about 15) below that of 1920. Were it not for this increase in price and the loyalty of the majority of our subscribers, our present balance, although small, would have been impossible. Of course the Society has extended its helping hand by purchasing the copies used in the exchanges for the Library, but it has done this for several years past and it is seemingly proper that it should do so.

The following officers and committees were elected to serve for 1922: *Director,* Philip Laurent; *Vice-Director,* R. C. Williams, Jr.; *Secretary,* J. A. G. Rehn; *Recorder,* E. T. Cresson, Jr.; *Treasurer,* E. T. Cresson; *Conservator,* Henry Skinner, M.D.; *Publication Committee,* E. T. Cresson, P. P. Calvert, Ph.D., and E. T. Cresson, Jr.

HYMENOPTERA.—Mr. Frison made a very interesting communication on the life-history of the Bumblebee, illustrated with excellent lantern slides, showing the various stages in the nesting life, methods of rearing and establishing of colonies. The nesting habits were discussed in detail, how and where colonies are established by the queen in the spring of the year. The successive stages beginning with the honey-pot, then the egg cell, then the emergence of the adult, were shown. The different forms of cell-making by several of the species observed, and the most serious parasites were also shown. The speaker then explained how experimental colonies are introduced in the field and laboratory, and the apparatus used. It was evident that the speaker was well acquainted with his subject, and that it must have taken a number of years of study in order to secure the information and technic which he possesses.—E. T. Cresson, Jr., *Recorder.*

OBITUARY.

Thanks to Dr. T. Tzabò-Patay of the Hungarian National Museum, I have recently received the January-February, 1916, number of *Rovartani Lapok* which includes an obituary notice of our lamented Sandor Mocsàry. For the sake of those interested, to whom the facts are not accessible, I venture to introduce the following free translation of the German summary published in the same place.

A. Mocsàry. 1841-1915.—The highly meritorious Hymenopterologist, A. Mocsàry, Abteilungsdirektor i. P. of the Hungarian National Museum in Budapest, died suddenly Dec. 26, 1915, after a protracted illness. He was the Nestor of the Hungarian entomologists, a generally esteemed scholar, whose death will be deeply mourned by his colleagues. Apropos of his 40 year service jubilee, *Rovartani Lapok*, Vol. 17, 1910, pp. 161-175, published a sketch of his life and this obituary refers back to that sketch. To complete, it remains to be noticed that Mocsàry was born in Nagyvarad, Sept. 27, 1841, where he also pursued his studies. In 1870 he was appointed as assistant in the National Museum, to which institution he belonged for 44 years as an energetic official. The first of June, 1915, he entered on his well-earned retirement; still he could not long enjoy this as his stomach trouble recurred and caused him to take to his sick bed. The burial took place December 28. On this occasion Dr. G. Horvath, representing the National Museum and the Ungarische Akademie der Wissenschaften, and J. Jablonowski, the Ung.

Entomologischen Gesellschaft, took their leave of the deceased in nobly held funeral orations.

So much for the translation. I may add that Mocsàry's bibliography comprises 178 titles, mostly devoted to Hymenoptera, especially Chrysidoidea. His contributions to science cover approximately 2594 pages.—H. L. VIERECK.

Among those who have contributed to entomology, whose deaths have not hitherto been noted in the NEWS, is Dr. ERNEST ROUSSEAU, who died November 13, 1920. Two notices of his life and work have appeared, both by M. J.-A. Lestage, one in the *Bulletin de la Société Entomologique de Belgique* (tome III, pp. 35-41, with a portrait), the later and longer in the *Annales de Biolcgie Lacustre* (tome X, pp. 261-283). Both are accompanied by the same list of his biological writings.

He was born at Ixelles, Belgium, May 27, 1872, his father professor of physics at the University of Brussels, his mother, born Hannon, a botanist. "Elevé dans un milieu si hautement scientifique," says his biographer, "Rousseau devait fatalement venir a la science; en effet, il lui consacra toute sa vie." While a medical student in Brussels, he joined the Entomological Society there and published on Carabidae and Malacoderms of Belgium. For some years his zoological activities were turned to sponges and to insect histology, then again to the Carabidae, when he contributed to Wytsman's *Genera Insectorum.* In 1906 the Museum of Natural History at Brussels placed him in charge of those limnological studies for which he is best known. In pursuance of these he established a fresh-water biological laboratory at the Lake of Overmeire and a new journal, the *Annales de Biologie Lacustre*, which has reached its tenth volume. Of the 57 papers (some unpublished) listed in his bibliography, 1 deals with Hydrachnids, 3 with insect histology and anatomy, 6 with Odonate larvae, 14 with adult Coleoptera, 2 with larvae of Coleoptera, 2 with Diptera, 1 with aquatic Hymenoptera. At the time of his death he had two works in preparation, one on *La Biologie des eaux douces* for the Encyclopédie Scientifique of Doin et fils, Paris, the other *Les Larves aquatiques des Insectes d'Europe,* in collaboration with J.-A. Lestage and H. Schouteden. The first volume of the latter has appeared since his death, consisting of 987 pages and 343 figures, and deals with the aquatic larvae of the Hemiptera, Odonata, Ephemerida, Plecoptera, Megaloptera, Plannipennia and Trichoptera. According to a note on page 32 of the *Bulletin* quoted, the second volume will treat of the Lepidoptera, Coleoptera, Diptera and technique.

His biographer, writing of him as an intimate friend, declares him to have been a man thoroughly good, generous, enthusiastic over his work, who irresistibly attracted the sympathies of all.—P. P. CALVERT.

The daily newspapers announced the death of Sir PATRICK MANSON, in London, April 8, 1922. He rendered two important services in ascertaining the mode of transmission of human diseases. The first was in 1878, when he discovered the manner of carriage of *Filaria* from man to man by mosquitoes,* thus, as Howard, Dyar and Knab state, becoming "the discoverer of the first recognized transfer of a disease organism by mosquitoes." The second was when he "first clearly formulated the hypothesis [of the rôle of carrier of malaria by mosquitoes]†, and it was largely due to his suggestion that Ross in Indian undertook to solve the problem" (Riley and Johannsen).

He was the son of John Manson, of Fingask, Aberdeen, was born October 3, 1844, was educated as a physician, and contributed to the literature of parasitology and tropical medicine. He was a fellow of the Royal Society, an honorary LL.D. of Aberdeen and of Hongkong, and an honorary Sc.D. of Oxford. In recent years he lived at The Sheiling, Clonbur, County Galway, Ireland.

His son, Dr. P. Thurburn Manson, was one of two who offered to be bitten by malaria-infected mosquitoes from Rome, in testing the malaria-mosquito theory, and who developed characteristic malaria as a result.—P. P. CALVERT.

*The development of *Filaria sanguinis hominis*. Medical Times and Gazette, London, II, p. 731, 1878. On the development of *Filaria sanguinis hominis* and on the mosquito considered as a nurse. Journ. Linn. Soc. London, Zool., xiv, pp. 304-311, 1878.

†Hypothesis as to the life history of the malarial parasite outside the human body. Lancet, London, 1896, ii, pp. 1715-1716.

Dr. Joseph Lane Hancock, one of the leading American authorities on Orthoptera, died of heart disease in Chicago, March 12, 1922. Born in that city on April 12, 1864, it is said that he "had attained almost equal distinction as a physician, naturalist, landscape artist and as an author."

In the study of Orthoptera, Dr. Hancock specialized on the Tettiginae (Acrydiinae) or "Grouse Locusts." His work on this group was equal in volume to, if not more extensive than, that of any other authority on the subject. His scientific publications, begun in 1895, continued until 1918, when press of work as a practicing physician forced him to abandon the study.

His largest publications in chronological order, are: *The Tettigidae of North America*, *The Tettigidae of Ceylon*, a series of *Studies of the Tetriginae in the Oxford University Museum* and *Indian Tetriginae*. His collection of Acrydiinae, one of the largest in the world, has been kept in an exceptionally good state of preservation, and now forms a portion of the Hebard Collection, deposited at the Academy of Natural Sciences of Philadelphia, having been acquired by purchase.

He was also the author of *Nature Sketches in Temperate America* (Chicago, McClurg & Co., 1911), "a popular account of insects birds and plants, treated from some aspects of their evolution and ecological relations," the last chapter being an "interpretation of environment as exemplified in the Orthoptera."

Dr. Hancock was at one time Curator of the Chicago Entomological Society and Editor of its *Occasional Memoirs*. He was a Fellow of the American Association for the Advancement of Science and of the Entomological Society of London.

Always kind and liberal in co-operation with other students of the Orthoptera, it is our regret that we knew Dr. Hancock only through infrequent correspondence.—Morgan Hebard.

Correction.

Insert the word "catalogs" after "manuscript," page 118, 4th line from the bottom.

JUNE, 1922

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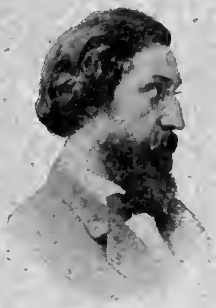

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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Notes on Clivina, with Description of a New Species from the Pacific Coast (Col., Carabidae).

By H. C. FALL, Tyngsboro, Massachusetts.

In rearranging parts of my collection to conform to the order in the new list, it became necessary to transfer my Clivinae to a new box. In so doing the species were examined somewhat critically, and certain errors in the last published table (by LeConte) were noted, to which it may be well to call attention.

The genus *Clivina*, fortunately perhaps, has long escaped the attention of systematists, and except for the placing of *collaris* Hbst. as a synonym of *fossor* L., the species stand in the Leng List just as left by Dr. LeConte in the table prepared with others for the Brooklyn Bulletin in 1879. As for *collaris* and *fossor*, these two introduced forms, though closely allied are now considered distinct by the best European authorities and are so recorded in the latest European Check List. Ganglbauer, in his *Coleoptera von Mitteleuropa*, gives the distinguishing characters, of which the rufous elytra with black suture in *collaris* is an all-sufficient criterion. *Fossor* is not so colored, the elytra being of nearly uniform tint, usually piceous, but varying to rufous. I have seen numerous examples of *collaris* from Massachusetts, and a few of *fossor* from Montreal.

Briefly, the errors in the LeConte table are these—*collaris* (and also *fossor*) has a spur near the outer tip of the middle tibia and should therefore have been tabulated with the species possessing that character. *Striatopunctata* has the clypeal outline as well as the other characters of *ferrea, convexa*, etc., and should be included in the same group with them. *Rufa* should stand between *americana* and *morula*. It is intermediate in size between these two, and differs in no way except color from black examples of like size which may be placed either with *americana* or *morula*, according to personal judgment or caprice. It is highly probable that *morula, rufa, americana* and *cordata* represent nothing more than size and color variations of a single species.

Of the characters used by LeConte in the table referred to, that of the spur near the outer tip of the middle tibia is of importance and is correctly used except in the case of *collaris* alluded to above. The meaning of the next leading character used in the table—"clypeus with lateral lobes" or "clypeus rounded at sides"—is not quite so easily interpreted. There are in reality three types of clypeal outline. In the first, represented by *dentipes* alone, the clypeus is bi-emarginate or bilobed at sides. In the species *impressifrons* to *cordata* inclusive the sides of the clypeus are uni-emarginate, the posterior convex outline defining the lateral lobe. In the remaining species the structure differs from the preceding in that the anterior margin is but slightly advanced, leaving a very small notch or emargination at the angles, the lateral lobe thus occupying almost the entire side of the clypeus.

Certain other characters, not mentioned or only vaguely alluded to by LeConte, are so definite and simple in their application as to make them well worthy of consideration. Classified according to the dorsal setigerous punctures of the elytra the species separate as follows:

Elytra with five dorsal punctures.......................... *dentipes*
Elytra with four dorsal punctures........... *impressifrons* to *cordata*
Elytra with two dorsal punctures......... *striatopunctata* to *stigmula*

Or, the species may be grouped with equal definiteness by the anal ventral setigerous punctures. There are always four such punctures (two each side) regardless of sex, arranged as follows:

Intermediate anal punctures mutually twice as distant as from the lateral ones .... *dentipes*

Anal punctures very nearly equally spaced.... *impressifrons* to *fossor*

Intermediate anal punctures widely distant and close to the lateral ones .... *rufa* to *cordata*

Intermediate anal punctures close together at the middle of the apical margin .... *striatopunctata* to *stigmula*

The last group—beginning with *striatopunctata*—is again sharply delimited by a character of such importance that the failure of LeConte to mention it is difficult to explain. The lateral marginal line of the thorax here fails to attain the true base, but turning inward forms a pseudobasal margin at the summit of an abrupt declivity very much as in certain genera of Anthribidae.

I would then divide our species of *Clivina* into four groups, giving each the name of its best known representative, as follows:

Dentipes Group.—Middle tibia with subapical external spur; clypeus bi-emarginate at sides; front thighs acutely dentate beneath apically; elytra 5-punctate; intermediate anal setae twice as distant from each other as from the outer setae. Represented by *dentipes* only.

Impressifrons Group.—Middle tibia with subapical external spur; clypeus uni-emarginate at sides; elytra 4-punctate; intermediate anal setae approximate to the lateral ones. Includes *impressifrons, texana, planicollis, punctulata, punctigera, rubicunda, pallida, collaris, fossor.*

Of these, *collaris* and *fossor* may be recognized by their color: *pallida* by having the ventral surface in great part polished (reticulato-alutaceous in all others); *rubicunda* by the very thick front thighs, which are convex both above and beneath and rather deeply sinuate apically beneath, also by the presence of diverging raised lines at the middle of the first ventral segment, these being otherwise present only in the *americana* group. The remaining species are closely allied and difficult to distinguish, and it is rather probable that *texanus* does not differ specifically from *planicollis.*

AMERICANA GROUP.—Middle tibia without subapical external spur; clypeus uni-emarginate at sides; elytra 4-punctate; intermediate anal setae approximate and distant from the lateral ones; first ventral segment with diverging raised lines at middle. Includes *analis*, *americana*, *rufa*, *morula* and *cordata*.

Analis is not known to me; the remaining forms are apparently identical in all respects except color and size and may be varieties of a single species.

BIPUSTULATA GROUP.—Middle tibia without subapical spur; clypeus rounded at sides almost throughout; prothorax with pseudobasal marginal line continuing the side margins which do not attain the extreme base; elytra 2-punctate; intermediate anal setae approximate. Includes *striatopunctata*, *ferrea*, *convexa*, *bipustulata*, *marginipennis*, *postica*, *stigmula*.

Putzey's species are practically unknown to us. They may perhaps be recognized by LeConte's table, but I suspect will in part prove not to be valid.

The following species in my collection is undescribed:

C. oregona new species.

Similar in form, size and general characters to *punctulata*, from which it differs as follows: The color is dark reddish brown to piceous brown, the prothoracic punctuation sparse, and so fine as to be barely perceptible; mentum strongly longitudinally carinate, the transverse posterior tumidity rectilinear; basal joint of protarsus without external dentiform prominence. In *punctulata* the color is bright red brown, prothorax distinctly punctulate, longitudinal carina of mentum feeble, the posterior transverse tumidity bisinuate behind, basal joint of protarsus with an external dentiform angulation.

Six examples of *oregona* are before me, the length varying from 4.8 to 5.5 mm. The *type* is from Corvallis, Oregon. Other examples are from Seattle, Wash. (Prof. O. B. Johnson). All in my collection.

The dentiform angulation on the outer side of the basal protarsal joint is a quite persistent feature peculiar to the species of the *impressifrons* group; its absence in *oregona* is therefore notable. *Oregona* may probably be safely determined by its locality label; the Californian *punctulata* is the only other species known from the Pacific Coast region and is rare at that.

A New Milliped of the Genus Polyxenus from the Florida Keys.

By Ralph V. Chamberlin, Cambridge, Massachusetts.

In January, 1919, Dr. Paul Bartsch took a *Polyxenus* either emerging from or taking refuge in the breathing pore of a *Cerion* on the Tortugas, Florida. The specimen apparently represents a new species which is here described.

Polyxenus bartschi, sp. nov.

The type specimen is not fully adult, being in the stage possessing eight pairs of fascicles of lateral setae. It is in the Museum of Comparative Zoology, Cambridge, Massachusetts.

The dorsum is marked with a broad longitudinal stripe along each side and a narrow median pale stripe. Setae of caudal pencil white as usual.

The eight articles of the antennae present and apparently fully developed; the third, fourth, fifth, sixth, seventh and eighth articles respectively .04, .058, .05, .1, .05 and .02 mm. long, with the corresponding widths being .046, .05, .05, .058, .05 and .03 mm. The precise number of ocelli in the patch on each side of head was not determined because of the obscuring pigment.

The major and more numerous setae of the head are relatively slender and flexible with the teeth long, slender and numerous, subdensely appressed; the naked terminal lobe distally a little rounded. There are fewer short scales which are only four times, or less, as long as thick and are half or less the length of the long setae; their teeth are coarser and fewer in number.

The setae of the lateral fascicles are similar to the major ones of the head, but are mostly less flexible and with the lateral teeth usually fewer.

The setae across the tergites are in general similar to the shorter setae or scales of the head; mostly with seven or eight teeth in each lateral series, the terminal lobe with distal margin convex; mostly between four and five times longer than wide.

In the caudal pencils there are two principal types of setae. There are, firstly, the mostly peripheral setae very similar to those of the lateral fascicles excepting for their greater length. The greater portion of the pencils, however, is composed of much finer setae of varying length which have subspatulate distal ends which are usually a little bent. None of the characteristic hooked setae, such as occur in *P. lagurus* and *P. fasciculatus*, are present.

Length, without caudal pencil, 2 mm. Length of caudal pencil, .66 mm. Length of maximum setae of head, .2 mm.; of setae of anterior paired fascicles, .23 mm.; of posterior paired fascicles, .28 mm.; of the dorsal setae or scales up to about .1 mm.

A New Gall Midge on Rushes (Dipt., Cecidomyiidae).

By E. P. Felt, Albany, New York.

Very little is known of the host relations existing between gall midges and rushes, though the writer found a midge larva in the deformed fruit of a rush some years ago, but was unable to obtain the adult. The record given below is the first American species reared from *Juncus*. It is interesting to note that Houard in his monograph on The Plant Galls of Europe fails to list even one species from the Juncaceae. He records a number of species as having been reared from the Cyperaceae and in our tabulation of American species,[1] it will be noted that several species (4) have been obtained from plants in this family, while 33 have been reared from the grasses, Gramineae. The fauna of the last named is by no means thoroughly worked up and the probabilities are that careful collecting and rearing would result in material additions to our sedge-inhabiting forms and very likely some increase in the number of species occurring in rushes.

Procystiphora junci n. sp.

A series of these interesting midges was forwarded by Mr. W. H. Larrimer, West Lafayette, Indiana, accompanied by the statement that they resemble somewhat the Hessian Fly, as to appearance, the effect on the host plant and the two generations annually occurring at about the same time as in the case of this wheat pest. The specimens were labeled, "reared from *Juncus dudleyi*, Centralia, Ill., October 6, 1921, W. B. Cartwright, Collector, Centralia, No. 2111."

In spite of the general resemblance of these midges to the Hessian Fly, there is a striking chitinization and infuscation of the basal segments of the ovipositor, likewise apparent in the type of the genus, namely *P. coloradensis* Felt. The above food habit record tends to confirm the opinion of Prof. Cockerell to the effect that the host plant of the type of this genus is *Carex*. It would not be surprising if both species had a somewhat similar effect upon the host plant.

♂.—Length 2 mm. Antennae (possibly of this sex, though not cer-

[1] 1918, N. Y. State Mus. Bul., 200, p. 216.

tainly), about three-fourths the length of the body, sparsely haired, dark brown; sixteen and possibly eighteen segments, the fifth with a stem about three-fourths the length of the basal enlargement, the latter with a length about twice its diameter, and a sparse subbasal whorl of short, stout setae, and a median whorl of much longer, curved setae; terminal segment compound, produced, with a length over three times its diameter, a distinct constriction near the distal third and a short, broadly triangular process apically. Palpi: first segment short, irregularly quadrate, the second smaller than the first, the third a little longer than the second, somewhat swollen distally, and the fourth one-half longer than the third, more slender.

Mesonotum dark brown, the sub-median lines sparsely haired; scutellum and postscutellum dark brown, sparsely haired, reddish brown; the distal segments distinctly swollen; genitalia dark brown; wings hyaline, sub-costa uniting with the margin at the basal half, the third vein just before the apex of the wing, the fifth at the basal third, its branch near the basal half; halteres reddish brown, pale yellow basally; legs a nearly uniform dark brown; claws moderately long, slender, strongly curved, minutely unidentate; the pulvilli nearly as long as the claws.

Genitalia: basal clasp segment moderately long, stout; terminal clasp segment as long as the basal clasp segment, rather stout; dorsal plate long, deeply and triangularly emarginate, the lobes broadly rounded; ventral plate rather long, somewhat deeply and narrowly emarginate, the lobes broadly rounded; style rather long, stout, narrowly rounded apically.

♀.—Length 2.5 mm. Antennae extending to the base of the abdomen sparsely haired, very dark brown; 17 subsessile segments, the fifth with a length nearly twice its diameter, the subbasal whorl of setae rather short, weak; the subapical whorl somewhat long; terminal segment produced, with a length about four times its diameter and terminating in a somewhat slender, irregular apex. Palpi: first segment short, irregular, the second quadrate, with a length about one-half greater than its width, the third nearly twice the length of the second, more slender, distinctly enlarged apically, the fourth twice the length of the second and more slender.

Mesonotum very dark brown; scutellum, postscutellum and abdomen dark reddish brown, the last almost black at its extremity (really the basal segment of the ovipositor), the tip of the ovipositor honey yellow; wings hyaline; costa dark brown, the third vein uniting with the margin a little before the apex of the wing, the fifth at the basal fourth, its branch near the basal half; halteres reddish brown, yellowish basally and apically; legs a nearly uniform dark brown; the claws rather long, moderately heavy, strongly curved, finely though distinctly unidentate; the pulvilli as long as the claws.

Ovipositor when extended probably about as long as the abdomen, the basal segment apparently rather heavily chitinized and distinctly infuscated, the seventh abdominal segment with irregular fuscous, mesal thickenings dorsally and ventrally, the posterior margins of these distinctly produced laterally.

Type Cecid. A. 3209, N. Y. State Museum.

Described from a series of females and one broken male.

A few Notes on Distribution (Lepid.; Orth., Blattidae).

By W. J. Holland, Carnegie Museum, Pittsburgh, Pennsylvania.

As the author of a couple of manuals, which have had wide circulation, I am in constant receipt of letters from all over the country informing me of the discovery of insects at places beyond the limits of distribution given in *The Butterfly Book* and *The Moth Book.* Some of these notes made by correspondents are of interest. I regret that in past years I have not always preserved them and cannot, therefore, refer to them at this moment. It has occurred to me, however, that it might be worth while to mention a few of those, which during the past twelve months have been brought to my attention, and which I find upon my desk.

Rhopalocera.

Euptoieta claudia (Cramer) has been reported to me as found in Minnesota, the Dakotas and Alberta.

Argynnis idalia (Drury) was formerly regarded as a rarity in the vicinity of Pittsburgh. The species has been taken rather commonly in recent years in Allegheny and Washington Counties, in southwestern Pennsylvania.

Vanessa j-album Boisduval and LeConte. This insect has recently been found quite abundantly in western Pennsylvania in the vicinity of Pittsburgh.

Junonia coenia Hübner. This species is reported to me as occurring as far north as Minnesota and Dakota.

Charis borealis (Grote & Robinson). This insect has been taken abundantly in the vicinity of Columbus, Ohio. It has never been taken, so far as I know, in western Pennsylvania in the same latitude as Columbus, which is rather remarkable.

Nathalis iole Boisduval. This species ranges as far north as Davenport, Iowa.

HETEROCERA.

Erebus odora (Linnaeus). The capture of specimens of this species has been reported to me from Boston, Mass.; Toronto, Ontario; Central Wisconsin, Minnesota, and Alberta.

Thysania zenobia (Cramer). The capture of this moth has been reported to me recently from McPherson, Kansas.

It is possible that the presence of these moths in northern localities, far removed from their southern metropolis, may in part be accounted for by transfer by railroads. The moths, hiding in freight cars beginning their run in southern Texas and Florida, may be carried far north, and then, escaping, be captured. I have an *Erebus odora* taken at Leadville, Colorado, on July 4, in a snowstorm. It was sent me years ago by one of my correspondents.

ORTHOPTERA.

Panchlora cubensis Saussure. The Green Cuban Roach has been recorded from Indiana, Massachusetts, Vermont, Florida, and Texas. It is well established at Brownsville, Texas. It has been reported from Philadelphia (Rehn, Hebard) and Pittsburgh (Riley). It appears to have been introduced with bananas and other tropical fruit. My cook brought me a specimen the other day found to her horror in the kitchen. It probably found its way into the house from a fruit-store. This is the second record for Pittsburgh. The specimen was promptly consigned to a cyanide bottle. It is unlikely that this species will become established in this locality.

Observations on Dibelona cubensis Brunner, a little-known Cuban Gryllacrid (Orth., Tettigoniidae).

By JOSÉ CABRERA, Cotorro, Cuba.

The first time I found *Dibelona cubensis* was eight years ago, in Camoa, Havana Province. It was a very young specimen hidden under a leaf fastened to a palm tree trunk. Later in opening some leaves fastened together, and which I believed contained a chrysalid, I was surprised to find a cricket-like insect in them. I remembered at once what Dr. Gundlach said in his work on Cuban Orthoptera, about a locustid he found under leaves fastened to tree trunks in Yateras, Oriental Department of the island.

The specimens found by me were young, so I kept searching for a while and found, in a hollow twig, a fully mature female.

This I brought home, and put it in a glass jar with some leaves and fruit. Next day it appeared neatly enclosed in three leaves it had united. Then I knew I had *Dibelona cubensis* Brunner, a very rare species with this curious habit.

Sometimes the species is found a foot from the ground, at others high up in tall trees. It is very voracious, as once one of them ate a young *Haplopus cubensis* Saussure and a *Dellia insulana* Stål, which I had in the same jar with it. Sometimes the insect stayed enclosed in its house as long as six to seven days, but when disturbed it would move continuously up and down in the jar, jumping from side to side, and not falling to the bottom. Most of the young specimens I kept died during the moults.

A mature specimen, found September 11, 1921, gave me opportunity for these notes. In making its house it began by cutting the leaf to the required size, from the margin to the stem. The leaf was too long and the insect did not use two or three leaves as others did. Then it stood on the uncut side of the leaf, holding both sides of the leaf with the fore legs, by means of the tarsal claws; the holding is done from the center of the leaf, not from the margin. When using two or three leaves the insect stands on the stronger one. Then one sees it act as if chewing something; it is making the mucilaginous paste. After a few seconds the mouth is applied to the margin, and a thread-like fluid is seen to issue therefrom. This thread is attached to the opposite margin and the operation is continued, the labial palpi touching the threads and searching for openings and weak spots in the weaving. These are covered by forcing the leaf into position, where it is held by the threads. The insect's head goes regularly to and fro, stopping a while now and then to make more paste, then adjusting the margins again until the work is finished. When the leaf cover is completed the insect's body (21 millimeters long) is hidden, but not its antennae, which are very long (110 to 115 millimeters). By turning two or three times around inside the house, the antennae are rolled around its body.

Dibelona has an enemy, a hymenopterous parasite of the Microgastrine group, the larva of which feeds upon its body. With so many precautions it is often a victim of a tiny antagonist.

Observations on Two Mealy Bugs, Trionymus trifolii Forbes and Pseudococcus maritimus Ehrh. (Hom., Coccidae).

By W. S. Hough, State Crop Pest Commission, Winchester, Virginia.

There was a time not long since when all mealy bugs were thought to be restricted feeders, that is, each species was thought to be limited to a single host plant or at most to very few. Likewise, a single host plant harbored but one species. With this belief prevalent it is quite natural that when different mealy bugs were found on the same host they were considered different forms of the same species. As a result, cases of seasonal forms or seasonal dimorphism appeared in literature from time to time and were not openly questioned until Ferris (1918 a & b) presented evidence that probably all such cases involved two or more species. The history and literature of several typical cases is reviewed by Ferris in the articles referred to.

The first case of seasonal dimorphism was established by Davis (1894) in connection with his observations on the clover root mealy bug (*Trionymus trifolii* Forbes). He observed a "winter form" which was an "oval, plump, mealy, egg-like object" and a "summer form" having "white waxy filaments which project out from the body." Both of these "forms" were studied by the writer at Columbus, Ohio, and were kept under observation from October, 1920, until June, 1921. A summary of the information obtained follows. The study was made under the direction of Dr. Herbert Osborn. G. F. Ferris, of Stanford University, and Harold Morrison, of the Bureau of Entomology, examined specimens of *Pseudococcus maritimus* Ehrh., the so-called "summer form." The ants were identified by Dr. W. M. Wheeler.

Trionymus trifolii Forbes.

In life the *adults* vary from 2 mm. to 3 mm. in length, are oval, plump, and when viewed laterally appear somewhat cylindrical. The flesh-colored body is covered by a white wax powder. There is but a single pair of white caudal tassels which usually vary from one-eighth to one-fifth of the length of the body. These tassels are frequently curled and lie so close to the body as to be easily overlooked. The short antennae are inconspicuous, about .15 mm. long, seven-segmented and straw-yellow in color. The legs are very short and straw-colored.

Although the adults are sluggish the *young* are active and move from one part of the plant to another. At birth the young are .4 mm. long, a bright pale yellow, flat rather than plump and cylindrical, have six-segmented antennae and legs which in proportion to the body are much more conspicuous than the legs of the adult.

Adult specimens were placed on the roots of small clover plants which had been transplanted into straight-edged vials. A single specimen was placed in each vial and the vial wrapped with black paper. Water was introduced from one to three times daily as the needs of the plant required. Eight adults brought from a clover field on February 14 began giving birth to young one month later, March 12 to 15. The total number of young produced was recorded daily for two individuals, one produced 131 larvae in 23 days and the other 162 larvae in 17 days. The other six adults gave birth to young over a period averaging 17.8 days and all died within three or four days after the last young appeared.

Within a short time, a few hours to a day, after birth the young left the flimsy cottony mass beneath the body of the mother and migrated to the stems and leaves where feeding began. About one week (20 individuals averaged 7.7 days) later the first molt occurred and within another week (28 individuals averaged 6.8 days) the second molt occurred, after which most of the larvae migrated down to the upper roots, on the crown and beneath the bracts around the base of the stems. Because of this migration it was with difficulty that only four individuals were followed through the third larval stage which averaged 12.2 days. These were kept under observation for five weeks after the third molt, when the writer left Columbus. During this time they had assumed the appearance of adults except for reduced size, being only 1.7 mm. long. Overwintering adults were from 2 mm. to 2.5 mm. in length and before young were produced in the spring the average length was increased to 3 mm. No males were observed.

In October adults, but no young, were common on the roots of clover two years old or older. They were always associated with the brown garden ant (*Lasius niger* Linn. var. *americanus* Emery) which had mined tunnels along all of the roots on which the mealy bugs were feeding. December 13 was the last fall date when any were found on the roots, and not until early in March did they again appear on the roots. By the last of March they were easily found within an inch of the surface and during the first week in May they began to produce young, which within a few hours' time deserted the subterranean life to pass the first larval stage, and in some cases the second larval stage, on the stems and leaves. Continual search throughout the winter revealed the fact that all of the adults had been collected by the ants and placed in specially constructed chambers from 10 inches to 12 inches below the surface. As spring approached the ants replaced them on the roots, bringing them nearer the surface as the weather became warmer. Not only did the ants extend their numerous tunnels along the roots of clover but sometimes included in their tunnel system the roots of dandelion, plantain and blue grass, on all of which the mealy bugs were found feeding. Mr. P. R. Lowery informs me he found this same species on sunflower roots.

In order to more closely observe the relationship existing between the ants and the mealy bugs three ant colonies, whose nests were about the roots of clover, were transferred to the insectary. The plants in two of the nests were then killed by keeping them very closely clipped. In both instances the ants tunneled to the living roots of surrounding clover plants, which were not less than eight inches away, and transferred their mealy bugs to the living roots. At the same time ten mealy bugs were placed on the roots of a living clover plant, which was then kept closely clipped. Although this dying plant was entirely surrounded by living plants not over eight inches away, all of the mealy bugs died with the dying plant. A repetition of this gave the same result and in both tests nothing but loose earth was between the living and dying roots. The mealy bugs have never been found unattended by ants and it seems they have ceased foraging for themselves. On the other hand, the ants depend on the profuse honey dew as one of their chief foods.

Honey dew is produced freely. After the third molt it was necessary to remove the colorless liquor daily from the specimens which had been placed in vials. Some of the adults from which the honey dew was not removed finally perished in the viscous mass.

Certain factors as humidity and temperature no doubt determine the movements of the ants with their mealy bugs. One cloudy morning in November the ants in the third nest, which had been transferred from a clover field several weeks before, moved their 24 mealy bugs over a surface path from the nest in a flower pot to a newly constructed tunnel in a bean bed two feet away. After watching this transfer a careful examination of the new tunnel revealed all of the mealy bugs stored in three cells. Three days later the sun was shining and the ants carrying their mealy bugs returned over the same path to the clover roots in the flower pot. Both movements took place at 8 A. M.

Pseudococcus maritimus Ehrh.

At various times during the fall months and frequently during the spring months the "flat" mealy bug with lateral "filaments which project out from the body" was found associated with the clover root mealy bug. As already stated, this "summer form" proved to be none other than the Baker mealy bug (*Pseudococcus maritimus* Ehrh.) which Ferris has reported from the Pacific coast (1918), New York (1918), Florida (1919), England (1919) and Lower California (1921).

During the progress of this study in Ohio it was taken from sycamore, elder, osage orange and the roots of clover and in Virginia it has since been found ovipositing on the green bark of apple trees. On two occasions it was ovipositing in the stem end of apples. Mr. P. R. Lowery, who has collected mealy bugs in Ohio for several years, informs me that he has collected it from the following additional hosts: Flowering dogwood, roots of goldenrod, hackberry, hazelnut, hickory, maple, *Rhododendron maximum* and wild cherry. In the botanical greenhouse at Ohio State University it ranks second to *Pseudococcus citri* Risso as a mealy bug pest. In this greenhouse it was found on 26 different host plants. The common name, "omnivorous mealy bug," which was once aptly applied to this insect, is not a misnomer. It is now recorded from 80 hosts and the list is far from complete. In the Shenandoah valley of Virginia it far outnumbers the clover root mealy bug on the roots of clover, but in central Ohio the latter was more abundant.

In life this species is very easily distinguished from the clover root mealy bug. The *adults* vary from 2 mm. to 6 mm. in length, width approximately half the body length, elongate oval when viewed dorsally and somewhat flattened from a lateral view. The reddish-brown body is covered with a white wax powder and around the body margin are 17 pairs of lateral tassels or filaments, which increase in length toward the posterior end, the caudal pair being from one-half to two-thirds as long as the body. The eight-segmented antennae are about one-fifth as long as the body and similar in color. The legs are slightly lighter.

Immature forms have the general appearance of the adults. First and second stage larvae have six-segmented antennae and larvae of the third stage have seven-segmented antennae. The caudal tassels make their appearance in the first larval stage and late in the second stage are nearly as long as those of the adult. Except for reduced size third stage larvae are similar to the adults.

The *males* are minute winged forms, 1.3 mm. in length, with a white pair of caudal tassels equal to two-thirds the length of the body They are active fliers, without functional mouthparts, and live for a few days only.

Since the life history has been studied in California (Clausen, 1915) a brief summary of observations made under Ohio conditions is given here. Specimens and eggs transferred from sycamore to clover were reared on the latter in the insectary, where the temperature fluctuated from 45 degrees to 90 degrees Fahrenheit. The complete life cycle from egg to egg averaged 85.5 days for six individuals. As spring approached this time was shortened. Winter was passed in every stage of development. As cold weather approached every stage of development was retarded, the immature forms and adults alike became very sluggish and inactive. None were ever found stored in ant nests. Eggs collected on December 1 and kept in a shaded place outdoors did not hatch until the middle of March.

Although found associated with the clover root mealy bug on the roots of clover, the ants rarely carried this species about. When a colony was disturbed the ants lost no time in carrying the clover root mealy bug to a place of safety, but the Baker mealy bug was usually left to shift for itself. The latter does not produce honey dew as profusely as the former.

When disturbed or handled rather roughly both species would eject from one to four dorsal globules over the location of the dorsal ostioles. When the ants touched these liquid globules they were invariably repelled while at the same time the anal secretion of honey dew was always eagerly accepted. As a rule honey dew was ejected in response to a gentle stroke of a stiff hair or needle, but when the treatment became too severe the dorsal globules were suddenly ejected, the ostiole nearest the point of disturbance being the first to respond.

REFERENCES.

CLAUSEN, C. B.—1915. The Mealy Bugs of Citrus Trees. Univ. of Cal. Exp. Sta. Bull. 238, pp. 26-30.

DAVIS, G. E.—1894. Mealy Bugs and Their Allies. Insect Life 7: 171-173.

1894. Insects That Are Common But Not Destructive. Mich. Agric. Exp. Sta. Bull. 116, pp. 58-60.

FERRIS, G. F.—1918. (a) The California Species of Mealy Bugs. Stanford Univ. Publication, Univ. Series, pp. 48-49.

1918. (b) The Alleged Occurrence of a Seasonal Dimorphism in the Females of Certain Species of Mealy Bugs. Entomological News, 29: 349-352.

1919. Observations on Some Mealy Bugs. Jour. Econ Ent. 12: 293.

1921. Report of a Collection of Coccidae from Lower California. Stanford Univ. Publication, Biological Sciences, 1. No. 2, p. 83.

Insects of the Yellow Thistle (Hem., Col., Lepid., Dip., Hym.).

By O. W. ROSEWALL, Louisiana State University, Baton Rouge, La.

Practically throughout the entire state of Louisiana one can find the plants of the Yellow Thistle (*Carduus spinosissimus* Walt.) growing at some time during the year, and in the southern part of the state the prickly green leaves may be found during the whole year, except when heavy frosts destroy them. In the spring, during the flowering season, they are very noticeable, especially in pastures and along the roadside where they stand as sentinels because the cattle have eaten the surrounding vegetation. The following statements taken from Britton and Brown's *Illustrated Flora of the Northern States and Canada* give the technical description of the plant:

Biennial or perennial, somewhat wooly when young, but becoming glabrate; stem branched, leafy, 2 ft. to 5 ft. high. Leaves green both sides, lanceolate or oblong in outline, sessile and clasping or the basal ones short-petioled and somewhat spatulate pinnatifid into triangular or broader, spinulose-margined and prickle-tipped, entire or dentate lobes; heads involucrate by the upper leaves, 2 to 4 inches broad, 1¼ to 1½ inches high; bracts of the involucre narrowly lanceolate, roughish and ciliate, long-acuminate, unarmed; flowers pale yellow, yellowish, or occasionally purple.

In moist or sandy soil, Maine to Pennsylvania, Florida and Texas. Abundant along the edges of salt-meadows in New York and New Jersey. May-August, or earlier in the South.

In Louisiana this plant is attractive to very few animals; however, certain insects may be found feeding on or visiting this plant. The collections of these insects* were made by the author in the vicinity of Baton Rouge, Louisiana, including the levee along the Mississippi River, and all dates in this paper are of the year 1920.

HEMIPTERA.

Acanthocephala declivis Say. (Coreidae.) Mar. 29. Several specimens taken on leaves. May 4. Numerous.

Agallia constricta Van D. (Cicadellidae.) Mar. 29. Few.

Euschistus bifibulus P. B. (Pentatomidae.) Mar. 29. Common.

Euschistus ictericus L. Mar. 29. One specimen taken.

Euschistus servus Say. Mar. 28. Common. April 20. Numerous, copulating. May 4 and 20. Common. Specimens practically on every plant.

Euschistus tristigmus Say. Mar. 28. Two specimens.

Entylia concisa Walk. (Membracidae.) Mar. 29. Common.

Leptoglossus phyllopus Linn. (Coreidae.) Mar. 28 and 29. Numerous all over plants.

Myzus braggii Gillette. (Aphididae.) April 8. Some of the plants almost covered with this aphid.

Nezara viridula L. (Pentatomidae.) Mar. 29. Few. April 8. Common.

Phymata wolfii Stal. (Phymatidae.) April 8. Occasional specimens found in flowers.

Repipta taurus Fab. (Reduviidae.) April 20. One specimen.

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*The author is indebted to the following for some identifications: Dr. J. M. Aldrich, Dr. H. G. Dyar, W. L. McAtee, H. L. Viereck,

COLEOPTERA.

Acmaeodera tubulus Fabr. (Buprestidae.) April 29. One specimen in flower.

Anthonomus suturalis Lec. (Curculionidae.) April 20. One specimen in flower.

Aphelogenia vittata Fab. (Carabidae.) Mar. 29. In axil of leaf.

Baris dicipula Csy. (Curculionidae.) Mar. 29. Few in axil of leaves.

Bruchus obtectus Say. (Bruchidae.) Mar. 29. Single specimen on leaf.

Calandra oryzae L. (Curculionidae.) April 8. Few in axil of leaves.

Chalcodermus aeneus Boh. (Curculionidae.) Mar. 29. One specimen in axil of leaf.

Chariessa pilosa Forst. (Lampyridae.) Mar. 29. Several specimens on leaves.

Chauliognathus marginatus Fab. (Lampyridae.) Mar. 29. One or two specimens on each plant. April 1. Very numerous and copulating.

Coccinella sanguinea L. (Coccinellidae.) Mar. 28, May 4 and April 1. Occasionally seen on all plants and numerous on those infested with aphids.

Diabrotica balteata Lec. (Chrysomelidae.) April 1. Few. Feeding on leaves.

Diabrotica 12-punctata Oliv. Feb. 4. Two specimens feeding on leaves. April 8. One or more specimens on every plant inspected.

Disonycha glabrata Fab. (Chrysomelidae.) April 8. One specimen taken in axil of leaf.

Disonycha quinquevittata Say. April 1. One specimen on leaf.

Drasterius elegans Fab. (Elateridae.) Mar. 29. Few.

Euphoria sepulchralis Fab. (Scarabaeidae.) April 20. This beetle is found in practically all mature flowers and occasionally two or three specimens may be removed from one head. They burrow deep in the flowers.

Lebia marginicollis Dej. (Carabidae.) April 8. One specimen on leaf.

Lebia viridis Say. April 8. One specimen on leaf.

Lema sayi Crotch. (Chrysomelidae.) April 8. One specimen in axil of leaf.

Limonius auripilis Say. (Elateridae.) April 20. One specimen on leaf.

Lina scripta Fab. (Chrysomelidae.) Mar. 29. Occasional specimens found in axils of leaves.

Megilla maculata Dej. (Coccinellidae.) Mar. 28. Common.

Myochrous denticollis Say. (Chrysomelidae.) Mar. 29. Common in axil of leaves.

Pyropyga decipiens Harr. (Lampyridae.) May 4. Several specimens taken in flowers.

Statira gagatina Mels. (Lagriidae.) April 20. One specimen in blossom.

Uloma mentalis Horn. (Tenebrionidae.) Mar. 29. One specimen on leaf.

LEPIDOPTERA.

Autographa biloba Stephens. (Noctuidae.) Caterpillar collected on April 8 while feeding on the leaves. Reared in insectary and moth emerged April 20.

Homoeosoma electellum Hulst. (Pyralidae.) Caterpillar collected on May 21 while feeding in base of bud. Reared in insectary and moth emerged June 2.

Phlyctaenia ferrugalis Hbn. (Pyralidae.) Caterpillar collected April 8 while feeding on leaves. Reared in insectary and moth emerged April 23.

DIPTERA.

Carphotricha culta Wd. (Trypetidae.) When present they may be found resting on the various parts of the plant. April 8. Common. May 17. Reared several adults from pupae which had been taken from the interior of the base of the dried up flowers.

Chrysops flavidus Wd. (Tabanidae.) April 30. One specimen taken on flower.

Eutreta sparsa Wd. (Trypetidae.) May 21. Occasional specimens on flowers.

Dilophus orbatus Say. (Bibionidae.) April 8 and 20. Numerous on all parts of plant.

Hydrotaea houghi Malloch. (Anthomyidae.) April 20. One specimen taken on flower.

Lucilia sericata Meig. (Muscidae.) April 8 and 20. Common on flowers.

Phormia regina Meig. (Muscidae.) April 8. Common on flowers.

Pseudopyrellia caesariana Meig. (Muscidae.) April 20. Common on flowers.

Rhamphidia flavipes Macquart. (Tipulidae.) Mar. 29. Very numerous. Ofter 50-75 individuals on a single plant would have a synchronic motion, moving the bodies up and down as if the legs were springs.

Sarcophaga quadrisetosa Coq. (Sarcophagidae.) April 20. One specimen taken on flower.

Tipula sp. ? (Tipulidae.) Mar. 29. A few specimens taken among the numerous *R. flavipes*.

Trypeta palposa Loew. (Trypetidae.) April 20 and 22. Common. Reared adults from pupae collected with the pupae of *C. culta* Wd. from interior of mature flower buds.

HYMENOPTERA.

Apis mellifica Linn. (Apidae.) April 1. An occasional bee in the flowers, but at no time have they been numerous.

Agapostemon virescens Fab. (Halictidae.) April 20. Common on flowers.

Bremus pennsylvanicus DeGeer. (Apidae.) April 1. Occasional.

Camponotus pennsylvanicus DeGeer. (Formicidae.) April 20. A single winged specimen taken on leaf.

Halictus ligatus Say. (Halictidae.) April 20. Occasional.

Iridomyrmex humilis Mayr. (Formicidae.) Common at all times on plants along river.

Megachile brevis Say. (Megachilidae.) Mar. 29. Occasional.

Oxystoglossa sp ? (Halictidae.) April 20. Three specimens on flowers.

Xylocopa micans LeP. (Xylocopidae.) April 1. Occasional.

No doubt there are many more insect visitors and insect enemies of this plant than are listed in this paper for this locality, and the list would increase with the inclusion of more territory, but the author feels that this list may lead others to watch this plant more carefully.

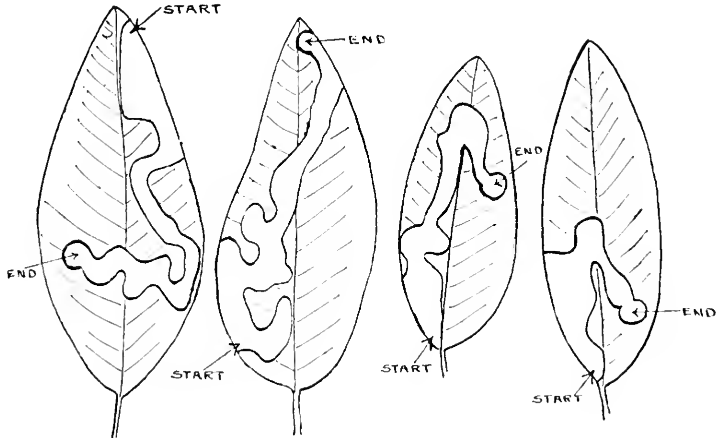
In concluding it is well to state that there are other animals who visit or live in the vicinity of this plant, *e. g.*, under the decaying leaves at the base are usually to be found sow-bugs, millipedes, centipedes and snails. The snails are often numerous on the plants near the river.

Notes on the Desmodium Leaf Miner, Pachyschelus laevigatus (Say) (Col.: Buprestidae).

By HARRY B. WEISS and ERDMAN WEST, New Brunswick, New Jersey.

This member of the *Buprestidae* which ranges from southeastern Canada to Florida and west to Iowa is common throughout New Jersey and can be found from the last of May until the first week of July on and in the vicinity of *Meibomia canadensis* (L.) (*Desmodium canadense*). Blatchley records the adults on the foliage of black gum and the flowers of black haw, milkweed, etc., and Chambers records it as mining *Desmodium*. At Rutherford, New Jersey, we found it mining the leaves of *Desmodium pendula*. At Fairlawn, New Jersey, adults were numerous on *Lespedeza capitata*, and at Boonton, New Jersey, mines were noted on *Lespedeza bicolor,* but it is not known definitely if they were the mines of *laevigatus.* At Monmouth Junction, New Jersey, several clumps of *Meibomia canadensis* growing along a railroad embankment were heavily infested by *P. laevigatus* (Say) and the following notes are the results of observations made for the most part at this place during 1921.

Adults appear about the last week of May and first week of June and feed on the upper surfaces of the leaves, leaving nothing but the lower epidermis which becomes reddish and in the course of time somewhat ragged due to the tissue drying and breaking. Copulation takes place during the last half of June, and by the first week of July small larvae can be found. The eggs are inserted in a little pocket made usually in the lower surface near the edge of the leaf. The subcircular, nearly flat, jelly-like egg is deposited under a thin layer of tissue. Both the tissue above and below the egg are pushed out slightly and this results in somewhat flat, oval-like blister or swelling which is visible on both leaf surfaces. The tissue over the egg on the lower leaf surface becomes dry and whitish, while the upper surface of the blister becomes somewhat reddish.



PACHYSCHELIS LAEVIGATUS MINES
IN DESMODIUM

The mine is started from the egg pocket and later extended in a somewhat irregular and linear manner. By the middle of July most of the larvae are nearly three-quarters grown and by the last of July many are full grown and the mines are completed. On the upper leaf surface the mines appear as dry, brown, irregularly linear areas. A few are blotch-like. The number of mines in a leaf varies from one to three, but is usually only one.

When the greenish larva is full grown it hollows out a circular cavity at the end of the mine. Such cavities are about five or six millimeters in diameter. In this place it constructs a circular, somewhat flat, thin, tough, parchment-like cocoon about four millimeters in diameter. These cocoons push out the upper and lower leaf tissues somewhat into comparatively large blister-like swellings. By the first week of August all of the larvae are in these cocoons. At this time the tissue over the linear mines starts to break up and this, together with the feeding which took place earlier in the season, cause the leaves to turn entirely brown and start to curl up toward the midrib.

After the larva enters its cocoon it shrinks longitudinally into a semiquiescent, compact, prepupal stage, in which it remains until the following spring, when it transforms to a pupa. The prepupal stage is long and lasts almost from the first of August until the following May. By the first week in September the cocoon with the dried leaf tissue over it somewhat resembles a *Desmodium* seed in color and shape. Later the leaves containing the cocoons and in fact all of the leaves fall to the ground and here the prepupa passes the winter.

Egg.—Width, 0.5 mm. Subcircular, flat, sides slightly convex; chorion apparently smooth; transparent when first laid, later becoming translucent and whitish. The egg resembles a flattened globule of water, but of thicker consistency.

Larva.—Length 6 to 7 mm. Width across middle of body about 1.7 mm. Flattened, spindle-shaped, tapering both ways from about the middle, more acutely posteriorly; each segment slightly convex dorsally and ventrally; body deeply notched, composed of thirteen well-defined segments; legs absent; ocelli absent; color light green, contents of alimentary canal sometimes showing as median dark green line; first segment narrower than second; first segment with well-defined, large, subquadrate plate on dorsal and ventral surfaces, dorsal plate apparently smooth, ventral plate bearing transverse rugosities; head small, retracted into first segment; antennae three-jointed; labrum comparatively large, protruded; mandibles short, strong, somewhat spoon-shaped, bifid at apex; maxillary palpi two-jointed; labium somewhat protruded; spiracles, one large one on each side of second segment and a smaller one on each anterior dorso-lateral surface of segments four to eleven. The embryonic larva appears to be more characteristically "buprestid" in shape. Viewed through the transparent covering, the anterior third of the body is wide and flat and the remaining two-thirds narrow and tail-like, folded against anterior third. After hatching it becomes oval.

Pupa.—Length about 3 mm. Width about 1.6 mm. Color whitish; shape oval, like that of adult. Abdomen terminated by a pair of minute tubercles; remainder of body apparently devoid of hairs or spines.

Adult.—*Pachyschelus laevigatus.* This was described by Say in 1836 (Trans. Am. Phil. Soc., vol. vi, p. 164). The original description was recently published by Nicolay and Weiss in their review of the genus *Pachyschelus* (Jour. N. Y. Ent. Soc., vol. xxviii, p. 140, 1920) and need not be repeated here.

On Anomalies in Wing Markings of Basilarchia astyanax Fab. (Lepid., Rhop.: Nymphalidae).

By Waro Nakahara, New York City.

Among some fifty specimens of *Basilarchia astyanax* Fab. (= *Limenitis ursula* Godt.) collected by me at Elmhurst, Long Island (near New York City) during the early part of August, 1921, two interesting aberrant specimens have been found. In one there is a complete submarginal row of red spots to the hindwing, upperside, exactly as in *B. arthemis* Dru. The specimen is a male with appearance entirely typical of *astyanax*, excepting the character just mentioned. In the other, a female specimen, there are elongated conspicuous red patches, one in each interspace, on the underside of the hindwing. This specimen appears typical of *astyanax*, as far as the upperside is concerned. Needless to say that almost every intergradation has been found between the typical *astyanax* and the two extremes here described.

It is well known that in form *proserpina* Edw. of *arthemis* the white bands are often completely obsolete, thus closely resembling *astyanax*. The only difference between the two species then consists of the presence in *arthemis* and the absence in *astyanax* of the red spots on the upperside of the hindwing. Therefore I would have referred the first specimen described above to *B. arthemis* f. *proserpina* Edw., if it were not for the fact that the specimen was found in company with numerous examples of *astyanax* and not of *arthemis*. Besides, as far as I am aware, *arthemis* has not been found to occur in the vicinity of New York City.

The occurrence of a *proserpina*-like form within a population of *astyanax*, which is not mixed with *arthemis*, is rather interesting. This fact, coupled with the well-known variability of *arthemis* itself and the geographical distribution of the two butterflies, seems to suggest that they represent two local races (sub-species) of a single species: *B. arthemis arthemis*, the northern, and *B. arthemis astyanax*, the southern race.

Another point that might be brought up in connection with the variability of the reddish markings in *astyanax* is the question of mimicry in the genus *Basilarchia*. The well-known resemblance of *B. archippus* to *Danais* (*Anosia*) *plexippus*, long believed to be a case of mimicry, has come in recent years to be looked upon with much skepticism. There has been no positive ground for the hypothesis of mimicry to begin with, and in the case of *archippus* especially it has been shown that in the ancestral form, *B. arthemis*, which *archippus* is supposed to have sprung from, the reddish markings show no such wide variability as called for by the hypothesis of gradual change by natural selection. That *astyanax* shows much variation in its reddish markings would seem to open a path for the hypothesis, which, however, does not seem to meet the condition. For the past three years, in the vicinity of New York City, *archippus* has been observed more commonly than *plexippus*. The time of appearance, too, seems to be different in the two species, they being seldom seen flying at the same time. Moreover, of the two Basilarchias occurring in this region, the "unprotected" *astyanax* is by far commoner than the supposedly protected *archippus*. A question arises: Does *archippus* derive any benefit from its resemblance to *plexippus?* With these facts at hand, it might be well to consider if *archippus* is so different in the markings from other congeneric forms as to require some special explanation. Is not *Vanessa antiopa*, for instance, different enough from other Vanessas to demand a special hypothesis to account for its unique coloration?

It is not within the scope of this short note to go into this question any deeper. Suffice it to say that, while *astyanax* shows wide range of variability in the reddish element of its wing markings, this fact by itself offers no argument for the supposed mimetic nature of the coloration of *archippus*.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JUNE, 1922.

Collect Data First, Specimens Second.

When this number of the NEWS reaches its readers *the* collecting season will already have been under way for some weeks. Indeed some kind of entomological collecting is possible at almost all seasons of the year. It is, therefore, never too late to remind collectors that in most cases the data which they may obtain with their specimens (if they will) are more important and more valuable than the animals (insects) themselves. To be sure, as an illustration of morphology or of a taxonomic unit of some sort, a specimen, unaccompanied by any data as to its habitat, its time of occurrence, its relations to its surroundings, has a certain value, but from any other viewpoint such a naked object is useless. All of the most interesting sides of entomology, of biology, are based upon the observations made in connection with the living thing and its surroundings, and the more completely these are recorded in connection with the specimens the better.

Dr. A. G. Ruthven, in his *Report of the Director of The Museum of Zoology* of the University of Michigan, for the year ending June 30, 1921, makes a strong and interesting appeal for "Geography in Museums of Zoology," saying among other things:

> Specimens accompanied by geographic data are more valuable for taxonomic investigations than those without this information, . . . such data are indispensable for geographic studies, . . . it is an anachronous practice to continue the piling up of records of a kind once thought to be adequate but now known to be inadequate for the purposes which they should serve.

The University of Michigan-Williamson Expedition to Brazil.

Mr. Jesse H. Williamson's letters from February 13 to March 1 state that Captain Strohm and he were still at Porto Velho, Brazil (see the NEWS for April, page 104). There was much rain and the opinion was expressed that there would be no collecting along or near the big rivers till they dropped 30 or 40 feet. On March 1 they estimated their collections of insects as comprising 2000 specimens of Odonata of 83 species and a few ants, beetles, grass-hoppers, crane-flies and cicadas; also a few spiders.

On March 5 they left Porto Velho by the Madeira-Mamoré Railway for Abuná, 220 kilometers to the southwest, in the State of Matto Grosso. This place is given as Abunan on the National Geographic Society's map; its official name is Presidente Marquez; it likewise is on the Madeira River. At first there were only light showers here, but after a week heavy rains fell putting even the woods trails a foot or more under water.

On March 15, Drs. Mann, Pierson and White of the Mulford Exploration arrived in Abuná, on their homeward way, and continued their journey to Porto Velho the next day. A "gab fest" between the two expeditions is reported.

In spite of the unfavorable weather their Odonata numbered 2945 specimens on March 14 and 3616 on March 26.

On March 27 they continued up the railway to Villa Martinho, where there is no hotel as at Porto Velho and at Abuná, and found quarters in a restaurant. Villa Martinho is 93 kilometers from Abuná. In these river towns the railway is the only foot highway.

A Request for Exchanges with Russia.

The Permanent Bureau of All-Russian Entomo-Phytopathological Congresses, Liteyny, 37-39, Room 59, Petrograd, Russia, desires:

1. To *exchange printed matter* (published since 1914) on entomology, phytopathology, mycology and zoology, with American Colleagues, Scientific Societies, Agricultural Experiment Stations, Museums of Natural History, Periodicals, etc.

2. To receive from *American publishers catalogues* and specimen numbers of various publications on the above mentioned subjects.

3. To receive *catalogues* and price-lists from American firms dealing in various *apparatus and chemicals* used in combating the plant injurers.

The above mentioned Permanent Bureau has supplied credentials to Mr. D. N. Borodin (who also represents the Bureau of Applied Botany of the Russian Agricultural Scientific Committee, Petrograd) to collect literature in this country and give all the necessary information to American Colleagues, concerning the entomological work conducted in Russia and to organize an exchange of literature.

Mr. Borodin will accept all packages of books, bulletins, etc., for

Russia, if they will be addressed to him at No. 110 West 40th Street, Room 1603, New York City.

[The Editors are aware that there has been difficulty in sending and receiving scientific papers to and from Russia, and will be glad if Mr. Borodin succeeds in reopening communication with that country.]

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

5—Psyche, Cambridge, Mass. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **8**—The Entomologist's Monthly Magazine, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **13**—Journal of Entomology and Zoology, Claremont, Cal. **15**—Insecutor Inscitiae Menstruus, Washington, D. C. **16**—The Lepidopterist, Salem, Mass. **22**—Bulletin of Entomological Research, London. **24**—Annales de la Societe Entomologique de France, Paris. **28**—Entomologisk Tidskrift, Uppsala. **39**—The Florida Entomologist, Gainesville, Florida. **45**—Zeitschrift fur wissenschaftliche Insektenbiologie, Berlin. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipsic. **62**—Bulletin of the American Museum of Natural History, New York. **68**—Science, Garrison on the Hudson, N. Y. **69**—Comptes Rendus, des seances de l'Academie des Sciences, Paris. **70**—Journal of Morphology, Philadelphia. **72**—The Annals of Applied Biology, London. **73**—Proceedings of the Linnean Society of New South Wales, Sydney. **77**—Comptes Rendus des seances de la Societe de Biologie, Paris. **80**—Revue Suisse de Zoologie, Geneve. **82**—The Ohio Journal of Science, Columbus, Ohio. **85**—The Journal of Experimental Zoology, Philadelphia. **87**—Arkiv for Zoologi, K. Svenska Vetenskapsakademien, Stockholm. **88**—Occasional Papers of the Museum of Zoology, University of Michigan, Ann Arbor. **89**—Zoologische Jahrbucher.

Jena. **91**—The Scientific Monthly, Lancaster, Pa. **104**—Zeitschrift fur Wissenschaftliche Zoologie, Leipzig. **114**—Entomologische Rundschau, Stuttgart. **115**—Societas Entomologica, Stuttgart. **125**—Verhandlungen del zoologisch-botanischen Gesellschaft in Wien. **138**—American Museum Novitates. **139**—Bulletin of the Southern California Academy of Sciences, Los Angeles. **140**—Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin.

GENERAL. Borodin, D. N.—The present status of entomology and entomologists in Russia. **12,** xv, 172-6. **Distant, W. L.**—Obituary notice. **8,** lviii, 66-67. **Handschin, E.**—Zur nomenklaturfrage. **115,** xxxvii, 9. **Louisiana Entomological Society.** [An account of the society by T. E. Holloway]. **68,** lv, 436. **Pierce, W. D.**—Lectures in applied entomology. Collection. Ser. 1, Pt. 1, No. 5. **Schrottky, C.**—Soziale gewohnheiten bei solitaren insekten. **45,** xxii, 49-57. **Thompson, Caroline B.**—Obituary notice. **72,** ix, 81-82. **Wahlgren, E.**—De europeiska polaroarnas insektfauna des sammansattning och harkomst. **28,** 1920, 1-23.

ANATOMY, PHYSIOLOGY, ETC. Baerg, W. J.—Regarding the habits of tarantulas and the effects of their poison. **91,** xiv, 482-89. **Brown, M.**—Notes on the structure of an endoparasitic water-mite larva occurring in frogs. (Washington Univ. Studies, ix, 291-308.) **Bryk, F.**—Grundzuge der sphragidologie. **87,** xi, No. 18. **Carpenter & Pollard**—The presence of lateral spiracles in the larva of Hypoderma. (Proc. R. Irish Acad., xxxiv, B. 73-84.) **Crampton, G. C.**—Evidences of relationship indicated by the venation of the fore wings of certain insects with especial reference to the Hemiptera-Homoptera. **5,** xxix, 23-41. **v. Emden, F.**—Beitrag zur kennzeichnung der holometabolen (heteromophen) insektenlarven. **52,** liv, 231-5. **Fassl, A. H.**—Einige kritische bemerkungen zu J. Robers "Mimikry und verwandte erscheinungen bei schmetterlingen." **114,** xxxix, 15-16. **Gaschott, O.**—Zur phylogenie von Psithyrus. **52,** liv, 225-31. **Genieys, P.**—Sur le determinisme des variations de la coloration chez un Hymenoptere parasite. **77,** lxxxvi, 767-70. **Heikertinger, F.**—Die wespenmimikry oder sphekoidie. **125,** lxx, 316-385. **Heselhaus, F.**—Die hautdrusen der apiden und verwandter formen. **89,** Ab. f. Anat., xliii, 369-464. **Hess, W. N.**—Origin and development of the light-organs of Photurus pennsylvanica. **70,** xxxvi, 245-77. **Kreuscher, A.**—Der fettkorper und die oenocyten von Dytiscus marginalis. **104,** cxix, 247-84. **Lienhart, R.**—Le mechanisme de la stridulations chez Cyrtaspis scutata. **24,** xc, 156-60. **Petrunkevitch, A.**—The circulatory system and segmentation in Arachnida. **70,** xxxvi, 157-89. **de Peyerimhoff, P.**—Etudes sur les larves des coleopteres. I. **24,** xc, 97-111. **Reh, L.**—Die wespenmimikry der Sesien. **125,** lxx, 99-112. **Roubaud, E.**—Sommeil d'hiver cedant a l'hiver chez les larves et nymphes de Muscides. **69,** clxxiv, 964-6. **Van der Heyde, H. C.**—On the respiration of Dytiscus marginalis. **85,** xxxv, 335-52. **Walker, E. M.**—The terminal structures of orthopteroid insects: a phylogenetic study. Part 2. **7,** xv, 1-88. **Wolff, B.**—Schlammsinnesorgane (pelotakische organe) bei Limnobiinenlarven. (Jenaische Zeit. f. Naturw., lviii, 77-144.)

ARACHNIDA, ETC. Ewing, H. A.—Three new species of peculiar and injurious spider mites. **10,** xxiv, 104-8.

NEUROPTERA. Sjostedt, Y.—Wissenschaftliche ergebnisse der schwedischen entomologischen reise der D. A. Roman in Amazonas. Odonata. **87,** xi, No. 15.

Watson, J. R.—New Thysanoptera from Florida. XI. Another new thrips from cocoanuts from Cuba. **39,** v, 65-6; 66-7. **Williamson, E. B.**—Notes on Celithemis with descriptions of two new species. **88,** No. 108.

ORTHOPTERA. Criddle, N.—Manitoba grasshoppers. (Can. Field-Nat., xxxvi, 41-44, 66-8.)

HEMIPTERA. Barber & Ellis—Eggs of three Cercopidae. **5,** xxix, 1-3. **Drake, C. J.**—The genus Dicysta. (Ann. Carnegie Mus., xiii, 269-73.) **Mason, A.**—Life history studies of some Florida Aphids. **39,** v, 53-9, 62-5.

Barber, H. G.—Two new species of Reduviidae from the U. S. **10,** xxiv, 103-4. **Sanders & DeLong**—New species of Cicadellidae from the eastern and southern U. S. **10,** xxiv, 93-102.

LEPIDOPTERA. Caudell, A. N.—Change of authorship of certain Noctuids. **15,** x, 112.

Barnes & Lindsey—A review of some generic names in the order Lepidoptera. **7,** xv, 89-99. **Cassino & Swett**—Two new species of Sericosema. Some new Geometrids. **16,** iii, 151-55; 155-58. **Wright, W. S.**—A new Lycaenid. **139,** xxi, 19-20.

DIPTERA. Crumb, S. E.—A mosquito attractant. **68,** lv, 446-7. **Alexander, C. P.**—The biology of the North American crane-flies. VI. The genus Cladura. **13,** xiv, 1-6. Undescribed species of Costa Rican flies belonging to the family Tipulidae in the U. S. Nat. Mus. **50,** lx, Art. 25. **Patton, W. S.**—Notes on the species of the genus Musca. **22,** xii, 411-26. **Pawan, J. L.**—The oviposition of Joblotia digitalis. **15,** x, 63-5. **Ping, C.**—The biology of Ephydra subopaca. (Cornell Univ. Agr. Expt. Sta., Mem. 49.) **Thompson, W. R.**—On the taxonomic value of larval characters in tachinid parasites. **10,** xxiv, 85-93.

Dyar, H. G.—The American Aedes of the scapularis group. Two mosquitoes new to the mountains of California. Illustrations of the male hypopygium of certain Sabethids. The mosquitoes of the Palaearctic and Nearctic regions. The mosquitoes of the Glacier National Park, Montana. Mosquito notes. **15,** x, 51-60; 60-61; 61-62; 65-75; 80-8; 92-9. **Garrett, C. B. D.**—Two new Blepharoceridae. A meristic variation. **15,** x, 89-91; 91. **Hine, J. S.**—Descriptions of Alaskan diptera of the family Syrphidae. **82,** xxii, 143-7.

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Doings of Societies.

The American Entomological Society

Meeting of June 6, 1921, at The Academy of Natural Sciences of Philadelphia. Twelve persons present, Dr. Skinner presiding.

ODONATA.—Dr. Calvert exhibited specimens of the true *Gomphus dilatatus* Rambur which has been found only in Georgia and Florida; also specimens from Weaver, Perry County, Pennsylvania (by the late Erich Daecke) and other northern states, which have passed for *dilatatus* but are specifically distinct and for which the name *lineatifrons* is proposed; also specimens of *G. vastus* Walsh which is the northern and smaller representative of the true *dilatatus*. The differences between these three were briefly discussed. [The full statement appears in a paper which has since been published in the *Transactions* of the Society, xlvii, pp. 221-232.] He remarked that *vastus* is a smaller form than *dilatatus* and asked for discussion on this point. Mr. Rehn said that in birds and mammals southern forms were smaller, while in grasshoppers they were larger. Mr. Hebard spoke on possible influence of richness of vegetation on size and remarked that the same influence is seen in ascending mountains.

LEPIDOPTERA.—Dr. Skinner stated that in butterflies the southern forms were larger and that *Papilio turnus* in Alaska was but half the size of those in the southern states. He discussed the various forms of *turnus* and whether they are species or not.

Mr. Hebard remarked that two forms might be distinct in two localities and yet converge to the area where intermediates are found. When the opposite is true there is no change even though the species are quite similar. In such cases they change from one form to the other without overlapping. Mr. Rehn remarked that the area of intergradation is usually narrow and that forms do not gradually merge over extensive territories.

Comments by Mr. Williams followed. Mr. Laurent noticed that Florida forms of Lepidoptera were usually larger. Dr. Skinner stated that there was plenty of food for *turnus* there, cherry and tulip poplar.

ORTHOPTERA.—Mr. Rehn exhibited specimens of the two species of *Hemimerus* and made some remarks on the family Hemimeridae, touching on the structure, habits and distribution of the species and the history of our knowledge of these remarkable insects.—DAVID HARROWER, *Recording Secretary*.

Meeting of October 26, 1921, at the Academy of Natural Sciences of Philadelphia. Members present, 8 and one visitor, Dr. Skinner presiding.

LEPIDOPTERA.—Mr. Davis presented a colony of cocoons of *Apanteles lacteicolor* Vier., a parasite of the Gypsy and Brown Tail Moths in New England, and he spoke of the introduction of these parasites in 1914-1916, and the apparent success of various parasites introduced for these pests. Dr. Skinner spoke about his researches in the Hesperidae, particularly his genitalic studies of that family, and exhibited outline sketches showing the various forms of these organs in a number of species.

ORTHOPTERA.—Mr. Hebard exhibited specimens of the Blattid genus *Prosoplecta* from the Philippine Islands which mimic species of the Coleopterous family Coccinellidae. He also spoke of the peculiar Orthopterous fauna of that part of the world. Mr. Rehn made a few remarks on the West Indian species of the Blattid genus *Nyctibora*, dwelling particularly upon the history of *N. laevigata*, which remained virtually unrecognized for over one hundred years after it was originally described. The series of the genus from the collection was exhibited.

General discussion, especially by Messrs. Hebard and Rehn and Cresson as to the generic value of certain characters, followed. A point brought out in the discussion was that a generic character may not necessarily be present in all species of the genus.—E. T. CRESSON, JR., *Recording Secretary pro tem.*

Meeting of December 12, 1921, at the same place. Eight members and contributors and Mr. T. H. Frison, of Riverton, visitor, present, President Skinner presiding.

The President gave an interesting reminiscence of his nearly forty years' connection with this Society as a member; of the meetings and their attendances, communications, and of the persons he knew and had been associated with during the early years.

A letter from the Consulate General of Finland was read in which mention was made that Mr. B. W. Heikel, Jardin Botanico, Asuncion, Paraguay, would like to correspond with any person wishing collections of Natural History specimens from Paraguay.

Mr. Rehn moved that the thanks of the Society be extended to Dr. Robert G. LeConte for a gift of the letters of his father, Dr. John L. LeConte.

Mr. Rehn moved that the meetings during 1922 be held as follows: Fourth Thursdays of February, April and October, and on the second Monday of December. Adopted.

The following officers and committees were elected to serve during 1922: *President*, Henry Skinner, M.D., Sc.D.; *Vice-President*, James A. G. Rehn; *Corresponding Secretary*, Morgan Hebard; *Recording Secretary*, Roswell C. Williams, Jr.; *Treasurer*, Ezra T. Cresson.

Publication Committee, James A. G. Rehn (Chairman and Editor), Ezra T. Cresson, Philip P. Calvert, Ph.D.

Finance Committee, Morgan Hebard (Chairman), David M. Castle, M.D., James A. G. Rehn.

Property Committee, Ezra T. Cresson, Jr. (Librarian and Custodian), Morgan Hebard and Philip Laurent.—E. T. CRESSON, JR., *Recording Secretary pro tem.*

JULY, 1922

ENTOMOLOGICAL NEWS

Vol. XXXIII No. 7

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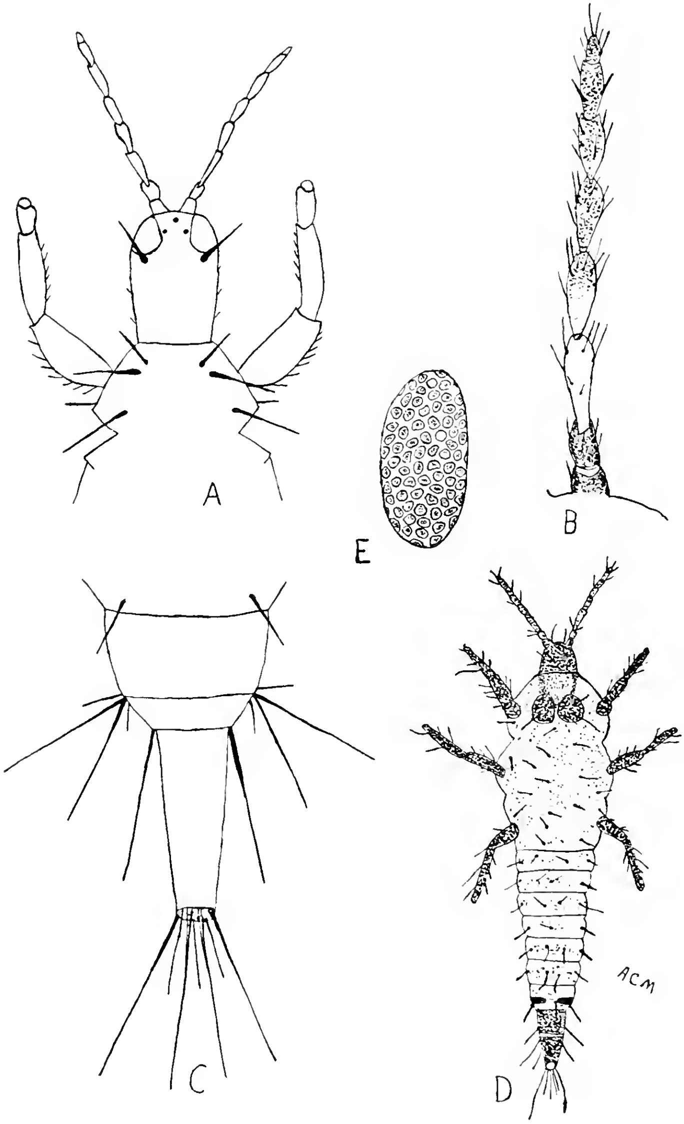

CRYPTOTHRIPS LAURELI, ADULT (A-C), EGG (E) AND LARVA (D).—MASON.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

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Cryptothrips laureli, a New Thrips from Florida (Thysanop.).

By ARTHUR C. MASON, Assistant Entomologist, Fruit Insect Investigations, Bureau of Entomology, United States Department of Agriculture.[1]

(Plate IX.)

INTRODUCTION.

While making a survey of the native bay trees of the genus *Tamala* (*Persea*) in the central part of Florida for the purpose of discovering, if possible, the origin of the camphor thrips (*Cryptothrips floridensis* Watson), a closely related species of *Cryptothrips* was found. The camphor thrips has proven a serious menace in the last few years to the newly developing camphor industry in the State and has been the subject of investigation by the Bureau. Although first taken to be an introduced insect peculiar to camphor, later developments tended to point to the fact that it might be native on the bays and had taken to the camphors because of their close botanical

[1]Published with the permission of the Secretary of Agriculture.

relationship. This theory,[2] that the native bays were the natural host for the camphor thrips, was held for some time. However, the results of this investigation have shown that the thrips on the bay, although identical in many respects with the camphor thrips, is a new species distinct from *C. floridensis*. The purpose of this paper, therefore, is to describe this new bay thrips and give its biological habits and other points of interest.[3]

Description of Bay Thrips.

Cryptothrips laureli n. sp. (Plate IX, A, B, C.)

Close to *C. floridensis* Watson, but differs in the following characters: general size, color and length of antennae; relative shape and size of third antennal segment; stronger spines on head, thorax and abdomen; number of doubled hairs on fringe of wings. Also in color and appearance of eggs, color of larvae, feeding habits, preferred host plants, general biological habits, such as length of instars, reproductive methods, etc.

General color almost uniformly glossy black; tarsi dark brown; antennae dark brown to black with exception of segment three, which is clear yellow.

Average measurements: Total length of insect, exclusive of antennae, 2.7 mm.; head, length .34 mm., width .25 mm.; prothorax, length .23 mm., width .44 mm.; mesothorax, width .54 mm.; abdomen, greatest width .57 mm.; tube, length .25 mm.; width at base .084 mm.

Antennae: 1, 37.1 microns; 2, 58.8 microns; 3, 107.1 microns; 4, 94.2 microns; 5, 85.4 microns; 6, 75.6 microns; 7, 67.2 microns; 8, 36.8 microns; total length .56 mm.

Head nearly one and one-half times as long as wide, cylindrical, sides almost straight and parallel; one rather prominent spine back of each eye. *Eyes* dark brown, rather large and prominent, finely facetted, not pilose. *Ocelli* present, concolorous with eyes, inconspicuous. *Mouth-cone* blunt, reaching nearly across the pronotum. *Antennae* with eight segments, almost twice as long as head; first two segments heavy, third segment long and slender in proportion to the others; segments one and two concolorous with the head, segment three clear yellow, segment four light brown at base and shading into darker brown toward the tip, remaining segments dark brown or black; bristles and sense-cones thick.

Prothorax short, slightly shorter than the width of the head, widest

[2]Watson, J. R. "The Native Host-Plant of the Camphor Thrips." In "Florida Buggist," Vol. III, No. 2, p. 25, 1919.

[3]The writer is indebted to Mr. W. W. Yothers, under whose direction this work was done, for many valuable suggestions in accomplishing it.

in center and narrowed toward each end; two prominent spines on both the anterior and posterior lateral margins. Mesothorax very short with straight parallel sides, about one and one-fourth times as wide as the prothorax. One short spine on each lateral margin. *Pterothorax* slightly narrower than the abdomen, sides almost straight. *Legs* long and slender except the fore femora; tarsi dark brown but otherwise concolorous with the body. *Wings* transparent, rather short, about two-thirds of length of abdomen, very slight constriction, finely fringed with hairs and doubled for from 5 to 13 hairs, usually about 7 hairs. 3 strong prominent spines at base of fore wings.

Abdomen long, first three segments of nearly equal width and then tapers gradually to segments 7 and 8, which are rounded off to the tube. A pair of prominent spines on outer posterior angles of all abdominal segments which become longer toward the posterior end, the last two pairs being as long as the tube. Tube rather long and slender with a circle of stiff hairs at the end, 8 of which are nearly as long as the tube and the alternating 8 about half as long.

Males are very much smaller but otherwise similar. Sometimes show reddish brown or purple pigment. Body length varies from 1.3 mm. to 2.2 mm. with an average of 1.7 for ten specimens.

Described[4] from a large number of adults, eggs and larvae collected on bays of the genus *Tamala*. Type localities Daytona and Orlando, Fla.

EGG.—The eggs (Plate IX, E.) average .46 mm. x .20 mm. in size, are light straw yellow to orange yellow, and become red during development of the embryo. The surface is sometimes smooth and sometimes covered with irregular scale-like patches; often one side of an egg will show these markings while the other side is smooth.

The average time for development of eggs was 6.5 days (average of 30 eggs). When ready to hatch a lid-like cap splits off the anterior end of the egg, allowing the young larva to escape. The egg shell remains intact on the limb or buds, often for a long period.

The preferred place for laying eggs seems to be among the bud scales on the new shoots. They are also found sometimes in the axils of the leaves or other sheltered places on the limb.

LARVA.—*First Instar.*—When first hatched from the eggs the young larvae appear a light carmine red color. Total length, including antennae, about one millimeter, the legs and antennae very long in proportion to the rest of the body. The antennae black, but have a short colorless area at the end of each segment; eyes small and red; two black spots on the thorax so large as to occupy most of the dorsal surface and make the entire thorax appear black; legs and last two abdominal segments dirty white or gray.

[4]Types deposited in the U. S. National Museum.

The average duration of the first instar for 18 individuals was 8.06 days. It varied from 6 to 11 days.

Second Instar.—(Plate IX, D.) Color bright carmine red, the larvae being conspicuous on the trees by their brilliant color. The color pigment solid throughout the body and not broken into blotches. Head, antennae, legs and last two abdominal segments clear glossy black. Also two large black spots on the thorax and two rectangular black markings reaching about half way around the center of the third segment from end of abdomen. The body, including legs and antennae, is covered with a number of black hairs or spines.

The larvae are not very active and when moving about often carry the tip of the abdomen curled upward and forward in a characteristic manner. The length of this instar varied from 6 to 13 days with an average of 7.9 days.

Third Instar. (Prepupa). Same clear red color as in preceding stages, although the color pigment is somewhat broken into blotches, particularly in head and thorax and near tip of abdomen. Head whitish and almost colorless except for a few blotches of red color in the center; eyes small and red; antennae short, stout and colorless. Wing pads very short and colorless; legs and last two abdominal segments also colorless. A few whitish hairs cover the body.

The larvae in this stage are very inactive. The instar is of short duration, lasting only 2 or 3 days, with an average of 2.4 days.

Pupa.—This stage is the same color as the preceding and appears similar except for the length of the antennae and wing pads. The antennae are now longer and folded back along the sides of the head. Wing pads reach to the 4th or 5th abdominal segment. The eyes appear somewhat larger and brown in color.

The pupae are very quiescent and usually remain in secluded places. The stage lasts for 4 to 6 days with an average of 4.5 days.

Distribution and Host Plants.

The natural host plants of this insect include all of the bay trees of the genus *Tamala* (family Lauraceae). There is in the State another entirely unrelated group of trees called bays, belonging to the genus *Magnolia* of the family Magnoliaceae. These, of course, have no relation to the laurels and are not concerned in this discussion. Although known to occur only in Florida, it is probable that the bay thrips extends over the entire range of its host plants which includes all of the southeastern states. All four species of *Tamala* have been found infested. The writer has collected *C. laureli* from three of these bays and Watson reports finding it on the fourth, *Tamala borbonia*, or red bay, near Gainesville. The shore bay, *T. littoralis*, is a very common tree along the sand ridges on the beach near Daytona and in nearly all cases harbors the thrips. In the so-called oak scrub, in central Florida, is a bay known as *T. humilis*, or scrub bay, and the thrips were taken from it between Orange City and Lake Monroe. Probably the most common bay of the State is the swamp bay, *T. pubescens*, which lives around the margin of lakes and along streams and in swampy ground over most of the State. The bay thrips is common on this species in the vicinity of Orlando and is reported by Watson as being found on them near Frostproof, Florida, and other points on the central ridge of the State. The red bay lives in the higher hammock lands and, as stated above, is also a host of the bay thrips.

The bay thrips also will live on camphor (*Camphora camphora*), but it is somewhat doubtful if it will establish itself permanently there. Several generations have been bred on camphor trees under observation at the laboratory, but no instances have been found where bay thrips have colonized themselves on camphor trees naturally. Camphor trees growing close to bay trees infested with thrips were uninjured. The preferred hosts certainly are the bays. Of the four species of *Tamala* no preference has been observed.

Life History and Habits.

The length of time required from egg to adult as determined from the average of 50 individuals was 28.3 days. As stated above the egg stage lasted for 6.5 days. The total time for the larval and pupal stages together was 21.8 days as an average. Since there is a preoviposition stage of several days, the period for the maximum generations would be in excess of 30 days. The life of the adult thrip often lasts about 60 days in confinement but in some cases has exceeded this. There is also a postoviposition stage lasting usually for several days preceding death. The bay thrips are not very prolific in number of eggs laid. Ten adults laid an average of 1.06 eggs per day over a period of about 2 months. The greatest number laid on any one day was 4. Many days were passed without any eggs being laid.

The above data were obtained during August and September when the weather was warm. Of course, the various stages would be much longer during the cooler weather. During these experiments the temperatures at the laboratory in Orlando, Florida, were as follows:

For August the daily maximums ranged from 90° F. to 100° F. with a mean of 94° F.; the daily minimums 65° F. to 75° F. with a mean of 71.2° F.; mean temperature for month 82.6° F.; greatest daily range 29° F.; precipitation 4.13 inches. For September the daily maximums ranged from 91° F. to 103° F. with mean of 95.9° F.; the daily minimums 67° F. to 73° F. with mean of 69.6° F.; mean temperature for month 82.8° F.; greatest daily range 32° F.; precipitation 1.93 inches.

Contrary to the sex ratio of many species of thrips, the percentage of males for this species seems to be relatively high, often as many as 50% of those captured being males. The same phenomenon has been observed among those bred in jars in the laboratory, a large number being males. The adults of both sexes have a habit of congregating together and copulation has frequently been seen to occur in the breeding jars. In fact it is very doubtful if this thrips will breed parthenogenetically. In a large number of experiments the adults reared in jars would die without laying eggs when they were not mated with males.

All stages of the thrips are found around the terminal bud and on the new shoots. The young larvae on hatching feed on the newly unfolding leaves, causing brown and dead spots to appear. The later stages of the larvae, as well as the pupae and adults, also feed on the new growth. When very numerous on a tree they will sometimes kill the buds, but ordinarily no damage is done. Although small areas are killed on the new leaves, the leaves later outgrow this injury. The thrips do not cause lesions or other injury to the bark, and no instances have been observed where trees, or even limbs on a tree, have been killed. This, of course, would be expected of a native insect on its natural host.

The adult thrips are always active and usually walk about on the stems and leaves with a rapid motion. They have a characteristic habit of carrying the tip of the abdomen curved upward and forward. Although possessed of fully developed wings, they have seldom been seen to fly and then only for short distances. When disturbed they will run rapidly around the stem or to some place of hiding. They are often found close down in the axils of newly opening leaves.

These insects possess the ability to puncture the skin. The writer while working with them has often felt a very perceptible stinging sensation from their bite on the back of the hand, neck or other place where the skin is tender.

Enemies.

One of the factors limiting the increase in numbers of the bay thrips is that it is preyed upon by other insects. At least two of these enemies have been found, one an internal hymenopterous parasite and the other a predaceous Anthocorid.

The first of these is *Tetrastichus sp.*,[5] apparently an undescribed species, and a representative of a genus not known before from Thysanoptera in this country. Internal parasites of thrips while very rare, have been reported in a few cases. Parasitized specimens of this thrips were collected on bay trees in September, 1921, and the adults bred from them in the laboratory. The eggs are laid by the adults in the bodies of the larval stages of the thrips. After a few days the thrips dies and the body becomes dried and swollen. About a week later the small wasp-like parasite emerges from a hole cut through the body wall on the dorsal surface near the end of the abdomen.

The second of these is *Anthocoris sp.*,[6] a small predaceous insect, which was found sucking the juices from the larval and pupal stages of the thrips. While perhaps not so important a factor in control as the internal parasite, still these Anthocorids will destroy a large number of thrips. These two insects undoubtedly are largely responsible for keeping the thrips from increasing and doing a large amount of injury to the bay trees.

Explanation of Plate IX.

Cryptothrips laureli n. sp. A.—Head and prothorax. B.—Antenna enlarged. C.—Tip of abdomen showing tube and hairs. D.—Second stage larva. E.—Egg.

[5]Determined by A. B. Gahan of the Bureau of Entomology.
[6]Determined by W. L. McAtee, of the Bureau of Entomology.

Indiana Somatochloras Again (Odonata, Libellulidae).

By E. B. Williamson, Bluffton, Indiana.

Eighty-five years ago, in 1837, Calvin C. Deam, aged six years, came to Wells County, Indiana, with his parents. Here they found only a few white people in a few small cleared areas in the practically continuous forest, two small prairies, the largest about seventy or eighty acres, being the only natural openings in the woodland which covered the land to the water's edge along the Wabash River. The forest was heavily underbrushed with prickley ash, spicewood, pawpaw and dogwood. The small streams of later years were then practically long swamps with short connecting streams. Here the timber was not so heavy, being principally ash, and the underbrush was not so thick, but the water was all shaded and log-dammed at frequent intervals. Creek beds as I knew them thirty years ago as a boy did not appear till the fallen logs were dragged out and the released waters made the channels. The Wabash was also log-jammed and full of deep holes. Its breadth permitted the sun to reach the water, which was deep and clear even in low stages when it almost ceased to flow. The boulders, now numerously exposed, were then all covered with but one exception. Even in the highest stages the water was only slightly roiled, never getting a muddy yellow as in these later days, though it frequently got out of its banks into the surrounding woodland. The prairie of seventy or eighty acres got dry enough in the summers to cut with scythes, but not dry enough for wagons, and the hay was pulled out with grape vines and horses. There were two Indian camps, one of thirty to forty Indians just below the mouth of Johns Creek (named for John Bennett) and one of twenty-five to thirty Indians just above the mouth of Bills Creek (named for William McDowell).

Calvin Deam has lived to see the day when the original forest has gone from Wells County as certainly and completely as has the Indian. He has seen the ruination of the Wabash and the complete destruction of many of its tributaries. The modern dredge has laid its unsightly gashes in every direction through the land, the old water level is forever lowered, and the primitive conditions are gone never to return. Study and discussion may devise methods of improving the Wabash, but it will be an artificial Wabash, not a restored Wabash, on whose banks no Indians will camp, from whose waters no doe and her fawns will drink, through whose forests no wild turkey hen will lead her brood.

And as Calvin Deam has told me of the deer that used to come in the heat of the day to the cool recesses of the Vanemon Swamp (known then as Bay's Swamp for William Bay, who owned it), so I would tell a little of the Somatochloras which still survive, but which are going,—which may be gone before another year has passed.

In *Entomological News* of April, 1912, I recorded the captures of Somatochloras in Indiana up to that date, and described Flat Creek in Wells County where two species had been found. Since then the Simmers sisters' woods, through which Flat Creek flows, has been cut over, exposing the Creek more to the sun, and weeds and mud have replaced the few gravelly spots which formerly existed. I took another male of *charadraea* there on July 4, 1913, but failed to find it after that date until during the summer of 1921, when another single male was taken on July 6. On July 10, 1914, a female of *linearis* was taken on the same creek and on July 9 and 13, 1919, four males and a female of the same species were collected. The female was ovipositing by striking her abdomen on the fine gravel at the water's edge of a shallow ripple. Since then this sandy ripple has become mud-covered and weed-grown, and we failed to find *linearis* on the creek in 1921.

North of Wells County, in Allen County, is a small tributary of Little River, named the Aboite River, which, a few miles above its mouth, flows for about a quarter of a mile through a bit of woodland known as Devil's Hollow, though there is nothing in the long pools and gentle ripples to suggest the name. Aboite River is in reality only a shallow creek averaging possibly ten feet in width. At the upper end of Devil's Hollow is a small right-hand tributary of cold clear spring water flowing through a thick second growth. This small stream is about a foot and a half wide and pursues a very tortuous course at the foot of a low bluff or ridge. On July 6, 1919, we collected at several points on the Aboite above Devil's Hollow and at Devil's Hollow. About noon, on the small tributary described above, we saw a Somatochlora hovering over a small pool. It was captured and proved to be *tenebrosa*. A few minutes later a second one was seen and captured over another small pool. Several trips back and forth over the course of the stream failed to reveal any more, and on several subsequent visits we have never been able to find a Somatochlora on the Aboite or its tributary.

One of these fruitless visits was made on July 3, 1921. Leaving the Aboite about the middle of the afternoon, Arch Cook, Jesse Williamson and myself started south for the old collecting ground on Flat Creek. Some detours were necessary and as a result we discovered a good looking creek one mile west and about half a mile south of Zanesville. This is Davis Creek and our road crossed it along the east edge of a bit of unpastured second growth woods, known as Shoups woods, through which the creek flows in a westerly direction. Leaving the road and following the creek into the woods we found a fine little stream three to eight feet wide, flowing mostly over gravel, with many gentle ripples and frequent pools, some of the latter almost waist deep. We had not gone far when a Somatochlora was seen and, collecting from about three to four p. m., we succeeded in taking two males of *linearis*. Below the Shoup woods, Davis Creek flows through some brushy unpastured blue grass fields, through two small, second growth, unpastured woods, then into a pastured woods where it is fouled and trampled, and finally, just before its mouth in Eight Mile Creek, it passes through a pastured field. Through the Shoup woods westward to the pastured woods just above its mouth it is more or less shaded and its banks and ripples are not ruined by live stock, as is the case in the pastured woods. East of the Shoup woods, in its upper courses, it passes through hot, sunny fields, a mere mud trough in a ruined landscape.

About five a. m. the next day, I again visited the creek with a party studying birds. But little time could be spared looking for Somatochloras, but I saw a female of *linearis* ovipositing, captured a male each of *linearis* and *charadraea*, and saw several more of both species.

On July 5, Arch Cook and I went again to the creek, reaching it about 4 p. m. We caught one male each of *charadraea* and *linearis*. The last specimen seen was flying the creek at 6.30 p. m. That night we slept in the J. M. Settlemeyer barn and were at the creek early the next day. The morning was cloudy or hazy, and seemed rather unfavorable, but we saw our first Somatochlora before 5 a. m. and we caught six more males of *linearis* and another *charadraea*, and returning home, we stopped at Flat Creek and caught a male *charadraea*.

Our success encouraged us to enlarge our party, and the night of July 7, Rev. D. C. Truesdale, Arch Cook, Jesse Williamson and I slept in the Settlemeyer barn again. Sun up the next day found us at the creek but the morning was hazy and between six and seven o'clock a heavy thundershower drove us, with only four or five *linearis* in our bottles, to the shelter of the tight floored road bridge over the creek. Here we cooked and ate our breakfast. By this time the storm was over and the sun came out brightly. We all returned to collecting, and before 9 a. m., when another thunder storm again drove us to shelter, we brought our total catch for the morning up to thirteen males and one female of *linearis* and two males of *charadraea*. From July 3, when we first saw the creek, to July 8, the water had fallen about eight inches and had ceased to flow above ground, though there was doubtless a continued flow through the gravel which forms the stream bed. Davis Creek is one of the very few undredged creeks in Wells County, but Eight Mile Creek, of which it is an a affluent, has been deeply dredged and into its lowered basin the water in Davis Creek is readily drained through the underlying sand and gravel.

With this catch before us, we planned a killing for the next Sunday, July 10. Eli Captain, master catcher of Macromias, was enlisted and Saturday night he, Arch Cook, Jesse Williamson and I spent another night at Settlemeyer's barn. Sunday morning came clear and cloudless and we were at the Creek before 4.30 a. m. At 4.45 a. m. the only female of *charadraea* any of us ever saw was seen ovipositing, and two of us, suffering from Somatochlora fever, in turn missed fair strokes at her. But that morning Somatochloras were very rare, and though the four of us collected diligently until after 10 a. m., a later hour than we had found it possible to remain on other days, we got a total of only three males and one female of *linearis* and two males of *charadraea*. Possibly the following record of temperatures, and possibly the lower humidity of the morning of July 10, will explain the relative scarcity of individuals on that date. As the minimum temperature each day was from 4 to 6 a. m., no other tabulation of early morning temperatures is given. The temperatures are from a registering thermometer at The Wells County Bank at Bluffton. Probably at Davis Creek the minimums fell slightly lower, but the record is accurate enough for our purpose. If temperature is not the cause of the difference in the activity of these dragonflies, I can offer no other suggestion. It is an unfortunate fact that after twenty years I am still unable to predict a good day for Macromias on the Wabash River.

Date, 1921	Maximum*	Minimum*	At 6 p.m.*	Morning	Somatochloras from about 5-9 a.m.
Saturday, July 2...	95° 5 p.m.	63° 5-6 a.m.	93°		
Sunday, July 3.....	95° 2 p.m.	73° 5 a.m.	84°		
Monday, July 4....	96° 3 p.m.	74° 5 a.m.	9[illegible]°	Clear	Many
Tuesday, July 5....	98° 4-5 p m.	74° 5 a m.	94°		
Wednesday, July 6.	99° 4 p.m.	75° 4 a.m.	95°	Hazy	Many
Thursday, July 7...	100° 4 5 p.m.	76° 5 6 a.m	97°		
Friday, July 8......	93° 3 p.m.	77° 3-6 a.m.	81°	Thunderstorm, then clear	Very many
Saturday, July 9...	87° 4 p.m.	69° 5-6 a.m.	86°		
Sunday, July 10 ...	86° 2 p.m.	68° 4-6 a.m.	81°	Clear	Rare

* Temperature, Fahrenheit scale.

During our collecting trips, we had several opportunities to observe females of *linearis* ovipositing. This always took place in fine gravel and sand at or near the water's edge where the water was very shallow, usually at a ripple. The females flew back and forth a few inches above the ground, frequently striking with the end of their abdomens. In no case did they alight. The spots selected were a few days later merely damp sand more or less distant from the water which had ceased to flow. The single female of *charadraea* seen ovipositing was flying back and forth tapping her abdomen on a damp clay surface at the edge of the creek and about a foot above the water. Occasionally a Somatochlora will fly along, striking the water with its abdomen and rarely throwing itself into the water, but in every case where positive observation was possible these individuals were males. The males at the creek spend their time beating back and forth, at an elevation of two or three feet, over the sandy spots where the females oviposit. Having examined one of these spots they may fly away a short distance to return at once, or, more probably, they fly swiftly up or down the creek to another similar ovipositing site. They frequently leave the creek and disappear upward among the trees. The males of *linearis* were never observed fighting, but on two occasions two males of *charadraea* were observed to fly at each other and fall to the ground in a rough and tumble scrimmage. In flying the creek, males of *charadraea* habitually fly at a lower level than males of *linearis*.

At three different times, at sunny openings among the trees over or near the creek, three to five Somatochloras, apparently both species, were seen hawking lazily back and forth at an elevation of twenty to thirty feet. These I think were certainly recently emerged individuals. I made several efforts, both in the mornings and afternoons, to locate Somatochloras in adjacent fields, pastures and brush lots, examining a considerable number of likely-looking habitats, but I never saw a Somatochlora in these places. Even during early imaginal life they do not seem to wander from the bit of woods where they live as larvae. Observations Arch Cook and I made in Tennessee indicate this is not true of *tenebrosa* which we found flying along roads and over fields at the edges of woods.

On July 27, Arch Cook, Jesse Williamson and I paid the final visit of the season to the creek, where we arrived about 5 a. m. after sleeping in Settlemeyer's barn. We found the water level greatly lowered and in the entire Shoup woods there were only four small pools remaining. The fine gravel or sand ripples where females of *linearis* had been observed ovipositing were now many of them entirely dry, in one case at least to a distance of two inches below the surface. The clay flat where *charadraea* was ovipositing seventeen days before was dry and hard, and, like the sand and gravel bars, far from any water. Mr. Settlemeyer told us that these small streams usually begin to flow again in September.

At 5.30 a. m. a female of *linearis* was observed ovipositing by tapping the abdomen in almost dry sand in a low stretch in the creek bed. She scattered her eggs at intervals over an area about four to six feet wide and twenty to thirty feet long. She was captured and represented the day's catch, though half an hour later a male was seen, but he was hurrying down the dry creek bed. No other specimens were seen. The imaginal life of the two species, *linearis* and *charadraea* in northern Indiana, is thus about thirty days or a little more, including the last few days of June and practically the entire month of July. Their period of ovipositing coincides with the time of rapidly falling water level in the creek, thus exposing successive clay banks and fine gravel bars on which the eggs are placed while the surface is moist, thus insuring the distribution of eggs over practically the entire creek bed. Oviposition was observed only where the forest, a heavy second growth mostly of white elm, lay on both creek banks. Somatochloras were not observed where one bank was cleared and the other wooded.

Associated with the two Somatochloras were a very few *Boyeria vinosa*, less than half a dozen being seen, and many *Calopteryx maculata*. No other dragonflies were on the wooded parts of the creek. Perhaps the most obvious difference to be noticed in collecting dragonflies in Indiana and in the American tropics, is the great difference in the amount of odonate life on small woodland streams. On Davis Creek, for example, there are only two dragonflies besides the two Somatochloras, and these two are widely distributed, though with pretty definite habitat preferences, while the two Somatochloras alone seem to be confined entirely to the creek. I can call to mind half a dozen little streams in the tropics, similar in size and general character to Davis Creek, and at once I recall a dozen species which made the ripples flash with color, or which sat motionless on dead twig tips on the darkest stretches of the creeks, giving life and vivacity to a somber forest. No such wealth of odonate life exists on Davis Creek where individuals are as rare as species, except for occasional assemblages of *Calopteryx maculata.* Frequently at sunrise individuals of this species were seen resting inertly on leaves with all four wings spread flat.

Undescribed Crane-flies from Argentina (Tipulidae, Dipt.) Part V.

By Charles P. Alexander, Urbana, Illinois.

The types of the novelties described in this paper are preserved in the collection of the writer through the great kindness of Dr. Bruch and Señor Weiser, to whom my thanks are due.

Dicranomyia omissivena sp. n.

General coloration whitish yellow; antennal flagellum brown; wings whitish subhyaline, veins pale; *Sc* long, cell *1st M2* open by the atrophy of the outer deflection of *M3.*

♂.—Length 4.2 mm.; wing 5.4 mm. ♀.—Length 4.8 mm.; wing 6 mm. Rostrum and palpi pale. Antennae with the scapal segments pale yellow, the flagellum gradually darkening into brown. Head pale yellow.

Mesonotum pale whitish yellow without darker markings. Pleura whitish yellow with slight green reflexions. Halteres pale whitish yellow. Legs pale whitish yellow with only the terminal tarsal segments dark brown.

Wings whitish subhyaline; veins pale. Venation: *Sc* long, *Sc1* ending opposite or just beyond midlength of *Rs, Sc2* at tip of *Sc1*; *Rs* about twice the deflection of *R4+5*; cell *1st M2* open by the atrophy of the outer deflection of *M3*; petiole of cell *2nd M2* shorter than the cell; basal deflection of *Cu1* close to the fork of *M.*

Abdomen whitish, the segments with greenish reflexions.

Habitat: Argentina. *Holotype,* ♂, Quebrada Famaillá, Tucumán, altitude 1600 meters, October 16, 1920 (V. Weiser). *Allotopotype,* ♀. *Paratopotypes,* 3 ♂ ♀.

Geranomyia (Geranomyia) gaudens sp. n.

General coloration of the thorax gray; halteres yellowish at base, the knobs brown; wings subhyaline, handsomely spotted and clouded with brown and gray, this including a series of four brown subcostal spots; *Sc* long, cell 1*st M2* closed; basal deflection of *Cu*1 before the fork of *M*.

♂.—Length (excluding rostrum) 8.6 mm.; wing 10.5 mm. ♀.—Length (excluding rostrum) 7.5-8 mm.; wing 8.8-9 mm.; rostrum 4.5-4.7 mm.

Rostrum elongate, the paraglossae beyond the palpi partly lost; when entire, the rostrum would extend to at least one-third the length of the abdomen, dark brown, the palpi concolorous. Antennae dark brown, the flagellum broken. Front and anterior part of the vertex with a golden-yellow pollen; remainder of vertex dark brown, the broad median area and a narrow border adjoining the eyes more grayish.

Pronotum gray, the lateral margins obscure yellow. Mesonotal praescutum dark gray with three lighter gray stripes, the median one of which is bisected anteriorly by a line of the ground color; scutum light gray, the lobes dark gray; scutellum reddish, gray pruinose; postnotum gray. Pleura brown, gray pruinose; dorso-pleural membrane obscure buffy-yellow. Halteres white, the knobs dark brown, the base of the stem yellowish.

Legs with the coxae yellow, the outer face infuscated, this including nearly the basal half of the fore coxae, a large area on the middle coxae and a slight cloud on the posterior coxae; trochanters yellow; remainder of legs broken except the basal half of the posterior femora which are testaceous.

Wings subhyaline, handsomely spotted and clouded with brown and gray; stigma brown; a series of four dark brown areas in the subcostal cell, the third at the origin of *Rs*, the last at *Sc*2; cord and outer end of cell 1*st M2* seamed with brown; conspicuous gray clouds in cell *R* beneath the brown subcostal spots, before the ends of the outer radial cells, at the ends of both anal veins and in the anal angle of the wing; veins pale, brown in the darkened areas. Venation: *Sc* long, *Sc*1 ending about opposite midlength of *Rs*, *Sc*2 at tip of *Sc*1; a supernumerary crossvein in cell *Sc*; *Rs* long, angulated and slightly spurred at origin; *r* more than its length from the tip of *R*1; *r-m* obliterated by contact of the long deflection of *R*4+5 on *M*1+2; *m* only about one-third to one-fourth of the outer deflection of *M*3; basal deflection of *Cu*1 at about one-third its length before the fork of *M*.

Abdomen dark brown, the pleural appendages of the hypopygium obscure orange.

Habitat: Argentina. *Holotype*, ♂, San Pedro de Colalao, Tucumán, altitude 2500 meters, January 28, 1921 (V. Weiser).

Allotype, ♀, Caspinchango, Catamarca, altitude 2500 meters, March 28, 1921 (V. Weiser). *Paratype*, ♀, with the allotype, March 2, 1921.

The female is entirely similar to the male. The femora are yellow with a conspicuous, dark brown, subterminal ring.

Rhabdomastix (Sacandaga) complicata sp. n.

General coloration dark brownish gray; wings tinged with brown, the extreme base paler in both sexes; *m* short or obliterated; male hypopygium with the outer pleural appendage bifid at apex, the lower arm bearing two long, chitinized teeth.

♂.—Length about 3.6 mm; wing about 3.2 mm. ♀.—Length 3.5-4 mm.; wing 3.6-4.2 mm.

Rostrum and palpi brownish black. Antennae with the scapal segments brownish black; flagellum slightly paler brown; flagellar segments subglobular. Head dark brownish gray with a sparse bloom.

Mesonotum dark brownish gray, the usual three praescutal stripes a little darker brown but very poorly defined. Pleura brownish gray. Halteres light yellow. Legs black, the femoral bases in some cases a little paler, in other cases the femora nearly uniform throughout.

Wings with a brownish tinge, the extreme base paler, this including the cells proximad of arculus; veins brown. Venation: *Sc1* ending about opposite two-fifths the length of *Rs*, *Sc2* near midlength of the distance between the origin of *Rs* and the tip of *Sc1*; *r* a short distance beyond the fork of *M*; cell *1st M2* closed; *m* short to lacking, cell *2nd M2* in some cases being short-petiolate; basal deflection of *Cu1* a short distance beyond the fork of *M*.

Abdomen dark brownish black. Male hypopygium generally similar to that in *R. basalis*, but the outer pleural appendage much more complex, appearing as a narrow arm that is expanded apically and here deeply bifid, the lower branch being chitinized and deeply notched apically, the outer edge of this notch produced into two long, blackened teeth, the margins of the notch feebly denticulate; inner pleural appendage much longer and stouter than in *basalis*, only a little shorter than the outer pleural appendage. The digitiform lobe on the inner face of each pleurite is stouter than in *basalis*. Ovipositor with the valves horn-colored.

Habitat: Argentina. *Holotype*, ♂, Masao, Catamarca, altitude 2500 meters, February 10, 1921 (V. Weiser). *Allotype*, ♀, Caspinchango, Catamarca, altitude 2500 meters, February 23, 1921 (V. Weiser). *Paratopotypes*, 5 ♀'s.

Rhabdomastix complicata is allied to *R. basalis* Alex. (Argentina), but is readily told by the darker coloration, the almost uniform wings in both sexes and the complex male hypopygium.

Tipula amoenicornis sp. n.

General coloration dull yellow; antennae elongate, bicolorous, the basal enlargement of the segments dark brown, the remainder yellow: wings with a strong yellowish brown tinge, cells *C* and *Sc* more saturated; abdomen reddish orange with a conspicuous black subterminal ring.

♂.—Length 12.5 mm.; wing 12.3 mm. Frontal prolongation of the head brownish yellow, the palpi concolorous, with the terminal segments darker. Antennae elongate, if bent backward extending to beyond the base of the abdomen; scapal segments obscure yellow; flagellar segments bicolorous, obscure yellow, the basal enlargement of each segment dark brown except at the extreme base; terminal flagellar segments broken. Head obscure brownish yellow.

Mesonotum dull brownish yellow without markings, the posterior sclerites more testaceous. Pleura yellowish testaceous. Halteres pale, the knobs faintly darker. Legs with the coxae and trochanters light yellow; remainder of the legs pale yellowish brown, only the tarsi passing into dark brown.

Wings with a strong yellowish brown tinge, the base and cells *C* and *Sc* more saturated; stigma small, oval, brown; a conspicuous obliterative area before the stigma, reappearing across the base of cell *1st M2*; veins dark brown. Venation: *Rs* short, arcuated beyond mid-length; cell *2nd R1* very small; parallel-sided; tip of *R2* preserved; cell *M1* about twice the length of its petiole; cell *1st M2* narrowed distally, *m* being about two-thirds the basal deflection of $M1+2$; *m-cu* elongate.

Abdomen conspicuous reddish orange; conspicuous black areas on lateral margins of tergites two, three and four; a conspicuous black ring including all of segment seven and all of eight except the broad posterior margin of the eighth sternite. Male hypopygium with all the sclerites separate, the ninth pleurite large. Caudal margin of the ninth tergite with a shallow V-shaped notch, the mesal margins of the lobes densely hairy; ventro-median portion of the tergite at the apex of the notch produced into a pendulous, bilobed appendage that is densely hairy. Pleural appendage flattened, the apex narrowly margined with black, at the base on the outer face a conspicuous blackened lobe that is microscopically spinulose. Ninth sternite extensive, the median portion filled with membrane, at the caudal margin of which hangs a very conspicuous, median, elongate, slender, hairy lobe that is split at the apex into two small, digitiform appendages. Eighth sternite unarmed.

Habitat: Argentina. *Holotype*, ♂, San Pedro de Colalao, Tucumán, altitude 2500 meters, January 27, 1921 (V. Weiser).

Notes on the Distribution and Synonymy of Some Species of Pterophoridae (Lepid.)

By A. W. Lindsey, M.S., Ph.D., Sioux City, Iowa.

Four months have elapsed between the publication of the *Pterophoridae of America, North of Mexico* and the writing of this paper, yet in that short time a number of interesting data have been added to our knowledge of this family. These data have been derived from three sources, viz., some notes on synonymy very kindly communicated by Mr. Edward Meyrick, a considerable number of specimens from British Columbia submitted by Mr. E. H. Blackmore for identification, and two specimens—yet a remarkable catch—which were the only Pterophoridae secured by the writer after his removal to Sioux City in the fall of 1921.

Mr. Meyrick's notes are placed at the end of the paper. Credit for them is due entirely to their author, who states in a letter of October 27, 1921, that they are to be published in *The Entomologist*. They are included here by his permission, in order that they may be more readily available to lepidopterists on this side of the Atlantic, and are quoted without change, aside from a few omissions, and without criticism. The writer would suggest, however, that it can do no harm and may do some good if anyone with both exotic and indigenous material will check these conclusions, especially by an examination of the male genitalia. While it is certain that the utility of these structures is limited, they are frequently conclusive.

For the successful use of genitalia in classification the following rules are a useful guide:

1. Study complete genitalia, not merely the valves.

2. Genitalia are subject to variation in form within the species. A striking example is that of *Hesperia tessellata* Scud., including *occidentalis* Skinner.

3. Conspicuous differences between the genitalia of specimens or series indicate that they belong to different species. If only slight differences exist they may indicate specific distinctness, but in such cases it is necessary to prove by the exam-

ination of series from various localities that the differences are constant.

4. Distinct species may possess genitalia indistinguishable from each other. Example: *Oidaematophorus homodactylus* Wlk. and *O. elliottii* Fern.

TRICHOPTILUS PYGMAEUS Wlsm. A single fragmentary specimen from Wellington, British Columbia, June 30, seems to belong here.

PLATYPTILIA TESSERADACTYLA Linn. One ♂, Princeton, British Columbia, June 20, confirms the occurrence of this species in British Columbia. A second specimen from Vernon, B. C., sent in by Mr. Blackmore, is much browner than any other North American specimen seen by the writer. It is quite like European specimens.

STENOPTILIA MENGELI Fern. One specimen from Mt. McLean, British Columbia, 5000 ft., Aug. This specimen is much paler than the Greenland type series, and even paler than the single Colorado specimen mentioned in the *Revision*, due to the paler gray shade and the more extensive pale over-scaling on the inner part of the primaries. The costal lobe has an evident dark dash and the dot at the base of the cleft is conspicuous. This specimen extends the known range of the species remarkably, and strengthens the writer's belief, as expressed in the *Revision*, that it may prove to be circumpolar.

OIDAEMATOPHORUS OCCIDENTALIS Wlsm. Two specimens. Vavenby, July 25, and Fort Steele, both British Columbia, August 15.

O. MATHEWIANUS Zell. Specimens from Kaslo, Mt. McLean and Lillooet, British Columbia, Aug., are much whiter than Californian specimens, with no discernible brownish shades.

O. GRISESCENS Wlsm. Kaslo, British Columbia, August.

O. FIELDI Wright. Two rather faded specimens from Atlin, British Columbia, appear to belong here. They check by both genitalia and superficial characters, excepting the rather dull brown color, and only the remarkable extension of range suggests any uncertainty.

O. PHOEBUS B. & L. Another British Columbia specimen taken at Kaslo, June 22, 1910, confirms the occurrence of the species this far north.

O. FISHII Fern. One ♀, Sioux City, Iowa, Sept. 3, 1921. An excellent specimen which seems referable only to this species, but it is as dark as California males. With the possible Manitoba record mentioned in the *Revision*, it suggests that the species may be found to range well to the north, becoming darker in higher latitudes.

O. IOBATES B. & L. One ♀, Sioux City, Iowa, Sept., 1921. This specimen extends the range of the species quite unexpectedly, but it is so nearly normal and perfect as to leave no doubt of its identity. The record is quite in keeping with others made in this region.

O. HELLIANTHI Wlsm. One ♂, South Fork Kaslo Creek, British Columbia, August 10, 1903. This may be the same specimen listed with doubt by Dr. Dyar (Proc. U. S. N. M., xxvii, 924, 1904).

O. BALANOTES Meyrick. Mr. F. H. Benjamin sent specimens to the museum at Decatur which were reared at Landon, Mississippi, Aug. 7, 1921, from larvae boring in the stems of "*Myreca*" (*Myrica?*). No doubt either Mr. Benjamin or Mr. L. E. Miles, who reared the specimens, will be able to furnish an account of the life history later.

Mr. Meyrick's remarks on synonymy are as follows:

"*Platyptilia crenulata* is a synonym of *brachymorpha* Meyr. (Africa, S. Asia, Ceylon, Hawaii); quite certain, your figure is very characteristic.

"*Platyptilia marmarodactyla* Dyar is a synonym of *fuscicornis* Zell., common in South America and Hawaii; I have many specimens from Hawaii, Peru, etc., and there is no question about it. Also I note that one of Walsingham's figures of *cosmodactyla* (Pter. Cal. Oreg., pl. ii, 4) (not the other two) is certainly this species, the different position of the scaletuft of hindwings and other characteristics being accurately given.

"*Pterophorus* (*Oidaematophorus*) *linus* is a synonym of *lienigianus* Zell. (Europe, Africa, India, Ceylon, S. America); I am very familiar with this species, which is common in India and Africa, and there is no doubt about it.

"*Orneodes* (*Alucita*) *montana* is in my opinion . . . a synonym of *huebneri* Wall. (Europe, throughout Africa, and Kashmir)." Mr. Meyrick also adds a discussion of the characters which lead him to the last conclusion.

Quite in keeping with the writer's private views, Mr. Meyrick expresses the belief that *Platyptilia shastae* and *fragilis* Wlsm. are synonyms of *albida* Wlsm. It may be added that Mr. Meyrick's knowledge of *marmarodactyla* Dyar and *montana* Ckll. is based in part upon authentic specimens sent from the museum at Decatur, part of the material used in the preparation of the *Revision*. The remaining synonymies are apparently deduced from the descriptions and figures included in the *Revision*.

Further Biological and Systematic Notes Concerning Bremus kincaidii Ckll. and Other Closely Related Species (Hym., Bombidae).

By Theodore H. Frison, Urbana, Illinois.

In a recent article on the *Hymenopterous Insects of the Family Bremidae from the Pribilof Islands, Alaska*, published in Volume XII, Number 14, Fourth Series, Proceedings of the California Academy of Sciences, I list a queen and a worker of *Bremus* (*Bombus*) *kincaidii* (Ckll.) from St. Paul Island. Because of the rareness of this species in collections and our lack of biological data concerning the same, it seems advisable to record in addition five adults and two pupae. These specimens were sent me for study too late for the data to be included in the article just cited. Two of the five adults are queens, two are workers and one is a male, all collected on St. Paul Island on August 10, 1920, by Dr. G. Dallas Hanna. The two queen pupae were collected on the same date and at the same locality as the adults.

The presence of the male and two queen pupae, in the lot of bumblebees last received from the Pribilof Islands, enables me to extend somewhat my previous biological remarks about this species. One of the queens collected on August 10 is in perfect condition, indicating that she was produced the same season as collected. That August 10 is not too early a date at which to expect the new queens of this species is evidenced by the fact that the two queen pupae taken on this date are in an advanced stage of development, and further that a male was captured at the same time. There is every reason to believe that in the far northern latitudes, as well as in the more temperate regions of North America, the males do not hibernate during the winter as do the impregnated queens. The time of appearance of the sexes is usually well correlated, though it is true the males often show a tendency to appear in advance of the new queens. The early production of males and queens and the formation of small-sized colonies were noted in my paper as phenomena to be expected in the life-histories of bumblebees, which inhabit far northern latitudes. Friese, in *Fauna Arctica*, 1902, V. 2, p. 490, has advanced the idea that in the cold regions *B. kirbyellus* (Curtis) and *B. hyperboreus* (Schönherr) in some instances apparently produce only queens and males, a condition characteristic of solitary bees.

Bremus kincaidii is also interesting from a systematic standpoint, as it belongs to a boreal group of bumblebees (Kirbyellus Group Franklin) which presents many classificatory difficulties. Franklin has suggested that this species may eventually prove to be a "color variant or subspecies of *strenuus* or *polaris*." Through the kindness of Mr. E. T. Cresson, Jr., the writer has had the privilege of comparing *Bremus kincaidii* with the type specimens of *Bremus strenuus* (Cress.) and a series of *Bremus polaris* (Curtis) contained in the collection of the American Entomological Society at Philadelphia.

As a result of this study I am forced to the conviction that *B. kincaidii, B. strenuus* and *B. polaris* are distinct species. An examination of the genitalia of *B. kincaidii* bears out the close relationship existing between all three species, particularly its affinity with *B. polaris*. The inner spatha of *B. kincaidii* has the general shape of the same structure in *B. polaris* as delineated by Sladen (1919) and Franklin (1913). In the specimen of *B. kincaidii* before me, the lateral margins of the triangular-shaped apex of this structure are much straighter than in *B. polaris*. In this last-named species, the lateral margins of the triangular-shaped apex are inclined to be more or less curved inward. The setae occurring on the inner spatha are also more restricted to the tip and lateral margins of the apex in *B. kincaidii* than in *B. polaris*. In *B. polaris* these setae are more evenly distributed over the entire tip of the triangular-shaped apex. Furthermore, in *B. kincaidii* the setae do not extend to the two parallel, longitudinal lines or more strongly chitinized areas, as is the case in *B. polaris*. The claspers of *B. polaris* and *B. kincaidii* are almost identical. The male of *B. kincaidii* collected by Dr. Hanna has the apical dorsal abdominal segments predominantly black, whereas in *B. polaris* these segments are normally ferruginous or have a large amount of light-colored hairs. *B. kincaidii* is also less robust than *B. polaris*, judging by the specimens I have studied.

An examination of the genitalia of the allotype male of *B.*

strenuus proves this species to be distinct from both *B. polaris* and *B. kincaidii.* Unfortunately museum pests have injured the internal abdominal structures of this male, but enough of the genitalia and inner spatha remain to establish the validity of the species. The apex of the inner spatha of *B. strenuus* does not end in a conspicuous triangular projection. Instead it is somewhat blunt and trilobed, the central lobe being larger than either of the two lateral lobes. In some respects the inner spatha is similar in outline to Sladen's figure of the inner spatha of *B. neoboreus* (Sladen), a species recently described from Bernard Harbour, Northwest Territories, in the *Report of the Canadian Arctic Expedition.* In this latter species, however, the lateral angles of the apex of the inner spatha are sharply pointed and the extreme apex or middle portion is blunt and slightly curved inward.

The shape of the inner spatha of *B. kincaidii* distinctly separates it from *B. hyperboreus* and *B. kirbyellus,* the only other described American species of the Kirbyellus Group not already discussed in the systematic portion of this paper.

The University of Michigan-Williamson Expedition to Brazil.

The expedition remained at Villa Martinho (see this volume of the NEWS, page 186) until April 9, when they went by launch upstream to Villa Bella, Bolivia, on the point of land at the junction of the Beni and Mamoré rivers to form the Madeira, and thence four hours up the Rio Beni to Cashuela Esperanza. This little town of 200 to 300 people is in the Provincia de Vaca Diez, Bolivia, at the falls of the Rio Beni. It is the headquarters of Suarez Brothers, the rubber kings of the district, and due to their wealth the town has a good hotel, ice plant, electric light plant, etc.; it is built on granite rocks on the right bank of the river. The falls were about 7 feet high at the time of the party's visit; they are said to be 15 feet high when the stream is at low water. On April 12 it was noted that the Beni had fallen about 7 feet from this year's high water mark.

At Villa Martinho on March 31, it is recorded that "little gnats, sand flies and other pestiferous insects abounded." Wasps, bees and spiders were abundant in the woods at Cashuela Esperanza on April 12 and following days. From the latter place collections were made also along the Yata river trail. On April 15, Mr. J. H. Williamson was taken with malaria, wherefore he went down stream to Candelaria where is a hospital in which he recovered in about ten days. Returning to Porto Velho collecting was resumed on April 25. Both at Villa Martinho and at Cashuela Esperanza there was much rain. On April 25 their Odonata were estimated at 5098 specimens of 128 species. (From Mr. Jesse H. Williamson's letters and "log.")

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JULY, 1922.

On Firing Shot.

One of the most interesting addresses, presidential or otherwise, which we have read for a long while is that entitled *The Factor of Safety in Research*, by the President of the Michigan Academy of Science, Arts and Letters, published in *Science* for May 12, 1922. Those who enjoyed it, as we did, will recall that a thesis maintained was:

> The training of young investigators on a diet of insignificant problems is not inevitably fatal and may even be beneficial.
>
> [Again:] The principle of this method is one which has been widely adopted in other affairs of life and has been found good. Firing a whole cartridge full of shot in order that one ball may bring down the game is a recognized principle of the huntsman. Is the remaining shot wasted? It is. Is the system which uses cartridges of shot, most of which is wasted, an uneconomical one? Any hunter will tell you it is not. The bullets of a machine gun are mostly wasted, but the system as a whole insures hitting the mark.

But if we have been trained on this method—and we do not presume to suggest a better—that is no reason why we should be content with thereafter wasting many shot in our marksmanship. There are those who take up one little problem after another, as such chance their way, without apparently looking into the future to form an opinion whether such chance research will ever lead to the solution of some larger question of pure or applied knowledge. It is surely better for each one to consider the possibility of his mastering some broader problem and of directing his continued efforts thereto through the years which may be his for research.

On the Types of Gnamptonychia ventralis, B. & L., a Correction (Lepid., Arctiidae).

In the original description of *Gnamptonychia ventralis*, B. & L., 1921, Entomological News, xxxii, 297, instead of "two paratypes ♀," read "two paratypes ♂."

WM. BARNES and F. H. BENJAMIN.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

A Braconid Feeding by Indirect Suction (Hym.).

Many notes have been published during the last few years on the feeding of parasitic Hymenoptera at the puncture hole made by the ovipositor; but B. Trouvelot, in the C. R. Soc. de Biologie, December 3, 1921, has published a note which brings in a new feature. The American Braconid, *Habrobracon johansenni* Vier., has been sent over to France by the Bureau of Entomology for the purpose of securing its establishment there, since it is a parasite of the potato tuber moth. It lays its egg in the larva of this moth after the latter has made its cocoon, and this cocoon is naturally considerably larger than the larva; therefore, when the parasite lays its egg by thrusting its ovipositor through the silken cocoon it is not able to feed at the puncture. Trouvelot finds that when the Habrobracon, standing on the silken cocoon, has thrust its ovipositor through the skin of the caterpillar it secretes from the extremity of its abdomen a mucilaginous tube, which hardens; then, after the ovipositor is withdrawn, the Braconid sucks the juices of its host through this tube.

My attention to this interesting communication was drawn by a note which Doctor Feytaud has published in the *Revue de Zoologie Agricole et Appliquée* (Bordeaux, January, 1922, p. 18). Doctor Feytaud adds that J. L. Lichtenstein has noticed a similar procedure with *Habrocytus cionicida*, a Chalcidid parasite of *Cionus thapsi*.

A similar habit will surely be found among the parasitic Hymenoptera in this country, and the object in sending this note to *Entomological News* is to ask its readers to watch for such cases.—L. O. Howard.

The Kiangsu Bureau of Entomology.

The Bureau of Entomology, Kiangsu Province, National Southeastern University, College of Agriculture, Nanking, China, has been organized with the following staff: Charles William Woodworth, Director and Chief Entomologist; Goey Park Jung and C. Francis Wu, Entomologists; H. S. Chang, Entomologist and Curator; Huan-quang Fu, Secretary and Editor; Fo-ching Woo, Tsong-ling Tsou, Chi-yeu Wang, We-i Young, Laboratory Assistants; M. S. Chang, Pai-han Wang, Clerks.

The Bureau is fitting up a houseboat 48x11 as a floating laboratory for its field investigations. It will provide living quarters for four Entomologists and four sailors. The canals in this province will make it possible to take this laboratory within easy walking distance of every farm. There will be a motor boat to tow and tend the houseboat.

The Bureau has undertaken the control of the flies and mosquitoes in co-operation with the city health department which contributes the funds and the services of twenty police officers. Seventeen students of the Southeastern University also take part in the campaign.

The Bureau has just begun the publication of a semi-monthly Bulletin which will be devoted largely to recording the distribution and injuries done by insect pests in China and each number will contain one or more articles on some phase of Economic Entomology.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B

The titles occurring in the Entomological News are not listed.

4—Canadian Entomologist, Guelph, Canada. **5**—Psyche, Cambridge, Mass. **8**—The Entomologist's Monthly Magazine, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **16**—The Lepidopterist, Salem, Mass. **20**—Bulletin de la Societe Entomologique de France, Paris. **21**—The Entomologist's Record, London. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **36**—Transactions of the Entomological Society of London. **42**—Entomologiske Meddelelser udgivne af Entomologisk Forening, Kjobenhavn. **50**—Proceedings of the United States National Museum. **67**—Le Naturaliste Canadien, Quebec. **68**—Science, Garrison on the Hudson, N. Y. **71**—Novitates Zoologicae, Tring, England. **89**—Zoologische Jahrbucher, Jena. **90**—The American Naturalist, Lancaster, Pa. **91**—The Scientific Monthly, Lancaster, Pa. **95**—Annales des Sciences Naturelles, Paris, Zoologie. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **102**—Broteria. Revista Lusco Brazileira. Serie Zoologica, Braga. **111**—Archiv fur Naturgeschichte, Berlin.

GENERAL. Bainbrigge Fletcher, T.—Setting without boards. (Proc. Fourth Ent. Meet. Pusa, 334-5.) **Felt, E. P.**—Bugs and antennae. **68,** lv, 528-30. **Harmer, S. F.**—Experiments on the fading of museum specimens. (Museum Jour. London, xxi, 205-22.) **Howlett, F. M.**—The practical application of insect psychology. (Proc.

Fourth Ent. Meet., Pusa, 368-80.) **Merle, R.**—Animaux venimeux et venins. (La Nature, 1, 225-9.) **O'Donoghue, C. H.**—A preliminary survey of the biota of a sand spit in Lake Winnipeg. (Canadian Field-Nat., xxxv, 121-31.) **Sladen, F. W. L.**—Obituary. **8,** lviii, 111-13. **Tavares, J. S.**—Cecidologia Brazileira as restantes familias. **102,** Zool., xx, 5-48. **Wheeler, W. M.**—Social life among insects. **91,** xiv, 497-524. **Note**—In **36,** 1921, Part 5, there are a number of articles on the behavior of several orders of insects which may prove of interest.

ANATOMY, PHYSIOLOGY, ETC. **Donisthorpe, H.**—On some abnormalities in ants. **21,** xxxiv, 81-5. **Forbes, W. T. M.**—Fugitive net-veining in the cicada. **90,** lvi, 191-2. **Gofferje, M.**—Uber den einfluss verschiedener salze auf die entwicklungsdauer von Culex pipiens, und auf das verhalten der Culex-larven wahrend der submersion. **89,** xxxix, Abt. f. Zool. 195-300. **Hayes, W. P.**—The external morphology of Lachnosterna crassissima. (Trans. Amer. Microsc. Soc., xli, 1-28.) **Howlett, F. M.**—Protective movements and range of vision in platypezid flies. (Pro. Fourth Ent. Meet., Pusa, 279-86.) **Lutz & Richtmyer**—The reaction of Drosophila to ultraviolet. **68,** lv, 519. **Sparck, R.**—Beitrage zur kenntnis der Chironomiden-metamorphose, I-IV. **42,** xiv, 32-48 (cont.) **Stumper, R.**—Le venin des fourmis en particulier l'acide formique. **95,** v, 105-12. **Welch, P. S.**—The respiratory mechanism in certain aquatic lepidoptera. (Trans. Amer. Microscop. Soc., xli, 29-50.)

ARACHNIDA, ETC. **Chamberlin, R. V.**—A new Lithobiid of the genus Paobius. **4,** liv, 47-8.

NEUROPTERA. **Banks, N.**—South Am. Glenurus and some other Myrmeleonidae. **4,** liv, 58-60. **Holland, W. J.**—Calopteryx maculata, an interesting photograph. **10,** xxiv, 117-8.

ORTHOPTERA. **Caudell, A. N.**—Report on Orthoptera and Dermaptera collected by the Barbados-Antigua expedition from the University of Iowa in 1918. (Univ. Iowa Studies, x, 19-44.) **Corkins, C. L.**—Notes on the migration of Melanoplus atlanis in northern North Dakota in 1920. **4,** liv, 1-4.

HEMIPTERA. **Champion, G. C.**—Miridae (Capsidae) common to Britain and N. America. **8,** lviii, 109. **Hussey, R. F.**—Notes on Neottiglossa trilineata. (Pentatomidae.) **5,** xxix, 85-8. **Morrison & Morrison**—A redescription of the type species of the genera of Coccidae based on species originally described by Maskell. **50,** lx, Art. 12. **Muir, F.**—On the genus Elidiptera (Homoptera). **4,** liv, 61. The Scutelleroidea of the Douglas Lake region. (Univ. Iowa Studies, x, 45-65.) **Stoner, D.**—Report on the Scutelleroidea collected by the Barbados-Antigua expedition from the University of Iowa in 1918. (Univ. Iowa Studies, x, 3-17.)

LEPIDOPTERA. **Blackmore, E. H.**—The Pterophoridae of British Columbia. (Rept. Prov. Mus. Nat. Hist., Victoria, 1921, 34-45.) **Dyar, H. G.**—The family position of Platyprepia and other notes. **4,** liv, 20-1. **Jordan, K.**—On an organ peculiar to the females of some genera of Ludiinae, a subfamily of Saturniidae. A monograph of the Saturnian subfamily Ludiinae. **71,** xxix, 247-8; 249-326. **Prout, L. B.**—New and little-known Geometridae. **71,** xxix, 327-63. **Rothschild, L.**—A preliminary list of the Arctiinae of Para, Brazil, and a few from other localities. **11,** ix, 457-94.

Cassino & Swett—New Geometrids. **16,** iii, 159-66. **McDunnough, J.**—Undescribed L. in the Canadian Nat. Collection. A further note on the genus Platyprepia. **4,** liv, 34-47; 66.

DIPTERA. **Chapais, J. C.**—Moustiques, brulots, simulies. **67,** xlviii, 221-4. **Frey, R.**—Studien uber den ban des mindes der niederen diptera schizophora nebst bemerkungen uber die systematik dieser dipterengruppe. (Acta Soc. Fauna et Flora Fennica, xlviii, No. 3, 246 pp., 1921.) **Johnson, C. W.**—Notes on distribution and habits of some of the bird-flies, Hippoboscidae. **5,** xxix, 79-85. **Melander, A. L.**—Microsania, a genus of the Platypezidae. **5,** xxix, 43-48. **Newstead, R.**—A new species of Phlebotomus from Trinidad. **98,** xvi, 47-50. **Tothill, J. D.**—Note on types of Ernestia. (Tachinidae.) **4,** liv, 48. **Walter, E.**—Beitrage zur kenntnis der larven von Hypoderma und Gastrus. **89,** xlv, Abt. f. Syst., 587-608.

Aldrich, J. M.—Two-winged flies of the genera Dolichopus and Hydrophorus collected in Alaska, with new species of Dolichopus from North America and Hawaii. **50,** lxi, Art. 25. **Curran, C. H.**—New species of Canadian Syrphidae. II. New species of the syrphid genus Chilosia from Canada. **4,** liv, 14-19; 19-20. **Greene, C. T.**—Synopsis of the North American flies of the genus Tachytrechus. **50,** lx, Art. 17.

COLEOPTERA. **Brethes, J.**—Notas coleopterologicas. (Revista Facult. Agron., La Plata, xiv, 163-9.) **Fisher, W. S.**—Notes on Agrilus lateralis. **10,** xxiv, 124-5. **Fleutiaux, E.**—Description d'un genre nouveau et d'un espece nouvelle de Melasidae. **20,** 1922, 72. **Kleine, R.**—Die geographische verbreitung der Brenthidae. **111,** 1921, A, 10, 39-132. **d'Orchymont, A.**—Le genre Tropisternus. II. (Hydrophilidae.) **33,** 1922, 11-18. **Sloane, T. G.**—On the number of joints in the antennae of Haliplidae and Paussidae. **36,** 1921, 590-1. **Strand, E.**—Lepidopterorum catalogus. Pars 26: Arctiidae: Lithosiinae. **Weiss, H. B.**—A summary of the food-habits of North American coleoptera. **90,** lvi, 159-65. **Wickham, H. F.**—Weevils of the genus Apion injurious to beans in Mexico. **10,** xxiv, 118-22.

Blatchley, W. S.—Some new and rare C. from southwestern Florida. **4,** liv, 9-14 (cont.). **Calder, E. E.**—New Cicindelas of the fulgida group. **4,** liv, 62. **Hippisley, W. W.**—Notes on northern

Br. Columbian coleoptera. **4,** liv, 63-6. **Liljeblad, E.**—A revision of the N. A. species of Mordella related to M. melaena. **4,** liv, 51-58.

HYMENOPTERA. Caudell, A. N.—A diving wasp. **10,** xxiv, 125-6. **Crawley, W. C.**—Formicidae.—A new species and variety. **21,** xxxiv, 85-6. **Cushman, R. A.**—The identity of Habrobracon brevicornis. **10,** xxiv, 122-3. **Donisthorpe, H.**—Mimicry of ants by other arthropods. **36,** 1921, 307-11. The subfamilies of Formicidae. **36,** 1921, xl-xlvii. **Friese, H.**—Eine neue gattung der Urbienen: Brachyglossa n. g. (Apidae). Eine neue bienengattung aus Sudamerika: Rhinetula (Apidae). **89,** xlv, Abt. f. Syst., 577-80; 581-86. **Hill, C. C.**—A preliminary account of two Serphoid (Proctotrypoid) parasites of the hessian fly. **10,** xxiv, 109-17. **Middleton, W.**—Description of some N. American sawfly larvae. **50,** lxi, Art. 21. **Taylor, L. H.**—Notes on the biology of certain wasps of the genus Ancistrocerus. **5,** xxix, 48-65.

Cushman, R. A.—On the Ashmead manuscript species of Ichneumonidae of Mrs. Slosson's Mount Washington lists. **50,** lxi, Art. 8. **Gahan, A. B.**—Descriptions of miscellaneous new reared parasitic H. **50,** lxi, Art. 24.

The Psychic Life of Insects by E. L. Bouvier. Translated by L. O. Howard. Illustrated, New York, The Century Co., 1922. 12 mo. pp. xvii, 377. 16 figs., $2.00. It is very fitting that this volume by the Vice President of the Academy of Agriculture of France should be translated by a Member of the same academy and that the latter in his preface should sketch the chief biological activities of the author and the interest which the present work aroused in the translator. Dr. Howard writes that it is "a broad summary of an interesting field in which much work has been done by many men of many nations, but which is as yet almost unexplored. It has interested me enormously, and I feel sure that it will have the same interest, not only for students of some one restricted field of biology, but also for all nature-lovers, especially those to whom the constant question 'why' occurs."

Many of us who knew this work in the original French, before the publication of Dr. Howard's translation, owed our introduction to it to Dr. W. M. Wheeler's review in *Science* for November 13, 1920, pages 443-446. In view of the existence of that review and its recent appearance it is not necessary to give here more than the merest outline of its contents.

After a brief Introduction the original is divided into a Fundamental and a Special Part, but although the former appears as a heading in the translation (page 1), the latter must be sought on page 196. The Fundamental Part embraces the first nine chapters: I. Directive Action of Light, Phototropism; II. The Differential External Stimuli and the Tropisms which they provoke. III. Vital Rhythms and Organic Memory. IV. Differential Sensitiveness. V. Differential Sensitiveness, Species Memory and Simulation of Death. VI. Individual or Associative Memory. VII. Spontaneous Modifications of Habits. VIII. Evolution of Instincts. IX. Comparative Psychology. History of the Pompilids. The Special Part comprises the following five chapters: X. Insects and Flowers. XI. The Faculty of Orientation. XII. The Faculty of Orientation [in] Terrestrial Articulates. XIII. The Division of [the] Sexes [in] the Nest-Making Hymenoptera. XIV. The Social Life of the Articulates and a Conclusion, containing, among other topics, that interesting comparison between the structural bases of the psychic life of Vertebrates and Insects respectively which is largely due to Bergson.

We confess that we can not always extract the same meaning from the original as the translator has done. We would have written "wakefulness," instead of "age," in the last line of page 168. On page 328 we would have preferred "polygynous" and "polygyny" to "polygenous" and "polygeny," and would have substituted "which the workers some times produce" for the second line of page 345. On page 342, "Bonnier" should be "Bugnion."

The translation is improved, in comparison with the original, by the fuller references to the places of publication of the literature quoted in the foot notes and by the addition of an index of more than twelve pages, even though some entries, *e. g.*, trophobiosis, page 334, may have been omitted therefrom.

That Dr. Howard's translation will add greatly to the available literature in English on this entrancing subject is evident and we wish to be among the first to appreciate his labors and to offer him our thanks.—P. P. Calvert.

Report of the Proceedings of the Fourth Entomological Meeting. Held at Pusa on the 7th to 12th February, 1921. Edited by T. Bainbrigge Fletcher, R. N., etc., Imperial Entomologist. Calcutta Superintendent Government Printing, India. 1921. Price Rs. 7 As. 8. 8vo. pp. xli, 401, pls. lvii. —— The Proceedings of this Fourth meeting occupy one volume as compared with three for those of the Third meeting (see the News, vol. xxxii, pp. 221-222). The names of 42 members and 2 visitors are given as having taken part. Fifty papers and reports are included, grouped as dealing with Crop Pests (21), Forest Entomology (1), Medical and Veterinary Entomology (8), Household and Store Pests (1), Lac (2), Life-histories and Bionomics (9), Collection and Preservation (1), Systematic Entomology (2), Publications (1), Miscellaneous (4). As we remarked last year also, some of these articles will be useful to economic entomologists of other lands as well as to those working in India. Certain other papers on mosquitoes and means of checking them, on Coleoptera in the human intestine (R. Senior White and K. Sen.); on the proportion of the female forms of *Papilio polytes* (by Prof. E. B. Poulton), the oviposition of *Gynacantha* (T. B. Fletcher), on life histories of *Culicoides oxystoma,* of *Gracilaria soyella* and its parasite, *Asympiesiella india,* of *Stauropus alternatus* and of two species of Celyphidae; Gynandromorphism of *Megachile bicolor*, etc., will appeal to a wide circle of extra-Indian students. Mr. T. B. Fletcher contributes an English translation of Dr. Johann Gerhard Koenig's rare paper on South Indian Termites from the fourth volume of the *Beschäftigungen der Berlinischen Gesellschaft Naturforschenden Freunde* (1779), preceded by a biographical note on the author, a pupil of Linneaus, who lived in India from about 1767 to his death there on June 26, 1785. Mr. Fletcher regards Koenig's paper as equally fundamental to the study of termites, from the historical standpoint, as the celebrated account by Smeathman. Mr. Fletcher also has a suggestion on setting insects without boards (shown on plate lvi). Mr. T. V. Rama Krishna Ayyar furnishes a check list of Coccidae of the Indian Region and a list of parasitic Hymenoptera of economic importance from South India. A suggestive paper, addressed chiefly to the economic entomologist, is by the late F. M. Howlett, *The Practical Application of Insect Psychology*, in which he pleads for the intensive study of the stimuli which determine the feeding, pairing and choice of a suitable nidus for the young of injurious insects, with the view of using these stimuli to provoke reactions of such species leading to their own destruction.—P. P. CALVERT.

The American Entomological Society.

Meeting of February 23, 1922, in the hall of the Academy of Natural Sciences of Philadelphia. Dr. Skinner presided; six members and contributors to the Entomological Section of the Academy were present.

Mr. Cresson, of the Property Committee, reported the following accessions to the Library: Zeitschrift des Oesterreichischen Entomologen Vereins, Wien, Jahr. II (1917)—VI (1921); Konowia, Wien, Band I (1922) No. 1-2; and to the Cabinet, seven named Hymenoptera from the Hawaiian Islands by Dr. D. M. Castle.

LEPIDOPTERA.—Dr. Skinner exhibited a series of *Neminois ridingsi* and *dionysus* from Colorado and South Utah respectively, their specific identity and distribution being the subject of a paper to be soon published by him (see the NEWS, xxxiii, page 74).

ORTHOPTERA.—Mr. Rehn spoke of a similar case in the Orthoptera, *Aerochoreutes carlinianus carlinianus*, the Great Plains and Great Basin forms joining with intergrades through the Wyoming plains.

There followed a general discussion of variation in insects due to climatic and topographic conditions in the western United States.

COLEOPTERA.—Mr. Hornig exhibited larvae, cells and imagoes of *Lasioderma serricorne* in mustard dust in the original tin container which he had had for four years.

R. C. WILLIAMS, JR., *Recording Secretary.*

OCTOBER, 1922

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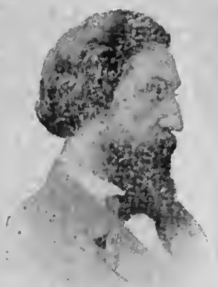

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ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

VOL. XXXIII OCTOBER, 1922 No. 8

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A Collecting Adventure Near Home (Coleop.).

By FRANK R. MASON, Philadelphia, Pennsylvania.

Early June, 1921, found Mr. Alan S. Nicolay, of Brooklyn, New York, and myself scouring the subalpine region of the White Mountains, New Hampshire, in search of Coleoptera, especially the rarer forms of Cychrini. However most species of this group *are* rare and require rather careful hunting.

We confined our efforts largely to the higher slopes of Mount Madison, Carter's Dome and up through Tuckerman's Ravine to the summit of Mount Washington (6288 ft.). All these points are accessible from Glen House, New Hampshire, which is the center of the wildest remaining section of the White Mountain region, far enough removed from tin cans and lunch boxes and the blare of auto horns to occasionally see a wild-cat slink along the trail and often raise a covey of grouse in the denser thickets.

Nomaretus bilobus Say, probably one of the rarest beetles in eastern North America and frequently confused in collections with the more common *fissicollis* Lec. and *cavicollis* Lec. from the Central States, was taken on Mount Madison at about forty-five hundred feet in heavy timber just below the lichened rocks, and two other specimens at a bit lower elevation in Tuckerman's Ravine under rotted bark. One specimen of the *leonardi* Harr. form of *Scaphinotus viduus* Dej. found its way into our perfumed tin traps in the valley floor, the bait consisting of molasses and assafoetida, a most sickening solution, which I should think any self-respecting *Cychrus* would avoid. A dead mouse added to the brew sometimes makes it even more effective. *Sphaeroderus canadensis* Chd. and *lecontei* Dej. were more abundant companions of the others.

Under the big summit rocks on Mount Washington we took in fair numbers *Carabus chamissonis* Fisch. var. *groenlandicus* Dej.; this is a species from The Labrador. Snow was found at the head-wall of Tuckerman's Ravine and, when marooned on the summit that night, the temperature dropped to twenty degrees; and all this in June east of the Rockies was quite a surprise. The next morning the sprightly *Cicindela longilabris* Say escorted us down the very easy wagon road. We took *Pterostichus* (*Cryobius*) *hudsonicus* Lec. and *Patrobus septentrionis* Dej. (a Palaearctic species) at six thousand feet and lower down *Pterostichus* (*Lyperopherus*) *punctatissimus* Rand., as well as the commoner *Pterostichus honestus* Say, *luczoti* Dej., *coracinus* Newm., *relictus* Newm., etc., and when within five hundred yards of Glen House a single specimen of *Pogonocherus fasciculatus* Deg. (a Greenland longicorn) and *Xylotrechus annosus* Say dropped into the sweep-net.

Along the banks of the Peabody River (West Branch) I found *Platidius rugicollis* Rand., not common in collections, also many other less interesting Carabidae as *Nebria suturalis* Lec., *Pristodactyla advena* Lec., *Trechus chalybeus* Dej., *Loricera coerulescens* L., *Bembidion nitens* Lec. and *scopulinum* Kby.

Pselaphidae and *Scydmaenidae* were very scarce, persistent sifting only secured three species; these families seem to dwindle as one goes north. I think this is also true of the western part of the continent.

On the bare, wind-swept rocks of Carter's Dome we took various good Elaterids: *Lepturoides denticornis* Kby., *Ludius spinosus* Lec., *virens* Schrank, *triundulatus* Rand., etc. This type of collecting is much like picking berries, you scramble over the rocks and gather in the crop, with always those superb glimpses of tumbled mountains below you. But atmospheric conditions must be just right, bright sunshine and not too strong a breeze. Some days we found no insects on the summits.

Carter's Notch near the little lake yielded some interesting things: *Scotodes americanus* Horn, *Phryganophilus collaris* Lec. (a rare Melandryid), *Schizotus cervicalis* Newm. and *Pedilus cyanipennis* Bland., sunning themselves on fallen timber. Some skinned poplar logs attracted *Gaurotes abdominalis* Bland., *Anthophilax attenuatus* Hald. and other longicorns. *Dichelonyx subvittata* Lec., together with numerous Buprestids and Elaterids were beaten from oak, spruce and pine. In vain I searched near the type locality for *Cicindela ancocisconensis* Harr.; I think we were too early. Clerids were few, probably for the same reason.

The above is by no means a complete list of species, only the more striking captures being noted, a large number of other boreal Coleoptera having been taken. In the valley the fauna was typically New England and general run; practically all the rarer species were found between three thousand and fifty-five hundred feet elevation.

This tract of the White Mountains is a most interesting region, a lovely sylvan country of running mountain streams clear and cold, where the Pipes of Pan will whistle to you all day long and with peaks high above timber-line to add a certain grandeur to it all, not often found among our eastern hills. The collecting, to be sure, is not bizarre and exotic like the tropics, neither are you subjected to the excessive discomforts of those hot countries. One great advantage, these mountains are almost in our back gardens; a trip of but fifteen hours by rail brings you to their very gateway. So I say to all entomologists, "why not go!"

Synonymic Notes on Lepidoptera.

By J. McDunnough, Entomological Branch, Ottawa.

In *Entomological News*, xxxii, p. 253, Drs. Barnes and Lindsey gave a few synonymic notes based on figures of some of Boisduval and Guenée's types published by Mr. C. Oberthür in Volume XXVII of his *Etudes de Lepidopterologie Comparée*.

Through the kindness of Dr. H. Skinner I have been able to examine a copy of the plates of this work and note a few additional changes in synonymy.

Plate DIII, figs. 4193, 4194, *Chelonia doris* Bdv. According to the original descriptions Fig. 4194 agrees with *doris* and Fig. 4193 with *nerea* Bdv. The species is, however, not *arge* Dru. as at present listed, but *michabo* Grt., and Boisduval's names will take priority. Typical *doris* has the lines and bands on primaries suffused with pink, whilst *nerea* represents the white banded form.

We have in the Canadian National Collection specimens from Calgary, Alberta, and Aweme, Manitoba, that agree well with *nerea*, whilst specimens from Southern British Columbia approach closer to *doris*. *Michabo* Grt., described from Nebraska, falls to *nerea; minea* Sloss., described from New Hampshire, is more intensely colored than *doris* and the name for the present may be held for the Atlantic Coast race. The synonymy will stand:

doris Bdv.
    form nerea Bdv.
        michabo Grt.
a. *minea* Sloss.

Pl. DV, fig. 4217, *Acronycta clarescens* Gn. The species was described from specimens in the Guenée, Boisduval and Doubleday collections, the latter type being in the British Museum. According to the type figured by Mr. Oberthür and to which we believe the name should be restricted, *clarescens* is evidently the same species as *pruni* Harris, but not the species figured by Hampson (Cat. Lep. Phal., Brit. Mus., VIII, 80, Pl. CXXIV, fig. 29) which belongs in the *inclara* group, showing no dark shade line between anal angle and t. p. line.

The synonymy given by Hampson will hold, with the addition of *smithi* Butl.

Plate DVI, fig. 4228, *Macaria contemptata* Gn. This species must certainly be removed from the synonymy of *granitata* Gn. The figure represents a species quite different from the usual conception of *granitata*, but one that is unknown to me in nature.

Plate DVII, figs. 4237, 4238, *Ypsipetes pluviata* Gn. An examination of the excellent figures shows that not only are the two sexes not conspecific, but also that neither of them represents the conception of the species as given in my *Hydriomena* revision (1917, Barnes & McDunnough, *Contributions*, IV, (1), 24). Under the circumstances I propose restricting the name to the male type (Fig. 4238), which is apparently a rather worn specimen of what was listed in the revision as *frigidata* Wlk.; the pale spot near the anal angle, the general trend of the lines and the dark hindwings all indicate this species; an examination of the genitalia should easily verify this reference. With *pluviata* Gn. taking priority over *frigidata* Wlk. the name *divisaria* Wlk. may be used for the *pluviata* of the revision. The female (Fig. 4237) appears to belong to *renunciata* Wlk., although somewhat smaller than usual.

Plate DVII, fig. 4240, *Coremia defensaria* Gn. I do not see how it is possible to consider this figure as correctly representing the type of *defensaria*. Guenée's description was drawn up from a single male and he notes that the pectinations of the antennae are more robust than in *convallaria* Gn.; in Oberthür's figure the antennae show no signs of pectinations, being thread-like, and the specimen figured looks extremely like a female. Furthermore the remainder of the description does not fit the figure at all well, which, as a matter of fact, represents a specimen of *Perizoma polygrammata* Hlst. or one of its close allies. Until further evidence can be produced it would be well to make no change in the present conception of *defensaria;* as pointed out by Mr. Swett, it is not a *form* of *convallaria*, as given in the 1917 Check List, but a good species.

Additional Data on North Carolina Tabanidae, Bombyliidae and Tachinidae (Diptera).

By C. S. Brimley, Division of Entomology. N. C. Dept. of Agriculture, N. C.

The present paper is supplementary to those previously published in the News as follows: on Tabanidae, vol. xv, pp. 270-275 (1904) and xix, pp. 168-173 (1908); on Bombyliidae, vol. xxxii, pp. 170-172 (1921); on Tachinidae, vol. xxxiii, pp. 20-26 (1922).

I. Tabanidae.

Chrysops bistellatus Daecke. Lake Ellis, not uncommon on road between Havelock and the lake, in late May, 1908, F. Sherman and CSB.

Chrysops cuclux Whitney. Raleigh, late April, 1912, CSB.

Chrysops dorsovittatus Hine. Lake Ellis, two in late May, 1908, Southern Pines, May, 1908, Manee; White Lake, late May, 1909 and early June, 1915, FS.

Chrysops hinei Daecke. Boardman, September 21, 1915, R. W. Leiby, Fair Bluff, September 25, 1920, T. B. Mitchell.

Chrysops indus O.S. Linville Falls, early June, 1920, one, FS.

Chrysops pudicus O.S. The specimens from Havelock (Lake Ellis) formerly referred to *cursim* seem to belong here, while the Raleigh *cursim* seem to be actually that species.

Chrysops separatus Hine. A male was taken by me at Raleigh, April 20, 1921.

Tabanus cymatophorus O.S. Southern Pines, A. H. Manee.

Tabanus endymion O.S. White Lake, early June, 1914, FS.

Tabanus sulcifrons Macq. Rocky Mount, mid September, 1911, four, Z. P. Metcalf.

Tabanus tener O.S. White Lake, late May, 1909, one, FS.

(All the preceding are new to our state list except C. separatus).

II. Bombyliidae.

(Species new to the state list are marked with a * star).

Anthrax alternata Say. Dillard-Highlands road, July 11, 1921. T. B. Mitchell.

Anthrax ceyx Loew. Marion, July 8, 1921, three, TBM.

*Anthrax faunus Fab. Raleigh, mid August 1914, C. L. Metcalf; late July 1912, July 22, 1921.

*Anthrax nigripennis Cole. All the Raleigh specimens previously referred by me to *halcyon* (Ent. News, XXXII, 171) belong to this species as well as five others taken in mid and late June, 1921. *Nigripennis* is not only darker-winged than *halcyon*, but also differs in venation (at least in our North Carolina specimens) as follows,—in *halcyon* the third posterior cell is bisected on a level with the distal end of the discal cell and the stump which projects into the distal portion of that cell arises from the discal cell, while in *nigripennis* that cell is bisected by a crossvein which is oblique to the discal cell and closes the proximal part of the third posterior cell not far from the wing margin, the stump arises from that crossvein and not from the discal cell. In both *ceyx* and *halcyon* the first antennal joint is red, the second and third black, while in *nigripennis* the first and second are red, the third only black. *Ceyx* and *nigripennis* fly in early or mid summer, *halcyon* in autumn.

ANTHRAX HALCYON Say. Aberdeen October 3, 1921, TBM.

*ANTHRAX DISPAR Coq. Southern Pines, August 6, 1921, TBM.

ANTHRAX HYPOMELAS Macq. Dillard-Highlands road, July 11, 1921, TBM.

*ANTHRAX LATERALIS var. *arenicola* Johnson. Southern Pines, late June, 1909, CSB., Dillard-Highlands road, July 11, 1921, TBM.

BOMBYLIUS SUBVARIUS Johnson. The single specimen from White Lake referred by me to this species (Ent. News, XXXII, 171) appears to be *B. fraudulentus* and not this species, hence *subvarius* is thereby eliminated from the state list.

*BOMBYLIUS FRAUDULENTUS Johnson. Raleigh, late May, CSB, June 14, 16, 1921, on flowers of Ceanothus, also the White Lake specimen mentioned above.

*BOMBYLIUS MEXICANUS Wied. Raleigh, late April to late May, common, Southern Pines, April, 1907, FS; Hendersonville, June, 1907, FS; Blowing Rock, June 25, 1902, FS, Andrews, mid May, 1908, FS. All these formerly referred to *B. varius* under a misapprehension.

BOMBYLIUS VARIUS Fabr. All our previous records (Ent. News, XXXII, 171) belong to *B. mexicanus*, except that from Charlotte, which is of a badly rubbed specimen of *azaleae*. The species, however, still remains on our list as I collected one at Fayetteville, in early June, 1921.

EXOPROSOPA DECORA Loew. Old Fort, late October, 1920, FS.

*GERON SUBAURATUS Loew. One taken at Raleigh, June 18, 1921, CSB. Although I took numerous other Gerons during the summer they were all *senilis*.

*ONCODOCERA LEUCOPROCTA Wied. "North Carolina," Aldrich's Catalogue of North American Diptera, page 239.

SPOGOSTYLUM CEPHUS Fabr. Marion, July 8, 1921, TBM.

TOXOPHORA LEUCOPYGA Wied. Goldsboro, July 26, 1921, TBM.

III. TACHINIDAE.

(Records of my own collecting are without initials).

A. Species not previously recorded.

ALOPHORA AENEOVENTRIS Will. Raleigh, May 17, 1921, TBM.

ALOPHORA near PULVEREA Coq. Raleigh, April 2, 1906.

Celatoria diabroticae Shimer, Raleigh, August 16, 1921.
Doryphorophaga doryphorae Riley. Terra Ceia, August 24, 1919, RWL.
Epigrymia polita Td. Raleigh, May 17, 1921.
Exorista futilis O.S. Raleigh, late April, mid June.
Frontina archippivora Will. Raleigh, mid April, 1920, M. R. Smith.
Gaediopsis facialis Coq. Raleigh, September 8, 13, 21, 1921.
Houghia setipennis Coq. Raleigh. July 22, 1921.
Jurinella ambigua Macq. Linville, August 19, 1921, TBM.
Leskia thecata Coq. Raleigh, September 8, 13, 21, 1921.
Masicera myoidea Desv. Raleigh, August 16, 29, October 17, 20, 1921.
Ocyptera dosiades Walker. Raleigh, mid June, mid August and mid September, 1921, thirteen specimens; Goldsboro, July 28, 1921, one, TBM.
Oestrophasia signifera V. d. W. Raleigh, May 23, 1921, one in window.
Paraplagia spinosula Bigot. Raleigh, April 21, 1921; Fayetteville, early June, 1921.
Phorantha calyptrata Coq. Raleigh, May 14, 1921.
Plectops melissopodis Coq. Raleigh, June 25, October 4, 1921.
Pseudatractocera neomexicana Td. Balsam, mid September, 1908, ZPM.
Pyraustomyia penitalis Coq. Fayetteville, late May, 1920, early June, 1921; Raleigh, June 1, 11, 1921.
Siphoclytia robertsoni Td. September, 1921, one.
Siphoplagia similis Td. November 9, 1920, also the specimens previously attributed to *S. anomala*.
Thryptocera flavipes Coq. Raleigh, June 18, August 16, 1921.

B. Additional Records of some species.

Chaetogaedia crebra V. d. W. Raleigh, November 5, 1921.
Euthera tentatrix Loew. Raleigh, October 17, 1921.
Masiphya brasiliana BB. Raleigh, late June, 1920.
Ocyptera argentea Td. Raleigh, late July, 1912, September 13, 1921.
Siphona geniculata DeG. Raleigh, July 5, 1921, four.
Siphophyto floridensis Td. (*Epigrymia floridensis*). Raleigh, mid July, mid May, mid August, three; Fayetteville, late May, 1920, one

C. Notes and Corrections to my list in Entomological News, January, 1922.

Dinera futilis Smith. Is a Dexiid.
Myiophasia aenea Wied. Of the specimens referred by me to this form most of those from Raleigh, and those from Gibson, run to *Enyomma globosa* by Townsend's key, while some of those from Raleigh and the specimens from Elrod, Fayetteville, and Charlotte run to *Phasioclista metallica*. I mention this without prejudice to any of the names quoted.
Neophyto setosa Coq. One from Raleigh has the apical cell open and appears to be this, but two others although very similar from Raleigh, August 23, 1921, and Spruce (Sunburst) late May, 1912, have the apical cell long petiolate, and may be *Phytodes hirculus* Coq.
Siphoplagia anomala Td. All our specimens appear to be *S. similis* Td.

Catocala ulalume a Distinct Species (Lepid., Noctuidae).

By G. H. French, Herrin, Illinois.

In his number for September, 1877, of *Lepidoptera Rhopaloceres and Heteroceres,* Mr. Herman Strecker described *Catocala ulalume,* on page 132. We know that Mr. Strecker's descriptions were not of much account as far as using them by some one else for future identification of specimens, and yet a few expressions in this description may serve to help us in the recognition of, and separation of, this species from the specimens of the variable species *C. lacrymosa* where it has been placed for a number of years.

In the description he compares *C. ulalume* with *C. desperata* (now *C. vidua*) in color, and says that the brown shade beyond the t. p. line of *C. desperata* is absent in *C. ulalume.* In all of the forms of *C. lacrymosa* this brown shade is present. Another characteristic of *C. lacrymosa* is that near the posterior margin of the primaries is a prominent white shade inside the t. a. and outside the t. p. lines. This is absent in both *C. dejecta* and *C. ulalume.* The ground color of *C. dejecta* is a little lighter bluish gray than that of *C. ulalume,* and there are other markings that separate them.

Both *C. ulalume* and *C. dejecta* used to be found in the hills of Union County, Illinois, and specimens of each were sent to Mr. Strecker for identification soon after his description of the two species, but my specimens of both have been destroyed. Of late the species, or rather both of them, have been found in the hills of Green County, southwestern Missouri, by my friend, Mr. A. E. Brower. Two specimens of *C. ulalume* were compared with the types in the Strecker collection in the Field Museum, Chicago, by Mr. W. J. Gerhard and pronounced identical.

The species has a clear bluish color over the whole wing except the whitish shade beyond the t. p. line that is without any brown. In the Barnes book, Fig. 6, Plate 2, the whole wing is suffused with brown. I do not know what that figure represents. The subreniform is open in *C. ulalume* but is closed in the forms of *C. lacrymosa.* The hind wings are black with white fringes, but the black at the ends of the veins of *C. ulalume* and *dejecta* are not as prominent as in *C. lacrymosa.*

During the last season my friend, Mr. Brower, has bred *C. lacrymosa* and *C. ulalume* from the eggs, and he says the larvae are different, but I will let him tell that story. From the above I think that *C. ulalume* is entitled to specific rank.

Preparatory Stages of Catocala ulalume Str., with Larva of C. lacrymosa for Comparison (Lepid., Noctuidae).

By A. E. Brower, Willard, Missouri.

Catocala ulalume Strecker.

Egg.—Diameter, .04 inch; height, .03; subspherical in shape, the base flattened, not saucer-shaped, the sides with 25 longitudinal ribs that reach the micropyle, with alternate shorter ones, the space between these with transverse shallower lines, as usual; color gray.

Larva.—Stage I.—Head brown; the newly hatched larva yellowish white, becoming grayish white later.

Stage II.—Head light gray, marked with darker stripes; body dark gray, with subdorsal and two lateral darker lines.

Stage III.—Head light gray, marked with brownish gray lines, a heavy black stripe extending upward from the palpi, apices with dark gray brown stripes; body light gray, with broken irregular subdorsal and spiracular lines.

Stage IV.—Head light gray, with longitudinal slaty gray lines, prominent gray brown stripe across apices extending over the front, a heavy black stripe from corner of mouth extending outward and angled upward; body light gray with irregular broken subdorsal and spiracular lines, and with a black shade on the juncture of the fifth and sixth abdominal segments.

Stage V.—Head large, rounded, larger than the next segment, light gray in color with longitudinal slaty gray lines; a prominent gray brown stripe across the apex of each lobe extending over the front, a prominent black stripe extends outward from the mouth and is sharply angled upward, abruptly terminating about half-way up the face; body whitish gray, with irregular broken subdorsal and spiracular lines, the subdorsal present only as quite prominent markings about the tubercles, a faint centrodorsal line present, a shade over the juncture of the fifth and sixth abdominal segments, less prominent on the fourth, fifth and eighth. The tubercles are fairly prominent, enlarged on the eighth abdominal segment, reddish brown in color. Filaments of fringes small, white.

In comparison with the larva of *C. lacrymosa* the larva of this species is much lighter in color, the lines are less continuous and without the dorsal chain of patches. The tubercles are brighter and more prominent on the eighth abdominal segment. The head appears to be comparatively larger with a somewhat different black stripe. In general the larva of *C. ulalume* greatly resembles the larva of *C. insolabilis* but is much lighter in color, while the larva of *C. lacrymosa* is much like the larva of *C. neogama*.

I have reared larvae from the ova laid by four females of *C. ulalume* and find the larvae as well as the moths quite constant. Mr. French has pointed out the differences between the imagines of *C. ulalume* and *C. lacrymosa.* If *C. ulalume* were a variety of *C. lacrymosa,* intergrades would be found. I have taken intergrades to all varieties of *C. lacrymosa* but none connecting *C. lacrymosa* with *C. ulalume.* The flight and habits of *C. ulalume* and *C. lacrymosa* in the woods are quite different. If *C. ulalume* were a variety of *C. lacrymosa* it would be found throughout the range of the latter, but such does not seem to be the case, as *C. ulalume* seems to be found only in the Southern and border United States. It is reported as scarce or rare at St. Louis. Mr. E. A. Dodge kindly allowed me to examine a single worn specimen from Louisiana, Missouri. Mr. E. J. Erb tells me that some years ago he collected several specimens of *C. ulalume* in Western Virginia. Messrs. Erb and Doll compared specimens that I collected here near Willard, Greene County, Missouri, with a cotype of *C. ulalume* in the Brooklyn Museum. Mr. Doll also kindly sent a specimen to Chicago where Mr. Gerhard compared it with Strecker's types of *C. ulalume* in the Field Museum.

Catocala lacrymosa Guen.

Egg.—This has been described by Barnes and McDonnough in a recent Bulletin of the American Museum of Natural History.

Larva. Stage I.—Head blackish brown; body grayish white.

Stage II.—Head brownish black; body light grayish white; light dorsal stripe, laterally reddish brown with two or three faint lateral lines.

Stage III.—Head smoky black apically, face grayish; body dull black with a lighter geminate dorsal and three lateral lines.

Stage IV.—Head dark gray with longitudinal black stripes, heavy black stripe crossing the apex of each lobe, continued by a light stripe to corner of the mouth; body dark gray, a geminate dorsal stripe and three lighter lateral lines.

Stage V.—Head gray, heavily striped with black, a little paler apically. Body gray, with subdorsal and spiracular lines of small black spots; two faint centrodorsal and three darker lateral lines.

Stage VI.—Head light gray, longitudinally lined with dark gray brown stripes, prominent darker brownish stripe on the apex of each lobe extending just over the front; a heavy black stripe extending outward from the jaws, after a short distance apparently merging into the lines of the face; body gray with centrodorsal, subdorsal and two lateral darker lines, the subdorsal being most prominent; dorsum with pale oval or diamond-shaped patches; the posterior portion of the fifth and the anterior of the sixth abdominal segments darker. Fringes pinkish white.

The larvae vary somewhat in shade of color but on the whole are quite constant. A single larva from ova laid by variety *paulina* produced var. *paulina*. The larva was quite similar to the larvae of the normal *lacrymosa*.

The food plant of both *C. ulalume* and *C. lacrymosa* is hickory.

Biological Notes on Elateridae and Melasidae (Col..)

By H. B. Kirk, Bureau of Plant Industry, Department of Agriculture, Harrisburg, Pennsylvania.

The following miscellaneous biological notes on insects of the families *Elateridae* and *Melasidae* have been assembled from field observations, rearings and collections by the author over a number of years, and from notes and specimens in the collection of the Bureau of Plant Industry by others, to whom due credit is given in the text.

Little is known of the habits of the adults of these two families, although they may be collected on foliage, flowers, trees and on the ground, sometimes beneath stones.

Larvae of some of the species are predaceous. This is particularly true of the species of *Adelocera, Chalcolepidius, Alaus* and *Hemirhipus,* which are decidedly beneficial. Certain species of other genera attack living plant tissue, roots, tubers, etc., and are destructive. Those attacking dead or decaying wood tissue are of no special economic importance. Larvae of the predaceous forms, although confined to either deciduous trees or conifers in nature, will in captivity feed on any woodboring larvae, and will attain at maturity their natural characteristics and markings.

Many species transform in July and August, and remain in their pupal cells until April or May of the following year. During this time adults with the cast larval skins may be found together, thus furnishing a means of connecting the adults with the larvae. Adults also hibernate beneath bark, in crevices and in abandoned cells of various insects, and are sometimes attracted to light.

While the family *Elateridae* has not been considered as containing any particularly beneficial species, a more thorough study of the younger immature larval stages will no doubt reveal as many equally important predaceous species as those of the family *Cleridae*.

ELATERIDAE.

ADELOCERA IMPRESSICOLLIS Say. Harrisburg, Pennsylvania, VII-15; Rockville, Pennsylvania, XII-12. Rare. Hibernating in decayed cavity in living tree.

A. RORULENTA Lec. El Paso County, Colorado, VI-14, VII-12. A. B. Champlain.

A. BREVICORNIS Lec. State College, Pennsylvania, V-25; Charter Oak, Pennsylvania, V-21; J. N. Knull. Wales, Maine, VI-23; C. A. Frost. Rare.

A. OBTECTA Say. Pennsylvania, VI, VII. Franklin, New Hampshire, IX-18, larva and adult found in gallery of woodborer in apple twig. F. C. Craighead.

A. PROFUSA Cand. Cornwall, Connecticut, VII-15, K. F. Chamberlain; Cranebrook, British Columbia, VII-8, C. B. Garrett; Oregon, VIII-11, adults taken in Yellow Pine, W. D. Edmonston.

A. MARMORATA Fab. Rockville, III-3; Hummelstown, IV-29, Kirk and Knull; and Harrisburg, April, June, July; all in Pennsylvania. Larvae of this species found feeding on *Bostrychid* larvae (*Trichodesma gibbosa*) in Gum tree (*Nyssa sylvatica*).

A. DISCOIDEA Web. All localities in Pennsylvania. Common beneath bark of dead Pine.

A. AVITA Say. Hummelstown, III-29, VII-7, Kirk and Knull, and State College, V, both Pennsylvania. A number of adults reared from larvae collected beneath bark of dying and dead hickory trees. These trees were heavily infested with woodboring larvae which were the hosts of *A. avita.* Have taken a number of adults on these trees at night during June and July.

A. AURORATA Say. State College, Pennsylvania, I-9, from beneath the bark of dead Pitch Pine (*Pinus rigida*), J. N. Knull; Pittsburgh, Pennsylvania, June.

LACON ILLIMIS Horn. Common at Tucson, Arizona. J. H. Shive.

ALAUS LUSCIOSUS Hope. Arizona. Larva reared by feeding it with various woodboring larvae.

A. ZUNIANUS Casey. Adults, larvae and pupae cut from Cerambycid galleries in fallen sycamore tree. East Catalina Mountains, Arizona, June 20, M. Christman.

A. OCULATUS Lec. One of our most common species. Adults and larvae may be found in decaying logs and stumps infested by various woodborers upon which they are predaceous. Very small larvae of this species were observed feeding upon the larvae of *Agrilus bilineatus* in chestnut, also a more mature larva of *A. oculatus* found feeding on larvae of *Buprestis rufipes* in *Liriodendron* stump, and also on larvae of *Chalcophorella campestris* in dead beech (*Fagus americana*) trunk. Have found larvae, about one-half grown, emerging from exit holes of a Cerambycid and *Tremex sp.* in hickory trees, where they crawl about on the trunk and re-enter other burrows in search of woodboring larvae. This species occurs only upon deciduous trees according to our notes.

A. MYOPS Fab. Occurs only in pine. Adults and larvae taken around Harrisburg, Pa., in pine trees and stumps infested with woodboring larvae. At Falls Church, Virginia, have taken hundreds of adults and larvae in yellow pine stumps infested with *Asemum moestum.*

A. MELANOPS Lec. Adults and larvae found commonly in stumps infested with *Chalcophora angulicollis.* Larvae predaceous on various woodboring larvae in dead coniferous trees. Oregon, VIII-8, adults, pupae and larvae in galleries in dead Douglas fir, W. D. Edmonston; El Paso County, Colorado, II-20, A. B. Champlain.

CHALCOLEPIDIUS VIRIDIPILIS Say. Rockville, Pennsylvania, VIII-8, collected at sour sap on oak tree in the evening, Daecke and Kirk; Baltimore, Maryland, July 30, V. A. E. Daecke.

C. SMARAGDINUS Lec. Reared from larvae taken from woodborer gallery in dead wood. Tucson, Arizona, VII-14, J. W. Shive; VIII-6, G. Hofer; Sabino Canyon, Arizona, VII-5, W. D. Edmonston.

C. BEHRENSI Cand. Tucson, Arizona, VII-31, J. W. Shive.

ATHOUS CUCULLATUS Say. Larva collected in dead log where it was feeding on woodboring larva. Adult reared.

LUDIUS HIEROGLYPHICUS Say. Adults collected feeding on small insects on foliage, Knull and Champlain.

HEMICREPIDIUS MEMNONIUS Hbst. Rockville, Pennsylvania, VII-24, under stones.

H. BILOBATUS Say. Harrisburg, Pa., VIII-27, taken on hickory trees at night.

Parallelostethus attenuatus Say. Common in rotten logs, feeding on decaying moist wood tissue. Common in vicinity of Harrisburg, Pa., July and August.

Genus Elater. Larvae of this genus feed on decaying wood tissue. Adults frequent flowers.

Elater vitiosus Lec. Adults and larvae with *Elater sayi* Lec. in decayed hole in living *Celtis occidentalis*, November 12. It is likely that these two forms may be the same species. Kirk and Champlain.

Megapenthes limbalis Hbst. Male of this species taken *in coitu* with black female that answers the description of *M. granulosus*, Falls Church, Virginia, VII-16, F. C. Craighead.

Genus Melanotus. Adults of local species hibernate in numbers in old logs beneath bark and in old galleries of woodboring insects, many being found in a single gallery.

Pityobius anguinus Lec. Grand Lake, Presque Isle County, Michigan, VII-2, R. J. Sim; Endeavor, Pennsylvania, VII-30, adult taken on fresh cut white pine log by J. N. Knull.

Genus Limonius. Adults taken around Harrisburg, Pa., fly early in the spring and are found commonly on flowers.

Melasidae.

Melasis pectinicornis Melsh. Reared from dead birch (*Betula lenta*) and beech (*Fagus americana*), J. N. Knull and A. B. Champlain.

Isorhipis ruficornis Say. Reared from dead chestnut, black birch, beech, linden and maple.

Deltometopus amoenicornis Say. North East, Pennsylvania, VII-22, J. N. Knull; Tyrone, VII-26, J. G. Sanders; Jeanette, Klages; Harrisburg, VI-29, A. B. Champlain; and Landisburg, VI-30; all in Pennsylvania. Falls Church, Virginia, VI-24.

Dromaeolus cylindricollis Say. Hummelstown, reared from dead *Platanus occidentalis*, J. N. Knull; Ohio Pyle, VII-20, T. L. Guyton; Jeanette, VII, Klages; Clarks Valley, Dauphin County; all in Pennsylvania. Reared from dead standing Hemlock (*Tsuga canadensis*), A. B. Champlain.

D. striatus Lec. Falls Church, Virginia, VII-31; Hummelstown, Pennsylvania, VII-17. Reared from dead chestnut stick.

Fornax badius Melsh. Harrisburg, Pa. Larva very plentiful in dead, decaying hickory. Adults on hickory trees at night, very active, crawling about and mating.

F. orchesides Newn. Harrisburg and Inglenook, Pennsylvania, larvae from decaying logs of willow and *Betula nigra* in swamps. The adults of this and other species in the genus are active only at night, and may be found mating, ovipositing and running over dead, decaying trees or logs at this time. During the daytime they crawl into cracks and crevices, where they remain concealed and inactive. The eggs of *F. orchesides* are placed in the cracks and crevices of decaying trees, stumps or logs, the wood of which is usually very soft and contains considerable moisture. The larvae insinuate their way through the soft wood tissue, the gallery apparently closing up after their passage, and when ready for pupation they work their way to the sapwood, where cells are constructed. The cell is formed by the actions of the larva, and by an accumulation of soft particles rubbed loose. The pupal duration is about two weeks. The adults emerge during June, and vary greatly in size. The spring or clicking operation is developed in this species to some extent. They are able to spring slightly and click when held in the hand by the abdomen. Observation by Champlain, Knull and Kirk.

MICORRHAGUS HUMERALIS Say. New Cumberland, VI-28, Kirk and Champlain.

NEMATODES ATROPUS Say. Harrisburg, Pa., I-28, VII-9, and reared IV-14 from dead hickory stumps. Adults taken at night on dead hickory trees. Kirk and Champlain.

N. PENETRANS Lec. Harrisburg, Pa., VII-4, Kirk and Champlain.

SCHIZOPHILUS SUBRUFUS Rand. Very rare. Taken at night on hickory tree at Harrisburg, Kirk and Champlain (this specimen in collection of U. S. National Museum). East Falls Church, Virginia, III-6. Knull.

Change of Address.

Dr. Charles P. Alexander has removed from Urbana, Illinois, to Fernald Hall, Mass. Agricultural College, Amherst, Massachusetts.

Foundation of a Brazilian Entomological Society.

Professor Benedicto Raymundo has written to The American Entomological Society, announcing the foundation, on February 2, 1922, of the Sociedade Entomologica do Brasil, of which he is President. The Society is located at 15 Rua 1o de Março, Rio de Janeiro. We wish it prosperity and a long life.

Cuvier's Magnifying Glass.

At the meeting of the Entomological Society of France, January 11, 1922, Dr. E. Gobert presented to the Society the magnifying glass (loupe) belonging to Cuvier and gave its origin in the following terms: This glass belonged to Cuvier, died in 1832. Dying, he left it to Audouin, who died in 1841. Audouin confided it to Leon Dufour, celebrated entomologist of St. Sever (Landes). This latter dying, left it to E. Perris, his favorite pupil. E. Perris, in his turn, confided it to me as his pupil and friend. If the Society accepts it, I shall be glad to offer it as a souvenir and in the name of the three entomologists of The Landes.

This glass will be preserved as a precious relic in the archives of the Society. (Bull. Soc. Ent. France, 1922, no. 1, p. 6).

# ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., OCTOBER, 1922.

The Need of Greater Precision in Taxonomic Literature.

It is no unusual experience, in reading taxonomic keys, descriptions of species and of genera and similar gems of literature, to meet with expressions intended to be diagnostic but so vague and indefinite as to give no true idea of the part described. Adjectives like "large," "small," "broader," "narrower," are frequently employed without any data being given to indicate the size intended. It does require some additional time and labor on the part of an author to specify how many millimeters these descriptive terms mean, or to state the dimensions of the structure concerned in terms of the length or width of some nearby part, or of the distance between some adjoining organs. Of course it does. But no one in these days has any right to work in taxonomy, or in any other branch of science, unless he is willing and ready to express precisely what the differences between objects compared really are. It is a reproach to us that so much of taxonomic literature is in so hazy a condition.

When one reads in a recent, otherwise valuable manual, on one of the largest orders of North American insects, the alternative rubrics of a key as "Marginal vein short" and "Marginal vein long" without further elucidation, he may, with righteous indignation, exclaim justly, "*How* long, O Lord, *how* long?"

Additions to the Coleoptera in The Academy of Natural Sciences of Philadelphia.

Three hundred and seven specimens of Coleoptera have been added to the collections from The Hebard-Academy Expedition of 1921. They include such interesting species as *Cicindela longilabris* Say, var. *oslari* Leng; also var. *montana* Lec. (from the summits of the Sandia Mts., New Mexico, 10500-11000 ft.), *Pasimachus obsoletus* Lec., *Platynus texana* Lec., *Chlaenius chaudoiri* Horn, *Helluomorpha texana* Lec., *Agrilus mercurius* Wickh., *Lema texana* Crotch, and *Gnathospasta mimetica* Horn. This is quite a remarkable showing in view of the fact that the collecting was primarily for Orthoptera and during the latter part of the summer when Coleoptera are not so abundant.—FRANK R. MASON.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Mr. E. A. Schwarz, Honorary Ph.D.

The University of Maryland, at its commencement exercises on June 10, conferred the honorary degree of Doctor of Philosophy upon Eugene Amandus Schwarz, honorary custodian of Coleoptera in the U. S. National Museum. Mr. Schwarz began work as a beetle specialist for the Division of Entomology under the Commissioner of Agriculture in 1878. His forty-four years of official scientific activity to the present have been continuously devoted to the building up of a great collection and to the assistance of other workers, both taxonomic and economic. As dean of entomologists in Washington and senior coleopterist in active service in North America, permanent president of the Entomological Society of Washington (of which he never misses a meeting), and honorary fellow of the Entomological Society of America, Mr. Schwarz is held in high and universal esteem by the entomological fraternity of the country, who would unanimously second his nomination to the honor now bestowed.—J. M. ALDRICH, U. S. National Museum, Washington, D. C.

The University of Michigan-Williamson Expedition to Brazil.

Our previous notice (this volume, page 216) of this expedition left it at Porto Velho, Amazonas, Brazil, where it remained until May 30, 1922. On April 30 it was noted of the Odonata: "Both species and individuals seem less numerous than when we were here before [*i. e.*, Jan. 21—March 5, 1922]. Certain species are no longer seen, but no new ones appear to have taken their place;" on the other hand, "some things like *Lais*, *Chalcopteryx*, etc., are much more common now." [May 9]. Considerable collecting was done on the city water supply creek, at this time 12—15 feet wide and 2—5 feet deep. In the last week of April it rained "every day and sometimes practically all day. We managed to put up one box of bugs, however." Nevertheless the second of May "was the record catch for the trip, 269 specimens to put up last night."* "Had a lively battle with a bunch of pestiferous little ants to-night (May 3). First discovered them in the collecting kit making way with the day's catch; then found they were in the drier getting after yesterday's stuff."

On May 9 it was noted: "Rainfall is now much less—larger creeks are wadable—but there are too many *cloudy* days." On May 10 Mr. J. H. Williamson had a return of the malarial fever. On May 12 and 14 Mr. Strohm collected at San Antonio, Matto Grosso, Brazil, as single day trips from Porto Velho.

On May 30 the Expedition left Porto Velho on a steamer of the

*But *cf*. Manáos, June 17, "Last night we papered 280 dragonflies."

Amazon River Steam Navigation Co. for Manáos; proceeding down the Madeira River, many stops were made, at some of which (Humayta, Manicoré, Borbá) a little collecting was done. On the Madeira below Borbá and on the Amazon, which was entered on June 3, the "waters overflowed banks, cacao groves, banana fields, etc. Native huts half submerged and cattle kept on rafts."

One June 4 Manáos was reached. "Rio Negro is now [at] highest stage ever recorded, being 2½ inches higher than in 1909, the former high water mark. Back water appears in the streets in places and the river is still rising." On June 21 Mr. Williamson wrote: "Rio Negro stays at same high level. Frequent rains keep the swamps and creeks in the hills well filled—much better collecting than when rains cease and they go down a foot or two." During this month collecting was done at Manáos itself and between the city and Flores, to which a street car runs. "Real original growth forest was seen for first time to-day [June 18]. Near the road—except where under present cultivation—was the usual second growth, so common around Manáos, but beyond this, the original forest began in lines plainly marked where clearing had ceased. [This was about 7 miles beyond Flores.] In the bottom or swamp lands between the hills there probably has been little or no clearing and no big trees ever grew." On June 17 the total catch of dragonflies was estimated at 7697 specimens and 157 species.

In the beginning of July a "friage" or cold wave, temperature 74° F., was experienced, lasting seven days. On July 2, taking steamship, the expedition proceeded from Manáos up the Rio Negro, which is split into many channels and full of long, wooded islands, the latter, like the river banks, being completely flooded, only the tops of trees visible. On July 6 Santa Isabel was reached without having seen any favorable collecting grounds on the way. At this place, 423 miles from Manáos, indications of a different Odonate fauna were obtained. The return to Manáos began July 8 and on July 11 "many teneral *Diastatops* and four other species of teneral Libellulines were caught by ourselves and fellow passengers," while "large numbers of *Tholymis* came out from shore at sunset, but only caught two as they flew over the boat." Manáos was reached near midnight July 12.

"It is indeed fortunate that we made Porto Velho our chief objective on the trip instead of any of the so-called towns along the Negro. There is nothing worthy the name of village above Manáos. No place have we seen collecting ground for one real day's work, let alone a monthly stop which would be necessary here. Haven't seen a creek all the way up; there may be some but the flooded country has them well concealed. I imagine one would have to travel several hundred miles above Santa Isabel by launch and canoe before reaching good collecting spots and then he would practically have to camp out to work them" (July 11, 1922).

From July 13 to 22 some further collecting was done in the vicinity of Manáos, bringing the estimated total of specimens and species of Odonata up to 8315 and 162 respectively. There was much cloudy weather and frequent showers. On July 21 "we collected Agrionines in Mr. Russell's house. They were quite numerous flying about, nosing along walls, furniture, etc., and resting on everything in sight from picture cords to the centre of a bed. Though we have caught some of this species in the house heretofore, they were never so numerous as to-day. Some were netted, many were caught by hand."

On July 22 the expedition took steamer from Manáos for Pará. The Rio Negro had fallen only 1½ feet since its new high water mark and the Amazon was still flooding the country to Pará, which was reached on July 29.

Expectations were that the Expedition would leave Manáos about August 1 for Para, leave Para about September 3 for Rio, arriving there September 17. (From Mr. Jesse H. Williamson's "log" and letters).

The Stridulation of a North American Noctuid, Heliocheilus paradoxus Grote (Lep.).

On the night of August 16th, 1921, while at Amarillo, Texas, an effort was made to secure species of Tettigoniidae by listening for their stridulation and then locating the singers with the aid of a hand flash-lamp. A wide grassy plain was visited, but it was soon evident that search would be unproductive. Only a few specimens had been heard and these at widely separated spots.

While standing in the knee-high grasses all was silent, when suddenly a faint stridulation became audible. Again and again this sound was approached, but nothing could be located. Finally, when undoubtedly close to a singer, a small buffy moth was seen to be hovering in the shaft of our light, just above the weeds and grasses, holding itself over the same spot by flying against the brisk breeze that was blowing. Suddenly it flew away and the sound ceased. The singer was in fact a moth and not one of the smaller katydids, as had been supposed.

After this, several specimens were easily secured by following up the sound they produced, all acting just as the first individual had done. The stridulation was like "the ticking of a loud watch, but much faster and easily audible to good ears at a distance of twenty feet." When alarmed a singer would fly away noiselessly and at great speed.

The species has been identified by Dr. Henry Skinner as *Heliocheilus paradoxus* Grote.[1] Stridulating organs for the Agaristidae and Noctuidae have been discussed by Dr. Jordan in 1921,[2] but we know of nothing in the literature bearing on the stridulation of the present insect or other North American Noctuids. The species is buffy and not strikingly marked. Toward the costal margin of the fore-wings, the highly specialized stridulating area is found.—MORGAN HEBARD.

[1] Described from Colorado, Proc. Ent. Soc. Phila., IV, p. 329, pl. 2, figs. 3 (♂), 4 (♀), 5 (♀, reverse), (1865).

[2] Proc. Ent. Soc. Lond., V, p. xxxiii.

Mulford Biological Exploration of the Amazon Basin News Bulletin No. 9.

The following letter from Dr. W. deC. Ravenel, Administrative Assistant to the Secretary in charge of the U. S. National Museum, was recently received by Mr. Milton Campbell, President of the H. K. Mulford Company:

"I now take pleasure in advising you that a large amount of additional material collected by Dr. William M. Mann, while a member of your Exploration Expedition, has been turned over to the collections, comprising insects, mammals, shells, crustaceans and textiles. All of the material is recorded as a gift in the name of the Mulford Biological Exploration of the Amazon Basin, and I would repeat my assurances of our appreciation of the generous interest which has been manifested in the national collections."

In reply to the communications from Dr. Ravenel, Mr. Campbell, President of the H. K. Mulford Company, thanked him for the generous expressions of appreciation and said, "It is a pleasure indeed to present these collections to the Smithsonian Institution in view of the splendid work the Institution is doing and its importance to the country."—R. H. HUTCHISON, *Secretary*, Philadelphia, Pa.

The Exchange of Scientific Literature with Russia.

Apropos of the note on this subject published in the NEWS for June of this year, page 186, we reprint the following from *Science* for July 14, 1922, page 45:

"The officers of the Russian Entomo-Phytopathological Congress sent a request some months ago to American scientific societies and investigators to send to Russia literature on entomological and phytopathological matters.

"In connection with this request the Russians promised to send Russian scientific literature in exchange. Certain difficulties, however, have been found to exist, principal among which is a regulation by the Soviet government, made about two months ago, which prohibits the sending out of literature from Russia without a special permit. This permit seems very difficult to get. The Russian scientific men, therefore, who have received American scientific literature in response to their request, feel much embarrassed by their inability to respond by sending Russian literature here, and I have promised to make known, in this way, the facts which have prevented their promised sending of Russian literature to those Americans who have kindly sent scientific papers to them.—VERNON KELLOGG."

In this connection we may call attention also to the arrangements which have been made for sending scientific works to Russia, described at length in *Science* for June 22, 1922, pages 667-668.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

4—Canadian Entomologist, Guelph, Canada. **5**—Psyche, Cambridge, Mass. **6**—Journal of the New York Entomological Society. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **13**—Journal of Entomology and Zoology, Claremont, Cal. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **21**—The Entomologist's Record, London. **22**—Bulletin of Entomological Research, London. **29**—Annual Report of the Entomological Society of Ontario, Toronto, Canada. **34**—Bulletin de la Societe Entomologique de Belgique, Brussels. **46**—Contributions to the Natural History of the Lepidoptera of North America. Ed. by Wm. Barnes. **48**—Wiener Entomologische Zeitung. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **50**—Proceedings of the United States National Museum. **64**—Parasitology, London. **68**—Science, Garrison-on-the-Hudson, N. Y. **76**—Nature, London. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **86**—The Quarterly Journal of Microscopical Science, London. **89**—Zoologische Jahrbucher, Jena. **90**—The American Naturalist, Lancaster, Pa. **91**—The Scientific Monthly, Lancaster, Pa. **92**—Archives de Zoologie Experimentale et Generale, Paris. **98**—Annals of Tropical Medicine and Parasitology, Liverpool. **99**—Bulletin du Museum National d'Histoire Naturelle, Paris. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **106**—Anales de la Sociedad Cientifica Argentina, Buenos Aires. **109**—Annales Historico-Naturales Musei Nationalis Hungarici, Budapest. **110**—Naturwissenschaftliche Wochenschrift, Jena. **111**—Archiv fur Naturgeschichte, Berlin. **118**—Die Naturwissenschaften, Berlin. **119**—Proceedings of the National Academy of Sciences of the U. S. A., Washington, D. C. **124**—Bulletin de la Societe Entomologique d'Egypte, Cairo. **127**—Archiv fur Entwicklungsmechanik der Organismen, Berlin. **128**—Zeitschrift fur Induktive Abstammungs- und Vererbungslehre, Leipzig. **141**—Internationale Entomologische Zeitschrift, Guben, Germany. **142**—Notulae Entomologicae, Helsingfors, Finland.

GENERAL. Criddle, N.—The entomological record, 1920. **29,** li, 72-90. **Felt, E. P.**—The possibility of exterminating insects. **91,**

xv, 35-41. **Hayes, W. P.**—Method of procedure in insect life history investigations. **4,** liv, 73-7. **Hoffmann, A.**—Entomologen-addressbuch. Annuaire des entomologistes. (Wien, 1921, 434 pp., Verlag Adolf Hoffmann.) **Hoffmann, F.**—Deutsche insektennamen in Brasilien. **124,** ii, 65-6. **Horn, W.**—Et meminisse et vaticinari liceat. Ueber oxenstjerna und entomologische museologie. **49,** xi, 42-3. **Howard, L. O.**—A side line in the importation of insect parasites of injurious insects from one country to another. **119,** viii, 133-39. **Lochhead, W.**—Inter-relations in nature. **29,** li, 53-60. **Nuttall, G. H. F.**—The Molteno institute for research in parasitology, University of Cambridge, with an account of how it came to be founded. **64,** xiv, 97-126. **Rau, P.**—Ecological and behavior notes on Missouri insects. (Trans. Ac. Sc., St. Louis, xxiv, No. 7.) **Rowland-Brown, H.**—Obituary. **9,** 1922, 121-3. **Williamson, E. B.**—Keys in systematic work. **68,** lv, 703.

ANATOMY, PHYSIOLOGY, ETC. **Armbruster, L.**—Vom horen der insekten (Bienen). **118,** 1922, 602-3. **Betts, A. D.**—The spiracular muscles in hymenoptera aculeata. **76,** cix, 813-4. **Bonnier, G.**—Double sex-linked lethals in Drosophila melanogaster. (Act. Zoologica, Stockholm, 1922, 135-52.) **Brecher, L.**—Die puppenfarbungen des kohlweisslings, Pieris brassicae. Die puppenfarbungen der Vanessiden (Vanessa io, V. urticae, Pyrameis cardui, P. atalanta). **127,** l, 41-78; 209-308. **Breitenbecher, J. K.**—Somatic mutations and elytral mosaics of Bruchus. **100,** xliii, 10-22. **Bugnion, E.**—The growth of the antennae and cerci of the cockroach. The growth of the antennae of Empusa egena. **124,** 1921, 56-66; 118-32. **Cholodkovsky, N.**—Sur les glandes colleteriques de l'appareil genital feminin des lèpidopteres. Contribution a la connaissance des glandes salivaires des dipteres. (Bul. Ac. Sci. Russie (6), 1918, 1351-56.) **Cole, W. H.**—Note on the relation between the photic stimulus and the rate of locomotion in Drosophila. **68,** lv, 678-9. **Crampton, G. C.**—The derivation of certain types of head capsule in insects from crustacean prototypes. **10,** xxiv, 153-57. **Dewitz, J.**—Weitere mitteilungen ueber die entstehung der farbe gewisser schmetterlingkokons.... **89,** Ab. f. Zool., xxxviii, 365-401. **Federici, E.**—Lo stomaco della larva di Anopheles claviger, e la dualita delle cellule mesointestinali degli insetti. (Atti R. Ac. Naz. Lincei, xxxi, 264-68, 394-97.) **Frisch, K. v.**—Ueber den sitz des geruchsinnes bei insecten. **89,** Ab. f. Zool., xxxviii, 449-516. **Genieys, P.**—Sur le determinisme des variations de la coloration chez un hymenoptere parasite. **77,** lxxxvi, 1080-83. **Goldschmidt & Machida**—Ueber zwei eigenartige gynandromorphe des schwammspinners Lymantria dispar. **128,** xxviii, 249-258. **Gowen & Gowen**—Complete linkage in Drosophila melanogaster. **90,** lvi, 286-8. **Grandi, G.**—Studio morfologico e biologico della Blastophaga psenes. (An. R. Sc. Sup. Agric., Portici, xvi, 33-144.) **Haviland, M. D.**—On the post-embryonic development of certain chalcids, hyperparasites of aphids. **86,** lxvi, 321-38. **Hollande, A. C.**—La cellule pericardiale des insectes. (Arch. Anat. Microsc., Paris, xviii, 85-307.) **Horst, A.**—Zur kenntnis der biologie und morphologie einiger Elateriden und ihrer larven. **111,** 1922, A. 1, 1-87. **Hovasse, R.**—Differences de proprietes histochimiques entre l'heterochromosome et les autres chromosomes de Gryllus domesticus. **77,** lxxxvii, 316. **Hyde, R. R.**—A high fecundity record for Drosophila melanogaster. (Proc. Indiana Ac. Sc., 1921, 259-60.) **Ives, H. E.**—The fire-fly as an illuminant. (Jour. Frankl. Inst., Phila., cxciv, 213-30.) **Lancefield & Metz**—The sex-linked group of mutant characters in Drosophila willistoni, **90,** lvi, 211-41. **Macfie, J. W. S.**—On the genital armature of the female mosquito. **98,** xvi, 157-88. **Martini, E.**—Ueber den bau der ausseren mannlichen geschlechtsorgane bei den stechmucken. **111,** 1922, A. 1, 134-42. **Morgan, L. V.**—Non-criss-cross inheritance in Drosophila melanogaster. **100,** xlii, 267-74. **Mueller, A.**—Ueber den bau des penis der tachinarier und seinen wert fur die aufstellung des stammbaumes und die artdiagnose. **111,** 1922, A, 2, 45-166. **Muller, M.**—Rhyphus und Mycetobia mit besonderer berucksichtigung des larvalen darmes. **111,** 1922, A, 2, 1-44. **Mutschler, O.**—Der farbensinn der biene. **110,** xxi, 349-50. **Pawlowsky, E.**—On the anatomy of Phymateus hildebrandti (Orthoptera, Phymateidae) in connection with the peculiarities of its dermal secretion. (Sc. Res. Zool. Exped. Br. E. Africa & Uganda, by Dogiel & Sokolow, Petrograd, i, No. 3.) **Payne & Denny**—A gynandromorph in Drosophila melanogaster. **90,** lvi, 383-4. **Przibram, H.**—Verpuppung kopfloser raupen von tagfaltern. **127,** l, 203-8. **Snodgrass, R. E.**—Mandible substitutes in the Dolichopodidae. **10,** xxiv, 148-52. **Stumper, R.**—L'influence de la temperature sur l'activite des fourmis. **77,** lxxxvii, 9-10. **Thienemann & Zavrel**—Die metamorphose der Tanypinen. (Arc. f. Hydrobiol. u. Plankt., Stuttgart, Suppl. Bd., ii, 566-654.) **Thomson, A. L.**—Notes on the regeneration of the fore-limb in various genera of Mantidae. **127,** l, 192-202. **Titschack, E.**—Beitrage zu einer monographie der kleidermotte, Tineola bisselliella. (Zeit. f. Tech. Biol., Leipzig, x, 1-168.) **Wheeler, W. M.**—Social life among the insects. **91,** xv, 68-88. **Whiting, P. W.**—Heredity in the honey-bee. (Jour. of Heredity, Washington, D. C., xiii, 3-7.) **Zeleny, C.**—The effect of selection for eye facet number in the white bar-eye race of Drosophila melanogaster. (Genetics, vii, 1-115.)

ARACHNIDA, ETC. Chamberlin, R. V.—Notes on West Indian millipeds. **50,** lxi, Art. 10. Further studies on North American Lithobiidae. Bull. Mus. Comp. Zool., Cambridge, Mass., lvii, 259-382.

NEUROPTERA, ETC. Ahlberg, O.—Thysanoptera from Juan Fernandez and Easter Island. (Nat. Hist. J. Fern. & East. Isl., iii, Zool., 271-76.) **Clemens, W. A.**—A parthenogenetic mayfly (Ameletus ludens). **4,** liv, 77-8. **Snyder, T. E.**—New termites from Hawaii, Central and South America, and the Antilles. **50,** lxi, Art. 20.

ORTHOPTERA. **Davis, W. T.**—Notes on katydids. **6,** xxx, 73-4. **Griffini, A.**—Sopra due Gryllacris del Museo di Budapest. **109,** xii (1914), 249-60.

Cabrera, J.—Descripcion de dos nuevas especies Cubanas de orthopteros del genero Eurycotis. (Mem. Soc. Cubana Hist. Nat., "F. Poey," iv, 94-5.)

HEMIPTERA. **Funkhouser, W. D.**—New records and species of South American Membracidae. **6,** xxx, 1-35. **Gowanlock, J. N.**—The periodical cicada. **68,** lvi, 144. **Hussey, R. F.**—A bibliographical notice on the Reduviid genus Triatoma. **5,** xxix, 109-23.

Bergroth, E.—The American species of Ploeariola. **142,** ii, 49-51 (cont.). **Davis, W. T.**—An annotated list of the cicadas of Virginia with description of a new species. **6,** xxx, 36-52. **Penny, D. D.**—A catalogue of the California Aleyrodidae and the descriptions of four new species. **13,** xiv, 21-36.

LEPIDOPTERA. **Aurivillius, Prout & Meyrick**—Lepidopteren vom Juan Fernandez und der Oster-Insel. (Nat. Hist. Juan Fern. & Easter Isl., iii, Zool., 255-70.) **Chamberlin, W. J.**—A new lepidopterous enemy of yellow pine in Oregon. **6,** xxx, 69-71. **Collenette, C. L.**—Protective devices by lycaenid butterflies against the attacks of lizards and birds. (Str. Branch R. Asiatic Soc., Jour. No. 85, 230-4.) **Forbes, W. T. M.**—The position of the Dioptidae. Stridulation in another family of Lepidoptera. Haploa and Callimorpha. **6,** xxx, 71; 72. **Le Cerf, F.**—Description d'Hesperides nouveaux. **99,** 1922, 162-5. **Meyrick, E.**—New microlepidoptera of the German entomological institute. **49,** xi, 44-7. **Niepelt, W.**—Zwei neue formen sudamerikanischer tagfalter. **141,** xvi, 67. **Oberthur, C.**—A propos de la synonymie de certains Hesperia et Lycaenidae americains. **20,** 1922, 124-7. Etudes de lepidopterologie comparee. Fasc. xix, part 1-2. **Pearson, G. B.**—California in October and December. **21,** xxxiv, 113-14. **Pruffer, J.**—Verzeichnis der schmetterlinge aus Peru....(Discip. Biol. Arch. Soc. Sci. Varsavienisi, i, 1-14.) **Schaus, W.**—New species of Pyralidae of the subfamily Crambinae from tropical America. **10,** xxiv, 127-45.

Barnes & Benjamin—Notes on Automeres. Revision of Grotella. Notes on Cucullianae. Notes on Drepana. New genera and species. **46,** v, 1-50. **Braun, A. F.**—Microlepidoptera: Notes and new species. **4,** liv, 90-4.

DIPTERA. **Alexander, C. P.**—Undescribed crane-flies in the Paris national museum (IV). **99,** 1922, 73-5. **Bequaert, J.**—The North American species of Cryptolucilia (Pseudopyrellia), (Anthomyiidae). **5,** xxix, 89-91. **Bezzi, M.**—Note sur la presence en Algerie du Sphyracephala hearseiana, de l'Inde et sur la synonymie de ce diptere. **99,** 1922, 69-72. **Bischoff, W.**—Zur kenntnis der Blepharoceriden. **89,** xlvi, Abt. f. Syst., 61-120. **Brethes, J.**—(See under Hymenoptera). **Cockerell, T. D. A.**—The dipterous family Blephariceridae. **9,** 1922, 135. **Dyar, H. G.**—The mosquitoes of the United States. **50,** lxii, Art. 1. **Edwards, F. W.**—Mosquito Notes. **22,** xiii, 75-102. **Evans, A. M.**—Notes on the Culicidae in Venezuela, with descriptions of new species. **98,** xvi, 213-22. **Ferris & Cole**—A contribution to the knowledge of the Hippoboscidae. **64,** xiv, 178-205. **Kertesz, K.**—Vorarbeiten zu einer monographie der Notacanthen. **109,** xii (1914), 449-557. **Leathers, A. L.**—Ecological study of aquatic midges and some related insects with special reference to feeding habits. (Bul. Bur. Fish., Washington, xxxvii, Doc. No. 915.) **Malloch, J. R.**—An unusual taxonomic character in Syrphidae. **19,** xvii, 42. **Marshall, J. F.**—The destruction of mosquito larvae in salt or brackish water. **68,** cix, 746-7. **Thienemann, A.**—Pelopia und Tanypus. Bemerkungen zur nomenklatur der Meigen'schen Chironomidengattungen. (Arc. f. Hydrobiol. u. Plankt., Stuttgart, Suppl. Bd., ii, 555-65.)

Aldrich, J. M.—A new genus of two-winged fly with mandible like labella. **10,** xxiv, 145-8. **Curran, C. H.**—New and little known Canadian Syrphidae. **4,** liv, 94-6. **Johnson, C. W.**—New genera and species of Diptera. (Oc. Pap. Boston Soc. N. H., v, 21-6.) **Van Duzee, M. C.**—Three new species of Parasynthormon with a table of species (Dolichopodidae). **4,** liv, 88-90.

COLEOPTERA. Cameron, M.—Descriptions of new species of Staphylinidae from the West Indies. **11,** ix, 633-52. **Chamberlin, W. J.**—A review of the genus Poecilonota as found in America, north of Mexico, with descriptions of new species (Buprestidae). **6,** xxx, 52-66. **Champion, G. C.**—The synonymy and distribution of Pantomorus godmani, a cosmopolitan weevil attacking roses, greenhouse plants, etc. **8,** lviii, 161-2. **Frost, C. A.**—Occurrence of Agrilus coeruleus in America. **4,** liv, 96. **Garnett, R. T.**—Notes sur le Dinapate wrightii. **20,** 1922, 119-21. **Heller, K. M.**—Springende blutenkelche, verursacht durch ein neues Apion. **49,** xi, 52-4. **Hustache, A.**—Synonymie et dispersion de Pantomorus godmani. **20,** 1922, 100-1. **Jeannel, R.**—Silphide Leptininae et morphologie comparee du Leptinus testaceus et du Platypsyllus castoris. **92,** lx, 557-92. **Kleine, R.**—Studien uber die Nemocephalini. **111,** 1922, A, 1, 143-51. **Knaus, W.**—Notes on a rare Buprestis. **6,** xxx, 66-68. **McCulloch, J. W.**—Longevity of the larval stage of the cadelle. **12,** xv, 240-3. **Marshall, G. A. K.**—Some injurious Neotropical weevils. **22,** xiii, 59-74. **Pic, M.**—Coleopteres Malacodermes nouveaux des collection du museum. **99,** 1922, 157-61. **Portevin, M. G.**—Note sur quelques Silphides et Liodides de la collection Grouvelle. **99,** 1921, 535-38. **van Emden, F.**—Die fuhler der Halipliden. **49,** xi, 50-1. **Walker, J. J.**—An American Scarabaeid in dried fruit. **8,**

lviii, 162. **Weiss, H. B.**—Notes on the puffball beetle, Caenocara oculata. **5,** xxix, 92-4.

Knull, J. N.—Annotated list of the Buprestidae of Pennsylvania. **4,** liv, 79-86. **Weise, J.**—Ueber einige amerikanische und australische nach Sudfrankreich eingefuhrte Coccinelliden. **48,** xxxix, 104.

HYMENOPTERA. Brethes, J.—Himenopteros y Dipteros de varias procedencias. **106,** xciii, 119-46. **Champlain, A. B.**—Records of hymenopterous parasites in Pennsylvania. **5,** xxix, 95-100. **Davis & Bequaert**—An annotated list of the ants of Staten Island and Long Island, N. Y. **19,** xvii, 1-25. **Donisthorpe, H.**—The colony founding of Acanthomyops (Dendrolasius) fuliginosus. **100,** xlii, 173-84. **Emery, C.**—L'ouverture cloacale des formicinae ouvrieres et femelles. **34,** iv, 62-5. **Herbst, P.**—Zur biologie der gattung Chilicola. **49,** xi, 63-8. **Mann, W. H.**—Ants from Honduras and Guatemala. **50,** lxi, Art. 13. **Mercet, R. G.**—El genero Azotus (Calcididos). (Bol. R. Soc. Espanola de Hist. Nat., Madrid, xxii, 196-200.) **Plath, O. E.**—Notes on Psithyrus, with records of two new American hosts. **100,** xliii, 23-44. **Smith, E. J.**—The rediscovery of Odynerus (Ancistocerus) waldenii. **4,** liv, 87. **Szepligeti, V.**—Ichneumoniden aus der sammlung des Ungarischen Nat. Museum. **103,** xii (1914), 414-32. **Turner, C. H.**—A week with a mining eumenid: an ecological behavior study of the nesting habits of Odynerus dorsalis. **100,** xlii, 153-72. **Wheeler, W. M.**—Observations on Gigantiops destructor, and other leaping ants. **100,** xlii, 185-201.

Brues, C. T.—On the hymenopterous genus Harpagocryptus and its allies. **5,** xxix, 101-9. **Mocsary, A.**—Chrysididae plerumque exoticae novae. **109,** xii (1914), 1-72. **Weld, C. J.**—Studies on chalcid-flies of the subfamily Leucospidinae, with descriptions of n. sps. **50,** lxi, Art. 6. **Weld, L. H.**—Notes on American gall-flies of the family Cynipidae producing galls on acorns, with descriptions of n. sps. Notes on cynipid wasps, with descriptions of new N. American sps. **50,** lxi, Art. 18 and Art. 19.

Études de Lépidoptérologie Comparée. By Charles Oberthür. Volume XIX, part 2. Rennes, France, May, 1922. This volume contains an introduction by Mr. Oberthür and the following papers: A Contribution to the Study of the Aegeriidae, with descriptions of new species and varieties, by F. Le Cerf. The editor makes some interesting remarks on the species of *Parnassius* in Central Asia, which are followed by an article by André Avinoff on *Parnassius adestis* Gr. M. Oberthür presents an article on *Syrichtus alveus*. These difficult Hesperidae are receiving much study in Europe. Additional notes are given on the Lepidoptera of Morocco. Some of the interesting Lepidoptera of Madagascar receive consideration by the editor, the beautiful *Urania* *ripheus* being particularly mentioned. Prof. C. Houlbert makes a valuable contribution, a study of the Melanargiinae of China and Siberia. There are 28 plates with the numerous species figured in color. These plates are of the superb character of those we have mentioned as appearing in former volumes. M. Oberthür richly deserves the thanks of all Lepidopterists for the production of this valuable series.—H. SKINNER.

PROFESSOR BENEDICT JAEGER, Early Entomologist of New Jersey.—Under this title, Mr. Harry B. Weiss has contributed a biographical sketch to the *Proceedings of the New Jersey Historical Society* (new series, vol. VII, No. 3, pp. 196-207, Newark, N. J., July, 1922). The author tells us that his interest in Jaeger "was first aroused by reading in Mr. John D. Sherman's 'Catalogue 10 of Books on Insects' the following statement referring to Prof. Jaeger's book on 'The Life of North American Insects': 'famous as the most worthless of all American Insect books'." In his usual painstaking way, Mr. Weiss brings together a number of scattered bits of published and unpublished information on his subject. Jaeger was born in Vienna, Austria, in 1789, came to the United States in 1831 and died in Brooklyn, August 17, 1869. His activities in natural history embraced other groups of animals in addition to insects and also plants.—P. P. CALVERT.

NOMENCLATOR COLEOPTEROLOGICUS. Eine etymologische Erklärung sämtlicher Gattungs- und Artnamen der Käfer der deutschen Fauna sowie der angrenzenden Gebiete. Zweite Auflage In Verbindung mit Prof. Dr. R. SCHMIDT herausgegeben von SIGM. SCHENKLING. Jena Verlag von Gustav Fischer 1922. 8vo., pp. iv, 255. Price in paper binding 95 Marks, in cloth 125 Marks.—In 1894 Herr Schenkling published the first edition of this book, now long since out of print. In 1917, at the expense of the German Union of Teachers of Natural Science, he issued an "Explanation of the scientific names of beetles in Reitter's Fauna Germanica" (Lutz, Stuttgart, publisher). This new edition of the Nomenclator Coleopterologicus goes beyond the "Explanation" in that it gives not only the meanings (in German) of the generic and specific names, but also their roots, both Greek and Latin, the quantity of the syllables of the roots, and a detailed chapter (pp. 1-12) on entomological nomenclature, explanations of technical terms and translations of a number of Latin adjectives, adverbs, numerals and conjunctions "so that one not acquainted with the ancient languages can, with the use of this book, translate Latin diagnoses and descriptions without great difficulty"—that is, if he can read German. The author further tells us in his preface: "One will find also in this book the explanation of many geographical names which, since they are often not of classical origin, are sought in vain even in the larger classical dictionaries. I need only hint at the high value of translations for retaining scientific names in one's memory, as these names express, in great measure certain peculiarities of the structure or habits."

On the philological side Herr Schenkling has had the assistance of Prof. Richard Schmidt, of the University of Münster in Westphalia.

The greater part of the book is divided into two sections, generic and subgeneric names (pp. 13-116) and "Species and their varieties; terminology" (pp. 117-249), the names in both sections being arranged alphabetically. The nature of the information given is well illustrated by examples from each part:

Cárabus L. V. καραβος (kárabos), Käfername bei den Griechen, auch Meerkrabbe. Unmöglich von κείνω (keino) abschneiden, wie Leunis will.—Vgl. Scarabaeus?

nemorális, e, in Hainen vorkommend.

Bogemáni (nicht Bogemänni), nach dem früheren schwedischen Hauptmann J. C. Bogeman.

As the subtitle of this Nomenclator indicates, the names included are limited to those of the beetle fauna of Germany and of the neighboring countries. With the increasing diffusion of European Coleoptera to other parts of the world, however, this work will be useful to extra-European entomologists—who read German.—P. P. Calvert.

University of Iowa Studies (Natural History), X, I. Iowa City, March 15, 1922.—This number contains reports on the Scutelleroidea [by Prof. Dayton Stoner] and the Orthoptera and Dermaptera [by Mr. A. N. Caudell] of the Barbados-Antigua Expedition of the University in 1918, and a report on Scutelleroidea of the Douglas Lake Region, Michigan, also by Prof. Stoner. The Barbados-Antigua collection of Scutelleroidea consisted of about 800 pinned specimens, representing 17 species on Antigua (taken between June 19 and July 19) and 9 of the 17 also on Barbados (taken between May 16 and June 11). "Of the 17 Antigua species, 14 occur also in the United States and 3 are strictly neotropical. . . . As a whole the pentatomid fauna of the two islands seems to be Central American and Mexican in its affinities rather than South American."

The Orthoptera and Dermaptera of the same islands consisted of 334 specimens comprising 31 species, but no general summary accompanies Mr. Caudell's Report.

The Scuttelleroidea of the Douglas Lake Region were collected in July and August, 1919 and 1920, within 15 miles from the Lake, and amount to 23 species, which may be compared with the West Indian figures given above. No species is common to both lists but three genera (*Mormidea*, *Euschistus* and *Podisus*) are. Prof. Stoner makes a brief comparison of the pentatomid faunae of Douglas Lake and of Lake Okoboji, Iowa, the latter of 29 species, 17 of which are also found at Douglas Lake.—P. P. Calvert.

Report of the Imperial Entomologist 1920-21. By T. Bainbrigge Fletcher. Calcutta Superintendent Government Printing, India. 1921. (Reprinted from Scientific Reports, Agr. Res. Inst. Pusa, 1920-21, pp. 41-59, pls. iii-viii).—The principal work done on insect pests during the year mentioned was a continuation of the investigation of borers in sugar cane and other gramineous plants and, on the side of pathological entomology, on Tabanidae in connection with surra disease and on Culicidae. A Chalcidid of the genus *Phanarus*? heavily infests the eggs of several Tabanids but it has not shown polyembryony. Twenty-one students received training to varying extents in agricultural and sanitary entomology, lac- and sericulture. The collection at Pusa is now estimated to contain rather more than 7,000 named species of Indian insects. Among the specialists whose aid in making identification is acknowledged are Messrs. Rohwer and Morgan Hebard, Profs. Cockerell and Felt. The project for the preparation and publication of a catalogue of all described Indian insects has been approved by Government and considerable progress made during the year. A notice of the first part of this catalogue (on Acrydidae or Tettigidae) appeared in the News for March last, p. 95 of this volume.—P. P. Calvert.

OBITUARY.

William Lucas Distant, known especially for his work on Lepidoptera and Hemiptera, died at Wanstead, Essex, England, February 4, 1922. He was born at Rotherhithe. November 12, 1845, son of Capt. Alexander Distant, "who in old South Sea whaling-days, sailed round and round the world, and transmitted a love of roaming to his sons," and whom the son accompanied to the Malay peninsula in 1867. In his earlier years he was engaged in the tanning business and in this connection spent a year in the Transvaal in 1890-91, and made a second visit thereto in 1898. From April, 1899, to November, 1920, he was a part-time Assistant in the British Museum (Natural History), rearranging the national collection of Hemiptera and describing many new species. His own collection of about 50,000 specimens, chiefly in this order, and over 2500 types came to the Museum in 1911. The last decade of his life was saddened by the loss of his wife and two younger sons and by incurable and protracted disease.

American entomologists are especially interested in *Hemiptera Heteroptera,* Vol. I (1880-1893) and *Heteroptera Homop-*

tera, Vol. I in part (1881-1905), which he contributed to the *Biologia Centrali-Americana.* Among his other works are *Rhopalocera Malayana* (1882-1886), *Monograph of the Oriental Cicadidae* (1889-1892), *A Naturalist in the Transvaal* (1892), *Insecta Transvaaliensia* (1900-1911), *Rhynchota*, 7 vols. (1902-1918), in the *Fauna of British India*, *A Synonymic Catalogue of Homoptera, Part I—Cicadidae* (1906), as well as numerous shorter articles in the English journals from 1874 to 1920. He was editor of *The Zoologist* from 1897 to 1914, and a member of the Entomological Societies of London, France, Stockholm and Belgium and a corresponding member of the Buffalo Society of Natural Sciences. Appreciative notices of him appeared in the March numbers of *The Entomologist* and *The Entomologists' Monthly Magazine,* from which the above account is drawn.

George Alexander James Rothney, born in 1849, died January 31, 1922, formed an extensive collection of Oriental Hymenoptera, many of them collected by himself in India from 1872 on. This, together with a library on the same group, he presented during his life time to the Hope Museum at Oxford, England. (Ent. Mo. Mag., May, 1922.)

Another martyr to research on the nature and transmission of typhus has fallen in the person of Arthur W. Bacot, who died in Cairo, Egypt. April 12, 1922. At the invitation of the Egyptian Government he had undertaken experiments with lice in the laboratories of the Public Health Department and it is supposed that he became infected by some accident. He was previously well known for his work on the bionomics of rat fleas (done at his home in Essex, England), of the Yellow Fever Mosquito (which he studied in Sierra Leone in 1914-15), and of lice in connection with trench fever (1915-17). In 1911 he was appointed Entomologist to the Lister Institute of Preventive Medicine, in 1916 Honorary Entomological Adviser to the War Office, in 1917 to the British Trench Fever Committee of the War Office, and in 1920 he went to Poland with the Typhus Research Commission of the League of the Red Cross

Society. His earliest entomological work was with the British Lepidoptera, elucidating many life histories and furnishing many data for genetics. (The Entom., June, 1922.)

HENRY ROWLAND-BROWN, "one of the best known and most popular of British entomologists," died May 3, 1922, at Harrow Weald. He was born at Woodridings, Pinner, May 19, 1865, educated at Rugby and Oxford, was athlete, journalist and poet, active and efficient secretary of the Entomological Society of London, and made the diurnal Lepidoptera of France his special study. A number of his papers are included in M. Charles Oberthür's publications. Americans in attendance at the Second International Congress of Entomology, at Oxford, in 1912, will not fail to remember him and to regret his decease at a comparatively early age. He bequeathed his books to the London society and the Hope Museum, Oxford, his collection to the latter. An obituary notice is in *The Entomologist* for June, 1922.

The same number reports the death of the well-known collector and author of "a very large proportion of the Rhopalocera section of Seitz's Exotic Macrolepidoptera," HANS FRÜHSTORFER, at Munich, April 9, 1922, in his fifty-ninth year.

DR. OTTO TASCHENBERG, Professor of Zoology at the University of Halle, author of the unfinished *Bibliotheca Zoologica II*, died March 20, 1922, in his sixty-eighth year. (Wiener Ent. Zeit., xxxix, p. 112.)

The death of LOUIS BEDEL, Coleopterist, was announced, without date, at the meeting of the Entomological Society of France, held February 8, 1922. His principal works were a *Monographie des Erotyliens* (1870), *Catalogue Raisonné des Coléoptères du Nord de l'Afrique* and *Faune des Coléoptères du Bassin de la Seine*, the latter two unfinished. He bequeathed the first set of his collection to the Entomological Laboratory of the National Museum of Natural History (Paris), the duplicates, his working instruments and such of his books not already in the Society's library to the Entomological Society of France. (Bull. Soc. Ent. France, 1922, nos. 3, 4.)

NOVEMBER, 1922

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Vol. XXXIII No. 9

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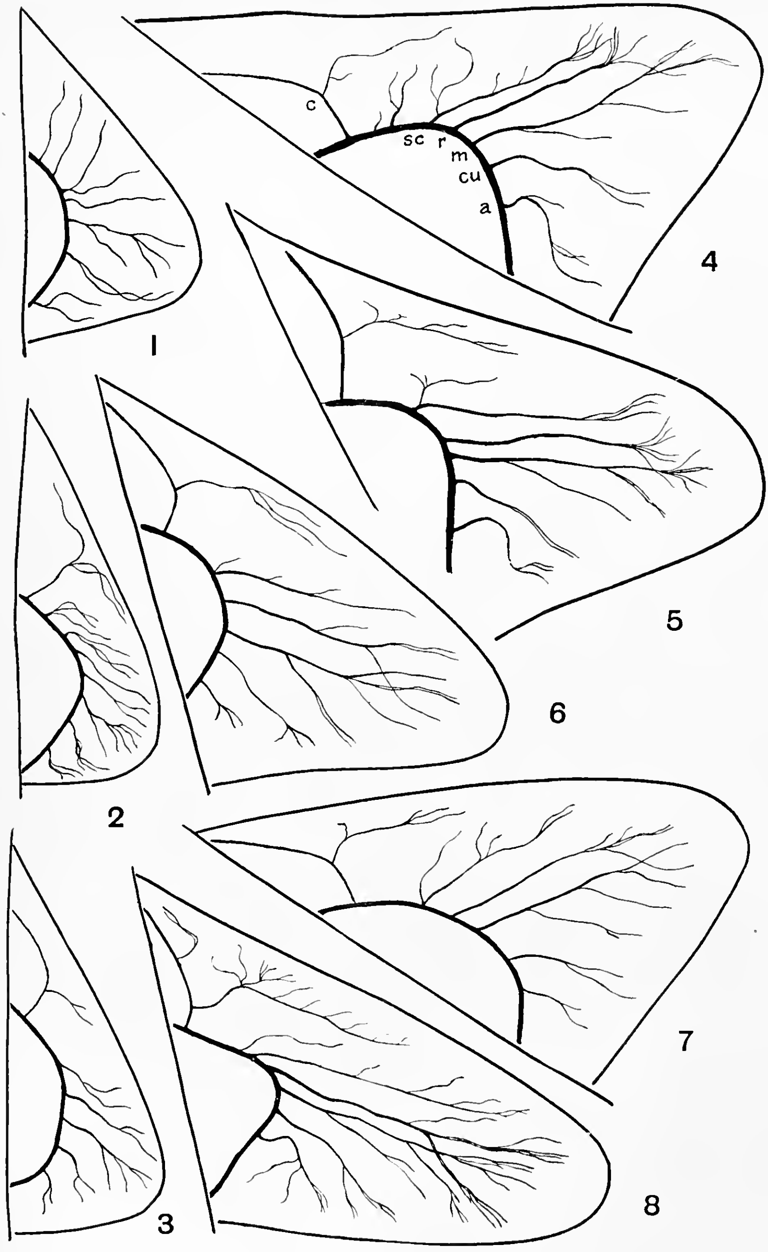


TRACHEATION OF WINGS OF EARLY LARVAL INSTARS OF ANAX JUNIUS.—SCHMIEDER.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

VOL. XXXIII NOVEMBER, 1922 No. 9

CONTENTS

The Tracheation of the Wings of Early Larval Instars of Odonata Anisoptera, with Special Reference to the Development of the Radius.

By RUDOLF G. SCHMIEDER, M.A., University of Pennsylvania, Philadelphia.

(Plates X, XI)

Comstock and Needham in 1898, and Needham in 1903 published an account of the development of the wing venation of the Odonata. In the account of Needham, 1903, the development of the wing veins is traced through a series of larval stages in order to show that the vein lying posterior to *M2*, the subnodal sector of earlier authors, is really the vein *Rs*, and that it has come to lie in this unusual position as the result of a series of evolutionary changes in the history of the dragon fly wing. These evolutionary changes, according to Needham, are indicated in the ontogeny of the larval tracheae. Figs. 1 and 2 in Needham's paper represent drawings of three stages in the development of the larval wing. These drawings are to show: in fig. 1, A, the primitive condition in which the trachea *Rs* occupies its normal position anterior to *M1*, in fig. 1, B. the second stage, in which *Rs* has come to lie posterior to *M1* but is still anterior to *M2*, and finally, in fig. 2, the condition obtaining in the full grown larva, in which *Rs* lies posterior to *M2*. The occurrence of these stages in the larval wings constitutes a part of Needham's evidence that the vein lying between *M2* and *M3* is the radial sector and is not a true branch of the media.

The work of Tillyard (1922) has again thrown doubt upon the identity of the vein *Rs*, for this author does not concur in Needham's interpretation but states that the *Rs* of Needham is really a branch of the media, although receiving its tracheal supply in part through a branch of *R;* and that the original *Rs* has been cut off by, and become attached to, the media. While admitting that if the ontogenetic stages described by Needham actually occur in the developing wing rudiments of the larva, this would constitute strong evidence in favor of Needham's view, Tillyard doubts that such stages can be demonstrated.

It was suggested to me by Dr. Philip P. Calvert, that in view of the doubts which had thus been cast upon the existence of the two earlier stages described by Needham, it would be desirable to go over the work of that author and examine the tracheation of the earliest larval instars, since an accurate knowledge concerning the condition of the trachea *Rs* at its first appearance and of how it comes to occupy the position it is said to assume in later instars might be of value in solving the difficult problem of the homology of the imaginal vein *Rs*.

The larvae examined were those of *Anax junius* Drury, *Gomphus villosipes* Selys and *Gomphus exilis* Selys. The wing rudiments of these larvae were prepared and mounted essentially after the manner described by Needham. In the case of the younger ones it was necessary, because of the small size of their wings, to cut out the thoracic terga and the first segment of the abdomen in one piece and, without removing or disturbing any of the underlying tissue, to mount the piece thus removed entire. Treated in this way, the wing rudiments and the delicate tracheae contained in them are subjected to no strain or pressure of any kind and there is practically no danger of the tracheae being displaced from their normal courses. The figures are all from drawings made with the aid of a camera lucida, for it was found that the earlier stages, such as those in which the wings were less than 0.5 mm. in length, could not be photographed, since the high magnifications necessary make it impossible to get all the tracheae in focus together. In the wing measurements given, the term "length" is used to indicate the distance between the mid-point on the line of articulation of the wing with the thoracic tergum and the extreme tip of the wing.

In *Anax*, the smallest larvae possessing wing rudiments which I was able to obtain were 9 to 10 mm. in length. The wings of these larvae were 0.2 to 0.22 mm. long; three such wings, from different larvae, are represented in figs. 1-3. The shortness of these wings compared with their width at base and the less definite arrangement of their tracheae make it immediately apparent that we have to do with a much earlier stage in the development of the wing than in the case of the earliest stages represented by Needham's figures or by Tillyard in his text fig. 3.

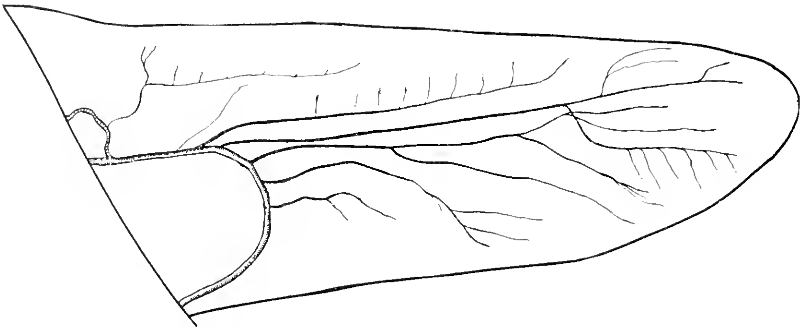
In comparing the wings in figs. 1-3, it is noted that there is considerable variation, that there is not a single trachea which is exactly alike in all three figures but that each may vary in the number of its branches and that their arrangement gives but little hint as to the manner of their disposition in the adult. We also note that additional tracheae may often appear between the costa and the subcosta; in fig. 2 there are two such tracheae, in fig. 1 there is one. I am confident in assuming that in all cases the extra tracheae are between *C* and *Sc* and that *M* is always adjacent to *R*, for I have never found, at any stage in *Anax*, any indications of extra tracheae inserted between *R* and *M*. Thus I have found, as Needham did, that in the earliest stage in the development of the wing there are six principal tracheae. The additional tracheae of which there may be one or more inserted between *C* and *Sc*, may persist through later instars but always remain small and are of no importance.

It is noted too, that variability in the number of branches also characterizes the radius and media in this primary stage. In figs. 2 and 3, *R* is two-branched, while in fig. 1 it is unbranched. The media is five-branched in fig. 2, while in figs. 1 and 3 it is in its more usual four-branched condition. Finally it may be noted that the posterior two tracheae are three-branched in fig. 2, and that in figs. 1 and 3 they are two-branched. In regard to the costa it might be mentioned that, at least in *Anax*, this trachea almost always arises not from the same tracheal trunk as do the other wing tracheae, but from a branch of this trunk, the accessory costo-radial trunk, which passes out of the base of the wing. This condition is seen in figs. 2-8; in fig. 1 the costa arises from the same trunk as do the other tracheae. In *Gomphus*, the costa arises either directly from the transverse basal as do the other wing veins, or from the accessory costo-radial trunk as it does in *Anax*.

Returning to the radius and observing the course of its branches in the earliest stages, we note that there is no crossing of any branch of this trachea over any part of the media. In fig. 1 the radius is not branched at all and is entirely remote from the media. In figs. 2 and 3 the radius has two branches, the posterior branch being, according to the view of Needham, the radial sector. This posterior branch, which for the present I will continue to refer to as *Rs*, is in this stage entirely free, and remote from the media. This observation apparently agrees with that of Needham, who illustrates such a condition in his fig. 1, A, if we disregard the difference in the sizes of the wings in the two cases. We must, however, remember that the wing rudiments represented in figs. 1-3, are in a much earlier stage of development than that figured by Needham which, he states, was 1 mm. long, as is indicated by their smaller absolute size, the difference in the proportions of length to width and in the great variability in the arrangement and in the number of branches of the various tracheae.

Figs. 4-7 represent the tracheation of the wing rudiments taken from *Anax* larvae whose body length was 13 to 13.5 mm. These larvae are apparently of the instar following upon that of the larvae just discussed, since on frequent collecting trips during August and September no larvae of an intermediate body length were found, although those of 10 mm. and those of 13 mm. were quite plentiful. The wings of this instar were 0.4 to 0.45 mm. long, the tracheation in them was much less variable than in those of the preceding instar. The additional tracheae, often so prominent in the previous instar, were less frequently observed or were at least comparatively smaller and of little importance. Other tracheal branches, especially those of *R* and *M*, heretofore simple, are in this stage composed of two or more fine branches which tend to cling together. The radius is, in all cases, at least two-branched, a posterior branch *Rs* crosses over the two anterior branches of *M*. In all of the twelve individuals of this instar which were examined the trachea *Rs* always behaved in this way. A single exception is shown in fig. 7. This wing was from the same larva as the wing in fig. 6, which represents the conditions found in all of the other three wings of this larva. The wing in fig. 7 may therefore be considered as a variation having no special significance and not by any means as representing a normal occurrence. We again note that compared with the wing represented by Needham's fig. 1, B, the wings of *Anax*, although only 0.4 mm. in length, have outstripped, in the specialization of tracheal paths as regards *Rs*, wings of *Gomphus* which were (*teste* Needham) 3 mm. in length, whilst in regard to many other features the *Anax* wings are far behind the *Gomphus* wings of Needham. Not only is the wing in Needham's figure much larger and more elongated (its length being greater than its width at base) than the wings in my figures, but the tracheae themselves, with the exception of *Rs*, speak of a more advanced stage of development. All the tracheae, excepting *C*, are comparatively closer together at their origin and along their parallel courses; *Cu* and *A* have taken on quite decidedly the characteristic paths which they assume in anticipation of the formation of the triangle; the nodus and the stigma are already indicated; and finally, the tracheal trunk supplying the wing tracheae describes an arc of a comparatively shorter radius, a condition more typical of later instars.

Fig. 8 represents a wing rudiment of the next succeeding instar, the larva being 15 mm. long and the wing 0.65 mm. in length. Here we note again that *Rs* crosses over *M1* and *M2*. The branches of *R* and *M* are composed in their distal portions of bundles of fine tracheae lying close together and often winding about each other, a condition already noted in the preceding instar and which has now become more pronounced. *C* and *Sc* have also developed a number of fine branches in this instar. This wing too, has many features in addition to its much smaller size, which indicate that it is in an earlier stage of development than that of Needham's fig. 1, B, which shows *Rs* as lying between *M1* and *M2*.



Text Fig. A.—Wing rudiment from larva of *Anax junius*; length of larva 33 mm., length of wing 1.9 mm.

Finally, in text fig. A. there is represented a wing 1.9 mm. long, taken from a larva 33 mm. long. The wing in this stage is considerably elongated and the fascicled condition of the ends of the branches of *R* and *M* has been abandoned.

(To be continued.)

Explanation of Plate X.

Figs. 1-8. Wing rudiments from larvae of *Anax junius*.

Figs. 1-3. Length of larvae 9 to 10 mm., length of wings 0.2 to 0.22 mm.

Figs. 4-7. Length of larvae 13 mm., length of wings 0.4 to 0.45 mm.

Fig. 8. Length of larva 15 mm., length of wing 0.65 mm.

Ovipositional Habit of Pyraustomyia penitalis Coq. (Dip., Tachinidae).

By H. W. Allen, Agricultural College, Mississippi.

Pyraustomyia (*Panzeria*) *penitalis* Coq.* is a common Tachinid parasite of the smartweed borer. *Pyrausta ainsliei* Hein. Adults of this parasite were abundant at Columbus, Ohio, during the summer of 1921 and their method of oviposition was several times observed. To the author at least, their rather unique method of spanning the distance from adult fly to concealed host was new, and differed from the varied methods of oviposition and larviposition previously noted.

The smartweed borer infests the cane of one of the more common smartweeds, (*Polygonum pennsylvanicum*), entering by a small hole at the node and developing within short tunnels between the nodes, in its earlier instars in small colonies near the tip, later as solitary larvae in the older succulent joints.

Females of *Pyraustomyia penitalis* in the act of ovipositing were observed to approach an infested node and quickly fasten a minute maggot enclosed in a very thin sheath of chorion, upon the cane, near the entrance hole of the borer. The maggot in all cases emerged from the sheath at once. Some found and entered the tunnel of the borer within a few seconds, while other instances were observed where the young maggot had been unable to find the entrance of the tunnel 20 minutes after oviposition. Maggots emerging from the sheath moved at first on a straight line represented roughly by a prolongation of the longitudinal axis of the sheath, then failing to find the entrance hole of the borer would take a wandering course, frequently raising the anterior end and waving the head in the air. The course of the minute maggot after entering the tunnel of the borer until it appeared within the body of the host was not observed. Young maggots were recovered from the blood of borers a few hours after ovi-

*Several adults were sent to Mr. John Tothill who has recently been working on a revision of this group of Tachinidae. He places Coquillett's *Panzeria penitalis* in the genus *Pyraustomyia*, Can. Ent., Vol. LIII, p. 201.

position, indicating that soon after entering the tunnel, maggots find their host and penetrate its body.

This manner of effecting parasitism seems remarkable in several respects. The host, though a borer and secure during most of its existence from the direct attack of a Tachinid parasite, is highly vulnerable to this specialized method of approach, as is indicated by the frequent high rate of parasitism. When the borer changes from the gregarious to solitary life, it leaves the colony tunnel and crawls on the outside of the cane to a joint lower down, cutting a new entrance there, and at this period of its existence is particularly vulnerable to direct parasite attack. But so far as observed, this parasite takes no interest in exposed larvae. Maggots, as indicated by the cast sheaths, are habitually deposited at distances ranging from about one-fourth inch to over an inch from the borer entrance. Before the parasitic life of the maggot could begin, it was forced to perform the tortuous and difficult journey from the point of oviposition to the entrance hole and then up the tunnel to the host and finally to penetrate the body of the host. So far as observed maggots were invariably placed near infested nodes. Superparasitism was common, several maggot sheaths being commonly found about the entrance containing but one borer. Many borers were found to contain two and three maggots. Females were induced to oviposit freely in small cages when confined with infested canes.

A Peculiar Damselfly Nymph of the Subfamily Thorinae (Odon., Agrionidae).

By James G. Needham, Cornell University, Ithaca, New York.

Among the aquatic insects collected by Dr. J. C. Bradley on the Cornell Entomological Expedition of 1919-20 to South America, there was one damselfly nymph of form so peculiar I deem it worthy of special notice. When I first saw the specimen in a vial of alcohol I thought that a bur or spiny seed of some kind was stuck to its tail, but when I got at the specimen and undertook to remove the supposed bur I found it to be the highly modified middle gill that is possessed by all damsel-fly larvae.

The curiously twisted ventral abdominal gills attached to segments 2 to 7 and bent beneath the abdomen as well as the form of labium and antennae show this nymph to be allied to that of *Cora* obtained by Dr. Calvert in Costa Rica and described by him in *Entomological News*, volume XXII, page 52. I place it, therefore, among the Thorinae. Nymphs of three genera of this group *Thore*, *Euthore* and *Chalcopteryx* remain unknown. The wings of this specimen are badly preserved so that there is no venation to be seen in them that might help to identify the genus. The wings, however, are long and the nymph though small is apparently grown, and on the basis of size alone I hazard the guess that it belongs to the smallest and most highly specialized genus *Chalcopteryx*, or else to one of the smallest members of the genus *Euthore*. Herewith I publish figures drawn by Dr. Hazel E. Branch and a brief description.

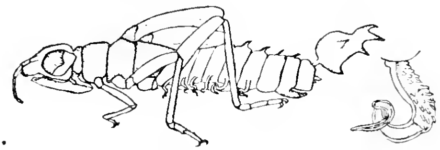


Fig. 1. Nymph of a Thorine damselfly from Peru. To the right, a gill of same detached.

Length 17 mm., antennae 2 mm., and modified middle gill 4½ mm. additional. Length of hind femora 4½ mm., width of head 4½ mm.

Color all brown, only the sutures and the tarsi paler. On the top of the head are seven oval bare scars that are somewhat yellowish, three of them transversely placed and conjoined about the middle ocellus and two pairs more laterally placed, one at the same level and almost contiguous to the eye, and one pair farther back and closer together.

Head wider than thorax, abruptly narrowed behind the eye with a broadly rounded occipital notch bordered at either side as viewed from above by a rather sharply projecting angle. Antennae 7-jointed, the 7th joint pale and feebly differentiated, the second joint longest, as long as joints 3 to 7 taken together, and one-half longer than the basal joint and twice as long as the third joint alone. There is a line of flat scale-like hairs bordering the inner margin of this long second joint, and a similar patch on the side of the head before the eye, and a dense fringe of scurfy hairs around the front edge of the labrum. The hinge of the labium extends rearward only to the middle of the prothorax, its median lobe is broadly rounded and cleft only to the level of the base of the lateral lobes. Each lateral lobe is 3-cleft at the apex into two outer,

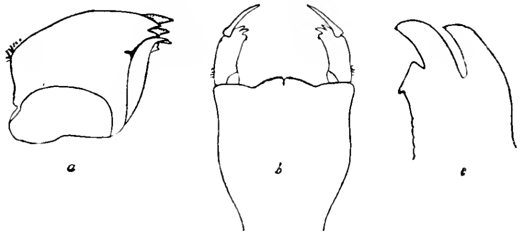


Fig. 2. Mouth parts: *a*, mandible; *b*, end of labium from within; *c*, more enlarged tip of lateral lobe of labium.

incurved subacute teeth, and one inner obliquely truncate and scarcely falcate tooth.

At each side of the pronotum is the usual pair of projecting lateral angles, the rear one being slightly larger; the legs are brown with yellowish tarsi, the femora bare, strongly longitudinally carinate and the tibiae similar, very weakly carinate. Wing tips extend posteriorly to abdominal segment 6. There are high, erect dorsal hooks on segments 2 to 9. Gills on 2 to 7 decurved and twisted at the tip, three-jointed, the basal joint bearing very short filaments along one side. There are no lateral spines.

The lateral gills are wanting. The mid-dorsal gill is of extraordinary form, inflated, heavily chitinized, pedicellate at base and compressed at apex, where it is bifurcated and slightly carinate beneath, where it bears a strong sharp tooth at each end of the inflated portion. There is also a pair of thorn-like processes projecting laterally from the middle of this portion.

A single ♀ specimen from Enañas del Pichis, Peru (east slope of the Andes), July 4, 1920.

Keys to the Syrphid Genus Sphegina Meigen (Dip.).

By J. R. Malloch, U. S. Biological Survey, Washington, D. C.

The genus *Sphegina* is most closely related to *Neoascia* Williston and is separable from it by the conspicuously concave face, the sloping instead of erect outer cross-vein, lack of distinct hairs on upper half of sternopleura (except in one or two species, and in these they are very inconspicuous), much shorter third antennal segment, and the presence of a more or less complete impressed curved line extending from humerus on each side to the transverse median impression.

The species vary much in color but in structure they are quite constant. No use has previously been made of the armature of the fifth sternite of the males in systematic papers though its shape has been mentioned, and previous authors have omitted any mention of the curved thoracic depression.

Nothing is known of the larval habits of the genus; the adults occur on various flowers.

Key to Males.

1. Hind tibia with a distinct elevated chitinized beaklike projection at apex on ventral surface which is either acutely pointed or compressed from each side; apical abdominal sternite without minute spinules, only fine hairs present..............................2

—Hind tibia either transverse at apex on ventral side or with a short apically rounded scooplike production..........................4

2. Small species, about 5 mm. in length; black and yellow in color, the apical process on hind tibia beaklike and slightly curved; hind trochanters without minute black setulae.. ..**flavomaculata** Malloch.

—Large species, 8-9 mm. in length.............................3

3. Reddish species; hind femora unicolorous rufous; hind tibia with the apical process rounded at tip and compressed from each side; hind trochanters without black setulae,

armatipes Malloch var. **rufa** Malloch.

—Black species with yellow markings; hind femora largely black; hind tibia with the apical process beaklike, slightly curved, not compressed from both sides; hind trochanters with some black setulae.....................................**armatipes** Malloch.

4. Scutellum transverse at apex, the two long setulose hairs separated by more than half the basal width of scutellum; hairs at apices of fourth and fifth abdominal sternites strong, but no short stout spinules present, fifth produced lobuliform at posterior angle on left side....................................**occidentalis** Malloch.

—Scutellum regularly rounded posteriorly, the setulose marginal hairs if only two in number separated by much less than half the basal width of scutellum...5

5. At least the fifth sternite with some short setulae or spinules apically 6

—No short spinules on fifth sternite, only fine hairs present........11

6. Both fourth and fifth sternites with some short spinules apically..7

—Only the fifth sternite with short spinules apically...............9

7. Fifth abdominal sternite almost transverse at apex, not noticeably produced in the form of a rounded lobe at left posterior angle; the

greater part of center of disc of both fifth and fourth sternites with short stubby spines; hind tibia produced scooplike at apex on ventral side.................................. **keeniana** Williston.

—Fifth abdominal sternite with a central concavity in posterior margin, the left posterior angle drawn out into a rounded lobe; hind tibia transverse at apex on ventral side............................8

8. Black spinules of fourth sternite conspicuous, stubby, extending well on to disc; fifth tergite with a large rounded lobe; fourth tergite without long hairs on posterior lateral angles.... ...**lobata** Loew.

—Black spinules on fourth sternite very sparse and fine, confined to extreme margin of haired part; fifth tergite with a small rounded lobe; fourth tergite with long soft hairs on each posterior lateral angle...**punctata** Cole.

9. Spinules of fifth sternite black and stubby, many fine hairs laterad of them on the two rounded slightly elevated areas. .**rufiventris** Loew.

—Spinules of fifth sternite reddish, elongated on the two rounded elevations laterad of the median line............................10

10. Fifth sternite with a very large rounded lobe on left side at posterior angle which is not heavily chitinized and is separated from remainder of segment by a depression, the hairs long and not very strong; outer crossvein and fourth vein beyond bend at apex infuscated......................................**petiolata** Coquillett.

—Fifth sternite with a small rounded lobe which is as heavily chitinized as the remainder of segment and not separated from it by a depression, the hairs shorter and stronger; veins not infuscated...................................**campanulata** Robertson.

11. Hairs on frons erect, conspicuous, the longest as long as the entire antenna; abdomen inconspicuously pedunculate; arista very little longer than antenna, densely pubescent...........**infuscata** Loew.

—Hairs of frons decumbent, short and inconspicuous, the longest not longer than second antennal segment; abdomen conspicuously pedunculate 12

12. Fifth abdominal sternite with a large lobe at right hind angle which is over half as long as the sternite at middle; only the apical segment of tarsi deep black, the subapical one brownish **lobulifera** sp. n.

—Fifth abdominal sternite not distinctly lobed as above...........13

13. Hind tibia with a slight but distinct scooplike production of the ventral surface apically; arista gradually tapered from base and distinctly pubescent; small species, 5-6 mm. in length,
flavimana Malloch.

—Hind tibia not produced as above, transverse at apex; arista swollen on about a fourth of its length from base and nearly bare; larger species, 8 mm. in length....................**californica** Malloch.

Key to Females.

1. Third (fourth) tergite of abdomen distinctly flared apically, fourth with a deep notch in middle of posterior margin; the curved linear

thoracic depression distinct and complete....... **monticola** Malloch.
—Third tergite not flared at apex..................................2
2. The curved linear depression of thorax extending from humerus to the transverse median depressed line not distinct except near the latter; third sternite distinctly longer than wide....................3
—The curved linear depression distinct and complete...............5
3. Hind femur with two black bands one just beyond middle and the other at apex; humeri pale yellow; disc of mesonotum black, entirely without vittae; fore and mid tarsi yellow ...... **biannulata** Malloch.
—Hind femora yellow, without black annuli; thorax black or yellow, with three or more or less distinct vittae; apical two segments of fore and mid tarsi black or brown..............................4
4. Third antennal segment yellow.......... **campanulata** Robertson.
—Third antennal segment black or fuscous ...... **rufiventris** Loew.
5. Anterior width of frons about one-third of the head width; third sternite distinctly wider at apex than long in middle; inner cross-vein not more than two-fifths from base of discal cell; scutellum usually with more than two long setulose marginal hairs, **infuscata** Loew.
—Anterior width of frons much less than one-third of the head width; scutellum with two setulose marginal hairs......................6
6. Scutellum distinctly transverse apically, the two long setulose hairs separated by more than half the width of scutellum; third sternite longer than wide...7
—Scutellum regularly rounded apically, the two setulose hairs separated by less than one-fourth of the basal width of scutellum....8
7. Hind femur conspicuously compressed on lower half apically, widest part distinctly beyond middle; thorax black, abdomen rufous **occidentalis** Malloch.
—Hind femur very slightly compressed apically, widest part close to middle; thorax and abdomen yellow............... **punctata** Cole.
8. Fifth (fourth visible) tergite with a shallow transverse rounded concavity before apex which causes the tip of the segment to flare upwards very slightly, the hairs on this segment and on fifth sternite long and soft; third sternite wider than long; a robust species, about 8 mm. in length....................... **armatipes** Malloch.
—Fifth tergite normal in shape; third sternite longer than wide; smaller species, not over 6 mm. in length.....................9
9. Fore and mid tarsi with the apical two segments deep black, **keeniana** Williston.
—Fore and mid tarsi yellow, the apical two segments hardly darker, **flavimana** Malloch.

Sphegina lobulifera sp. n.

♂.—Shining black, antennae, lower half of face and a broad fascia on basal half of third tergite of abdomen yellow. Legs yellow, apical tarsal segment on all legs deep black, subapical one brownish; apical half of hind femora, a mark on apical half of hind tibiae, and most of basal segment of hind tarsi black. Cross-veins and tips of wings slightly clouded.

Head as in *californica*. None of the abdominal sternites with setulae, the peduncle moderately narrow, as in *lobata*. Hind femora much swollen; hind tibiae transverse at apices. Length, 7 mm.

Type, Plummers Island, Maryland, April 30, 1922, on flowers of *Alliaria officinalis* (H. L. Viereck). Type in U. S. National Museum.

This species has the cross-veins more erect and the lower posterior angle of the first posterior cell less rounded than most species. The inner cross-vein is but little in front of middle of discal cell.

A New North American Genus of Cydnidae (Hem.).

By E. P. Van Duzee, San Francisco, California,* Curator, Department of Entomology, California Academy of Sciences.

PSECTROCEPHALUS new genus

Allied to *Pangaeus* but wanting ocelli, and anterior margin of the head armed with comb-teeth. Ovate, subdepressed, sides nearly parallel. Head broadly rounded before; cheeks approaching at apex of tylus but scarcely forming a notch there; edge strongly reflexed, the depressed submargin armed with alternating spines and bristles; eyes small, closely set against anterior angles of pronotum. Ocelli wanting. Antennae five-jointed; segment II thinner and slightly longer than those following. Rostrum reaching intermediate coxae; segment I attaining base of head, III longest and thickest. Pronotum subquadrate; anterior margin shallowly excavated, flattened and punctate but immarginate, armed with one bristle behind inner angle of each eye; sides ciliate, slenderly but acutely carinate; disk without transverse depression. Scutellum a little longer than wide, apex narrowly rounded; punctate, with base nearly smooth. Corium scarcely exceeding scutellum, quite uniformly and coarsely punctured, its apex broadly, feebly arcuate; costa ciliate nearly to apex, the

*Contributions from the California Academy of Sciences, No. 138.

connexivum ciliate beyond that point. Osteole without a sulcus, opening behind a tumid elevation. Feet as in *Pangaeus*.

This is the first American genus of Cydnidae known to me in which the ocelli are entirely wanting. This character, with the spinose margin of the head and longer second antennal segment will serve to separate it from *Pangaeus*, its nearest relative.

Type: *Psectrocephalus caecus* n. sp.

Psectrocephalus caecus new species.

Black, coarsely punctate; antennae testaceous; marginal cilia rufous. Length 5 mm.

Vertex and tylus nearly smooth, the latter transversely wrinkled toward apex; cheeks rugosely punctate; marginal spines as long as thickness of 3d antennal segment; cilia about five times the length of the spines and nearly equal to median width of cheeks; anterior submargin armed with a long bristle either side at base of bucculae; anterior disk of pronotum continuously smooth, the lunate anterior margin and broad sides punctate, as is the posterior lobe; punctures on scutellum shallow, becoming closer posteriorly, the base nearly smooth; corium closely, deeply punctate; membrane attaining apex of abdomen; beneath polished, impunctate, the osteolar area opaque.

Color deep black when mature, polished; rostrum and antennae piceotestaceous, segments II and III of antennae darker; tarsi pale; marginal cilia and eyes rufous; membrane white, in one individual shorter and sooty black.

Described from two male and three female examples taken as follows: Pasadena, California, October 12, 1916, one pair taken among ants under a stone by Mr. J. O. Martin; La Jolla, California, one female taken by me under a stone, on the hill back of Scripps' Institution, July 27, 1913; Laguna Beach, California, one male taken by Prof. E. O. Essig, July 15, 1913, and one female taken by Mr. C. T. Dodds at same place, July 7, 1921, both under stones.

Holotype, male, No. 926, and allotype, female, No. 927, Museum California Academy of Sciences, from Pasadena. Paratypes in collections of the Academy, in that of Mr. Harold M. Jeancon and in that of the author. This species undoubtedly is an inhabitant of ants' nests and may be common in such situations.

Studies in the Genus Hetaerius (Col., Histeridae).

By J. O. Martin, Berkeley, California.

All of the members of this interesting genus of the Histeridae are, so far as at present known, myrmecophilous and aside from this, little exact knowledge exists as to their life histories or their relations to their hosts. Although they live at the ants' expense, they show no signs of the degeneracy so often accompanying parasitism and seem to be as efficient as any of the family to which they belong. They have well developed wings and can use them and their legs, while apparently awkward, get them over the ground at a surprising rate. The compact body of these beetles is strongly chitinized and with its retractile head and antennae, its broad flat legs, serving as additional abdominal protection, offers impregnable defense to attacks of the ants. It is quite evident, from numerous observations, that the ants tolerate these beetles owing to secretions which they exude and of which the ants are very fond. These secretions are believed to arise at the basal thoracic angles and there are specializations at these points which seem to support this idea. Also the ants are known to favor this region, even to the extent of gnawing holes through the thoracic walls, presumably while the chitin is soft directly after emergence from the pupa.

The members of this genus are all of small size, varying in length from one and a half to three millimeters. The general form of the body is quadrately oval with variations in the ratio of length to breadth as well as to convexity. The general body color does not vary greatly in the different species, being a reddish brown similar to that common to many other insects of myrmecophilous habits. In vestiture there is a variation from almost complete nudity, to a considerable degree of hairiness. The hairs themselves vary from plain bristles, through different degrees of plumosity to a squamose type which is generally plumose and recumbent. These hairs offer useful taxonomic characters, but should be used with caution as I am convinced that the ants frequently gnaw some of them off.

The form of the prothorax is a very useful means of specific determination and as there is a very unusual development of this sclerite, it seems advisable to designate the various features in order to make clear the terms used in descriptions. The dorsal surface of the prothorax is divided into three main regions by two oblique, converging sulci, extending from the basal to apical margins and dividing the surface into a central *discal area*, with two bordering *lateral areas* of which the discal area is the largest. The sulci which produce this division are called the *oblique sulci*. The discal area is convex and highest along its central portion, sloping gradually toward the apex and also toward the sulci before reaching which it begins to curve upward to a carinate edge forming the inner border of the oblique sulcus. The depression which parallels this sulcus and is a part of the discal area, is, in all of the species I have examined, smooth, shining and impunctate, while the raised portion of the discal area may be variously punctured and hairy; I shall call this depressed portion of the discal area the *oblique depression*. The lateral areas lying between the oblique sulcus and the lateral margin, are various in shape and in all cases are extended further cephalad than the discal area. The inner margin of these lateral areas is carinate and forms the outer border of the oblique sulcus. Each lateral area is divided near its basal third by a *transverse sulcus* which may vary in shape and depth in the various species. The portion of the lateral area cephalad of the transverse sulcus is generally punctate with varying hairiness and is inclined to rugosity, while the smaller portion caudad of the sulcus generally has its inner surface at least, smooth and shining. The surface of this division is, as a rule, convex and blister-like in shape; I shall therefore speak of it as the *bulla*. It is about this bulla that the ants seem to center their attentions and it seems probable that here is the chief seat of glandular secretion.

The divisions of the prothorax above mentioned are to be found in all of our species at present described but in *Hetaerius ferrugineus*, the type of the genus, neither the oblique nor transverse sulci are present. The oblique sulcus is indicated by two parallel raised lines but there is no sulcus between them. Of the transverse sulcus there is not the slightest indication, neither is there any development of the bulla. In all other respects, however, this species seems to agree with our American species.

In the pygidium and propygidium I can find no other specific characters than the variation in punctation and hairiness. These variations, however, seem to be constant and offer a ready means of separating the species. I have carefully examined a series of eighteen specimens of *Hetaerius zelus* Fall, and over twenty-five of *Hetaerius tristriatus* Horn, for sexual characters, but have not been able to detect any here or elsewhere.

In the prosternum we encounter one of the most valuable series of variations for specific separation as well as generic division. There are two types of prosternum, separating the genus into two well defined groups, one I shall call the subcylindrical, the other the depressed type. In the first or subcylindrical type, a ventral view of the prosternum shows a sort of vase form with its base between the coxae and its bulbous tip at the cephalic extremity. The mesothoracic contact is emarginate and extended into two rounded angular lobes around the ends of the coxae. Between the coxae the sides are suddenly convergent, followed by a gradual divergence to a maximum at about the middle of the prosternum, at which point there is a convergence to a neck-like constriction, then an expansion to a bulbous extremity which has a pit-like depression on its end. The cephalic portion of this prosternal ridge is subcylindrical in bas-relief, growing less so at the middle and becoming flat between the coxae. The second or depressed type is the same in general plan as the above except that there is a varying slope away from the summit of the prosternal ridge instead of an abrupt drop as in the former. The mesothoracic contact is margined in both types and the extension of the bordering carina along the flattened surface of the ridge produces the *margined area*.

In the head we find some differences both in shape and punctuation, but owing to its retraction. the front is the part most often made use of. The antennae also are difficult to see and for this reason have probably not been mentioned in descriptions.

The legs differ considerably in their proportions but as it requires special manipulation to measure them, I have tried to avoid the use of this character except where it is easily noted.

As a result of the present study I have recognized eighteen species, two east of the Rocky Mountains and the remainder from the Pacific side of the divide. I am confident that there are still others awaiting discovery, especially in the higher altitudes of the Sierras. Comparison with a paratype has convinced me that my species *nitidus* is synonymous with *exiguus* Mann, also that the description of the latter species was rather incomplete. Since Horn's "Synopsis of the Histeridae," 1873* there has been no attempt to tabulate the species of this genus and as there were then but three known species, I offer the following table as a help in future studies of this genus.

Hetaerius vandykei n. sp.

Form oblong oval, ratio of extreme length to breadth as seven to five. Color fulvo-ferruginous; punctate and hairy on all parts of the body except the prosternum; punctures coarse, uniform and fairly close together; hairs except where elsewhere noted fine, long, suberect and fulvous.

Head at vertex nearly flat, coarsely, evenly punctate and hairy; epistoma and labrum smooth, shining, impunctate; front very shallowly impressed.

Prothorax less than twice as wide as long; sides evenly rounded from apex to transverse sulcus, which is rounded at bottom and rather deeply impressed. Bulla punctate and hairy on the outer two-thirds of its surface with stiff, inward curving, plumose hairs. These hairs are coarser than the hairs of the discal area. Discal area coarsely, evenly, punctured, each puncture with a long, suberect, soft yellow hair; punctures and hairs of this area extend further into the oblique depression than in any other species I have examined. Lateral area coarsely punctured and hairy; hairs along the margin coarser and castaneous in color.

Elytra evenly, closely, punctate and hairy; first dorsal stria extends three-fourths the distance to apex, second not quite reaching apex.

Pygidium and propygidium punctate and hairy, each puncture marked by a slightly curved, fine, depressed line in the chitin; punctures somewhat less closely together than on upper surface, hairs depressed.

Prosternum of the depressed type; carinae of the margined area broadly convergent between the coxae, then diverging to one-half the length of the prosternum, then suddenly convergent, becoming parallel at tips, leaving the margined area open at its cephalic end. Prosternum

* Proc. Am. Phil. Soc. XIII, 1873, p. 303.

punctate, shining and but for a few coarse hairs between the coxae, naked. Meso- and metasternum punctate and hairy, hairs depressed, where the legs cover these sclerites in repose there are no hairs. Legs hairy. The hairs on under surface of body and legs are finely plumose and not as long as those on the thorax and elytra. Length 1.5 mm.; width 1+ mm.

Described from an unique in the collection of Dr. E. C. Van Dyke, who collected it in the Yosemite Valley, California, and in whose collection the type remains.

Hetaerius pilosus n. sp.

Form broadly quadrate oval, ratio of extreme length to breadth, three to two. Color fulvo-ferruginous. Shining throughout.

Head at vertex very slightly concave; finely, closely punctate, minutely rugose between the punctures which deadens the surface lustre on vertex and front, punctures with long, curved, golden yellow hairs; labrum and epistoma shining but minutely rugose.

Thorax twice as broad as long; disc smooth, shining, moderately punctate each with a long, very fine, curved, yellow hair. Bulla punctate and hairy on outer two-thirds, inner surface smooth and shining. Transverse sulcus deep and broad at bottom. Lateral area punctate and hairy; these hairs and those on bulla coarser than those on the disc; oblique sulcus carinate on both sides to base of elytra.

Elytra smooth, shining, evenly, moderately punctured, punctures fine, each one bearing a long, fine, curved, suberect hair which tapers to a very fine, long point. First dorsal stria extends three-fourths the distance to the tip of elytra; all the others reach apex; striae fine.

Pygidium smooth, shining, impunctate; propygidium smooth, shining, punctate, punctures more widely dispersed than on upper surface of body, each with a long pilose hair.

Prosternum of the depressed type; carinae of the margined area convergent between the coxae, thence gradually divergent to one-half the length of prosternum at which point they converge in a nearly straight line meeting in a sharply rounded tip, thus closing area in front; surface of margined area minutely acinose; remainder of prosternal surface punctate and acinose, punctures without hairs; cephalic apex of prosternum slightly emarginate and broadly depressed at tip of ridge. Meso- and metasternum and abdominal segments smooth, shining, impunctate. Legs smooth, shining and rather widely punctured, punctures with short hairs. Length 2 mm.; width 1.5 mm.

A single example taken in the nest of a small dark ant at Cypress Ridge, Marin County, California. *Type* in my own collection.

This species is close to *helenae* Mann from Mexico but, according to Mr. H. C. Fall, who kindly compared it with the type, it differs from that species in being more densely hairy with no trace of regularity in the arrangement of the elytral hairs, which in *helenae* are in definite longitudinal series. In *pilosus* the margined area of the prosternum is closed in front while in *helenae* it is open or in some cases nearly closed. In *pilosus* the propygidium is hairy all over.

(To be continued.)

Early Stages of Noropsis hieroglyphica Cram. (Lepidoptera, Noctuidae).

By F. H. Benjamin, Agricultural College, Mississippi.

Larva.—*Head*, bright, shining, greenish-brown, clypeus whitish, mandibles black, antennae white at base with last two segments black. *Body* and *thorax*, transversely striped with three or four distinct black stripes to each segment, one of these stripes being broadest and most conspicuous, and this stripe broadening out on dorsum and each latex to form an interrupted dorsal line, and a dorso-lateral line on each side. The transverse stripes do not go around the entire body, but end in a ventro-lateral longitudinal black stripe below the spiracles. This stripe is broken to surround a small spot of ground color on the segment before the prolegs, and above each of the prolegs except the anal pair. The spiracles themselves are surrounded by black, resembling small black dots. A black dorsal plate on the first abdominal segment, divided cephalo-caudad by a medial very faint line of ground color, and sometimes interrupted by a more conspicuous transverse band of ground color. General ground color bluish-slate with somewhat of a greenish cast above the ventro-lateral line; underneath, lighter, with the greenish cast stronger and more pronounced. *True legs*, black. *Prolegs*, blackish with yellowish-green in the middle. *Anal prolegs*, black. All prolegs very strongly chitinized, giving them a peculiar shining appearance. *Anal plate*, yellowish green marked by black cephalad, with a tendency for this black to surround the yellowish green by being very faintly present on the lateral and caudal borders of the plate. Length of larva 45 mm. Diameter 7 mm. Head 4x4 mm.

Pupa.—Reddish at first, turning darker to a very dark reddish-brown almost blackish; the ventral part of the abdominal segments lighter. *Cremaster*, with two spine-like processes extending at about 45 degree angles from an imaginary mesal line, with no ordinary setae visible. *Prothoracic legs*, reaching cephalad to eye pieces. *Mesothoracic legs*, not reaching as far cephalad. *Prothoracic femora*, not visible except as a slight widening between sutures. *Dorsum*, of abdominal segments pebbled with large raised granulations; between the segments are fine granulations, those on the cephalic end coarser than those on the caudal end, giving a sandpaper-like appearance. *Spiracles*, ovate, slightly depressed caudad; with a raised flattened-crescent-shaped ridge near their cephalic margin. *Meso* and *metathoracic spiracles*, similar to and unmodified except in the same manner as the abdominal ones. *Sutures*, all deeply impressed. Length of pupa 15-17 mm. Breadth 5-5.5 mm.

The characters used in this description are the same as those used by Miss Edna Mosher in Bull. Ill. Nat. Hist. Surv. XII, 108-112, 1916, and would place the insect in her version of the Hadeninae.

Cocoon.—Several spun beside, above and below each other, in crotches of branches. The cocoon is made out of thin, coarse silk with fragments of leaves and bits of rubbish of various sorts covering the outside. The whole appears to have been cemented together by a fluid which hardens into a stiff glassy substance. Shape oval, about 20 mm. long and half as broad through the middle.

Temnostoma bombylans Linne Doubtfully American (Syrphidae, Diptera)

For some time I have had grave doubts as to the authenticity of the records of *Temnostoma bombylans* Linné from this country and have taken the trouble to get a specimen of the species from Europe, kindly supplied me by Dr. M. Bezzi, for comparison with our specimens. I find that there are differences between the specimens in our collections that do duty for that species and the European specimen. In fact I consider that there are two valid species, both described, from America, neither of which is *bombylans*. I have seen the type of *trifasciata* Robertson, sent to me by the describer, and have received data from Mr. Nathan Banks on the type of *obscura* Loew. I append a diagnosis for distinguishing the forms involved.

1. Third and fourth tergites in male slightly bluish, and with short decumbent black setulose hairs beyond the pale fasciae, fifth tergite in female similar to fourth; narrowest part of frons distinctly wider than anterior ocellus; base of male hypopygium with black hairs; tarsi of mid and hind legs in male entirely yellow...... *trifasciata* Robertson.

— Third and fourth tergites in both sexes with yellowish or brownish hairs beyond the pale fasciae, which are rather fine; narrowest part of frons not wider than anterior ocellus........................ 2

2. Hairs on fourth tergite and base of hypopygium pale yellow, and rather long and soft; tarsi of mid and hind legs entirely yellow, *obscura* Loew.

— Hairs on fourth tergite and base of hypopygium brown, shorter and stronger; apical two tarsal segments on mid and hind legs black, *bombylans* Linné.

The male hypopygia appear to offer very good characters for the separation of the three species.—J. R. Malloch, Bureau of Biological Survey, Washington, D. C.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., NOVEMBER, 1922.

Insect Surveys.

In 1917, after the United States had entered the World War, the importance of increasing crop production by the control of injurious insects was immediately recognized by entomologists, and Dr. L. O. Howard, as Chief of the Federal Bureau of Entomology, issued a circular, republished on the editorial page of the NEWS for May, 1917, page 229, inviting co-operation in the reporting of insect pests. With the data, which it was hoped, would be sent to Washington,

> the central office will be able to tabulate and map the occurrence of all injurious pests and to indicate to the men in the field the sections which are threatened with insect damage and the means for combatting same. With this information it will be possible to conduct a vigorous campaign against threatening pests.

The plan thus proposed resulted in the "Emergency Entomological Service," the reports of which appeared in mimeographed form and extracts from them are to be found in the NEWS for June, 1917 (page 283), and subsequent numbers.

It is evident that the data gathered during a period of war are also useful in times of peace, and the American Association of Economic Entomologists, at its last annual meeting, recommended that a National Insect Pest Survey be organized under the direction of the Bureau of Entomology. Dr. Howard arranged for such a survey under the charge of Mr. J. A. Hyslop and Bulletin No. 1103 of the United States Department of Agriculture, dated July, 1922, gives the first results of the Survey. It is by Mr. Hyslop and is entitled *Summary of Insect Conditions throughout the United States during 1921.* It reads:

> The object of the insect-pest survey is to collect accurate and detailed information on the occurrence, distribution, ecology and relative destructiveness of insect pests throughout the United States, and to study this

[*sic*] data from month to month and year to year with relation to the several factors that influence insect abundance. The results to be obtained from this undertaking over a series of years are manifold; we should be able to throw light on the reasons for the cyclic appearance of certain insect pests, the gradual shift of regions of destructive abundance, the limiting barriers to normal dispersal, the directive influences that determine the paths of insect diffusion, and the relation of climatology, geography, topography and geology, as well as biological complexes, to insect distribution and abundance. This is the necessary foundation for the next advance step in economic entomology, *entomological forecasting.*

The degree to which this Bulletin realizes these high hopes must be decided by those who read it. The object is one well worthy of the support of both pure and applied entomologists, since it lies within the fields of both classes of students. It appeals to those without as well as within the Bureau as, for example, to Mr. John J. Davis, who has argued for *An Indiana Insect Survey* in the Proceedings of the Indiana Academy of Science. Mr. Davis would

explore, exploit, record, map, collect and study the insect fauna of Indiana, determine the occurrence and range of all insects of the state and study their relation to plants, animals, human welfare, etc. Such a survey would include a study of the relations of insects to changing conditions, that is, swamp areas being reclaimed by drainage, peat bogs, sand areas and the like, being put under cultivation for the first time, etc. It would also include studies of the small lake areas, caves and similar places.

May all these surveys be carried out in detail!

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Protoparce rustica in Florida (Lep.: Sphingidae) and Mr. T. L. Mead

Mr. Theodore L. Mead has sent us a moth, *Protoparce rustica*. He says the caterpillar feeds on *Callicarpa americana*, down at his home, Oviedo, Florida. The larva of this species appears to have a variety of food plants. The life history is well illustrated in ENTOMOLOGICAL NEWS, 1900, xi, 485. Mr. Mead has not been collecting insects for forty years but still takes an interest in them and gets specimens for friends in this country and Europe. He was a famous collector and writer in the past and his work is known to most Lepidopterists.—H. SKINNER.

The University of Michigan-Williamson Expedition to Brazil.

The Expedition made collections in the vicinity of Pará (see the NEWS for October, page 244), August 1-10. On August 13, Mr. John W. Strohm sailed from Pará for New York, with a snake chest, another box of reptiles, etc., one trunk solid with dragonflies, a wooden chest full of unnecessary supplies and other impedimenta. Mr. Jesse H. Williamson remained at Pará until the morning of August 18, when he took steamer for Rio de Janeiro. There was much cloudiness and some heavy rain during their stay at Pará and on August 17 Mr. Williamson wrote: "Weather seems to be getting worse here instead of better;" on August 8: "Here, as elsewhere on the trip, all say the season is unusual." As to the Odonate fauna of Pará he wrote (Aug. 11): "Most things are the same as, or so similar that I detect no difference from, the Rio Madeira specimens." On Aug. 8 the Odonata of the Expedition were reckoned at 9029 specimens of 166 species.

The Authorship of the Lepidoptera Described in the Encyclopédie Méthodique, Vol. IX.

A recent examination of the descriptions of Hesperiidae in this work led me to the interesting discovery that the authorship of all the Lepidoptera should be attributed to Godart, and not to Latreille, as is commonly done. This was first disclosed in the footnote to *Hesperia godart* on page 722, and a reference to Latreille's introduction added other evidence in support of the conclusion.

The title page of the volume would lead one to expect joint authorship, at least, since it mentions Latreille as author with the assistance of Godart, but the passages by Latreille which are mentioned above disclaim all responsibility for the descriptions of species and give full credit to Godart.* The pertinent lines of the introduction read thus: "A l'exception des généralités préliminaires, que je m'etois réservées, cet article Papillon lui [Godart] est absolument propre; et si la justice ne me commandoit point cet aveu, je ne craindrois point d'y mettre mon nom." (With the exception of the preliminary general remarks, which I had reserved for myself, this article on butterflies is absolutely his own; and if justice did not command this acknowledgment I would not fear to place my name here). Certainly this is definite enough

*At the suggestion of the editor, Dr. P. P. Calvert, I am adding the wording of the title page of the volume under discussion. It is as follows: "Encyclopédie-Méthodique—Histoire Naturelle.—Entomologie, ou Histoire Naturelle—des Crustaces, des Arachnides et des Insectes.—Par M. Latreille,—Membre de l'Institut, Académie Royale des Sciences, etc.—Tome Neuvième.—Par M. Latreille, de l'Académie des Sciences, et M. Godart,—ancien Proviseur du Lycée de Bonn, etc.—a Paris,—Chez Mme. Veuve a Gasse, Imprimeur-Libraire, rue des Poitevins, No. 6—MDCCCXIX."—A. W. L.

in itself, but we find additional confirmation in the footnote to *H. godart.* This footnote does not bear Latreille's name, but its tenor indicates him as writer beyond reasonable doubt. The passage reads, in part: "Je n'ai autre part à son travail que celle de lui avoir fourni des moyens d'execution et de l'avoir aidè de mes conseils" (I have no other part in his work than that of having furnished him the means of its execution, and of having aided him with my advice).

One rather contradictory point is the appearance in this work of the species *Hesperia godart*, since it would be rather poor taste in an author to name a species for himself. This is counterbalanced, however, by the appearance on page 799 of another new species under the name of *Castnia latreille!*

The case certainly favors Godart's authorship of these species, in spite of the common attachment of Latreille's name to them, and it seems to the writer a matter or sheer justice that the change should be made. A thought is suggested by this, *viz.*, that it is all too easy to be careless about reading introductory matter, perhaps more in systematic treatises than in others.—A. W. LINDSEY, M. S., PH. D., Denison University, Granville, Ohio.

A Note on Timema californicum Scudder (Orthoptera; Phasmidae).

This strange little Phasmid has attracted the attention of the present writer at various times during the past few years, with the result that it is possible to add a few field notes to those given by Hebard in the latest discussion of the species[1].

In the case of this particular species the only food plant indicated by Hebard is fir, although *T. chumash* Hebard, the only other member of the genus is recorded as having been swept from *Ceanothus.* I have at various times taken single specimens of *T. californicum* purely by accident, finding them upon clothing or insect net after passing through the "chapparal" (which is simply the western word for brush) with which many of our hills are covered. As the "chamise," *Adenostoma fasciculatum*, is the most abundant member of the chapparal association it appeared probable that this was the normal host. However, a visit to the brush-covered top of Loma Prieta Mountain near San José, California (altitude 3000 feet) on June fourth, 1921, produced evidence that the normal host is really another shrub, the "silk tassel," *Garrya elliptica.* Of twenty specimens secured, eighteen were jarred from one or two shrubs of this particular plant, one was found on the ground and one was taken in general sweeping. None were found on *Adenostoma.* The species is evidently abundant, if sought for in the right time and place, for scarcely a quarter of an hour was necessary to obtain these.

The published descriptions of the species have evidently been based

[1] *The genus Timema*, etc., Hebard, *Ent. News*, 31: 126-132. (1920).

upon dried specimens. The only color notes from fresh material are those given by Hebard for specimens from fir, these being described as green. My material shows that the species presents a marked color dimorphism. Of the twenty specimens, eighteen were entirely green except that the antennae were dusky in both sexes while in the males the tarsi, tibiae and apical half of the femora were pinkish brown or pink. Two specimens, one of each sex, had the entire dorsum pink, the venter green, and the tarsi, tibiae and apical half of the femora pink.

The measurements given by Hebard appear also to have been made from dried specimens, the greatest length given being 19.8 mm. for the female and 14.5 for the male. My specimens, which were killed in Carnoy fluid, ranged from 22-24 mm. for the female and 15-18 mm. for the males.

With a knowledge of the host plant it is hoped that further notes as to the life history may be obtainable.—G. F. Ferris, Stanford University, California.

Insect Photography.

At the meeting of the Entomological Society of Belgium, Brussels, March 4, 1922, M. Bastin, of Antwerp, showed a photostereosynthesis (Lumière system) of a Dipter which, viewed as a transparency, gave the impression of astonishing reality. It had been obtained by the exact superposition of six photographs on glass, taken at the same magnification with the aid of a microscopic objective, at regularly increasing depths of the preparation. (Bull. Soc. Ent. Belg. iv, p. 41).

Chrysops costata Sucking Human Blood in Cuba (Dip.: Tabanidae).

Under the title *Sobre la mosca Chrysops costata Fabr. que chupa la sangre del hombre, observada en Cuba*, Dr. W. H. Hoffman has a note in *Sanidad y Beneficencia* (Boletin Oficial, Edicion Mensual, XXVI, No. 3, p. 121, Habana, Setiembre, 1921) describing his personal experiences in being bitten on the head about twelve times by flies which Dr. Walter Horn, of Berlin-Dahlem, identified as *Chrysops costata* Fabr. The flies bit the observer at various hours, both by day and by night, from October to February, in the grounds of Las Animas Hospital at Havana. Generally the flies had a little blood in the stomach and they made no attempt to escape from his hands. The bite was followed by considerable inflammation and pain. As other residents of the locality have not been bitten by this fly the observer suggests that his keeping his hair short, which is not the prevailing custom, exposes him to these attacks. He has not found this species elsewhere than on his own person. The transmission of *Filaria* by *C. dimidiata* in West Africa and of *Bacterium tularense* by *C. discalis* in Utah suggests to him the possibility that this Cuban species may also serve as a vector of disease.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

2—Transactions of the American Entomological Society of Philadelphia. **4**—Canadian Entomologist, Guelph, Canada. **7**—Annals of The Entomological Society of America, Columbus, Ohio. **8**—The Entomologist's Monthly Magazine, London. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **16**—The Lepidopterist, Salem, Mass. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **22**—Bulletin of Entomological Research, London. **24**—Annales de la Societe Entomologique de France, Paris. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **34**—Bulletin de la Societe Entomologique de Belgique, Brussels. **36**—Transactions of the Entomological Society of London. **44**—Ectoparasites. Edited by Jordan & Rothschild, Tring, England. **45**—Zeitschrift fur wissenschaftliche Insektenbiologie, Berlin. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipsic. **54**—Proceedings of the Biological Society of Washington, D. C. **62**—Bulletin of the American Museum of Natural History, New York. **67**—Le Naturaliste Canadien, Quebec. **68**—Science, Garrison-on-the-Hudson, N. Y. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **70**—Journal of Morphology, Philadelphia. **76**—Nature, London. **81**—The Journal of Parasitology, Urbana, Illinois. **96**—Physis. Revista de la Sociedad Argentina de Ciencias Naturales, Buenos Aires. **97**—Anales del Museo Nacional de Historia Natural de Buenos Aires. **100**—Biological Bulletin of the Marine Biological Laboratory, Woods Hole, Mass. **103**—Biologisches Centralblatt, Leipzig. **104**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **106**—Anales de la Sociedad Cientifica Argentina, Buenos Aires. **111**—Archiv fur Naturgeschichte, Berlin. **114**—Entomologische Rundschau, Stuttgart. **116**—Entomologische Zeitschrift, Frankfurt a. M. **119**—Proceedings of the National Academy of Sciences of the U. S. A., Washington, D. C. **124**—Bulletin de la

Societe Entomologique d'Egypte, Cairo. **129**—The Bulletin of the Hill Museum, Witley, Surrey, England.

GENERAL. Downing, E. R.—A naturalist in the great lakes region. (Univ. Chicago Press, 1922, 328 pp., ill.) **Druce, H. H.**—Obituary. **8,** 1922, 211. **9,** 1922, 215. **Fahringer, J.**—Die feinde der schlammfliege. **45,** xvii, 113-24. **Gibson, A.**—A quoi sert l'entomologie? Benefices monetaires resultant des recherches entomologiques. **67,** xlix, 30. **Graef, E. L.**—Obituary notice. **19,** xvii, 43-5. **Greene, C. T.**—[Minutes of the Entomological Society of Washington. Discussions on the number of insects.] (Jour. Wash. Acad. Sc., xii, 335-40.) **Hayward, K. J.**—Colour-preservation in dragonflies. **9,** 1922, 209-10. **Hyslop, J. A.**—Summary of insect conditions throughout the U. S. during 1921. (U. S. D. A. Bull. 1103.) **Mast, S. O.**—Photic orientation in insects. **119,** viii, 240-5. **Morris, H. M.**—On a method of separating insects and other arthropods from soil. **22,** xiii, 197-200. **Mueller, R.**—Ueber vererbungslehre und entomologie. **114,** xxxix, 29-30 (cont.). **Sherborn, C. D.**—Index animalium.... 1801-1850. Sectio secunda. Part I. **Talbot, G.**—Nomenclature and illustrations. **129,** i, 366-7. **de la Torre Bueno, J. R.**—Color characters vs. structural characters. **19,** xvii, 63-4.

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OBITUARY NOTE.

We are indebted, in the first instance, to Dr. L. O. Howard, for the sad news of the death of Dr. David Sharp, which occurred at Brockenhurst on August 27. A notice of his life and work will appear in a later number of the News.

DECEMBER, 1922

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PHILIP P. CALVERT, Ph. D., Editor.
E. T. CRESSON, JR., Associate Editor.
HENRY SKINNER, M.D., Sc.D., Editor Emeritus.

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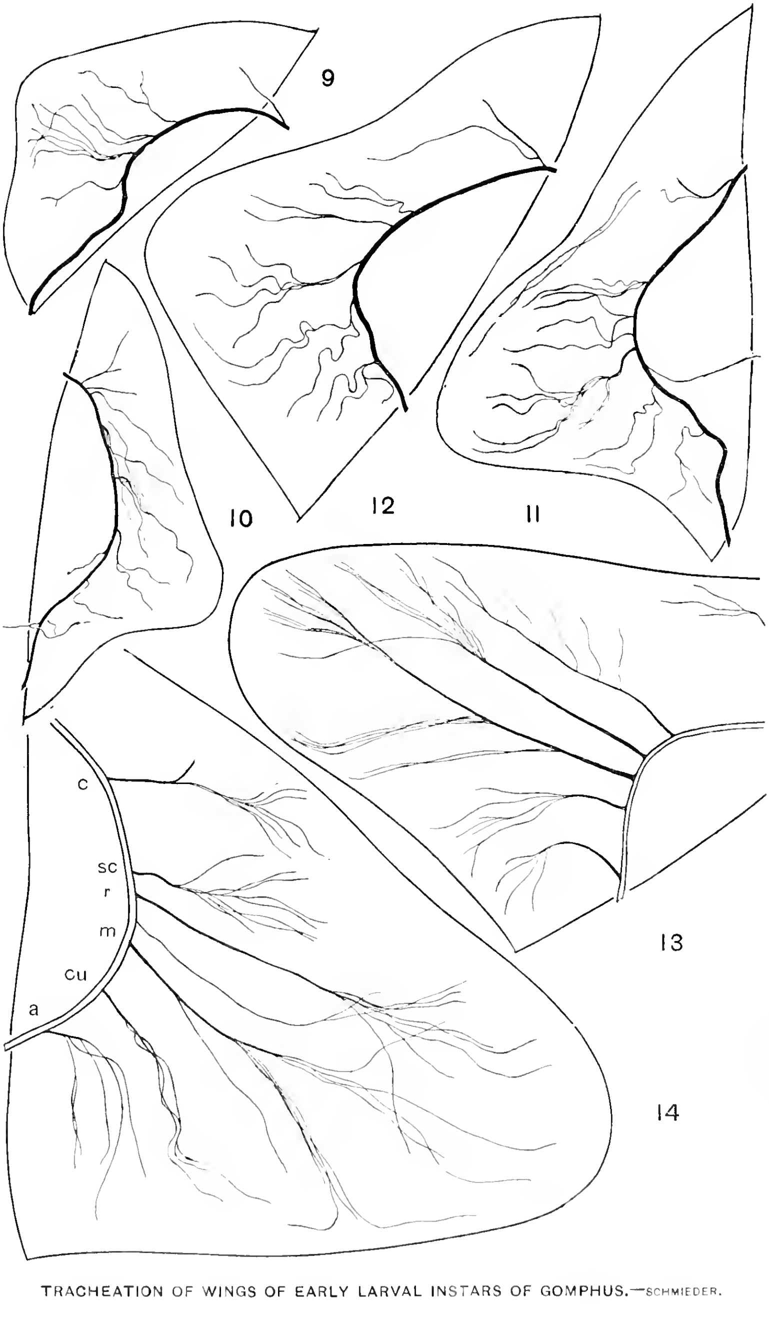

TRACHEATION OF WINGS OF EARLY LARVAL INSTARS OF GOMPHUS.—SCHMIEDER.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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Studies in the Genus Hetaerius (Col., Histeridae).

By J. O. MARTIN, Berkeley, California.

(Continued from page 277)

Hetaerius setosus n. sp.

Form broadly quadrate oval. Color ferruginous. Punctate and setose.

Head but slightly concave at vertex, which is evenly, moderately punctate, each puncture bearing a long bristle-like seta; front impunctate, shining, minutely rugose; labrum smooth shining.

Prothorax twice as wide as long; minutely rugose except in the oblique depression which is smooth and impunctate; disc evenly, moderately punctate and setose, the setae long, recurved and tapering to a sharp point, minutely plumose along cephalic margin. Lateral areas more closely punctured and setose, these setae becoming coarser, longer and more evidently plumose at the outer edge; sides evenly rounded from transverse sulcus to apex; inner carina of the oblique sulcus bends sharply inward opposite the transverse sulcus, by this separation producing a deep triangular depression opposite the bulla and narrowing the oblique depression at this point. Bulla smooth shining on inner half, outer portion punctate and bordered by coarser and longer plumose setae.

Elytra shining and minutely rugose; space between the first dorsal stria and the elytral suture evenly, moderately punctate with setae similar to those on disc of thorax; punctures without regular arrangement; each stria has along its raised edge a row of setigerous punctures slightly closer together than those on the disc; parallel to this is another single row of setigerous punctures more widely spaced. First dorsal stria reaches but one-half the distance to apex; remaining striae extend to apex.

Pygidium and propygidium evenly, moderately, punctate and setose.

Prosternum finely punctate and rugose but lacking setae; bordered area contracted between the coxae, thence gradually separating to one-half the length of the prosternum where they merge into the prosternal surface, leaving the cephalic end of the margined area open. Cephalic end of prosternum emarginate; immediately caudad of the emargination there is a slight indentation in the raised portion. Meso- and meta-sternum punctate and hairy. Legs evenly and moderately punctate on the outer surface, setae shorter than those on upper surface of body. Length 2 mm.; width 1.5 mm.

Described from a series of nine specimens taken at North Fork, California, in the nests of *Formica plicicornis?* *Type* in my collection, paratypes in the collection of Mr. Henry Dietrich who collected the species.

Hetaerius nudus n. sp.

Of the same form as *setosus*, which it resembles in many respects; it has more yellow in the body color and is noticeably less convex.

Vertex of head flat, evenly, moderately punctate, punctures with short, squamose, recumbent hairs; front impressed, finely rugose, impunctate; labrum finely rugose, shining.

Prothoracic disc evenly, moderately, punctured with minute, short recumbent hairs in each puncture; basal end of oblique depression broad; lateral areas finely rugose, marked with a series of slightly raised lines extending from transverse sulcus to the apex; between these lines are single rows of punctures bearing the same type of hairs as those on the disc; outer margin with a row of coarser, curved hairs; inner margin for half its length, beginning at transverse sulcus, with a single row of flattened, recumbent hairs; bulla finely rugose on outer half, which is punctate with coarse, squamose, recumbent hairs, outer margin with hairs like those on margin of lateral area, inner surface finely rugose, impunctate. Carinae of the oblique sulcus not as widely separated at base as in *setosus*. Outer margin of lateral area while rounded shows a slight tendency to angulation at one-third the distance from apex to transverse sulcus.

Elytra evenly, moderately punctured and with the same minute, recumbent hairs as those on the prothoracic disc; the first and second dorsal striae of same length and not quite reaching to apical margin.

Prosternum of the same type as in *setosus* but with the margined area narrower and the general surface less convex; cephalic margin more deeply emarginate and with a more pronounced prosternal pit.

Pygidium and propygidium evenly, moderately punctured and with the same type of hairs as on upper side of body. Legs on outer surface and remainder of under surface the same. Length 2 mm.; width 1.5 mm.

Described from five specimens taken by Mr. Henry Dietrich at North Fork, California, in the nests of *Formica plicicornis? Type* in my collection, paratypes in that of Mr. Henry Dietrich.

This species while close to *setosus* is distinct in the characters given above. The hairs are so minute as to give it a naked appearance when compared with that species.

Hetaerius dietrichi n. sp.

Form quadrate oval; ratio of extreme length to width as seven and a half to five plus; color ferruginous.

Head at vertex nearly flat, where it is coarsely punctate and rugose; punctures with squamose, suberect hairs, a few of which near thorax are twice as long as the others, all being plumose; front and labrum punctate and rugose, shining.

Thorax less than twice as broad as long; discal area smooth, shining, thickly punctate in front, but becoming less so at base, punctures with short, small, yellow hairs; lateral area more coarsely punctured, hairs of the same type as on the disc; bulla slightly smaller in proportion to lateral area than usual; transverse sulcus broad and shallow, becoming more narrow toward the oblique sulcus; outer half of bulla coarsely punctate and hairy.

Elytra smooth, shining, finely punctured, punctures with short minute hairs; first and second dorsal striae reaching three-fourths the distance to apex.

Pygidium and propygidium shining, minutely rugose and very finely punctate with minute hairs in the punctures.

Prosternum closely punctate and rugose with short minute hairs in the punctures; margined area with carinae convergent between the coxae, thence divergent to less than half the length of prosternum, where they converge toward a common point, in some cases very nearly meeting but in the majority of cases well separated, leaving margined area open in front. Meso- and metasternum shining, less closely punctured than prosternum, punctures with short, minute hairs. Outside of legs sparsely punctate, the accompanying hairs coarser and evidently plumose. Length 1.5 mm.; width 1.25 mm.

Described from six examples taken by Mr. Henry Dietrich at Dalton Creek, Fresno County, California. I have also a single example which I am unable to separate from the above which was found by Mr. E. R. Leach of Piedmont, California, floating in an irrigation ditch in Nevada County, California. *Type* in my collection, paratypes in the collection of Mr. Henry Dietrich.

This small species varies in amount of vestiture, one specimen being almost without hairs, the type being a fair average. It also varies in the distance apart of the cephalic ends of the carinae enclosing the margined area of the prosternum; I have seen no case where they actually meet, but in two instances they very nearly do.

Table to the Species of Hetaerius.†

Prosternum subcylindrical.
  Posterior femora over three times as long as wide.
    Pygidium and propygidium with the punctures separated by a space equal to the diameter of a puncture....1. **morsus** Lec.
    Pygidium and propygidium with the punctures contiguous and coarser than the above....................2. **strenuus** Fall
  Posterior femora about two and one-half times as long as wide.
    Pygidium without hairs, propygidium with hairs.
      Centre of thoracic discal area punctate and hairy, 3. **tristriatus** Horn.
      Centre of thoracic discal area finely punctate and without hairs ....4. **hirsutus** Mart.
    Pygidium and propygidium both with hairs.
      Outer surface of legs moderately clothed with long, pointed, plumose hairs ....5. **williamsi** Mart.
      Outer surface of legs moderately punctate, femora without hairs, tibia with small pointed hairs..........6. **zelus** Fall
      Outer surface of legs moderately, closely punctate with minute blunt hairs ....7. **blanchardi** Lec.
    Pygidium and propygidium both hairless......8. **horni** Wickh.
Prosternum depressed.
  Prosternal margined area closed in front by a coalescence of the margining carinae.
    Carinae of the margined area converging to a rounded point, slightly sinuate before meeting.
      Upper surface of body sparsely punctate with suberect, squamose hairs ....9. **minimus** Fall
      Upper surface of body closely punctate with long, pilose hairs ....10. **pilosus** Mart.

†I am unable to find any record of the capture of *Hetaerius helenae* Mann in the United States and see no reason for its inclusion in Leng's List.

Carinae of the margined area closing with a rounded arch in front.
With a few scattered hairs on disc of thorax and elytra, 11. **brunneipennis** Rand
With numerous long, pointed hairs on disc of thorax and elytra ....12. **californicus** Horn
Without hairs, but with evident punctures on disc of thorax, elytra punctate with a few hairs..........13. **exiguus** Mann
Prosternal margined area with carinae not meeting in front.
Carinae beyond intercoxal convergence, divergent to their cephalic ends, leaving margined area widely open in front.
Pygidium and propygidium sparsely punctate with long, pointed hairs ....14. **setosus** n. sp.
Pygidium and propygidium without long hairs.
Pygidium and propygidium with minute, squamose, recumbent hairs ....15. **nudus** n. sp.
Pygidium and propygidium without evident hairs, 16. **wheeleri** Mann
Carinae of the margined area converging at apex, but not meeting.
Disc of thorax with short, minute, sparse hairs, 17. **dietrichi** n. sp.
Disc of thorax with long, pilose hairs......18. **vandykei** n. sp.

In concluding I wish to extend thanks to Mr. H. C. Fall, who examined for me the types of *morsus* Lec. and *helenae* Mann; also to Dr. E. C. Van Dyke, who kindly loaned me all of his material in this genus. I am also indebted to Mr. Henry Dietrich for the loan of his material, including three new forms. Prof. H. F. Wickham also sent his specimens which included a number that I had not seen.

Notes on two Acalyptrate Diptera.

In 1913 (Jour. N. Y. Ent. Soc. vol. 21, p. 294) Dr. A. L. Melander described *Mumetopia nitens*, distinguishing it from *terminalis* Loew by its partly black face and parts of the head This form is merely the male of *terminalis*, which has the head and its parts yellow or whitish. In the same paper he recorded *Cerodonta femoralis* Meigen from the west, an error which I avoided in my paper on the family which appeared at the same time. My view has since been confirmed by Dr. Aldrich in print. This year I took one specimen of the true *fulvipes* Meigen (*femoralis* Meigen) at Glen Echo, Maryland, so that the species really does occur in America though not present in Melander's material from the west. Hendel has recently followed Melander in recording *femoralis* from this country, the record being based upon the dark form known in Europe as *denticornis* var. *nigroscutellata* Strobl which is common in the extreme west.—J. R. Malloch, Bureau of Biological Survey, Washington, D. C.

List of the Robberflies (Asilidae, Diptera) of North Carolina.

By C. S. Brimley, Entomological Division, N. C. Department of Agriculture, Raleigh, N. C.

The following list of the robberflies of North Carolina is based on the records of this department which have been gathered by Mr. Franklin Sherman, Chief in Entomology since 1900, and by his various assistants. The initials following the records are those of Mr. Sherman, Messrs. G. M. Bentley, S. C. Clapp, J. E. Eckert, R. W. Collett, S. W. Foster, V. R. Haber, C. O. Houghton, R. W. Leiby, W. B. Mabee, C. L. Metcalf, T. B. Mitchell, M. R. Smith, R. S. Woglum, and myself, his assistants at various periods, also of Mr. A. H. Manee, of Southern Pines, N. C., and Mr. C. W. Johnson, of Boston, Mass. The Raleigh records are not as a rule initialled.

I. Subfam. Leptogastrinae.

Leptogaster badius Loew. Raleigh, May 16, 1909; June 30, 1921.

Leptogaster brevicornis Loew. Raleigh, early June, 1909; May 30, 1921.

Leptogaster incisuralis Loew. Southern Pines, late August, 1912, AHM.

Leptogaster obscuripennis Johnson. Raleigh, July 25, August 4, 16, 1906; August 13, 21, 1921; Blantyre, early September, 1906. RSW.

Leptogaster pictipes Loew. Raleigh, May 2, 1905; September 2, 1904; June 5, 11, 1906; Murfeesboro, June 9, 1895, CWJ.

Leptogaster testaceus Loew. Raleigh, early August, one, FS.

Leptogaster virgatus Coq. Raleigh, taken on May 31, June 13, 14, August 13, 16, in different years.

II. Subfam. Dasypogoninae.

Ceraturgus cruciatus Say. Swannanoa, July 15, 1917, RWL; Linville Falls, late June, 1920, FS.

Ceraturgus nigripes Will. Linville Falls, late May and early June, 1920, FS; Spruce, June, 1911; late May, 1913, FS; Black Mts., late May, 1910, FS; Andrews, mid-May, 1908, FS; Macon County between Highlands and Franklin, 2200 to 4000 ft., early May, 1908, FS.

Ceraturgus sp., larger than *cruciatus* with blackish wings. Raleigh, June 30, 1921, TBM.

Cyrtopogon alleni Back. Spruce, late May, 1913, CSB.

Cyrtopogon falto Walker. Spruce, late May, 1913, CSB.

Cyrtopogon lyratus OS. Black Mts., July 18, 1919, about 5000 ft., RWL.

Cyrtopogon marginalis Loew. Linville Falls, late May, 1920, FS; Spruce, late May, 1913, FS; Highlands, July, 1907; early May, 1903, FS; Aquone, mid-May, 1911, FS; Macon County between Highlands and Franklin, mid-May, 1908, FS.

Deromyia platyptera Loew. Goldsboro, July 28, 1921, one male, TBM.

Deromyia rufescens Macq. Raleigh, late August, 1914, CSB; Beaufort, August 11, 1902, FS; Southern Pines, September 14, 1912, AHM; McCullers, September 10, 1921, TBM.

Deromyia ternatus Loew. Raleigh, June to September, not uncommon; Southern Pines, mid-July, 1906, AHM; Marion, mid-July, 1907, FS; Havelock, late June, 1905, FS.

Deromyia umbrinus Loew. Blowing Rock, August 29, 1902, two, FS.

Deromyia winthemi Wied. Raleigh, mid-July to mid-September, not uncommon; Elizabeth City, early and mid-August, 1919, FS; Statesville, mid-July, 1919, FS; Durham, July, 1903, SWF.

Dioctria albius Walker. Swannanoa, June 22, 1917, RWL.

Dioctria brevis Banks. Black Mts. (north fork of Swannanoa River), Banks, Psyche, 1917, p. 117; Linville Falls, early June, 1920, two females, FS.

Dizonias tristis Walker. Willard, July 20, 1920, one male, VRH.

Echthodopa formosa Loew. "North Carolina," Back, Trans. Am. Ent. Soc., vol. 35, p. 249.

Holcocephala abdominalis Say. Late June to late September, common at Raleigh in rank herbage in damp shady places; also taken at Blowing Rock, in August and September; Grandfather Mt., up to 4000 ft. in September; Black Mts. in mid-July at about 5000 ft.; Statesville in mid-June; Greensboro in early October; Gibson in mid-October. Not yet taken east of Raleigh.

Holopogon guttula Wied. Pendleton, June 7, 1895, CWJ; Southern Pines, early May, 1912, AHM; Swannanoa, mid-June, 1919, FS.

Laphystia flavipes Coq. "North Carolina, Morrison," Back, Trans. Am. Ent. Soc., vol. 35, p. 229.

Laphystia sexfasciata Say. Beaufort, mid-June, 1903; early July, 1909, FS; Wilmington, September, 1905; July, 1906, RSW; mid-October, 1919, MRS; September 23, 1920, WBM; Wrightsville, September 23, 1920, TBM.

Lasiopogon opaculus Loew. Raleigh, mid and late April and early May, several specimens; Lake Toxoway, May, 1907, Mrs. A. T. Slosson.

Nicocles pictus Loew. Southern Pines, October and November, common, AHM.

Nusa fulvicauda Say. "North Carolina," McAtee, Ohio, Jour. Sci., vol. 19, p 246.

Stenopogon subulatus Wied. Lumberton, September 6, FS.

Stichopogon trifasciatus Say. Beaufort, August 9, 11, 1902; early July, 1909; mid-September, 1911 and 1912, FS.

Taracticus octopunctatus Say. Raleigh, June 30, 1921, CSB; Delco, early May, 1920, FS.

III. Subfam. Laphrinae.

Atomosia glabrata Say. Raleigh, July 28, 1906, CSB; Swannanoa, mid-July, 1919, above 3000 ft.; June 22, 1917, RWL.

Atomosia puella Wied. Lake Ellis, May 27, 1907, CSB; Southern Pines, late July, 1912, AHM; Swannanoa, mid-June, 1919, FS; Spruce, June, 1911, FS; Blowing Rock, July, 1904, GM; Hendersonville, June, 1907, FS; Hot Springs, Mrs. Slosson.

Cerotainia macrocera Say. Raleigh, July 25, 1906; June 25, July 10, 1907, CSB.

Dasyllis affinis Macq. Raleigh, mid-September to mid-December, rather common; also within the same season at Lumberton, Wadesboro, Gibson, Dundee, Pilot Mt. and Newton. Not as yet taken east of Raleigh.

Dasyllis champlaini Walton. Dillard-Highlands road, July 11, 1921, TBM; Swannanoa, mid-June, 1919, FS.

Dasyllis cinerea Back. Raleigh, late March to early May, not infrequent; Southern Pines, March, 1903, Manee.

Dasyllis divisor Banks. Black Mts., late May, 1910, FS; Linville Falls, late May to late June, 1920, FS; Andrews, mid-May, 1907, FS and CSB.

Dasyllis flavicollis Say. Same places and dates as preceding, and also Spruce, late May, 1913; June, 1911, FS.

Dasyllis grossa Fabr. Raleigh, mid-June, CSB; late June, 1921, TBM; June 14, 1921, CSB; Cedar Grove, June 13, 1901, FS; Highlands, July, 1907, FS; Dillard-Highlands road, July 11, 1921, TBM; Swannanoa, mid-June, 1919, FS.

Dasyllis posticata Say. Pendleton, June 7, 1895, CWJ.

Dasyllis sacrator Walker. Blowing Rock, June 27, 1901; July 24, 1904, FS; Black Mts., late May, 1910, FS; Swannanoa, mid-June, 1919, FS; Spruce, June, 1911, FS.

Dasyllis thoracica Fabr. Black Mts., late May, 1910, FS; Southern Pines, specimen received from A. H. Manee, by CSB.

Dasyllis virginica Bks. Raleigh, mid-May, 1915, CSB; April, CSB.

Lampria bicolor Wied. Raleigh, October 1, 1900, FS; June 16, 1921, CSB; Pendleton, June 7, 1895, CWJ.

Lampria rubriventris Macq. Wilmington, October 15, 1919, M. Kislink.

Laphria aktis McAtee. Craggy Mts., June 8, 1916, two, RWL.

Laphria index McAtee. Linville Falls, mid-June, 1920, one male, FS.

Laphria saffrana Fabr. Wilmington, April 24, 1920, one, RWL; Southern Pines, May, not common, AHM; Tryon, W. F. Fiske (McAtee, Ohio Jour. Sci., vol. 19, 169).

LAPHRIA SERICEA Say. Blantyre, May, 1907, FS; Spruce, late May, 1913, CSB; Black Mts., McAtee, *l. c.*, 157; Linville Falls, late May to late June, 1920, FS; Blowing Rock, July 22, 1904, GMB.

LAPHRIA SICULA McAtee. Raleigh, May 30, 1921, CSB; mid-June, 1914, CLM; July 5, 1904; July 12, 1921; July 14, 1908, CSB; Waynesville, July, 1901, FS; Linville Falls, late June, 1920, FS.

POGONOSOMA MELANOPTERA Wied. Pendleton, June 7, 1895, CWJ.

IV. SUBFAM. ASILINAE.

ASILUS ANGUSTIPENNIS Hine. Highlands, September, 1906, RSW.

ASILUS ANTIMACHUS Walker. Southern Pines, early April, 1913, AHM.

ASILUS AURICOMUS Hine. Raleigh, mid-October, 1904, SMB.

ASILUS AUTUMNALIS Bks. Swannanoa, mid-June, 1919, FS.

ASILUS FLAVOFEMORATUS Hine. "North Carolina," Hine, Ann. Ent. Soc. Am., 1909, 153.

ASILUS FUSCATUS Hine. Raleigh, June 14, 1921, CSB; Pendleton, June 7, 1895, CWJ; Murfreesboro, June 8, 1895, CWJ; Swannanoa, mid-July, 1919, above 3000 ft., RWL.

ASILUS GRACILIS Wied. Raleigh, late June, 1917, CSB.

ASILUS LECYTHUS Walker. Raleigh, May 18, 28, 1921, CSB; mid-May, 1921, TBM; Swannanoa, mid-July, 1919, RWL.

ASILUS MANEEI Hine. Southern Pines, May 15, 1908, A. H. Manee; Statesville, mid-July, 1919, FS.

ASILUS NOTATUS Wied. Andrews, mid-May, 1908, FS; Highlands, September, 1906, RSW; Craggy Mts., June 8, 1916, RWL; Blowing Rock, July 20, 1904, FS.

ASILUS NOVAE-SCOTIAE Macq. Raleigh, early July, FS; Blowing Rock, August 29, 1902, FS; Hot Springs, Mrs. Slosson.

ASILUS ORPHNE Walker. Cranberry, Linville Falls, Black Mts., Craggy Mts. and Spruce, late May to late June.

ASILUS SADYTES Walker. Raleigh, mid-June, 1906, RSW; July 8, 1902, FS; Cary, September 19, 1900; also at Wilkesboro, Blowing Rock, Blantyre and Highlands in August and September.

ASILUS SERICEUS Say. Raleigh, early June, one CSB; also at Elkin, Blowing Rock, Cranberry, Swannanoa and Hot Springs in June.

ASILUS SNOWI Hine. Raleigh, May 18, 1909, CSB; July 3, 1902, GMB; August 18, 1902, COH.

ERAX AESTUANS L. (BASTARDI Macq.). Whole state, late May to early October, common.

ERAX APICALIS Wied. Southern Pines, AHM.

ERAX BARBATUS Fabr. Whole state, mid-May to early October, common.

ERAX INTERRUPTUS Macq. Whole state east of the mountains, June to September, common. I bred the species from its larva in summer of 1921.

Erax rufibarbis Macq. (aestuans Wied.). Whole state, mid-August to early November, common.

Mallophora bomboides Wied. Southern Pines, August, September, AHM; Aberdeen, early October, 1921, TBM.

Mallophora clausicella Macq. Raleigh, early July to late September, common, bites sharply if handled incautiously; McCullers, LaGrange, Overhills, Southern Pines and Greensboro, within the same dates.

Mallophora guildiana Will. "North Carolina," Williston, Trans. Am. Ent. Soc. XII, 60.

Mallophora ercina Wied. Raleigh, late July to mid-August, 6 specimens, CSB; Beaufort, August 9, 1902, FS; Statesville, mid-July, 1919, FS; mid-September, 1917, JEE.

Mallophora laphroides Wied. Southern Pines, August 15, 1902, FS; August 6, 1921, TBM; Wilmington, August 1, 1921, TBM; Fayetteville, July 30, 1919, JEE.

Ommatius marginellus Fabr. Raleigh, August 15, 1904; June 19, 1906, CSB; Beaufort, June 15, 24, FS; Lake Ellis, June 23, 1905, CSB; Whiteville, July, 1906, RSW; Highlands, September, 1906, RSW; Swannanoa, July 10, 1913, CLM; mid-June, 1919, FS.

Proctacanthus brevipennis Wied. Eastern part of state, west to Raleigh and Southern Pines, mid-April to early July, not uncommon.

Proctacanthus heros Wied. Southern Pines, August, Manee.

Proctacanthus longus Wied. Castle Hayne, July 30, 1921, one, TBM. Wilmington, 1919, M. Kislink.

Proctacanthus milberti Macq. A specimen each from Raleigh (mid-October, 1904, GMB) and Southern Pines (early July, 1906, RSW) doubtfully identified by Prof. J. S. Hine as this. Neither specimen is in good condition.

Proctacanthus philadelphicus Macq. Beaufort, early July, 1909; Kingsboro, early October, 1919, MRS; Lucama, September 29, 1920, TBM; Moncure, October 6, 1921, TBM; Greensboro, August 31, 1903, SWF; August, 1902, FS; Andrews, August, 1904, RWC.

Proctacanthus rufiventris Macq. "North Car.," Hine, Ann. Ent. Soc. Am., 1911, 158.

Proctacanthus rufus Will. Raleigh, July 10, 1902, two, FS; late June, 1921, one, TBM; Nagshead, late August, 1919, FS.

Promachus bastardi Macq. Raleigh, mid-June to mid-July, several, FS and CSB; Durham, July, 1903, SWF.

Promachus rufipes Fabr. Raleigh, and Overhills, Laurinburg, Liberty, Greensboro, Barber and Wilkesboro, early July to mid-October. Common.

The greater number of the preceding species have been identified by Prof. J. S. Hine, of Ohio State University, to whom we express our sincerest thanks. Others have been named by Prof. O. A. Johannsen and the late Mr. D. W. Coquillett, and a few by myself.

The Tracheation of the Wings of Early Larval Instars of Odonata Anisoptera, with Special Reference to the Development of the Radius.

By RUDOLF G. SCHMIEDER, M.A., University of Pennsylvania, Philadelphia.

(Continued from page 262)

In the wings of *Gomphus*, stages of tracheal development were found which corresponded to those found in *Anax*. The observations and remarks made concerning the wings of *Anax*, as regards their size at the various stages of tracheal development, the variability in the number of tracheae and tracheal branches, and the condition of the tracheae, whether simple or fascicled, apply also in a large measure to the wings of *Gomphus*, as is shown in figs. 9-14. (Figs. 9-13 are of *G. villosipes*, fig. 14 is of *G. exilis*.)

In addition it should be noted that, especially in the earliest stages, the wings of *Gomphus* show even greater variations than have been described for *Anax*. Fig. 9 is a wing 0.12 mm. in length from a larva 8 mm. long. It has only five tracheae, the anal being entirely absent. The radius is branched from its point of origin, the posterior branch is bent at right angles and its distal portion passes caudad and crosses over the four anterior branches of the media. It is often found that in early stages tracheae may be very elongated so that their distal portions pass either cephalad or caudad along the edge of the wing, and this fact, together with the observation that the courses of the tracheae are at this time indefinite and largely a matter of chance, indicates that the condition of the posterior branch of *R* in this wing has no relation to the crossing of a radial branch over *M1* and *M2*, which is found in later instars.

In fig. 10, a wing 0.15 mm. long from a 7 mm. larva, conditions are very different from the preceding, there being no less than eleven distinct tracheae originating from the transverse basal trunk. In this wing *R* is unbranched, and *M* has but two branches.

Figs. 11 and 12 are of the front and hind wings respectively of a 10 mm. larva. These wings are 0.23 mm. in length and again show noteworthy variations.

Figs. 9-12 then, represent the ontogenetic stages in *Gomphus* corresponding to the stages in *Anax* of figs. 1-3. The succeeding stage is shown in figs. 13 and 14,—wings which are 0.4 and 0.45 mm. long, and corresponds to that of figs. 4-7 of *Anax*. The differences in the sub-costa of figs. 13 and 14 are interesting, as is also the presence of an additional trachea between *R* and *M* in figs. 11 and 14, since such was never observed in *Anax*.

Can we derive from the foregoing observations any clew as to the identity of the vein *Rs*; can we now determine whether the trachea crossing *M1* and *M2* really represents *Rs* and that we should therefore call the vein which forms along its course and in the adult lies posterior to *M2* the radial sector?

Needham has shown that in many insects the veins of the adult may be formed independently of the tracheae and that a vein is not always supplied by its corresponding trachea. Indeed in the wings we are now considering, we see that the costa receives its tracheal supply in great part from the subcosta and radius. There is, therefore, no *a priori* reason for assuming that the trachea called *Rs* may not, although it is a branch of *R*, be supplying a vein which is a true branch of the media, especially since Tillyard has shown that in *Uropetala* the vein *Rs* is supplied by a branch of *M* as well as by a branch of *R*.

Referring again to our figures we note that the radius in the very earliest instars (figs. 2, 3, 9, 11, 12) usually shows two branches and that in the next instar it most often has two groups of branches (figs. 4, 5, 13, 14) representing the same two branches; and in addition to these a fine tracheal branch which passes backward and crosses over the two anterior branches of the media. The differences between *R* in figs. 4 and 5 and the same trachea in figs. 6 and 7 are easily explained by referring back to the conditions found in the preceding instar. All of the principal tracheae in this first stage are simple, they are not composed of fascicles of fine branches as in the two later instars. In passing from this instar to the next, the two branches of *R* seen in figs. 2 and 3 develop branches equaling themselves in caliber and pursuing a course more or less parallel to the tracheae from which they have originated, thus producing the conditions shown in figs. 4 and 5. In fig. 4 the anterior of these two branches is now composed of three fine tracheae, the posterior branch is still a single trachea; in fig. 5 the anterior branch is three-branched, the posterior two-branched. In addition there is another fine branch, the trachea *Rs* of Needham. This trachea is always but a single fine strand in this instar and crosses over *M1* and *M2*. It can be interpreted only as a new outgrowth of the radius, appearing for the first time in this instar, and not as the original posterior branch of this trachea which has shifted its position. In fig. 1 the radius has no branches; a larva in which such a condition obtains would in the succeeding instar show a condition such as is represented in figs. 6 and 7. The distal end of the vein has produced a branch so that it is now double at the end, in the same manner as the two branches of *R* in figs. 2 and 3 have given rise to the two anterior groups of branches seen in fig. 5. In addition, *R*, in figs. 6 and 7, shows a caudal branch *Rs* which again is a new outgrowth, appearing for the first time in this instar, just as the small branches which have appeared on the anterior side of both *Sc* and *R* are new outgrowths. With respect to *M*, a similar observation might be made on the phenomenon of tracheal branching and on the presence of fascicles of tracheae where only single tracheae existed in the preceding instar. In fig. 8 is shown the instar following upon that which is represented in figs. 4-7. The fascicled condition is more evident than in the preceding instar and it is noted that *Rs*, which was heretofore always simple, has now also produced branches and is composed of a group or fascicle of three tracheae.

In the wings of *Gomphus* the same conditions obtain. The usual two-branched condition of the radius of the earliest stage is seen in figs. 9, 11, 12; and in figs. 13, 14, the next stage, in which the two radial branches have been replaced by two fascicled branches and in which there is an additional fine branch crossing over *M1* and *M2*.

It is evident then, that when a trachea or tracheal branch appears it is at first a single strand and not until the following instar does it acquire a fascicled condition as the result of the formation of parallel branches. Therefore, I believe that the branch *Rs*, which appears in the instar shown in figs. 4-7 of *Anax*, and in figs. 13 and 14 of *Gomphus*, is a new tracheal outgrowth appearing first in this instar and that it is not the posterior branch of the two-branched radius of the preceding instar (figs. 2, 3, 9, 11, 12). This posterior branch of *R* (called *Rs* by Needham) really develops into *R*1, while the original *R*1 of this first stage does not develop into any principal trachea, but the small branches of which it is composed pass forward into the region of the costal vein.

I believe the evidence I have given is sufficient to demonstrate that if the trachea which Needham refers to as *Rs* in his fig. 1, A, is the true *Rs*, then in the grown larva the trachea *R*1 is really *Rs*, and the *R*1 of Needham's figure is represented in later stages only by the fine tracheae which pass forward and supply the costa, or possibly it has become combined with *Rs* and the fine tracheae going to the costal vein represent branches of *R*1.

I have also shown that the tracheal branch of *R* which crosses *M*1 and *M*2 is not the original posterior branch of this vein which is seen in the first stage and which, according to Needham, has undergone a shifting in position, but rather that it is a new outgrowth of the radius and that in the instar in which it first appears it is already in the position which it occupies in the full grown larva. This trachea therefore, cannot be considered as representing *Rs* in the sense that it has developed by a shifting of the posterior branch of *R* which is observed in the earliest stage and which Needham has said must be *Rs*.

This study of the tracheation of the wings of two Anisopterous larvae has thus yielded not the slightest evidence that the trachea *Rs* of the earliest instar has undergone a shifting in position and has come to lie posterior to *M*2; but rather it has shown that this trachea retains its original position and forms, at least in part, the *R*1 of the grown larva. It has revealed that the tracheal branch of *R* which supplies a part of the course of the imaginal vein *Rs*, appears as a secondary outgrowth whose purpose is to function as a part of the tracheal supply of a vein which for some reason has failed to receive a tracheal supply from the one of which it is properly a branch, the media. Unless we interpret *Rs* as a supplementary vein not homologous to any primitive one, we must accept the theory of Tillyard and consider it as a true branch of the media. As to the fate of the original *Rs*, the ontogenetic stages in the larva seem to indicate that, at least the tracheae corresponding to this vein, remain along the course of *R*1, and that possibly the vein *Rs* has combined with *R*1 or has taken its place. This is the conclusion we should arrive at if we trusted in the ontogenetic stages to obtain a true account of phylogeny. However, I believe that our faith in such evidence should not be too implicit and that conclusions derived therefrom should not be accepted unless supported by other evidence which may develop out of a paleontological study.

Bibliography.

COMSTOCK, J. H., and NEEDHAM, J. G., 1898,—The Wings of Insects. Amer. Nat., XXXII and XXXIII, 1898 and 1899; Art. Odonata, XXXII, pp. 903-911, 9 figs.

NEEDHAM, J. G., 1903,—A Genealogic Study of Dragon-Fly Wing Venation. Proc. U. S. Nat. Mus., XXVI, pp. 703-764, Plates xxi-liv. (No. 1331). Wash., U. S. A., 1903.

TILLYARD, R. J., 1922,—New Researches upon the Problem of Wing-Venation of Odonata. I.—A Study of the Tracheation of the Larval Wings in the Genus Uropetala from New Zealand. Ent. News, XXXIII, pp. 1-7, 45-51, Plate I.

Explanation of Plate XI.

Figs. 9-13, Wing rudiments from larvae of *Gomphus villosipes*.

Fig. 9, Length of larva 8 mm., length of wing 0.12 mm.

Fig. 10, Length of larva 7 mm., length of wing 0.15 mm.

Figs. 11-12, Length of larva, 10 mm., length of wings 0.23 mm.

Fig. 13, Length of larva 12 mm., length of wing 0.4 mm.

Fig. 14, Wing rudiment from larva of *Gomphus exilis;* length of larva 10 mm., length of wing 0.45 mm.

A New Typocerus (Coleop., Cerambycidae).

By A. B. Champlain and J. N. Knull, Bureau of Plant Industry, Harrisburg, Pennsylvania.

Through the kindness of Prof. J. S. Hine and Prof. J. G. Sanders, the authors were allowed to work over some undetermined Cerambycidae in the collection of the Ohio State University. An apparently new species of *Typocerus* was found. After carefully going over the literature, the species was found to be undescribed. Specimens were sent to Prof. H. C. Fall and Chas. Liebeck for examination.

Typocerus trimaculatus n. sp.

Size and form of *Typocerus velutinus* Oliv.

Head black, front finely punctate, covered with golden pubescence, which is more dense on the vertex. Prothorax black, convex, apex constricted, base impressed, finely and densely punctate, covered with golden pubescence which becomes more dense at base and apex. Scutellum triangular, densely clothed with golden pubescence. Elytra gradually attenuate to apex, which is obliquely truncate and bispinose, surface densely punctate and pubescent, bright yellow, with base, suture and tip varying in color from brunneous to piceous, and three transverse piceous bands running from suture to lateral margin. Ventral surface finely and densely punctate, clothed with golden pubescence. Legs yellow. Length 15 mm.

♂.—Antennae black; when laid over the dorsal surface, extending four-fifths the length of the elytra, joints six to eleven provided each with two large poriferous areas, the eleventh joint appendiculate and containing four such areas.

♀.—Antennae black; when laid over the dorsal surface, extending beyond the middle of the elytra, joints six to eleven provided each with two smaller poriferous areas, the eleventh joint appendiculate and containing four such areas.

Superficially this species resembles *Typocerus zebratus* Fab., but it is easily distinguished from this species by the larger size and finer punctuation of the prothorax. According to Leng's Key* it runs to *T. velutinus* Oliv. The bright yellow color of the elytra, together with the black cross bands, will at once separate the two species.

Type, a male collected at New Roads, Louisiana, on July 14, in Authors' collection. Paratypes as follows:—Gainesville, Florida, collected on May 14, by C. J. Drake, in Ohio State University collection; New Roads, La., collected on July 14, in the collection of the Pennsylvania Bureau of Plant Industry; Winnfield, Louisiana, collected on May 12, by H. C. Fall, in the collection of Prof. H. C. Fall, to whom we are indebted for the loan of the specimen.

*Entomologica Americana V. 6, p. 150—1890.

The Life History of Lerodea eufala Edwards. (Lepidoptera, Hesperiidae.)

By Karl R. Coolidge, Hollywood, California.

Lerodea eufala, a rather common butterfly of the southern states, extending its range thence through Mexico into Central America and the Antilles, seems to have only recently invaded California, entering by way of the Imperial Valley. No published records exist of its inhabitation in California. The late W. G. Wright, in his *Butterflies of the West Coast,* misidentifies the species, figuring it on plate 31, b and c, as *Pamphila nereus*, and stating that: "It is common enough at Yuma, but does not come further west." Dr. Lindsey, in his recent revision of the Hesperioidea, gives the range of *eufala* as "Florida, Texas, Arizona" and its seasons as "April to July, October and November."

In recent years several specimens have been taken about San Diego, and in the Coachella Valley, which is virtually an extension of the Imperial Valley, and which marks the western limits of the Colorado Desert, it seems to have gained a firm stronghold.

It occurs only scantily about Palm Springs, but at Indio, some twenty miles to the south and in a much warmer district, it is rapidly becoming a common butterfly. Here it is certainly triple-brooded, and may even have four or five broods. The first hot weather in late March or early April brings it on the wing, but not in any considerable numbers. Towards the first week in June it appears again and by the middle of the month is fairly abundant. But the largest numbers are to be found about the middle of October, continuing well into November. Very probably there is a brood emerging some time in August, but as this is a scorching month on the desert no records of its appearance then have been noted.

On October 21, 1920, I found *eufala* abundant at Indian Wells, a small settlement near Indio, and confined some females in a mason jar with some ordinary lawn grass. These proceeded to lay almost at once when exposed to the hot sun, and by October 23 a total of twenty-eight eggs had been laid. On October 30 these began to disclose, making the egg period nine days.

Brought to Los Angeles, most of the larvae ceased feeding and in a few days were dead, apparently unable to adapt themselves to a seacoast climate so much in contrast with the dryness of the desert. In fact, I have had this same difficulty with all the eggs and larvae I have brought in from the desert. Larvae of *Pholisora libya* Scudder, though supplied with absolutely fresh sprigs of their food-plant, could not be induced to touch them. Likewise, larvae of *Melitaea chara* Edwards refused their *Beleperone* and soon passed away. And this season not a single one of over fifty eggs of *Atlides halesus* Hübner has hatched, although I can see that the embryos have apparently fully developed. But half grown larvae do not seem to mind the change in the least, and readily go on with their transformations.

So but two of my *eufala* larvae survived their visit to Los Angeles, and the record of their transitions is as follows:

Eggs laid	October 23rd, 1920
Eggs hatched	October 30th, 1920
Larvae passed first moult	November 15th, 1920
Larvae passed second moult	December 28th, 1920
Larvae passed third moult	February 2nd, 1921
Larvae passed fourth moult	March 11th, 1921
Pupated	April 1st, 1921
Imagos emerged	April 24th, 1921

This makes a total of 184 days from egg to imago, but very probably on the desert, under natural conditions, the larvae mature much more quickly and pass the winter in a pupal state.

There is nothing of unusual interest to record in the behavior of the young larvae. They form the usual type of vertical nest by drawing together the edges of a blade of grass with ten or a dozen loose strands of silk. In later stages the nest is more perfectly closed, a cylinder being formed in which the larva remains hidden from view and apparently feeding entirely by night. They were extremely sluggish, remaining at times motionless for days at a stretch.

Egg.—Hemispherical, the base sharply flattened, 1.04 mm. in diameter. From base sloping at first very gradually, then from upper two-thirds rather rapidly, to the narrow, rounded summit, where the diameter is but .30 mm. The micropyle is in a shallow weak pit and difficult to detect. The surface of egg rather evenly broken by a delicate tracery of scarcely perceptible raised polygonal cells, which average .04 mm. in diameter. Color a very delicate pale green, glistening. Height .72 mm.

The young larvae, upon emerging from the eggs, at once attacked the empty shells and in nearly every instance devoured them to the bases.

Larva.—First Instar.—Head subtriangular, rounded, higher and broader than any part of the body, and with the median suture only faintly impressed. Head .56 mm. in diameter, black, shining, delicately rugose and clothed with only a few short straight sharp but weak colorless hairs, at scattered intervals, but most numerous about the frontal triangle. These hairs .08 mm. in length.

Body slender, quite uniform, tapering only slightly posteriorly. In color the body is a pale lemon yellow, with a very delicate whitish sheen.

Series of minute, bristle-bearing papillae arranged on the body as follows: A subdorsal series, located on the anterior portion of the segment, one on each side to a row and rather sharply inclined outwards. A laterodorsal row, centrally located. A suprastigmatal row, placed slightly anterior to middle of segment. An infrastigmatal row, situated just posterior to middle of segment. On the thoracic segments the subdorsals become supralaterals and are there centrally located. These papillae are black, .01 mm. in height, and of the same diameter at base. The arising hairs are black, .04 mm. in height, very slightly enlarged and flattened apically, where the diameter is .01 mm.; the tips pellucid.

Each segment with six, fine, transverse creases, of which the foremost one is the most conspicuous. The transverse dorsal shield of first thoracic segment shining black, narrow, extending laterally to just above the spiracles, .03 mm. in width, but thickened subdorsally. A few fine black hairs on the shield. Anal segment with four, subdorsal, pale yellowish papillae from which project long, colorless, spiculiferous hairs posteriorly, these being .40 mm. in length; also a few shorter, colorless, wavy hairs bordering the anal segment, some as long as .20 mm., others but .08 mm.

Pseudostigmatic blisters laterally on second and third thoracic segments geminate, pale testaceous. Spiracles round, .02 mm. in diameter, with a prominent brownish orange ring. On the eighth abdominal segment the spiracles are enlarged, .04 mm. in diameter, elevated, and higher above the line than the others. A fine, even, dark green dorsal line, .02 mm. in length.

Prolegs and ventral surface pale greenish yellow. Legs very pale yellow brown, shining.

Length 2.56 mm. Height at first thoracic segment .44 mm. Width at anal segment .38 mm.

As the larva feeds the ground color of the body becomes more and more a pale grass green, and white substigmatal and suprastigmatal bands appear, but are not well defined nor prominent in this stage.

Second Instar.—Head .90 mm. in diameter, pale orange brown, mottled with sordid white: the brown quite regularly defined, especially in a median stripe that divides and sends two branching streaks over the front face, and a conspicuous oblique band. Hairs of head weak, sharp, colorless, scattered, .08 mm. in length on the average.

Body profusely sprinkled with minute black papillae, each giving rise to a short, sharp, black hair, .05 mm. in length. The dorsal line even, fine, dark green. Collar as before, piceous black. Anal segment with a rather thick fringe of sharp, wavy, colorless hairs, spiculiferous, some as long as .30 mm. Spiracles round, .03 mm. in diameter, with a fine orange brown annulation.

Body in color pale grass green, with a white sheen especially noticeable on either side of the dorsal line. Prolegs and ventral surface pale green. Legs pale yellow brown. The suprastigmatal and substigmatal white bands still indistinct.

Length 7 mm. Width at first thoracic segment .80 mm. Width at anal segment .72 mm.

Third Instar.—Head 1.16 mm. in diameter, sordid white, with pale orange brown blotchings as in previous stage; along the median suture this blotching is deep brown, almost black. Hairs of head as before, now averaging .12 mm. in length.

Body adorned as before with minute papillae, now .02 mm. in height and with the arising hairs .08 mm. in length on the average. Collar, as before, piceous black. Hairs fringing anal segment as long as .40 mm. Spiracles .04 mm. in diameter, with a distinct orange brown ring; on eighth abdominal segment the spiracles are .08 mm. in diameter. Dorsal line prominent, dark green, .20 mm. in width.

Body in color pale grass green; on either side of the dorsal line the ground color is more or less broken up by whitish blotchings. Prolegs and ventral surface pale grass green; legs pale orange brown, shining, fuscous at tips. The white suprastigmatal band now rather prominent; the white substigmatal stripe much less so.

Length 12 mm. Width at first thoracic 1.06 mm. Width at anal segment 1 mm.

Fourth Instar.—Head 1.60 mm. in diameter, sordid white, marked as before with orange brown stripes, blackish brown along the median suture. Hairs of head as before, some as long as .24 mm., others but .08 mm.

Numerous, black body papillae as before, now .03 mm. in height and of the same diameter at base, with the arising hairs .10 mm. in length, straight, sharp, colorless. Hairs fringing anal segment as long as .56 mm. Spiracles .05 mm. in diameter, round, with a prominent orange brown ring. Dorsal line dark green, prominent, .30 mm. in width.

Body in color a vivid grass green. Prolegs and ventral surface pale grass green. Legs pale orange brown, shining, darker at tips. The suprastigmatal band now yellow white, not very prominent; below it a second, finer, concolorous band, not very distinct. The substigmatal band white, even, but not at all prominent. The space between the upper band and the dorsal line subject to yellowish white blotchings, especially immediately next to the dorsal line.

Length 17 mm. Width at first thoracic 1.38 mm. Width at anal segment 1.20 mm.

Fifth Instar.—Head 2.08 mm. in diameter, sordid white, and as before marked with orange brown stripes. Sides of head pale gray yellow. Interior to these sides a dark orange brown area broken with a wavy stripe of yellow and with irregularly placed yellow blotchings. The line of the median suture black, spreading out to include the frontal triangle, now a pale gray green. Hairs of head as before, some as long now as .36 mm.

The black body papillae as before, .04 mm. in height and of the same diameter at base, with the arising hairs straight, sharp, colorless or faintly brown tinged, of varying lengths, some .12 mm. long, others but .05 mm. Hairs fringing anal segment as long as .62 mm. Spiracles pallid, .12 mm. in diameter, with fine brown rings. Dorsal line even, dark green, and bordered with an obscure blotching of rather bright yellow. The segmental creases of each segment fine, bright yellow.

Body in color vivid grass green. Prolegs and ventral surface pale grass green. Ventral surface with some short, sharp, colorless, spiculiferous hairs, perhaps .16 mm. in length on the average. Legs pale orange brown, shining, darker at tips. The two suprastigmatal bands as in previous stage, pale yellow, not very prominent nor sharply defined. The substigmatal band white, even, but not conspicuous.

Length 21 mm. Width at first thoracic 1.90 mm. Width at anal segment 1.68 mm.

Chrysalis.—Slender and cylindrical, of almost uniform width until tapering rapidly at the last three abdominal segments. Head with sides straight, slightly narrower than the thorax. Ocellar swellings rather prominent. Head in middle protuberant, the projection extending to a distance of 2 mm. and ending in a rounded knob.

On the abdominal segments a prominent dark green dorsal line, .5 mm. in width, marked on either side with a crenate yellowish white edging. This dorsal line narrowing posteriorly and fading out on the last two abdominal segments. A subdorsal, yellow white band, fairly prominent, beginning on abdominal segment one, parallel with the dorsal line, but converging laterally, and then sweeping back dorsally so as to join the dorsal line at next to the last abdominal segment, where both bands disappear. Tongue case freely extending beyond tips of wings to a distance of 3.4 mm., truncated at end, where the width is .16 mm. In color the free portion of the tongue is a sordid green, with a prominent golden brown edging.

Color a delicate green, slightly deeper in tone on the abdomen dorsally. Head protuberance and cremaster opaque. A few fuscous hairs, clavate and sharply bent, on edges of head case; these are exceedingly minute, but .02 mm. in height, and very infrequent. Spiracles elongate, .14 mm. in length, with a distinct brown edging. Hooklets of cremaster opaque, .26 mm. in length, abruptly crooked apically into a clubbed head, .02 mm. in width and reddish brown tinged.

Length 20.5 mm. Width of head 3 mm. Width of thorax 3.75 mm. Suspended weakly by a small button of silk anally, and with a strong but loose thoracic girdle.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Old Time Economic Entomology on Staten Island, New York.

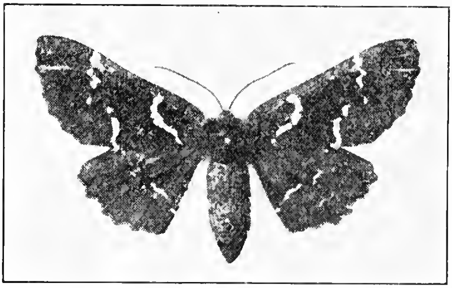
In an old book of records of the town of Northfield, Staten Island, labeled "Town Records, 1783 to 1823," an agriculturist of the period recorded at least two ways of combatting insect pests. It was thoughtful of him to put his information in such a safe place, for of course the book of town records was to be preserved, and our regret is that he failed to fill up all of the blank pages with observations on the natural history of Staten Island when he was trying out his experiments with soft cow dung, water and "Eder sprouts."

The recipes are as follows: "1. Tanse boiled and Cabich or other Plants Weterd with the Decoction prevents flys &c, Eating them.

"2. Soft Cow Dung put in Water and Eder [Elder?] Sprouts bruised and Steepd in the Water put over any plant prevents any insects injuring them."—Wm. T. Davis, New Brighton, S. I., N. Y.

The Moth Nacophora quernaria variety atrescens (Lep.: Geometridae).

The black and white variety of *Nacophora quernaria* described by Hulst in the Canadian Entomologist for June, 1898, under the name of *atrescens*, appears to be very rare in collections. It is not represented in the extensive collections of the American Museum of Natural History, the Museum of the Brooklyn Institute of Arts and Sciences or in the Academy of Natural Sciences of Philadelphia. The type came from "London, Ontario, Canada; from Mr. Moffat."



Nacophora quernaria var. *atrescens* Hulst.

In the summer of 1921 the senior author found a large Geometrid caterpillar on wild cherry at Upper Montclair, New Jersey, and on April 23, 1922, the female moth, reproduced in the accompanying figure, appeared. It is one of the most beautiful of Geometrid moths, and, as far as known, the first record of the insect from this part of North America.—Ernest Shoemaker and Wm. T. Davis.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., DECEMBER, 1922.

"He Helped Me When No Others Volunteered."

The cover of the NEWS for this year, 1922, has borne a small portrait of Charles Alfred Blake, an early member of the American Entomological Society and a contributor to the literature on American Lepidoptera and Hymenoptera. After his death on June 24, 1903, an obituary notice of him appeared in this journal for September, 1903, accompanied by a larger and later photograph. That notice contains this interesting recollection by Mr. E. T. Cresson:

> I remember the many nights Mr. Blake toiled with me in the publication of the Proceedings and Transactions, and he was ever ready and willing to help me when no others volunteered; we worked together side by side at the case, and while I rolled on the ink, he pulled the press—being the stronger. He was a cheerful companion, and his good humor rendered the work easier and the time passed more pleasantly. The Society is greatly indebted to him for his endeavors in its behalf.

Those endeavors are referred to by the late Dr. Henry C. McCook in the Introduction to the History of the same Society, published in 1909. Speaking of the founders, he wrote:

> these pioneers, discerning clearly the importance of the work to which they had set themselves, and the need of an organ of communication with entomologists elsewhere, began almost immediately the publication of a journal of their proceedings. The lack of income and of state aid and patronage did not deter them. Indeed it did not even occur to them to appeal to city, state or nation for help. They purchased fonts of type and a hand press and set up and printed off, by their own labor out of business hours, as well as wrote and edited their discoveries, descriptions and reflections thereon.

It is well to recall these voluntary, unpaid labors of our predecessors, for the need of similar, unselfish aid is as great today as it was in the eighteen hundred and sixties—nay, greater. "When no others volunteered." Then, as now, it was the few who did. The many looked on.

The University of Michigan-Williamson Expedition to Brazil.

Mr. Jesse H. Williamson went by the steamship Bahia from Pará on August 18, 1922, to Rio de Janeiro, arriving August 28, and having landed en route for a few hours respectively at Maranhão, Ceara, Recife (Pernambuco) and Bahia. He collected in the vicinity of Rio from August 31 to September 27 on favorable days, as there was much cloudy weather when insects were not visible. He arrived at his home in Bluffton, Indiana, in the latter half of October.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are grouped at the end of their respective Orders.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

4—Canadian Entomologist, Guelph, Canada. **5**—Psyche, Cambridge, Mass. **6**—Journal of the New York Entomological Society. **7**—Annals of the Entomological Society of America, Columbus, Ohio. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **13**—Journal of Entomology and Zoology, Claremont, Cal. **30**—Tijdschrift voor Entomologie, The Hague, Holland. **33**—Annales de la Societe Entomologique de Belgique, Brussels. **37**—Proceedings of the Hawaiian Entomological Society. **49**—Entomologische Mitteilungen, Berlin-Dahlem. **54**—Proceedings of the Biological Society of Washington, D. C. **62**—Bulletin of the American Museum of Natural History, New York. **68**—Science, Garrison-on-the-Hudson, N. Y. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **74**—Proceedings of the Staten Island Institute of Arts and Sciences, New York. **76**—Nature, London. **85**—The Journal of Experimental Zoology, Philadelphia. **90**—The American Naturalist, Lancaster, Pa. **91**—The Scientific Monthly, Lancaster, Pa. **101**—Journal of The Linnean Society of London. **103**—Biologisches Centralblatt, Leipzig. **111**—Archiv fur Naturgeschichte, Berlin. **114**—Entomologische Rundschau, Stuttgart. **116**—Entomologische Zeitschrift, Frankfurt a. M. **138**—American Museum Novitates. **143**—Stettiner Entomologische Zeitung.

GENERAL. Gibbs, L.—Obituary notice. **4**, liv, 167-8. **Horn, W.**—Et meminisse et vaticinari liceat. Ueber erfahrungen mit papierschere und kleistertopf. **49**, xi, 130-1. **Jordan, D. S.**—The production of species. **68,** lvi, 448. **Sharp, D.**—Obituary notice. **9,** 1922, 217-21; **8,** 1922, 234-7; **76,** cx, 521-2. **Wade, J. S.**—The scarab: emblem of eternity. **4,** liv, 145-9. **Weiss, H. B.**—The fungous insect fauna of a mesophytic woods in N. Jersey. **54,** xxxv, 125-28. **Williams, C. B.**—Co-ordinated rhythm in insects; with a record of sound production in an aphid. **9,** 1922, 173-6.

ANATOMY, PHYSIOLOGY, ETC. **Baldi, E.**—Studi sulla fisiologia del sistema nervoso negli insetti. **85,** xxxvi, 211-88. **Clausen & Collins**—The inheritance of ski wings in Drosophila melanogaster. (Genetics, vii, 385-426.) **Garstang, W.**—The theory of recapitulation: a critical re-statement of the biogenetic law. **101,** xxxv, 81-102. **Hyde, R. R.**—An eyeless mutant in Drosophila hydei. (Genetics, vii, 319-34.) **Janet, C.**—Considerations sur l'etre vivant. L'individu, la sexualite, la parthenogenese et la mort, au point de vue orthobiontique. Beauvais, 1921. 196 pp. **Krausse, A.**—Myrmekologie und phylogenie. **111,** 1922, A, 9, 79-89. **Lancefield, D. E.**—Linkage relations of the sex-linked characters in Drosophila obscura. (Genetics, vii, 335-84.) **Pearl & Parker**—On the influence of certain environmental factors on duration of life in Drosophila. **90,** lvi, 385-405. **Timberlake, P. H.**—Observations on the phenomena of heredity in the ladybeetle, Coelophora inaequalis. **37,** v, 121-33. **Wolff, C.**—Uber konzentrische strukturen im eikern von coleopteren. (Arch. f. Zellforschung, Berlin, xvi, 443-62.)

ARACHNIDA AND MYRIOPODA. **Ewing, H. E.**—The phylogeny of the gall mites and a new classification of the suborder Prostigmata of the order Acarina. **7,** xv, 213-22. **Oudemans, A. C.**—Ueber die metamorphose der vogelbewohnenden Acaridiae. **30,** lxv, 184-91. **Pawlowsky, E. N.**—Zur mikroskopischen anatomie des blutgefassystems der skorpionen. (Act. Zool., Stockholm, 1922, 461-74.) **Thor, S.**—Ueber die phylogenie und systematik der Acarina mit beitragen zur ersten entwicklungsgeschichte einzelner gruppen. (Nyt Mag. f. Naturv., Kristiania, lx, 113-30.)

Chamberlin, R. V.—The No. American spiders of the family Gnaphosidae. **54,** xxxv, 145-72. **Chapin, E. A.**—On Simonella, a genus of Salticid spiders new to No. Am. **54,** xxxv, 129-32. **Marshall, R.**—New American water mites of the genus Neumania. (Tr. Wisc. Ac. S., A. & L., xx, 205-14.)

THE SMALLER ORDERS—**Branch, H. E.**—A contribution to the knowledge of the internal anatomy of Trichoptera. **7,** xv, 256-75. **Lacroix, J. L.**—Etudes sur les Chrysopides. (An. Soc. Linn. Lyon, 1921, 51-107.) **Longinos Navas, R. P.**—Insectos nuevos o poco conocidos. (Mem. R. Ac. Cien. y Artes, Barcelona, xvii, No. 15.) **Lucas, W. J.**—Colour preservation in dragonflies. **9,** 1922, 209. **Sulc, K.**—Prispevky ku poznani Psyll. 111. (Roz. Ceske Ak. Fr. Jos., Praze, xxiv, II, 5.) **Withycombe, C. L.**—The wing venation of the Coniopterygidae. **9,** 1922, 224-5.

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Ectoparasites. Edited by Dr. K. Jordan and the Hon. N. Charles Rothschild, M. A., Vol. I, pt. 4, pp. 199-286, text figures 195-280. Issued September 1, 1922. [Zoological Museum, Tring, Herts, England.]—This publication is issued at irregular intervals, the preceding three parts bearing the dates December 30, 1915; January 20, 1920, and January 15, 1921, and being devoted entirely to fleas. The present number contains articles on Polyctenidae (including one on *The American Polyctenidae* by Dr. Jordan), on Clinocoridae and Siphonaptera (with some new species of fleas from North, Central and South America). Of the Polyctenidae Dr. Jordan says: "The five American species which are known [3 of them new] are so much alike that not only must they be placed in one single genus *Hesperoctenes* Kirk. (1906), but cannot be distinguished from one another except by a close examination of the details in the vestiture and of the relative proportions of the sections of the body and appendages. *Hesperoctenes* is a primitive genus which has remained comparatively stationary, the species not having developed in very different directions . . . Considering the large number of species of bats which are known we may conclude that the ten Polyctenidae so far discovered represent but a small proportion of the species actually existing on these mammals in the tropical and subtropical countries."

There is a *Note on the Distribution of the Organ of Berlese in Clinocoridae*, also by Dr. Jordan. He finds that this organ (which appears externally as a deep triangular incision in the apical margin of the fourth abdominal sternite of females, placed asymmetrically on the right side, about midway between the centre and the lateral margin of the segment), is present in seven described species of *Clinocoris* (*Cimex* auct.), *Bertilia valdiviae* and two species of *Oeciacus*, the Swallow Bugs. In *Haematosiphon* and *Cacodmus* there is an analogous organ on the *upper* side of the fifth abdominal segment, central in *Haematosiphon* ("which is presumably the more primitive position"), asymmetrical toward the left side in *Cacodmus*. Berlese's organ has been supposed to be an organ of copulation, receiving the spermatozoa direct from the male and passing them on to the body cavity, whence they reach the oviduct and the ova. In the Clinocorid genus *Loxaspis* and the nearly related Polyctenidae no such organ is known.

Doings of Societies.

Entomological Section, The Academy of Natural Sciences of Philadelphia.

Meeting of January 26, 1922. Five persons present, Dr. Skinner presided.

COLEOPTERA.—A specimen of the sweet potato weevil, *Scylas formicarius*, from Hayti was presented by Mr. Kisliuk.

ORTHOPTERA.—Mr. Rehn made a few remarks on two Cuban species of the genus *Eurycotis*, and followed this by commenting upon the number and distribution of the West Indian species of the genus *Epilampra*, with particular reference to those of Hispaniola.

Meeting of March 23, 1922. Eleven persons present, Vice-director R. C. Williams presided. Messrs. John C. Hollinger, R. H. Hutchison and Arthur D. Whedon were elected members.

Mr. Rehn gave an interesting account of the collecting trip he made last summer with Mr. Hebard in the western United States.

DIPTERA.—Mr. Cresson exhibited a collection of named Diptera from the East Indies, which he said would make a valuable addition to the collection. It contained more than 100 species new to our series. Mr. Rehn moved that the Conservator approve the purchase by the Academy or the Section for the sum of $25.00. Carried.

Mr. Hornig mentioned the late appearance of mosquitoes this season. He noted for the first time the appearance of *Culex canadensis* the day before.

Meeting of May 26, 1922. Nine persons present, including Dr. J. M. Aldrich, U. S. National Museum, visitor. Director Philip Laurent in the chair.

DIPTERA.—Mr. Cresson reported the purchase by the Academy of the collection of Diptera to which attention of the Section was called at the last meeting.

Dr. Aldrich gave an interesting account of his trip to Alaska the preceding summer. He spoke of the present accessibility of the country, of the climatic conditions in the interior as so different from those of the coastal regions, which necessarily have much influence on the insect fauna. He spoke of the similarity of the flora and insect fauna with those of northern Minnesota and southern Canada. Regarding the Diptera, he said there was an abundance of species of the Drosophilidae and Anthomyiidae in the interior, but there was an apparent scarcity of the Muscoidea in general. He did not see any specimens of the house-fly until he returned to British Columbia. For the first time in all his years' collecting he captured both sexes of a species of the Lonchopteridae in numbers at the same time. He said both sexes of these flies are rarely captured at the same time.

Lepidoptera.—Mr. Williams exhibited some of the larger North American Hesperidae and drawings of their male genitalia, calling attention to several species superficially very close, but which showed remarkable differences in the characters of these organs.

Orthoptera.—Mr. Rehn made a communication upon the West Indian species of the blattid genus *Plecoptera*, illustrating his remarks with a series including all the species now known from those islands. The speaker discussed the taxonomic features of the species and their groups, particularly those of the genitalia.

Ezra T. Cresson, Jr., *Recorder.*

OBITUARY.

Two obituary notices of the late Dr. David Sharp lie before us—from *The Entomologist* for October, by W. J. Lucas, and from *The Entomologist's Monthly Magazine*, for the same month, by J. J. Walker. Each is accompanied by a (different) portrait. One refers to him as of the "very front rank of zoologists," the other as "one of the most distinguished Entomologists of our time." "Unquestionably," says one, "Dr. Sharp's *magnum opus* is the treatise on 'Insects' forming the greater part of two volumes [V, VI] of the 'Cambridge Natural History'," published in 1895 and 1899, "but it is safe to say that no work of equal value on general Entomology has been produced in this country since Westwood's 'Introduction to the Modern Classification of Insects' appeared more than half a century previously." When the present writer had to select a general work on insects as part of a necessarily small collection of books to accompany him during a year in Costa Rica, his choice fell upon this work of Sharp's. Although Dr. Sharp was a specialist in Coleoptera, his wide sympathies and experience made it possible for him to deal more equally with the various orders of insects than almost any other one man could have done, and the two volumes—if largely compilations from the nature of the task—contain much new material throughout.

Dr. Sharp's greatest service to zoologists, and hence to entomologists, was his recordership of the section on insects in the *Zoological Record* from 1885 and his editorship of the entire annual volumes from 1891. "This work he continued till the year of his death, even completing the reading of the final proofs of records for 1920 during his last illness."

Mr. Walker says: The magnitude of Dr. Sharp's entomological work during his long life may be estimated by the fact that no fewer than 257 entries stand under his name in the Royal Society's Catalogue of Scientific Papers and the Zoological Record to date, besides a multitude of minor articles in our own and other magazines.

His chief works on the Coleoptera are *A Revision of the British Species of Homalota* (1869), on the Staphylinidae of Japan (1874) and of the Amazon Valley (1876); on Coleoptera of New Zealand (1878, 1885) and of the Hawaiian Islands (1878-80, and in the *Fauna Hawaiiensis*, 1899, 1908); *On Aquatic Carnivorous Coleoptera or Dysticidae* (1880-82); on water-beetles, Staphylinidae, most of the Clavicornia, certain Rhynchophora, Brenthidae and Bruchidae in the *Biologia Centrali-Americana* (1885-1911), *Catalogue of the British Coleoptera* in conjunction with Canon W. W. Fowler (1893), Rhynchophora of Japan (1896), and *The Comparative Anatomy of the Male Genital Tract in Coleoptera* (with F. Muir—his son-in-law—1912).

He was born October 15, 1840, at Towcester, Northants, and died August 27, 1922, at Brockenhurst. From about his twelfth to his twenty-fourth year he lived in London with his father, a leather merchant, where—

Herbert Spencer was for some considerable time an inmate of his father's house and there can be no doubt that the keen and logical quality of Dr. Sharp's mind was in large measure due to his early association with the eminent philosopher, who gave him much encouragement and assistance in his first efforts in the study of Natural History, and of whom he was wont to speak with respect and affection to the end of his life. In 1904 [he] wrote an article in the Zoologist entitled *The Place of Herbert Spencer in Biology*, having particular reference to him in connection with the teachings of Charles Darwin.

Sharp studied medicine for two years in St. Bartholomew's Hospital, London, then at the University of Edinburgh, where he received the degree of M.B. in 1866. From 1867 to 1883 he practiced in Dumfriesshire; from 1890 to 1909 he was Curator of the University Museum, Cambridge. His own collection of beetles from all parts of the world was acquired for the British Museum, his entomological library by the Cawthron Institute, Nelson, New Zealand; his British beetles remain with his family.

He was President of the Entomological Society of London in 1887 and 1888, elected a Fellow of the Royal Society in 1890, an honorary M.A. of Cambridge, one of the fifteen honorary members of the Entomological Society of France, corresponding member of the American Entomological Society (1898), and of many other scientific associations.—P. P. CALVERT.

HAMILTON H. C. J. DRUCE, son of the Lepidopterist, Herbert Druce (1846-1913, see the NEWS, xxiv, page 432), died June 21, 1922, at the age of 54. He specialized on the Lycaenid and Hesperid butterflies, his most important publications being *Monograph of Bornean Lycaenidae* (1895, 1896) and *Neotropical Lycaenidae* (1907), both in the *Proceedings of the Zoological Society of London*, which contain also a number of his shorter papers.

His only separately published work was a small but very valuable volume* containing photographic reproductions of many of the type specimens of Lycaenidae in the Berlin Museum, but he was, until forced to give up on account of ill health, actively engaged in completing the volumes on Rhopalocera in the Fauna of British India Series. His collections are now in the Hill Museum, Witley, having been purchased by Mr. J. J. Joicey some three or four years ago. (Entom., Sept., 1922.)

EDWARD LOUIS GRAEF, the lepidopterist, of Brooklyn and Bay Shore, New York, died February 15, 1922, in his eightieth year. An obituary notice and portrait were published in the *Bulletin of the Brooklyn Entomological Society* for April (received August 17).

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*This is doubtless: *Illustrations of South African Lycaenidae; being photographic representations of the type specimens contained in the Imperial zoological museum at Berlin.* London, 1910, pp. 1-35, 8 pls., quoted in the *Zoological Record* for 1910, Insects, pp. 37, 321.—EDITOR.

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EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—Species of Homoptera, Hemiptera and Orthoptera not represented in my collection in exchange for duplicate material of these orders from South Dakota. List of duplicates on application. H. C. Severin, South Dakota State College, Brookings, South Dakota.

Buprestidae, Cleridae, and **Carabinae** wanted from U. S. or Buprestidae of the world. Will collect insects of any group (except Lepidoptera) in exchange or pay cash. Alan S. Nicolay, 416a Grand Ave., Brooklyn, New York.

For Exchange—A large number of live cocoons of Callosamia promethea, C. cynthia and P. cecropia for other pupae or Lepidoptera. D. C. Heim, Sunbury, Pa.

Wanted to Exchange—N. A. Coleoptera for same not in my collection. Carl Selinger, 4419 Dover St., Chicago, Ill.

Wanted for Cash or Exchange—Catocala eggs, also brilliant colored butterflies and moths for trays. Mrs. Robert Milde, Lewiston, Minn.

Syrphidae from all parts of North America wanted. Monographing the family.—C. H. Curran, Department of Entomology, University of Kansas, Lawrence, Kansas.

Will collect in all orders except Lepidoptera, in exchange for Cerambycidae (longicorn beetles) and Pentatomidae (stink-bugs). G. Chagnon, P. O. Box 521, Montreal, Canada.

I will collect Coleoptera and Lepidoptera in southwest Arkansas for those so interested.—Miss Louise Knobel, 417 West 2nd Avenue, Hope, Arkansas.

Correspondence solicited from anyone desiring general collections of insects, to be made in Costa Rica. Austin Smith, Apartado 412, San José, Costa Rica.

Wanted—For cash, during winter of 1922 and 1923, pupae of Saturniid moths. Please state species, quantity and price. P. Rau, 2819 S. Kingshighway, St. Louis.

Wanted—Am working on a Revision of the Buprestidae of the West Indies and would like to examine any material in this family from that region. W. S. Fisher, U. S. National Museum, Washington, D. C.

For Exchange—A large number of Papilio Turnus, P. Cresphontes and P. Ajax pupae, or the same specimens in papers, for other pupae or Lepidoptera. Carl Selinger, 4419 Dover St., Chicago, Ill.

Wanted—Dytiscidae not in my collection, in exchange for local specimens. Offer Coelambus sellatus, Oregonus, etc. F. S. Carr, 11050 123rd St., Edmonton, Alberta.

Coleoptera for exchange—Cicin. generosa, hirticollis, modesta, sexguttata, 12-punctata, Saperda populnea, Uro. fasciata, Donacia subtilis, palmata, texana-minor, biimpressa, refuscens. Ernest Bayles, 5011 Saul St., Philadelphia, Pa.