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The Canadian Entomologist.

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MEETING OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, 1892.

(Continued from page 265.)

Mr. Osborn followed with a paper upon

HONEY-BEE OR HOUSE-FLY.

BY HERBERT OSBORN.

Ever since entomologists have classified insects and attempted to assign a relative rank to different members of the class, the honey-bee has had the distinction of standing at the head of the list, has been the crowning point, the apex of an immense pyramid of inferior forms.

That so useful a member of the insect class should occupy this exalted position has seemed most appropriate, and that the reign of the honey-bee has had universal sanction is proven by the fact that it has so long held undisputed possession of the throne.

In recent times, however, ruthless hands are raised in treasonable attacks upon Queen Apis; and whom do they propose to crown instead? No less an arrant disturber than the ubiquitous, omnipresent, insolent fly. Down with Queen Apis!! Up with King Musca!! How does that sound?

All this is proposed by a young man, Prof. Aldrich, who makes flies his especial pets, and he backs himself up with such authority as Prof. Hyatt and Miss Arms, and is seconded by Prof. Townsend. The worst of it is that these revolutionists seem to have the logic of the situation. To be sure, it is suggested that the sheep-tick may, in the ultimate analysis of the scheme, be the enthroned insect, but we fear that all other claimants will be downed by the house-fly. What a travesty on beneficent evolution, to produce this pestiferous plague—the most unmanageable rascal afloat—as its most finished piece of insect handiwork. Can nothing be done to avert such a calamity? Have we no talented evolutionist who can discover some series of relationship to prove that Musca lacks

the royal blood to entitle him to the throne, or, if his lineage be too strong, had we not better establish a democracy of insects and, by the suffrages of tortured animal life, relegate this buzzing busybody to his proper sphere?

Seriously, however, I am led to inquire whether there is not strong reason why we should make an effort to avoid the expression of lineal rank in groups of animals. The most specialized are often degraded in many respects, and there is no basis for the expression of rank except their phylogeny, and the higher groups of insects are certainly not connected in any lineal series, but represent divergent, or in some cases, perhaps, nearly parallel branches from some common ancestral form or group of connected forms. To place any one group as the head of a lineal series is to give an expression that is not present in nature.

Lists of insects may have to be written in a lineal order, but can we not emphasize more strongly the point that this order is not an expression of natural relationship?

Mr. Smith thought that the line of argument adopted by Messrs. Aldrich and Townsend was inconclusive, and that the article referred to carried with it its own refutation. He thought Mr. Osborn was correct in that the orders should be placed parallel, but that groups or families were more highly developed in some orders than in others. Mere specialization is never a test of rank in itself, and any line of argument that places the Hippoboscidæ at the head of the insects as the highest in rank, is simply unworthy of attention, since it omits the intellectual or nervous development as a factor.

The Secretary read the following paper:—

THE LIFE-HISTORY OF THE NORTHERN MOLE-CRICKET—GRYLLOTALPA BOREALIS.

BY E. W. DORAN, PH. D., COLLEGE PARK, MD.

Although this is a common insect in many parts of the United States, it is not generally found in great numbers in any locality, and, notwithstanding its general distribution, the various stages of the insect seem not to have been described or figured.

While I am not yet able to clear up all the points in its history, I have studied the insect in all its stages, though I have not reared it from the egg to maturity, on account of the time required for it to develop—in all probability three years.

During the last six months I have had about fifty specimens in confinement, representing all the stages of the insect. They were nearly all obtained in one limited locality, about the edge of a small pond near the Maryland Agricultural College. I found every stage in this locality except the egg. Two females oviposited in the breeding jars, and I now have larvæ about two months old. I present the following description of the insect in all its stages :—

1. *The egg.*—The eggs were deposited in confinement in irregular heaps without any apparent arrangement. The number is only 40 to 50, though it is stated that *G. vulgaris* deposits 200 to 300. There is an irregular enlargement of one of the canals, about an inch and a-half in diameter, in which the eggs are placed.

The egg is of a dirty whitish or light brown colour, opaque, with no distinct external markings. Length, about 3 mm.; width, 1.7 mm. Shape slightly ovoid-reniform.

The date of the deposition is a little uncertain. May 20, 1892, I made extensive excavations in their burrows, but found no eggs, though I took three gravid females ; one of these was dissected, and the eggs appeared pretty well matured, though not full size. Two females were placed in confinement, one had oviposited June 8, eggs from the second were not found till June 25. The eggs of the first had hatched June 18, ten days after they were found. The eggs of the second hatched between Aug. 1st and 10th, about a month and a-half after the first lot, and five or six weeks after they were deposited. Both were subjected to the same conditions.

2. *The larva.*—When first found the larvæ may have been a week old. They closely resemble in appearance the mature insect. Length, 6 mm. ; antennæ long, 37 mm., anal stylets, 3 mm. Head and thorax shining black, with median dorsal line lighter. Abdomen lighter in colour than thorax; the dorsal part of each segment dark brown, the space between segments creamy ; the first three rings very dark, the rest lighter, except the 7th, which is generally broad and dark. The underside of the body is creamy white. Anterior pair of legs light brown, middle pair with femora darker, posterior pair darker except at the joints, tarsus of first pair broad, toothed, as in imago. Legs and abdomen slightly pubescent. Before the first moult the larvæ have the power of leaping several inches. After this they do not seem to have this power, and are more sluggish in their movements. After the first moult they have the

power of ejecting a viscid, nauseous fluid for protection, and if several are confined in close quarters they invariably get badly "stuck up" if excited. After first moult the colour of the dorsal part of the abdomen is darker.

The larval stage evidently lasts about two years. Several specimens taken Jan. 4, 1892, were about 13 mm. long. These kept in confinement in a warm room during the winter moulted April 18th, when all died. They were then about 16 mm. in length. May 20, two or three larvæ were found which were very little larger than those taken in January before. They are said to be inactive in winter, hence had not grown so fast as those kept in a warm room. Along with these small larvæ were taken some about 18 mm. in length, but much stouter in appearance, all of which had pupated before June 18. These last larvæ were evidently about two years old, and after pupating were not distinguishable from pupæ taken at the same time.

3. *The pupa.*—After pupating they are about 29 mm. in length, with considerable increase in thickness, especially in the abdomen. There is a very slight change in appearance otherwise, except for the appearance of the small wing pads.

This stage evidently lasts almost a year. Those which pupated in June, or last of May, will not deposit eggs this year. They are yet (Aug. 15) pupæ.

4. *Imago.*—The mature insect has but short, apparently feeble wings, while the body is long and heavy, hence their powers of flight are evidently not great. The male measures about 31 mm. in length, while the female may reach 37 mm. or 38 mm. This stage has been described and figured in various publications.

Food Habits.—It is generally supposed that the mole cricket lives chiefly upon roots of grasses, etc. I much doubt that this is the usual food, and it is certainly not the entire food. In the wild stage the burrows are generally found in moist, sandy places near the water, often where no vegetation is found. They make long, winding channels, often six to eight inches deep, forming new burrows very much like a mole. This habit would seem to indicate that they are in search of animal food, especially angle or earth worms. In confinement they seem to feed but little, if at all, upon roots of grasses, and for several months they have had nothing but earth worms given them, and they seem to thrive upon this diet. If pressed by hunger they will readily devour the smaller or

weaker of their own kind. If two are confined in a small vessel over night one generally kills the other. Several of my specimens have been destroyed in this way.

Mr. Smith asked if it was known that some of the Acrididæ occasionally fed upon animal diet, and stated a case where a species of *Melanoplus* had been fed upon house flies.

Mr. Riley stated that several of the Acrididæ were known to be omnivorous, especially *Melanoplus spretus*. He also stated the experience he had had when in France in regard to a secret remedy a Frenchman had for destroying *Gryllotalpa*. Upon investigation, the secret remedy was found to be nothing but pouring soapsuds into the holes made by the insect.

Mr. Fletcher gave his experience with a specimen of *Gryllotalpa* in confinement in a glass jar. Potatoes were planted in the jar and the roots spread throughout the bottom of it. Meat was placed on top of the earth in the jar, but so far as he could notice the specimen ate nothing. It is a very animal-like insect, and is rare in Canada.

Mr. Hubbard thought that the *Gryllotalpa* was common in Canada, but was hard to find except in particular places.

Mr. Weed stated that he had the species sent for identification quite often, but it was rare except in particular places.

Mr. Riley then read a paper on "The Osage Orange Pyralid," by Mary E. Murtfeldt, Kirkwood, Mo. (Published in "Insect Life.")

Mr. Weed stated that the species was quite common in Mississippi, the moths having been taken abundantly.

Mr. Smith stated that the osage orange in some parts of New Jersey was seriously attacked by the Bag-worm, *Thyridopteryx ephemeræformis*, which was the only thing that seemed to trouble it.

Mr. Riley then read the following :—

NOTE ON A BORER IN THE STEM OF THE RED CURRANT.

BY E. W. CLAYPOLE, AKRON, OHIO.

For several years I have observed traces of a borer in the tips of the twigs of my red currant bushes, whose habits did not correspond with those of any insect with which I am acquainted. My knowledge of the subject is very limited, and I consulted the department at Washington. In reply it was suggested that possibly it was the same insect which infested the tips of the raspberry, *Oberea tripunctata*. But the facts not

quite agreeing with this reference, I wrote to Prof. Riley, stating the facts in the case. The mischief, if such it can be called, is first noticed in the middle of May, two or three weeks before the signs of *O. tripunctata* are seen, and the girdling consists of a single ring instead of two, or if there are two the lower one is very indistinct. Moreover, the tip of the twig fades at once, and much more quickly than when attacked by *O. tripunctata*. Lastly, the later attack of *Oberea* is in my garden confined to the raspberry. I never find it on the red currant.

I was requested to send some specimens about the end of July, and I did so just before starting for this meeting. I received a reply a day or two ago from Mr. Marlatt, in the absence of Dr. Riley, saying that the insect was probably the *Janus flaviventris* of Fitch, found by Professor Lintner recently at Adrian, Mich. It is a saw-fly of the family Cephidæ, whose early history has not been well worked out.

Having little technical knowledge of the group, my only excuse for troubling the Club with this note is a desire to aid others in a work which I cannot, from the pressure of different engagements, now prosecute myself as formerly. Moreover, I think such short notes are peculiarly adapted for presentation to the Entomological Club.

Mr. Lintner stated some experience in regard to this species. An attacked twig dies down at the upper part above the cut. From a half dozen twigs which had been marked at the time of the attack and cut and sent to him the following spring, he had obtained but one specimen of the Saw-fly, and this did not appear to agree with Fitch's description of *flaviventris*.

Mr. Smith remarked upon the difficulty of obtaining specimens of the sexes of twig borers, unless the entomologist was constantly in the field and himself cut them out of the infested wood.

Mr. Fletcher then read the following:—

REPORT OF COMMITTEE ON AN ENTOMOLOGICAL CONGRESS IN 1893.

Doubtless all agree that the meeting of this Club and that of the Association of Economic Entomologists in 1893 may afford unrivalled opportunities for us to meet and make the acquaintance of many foreign entomologists; that the occasion may afford excellent opportunities to make known our own methods and to extend a knowledge of the nature

and extent of entomological investigation being done in this country among those of other countries engaged in similar pursuits, and enable us to learn the same concerning them. In other words, our next annual meeting should be an occasion of great social advantage and of mutual scientific and practical benefit to ourselves and our visitors. To attain this should be our aim. The Association of Economic Entomologists and the Entomological Club of the A. A. A. S. have mutually pledged co-operation in this matter. A plan, therefore, for attaining the desired end is the question for present consideration.

The Committee, after due consideration, submit the following suggestions for your consideration and that of the Association :—

1. That the Executive Committee of this Club (understood to consist of its officers) shall be authorized to act for us jointly with an authorized body of the Association.

2. That as early as January, 1893, the Association concurring, a joint communication be sent to foreign entomologists and Entomological Societies generally inviting attendance, stating the nature of our meetings and soliciting papers and demonstrations for the same.

3. That members of both organizations be asked and urged to present examples of their best work in a finished state, illustrated as far as practicable by specimens, charts and drawings, and that the same be reported to the respective Secretaries in ample time for arrangement and the printing of a programme before the beginning of the meeting.

4. That the economic papers, regardless of authorship, be assigned to the meetings of the Association, and those of systematic or biological nature in like manner to the meeting of the Club. Visiting entomologists should, of course, be considered members for the time being.

5. That we believe an interesting feature would be an exhibition of uniques.

6. That the feasibility of a practical exhibition of apparatus and methods should be considered, and if possible instituted.

7. That a banquet in honour of our visitors should be made a feature of the meeting.

8. That the history of economic entomology in America should be treated by a competent hand.

9. That these propositions should be submitted to the President of the Association of Economic Entomologists.

D. S. KELLICOTT, Chairman.
L. O. HOWARD.
JAMES FLETCHER.

The report was adopted, and the officers of the Club were appointed a committee to issue a circular in regard to the Entomological Congress, inviting foreign entomologists to be present at the meeting of the Club next year.

The committee appointed in reference to the preparation of a Manual of Entomology reported progress, and, upon motion, were continued until another year.

The committee appointed to nominate the officers for the ensuing year reported as follows :—

President—Chas. J. S. Bethune.
Vice-President—H. G. Hubbard.
Secretary—C. L. Marlatt.

The report was adopted and the officers elected.

An adjournment was then taken until four p. m.

The Club assembled at four o'clock, and Mr. Weed read the following paper :—

NOTES ON THE INSECT FAUNA OF THE MISSISSIPPI BOTTOMS.

BY HOWARD EVARTS WEED, AGRICULTURAL COLLEGE, MISS.

Geographically the State of Mississippi is divided into what is known as the hills and the swamps. The hills comprise the middle and eastern portions of the State, while the swamps comprise the western border or the country adjacent to the Mississippi River, the larger portion of which is overflowed every year.

The insect fauna of this region presents many things of interest, there being an absence of many species found in other parts of the State, doubtless owing to the inundation and consequent drowning out in the spring of the year. Indeed, how it is that some of the species which are quite common in this region survive an overflow lasting from three weeks to two or over three months, I leave for others to explain.

As might be expected, in this region there are found but comparatively few species, but these in great numbers.

It was recently my privilege to visit this region, going by boat from Vicksburg to Greenville, and stopping off for about two weeks midway between these places at Mayersville, in Issaquena County. These notes are not intended to be in any way complete, and I will only mention a few of the more common species, which may be taken as a fair example of the midsummer fauna of this region.

Very few Hymenoptera are here found, and they are, indeed, conspicuous by their absence. Humble bees are exceedingly scarce, and this no doubt accounts for the fact that red clover does not re-seed in this region, as it dies out at least by the end of the third year from planting. But very few honey bees are kept here. The fossores are among the most common hymenoptera, *Pelopœus cementarius*, var. *architectus*, being especially common. Various species of *Vespa*, *Polistes* and *Halictus* are also common.

The Diptera are well represented in many families. The swamps of Mississippi are said to be the land of mosquitoes and gnats, which statement is quite true, the many low places and stagnant pools forming an excellent breeding place for the former, while the rapid running streams and bayous tributary to the Mississippi form a good breeding place for the latter at certain seasons of the year. The Muscidæ are very numerous, the common house-fly being an especial great pest. Very few screen doors and windows are here used, and in many cases the meals during the summer months are served in the open air upon a side porch. In this region during the summer of 1890 the Screw-worm (*Compsomyia macellaria*) was very destructive to live stock. During the past two seasons, while no cases of injury have been reported, yet the species is quite commonly seen, not only about refuse matter, but, like the house-fly, it is often to be found flying about the table at meal time.

Neuroptera are not common, *Libellula pulchella* being the only species of the larger dragon flies noticed.

Lepidoptera are not very well represented in this region. Among the butterflies several species of *Colias* are abundant, while *Catopsila eubule* and *Papilio asterias* are occasionally seen. The Noctuidæ are the most common of the Heterocera.

Nearly all the families of the Coleoptera are well represented in this region. As might be expected, the sandy shore along the Mississippi river is a most excellent place in which to collect Cicindelidæ. Boats plying the river are furnished with one or two electric lights, which are

only lit at the landings when freight or passengers are transferred. These lights attract many insects, including several species of Cicindelidæ, which may be easily collected on the deck under the lights. The most common species taken were *Cicindela repanda*, *C. hirticollis*, *C. punctulata* and *C. cupreseens*. These species are very common along the river shore, where the sandy strip, extending from the river's edge to the levees, forms an excellent breeding place for them.

The most common insect attracted by the electric lights is the Staphylinid *Bledius gularis*, which swarms upon the decks in countless thousands. By means of a small shovel I filled a large cyanide bottle full of this species in less time than it takes to tell it. Indeed, so common was the species that the electric lights were turned on only when actually needed at each landing, and by the time another landing was reached the decks would be nearly clear. Very often many of the specimens were trampled under foot and gave out a peculiar sickening odour.

Water beetles, especially the Hydrophilidæ, are very common. The family Heteroceridæ is exceedingly common, the most abundant species being *Heterocerus ventralis*, *H. undatus*, var. *limbatus*, and *H. pallidus*.

The only Coccinellidæ noticed were *Megilla maculata*, *Hippodamia convergens* and *Coccinella 9-notata*.

Cerambycidæ and Chrysomelidæ are especially common. *Lema peninsulæ* was so thick that large numbers would strike against a person when walking along the levees in the early morning. Flying with this species were large numbers of *Disonycha crenicollis* and *D. pennsylvanica*.

Orthroptera are fairly well represented by several species, the most common being *Scudderia curvicauda*, *Dissosteira carolina*, *Shistocerca americanum*, *Acridium obscurum*, *Melanoplus differentialis* and *M. atlanis*.

Hemiptera, especially Homoptera, are very abundant. Among the Heteroptera the most common species collected were *Amnestus pusillus*, *Metapodius* sp., *Leptoglossus phyllopus*, *Gcocoris bullatus* and *Lygus pratensis*, while many species of Notonectidæ and Corisidæ were met with.

Many interesting species of Homoptera are to be found in this region *Cicada tibicen* is very common, while *Clostoptera xanthocephala* occurs in large numbers. Other common species are *Agallia 4-notata*, *Diedrocephala mollipes*, *D. versuta*, *Chlorotettix viridis* and *Homalodisca*

triqueta, while the types of Mr. Van Duzee's new species, *Anthysanus bicolor*, *A. obtutus*, *Deltocephalus flavocastatus*, were collected here, *A. obtutus* being especially abundant.

In reply to a question, Mr. Weed stated that he had found no Myriopoda in this region.

Mr. Smith remarked upon the difficulty of obtaining specimens of Lepidoptera from the Southern States. He also stated that some of the species figured by Mr. Abbott had remained unknown until quite recently, and that in the British Museum there were excellent drawings of species undoubtedly new, or, rather, undescribed, and which have not been since found.

Mr. Weed stated that he had been disappointed in regard to the southern fauna, it having been his experience that there were plenty of insects, but comparatively few species.

Mr. Cook followed with a paper entitled "Do Termites Cultivate Fungi?"

Mr. Hubbard mentioned some of his observations upon Termites in Jamaica, which have been published in the Boston Society of Natural History.

Mr. Cook thought that the so-called fungi masses were only the wood which had been eaten or gnawed off by the Termites. Old Termites do not appear to have anything to do with these masses. The masses of fungi are about four or five inches through, and are not found in the central part of the hills.

Mr. Hubbard stated that these were different from those which he had observed in Jamaica.

The Secretary then read the following paper:—

THE WEB-WORM TIGER (PLOCHIONUS TIMIDUS, HALD).

BY MARY E. MURTFELDT, KIRKWOOD, MO.

It would seem appropriate that this hitherto somewhat rare and inconspicuous little carabid should be brought to the notice of the Entomological Club of the A. A. A. S. in its new *role* of a benefactor.

I have been observing its habits for two years, and am confident that to it, more than to any other agent, do we, in the neighborhood of St. Louis, owe our present comparative freedom from the Web-worm nuisance. Whereas formerly almost every other tree would, at this season of the year, be infested with one or more of the disfiguring nests,

they are now so few and far between that it requires some search to find one. I was particularly struck with the difference, in this respect, between this section and the Atlantic slope, on my journey to Washington last August, the eastern woods and orchards being in many places almost defoliated and presenting a very unhealthy and unsightly appearance from the ravages of this insect.

It is impossible, of course, to ascertain just when or how the beetle under consideration acquired the habit of preying upon the Web-worm; but I think it could not have been much previous to its discovery. In 1888 *Hyphantria* was abundant in Kirkwood, and for the purpose of obtaining fresh specimens of the moth, as well as of its usual parasites, I transferred a colony from a box elder tree to the rearing cage. From these a large number of perfect insects were bred and also parasites of two or three species, but no larvæ or imagines of *Plochionus* were observed.

Early in June, 1890, I had been struck with the wasting away of one or two colonies of *Hyphantria* and was about to examine into the causes, when I received from Mr. J. C. Duffey, the Horticulturist of the Shaw Botanical Garden, a note informing me that larvæ of a small carabid had been found in a nest of Web-worms, upon which they were evidently feeding. Accompanying this communication was a box containing one of the infested colonies. Unfortunately the box had been broken in transit, and when I called for my mail the Web-worms were pervading the office, and the distracted postmaster was engaged in a vain attempt to confine them in a newspaper, and expressing himself with some emphasis concerning the sort of mail posted by entomologists. Undoubtedly many of the predaceous larvæ escaped with the caterpillars, but upon examination, after reaching my study, I found seven or eight of the larvæ in the fragments of the web and a sufficient number of Web-worms to afford them sustenance. Placing them on fresh leaves in a small rearing cage on my desk, I soon had ocular verification of Mr. Duffey's interesting observations.

The *Hyphantria* larvæ had all passed the last moult and many were nearly full grown; the carabids were also nearly mature, varying in length from one-fourth to one-third inch, somewhat alligator-shaped, the head provided with sharply pointed trophi, with rather long and strong legs, the body above dark and horny; they had quite a formidable aspect. By preference this larva attacks its victim from the front, biting into the

under part of the thoracic segments; but in many cases I have seen it seize hold of the side of a caterpillar, into which it would soon almost bury its head, and not the most violent contortions on the part of its prey were of avail to dislodge it. By the time its appetite was appeased the Web-worm would be fatally injured, and a fresh one would be required for its next meal. In this way one beetle larva was capable of destroying a great number of the worms in the course of its development. The two species, web-worm and carabid, reach maturity about the same time, the period of carabid adolescence being about one week less than that of the insect on which it preys. The change to pupa takes place both on the surface of the ground and in the remnants of the web on the tree—in the latter case it (being very soft and white and not enclosed) is subject to destruction by birds and other insects. The beetle appears in from eight to ten days after the change to pupa, and requires a day or two to acquire its dark brown colour and the firmness in texture of maturity. It is very swift and furtive in its movements and remains hidden as far as possible during the daytime, but is, even in the rearing cage, quite active at night, using its wings freely. It feeds, sparingly, on aphides and similar soft insects. This season I found it in considerable numbers in the two web-worm nests that occurred in our orchard, and to test its destructive capacity I placed thirty-six three-fourths grown *Hyphantria* larvæ in a large glass jar, with three nearly mature *Plochionus* larvæ. A large number of the caterpillars were killed in the course of the following week, and from the three dozen larvæ I bred seven parasites *(Meteorus hyphantriæ)* and but three moths; the remainder had evidently succumbed to their coleopterous foes, all three of which developed into fine beetles.

In respect to Mr. Duffey's wish to present the first published account of this insect, I refrained from mentioning it to the Club at the Indianapolis meeting, but referred to its valuable services in my notes for the Division of Entomology of the same year. Early in the autumn, 1890, Mr. Duffey read a paper on this insect and its interesting habits before the Academy of Science of St. Louis, giving its history somewhat in detail, and also technical descriptions of the adolescent stages, accompanying these with some tolerable illustrations. This paper was published in the Transactions of the Academy the following February, and renders it unnecessary for me to describe the larva and pupa more minutely.

I believe the perfect insect occurs sparingly in many sections of the country, but it may not in every locality acquire the habit of preying on

Hyphantria. It is to be hoped, therefore, that the divergent type will slowly spread from State to State until it, in connection with other predaceous and parasitic species, will practically relieve us of one of our most prominent arboreal pests.

Mr. Schwarz stated that it was rather singular that this habit of the species had not been hitherto noticed.

The Club then adjourned.

HOWARD EVARTS WEED, *Secretary.*

The following papers were not received by the Secretary in time for insertion in their proper places:—

GALERUCA XANTHOMELAENA POLYGONEUTIC AT WASHINGTON.*

BY C. V. RILEY.

It will be remembered that at the meeting of the Club a year ago, Professor J B. Smith gave the results of his observations for that year upon the Elm-leaf Beetle at New Brunswick, N. J., and concluded that it was single-brooded there. His observations were so carefully made that his conclusions could not well be doubted; yet they did not agree with those made at Washington, where the species had been found to be at least double-brooded. In the article which I had published upon this insect in Bulletin 6 of the Division of Entomology of the Department of Agriculture, I had discussed the evidence as to number of broods, both from European sources and my own experience; but Professor Smith's observations were so conclusive, so far as his locality is concerned, that I felt the need of more accurate notes than any that had been published hitherto, and of the desirability of settling the question as to number of broods at Washington by a series of carefully-planned indoor experiments, where, by breeding from one generation to another, there could be no question of an erroneous conclusion. This I have done, and have communicated from time to time the results to Professor Smith, who has also communicated his to me, and in a general way I may say that the work at each point, so far as I have heard from Professor Smith up to July 28th, appears to bear out the previous conclusions and experience at either point. In short, Professor Smith finds the species to be single-brooded in New Jersey this year, whereas at Washington it is double-brooded as a

*See page 245.

rule, and produces at least a third and probably will produce a fourth generation, by exception.

During the first week of May of the present year the beetles were abundant, and by the 6th of May the first eggs were found. By the 20th of the same month the eggs were hatching, and by June 8th the first pupæ were obtained. By June 12th the bulk of the larvæ had transformed to the pupa state, and by June 18th, in the vivarium, the second generation of beetles (or first bred of the season) began to appear, and were in great numbers by the 20th of the same month. Before the end of the month of June most of the second brood of beetles had issued and eggs from this second brood were obtained in numbers and were numerous out of doors wherever the leaves had not been already ruined. Yet up to this time belated larvæ of the first generation were yet to be found. By the 15th of July the second generation of beetles began to get scarce and to perish in the vivarium. By the 18th of July the first pupæ of the second generation were observed, and the bulk of the larvæ were descending the trees. Nevertheless, at the same time and up to the 26th of July, there were eggs and larvæ of all sizes yet to be found of this second generation. During the last days of the month, these larvæ of all sizes were everywhere crawling about, having defoliated the trees. The third generation of the beetles in the vivarium began to appear on the 27th of July, exactly 27 days from the egg, and during the first ten days of August the eggs were obtained in the vivarium from this third generation of beetles. To sum up, the larval period of the first generation lasted from the third week in May to the end of June, the bulk transforming to the pupa state about the middle of June, the hibernated imagos being scarce or absolutely unseen during the month of June. The beetles of the second generation began to appear about the middle of June and were in force during the third week of that month, while yet a few larvæ of the first generation were to be found. By the end of June most of the second generation of beetles had issued, and the eggs of these were numerous where the leaves had not been previously destroyed. By the middle of July the imagos of the second generation became scarce, and during the third week of the month the bulk of the larvæ of the second generation were descending the trees. Some pupæ were formed, and a few of the eggs and larvæ of all stages were yet to be seen. By the last of July the third generation of beetles began to appear, and continued to issue during early August. The eggs of this third generation are laid only on fresh leaves.

Thus, as stated, there can no longer be any question that the species at Washington is double-brooded as a rule, and that it produces exceptionally a third and even a fourth generation. Yet during the latter part of July we have at Washington very much the same condition of things in the abundance of the larvæ and the injury of the trees from the second generation as they have at New Brunswick, N. J., from the first generation. I give below a detailed record of the observations made the present year, as noted by Mr. Theo. Pergande, who had charge of the experiment, though I have personally watched over and superintended the breeding and can confirm the accuracy of the record. Before leaving the subject, it may be well to note that in the fourth edition of the European Catalogue of Coleoptera, as pointed out to me over a year ago by Mr. John Hamilton, the nomenclature of this species is given as follows :

Galeruca luteola Müll., Mil. Turin 3, 187.
xanthomelæna Schrank, Ws., 627.
calmariensis Fab., Gyll. Ins. 3, 508.

There seems no other course than to follow the resurrectionists and to change the name that has already become so familiar to us once more in favor of *luteola*, unless we hold by the 20 years limit promulgated and discussed in the rules for entomological nomenclature considered in the early history of this Club.

STATEMENT OF EXPERIMENTS WITH THE ELM-LEAF BEETLE.

HIBERNATED OR FIRST GENERATION OF BEETLES.

May 3, '92.—Beetles now swarming and quite abundant on some of the Elms on the grounds of the Department of Agriculture, eating the characteristic round holes in the leaves.

May 6, '92.—First eggs noticed.

May 20, '92.—A few batches of eggs hatching. A lot of young larvæ are placed in vivarium. Marked also 8 colonies for outdoor observation.

May 27, '92.—Larvæ are casting first skins.

June 6, '92.—Larvæ are casting the second skin.

June 8, '92.—One Larva has changed to pupa. Larvæ on branches which were marked, May 20th, are leaving and descending the trunk. There are still great numbers of larvæ on the trees, some of them still in second stage. Placed a considerable number of larvæ in separate vivarium.

June 12, '92.—Most all larvæ in vivaria have changed to pupæ.

June 16, '92.—There are still a considerable number of larvæ on the trees. All are about full-grown. No beetles so far. Plenty of pupæ around base of trees.

SECOND GENERATION OF BEETLES.

June 18, '92.—Two beetles issued to-day from the lot in vivarium. None to be found out doors so far. Apparently the last of the larvæ are now descending the trees. Pupæ are present in heaps around base of trees. Placed a lot in breeding cage to obtain beetles.

June 20, '92.—To-day 51 beetles issued from lot in vivarium. Placed them all with a branch of Elm to permit feeding and breeding. Examined the trees but failed to find any of the beetles. There are still a few of the larvæ feeding.

June 21, '92 —Noticed the first few beetles on the trees; there are still some larvæ.

June 22, '92.—Beetles have become somewhat more numerous, particularly on the last tree at the east entrance. Found also a few batches of recently deposited eggs. Separated these in another vivarium.

June 24, '92.—Large numbers of beetles are issuing; eggs are still very scarce. Beetles are feeding on leaves, eating small holes. There are still a few larvæ of the first generation.

June 25, '92.—There are still a few larvæ. Beetles have become quite numerous, though eggs are still very scarce.

June 27, '92.—Eggs are still scarce on the trees. Beetles in vivarium have deposited quite a number of eggs.

June 30, '92.—Beetles have become very numerous, and have almost ruined the leaves on one tree. The majority have now issued. They do not like to oviposit on the trees on which the leaves are nearly ruined, but eggs are now already quite numerous on all other trees, the foliage of which, so far, is but slightly injured.

July 2, '92.—Nearly all beetles have issued. Plenty of eggs have been deposited by them on some trees, so that often 5-7 egg-masses are deposited on one leaf. On other trees, on which the beetles are also plentiful, extremely few eggs can be found.

THIRD GENERATION OF BEETLES.

Eggs in vivaria, both those taken out doors and those obtained in breeding cage, are hatching.

July 8, '92.—A number of beetles died. No eggs deposited.

July 15, '92.—Beetles are getting very scarce.

July 18, '92.—Some of the larvæ in cages have changed to pupæ, just seventeen days since hatching of the eggs.

July 19, '92.—The oldest larvæ are already descending the trunk of the trees. There are still a few beetles to be seen, also quite a number of unhatched eggs, some of which have been but recently deposited; also larvæ in different stages, from the youngest to the oldest.

July 22, '92.—Larvæ are descending the trunks by thousands; large numbers are heaped up between tufts of grass, ready to change to pupæ. There are still some beetles on the trees; plenty of unhatched eggs and larvæ in all stages of growth. Badly infested trees look as if scorched by the sun; leaves are dropping.

July 26, '92.—Some trees are now almost bare of leaves, most of them having dropped. Larvæ of all sizes are running about on branches and trunks; those which are full-grown go to the ground to transform, all others are doomed to die of starvation. No more beetles to be seen. There are already plenty of pupæ and huge piles of larvæ around badly infested trees.

July 27, '92.—Beetles are issuing in vivarium ten days after changing to pupæ.

July 30, '92.—The first beetles of this third generation are issuing out doors. On some of the trees which yet have leaves there are still a considerable number of larvæ in different stages of development.

Aug. 1, '92.—Considerable numbers of beetles have issued to date, both out doors and in vivarium. Larvæ of all stages are still crawling about on trunk and branches. Younger larvæ are still feeding on remaining leaves. Beetles are also feeding.

Aug. 3, '92.—Beetles are issuing in large numbers, and are migrating to the trees on which leaves are still present; none to be seen on defoliated trees. There are still numbers of larvæ in the last two stages on some of the trees. Pupæ and larvæ are piled up under some of the worst infested trees to the depth of about one inch.

FOURTH GENERATION OF BEETLES.

Aug. 3, '92.—Found to-day out doors five small batches of eggs, which will produce the third generation of larvæ, and are doubtless deposited by beetles of the third generation. None are deposited so far in the vivarium. Large numbers of the lower layers of pupæ are dead and have commenced to rot, evidently on account of the recent rains and excessive heat.

Aug. 5, '92.—Beetles are swarming in large numbers, the air is full of them. There are still numerous pupæ and larvæ ready to change. Numbers of larvæ are still feeding; most of them are about full grown. Eggs are still rather scarce. None have been deposited, so far, in the cages. There are now millions of beetles on the trees; the remaining leaves will, therefore, be soon consumed. Eggs are still scarce, though batches of them are scattered over the trees; there is scarcely a chance for larvæ of the third generation to develop. There are still thousands of pupæ and also some larvæ of the second generation. Eggs found August 3rd have already hatched.

Aug 9, '92.—The majority of beetles have now issued. There are still a few larvæ. The denuded trees will soon have new leaves. Eggs are still scarce. Beetles in cages have commenced to deposit some eggs.

Aug. 11, '92.—Nearly all beetles have issued. There are still a few larvæ of second generation to be seen. Eggs (third generation) have become somewhat more numerous, especially on some young shoots, which are completely covered by the beetles. Leaves are appearing on some of the denuded trees.

ON DEMODEX FOLLICULORUM VAR. BOVIS IN AMERICAN CATTLE.—*

BY C. W. STILES, PH. D., WASHINGTON, D. C.

In most books which treat of *D. folliculorum*, considerable space is given to a description of the lesions it produces in man, dogs, cats and sheep, while its presence on cattle is simply mentioned with the remark that Claus and Gros state that it is occasionally found on these animals.

Gros seems to be the first who observed it on cattle. His original article is not at my disposal, but I quote from Blanchard.

*See page 245.

Walter Faxon† added an interesting contribution to our knowledge on this subject, when he described some pits and pimples found in the skin of cattle and caused by the presence of the parasite in question. Faxon's paper seems to have remained unknown to most authors, while a few who have evidently seen it ignore it, with the remark that the description and figures are so poor that no confidence can be placed in it. Only a few authors have accepted his results.

While forced to admit that from a zoological standpoint Faxon's paper is not all that could be desired, I believe it should have received more attention than has been given to it, and I am now in position to support Faxon in his statements.

This past winter and spring Pfister and Vogel have sent to the Hon. Secretary Rusk several hides which were covered with "pimples" or pustules, and which, according to their letters, have been noticed occasionally in former years, but never in such alarming frequency as this year.

The hides were referred to me for examination, with the following result :—

They were dotted with numerous swellings about as large as a pea, and with numerous small punctures about the diameter of a pin.

Upon opening the swellings it was found that they contained a granular mass, which, owing to the preparation through which the hides had passed, was greatly changed histologically ; besides the granular substance there were immense numbers of *D. folliculorum* var. *bovis*. The parasites were easily recognizable, but were too macerated to warrant my giving figures of them in this note. The punctures were evidently the entrances to hair-follicles, while the lumen of the pimples evidently represented enlarged hair-follicles, the enlargement being due to the immense numbers of the parasitic mites present.

Dr. Michener requested Messrs. Pfister and Vogel to informs us in regard to the frequency of these pimples in hides which came through their hands, and received the following reply :—

"Milwaukee, Wis., April 28, 1892.

"Dr. C. B. Michener, Asst. Chief, Bureau of Animal Industry, Washington, D. C.:

"DEAR SIR,—Yours of the 22nd inst. received, and we are very thankful for the information you have furnished us. We have had such a variety of opinions on just what

†On the Presence of *Demodex folliculorum* in the skin of the Ox : Bulletin of the Museum of Comp. Zool. of Harvard College, Cambridge, Mass., 1878. Vol. 5, No. 2, p. 11–16. 1 Pl. with 9 figs.

was the cause of these troubles that the result of your researches is very gratifying to us, as we were in the dark whether the cause was not some fault of ours in the manufacture of the leather. You asked at what time of the year this trouble appears. We have noticed it at all seasons, but had a remarkably large percentage of it in the hides received during the months of September, October, November and December of last year.

"We have found it in hides that were bought in St. Paul, Chicago, Kansas City, but think we noticed it more in hides from the southern districts. The damage to the hide is a severe one, being fully 20 per cent. Taking 50 pounds as the average weight of country hides it would amount to 50 cents per head, which, of course, in the aggregate is an immense loss to the tanning interest.

"Yours very respectfully,

"(Signed) PFISTER & VOGEL LEATHER CO.,

"Per Fred Vogel, Jr., Mngr."

It will be seen from this letter that this parasite occurs on cattle much more frequently than has hitherto been supposed.

It would of course be extremely difficult to treat a herd of cattle affected with this parasite. Several authors recommended the same treatment for cattle which is used in cases where dogs are affected with the same parasite. Prevention, however, can effect a great deal, and as soon as the mites are noticed on an animal, the latter should immediately be isolated from the herd.

Bureau of Animal Industry, Washington, D. C.,
July 1, 1892.

Postscript.—Prof. Riley in personal conversation with me suggested the use of kerosene emulsion to destroy these parasites. The emulsion is certainly worth trying, but I must confess I have not much confidence that it will prove as effectual against these mites as it has against other arthropode parasites. Experience has shown that nothing short of a thorough rubbing in of whatever is used (benzine, carbonate of potash, green soap and all the rest of the remedies recommended in various books) will destroy the hair-follicle mite.

In the discussion which followed the presentation of the paper before the Entomological Club, the other varieties of *Demodex* were mentioned, and at the request of several members of the Club I append below the measurements (in mm.) of the varieties in question [compiled from Meguin, Railliet, Neumann, Zürn].

1. *D. f.* var. *hominis*.

Female: length..... 0.40
rostrum.....0.02 long, base 0.03 broad.
thorax..... 0.09 by 0.04

Male: length 0.30
rostrum, same as in female.
thorax..... 0.085 by 0.04
First larva (apode):..... 0.06 by 0.04
Second larva (apode)..... 0.08 by 0.06
Hexapode larva:..... 0.12 by 0.05
Octopode larva:. ..... 0.36 long.
Ovum:..... 0.06–0.08 by 0.04–0.05
rostrum + cephalothorax=one-third to one-fourth of the total length of the body.

2. *D. f.* var. *canis.*
Female: length..... 0.25–0.30
rostrum.....0.03 long, base 0.03 broad.
thorax..... 0.10 by 0.045
Male: length 0.22–0.25
rostrum same as in female.
thorax ..... 0.095 by 0.045
First larva (apode) :..... 0.06–0.09 by 0.015–0.025
Hexapode larva: ..... 0.11 by 0.032
Octopode nymph:..... 0.19 by 0.04
Ovum:..... 0.07–0.09 by 0.025
rostrum + cephalothorax=slightly less than one-half of the total length of the body.

3. *D. f.* var. *cati:*
Similar to var. *canis*, but one-fourth smaller.

4. *D. f.* var. *caprae.*
Female:..... 0.23–0.25 by 0.06–0.065
Male:..... 0.22–0.23 by 0.05–0.055
Ovum:.....0.68–0.08 by 0.032–0.045
rostrum + cephalothorax=nearly one-half of the total length.

Causes a disease in goats similar to that described above in cattle (Nocard, Railliet).

5. *D. f.* var. *ovis.*
Said to differ from var. *hominis* in having a broader rostrum and cephalothorax (Oschatz).

6. *D. f.* var. *equi.*
E. Wilson says it is identical with var. *hominis.*

7. *D. f.* var. *bovis.*
length..... 0.2

The material in my possession at present does not warrant my giving exact measurements. Faxon's figures show that the abdomen is shorter and broader than that of var. *hominis*, and slightly less than two-thirds of the entire length. The form is more like that of var. *canis*, and I should not be at all surprised if a study of fresh material would result in the conclusion that var. *bovis* is simply a diminutive form of var. *canis*, and that the cattle originally became infected from contact with dogs. This is, however, mere speculation.

8. D. f. var. *suis=D. phylloides*, Csokor, 1878.

Female:.....0.24–0.26 by 0.06–0.066
Male:..... 0.22 by 0.05–0.057
Hexapode larva:..... 0.13–0.14 long.
Octopode larva:..... 0.22–0.28 long.
Ovum:..... 0.10–0.11 by 0.034

rostrum + cephalothorax=about one-half the length of the body.

As I stated in the discussion, in answer to a question, this form is totally different from var. *bovis*, having an extremely pointed abdomen. It is so different, in fact, that Csokor described it as a new species; most authors admit it only as a variety. Personally, however, I rather incline towards Csokor's opinion.

NOTES ON THE BEAN WEEVIL.*

Professor Riley gave some verbal notes on the above subject, covering substantially the facts in articles recently published in the *Canadian Entomologist*, and an editorial prepared for the first number of Volume V., *Insect Life*.† Both the Bean Weevil and the Pea Weevil were found to have temporary thoracic legs of a peculiar form in the post-embryonic larval state, and also certain prominent spines on the prothoracic shield. The eggs of the Bean Weevil in the field are not attached to the outside of the pod, as had hitherto been stated and believed, but are laid in masses within the pod, through an aperture made by the jaws. In the green pods this aperture must frequently close up, so as not to be noticeable, as pods which were brought in from the field showing

*See page 255.

†Canadian Entomologist, August, 1892, Vol. XXIV., No. 7, p. 185.
Insect Life, Vol. V., No. 1, p. 27.

no trace of puncture gave out large numbers of Weevils, but in the drier pods the aperture remains and often takes the form of an elongate slit along the ventral suture. More often, however, the eggs are thrust into the more mature pods through the natural opening, as the pods dehisce. In reference to nomenclature, Professor Riley confirmed the position he had taken in 1870 that our Bean Weevil is not *Bruchus obsoletus* Say, this species having been rediscovered by Mr. Schwarz on *Tephrosia virginiana*. Our Bean Weevil, he concluded, must be known in future as *Bruchus obtectus* Say.

AN ADDITIONAL NOTE ON THE BEAN WEEVIL.

BY C. V. RILEY, PH. D.

In the note on the post-embryonic larvæ of the Pea and Bean Weevils, published in the August number of the *Canadian Entomologist*, (p. 185), I have stated that the eggs of the Bean Weevil "are primarily laid upon the bean pod in the field, but chiefly, if not entirely, upon those which are already matured and ripening." This statement was based upon the finding of the eggs upon more mature bean pods in years gone by, and represents the current belief hitherto held. A more careful examination of the eggs thus found the present season, after the note above referred to had been sent to the editor, showed that they did not entirely agree with the eggs of the Bean Weevil as laid on stored beans, the difference being sufficient to justify a doubt as to the former being those of the ordinary Bean Weevil, and to cause me to look into the matter more fully, which I have done in my own garden the past summer. The facts resulting have been recorded in *Insect Life*, Vol. V., No. 1, page 32, and they show that the eggs hitherto taken for those of the common Bean Weevil are, without much question, those of another Bruchus, either *Bruchus quadrimaculatus* Fab. or *B. scutellaris*, both of which infest beans. The eggs of our common Bean Weevil (*Bruchus obtectus* Say) are thrust into an aperture made by the jaws of the parent Weevil, generally along the ventral suture near the funiculus, or else are laid in clusters on the inside of the pod, wherever this is sufficiently ripe to cause a partial opening. In the field the aperture must be made early enough to permit more or less perfect closing by growth of the pod; whereas on mature pods it is often quite elongate and does not close.

I have also shown, in the article above alluded to, that our Bean Weevil should be known in the future as *Bruchus obtectus* Say, and not as *B. obsoletus* (Say) Horn, Mr. E. A. Schwarz having obtained what agrees entirely with the description of *obsoletus* upon *Tephrosia virginiana* in connection with *Apion segnipes*, which was also found upon the same plant (Say having found the two species associated on the same Astragalus), while the description of *obtectus* Say, so far as it goes, agrees very well with our Bean Weevil, that of *obsoletus* not agreeing, as was shown in my Third Report on the Insects of Missouri (1870). The synonymy of the species, chronologically, would stand thus:

1831—Bruchus obtectus Say.
1835—Bruchus leguminarius (Chevrolat) Gyll.
1839—Bruchus irresectus (Schönherr) Fahræus.
1839—Bruchus pallidipes (Chevrolat) Fahræus.
1854—Bruchus subellipticus Wollaston.
1861—Bruchus fabæ Fitch.
1867—Bruchus breweri Crotch.
1871—Bruchus fabæ Riley.
1873—Bruchus obsoletus (Say) Horn.
1889—Bruchus subarmatus Janson (?—subarmatus Gyll.).

FENISECA TARQUINIUS.

Mr. S. H. Scudder, in his "Butterflies of Eastern U. S." states that "*Fenisecca Tarquinius*" has never been captured east of the Connecticut Valley in Massachusetts. Other writers mention it as rare in New England. It may interest some of your readers to know that I found it *very common* on the Glen Road near Jackson, N. H., in the second week in June. I also found a specimen on a window of the Boston Athletic Club, which seems a strange place for it. The building is on new made land, nowhere near any alder growth, in fact, in the city. I have collected a number of years in the suburbs of Boston, but have never seen a specimen.

Chestnut Hill, Mass. A. G. WEEKS, JR.

Mailed November 5th.