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No. 7

THE HESSIAN FLY AN IMPORTED INSECT.

BY DR. C. V. RILEY, WASHINGTON, D. C.

As the readers of the CANADIAN ENTOMOLOGIST are aware Dr. H. A. Hagen has argued at length to the effect that the Hessian Fly was, *first*, not imported by the Hessian troops; *secondly*, that it was not imported from Europe at all, and that it is an indigenous North American insect. In the Third Report of the U. S. Entomological Commission, Dr. Packard has an extended article upon the Hessian Fly, and while he alone is responsible for the general position there taken on this subject, we discussed the matter together, and the views there presented are substantially those which I held at the time, as it was Dr. Packard's desire to arrive at an impartial judgement. The subsequent communication of Dr. Hagen in the CANADIAN ENTOMOLOGIST for May, 1885, seemed, however, positively to set at rest the question of the introduction of the insect by the Hessian troops, as well as of its occurrence in this country prior to the revolution; because the correspondence which he there published from Mr. H. Phillips, jr., seemed to admit of no further doubt that the first question was settled in the negative, and the second in the affirmative. While in Europe last autumn, I found a great deal of interest manifested in the subject of the Hessian Fly in England, on account of its recent introduction there, and, being called upon, I made some statements at one of the meetings of the London Entomological Society, which will be found reported in the Transactions of the Society for October 5, 1887. I take the liberty of quoting therefrom the following passages as indicating my position in the matter:

"Prof. Riley said it would extend his observations beyond reasonable limits, to enter into the details on which he based his own conviction, which had been substantially expressed in the full paper by Packard, in the 'Third Report of the United States Entomological Commission (1883).' His opinion was that while we might drop the Hessian theory—since Mr. Henry Phillips, jr., as quoted by Hagen (1885), finds mention of the 'Hessian Fly,' in the unpublished minutes of the American Philosophical Society for 1768 (a rather astonishing fact, as it antedates the landing of the Hessians!),—and

concede that the insect was introduced some time prior to the revolution ; yet that its introduction *about* that time must be accepted, because Hagen's arguments to the contrary were not supported by [sufficient] evidence."

"Prof. Riley further remarked that he had referred to these conflicting views of leading writers as to the original source and time of introduction of the insect into America, not so much to foreshadow the future conflict of opinion on similar points in England, as to bring out this important fact as a warning to hasty generalisers, viz., that the arguments of Wagner, Hagen, etc., against its introduction into America, were inherently weak from the biologic side. They are based on the average or normal period of summer development of about seven weeks from egg to adult, and *ignore the important bearing of exceptional retardation in development whereby the puparia of one summer remain latent and only give forth the flies in the spring or early summer of the ensuing year.* This fact, recognized by Harris (1852), Prof. Riley said he had evidence of in America in garnered straw, and it was proved by Wagner himself to have occurred in Germany in field stubble. It was more apt to occur, however, in straw kept dry and packed than in stubble or exposed straw, and is in keeping with many other similar cases of retarded development in insects, some remarkable instances of which he called attention to before the American Association for the Advancement of Science in 1881. It destroyed Hagen's main argument, rendered the introduction of the species possible at almost any season, and made its introduction to America by the Hessians, who left Portsmouth, April 7th, and landed June 3rd, 1777, on Staten Island, quite probable and plausible from biologic grounds."

For the purpose of the present communication, it is not necessary to go into the other arguments which Hagen has brought forward to relieve the Hessians of whatever onus attaches to their accidental introduction of this insect: the more important are, (1) that there was no Hessian Fly in Germany at the time, and (2) that the Hessian troops did not carry straw from regions in which it did occur. At this late day it would be folly to attach too much importance to these negative deductions, where there are so many possibilities of their both being erroneous in fact. The evidence as to the introduction and spread of the insect in this country is of a so much more clear and positive nature that it off-sets such negative deductions. With the exception of Mr. Phillips's positive statements, there is only one other recorded statement that would seem to indicate that the Hessian Fly was known in the United States prior to the landing of Hessian troops. This is a statement quoted by Fitch, of Judge Hicock, of Lansingburg, N. Y., who says (Memoirs of Bd., of Agr., 11, p. 169) that a farmer named Jas. Brookins had informed him (Hicock), that upon his first hearing of the alarm upon Long Island, in the year 1786, he (Brookins) detected the same insect in the wheat growing on his farm in Lansingburg. Fitch remarks in parenthesis, "doubtless 1776

is intended here," evidently on the assumption that Brookins's first hearing of the alarm on Long Island was coincident with the first alarm—an assumption by no means necessary, and one which only complicates the matter. If we grant Mr Brookins's statement to be reliable, there would be nothing remarkable in it as an observation of 1786. But whether for 1776 or 1786 it were folly to overthrow prevailing record and belief by one such unverified statement as this, where the chances are so great of inaccuracy from mere hearsay, and Fitch was justified in stating the strong probability that it was some other insect which was found by Col. Brookins.

Mr. Phillips's statements, as the readers of the CANADIAN ENTOMOLOGIST are aware, are of a very different character. In response to Hagen's inquiries, made to Prof. J. P. Lesley, Mr. Phillips wrote as follows :

"At the request of Prof. Lesley, I have examined our old minutes in reference to the Hessian Fly, and append on next page the results of my search. I know *positively* that before the revolution our newspapers were full of communications in reference to the Hessian Fly *eo nomine*. I cannot call to mind any one paper, but I remember perfectly frequently seeing these articles when reading for other purposes. I cannot find that the committee ever reported."

The following are the extracts from the minutes as furnished by Mr. Phillips :

1768, May 18. Com. on Husbandry to consider whether any method can be fallen upon for preventing the damage done to wheat by the Hessian Fly. [N. B.—Mr. DuHamel has written on the subject.]

1768, June 21. Papers on the Hessian Fly read by Dr. Bond, ordered to be published. See No. 4, original papers.

1768, Oct. 18. Col. Landon Carter, Sabine Hill, Va., observations on the Fly Weevil destructive to wheat ; ordered to be published. [Is published in Vol. 1. of the Transactions of the Society. Cf. Harris, Injur. Ins., pp. 502. Dr. H. A. H.]

And upon being again questioned by Dr. Hagen as to the possibility of error Mr. Phillips writes :

"1. 1768 is not an error. It occurs in the proper place in the old M.S. Vol., and there can be *no doubt* about the fact. *Similiter* the words *Hessian Fly*.

"The term came in use in Pennsylvania from the early German immigrants long before the revolution. I am *sure* the term occurs in our Pennsylvania gazettes long prior to that period.

"2. Cannot say if that paper (of Bond) was ever published. Possibly in some gazette *pro bono publico*. There is no clerical error as to the date and name."

Since this correspondence was published by Dr. Hagen in the CANADIAN ENTOMOLOGIST, the early minutes of the American Philosophical

Society have been published, and the published volume confirms the above statements of Mr. Phillips, as in the minutes for May 18, and June 21, 1768, the term Hessian Fly was printed.

The evidence against the introduction of the Hessian Fly, and even its introduction by Hessians is so easily set aside, and so weak as compared with the positive evidence of such introduction, that I have long wondered at the records of these meetings, and thought that there must be some error. Only recently, however, did I have the opportunity of personally referring to and examining these early minutes in the original. I felt an interest in doing so, because I thought it barely possible to show that they were transcripts from earlier rough minutes, and made subsequent to the revolution, when the term Hessian Fly, then familiar, was inadvertently added by the transcriber. I was therefore much amazed to find that there is really no mention of the Hessian Fly in these old minutes, until the year 1791. I take the liberty of reproducing *verbatim et literatim* the records as they really occur of the three meetings in 1768, quoted by Mr. Phillips in Dr. Hagen's communication :

May 18th, 1768.—“ It was recommended to the Committee of Husbandry, &c., to meet on Tuesday, 31st of this month, at the college to consider whether any method can be fallen on for preventing the damage done to wheat by what is called the fly. N.B. Monsieur du Hamel has written on this subject.”

June 21st, 1768.—“ The Committee for Husbandry report that they had considered ye affair of destroying the Fly in wheat, and that Dr. Bond had laid before them a paper containing many useful observations on that subject, which Dr. Bond was requested to read before ye Society. The Society having heard and approved of ye paper request him to prepare it for ye Press, that it may be communicated to ye public without loss of time.”

Nov. 15, 1768.—“ Colonel Lee transmitted to the Society the ingenious and accurate observation of Colonel Landon Carter, of Sabine-Hall, in Virginia, concerning the *fly-weevil* that destroys the *wheat*. The Society acknowledge themselves under great obligations to Col. Carter for communication of the conclusions he has formed (on long experience) concerning that insect's propagation and progress, and the methods to be used to prevent the destruction of the wheat by it, and order it to be printed for the public benefit.”

It will be seen that in all three “ the fly,” “ the fly in wheat ” and “ the fly-weevil ” are the terms used, and it is susceptible of positive proof that all these popular terms applied then, as they sometimes do yet, to entirely different insects, viz., the grain-weavils, *Sitophilus granaria* and *S. oryzae*, and the Angoumois grain-moth, *Gelechia cerealella*. Now the minutes, as published, are avowedly abstracted from the original

minutes by Prof. Lesley, and not full, while the copies of Mr. Phillips neither agree with the originals nor with the published abstracts, while in one case, as may be seen, he has changed Nov. 15, to Oct. 18. I can readily understand how Prof. Lesley inadvertently used the term Hessian Fly in abstracting from the minutes, if indeed he did so; but it is more difficult to explain Mr. Phillips's positive statement after Dr. Hagen's specific questioning. Mr. Phillips was unable to explain to me how he came to make the error, and just as unable to give me any definite reference that will justify his very positive recollections of having seen the term "Hessian Fly" *eo nomine* in pre-revolutionary literature. When the statement of ocular evidence turns out to be so incorrect we cannot attach any importance to his memory, even where so confidently asserted.

With the final disposition of this strongest blow to the general belief that has prevailed for a century among both husbandmen and entomologists, I feel that we must not only accept the general verdict and tradition as correct that the insect was introduced about the time of the revolution, but that there is no very convincing or valid reason for rejecting the other common belief that it was imported by the Hessian troops. The recorded history of the period does not necessarily include all possible, or even probable facts in relation to the limits of distribution of the insect in Europe, or of the sources from which infested straw may have been derived by the Hessians.

In what I have said above I have spoken of the *general* belief and arguments in favor of the introduction of the Hessian Fly to this country, because I am quite aware that others besides Dr. Hagen have argued for its indigenous nature; but none of them have perused the question with such single perseverance, and such bibliographical zeal and erudition. He, in fact, deserves our thanks for having brought together so large a body of bibliographical data, because I think it has been the means of confirming not his own conclusions, but the opinion arrived at by Fitch and others.

While in London last autumn I took the trouble to look up and read over the voluminous letters and reports, of which Dr. Hagen has published a list, contained in "the proceedings of His Majesty's most Honorable Council, and information respecting an insect supposed to infest the wheat in the Territories of America." I was thus enabled to verify the accuracy of the list furnished Dr. Hagen by Prof. Nichols. I was fortunate enough to

secure a copy of the "Annals of Agriculture," published by Arthur Young, Vol 11, 1789, pages 406 to 613, of which are devoted to these papers. The title in this volume differs only from that given by Dr. Hagen, in having the word "Privy" before "Council," and the contents of the volume from the table of titles given by Dr. Hagen, only in that his Nos. three and seven "Orders of the Council" are omitted in the Annals. The original paper is a quarto volume, and fills in the octavo Annals nearly 208 pages, which will account for the discrepancy in the space occupied by each article, the articles in the Annals not being numbered, I refer to these old papers because they are most interesting as exemplifying the fact, that the late confounding of such terms as "Fly-weevil" for "Hessian Fly" in the minutes of the American Philosophical Society, which has made such a difference in the historic facts, had its counterpart at that time. The more important papers consist of a letter (1788) by P. Bond, Consul at Philadelphia, to the Right Honorable Marquis of Carmarthen, about the injury of the "Hessian Fly" in the Middle States, and supposing that the eggs are laid in the grain, as "seed wheat steeped in a preparation of elder juice effectually secures a crop." Bond probably referred to the true Hessian Fly, but his letter is followed by one from Sir Jos. Banks, President of the Royal Society, to the Marquis of Carmarthen, in which Banks calls the insect "the Flying Weevil," describes the adult as a minute moth, likens it to the clothes moth, states how the eggs are laid upon the grains of wheat and produce a diminutive caterpillar; in fact refers to the Angoumois grain-moth. There is a large subsequent correspondence, and finally Banks recognizes his first mistake and collects a good deal of information about both *Gelechia cerealella* and the true Hessian Fly, the latter derived from Dr. Mitchell.

Pages 465 and 471 are occupied by an excellent article by Col. Geo. Morgan, of New Jersey, to Sir John Temple, Consul General for Great Britain at New York, which gives a good account of the spread of the Hessian Fly and its origin, states that the name was given by him and a friend early after its first appearance on Long Island, and then treats of the "Virginia Wheat-fly," and also of the "Chintz Bug-fly." It is worthy of note that these papers are preceded in Young's Annals by an anonymous article entitled, "On the Hessian Fly, whose depredations have been very mischevious in America," in which the author recognizes and describes the work of *C. destructor*, describes its annual spread from the

points of introduction, and remarks that it must not be confounded with the "Virginia Wheat-fly" (*crealotta*). The reading of all these papers simply confirms the conclusions which I have expressed in this communication.

Washington, D. C., May 22nd, 1888.

P. S.—In the above communication I have stated merely the facts of the case without any attempt at explaining away Mr. Phillips's misleading statements. The receipt, since the article was written, of the latest part (No. 127) of the Proceedings of the American Philosophical Society, bringing them down to the meeting of May 4th last, induces me to add this postscriptum.

I spent the evening of May 3rd very delightfully with Dr. G. H. Horn, who, as one of the secretaries of the American Philosophical Society, was interested in my intended investigation of the old minutes; in fact Dr. Horn informed me that Mr. Phillips, knowing that he (Horn) was about to visit Dr. Hagen on his way to Europe, had but a short time before charged him to tell Dr. Hagen, that the latter might feel quite certain of the accuracy of his (Phillips's) statements. I have already indicated my surprise at finding them unverified, and shown how Mr. Phillips was unable to give me any explanation of his mistake.

There was to be an exceptionally interesting meeting of the Society that evening, and I purposely remained in Philadelphia to attend it, and took occasion to call attention to the error in the old minutes above set forth. Mr. Phillips, following my remarks, threw all the blame for the published error on Prof. Lesley who was absent in Europe at the time; and, having in mind his (Phillips's) communications to Hagen, this conduct struck me as not very magnanimous. I deemed the correction of this error of sufficient importance to go on record, and handed to the Secretary for incorporation in the minutes a brief abstract of my remarks. Judge of my surprise therefore to find the whole matter passed by in the published minutes of that meeting of May 4th last, by the statement of the Secretary that "Prof. C. V. Riley referred to a possible error of transcription in the Volume of Early Proceedings (No. 119), on pages 14 and 15, as to the word Hessian Fly" (!!) Mr. Phillips's conduct in this particular is as remarkable as his correspondence with Dr. Hagen, and I call attention to it that it may no longer obscure the facts of history.

ON DIADEMA MISIPPUS, LINN, IN FLORIDA.

BY W. H. EDWARDS, COALBURGH, W. VA.

About the middle of last November Miss Annie M. Wittfeld, whose untimely death I have spoken of elsewhere, wrote me that she had taken a butterfly of a species which she had never seen before, while it was laying eggs on purslane. She confined the butterfly with the plant and obtained 74 eggs. It was like a Danaid, she said, but the caterpillars were like a Vanessan. I wrote her it probably was *Misippus*, a single male of which Dr. Wittfeld had taken several years before. The female of this species is entirely unlike the male in colour and markings, and really imitates a pale Danaid. Meanwhile eggs and larvæ at every moult were put in alcohol for me, and after my letter was received Miss Wittfeld inflated two mature larvæ, and with all these stages sent me living papæ, so that I shall be able to illustrate the history of this curious butterfly. This was the last thing Miss Wittfeld did for me, and is an example of the intelligent and painstaking work she was accustomed to.

Misippus is a common species in south-eastern Asia, in Australia, Africa, in parts of South America, and is found in some of the West India Islands. Drury figured the male, and gave New York as one of the localities, but, except these few Florida examples, I know nothing of the occurrence of the species within the United States. As the food plant is everywhere one of the commonest of weeds, it is not improbable that from Florida *Misippus* may spread northward.

In *Papilio* 1, p. 30, I mentioned the capture of the male spoken of under the name *D. Bolina*, Linn. *Bolina* is an allied but distinct species. The one taken in Florida is MISIPPUS.

SOME NEW NOCTUIDÆ.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

Agrotis agilis, n. s.

Two males in good condition received from Mr. James Fletcher, from Vancouver, belong to a decidedly different species from my *semiclarata*, Essay, Plate 1, Fig 9, though allied, as also to Californian *gravis*, and our Eastern *venerabilis*. Antennæ brush-like. Gray, with a brown tinge. Lines obliterate. Fore wings yellowish gray fuscous, brownish, with a red

tinge along costa, this color obtaining before the s. t. line before apices. A distinct velvety black basal streak, absorbing the claviform spot and extending below median vein from base to the faint yellowish brown median shade line. Cell filled in with velvety black on which the complete, rounded, orbicular rests, a little pointed outwardly. Reniform moderate, subequal, transverse, of the normal shape, surrounded almost completely by the cellular black filling. Some black scales along costa marking the inception of the transverse lines, which are here filled in with white, under the glass. The red brown shade obtaining before apices, shows three pale ante-apical costal dots. The s. t. line is marked by cuneiform, dark, subequal shades and followed by a white shade more determinate at costa. Terminal space narrow, darker than the wing. Hind wings rather uniformly pale fuscous; beneath with an outer shade line and costal border, paler than fore wings beneath, with a thick cellular spot and somewhat whitish at base and inferiorly. Fore wings smoky fuscous, with faint outer transverse shades. On fore wings above, the pale shade is more or less noticeable outside s. t. line at the apex of the wing. Head and collar ochre brown. The collar shows a double black superior line enclosing a reddish shade; the upper black line edged outwardly with white scales. Tegulae whitish, pale; abdomen fuscous; anal hairs ochery. *Expanse* 30-32 mil.

Agrotis hospitalis Gr., Can. Ent. xiv., 184.

This species is allied to *Baja* by the black mark, inaugurating s. t. line, but otherwise it is quite close to *Perconflua*. I think that I am hasty in considering it a variety of the latter species, but the pattern is much the same, although the lines are marked in black in *Hospitalis*, and the color of primaries is a more uniform and darker brown, approaching *Baja*. At any rate this species must be catalogued with *Conflua*, *Perconflua* and *Hilliana*. In Papilio iii., 29, my late lamented correspondent, Mr. W. W. Hill, records the capture of two specimens of *Hospitalis* in the Adirondack region in July. On a very close comparison with *Perconflua*, taken by the same Entomologist at Centre, N. Y., in August, the shape of the t. p. line is seen to differ from that species. In *Hospitalis* it slopes away downwardly and outwardly from costa much more obliquely; it is less upright, more outwardly exerted or bent. The species are alike in size, in color of hind wings and in the paler front and palpal tips, contrasting with the

darker sides of the face and palpi. There will be nothing gained in throwing these forms together, and they must be bred to decide. The character of the t. p. line escaped me until recently, and speaks for the ultimate distinctness of *Hospitalis*.

Xylomiges Fletcheri, n. s.

The species sent me from Vancouver, by my kind correspondent Mr. James Fletcher, is apparently allied to the forms described by myself from California, under *Xylomiges*, such as *hiemalis* and *curialis*: a specimen of *X. crucialis* Harv. is also before me from Vancouver. *Fletcheri* differs by the more compact shape, the pale fuscous hind wings with darker stained veins. The eyes are hairy, the body untufted, and the color is a stone gray overlaid with whitish, so that the moth approaches *Anytus sculptus* in color. The costa is straight, the wings rather short and full outwardly, with pronounced apices, reminding one a little of *Cloantha*. To the eye the wings appear of a rather light stone gray, but under the glass the whole base of the wing is seen to be overlaid by white scales, as also the coalesced large stigmata, which are outlined in black, completely fused inferiorly, forming an irregular V; the inner limb of this, the obicular is outwardly oblique; the outer, the reniform, is upright, sinuate on its outer edge. The white scales appear again over the terminal portion of the wing. The lines are black, fragmentary, marked by different shades on costa. A fine black basal ray. The median lines are waved and inferiorly approach each other, narrowing greatly the median space below the cell; the concolorous claviform spot, also outlined by black scales, joins the median lines on submedian fold, although moderate in size. The subterminal line is fragmentary, black, appearing between the veins. Head and thorax fuscous gray, a little darker than fore wings, unlined; tegulae shaded with whitish; at the sides with a black edging. Abdomen dusky gray. Beneath the primaries are clouded fuscous; the secondaries paler than above with a neat dot and an extra mesial line accentuated on the veins. Antennae of the male simple; smaller and shorter-winged than the other species described by me. *Expanse* 30 mil.

Orthosia hamifera n. sp.

This species has been sent me from California, by my kind friend Mr. James Behrens. It is allied to *purpurca*, but larger. The male antennae are brush-like, female simple. The fore wings are pointed at apices;

the exterior margin somewhat sickle-shaped; the eyes are naked; the tibiae unarmed. Head, thorax and fore wings brownish wine-red; the thoracic hairs show a tipping of white scales under the glass. All the markings obliterate, so that the insect in color and appearance reminds one of *Perigrapha transparens*. The markings are indicated by blackish scales. Reniform marked by an upper and lower blackish clouding, moderate, upright, finely ringed with pale. Orbicular more faintly marked, a little oblique, approximate, also finely ringed with pale. The median shade crosses the wing. Lines not discernible; under the glass the s. t. line is seen to be marked by double black points on the veins. Fringes more clearly red on both wings; secondaries without marks, somewhat evenly fuscous; beneath paler, with traces of the reniform on primaries; secondaries with a dot. This is larger than *crispa*; varying in depth of red, the female the darker. Three specimens. The insect looks like *Gortyna nœbris* a little, except in its red color. *Expanse* 35 mil.

DESCRIPTION OF THE PREPARATORY STAGES OF CHIONOBAS JUTTA.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

Eggs laid June 17th., scattered, hatched July 1st.

EGG.—Creamy white: one-twenty-fourth of an inch in diameter; shaped like a nutmeg-melon; marked longitudinally with zig-zag ridges; attached by short foot-stalk.

NEWLY HATCHED LARVA.—One-eighth of an inch long. Head large in proportion to body, honey-yellow, granulated. Body attenuated and ending in two pointed prolongations; pale amber, set with brown tubercles bearing light spines. Dorsal and side lines darker amber. Spiracles dark brown. Head and fore legs bearing a few bristles. The insect feeds with its head downwards on the edge of the leaf. Its food plant is the sedge, *Carex oligosperma*.

The first moult occurred July 6th. The skin was ruptured under the head.

Larva After First Moulting.—Length one-fourth of an inch. Colour a delicate shade of pea-green; dorsal, sub-dorsal and side lines a pale warm

brown; spiracles black. A few small black warts on the body. Head honey-yellow.

Moulted July 30th.

Larva After Second Molt.—Length three-quarters of an inch. Colour grey; dorsal and sub-dorsal lines amber, the dorsal having twelve blotches of a darker shade; side lines dark brown. Under the side line comes a spiracular line of grey, and then a brown line touching the legs. Head large, amber coloured; thickly indented like a thimble, and marked with four longitudinal rows of brown dots. Under the microscope the body is seen to be thickly set with elongated amber-coloured warts—the brown warts having disappeared.

In feeding the insect has changed its posture, carrying its head upwards and cutting through the blade till the top falls off; then eating across, always working from the near edge, systematically shortening the blade and lowering itself when necessary.

Moulted Aug. 14th. Inert and sickly-looking before the change.

Larva After Third Molt.—Length nine-tenths of an inch. General colour grey; thickly covered with light brown hairs. Spiracular line whitish. Spiracles kidney-shaped, chocolate-coloured with a yellowish white perpendicular line through the centre. Dorsal line represented by twelve brown spots; sub-dorsal lines very faint. Head large, has five warty dark brown spots on each side. Mandibles brown.

Moulted Sept. 1st.

Larva After Fourth Molt.—Length one inch and five-sixteenths of an inch. Head pale brown, indented, set with reddish hairs, and having six longitudinal rows of dark brown dots, also on either side five dark warts. Mandibles brown; general colour of the body pale green, thickly set with reddish hairs. Dorsal line dark green, bearing the twelve oblong brown spots. Pale sub-dorsal lines, and dark green side lines bordered below with a pale streak. Spiracles dark brown. Caudal fork has a slight rosy tinge. Fore legs colour of head.

I left home for England on the 4th of October, having provided a sufficiency of growing sedge, embedded in sphagnum, for the use of *Jutta*. I returned in February, and found the larvæ fresh and plump, but quite torpid. They had undergone the 5th moult (probably in October). On the 6th of April they revived.

MATURE LARVA AFTER HIBERNATION.—Length one inch and a quarter. Body pale pea-green, set with light brown hairs. Legs of the same hue of green. Head green with six rows of brown dots; indented. Twelve greenish-brown spots along the back; side-lines dark brown; spiracles black.

After their revival the larvæ ate little, if anything. They pupated April 21st.

CHRYsalIS.—Length five-eighths of an inch; greatest breadth one-fourth of an inch. Head-case amber-coloured, with a brown dash on either side. Wing-cases pea-green, outlined and streaked with brown. Thorax prominent, abdomen conical, in colour pale yellowish green, with dorsal line of darker green and numerous longitudinal rows of brown dots. Extremity of abdomen rosy. .

The perfect insect appears in this locality from May 31st to June 15th.

PARASITES ON DANAIS ARCHIPPUS AND ANTHOMYIA RAPHANI.

BY C. P. GILLETTE, AGRICULTURAL COLLEGE, MICH.

I am not aware that any parasites have ever been reported as attacking the larvæ of *Danais archippus* or the maggots of *Anthomyia raphani*. However that may be, it will be of interest to the readers of the ENTOMOLOGIST to know that last fall I obtained from a single chrysalis of *D. archippus* over fifty specimens of a new species of *Pteromalus*. The parasites came forth September 13, the chrysalis having been brought into the laboratory a few days before, and inclosed with a bell-jar. Specimens were sent to Mr. L. O. Howard, who has since described the species and given it the name of *Pteromalus archippi*.

The parasites from *A. raphani* belong to the genus *Eucoila*, and are probably a new species also. A large number of pupæ and full-grown maggots of *A. raphani* were put in a jar containing earth, from which the flies began to come forth June 9. The jar remained covered with gauze until September 2, when the parasites began to appear, and in a few days eight specimens were obtained.

In connection with the latter parasite it may be well to note the fact that a red garden mite, a species of *Trombidium*, did excellent service

last summer in the College garden by feeding greedily upon the eggs of *Anthomyia brassicae*. It was not uncommon to find nearly a half teaspoonful of empty egg shells about the stems of the plants, and in such cases a number of the mites were always to be found just below the surface near the plant.

For experiment's sake three of these mites were kept in a jar of moist earth for a time, and fed each day upon fresh eggs, when it was found by actual count that they would suck, on an average, twenty-eight eggs each and every day.

Many of the plants did well and produced fine heads, that I am certain would have withered and died had not these mites devoured enormous numbers of the *Anthomyia* eggs.

DESCRIPTIONS OF SOME LEPIDOPTEROUS LARVÆ.

BY WM. BEUTENMÜLLER, NEW YORK.

Datana integerrima, Gr. & Rob.

BEFORE LAST MOULT.—Head and cervical shield shining jet black. Body deep reddish brown, with three very fine, narrow, sordid white stripes along each side, and a broader one below the spiracles, which are black, and another stripe along the middle of the venter. Thoracic feet, extremities of abdominal legs and anal legs jet black, shining. The body is also covered with sordid white hairs. Length 32 mm.

MATURE LARVA.—Body wholly jet black, and covered with very long floss-like, sordid white hairs, becoming yellowish as the larva undergoes its changes to the pupa. Thoracic feet black, shining. Abdominal legs black outside and reddish-brown on the inner side. Length 55 mm.

Lives together in large companies on walnut (*Juglans*), hickory (*Carya*), beech (*Fagus*), and also on oak (*Quercus*), but very rarely.

In several individuals of the brood of this species, in the last stage, there are visible a sub-dorsal, ill-defined, white, longitudinal stripe, and a rather broad wavy lateral stripe below the spiracles, and sometimes there is also a white stripe along the middle of the underside. In all else resembling the typical form.

Datana contracta, Walk.

BEFORE LAST MOULT.—Head and cervical shield jet black, shining. Body black, with four equidistant sordid white stripes along each side,

being as wide as the intervening spaces, except the dorsal space which is the widest. Body beneath concolorous to the above, with three longitudinal stripes, and the intervening spaces much broader. On each of the 4, 5, 10 and 11 segments two reddish brown patches. Thoracic feet and claspers of the abdominal legs jet black, with their bases reddish brown. The body is also sparsely covered with sordid white hairs. Length about 30 mm.

MATURE LARVA.—The cervical shield now becomes orange yellow, and the stripes creamy white. Otherwise as in the previous stage. Length 55 mm.

FOOD PLANTS.—Oak (*Quercus*), chestnut (*Castania*), hickory (*Carya*).

Datana Angusii, Gr. & Rob.

Head and cervical shield jet black, shiny. Body black, with four very narrow, pale yellow stripes along each side, all being much narrower than the intervening. On the underside three pale yellow stripes. One along the middle, which is the broadest, and one on each side being broken by the legs; the intervening spaces are much wider than those above. Thoracic feet black. Abdominal legs reddish, with the extremities jet black. On the 4, 5, 10 and 11 segments two reddish patches. Body with sparsely distributed sordid white hairs. Length 55 mm.

FOOD PLANTS.—Hickory (*Carya*) and walnut (*Juglans*).

The following synoptical table may serve in determining the larvæ of the genus *Datana*. The larvæ of *D. robusta*, Strk., and *D. major*, G. & R., are unknown to science:—

STRIPES NARROWER THAN THE INTERVENING SPACES.

Body black, stripes sulphur yellow.....*Ministra*.
 Body black, stripes citron yellow, confluent posteriorly.....*Drexelii*.
 Body black, stripes very fine, pale yellow.....*Angusii*.
 Body black, stripes absent.....*Integerrima*.

STRIPES AS WIDE OR WIDER THAN THE INTERVENING SPACES.

Body black or red, stripes bright lemon yellow.....*Perspicua*.
 Body black, stripes creamy white.....*Contracta*.
 Body black, stripes yellowish, head and anal plates red.....*Floridana*.

Hadena turbulenta, Hüb.

Head jet black, shining; mouth parts sordid white. Body above jet black, with a number of fine longitudinal stripes, beginning at the anterior portion of the second segment and running to the end of the tenth segment; last segments black, with a number of white spots. Cervical shield velvety black, with a few semilunate spots on the anterior portion, and posteriorly margined with white. Body at the sides and beneath dull amber yellow. Along the sides are three white stripes; the two below the stigmata run from the anterior portion of the first segment to the last segment, while the remaining stripe runs the same as those above. Thoracic feet black, shining. Abdominal and anal legs dull amber yellow, with a brownish patch, followed by a white one, on the outside. All the stripes on the black portion of the body are connected in pairs by a fine transverse stripe at the posterior extremity. Lives socially on catbriar (*Smilax*). September.

THE ENTOMOLOGICAL CLUB OF THE A. A. A. S.

We are requested to announce that the next meeting of the Club will be held at Cleveland, Ohio, in the High School Building, beginning at 9 a. m., on Wednesday, the 15th of August. This date is a week earlier than that at first decided upon for the meeting of the A. A. A. S. As this location is central and convenient alike for both United States and Ontario Entomologists, it is expected that there will be a large attendance, and an interesting and enthusiastic meeting. All entomologists are requested to come prepared to aid in the matter; those who desire to present papers should send to the Secretary, Prof. A. J. Cook, Agricultural College, Mich., the subject they propose to discuss in order that it may be announced in the programme.

CORRESPONDENCE.

DANAIS ARCHIPPUS.

Dear Sir: I wish to enquire through your columns whether any progress has been made lately in explanation of the migratory habit of *Danais archippus*. The last information I have got on the subject being from the vividly descriptive pen of Dr. John Hamilton (CAN. ENT., Vol. xvii., No. 11), who showed clearly, that, up to that time, the facts and

the theories had failed to agree. Several causes have combined recently to turn my attention to the subject, notably a question from Mr. W. H. Edwards, as to its time of ovipositing here, which I could answer only in the most general terms. I have always regarded it as a misfortune that Mr. Roland Thaxter, in his account of what he saw in Florida (CAN. ENT., Vol. xii, No. 2), did not give the month or months in which his observations were made; it might have assisted us much in forming an opinion as to whether they were flocks from the north come for the purpose of going into hibernation or not, although the fact of some of them pairing is decidedly against the idea that these, at all events, intended to hibernate. They make their appearance here about the latter part of May, according as the season favors; the first ones are restless and energetic, like males looking for mates; not in the least broken or damaged; not so rich and bright in color as fall specimens, but fairly good withal. In a week or so they become more plentiful, and begin to mate, and for a time are scarcely seen but in pairs. Shortly after eggs may be found on the flower clusters of the milk-weed, which is not yet in bloom. They never seem to entirely disappear till fall, fresh hatched specimens mingling with the old battered ones of the early season. Their conduct in spring is quite in harmony with that of species which hatch from the chrysalis here. If they hibernated in this locality I should expect them to put in an appearance a good deal earlier than they do. I regard it as a particularly interesting creature in every respect; although so common, it is never "vulgar," never in a hurry; it has the easy grace of the leisurely class. I have thought that one who has seen it only in an open country can form but an inadequate conception of the diversity of its movements on the wing. To see one on a bright summer day, when a stiff breeze is blowing, disport itself about the wide-spreading top of a high tree, is a choice pleasure. It seems to fairly revel with delight in a gale; now it rolls and tosses and heaves, always heading against the wind; now it spreads its sails to the breeze, and is hurried violently backward and upward; again it furls them, and, slowly descending and advancing, it describes a variety of the most charmingly graceful curves and waves and undulations imaginable; a thing of beauty to look at, and a joy to think of forever after. Attempts have been made to attach to it common names. I have thought, when watching one at such a time, that "the storm king" would be very appropriate, and quite befitting its regal

character. In my former 'scrap on this insect, an error in punctuation occurs, which makes it rather confusing. The "at least every other day" there refers to my visiting the woods, not to the movements of the butterflies. I have but little of personal observations to add to it, having seen but one small gathering since. A stream of *Archippus* from the side of a wood attracted my attention. I entered to watch it go. There was nothing of the listless attitude of my former observations in this group. There was a general uneasiness pervading the whole flock, rather difficult to describe. It did not come from a working of the wings, but of the feet, as if the foothold was not good, and they were trying to secure a better, which produced a rocking motion, whilst continuously throughout the swarm one and another was dropping off to make for the edge of the woods and join in the grand procession.

J. ALSTON MOFFATT, Hamilton, Ont.

THE CLOVER-ROOT BORER, *HYLASTES TRIFOLII*, MULLER

Dear Sir:—As far as I know, this insect has not been mentioned in the *Entomologist* as occurring in Ontario. The beetle has appeared in this locality, and is doing incalculable damage to the clover fields. At the time of writing this, the beetles, which have hibernated in the root during the winter, have not all left their retreats, and may be counted by the dozen in roots badly infested. No doubt the insect has been working in our midst for some time, and at present fully three-fourths of the red clover, *Trifolium pratense*, is dead or dying from the injury caused to the root. The damage has not been all occasioned by the larvæ during the past season, for I found the perfect beetle driving channels in various directions through the roots during May and the early part of June. My observations correspond so well with the description given by Mr. W. Saunders in the annual report of the Entomological Society of Ontario, 1881, page 43, that I need only refer the reader to his paper.

June 9, 1888.

J. WHITE, Edmonton, Ont.

Dear Sir: Mr. Brehme, in his article on "The Early Stages of *Arzama Obliquata*," after stating its manner of feeding in the reed, says, "It then returns to the top and forms its pupa there." I would remark that that is not its invariable habit in nature, for I have found the chrysalis in early spring beneath the bark of a decaying stump, corresponding in that respect with *Diffusa*, and in some instances quite a distance away from the marsh where the reeds grow. From Mr. Brehme's dates it would appear to be double brooded with him.

J. ALSTON MOFFAT, Hamilton, Ont.

ON *BOLINA FASCIOLARIS*, HÜBN.

Dear Sir: In the pages of the CAN. ENT. I showed that Mr. Morrison's statement, that we had re-described *Bolina fasciolaris* Hüb., was an error, based upon a mistaken identification of Hübner's species. That my determination was correct, is proved by a letter of Mr. Butler's, published in *Entomologica Americana*, vol. iv., p. 13, where a specimen of the true *B. fasciolaris*, as determined by myself, is alluded to from my collection. This specimen came to me as from "Mexico." To my knowledge *B. fasciolaris* does not occur in our limits, but not improbably it may be found in the south-west. Mr. Butler thinks that it is highly probable that *B. ochreipennis* Harvey is the male of *B. nigrescens* G. & R., and thus repeats the suggestion already made by myself. The species will be known as *nigrescens*, this name being much the older. The genus *Bolina* of Duponchel is, in my opinion, incorrectly used, and our species should be referred to *Melipotis* of Hübner, as I have done in my Check List, where *ochreipennis* is doubtfully referred to as the male of the preceding species, *nigrescens* G. & R. (p. 39, No. 1145). The sexual distinction in ornamentation in *Melipotis* is peculiar and interesting.

A. R. GROTE.

CHANGE OF ADDRESS.—Mr. C. H. T. Townsend requests us to state that he has left the Adjutant-General's Office, War Department, and is now an assistant in the Division of Entomology, Department of Agriculture, Washington, D. C.

OBITUARY.

Miss Annie M. Wittfeld, only daughter of Dr. Wm. Wittfeld, of Fairyland, Indian River, Florida, died suddenly of rheumatism of the heart on the 10th April, aged 23. Fifteen months before—to a day—Dr. Wittfeld had lost his only son by brain fever while down the coast on a boating expedition, and so the stricken parents are desolate. It is about ten years since Miss Annie began to aid me in obtaining eggs and larvæ of butterflies, and it is mostly owing to her zealous, friendly and intelligent assistance that I have been able to learn the history of so many Florida species. Her death is a loss to science. The readers of this magazine will sympathize with Dr. and Mrs. Wittfeld in their bereavement.

W. H. EDWARDS.

DEATH OF THE "YOKOHAMA NATURALIST."

Particulars have been received of the death in Japan, on the 17th of February, of Mr. Harry Pryer, C. M. Z S., the Yokohama naturalist, at the early age of thirty-seven. When Mr. Pryer went to Japan in 1870 he was already known as an active Fellow of the Entomological Society of London. In the intervals of a busy mercantile career he interested himself in Japanese natural history, and soon became a recognized authority on the subject. In conjunction with Captain F. Blakiston, he wrote the standard monograph on the birds of Japan, and at the time of his death he was engaged in publishing in English and Japanese an important work on the butterflies of Japan, entitled "Rhopalocera Nihonica." Mr. Pryer was not only an assiduous collector, but a keen observer and a practical investigator, and his researches on the parasites of the silk worm have been of material advantage to the silk culture of Japan. His house and garden were filled with valuable specimens and collections of animals and insects, living and dead, and the loss sustained by the European community through his death is shared by the Japanese, who recognize the valuable services he rendered in connection with the establishment and maintenance of the museum at Tokio.—*Pall Mall Gazette.*