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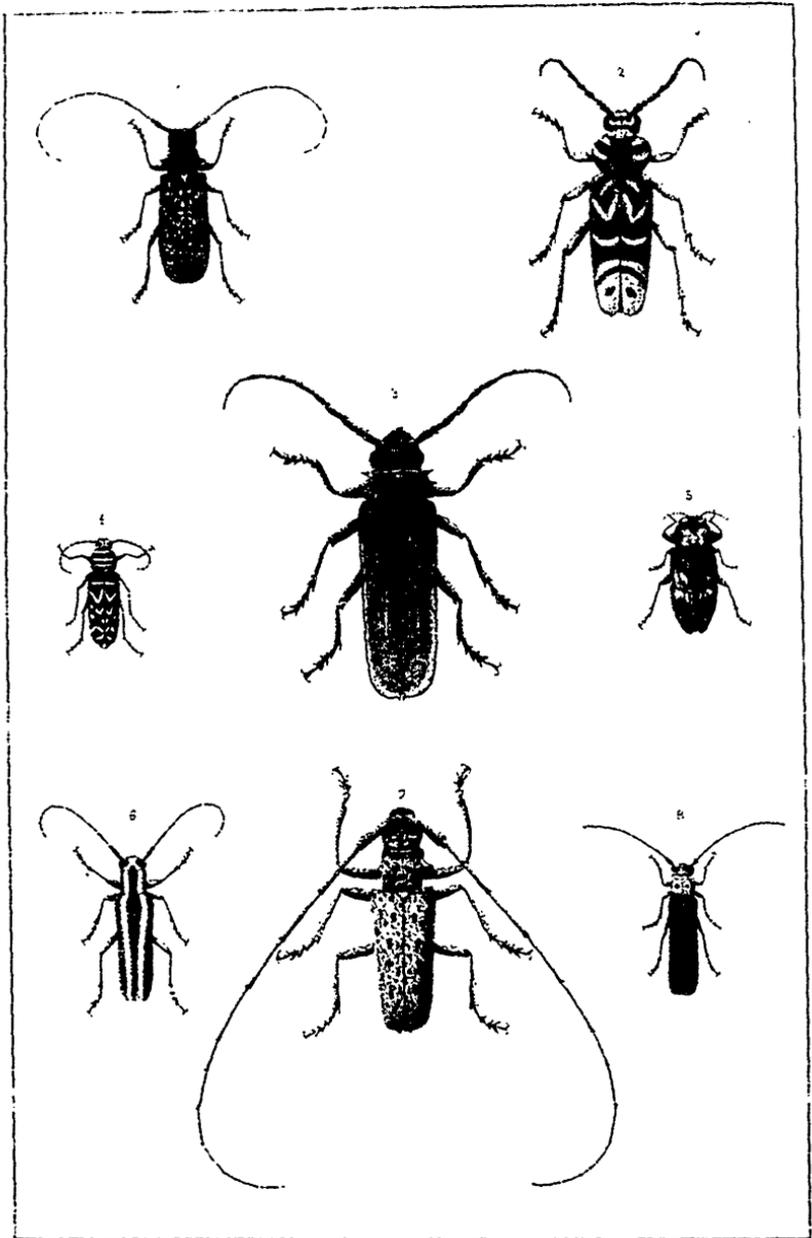
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ERRATA IN VOLUME IX.

The following corrections have been kindly sent us by J. A. Lintner, Albany, N. Y. :—

PAGE.	LINE.	CORRECTION.
29	13	For <i>melana</i> read <i>malana</i> .
90	5	" <i>robiginosaria</i> read <i>rubiginosaria</i> .
91	last.	" cinerofrons read cinereofrons.
92	27	" Stenopsis read Sthenopsis.
92	27	" argentimaculata read argenteomaculata.
96	28	" <i>Hemiluca</i> read <i>Hemileuca</i> .
98	2	" <i>Pholiosora</i> read <i>Pholisora</i> .
106	3	" <i>vautalis</i> read <i>rantalis</i> .
117	19	" eurydice read eurytris.
117	1	Place RHOPALOCERA before line 31, p. 116.
117	7	For <i>Nymphalides</i> B., read <i>Melitæa</i> Fabr.
117	27	dele melinus—a Californian species.
117	26	For lucillius read lucilius.
117	32	" <i>Palm.</i> read <i>Dalm.</i>
118	3	dele tenuis—a repetition.
118	7	Change SPHINGIDÆ to below HETEROCCERA, line 31, page 117.
118	9	For chamoenerii read chamænerii.
118	8	" Carpenter read Charpentier.
118	14	" procris read Americana.
118	24	" Peraphora read Perophora.
118	24	" Hüb. read Harris.
118	31	" Hypurpax read Hyparpax.
118	32	" " " "
120	6	" <i>Charandra</i> read <i>Charadræ</i> .
128	17	" <i>Smyrinthus</i> read <i>Smerinthus</i> .

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No. 1

HISTORY OF PHYCIODES THAROS, A POLYMORPHIC BUTTERFLY.

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

In the month of July, 1875, I chanced to be in the Catskill Mts., when Mr. Mead discovered the food-plant of *tharos*, as detailed by him in Vol. vii, ENT., p. 161, this being the common wild Aster, *A. Nova-angliae*, and I obtained from him a cluster of eggs; also afterwards got others for myself by tying the females in bags over the stems of the same plant. The larvæ hatched, and while in their younger stages I brought them to Coalburgh. On the journey, stopping at several points, I had to give them leaves of such species of Aster as I could find, and they ate any and all readily—even German Asters from the garden. By the 4th of September they had ceased feeding, after having all passed two moults, and slept. Two weeks later, part of them were again active and fed for a day or two, when these gathered in clusters and presently passed their third moult, and became lethargic, each one where it moulted, with the cast skin by its side. I placed all the larvæ in the cellar, and so they remained till 7th Feb., when such as were alive (many had died from mould), were transferred to leaves of an Aster which had been forced in the green-house. The same day some were feeding. They all passed in due time two more moults, making a total of five in some cases. But whether those larvæ which moulted twice only in the fall did not pass three moults in the spring I cannot say. Further observations are necessary on this habit. The first chrysalis was formed 5th May, and its butterfly emerged on 18th, or after 13 days. Another emerged on 30th, after 8 days, this stage being shortened as the weather became warmer. There resulted 8 butterflies, all *marcia*, 5 ♂, 3 ♀, and all of the variety hereinafter designated C, except one ♀, which was var. B.

The first individuals of the species seen by me, in the field, at Coalburgh, were 3 ♂ *marcia*, on 18th May. A single ♀ was taken 19th, two

on 23rd, two on 24th, and these were all I saw up to the last date, although I carefully watched for them. Shortly after, both sexes became common. On the 26th I took 7 ♀, and tied them up in separate bags, on branches of Aster. The next day 6 of the 7 had laid eggs, the clusters varying from about 50 to 225 eggs each. They were always laid on the leaves, and usually on the under side of them, in rows nearly or quite straight, and touching each other. In the larger clusters the layers were three deep. These gave me hundreds of caterpillars, and each brood was kept separate. The butterflies began to emerge 29th June, the several stages being thus : egg 6 days, larva 22, chrysalis 5. There were four moults and no more, but much irregularity in every larval stage, so that some of the butterflies did not emerge till 15th July. Just after these larvæ hatched I went to the Catskills, taking one brood with me, and they reached chrysalis there, and in that stage were mailed back to Coalburgh. I returned by the time the butterflies from these chrysalids were emerging. There was no perceptible difference in the length of the several periods of this brood and the others which had been left at home, and none of either lot became lethargic. In my absence the larvæ had been cared for by a member of my family, charged to note carefully all changes. The butterflies from these eggs of May, with a single exception, were *tharos*, and this one was *marcia* ♀, var. C. This was the second generation of the season, counting the one which proceeded from the hibernating larvæ as the first.

On 16th of July, at Coalburgh, I again obtained eggs from several females, this time all *tharos*, as no other form was flying. The eggs hatched in 4 days, the larval stage was 22, and chrysalis 7 ; but as before, many larvæ lingered. The first butterfly emerged on 18th Aug. All were *tharos*, and none of the larvæ had been lethargic. This was the third generation in succession, and from the second laying of eggs.

On 15th Aug., at Coalburgh, I again obtained eggs from a single *tharos* ♀, and took them directly to the Catskills, and they hatched just as I arrived there, 20th. This was the fourth generation of the season from the third laying of eggs. The weather in Virginia had been excessively hot, and so I found it on the journey, but on reaching the mountains it was cool, and the nights decidedly cold. Two days after my arrival the mercury stood at sunrise at 40°. September was a wet and cold month, and I protected these larvæ in a warm room at night, and much of the time by day, for they will not feed when the temperature is less than

about 50° Far. The first chrysalis was formed 15th Sept., 26 days from the hatching of the larvæ, and others at different dates up to the 26th Sept., or 37 days from the egg. Forty per cent. of this brood, or 52 larvæ out of 127, became lethargic after second moult. I entered in my journal as follows: "16th Sept., 52 larvæ have ceased feeding at second moult." "26th Sept., fully one-half of the larvæ which had ceased feeding at second moult began to feed again, after resting a few days, and have now passed third moult." After which they became lethargic and so remained. I was much puzzled at finding in the summer that the broods then had but four moults, as I satisfied myself by repeated tests, and that, in each brood, inasmuch as I had noted down three fall moults in some cases, and two in the spring in the larvae of 1875, and written descriptions of them. Moreover Miss Peart had made a drawing of this third fall moult, and it did not correspond with any one of the summer moults, though plainly later than the second, and much smaller than the summer third, besides differing from it in markings. But in the brood of larvae, whose history I have just recited, the two moults show for themselves, as I have them now before me, and the third agrees with Miss Peart's figure. The species passes five larval moults in the winter brood, though perhaps but four in some cases, and there are but four in summer.

I returned to Coalburgh 15th Oct., and till I reached this place the weather on the way had been cold, with several frosty nights. So that for a period of 30 days, the chrysalids had at no time been exposed to warmth. The day I arrived, the butterflies began to emerge, and before the end of a week all that were living had come forth, viz., 9 males, 10 females. Several were dead, from bruises received on the journey. Of these 9 males, 4 were changed to *marcia*, var. C, 3 were var. D, and 2 were not changed at all. Of the 10 females, 7 were changed, 5 of them to var. B, 3 to var. C. The other 2 females were not different from many *tharos* of the summer brood, having large discal patches on under side of hind wings, besides the markings common to the summer brood.

Ten of the chrysalids of this brood I mailed from the Catskills to Mr. Lintner, at Albany, N. Y., asking him to keep them in a cool place and watch the result. I have before me from these chrysalids 6 butterflies, which emerged between 21st Oct. and 2nd Nov., all females, and all of var. B. Of the remaining chrysalids, Mr. Meske, in whose charge they were placed, writes, 27th Dec., that three seem to be still alive, and

one is dead. In nature I do not believe this species ever hibernates in the chrysalis stage. These butterflies were more completely changed than were those from the chrysalids brought to Coalburgh, as appears by comparison of the results in the two cases.

And 18 of the chrysalids I had placed on ice, 20th Sept., laying them in a tin box directly on the surface of the ice, the temperature of the house being 40° Far. Part were so placed within three hours after the forming of the chrysalis, and before they had hardened; others within six hours, and others within nine hours, and so all remained for seven days, that being the longest summer period of the chrysalis. On removing them from the ice, they seemed to me dead. They were soft, and when they became hard had a shrivelled surface. I brought them to Coalburgh, and discovered no sign of life till 21st Oct., when the weather suddenly became hot, the mercury rising to 87°, with a south wind. In two days 15 butterflies emerged, every one *marcia*, not a doubtful form among them in either sex. There were 10 males, 5 females; of the former 5 were of var. C, 4 of D, 1 of B. Of the 5 females, 1 was var. C, 4 of B. The other three chrysalids were dead. All the butterflies of this brood were diminutive, starved by the cold, but those from the ice were sensibly smaller than the others. All the examples of var. B were more intense in the coloring of the under surface than any I ever saw in nature, and the single male was as deeply colored as the females, and this also I never saw in nature. The examples of the other vars. were extreme, but not so unusual.

So much for the Coalburgh broods, and I am able to compare their behavior with those of the same species in the Catskills. When I went thither in June, arriving on the 18th, I found a few male *marcia*, var. D, flying, no females. This was exactly one month later than the first males had been seen at Coalburgh. The first female was now taken 26th June, and on 27th and 28th I took one female each day, all of them *marcia*, var. C. No more were seen, and no *tharos*, though I was daily in the fields. So that the first female was 38 days later than the first at Coalburgh. These three females I set on Aster, and two forthwith deposited eggs. The females of this species give fertile eggs when but a few hours out of chrysalis, just as I have shown, Ent., Sept., '76, that *Arg. myrina* may do.

The eggs thus obtained I mailed to Coalburgh, and returning soon after, found that they had hatched, 3rd July. The first moult occurred on the 9th, the second on 12th, the third on 15th, the fourth on 18th, and

the first chrysalis suspended on 20th, its butterfly emerging 29th July. So that the periods were, egg 6, larva 17, chrysalis 9 days. Five per cent. of this brood became lethargic after second moult. This, then, was the second generation of the butterfly of the season, from the first laying of eggs. All the emerging butterflies were *tharos*, no *marcia*, and all were characterized by an intense blackness of the dark portions of the wings, as compared with any Coalburgh examples. Also nearly all the females showed the discal band on fore wings above yellow, instead of fulvous. (This last peculiarity, the change in the band, appeared in some of the females of the *third* Coalburgh generation, but no other.) On the under side the reticulated lines were unusually heavy, and the marginal cloud and the brown patches largely extended and deep colored.

This second generation was just one month behind the second at Coalburgh. So far only could I trace the Catskill generation this year; but, as in 1875, Mr. Mead obtained eggs on the 27th July and following days, the larvae from which all hibernated, that would be the second laying of eggs of the season, and the resulting butterflies the first generation of the following year.

So that, in the Catskills, the species is digoneutic, there being two generations annually, the first of which is *marcia*, or the winter form, and the other is the summer form, and a certain proportion of the larvae proceeding from the first hibernate (so far as appears) and all those from the second.

At Coalburgh there are four generations, the first of which is *marcia* and the second and third are *tharos*, and none of the larvae from these have so far been found to hibernate; and the fourth, under exceptional circumstances, has produced some *tharos* and more *marcia* the same season, a large proportion of the larvae also hibernating. But had the larvae of this brood remained at Coalburgh, where the temperature for several weeks after they left the egg remained high, the resulting butterflies would have been *tharos*, and the larvae from their eggs would have hibernated. And here I may say that, in addition to the broods spoken of, I also raised others at Coalburgh out of the line of regular succession, as midway between the second and third generations, for example, and none of these larvae became lethargic, and the resulting butterflies were all *tharos*.

The altitude of the Catskill region in which I was is from 1650 to 2000 feet above tide water, and the highest peaks of the range were

directly near. The altitude of Coalburgh is 600 feet. As appears, the changing of the larvae from New York to Virginia, about 40° latitude, besides the difference of altitude, and the reverse, from Virginia to New York, had no perceptible influence on the resulting butterflies of the several broods, except in case of the last one, where the effect of the change of climate was direct on part of them, both as to the form and the size. The periods of the Catskill brood of June may have been accelerated a trifle by transference to Virginia, but not more, for the weather in the mountains at that time was warm; and the butterflies retained their peculiarities of color, which, as I have stated, were very marked. So also they retained their habit of lethargy, which, I may say in passing, is a very serviceable habit in a two-brooded species of butterfly, in a mountain region, and exposed to sharp changes of temperature. If the fate of the species depended on the last larval brood of the year, and especially if the larvae must reach a certain stage of growth before they were fitted to enter upon their hibernation, it might well happen that now and then an early frost, or a tempestuous season, would destroy all the larvae of the district. The species in the Catskills, in such circumstances, would probably be about as scarce as it now is on Anticosti.

On the other hand, the May brood, taken from Virginia to the Catskills, suffered no retardation of their periods, as compared with other larvae of the same generation left at home, nor was there any change of color, nor did any larva become lethargic. It might have been expected that all of the last brood taken to the mountains would have become lethargic, under the severe conditions to which they were exposed, but the greater number resisted change even in this habit. From all which we may conclude that it takes time to naturalize a stranger, and that habits and tendencies, even in a butterfly, are not to be changed suddenly.

The larvae of *tharos* are at no period protected by a web, either one common to the community, as with *phaeton*, or one for each individual, after the habit of *mylitta*, according to Mr. Henry Edwards, in lit. They are exposed, just as are the larvae of *nycteis*, and the only shelter either of these species have is what the leaf over them affords. I have left larvae of *tharos* on the growing food-plant, uncovered by any net, till after first moult, expressly to test the point of a web, as it had been suggested that these larvae might wholly change their natural habit in confinement, something that, so far as I know, larvae never do. The larvae of *nycteis* I have seen naturally on their food-plant until after

third moult, and there was not a thread of a web.* The larvae of *tharos* are sluggish, and a pretty sharp jar is necessary to cause them to drop from the leaf. This they do in a coil, and their bristles effectually protect them from all harm.

When about to moult, the larvæ bred by me ceased feeding, and collected in groups on the covers of the glasses in which I usually kept them, resting for about 36 hours. The body contracted, and as the time for the moult drew near, the skin became glassy as it separated from the newly formed skin beneath. The spines and bristles of the new skin lie folded down and back, and as the old skin, after splitting behind the head, is shuffled past the successive segments, the spines and pencils of hairs suddenly spring up, and the latter instantly become divergent. For some moments the old mask adheres to the new face, but the larva presently proceeds to rub it off with its feet. When the larva prepares for chrysalis, it spins a button of white silk, and hangs suspended for about 24 hours, its position being nearly circular.

As I have shown, *tharos* is polygoneutic in West Virginia, digoneutic in the Catskills, of New York. In a high latitude, or at a high altitude, we might then expect to find it monogoneutic, and restricted probably to the winter form *marcia*. And this is precisely what does occur in the island of Anticosti (about lat. 50°) and on the southern coast of Labrador opposite. Mr. Couper, who collected in 1873 on the island, informs me that *tharos* is a rare species there, though he saw it in localities 100 miles apart; that he saw no examples later than 29th June, from which date "it disappeared"; and adds, "I do not think any of the diurnals on Anticosti or in Labrador produce a second brood." When he left, 27th July, "the weather was becoming cold and very few butterflies of any sort were to be seen." Also, "the summer temperature of Southern Labrador and Anticosti are about the same." Of *tharos* from Anticosti Mr. Couper has sent me 14 males, 8 females. Of these males, all are var. D; of the females, 1 is var. C, 7 var. D. With these also came 11 males, 2 females from Labrador, all of same variety, D. All these examples are of reduced size, as might be expected from so cool a region.

Dr. Weisman states (Sec Can. Ent., Vol. vii, p. 232), that Dorfmeister was led by his experiments on the effect of cold on the pupae of butter-

* I found last summer that *nycteis* larvæ will eat asters as readily as *Actinomeris squarrosa*, which hitherto I had fed them on.

flies to believe that temperature exerts the greatest influence during the turning into chrysalis, but nearly as much shortly after that time; and he considers it very possible that a period may be fixed at which the original tendency might be diverted more strongly. As related above, the chrysalids of *tharos* which were subjected to cold three hours after forming reached the same result as those which were exposed six and nine hours after forming. The period of exposure, 7 days, did not seem to me at the time very long for the purpose in view, especially as in Dr. Weismann's experiments the exposure had been from 34 days to three months. This too at a temperature of 33° Far., while in case of *tharos* it was but 40°. It is true, the greater part of the chrysalids of *tharos* which did not have an exposure to this artificial temperature also produced the winter form of the butterfly, but on the other hand some were not changed at all, whereas in all the chrysalids subjected to ice the change was complete and extreme. Nevertheless, it would have been more satisfactory had chrysalids of the summer brood been experimented with, and if I live to another summer, I will test the matter. It seems to me very probable that a much shorter exposure to cold immediately after the forming of the chrysalis—a day or two, or even a few hours—may be found to divert the direction of the form, in this species.

There is a very great range of variation in the winter form. It exhibits at least four well marked types, and there are sub-varieties about each of, and connecting, these. The first, A, has the basal area of under side of hind wings (which area comprises half the wings, and is occupied by the reticulated lines, while beyond is a clear field for a certain space) whitened or silvered, as is also the whole series of sub-marginal crescents, and there is either no marginal cloud, or but the slightest; the extra basal space buff. A sub-var. of this has the basal area whitened, but the rest of the wing clouded, and is between A and B. The second, B, has the whole surface, except a narrow border along costal margin, dark brown, running into blackish, but with a clear white or yellow belt formed of the outer reticulated lines, across the disk. Its principal sub-variety has the brown area broken, discovering a yellow ground, the belt remaining white, and is between B and C. The third, C, is variegated and gay, the ground being of a deep rich yellow, the marginal cloud extended quite to the belt, and ferruginous in color; a large patch on the disk and another on costal margin, both ferruginous; the reticulated lines of same color and distance, and a lilac flush over the whole hind margin. Sub-varieties of this have the

ground in shades of buff instead of yellow, the cloud and patches brown instead of ferruginous; sometimes the discal patch large, triangular and occupying a large part of the basal area; or in the form of an oblong band extending from middle of the wing to the inner margin, and met by a similar band filling the cell. C passes by grades into D. The fourth, D, has the ground color reddish-ochreous, the lines ferruginous, as also the extra discal points; the cloud and both patches pale brown, often a mere wash of color; on the fore wings the black spots are reduced and very pale, and the margin is pale fulvous and reddish-ochraceous. Of this type are the northern examples mostly; but in the Catskills and White Mountains, and in West Virginia, the red tint is less decided and the cloud and patches deeper colored.

And this variety D gradually shades into the summer form, particularly in the male, so that many examples of this sex cannot be distinguished from many males of the summer form. There is not much variation in these last, they being generally characterized by a restricted marginal cloud, obsolete discal patch, and very small, if not obsolete, costal patch. But the summer females are of two distinct types, one closely like the male, and consequently also the male of var. D of the winter form; the other quite different from its male, characterized by large brown patches on disk and costa, and a diffuse marginal cloud. This finds its counterpart in the female of var. D, or at any rate agrees most nearly with it, the peculiarities of the winter form being exaggerated in the summer.

Of these varieties, A is rare, and has appeared in none of the butterflies bred by me. I have occasionally taken it on the wing at Coalburgh, and in the Catskills. Var. B is common in W. Va., and nearly all the females taken in the spring are of this type; in the other sex it is rather rare, most of the examples being of var. C. Through the South also as far as Texas, beyond which I have not followed the species, var. B seems to be the prevailing winter form. It becomes less abundant to the north of Virginia, appearing but occasionally in the Catskills. At Albany, neither Mr. Lintner or Mr. Meske ever met with it.

Var. C is common in W. Va., in the male, and somewhat so in the female. So also in N. Carolina, if I may judge by examples sent me by Mr. Morrison. But I have not seen it from farther South, nor from Texas. It is common in the Catskills, and is occasional even to the extreme northern limit of the species.

Var. D is rare in W. Va., but in the Catskills the male of this is most abundant of all; the female much less so, being replaced by C and B to a great degree. Of 3 males, 3 females, sent me from New Hampshire by Mr. Whitney, and taken at random from his collection, all were of the winter form, var. D, except 1 female of the summer form. From Canada, Labrador and Anticosti, all the examples received were D, with an occasional exception of var. C. Of 4 males from Colorado, all were D; of 2 females, 1 is D, 1 C. From Lake Lahache, Br. Columbia, lat. 54°, and perhaps the most northern limit of the species, I have 1 male D, 1 female C. From New Mexico even, taken high in the mountains, 2 males are decidedly of var. D, and similar to the usual type from Anticosti in markings, the under side also being like that, red-tinted.

(To be Continued.)

DESCRIPTION OF A NEW BOTIS ALLIED TO FLAVIDALIS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

I have received from Mr. Frank W. Langdon, of Madisonville, Ohio, a specimen (♀) of a new species of *Botis*, which I name *Botis Langdonalis* after its discoverer. It is one of the largest and most striking forms yet made known, and belongs to the group of *flavidalis*, with which it agrees in the general color of body and wings. The fore wings from base to first transverse line are clouded with fuscous, and stained with ochreous. The two discal marks are present, the orbicular a dot, the reniform a streak. The space between the exterior transverse or elbowed line and the subterminal line is much *wider* than usual, and this space is filled in with a broad fuscous band crossing the hind wings as well; the lines are only indicated by the contrast of color. An ocher discal dot on hind wings. Beyond the broad common band the terminal space is narrowly yellow on both wings. Beneath white, opalescent, with discal dots and the broad shade band repeated. Palpi white tipped with ferruginous; body white beneath. *Expanse* 37 mil. *Length of body* 18 mil.

NOTES ON MELOE ANGUSTICOLLIS.

BY W. BRODIE, TORONTO, ONT.

In the Editor's "Notes on Cantharides," published in the December No. of the ENTOMOLOGIST, there are some particulars in reference to *Meloe angusticollis* which differ somewhat from my own observations on this species, extending over a period of seven years. According to my experience, *Meloes* make their appearance in the perfect state about the end of August or beginning of September, when they feed greedily on *Ranunculus acris*. Later in the season, when the abdomens of the females are much enlarged, they pair, and later still—sometimes after the first frost—they deposit their eggs and invariably die that season.

The larvæ emerge from the eggs early the following spring, and I think attach themselves to bees generally on the blossoms of the willow. I presume this because I often find females about to oviposit near to willow bushes, but I have detected the young larvæ in the flowers of *Caltha palustris*, and suppose they will take to any early flowering plant.

In confirmation of these statements I submit the following from my notes on *Meloe* in the vicinity of Toronto, dating from 1870.

Although *Meloc* is common here, I have never found them much further to the north, and as I am pretty well acquainted with all parts of the county, I would say they are not found in the central nor in the northern portions of the County of York. This is curious, as in the better wooded sections the stinging Hymenoptera are more numerous than about Toronto.

1870—Aug. 30th. In early morning saw several *Meloes* descending a white oak tree, in St. James' Cemetery, which tree was afterwards blown down and proved to be a *bee tree*. This would indicate that *Meloc* pupates in the hive, and when perfect, deserts it during the night.

1871. *Meloes* first seen Aug. 10th.

1872—Aug. 20th. *Meloes* feeding on *R. acris*.

1873—Aug.-Oct. *Meloes* very numerous, feeding on *R. acris*; found many females ovipositing in a cold, wet situation, after first fall frost.

1874—Aug. 29th. Found about forty *Meloes* closely huddled in a ball; they were not fighting, and although both sexes were present, do

not think they were pairing. None of the females had large abdomens, and when disturbed they all quickly ran away.

Sept. 1st—10th. Found about sixty *Meloes*, of both sexes, many of them pairing; feeding on *R. acris*, on a small miry patch, about one-fourth acre, bounded on the right by a small stream, which they could not cross; on the left, about 150 yards up a bank, were six hives of neglected bees. This is the same situation where, in 1873, I found females ovipositing after frost.

1875—Aug. Found *Meloes* in same localities as last season. Captured several females; fed them on *R. acris*; they began ovipositing Sept. 20th. Oct. 20th, all dead. The eggs were of an orange color, and placed in a hole about $\frac{3}{4}$ inch deep and large enough to receive the abdomen.

1876—Aug. 15th. *Meloes* first seen. Sept. 1st, found about fifty in a ball, as I had found them in 1874. Do not think they were either fighting or pairing; could not make out what they were doing; when disturbed they soon ran away. This season they were about as numerous as in 1875, in same localities at same dates.

From these notes, from my own recollections and from the recollections of my children, I infer that *Meloes* make their appearance about the middle of August, that they pair and oviposit before the winter sets in, and that they never survive the winter; and also that they are very seldom, if ever, found under stones in the neighborhood of Toronto.

[We are very glad to get these highly interesting and valuable notes from our esteemed correspondent, and hope to hear from him again before long. As *Meloe angusticollis* is rarely found in our neighborhood, most of the statements made in reference to it were given by us as the results of the observations of others.—ED. C. E.]

NOTICE.

Tortricidæ.—I shall be much obliged for specimens of *Tortricidæ* from collectors in all parts of the U. S. and Canada, as I am now working on that group. Credit will be given to all persons supplying me with material. It is desirable that notes should be furnished of food plant or date of capture. All material sent to me will be determined as fast as possible, and on the completion of my work, sets of specimens will be returned named to the contributors.

A. R. GROVE, Buffalo Society of Natural Sciences.

ON SAMIA GLOVERI AND COLUMBIA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

The type ♀ specimen of *Samia Gloveri* having been presented by Mr. Strecker to the collection in the museum of which I have charge, I have most carefully compared it with the type ♀ specimen of *S. columbia*. I am bound to state that I cannot find any difference except the rosy color of *Gloveri*, and there are no characters which I consider of value to separate the two species. I freely admit that the examination, however carefully made, of only two specimens, both of which are old and in poor condition, is scarcely sufficient to determine this point, but I wish to draw the attention of students who may have a larger amount of material for comparison, to the facts stated, with the hope that the true relationship of these insects may be determined.

The suggestion that *S. Gloveri* is perhaps produced by the different conditions surrounding it in the country in which it is found (a salt deformity) is very easily made, but I should object to such a conclusion until we are placed in possession of fuller information regarding the early stages of both species. It would be very interesting and important to know with certainty whether any other Lepidoptera from Utah and Arizona present similar differences in color, among the same or related western and eastern species.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ERRATA.—Ante p. 19, tenth line from top, for “Drura” read Denver. Ante p. 136, eighteenth line from bottom, for “Philonome Staintonella” read P. Clemensella.

Laverna grissella Cham.

This proves on comparison of specimens to be identical with *L. Murtfeldtella* Cham.

Gelechia glandifuella Zell.

Further examination satisfies me that *G. sella* Cham. is the same species.

G. gallaesolidaginis Riley.

The specimens bred by me in the Rocky Mountains (see *Cin. Quar. Four. Sci.*, v. 2, p. 289) belong to this species, but as suggested (*loc. cit.*) they are much smaller and the markings are indistinct.

Gelechia roseosuffusella Clem.

I have received specimens of this species from Mr. J. D. Putnam, which were taken at Springlake Villa, Utah. It is very widely distributed over North America.

Glyphipteryx montinella Cham.

This species may be distinguished by the fact that the large dorsal streak is behind the first costal streak and opposite to the second, with which it is sometimes confluent; besides, the first costal streak is as large or sometimes even larger than the large dorsal streak. In some specimens there is a dorsal white spot on or near the base; the apical half of the fore wings is rather golden brown than golden, as I have described it. The form of the hind wings is like that of *G. equitella*, but much broader, while *G. exoptatella* has these of the same form, and not wider than in *equitella*, or but little so.

Coleophora bistrigella Cham.

In the description of this insect I have considered the golden or "pale sordid ochreous" as the ground color. It will perhaps be more easily recognized if we consider the white as the ground color, with two wide golden-yellow streaks from the base: the first being the widest and going to the apex, and the second near to the dorsal margin.

Gracilaria (Coriscium) quinquestrigella Cham.

A typographical error (I suppose) in the description of this species makes me say: "annulus about the middle of the third joint at its tip"; the words "and another" should be inserted after "joint." Possibly (though I do not think so) I have two species before me, though there is some variation in the ornamentation. The first four costal white streaks differ in length in different specimens. (These all point obliquely back-

wards, whilst the fifth one, separated a little from the others, points obliquely forwards.) The wing behind the fifth costal streak is a little darker than elsewhere, and some specimens may be said to have a large brownish apical spot. There is a dark brown hinder marginal line at the base of the ciliae, which are tipped with brown at the apex. The line of union of the white of the dorsal margin with the brown color of the wing is irregular, and in some specimens it is marked by distinct brownish spots, and sometimes the white of the dorsal margin contains behind the middle a narrow brown longitudinal line which passes obliquely down towards the apex.

G. alnivorella Cham.

I find a specimen of this species among a few species sent to me from Lake Villa, Utah, by Mr. J. D. Putnam.

Helice palidochrella Cham.

Though the larva is unknown, I am convinced that it feeds in some way upon *Gleditschia triacanthos*. In Kentucky it makes its appearance in the imago about the 15th of May, resting on the trunks of *Gleditschia* trees with the wings horizontal and a little divergent, and the head lowered and abdomen raised. Sometimes the fore wings are so densely dusted towards the apex as to give the appearance (to the inward edge) of a small brown spot lying along the base of the costal ciliae; the base of the costa is usually brown, and sometimes there is a small creamy patch on the wing before the first costal streak, which is a narrow triangle with the apex at the fold, and is sometimes margined before and around its apex with a creamy or pale ochreous color. The legs and abdomen are dark brown or blackish, annulate with white, and the anal tuft is white.

CANADIAN HEMIPTERA WANTED.

At the request of our esteemed correspondent, Dr. White, we gladly find space for the following notice, and trust that during the coming season some of our energetic collectors will devote some attention to this order and aid Dr. White by sending him material.—Ed. C. E.

TO NATURALISTS AND OTHERS.

As I am at present working at the Hemiptera of the world, I should be very much obliged for specimens from any part. For the benefit of those who may kindly wish to help, I give a few hints on the collection and preservation of this neglected order of insects. Hemiptera (which include the various insects popularly known as Plant-bugs, Tree-hoppers, Cicadas, Fireflies, Aphides, &c.) resemble in general appearance Beetles, but have more membranous upper wings (or wing cases), and are usually of softer consistence, besides having their mouth provided with a rostrum or proboscis, instead of jaws. In size, Hemiptera vary from an inch or more to less than one line in length. In color they are also variable, some being exceedingly brilliant, others very obscurely colored. They inhabit trees, shrubs and low plants; some run about on the damp margins of streams and lakes, some inhabit the surface of the water, and others swim in the water or crawl on the mud below. A few live under the dead bark of trees, and are usually flat and dull colored. The best mode of catching those on trees and shrubs is by shaking the branches over an inverted umbrella; those that are found on or under low plants (grass or other herbage) may be collected by sweeping the herbage with a net (which can easily be made out of a ring—12-18 inches in diameter—of stout wire, attached to a stick, and having a bag of canvas sewn on to it). They may also be found by searching on flowers and leaves. Those at the margin of the water may be found by searching; those on and in the water by using a net similar to the sweeping one, but with canvas open enough to allow the water, but not the insects, to pass through. Rather shallow, still water, among weeds or in open places among weeds, are the best situations. Many species fly into houses at night, attracted by the lights. In habits these insects are variable: some move slowly, others run or fly with celerity, and others (Tree-hoppers, &c.) jump with great activity. As many species closely resemble each other, it is desirable that *all* specimens met with should be secured. It is also desirable that *small* species as well as large ones should be collected, as it is among the former that most undescribed forms may be expected. To kill and preserve these insects, all that is necessary is that on capture they are put in a bottle filled with spirits of wine (rum, whiskey, &c., will do). Care must be taken, however, that the bottle is kept filled with fluid, otherwise the specimens will be shaken about and broken. So in transit great care must be taken to guard against the evaporation of the spirit. The bottles,

if not filled to the top with specimens, should have the empty space filled with crumpled pieces of paper, then filled with spirit, and tightly corked ; all the bottles may then be packed into a larger one, or jar, also filled with alcohol and tightly corked.

In return for any specimens (few as well as many) kindly sent to me, I shall be happy (if wished) to return named specimens, or to give in return named British Lepidoptera, Coleoptera, Hemiptera, or Flowering Plants ; or in certain cases I shall be glad to buy specimens.

Communications may be addressed to

DR. BUCHANAN WHITE, Perth, Scotland.

CORRESPONDENCE.

DEAR SIR,—

In ENT. for Nov., Mr. Lyman calls attention to an apparent discrepancy between a statement made by me as to the appearance of the sexes of butterflies and the facts as he has observed them. My statement had reference solely to the butterflies emerging from chrysalids of bred larvæ. No one has failed to observe in the field that the males of most butterflies are seen from several days to two weeks earlier than the females. I have repeatedly mentioned this myself. See notes on *ajax*, on *aphrodite*, and *pseudargiolus*, in Butt. N. A., vol. 1 ; also, on *cybele*, ENT., 6, 124. Nevertheless, in breeding I have found that either sex may first appear, or they will alternate irregularly until the whole brood has emerged. See mention of this on page 11, Butt. N. A., where of two broods of *ajax* the females first emerged. It is so with all *Papilios*, *Colias*, *Graptas*, etc., etc., that I have bred in any numbers. Of course when one or two butterflies of a brood only were raised, the result would be of no value. Thus a single *diana* and a single *aphrodite* emerged out of a large number of larvæ hatched of each. But in other cases I have bred the butterflies by scores and hundreds, and the result was as stated. In case of *dyton*, the behavior was different ; see Butt. N. A., vol. 2. Why such differences between species of butterflies occur, or why bred examples should behave differently from those in the field, I do not attempt to explain.

W. H. EDWARDS, Coalburgh, W. Va.

ON THE HABITS OF AMBLYCHILA CYLINDRIFORMIS, SAY.

DEAR SIR,—

This beetle, usually considered very rare, is, I am satisfied, much more common than heretofore supposed.

I base this opinion on my own observations, and have a good collection to sustain it. Their peculiar habits are evidently the great cause of their rarity, and, once understood, I am positive they will become quite common.

Their geographical distribution is, so far as is now known, rather limited ; yet there is now no reason to suppose that they will not eventually be found extending over a large portion of Kansas and Colorado.

The following is such as I have learned concerning them :

Nocturnal (Crepuscular) rarely being taken until after sunset, and occasionally in the early morning. Found usually along clay banks, where they live in holes generally made by themselves, where they find that seclusion so congenial to their nature. The state of the weather affects appreciably this insect. When cold and blustery they remain concealed, preferring a warm, balmy air ; occasionally a *warm, cloudy afternoon* will entice them from their retreats, but this is rarely to be expected. Like the rest of the *Cicindelidæ*, they are predaceous. They also feed on effete matter. In many of their habits they are like *Asida*.

HARRY A. BROUS, Manhattan, Kansas.

ON CAPTURING CATOCALAS IN THE DAY-TIME.

DEAR SIR,—

According to promise, I give you my method of capturing *Catocalas* in day-light. I very seldom take my net with me when hunting them, as they are such lively insects when in the net that they are sure to injure themselves by rubbing the scales off the thorax, which spoils their appearance. I take with me a long blue beech sapling, a wide-mouthed wine-glass with the bottom broken off, a piece of pasteboard and a small bottle of chloroform. When on the ground where I usually hunt them, which is a wood of white oak and hickory, I commence by rubbing the blue beech stick quickly up and down the side of the tree. The *Catocalas* usually settle low down on the trees, and when disturbed by the noise made by rattling

the stick, they fly off to some other tree near at hand, where they settle with head down and wings closed. I then go quietly up and place the glass over the insect, and with the other hand push the pasteboard under the glass and secure it; a few drops of the chloroform having been poured on the pasteboard, the moistened part is slipped under the glass, and in a very short time the moth is quiet, when I pin it and put it in my box, and start for more game. In this way I rub every oak and hickory tree that comes in my way. I find that the insects prefer the trees of medium size and that some of the darker-winged varieties are oftener met with on the hickory and red oak; yet from the white oak I have obtained by far the greatest number of species and specimens.

The best time in the day for operating is, I think, from 1 to 4 p. m. As the evening advances the moths become more restless and often alight so high up on the trees as to be out of reach. In such cases I have sometimes tied the glass to the pole, and when secured, have drawn them carefully down, rubbing the glass against the bark; this, however, requires to be done very carefully, or the insect will be injured. Sometimes the insects settle with their wings open and head pointing upwards, when they are much more difficult to approach, and if disturbed, will often fly upwards and settle high on the tree.

As to weather, I have succeeded best after a very warm day and night, with the wind southerly; if the wind is a little strong, so much the better, as the moths will not then fly so far when disturbed. They always sit on the north side of the tree, and when the wind is easterly or northerly very few will be found. I have tried the Cyanide bottle, but prefer the wine glass and chloroform, as I think that when treated in this way the specimens have a fresher look. When the weather is windy, I have often observed the black-winged varieties fall to the ground when disturbed, and hide themselves among the grass. In the manner thus detailed I have captured *Catocalas* for seven years past with much success.

WILLIAM MURRAY, 115 Maiden Lane West, Hamilton.

LARVA OF THYREUS NESSUS.

DEAR SIR,—

I am not aware that any description of the larva of *Thyreus (Amphion) nessus* has been given, so I send you the following extract from my notes :

Mature larva of *Thyreus nessus* Cram.—Two and a half to three inches in length, tapering gently from the fourth segment to the head. Color—uniform chocolate brown, thickly dotted over the body, and particularly along the dorsal line, with dark amber, of which color are also the eight lateral or stigmatal stripes. Anal horn on eleventh segment, very short, one-fifth of an inch in length. Very sluggish in its movements, showing none of the irritability of *T. Abbotii* when touched. When at rest, it stretches itself at full length along the leaf, or leaf stem, of the plant on which it feeds, never raising or retracting the anterior segments.

Pupa dark brown; formed either among rubbish on the surface of the ground, or slightly beneath the surface. Tongue case internal, not visible.

Feeds on fuchsia. Pupa 11th, 12th, 13th July. One imago on 8th August. Two others not yet emerged, and probably will winter in the pupa state. Notwithstanding the presence of the anal horn, and the difference in habit betwixt it and *Abbotii*, I regard *nessus* as a true *Thyreus* and recommend its restoration to that genus.

Parthenos nubilus Hüb.—I propose to substitute for the above generic name, which is also occupied by a genus in Rhopalocera (Hüb. Verz. bek. Schmett., p. 38, 1816), the generic name *Catocalirrhus*, reading thus: *Catocalirrhus* W. V. A., *nubilus* Hüb. My reason for changing the name in Heterocera instead of in Rhopalocera (no law preventing it), is on the ground of convenience, the butterflies having a majority of species in this genus. Furthermore, I feel certain that after a little more investigation we shall be able to refer *Catocalirrhus* to *Catocala*.

W. V. ANDREWS, 36 Boerum Place, Brooklyn, N. Y.

BLACK VARIETY OF *P. TURNUS*.

DEAR SIR,—

In answer to Mr. W. H. Edwards' query concerning the northern limits of the black variety of *P. turnus* ♀, I would say that at Omaha, in this State, the dark variety is more frequently met with than the yellow one. Here at West Point, the species is not so common on account of the scarcity of its food-plants; however, we have both varieties in about equal numbers. The same can be said of this insect as far north as the Niobrara River, where the species seems to become quite scarce.

LAWRENCE BRUNER, West Point, Nebraska.