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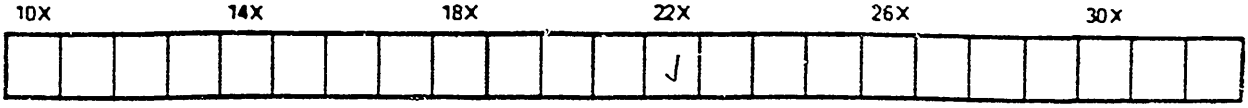

The Canadian Entomologist.

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THE NOCTUIDÆ OF NORTH AMERICA AND EUROPE.

(First Paper.)

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

We have seen in several of my previous papers that the Owlet Moths, or *Noctuidæ* of temperate North America, the United States and Canada, resemble most strongly those of Europe. The divergence lies chiefly in the greater number of species belonging to the *Noctuidæ fasciatæ*, or *Catocalinæ*; and this is a tropical feature, such forms becoming more plentiful as we go southward, although *Catocala*, the typical genus of the group, does not seem to cross the equator, to which latter fact I have already called attention. Forms allied to *Phcocyma (Homoptera)* and belonging to this group, intrude into the European fauna, on the coasts of the Mediterranean. From the fact that the Southern States reach into the sub-tropics, the mountain chains forming no cross barriers, there is no impediment to the range of southern moths, and a greater number of species and genera of these extend into Canada and the north. The resemblance between the *Noctuinæ*, or *Noctuæ nonfasciatæ* of Europe and North America, can be traced in that the leading European genera are represented with us, and the species are even more numerous. Such leading genera, about which genera of less importance cluster, are *Apatela (Acronycta), Agrotis, Hadena, Mamestra, Heliothis, Eustrotia (Erastria*, Tr. non Hübn). The genus *Catocala* has in North America its metropolis, where the number of forms, species and varieties reaches its maximum. The fact that the forms run very close seems to illustrate the observation that in the North-American fauna there exists an evident tendency to the differentiation, or throwing off of species. Instances of this may be cited in the Lepidoptera, in the genera *Argynnis, Colias, Papilio, Hemaris, Callimorpha, Datana, Clisiocampa, Scopelosoma*, among many others. As compared with the North-American species of

Catocala, the European are fewer in number and comparatively better marked and distinct, standing farther apart from each other. The hardening process by which each species becomes more isolated in time, seems to have reached a more final stage with the European species of *Catocala*, etc. I have orginally compared the European *C. fraxini*, with the North-American *C. relicta*. I found differences in size and color between the two "representative" species, on the whole so slight as to warrant the belief that the two were derived from a common ancestral stock. We must seek for this ancestral stock in the tertiary, when its range probably extended over Northern or British America, and Siberia. A character which is distinctive of the present European species, is the dull blue median band of the secondaries. Now, I found, and first recorded the fact, that, in certain examples of the American form which has the band white, a faint blue edging to the band was found. This was a reversion to the original color in all probability. The tendency of color to become brighter and lighter in America, owing probably to atmospheric or climatic conditions, is thereby exemplified. The specimens of *C. relicta*, which have the forewings dusky, are also probably instances of this reversion. A form belonging to this group of the genus has been also described from California. It is doubtful, as yet, whether this can be considered a distinct species. The variation of the North-American forms has led to the publication of a number of names which, in some instances at least, are not properly founded. This "hardening into species" seems to be a natural process by which we may conceive the forms to become gradually more peculiar, different from their surrounding allies. At length the time may arrive when they disappear by extirpation, having given rise themselves to other species, through variation, their species-offspring surviving them.

From a classificatory point of view, the genus *Catocala* can hardly be held as "typical" of the *Noctuæ fasciatæ*, the more geometriform group of the family. Rather is *Pheocyma (Homoptera)* to be thus considered; the wings are unicolorous, and the darker rivulous markings extend over both pairs, while the secondaries are more or less exposed in repose. In *Catocala* they are hidden, and Lederer sees no necessity for any sub-family division. Probably the terms are to be used strictly for the convenience of students. The tibiæ are often spinose in these wide-winged genera, and this character, not unusual in the family, the *Catocalinæ* have in com-

mon with the typical group of the *Noctuidæ*, where we see it in *Agrotis*, and a number of separated genera of smaller extent. This spinosity of the tibiæ is not frequent in the *Bombycidæ*, or in the *Geometridæ*; it is not so far apparent in the lowest group of the Owlet Moths, the *Deltoidinæ*. In the *Catocalinæ*, however, the body tends to become untufted and concolorous, the abdomen tapers to the tip, and the resemblance to the *Geometridæ* is further heightened by the looping larvæ.

Either from actual structural characters, or from the peculiar *form*, or as a matter finally of pure convenience for the student, I have divided the Noctuidæ into five sub-families: the *Thyatirinæ*, the *Noctuidæ*, the *Catocalinæ*, the *Deltoidinæ*, the *Brephinæ*. All these grounds for subdivision are recognized by modern systematists. The divisional terms help, as I have elsewhere said, to light up the group to enable us to compare the representation of the family in different quarters of the globe, and to arrive at conclusions relative to distribution and origin. For, on common sense grounds, I object to a classification absolutely technical and rigid; so rigid as to take no note of the plasticity of the forms, and so ignorant of the process by which a spine or a tuft is formed, as to be unable to determine categorically what characters are most difficult, or take more time to be produced in nature. The value of characters for systematic purposes may, therefore, stand in opposition to their biological value. A reasonable entomologist will therefore take note of *all* the facts presented, and will make his categories correspond, so far as possible, with the total qualities of the creatures he proposes to classify. The bare record of structure, and the erection of an artificial nomenclature is the smallest part of a naturalist's work. The thinking mind will discover the bearing of facts upon each other, and educe therefrom the action of natural law.

1.—Sub-family *Thyatirinæ*.

With the exception of *Pseudothyatira* and *Leptina* the generic representation of this group, which differs by the position of vein seven of the secondaries, is the same in Europe and North America. The former we may regard as a modification of *Habrosyne*, while the latter seems more removed from the different European generic groups allied to *Bombycia* (*Cymatophora* of Authors non Hübn). North America has one; Europe another, and Japan a third species of *Habrosyne*, so closely allied that they may be considered as geographical or representative species. These

species run much closer together than the species of *Thyatira*; in the size, the characteristic wavy markings, they are nearly alike. Although, the European species of *Thyatira* is sufficiently distinct from *Bombycia (Cymatophora)*, so that the ground for these genera being placed together is not obvious until we compare the neuration of the secondaries, the American western representatives approach each other more nearly in external characters. Of the two genera, it is *Habrosyne (Gonophora)* which is most aberrant, most like the typical Noctuae, most like the genus *Plusia*. And I would here record a most singular fact: older European writers, as Meigen, etc., place *Thyatira* near *Plusia*. Probably the cut of the wing in *derasa*, and the tufts, together with the bright tints of both *batis* and *derasa*, influenced their decision. But there are no special resemblances between the species of *Plusia* and *Thyatira* in the European fauna. Now, in North America, we have two species of *Plusia*, which actually mimic species of *Leptina* and *Thyatira*. The first of these is *Plusia formosa* Gr., which so closely resembles a *Leptina* that, at the commencement of my studies, I described the type under this genus. I had my doubts, owing to the long *Plusia*-like labial palpi, to which I especially alluded. It so happened, that I at once returned the type to Mr. Treat, while I never afterwards saw a specimen, owing in part to the undoubted rarity of the species. I could not myself then subsequently make the correction, which was supplied by the late Mr. Morrison, (who was largely indebted to me for generic and specific determinations in the *Noctuidæ,)* in the Annals of the N. Y. Lyceum of Natural History. The second instance, as its name implies, is the *Plusia thyatiroides* of Guenèe, which, in its rosy patches on primaries, reminds one of *T. pudens*. Had these two forms occurred in Europe, they might have strengthened, or of themselves suggested the opinion that *Thyatira* and *Plusia* were allied. As it is, the case is one of the most singular which I have met with in the moths. It is to Hübner that we owe the more correct classification of this group. How much we do owe to this author! This fact alone, and that he has correctly limited the genera, should oblige us to retain Hübner's nomenclature in this sub-family. Writers, who themselves make mistakes in describing structure, should be more modest in their criticisms of Hübner.

The various genera into which the typical European forms are divided by Hübner, are probably valid: *Bombycia*, *Asphalia*, etc. As against

the two European species of *Bombycia, or* and *ocularis*, we have two from the west coast, *improvisa* Hy. Ed., and *semicircularis* Gr. But the other European structural types seem to be wanting with us, *Leptina* seems to be quite distinct from these, and an American outgrowth. The species described by Walker from the east, under *Cymatophora*, I have partly examined, and have corrected his generic determination, so that it seems unlikely that we have any eastern representative of the European genera. It would seem to be a proof that the west coast fauna more nearly coincides structurally with the European, that the typical European genus of this sub-family, *Bombycia (Cymatophora)*, occurs there, and not in the east of North America. There seems to be, finally, some doubt as to what the west coast species of *Habrosyne* really is; whether our eastern *scripta*, which is rather unlikely, or a form identical with the European, which Mr. Hy. Edwards has suggested. While the species of *Pseudothyatira* seems to extend nearly, if not quite, across the Continent, our eastern *T. pudens* Guen. appears to be replaced on the west coast by *T. lorata* Grote. But I have seen no record of this species from California.

We may believe that the peculiar resemblance of the Californian and west coast fauna to that of Europe, has arisen partly in the fact that the preglacial fauna forced downwards during the Ice Age, has been on the west confined to a comparatively narrow strip between the Rocky Mountains and the Pacific Ocean, and that it has been exposed to lesser variation from migration. The temperature and food-plants necessary to many species are contained in narrower belts, with probably more abrupt confines, precluding the range of the species. Thus the original form may have been longer preserved.

I may conclude that this sub-family must be regarded as belonging to the Northern Hemisphere, and its representation in the New and Old World, as derived from a former circumpolar fauna. While certain generic forms found in Europe (at least two in number: the hairy-eyed *Asphalia*, and the naked-eyed genus of which *duplaris* is the type), do not apparently occur in America, we have, as an offset, the species of *Leptina*. We have also, in the more aberrant group of the sub-family, the peculiar genus *Pseudothyatira*, with its one species appearing in two forms, *cymatophoroides* and *expultrix*. On the whole, then, the representation of the *Thyatirinæ*, though probably without coincident species, is quite nearly equal in the New and Old World. For, if we have a representative

species of *Thyatira* in the east and another in the west, so Europe has one peculiar species, and, beyond the Ural Mountains, in Siberia, there is found a fourth. All these species differ in size and markings, so that they are readily to be distinguished; while the pattern of ornamentation, pale or pink blotches on the brown primaries, is preserved throughout, perhaps most strongly contrasting in the European *Thyatira batis*, which English collectors call by the pretty name of "Peach Blossom." Our eastern species of *Habrosyne*, *H. scripta*, surpasses, I think, the European *H. derasa* in beauty; it was first described from Canadian specimens by the eminent naturalist, the late Mr. Gosse, after whom I have given it the English name of "Gosse's Arches."

A LIST OF THE BUTTERFLIES OF PHILADELPHIA, PA.

BY HENRY SKINNER, M.D., AND E. M. AARON.

Appreciating the value to students in geographical distribution of faunal lists of a given region, with notes thereon, and the interest that such lists have for beginners in the same field in after years, we have concluded to publish here a list of the DIURNAL LEPIDOPTERA known to us to have been taken in the vicinity of Philadelphia. A circle drawn around the new City Hall, with a radius of ten miles, is the line of limit to the "vicinity" here treated of.

We wish to disclaim any intention to enter into the question of synonymy in this paper, and have, therefore, implicitly followed the catalogue of Mr. W. H. Edwards, edition of 1884, as being the most complete and at the same time the most accessible to students. The collections of the Academy of Natural Sciences of Philadelphia, of the American Entomological Society, and of Messrs. Peale*, Ridings*, Wilt*, Blake, Laurent, Johnson, Keen, Bartholomew, *et al*, have been looked through by one or both of us, or their owners have been consulted as to their captures in this locality. Very few of the species here enumerated are unknown to us personally as natives of this region.

To this we have added a brief list of species heretofore accredited to this region on what seem to us to be doubtful or insufficient grounds.

* Now in the possession of the American Entomol. Soc.

A few hitherto undescribed varieties have been given names, as we believe that any form sufficiently distinct to merit a characterization is worthy a distinguishing name. Such action, in our opinion, is in the interests of the science. A variety unnamed, or only indicated by a number or a letter of the alphabet, is much more likely to be ignored and subsequently redescribed than if it is at once elevated to the dignity of a recognizable name. *Papilio asterias*, var. *alunata*, is more likely to be respected than *P. asterias*, var. A.

Papilio ajax.—This species is said to have been found here in some numbers in past years. In a collecting experience of twelve years we have seen but three specimens. Pawpaw, its food plant, is scarce in this region. Nearly thirty years ago Mr. Newman reported rearing it in some numbers from the chrysalis.

Papilio philenor.—Occasionally common, but as a rule very few specimens are to be taken. During the season of 1888 a colony of larvæ was found here on the moon-vine *(Ipomœa bonei-nox)*, a cultivated plant which is grown to a considerable extent in West Philadelphia. Most of these were infested by parasites, which, at this writing, have not emerged from their chrysalids. A feature of the unusually warm weather of the past winter was the finding of a perfect ♀ *Philenor* flying in Logan Square, opposite the Academy of Natural Sciences, on February 26th.

Papilio asterias.—Common and very variable. One very interesting variation we think worthy of description.

P. asterias, var. ♀, *alunata*, nov. var.—Type, American Entomological Society. Expands four inches; emarginations faint and nearly white; primaries apically produced, with but four sub-marginal spots, each one growing fainter as the last one in the lower disco-cellular nervule is reached; the spot between 1st and 2nd sub-costal nervures is faint; in the marginal row the spots are smaller and rounder. Secondaries: marginal lunules indicated very faintly, the blue between the nervures bright and well marked; no yellow spots internal to the blue, except the one at the apex, which is much smaller than the normal. Beneath: primaries as above, the orange spots usual in lower half of the sub-marginal row wanting. Secondaries with the sub-marginal row of orange spots very much smaller than in the typical form. No spot in the cell. In the collection of Dr. Skinner there is a striking specimen which differs from

the type of *alunata* in that the lunate spots on the secondaries are normal except in colour, which is the same as those in *P. troilus*. The submarginal row of spots on the primaries is wanting, the first one very faintly indicated. In other respects it does not differ from *alunata*. Although the type specimen of *alunata* has no locality label on it, we have good reason to believe it to be from this region. The specimen in Dr. Skinner's collection was taken in Fairmount Park.

Papilio troilus.—Common.

Papilio turnus.—Common. Philadelphia seems to be about the latitude where the yellow and black *(glaucus)* females are found in equal numbers, and consequently, as is to be expected, interesting gradational forms have been taken here. A number of specimens of ochraceous females have been taken. One remarkable specimen was captured by Dr. W. L. Abbott at Chestnut Hill, and is now in the collection of Dr. Herman Strecker, of Reading. Perhaps the best way to convey a correct impression of its appearance is to say that were a black ♀ to be pasted over a yellow ♀ and the black then torn off in irregular shreds leaving the yellow to show from below, the specimen so treated would closely resemble this very striking form. The lines where the black and yellow join, while irregular, are abrupt. There is no flaking or commingling of the two colours. Another specimen, which, like the above, is believed to be unique, instead of being bi-laterally divided like those figured on plate 5, of Vol. II., of "Butterflies of North America," by Mr. W. H. Edwards, is divided antero-posteriorly. The primaries were *glaucus*, and the secondaries normal *turnus*. This specimen is also in the collection of Dr. Strecker.

Papilio cresphontes.—Occasionally taken. A fine pair have been seen in Fairmount Park, and several have been taken near Angora.

Pieris protodice.—*Pieris rapæ* seems to have pretty well supplanted the indigenous species *protodice*, the latter having been much more common some years ago. At the present time it may be said to be one of the rarer species. At Gloucester its food plant has been observed to be the common pepper-grass *(Lepidium Virginicum)*.

Pieris rapæ.—Painfully common. A number of specimens of a marked varietal form have been taken. They may be known as follows:—

Pieris rapæ, var. *immaculata*, nov. var.—Same size and form as the

parent form, from which it differs in that it has no spots on the upper or under side of the primaries. Described from five specimens in the collections of Am. Ent. Soc., Dr. Skinner and E. M. Aaron.

Anthocharis genutia.—Rare. While this species has been taken at Westville, N. J., five miles below Camden, by Messrs. Newman, Wilt and Johnson at three or four different times in the past twenty years, we have searched for it unsuccessfully for a number of seasons past, in April and May, and have not succeeded until this season (May 6th) in capturing it—two female specimens. These we found flying over banks on which the white-flowered *Cerastium arvense* grew thickly. The food plant, *Sisymbrium thalianum*, though usually not common, is found there in considerable quantities. The locality is directly on the red clay banks of the Delaware, just west of Westville, at the point where the large shad nets are hauled in.

Callidryas eubule.—Exceedingly rare. Two or three specimens only are known to have been taken. It is, however, common in the pine barrens of South Jersey.

Colias eurytheme.—Very rare. The form *Keewaydin* has been taken in a few instances.

Colias philodice.—Common.

Terias nicippe.—Rare at Philadelphia, more plentiful below Camden, N. J. The food plants, species of *Cassia*, are not common in this locality.

Terias lisa.—Moderately common, but very local. Feeds on false sensitive plant *(Cassia nictitans).*

Danias archippus.—Common. The caterpillar is usually infested with a dipterous larva, perhaps *Mascicera archippivora.* In some cases not one of a large number of caterpillars reaches the imago state.

Agraulis vanillæ.—Exceedingly rare. Probably only an occasional visitant. It is possible that it has been brought here in one of its early stages on its commonest southern food plant, *Passiflora incarnata.*

Argynnis idalia.—Plentiful some years; usually rare. On page 543 of his "Butterflies of the Eastern United States," Mr. Scudder states that "the female generally flies a little faster than one can walk hurriedly. The ample wings are flapped with great vigor, but do not seem adapted

to swift flight." Dr. Skinner, in CANADIAN ENTOMOLOGIST, Vol. XIV., page 20, has already pointed out, that in this region the flight of the female "is exceedingly rapid, and generally in a straight line for about one hundred feet; then they do not alight on a flower or a bush, or flutter about like the male, but suddenly drop like lead in the long grass. It would be almost impossible to tell the exact spot where they alight, as they drop so suddenly, but on approach near it they are off like a shot again." Our observation, and that of a number of competent observers, consulted by us, substantiate the accuracy of the latter description of the habits of the female. It is more especially true of fresh females, which are being sought by the males.

Argynius cybele.—Common. Mr. Scudder, on page 560, says:—"The eggs are laid upon the leaves and stalks of the food plant and not, as stated by H. Skinner, dropped from a distance upon the herbage." Dr. Skinner did not say or infer that this is the invariable habit of the insect, but simply recorded a single observation with the following comment:—"It remains to be seen whether this species always drops its eggs from a height, or only behaves in the peculiar manner occasionally while ovipositing." On page 562, Mr. Scudder asks:—"Is it possible that the female ever deposits by hovering in the air as Mr. Skinner reports?" Affirmative testimony, such as Dr. Skinner has given, is certainly, in a case of this kind, of greater value than any amount of negative testimony, and it should be added that Mr. G. H. Parker, now Instructor in Zoology in Harvard College, was present and also observed the actions of the female *cybele*, described by Dr. Skinner. Messrs. E. M. and S. F. Aaron have both also observed the same thing.*

Argynnis aphrodite.—Very rare.

Argynnis myrina.—Common in restricted localities. In the Proceedings of the Entomological Section of the Academy of Natural Sciences of Philadelphia, 1887, page 5, Dr. Skinner has described an interesting variation of both sexes of this species, found in Fairmount Park. These specimens are in the collection of Dr. Strecker.

* Since the above was written the authors have been favored with an opportunity at Westville, N. J., of observing *Argynnis myrina* following this same strange course in ovipositing. During this season also Mr. Aaron has detected *A. bellona* in the same habit, and he is strongly of the opinion that strange motions frequently observed in *A. diana* in Tennesse are to be accounted for in the same way, though at the times of observation they seemed quite unaccountable.

Argynnis bellona.—Never very common.

Euptoieta claudia.—Rare.

Melitæa phæton.—Rare; very local.

Phyciodes nycteis.—Very rare.

Phyciodes tharos.—Common in its various forms.

Phyciodes Batesii.—Reported to have been not rare in this locality twenty years ago. Tryon Reakirt described it from types found at Gloucester, N. J. We are not aware of its capture of late years, except in two examples.

Grapta interrogationis.—Moderately common.

Grapta comma.—Not common.

Vanessa Antiopa.—Common.

Vanessa Milberti.—Exceedingly rare. Only two or three specimens known to have been taken here.

Pyrameis atalanta.—Very common. In this locality *Atalanta* generally feeds on false nettle, *Boehmeria cylindrica.*

Pyrameis Huntera.—Very common. Mr. E. M. Aaron has observed a female laying her eggs on the Canada Thistle *(Cirsium Arvense)*, in Fairmount Park.

(To be continued.)

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

The annual meeting of the Club will be held at Toronto in the room of Section F., University of Toronto Building, beginning at 9 a. m. on Wednesday, August 28th. Members of the Club are requested to register at once upon arrival and obtain the Club badge. Those who intend to contribute papers are requested to send the titles to the President, Mr. James Fletcher, Government Experimental Farm, Ottawa, Ontario, or to the Secretary, Dr. D. S. Kellicott, Buffalo, N. Y. It is expected that there will be a large attendance and an especially interesting series of meetings.

The annual meeting of the Entomological Society of Ontario will be held at London during the following week. It is to be hoped that many of our visiting entomologists and associates will be present.

DROVES OF LYCÆNID CATERPILLARS HERDED BY ANTS.

BY MRS. WYLLY, OF INDIA.*

The larvæ of *Tarucus theophrastus* Fabricus are cultivated and protected by the large, common black ants of Indian gardens and houses. The caterpillar, which varies in colour from light pure green to a dark reddish tint [this is a common variation in Lycænid larvæ], is about three-quarters of an inch long, louse-like in shape, and slow in movement, and it feeds on the *Zizyphus jujuba*, a small, thorny bush of the jungles with an edible, astringent, yellowish fruit, the "Byr-coolie" of the natives. Some Lycænidæ larvæ have the power of protruding and retracting at will two small, fleshy tentacles or horns, each tufted with a brush of fine hairs, from the upper surface of the tail segments. Between [on the next segment anteriorly] these tentacles is a small slit, from which they exude a small drop of a juice of some sort eagerly sought by the ants, and which they can generally procure by stroking the larvæ gently with their antennæ. The ants set up what appears to be merely a temporary nest at the foot of the tree, the better to carry on their operations. Just before the rains set in, about the middle of June, great activity among the inhabitants of a Zizyphus tree may be observed. The ants are busy all day long running along the branches and leaves in search of the larvæ, and without fail an ant will come to one full-grown, and meditating on the choice of a snug retreat [in which to turn to a pupa]. A friend or two turning up, the ants set to work to guide and drive their caterpillar in the direction they wish him to go, *i. e.*, down the stem of the tree towards their nest. This is not always an easy business if the prisoner is refractory and would prefer going somewhere else; but as a rule they are docile and easily led. Having kept guard over him until they get him safely into his proper berth in the row, and he has accepted their ultimatum as final, he drops off into a preliminary doze and undergoes his transformation into a pupa. If you gently scrape away the loose earth piled up at the base of the tree you will see some hundreds of larvæ and pupæ in all stages of development arranged in a broad even band all round the trunk and lightly covered with earth. The ants object to their being uncovered, and will immediately set to work to re-cover them, and if you persist,

* Reprinted from an article entitled Butterflies and Ants, by Lionel de Niceville, F.E.S., in the Journal of the Bombay Natural History Society, Vol. III., p. 164 (1888).

they will remove all the chrysalids and bury them lower down. When the butterfly is ready to emerge, which is in about six or seven days, it is tenderly assisted to disengage itself from its shell, and should it be strong and healthy, it is left undisturbed to spread and strengthen its wings and fly away. But if, by any mischance, it emerges deformed and too crippled to use its wings, a catastrophe occurs. In one case, a butterfly had fallen to the ground before its opening wings had dried, and one of the soldier-ants tried to rescue it. He carried it back to the tree with the utmost care, and made several attempts to assist the butterfly to hold on again. Finding his efforts unavailing, he left the cripple for a short time to recover itself. On his return, seeing no improvement, he appeared to lose patience, and, rushing in, bit off both the deformed wings at the base, and carried off the wingless body into the nest below, whether as food for the community or for what other purpose I was unable to ascertain. That was the only occasion on which I ever saw any high-handedness on the part of the ants, though their usual ill temper requires no very close observation to detect.

It is a curious sight to watch the fragile and delicate newborn butterflies wandering about, all feeble and helpless, amongst the busy crowd of coarse, black ants, and rubbing shoulders in perfect safety with the ordinary fierce big-headed soldiers; as odd a contrast as the fresh creamy whiteness of the opening wing, the flash of purple and blue, and the sparkle of green and silver eyes is to the darkness and dinginess of their queer home. For some time after the butterflies have gained strength to fly away, they remain hovering over the nest. A larva of a species of Catopsilia [one of the Pierinæ, or "Whites,"] I threw down as an experment, was immediately set upon and torn to pieces in a second by the ants.

I took a *T. theophrastus* larva from a tree, and introduced it on the pathway of another company of the same species of ants who lived in our verandah, but kept no "farm," and it was odd to see the ants come tumbling out headlong to fight the intruder, and the sudden way they cooled down on investigation of the foe; none attempted to harm him, and he was politely escorted across their boundary, the ants running alongside, and feeling him all over with their antennæ. This must have been instinct, as they could have no former knowledge of him as a "milk-giver." The dead chrysalids in an ants' nest are carefully removed and thrown away outside; the ants also distinguish between the dead and living.

ADDITIONS TO THE LIST OF CANADIAN COLEOPTERA.

BY ALVA H. KILMAN, RIDGEWAY, ONT.

(Continued from page 110.)

3443—*Trogoderma tarsale* Melsh. Not rare.

3683—*Carpophilus antiquus* Melsh. Rare; under bark of dead maple and beech.

3686—*Colastus maculatus* Er. Rare; took three or four from the stump of a maple tree, cut while the sap was running.

3712—*Eupuræa peltoides* Horn.

3753—*Cryptarcha strigata* Fab.

3823—*Corticaria pumila* Lec.

3871—*Bactridium striolatum* Reit.

By placing chips on the top of fresh-cut stumps of maple, oak and other trees, and turning them from time to time, these last-named species are found. Attracted by the flowing sap, they hide under the chips and may be taken along with the more common species of *Nitidulidæ*, *Trogositidæ*, etc., in considerable numbers.

3987—*Ptilodactyla angustata* Horn. Swept from weeds. June. Not common.

3992—*Eucinetus morio* Lec. Swept from bushes. Muskoka. August.

4015—**Cyphon collaris* Guér. Rare; beaten from wild gooseberry.

4031—*Dromæolus basalis* Lec.

4038—*Dromæolus striatus* Lec.

These species, a few specimens of each, were got by beating. I have no record of the plant.

4097—*Cardiophorus convexus* Say. Not common on conifers.

4217—*Elater pedalis* Germ. Several taken in sweeping net.

4228—*Elater socer* Lec. Rare; found two under bark.

4229—*Elater rubricollis* Hbst. One by beating in July.

———*Elater ? macilentus* Rand. One taken on beech. June.

4290—**Agriotes oblongicollis* Melsh.

4305—*Melanotus longulus* Lec.

4335—*Melanotus tenax* Say. Taken occasionally by beating shrubbery. June and July.

4439—*Corymbites fulvipes* Bland. Rare on beech and maple. June.

4475—**Corymbites fallax* Say. Occasionally on thorn.

4494—*Corymbites aratus* Lec. Two specimens on lake shore.

4542—*Drapetes geminatus* Say. I find these pretty little beetles in a certain locality each year on elder blossoms.

4666—*Actenodes acornis* Say. Rare; one specimen on oak.

4767—*Rhyncheros sanguinipennis* Say. Found one flying in a pine grove. Mr. Jas. White also got one on pine.

4820—*Pyropyga decipiens* Harr. Not rare; on beech and other foliage. June.

4911—*Podabrus corneus* Lec. One specimen; no record.

5177—*Clerus nigriventris* Lec. Quite abundant on pine brush. July and August.

5229—*Laricobius Erichsoni* Rosen. Taken on pine in May; quite common. This is the *L. rubidus* of the Toronto list and of Canadian collections.

5243—*Ptinus bimaculatus* Melsh. Three years ago I found one specimen crawling around in a cork-lined box used for duplicates. As I could not discover that my duplicates were infested, I did not overhaul the box. The following summer, June, 1887, I found two or three specimens of this interesting beetle in the same box. Since then I have kept it as a breeding place for this species, and in May, 1888, found several more specimens therein. I have no recollection of having ever placed in the box anything but Canadian beetles, and thus introduced it from abroad. The beetles submitted as food for the larvæ bear evidences of having been used as designed. Packard says that the commoner species, *Ptinus fur* Linn., is known to attack collections of insects.

5251—*Ernobius granulatus* Lec.

5254—*Ernobius lutcipennis* Lec. Both rare on pine. June.

5289—*Vrilletta convexa* Lec. One specimen taken while beating. Mr. Ulke says:—"This is a California species; never before saw it east."

5339—*Sinoxylon basilare* Say. Rare.

5404—*Enneartbron thoracicorne* Zeigl.

5408—*Odontosphindus denticollis* Lec. Rare; swept from shrubbery.

5459*a*—*Onthophagus Orpheus* Panz. One specimen flying. August.

6011—**Callidium æreum* Newm. Two taken at Ridgeway on pine, one at Edmonton by Mr. White, and one at Hamilton by Mr. Johnston.

6090—*Phyton pallidum* Say. I took a pair of these handsome little Longicorns on wilted leaves of red oak *(Quercus rubra)* July 12, 1887. It is rare indeed.

6183*a*—*Xylotrechus lunulatus* Kirby. Not common on hickory.

6209—**Microclytus gazellula* Hald. Several taken by Mr. Moffat at Hamilton. Three were taken here on hickory.

6609—*Bassareus detritus* Oliv. Several swept from foliage.

6671—*Pachybrachys trinotatus* Melsh. Not common; taken by sweeping with net, but I cannot say upon what plant.

6945*b*—*Oedionychis limbalis* Melsh. Beaten from leaves of ash and linden.

7003—*Systena blanda* Melsh. Rarely found in moss. March.

7534—*Hypophlœus tenuis* Lec. Not rare under bark of stumps.

7693—*Canifa pusilla* Hald. Quite common in fungi.

7698—*Nothus varians* Lec. Not common in crevices of bark on dead trees.

7840—*Mordellistena convicta* Lec. Found occasionally on thorn blossoms.

7900—*Xylophilus nebulosus* Lec. Taken while sweeping; rare.

7967—*Anthicus spretus* Lec. Not rare; by sweeping in wet places.

8364—*Apion erythrocerum* Smith.

8371—*Apion impunctistriatum* Smith.
These were found in moss in spring.

8427—*Phytonomus punctatus* Fab. Common on lake shore and in meadows. June to September.

8429—*Phytonomus setigerus* Lec. A pair taken by Mr. Jas. White, of Edmonton, Ont., on the sand near some stream or pond.

8440—*Listronotus sordidus* Gyll. Rare; on lake shore.

8567—*Onychylis nigrirostris* Boh. Occasionally found on the shore.

8575—*Endalus ovalis* Lec. Swept in numbers from the grass growing on the margin of a pond in the woods. August.

8582—*Lissorhoptrus simplex* Say. Common on the petals of the yellow pond-lily.

8607—**Otidocephalus Chevrolatii* Horn. Not rare on leaves of elm, etc.

8611—*Magdalis perforata* Horn.

8690—*Thysanocnemis helvolus* Lec. One specimen from foliage of hickory, July 26; this is a rare species.

8753—*Acamptus rigidus* Lec. Not common on lake shore.

8786—*Cryptorhynchus parochus* Hbst.

8788—*Cryptorhynchus pumilus* Boh.
8795—*Cryptorhynchus fallax* Lec.
These kinds I find occasionally on the bark of dead linden, etc.
8820—**Acoptus suturalis* Lec. Quite common on hickory. June and July.
8834—*Cœliodes flavicaudis* Boh. Rare; swept from smart weed (*P. persicaria*).
8893—*Pseudobaris t-signum* Boh.
9071—*Pityophthorus cariniceps* Lec.
9223—*Brachytarsus alternatus* Say.
These three species I have taken rarely while sweeping.

PREPARATORY STAGES OF EUPLEXIA LUCIPARA, LINN.

BY HARRISON G. DYAR, RHINEBECK, N. Y.

EGG.—Nearly spherical, flattened at the base, marked with about twenty-five longitudinal ribs and numerous transverse ridges, the former somewhat irregular and running to a depression on the summit; color whitish, with a circle around the middle and a spot on top of purplish-brown; these marks more or less confluent. Length about .5 m.m.

NEWLY-HATCHED LARVA.—Walks in the manner of a geometer, not using the central abdominal legs. It is of a whitish colour, with many black dots, from each of which arises a hair. Head, thoracic legs, and cervical spot, black. Duration of this stage about four days. When not feeding, the insect remains stretched out at full length on the back of a leaf.

AFTER FIRST MOULT.—Semi-transparent, whitish, with fine black dots as in the previous stage, a transverse row to each segment. Head whitish, mouth-parts black. Duration of this stage four days.

AFTER SECOND MOULT.—Differs from the preceding only in size. Duration, five days.

AFTER THIRD MOULT.—Whitish, a blackish lateral band with traces of dorsal and sub dorsal lines on first three segments. Black piliferous dots. Duration, six days.

AFTER FOURTH MOULT.—Much the same. The twelfth segment is somewhat thicker than the rest of the body. Semi-transparent, with the markings indistinct. Lateral line white, shaded with blackish above, the

black dots encircled with white. Duration of this stage about seven days. At this period, the larva was observed to use all its legs in walking; but the exact period when this power was acquired was not noted.

AFTER FIFTH MOULT.—The body now appears green. A row of white spots, one on each segment, above the interrupted sub-dorsal line. Duration about seven days.

AFTER SIXTH MOULT.—Head rounded and smooth, slightly depressed at the vertex, partly withdrawn beneath the skin of joint 2. Pale-whitish, mouth-parts darker. Body semi-transparent whitish-green; a lateral white line edged with blackish above. On each segment to the twelfth, an oblique blackish shade, running back from the base upward, and terminating in a white point on the next segment, these points forming a sub-dorsal row. The two points on joint 12 are nearer together and larger than the others. Joint 12 is thickened and larger than the other segments. There is an interrupted dorsal blackish shade with white points. Body furnished with thin, fine, short, whitish hairs. Duration of this stage seven days.

AFTER SEVENTH MOULT.—Mature larva. Similar to the preceding. Head slightly shaded with blackish above. The dorsal line appears as traces of a white dorsal stripe, edged with blackish on both sides, occuring in the fold between the segments. The color of the body is a darker, more velvety green, less transparent, but whitish beneath. There is a row of small whitish dots, one on each joint, above the spiracles, and another similar row between the dorsal and sub-dorsal lines. Each dot of both rows furnishes a short whitish hair. The two spots on joint 12 are quite conspicuous. Spiracles black. The larva rests with its body bent near the middle, forming a loop, the head touching the last segment. It feeds mostly at night. Length about 23 m.m. Duration of this stage about eleven days.

Pupation occurs in a very slight cocoon beneath the surface of the ground. There appear to be two broods annually, the winter being passed in the pupa state. This insect is common to America and Europe, according to Dr. Speyer.* Humphreys and Westwood give a figure of the mature larva,† and the same stage has been described by Edwards and Elliot.‡

* Entomologische Zeitung, Stettin, Vol. XXXVI., page 153.
† British Moths, Vol. I., plate 35, figure 5.
‡ Papilio, Vol. III., page 133.

NOTE ON THE GENERA GORTYNA AND OCHRIA.

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

I have lately had an opportunity of examining bred specimens of the European *Ochria ochracea (flavago)*. The clypeal tubercle may be felt with a fine pin or seen under the glass when the frontal scales are partly removed. We have two North American species agreeing with *Ochria*, viz., *Sanzalitae*, from California, and *Buffaloensis*, from the east. With the former, the European species has a nearer resemblance externally; our eastern species differing much in colour. The type of *Gortyna* Hüb., is *Micacea*, and the type of *Hydræcia* Guen., as indicated by an asterisk in the Species Genèral, is this same species. Consequently *Hydræcia* falls. The genus *Ochria* is used by Hübner for the sole species *flavago*, consequently this must obtain for the genus, which differs from *Hydræcia* of European authors mainly in the presence of the clypeal tubercle. While *flavago* resembles in colour several North American species of *Gortyna*, I may have overestimated its resemblance to our eastern *cataphracta*, although a resemblance certainly exists. The type of *Apamea* is now difficult to ascertain, but if, as I assume, it is really *nictitans*, it may give way to the earlier *Gortyna*, as the species do not seem to be generically separable. In CAN. ENT., XIV., 17, I gave a list of the North American species, which may be amended as follows:—

Gen. GORTYNA Hübn.

(= *Hydræcia* Guen.)

purpuripennis Gr.
juvenilis Gr.
erepta Gr.
immanis Guen.
obliqua Harv.
stramentosa Guen.
nictitans Esp.
var. *erythrostigma* Haw.
var. *lucens* Tr.
inquæsita G. & R.
cerina Gr.
rigida Gr.
impecuniosa Gr.
cataphracta Gr.
purpurifascia G. & R.
rutila Guen.
Harrisii Gr.
speciosissima G. & R.
cerrussata Gr.
marginidens Guen.
limpida Guen.
appassionata Harvey.
necopina Gr.
nitela Guen.
var. *nebris* Guen.
serrata Gr.

Gen. OCHRIA Hübn.
(= *Gortyna* Led.)

sanzalitæ Gr. *Buffaloensis* Gr.

The genus *Gortyna*, as above defined, contains species of Noctuidæ, having the ♂ antennæ of various structure, fringed with hair, brush-like, in *serrata* pectinated. The front is smooth, thickly, somewhat woolly haired. Labial palpi short, with small terminal article. The thorax has an elevated scale ridge behind the collar, and a tuft behind, while the abdomen is stout and usually untufted. The eyes are naked, the tibiæ unarmed. The larvæ, so far as known, are internal feeders in roots and bulbs. They are livid or yellowish, with dark warts, and prothoracic shield; pupating in the ground.

CORRESPONDENCE.

PHALANGODES ROBUSTA (Pack.)

Dear Sir: Packard, in 1877, described this species from specimens taken in Colorado by Mr. E. Ingersoll in 1874, but the precise locality and habitat were entirely forgotten. In his recently published memoir on the Cave Fauna of North America (Proc. Nat. Ac. Sci., Vol. IV.), he redescribes the species, which is of extreme interest as being an out-of-door species of a usually cave-inhabiting genus, and suggests that it will probably be found under stones, though its precise manner of life, etc., remain as little known as in 1877. I am therefore pleased to be able to record that I have found a *Phalangodes*, agreeing quite well with *P. robusta*, in very considerable abundance by Swift Creek, Custer Co., Colorado, in damp places in a grove of *Populus tremuloïdes, always under logs*, and never, to my knowledge, under stones. This is about 8,200 feet altitude. I met with the same species under logs near Clearwater Creek, on the Grand Mesa, Mesa Co., at about 9,800 feet altitude.

May 31, 1889. T. D. A. COCKERELL, West Cliff, Colorado.

A NEW MYRMOPHILE.

Dear Sir: On pp. 165–166, Vol. xx., Dr. Hamilton gives a list of eight species of *Cremastochilus* known to be Myrmophilous. I can add one other, namely, *C. Knochii* Lec., which I found in an ants' nest on March 30th, last year, near Swift Creek, Custer Co., Colorado, at about 8,100 feet alt. This was under a stone on the open prairie.

T. D. A. COCKERELL, West Cliff, Colorado.

Mailed July 2nd.