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## THE NOCTUIDÆ OF EUROPE AND NORTH AMERICA COMPARED.

(Seventh Paper.)

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

We have now passed in brief review the bombyciform *Noctuidæ*, or *Thyatirina*, and the typical *Noctuidæ*, or *Noctuina* (*Noctuæ nonfasciatæ*). The former group differs in certain details of the neuration, and the question comes up as to the value of this character for classification. In all other respects, this small assemblage of moths must be considered as belonging to the *Noctuidæ*. The palpi, though short, have the Noctuid form. The eyes are sometimes naked, sometimes hairy. The legs, though somewhat short, are not unlike those of other owlet moths; the fore pair have a tibial epiphysis so far as known to me. The fore wings are subtriangular with pointed apices. The resemblance to the *Notodontina* is seen in the neuration of primaries where vein five is intermediate, though this vein is sometimes wanting in the Bombycid group. But in *Nolaphana*, which Fitch considered a Tortricid, Zeller at first a Nolid, vein five seems also intermediate. This character of vein five of fore wings is, perhaps, of more value than the variations of the secondary costal veins. The difference in the position of vein seven of hind wings is, perhaps, not so important when we see that, in *Stilbia* and *Rivula*, vein eight springs from seven, the upper margin of the median cell. This is also the case with *Cerathosia*, and we may briefly consider the position of this moth. The name is derived apparently from the Greek *Keras*, a horn, in allusion to the clypeal tubercle perhaps; and *thosia*, whatever that may be, I know not. It looks like a piece of *Lithosia*, a name derived from the Greek *lithos*, a stone, so that it might seem as though Mr. Smith intended

to classify the moth as a Lithosian before asserting it to be an Arctian, "next to Utetheisa." I have already pointed out Mr. Smith's misstatements as to the neuration. These corrected, we have before us a Noctuid in all structural characters, except that the secondaries have vein eight of seven; but thus also paralleled by *Stilbia*. On the fore wings vein five originates near four, and runs nearer four than six. The clypeal tubercle and the legs, with a claw on fore-tibiæ, recall, as I have said, the *Stiriini*, and, so far as I can see from my six specimens, the tegulæ do not lie close to the thorax. But the squamation resembles that of *Tarache*, and we may place the moth after this group and before *Spragueia* and the *Eustrotiini*. Since 1868, I have been occupied in bringing our *Noctuidæ* into natural genera, founded on characters exposed by Lederer, characters used also by prominent recent specialists, such as Prof. Fernald and Lord Walsingham. It is therefore ridiculous for Mr. Smith to accuse me of ignorance of Lederer's definitions. But it will be better not to discuss any further Mr. Smith's remarks on this genus. The question whether relatively slight variations in the neuration can establish natural families in the Lepidoptera, is not to be decided after the fashion of Mr. Smith, but must be reasonably discussed. I have shown cases of individual variation in neuration, and science has not yet removed the scales and studied the veins of all the species of moths. We must not fall into the fault of tucking away an insect under a scientific label, but constantly occupy our minds with its various characters until its affinities become clear to us.

We may now enumerate the tribes into which I have divided the *Noctuina*. It may be premised that the genera thus associated may, in some instances, need transference. The limits between certain of these tribes seem faint, and I have had to rely often on somewhat vague and general characters for their definition. Unlike the Coleoptera, the investigator of the Lepidoptera is often at a loss to find structural features, so uniform is the general character, so soft the body parts, clothed with dense hair and scales, difficult to remove so that the external skeleton be studied. I have recognized the divisions of tribes, sub-families and families, and have endeavored to follow Leconte in his classification of the Coleoptera in my nomenclature. I think we should make a distinction between the characters employed for these divisions, and that we should not allow for a subordinate structural character a "family" value. On

this head the student is referred to a most valuable paper by Dr. Packard on the *Noctuidæ*, published in the Proceedings of the Portland Society of Natural Sciences, I., 153. This paper should be reprinted. It speaks of the natural value of the great families of moths, and contains statements of fact and admonitions to students, which can only be disregarded to the detriment of the study. From the relative intangibility of the structural characters of butterflies and moths, arises some necessary latitude of opinion. In no case is there any excuse for an improper criticism of the opinions of older or of more experienced writers. Rather is there room for a gentler treatment of this subject of our moths, these pretty locks of nature's fleece, so tender and so fleeting! In the paper above alluded to, Dr. Packard complains of the effect of amateurism on the literature of the science. No doubt in one sense the remark is well founded, but this amateurism is rather a proof of the attractiveness of the study and its aesthetic value. For my part I should be glad of the largest possible accession to the ranks of butterfly hunters and students, and I have tried always to do what I could toward creating a larger interest in this field. Elsewhere I have drawn attention to the greater general interest felt in England on the subject, and how valuable an addition to the charms of life the collection of butterflies and moths is proved to be. For this reason I have favored the gradual use of English names, and I have looked forward to the time when the distinction between "amateurs" and "scientists" should be obliterated by good work being done on all hands. Far more do I incline to disapprove of the work of those, whose temperament and training allow them to misrepresent what others have said and done, in order to ease their wounded vanity, or rise by improper criticism. Let us forsake such conduct. We are, as Mr. Scudder would call us, Aurelians, although this title smacks a little of the hobby, and it were well if our kinship in interest would make us kind. There cannot be an agreement, as the world is infinitely diverse.

The tribes of Noctuinæ I have defined are:—1, *Bombycoïdi*; 2, *Apatelini*, including *Bryophila*, although the disposition of the American genera is not settled between these two first tribes; 3, *Agrotini*; 4, *Dicopini*\*; 5, *Hadenini*; 6, *Arzamini*\*; 7, *Nonagriini*; 8, *Scolecocampini*; 9, *Nolaphanini*\*, only *Nolaphana*; 10, *Caradrini*; 11, *Orthosiini*;

\* These groups do not occur in the European fauna,

12, *Calocampini*, only *Lithophane* (*Xylina*), *Lithomia*, *Calocampa* and *Xylomigis*; 13, *Cleophanini*, only *Cleophana*. I regard *Nyctophæata* as a Heliothid; 14, *Cuculliini*; 15, *Eurhipiini*; 16, *Ingurini*\*; 17, *Anomiini*\*; 18, *Litoprosopini*\*; 19, *Calpini*; 20, *Stiriini*; 21, *Plusiini*; 22, *Heliothini*; 23, *Tarachini*; 24, *Cerathosiini*; 25, *Eustrotiini*; 26, *Hyblæini*.

There remain to be considered the geometriform *Noctuidæ*, or the *Catocalinæ* (*Noctuæ fasciatæ*), the pyralidiform *Noctuidæ*, or the *Deltoïdinae* and a small sub-family group, the *Brephinae*, containing only two genera, with few species, found in northern latitudes and elevations over Europe, Siberia and North America, a relic of a preglacial fauna. The genera are *Brephos* and *Leucobrephos*.

As may be drawn from the above names applied to the leading groups, the *Noctuidæ* are a large family, with various resemblances to the surrounding families of moths. The Owlet moths touch the Spinners, the Spanner and Sparkler moths, while the typical *Noctuinæ*, from their total form and embryology, bring the whole family, in a linear arrangement, between the two first. In number of species and structural variation the *Noctuidæ* yield to no other in interest, and its large representation in North America commends it to the attention of the student. For the student I have at least originally shown the way his studies in this group should be carried on. The matters of detail have not always seemed so important to me as the method, and this method I have originally introduced into the study, combining my reading with observations under the microscope. There is growing up a tendency, especially in Europe, where the living material is wanting, to engage in a sort of book working of nature. The new student constructs, out of the writings and pictures of others, some new turn to our views of life and variation, fancying even that Darwin may be damaged by such methods. It is vanity displayed in vain.

#### Sub-family *Catocalinæ*.

The earliest recognition of this group which I find in literature is that of Borkhausen, who calls this *Noctuæ fasciatæ*, in contradistinction to the *Noctuinæ*, or *Noctuæ nonfasciatæ*. These terms are clumsy and had better give way to those proposed by Packard (Proc. P. S. N. H., Vol. I., 153, et seq.). The wings are broad; primaries triangulate; secondaries

full, tending to be marked by continuous bands. The eyes are naked ; antennæ generally simple ; body usually untufted ; abdomen smooth and tapering ; the dorsal surface rarely crested ; the tibiæ not unfrequently armed. Packard says that the epicranium is longer than in the *Noctuinae*. The basis of this sub-family is comparative form. No single structural feature holds the genera together, and Lederer does not recognize its existence. Nevertheless the moths and larvæ seem to me more or less readily distinguishable, and that we may retain the sub-family term. Dr. Packard says (l. c.) that these two sub-families "agree in the main with the *Trifidæ* and *Quadrifidæ* of Guenée, though the use which he makes of the venation seems to us to lead to artificial distinctions. The very constant venation of this family does not admit of any variation in the grouping of these veins and their branches, and hence they offer characters of secondary importance." With this statement my experience fully agrees. I do not think that the venation alone should decide family position. There are already too many exceptions known to the system of Herrick-Schæffer, which is, in some cases, considered the test of family character by Lederer. I regard this paper of Dr. Packard's as of fundamental value in the study of the *Noctuidæ* ; the author, however, excluded the Deltoids, which, I think, from all their characters are *Noctuidæ*. It is not at all clear also, whether Dr. Packard considers the *Thyatirinae* as a distinct sub-family group. Probably not, and that they are merely a tribal division of the *Noctuinae*. To this view I should not seriously object, although I do not venture to decide upon it. The unequal characters by which we separate the *Thyatirinae* and *Brephinae* from the rest of the *Noctuidæ* are an objection to Lederer's classification. In the present series of papers the object is mainly to compare the fauna and the full discussion of this and similar points, must be left to a future occasion. Primarily this sub-family falls into two groups :—First, the tribe *Catocalini*, in which the secondaries, though often gaily coloured, are covered by and subordinated to the primaries. The European genera belong chiefly to this tribe. Secondly, the *Pheocymini* (*Pheocyma*, *Homoptera*, *Erebus*, etc.) in which the secondaries are partially exposed and marked like the forewings, decidedly geometriform moths. The larva thus first becomes geometriform as we recede from the higher *Noctuidæ*, and then the perfect insect follows suit.

## NEW NORTH AMERICAN HOMOPTERA.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

## IDIOCERUS CRATÆGI, n. sp.

Soiled white. Antennal depression, a dot on each ocellus, a pair of large round spots on the vertex, an angular spot behind each eye, the basal angles of the scutellum, the tergum and disc of the pleural pieces, black; the elytra whitish hyaline generally with fuscous nervures. Length about 6 m.m.

Front slightly convex, the sides gradually converging to the rounded apex. Clypeus narrow, at the apex abruptly but not widely expanded; loræ rather narrow; outer margins of the cheeks feebly concave. Pronotum short, hind edge obscurely concave, the posterior angles rounded.

Colour soiled whitish; tinged more or less with yellowish green on the margins of the vertex and face, sides of the pronotum, scutellum, basal and costal nervures of the elytra, and on the connexivum. A curved longitudinal cloud on each side of the front, and two subtriangular oblique spots between the ocelli, brown; these marks may be obsolete, or they may be deepened to piceous black in places. A narrow triangular spot below the antennæ, a dot on each ocellus, and a large round spot above the latter on the vertex, deep black. Eyes brown. Antennæ white, setæ brown. Pronotum with an oblong black spot on the anterior margin behind the inner angle of each eye, disc sometimes with an indistinct brownish cloud. Scutellum with a large triangular spot within each basal angle, and two dots before the transverse depression, black; the middle of the anterior field sometimes clouded with brown. Elytra whitish hyaline, ordinarily with heavy brown nervures; the shoulder, commissure and claval suture yellow, costal nervure at base brown. Wings slightly smoky, iridescent; nervures brown. Pleural pieces black, edged with pale yellow. Legs soiled white, tarsi black. Tergum black; connexivum yellow; venter yellowish, sometimes clouded with brown, laterally; pygofer in both sexes black, edged with pale.

Genital pieces, male: Last ventral segment large, subtriangular, convex, longer than the two preceding, and covering the pygofer for about

half their length ; the latter broad and short, almost cylindrical, meeting on the ventral aspect nearly to their tips, thus forming a small opening around the anal style, a little separated basally beneath the ultimate ventral segment ; plates slender, weak and flaccid, but slightly exceeding the pygofers in length, fringed with long soft hairs. Female : Last ventral segment as in the male, except that the apex is truncated or slightly concave ; pygofers short and thick, the blunt apex but little exceeded by the ovipositor.

Buffalo, N. Y., July and August, occasional on thorn bushes ; Hamilton, Ont., James Johnston, Esq. Described from five male and six female examples.

Allied to *I. lachrymalis*, from which it can be readily separated by its smaller size, different markings, and the form of the genitalia.

L'Abbe Provancher, in his *Petite Faune Ent. du Canada III.*, p. 288 (Jan. 1890), describes a very pretty little species of *Idiocerus* as *Bythoscopus clitellarius* Fitch, with the reference "Third Rept. Inj. Ins. p. 69"; this should have read No. 69, and may be found on p. 365 of the *Trans. N. Y. State Agl. Soc. for 1856*. Fitch, however, here refers to *Jassus clitellarius* Say, a species of *Thamnotettix* and not to the insect described by M. Provancher, for which I now propose the name *Idiocerus Provancheri*. This conspicuous little insect pertains to the group represented by *I. maculipennis* Fitch. It is not uncommon here at Buffalo on oak and other bushes through June, July and August. I have also taken it at Muskoka, Ont., and have seen examples captured at Hamilton, Ont. by Mr. James Johnston.

Since the publication of my paper on *Pediopsis* in *Ent. Am.* for Sept., 1889, I have received from M. Provancher a pale example of *Bythoscopus fenestratus* Fitch., labelled *Pediopsis flavescens* Prov., and accompanied by a note stating it to be a typical example. It agrees well with his description in the *Nat. Can.*, IV., p. 376, Dec., 1872, and it is the insect described as *Pediopsis flavescens* on p. 295 of the *Petite Faune Ent. du Can.*, Feb., 1890. This, therefore, leaves the insect described by me as the *flavescens* (*Ent. Am.*, V., p. 173, No. 7) without a name. It is a well characterized species, and may be called *Pediopsis canadensis*,



## PLATYMETOPIUS FRONTALIS n. sp.

Smaller and shorter than *P. acutus*. Blackish fuscous, sparingly irrorate with pale; face pale yellow. Length about 4 m.m.

Vertex shorter than in *acutus*, one-quarter longer than broad between the eyes, with a longitudinal depression, apex obtuse. Cheeks broader, and the clypeus shorter and broader than in *acutus*, the sides of the latter almost rectilinear. Head, scutellum and abdomen, closely punctured. Pronotum smooth, obscurely transversely wrinkled. Last ventral segment of the male rather deeply concave, valve large and rounded; plates triangular, on the impressed suture about as long as the valve, apex subacute, margins sparsely ciliate; pygofer elongated, surpassing the plates. Last ventral segment of the female broad, slightly keeled and compressed apically, the hind edge feebly notched on the middle, pygofer short and broad, scarcely exceeded by the ovipositor.

Colour fuscous, or almost black; posterior disc of the vertex, pronotum, scutellum, and all beneath, minutely but sparingly irrorate with pale; vertex and venter of the male almost immaculate. Apex of the vertex whitish, with some irregular fuscous lineations on either side of the central line; face yellow, cheeks infuscated exteriorly, base of the front with but faint indications of the concentric lines characteristic of our other species. Pronotum, with five whitish longitudinal lines, faintly indicated. Nervures of the elytra bordered with interrupted pale lines that sometimes form reticulations on some of the areoles; costal area outwardly whitish hyaline, crossed by about eight oblique blackish veinlets; apical areoles, excepting on their base fuscous, the extreme edge pale. Elytra normally with about fifteen round whitish dots placed on the ends of the areoles, but more or less of the basal are frequently wanting. Wings sordid hyaline, nervures fuscous. Tibiæ spotted with pale; tarsi pale, the joints tipped with black.

Described from two ♂ and five ♀ examples. Buffalo, N. Y., June and September; Ames, Iowa, (H. Osborn).

I have swept this species from low bushes and weeds with *P. acutus*, from which it may readily be distinguished by its smaller size and blackish colour. *P. acutus* has the sides of its clypeus concave, and the apex of the valve of the ♂ obtusely pointed. *P. modestus* Stål is unknown to me, as is also *P. magdalensis* Frov., but these are larger pale species.

## DESCRIPTION OF A NEW SPECIES OF ARGYNNIS FROM CANADA.

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

*Argynnis Alberta.*Belongs to the *Chariclea* group.

Male.—Expands 1.9 inch. Upper side pale yellow-fulvous; the markings as in *Helena*, but pale black, reduced; the mesial stripes on both wings interrupted, macular; the extra discal rounded spots on primaries minute, the sub-marginal crescents wanting, and represented by small clusters of scales at the summits only, leaving a clear space to the margin, which margin is edged by an even stripe; on secondaries the rounded spots are larger, and the crescents are represented by larger clusters of scales; the marginal border is extended on each nervule so as to encroach on and make narrow the clear space. Under side of primaries pale red-brown, uniform from base to margin; the black markings obsolescent or altogether wanting. Secondaries brown (without the red shade); across the disk a belt of same form as in *Chariclea* and *Helena*, a shade only lighter than the ground, and all of one hue (no white as in the allied species); the rounded spots and clusters of scales repeated faintly, and behind each of the latter a pale, undefined patch.

Female.—Same size. Brown, dusky, inclining to melanism, sometimes of a slaty hue rather than brown, and always with a peculiar smooth surface, suggestive of grease which had been removed by benzine; the markings pale, diffuse; the mesial stripe, on primaries, has become a broad band reaching from margin to margin, and the sub-marginal clusters of scales are merged in a continuous stripe; on secondaries, all the markings about base and on disk are obsolescent, the sub-marginal clusters are large and diffuse, and the margin is edged by a crenated band. Under side as in the male.

From one ♂ and two ♀ sent me by Mr. Thomas E. Bean, and taken at Laggan, Alberta. He writes: "This *Argynnis*, I think, occurs strictly above timber line, and not very near it either, though also not at the highest points of the mountains. In 1888, on one mountain, it was decidedly frequent, but in 1889, I saw not one. The females all present the same slightly shining surface, whether brown or slate in color, but it is not grease. The examples I sent you were not in the least greasy, nor

are any that I have." (This was in direct reply to my question, suggested by Dr. Holland, who was confident they had been greased and cleaned.) "I do not notice this shiny surface especially in the males; they are all fulvous, and none show melanism. All the females tend to obscurity, and more than half are about as melanic as those sent you, one or two perhaps a little darker. Some few are clear enough for the fixed lines to show. This form does not at all frequent the same localities as *Chariclea*, which only occurs below timber, so far as I know."

*Alberta* is wholly unlike any member of the group known to me. It does not at all agree with *Chariclea*, var. *obscurata* McLachlan.

In the delicacy of its markings the male is nearer *Helena* than *Chariclea*, but these are interrupted and reduced. *Helena* is an alpine species, and found above timber line. But it retains at every elevation which it frequents the same features. The examples under view are larger than any *Helena*, and equal the largest *Chariclea*.

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#### NOTES ON SIGALPHUS CURCULIONIS AND SIGALPHUS CANADENSIS.

BY C. P. GILLETTE, AMES, IOWA.

I reared from *Conotrachelus nenuphar* last summer a number of parasites, which were determined for me by Dr. Riley as *Sigalphus curculionis* Fitch, and *S. curculionis*, var. *rufus*. Full descriptions of both of these may be found on page 27 of Riley's Third Missouri Report, and upon page 67 of the Supplement to the Missouri Reports.

The variety *rufus* appeared much more abundant than *curculionis* in my breeding cages the past summer. These two forms differ so much from one another, and in some respects, especially in the number of joints of the antennæ, from Riley's descriptions, that I have made the following notes upon them:—

Three females of the dark form, bred by myself, and two males loaned me by Prof. Osborn, have the ocelli in every case, not touching, but distinctly separated. The two males have respectively 29 and 30 joints in the antennæ. Two of the females have 29 joints each, and one 28 joints in the antennæ. The largest female measures just .14, and the males

measure a scant .13 of an inch in length. The ovipositor is exerted in one case .11, and in two cases .12 of an inch. Length of wing .14 of an inch; length of antennæ .125 of an inch. The breadth of the head, as compared to *rufus*, is as five to six.

In the eleven specimens of *rufus* now in my collection the ocelli are in every case distinctly separated. In five cases the antennæ are 32-jointed; in four cases they are 31-jointed, and in two cases they are 30-jointed. All are females, and in no case do they vary much from .15 of an inch in length. The shortest measurement of exerted ovipositor is .14, the average is .18, and the longest is .20 of an inch in length. The breadth of the abdomen, as compared to *curculionis*, is in the proportion of four to five. Length of wing .15 of an inch; length of antennæ .15 of an inch. *Rufus* is decidedly more robust and larger in every case than *curculionis*, and, were it not for the fact that so eminent an authority as Dr. Riley considered them the same species, I should think that *rufus* ought to be raised to the rank of a species.

*Sigalphus canadensis*.—Three specimens of *S. canadensis* were reared by me the past summer from the plum gouger *Anthonomus scutellatus* (*prunicida*). How this little braconid can deposit her egg within the hard pit of the plum, I am unable to say. It can not be that it is deposited there before the pit becomes hard, for the larva of the gouger does not get entirely through the pit until the latter becomes very hard, and the parasite does not attack the larva of the gouger in time to prevent its complete development and pupation, as was found by cutting into the plums containing parasitized pupæ of *Anthonomus scutellatus*. When the larva of the gouger becomes full grown it gnaws a hole through the pit, out of which it can escape when it has changed to a beetle, and the parasite is dependent upon this provision of the larval gouger for its own escape. Possibly the parasite does not deposit the egg until the opening has been made in the pit; but, if this is the case, it must go through its transformations in a very short time. And how would the female know at what part of the plum to insert her ovipositor to strike the small opening in the pit? Although but three of these parasites were secured, it was not uncommon to find a plum with a small exit, such as is made by the mature parasite in escaping, and which is much too small for the exit of the gouger.

PRELIMINARY CATALOGUE OF THE ARCTIIDÆ OF TEMPERATE NORTH AMERICA, WITH NOTES.

BY JOHN B. SMITH, NEW BRUNSWICK, N. J.

(Continued from page 104, Volume xxii.)

Genus LEPTARCTIA Stretch.

1873—Stretch, Zygænidæ and Bombycidæ, 118.

Head small, hardly retracted; eyes inconspicuous, bulging; ocelli distinct; vestiture thin, loose and divergent; tongue weak and short, spiral; palpi weak, short, drooping, with thin divergent vestiture; legs sub-equal, posterior slightly the longest; middle and posterior tibiæ each with minute terminal spurs only. The thorax is short, stout, convex with thin hairy vestiture. The antennal joints of the female have the joints marked, scarcely serrate; in the male they are bipectinate. The primaries have 7 to 10 out of a long stalk from the end of the sub-costal, 6 from a short spur out of the same point; 3, 4 and 5 are nearly equi distant from the end of the median, and quite close together. On the secondaries 8 as usual, 6 and 7 from the end of the sub-costal; 3, 4 and 5 rather close together from the end of the median. I had intended to give a review of Mr. Butler's work on this genus (1881, Ann. Mag., N. H., ser. 5, VIII., 312), but the excellent paper by Mr. French in the November-December, 1889, numbers of the CAN. ENT. has rendered this unnecessary, and I simply give the bibliography, using Mr. French's sequence of species or varieties. Whether in a genus like this, where no two specimens are alike, so many names are desirable is a question. Twice the number could be as justly applied. A large series of specimens is in the United States National Museum, one lot bred from eggs produced by a ♂ *stretchii* with a ♀ *lena*—the extremes of the series as arranged by Mr. French.

*L. stretchii* Butler.

1881—Butl., Ann. Mag. N. H., 5, VIII., 312, *Leptarctia*.

1889—French, CAN. ENT., XXI., 222, f. 12, *Leptarctia*.

♂ *dimidiata* Str.

1873—Stretch, Zyg. & Bomb., pl. V., f. 9, *Leptarctia*.

1881—Butler, Ann. Mag. N. H., 5, VIII., 312, *typ. pr.*

Habitat—Oregon, So. California.

*L. boisduvalii* Butler.

1881—Butler, Ann. Mag. N. H., 5, VIII., 313, *Leptarctia*.

1889—French, CAN. ENT., XXI., 222, f. 13, *Leptarctia*.  
*decia* Stretch.

1873—Stretch, Zyg. & Bomb., pl. V., f. 15, *Leptarctia*.

1881—Butler, Ann. Mag. N. H., 5, VIII., 313, *typ. pr.*

Habitat—Oregon.

*L. dimidiata* Stretch.

1873—Stretch, Zyg. & Bomb., 123, ff. 7-10, *Leptarctia*.

1881—Butler, Ann. Mag. N. H., 5, VIII., 313, restr. to f. 7 and 8.

1889—French, CAN. ENT., XXI., 222, f. 14, *Leptarctia*.

Habitat—Calif., Oregon, Colorado.

*L. albifascia* French.

1889—French, CAN. ENT., XXI., 232, f. 15, *Leptarctia*.

Habitat—California.

*L. occidentalis* French.

1889—French, CAN. ENT., XXI., 223, f. 16, *Leptarctia*.

Habitat—Northern California.

*L. latifasciata* Butler.

1881—Butler, Ann. Mag. N. H., 5, VIII., 313, *Leptarctia*.

1889—French, CAN. ENT., XXI., 223, f. 17, *Leptarctia*.

Habitat—Oregon, So. California.

*L. fulvofasciata* Butler.

1881—Butler, Ann. Mag. N. H., 5, VIII., 313, *Leptarctia*.

1889—French, CAN. ENT., XXI., 223, f. 17, *Leptarctia*.

*lena* Stretch.

1873—Stretch, Zyg. & Bomb., pl. 5, ff. 13-14, *Leptarctia*.

1881—Butler, Ann. Mag. N. H., 5, VIII., 313, *typ. pr.*

Habitat—Oregon, Truckee Calif.

*L. californiæ* Walker.

1855—Wlk., C. B. Mus. Lep., III., 625, *Nemeophila*.

1873—Stretch, Zyg. & Bomb., 240, = *lena*.

1881—Butler, Papilio, I., 130, *an sp. id. lena*.

1881—Butler, Ann. Mag. N. H., 5, VIII., 312, *Leptarctia*.

1889—French, CAN. ENT., XXI., 223, ff. 18-19, *Leptarctia*.

*lena* Bdv.1869—Bdv., Lep. Cal. (Ann. Soc. Ent., Belg., XII.), 73, *Lithosia*.1873—Stretch, Zyg. & Bomb., pl. V., ff. 11 and 16, *Leptarctia*.  
*adnata* Bdv.1869—Bdv., Lep. Cal. (Ann. Soc. Ent., Belg., XII.), 73, *Lithosia*.1873—Stretch, Zyg. & Bomb., 120, *pr. syn.*1881—Butler, Ann. Mag. N. H., 5, VIII., 313, *pr. syn.*

Habitat—Calif., Oregon.

*L. wrightii* French.1889—French, CAN. ENT., XXI., 224, ff. 18-19, *Leptarctia*.*L. decia* Bdv.1869—Bdv., Lep. Cal. (Ann. Soc. Ent., Belg., XII.), 72, *Lithosia*.1873—Stretch, Zyg. & Bomb., 121, pl. 5, ff. 1, 2 and 15, *Leptarctia*.1878—Strecker, Proc. Dav. Ac. Sci., II., 273, *Leptarctia*.1881—Butl., Ann. Mag. N. H., 5, VIII., 314, *Leptarctia*.1889—French, CAN. ENT., XXI., 224, ff. 20, 21, *Leptarctia*.

Habitat—California, Oregon.

*L. lena* Bdv.1869—Bdv., Lep. Cal. (Ann. Soc. Ent., Belg., XII.), 73, *Lithosia*.

1873—Stretch, Zyg. &amp; Bomb., 120, 240, pl. V., ff. 3-6, 11-14, 16.

1881—Butler, Ann. Mag. N. H., 5, VIII., 314, restr. to ff. 3 and 5.

1889—French, CAN. ENT., XXI., 224, f. 22, *Leptarctia*.

Habitat—California, Oregon, Colorado.

This arrangement, giving each of the forms equal value, is of course not to be taken as indicating the specific distinctness of any. The indications are all that there is but a single species with a wide range of variation. It remains only to state that in Mr. French's paper he gives the life history of the species, describing all stages.

## Genus KODIOSOMA Stretch.

1873—Zyg. &amp; Bomb., 67.

This genus contains a series of forms of doubtful distinctness, none of which I have been enabled to study. The species seem excessively rare, and there are no specimens of the genus in the collection U. S. National Museum.

- K. eavesii* Stretch.  
1873—Stretch, Zyg. & Bomb., 69, pl. II., f. 6, *Kodiosoma*.  
Habitat—Nevada.
- K. fulva* Stretch.  
1873—Stretch, Zyg. & Bomb., 67, pl. 2, f. 7, *Kodiosoma*.  
Habitat—California.
- K. nigra* Stretch.  
1873—Stretch, Zyg. & Bomb., 68, pl. 2, f. 8, *Kodiosoma*.  
Habitat—California.
- K. tricolor* Stretch.  
1873—Stretch, Zyg. & Bomb., 68, pl. 2, f. 5, *Kodiosoma*.  
Habitat—California.

GENUS PHRAGMATOBIA Steph.

- 1830—Steph., Ill. Brit. Ent. Haust., II., 73.  
1855—Wlk., C. B. Mus., Lep. Het., III., 628.  
1862—Morris, Synopsis, 346.

Head small, retracted; tongue weak and short, palpi rudimentary. Vestiture woolly. Antennæ simple in both sexes. Legs weak and rather short; tibial spurs distinct and normal in number. The anterior and middle claws seem simple; posterior with a decided tooth at tip. The tarsi are very feebly spinulose.

Primaries with 7 to 10 out of a stalk from the end of subcostal; 7 and 10 from about the same point; 8 and 9 forking just before the apex; 3, 4 and 5 are about equi-distant from the end of the median.

Secondaries veins 6 and 7 together from end of subcostal, 8 from its middle; 3, 4 and 5 from the end of the median rather close together; 4 about twice as far from 3 as from 5.

*P. assimilans* Wlk.

- 1855—Wlk., C. B. Mus., Lep. Het., III., 630, *Phragmatobia*.  
1860—Clem., Proc. Ac. N. Sci., Phil., XII., 536, *Phragmatobia*.  
1862—Morris, Synopsis, Suppl., 346, *Phragmatobia*.  
1863—Saund., Syn. Can. Arct., 23, *Phragmatobia*.  
1864—Pack., Proc. Ent. Soc., Phil., III., 122, =*rubricosa*.  
1889—Slosson, Ent. Amer., V., 85, *an sp. dist. rubricosa*.  
Habitat—New Hampshire.



This species—if species it is—has languished among the synonyms, ever since Dr. Packard referred it there in 1864. A specimen taken in 1888 by Mrs. Slosson seems to justify its claim to recognition as a species, and it is so recognized here.

*P. rubricosa* Harris.

1841—Harris, Rept. Ins. Mass., 253, *Arctia*.

1852—Bdv., Lep. Cal. (Ann. Soc. Ent. Fr.), 49, *Arctia*.

1860—Clem., Proc. Ac. N. Sci., Phil., XII., 541, = *Crocota rubicundaria*.

1862—Harris, Inj. Ins., 356, f. 171, *Arctia*.

1862—Morris, Synopsis Suppl., 341, *Arctia*.

1863—Saund., Syn. Can. Arct., 24, *Phragmatobia*.

1864—Pack., Proc. Ent. Soc., Phil., III., 122, *Phragmatobia*.

1883—Edw.\*, Papilio, III., 127, *Phragmatobia*.

1887—Edw.\*, Ent. Amer., III., 168, *Phragmatobia*.

*fuliginosa* † Auct.

1852—Bdv., Lep. Cal. (Ann. Soc. Ent. Fr.), 40, *Arctia*.

1855—Wlk., C. B. Mus., Lep. Het., III., 628, *Phragmatobia*.

1860—Clem., Proc. Acad. Nat. Sci., Phil., XII., 539, *Phragmatobia*.

1868—Grt. & Rob., Tr. Am. Ent. Soc., II., 71, *pr. syn.*

Habitat—Mass., New York, Maine, California, Canada.

It is not admitted by some of our old collectors that *rubricosa* refers to a form really distinct from the European *fuliginosa*. Superficially they undoubtedly resemble each other very closely; but how nearly they will agree when closely compared is another question.

*P. dubia* Wlk.

1856—Wlk., C. B. Mus., Lep., Het., III., 682, *Cynia*.

1868—Grt. & Rob., Tr. Am. Ent. Soc., II., 72, *Phragmatobia*.

Habitat—H. B. Terr.

This species has dropped out of our list; but I cannot find that it has been referred as a synonym anywhere. Messrs. Grote and Robinson in their notes (supr. cit.) say: "Wings semitranslucent, brown or mouse color; veins on both wings whitish above; eyes margined narrowly with white; legs shaded with whitish outwardly; abdomen (greasy in the specimen) with three rows of brown spots." There should be no difficulty in identifying this species should it turn up.

(To be continued.)

## FOOD PLANT OF MELITÆA TAYLORI, EDW.

Having been asked by Mr. Jas. Fletcher, of Ottawa, to look for the larva of *M. Taylori*, with the purpose of discovering its food plant, &c., it was with much pleasure that I accepted the commission, and now have the gratification to inform you of my success.

I began searching on March 10th, but found everything very backward, owing to the severe winter experienced on this island. Being determined, however, not to miss an opportunity of succeeding, I continued making a close examination of the declivities of the coast at Beacon Hill (thinking it probable that the larvæ had not reached the top of the bluff before hibernating); but after several attempts to locate it, I turned my attention on March 30th to the level land above the cliff, and was rewarded by finding it feeding in numbers on the Rib-wort Plantain (*Plantago lanceolata*, L.)

One peculiar fact I must mention of *M. Taylori* is that the larvæ evidently avoided the old plants, and fed solely on the younger ones, instinctively knowing, perhaps, that they would be less exposed to the attacks of their natural enemies, as the young plants were mostly hidden by the dead grass of last year's growth; however, when the first was found it was an easy matter to follow them up, with the result of capturing about two dozen in half an hour.

They varied considerably in size, some being 6 lines, while most of them were 10 lines in length. I found a cast-off skin showing that they had moulted since "feeding up" this spring; and also that had I looked in the right place a few days sooner I should, without a doubt, have found them. They generally feed singly, but as their food plant grows in large patches it was possible to collect a dozen or more without changing one's position.

They occur all along the coast immediately fronting Beacon Hill, and I have found them a mile away from where they were plentiful; but, in that case, they were very few and far between, although I have collected several dozen during the few hours I could spare from business. They are day feeders, and naturally very slow in their movements.

The following table gives dates of capture with result:—

March 30	took	23	in	½	hour.
" 31	"	37	"	1	"
April 2	"	25	"	1	"

April 6 took 11 in 2 hours.

“ 11 & 12—heavy snow storm.

“ 14 took 5 in 1 hour.

“ 17 “ 1 “ 1 “

The larvæ are doing well in the breeding cage, and at some future time I shall be glad to submit my observations as to habits while in captivity. Meanwhile am pleased to contribute the above facts.

W. H. DANBY, 57 Government Street, Victoria, B. C.

### ARGIOPE RIPARIA AND ITS PARASITE ICHNEUMON ARANEARUM, AND ITS PARASITE A CHALCID FLY.

BY FREDERICK CLARKSON, NEW YORK.

The nests of *Argiope riparia* were unusually abundant last autumn in the neighborhood of this city. During the preceding summer this gayly colored, but atrocious looking spider, could be seen stationed in the centre of its well formed geometric web on nearly all of the low shrubbery in the uncultivated portion of Central Park. Merciless to every insect caught in her web, her household is nevertheless oftentimes greatly reduced, if not altogether destroyed by *Ichneumon araneorum*, a fearless and victorious enemy. Among a large number of nests collected last autumn, those obtained in the latter part of September and as late as the 10th of October contained ova: a single cocoon possessing by actual count 1,277 eggs; those found later in October, and as late as November 3rd, contained young spiders. Only a few of those collected in October had suffered parasitic attack, but the greater number of such as were gathered later in the autumn, contained the larvæ of *Ichneumon araneorum* feeding upon the spiders, or else spun up in their cocoons sometimes to the number of forty. May we not infer from these facts that the parasite deposits her eggs in the nest of *Argiope* after the eggs of the latter have hatched, or at least, whatever may be the time of depositure, the larva of the parasite feeds upon the spiders?

In examining the cocoons of this *Ichneumon* an interesting exhibit of secondary parasitism was revealed. In several of the nests of *Argiope* containing each some thirty cocoons of the *Ichneumon*, I found that each larval inhabitant was being devoured by from eight to ten larvæ of a Chalcid fly.

“ Great fleas and little fleas have smaller fleas to bite ’em,  
The smaller fleas have lesser fleas, so on ad infinitum.”

## CASES OF LONG PUPAL PERIODS AMONG LEPIDOPTERA.

BY R. R. ROWLEY, CURRYVILLE, MO.

In May, 1888, I received from Mr. W. H. Edwards, of Coalburgh, two larvæ of *Anthocharis genutia* which were feeding on pepper grass. On the 22nd (May), both larvæ pupated, having suspended two days before.

As the imagoes did not appear in a reasonable length of time, I communicated the fact to Mr. Edwards, and he informed me they would remain chrysalids till the next May. The summer of 1889 came and went and still my little *Genutia* pupæ slept on and entered upon the second year of their fast. I then learned of the tendency in the genus *Anthocharis* to remain two years in the chrysalis state.

The pupæ were kept through the past two winters in a closet adjoining a warm room, and the first imago, a beautiful male, appeared March 7th, 1890, the other, a female, five days later (12th), after a pupal period of nearly twenty-two months.

In a recent letter from Mr. Edwards, I was informed that the Californian species of *Anthocharis* often remain two years as chrysalids, but he does not state that he has ever known a *Genutia* pupa to go so long.

Another case.—On the 13th of February, 1888, I received four cocoons of *Callosamia angulifera* from Miss E. L. Morton, of Newburgh, N. Y. These cocoons were spun in the mid-summer of 1887. Three of them produced imagoes the following May, but the fourth remained over till the 19th of the next April (1889), having passed twenty-one or twenty-two months in the pupal state. I have had pupæ of *Triptogon modesta*, *Philampelius pandorus*, *Citheronia regalis* and *Eacles imperialis* to fail to give imagoes in the spring, living through the summer, and lingering even till early autumn before death overtook them, but never knew one to survive till the second summer.

## NOTES.

A RARE BUTTERFLY.—We learn from the Ottawa Naturalist that five specimens of *Erebia discoidalis* Kirby, one of the rarest in the Canadian fauna, were taken by Mr. John D. Evans, at Sudbury, Ontario, on the 12th May last. The perfect insect is figured and described in Edwards "Butterflies of North America," 3rd Series, Part VII.

## TWO INTERESTING MONSTROSITIES.

BY W. HAGUE HARRINGTON, OTTAWA.

Many minor malformations of wings, elytra, etc., have been observed in examining insects, but recently I have met with two monstrosities which seem worthy of record. The first insect is a ♀ *Fanus tarsitorius* Say., given to me by my friend, Mr. Guignard, and captured by him on 24th June, 1885. In this specimen the left posterior tibia becomes trifid about one-fourth of its length from the base, the side branches diverging at an angle of about 30°. The three portions are symmetrical, of nearly equal size (but slightly smaller than the tibia of the opposite leg), and bearing the terminal spurs, etc. The three tarsi issuing from them are perfect in every particular of size and colour. The femur is swollen and gives an impression of three agglutinated, while the trochanter and coxa are also enlarged.

The second specimen was noticed a few days ago while I was putting sex labels on some Carabidæ, and is a ♀ *Pterostichus lucublandus* Say. In this insect only the last joint of the left middle tarsus is in triplicate, and while the parts are equal in size to one another, they are individually under the normal size. The fourth joint is widened (like three small ones joined laterally), while the remaining articles are somewhat shortened and thickened. The tibia is also slightly modified; the spines being irregular, and one of the terminal spurs flattened and bifid.

## CORRESPONDENCE.

## HEPIALUS QUADRIGUTTATUS.

*Dear Sir:* In a letter to me, dated October 7, 1864, the late Mr. Francis Walker wrote as follows: "Your *quadriguttatus* is, as you suppose, identical with my *H. argenteomaculatus* var." I have myself no doubt that these two Hepiali are distinct species. In Agassiz's Lake Superior, Harris gives *quadriguttatus* as the same as the eastern *argenteomaculatus*, which latter Mr. Mead took in the Catskills, N. Y.

A. R. GROTE, Bremen, Germany.

Mailed June 4th.