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THE LEPIDOPTEROUS FAUNÆ OF EUROPE AND NORTH AMERICA.

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

The study of representative species of butterflies and moths shows us that very different grades of resemblance exist between allied forms inhabiting Europe and North America. I have shown that the modification shows itself sometimes mainly in the larval state; again the perfect insects depart more or less strongly. I have also ventured to decide that these representative species are entitled to specific rank in our nomenclature. They fulfil the condition of species, since they do not intergrade, and they can be distinguished quite surely by competent specialists. The study of these representative species leads to the question of their relation, and we have seen that they may be regarded as survivals of a former northern, circumpolar fauna, which was broken up and driven southwards by the Ice Period of geologists. I have originally tried to show, in Silliman's Journal, that we have in our Lepidopterous fauna different elements. The representative species belong to this ancient circumpolar fauna. And here belong in part the identical species like *Vanessa antiopa* or *atlanta*. The identical species have remained unaltered, but certain species have been introduced by commerce, as the White Cabbage Butterfly and perhaps the Currant Borer, *Sesia tipuliformis*. The certain separation of these two sources of North American species belonging to the circumpolar element requires historical data which will hardly be forthcoming. The second element is that which comes to us from the south, a return wave of the migration southwards, which set in on the advent of the Glacial Age. This southern element is divisible into such forms as have already firm foothold, and such as the physical phenomena of the Gulf Stream, the prevailing air currents during the summer, land as wind-visitors upon our shores. *Erebus*, *Aletia*, *Euthisanotia*, among the moths, are more or less

partial breeders in our territory. How far north the permanent residence of the Cotton Moth obtains is not yet known. I am the first to point out that it is winter-killed over much of the territory which its summer migrations cover as a moth. I have seen how the migration takes place. The moths crawled out in numbers on my plantation during one or two days, and I anticipated a third and more destructive brood of caterpillars. The next morning not one perfect moth was to be seen. O the ground crawled a few cripples with unexpanded wings, to be killed by the sun and the ants. There was no third brood; the moths had migrated, been swept by the winds to the north during the night. I have alluded to the influence of the winds upon the time of arrival of the Cotton Moth on the Atlantic coast.

The "original" part of my work on the Cotton Worm was my discovery that it hibernated in the moth state; that it was winter-killed over a part of the territory it occupied both as larva and moth during the summer; that in the south it had no other food plant than cotton. I accounted for the moths in Canada in the fall by considering them wind-migrants. No alternative food plant is known in the north. In the south, as I originally stated, the worms migrate from eaten-out cotton fields, leaving the weeds and vines untouched, in search of fresh cotton. I identified the insect with the South American *Aletia argillacea* of Hübner, and stated my theory which I arrived at from a study of the habits of the moth and from a knowledge of the cotton plant itself, which like its parasite is not indigenous with us. Both have changed their normal condition. Man brought the cotton plant, which under culture and in our climate has become an annual, itself winter-killed in part, but so more productive of cotton; the winds brought the moth and the cultivated cotton fields supplied abundant food. I pointed out the yearly seasonal spread of the moth from south to north.

But to leave the special subject of the Cotton Worm, which is interesting by itself as illustrating one of the sources of the southern element in our Lepidopterous fauna, and to proceed with our analysis. The third element in our fauna is that which is North American *per se*, that is, which is descended from a pre-Glacial North American fauna, or which has become so modified from its original source as to be classed as North American. Here is a very difficult study in a consideration of the characters of our Lepidoptera. I have taken *Cressonia juglandis* as a

type of a North American moth descended from a pre-Glacial North American ancestor. I have taken *Datana* as an example of a North American moth which has become so modified from its original source as a member of the ancient circumpolar fauna, the first element in our present North American fauna, as to be now classed as North American. In the same group I take *Apatelodes* as an example of a North American moth which has become so modified from its original source as a member of the tropical, or South American fauna, as to be now classed as North American. The *Ceratocampinæ*, the genus *Hyperchiria*, I regard as ultimately of Southern origin. The genus *Catocala* belongs to the first element in our fauna; it is a development from a former circumpolar fauna.

But not to go further for the moment in this direction, let us compare the American and European butterflies and moths in a more general way, so as to arrive at some conclusion with regard to the departure from a common type in the members of the circumpolar fauna. The first thing which strikes us is the comparatively greater tendency to variation, to splitting into species which characterizes the North American butterflies and moths. Take the genus *Colias*, which belongs to the first element in our fauna; how it wanders into distinct forms, sometimes still connected, again no longer now members of the same reproductive cycle. Without Mr. W. H. Edwards's observations on the larva, we should be quite at sea.

But now, compare our protean *Colias* species with the two set European forms! What is true of *Colias* is true in other genera. Take the genus *Datana* among the moths; this is an American out-growth of the European *Phalera*. Now in Europe there are two closely allied forms of *Phalera*, *bucephala* and *bucephaloides*, but they are to be at once picked out by a slight but constant difference. In America we have six or seven species of *Datana*, and, if we take out *Angusii* and *perspicua*, as being distinguishable by general colour, all very near and difficult to distinguish as moths. In the genus *Clisiocampa*, the same phenomena are repeated. See how variable the underwings are and how much difference of opinion exists among writers! I am of opinion that *Catocala residua* is a good species, but Mr. Hulst is not with me here. At the best we can say, that Mr. Hulst, in regard to other species and varieties (e. g. *præclara*, *herodias*, *gisela*), has corrected himself and adopted my views, and that he will also probably come in time to agree with me in regard to *Alabama*,

Whitneyi and *residua*. We have seen, that the more correct determination of the moths alone is a matter of scientific experience, inborn feeling, in short of tact which comes alike from long work and genius for the study. The check to all such determinations of the perfect insects is breeding from the egg.

In the North American fauna, we also have the European genus *Scopelosoma* ; in Europe with one constant form, in North America with several closely allied. How thankful I am, that Mr. Thaxter has bred our closely allied species, so that no opinion formed from the imagines alone is now worth having or recording.

As the result of our comparison, we see the fact that species tend more to vary, to wander off into new forms in North America ; whereas, in Europe, they have a greater setness, or fixity in their appearance. It would seem as if the faunal changes in America had been greater, influenced by physical causes, the chain of longitudinal mountains, the land connection of the tropics, the course of the winds of the gulf stream, all the phenomena of climate and temperature. The probability is, that the European species are nearer the old circumpolar pre-glacial forms ; that in most cases the North American forms have made the variation, the step in a new direction.

Species by species, genus by genus, must these comparisons be made, so that we may unroll the probable past of our butterflies and moths. The life-histories must be known and compared. Work like that done by Mr. W. H. Edwards, Mr. Thaxter, Prof. French, Mr. Beutenmüller and others must be encouraged. Some papers by Mr. Moffat, on the question of species and variety naming, recommended themselves to me greatly. At the risk of repeating myself, I maintain that, as an entomologist, we are here to discriminate, not to lump ; our work is to talk about and illustrate the differences we find in insects.

An intelligent resolving of the study into its different phases is much needed. While with patience, the fine work of discriminating the forms is being carried on, the labour of comparisons, for the purpose of aiding the solution of wider questions, should not be neglected. There is enough to do, and I am glad to see, as the years go by and fresh workers come into our field, that there will be enough to do it. It is the pursuit of truth that is always new and interesting.

A NEW SPECIES OF NEONYMPHA.

BY G. H. FRENCH, CARBONDALE, ILL.

Neonympha Mitchellii n. sp.

Expanse of wings, male, 1.20 to 1.30 inches; female inches.

Male.—Upper surface grayish wood-brown, rather dark, without spots or marks, except that the spots on the underside of the hind wings and the dark lines bordering the terminal dark yellow line on the same wings show through a little. Fringes concolorous, in certain lights a little smoky tinged. Under surface slightly paler than the upper, a little more of the mouse order of color, sprinkled with buff scales. Both wings are crossed by four transverse brownish-yellow stripes, so dark on the fore wings as to be yellow-brown, occupying the same position as the same lines in its ally, *N. Areolatus*, the first and second uniting by a rounded end about a tenth of an inch from the inner margin of hind wings, the two outer—one terminal and the other sub-terminal—also uniting before reaching anal angle. In *Areolatus* these lines do not unite. Each of these lines has a dark brown (more or less distinct) fine bordering line on each side of it. The first line crosses the fore wings a little more than two-thirds the distance from the base of wing to end of cell, the hind wings about two-thirds. The second line crosses fore wing a little beyond the end of cell, the hind wings across the end of cell. The second and third are approximate anteriorly as in *Areolatus*. Fore wings with a row of four small ocelli between second and third lines, black, circled with pale Naples yellow or buff, the first varying from a dot, the size of an ordinary period, to about twice that diameter; in four examples circular, in two a little oval, in two a silvery metallic centre, the second a little more than twice the diameter of the first; in three examples circular, the other three slightly ovate, each with from one to three metallic points, when three present in the form of a triangle; the third averaging the size of the second, circular, with from one to two metallic points, when one central, when two in line with the row of spots; the fourth about one-fourth larger than the first, circular, all but one, which has the buff circle almost complete on the outside, but also a few buff scales outside the circle, a single metallic point to each of these.

Hind wings with six ocelli to each wing, circled with buff as those on

the fore wings. The first varying from a few buff scales, in one example, without the black centre, to twice or thrice the diameter of an ordinary period, circular, the largest with, in one example, a silvery metallic point; the second about .04 of an inch in diameter (the black portion), circular in four examples, in two a slight bulging in outer anal part, from one to five metallic scales, aggregated or scattered; the third from .06 to .07 of an inch in diameter, all nearly or quite circular, two silvery metallic points, in line with the ocelli; the fourth size of the third and the same shape. In each of these one example has a few black scales projecting into the buff annulus externally on one wing, points as in the third, except that in one the metallic scales are scattered on one wing; fifth of the size of the third, circular, in one example a few buff scales invade the black externally on one wing, in two other examples they are a little irregular in shape externally on both wings, two metallic points to each, with a few scattering scales in two examples; sixth about constant in size, as large as the largest of the first, one metallic point in all but one, ocellus, where the scales scatter a little, circular.

Body concolorous; antennæ above on basal two-thirds colour of wings, terminal orange shading into basal colour; beneath whitish, outer third orange; sides of basal two-thirds brown and whitish.

Female.—Differs from the male in being paler both above and below, and slightly in the arrangement of the transverse lines on the under side. In two of the four before me, the second and third lines distinctly unite with each other near the anal angle, while the lines by which the first and second, and the third and fourth unite are to be seen but are obscure. In one of the others there is no union between the second and third, while there is plain union between first and second, and third and fourth. The fourth has a distinct union between the first and second, and third and fourth, but the rounded ends of these unions touch. Both wings of the same example alike in this character. Ocelli as in the males, with about the same amount of variation.

This species differs from *A. Areolatus* in the following points:—In *Areolatus* the fore wing may have three ocelli and vary from that to many, while the hind wings have five. In *Mitchellii* four are always found on the under side of the fore wings, and six on hind wings in both sexes. In *Areolatus* the ocelli are elongate, the long part the long way of the wing. In *Mitchellii* they are all circular with only a little variation.

In *Areolatus* the metallic points in the ocelli are pale blue, and are arranged more or less in rows in the ocelli lengthwise of the wing. In *Mitchellii* they are, if in rows at all, across the wing. In *Areolatus* the transverse lines on the under side are ferruginous, and the second and third always unite near anal angle of hind wings. In *Mitchellii* they are more of a brownish-yellow; in the males the second and third lines never unite, but the first and second, and the third and fourth always unite leaving a little space between their rounded ends; in the females only one out of four had the second and third distinctly united. In *Areolatus* the metallic points are pale blue. In *Mitchellii* they are lighter, being more of a silvery colour, giving none of the real blue reflection, unless seen at a very oblique light, and then very pale.

Described from six males and four females taken by my friend, Professor J. N. Mitchell, in Cass County, Michigan, to whom I dedicate the species. They were found in upland dry meadows, about ten miles from the Indiana line. Professor Mitchell is of the opinion that the species has been found as far north as Kent County, Michigan.

TWO NEW SPECIES OF TINEIDÆ FROM THE ALEUTIAN ISLANDS.

BY WM. BEUTENMÜLLER, NEW YORK.

Cerostoma Aleutianella, n. sp.

Head and palpi olive gray; legs olive gray, tibiæ annulated with fuscous; body fuscous. Primaries olive gray, becoming paler toward the outer margin; above the fold is a broken fuscous basal streak, running to a little beyond the middle of the wing; at the end of the cell a small fuscous spot, limited beneath by a white patch. Cilia olive gray. Secondaries grayish fuscous. Underside of wings grayish fuscous. Cilia of the primaries tipped with greenish gray.

Expanse 20 mm. 1 ♂. Coll., Hy. Edw.

Cerostoma Dubiosella, n. sp.

Head, thorax and palpi fuscous. Primaries grayish fuscous, thickly covered with deep fuscous scales; before the outer margin a few white and black scales. Secondaries grayish fuscous, as are also the underside of the wings.

Expanse 18 mm. One example. Coll. Hy. Edw.

NOTES ON BOMBYCIDÆ.

BY FREDERICK CLARKSON, NEW YORK.

The habits of insects present an attractive and fruitful field of discovery, illustrating in many remarkable ways their peculiar instincts governed by heredity, and more or less conditioned by environment. The power which we call instinct, controlling the habits of insects, has a regularity of action governed by ordinary conditions, but there are frequent manifestations of adaptation to circumstance, as conspicuous in the several orders of insects as in the various races of mankind. The extraordinary condition can only be regarded as an obstruction to the usual law that governs instinct, and compels the creature to conform to the changed surroundings. The larvæ of *Bombyx mori* if crowded for space at the time of pupation will associate to the number of three or four in spinning the one cocoon which covers them. The larvæ of *Samia cynthia* under like environment present a similar variation of habit by spinning interior sections one above the other in the silk-lined leaf constituting the one envelope, so that outwardly it has the appearance of a long, single cocoon. The marked feature of this dual cocoon is, that while ordinarily the place of escape for the imago is at the upper end of the cocoon, the inhabitant of the lower section emerges at the lower end of the cocoon, from the lower end of its section. The *Cynthia* worms occasionally, from like necessity, will, to the number of two, spin a cocoon in common and undergo transformation in the one interior section. I have collected the past season very diminutive cocoons of *P. cecropia* and *S. cynthia*, the former measuring one and one-half inches long by one-half inch in diameter; the interior section three-quarters of an inch long by three-eighths of an inch in diameter; the latter was spun on a leaf one and one-half inches long, the cocoon rather less by three-eighths of an inch in diameter. The cocoons contained the larva dead and in a dried condition.

From a cocoon of *P. cecropia* I have obtained a very small male, measuring scarcely four inches in expanse of wing. The kidney-shaped spots on secondaries are reversed from their usual position, the pointed end being directed towards the abdominal or inner margin, instead of as commonly to the exterior margin. The wavy white line, bordered with black, on the exterior margin of the primaries, which is usually more or less pointed into the adjoining lilac, is in this specimen a line corresponding in form with that of the margin of the wing.

NOTES ON COLEOPTERA.—No. 5.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Cicindela. A glance over the catalogue shows many names marked as varieties of others, and a glance into the boxes of any fair collection shows these same to have a diversity of appearance, that in many instances requires an educated experience to reconcile with their being specifically identical; as for example, a green *C. sex-guttata* and a black *consentanea*, or an immaculate green *unicolor* and a black *modesta*. With systematists, size, color and markings have no primary weight in specific identity; that is, when the species are not *made*. It is not here purposed to enter on the relation of races, the determining causes of which are beyond reasonable conjecture and must have been indefinitely remote, since hereditary reversion to a common ancestral type is obsolete, and many varieties breed true to themselves without producing any of the others; but, to protest against the practice some collectors have of ignoring varieties in making exchanges, as sending *vulturina* or *prasina* instead of *obsoleta*; and to advise that they be treated as species. Indeed it is quite possible when their internal anatomy is better known and structures like the sexual organs studied and used in systematic work, as has been done by Dr. Horn in *Corphyra*, some of these varieties may turn out to be species. I take var. *consentanea* and var. *modesta* abundantly in the pine woods of New Jersey near the coast, basking in the sunshine on the white sand, but neither *sex-guttata*, nor *scutellaris*, nor any intervening varieties are found near there, and I doubt greatly whether the opposite sexes would recognize relationship or produce fertile offspring. *C. repanda* and var. *12-guttata* are found in great plenty here and do not appear to mingle, each race confining itself to its own territory—the former to the river shore and benches, the latter to the rocky creeks and adjacent plateaus—and are not known to hybridize or in any way acknowledge kinship. The above recommendation is intended to apply to the other families of Coleoptera as well as to *Cicindela*, and it is believed every race that is distinct should have a name for the convenience of collectors, if for no other purpose.

Dyschirius. The following, with the other named beetles, were taken Aug. 27th, on Brigantine Island, N. J., in a salt marsh on a sandy spot about three feet by two and elevated some six inches above the level of

the ordinary tides: *D. sphaericollis*, 7 sp.; *D. pallipennis*, 2 sp.; *D. filiformis*, 1 sp.; *D. pumilus*, 10 sp.; *Clivina striatopunctata*, 5 sp.; *Bledius politus*, 16 sp.; *B. basalis*, 20 sp.; *Trogophlæus?* sp., 12 spec.; *Rhyssematus scaber*, 18 sp.; many *Bledius maxillosus* around the base were not collected. The *Dyschirius*, *Clivina* and *Bledius* burrow only deep enough in the moist sand to fairly cover themselves, and their presence is known by the little mounds at the entrance of their excavations. In life the elytra of *Bledius basalis* are pearly white, with the basal declivity black; those of *B. politus* are reddish-yellow and shining, and the thorax is ferruginous, and it may be known from all others of its size by the deep thoracic channel and the sparse coarse punctuation of the thorax and elytra; the head of the male is large, and tuberculate between the ocular ridges; both species extend southward along the coast to Florida. *Rhyssematus scaber* does not burrow, but lives beneath a thin layer of a confervoid growth that forms on the marshes and about the roots of grass. This little beetle feigns death so persistently that I never saw one move in the least, and the only other Aphodide I know of that has this habit is *Dialytes striatulus*.

Lebia vivida Bates. A specimen of this beautiful little beetle, described from Mexico and introduced into our catalogue on the strength of two specimens taken in Arizona, is in my collection through the kindness of Mr. T. D. A. Cockerell, taken by him in Custer Co., Col., at an elevation of some 8,000 feet, thus showing that it belongs to the fauna of the Rocky Mountains.

Cychrus Lecontei Dej. Most of the Carabidæ have a regular time of appearance, but this does not seem to be the case with *Lecontei*, bright new specimens of which may be found from April to December. I have found them paired in November, in April, and at various times during the summer. It hibernates, as is well known, in logs and under moss and stones.

Chlænius Pennsylvanicus Say is subject to considerable variation in color, size and sculpture, but nothing is seemingly stable enough to form a race or true variety. One of these variations I was once disposed to regard as a species till set right by Dr. Horn. It has pale epipleura, and the side margins of the ventral segments rufous, like *Circumcinctus*; the outer three intervals of the elytra are dark green, contrasting with the the dark disk. It occurs here in summer on the river beach, and I have

not seen it inland. I have specimens of it from Missouri, New York and Canada labelled in error, *tricolor*.

Harpalus vulpeculus Say appears late in the season, and then the thorax is rufous, but becomes black in some individuals after hibernating. This tendency to *melanism* has not been observed in *H. dichrous*, which occurs with it, and has likewise a rufous thorax. *Stenolophus conjunctus* appears in summer and autumn, and then its thorax is rufous; in the fall it becomes gregarious, and winters under rails and stones in grassy places, after which the thorax is entirely black.

Tachycellus Kirbyi Horn is not met with every day, as it lives in grassy places in boggy swamps in their natural state, mostly inaccessible except in the dry part of the season. It is usually found about the roots of tufts of grass. A good way to take swamp beetles is to spread an armful of cut grass over some wet, bare place in the swamp, and on turning it over every three or four days some otherwise rare insects may be taken, as *Pterostichus patruelis*, which here inhabits swamps. Along with it is found plentifully a common species of *Stenolophus*, yet undescribed, that goes in with *ochropezus* or *plebeius*, as the collector fancies.

Pocadius helvolus Er. Whoever desires this beetle may take it during August in a growing *Lycopodium*, which when ripe is commonly known as puff-ball. A dozen or more are often taken in a single one, and are of all colors from ferruginous to nearly black; but young puff-balls are not always plentiful, and when found not more than one in twenty contains beetles, which need not be greatly regretted by the collector if he is anything of an epicure.

Pityophagus verticalis Horn was described from a single specimen from Colorado, the absence in which of the small spinules on the external edge of the tibiae seen in the other species was attributed to probable abrasion. From Mr. T. D. A. Cockerell I have received from Custer County, in the same State, an apparently perfect specimen in which there is no trace of these spinules. This character, when more specimens of this and *rufipennis* occur, may, apart from color, have chiefly to be depended on to separate the species, as from the specimens before me it is doubtful whether the cephalic characters will do it in all cases. In this specimen of *verticalis* the vertical fovea is rather an elongate impression with a fine line extending on the occiput. In three specimens of *rufipennis* from California the fine occipital line is absent in two and only discernible

in the third, but well marked in one from Oregon; while in one specimen there is a very obvious frontal impression, much like that in this *verticalis*. In both species the head is transversely impressed posteriorly, and the pygidium concave with a much raised hind border.

Aphodius marginatus Lec. This fine species was described from a unique, and by Dr. Horn in his monograph, from the type and another specimen, both from eastern Nevada, and supposed to be females. Through the favor of Mr. Cockerell, who collects in Custer County, Col., at elevations of from 6,000 to 8,000 feet and upward, I have a specimen that appears to be a male. It differs from the type by having the front distinctly tri-tuberculate, and a fine basal thoracic marginal line evident at the middle, but obsolete near the sides; the punctulation of the thorax and elytral intervals is exceedingly fine, and cannot be seen by the unaided eye; there are large coarse punctures disposed in clusters along the sides and base of the thorax, but absent from a large triangular space on the disk with its apex posterior; also a depression or concavity at the front as well as the hind angles.

Ligyryus relictus Say. Walking on the river beach in August, I turned over a shingle on a small sandy place about which some grass was growing, under it were seven *Harpalus caliginosus*, and the elytra and other remains of several *L. relictus* which they had devoured. Noticing the sand to have been much disturbed I dug down and soon turned out twenty-seven of the beetles named, which were buried from two to four inches deep over an area of about ten by sixteen inches, and of both sexes. Other similar spots were investigated without results. Now is this a known and common habit? What is its purpose in the economy of the insect? Did the *Harpalus* kill those they feasted upon? *L. relictus*, also *Chalepus trachypygus* and an occasional *Polymachus brevipes* come to the electric lights in the city, but *relictus* flies also by day in the warmest sunshine, especially along the river.

Leptura haematites Newm., *nana* Newm., *exigua* Newm., *saucia* Lec., *subargentata* Kirby, *similis* Kirby, *ruficeps* Lec., and *rhodopus* Lec. These names have long been a source of perplexity to collectors and of no little confusion. Dr. Horn (*Entomol. American* i., 8) recognizes only three species, *haematites*, *exigna* and *subargentata*, placing five others in synonymy—*nana* and *saucia* with *exigna*, and *rhodopus*, *ruficeps* and *similis* with *subargentata*. This leaves a very common species here and

northward through Canada without a name. *L. haematites*, with its red thorax, is well known, occurring abundantly on *Crataegus* and other blossoms in the spring. Its sexual differences consist in the thorax of the male being much longer than that of the female, and anteriorly narrowed. The unnamed species is similar in size (.18 to .22 inch in length), and has the same sexual characters, but the thorax and elytra are concolorous, being black, or brownish black, with cinereous pubescence. These two species are frequently taken together, and were the thorax of the same color could not be separated by any character yet discovered. I have the unnamed species from New York, Canada and elsewhere labelled *subargentata*, or *similis*, according to the color of the feet. *L. subargentata* is, however, a very different insect, though having the same sexual characters. It is much larger (.26 to .30 inch in length), blacker, more coarsely punctured and sparsely pubescent, occurring more commonly in northern Canada and the Rocky Mountain region to Mexico. In all these species the legs vary from black to rufous, and the colour is of no value. *L. exigua* does not belong to this group, having different sexual characters; the male has the last ventral segment convex at middle and impressed at tip, and in front of the impression a mucronate tubercle projected backwards; this, and the black spot on the thorax surrounded by golden pubescence, easily separate it (*L.* .24 inch). The unnamed species is probably in most collections by some name.

Leptura Zebra Oliv. July 6th. Several females taken ovipositing on a white oak stump made the preceding spring.

Agasphaerops nigra Horn. Among a number of Rhyncophora from Vancouver Island, B. C., from Rev. Geo. W. Taylor, there was a specimen of this singular insect, so like *Otiorhynchus sulcatus* that I passed it by as such till the unknown forms were examined. The genus and species were founded on two specimens taken at Mendocino, Cal. This specimen differs a little from the types being a little larger (.34 inch); the tubercles on the thorax are not very close, each being about the size of a No. 2 to 3 Klæger pin head, flattened on the top, and bearing a deep puncture; the elytral intervals are composed of single rows of tubercles equally as large and similarly punctured. On the thorax and elytra there is a pattern of white and golden scales similar to that seen in *Hormorus undulatus*, but they are sparser and less conspicuous; these scales are easily rubbed off, which may have been the case with the types before they were seen,

otherwise this might be regarded as a second species. The beak is sulcate like *Otiorhynchus sulcatus*, but twice the length, and the scape of the antennæ scarcely reaches the eye. The elytral ornamentation of *sulcatus* is less noticeable and more pubescent like, and none of the tubercles of the thorax and elytra, which are much smaller, are perforate, those of the intervals being arranged in irregular clusters.

Conotrachelus naso Lec. I am not aware of a record of this species occurring in the Northern States. Last year and also the present I bred it from the fruit of *cratægus*—haws—as well as *C. posticus*. The species are very close and are best separated by the two yellowish white spots on the thorax of *naso*. *C. cratægi* is, however, the great haw worm next to the larvæ of the Lepidopterous *Grapholitha prunivora* Mels., which develops with, but a couple of weeks later, than the beetles.

DESCRIPTION OF THE LARVA OF DATANA MAJOR G. & R.

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

Young larva.—Body dark reddish, inclining to black; otherwise as in the following stage.

Before last moult.—Body black or reddish black, with eight longitudinal clear white stripes, as broad as the intervening spaces or broader, with the exception of the dorsal space. Beneath are three partly obsolete white lines, two of them interrupted by the legs. The head and cervical shield all dark mahogany red, as are also the abdominal feet, the bases of the thoracic feet and two spots on segments 4, 5, 10 and 11. Thoracic feet black. The anal plates are black or dark mahogany red; sparsely distributed white hairs. Length about 30 m.m.

Mature larva.—Body black; stripes broken into a series of irregularly square or rectangular white spots. In the three upper rows on each side these spots occur two on each segment situated near the edges of the segment. The lower row consists of a spot before the spiracle, alternating with an elongated one overlapping on two segments, so that these spots nearly alternate with those of the upper rows. Head, cervical shield, anal plates, all feet (except thoracic) with their bases and two spots on segments 4, 5, 10 and 11, dark mahogany red. Below are a few white dots representing the usual stripes. Scattered whitish hairs. Length about 60 m.m.

There is a variety in which the stripes, and later the spots, are bright lemon yellow instead of white. The colour seems to be constant for an individual. The larvæ live together in rather small swarms, not exceeding fifty, till after the last moult, when they separate, often leaving the food-plant to ascend another in the vicinity. They then feed singly to maturity.

Food-plant, *Andromeda ligustrina*.

NOTES ON SOME CALIFORNIA MOTHS.

BY G. H. FRENCH, CARBONDALE, ILL.

Arctia Shastaensis Behrens, MS., nov. var. or nov. sp.

This new form was found by my friend, Mr. James Behrens, of San Francisco, at Upper Soda Springs, Siskiyou County, near Mount Shasta. The hind wings and abdomen are wanting, but the fore wings are present and in a very fair state of preservation. They are black, without light markings on the veins, but marked with yellow as follows:—A very broad transverse stripe, the basal of the usual three found in *A. Achaia* and *A. Behrii*, as wide as the female of *Behrii*, but more regular along its edges and curved more as this stripe is in *Achaia*, and not extending out on the costa as does this stripe in *Behrii*; the second of the three usual stripes is absent, save a few yellow scales on the sub-costal vein; the third is present, but narrow, arcuate, does not quite reach the costa, and only comes a little below the streak along median vein to posterior angle, a little attenuated at both ends; the usual longitudinal stripe below median vein, not reaching the base as this stripe does in both *Achaia* and *Behrii*, but beginning just inside the broad stripe, where it almost connects with an outward curved half line inside the broad stripe, that is broad on costa, but narrow below, outside the broad stripe the stripe is narrow, and on one wing broken before reaching posterior angle; the M-mark present much as in *Behrii*, beginning on costa midway between stripe three and apex, the first bar of the M curved inward, the other two outward and joined together and to the third stripe, the fourth bar absent as the spur that is usually sent out from the sub-median stripe is here absent. Fringes black; head, thorax and patagia black. Beneath as above, only paler. Legs black, except inside of anterior femora, which are yellowish.

The basal half line and fringes being black with the broad basal stripe would point to this insect being a variety of *A. Behrii*, as also the black body parts, but the downward curving of the sub-median stripe before reaching posterior angle ally it to *Achaia*; unlike either of these, it has no yellow along the posterior margin.

Apatela Felina Grote.

Mr. Grote describes this insect in vol. 5, No. 2, page 208, of the Government Survey Bulletins, comparing it with its ally, *A. Lepusculina*. Having several bred specimens, I make here a few additions to Mr. Grote's description.

The fore wings are distinctly blueish-gray, and the marks are more obliterate than in the usual *Lepusculina*. The female has scarcely a trace of the sub-terminal line, even in whitish shading; but one male has the sub-terminal line nearly as distinct as in *Lepusculina*, like that interspace-ally arcuate, but bending inward only about half as far on the second median interspace, and consequently the line is not so far from the outer margin, below this vein as in *Lepusculina*. The psi mark is less distinct. Reniform obsolete, except a curved mark, part of the inner or basal portion of the annulus. One male has on one wing almost a perfect orbicular but faint. It is elliptical, the long diameter parallel with costa and much narrower than the same in *Lepusculina*. Hind wings of male white, soiled terminally and along the veins; of female so much soiled as to be gray. The fringes of both wings concolorous, checkered with black.

CANADIAN COLEOPTERA.

The Council of the Entomological Society of Ontario has decided upon rearranging the Society's collection of Coleoptera according to Henshaw's List. This will necessitate the entire reprinting of the "List of Canadian Coleoptera," and as it is desirable that the new list should be as full and as correct as possible, our friends will confer a great favour by forwarding to the Secretary a list of all new names of Canadian beetles that they may have obtained by correct identification. As it is necessary that the list should be placed in the hands of the printers with as little delay as possible, our readers are desired to reply to this request at once. Henshaw's numbers will be printed on the new list, which will be for sale in sets when completed.

MR. SMITH ON CERATHOSIA.

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

In reply to Mr. Smith's paper, somewhat inappropriately styled "*Arctiida vs. Noctuidæ*," I would state that my original paper in Entom. Amer. on *Cerathosia* had for its *main* object the pointing out of the errors contained in Mr. Smith's original description of the genus in the neuration. When these errors are corrected according to my statements (which latter in the main seem to be acknowledged by Mr. Smith as correct), the probability that the moth is an *Arctian* next to *Utetheisa* is weakened, and, as I have shown it is not a *Lithosian*, the chances are we must look for its position elsewhere. The *secondary* object of my paper was to suggest that we might find a better place for *Cerathosia* next to *Acopa*, etc., in the *Noctuidæ*. Now, in reply to Mr. Moeschler, and Mr. Smith, I have to say, that I did not discuss vein 8 of *Cerathosia*. I have also to complain that Mr. Smith is an unfair writer, who indulges in large expressions of condemnation upon small grounds (as for instance the fact that some *Lithosians* have an accessory cell, while I give no accessory cell as a character of the sub-family), and above all a writer who misrepresents the party he desires to criticize. Mr. Smith alludes to a paper on *Cerathosia* "not yet reached." I advise him when that paper is reached, to have any statement it may contain as to the neuration of *Cerathosia* corrected according to my original corrections. I have no objections to my writings being "handled without gloves," as Prof. Fernald says Mr. Smith does, when the criticism is fair and reasonable.

A FINAL WORD ABOUT THE GENUS RILEYA.

BY WM. H. ASHMEAD.

In the last issue of the CAN. ENT. Mr. Howard, with a commendable solicitude for my entomological reputation, and under a heavy discharge of deadly parallel columns, seeks to evade the question at issue between us, *i. e.*, who has *priority in the use of the generic term Rileyæ*; and notwithstanding the opportunity was afforded him to rechristen his interesting genus, he seems loath to do so, and again, by a misrepresentation, makes a claim of priority in publication.

Had Mr. Howard written *read* instead of "published," he would have been nearer the truth. However, this may have been another *lapsus*

pennæ. His published description first appeared in the October number of the CAN. ENT., nearly five months after the publication of "my synoptic tables," as previously pointed out by me, and the points claimed by him are without value.

In order to close a controversy that has already assumed an inconsistent warmth, I now propose for Mr. Howard's genus the name *Chrysoplatycerus*, and the species may in future be known as *Chrysoplatycerus splendens* Howard.

CORRESPONDENCE.

A FLOCK OF BUTTERFLIES.

Dear Sir: While in the interior of New Guinea, in Aug., 1883, I observed what might properly be called a flock of butterflies. They were apparently of one species* (of a dark brown color, with a blue reflection on the fore wings in a certain light), and in such great numbers as to actually blacken the green bushes on which they lit. I first came across them one day, while out after birds, in a thick and shaded part of the tall forest, in low land adjoining the Laloki river. Being so numerous, I supposed it would be an easy matter to catch all I desired without the aid of a net, but after several unsuccessful attempts, in which case they would rise in a cloud and settle again in a few moments on the bushes close at hand, I was obliged to give it up. They did not seem to be very much disturbed at my approach, but would not, however, allow me to get very near without taking flight. As soon as I remained still, they would immediately settle on bushes and foliage close by, but always out of reach. The flock was, perhaps, two acres in extent, but the butterflies were not equally numerous over this entire area. In some places every bush, branch, twig and leaf seemed to be covered with them, while in others there were comparatively few. What their object was, or how long they remained in that locality, I am unable to say, except that in visiting the place several days afterwards, they were still there in apparently undiminished numbers. I might add none were seen feeding, and, so far as I observed, there were no flowers in bloom anywhere in the vicinity.

S. W. DENTON, Wellesley, Mass.

* The name is unknown to me, but I have a specimen of this butterfly which, if returned; I will send to any person who is capable and willing to determine it.

ARZAMA OBLIQUATA.

Dear Sir: The recent communications of Mr. Brehme and Mr. Moffat (CAN. ENT. XX.—119, 130, 180, 238), have revived my interest in the habits of *Arzama Obliquata*, G. and R. At the Minneapolis meeting Entomological Club A. A. A. S. (1883), the habits of the insect were discussed at some length, principally by Dr. Riley and myself. So much of the discussion as the Secretary considered worth printing, may be found in Vol. xv. of the CAN. ENT., pp. 171 and 174. The only difference worth noticing between us was in regard to whether there are two broods annually or one. It was finally agreed that both were correct—quite unusual in matters of this kind! In all probability, about Washington there are two, whilst in Western New York there is but one; if this be so, some of the apparent discrepancies of your correspondents may be cleared up. Mr. Brehme describes the egg, and Dr. Riley the masses of eggs (xv.-171). It would be of interest if Mr. Brehme would communicate the manner of occurrence of the eggs. I have not been so fortunate as to find these bodies, but have followed the quite young larvæ to maturity. I feel sure that it is single brooded in New York and Canada, and that the mature larva in the fall swims to land if necessary (see xv.-174), and crawls into loose earth, or preferably into old wood, or under rubbish where it remains until spring, transforming in May. I have ransacked *Typha* stalks at all seasons for borers, and do not remember to have found this larva, nor have I any notes stating that it was ever found as larva late in autumn or in spring within the stalks, or that it was found to transform in the same. Whatever the habits may be in New Jersey, or at Washington, I have evidence which confirms the correctness of Mr. Moffat's impressions of the habits of the species in his latitude.

Dec. 17, 1888.

D. S. KELLICOTT, Columbus, Ohio.

PIERIS ILAIRE, GODT.

Dear Sir: I wish to record in your valuable journal the capture of *Pieris ilaire* Godt. at Lancaster, N. Y. The accidental occurrence of such southern forms at this northern locality has a certain interest which, I think, will warrant this notice. The present specimen was taken fluttering around a corn field on the 22nd of September, 1880. For about a

week previously warm southerly winds had prevailed with little or no rain, followed by a light frost on the morning of the 21st. At first sight of the butterfly I recognized it as a stranger to our neighbourhood, and with care succeeded in capturing it without further injury, if indeed such were possible, as it was already a woeful looking object, the wings were torn and badly denuded, and the poor creature hardly had the strength to support itself the few yards it attempted to fly. For eight years I have kept this sorry looking treasure hoping some day to learn its name and history, and in this I have at last been successful. Poey gives a good figure of the female in his *Centurie des Lepidopteres de l'Ile de Cuba*, and it is well described by Boisduval in his *Species gen. des Lepidopteres*, vol. 1, p. 491. The present example is a large female with the black border of the wings unusually broad, which variation is mentioned by Boisduval. The most northern habitat that I can find is given in French's *Butterflies of the Eastern United States*, as "Indian River, Florida, Texas and Arizona," but I have had little opportunity for investigating the subject, and it may be a more common visitor in the north than I imagine. Prof. Grote, in his charming paper on the Geographical Distribution of the N. A. Lepidoptera, published in the eighteenth volume of this journal, has given us a very serviceable classification of the origin of the N. A. fauna. Probably *P. ilaire* pertains to the fourth table of his third category (p. 236), at least two of the species there enumerated appear to have been taken here, viz., *Thysania zenobia* and *Brotis vulneraria*. If, however, it breeds continuously in the Southern States, its association with *Erebus odora* in Grote's second table (p. 235) would seem more natural, and would render its occurrence here less surprising.

E. P. VAN DUZEE, Buffalo, N. Y.

The second paper on "Popular and Economic Entomology," which was promised for this number, has been prepared by Mr. Fletcher, but owing to the cuts required for its illustration being in the hands of the printers of the Annual Report at Toronto, it has been found necessary at the last moment to defer it till next month.

Mailed February 9th.