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ELAPHIDION VILLOSUM, FAB.

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

The account of this insect given by the early fathers of Economic Entomology is so charming that it seems almost profane to disturb a history accepted by most of their credulous offspring with unquestioning faith. Its wonderful habits and supra-rational instincts have been stock in trade ever since, and, like the fiction of the fly walking on glass by a sucker arrangement of its feet, is likely to hold its place in paste and scissor literature for all time to come.

Divested of all romance and imagination, and descending to facts, the observations of Professor Peck, Fitch and Harris may be reduced to this. In the month of July the parent lays the eggs on the limbs, or in the axil of a leaf near the end of the twigs of that year's growth of various species of oak, and perhaps other trees. After hatching, the young larva (in the latter case) penetrates to the pith and devours it downwards till the woody base is reached, and so onward to the centre of the main limb; here it eats away a considerable portion of the inside of the limb, and then plugging the end of the burrow, which it excavates towards the distal end, eventually falls to the ground with the limb, which being weakened, is broken off by the high autumnal winds. They exist here either as larvæ or pupæ till spring, and emerge in June as perfect beetles. Time, one year, though not so stated in words.

The account given in detail below is so different from the above, that were the identity of the individuals not established by actual comparison and by recognized authority, it might well be asserted I had given an account of some other *Elaphidion*.

April, 1883, I procured a barrel of hickory limbs from a tree girdled early in 1882; the limbs were from one-half to one inch in diameter. Very few things developed from them that season: but the next (1884) quite a number of species came forth—*Clytanthus ruricola* and *albo-fasciatus*, *Neoclytus iuscus* and *erythrocephalus*, *Stenosphenus notatus*, etc.

Many larvæ of some Cerambycide continued to work on under the bark ; late in the fall I observed the most of these had penetrated the wood, but some remained under the bark till April and May of the next year (1885). The most of the beetles appeared during the first two weeks of June, though individuals occurred occasionally till September. A few larvæ were still found at work, but by October they, likewise, had bored into the wood and appeared as beetles the next June (1886). The normal period of metamorphosis is therefore three years, but in individuals it may be retarded to four or more years.

At the present writing (June 5th) these beetles are issuing in great numbers from a barrel of hickory limbs obtained in April, 1885, from a tree deadened in January, 1884, thus verifying the first observation.

How the larvæ get under the bark could not be ascertained. When first examined, in April, they were from 4 to 5 m.m. long ; they ate the wood under the bark, following its grain, and packed their burrow solidly with their dust. Their growth and progress were both slow, for by the next April they had scarcely more than doubled in length, and had not traveled more than from four to six inches during the year ; but after July they developed an enormous appetite, and consumed the wood for at least an inch in length, and often entirely around the limb, ejecting their castings through holes made in the bark. When full fed, they bore obliquely an oval hole into the wood, penetrating it from four to ten inches. The larva then packs the opening with fine castings and enlarges a couple of inches of the interior of the burrow by gnawing off its sides a quantity of coarse fibre, in which it lies, after turning its head to the entrance. When about to become a pupa (I witnessed the process), the skin ruptures on the dorsum of three or four segments next the head ; the head of the pupa appears, and after about half an hour's wriggling the whole body is divested of its covering. To the observer the pupa appears to crawl out of the skin, but in fact the skin with the large mandibles is forced backwards by the alternate extension and contraction of the segments, assisted materially by the fibre that surrounds it. After its soft body hardens, the same movements free it from the fibre, some being shoved in advance of the head, and some posteriorly, the exuviae being often found at the distal end of the hole.

The time spent in the pupal state is indefinite, and does not seem to concern greatly the time of the appearance of the beetle. Sticks split open at different periods from December till March contained larvæ and

pupæ about equally, but no developed beetles. A larva that I observed to go into the wood in April appeared as a beetle among the first of such as had presumably pupated in the fall.

The number of these beetles obtained that and the present season was great, and afforded a good opportunity to observe individual variations, and they do differ greatly. In length from 8 to 18 m.m.; in pubescence, some being nearly naked and unicolored, others having it longer and condensed into spots or almost vittate; some being quite slender and elongate, while others are short and broad; the surface of the elytra is mostly uniform, but in some, especially such as are narrow and elongated, one or two costæ are more or less evident.

Now, although this account differs so widely from that given by Mr. Fitch, still the beetles are the same. Unfortunately I have never been able to find any pruned oak limbs from which to obtain the insect myself, but I have a good set from Mr. Blanchard, of Mass., presumably from the oak, which are identical. Through the kindness of Mr. F. Clarkson, I have a set of those described by him in the CAN. ENT., vol. 17, p. 188, from oak limbs, and which became imagos in November, and there is no perceptible difference. Dr. Geo. H. Horn says, "they are the same."

To identify *Elaphidion parallelum* had always been a puzzle to me, and I once thought I had a real set; I obtained it about a dozen times by exchange, but could never be satisfied that the specimens received were not pauperized, or peculiar individuals of *E. villosum*. On comparing my hickory insects with all the descriptions of *E. villosum* and *parallelum* and their several synonyms, as far as I possess them, it was easy to pick out sets that would answer satisfactorily all their requirements, and I became satisfied that *E. parallelum* could not be separated.

An inquiry of Dr. Geo. H. Horn elicits the following note and kind permission to use it:

"Regarding the two species of *Elaphidion* (*villosum* and *parallelum*) of which you write, I can only say that my opinion, based on the series in my cabinet and an examination of those in the cabinet of Dr. Leconte, is that they are inseparable. The slight differences, referred to by Dr. Leconte, in the last ventral segment of the males, are not real but dependent on the angle at which they are seen." The differences referred to are that in *E. villosum* the last ventral segment of the male is rounded, while in *parallelum* it is emarginate. The only other structural difference mentioned by Dr. Leconte is,

“Prothorax scarcely longer than wide—*villosum*.

“Prothorax distinctly longer than wide—*parallelum*.”

From the insects before me from the hickory, it is easy to pick out some with the thorax fully one-fourth wider than long, and others with it one-fourth longer than wide, but they are brought together so insensibly by intermediates, that where the proper separation into species should begin it is impossible to decide. The same may be said of the differences in elongation, narrowness and pubescence; and I can find no basis for retaining *parallelum* as even a racial or varietal name.

I trust the foregoing may stimulate such as have opportunity to investigate the habits of this interesting beetle more thoroughly. I mention some of the points that require clearing up. First, the length of time occupied in the metamorphosis of such as breed in the branches of living trees. One year is certainly an error, as it is opposed to the known history of any other Cerambycide having a similar habit. Second, whether the falling of the limb is not accidental, the majority containing larvæ not being weakened enough to break. Third, whether the end of the limb remaining on the tree does not contain the insect equally with that which falls—points that might be determined by cutting down a tree in autumn from which limbs had been pruned. Fourth, to make a collection for comparison from each species of tree infested.

Besides the accounts of Professor Peck, Fitch and Harris, the following bibliography may be noticed:

Haldeman—Trans. Am. Phil. Soc., vol. 10, p. 34.

Larva feeds on the living [?] wood of oak, hickory and chestnut; also dead Abies.

Riley—American Ent., vol. 2, p. 60; *ib.* vol. 3, p. 239.

Larva bores in plum and apple twigs, and in dry grape cane, Missouri Rep., 3, p. 6. Bores into and prunes the limbs of the apple. *ib.* 4, p. 54. Bred abundantly from injured grape stems.

Rathvon—U. S. Agricultural Rep., 1861, p. 615.

Merely a synopsis of Fitch's account.

Packard, jr.—Bul., No. 7, p. 30. U. S. Entomological Commission. Scissored from Fitch in full.

Clarkson—Can. Ent., vol. 17, p. 188, and vol. 19, p. 31.

Discovers that the insect completes its metamorphosis in the fall and

early winter, in oak limbs, and takes issue with Peck, Fitch and Harris on several points.

Townsend, Can. Ent., vol. 18, p. 12.

Thinks Mr. Clarkson's discovery the exception, and not the rule, in the time of metamorphosis.

DESCRIPTIONS OF NEW SPECIES OF NORTH AMERICAN HETEROCERA, WITH NOTES.

BY HENRY EDWARDS.

FAM. ÆGERIADÆ.

FATUA PALMII, n. sp.

Allied to *F. denudata*, but differing greatly in important particulars. Fore wings are bright shining seal-brown, deep orange along the costa for the basal half. At the middle of the wing at base is a narrow denuded space, and the internal angle is also devoid of scales, but much more narrowly so than in *denudata*. The transparent space is golden yellow in shade. Lower wings transparent golden yellow, with very bright but dark opalescent reflection. The margin and spot at the extremity of cell dark brown. Antennæ bluish black, orange brown at the base. Head, disk of thorax, and the upper portion of the abdominal segments, black. Eyes black, palpi with black at their base. Front of head, collar, sides and base of thorax, posterior edges of abdominal segments bright orange. Feet and legs wholly orange without any black bands.

Exp. wings 45 m.m. Length of body 22 m.m. 1 ♀. Enterprise, Florida. Taken by Mr. C. Palm, to whom I dedicate the species.

FAM. BOMBYCIDÆ.

LIMACODES BEUTENMUELLERI, n. sp.

Primaries rich chestnut brown, very glossy and mottled with blue metallic scales. Across the median space, and extending along internal margin to base is a deep fawn brown shade enclosing darker shades, and giving a clouded appearance to the wing. The apical part of the margin and the fringe pale fawn drab, passing into darker shade at the internal angle. Secondaries smoky brown, margins paler. Beneath

wings wholly smoky brown, with the apices pale. Head, thorax and abdomen chestnut brown. Exp. wings, 21 m.m. Length of body 9 m.m. Enterprise, Florida. 1 ♀.

I name this beautiful species after its discoverer, Mr. W. Beutenmueller, an earnest and talented entomologist, from whom good work in the future may be expected.

FAM. NOCTUIDÆ.

SCOTOGRAMMA STRECHII, n. sp.

With much of the general appearance of *Perigea falsa*, Gr., but said by Mr. J. B. Smith to belong to his new genus *Scotogramma*. Dark stone drab, the lines blackish, all much confused, and the ground color of the wing covered with brownish irrorations. Basal half-line indistinct. T. a. line nearly straight, with a deep tooth anteriorly pointing towards the base. T. p. line dentated outwardly and joining the reniform in a darker cloud. Marginal line lost in $\frac{1}{2}$ row of dark clouds. Intronervule spaces pointed with black lunules. The basal, median and submarginal spaces are pale by contrast with the dark lines. Lower wings dull stone drab, a little paler toward the base. Under side uniform stone drab, with very distinct darker discal spots and a median band common to both wings. Margins also dark. Thorax and abdomen concolorous. Exp. wings, 32 m.m. 1 ♀, 2 ♂. Colorado Desert. R. H. Stretch.

NOTES.

SPHINX CUPRESSI, Bdv.

It has been my good fortune to have the opportunity of examining two specimens (both ♂) of this very rare Sphinx, one taken by Mr. C. Palm, at Kissimmee, Florida, and the other by Mrs. Slosson, at Enterprise, Florida. I have no doubt whatever as to its being a very distinct species. Its color is pale fawn, with some whitish dashes over the primaries, and three brown streaks as indicated in Boisduval's figure. The lower wings are rich brown. Mr. Palm's specimen was taken in a cypress swamp, and Mrs. Slosson's at electric light. Both captures were made in May. It is probably an early insect, as the examples were somewhat rubbed.

PRIONEA LACERTULA, L.

This well-known European moth must be added to our fauna. A fresh specimen was taken by me in July, 1886, at St. John, N. B. I am

inclined to think that this species may be confounded in some collections with *P. bilineata*, examples of which from Nova Scotia are in my collection.

NOTE ON THECLA AUGUSTUS.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

I beg to record the capture, by myself, in the neighborhood of Berger-ville, Province of Quebec, of two specimens of *Thecla Augustus*. One of them was taken on the 6th, and the other on the 8th of June. I am indebted to Mr. W. H. Edwards for the identification of the insects.

A figure of *Thecla Augustus* is given by Harris in his work on insects injurious to vegetation, page 279. As he gives no description of the insect, the following may not be unwelcome to some of the readers of the CANADIAN ENTOMOLOGIST:—

Expanse of wings 1 inch. Colour above, umber-brown, darker along the costa, and at the base in fore-wings. At the centre, in the fore-wings, there is a rust-red tinge or blush; and at the anal angle in the hind-wings there is an indistinct spot of the same color. The under-side of the fore-wings is of a lighter shade than the upper. Beyond the centre of the wing is a wavy transverse dark line. The hind-wings on the under-side have a basal patch of dark umber irregularly bordered. The antennæ are ringed black and white.

STRAY NOTES ON MYRMELEONIDÆ, PART 2.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from page 136.)

3. *Acanthaclisis Texana* Hagen.

I have a male and two females from Carrizo Spring, Dimmit Co., Western Texas, just near the frontier of Mexico.

Length of body, male, with app., 50 m.m.; female, 45. Length with wings, 65 m.m. Exp. al., 118 to 120.

Very similar in shape and color to *A. Americana*. After long consideration I believe them to be different species, until by a larger material

it shall be shown that the differences given are such that *A. Texana* should be considered to be only a well marked variety.

The differences are:—

1. The vertex is rounded, convex above and before, very slightly depressed longitudinally in the middle. The vertex of *Americana* is strongly flattened above, and cut off sharply anteriorly.

2. The last joint of labial palpi is more thickened, the suddenly carinate tip shorter and truncate on the extreme apex. The same joint of *Americana* is less thickened, the tip longer and pointed.

3. The prothorax is a little shorter, equally broad in front and near the mesothorax. In *Americana* the prothorax is visibly narrowed before, so that its breadth near the head is only a little more than half its breadth near the mesothorax. I consider the structural differences of the head, thorax and wings important, and was indeed induced only by them to separate the two species. The difference of the spots on the wings is less important, the more so as I have noted, *Stett. Ent. Z.*, xix., p. 124, a specimen of *A. occitanica* from Russia with similar spotted wings as in *Americana*.

4. All wings are sharper pointed, the hind wings are narrower, and the apex more falcate. The wings are less spotted; the space between fourth and fifth vein is without spots, the space between subcosta and radius nearly spotless; the hind wings less spotted.

5. The color of the body below is yellow, the legs nearly yellow; the abdomen above yellow with a longitudinal brown band, divided in the median line; on each side a lateral dark band; the segments 5 to 7 with a small yellow dot on each side nearer to the base. The appendages of the male are short, 3 m.m. long, cylindrical, straight, rounded on tip, with black hairs.

4. *Acanthaclisis fallax* Rbr.

I am not able to give now an exact and sure opinion of this species, as my 12 specimens were destroyed in bringing over my collection. Of these, seven males were from Brazil and Guiana (*M. senilis* Klug, still present in the Berlin Museum), and from California. I had provisionally separated five of these from Cuba and Venezuela (not described) as *M. Cubana, mihi*. But I have described them all later as *A. fallax* Rbr. (type compared) and *A. impostor* Walk. (type compared) in my Synopsis of Neuropt. of N. America, p. 223, No. 2. Only two specimens in very

bad condition are now before me, from Mungruba, Ceara, N. E. Brazil, and from the Isthmus of Tehuantepec, Mex., coll. by Prof. Suamichrast. A figure, which has been overlooked, is given (1742) in Reaumur, Mem., vol. 6, pl. 34, f. 15, and only mentioned, p. 386, as received from Hayti by Mr. DuHamel. The figure, a male, is bad, but represents very probably the same species.

The wings of *A. fallax* are much paler, less spotted, or not at all. Otherwise, if my memory is right, they agree with *A. Texana*, at least some small differences in Rambur's and Walker's descriptions seem to be not important. If so, *A. Texana* would be only a northern, stronger colored form of *A. fallax*.

Though I have tried to separate carefully *A. Americana* from *A. Texana*, the assumption that the first species may represent only a more northern and strongly marked form of the latter one is very inviting. Nevertheless I have before me the raised larva of *A. Americana* from Florida, and the supposed larva of *A. fallax* from Victoria, Brazil. Both seem to me different, and until now no other Brazilian species is known.

5. *Previous Stages of Acanthaclisis Americana.*

Larva full grown Head oblong, broad, the base covered by the prothorax; a little longer than broad, above flattened, below slightly convex; sides a little curvate, so that the base is narrowed; front margin notched; labrum nearly as broad as the head, on each side covering as a narrow lobe the base of mandibles; front margin with black bristles; eye-cone with six ocelli, and a seventh below the others among black bristles; antennæ short, thin, with annulated joints, and a longer, cylindrical apical one; mandibles as long as the head, black, powerful; basal half dilated with three oblique strong teeth, separated, the basal one a little shorter; apical half curved, pointed; no interior bristles; head above with short hairs, directed to the front, on sides and below more numerous; labial palpi short, two cylindrical small basal joints; apical as long as both together, thicker, above triangularly dilated.

Prothorax a little broader than head, above globose; hind segment short with two stigmata; the other parts ovoid, hair as broad as long; mesothorax broadest; scars as commonly; first abdominal segment with a dorsal stigma, the following ones lateral; the segments with short black lateral brushes; abdomen above with black hairs on the transversal folds; last segment round, transversally split with numerous black thorns and

hairs. Legs moderately long and thick, the claws a little incurvate on tip; hind legs shorter; claws short, strong, pyramidal. Color yellowish gray; head above with two black bands, enlarged before, and on each side an incurved black line, touching the front corner of the band and going behind to the lateral margin; before the bands two angular spots; lateral margin dark; head below blackish brown on the middle of front margin, and on the sides below the eye-cones yellowish; on each side of the base brownish, less dark; prothorax with two blackish longitudinal bands, broader anteriorly; basal segment with two angular spots; abdomen above gray, checkered with black; two black bands on each side are interrupted to form square black spots; below the abdomen is more yellowish at base, with angular black spots between the legs, which are pale yellow.

Long., 23 m.m.; lat., 10 m.m.

Comparing this larva with those supposed to belong to *A. fallax* (Stett. Ent. Z., 1873, p. 266), there can be no doubt that they belong to different species. Those of *A. fallax* are longer, more slender, the head narrower, longer, the lateral margins of abdomen with long black brushes, the teeth of mandibles different, and the part of the mandible in which they are inserted more inflated; besides the colors are different.

The larva of *A. Americana* is in shape, form and color more like that of *A. occitanica*, but the teeth of the latter are more like those of *fallax*.

The shed larva skin of *Americana*, 12 m.m. long, is before me; also the cocoon, 20 m.m. in diameter, externally covered with sand.

A nymph just hatched, 26 m.m. long, is still partly in the skin; the mandibles are just as broad and just as serrated as Brauer figures them for *A. occitanica*. In fact all stages are so similar that it is difficult to believe them to belong to different genera.

Habitat.—Mr. H. G. Hubbard, to whom I am indebted for this valuable discovery, writes as follows: "The *Acanthaclisis Americana* I bred from the larva. One died in quitting the cocoon. I never saw the imago until I bred it, so it must be very rare in Florida. The larvæ I found in dry sand under a building in Crescent City, Florida. They do not make pits, but they prey upon the common pit-fall making Myrmeleon larvæ. These they chase under the sand, as fish pursue their prey under water. I found that in confinement they would not eat anything which remained on top of the sand, nor which I purposely buried for them. But they

captured and ate as many larvæ of *Myrmeleon* as I had time to procure for them."

6. *Larva*.

Together with the two larvæ of *A. Americana*, Mr. Hubbard sent a very similar but a little smaller one from the same locality.

The larva is of much brighter colors, long. 17 m.m., broad 7 m.m., and is similar to *A. Americana*, but with only one tooth on the mandibles. This is so entirely exceptional for *Myrmeleon* and *Ascalaphus* (only *Suphalasca Dietrichiæ*, Brauer, is known with one tooth), that at first I supposed it to be a deformity. Nevertheless both mandibles are entirely alike, and no trace of any deformity is to be seen. The mandibles are reddish-brown, shorter than in *Americana*, and less incurved; internally after the third basal part a strong, oblique, conical tooth, much longer and larger than the basal tooth of *A. Americana*; there are no bristles, but the inner margin of the mandible goes behind the tooth, sloping to the tip. The eye-cone is lower; antennæ with three basal joints longer, conical, followed by a few annulate short joints, the apical one larger ovoid. Head smaller; otherwise the whole larva, colors excepted, is entirely similar to *A. Americana*. The color is light yellow with a grayish tinge on thorax and abdomen; two black dots near the front of the head; prothorax on each side of the front margin with a transversal black band, notched behind; two large spots near the hind margin; mesothorax and metathorax on each side with a round black spot, divided by a yellow line; abdomen above with two black interrupted bands, formed by a square spot on each segment; a strong black brush directed anteriorly on the side margin of segments; the under side and legs are uniformly yellow; head with a black anterior margin; last segment as in *Americana*.

I can not say more about this curious larva. Mr. Hubbard writes me that it was collected in the same place with the others, but that he had not remarked the difference of the mandibles. Perhaps he will be able to solve the mystery.

7. *Acanthaclisis occitanica*, Vill.

The life history of this species is very well described by Professor Brauer; all stages are before me. It was known long ago that among the species of *Acanthaclisis* in America, Africa, Asia and perhaps Australia, a certain number have not the spurs broken in a right angle suddenly, and the basal part dilated as in the type. Rambur is supposed to

have chosen the name of the genus for this character, though I am not aware that he ever had mentioned it; the derivation is given in Agassiz Nomenclator. The other species have the spurs subuliform, more or less incurvated. This character is indeed very obvious, and so it has been several times stated that probably the species with subuliform spurs could form a different genus. Mr. Redtenbacher, 1884, remarks that I had not stated whether the larva of *A. fallax* had bristles between the teeth of the mandibles or not. Now *A. fallax* has no bristles, and therefore they were not mentioned by me. But I was not then aware of the importance of this character, otherwise I should have mentioned their absence. The splendid figures of all my larvæ drawn by Mr. Konopicki, Vienna, I have not yet been able to publish.

The question whether *Acanthaclisis* has to be divided or not, was studied by me carefully. The previous stages of *Americana*, the first species known with unbroken spurs, except for the entire absence of bristles between the teeth of the mandibles, seem not to favor a division. I am until now not able to find differences in the characters, except the negative one in the larva, and the positive one in the imago. But I think in *Chrysopa* and its allied forms similar differences exist. The third N. American species, my *A. congener*, has broken spurs similar to those of *occitanica*, and my presumed larva (Mr. Redtenbacher supposes it to belong to *Macronemurus*) has bristles on the inner margin of the mandibles.

Mr. McLachlan, Ent. M. Mag., vol. xx., p. 183, says of *A. occitanica*: "Introduced in Prussia." If his statement is not based on new facts or observations unknown to me, I believe that a perusal of the statements given in Stett. Ent. Zeit., vol. xix., p. 124, and vol. xx., p. 431, will not warrant us to consider the species as introduced in Prussia. It is true that the species found through seven years in Kahlberg, Prussia, is not recorded for the whole region between Prussia and Hungary, or beyond the Alps. But I may remark that *A. Americana* is not recorded for the larger distance from Sandy Hook, New York, to the south of N. Carolina. It is believed that a number of insects of the southern species, even of Florida, are to be found in S. Massachusetts, Martha's Vineyard, Nantucket, as a consequence of the warmer temperature of the Gulf Stream; I am assured of the same fact for Sandy Hook. There is perhaps another explanation of the fact that *A. Americana* has not been yet discovered between New York and N. Carolina. Those large *Acanthaclisis* belong to the most sluggish insects known. For the European species I can

speak from my own experience, which is fully corroborated for the American species by two entomologists here. In Kahlberg, Mr. Schindofsky came to show me the insect in the field, and told me he was sure I would pass by it without seeing it. On a rustic fence I really passed it; the specimen had been sitting on the same place at least for two hours, and matched perfectly with the color of the bark of the fence rail. I threw it in the air to see it fly. It fluttered in the most lazy and awkward manner, until it tumbled in a potato field very near; when I took it up again, without any resistance on its part, the same show was experienced. Perhaps they are more agile during the night. The not uncommon presence of the insect in the same place was observed during the last seven years before I left Europe. As later, by order of the Government, a country road was laid just through the sandy hill where the insect lived, it may have been destroyed, but I have had no information about it. As I have been connected most intimately since the first discovery of this species in Prussia, with the question, "introduced or not," I beg leave to give my objections to the statement that it is introduced, which seems to be an impossibility.

The following interesting species of an Ascalaphide, described by me many years ago, but not yet published, has the same distribution as *Acanthaclisis Americana*, going even further to the north.

8. *Colobopterus excisus* Hagen.

Male. Eyes globose, very large, separated above by a narrow, hollowed, dark brown furrow; front dark brown, along the inner border of the eyes pale; near the antennæ with long grayish hairs; each side above the labrum with dense whitish hairs; labrum yellowish; palpi shining, blackish-brown, joints paler on tip, which has black hairs around, except the apical joint; labium yellow. Eyes blackish-brown behind; antennæ a little shorter than front wings, blackish, base with grayish hairs, club large, ovoid, the joints above and below with white transversal lines. Thorax dark brown with two yellow spots and brown villosity above; besides gray hairs. Abdomen a little longer than the wings, basal half a little enlarged; black, segments 2nd to 4th with a long black velvety band on each side of the apical half; surrounded by yellow, which covers the basal half, and is separated only narrowly in the middle; segment 2 with a dorsal brush of erected black hairs in the middle, where the velvety bands begin; the three last segments yellowish on tip; last segment covering two oblique appendages, the tip somewhat inflated, yellowish; those

parts are not well visible. Legs short, black, very hairy; spurs as long as four tarsal joints. Wings hyaline, veins brown; extreme base of all brownish; pterostigma yellowish; hind wings on the basal third of the hind margin with a deep semi-circular excision, reaching the longitudinal veins; front wings with a very flat notch on the base.

Long. of body 34 to 38 m.m.; long. of abdomen 25 to 31 m.m.; long. antennae 26 m.m.; exp. al. 64 m.m. Lat. of hind wings, 7 m.m.; on the notch, 3 m.m.

Hab.—A male from Florida, by Uhler; a male from Cumberland Gap, Ky.; a male from New Haven, Conn., by E. Harrison; a male from Falmouth, Mass., July 22; a male from Middleboro, Mass.; besides I have seen some fresh specimens collected by B. P. Mann in June, in Martha's Vineyard. The distribution from Florida to Martha's Vineyard Isl. is very large. This species is until now the only one known from the U. S.

I have before me a sketch of a young larva of an Ascalaphide, made more than a dozen years ago, which was shown to me by Mr. Riley; perhaps it belongs to this species, at least it differs from all larvae known.

9. *Acanthaclisis congener* Hag.

Synops. N. Am. Neuroptera, p. 224, No. 3.

Black with gray villosity; face, palpi and base of the antennae beneath yellowish white; antennae short, stout, black, faintly annulated with yellow, more visible on the apex; maxillary palpi yellow, slender, cylindrical; labial palpi longer, stronger yellow, last joint with short black hairs, inflated before the sudden coarctated pyramidal tip; on the inflation an external impressed longitudinal narrow band; vertex black with two anterior transversal bands, the posterior one incomplete, interrupted in the middle, and two dots posterior to the bands, all yellow; prothorax quadrangular, a little broader near the thorax, front margin about straight; black, with some whitish villosity; some tufts of black hairs on each side; a maculose stripe on each side and two middle spots yellow; posterior margin fulvous, black in the middle; mesothorax black, covered with whitish villosity; two spots on the front margin, then six in a series, the intermediate ones triangular, and two posterior, all yellow; some not well defined below the wings. Abdomen black with gray pile, more dense at the base; posterior margin of segments pale yellowish; segments 5 and 6 of males with a large triangular apical spot, which is bifid on the 5th segment; last segment short, black; male appendages very hairy, light

brown, twice as long as last segment, basal half thicker, with a knee below, apical half cylindrical, rounded on tip, with a brush of black hairs below; seen from besides the basal half is triangular, going downward, the apical half straight horizontal. Abdomen of female a little shorter and thicker; last segment below with black hairs, and split in the middle; on each side with a yellow cylindrical appendage as long as segments; legs short, hairy, fuscous; tibiæ yellowish, annulated with black, or sometimes black annulated with yellow; spurs brown, dilated, the tip broken down suddenly in a right angle; tarsi black, apical joint yellow; claws brown, incurved. Wings hyaline, a little acuminate, veins and veinlets alternately yellow and black; pterostigma small, indistinct, blackish; costal space with one series of areoles; hind wings a little shorter, veins not so much spotted; the males at base with a small yellowish pelote.

Long. of body, 36 to 38 m.m.; exp. alar., 70 to 80 m.m.

Hab.—The types (now destroyed) were four females from Pecos River, Western Texas (now N. Mexico), collected in July on Capt. Pope's Expedition; one specimen of the same lot is still present in Mr. Uhler's coll. I have now before me a dozen specimens, half females, one from Oregon by Mr. H. Edwards, and all others from Ainsworth, Wash. Terr., July 20, coll. by Mr. S. Henshaw. Ainsworth, a town, then only a few months old, is situated in the middle of a sandy desert just near the Columbia River and mouth of Snake River. The little inn where we had to stay showed the windows and window-sills covered with Myrmeleons, all of a very sluggish temper. *A. congener* was common. One male was collected the day before, July 19, on the Big Bend of the Yakima River.

About the supposed larva of this species described by me long ago, I have to speak later.

The species of *Acanthaclisis* described here are the only ones known to exist in N. America.

10. *Myrmeleon gulo* Burm.

The type of Burmeister, vol. ii., p. 997, No. 18, from Senegambia, in Winthem's collection, has been carefully compared by me. Burmeister quotes *M. gulo* Dalman, Analecta., p. 89, No. 101, but neither the label nor the description give any surety that the specimen had been sent by Dalman as his type, the more so as this is stated for the following species in Burm. Handb., *M. Hyacina*. The type of the latter is now with

Schoenherr's collection in the Stockholm Museum. Indeed the identity of Burmeister's *M. gulo* with this of Dalman is rather doubtful, as the following characters of Dalman's description are wanting in Burmeister's specimen :

1. *Niger*—*alis fuscescentibus*—*nigro strigosis*.
2. *Collare*—*nigropilosum*.
3. *Thorax supra*—*immaculatus*.
4. *Pedes*—*immaculati*.
5. *Alar. confertim reticulatæ*; *stigmata fusco*; *punctum fuscum medium ante apicem*.

As Burmeister's *M. gulo* is apparently *Acanthaclisis distincta* Rbr., we may retain this name.

11. *Myrmeleon nigrum* Linn.

Among Linnæus's papers were found the descriptions of some species which were published by Afzelius in Linnæus's autograph annotations, p. 138, No. 14. The same was re-published, 1832, by Fee, in the *Life of Linn*, *Mém. Soc. Sc. Lille*, p. 365 :

Myrmeleon nigrum.—*Alis medio fascia posticeque maculis albis*. Hab., Africa, Fothergill. *Corpus Myrm. formicarii sed alae latiores, et totum nigrum. Antennæ setaceæ. Alae nigræ concolores; fascia alba lineari interrupta in medio, sed postice maculis albis plurimis majoribus magis sparsis.*

I am not aware that the species is mentioned by later entomologists. I do not know where it belongs.

THE CLASSIFICATION OF THE BOMBYCIDÆ.

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

Notwithstanding much that has been learnedly written upon the family BOMBYCIDÆ, or Spinner Moths, no strong exclusive structural characters have been brought to light which hold the groups together as a natural family. Following Linné and Latreille, the American authors, Dr. Harris and Dr. Packard, have, however, considered such a family to exist. In Germany the different groups, or sub-families, have been raised to the rank of families, while under the loose term Bombyces the Spinner Moths as a whole have been designated. In this paper the

American tradition is followed, and the nomenclature adapted to this classificatory view. The *Bombycidae* are characterized as a whole by their ample wings and sluggish habit. The head is small and the oval structure generally weak and undeveloped. The antennæ are short, rather than long, and oftenest pectinated in the male sex. The pieces of which the thorax is composed present a somewhat different proportion, as compared with other families of moths, and the thorax appears shorter and also more elevated dorsally. The legs are weak; the abdomen cylindrical, untufted as a rule, and not exceeding the hind wings. The habit of cocoon-making is carried to its greatest development in certain groups, but the American sub-family *Ceratocampinae* makes no cocoon, the pupa lying naked in the ground. The strong characters which mark certain sub-families, such as the *Hepialinae*, in the venuration and thoracic structure, at first sight seem of family rank, but the general form, which must decide the question, according to Agassiz, enables us to consider all these groups as interrelated and as the survivors of a former complex in which there were fewer gaps. The arrangement of these groups in a linear series must proceed according to our ideas of rank, and in this case it cannot be doubted that the *Hepialinae* are the lowest. The classification of Harris is thus apparently more philosophic than that of v. Hainemann and Speyer.

I have only differed from Dr. Packard in eliminating the *Hemileucinae*, and in separating the *Cossinae* and *Hepialinae*; further, I have placed the genus *Crocata* among the *Arctiinae*; I have also rejected Packard's genus *Platycerura* as not allied to *Cerura*, but as probably an Apateloid form. If we do not include this genus among the higher Owlet Moths, it must find a place beside *Dasychira*. The moth itself was one of my own earliest discoveries. I kept back from describing it on hearing that it was to be published in the well-known Synopsis of the family which shortly after appeared in the Proceedings of the Entomological Society of Philadelphia.

The different sub-families of the *Bombycidae* show resemblances to other families of moths: The *Arctiinae* are with difficulty to be separated from the lower *Zygenidae*; the *Psychiinae* run close to certain *Tineidae*; the *Notodontinae* resemble the *Noctuidae*; the *Ceratocampinae* the *Sphingidae*; the *Cochliopodinae* the *Tortricidae*; the *Platypteryginae* the *Geometridae*. The *Cossinae* and *Hepialinae* are internal feeders in the larval state, and thus resemble the *Aegeriidae*. Dr. Packard has most inter-

estingly shown that the *Neuroptera* afford a synthetic type among the orders of insects, and also how the *Hepialinæ* are related to this order by their long thorax, the sub-equal wings, the unusual number of veins, their distance at base, being nearly set on a plane, as the wings of dragon-flies. So, among the moths themselves, the Spinners occupy a central and synthetic position, having resemblances to all the other moths, and probably containing very old types of *Lepidoptera*.

The caterpillars are usually hairy or provided with warts and bristles, but not a few are naked and spingiform, as that of *Notodonta stragula*. Probably one of the most remarkable known lepidopterous larvæ, that of the European *Stauropus fagi*, occurs in this family. This brown caterpillar is called "the lobster" by collectors from its odd shape; the thoracic feet are abnormally developed. The moth is not unlike our genus *Heterocampa* and is sufficiently commonplace. Walker mistakenly credits North America with species of this genus.

The sub-family *Nycteolinæ*, of which *Nola* is the type, and which is characterized by the weak bushy palpi, while the white and grey moths look like minute *Noctuidæ* (*Eustrotia*), is represented in North America by the genera *Nola*, *Argyrophytes* and *Sarothripus*. The palpi exceed the head, and are somewhat flattened. The second sub-family, or *Lithosiinæ*, is characterized by the absence of simple eyes, or ocelli, and narrow wings, while most of the genera are, like the Bryophilians, lichen feeding. The genus *Crocota* is wrongly included here by Dr. Packard. Prof. Saunders describes the larva of *C. quinaria* under the name of *Arctia bimacula*, and it is quite clear that this frail genus is to be classed under the sub-family *Arctiinæ*.

In the present brief paper I only direct attention to the position of the sub-family *Hemileucinæ*. In this sub-family, which I separated from the *Attacinæ* (=Saturnidæ of Authors), the mature larva is provided with short bristles arising in fascicles, and thus in the mature larval stage resembles the young larva of the *Attacinæ* on leaving the egg, such as that of *Platysamia cecropia*. The cocoon is not free and spun in the leaves and branches, but on the ground, amid debris and mixed with sand and soil. The perfect insect has the antennæ less lengthily pectinate, as compared with the *Attacinæ*, and the broad wings are no longer falcate. We have to do with a type intermediate between the *Attacinæ* and *Ceratocampinæ*. The genera are *Pseudohazis*, *Hemileuca*, *Argyrauges*, *Coloradia* and *Hyperchiria*. *Hemileuca* contains species so closely

allied that it is evident we have to do with one of the kind I have called *Progenera*, of which *Datana* is so conspicuous an example. The moth *H. tricolor* Grote, ex Pack., is, however, a true *Hemileuca*. The characters of this genus, the black antennæ, the red body tufts, are retained in this faded moth, which has been cited by Dr. Packard as owing its color to its peculiar environment. The genus and species *Argyrauges Neumoegeni* Grote, ex Hy. Edwards, is closely allied, but here the antennæ are yellowish and comparative differences allow us to concede a new generic type. The relationship is evidenced by the red tufts still, but the pattern, not the color, has also undergone a modification. It is quite clear that the genus *Euleucophæus* has been misapplied by Henry Edwards and Mr. Neumoegen. I have not seen the insects described by these writers, but they must be referred to a different genus, since *Euleucophæus*, with its type *tricolor*, has no standing. They may be allied to *Coloradia*.

The sub-family *Ceratocampinae* is first eliminated by Dr. Harris. It appears to me to be exclusively North American, and even to be confined to the wider region east of the Rocky Mountains, the Sierras and Cordilleras and Andes of America, the rocky back bone of the whole continent. Among our *Attacinae*, the two species of *Saturnia* are most interesting, both because they belong to this European genus, and because they illustrate what I have pointed out among the lower moths, a certain affinity between the faunas of Texas and California, not apparent in the Lepidoptera of the Middle States.

SOME EUROPEAN BEETLES IN AMERICA.

BY SAMUEL HENSHAW, BOSTON, MASS.

On page 114 of the present volume of the CANADIAN ENTOMOLOGIST Mr. A. R. Grote in his "Note on Mistaken Identifications," mentions Dr. Harris's record of the capture of *Carabus auratus* Linn., in Massachusetts, and implies that Dr. Harris has made an erroneous, or "curious," identification. This, however, is not the case, and it would be impossible for so careful an observer as Dr. Harris to make a mistake about a species so well known.

The specimen referred to is preserved in the Harris collection, and, so far as I know, is the only one on record captured in the United States.

In the catalogue of the Harris collection we read: "2. *Carabus auratus* L. In Dr. Holbrook's garden, 1819. Undoubtedly introduced in balls of earth surrounding the roots of French trees."

Dr. Leconte (Ann. Lyc. 1848, vol. iv., p. 159-160,) also mentions this occurrence of *C. auratus* in the United States, and assigns the same method of dispersion. This record of *C. auratus* recalls the case of another common European beetle found once in Eastern Massachusetts, but which has failed to become established. In the Proc. Bost. Soc. Nat. Hist., 1869, vol. xii., p. 381, Mr. Ernest Papendiek notes the capture in Milton, Mass., of twenty specimens of *Silpha atrata*.

In 1844, Dr. F. E. Melsheimer described as new *Onthophagus rhinoceros* and *Aphodius pensvallensis*; subsequent study, however, proved *O. rhinoceros* synonymous with *O. nuchicornis*, and *A. pensvallensis* the same as *A. erraticus*, both well known European species. Drs. Haldeman and Leconte in a foot note to the Melsheimer catalogue doubted the occurrence of both species, "unless introduced by accident," and it is only quite recently that we have been able to add both species to our lists. Mr. Otto Lugger reports *A. erraticus* as abundant in Maryland, and in June, 1881, when collecting on several of the Magdalen Islands in the Gulf of St. Lawrence, I found *O. nuchicornis* abundant in cattle droppings. As I have since seen specimens from New Brunswick and Rhode Island, the species is probably established in this country.

On some future occasion it will be interesting to note the species erroneously accredited to the fauna of North America, together with those common to America and the eastern hemisphere.

REPORT OF THE SELECT STANDING COMMITTEE ON IMMIGRATION AND
COLONIZATION of the House of Commons, Ottawa, 1886.

In this "Blue Book" we find some valuable information on injurious insects given to the Committee by our friend Mr. James Fletcher, who is doing much good work in Economic Entomology in connection with the Dominion Department of Agriculture. It must be evident to the Department, we should think, by this time that Mr. Fletcher's services are of so much value to the country that they should be no longer of a purely "honorary" character, but should be regarded in the same light as those of Prof. Riley at Washington, Dr. Lintner at Albany, Prof. Forbes in Illinois, and many others in various States of the Union.