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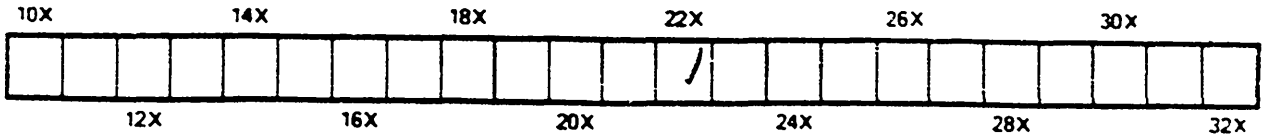

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DESCRIPTION OF THE PREPARATORY STAGES OF ARGYNNIS ATLANTIS, EDW.

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

EGG.—Conoidal, truncated, higher than broad, the base somewhat rounded; marked vertically by 14 ribs, one half of which reach the summit, the others nearly as far; the spaces between the ribs broad, excavated and crossed by ten or twelve fine ridges; the micropyle at top in centre of a rosette of five minute flat cells; and about these are successive irregular rings of cells, each larger than the one next within, to the verge of top; these are six and five sided, and some are sub-triangular, deeply excavated; color greenish-yellow when first laid, soon turning to brown. In shape, this egg is like that of other species of this genus, but it is characterized by fewer ribs than any with which I am acquainted. Duration of this stage 16 to 18 days.

YOUNG LARVA.—Length .06 inch; cylindrical, even; color of dorsum yellow-green, of sides and lower parts more yellow; marked as in other species of the genus by longitudinal rows of flattened tuberculous brown spots, there being three on either side over spiracles, each of which gives one or two long tapering hairs; below the spiracles is another row of similar spots, smaller, and on part of the segments broken into four spots, each with its hair; on dorsum of 2, an oval spot of same character as the others, with a row of hairs in front which are bent forward over the head, and a shorter row behind these; this oval spot corresponds to the four upper spots of the other segments; on the side is one spot above and another below spiracle, each with two hairs, and over the foot a smaller one, also with two hairs; on 3 and 4 each is an additional spot below spiracle, the three, on 2, 3, 4, making a demi-row; head obovoid, black, shining, with many long hairs. The larva hibernates directly from the egg.

After first moult, in spring: Length .11 inch; color brown-green; the spines in number and position as at maturity, and as in the genus, black, as well as the tubercles from which they spring; beset with many short, divergent, black bristles; head obovoid, black, with black hairs. Duration of this stage about 10 days.

After second moult: Length .16 inch; color gray-black with a green tint over upper side; under side pale green; the spines black, with black bristles; all the tubercles pale yellow; head as before, black. To next moult about 14 days.

After third moult: Length .32 inch; color gray mottled with black; a double dorsal stripe of gray; spines black; the bases of dorsal rows black on dorsal side, but yellow on outer side; of middle and lower rows dull yellow; head as before, but reddish-yellow, the back less red, more yellow. To next moult about 10 days.

After fourth moult: Length .5 inch; very much as at last previous stage, the dorsal lines same, spines same. To next moult about 6 days.

After fifth moult: Length .74 inch; slender; color brown-black, with a dorsal band of grayish-brown and not clearly defined markings elsewhere; these markings became distinct as the stage progressed.

MATURE LARVA.—Length 1.5 inch; slender, somewhat thickened in middle, the segments well rounded; on dorsum a broad greenish-yellow band, with a black line through the middle, edged by a little green; a narrow greenish-gray band between the dorsal and middle rows of spines, and a short band between the base of each dorsal spine and the next in advance of the middle row; these gray bands are of irregular width and the edges are whitish; the spaces between the bands brown-black; the sides, from middle row to the outside of lower row, gray with a rust-red tint in the middle of this area, and below to feet a darker, or more brown shade of gray; the spines are rather slender, swollen next base, above this tapering to a small conical top, from which proceeds a straight bristle; a few bristles about the sides, each from a tubercle, and standing at about 45° with the axis of its spine; the dorsal row are gray, the middle row gray tipped with rust-yellow, the lower row all rust color of deep shade; feet black, pro-legs gray-brown; head sub-cordate, the vertices rounded; color dull dark brown in front, dull yellow at back, with many short black hairs. From fifth moult to pupation 9 days.

CHRYSALIS.—Length .8 inch; shaped as in Group 1 of the genus; head case square, bevelled on either side about equally to the cross ridge; mesonotum prominent, carinated, followed by a deep and narrow depression; the wing cases very prominent at outer ends; abdomen conical, with fine tubercles corresponding to those of the larva; color mottled dark brown and black; the wing cases gray-brown. The only chrysalis I had died before imago.

I have several times in previous years had eggs of *Atlantis*, and the young larvæ from them, but always had the ill luck to lose the latter during the winter. But, 25th Aug., 1886, I received several eggs from Miss Caroline G. Soule, then at Stowe, Vt., laid 21st and 22nd. They hatched 3rd Sept., and the larvæ were placed in ice-house, and in October were sent to Clifton Springs, New York, to go in the "Cooler" at the Sanitarium there. They came back to me 21st March, 1887, most of them alive, and were laid on the tender leaves of a violet plant which had been forced in anticipation of their coming. One larva passed 1st moult 15th April, others two and three days later. The first to pass second moult was on 25th April, two passed same 29th. On 9th May, one passed third moult, the fourth 19th, the fifth 24th, and this larva pupated 3rd June, but died during the pupal stage. The other larvæ had died off from time to time before 4th moult. So that I am not able to give the length of the last stage to imago, but it is probably about 20 days, as in the allied species. The habits of the larvæ in confinement are in all respects like those of *Cybele*.

ATLANTIS is found over British America from Newfoundland and Anticosti to the Pacific. In the United States, over the mountainous parts of New England, New York and Michigan.

DESCRIPTION OF THE PREPARATORY STAGES OF ARGYNNIS EDWARDSII, REAKIRT.

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

EGG.—Shaped generally like the eggs of this Group, higher than broad, about as 15 to 13, the number of ribs 30, conoidal, truncated, the middle but little narrower than the base, the upper half sloping rapidly, and convex; about one third the ribs reach the summit, the rest end at

from one half to two thirds distance from base; the spaces between the ribs excavated roundly, and crossed by many fine ridges; the micropyle in centre of a rosette of fine minute flat cells, outside of which are four irregular rings of excavated cells, generally long and narrow, varying from sub-crescent to five-sided; color greenish-yellow. Duration of this stage 10 to 11 days, in July.

YOUNG LARVA.—Length .08 inch; cylindrical, even; color yellow-green; marked as in the allied species by flattened, tuberculous, brown spots in longitudinal rows, three rows on either side above spiracles; each of which gives one or two long, tapering hairs; below the spiracles another row of similar smaller spots; on dorsum of 2 an oval dark patch with a row of hairs in front, turned forward, and a shorter row behind; head obovoid, bilobed, black, shining, with many long hairs. The larva hibernates from the egg.

After first moult, in spring: Length .1 inch; color greenish-brown, mottled; the spines as in the genus in number and position, stout at base, tapering to top, with many divergent short bristles; head obovoid, black. Duration of this stage 9 days in April and May.

After second moult: Length .18 inch; color gray; a black mid-dorsal line; the spines black; the tubercles at base of dorsal spines black, of the middle row yellow-brown, of the lower row same and more decidedly; head as before, black. To next moult 7 days, in May.

After third moult: Length .25 inch; color gray and black, either dark gray or whitish, individuals differing; a broad, clear gray band fills all the space between the two dorsal rows of spines, through which runs a black line, sometimes macular, or partly wanting; the spines as at last previous stage, the yellow at bases darker; head black over the front, yellowish behind. To next moult 6 days.

After fourth moult: Length .46 inch; color over upper part black with yellow white and gray bands and stripes; the dorsal band yellow-white, with more or less of a mid line of black; between the dorsals and middle row a gray stripe, and from each dorsal spine a similar stripe runs to the base of the spine next in advance on middle row; all the spaces between the band and these stripes black; the sides gray; the lower row of spines deep yellow at base and half way up, all others yellow at base only, remainder greenish-gray; head as before. To next moult 7 days.

After fifth moult: Length .9 inch; color black and gray-yellow, the dorsal band brown-gray.

MATURE LARVA.—Length 1.4 inch; stout, the segments well rounded; the pattern of the markings similar to that of *Atlantis;* a broad dorsal band which fills the space between the two dorsal rows of spines, in color a deep yellow, cut throughout by a black line; between dorsals and middle row a narrow gray band, and a short band of similar color between the base of each dorsal spine and the spine next in advance on the middle row, these bands edged with whitish; the spaces between brown-black; below this area the sides to base are gray, mottled, with a shade of reddish-yellow, most decided in the middle part; feet black, prolegs green-brown; the spines as in *Atlantis;* of the two upper rows gray-green to base, a little yellow about base of those of middle row, and on 2 and 3 half up stem; those of lower row also yellow, except the upper half; the two dorsals on 2 are turned forward, but are not longer than the rest; head sub-cordate, the vertices rounded; color dull brown-black in front, dull yellow about top and behind. From fifth moult to pupation 15 days.

CHRYSALIS.—Length .9 inch; breadth across mesonotum, .24, across abdomen, .26 inch; general shape of this Group of the genus, but long and slender; head case square, bevelled on both sides to a cross ridge, which is a little arched; the corners rounded; mesonotum long, moderately prominent at rear and rounded, sloping to the front and rounding down to head case; carinated, the sides convex; abdomen conical; the wing cases prominent; color in shades of brown, the anterior parts dark and reddish, mottled, on mesonotum, with yellowish; on the tongue and antennæ cases reddish-yellow streaked and specked with dark brown; wing cases yellow-brown, with dark streaks along the nervules, and a small spot at end of cell; the abdomen has on the front of each segment a dark brown band, somewhat broken, and serrated; the rear part of the segments pale gray, mottled with patches of a darker shade. Duration of this stage 12 days.

This species is found in the Rocky Mountain region from Colorado to Montana, and was taken in Br. America by Captain Geddes, at Blackfoot Reserve (C. E., xv., 222).

SAPERDA FAYI, S. CONCOLOR AND APHODIUS RUFIPES.

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

SAPERDA FAYI, Bland.—This beautiful Saperda breeds in the small limbs of Crataegus, especially *crus-galli* and *tomentosa*, as first observed by Mr. C. D. Zimmermann, CAN. ENT., 10, 220; and should it, like some of its allies, acquire a taste for cultivated fruit trees, it would be a formidable enemy, as is evidenced by the way it depredates on thorn bushes. The beetles appear here the last week in May or the first week in June, according to the season, the males preceding the females three or four days. They do not appear to eat and are short lived, the whole brood (except stragglers) appearing and disappearing within the space of ten or twelve days, so that should the collector be negligent, or the weather unsuitable for collecting at the time of their appearance, he may get none till the next season. As soon as the females appear the males are ready to associate with them, the union lasting three or four hours. They are not much given to flying about, usually ovipositing on the same tree they inhabited as larvæ. There may be several thorn trees not far apart, and one will be depredated on year after year till it is nearly destroyed, while the others will remain untouched till colonized apparently by accident. The beetles are sluggish, and when approached suddenly fall to the ground and quickly endeavor to conceal themselves, not feigning death, as many insects under the same circumstances do; and when I say feigning death, I mean it literally, in opposition to an unsupported dogmatic statement which I lately saw in print somewhere, "that insects can have no knowledge of death."

Oviposition is effected probably during the night, and the process has not been witnessed, nor the eggs seen. The limbs selected for this purpose vary from one third to one and one fourth inches in diameter, and according to the thickness of the limb, the female with her powerful mandibles makes from three to six longitudinal incisions through the bark, each about three fourths of an inch long and equi-distant and parallel to one another, dividing the circumference into sections nearly equal; an egg is placed in each end of each of these slits, and as soon as hatched the larva makes a burrow beneath the outer layer of wood, perhaps one eighth inch in length at first, and uses this as a retreat whence it issues to feed on the diseased wood caused by the incision. These slits and the

irritation produced by so many larvæ at work, cause an increased flow of sap to the part, and a consequent thickening of the sections between the slits, so that the injured part soon assumes a gall-like appearance. On the approach of winter, the larvæ having now attained the length of .25 inch, retire back a little further and close the opening of their burrows with borings. One of the larvæ, however, and in thick limbs two or three at each end bore obliquely till one of them reaches the centre of the limb, up which it proceeds, often two or three inches; the others parallel this, but keep a wooden partition between the burrows. These larvæ are much larger—often twice the size—of those inhabiting the outer wood, and are the only ones that produce beetles.

The whole of the interior of the limb is now dead wood enclosed by a growth of living but unsound woody tissue, through which some openings remain. The limbs are much weakened at these places, and many of them, like the oak on which *Elaphidion villosum* depredates, would be broken off by the winter storms were the fibre not very tough and the trees very low. And here analogy leads to the conclusion that as the larvæ inhabit the portion of the limb next the tree, equally with that beyond the injured part, this is likely to be the case in the history of the Elaphidion mentioned.

Many of the larvæ in the outside wood perish during the winter, and the survivors, after feeding a while in the spring, likewise die, their mission seeming to have been merely to insure a sufficiency of dead wood to sustain the life of the favored few destined for full development.

In the spring the larvæ in the deep wood return and feed on the dead wood, which is now abundant enough for all their wants, and by autumn they are nearly full grown; they again retire for the winter, and in the spring, after opening up communication with the outside world, feed for a short time, and when full grown measure in length about three fourths of an inch. The larvæ now return to their burrows for final transformation. Some of them bore for at least six inches, while others scarcely go from the entrance more than twice their own lengths; the outer ends are closely packed with borings without and soft fibre within, which also fills the inner ends. The head of the larva may be either toward or away from the opening—seemingly a matter of indifference; in the former case the beetle emerges from the place of entrance, in the latter from a round hole at right angles to the burrow, probably cut by the beetle itself, as no such hole has been detected in the many limbs I have examined contain-

ing pupæ with their heads turned from the opening. Pupation occurs after the middle of April, and the perfected beetle will be found in the limbs about the first of May, though few of them emerge till the time stated at the beginning of this paper.

The above is the result of three years careful observation of the habits of this beetle, and imperfect as the history is, the amount of time and labor expended in developing it can only be understood by those who have attempted similar things. How widely this beetle is distributed is uncertain, as till recently its habitat was unknown. The typical insects were taken in Ohio; it is in Mr. Reinecke's Buffalo Catalogue, and occurs at Hamilton, Ontario (Moffat). Any one can readily ascertain whether it occurs in his fauna by examining the limbs of the Crataegus for the unmistakable swellings it occasions.

SAPERDA CONCOLOR Lec. appears about the same time as *S. Fayi*, and like it, is short lived, few individuals occurring after the middle of June. Its larvæ infest the canes of a small willow growing along water courses and in swampy places—*Salix longifolia*. The smaller canes are usually selected for breeding purposes, these varying from one fourth to three fourths of an inch in diameter. The beetle makes a longitudinal incision through the bark with her jaws about three fourths of an inch in length and in each end deposits an egg. Usually several incisions are made in the same cane some distance apart, which often cause its death the following year. The young larvæ follow the same course as those of *S. Fayi*, only they burrow deeper into the wood, and there are no supernumeraries, as there is no need for them, the wood of the willow dying much more quickly than that of Crataegus, and a warty, gnarly swelling occurring around each incisure.

The beetle, however, does not always select the smaller canes, sometimes choosing ones from one and one half to two inches thick, in which case the larvæ pursue a different course, for instead of boring up and down, they take a transverse direction and girdle the stem one third to one half its circumference, causing a rough annular swelling and frequently the death of the cane. Two years is the time usually required to complete the transformation, but some individuals probably pass through all the stages in a single year. The head of the pupa is toward the opening, from which the perfect insect emerges. The willow named seems to be the natural food-tree of the larvæ of *S. concolor*, and, did it confine itself

to this insignificant shrub, could scarcely be classed with injurious insects; but it appears to have likewise either a natural or an acquired taste for poplar, and might become very destructive, a fact first brought to notice in Bul. No. 7, 118, U. S. Ent. Com., where the compiler writes: "Girdling the trunks of sapling poplars, by carrying a mine around the trunk, which causes a swelling often nearly twice the diameter of the tree. We have found numerous saplings of the common poplar in the woods about Providence with the unsightly swellings around the trunk." In case this taste is perpetuated, this beetle will no doubt prove a formidable enemy to this species of shade or forest tree. But in what State this Providence is, or what kind of a tree "common poplar" is, we are not informed. Here the common poplar is the *Liriodendron tulipifera*, but at that Providence it may be a tree of some other genus. This beetle seems to have an extended distribution, occurring in Texas, Michigan, Canada and New York, as well as here.

APHODIUS RUFIPES Linn.—This fine beetle is an interesting addition to our list, and is fully described by Dr. Geo. H. Horn in his exhaustive Monograph of our Aphodiini, just published, Tr. Am. Ent. Soc. Phil., 14, 1. In Europe it is widely distributed, and, though probably indigenous here, as observed by Dr. Horn, has only recently been discovered owing to its inhabiting territory the Coleopterous fauna of which is very imperfectly known. Only three American specimens were known while Dr. Horn was writing the description, two taken at Deer Park, Garret county, Md., and one at St. Vincent's Abbey, Westmoreland county, Pa. Dr. Horn has now two specimens in his collection taken at the latter place, and I have one from Turkey Foot (now Confluence), Somerset Co., Pa., midway between there and Deer Park, which is in the extreme north-west corner of Maryland, the meridian of which to the north passes over a rugged semi-mountainous country; first over the hills bordering the Yonghiogheny thirty miles to Confluence, and thence through the Laurel Ridge Mountains forty miles to St. Vincents. How much further to the north or to the south-west from the points named it extends in a long range of country of the same general character, the future will determine. The two individuals I have examined, on comparison with my European specimens, do not differ perceptibly—a proof of the remarkable stability of species, considering the time that has elapsed since the ancestors of those of the two hemispheres parted company.

A NEW SOUTH AMERICAN GENUS OF CONOPINAE.

BY S. W. WILLISTON, NEW HAVEN, CONN.

Hitherto but a single genus *(Conops)* of this group has received general acceptance among dipterologists. A second genus, *Physocephala*, was based by Schiner on characters in themselves of but little importance, and which I did not deem sufficient to separate our species in the first paper I published* on the North American forms. A further study, however, convinced me that they were sufficiently constant to warrant their use, particularly in connection with other important ones in the neuration, which I pointed out.† I have recently had the opportunity of studying sixteen South American species of the two genera, collected by Mr. Herbert H. Smith, and I am yet more convinced of the validity of *Physocephala* as a genus.

A half dozen genera that Rondani attempted to establish (to say nothing of Lioy's fanciful productions) were based upon such confessedly trivial characters that they have no where commanded any attention by entomologists, save by Rondani's devoted follower, Mr. Bigot, who, in his last paper‡ on this family, while rejecting *Physocephala*, accepts *Brachyglossum* Rond., based upon the comparative lengths of the proboscis. I do not think Mr. Bigot's views will receive the approbation of many dipterologists.

The only other genus which presents any claims for acceptance is *Pleurocerina* Macq., which I suspect was based upon an accidental malformation, the more so as I have seen several specimens of *Conops* and *Zodion* with a very similar projection of the front, springing from the frontal lunule, and due to some artificial cause. I am not aware that the type species, described from Tasmania, has been recognized since its original description, and I think the genus had better be held in abeyance till specimens are again examined.

The sub-family *Conopinae*, then, consists of two genera, to which I here add the third, distinguished from the closely allied *Conops* by excellent structural characters.

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*Trans. Conn. Acad., iv., 327.

†Ibid., vi., 388.

‡Ann. Soc. Ent. Fr., 1887, 31.

TROPIDOMYIA, gen. nov.

Face, in profile, vertical and straight, with a median sharp ridge, on the sides plane or gently concave, wholly without grooves or lateral ridges. In front view, the face shows, below, a sharp triangular notch, rising a little above the lower border of the eyes, from the apex of which the sharp carina runs to the base of the antennæ. Wings narrow; anterior cross-vein near middle of discal cell, and opposite the termination of the auxiliary vein; termination of second vein remote from that of the first, the interval as great as that between the terminations of the second and third veins.

The above are the most essential characters, readily distinguishing this genus from *Conops*. Other characters that may or may not be of generic value are the following: Third joint of antennæ very short, scarcely longer than wide, shorter than the first, the latter about one-third or two-fifths the length of the second. Posterior cross-vein straight, and rectangular to both the fourth and the fifth veins. Second segment of the abdomen in the male very slender, somewhat broader in front, nearly as long as the three following segments together; in the female the second segment is cylindrical, but less slender than in the male, only a little longer than the third, the sixth segment as long as the three preceding together, the fifth with a large process below. Proboscis as long as the hind femora. The legs and front, and general structure otherwise, are like those of *Conops*, sens. str.; the wings with their narrow cells present a very different appearance, however. The carinate, non-grooved structure of the face differs from that of all the other genera of Conopidae save *Stylogaster*, a species of which (*S. stylatus* Fabr., which is distinct from both the North American species) was found in the same region with the present species.

TROPIDOMYIA BIMACULATA, n. sp.

♂, ♀. Face with a silvery, or slightly yellowish, sheen, showing the black ground-color in different reflections; a slender median black line on the carina. Vertical callosity yellowish red below, obscurely blackish and luteous, save the narrow margins, which are more yellow; close to the eyes below, a circular opaque black spot. Antennae brownish red, the third joint red; style short, conical, but little longer than the lateral projection. Thorax opaque black, thinly pollinose on the sides, a slender

golden pollinose spot on the inner side of the humeri; humeri and scutellum red; disk of metanotum shining. Abdomen black, the second segment brownish red; sixth segment thickly whitish pollinose; fourth and fifth segments (fifth only in female?) with a narrow yellow hind margin. Legs blackish red; tibiae more red, tarsi black; a silvery spot on the outer distal part of the four anterior tibiae. Wings sub-hyaline, brownish in front, but without a distinct picture. Length 7, 8 mm.

Two males and one female, Chapada (near Cuyaba), Brazil (H. H. Smith). The yellow, intra-humeral spot and posterior abdominal margins appear to be wanting in one of the males.

THREE SPECIES OF MOTHS NEW TO OUR FAUNA.

BY HENRY EDWARDS, NEW YORK.

After all, the geographical range of our fauna, as regards the distribution of insects, is but incompletely marked, and the fact that artificial lines cannot limit the habitat of a species is every day made more apparent. The Florida coast is constantly turning up species properly belonging to the fauna of the West Indies, and Texas and Arizona are as often adding Mexican forms to our list. It is, nevertheless, somewhat strange that three such conspicuous species as those hereafter noted should have only recently appeared within our limits, or at least for so long a time have escaped the watchful eyes of our numerous observers. They may all be cited as examples of the Mexican fauna, though *Pseudosphinx Tetrio* is also found in the W. Indies, and on the continent reaches as far south as the Argentine Confederation. As the insects are probably not known to our local collectors, I have thought it advisable to append descriptions of each.

FAM. SPHINGIDÆ.

PSEUDOSPHINX TETRIO, Linn.

Whole upper surface light gray, the lines and markings brownish black. The basal half line is whitish, with a black dash behind it obliquely. Between it and the median line are some waved brownish indistinct streaks, reaching only from the costa to the middle of the wing. There is a very prominently marked discal spot, and a sub-triangular brown

patch near the apical third of the costa. Behind this is a whitish cloud, followed by a darker shade which cuts the wing directly across from about 16 mm. from the apex to about the same distance from the internal angle. This darker shade encloses, a little from the apex, a heavy black streak, and some shadings of brown. The lower wings are dusky brown, pale along costa, bluish gray at the anal angle, and there marked by a double dentate streak. Beneath both wings are brownish gray, with a submarginal dentate line, an oblique simple median line, and on the secondaries the same lines continued, the marginal one being more distinctly curved. Abdomen brownish black, the segments edged rather broadly posteriorly with whitish. A rather indistinct dorsal gray line, much widest in the male. The thorax is gray, mottled with brown, and from the middle run towards the junction of the abdomen two black lines forming an acute angle, something as in *Sph. cinerea*. Collar transversely marked with black. The shaft of the antennæ is whitish, the pectination pale brown.

Average exp. wings, male, 115 mm.; female, do., 150 mm.

Described from 6 examples in my collection, from Cuba, Brazil, Mexico and Arizona.

The claim of this species to a place in our fauna rests upon the capture of two specimens, male and female, at Tucson, Arizona, by Mr. W. S. Edwards, and one male found in N. W. Texas, and now in the collection of Prof. O. S. Westcott, Maywood, Illinois.

There is no doubt but that this is the *Sph. Hasdrubal* of Cramer = *Macrosila Hasdrubal* of Walker, and it has been so quoted by Mr. Grote in his admirable paper on Cuban Sphingidæ (Proc. Entom. Soc. Philad., 1865, p. 64), in which notice the full synonymy of the species is given. It would seem, however, that in Clemens' description of *Macrosila Hasdrubal* Cr., in Morris's "Lepidoptera of N. Amer.," p. 185, the allusion to the male must have reference to the dark form described by Butler in "Revision of the Sphingidæ," p. 610, as *Pseudosphinx obscurus*. Poey, in his description, speaking of the male, simply says that "it is smaller than the female, with the black lines more distinct." This is correct, but the under surface is not "ash gray," which I take to be the color of ashes of wood or coal, but brown gray, with the bands of a darker shade. The larva is described by Poey (Cent. Lepidopt.) and a translation or adaptation of his description is given by Clemens, loc. cit. A singular error, however, occurs with reference to the pupa. Prof. Poey

is quoted by Dr. Clemens as saying, "the pupa is represented without the detached tongue-case." Now in fact, the pupa has no external tongue-case at all, such as is so noticeable in *Amphonyx Antœus*, *Protoparce Rustica*, in the other species of *Protoparce*, and to a less degree in those of *Diludia*. The pupa of *Pseud. Tetrio*, of which I possess several examples through the kindness of my friend, Wm. Schaus, Esq., jr., is as follows: Pitchy, cylindrical, tapering a little from the junction of the thorax and the head, and more abruptly from the 8th abdominal segment to the tip. It is swollen on the thorax and on the eye cases, while the head is distinctly rounded in front. The covers of the antennæ and the wing bases are slightly marked with transverse corrugations. In the earlier stages of the pupa it has a paler tint, and is marked with some black transverse bands on the upper abdominal segments, which, however, are lost in the ground color as the pupa assumes with age a darker shade. The pupa most nearly resembles that of the genus *Philampelus*. Length 65 mm.; width of head, 11 mm.; width of middle of abdomen, 16 mm.

PHILAMPELUS TYPHON, Klug.

"Cinereous, reddish beneath. Palpi red. Thorax with two dark brown abbreviated stripes. Abdomen with dark brown bands, red on the sides. Anterior wings glaucescent and testaceous mixed, with several blackish-brown sub-trigonate patches. Posterior wings red, with a denticulated band, black, varied with glaucescent, with the exterior margin brown, and the cilia white."—CLEMENS.

This grand insect, of which a specimen taken by the late H. K. Morrison is now in the collection of B. Neumoegen, Esq., is in some respects closely allied to *P. Achemon* Drury, but is larger in size, and altogether richer and darker in color, while the markings are more diffused, and in stronger contrast to the ground color of the wings. A fair figure of it is given in "N. Amer. Lepidoptera," Sphingidæ, pl. 11, by Weidemeyer, Calverley & Edwards, while that by Klug in "Neus Schmett," pl. 3, is remarkable for its accuracy and fidelity to color. Mr. Neumoegen's example was taken in N. E. Arizona.

SYNTOMEIDA EPILARIS, Walk.

Wings, thorax and abdomen bluish black, with a metallic lustre. The primaries have five white spots each, one small at base of costa, one in middle of wing near to basal third, one half way on costa, one smaller a

little behind this, which is cut by the nervule, and one behind the cell also cut by the nervule. The secondaries have one rather large white central spot, almost reaching to the costa. The abdomen has two basal spots very clear white, conspicuous, and its sides have also three clear white spots, the middle one the largest. Tip of the abdomen orange-red. At the base of the coxæ are also white spots. Lower side with the markings repeated. Exp. wings, 50 mm.

Taken in Florida by Mr. C. J. Maynard. Coll. Museum Comp. Zoology, Cambridge. A figure of this beautiful species is given by Mr. Butler in Lepid. Heteroc. B. Museum, Pt. 1, plate 8, figure 5. Mr. Butler gives the locality as Honduras.

DESCRIPTION OF TWO LEPIDOPTEROUS LARVÆ.

BY WM. BEUTENMULLER, NEW YORK.

Botis magistralis, Grote.

Head pale brown, smooth, shining; mouth parts dark brown; cervical shield brown, divided in the middle by the color of the body, which is translucent greenish-white; along the dorsal region two rows of shining pale brown piliferous spots, four on each segment, those on the first segment darker in color. All the spots bear a short light brown hair. Thoracic feet, abdominal and anal legs concolorous with the body. Length 30 mm. Lives singly on *Clethra alnifolia*, in a number of leaves fastened together with silken threads. Pupated July 6th. Imagos emerged July 17th and 18th.

Botis erectalis, Gr.

Head small, jet black, shining; mouth parts whitish. In some individuals of the brood the head is marked with dirty white. First segment dirty white mottled with black. Body above ochreous, with five rows of rather large shining jet black piliferous spots on each side, placed as follows: One row on the dorsal, one on the sub-dorsal, one above, and two below the spiracles, which are black. From all the spots springs a short pale brown hair. Anal plate dirty white, spotted with black. Body beneath sordid white; on the 4th, 5th, 10th and 11th segments two shining black spots, and two minute ones between. Thoracic feet jet black, mottled with dirty white; abdominal legs whitish with three minute

black spots outside and one inside; between the thoracic feet are also a few minute black spots. Length about 23 mm.

Lives socially in a web on Indian hemp (*Apocyum androsæmifolium*, L.) Sept. Spins a thin cocoon, passing the winter in the larval state, and pupates the following spring.

DESCRIPTION OF PREPARATORY STAGES OF DATANA MINISTRA, DRURY.

BY WM. BEUTENMULLER, NEW YORK.

EGG.—Pure white, ovoid, with flattened base, the apex with black dot showing impregnation. Laid in masses, from 25 to 50 on under side of leaf.

YOUNG LARVA.—Head black, shining, second segment orange brown in front, cervical shield black. Body color chestnut brown, with the stripes a little darker; anal clasps and thoracic feet jet black. Length 3 mm.

AFTER FIRST MOULT.—The head jet black, as is also the whole of the second segment and anal segment. Body color now much darker, as are also the stripes, these being almost obscured, except along the lateral region. Thoracic feet black. Length 12 mm.

AFTER SECOND MOULT.—Head black, rather small, second segment yellow except the cervical shield, black. The thoracic feet, abdominal and anal legs, and termination of anal segment, jet black, while the stripes are very clear yellow on the chestnut brown ground. Scattered over the body are also a few short sordid white hairs. Length 20 mm.

Until after this moult the larvæ feed upon the under side of leaf (parenchyma), and do not attack the edges until after the third moult begins.

AFTER THIRD MOULT.—Head jet black, second segment orange, cervical shield black. Body color reddish-brown with rather broad yellow stripes; anal clasps, tip of legs and thoracic feet jet black; under side striped equally with reddish-brown and bright yellow. Length 30 mm.

AFTER FOURTH MOULT.—Head jet black, neck yellow, cervical shield jet black, shining. Body chestnut brown, the stripes bright yellow and equidistant; the feet and anal clasps jet black, abdominal legs yellow

banded with jet black outside. The hairs over the body are now quite long. Length 33 mm.

MATURE LARVA.—Head jet black, sometimes chestnut-red, shining, finely punctured, neck bright yellow, cervical shield dull orange. Body pitchy black with four sulphur-yellow equidistant longitudinal stripes on each side, all being narrower than the intervening spaces, the dorsal space being the widest; anal plates jet black, roughly punctured. Under side also pitchy black with three stripes. Thoracic feet jet black, with their bases yellow; abdominal legs bright yellow, banded with jet black outside. On the 4th, 5th, 10th and 11th segments two yellow patches. The sordid white hairs are few to each segment, though long and most numerous on the lateral region. Length 55 mm.

PUPA.—Pitchy black, wing cases brown and very much wrinkled; head prominent; segments coarsely punctured about the anterior portion, smooth at the junction; cremasters very short, four in number; spiracles ovate, very conspicuous. Length about 23 mm.; width of wing cases 7 mm.

FOOD PLANTS.—Linden *(Tilia)*, cherry *(Prunus)*, pear *(Pyrus)*, quince *(Cydonia)*, walnut *(Juglans)*, hickory *(Carya)*, oak *(Quercus)*, chestnut *(Castania)*, beech *(Fagus)*, hazel *(Corylus)*, hornbeam *(Carpinus)*, birch *(Betula)*. Found from the latter part of July to about the middle of September. Single brooded. Subterraneous.

PREPARATORY STAGES OF CATOCALA RELICTA, WALK.

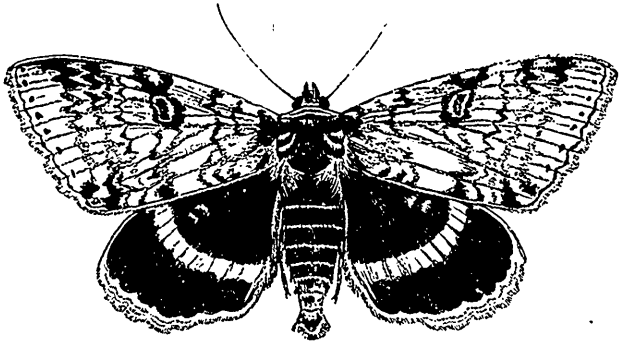
BY HOWARD L. CLARK, PROVIDENCE, R. I.

EGG.—Shape of flattened sphere. Diameter, 1 mil. Color, brownish slate. There are thirty-si[illegible]vertical ribs, each alternate one only reaching the apex; and numerous horizontal parallel striations. The eighteen ribs which reach the apex there unite with the horizontal lines, forming an irregular network. Duration of this period 241 to 246 days.

YOUNG LARVA.—Length, 7 mil. Body very slender and geometrid-like, the two anterior pairs of pro-legs rudimentary. The two posterior pairs fully developed. Crawl with a very rapid looping movement. Head ochreous, large and prominent, with minute black piliferous spots. Color

of body light translucent green, in some cases inclining to olive. Five longitudinal lines are faintly indicated in shades of the prevailing color. These markings and the green color becoming more pronounced in the course of a day or two. Small black tubercles, each with a single black hair, distributed somewhat irregularly over the body. A dark oval ventral spot on each segment. Duration of this period five days.

After First Moult.—Length 10 mil. Form much as before, the head perhaps a trifle less prominent. Hairs and tubercles the same, and the anterior pro-legs still undeveloped. Head light straw color, with three or four indistinct wavy brown vertical streaks on each lobe. Immediately after shedding the skin, the body appears of an uniform light straw color, nearly concolorous with the head, with three narrow brownish



longitudinal lateral lines on each side. A few hours later, after eating, the dorsum appears darker; the spaces between the lateral lines light cream color, and the food which has been partaken of shows through in greenish patches in parts of the body. Ventral spots as before. Duration of this period seven days.

After Second Moult.—Length 20 mil. Diameter 2 mil. Head flat and rather large, of an opaque whitish color, shaded with yellowish. The lobes are marked vertically with irregular black and brown lines, interlacing with horizontal lines to form a vein-like design. Top of head marked with black. The body is wrinkled, very slightly constricted at the third segment, is thickest at the ninth, thence diminishing suddenly posteriorly. A dorsal excresence indicated on the ninth segment. Color a uniform greenish cream, with a faint rosy tint at the junctures of the segments, and thickly sprinkled with brownish atoms. Piliferous spots

very minute. The ninth segment presents the appearance of having been stippled with lamp black, and there is a less conspicuous repetition of this marking on the twelfth. Pro-legs greenish, tipped with flesh color, the two anterior pair still abortive Venter greenish with dark oval spots. A sub-stigmatical fringe of fleshy shreds as observed on larvæ of other species. Duration of this period nine days.

After Third Moult.—Length 28 mil. Body shaped and proportioned much as after the last moult. Ground color the same bluish or greenish cream, thickly sprinkled with brown dots. The same excrescence and black markings on the ninth and twelfth segments. The head is shaped as after the last moult, is opaque white with black markings much as before. Between the markings of the face and the gridiron-like marks above, is a clear white space forming a sort of crescent-shaped mark at the apex of either lobe. Piliferous spots brown, minute. Stigmata concolorous ringed with black. Legs more or less green concolorous with venter. Black ventral spots conspicuous. Towards the end of this period the stigmata appear with a black centre, and the crescent-shaped marks assume a pinkish hue. Duration of this period seven days.

After Fourth Moult.—Length 40 mil. Body rather more flattened ventrally; the hump on the ninth segment is more pronounced and the skin is much wrinkled at the junctures of the segments. The ground color has a more distinctly greenish tinge and the numberless dots with which the body is thickly sprinkled are of a paler yellowish brown. The black markings on the ninth segment extend on to the anterior portion of the fourth pair of pro-legs. The twelfth segment also marked with black as before, and the anal pro-legs streaked with the same. Piliferous spots small and concolorous. Stigmata concolorous, ringed with black. Head very large and prominent, face measuring 4 mil. each way, a trifle broader superiorly. The gridiron markings above are suffused almost to the exclusion of the ground color, and the lateral marblings are heavier black. The mouth parts have a violet tinge. The two anterior pairs of pro-legs still lack their full development. All the legs concolorous with the venter, which is light bluish green. Duration of this period fifteen days or more.

No more moults observed.

Mature Larva.—Length 60 mil. Body same shape as before, thickest from the fifth to the tenth segment inclusive. The black markings on the ninth, tenth and twelfth segments are constant, but in some cases

there are slight black stipplings on other parts of the back. When provided with dried leaves, the larvæ drew them together, forming a very thin cocoon.

CHRYSALIS.—Length 28 mil.; length of wing cases, 16 mil.; depth of thorax, 8 mil. General shape as far as the ends of the wing cases, cylindrical, rounded anteriorly and somewhat constricted dorsally at the juncture of the thorax and abdomen. Remainder of the pupa conical, the extremity provided with eight hooks, the longest pair curving outwardly, the next longest pair the same, while the two short pairs at the base curve inwardly. On each of the two segments, posterior to the ends of the wing cases, is a pair of ventral protuberances, which appear to be the rudiments of the posterior pro-legs of the larva. The stigmata are plainly indicated and the abdomen is provided with a few black hairs. Immediately after pupation the color is bright green, which, however, soon changes to a purplish brown, dusted with a whitish bloom. Duration of this period twenty-five days.

It is probable that in their natural state the mature larvæ and pupæ attain somewhat larger proportions than those described above, as the moths which were bred expanded only from 65 to 68 mil., while the parent moth from which the eggs were obtained expanded 80 mil. On the emergence of the larvæ they were offered leaves of white birch, which, however, they did not take to very readily. These were afterwards changed for willow, at the suggestion of Prof. G. H. French, to whom the writer is much indebted for his kindly interest and valuable instruction in this department of entomological research. Upon this food-plant the larvæ appeared to thrive, and some ten examples of the imagines were obtained.

The Society's Collection of Insects sent to the Colonial and Indian Exhibition in London, in 1886, came back in safety, with the exception of two cases, which were somewhat damaged. We are anxious to replace the following species, specimens of which will be thankfully acknowledged, if sent to MR. E. BAYNES REED, London, Ont. :—*Parnassius smintheus*, var. *Hermodur*; *Pieris protodice, oleracea, vernalis, virginiensis, frigida rapæ*; *Colias cæsonia, eurytheme, philodice*; *Terias lisa, nicippe*; *Erebu odora*; *Zale horrida*; *Homoptera edusa, Saundersii, lunata, calycan thata, albofasciata, lunifera, benesignata, duplicata*; *Ypsia undularis*.