

**Article VIII.—DESCRIPTIVE CATALOGUE OF THE
SPHINGIDÆ FOUND WITHIN FIFTY MILES OF
NEW YORK CITY.**

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PLATES II-VII.

The present paper constitutes the second part of my work on the Lepidoptera found within a radius of fifty miles of New York City, and is the beginning of a series of similar papers on the Moths of the region. The first part of the work, on the Butterflies, was published in the Museum Bulletin, Volume V, 1893, pp. 241-310.

The main object of the work is to enable those interested in the study of our local fauna to identify their material. The descriptions in the following pages have been made as brief and simple as possible, and with the aid of the illustrations the species may be readily recognized.

Family SPHINGIDÆ.

The members of this family are commonly called Hawk-moths, on account of their powerful and rapid flight; they are also called Hummingbird Moths, owing to their peculiar habit of hovering over flowers while drawing up nectar with their long proboscis, and while in this position they superficially resemble Hummingbirds. Some species fly during mid-day in the hottest sunshine, while others fly late in the afternoon and at night.

The moths are of medium or large size, with long and narrow fore wings, with an oblique and entire outer margin or with the outer margin excavated or scalloped. The hind wings are much shorter with the outer margin entire, the anal angle usually produced and the apex rounded or pointed.

The head is usually clothed with smooth scales, or has a tuft between the antennæ.

The eyes are hemispherical, naked, and are as a rule lashed in front above.

The proboscis is well developed in most of the species, and is nearly as long or longer than the body, and when not in use is curled up like a watch-spring between the palpi. The antennæ are fusiform, ciliate in the male and simple in the female, and with the tip more or less bent into a hook. In some species the antennæ are club-shaped, with a few short setæ at the extreme tip.

The thorax is well developed, either with the vestiture smooth, or with the posterior portion with erect scales, or with the anterior portion with an elevated tuft.

The abdomen is long and graceful as a rule, with the segments gradually tapering, and some species are provided with a more or less complete fan-like tuft at the end of the body.

The mature larvæ are smooth, or sometimes more or less granulated over the surface. The last segment is provided with a horn, or, in absence of this, the place is marked by a tubercle or polished eye-like spot instead. The majority of the larvæ are provided with seven lateral oblique stripes. After they have reached maturity and are ready to transform they descend to the ground and burrow into the soil, where they construct a cell, in which they change to pupæ. Some species, however, form their pupæ on the surface of the ground, in a loose cocoon between leaves. The pupæ are most always chestnut brown, elongate, with the tongue-case buried or detached and resembling the handle of a pitcher.

Subfamily MACROGLOSSINÆ.

Hemaris Dalman.

Head small, untufted; palpi closely scaled, cone-like; proboscis corneous, nearly as long as the body; eyes of medium size, lashed; antennæ about two-thirds as long as the costa of the fore wings, swollen, club-shaped towards the end, which terminates in a minute and bent seta, biciliate in the males, simple in the females; thorax smooth, closely scaled; abdomen flattened beneath, with a broad fan-like anal tuft. Fore wings eleven-veined, transparent in the middle, the outer border somewhat rounded; hind wings also transparent in the middle, the outer border somewhat excavated between veins 1*b* and 2.

The members of this genus fly during the middle of the day in the hot sunshine. They hover over flowers and very much resemble Hummingbirds. The larvæ construct loose cocoons on the surface of the ground.

Hemaris thysbe (Fabr.).

PLATE II, FIG. I.

Fore wings transparent, with narrow costal and inner borders, broad outer border dentate within, and base reddish brown; the extreme base is washed with olive green scales. Hind wings also transparent, with a narrow outer border and basal half of wings reddish brown, costal border very narrow; borders of wings beneath paler than above. Head and thorax above olive green, white beneath. Abdomen above with first and second segments yellowish green, third and fourth reddish brown, and fifth and sixth olive green and reddish brown along the middle; abdomen beneath reddish brown with small white tufts at the sides; anal tuft reddish brown, black at the sides. Legs whitish, with the tarsi reddish brown. Expanse of wings about 2 inches=50 mm.

Var. uniformis Gr. & Rob.—(Plate II, Fig. 2.) Differs from *thysbe* in having the outer border of the fore wings somewhat narrower and not dentate within. It is also less common. Size same as *thysbe*.

Var. floridensis Gr. & Rob.—Similar to *thysbe* but is more robust and larger, with the borders of all the wings broader, thus making the vitreous space smaller. Expanse, 2.40 inches=65 mm.

Larva.—Head pale green, with numerous minute granulations. Body pale whitish green along the dorsal region, limited by a serrated white longitudinal line along the subdorsum and running from the anterior edge of the second segment to the caudal horn; these two lines are in close proximity on the second segment, but gradually become wider apart on the middle segment, and the space between decreases again as they meet at the sides of the caudal horn; along the dorsum are two longitudinal white stripes close together; sides of body light green; spiracles yellow, scarlet red in the middle; first segment with granulations on the dorsum (representing the cervical shield); anterior edge of second segment with a transverse row of canary yellow elevated spots; caudal horn blue, with black and white dots; over the body are numerous small white dots placed regularly in transverse rows. Underside deeper green than above, sometimes partly pink; thoracic feet reddish with a black and yellow ring, extreme base yellow; abdominal legs green with a black and yellow patch outside, the yellow forming a stripe on the tenth and eleventh segments. Anal plates edged with yellow. Length, 1.60-2 inches=40-50 mm.

Pupa.—Broadest about the middle, tapering thence to the anal extremity; surface finely shagreened; color brownish black; junction of segments smooth, brown; head-case subtriangularly produced; tongue-case buried; terminal spine broad at base, somewhat flattened, rugose, rounded towards the tip, with a marginal row of minute hooks on each side, and a larger double hook at the tip. Length, 1 inch=25 mm.

Food-plants.—Various species of *Viburnum*, Honeysuckle and Snowberry (*Symphoricarpos*).

Very common in this vicinity, especially during the latter part of July and early in August. It is double brooded, the first brood appearing during the latter part of May and early in June. The eggs are generally deposited singly on the underside of leaves. The larva when fully grown spins a thin web-like cocoon among leaves on the ground. The form *uniformis* is less common than *thysbe*, and the form *floridensis* is very rare in this district, but is common southward. The species ranges from Labrador and Canada to Florida and westward to the Mississippi.

Hemaris gracilis (*Gr. & Rob.*).

PLATE II, FIG. 3.

Wings transparent, with reddish brown borders, outer border broad with the inner margin straight. Thorax and first and second segments of the abdomen olive green, remaining segments reddish brown, slightly olive at the sides of the last two segments; anal tuft reddish brown with a black tuft at each side. Thorax beneath pale yellowish white with a reddish brown stripe on each side. Abdomen beneath reddish brown with three rows of small white scale-like spots. Legs reddish brown. Expanse, 1.60 inches=40 mm.

Very rare in this neighborhood, appearing in May and June and again in July and August. It is closely allied in general appearance to *H. thysbe* var. *uniformis*, but differs from it by its smaller size and by having a red stripe on each side of the thorax beneath and three rows of white spots on the underside of the abdomen. It is also a more graceful and slender built insect than *uniformis*. The early stages are unknown.

Hemaris diffinis (*Boisd.*).

PLATE II, FIG. 4.

Fore wings largely transparent, with a very narrow blackish costal border and a broader outer border of the same color, gradually narrowing as it reaches the hind angle; at the apex on the outer border is a rust colored spot; base of wings with a blackish patch elongated along inner margin. Hind wings also transparent with a very narrow outer border and a very broad inner border marked with red. Head above and thorax along the middle olive yellow, sides of thorax yellow; the colors of the thorax are continued over the back of the basal segments of the abdomen which is black, last two segments yellowish; anal tuft black, yellow in the middle above. Thorax beneath yellow. Legs black. Upper side of palpi black, underside yellow. Expanse of wings, 1.60 inches=40 mm.

Larva.—Head oval, green, bluish, or reddish, with fine granulations. Body bluish above, green at sides and reddish beneath, sometimes more entirely reddish or brownish. Along the back is a median reddish shade and a whitish or yellowish subdorsal line along each side running from the second segment to the caudal horn; laterally above the spiracles is a yellow line more or less broken; caudal horn black or reddish; the granulations of the cervical shield anteriorly are yellow. Length, 1.50-1.60 inches=37-40 mm.

Pupa.—Similar to that of *H. thysbe*; in fact there is no perceptible difference between them.

Food-plants.—Bush Honeysuckle, Snowberry (*Symphoricarpos*), and Feverwort (*Triosteum perfoliatum*).

Found during the latter part of May and early in June, and again during July and probably August. In the immediate vicinity of New York this species is very rare. It is found from Canada to Florida and westward to Missouri and Iowa, and in certain localities is rather common.

Hemaris axillaris (*Gr. & Rob.*).

Fore wings transparent with dark brown borders, the outer one broadest and dentate within, and with a dark reddish mark before the apex. Hind wings also transparent and bordered with dark brown. Head, thorax and first two segments above, olive yellow or greenish. Abdomen black, brownish on the back, the last two segments olive yellow; anal tuft black, olive yellow centrally above. Underside of head and thorax light yellow, the latter with a black stripe on each side. Legs black. Expanse, 1.60-1.80 inches=40-45 mm.

Var. marginalis *Gr.*—Color and size same as in *H. axillaris*, but differs in having the outer border even or slightly dentate within instead of strongly dentate.

Larva.—Whitish green on the dorsum, yellowish green on the sides, and dark brown on the underside. Head yellowish green, mandibles black. Cervical shield with yellow tubercles on each side. Spiracles black surrounded by a narrow white border. Caudal horn glossy black, yellow at the base. Thoracic feet black. Length, 1.25-1.50 inches=31-37 mm.

Pupa.—Similar to that of *H. thysbe*.

Food-plants.—Various species of plants of the Honeysuckle family.

Very rare in this vicinity, but more abundant in the Western States. It is found from New York to Texas. In fresh examples just emerged from the pupa the transparent portion of the wings is thickly powdered with black scales, which are lost in flying.

In general appearance it resembles *H. diffinis*, but the outer margin is not as much rounded and the body is more elongated, and the outer border is more or less toothed inwardly, while in *diffinis* it is even.

Synopsis of Species of Macroglossinæ.

Hemaris.

Color olive green and reddish brown ; wings transparent centrally.

Discal cell crossed by a longitudinal bar of scales.

Outer border of fore wings strongly dentate inwardly. *H. thysbe*.

Robust ; wings broadly bordered with reddish brown, vitreous

space small. var. *floridensis*.

Outer border of fore wings not dentate inwardly. var. *uniformis*.

Discal cell without the longitudinal bar of scales.

Underside of thorax with reddish lateral shades. *H. gracilis*.

Colors black and yellow.

Outer border of fore wing broad and dentate inwardly. . *H. axillaris*.

Outer border slightly or not dentate inwardly. var. *marginalis*.

Outer border of fore wing narrow, not dentate inwardly. . . *H. diffinis*.

Subfamily CHÆROCAMPINÆ.

Aellopos *Hübner*.

Body depressed, smoothly scaled, and of almost equal width throughout ; abdomen with sides almost parallel, last segment slightly narrower, with a broad, long-haired, flat, fan-like tuft ; underside of body flattened, with the vestiture from above overlapping along the sides, in form of short tufts. Head broad, prominent ; eyes not prominent, palpi pointed. The vestiture of the head, palpi and thorax are closely applied, appearing to form one piece. Legs not spinose ; middle tibiæ with short terminal spurs, hind tibiæ with two pair of spurs. Antennæ of almost equal width, with a short, pointed, recurved hook at the tip. Fore wings with apex acute, costa and inner margins straight, outer margin oblique. Hind wings small, apex rounded, anal angles produced.

Aëllopus fadus (*Cram.*).

PLATE III, FIG. I.

Fore wings sooty black with an olivaceous tinge, a median, straight, narrow, whitish band from the end of the cell to the inner margin, closely followed by a narrower, second and similar band and an outer arcuate row of white spots from the costa towards the inner margin. Hind wings sooty black. Head, thorax and abdomen sooty brown with an olivaceous tinge, the third segment of the abdomen white (var. *titan*), or concolorous (*fadus*). Expanse, 2.20-2.30 inches=55-57 mm.

This is a Southern species, ranging northward, said to be occasionally found in this vicinity. The early stages are not known. It may be known by its sooty black color and white third segment of the body. It flies in the day time in the hottest sunshine.

***Aëlopus tantalus* (Hüb.).**

Similar to the preceding species, but the white band on the primaries is obsolete and the subterminal arcuate band of whitish spots is reduced to two or three irregular spots toward the middle of the wing; beneath the median band is entirely wanting. It is also smaller. Expanse, 1.80 inches=45 mm.

It is not improbable that this insect will prove to be identical with *A. tantalus*, when the early stages are known. It is a Southern species, and rarely occurs in this vicinity.

Triptogon Ménétries.

Body stout, fusiform, head large and broad with prominent eyes; palpi erect, smooth and reaching about the middle of the front; proboscis about as long as the body; antennæ rather short, somewhat thickened towards the end, minutely ciliate in the male, simple in the female, and the tip with a short, pointed, recurved hook. Thorax smooth, with a prominent crest on anterior portion; abdomen long, conic; anal tuft small, hardly spreading. Legs unarmed; middle and hind tibiæ spurred. Fore wings shorter than the body, inserted before the middle of the thorax; apex obtuse and excavated beneath to vein 5, where it is again excavated to the anal angle, which is decidedly produced; inner margin excavate for some distance before the apex. Hind wings with apex rounded, somewhat excavated before the anal angle, which is produced into a broad angle.

***Triptogon lugubris* (Linn.).**

Wings and body chocolate brown; fore wings with a darker shade outwardly, and before the middle is an oblique, narrow transverse line; across the wings are traces of transverse lines, but they are very indistinct. Abdomen with two rows of dark spots along the back, which are absent in some individuals. Underside uniform chocolate brown with traces of transverse lines. Expanse, 2-3 inches=50-75 mm.

Larva.—Head dark green, with a yellow frontal band. Body pale green with dark green dorsal dashes and a dark green subdorsal line, bordered beneath with whitish; along each side are nine pale yellow oblique bands; spiracles reddish. Length, 2.40 inches=60 mm.

Food-plants.—Grape and Virginia Creeper (*Ampelopsis*).

This Southern species occasionally occurs in this neighborhood, but very rarely. It is common in the Southern States, Mexico, and the West Indies.

Amphion Hübner.

Head small, not sunken into the thorax; palpi forming a point in front of the head; eyes lashed above; tongue almost as long as the body; antennæ fusiform extending to a little beyond the middle of the costa, ciliate beneath in the male, simple in the female, hooked at the end. Thorax well developed and much broader than the head, scales rather closely applied. Abdomen narrowing suddenly to the tip which is provided with a flat fan-like tuft, with the sides rounded and the middle prominently pointed; posterior edge of segments at the extreme sides with short tufts of scales. Anterior and middle tibiæ with a few short spines near the tip; middle and hind tibiæ with small spurs. Fore wings as long as the body, outer margin excavated below the apex, and again above the hind angle, which is prominently produced; inner margin concave before the angle. Hind wings with apex rounded, outer margin excavated before the anal angle which is obtusely produced.

Amphion nessus (Cr.).

PLATE II, FIG. 5.

Fore wings rich dark brown, crossed by a darker velvety brown band which is divided at the costa, and with shades of the same color before the outer border; on the costa before the apex is a reddish brown patch, and across the outer third is a narrow buff colored transverse streak, which is sometimes quite obsolete. Hind wings rich, deep brown, with a median reddish brown band. Wings beneath rusty yellow, brown at the outer borders; across the middle of the wings are two very narrow ferruginous transverse lines. Head, thorax and abdomen rich, deep brown, the latter with a narrow canary yellow transverse band between the fourth and fifth segments. Underside of head and thorax rust colored with a yellowish line on each side; abdomen darker, with two small white tufts on the posterior edge of the segments. Expanse, 1.80-2.50 inches=45-62 mm.

Larva.—Uniform chocolate brown, checkered with black markings and dotted with dark amber, especially along the back, and there are stripes of the same color along the sides; caudal horn reddish. Sometimes the larva is of a bluish green color, with the stripes yellow and seven oblique lateral stripes of the same color. Length, 2.50-3 inches=62-75 mm.

Food-plants.—*Epilobium*, *Ampelopsis*, and Grape.

Not common in this vicinity. It is found late in May and early in June, and flies in the hottest sunshine and also in the evening. Found from Canada to Florida, and westward to Iowa.

Sphecodina Blanchard.

Body stout, depressed, with the sides almost parallel. Head well developed, with the scales forming a low ridge between the antennæ; palpi closely scaled and forming a blunt point in front of the head; eyes moderate, distinctly lashed above. Antennæ of almost equal width, ciliate in the male, simple in the female, tip gradually tapering into a bent hook. Thorax well developed, rather broader than long, scales smooth in front, rather loosely tufted transversely behind; abdomen as broad as the thorax, last segment slightly tapering, underside somewhat flattened, anal tuft of male long and flat, with a short point in the middle; in the female the tuft is long and cylindrical, with a short lateral bunch of hairs; posterior edges of last segments with raised scales, and laterally with bunches of scales, forming dentations. Legs unarmed, middle and hind tibiæ spurred. Fore wings almost parallel, longer and narrower than the body, apex produced and excavate below and also above the hind angle, the excavate portion with a minute dentation; hind angle produced and excavated on the inner margin. Hind wings dentate along the outer margin, anal angle somewhat produced.

Sphecodina abbotii (Swains.).

PLATE II, FIG. 6.

Fore wings chocolate brown with a narrow, black oblique line running from the basal third of the inner margin and terminating on the costa at about the middle of the wing; beyond this the wings are paler and several dark streaks run from the inner margin towards the outer border and are lost about the middle wing, above which the lines are strongly dentate, but indistinct. The terminal space is variable dark brown. Hind wings bright yellow at the base, outer border deep blackish brown, containing several pale streaks at the anal angle. Underside of fore wings brownish yellow, with a narrow, strongly dentate black line across the outer third, beyond which the wings are chocolate brown. Hind wings beneath bright yellow at base, costal region scaled with brownish, outer border chocolate; through the middle of the wings are two dentate lines. Head and thorax above chocolate brown with a bluish iridescence; across the thorax are two narrow black transverse lines; abdomen blackish at base, paler and with more or less iridescence across the middle, darker at tip. Expanse, 2.20-2.80 inches=55-70 mm.

Larva.—Chocolate brown, with very narrow transverse lines; a dark dorsal line, and one of the same color along the subdorsum and sides; anal segment provided with a large polished spot instead of a horn. Head dark with a lighter broad band on each side. Sometimes the larva is marked with numerous pea-green patches, oval on the back and irregularly triangular on the sides, with an interrupted subdorsal chocolate-colored line. Head brown with a light green band on each side. Length, 2.20 inches=55 mm.

Pupa.—Deep chestnut brown, paler between the segments. Head-case broad and rounded; tongue-case concealed and level with the breast; segments deeply punctured, smooth between the segments; last segment with a rugose, wedge-shaped point. Length, about 1.40 inches=35 mm.

Food-plants.—Grape and Virginia Creeper (*Ampelopsis*).

Common in this neighborhood. The moth appears in May and early in June, and again during the latter part of July and early in August. When at rest the larva does not assume the attitude of holding up the head common to the larvæ of Sphingidæ, but stretches out at full length. If disturbed it throws its head from side to side, hereby producing a creaking noise. It is found from Canada and eastern United States westward to Iowa.

Deidamia Clemens.

Head small, with a prominent tuft between the antennæ; eyes small and lashed; palpi rather short; antennæ of almost equal width and tapering at the apex which is bent at the tip, but not into a recurved hook, biciliate in the male, simple in the female; thorax stout, vestiture forming a distinct dorsal ridge. Abdomen conical, anal tuft in the male small, flattened laterally, and forming a rounded bunch in the middle; in the female the tuft is composed only of a bunch of short hairs. Wings longer than the body, and very similar in outline to *Amphion*, only somewhat less oblique.

Deidamia inscripta (Harris).

PLATE II, FIG. 7.

Fore wings ashen gray with minute brown scales; before the middle is a transverse brown band incurved on the inner margin, and before this band are some indistinct transverse lines; median space gray; across the outer third is a broad brown band, angulated outwardly above the middle and shaded outwardly with brown; in the pale apical region is a rich brown spot, and a short dentate apical streak. All these markings are ill defined, somewhat confluent, and more or less suffused with brown. Hind wings reddish brown with a somewhat darker terminal band. Underside of fore wings dull fawn color, with an irregular ferruginous transverse shade outwardly, beyond which the space is dark with a distinct white spot in the apical region; hind wings ashen brown with indistinct transverse lines. Head and thorax ashen brown, the latter with three more or less distinct transverse whitish lines edged with brown. Abdomen with a row of small brown spots along each side of the back. Expanse, 1.80-2.40 inches=45-60 mm.

Larva.—Body pale green with a yellow subdorsal line ending at the base of the caudal horn, which is whitish at the tip. The segments are also transversely marked with fine black lines. Length, 2 inches=50 mm.

Pupa.—Dark pitchy brown, mottled with testaceous on the wing-cases, thorax and head-case, and also somewhat on the segments; head-case with a pointed tubercle, and also one on each eye-case, which are surrounded with a sharp ridge; tongue-case concealed, keel-shaped; the leg and antennæ-cases are also outlined with sharp ridges; anterior part of thorax with a transverse mark outlined and divided in the middle by a ridge; segment deeply punctured, last one provided with a sharp spine. Length, .80-1.20 inches=20-30 mm.

Not common in this vicinity. The moth makes its appearance during the latter part of May and the first days in June, and is probably double brooded. The larva is fully grown about the last of June or early in July. It feeds on the Grape and Virginia Creeper (*Ampelopsis*).

Deilephila Ochsenheimer.

Body stout fusiform; head of moderate size, not sunken into the thorax, smoothly scaled; eyes rather large; tongue nearly as long as the body; antennæ gradually thickening toward the tip, which has a minute, pointed hook; thorax smooth; abdomen smooth, segments gradually decreasing in size; tip pointed, and provided with a bunch of long hairs, forming the anal tuft. Fore wings with apex and hind angle acute, outer margin oblique, entire, inner margin very slightly sinuate. Hind wings with outer margin entire, and a slight projection before the rounded anal angle.

Deilephila lineata (Fabr.).

PLATE III, FIG. 2.

Fore wings pale olive brown with a broad oblique buff band running from near the base of the inner margin to the tip of the apex, where the band terminates in a point. The veins are heavily marked with white to the outer space, which is lilac gray. Hind wings black, with a broad, pink median band; outer border narrow, pinkish, with the fringes white. Head, thorax and abdomen olive brown; thorax with three parallel white stripes on each side; abdomen with a row of large black and white spots on each side, and along the middle is a narrow broken white line with a small black spot on each side at the posterior end of the segments. Underside lilac gray with the oblique buff band of the fore wings partly repeated; the pink band of the hind wings is buff color; the wings are also minutely dotted with brown. Expanse, 3-3.60 inches=75-90 mm.

Larva.—Yellowish green, with a prominent subdorsal row of elliptical spots, each spot consisting of two black curved lines, inclosing superiorly a crimson space and inferiorly a pale yellow line; the whole row of spots is connected by a pale yellow stripe edged above with black; sometimes these eye-like spots are disconnected, or the larva is black with a yellow line along the back and a series of pale yellow spots and darker yellow dots along the sides. This dark form is subject to variation, some specimens entirely lacking the line along the back, and having the spots of different shape. Length, 2.50–3 inches=62–75 mm.

Pupa.—Light brown, head-case prominent, showing the palpi, rugose, as is also the thorax; segments punctured; tongue-case not apparent. Length, 1.60–1.80 inches=40–45 mm.

Food-plants.—Purslane (*Portulaca*), Buckwheat, Turnip, Watermelon, Chickweed (*Stellaria*), Dock (*Rumex*), Evening Primrose, Apple, Plum, Currant, Grape and Gooseberry.

This species is found in the United States, Canada, and Cuba. In this vicinity it is common everywhere. It flies early in the evening and often in bright daylight. The larvæ are most commonly found in fields feeding on purslane, which seems to be their favorite food plant. The insect is double brooded, the first brood appearing during June and July, and the second during the latter part of August and early in September.

***Deilephila galii*, var. *intermedia* Kirby.**

PLATE III, FIG. 3.

Fore wings olive brown with a buff-colored oblique band, running from the hind margin near the base to the apex; the upper edge of the band is indented, and the lower edge somewhat curved; the outer border of the wings is lilac gray, base black. Hind wings with a broad pink central band, followed by a narrow black band; terminal border lilac gray, base black. Thorax olive with a white stripe on each side, running along the head. Body olive with a row of minute white dots along the middle; first and second segments marked with black on the sides; the second, fourth, and following segments with white. Underside of thorax dull yellowish brown; wings buff color with the marking from above somewhat reproduced. Expanse, 2.65–3 inches=65–75 mm.

Larva.—Dark green with nine yellow spots encircled with black on each side; spiracles yellow with a black ring; caudal horn red; head and thoracic feet blue gray. Sometimes the larva is olive green with a bright yellow dorsal line and spots on each side; or is blackish gray with a red dorsal line and two rows of yellow spots on each side. Length, 3 inches=75 mm.

Pupa.—Pale brown mottled with black in its impressed portions; head-case projecting, corrugated; tongue-case concealed, corrugated; wing-cases corrugated; segments punctate; terminal spine tapering, bifid at tip. Length, 1.80 inches=45 mm.

Food-plants.—*Epilobium*, Purslane (*Portulaca*), Evening Primrose and Apple.

Not common in this neighborhood. Found during June and again in August. It occurs from Canada to Georgia and westward to California; also in Europe. The median pink band of the hind wings in the European form (*galii*) is much paler than in *intermedia*.

Theretra Hübner.

Body long and graceful; head of medium size and smoothly scaled; eyes large, hemispherical; proboscis almost as long as the body. Antennæ minutely ciliate in the male, simple in the female, and of almost equal width throughout, with a small bent hook at the tip; thorax smooth; abdomen very long, and tapering to a point, vestiture very smooth and closely applied, and a narrow brush of hairs at the tip. Fore wings long and narrow, apex sharply pointed, outer margin very oblique, inner margin sinuate; Hind wings narrow, apex pointed, sharply produced before the anal angle.

Theretra tersa (Linn.).

PLATE III, Fig. 4.

Fore wings ochreous brown, paler at the base, which has a slight purplish reflection; from the apex to the middle of the inner margin is a series of from seven to nine diverging, oblique light brown lines; the outer ones are almost parallel with the outer border, and the inner ones extend nearly to the base of the wing. Hind wings smoky black with a series of large wedge-shaped, yellow subterminal spots. Head and thorax fawn color, with a roseate lateral stripe; abdomen rusty brown above with indistinct fawn-colored stripes; sides rusty yellow; underside paler. Expanse, 2.25-3 inches = 56-75 mm.

Larva.—Pale green, with fine longitudinal irrorations; along the subdorsum is a rather broad white band, running from the fourth segment to the caudal horn; on the band is placed, on each segment, a round black ring, the one on the fourth segment with a black eye-like spot in the centre. Caudal horn reddish, tip black. Length, 2.40 inches=60 mm.

Food-plants.—*Bouvardia*, Buttonweed (*Spermacoce glabra*), *Manettia bicolor*.

Quite rare in this vicinity, but common in the Southern States, West Indies, Central and South America. It ranges northwardly as far as Canada. It is usually found in flower gardens. The moth may be easily recognized by its graceful form. It varies somewhat in ground color from light to dark ochreous brown.

Argeus Hübner.

Form robust; head large and prominent; eyes large, not lashed; thorax stout, well advanced in front of the base of the fore wings; abdomen long and robust. Fore wings shorter than the body, outer margin obliquely rounded, inner margin sinuate; hind wings entire with anal angle produced.

Argeus labruscæ (Linn.).

PLATE V, FIG. 6.

Fore wings green, with a large V-shaped deeper green space; beyond this are two somewhat deeper green transverse lines; a series of small black sub-terminal spots, and a rather large rounded brown patch about the middle of the wings. Hind wings blue, with a median black band, in which is a blue spot, and marked with red towards the inner margin; in front of the outer border is another black band; outer portion of wings buff colored. Head, thorax, and abdomen green; abdomen with a series of white lateral spots. Expanse, 4.25-4.75=106-119 mm.

A South American species, occurring northward to Canada. In the north it is an occasional visitor, and is very rarely taken.

Pholus Hübner.

Body robust; head large, smoothly scaled; eyes large, not lashed; antennæ ciliate in the male, simple in the female, hooked at the tip; thorax stout and smooth; abdomen stout, smooth and gradually tapering. Tibiæ not spinose, middle pair with two unequal terminal spurs, hind tibiæ with two pairs. Fore wings much longer than the body and broad, outer margin rounded and somewhat excavated below the apex or obliquely rounded, inner margin strongly sinuate. Hind wings broad, apex pointed, outer margin somewhat excavate before the anal angle.

Pholus pandorus Hübner.

PLATE III, FIG. 5.

Fore wings pale olive green, marked with patches and shades of rich olive green; on the inner margin near the base, is a long olive green patch running

to about the middle of the wing, and separated by a pink shade from the triangular patch within the hind angle; a similar patch rests on the costa a little before the apex, there is also a dark olive shade from the costa extending outwardly; across the wing are several narrow, wavy, indistinct lines; discal spot consisting of two or three small blackish spots at the end of the cell.

Hind wings pale greenish at base, with a black patch at the middle of the inner margin, and a broad black subterminal band running from the costa to the middle of the wing, where it breaks up into spots and lines on a roseate ground; outer margin olive green. Head and thorax with a blackish line along the middle, thorax at sides with an olive green triangular patch. Under-side pale olive, with two narrow transverse lines on each wing. Expanse, 3.75-4.50 inches=95-112 mm.

Larva.—Pale green above, darker at sides, or reddish brown, lighter dorsally; at the sides from the fifth to tenth segments each with an oval cream-colored spot in which are the spiracles. Last segment with a black, polished, eye-like spot instead of a caudal horn; anterior segments with numerous, minute black dots. Head small and rounded. Length, 3 inches=75 mm.

Pupa.—Elongate, chestnut brown. Head-case prolonged, subtriangular laterally, slightly corrugated; wing-cases smooth; tongue-case concealed, and extending slightly beyond the wing-cases; segment thickly punctured; middle portion of pupa thicker than either extremity; terminal spine rather long, pointed and minutely bifid. Length, 2.50 inches=62 mm.

Food-plants.—Grape and Virginia Creeper (*Ampelopsis*).

Rather common in this neighborhood, in gardens and vineyards. It is double brooded; the first brood appearing during June and early in July, and the second in August. It is found in the United States east of the Great Plains and also in Canada.

Pholus achemon (*Drury*).

PLATE III, FIG. 6.

Fore wings pale chocolate brown with a pinkish tinge, with darker shades and several wavy transverse lines; on the inner margin at the middle is a large, deep velvety brown quadrate patch, and a small triangular patch of the same color before the hind angle, and a larger one on the costa immediately before the apex. Hind wings pink with a light chocolate-brown outer border, containing a row of deep brown spots, which are not clearly defined before the middle of their course. Head, thorax and abdomen same color as the upper wings, the thorax with a deep triangular patch on each side. Underside of fore wings roseate with a pale chocolate-brown outer border and with two parallel, deeper brown transverse lines; hind wings roseate brown, powdery, with two transverse lines. Expanse, 3.75-4.25 inches=95-106 mm.

Larva.—Varying from green to reddish brown or pale straw-color, darker along the sides; an interrupted brown line runs along the middle of the back, and an unbroken one extends along each side, beneath which are six cream-colored oblique spots, one on each segment; on the last segment is a polished black, flat tubercle, instead of a caudal horn. Over the body are sprinkled numerous minute dark dots. Length, 3 inches=75 mm.

Pupa.—Very similar to that of *P. pandorus*, but less elongated, and the head-case less prolonged and pointed; the last segments are broader and the terminal spine shorter and obtuse, instead of pointed. Length, 2-2.25 inches=50-56 mm.

Food-plants.—Grape and Virginia Creeper (*Ampelopsis*).

This species is double brooded, the first brood appearing in June and July, and the second in August. It is somewhat common in this vicinity, and is found throughout the United States from the Atlantic to the Pacific, and also in Canada. The larva, in shape and size, is the same as that of *P. pandorus*, but differs in shape of the spots along each side, which are elongated instead of oval as in *pandorus*.

Pholus vitis (Linn.).

PLATE III, FIG. 7.

Fore wings deep olive green, with a pale flesh-colored band extending from the middle of the base to the apex and crossed by a similar band which runs from the outer fourth of the costa to the middle of the inner margin; the costa to the transverse band is chocolate brown, as is also the outer border; between the oblique transverse band and the outer border the veins are pale flesh-colored; at the basal third of the wing is a narrow line running from the band to the inner margin. Hind wings pale greenish inwardly, with a broad pink outer border interrupted by an olive green space before the angle; within the outer border is a broad black fascia terminating in two narrow lines; below the disc are two large black spots, separated by a few pink scales. Head, thorax and abdomen flesh-colored, head and thorax with a median olive green line, and an elongate olive green patch on the patagia; abdomen with a blackish patch on each side of the base, and on each side of the back a broad olive green stripe. Underside of wings pinkish flesh color, roseate at the inner margin of the hind wings. Expanse, 3-4.25 inches=75-106 mm.

Larva.—Head claret red with two black stripes; body yellowish, with narrow transverse black lines, junctions of segments claret red; along the sides are a series of elongate, oblique, oval, whitish patches; beneath greenish with black lines. Length, 3 inches=75 mm.

Pupa.—Shape similar to that of *P. pandorus*, but differs in having only the anterior parts of the segments, as is also the prolonged head-case; the last segment is more rounded, and the terminal spine is somewhat curved and polished at the base. Length, 2.20 inches=55 mm.

Food-plant.—Grape.

This is a southern species very rarely taken in this vicinity. It has been recorded from South America, Central America, Cuba, Texas, Florida, and along the Atlantic coast to Massachusetts. The larva is very different from its congeners.

Pholus linnei (*G. & R.*)

Closely allied to *P. vitis*, but differs in having the outer border of the fore wings rounded instead of being straight as in *vitis*. The markings of the fore wings are darker, and the hind wings are greenish at base, with the outer border grayish brown, instead of pink, and at the anal angle is a pink patch and a black patch within. Expanse, 3.25-4.5 inches=81-112 mm.

Inhabits South and Central America, Cuba, and the Southern States, and is said to be found northward as far as Massachusetts; if so it may possibly be found in this vicinity.

Everyx Ménetries.

Head small, vestiture forming a central ridge or tuft between the antennæ; eyes moderate and slightly lashed; proboscis about half as long as the body; antennæ ciliate in the male, simple in the female, with a large hook at the tip. Tibiæ not spinose, except in *E. cherilus*, which has the anterior and middle pair minutely spinose. Thorax prominent, smooth; abdomen untufted, smooth and tapering. Fore wings as long as the body, rather broad, apex subfalcate, outer margin more or less excavate, inner margin sinuate. Hind wings excavate before the anal angle, apex rounded.

Everyx chærilus (*Cramer*).

PLATE II, FIG. 8.

Fore wing rusty brown with slight purplish reflections; basal half grayish brown with two curved transverse lines; outer part of wings rusty brown crossed by several more or less distinct zig-zag lines; terminal space same color as the base of the wings. Hind wings uniform rusty red with a very narrow fringe, edged with white. Head, thorax and body rusty brown, patagia edged with gray. Underside of wings pale rusty brown with two faint transverse lines on each; outer border of fore wings same as above. Expanse, 2.25-3 inches=56-75 mm.

Larva.—Body pale green, with a darker dorsal line; second segment yellowish green with numerous irrorations. Spiracles orange, white above and below, those on second segment are orange and yellow above and below; along each side of the 5th, 6th, 7th and 8th segments is a white oblique band, and on the posterior segments the bands are connected with a continuous line to the base of the caudal horn, which is bluish at the base, green at the tip and white in the middle. Sometimes the color of the larva varies from pinkish to brown or even leaden brown. Length, 2.20 inches=55 mm.

Pupa.—Purplish brown, with a pink tint over the whole surface, and slightly mottled with black. Wing-cases mottled with black, spaces between the segments blackish brown. Tongue-case concealed. Length, 1.40 inches=35 mm.

Food-plants.—Sheep-berry (*Viburnum lentago*), Arrow-wood (*Viburnum dentatum*), also other species of *Viburnum*, Sour-gum (*Nyssa*), and Azalea.

This is a rather common species, and is found in open woods. It may be easily recognized by its rusty brown color and purplish-gray shades on the fore wings. It is double brooded. The larva spins a rude cocoon, amongst leaves on the surface of the ground. Found from Canada to Georgia, and westward to Iowa.

Everyx myron (*Cramer*).

PLATE II, FIG. 9.

Fore wings olive gray, varying to purplish gray, with olive green, oblique, transverse bands and shades, which are more or less distinct. The band across the basal third is continuous, while the band across the outer third is nearly always more or less broken in the middle by the pale ground color. The outer part of wing is shaded with olive green at the apex and inner angle, leaving the rest of the terminal space olive or violet gray. Hind wings rusty brown with a darker, more or less distinct and complete terminal band. This band is very often reduced to an olive gray patch on the anal angle. Head, thorax and abdomen olive green or gray. Underside pale rust red or grayish, with two narrow transverse lines. Expanse, 1.80-2.50 inches=45-62 mm.

Var. cnotus Hübn.—In this variety the fore wings are uniform brown, without traces of the olive transverse bands and shades.

Larva.—Body green sprinkled with yellow dots; along the middle of the back is a row of yellow patches, each containing a spot varying from red to pale lilac; along the sides, from the head to the caudal horn, is a white stripe with a dark green margin, and below this are seven oblique lateral stripes. The caudal horn varies from red to bluish, granulated with black, and is sometimes yellow behind and at the tip. The larva is sometimes green, cream color, purplish brown, deep brown, or leaden brown. In some the yellow patches along the back are almost wanting. Length, about 2 inches=50 mm.

Pupa.—Shape like that of *E. charilus*. Pale brown; wing-cases sprinkled with black dots; junctions of segments dark brown. Tongue-case concealed. Length, about 1.20–1.40 inches=30–35 mm.

Food-plants.—Grape and Virginia Creeper (*Ampelopsis*).

Rather common in gardens about grape vines. It may be readily known by its olive gray color with olive green markings. The larva in shape is like that of *E. charilus*, but differs in having the lateral oblique stripes interrupted by the lateral white line, which forms a straight edge at the junction of the oblique lines. It also differs in having a row of sub-oval dorsal spots, which are absent in *E. charilus*. When fully grown it spins a loose cocoon amongst leaves on the ground. It is double brooded, the first brood appearing in June and July and the second in August. It is found from Canada to Georgia, and westward to Missouri and Iowa. The variety *cnotus* is rare, but is the common and prevailing form in the Southern States.

Everyx versicolor (*Harris*).

PLATE II, FIG. 10.

Fore wings green shading into lighter green or yellowish green, with a number of transverse whitish or pinkish lines. Several more or less distinct curved lines run from the costa before the middle to the base of the wing, and beyond the middle, across the outer fourth, are also three more or less distinct transverse lines and a curved subterminal white line beginning at the apex and running irregularly down to the anal angle; near the apex it is crossed by two white dashes; sometimes this line is almost absent. Hind wings rust brown, the margin grayish. Head, thorax and abdomen green tinged with yellow; a narrow white line extends over the top of the head to the end of the abdomen; along the sides of head and thorax also a whitish line. Underside of wings marked with green, yellow and white, sometimes with reddish on the fore wings. Expanse, 2.75–2.90 inches=68–72 mm.

Larva.—Head and first four segments yellowish green; rest of body pea green, with a white line along each side from the mouth to the base of the caudal horn; this line is composed of several lines, as follows: a subdorsal line, extending from each side of the mouth back to the rear of the fourth-segment of the body; a similar line runs obliquely from the lower part of the fourth segment, just under the stigmatal point, upwards and backwards to the rear of the fifth segment, meeting it just below the dorsal line. This is followed by five other parallel lines, each beginning and ending one segment further back, except the last, which extends across the last three segments up to the base of the caudal horn. There are also faint indications of other lines at the lower part of the

tenth and eleventh segments; body also covered with white specks. Spiracles red, with yellow at each end. Caudal horn black, red on the sides. Sometimes the ground color is pinkish brown instead of green, and the markings are then pinkish white. Length, 2.50-3 inches=62-75 mm.

Pupa.—Dirty brown, with chocolate brown spots, almost covering the wing-cases and anterior parts; eyes and spiracles black, as also between the segments; tongue-case concealed.

Food-plants.—Buttonbush (*Cephalanthus occidentalis*) and Swamp-loose-strife (*Nesaea verticillata*).

Quite rare and local in this vicinity. It is double brooded, appearing in June and early in July and again in August. The moth may be easily known by its bright green shades on the fore wings, with the more or less distinct whitish transverse lines. The larva is very quiet in its habits, never leaving a stem of the food-plant so long as a leaf remains. In eating, when fully grown, it hangs from the mid-rib of the leaf, and eats usually from the extreme end, finishing a section across the leaf as it goes. It generally eats the mid-rib and petiole down to the woody stem.

Synopsis of Species of Chærocampinæ.

Aëllopos.

- Abdomen with a broad fan-like anal tuft. Wings entire.
- Sooty black; abdomen with the third segment white.
- Fore wings with two transverse bands beneath the cell and an arcuate row of subterminal spots.....*A. fadus.*
- Fore wings with the bands obsolete, and the subterminal row of spots reduced to two or three spots.....*A. tantalus.*

Triptogon.

- Fore wings excavate, below the apex and above the hind angle.
- Chocolate brown with darker shades outwardly on the fore wings.
- Thorax with a prominent tuft on the fore part.....*T. lububris.*

Amphion.

- Fore wings excavate outwardly; rich dark brown with darker markings.
- Abdomen with a transverse, canary yellow line between the fourth and fifth segments.....*A. nessus.*

Sphecodina.

- Fore wings excavate outwardly; last segments of abdomen with dentate lateral tufts.
- Dark brown, fore wings with oblique streaks; hind wings yellow at base.....*S. abbotii.*

Deidamia.

Fore wings excavate outwardly, head with a prominent tuft.

Ashen gray with brown markings ; hind wings reddish brown,
D. inscripta.

Deilephila.

Wings entire, not excavate ; fore wings with a buff-colored oblique band from the base to the apex.

Veins of fore wings and thorax lined with white.....*D. lineata.*
Veins and thorax not lined with white.....*D. galii* var. *intermedia.*

Theretra.

Body long and graceful, wings pointed, entire.

Pale ochreous ; fore wings with paler oblique stripes ; hind wings black with a subterminal row of yellow wedge-shaped spots, *T. tersa.*

Argeus.

Outer margin of fore wings not excavate beneath the apex.

Fore wings wholly green, with a darker V-shaped space.
Hind wings blue, black, red and buff.....*A. labrusca.*

Pholus.

Large species ; wings broad ; fore wings slightly excavate beneath the apex.

Fore wings pale olive green, with dark green shades and patches.
Hind wings pale green with a black patch and subterminal band,
P. pandorus.

Fore wings pale chocolate brown, with rich, dark brown patches.
Hind wings pink, outwardly pale brown.....*P. achemon.*

Fore wings deep olive, with an oblique flesh-colored band from the middle of the base to the apex, and an oblique transverse band of the same color.

Hind wings pale green at base, pink outwardly, and with a black spot and short band.....*P. vitis.*

Hind wings pale greenish at base, black outwardly ; anal angle with a pink patch.....*P. linnei.*

Everyx.

Fore wings with apex subfalcate, entire.

Olive gray, with olive green markings, hind wings red brown...*E. myron.*
Rusty brown ; basal half of fore wings pale grayish brown...*E. charilus.*

Light and dark green, with white transverse lines on fore wings ;
hind wings ferruginous ; from head to end of body a white line,
E. versicolor.

Subfamily SPHINGINÆ.

Dilophonota *Burmeister.*

Body long ; fore wings as long as the body ; head large, smoothly scaled ; eyes large ; tongue about half as long as the body ; antennæ minutely ciliate in the male, simple in the female, tip with a short hook ; thorax smooth, with a short, divided rest on the middle of the anterior portion ; abdomen smooth,

slender. Legs unarmed; middle and hind tibiæ spurred. Fore wings with the outer margin oblique and slightly scolloped between the nervules. Hind wings with apex acute, anal angle somewhat produced.

Dilophonota ello (*Linn.*).

PLATE IV, FIGS. I AND 2.

Fore wings ashen gray, with an indistinct, dentate line running from the outer fourth of the costa to the middle of the hind margin, and an outer row of small dark spots. Often there is a brown shade from the middle of the base to the apex, and above and below this shade the wings are also marked with brown, forming no regular pattern. Hind wings ferruginous, terminal border blackish, not reaching the anal angle, and grayish before the angle. Head and thorax ashen gray or marked with brown. Abdomen gray with five large, transverse, oblong spots on each side, with the space on the back forming a line. Underside of wings ferruginous, dusky outwardly; body light gray. Expanse, 3-4 inches=75-100 mm.

Larva.—Body green; head with a dark brown line on each side in front, thence running over the top of the head and along the subdorsum of the body and converging at the base of the caudal horn; these lines are bordered with yellow; on the fourth segment is a large, round, velvety black spot bordered with yellow, and outside on either side is a shade of deep reddish brown; on the middle of the back from the head to the end of third segment is a fine dark brown line; abdominal feet with a velvety black patch externally; caudal horn short and blunt. The body is also sprinkled over the surface with minute dark brown and yellow dots. Sometimes the larva is reddish brown, with the lines less distinct than in the green variety. Length, 3-3.50 inches=75-87 mm.

Pupa.—Pitchy black, smooth, and very shining wing-cases and breast with longitudinal ochreous lines; thorax and head-case also with ochreous lines; abdominal segments ochreous with short black transverse lines and dots, last three segments pitchy; anal spine smooth, compressed, and in form of a triangular tooth. Head-case prominent and smooth. Length, 2-2.25 inches=50-56 mm.

Food-plant.—*Euphorbia*.

Very rare in this vicinity but common in the South. It is found from Brazil northward to Canada. It varies from an almost uniform gray to a form with distinct brown shades.

Phlegethontius Hübner.

Head very large and prominent; eyes large; proboscis much longer than the body; antennæ rather strongly biciliate in the male and simple in the

female; thorax robust, well advanced in front of the base of the fore wings, and with short erect tufts posteriorly; abdomen tapering, untufted. Fore wings well developed, somewhat longer than the body, outer border obliquely rounded and entire; apex acute; hind wings with outer margin very slightly scalloped.

Phlegethontius quinquemaculatus (Haw.).

PLATE IV, FIG. 3.

Fore wings ashen gray, shaded more or less with blackish beyond the middle and toward the apex; across the wings from the costal third is a series of three narrow black lines running outwardly, then obliquely backwards to the inner margin near the base; across the outer fourth are three much angulated, parallel lines running to the middle of the inner margin; beyond these lines is a less angulated, darker and more distinct line, and a short apical streak of the same color. All the lines are more or less ill-defined. Hind wings pale gray, ashen gray outwardly, and are crossed by two parallel dentate lines through the middle and with a rather broad subterminal black band, widest at the costa. Head and thorax ashen gray, the latter marked with several short transverse lines in front, one along the edge, and another through the middle of the patagia; across the hind part of the thorax is a broad black band, with, in front of it, one or two spots composed of bluish tufts. Abdomen gray with a row of large, conspicuous, orange colored spots surrounded with black along each side and edged on the anterior parts above and below with white. Underside of wings uniform ashen gray, with two transverse bands on each, the outer one on the fore wings and those on the hind wings toothed. Expanse, 3-4.50 inches=75-112 mm.

Larva.—Body dull green with yellowish white, oblique lateral stripes, or dull sea green with ocellated spots anteriorly with the oblique lateral bands and stigmatal stripe flesh color; head black with an elongated flesh colored triangular patch; thoracic feet, exterior of prolegs, and anal plates black. Underside paler than above. Sometimes the body is very dark brown sprinkled with yellow dots; and the lateral oblique bands and the stigmatal stripe are yellow, as is also the border of the caudal shield; head with triangular spot drab; caudal horn black, spiny. Length, 3-4 inches.

Pupa.—Chestnut brown; tongue-case detached, very long, prominent, and strongly curved, like the handle of a pitcher, with the bulbous end touching the body beyond the middle of the wing-cases. Length, about 2.50 inches=62 mm.; tongue-case, 30 mm.

Food-plants.—Tobacco, Tomato, Jamestown-weed (*Datura*), Matrimony Vine (*Lycium vulgare*), and Ground Cherry (*Physalis viscosa*).

Not common, and double brooded in this vicinity. The first brood appears in June, and the second in August. It may be known by its ashen-gray color and the five orange spots on each

side of the abdomen. Found throughout the United States and Canada. The pupa is a well-known object of interest, and from its long arched tongue-case may be readily distinguished.

Phlegethontius carolina (*Linn.*).

PLATE IV, FIG. 4.

Fore wings dark brownish gray, with the transverse lines near the base and across the outer fourth very similar to those of *P. celeus*. The outer dark transverse line is scalloped, while in *celeus* it is slightly curved, and beyond this is a subterminal angulated whitish line. Discal spot small, white. Hind wings gray, with three transverse black bands, outer portion dark gray. Head and thorax brownish gray with yellow scales, the latter with indistinct black lines and black across the posterior part. Abdomen wood brown or gray with a row of large, deep orange spots along each side, which decrease in size towards the end of the abdomen and are surrounded with black. Underside of wings gray with transverse bands. Expanse, 3-5 inches=75-125 mm.

Larva.—Green, paler above, with seven oblique white bands, bordered above on each side with bluish or dark brown, last segment edged with white; caudal horn reddish, white at the base of sides, or wholly black. Over the body are also scattered fine, short, transverse lines. Length, 2.80-3.50 inches = 70-80 mm.

Pupa.—Chestnut brown, and similar in shape to that of *P. celeus*, but less swollen at the middle, the detached tongue-case is shorter and much less arched, and does not quite extend half-way to the end of the wing-cases. Length, about 2.20 inches=55 mm.; tongue-case, 23 mm.

Food-plants.—Tomato, Tobacco, and Jamestown-weed (*Datura*).

Closely allied to *P. celeus*, but is a much darker insect, the yellow spots on the abdomen are much larger, and the central bands on the hind wings are straight instead of toothed. It is found in the United States from the Atlantic to the Pacific, in Canada and the West Indies. In this vicinity it is sometimes quite common and double brooded.

Phlegethontius cingulatus (*Fabr.*).

PLATE IV, FIG. 5.

Fore wings dark gray, sometimes mottled with brown; darker than in *P. celeus*, and lighter than in *P. carolina*. The transverse lines are almost like

those of *P. carolina*. Below the cell, between the veins, are two black streaks. Hind wings rose colored at the base, gray outwardly, and crossed by three black bands. Head and thorax dark gray, the latter with black lines at sides and in front; abdomen dark gray with five bright rose colored spots on each side, decreasing in size towards the posterior end of the body, and separated by black bands. Underside of wings dark gray; hind wings white at base along the inner margin. Expanse, 3.75-4.50 inches=94-112 mm.

Larva.—Dark green with seven oblique black bands along each side, which terminate on the back in two longitudinal stripes of the same color; on the dorsum of the third and fourth segments are two black spots, four very small ones on the tenth, and two very large ones placed laterally at the incisure of the first and second segments. Head green with black stripes. Caudal horn yellow or ferruginous, tip black; anal shield orange yellow. Length, 3-4 inches=75-100 mm.

Variety A.—Clear green, with the oblique lateral bands entirely white, and the two dorsal stripes replaced by two rows of black points.

Variety B.—Dull green with six longitudinal rows of blackish or brownish spots, and the head and horn ferruginous.

Variety C.—Dead leaf brown on the back, white on the sides, and flesh colored beneath; seven oblique lateral stripes of deeper brown and a lateral stripe of straw color, which is continuous on the first three segments, and interrupted after the fourth segments at the middle of each. Head pale fawn color with black lines; caudal horn black; shield orange.

Variety D.—Brown with four longitudinal lines of dirty white on the first three segments, two dorsally and two laterally.

Variety E.—Earthen brown with the back and oblique bands of a deeper brown.

Pupa. Brown, with the tongue-case detached, not reaching the middle of the wing-cases, bent downward and backward for about half its length; the turned portion resting on the breast. Length, 2.50 inches=62 mm.

Appears in June and again during the latter part of August and in September. It may be known from the other members of the genus by the rose red spots on the abdomen. The larva is very variable, and besides the varieties described above, intermediate ones are met with. It hides itself at the base of the plant under leaves, but may be discovered from its large excrements. The insect is found from Canada to Brazil, and to the extreme west of our continent; also in the Hawaiian Islands.

Phlegethontius rusticus (*Fabr.*).

PLATE IV, FIG. 6.

Fore wings sooty brown, with white transverse wavy lines across the basal and outer third, and subterminal white markings of no regular pattern; sometimes the wings are more or less rust brown. Hind wings sooty brown with a whitish band near the base and two more or less distinct, black central bands, followed by whitish shades. Fringes black, cut with white. Head, thorax and abdomen sooty black, or marked with rust brown, thorax marked with white; abdomen with three large orange spots on each side. Underside of fore wings paler than above with transverse lines; hind wings whitish or grayish with two dentate central bands; body white. Expanse, 3.50-5.60 inches=87-140 mm.

Larva.—Head and body dark green, yellow on the dorsum; along each side are seven oblique blue bands edged with purple, and beneath these is a white longitudinal band, edged with yellow on the lower part. Caudal horn yellow, with reddish tubercles. Length, 4 inches=100 mm.

Pupa.—Chestnut brown, and similar in shape to that of *P. carolina*, but larger and more robust, with the detached tongue-case more curved. Length, about 2.50-2.80 inches=62-70 mm.

Food-plants.—*Chionanthus*, Privet, and Lilac.

Found from New York southward into South America. In this vicinity it is very rare. It may be known by its large size, sooty-brown color, the white wavy lines, and by having three yellow spots on each side of the abdomen.

Sphinx *Linnaeus.*

Head moderate; proboscis as long as the body; eyes small, usually distinctly lashed; palpi curved upward and projecting beyond the head; antennæ with the tip more or less bent; thorax well developed, untufted, metathorax with erect hairs. Legs more or less spinose; middle and hind tibiæ spurred. Fore wings with very acute apex and the outer margins very oblique, entire. Hind wings narrow, apex distinct.

Sphinx drupiferarum *A. & S.*

PLATE V, FIG. I.

Fore wings smoky black, broadly grayish or whitish along the costal region from the base of the wings to nearly the apex; the outer margin is also grayish, containing a whitish line which is limited inwardly by a wavy black line; between the veins in the dark portion of the wings are several black dashes. Hind

wings black, base whitish, and also a central whitish band; terminal border dirty grayish brown. Thorax black, sides grayish, as is also the head. Abdomen brownish, with a fine black line along the middle; sides black, with a row of four or five large white spots. Underside: fore wings smoky, terminal border grayish brown; hind wings grayish at base and a central band and outer border of the same color. Expanse, 3-4 inches=75-100 mm.

Larva.—Bright apple green; head with a dark brown stripe on each side; along each side of the body are seven oblique white stripes bordered with purple on the upper side; spiracles orange; caudal horn dark brown, yellow at the base of the sides. Length, about 3.50 inches=87 mm.

Pupa.—Dark chestnut brown; tongue-case detached, short and straight, and not resting on the breast. Length, about 2 inches=50 mm; tongue-case, .25 inch=6 mm.

Food-plants.—Apple, Plum, Hackberry (*Celtis*).

Not common. Double brooded in this vicinity, appearing in June and again early in August. The species is recognizable by the smoky black fore wings and the whitish costal space. Found from Canada to Florida and westward.

***Sphinx kalmiæ* A. & S.**

PLATE V, FIG. 2.

Fore wings pale chestnut brown, with lighter and darker streak-like shadings; before and parallel to the outer border is a pale brownish white transverse line, limited inwardly with black; fringes alternately brown and whitish. Hind wings brownish white with a central and subterminal blackish band. Head and thorax chestnut brown on top, patagia edged with black; sides of head and thorax pale whitish brown. Abdomen chestnut brown along the back with a narrow black line; sides black, with a row of large whitish spots. Underside of wings chestnut brown, with a terminal dark brown shade, and a paler central band across the hind wings. Expanse, 3-4.50 inches=75-112 mm.

Larva.—Body apple green, paler above and dark at the sides, with seven oblique lateral stripes, which are whitish along the middle, bordered with blue-black anteriorly and with yellow posteriorly. Caudal horn light blue, with black tubercles. Spiracles pale orange, thoracic feet black, whitish at their bases; abdominal legs with two black spots externally, and separated by yellow. Length, about 3 inches=75 mm.

Pupa.—Deep chestnut brown, with the detached tongue-case short and straight, and is similar in shape to the pupa of *S. drupiferarum*. Length, about 2 inches=50 mm.

Food-plants.—Laurel, Lilac, Privet, *Chionanthus*, and Ash.

Not common. It may be known by its chestnut brown color, with lighter and darker streaks. The larva is quite conspicuous, with the lateral oblique stripes very broad. It is double brooded, the first brood appearing in June and the second late in July and early in August. Found from Canada to Georgia, and westward to Missouri.

Sphinx lucitiosa Clemens.

PLATE V, FIG. 3.

Fore wings rusty brown with the costa and outer margin sooty brown; most of the veins are finely marked with blackish. The band on the outer margin gradually narrows as it nearly reaches the apex; before this band, from the inner margin, is a light brownish oblique wavy streak. Discal dot small, whitish. Hind wings ochre yellow with traces of a dark central band and a broad black outer border. Thorax and top of head sooty black; sides of head and thorax pale brownish gray. Abdomen dull ochre yellow, with a narrow black dorsal stripe, a black band along each side, broken by whitish spots on the edges of the segments. Underside of wings pale ochreous yellow, with a smoky brown outer border. Expanse, 2.50-3 inches=62-75 mm.

Larva.—Head pale green with a yellow line on each side, indistinctly edged above with black; mouth parts black; body green; the first three segments and the lower half of all the others covered with small white dots, each dot encircled with black; on each side are seven oblique stripes, white, with pinkish lilac above. Thoracic legs white with red tips; abdominal legs green with a faint purplish tinge; caudal horn rather short, green with a black stripe on each side; spiracles red. Length, 3.50 inches=87 mm.

Pupa.—Bright mahogany brown, with a short detached tongue-case. Length, 1.59 inches=37 mm; tongue-case, .125 inch=3 mm.

Food-plant.—Willow.

Very rare in this vicinity. It may be known by its brown color and ochre yellow hind wings.

Sphinx gordius Cramer.

PLATE V, FIG. 4.

Fore wings gray, more or less clouded with sooty brown; veins finely marked with black, with a few dashes of the same color between them and in the cell; outer border of wing sooty black, the band gradually narrowing as it reaches the apex. Discal spot white. In some individuals there are traces of a few

transverse dark bands, one across the basal fourth, one across the middle, and another a little beyond. Hind wings dirty white, with a central black band and a broad black outer border. Head and vertex of head sooty black, sides grayish. Abdomen grayish, with a black dorsal line; sides black and white in form of bands. Underside of fore wings smoky; hind wings marked as above, but paler. Expanse, 3-3.60 inches=75-90 mm.

Larva.—Bright apple green, with a yellow and brownish stripe on each side of the head; along the sides of the body are seven short, oblique stripes, which are white and margined above with carmine. Caudal horn black, green on top and beneath. Length, about 2.50 inches=62 mm.

Pupa.—Deep brown, with a very short detached tongue-case. Length, 1.40 inches=35 mm.

Food-plants.—Apple, Pear, Ash and Wax-Myrtle (*Myrica*).

This species is allied to *S. lucitiosa*, but may be separated by its gray color and differently marked hind wings, which are ochre yellow in *S. lucitiosa*. It is not common in this vicinity, and is double brooded. It ranges from Canada to Georgia, and westward to the Mississippi, and probably further westward.

Sphinx chersis (*Hübner*).

PLATE V, FIG. 5.

Fore wings light ashy gray with a small bunch of blackish scales at the base of the inner margin; between the veins, from beneath the cell to the apex, is a short black dash between each, the last one almost uniting with a short black apical streak; before the outer margin is a narrow transverse black and whitish line. Hind wings whitish with a black central band and a terminal band. Head and thorax light gray; patagia lined inwardly with black, and a tuft of the same color on each side of the posterior edge of the thorax. Abdomen gray, with a central black line; sides black and broken by white cross-stripes. Underside of wings gray with an ill-defined subterminal band on the fore wings and a pale dentate, median band on the hind wings. Expanse, 4-5 inches=100-125 mm.

Larva.—Pale apple green; dorsal region whitish, and with seven oblique yellow stripes along each side. Head with a yellow stripe on each side; caudal horn pale bluish; thoracic feet pink. Length, about 3 inches=75 mm.

Pupa.—Deep chestnut brown, with a short detached tongue-case. Length, 2.50 inches.

Food-plants.—Lilac, Privet and Ash.

Double brooded in this vicinity, appearing in May-June and again late in July. It may be known by its uniform gray color, very oblique outer margin and pointed apex. Found from Canada to Georgia, and westward to California.

***Sphinx canadensis* Boisd.**

PLATE VI, FIG. 1.

Fore wings light brownish gray, streaked with black between the veins, and a terminal black line edged with whitish and followed by another within. Hind wings pale grayish at the extreme base, followed by a broad median and a terminal band, leaving the space between them very narrow. Head and thorax grayish, the latter brownish gray, with the patagia edged inwardly with black. Abdomen gray black on each side, broken by white on the edges of the segments. Expanse, 3.25-3.60 inches=81-90 mm.

It is possible that this rare species may occur in this vicinity. It is found in Newfoundland, Canada, Maine, northern New York and Ohio. The early stages are unknown.

***Sphinx eremitus* Drury.**

PLATE VI, FIG. 2.

Fore wings brownish ash color, clouded with darker brown, with a rather heavy short black dash between each vein from beneath the cell to the apex. Discal spot white. From near the base, on the inner margin, are two short, parallel, oblique, black streaks and across the outer portion of the wing is an indistinct transverse, curved band. Hind wings with a black patch at the base and a broad median and terminal border of the same color; spaces between these and the basal spot dirty white. Head and thorax brownish ash, the latter with a black line through the middle of the patagia. Abdomen brownish ash, a median black line and the side alternately black and dirty white. Underside of fore wings grayish brown with faint indications of three transverse bands; hind wings dirty whitish, with the central and terminal band brownish. Expanse, 2.50-3.15 inches=63-79 mm.

Larva.—Head small, brown with a lateral white stripe. Abdominal segments reddish brown with many tan-colored or whitish ocellated spots. Second segment light brown above, olive at the sides; collar light brown outlined with black. The second segment is subtriangularly produced, with the apex rounded, pointing forward, and extending over the head when the larva is at rest; it is olive brown at sides with a velvety brown spot. Third and fourth segments also

olive brown with a velvety brown spot on top. Along the sides of the body are seven whitish oblique stripes, bordered with brown posteriorly. Caudal horn brown. Length, 2.25-2.75 inches=56-68 mm.

Pupa.—Chestnut brown; head-case subtriangular; tongue-case exerted, dark brown, nearly straight and slightly raised from the breast by its bulbous end. Length, 1.60 inches=65 mm.

Food-plants.—Spear Mint (*Mentha*), Wild Bergamot (*Monarda*), *Salvia*, etc.

Very rare in this vicinity. It may be recognized by its brown color and the black streaks on the fore wings. Double brooded. The larva may be known by the triangular protuberance on the second segment, differing in this respect from all our Sphinges.

Sphinx plebeius Fabr.

PLATE VI, FIG. 3.

Fore wings gray, streaked with black between the veins from the base of the inner margin, thence obliquely to the apex. Discal spot white. Across the outer fourth are traces of transverse lines, but they are very indistinct or absent; before the outer margin are some indistinct shadings of whitish. Hind wings smoky brown with traces of a lighter shade across the middle and base; fringes white, cut with smoky brown. Head and thorax gray, with a black line around the anterior portion and continued along the middle of the patagia. Abdomen gray, with a narrow black dorsal stripe and a broad black stripe along each side containing a row of grayish spots. Underside of wings fuscous. Expanse, 2.65-3 inches=66-75 mm.

Larva.—Body green, paler above, with seven oblique lateral stripes along each side, yellow, edged with black anteriorly. Caudal horn blue, with small black tubercles. Sometimes the larva is olive pink with numerous flesh-colored dots, with the oblique bands olive, and a shade of the same color along the subdorsum; sides of body olivaceous. Length, 2.60 inches=65 mm.

Pupa.—Chestnut brown, with the detached tongue-case very straight and closely applied to the breast; and at its base it is very slightly curved and reaches to about the middle of the wing-cases. Length, 1.40 inches=35 mm.

Food-plant.—Trumpet-vine (*Tecoma*).

This species is not rare in this vicinity; especially found in flower gardens about the trumpet-vines. It is double brooded, appearing in June and again latter in July and early in August. Found from Canada to Florida and westward to the Mississippi.

[September, 1895.]

Chlænogramma Smith.

Form robust ; head rather large with a small tuft between the antennæ ; eyes moderate, not lashed ; antennæ fusiform, minutely biciliate in the male, simple in the female, slightly curved at the tip ; thorax stout, somewhat produced before the base of the fore wings ; abdomen long, pointed, with a row of loose tufts along the back. Fore wings long, much longer than the body, and rather broad ; outer margin slightly rounded, oblique, and somewhat excavated above the hind angle. Hind wings rounded.

Chlænogramma jasminearum (Boisduval).

PLATE VI, FIG. 5.

Fore wings pale gray, finely mixed with brown and blackish scales ; across the basal third are two indistinct wavy lines, and three similar transverse lines beyond the middle, and beyond these is another line less distinct and interrupted ; from the basal line on the costa is a conspicuous blackish shade running obliquely to the middle of the outer margin ; discal spot small, whitish, with a yellowish brown blotch beyond ; fringes white and black. Hind wings brownish black with traces of a very indistinct paler central band. Head, thorax and abdomen gray ; thorax with a blackish transverse line in front extending through the middle of the patagia, hind part with two black spots and two spot-like bands along each side. Underside of wings uniform fuscous, with a slightly darker central band. Expanse, 3.20-4.25 inches=80-105 mm.

Larva.—Pale green, lighter dorsally ; body with six oblique lateral white stripes, and a seventh red stripe which extends to the green caudal horn ; thoracic feet pink ; spiracles white encircled with black. Length, 3 inches=75 mm.

Pupa.—Dark brown, with a very short cylindrical tongue-case, bulbous at the end, and applied to the breast. Length, about 2.50 inches=62 mm.

Food-plants.—Various species of Ash (*Fraxinus*).

This species may be easily known by its gray color and distinct oblique black shade across the fore wings. In this vicinity it is quite rare, and is probably double brooded. It is found from Canada to Georgia. The larva and pupa are imperfectly known.

Ceratomia Harris.

Head rather small, with a light tuft between the antennæ ; eyes small, not prominent ; antennæ biciliate in the male, simple in the female ; proboscis reaching the end of the thorax ; thorax short, somewhat advanced in front of the base of the fore wings ; abdomen untufted, tapering. Spurs of middle and

posterior tibiæ small. Fore tibiæ with short stout terminal spinules; anterior tarsi with three claw-like spines on the first joint and one on the second. Fore wings large, much longer than the body, outer margin oblique or slightly rounded. Hind wings with margins entire, and anal angle slightly produced; apex obtusely rounded.

Ceratomia amyntor (*Hübner*).

PLATE VI, FIG. 6.

Fore wings dark coffee brown; costal region and outer margin clay brown; outer portion of costa mixed with gray; along the middle portion of the wings between and parallel with the veins, below the median vein and beyond the cell, are several heavy black dashes; at the basal portion of the wings are traces of several wavy transverse lines; across the outer fourth are several angulated and wavy transverse lines, curved outwardly. Discal spot distinct, whitish. Hind wings clay brown, with a central and subterminal ill-defined band. Head above, collar and front part of thorax whitish; patagia coffee brown with black lines; central portion of thorax clay brown; abdomen clay brown, with a black dorsal stripe and two lateral stripes. Underside of wings brown with grayish scales, fore wings with traces of the outer transverse lines from above repeated; hind wings with a double transverse zig-zag line. Fringes above and below brown, interrupted with whitish spots. Expanse, 3-4.25 inches=75-106 mm.

Larva.—Pale green, sometimes reddish brown; head and body strongly granulated, with a dorsal row of short fleshy teeth, tipped with white or pink, these teeth extending from the fourth segment to the caudal horn; on each of the third and fourth segments is a pair of short, straight tubercles, covered with short spines; along the sides are seven oblique whitish stripes composed of granulations. Caudal horn green, thickly covered with short spines. Length, 2.75-3.25 inches=68-81 mm.

Pupa.—Chestnut brown; head small, rounded, slightly depressed; eye-cases margined inferiorly by an impressed line; tongue-case buried; antennæ-cases granulated; first and second segments with a slightly elevated median line. Abdominal segments punctulate, wrinkled posteriorly; terminal spine rugose, pointed, minutely bifid. Length, 1.50-2 inches=37-50 mm.

Food-plants.—Various species of Elm, Linden and White Birch.

Rather common in this vicinity in June and July. It may be readily known by its coffee brown and clay brown colors and by the black dashes on the fore wings. The larva may be known by the two fleshy horns on each of the third and fourth segments. Its favorite food is elm. The insect is found from Canada to Virginia, westward to Missouri and Iowa.

Ceratomia undulosa (*Walker*).

PLATE VI, FIG. 7.

Fore wings gray mixed with light brownish scales ; across the basal portion are three angulated transverse black lines, furthest apart on the costa and coming closer together as they reach the inner margin ; these lines are more or less distinct ; from the middle to the outer fourth are four transverse curved lines, the middle two are toothed and the space between them is gray ; from below and beyond the cell, between the veins, are three black dashes and a wavy apical streak ; discal spot white narrowly bordered with black ; fringes alternately brown and white. Hind wings grayish brown, with three ill-defined blackish bands. Head grayish, thorax gray mixed with yellow ; through the middle of the patagia is a black line connected with the one across the anterior portion of the thorax ; across the hind part of the thorax is also a black line edged with yellow and white ; abdomen grayish brown with a black dorsal line and two rows of large black spots along each side. Wings beneath almost uniform grayish brown, hind wings somewhat paler, both wings with two transverse bands ; fringes same as above. Expanse, 2.80-4.60 inches=70-115 mm.

Larva.—Pale green, smooth ; on each side of the body are seven oblique yellowish white stripes ; spiracles pink ; caudal horn pink ; head green with a whitish band on each side. Length, 3 inches=75 mm.

Pupa.—Dark brown ; head-case rugose, rounded, somewhat prominent, and a little compressed laterally ; eye-cases rough, slightly prominent, with a crescent-shaped mark before the middle ; tongue-case concealed ; thorax shagreened ; wing-cases very slightly wrinkled ; abdominal segment deeply punctured, smooth on the junctions ; anal spine short, rugose, pointed. Length, about 1.75 inches=43 mm.

Food-plants.—Lilac, Ash and Privet (*Ligustrum*).

Rather common and double brooded in this vicinity, the first brood appearing in June and the second in August. The ground color of the insect varies somewhat from light to dark gray, and the lines are more or less heavily marked. It is found from Canada to Carolina, and westward to Iowa.

Dolba *Walker*.

Head rather small, roughly scaled, inclining to form a tuft between the antennæ ; palpi roughly scaled ; proboscis longer than the body ; eyes moderate, lashed ; antennæ minutely biciliate in the male, simple in the female, hooked at the end ; thorax stout, as broad as long. Tibiæ not spinulose, middle with one

pair, posterior with two pairs of unequal spurs. Fore wings as long as the body, rather broad; outer margin entire, very slightly excavated above the hind angle. Hind wings broad, apex well rounded, entire, and slightly excavated before the anal angle.

Dolba hylæus (*Drury*).

PLATE VI, FIG. 4.

Fore wings dark rusty brown with three transverse black lines across the basal third, the inner two diffused with white; across the outer fourth are four dentate black lines, the outer ones with more or less white between them; terminal space shaded with white, forming no definite pattern. Discal spot small, white. Fringes rusty brown, cut with white. Hind wings smoky brown with two parallel whitish lines across the middle. Fringes white, cut with brown. Head and thorax rusty brown, the latter white at the extreme sides, with black and white on top. Abdomen rusty brown, a dusky broken central line, and a row of small white dots on each side; laterally the abdomen is black and broken with white on the edges of the segments. Underside of wings smoky brown, with traces of transverse lines across the outer fourth of the fore wings. Hind wings whitish and crossed by several dentate lines, followed by whitish shades. Expanse, 2.20-2.60 inches=50-65 mm.

Larva.—Pea green, with seven oblique lateral whitish bands edged above with pink; caudal horn purple, and a pale blue stripe on each side of the head. Length, 2.33 inches=58 mm.

Pupa.—Chestnut brown; tongue-case concealed, straight and closely applied to the breast. Length, 1.60 inches=40 mm.; tongue-case, .50 inch=12 mm.

Food-plant.—Ink-berry (*Ilex glabra*).

Not common in this vicinity. It may be easily known by its small size and rusty brown color, with the transverse black lines and white shades. In general appearance it resembles a miniature *Phlegthontius rusticus*. It is found from Canada to Florida, and westward to Iowa.

Lapara Walker.

Head small, retracted, the scales forming a tuft or ridge between the antennæ; palpi short, slender, porrect not pointed upwards, and much shorter in the female than in the male; eyes of medium size, slightly lashed; proboscis very short; antennæ biciliate in the male, simple in the female, tip slightly bent; thorax scarcely advanced in front of the wings, short, stout; abdomen untufted. Fore wings entire, with outer margin obliquely rounded. Hind wings with apex rounded, outer margin with hind angle somewhat produced.

Lapara coniferarum (A. & S.).

PLATE VII, FIG. 1.

Fore wings leaden gray, with a darker, dentate line across the outer fourth, from the costa to the inner margin; between the veins beneath the cell are two blackish dashes, the lower one being the shortest. Hind wings grayish brown. Head and thorax leaden gray; abdomen brownish gray. Underside of wings uniform brownish gray. Expanse, 2-2.50 inches=50-62 mm.

Larva.—Yellowish green with three longitudinal, equidistant, white stripes along each side. Head conical, flattened in front, yellowish green with a black line along each side, uniting on the summit. Stigmatal spaces marked with red. Caudal horn wanting. Sometimes the larva is checkered with light and dark-gray squares. Length, 2.25-3 inches=56-75 mm.

Pupa.—Cylindrical, pitchy black. Head, thorax, and anterior margin of wing-covers rugosely punctate, as are also the fore margins of the segments. The four posterior segments are rugosely punctate nearly over their entire surface. Anal spine pointed. Tongue-case concealed. Length, 32 mm.

Food-plants.—Various species of Pines.

This species is somewhat variable. The fore wings are sometimes almost uniformly leaden gray without the two dark dashes, or have only one dash. The insect is quite rare in this neighborhood. Found from Canada to Florida.

Lapara bombycoides var. *harrisii* (Clem.).

PLATE VII, FIG. 2.

Fore wings gray, with a pair of dentate lines across the outer fourth from the costa to the inner margin, with the space between light gray, as is also the outer portion of the wings; before the middle and across the basal fifth are two transverse lines, angulated outwardly above the middle; beneath the cell are two conspicuous black dashes. The spaces between the lines are more or less shaded with light gray. Hind wings uniform brownish gray; also the head, thorax, abdomen and tip of the patagia are light gray. Underside of wings uniform gray or brown, sometimes with a dark line across each. Expanse, 2-2.25 inches=50-56 mm.

Larva.—The ornamentation consists of alternate green and white longitudinal stripes. Dorsal stripe green, spotted with red. Head red in front, with a white or pinkish white border. Collar and legs green; prolegs and last segment bordered with red. Caudal horn absent. Length, 2-2.50 inches=50-62 mm.

Pupa.—Chestnut brown, with a rough, not produced head-case. Tongue-case buried. Posterior segment tapering. Terminal spine black, contracted at base, minutely bifid at tip. Length, 1-1.10 inches=25-27 mm.

Food-plants.—Various species of Pines.

Rare in this neighborhood, and is probably double brooded. Found from Canada to Florida, and westward to the Mississippi. It may be recognized by its small size, gray color, and transverse, dentate and angulated lines.

Synopsis of Species of Sphinginae.

Dilophonota.

Thorax anteriorly with a short crest divided in the middle; eyes large.
Fore wings light gray or streaked with fuscous; hind wings rust red with black outer border. *D. ello.*

Phlegethontius.

Thorax not crested; head and eyes very large; abdomen with yellow or pink spots along each side.
Fore wings light ashen and dark gray, with black lines and streaks; hind wings with two central dentate lines,
P. quinquemaculatus.
Fore wings dark brownish gray, markings similar to *quinquemaculatus*; hind wings with central lines not dentate, *P. carolina.*
Fore wings dark gray, lines and streaks black; hind wings at base and spots on abdomen pink. *P. cingulatus.*
Fore wings sooty or rust brown, with black transverse lines and shaded with white. *P. rusticus.*

Sphinx.

Head moderate, eyes small; abdomen black at sides, with spots.
Thorax dark smoky brown, pale grayish at sides.
Fore wings smoky black; costal region whitish. *S. drupiferarum.*
Fore wings entirely sooty black marked with gray, costal region concolorous. Discal spot white *S. gordius.*
Fore wings rust brown; discal spot wanting; hind wings ochre yellow, outer border black *S. lucitiosa.*
Thorax chestnut brown, sides grayish.
Fore wings light and dark chestnut brown, in form of streaks, *S. kalmia.*
Thorax dark grayish, sides whitish; patagia with a black line inwardly.
Fore wings gray, with black dashes between the veins. *S. canadensis.*
Thorax entirely gray; patagia with a black line inwardly.
Fore wings light gray with black dashes. *S. chersis.*
Thorax ashen brown with black through the patagia; sides pale.
Fore wings ashen brown with black dashes. *S. eremitus.*
Thorax ashen gray, white at sides; patagia with a broad black line through the middle.
Fore wings gray with black streaks; discal spot white; hind wings black. *S. plebeius.*

Dolba.

Small species: Head roughly scaled, with a tuft between the antennae.
Fore wings sooty brown or rust brown, with transverse dentate black lines, shaded with white. *D. hyleus.*

Chlænogramma.

Large species : Eyes large ; abdomen with bunches of raised scales along the dorsum ; legs not spinose.

Fore wings gray mixed with brown, and a black shade from the middle of the costa to the middle of the outer margin,

C. jasminearum.

Ceratomia.

Large species : Eyes small ; abdomen without dorsal tufts ; legs spinose.

Fore wings coffee brown, paler along costal and outer region, and with black streaks between the veins. *C. amyntor.*

Fore wings gray, with transverse black lines. *C. undulosa.*

Lapara.

Small species : Head small, retracted ; palpi very small, not ascending.

Fore wings leaden gray, with a transverse black line beyond the middle, sometimes with two short black dashes beneath the cells. *L. coniferarum.*

Fore wings gray scaled with white ; two angulated transverse lines before the middle, and two dentate ones beyond, *L. bombycoides* var. *harrisii.*

Subfamily SMERINTHINÆ.

Amorpha Hübner.

Large species ; head small, sunken, with a small median crest ; palpi very small, rudimentary ; antennæ strongly biciliate in the male, simple in the female. Thorax stout, not tufted ; abdomen plump, last segment blunt. Middle and hind tibæ with a single pair of short terminal spines ; anterior with a stout curved spine at the inner side of the tip. Tarsi finely spinose. Fore wings broad, much longer than the body, with the outer border regularly scolloped. Hind wings also scolloped.

Amorpha modesta (Harris).

PLATE VII, FIG. 7.

Fore wings light mouse gray at the base ; across the middle is a very broad olive gray band ; outer portion of wings olivaceous with lighter transverse shades. Hind wings gray, shaded more or less with claret red through the middle, and at the anal angle a bluish gray patch. Head, thorax and abdomen mouse gray, with a bluish tint. The wings have also a decided bluish reflection. Underside of wings olive gray with pale gray transverse shade ; fore wings more or less claret red towards the base ; sometimes the wings are almost uniform gray. Expanse, 3.50-5.50 inches=88-138 mm.

Larva.—Light green coarsely granulated with white points ; along each side with seven oblique yellow bands, and on each side a yellow subdorsal line ; caudal horn rudimentary ; prolegs red ; spiracles brown ; head green, triangular, granulated. Length, 3 inches=75 mm.

Pupa.—Robust, blackish brown, shagreened, terminal spine short, blunt and flattened horizontally; tongue-case concealed. Length, 1.80-2 inches=45-50 mm.

Food-plants.—Willow and Poplar.

Rather scarce in this vicinity, but more common in the Northern and Western States. It is found from the Atlantic to the Pacific. It varies in depth of the ground color from light to dark, and in the distinctness of the transverse markings. In the Western States the prevailing form of this species is quite pale, and has been named *occidentalis*. In this neighborhood it is found during the latter part of July and August, and is probably double brooded.

Smerinthus Latreille.

Head small, sunken, tufted between the antennæ; palpi short, not closely applied to the head; tongue rudimentary; eyes small; antennæ rather strongly pectinate in the male, simple in the female; thorax stout; abdomen more or less tufted at the sides. Fore wings more or less excavated outwardly or scoloped; anal angle produced; inner margin excavated; hind wings rounded, costa straight or excavated; anal angle more or less produced.

Smerinthus geminatus Say.

PLATE VII, FIG. 4.

Fore wings ashen gray, or brown with a rosy tinge; across the basal third is an angulated deep brown line, the angle being a little below the middle and pointing outwardly; across the wings are also a number of transverse wavy lines, usually more or less distinct but sometimes quite confluent with the ground color; from the angle of the basal line a velvety brown dash runs outwardly to the transverse roseate or gray line, sometimes filling the lower half of this interspace. The terminal space is light or dark brown, forming a distinct apical lunule. Hind wings rosy red, with buff colored outer borders, which are rarely pink, and a large black spot near the anal angle containing one or two small blue spots. Head and thorax ashen gray or ashen brown, the latter with a deep brown patch occupying the entire space between the patagia. Underside of fore wings rosy red at base, outer half brown with wavy transverse lines; hind wings brown and grayish, powdery, with transverse curved lines. Expanse, 1.80-2.75 inches=45-65 inches.

Larva.—Body green, paler dorsally, with numerous granulations; along each side are seven oblique bands of a pale yellow color except the last, which is bright yellow; on the anterior segments is also a stripe on the subdorsum;

head triangular, green, granulated, with an oblique yellow stripe on each side, meeting at the apex. Caudal horn bluish, granulated; thoracic feet green; spiracles red. Length, 2-2.60 inches=50-56 mm.

Pupa.—Very similar to that of *S. excæcatus*, but smaller.

Food-plants.—Cherry, wild and cultivated, Plum, Apple, Elm, Oak, Hazel, Hornbeam (*Carpinus*), Ironwood (*Ostrya*), Birch, Willow, Poplar, Ash, etc.

Rather common in this vicinity. It is double brooded, the first brood appearing in June and July, and the second in August. The moth is subject to considerable variation from light to dark shades on the fore wings. It also varies in the form of the ocellus of the secondaries. It is found from Canada to Virginia, and westward to Iowa.

Smerinthus excæcatus (A. & S.).

PLATE VII, FIG. 4.

Fore wings fawn color, with a pinkish tinge and darker shades and markings; the basal third is fawn color with one or two more or less distinct wavy brown lines; beyond this is an oblique dark brown shade running from the costa at the basal fourth to the hind margin near the angle, where it is broken by two or three small black spots. Across the outer fourth are three sinuous lines of the same color as the base of the wing, and in which are two narrow darker lines; outer part of wings dark with a narrow, wavy, light band or shade. Hind wings rose red with a large black spot containing a blue centre. Underside of fore wings rose color, outer portion partly ochreous, with pinkish broken lines. Hind wings ochraceous with pink transverse lines. Head and thorax fawn color, the latter rich velvety brown along the middle; abdomen ochreous above, pinkish fawn color at sides. Expanse, 2-3.80 inches=50-95 mm.

Larva.—Body granulated, apple green, paler above, with oblique, yellow lateral bands and a yellow subdorsal stripe broken by the bands. Head triangular, green with a yellow stripe on each side uniting at the apex, granulated; caudal horn green; thoracic feet reddish brown, bases yellow. Sometimes the body is more or less marked and spotted with red. Length, 2.20 inches=55 mm.

Pupa.—Dark brown; head-case rounded, corrugated; wing-cases smooth; thorax and segments punctured; terminal spine corrugated, and sharply pointed; tongue-case concealed. Length, 1.20-1.80 inches=30-40 mm.

Food-plants.—Wistaria, Cherry, wild and cultivated, Plum, Apple, Pear, Raspberry, Rose, *Spiræa*, Elm, Oak, Hazel, Hornbeam (*Carpinus*), Ironwood (*Ostrya*), Birch, Willow, Poplar, Ash, etc.

Common in this neighborhood, and is double brooded, appearing in June and July and again in August. The moth is very variable in color; sometimes the males are very much darker with an olivaceous shade, tinged with purplish. It is found throughout the eastern United States and Canada. It may be easily recognized by having the outer edge of the fore wings regularly scalloped, and by the rose-colored hind wings with the eye-like spot.

Smerinthus myops (*A. & S.*)

PLATE VII, FIG. 5.

Fore wings rich brown with a lilac wavy line across the basal third and several across the outer fourth; on the costa before the apex is a small yellow patch, and another before the anal angle; sometimes these two patches almost run across the wing in shape of a band between the lilac lines. Head, thorax and abdomen light or dark brown, thorax yellowish along the middle. Hind wings yellow bordered with brown along the costa and outer border; in the yellow area is a large black spot with a blue centre. Underside of wings yellow, more or less marked with brown, and with the lilac outer lines of the fore wings partly repeated; across the hind wings are two or three wavy, lilac lines. Expanse, 2-2.50 inches=50-62 mm.

Larva.—Green, not granulated, with seven yellow oblique lateral bands, and one on each side of the head; along each side of the back a row of red spots and another row near the spiracles; caudal horn green. Length, 2 inches=50 mm.

Pupa.—Same shape as that of *S. excæcatus*, but smaller and less stout. Length, 1.20 inches=30 mm.

Food-plants.—Wild and cultivated Cherry.

Rare in this neighborhood; found during June and July. It is probably double brooded. The moth may be easily known by the deep brown upper wings and yellow hind wings with the black eye-like spot. The larva very much resembles that of *S. excæcatus*, but is smooth instead of granulated. It is found from Canada to Florida, and west to the Mississippi.

Smerinthus astylus (*Drury*).

PLATE VII, FIG. 6.

Fore wings ochraceous brown with lighter and darker shades ; across the wings, from near the base to the inner margin near the angle, is a dark oblique line ; along the inner margin, beyond the base, runs a black shade terminating on a yellowish brown spot before the hind angle ; across the terminal space is a lilac line ; on the costa before the apex is a subtriangular orange ochreous patch from which runs a darker shade, losing itself in the ground color about the middle of the wing ; before the costal patch are two short lilac lines. Hind wings paler than the fore wings, containing a round black spot with a bluish centre. Head and thorax with a lilac tinge, the latter ochreous brown along the middle ; abdomen lilaceous with a yellowish ochreous shade along each side of the back, and a darker dorsal line more or less distinct. Underside of wings ochreous, outer portion darker ; on the fore wings the lilac lines from above are repeated, as are also the orange ochraceous patches, the one near the hind angle much the larger ; hind wings with two transverse lilac lines across the middle followed by a bright orange ochraceous band, terminal space dark. Expanse, 2-2.50 inches=50-62 mm.

Larva.—Yellowish green ; yellowish along the dorsal region ; head broadly marked with pink on each side, this color uniting at the apex ; on the first to the end of the second segment is a pink subdorsal stripe ; on each side of the body are seven oblique, broad yellow bands, which are broadly marked anteriorly with pink on the dorsal region ; spiracles in a pink patch ; thoracic feet pink ; abdominal and anal legs pinkish outside ; caudal horn pinkish at base, tip yellow and minutely forked ; head and body covered with small white granulations. Length, 2 inches=50 mm.

Food-plants.—Various species of Huckleberry and Rosaceæ.

This rare species may be distinguished from its congeners by its plain color and markings. The life history is imperfectly known. It is found from Canada to Pennsylvania, and probably also southward and westward.

Cressonia *G. & R.*

Head small, sunken, with a ridge in front ; palpi in the male long and exceeding the vertex, not closely applied to the head, separated and divaricate at the tip ; in the female the palpi are much shorter ; tongue rudimentary ; antennæ of male strongly bipectinate, simple in the female ; thorax short and stout, slightly crested along the middle ; abdomen of male tapering, with tufts

along each side in form of dentations, hardly visible in the female. Fore wings as long as the body in the male, longer in the female, broad, outer margin dentate, inner margin sinuate. Hind wings rounded, dentate outwardly.

Cressonia juglandis (*A. & S.*).

PLATE VII, FIG. 8.

Fore wings pale fawn color, sometimes with a pinkish tint, or sometimes with light or dark brown shades between the transverse markings and outer portion of the wings; across the basal fourth is a narrow brown line, and another across the basal third; across the outer fourth are also two parallel transverse lines, curved at the costa and running to the hind margin, the inner line ending near the middle of the wing; before the inner line is sometimes a transverse shade in form of a line. Hind wings with two or three lines across the middle. Head, thorax and abdomen pale fawn color, thorax light or dark brown along the middle. Undersides light or dark ochraceous with the outer transverse line from above on the fore wings repeated; hind wings with lines same as above. Expanse, 2-3.20 inches=50-80 mm.

Larva.—Green or brown; head triangular, apex quite pointed and bifid, much more so than in the larvæ of *Smerinthus*, with white granulations; body elongated, tapering gradually from the seventh segment to the extremity, granulated with white; along each side are seven light green or whitish oblique bands, composed of granules; caudal horn brownish, covered with black spinules. Sometimes the body is spotted with pink. Length, 2.50 inches=63 mm.

Pupa.—Dark brown, almost black, rough, covered with short points; head-case with four projections and also one on each eye-case; antennæ-cases with a row of short pointed spines; tongue-case buried; last segments very much flattened beneath and compressed laterally; anal segment with a flat, truncate projection; last few segments encircled with rows of short spines. Length, 1.20-1.50 inches=30-43 mm.

Food-plants.—Hickory, Walnut and Ironwood (*Ostryia*).

Not rare, and double brooded in this vicinity. The first brood appears in June and the second in August. The species is subject to considerable variation; some specimens are uniformly pale fawn color or ochraceous, with the transverse lines distinct, while other examples are more or less covered with dark brown so as to almost obscure the ground color and transverse lines. It is found from Canada to Florida, westward to the Mississippi and Texas. The larva may be known by its triangular head with the apex pointed and bifid.

Synopsis of Species of Smerinthinae.

Amorpha.

Large species : Outer margin of fore wings regularly scolloped ; abdomen obtuse at apex.

Fore wings pale gray, with a very broad olive gray median band ; hind wings shaded with claret red... .. *A. modesta.*

Smerinthus.

Head small, sunken, tufted between the antennæ ; fore wings scolloped or more or less excavated. Hind wings with an eye-like spot.

Fore wings scolloped, fawn color with darker shades ; hind wings pink *S. excæcatus.*

Fore wings excavate ; gray with dark brown markings ; hind wings pink in the middle..... *S. geminatus.*

Fore wings less excavate than in *geminatus*, dark chocolate brown ; hind wings yellow centrally..... *S. myops.*

Fore wings with outer margin almost entirely straight ; color almost uniform ochre brown *S. astylus.*

Cressonia.

Wings broad, outer margin dentate ; palpi of male long, ascending, and divaricate at tip ; very short in the female ; hind wings without eye-like spots.

Pale fawn color, sometimes shaded more or less with dark brown, with narrow transverse lines..... *C. juglandis.*

EXPLANATION OF PLATES.

PLATE II.

- Fig. 1.—*Hemaris thysbe* (Fabr.).
 Fig. 2.— “ “ var. *uniformis* (G. & R.).
 Fig. 3.— “ *gracilis* (G. & R.).
 Fig. 4.— “ *diffinis* (Bdv.).
 Fig. 5.—*Amphion nesus* (Cramer).
 Fig. 6.—*Sphecodina abbotii* (Swains.).
 Fig. 7.—*Deidamia inscripta* (Harris).
 Fig. 8.—*Everyx chærilus* (Cramer).
 Fig. 9.— “ *myron* (Cramer).
 Fig. 10.— “ *versicolor* (Harris).

PLATE III.

- Fig. 1.—*Aëlopos fadus* (Cramer).
 Fig. 2.—*Deilephila lineata* (Fabr.).
 Fig. 3.— “ *galii* (Rott.).
 Fig. 4.—*Theretra tersa* (Linn.).
 Fig. 5.—*Pholus pandorus* (Hüb.).
 Fig. 6.— “ *achemon* (Dru.).
 Fig. 7.— “ *vitis* (Linn.).

PLATE IV.

- Fig. 1.—*Dilophonota ello* (Linn.). Male.
 Fig. 2.— “ “ “ Female.
 Fig. 3.—*Phlegethontius quinquemaculatus* (Haw.).
 Fig. 4.— “ *carolina* (Linn.).
 Fig. 5.— “ *cingulatus* (Fabr.).
 Fig. 6.— “ *rusticus* (Fabr.).

PLATE V.

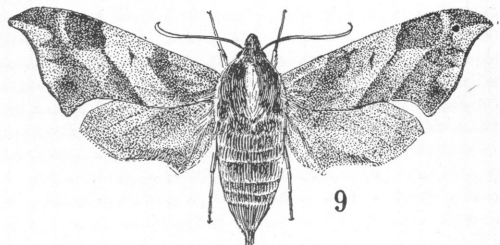
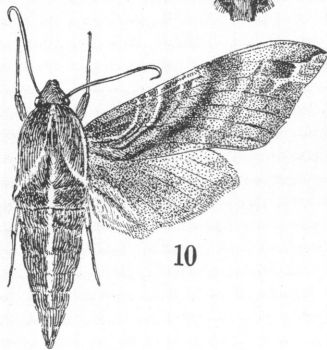
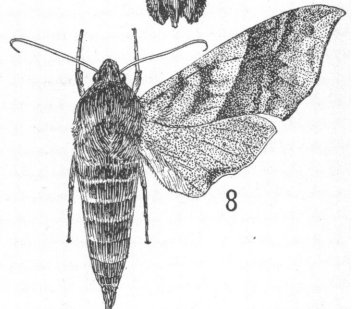
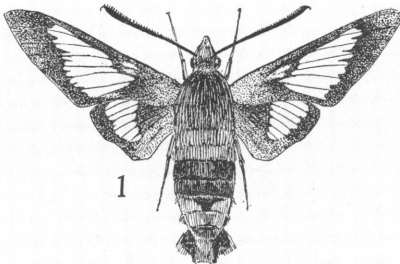
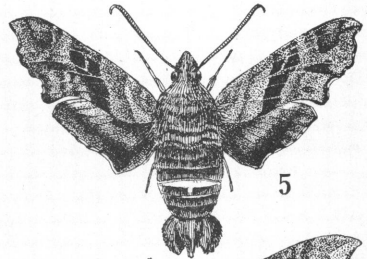
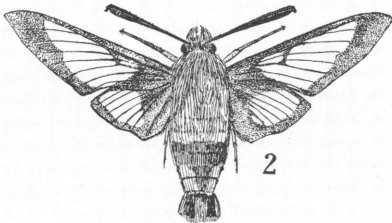
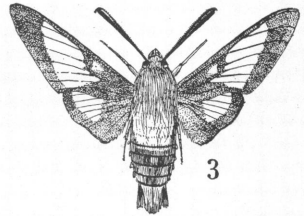
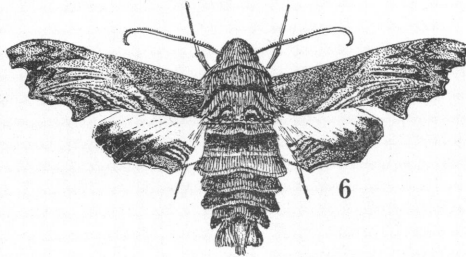
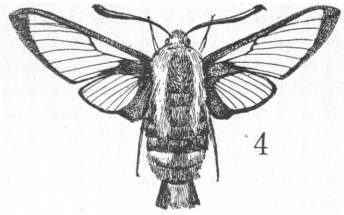
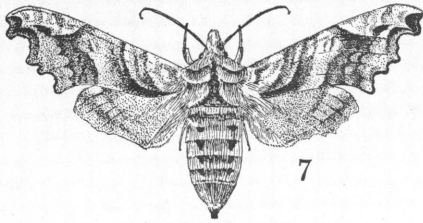
- Fig. 1.—*Sphinx drupiferarum* A. & S.
 Fig. 2.— “ *kalmie* A. & S.
 Fig. 3.— “ *lucitiosa* Cramer.
 Fig. 4.— “ *gordius* Cramer.
 Fig. 5.— “ *chersis* Hübn.
 Fig. 6.—*Arges labruscæ* (Linn.).

PLATE VI.

- Fig. 1.—*Sphinx canadensis* Bdv.
 Fig. 2— “ *eremitus* (Hüb.).
 Fig. 3— “ *plebeius* Fabr.
 Fig. 4.—*Dolba hylæus* (Dru.).
 Fig. 5.—*Chlænogramma jasminearum* (Bdv.).
 Fig. 6.—*Ceratonia amyntor* (Hüb.).
 Fig. 7.— “ *undulosa* (Walker).

PLATE VII.

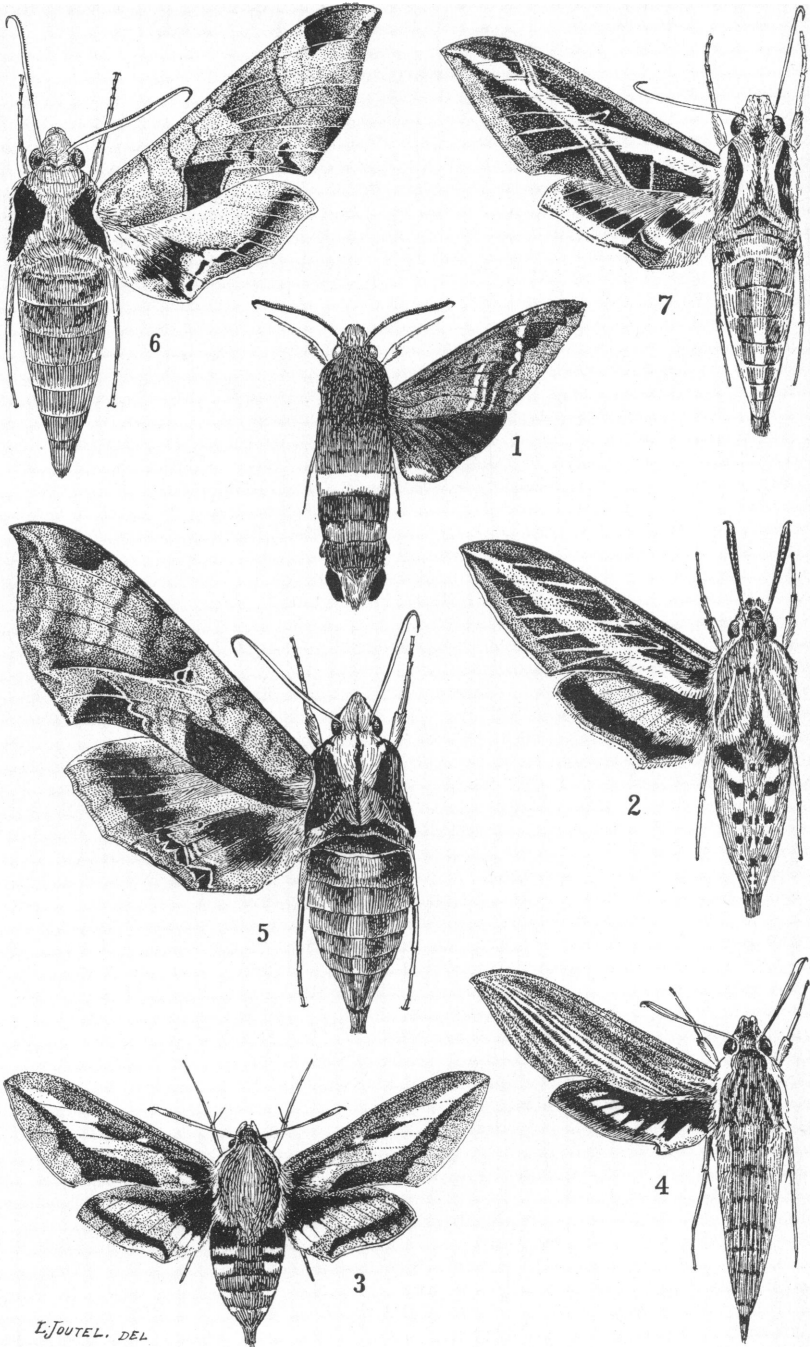
- Fig. 1.—*Lapara coniferarum* (A. & S.).
 Fig. 2.— “ *bombycoides*, var. *harrisii* (Clem.).
 Fig. 3.—*Smerinthus geminatus* Say.
 Fig. 4.— “ *excæcatus* (A. & S.).
 Fig. 5.— “ *myops* (A. & S.).
 Fig. 6.— “ *astylus* (Dru.).
 Fig. 7.—*Amorpha modesta* (Harris).
 Fig. 8.—*Cressonia juglandis* G. & R.



L. JOUTEL DEL.

1. *Hemaris thysbe* (Fabr.).
2. " " var *uniformis* (G. & R.).
3. " *gracilis* (G. & R.).
4. " *diffinis* (Bdr.).
5. *Amphion nessus* (Cram.).

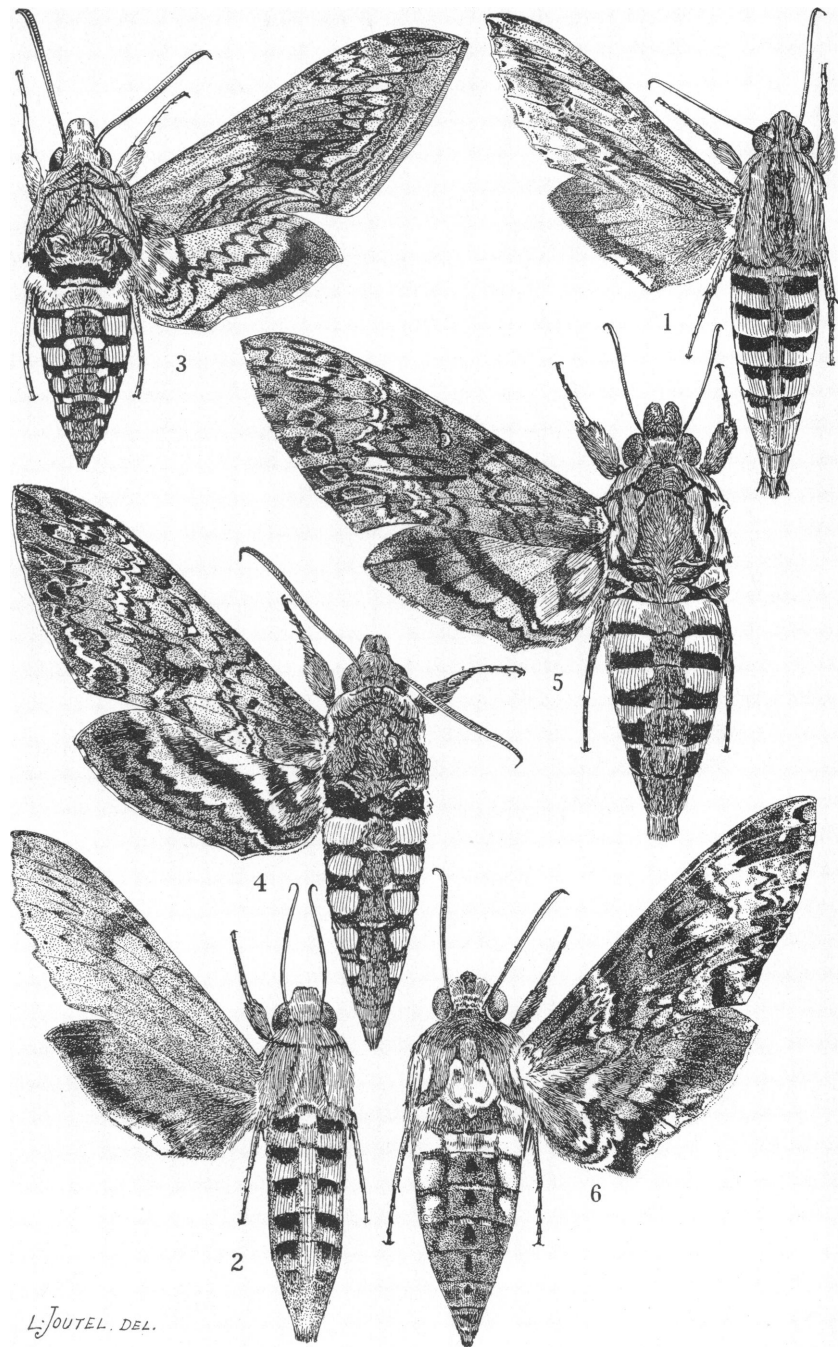
6. *Sphecodina abbottii* (Swain.).
7. *Deidamia inscripta* (Harris).
8. *Everyx chœrilus* (Cramer).
9. " *myron* (Cramer).
10. " *versicolor* (Harris).



L. JOUTEL. DEL

- 1. *Aellopos fadus* (Cramer).
- 2. *Deilephila lineata* (Fabr.).
- 3. " *galli* var. *INTERMEDIA* (K'by.).
- 4. *Theretra tersa* (Linn.).

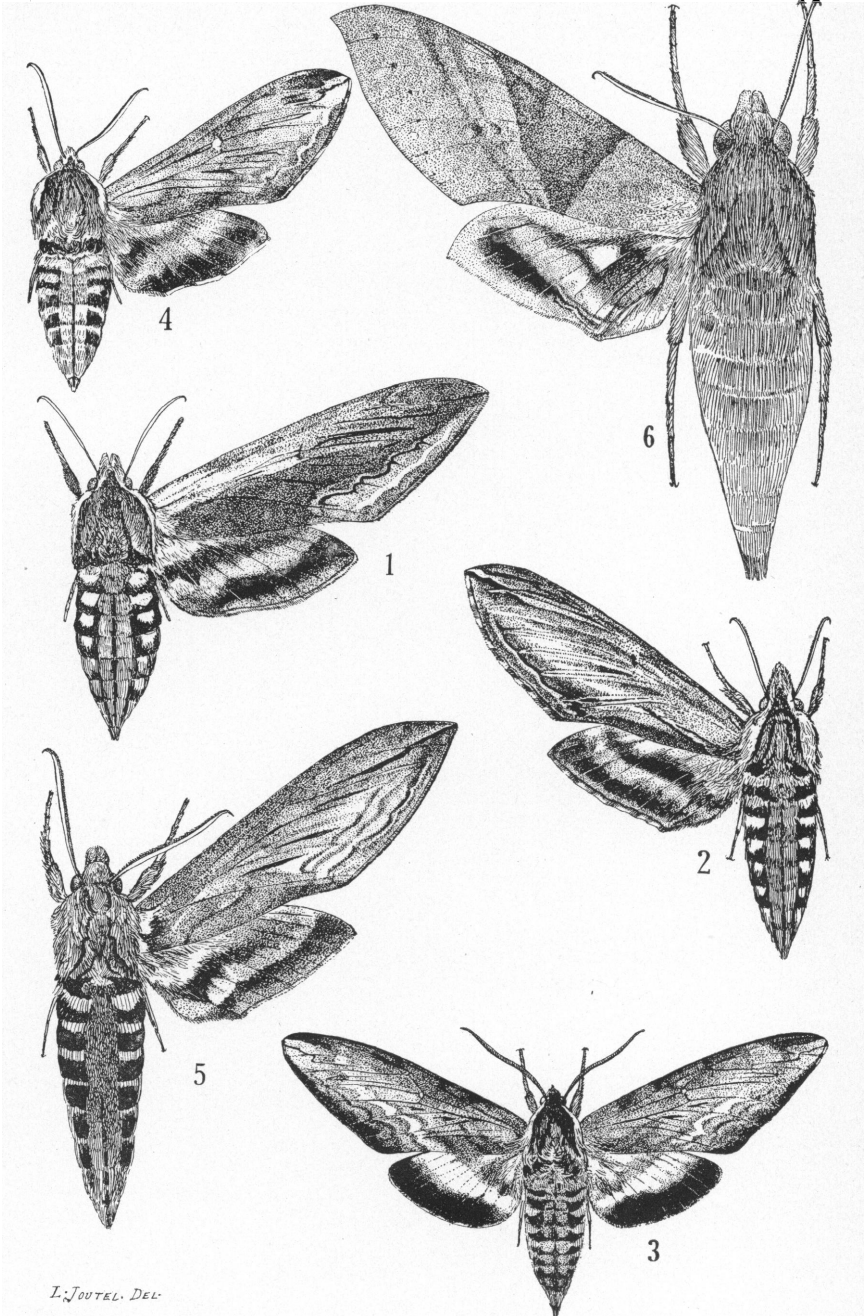
- 5. *Pholus pandorus* (Hüb.).
- 6. " *achemon* (Dru.).
- 7. " *vitis* (Linn.).



L. JOUTEL. DEL.

- 1. *Dilophonota ello* (Linn.).
- 2. " " (female).
- 3. *Phlegethontius quinquemaculatus* (Haw.).

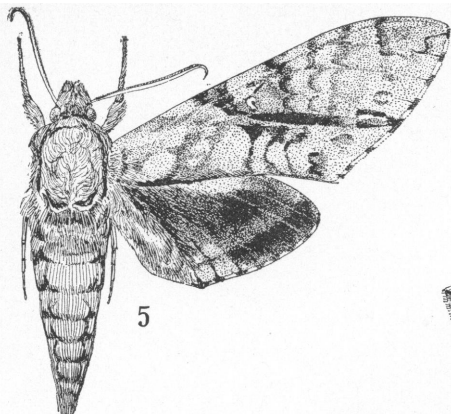
- 4. *Phlegethontius carolina* (Linn.).
- 5. " *cingulatus* (Fabr.).
- 6. " *rusticus* (Fabr.).



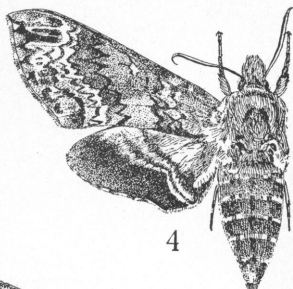
L. JOUTEL. DEL.

- 1. *Sphinx drupiferarum* (A. & S.).
- 2. " *kalmiae* (A. & S.).
- 3. " *lucitiosa* (Cramer).

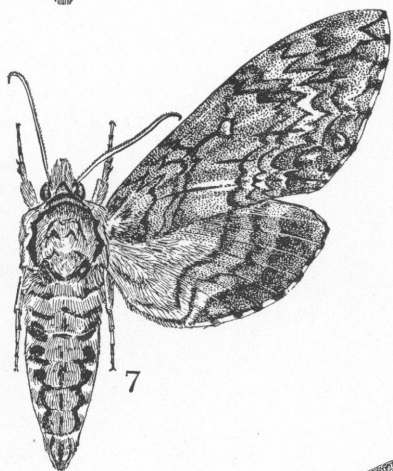
- 4. *Sphinx gordius* (Cramer).
- 5. " *chersis* (Hüb.).
- 6. *Argeus labruscæ* (Linn.).



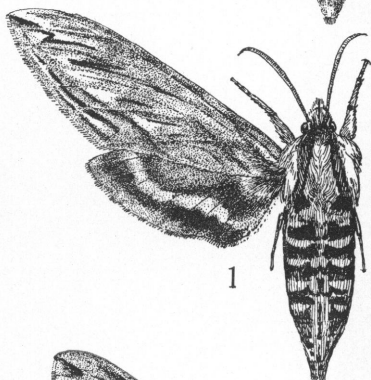
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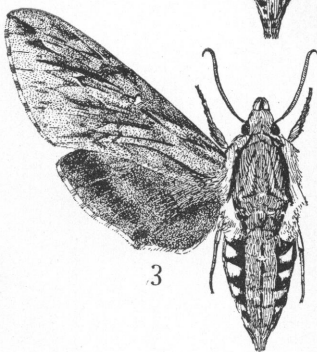
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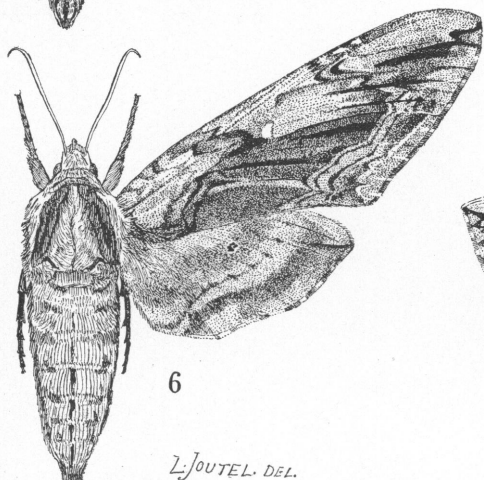
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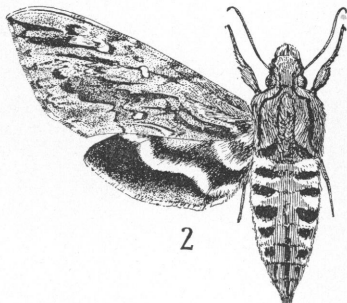
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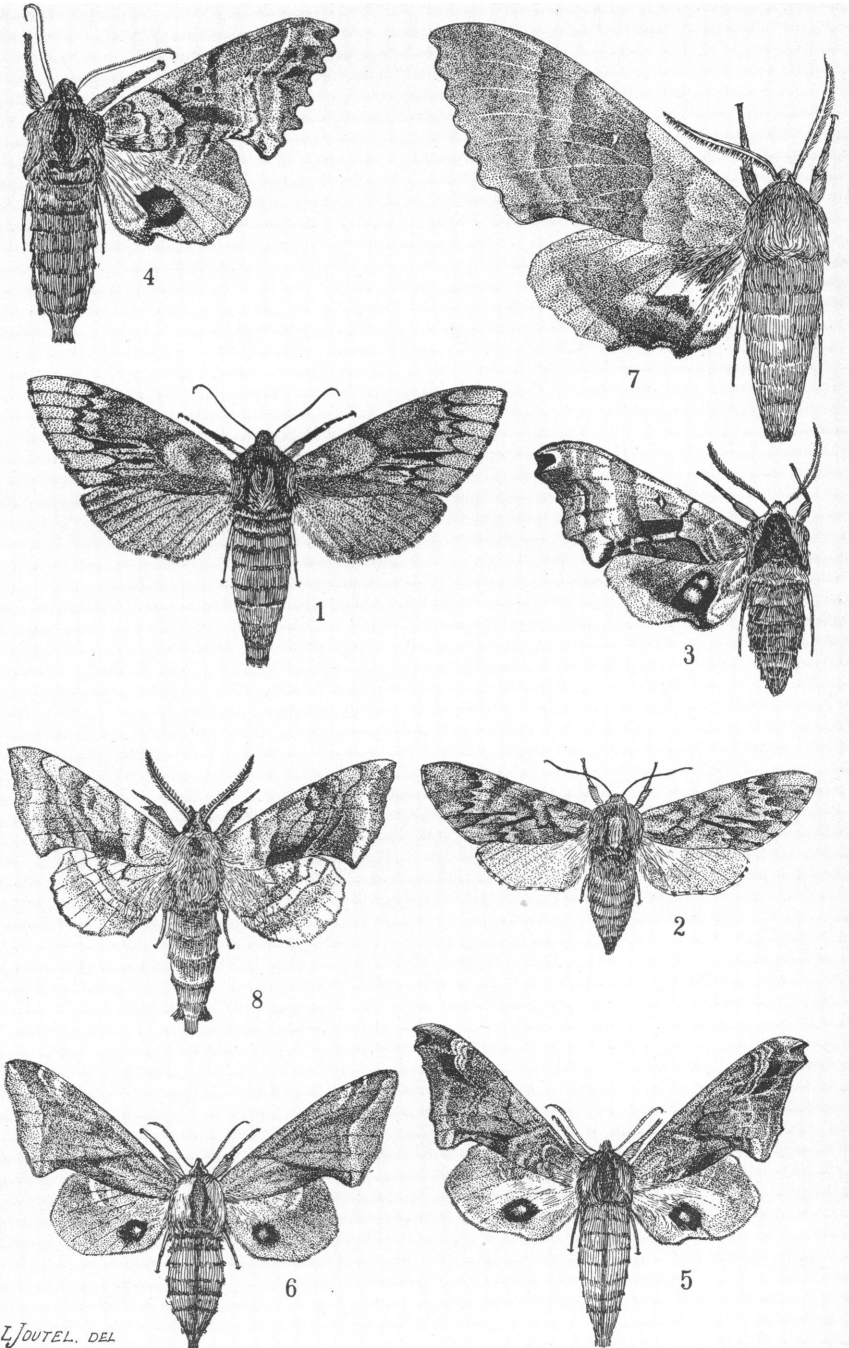


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L. JOUTEL. DEL.

- 1. *Sphinx canadensis* (Bdv.).
- 2. " *eremitus* (Hüb.).
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L. JOUTEL. DEL.

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