

THE NORTH AMERICAN ICHNEUMON-FLIES OF THE TRIBES LYCORINI, POLYSPHINCTINI, AND THERONIINI.

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INTRODUCTION.

This paper consists of revisions of the North American species of three of the tribes of the subfamily Ichneumoninae, the Lycorini, Polysphinctini, and Theroniini as defined by Cushman and Rohwer,¹ and is a contribution to a revision of the entire subfamily as represented in the North America fauna.

The drawings of the entire insects and many of the detail drawings are by Miss Mary Carmody, formerly of the Bureau of Entomology, United States Department of Agriculture.

Tribe LYCORINI Cushman and Rohwer.

This tribe includes the genera *Lycorina* Holmgren and *Toxophorides* Cresson as well as a new genus described below.

The two described genera have always been referred to the (Pimplini) Ichneumonini. The tribe is distinct from all the other tribes of the Ichneumoninae in the peculiar structure of the tergites. In this it superficially resembles the Glyptini, but is distinct from that tribe in having the first tergite apically similar in structure to the others and, in the female, in the form of the ovipositor and hypopygidium. These differences are of such nature that it is very doubtful if these two tribes have any real affinity. In the lanceolate ovipositor and pectinate claws the Lycorini are allied to the Phytodietini, but are readily separated by abdominal, propodeal, and other characters. With the latter tribe the Lycorini seems to have more in common than with any of the other tribes of the subfamily, but that the affinities between the two are very close seems rather doubtful.

The species so far as is known, are parasitic on the larvae of microlepidoptera.

Description.—Body stout; head in front view strongly transverse; eyes large, parallel within and usually slightly emarginate opposite

¹ Proc. U. S. Nat. Mus., vol. 57, 1920, p. 379-396.

antennae; malar space rather long, the malar furrow present; clypeus transverse, distinctly separated, rounded to subtruncate apically; frons concave, bounded laterally by a more or less distinctly elevated ridge; temples flat or weakly convex and very sharply sloping; occipital carina complete; antennae rather stout, subattenuate basally; the apical joint nearly or quite as long as preceding two combined, first joint of flagellum distinctly longer than the second, scape subhemispherical, barely emarginate at apex; pronotum with a sharp carinate tubercle on each side dorso-anteriorly; notauli obsolete or absent, prescutum long; scutellum quadrate or trapezoidal strongly carinate laterally; propodeum short, declivous behind, dorsal and posterior faces separated either by a more or less distinct carina or by difference in sculpture; metapleura not or indistinctly separated from propodeum; wings large; areolet absent, intercubitus nearly or quite twice as long as second abscissa of cubitus, basal vein straight or nearly, nervulus interstitial or nearly, nervellus strongly inclivous; front tibiae more or less swollen in middle and constricted at base and apex; claws strongly pectinate; abdomen stout ovate, first four tergites in female, five in male, with median triangular areas set off by oblique furrows and an apical transverse furrow, tergites beyond first also with deep basal furrow, fifth in female and sixth in male without the apical furrow; apical tergites in female retracted, hypopygidium reaching to or beyond apex of abdomen, membranous in basal middle, ovipositor half or more as long as abdomen, compressed lanceolate apically.

The tribe is very homogeneous with very few generic characters. What characters there are however, are apparently very constant and have practically all been used in the following key to the genera.

KEY TO GENERA.

1. Propodeum sharply areolated, distinctly separated from metapleura; scutellum quadrate, truncate at apex; nervellus distinctly broken, subdiscoidella distinct; black with only clypeus and minute markings on head and scutellum yellow.

Lycorina Holmgren.

- Propodeum with at most an obsolete apical carina and traces of the median carinae, not separated from metapleura; scutellum trapezoidal, rounded apically; nervellus curved or straight, not broken, subdiscoidella obsolete or absent; body highly ornamented..... 2.

2. Posterior face of propodeum perpendicular; apical carina obsolete; body black with yellow markings and thorax more or less reddish; wings immaculate.

Chlorolycorina Cushman.

- Posterior face of propodeum oblique, apical carina absent, dorsal and posterior faces of propodeum separated by difference of sculpture; body mostly yellow with blackish markings, at least without red; front wings usually infumate at apex..... *Toxophoroides* Cresson.

Genus LYCORINA Holmgren.

Lycorina HOLMGREN, Öfvers. Vet.-Akad. Forh., vol. 16, 1859, p. 126. *Genotype*.—*Lycorina triangulifera* Holmgren.

This genus is unknown in the North American fauna, the genotype and only described species being European.

Distinct by the characters employed in the key, in most of its other features it is very similar to the other genera of the tribe.

CHLOROLYCORINA, new genus.

In structure this genus stands between *Lycorina* Holmgren and *Toxophoroides* Cresson. In the perpendicular posterior face of the propodeum it is allied to *Lycorina* while differing from that genus in lacking all the carinae except the obsolete apical and traces of the median. In color pattern, which in this group is undoubtedly of generic value it is allied to *Toxophoroides*. From both genera the red color of the pleura distinguishes it.

Genotype.—(*Glypta*?) *Toxophoroides scitula* (Cresson).

The species are readily distinguished by the color characters employed in the following key.

KEY TO SPECIES.

1. Hind tibiae with alternating bands of white and black, tarsi white at base; mesoscutum more or less red; triangular areas of tergites each with a white spot *scitula* (Cresson).
- Hind tibiae white only basally, reddish in the middle, tarsi entirely black; mesoscutum without red; triangular areas of tergites immaculate 2.
2. Hind coxae red; ovipositor distinctly longer than hind tibiae. *albomarginata* (Cresson).
- Hind coxae black with apex white; ovipositor and hind tibiae equal in length. *soror* Cushman.

CHLOROLYCORINA SCITULA (Cresson).

Glypta scitula CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 155, female.

Type.—No. 1464, Acad. Nat. Sci. Phila.

? *Glypta (scitula)* Cresson WALSH, Trans. St. Louis Acad. Sci., vol. 3, pt. 1, 1873, p. 129, female.

Toxophoroides scitula (Cresson) VIERECK, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 196.

Glypta (Toxophoroides) scitula Cresson, VIERECK, Hym. Conn., 1917, p. 317.

Discussion based on type and two specimens compared with type by the present writer.

This species has been adequately described by both Cresson and Walsh. It is very distinct from the other two species of the genus by the characters used in the key.

The United States National Museum collection contains two females, one from Monticello, Florida, where it was reared October 7, 1914, by A. I. Fabis under Quaintance No. 10561 from *Tetralopha subcanalis* Walker; and the other reared June 10, 1885, under Bureau of Entomology No. 3722. A note by the late Theo.

Pergande in the bureau files relates to the rearing of the latter specimen; it is as follows: "A very curious cocoon of an Ichneumonid was found by Koebele on an apple tree on the Agricultural Grounds May 23, 1885. The cocoon is elongate, squarish, pointed toward both ends, light brown, and is held in place by three long threads, each thread being about equal in length and placed in such a position as to hold the cocoon between them suspended. The fly issued June 10."

The Florida specimen has more black, especially on the lateral lobes of the mesoscutum and scutellum, and is considerably larger than the type. The other specimen has the thorax less contrastingly colored with more red on the mesoscutum and scutellum.

The type is from New York.

CHLOROLYCORINA ALBOMARGINATA (Cresson).

Glypta albomarginata CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 157, female. Type.—No. 1465, Acad. Nat. Sci. Phila.

Toxophoroides albomarginata (Cresson) VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 645.

Discussion based on type, a female specimen compared with type by the present writer, one other female, and one male.

Distinct from *scitula* (Cresson) by the key characters.

The two National Museum female specimens show some color variation from the type, both showing red on the mesopleura. The specimen compared with the type also has the black of the front and middle coxae replaced by red. The male is very similar to the female, differing principally in having the face entirely pale.

The last mentioned female specimen was reared by C. R. Ely July 2, 1912, at East River, Connecticut, from *Ypsolophus bipunctellus* Walsingham, while the other female is from Cranmoor, Wisconsin, taken by C. W. Hooker on October 10, 1910. The male was reared by Dwight Isely at Bentonville, Arkansas, under Quaintance No. 16379 from *Canarsia hammondi* Riley. The type is from Maine. These are apparently the only known specimens.

CHLOROLYCORINA SOROR, new species.

Female.—Length 5 mm., ovipositor 1.5 mm.

Closely related to *albomarginata* (Cresson), from which it differs principally as follows: face with two narrow pale stripes in the black median area; malar space much shorter than basal width of mandible; hind coxae and trochanters black, the former white at apex; ovipositor not longer than hind tibia.

Head polished; face sparsely punctate; temples convex; thorax polished, sparsely punctate; scutellum broad and broadly rounded at apex; propodeum rather sparsely punctate; abdomen densely, finely punctate; ovipositor as long as hind tibia.

Black with color pattern of red and yellow as follows: orbits, mouth parts, two lines on face, lines in positions of notauli dilated anteriorly, dorsal margin of pronotum, tegulae, spot below, one at anterior edge of mesopleurum, one above base of middle coxa, one below hind wing, margin of scutellum, postscutellum, spot at top of propodeum, and apical and lateral margins of first five tergites yellow; metapleura rufous; wings hyaline, veins and stigma dark brown; coxae black at base, white at apex, the posterior pair practically all black; front trochanters, tibiae and tarsi white, their femora pale testaceous; middle femora pale testaceous; their tibiae and tarsi stramineous, apical joint of their trochanters black; hind trochanters black, their femora dark testaceous, fuscous at apex, tibia rufofuscous, white at base and with darker fuscous bands at apex and next to basal annulus, tarsi entirely fuscous; ovipositor sheath black, pale at apex

Type-locality.—Las Cruces, New Mexico.

Type.—Cat. No. 22143, U.S.N.M.

Described from one female.

Genus TOXOPHOROIDES Cresson.

Toxophoroides CRESSON, Proc. Acad. Nat. Sci. Phila., 1873, p. 406. *Genotype*.—

Lycorina? apicalis Cresson.

Toxophoroides CRESSON, Viereck, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 195.

In both color and sculpture this genus stands at the opposite end of the tribe from *Lycorina*. From that genus and from *Chlorolycorina* it differs in the sloping posterior face of the propodeum separated from the dorsal face by difference in sculpture rather than by an obsolete carina. In most of the species the color is the reverse from that of *Chlorolycorina*, the ground color being yellow with dark markings. In an undescribed species represented only by two males in the United States National Museum collection, however, the black is more extensive than the yellow, but the entire lack of the red color of the pleura appears to be a constant generic character.

KEY TO SPECIES.

1. Front wings not distinctly infumate at apex.....*xanthozonata* (Ashmead).
Front wings distinctly infumate at apex..... 2.
2. Head in dorsal view almost evenly ovate, temples convex, eyes not bulging, in front view eyes not higher than vertex.....*apicalis* (Cresson).
Head in dorsal view not evenly ovate, temples flattened, eyes bulging, in front view eyes higher than vertex.....*glaucomatus* Cushman.

TOXOPHOROIDES XANTHOZONATA (Ashmead).

Glypta xanthozonata ASHMEAD, Proc. U. S. Nat. Mus., vol. 12, (1889), 1890, p. 449, male. *Type*.—Cat. No. 2117, U.S.N.M.

Toxophoroides xanthozonata (ASHMEAD), Viereck, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 195, footnote.

The unique type male, reared by Miss M. E. Murtfeldt in Missouri from a tortricid on oak, is extremely like *apicalis* (Cresson). It is very likely the male of that species, but since the infuscation of the apices of the wings is very weak and since it comes from such a widely different locality, it seems inadvisable to synonymize it.

In the type the propodeum can hardly be said to be distinctly divided transversely since the sculpture is so weak that it is inconspicuous.

TOXOPHOROIDES APICALIS (Cresson).

Lycorina (Toxophoroides) apicalis CRESSON, Proc. Acad. Nat. Sci. Phila., 1873, p. 407, female. Type.—No. 635, Acad. Nat. Sci. Phila.

Lycorina apicalis CRESSON, Dalla Torre, Cat. Hym., 1901-1902, p. 418.

Toxophoroides apicalis (CRESSON), Viereck, Proc. U. S. Nat. Mus., vol. 40, 1911, p. 195.

Discussion based on the type and a specimen compared with the type by S. A. Rohwer.

Both the specimens examined are from Mexico and hence out of the restricted area covered by the present paper, but the species is so closely allied to *xanthozonata* (Ashmead) and possibly identical with it that it is included.

The writer has not examined the type but Mr. Rohwer has done so and has compared a National Museum specimen with it. Mr. Rohwer was of the opinion that the two specimens are conspecific and made the following comparative notes: "The National Museum specimen is smaller, sculpture of abdomen not as dense but of the same type, and the black of the abdomen forms complete bands (in the type the black is separated medially on first by a very little but more widely on other segments)." Compared with Cresson's description this specimen also differs as follows: The maculation of the mesoscutum consists of three parallel streaks, one on the prescutum and one on each of the lateral lobes, and a triangular spot in front of the scutellum; in addition to the black markings mentioned by Cresson there is one on each side of pronotum, the two connected by a line, a large spot at base of propodeum, almost interrupted in the middle, and a small, nearly round median apical spot; only the apical joint of hind trochanters black; ovipositor nearly as long as abdomen; length 4.5 mm.

TOXOPHOROIDES GLAUCOMATUS, new species.

Closely related to *apicalis* Cresson, but easily distinguished by the prominent eyes and flat temples and vertex.

Female.—Length 9 mm., antennae 8 mm., ovipositor 3.5 mm.

Head in front view very strongly transverse, the eyes large and prominent, the cheeks, temples, and vertex flat, the last below level of top of eyes; face slightly convex with a shallow longitudinal groove on each side, weakly punctate below antennae; head otherwise im-

punctate; pronotum almost without sculpture, anterior dorsal angles very sharp; mesoscutum and mesopleura polished, sparsely punctate, scutellum more densely and strongly so; metapleura more strongly, but not more densely, punctate; propodeum with very deep punctures which dorsally are arranged more or less in transverse rows and posteriorly in longitudinal rows, this difference together with a slight concavity of the sloping posterior face indicating the line of division of the propodeum into dorsal and posterior faces; median longitudinal carinae very briefly indicated at base; legs slender, hind basitarsus very nearly as long as other joints combined; abdomen sparsely though strongly punctate, the triangular areas practically without punctures; first tergite slightly longer than wide at apex, sides nearly straight.

Yellow with the following black or blackish markings: ocellar area, occiput dorsally, vertex posteriorly, elongate spot on prescutum, one on each of the lateral lobes coalescing posteriorly with a triangular spot in front of the scutellum, a spot on each side of mesosternum running up along prepectus then backward under front wing and narrowly connected with a large spot on the posterior margin of mesopleurum, a narrow transverse band at base of propodeum and a rounded apical spot, hind coxae basally, a band across middle of first tergite, a basal band on each of the next three tergites which is narrow medially and becomes dilated laterally to embrace the entire lateral elevated areas, and a broad band on fifth tergite; antennae pale beneath and at apex, dark brown above; wings hyaline, veins and stigma dark brown, apices of front wings fuscous; front and middle legs yellow; hind coxa at apex, the trochanter, tibia except at apex, and tarsi yellow, femur testaceous, tibia at apex reddish fuscous; ovipositor sheath black, yellow at apex.

The paratype differs practically only in being somewhat smaller, in having the black markings of the thorax somewhat larger, the mesosternum and mesopleura almost entirely black, a large spot on each side of pronotum, the alar region varied with piceous and the black of the fourth tergite entirely surrounding the triangular area.

Type locality.—Plummer's Island, Maryland.

Type.—Cat. No. 22144, U.S.N.M.

Described from two females both from the type locality, the type collected by S. A. Rohwer, June 20, 1911, and the paratype by H. L. Viereck, September 8, 1912.

Tribe POLYSPHINCTINI Cushman and Rohwer.

The genera comprising this tribe have heretofore been placed in the (Pimplini) Ichneumonini.

The present revision is based on the collection of the United States National Museum, but practically all of the types in various collec-

tions have been examined by either the writer or S. A. Rohwer, and the United States National Museum collection contains types, homotypes, or specimens compared with the types of most of the species discussed.

With a few exceptions the species of this tribe are rare. Most of them have been described from uniques, and some are still represented in collections solely by the types, while a few are known only from the original descriptions, the types having been lost or destroyed. Very likely with more specimens available for study some of the species would be found to be synonyms. Some synonymy has already been published and more is indicated in the present paper.

All of the species of which the habits are known are externally parasitic on spiders, the larva lying curved around the anterior margin of the abdomen of the host. These records include members of all the genera and subgenera except the new genus described below. As suggested by Marley¹ the European records of Gravenhorst and others ascribing hosts other than spiders to members of the genus *Polysphincta* are the result of the incorrect determination either of host or of parasite. The fullest and most interesting account of the attack of one of these insects on its host and the subsequent development is by Bignell² who watched a female of *Acrodactyla madida* Haliday attack its host, the spider *Linyphia obscura*. The polysphinctine cocoon is highly specialized, being usually loosely woven and having at the caudal end an opening through which the meconial discharge and exuvia are voided.

Most authorities have treated the genera *Acrodactyla* Haliday and *Zatypota* Foerster as subgenera of *Polysphincta* Gravenhorst while treating *Colpomeria* Holmgren as a distinct genus. But Foerster, followed by Ashmead, treated them all as genera. All of the writers who have considered these groups as subgenera also included *Zaglyptus* Foerster because of its incomplete areolet, although on all other characters it is much more closely allied to *Tromatobia* Foerster. Moreover, certain species of *Polysphincta* have the areolet fully defined, while the type of the new genus, *Zabrachypus*, has it pentagonal in position though open behind, almost exactly as in *Zaglyptus*. The character employed for separating *Colpomeria*, the angularly incrassate front femora, is a unisexual character, being found only in the female; but the cristulae on the front of the prescutum are common to both sexes and therefore of more value. This character will not separate *Colpomeria* from *Polemophthorus* Schulz (= *Symphylus* Foerster), which Morley³ tells us is synonymous with *Acrodactyla* Haliday. In this synonymy Morley is in error if a specimen in the

¹ Brit. Ichn., vol. 3, 1908, pp. 119-120.

² Trans. Devon. Assn., 1898, pp. 471-472.

³ Brit. Ichn., vol. 3, 1908, p. 131.

National Museum labelled *Acrodactyla madida* Haliday is correctly determined, for this specimen lacks the cristulae, while Foerster's genus possesses them. In this respect *Polemophthorus* is more closely allied to *Colpomeria* and possibly synonymous with it. Since no specimen of *Polemophthorus* is available for study and Foerster does not state the structure of the tibiae it is impossible to form a definite opinion in regard to the synonymy. As regards the synonymy of *Oxyrrhexis* Foerster and *Acrodactyla* Haliday the same is true, since no specimen of the genotype of the former genus, *Oxyrrhexis carbonator* (Gravenhorst) is available. Judging, however, from the description of *carbonator* it seems improbable that the synonymy is well founded, for that species is said to have the abdomen very strongly punctate, whereas one of the most conspicuous characters of *Acrodactyla madida*, as represented in the United States National Museum, is its entirely impunctate abdomen. *Polemophthorus* and *Oxyrrhexis* will therefore be eliminated from further consideration because of the lack of specimens and because of the uncertainty of their affinities.

In the present paper *Acrodactyla* and *Colpomeria* are treated as genera, while *Zatypota* is considered as a subgenus of *Polysphincta*.

In general appearance and form, largely influenced by the abdominal structure, the genera comprising this tribe bear a very strong superficial resemblance to the typical Ichneumonini. But the very peculiar host-relations and the more minute structure, especially in the female, render them very distinct. These features are very reminiscent of certain genera of the Tryphoninae, such as *Monoblastus* Hartig and *Polyblastus* Hartig, and of the Paniscini.

Description.—Head strongly transverse, temples flat or slightly rounded, sloping sharply to the strong and complete occipital carina; face convergent below and at least as long as wide at clypeus, the latter convex or slightly flattened, usually rounded at apex, and frequently with a reflexed margin, rarely very weakly, broadly emarginate, never medially impressed or inflexed; mandibles narrow at apex, bidentate, the upper tooth the longer; eyes and ocelli large; antennae long, filiform. Thorax subovate, usually more or less distinctly compressed; notauli strongly impressed throughout, converging posteriorly, the prescutum very prominent, rarely broad and shallow, but in this case the prescutum is nevertheless very long and most of the other characters are especially well-marked; scutellum elevated and more or less distinctly compressed from the sides; propodeum rarely without carinae, frequently with two well-defined median areas, the petiolar and the confluent areola and basal area; wings broad, stigma rather small, usually narrow lanceolate, areolet rarely complete or even defined; third discoidal cell usually strongly narrowed basally, nervellus broken at, below, or not far

above middle or unbroken; legs long, femora, especially the front pair, most frequently stout, last tarsal joint, claws and onychia large, claws in female with a large basal lobe or tooth, in male simple. Abdomen from short ovate to siblinear or long subclavate; first tergite usually sessile with prominent dorsal carinae, rarely subpetiolate with carinae distinct only at extreme base; middle tergites usually with distinct lateral elevations or with a median rhomboid area set off by grooves; ovipositor short, rarely half as long as abdomen, and with a distinct ventral swelling at or near the middle, whence it tapers to a very acute point; hypopygidium retracted far from apex of abdomen.

KEY TO GENERA.

1. Eyes and ocelli very large, posterior ocelli nearly touching the eyes, which are strongly emarginate, malar space practically obliterated; temples very flat or even concave and strongly convergent toward the unusually strong, flang-like occipital carina; clypeus submarginately truncate (see fig. 1); long slender species mostly light colored, with abdomen parallel-sided or subclavate, slender legs, and fasciate wings (see pl. 2, fig. 1.)..... *Hymenoepimecis* Viereck.

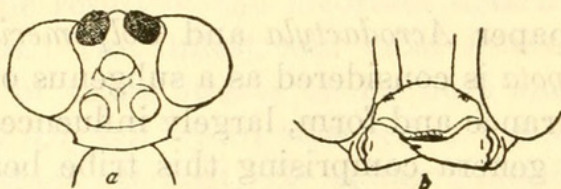


FIG. 1.—*HYMENOEPIMECIS* WIRTHI (CRESSON). *a*, DORSAL VIEW OF HEAD; *b*, CLYPEUS AND MANDIBLES.

Eyes and ocelli not especially large, posterior ocelli widely separated from eyes, malar space distinct; temples usually slightly convex and less strongly convergent, occipital carina not especially strong; clypeus usually rounded at apex, rarely obscurely truncate (see fig. 2); shorter, stouter, darker colored species, with abdomen, at least in female, with sides usually arcuate, with stouter legs, shorter ovipositor, and hyaline, unfasciate wings (see pl. 2, fig. 2 and fig. 5.)..2.

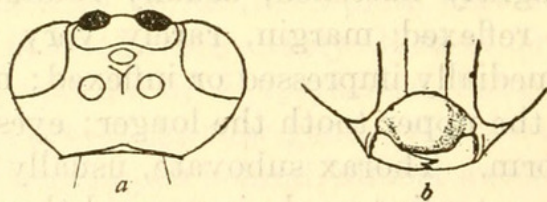


FIG. 2.—*a*, *POLYSPHINCTA* BURGESI CRESSON. DORSAL VIEW OF HEAD; *b*, *POLYSPHINCTA* (ZATYPOTA) BRAUCHERI CUSHMAN. CLYPEUS AND MANDIBLES.

2. All tergites beyond second with furrows, impressions, and elevations obsolete; first tergite very narrow, nearly parallel-sided; stigma very narrow, its posterior margin curved, radius originating far before the middle; eyes rather small, shorter than width of frons..... *Acrodactyla* Haliday.
- Tergites beyond second with either furrows, impressions, or elevations distinct; first tergite broader, its sides divergent; stigma broader, its posterior margin angulate at origin of radius, which is usually not far before the middle; eyes longer than width of frons.....3.

3. Prescutum cristate on each side; front and middle femora in female angularly incrassate in middle; (see fig. 3) first tergite nearly twice as long as wide at apex with sides gradually divergent.....*Colpomeria* Holmgren.

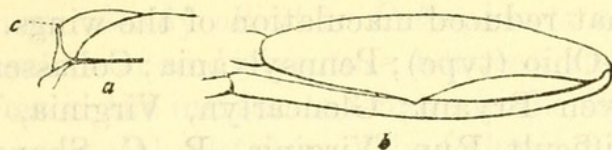


FIG. 3.—a, *COLPOMERIA MELLITHORAX* CUSHMAN. LATERAL VIEW OF PRESCUTUM SHOWING CRISTULAE (c); b, *COLPOMERIA KINCAIDII* (ASHMEAD). FRONT FEMUR AND TIBIA OF FEMALE.

Prescutum and femora normal; first tergite relatively much wider and with sides strongly divergent..... 4.

4. Tarsi normal; sternauli not deeply impressed; areolet entirely lacking or rarely oblique quadrangular.....*Polysphincta* Gravenhorst.

Tarsi very short and thick, those of hind legs but little more than half as long as tibiae, first joint little more than twice as long as thick; body very short and thick; second intercubitus lacking but the areolet irregularly pentagonal in position; sternauli deeply impressed though short (see fig. 4)..*Zabrachypus* Cushman.

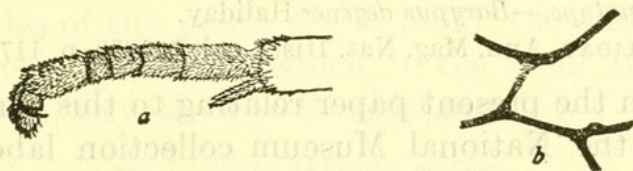


FIG. 4.—*ZABRACHYPUS PRIMUS* CUSHMAN. a, HIND TARSUS OF FEMALE. b, AREOLET.

Genus *HYMENOEPIMECIS* Viereck.

Epimecis BRULLÉ, Hist. Nat. Ins., Hym., vol. 4, 1846, p. 112. (Preoccupied in Coleoptera by *Epimeces* Billberg). *Genotype*.—*Epimecis bicolor* Brullé.
Hymenoepimecis VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 149.

Largely neotropical in its range, this genus is represented in our fauna by a single species. It exhibits to an extreme degree most of the features characteristic of the tribe. The very large, strongly convergent eyes; the narrow face; the large, prominent ocelli; the flat, or even concave temples, sloping sharply to the prominent occipital carina; the very prominently long and sloping prescutum, though not deeply impressed notauli; the elevated and compressed scutellum; the highly polished, slender body and legs; the largely bright reddish-testaceous color; and generally more or less infumated wings combine to make an insect of most striking appearance and easy recognition.

HYMENOEPIMECIS WILTII (Cresson).

Plate 52, fig. 1.

Epimecis wiltii CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 143. *Type*.—Acad. Nat. Sci. Phila., No. 1540.

Discussion based on homotype and other material.

The five females examined are very much alike, varying from 13 to 15 mm. in length and in the intensity of wing and abdominal color.

The male, two specimens of which are in the United States National Museum collection, differs from the female in the slightly greater extent of the dark color at the apex of the abdomen and hind legs and the somewhat reduced maculation of the wings.

Distribution.—Ohio (type); Pennsylvania; Cohasset, Massachusetts (homotype), Owen Bryant; Glencarlyn, Virginia, J. R. Mulloch; Black Pond, Difficult Run, Virginia, R. C. Shannon; Plummer's Island, Maryland (cocoon only), R. C. Shannon; South Carolina; Pyziton, Clay County, Alabama, H. H. Smith; Handley, Texas, W. D. Pierce; Onaga, Kansas, Crevecoeur.

Mr. R. C. Shannon has published¹ a very interesting account of the finding of a larva and subsequent rearing of a specimen of this species as a parasite of the spider. *Epeira trivittata*. This specimen, a male, is one of the series examined.

Genus ACRODACTYLA Haliday.

Barypus Haliday, CURTIS, Guide Arrang. Brit. Ins., ed. 2, 1837, p. 94. (Preoccupied.) *Genotype*.—*Barypus degener* Haliday.

Acrodactyla HALIDAY, Ann. Mag. Nat. Hist., vol. 2, 1839, p. 117.

All remarks in the present paper relating to this genus are based on a specimen in the National Museum collection labeled *Acrodactyle madida* Haliday. This specimen differs markedly from Morley's idea of the genus. As thus typified the genus is not represented in the known North American fauna. The almost entire lack of either furrows or elevation on the tergites except the second, the subpetiolate abdomen with the very short and inconspicuous dorsal carinae of the first tergite, and the lack of prescutal cristulae render it very distinct from either of the other genera.

Genus COLPOMERIA Holmgren.

Colpomeria HOLMGREN, Ofvers, Vet.-Akad. Forh., 1859, p. 126. *Genotype*.—*Colpomeria laevigata* Holmgren.

This genus has been universally considered as a genus distinct from *Polysphincta* Gravenhorst. Morley² considers it very probably a synonym of *Scambus* Hartig, from which genus he states it differs only in the absence of the areolet. Morley's conclusion is obviously erroneous since the femoral character in *Colpomeria* is a secondary sexual character in the female and common to both front and middle legs, while in *Scambus* it is a male character and confined to the front legs. Moreover, in *Colpomeria* the femur is angularly incrassate in the middle while in *Scambus* it is concave in the middle. Davis fell into the same error when he described his *Colpomeria litoralis*, which is the male of *Epiurus pterophori* (Ashmead).

¹ Proc. Ent. Soc. Wash., vol. 15, 1913, p. 162.

² Brit. Ichn., vol. 3, 1908, p. 137.

No specimen of the genotype has been available for study, but the two species discussed below, judging from previous characterizations of the genus, seem to belong here.

Colpomeria is very closely allied to *Polysphincta* and *Acrodactyla*, standing in general form and structure between those two genera. From both it differs in the incrassate femora in the female and in the possession of the prescutal cristulae. The following additional characters possibly of some generic value are common to all specimens at hand: head from above transversely oval; malar space subequal to basal width of mandible; propodeum longer than high, straight above with petiolar region declivous, median and apical carinae rather strong; abdomen narrowly sessile, subclavate, broadest at about apical third, first tergite nearly twice as long as wide at apex, its sides nearly straight and but slightly divergent, other tergites with the usual elevations and impressions rather weak; ovipositor gently up-curved and much shorter than first tergite; mediella strongly curved before the nervellus, which is strongly inclivous.

Only two species of this genus are at hand; these are separable on structural and color characters, which, in the small number of specimens available for study, seem to be constant.

KEY TO NORTH AMERICAN SPECIES.

- Prothorax and mesothorax entirely bright testaceous; tergites laterally smooth. *mellithorax* Cushman.
 Prothorax and mesothorax black or piceous at least dorsally; posterior tergites laterally with large suberased punctures *kincaidii* (Ashmead).

COLPOMERIA MELLITHORAX, new species.

Closely allied to *kincaidii*, but distinguishable from that species by the characters employed in the key.

Female.—Length 4.5 mm., ovipositor 0.3 mm., antennae (broken). Head polished, impunctate; eyes weakly divergent and not at all emarginate; ocell-ocular and postocellar lines about equal to each other and to diameter of lateral ocellus; malar space slightly longer than basal width of mandible; prothorax and mesothorax polished, the latter obscurely punctate below; metapleura and pleural areas polished, more or less rugosely roughened near the carinae; first tergite about three-fifths as wide at apex as long, carinae nearly reaching apex, polished between the carinae, dorsal surface outside the carinae somewhat longitudinally rugosely roughened and with a small low elevation beyond the middle; second tergite rugosely roughened laterally; abdomen otherwise polished and unsculptured.

Piceous black with prothroax and mesothorax entirely testaceous; legs yellowish white with coxae paler, hind tibia with distinct piceous apical annulus and a weaker one at about the basal third, this pattern obscurely repeated on middle tibia but with the dark color replaced by stramineous, middle tarsi with entire last joint and apices of all

others pale testaceous or stramineous (the hind tarsi are broken off but undoubtedly have the same pattern with the annuli darker); tegulae and wing bases, scape and pedicel beneath (flagella wanting), mandibles and palpi white.

Type locality.—Unknown.

Type.—Cat. No. 20060. U.S.N.M.

A single female labeled "June 11, 1885, through C. V. Riley, 1888."

COLPOMERIA KINCAIDII (Ashmead).

Zaglyptus kincaidii ASHMEAD, Ins. Life, vol. 6, 1894, p. 260, female, male. *Type*.—Cat. No. 20061, U.S.N.M.

Discussion based on type, allotype, and two other females. Except in the characters given in the key this species is hardly distinguishable from *mellithorax* Cushman, described above, and it is possible that the two will, with more material for study, be found conspecific. In one specimen is shown a distinct tendency toward red in the thorax, this color including the mesosternum and a large part of the mesopleura, while the pronotum is distinctly reddish piceous. In the type and one of the other females the petiolar and lateral areas are only partially separated by carinae, while in the allotype and the other female the carinae are rather strongly complete. The females vary in length from 4.5 mm. (type) to slightly over 5 mm.

The types are from Olympia, Washington, where they were reared from a spider, *Tetragnathus* species, while the other two females are from Mount Washington, New Hampshire.

Genus POLYSPHINCTA Gravenhorst.

In general form and structure this genus stands between *Colpomeria* Holmgren and *Zabrachypus*, new genus. It lacks the prescutal cristulae and, in the female, the femora, while usually considerable swollen, are not angularly incrassate as in *Colpomeria*. The head is somewhat more transverse and less regularly oval than in *Colpomeria*; malar space distinctly, usually much, shorter than basal width of mandible; propodeum not longer than high, usually shorter, arcuately declivous above, usually with at least the median carinae, frequently with two median areas, rarely without carinae; first tergite much more than half as wide as long, frequently as wide as long, its sides widely, arcuately divergent; other tergites with elevations or furrows distinct; ovipositor straight and at least nearly as long as first tergite, frequently much longer; mediella less strongly curved before the nervellus, which is either broken or unbroken and perpendicular or less strongly inclivous.

Although the extreme types of the two subgenera are very distinct the intermediate variation is rather gradual, and the characters employed in the following key, although stated positively, are really essentially comparative.

KEY TO SUBGENERA.

- Middle tergites with more or less prominent lateral rounded elevations, the apical transverse furrows usually interrupted in the middle and reduced to broad impressions; abdomen smooth and polished or distinctly punctate; exserted portion of ovipositor at least nearly as long as first tergites; generally larger, more slender species.....*Polysphincta* Gravenhorst.
- Middle tergites with lateral elevation lacking, the apical furrow usually complete and sharply defined, and, with basal furrows, setting off a more or less distinct rhomboid or oval median area; abdomen usually finely shagreened, sometimes minutely transversely aciculate or polished; exserted portion of ovipositor much shorter than first tergite; generally smaller, stouter species.....*Zatypota* Foerster.

Subgenus POLYSPHINCTA Gravenhorst.

Polysphincta GRAVENHORST, Ichn. Eur., vol. 3, 1829, p. 112. *Genotype*.—*Polysphincta tuberosa* Gravenhorst.

Distinguishable from *Zatypota* in addition to the key characters by having the face usually broader, rarely distinctly longer than width at clypeus; notauli usually broad and shallow; legs stouter; intercubitus distinct, rarely very short; nervellus usually broken.

The species of this group are easily separated by the venational, clypeal, sculptural, and color characters used in the following key.

KEY TO NORTH AMERICAN SPECIES.

1. Abdomen strongly, coarsely punctate; hind tarsi black with only the basitarsus pale at base; entire length of ovipositor but little longer than first tergite; body entirely black.....*texana* Cresson.
- Abdomen practically impunctate, polished, or occasionally, especially in males, more or less punctate in the depressions; entire ovipositor at least nearly twice as long as first tergite; thorax most frequently more or less reddish..... 2.
2. Clypeus white; body, except apical lateral spots on tergites, sanguineous; legs entirely white or whitish.....*albipes* Cresson.
- Clypeus piceous to black..... 3.
3. Clypeus somewhat flattened, short and broad, its apex more or less reflexed, in certain positions giving the impression of truncation..... 4.
- Clypeus strongly convex, long, and strongly rounded and not reflexed at apex..... 6.
4. Mesothorax laterally largely testaceous.....*koebelei* Howard.
- Mesothorax laterally mostly or entirely black..... 5.
5. Propodeum with median longitudinal furrow, but without carinae and polished; ovipositor approximately half as long as abdomen.....*elongata* Cushman.
- Propodeum with longitudinal carinae and more or less irregularly rugulose; ovipositor distinctly less than half as long as abdomen...*burgessi* Cresson.
6. Wings with areolet.....*slossonae* Davis.
- Wings without areolet.....*strigis* Howard.

POLYSPHINCTA (POLYSPHINCTA) TEXANA Cresson.

Plate 2, fig. 2.

Polysphincta texana CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 149, female
Type.—Acad. Nat. Sci. Phila., No. 1,427.

Polysphincta vicina PROVANCHER, Nat. Can., vol. 5, 1873, p. 470, male. *Type*.—
Pub. Mus. Quebec, 1877 Provancher coll.

Polysphincta bicarinata DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 369, female. *Type*.—Acad. Nat. Sci. Phila., No. 168.

Discussion and synonymy based on examination of type, types of both synonyms, homotype, and a number of other females and one other male, mostly in the United States National Museum.

This is the most abundant of all North American species of *Polysphincta*. Failure to comprehend the antigeny has caused the description of the male under at least two different names. Provancher considered females at first determined by him as *texana* to be the

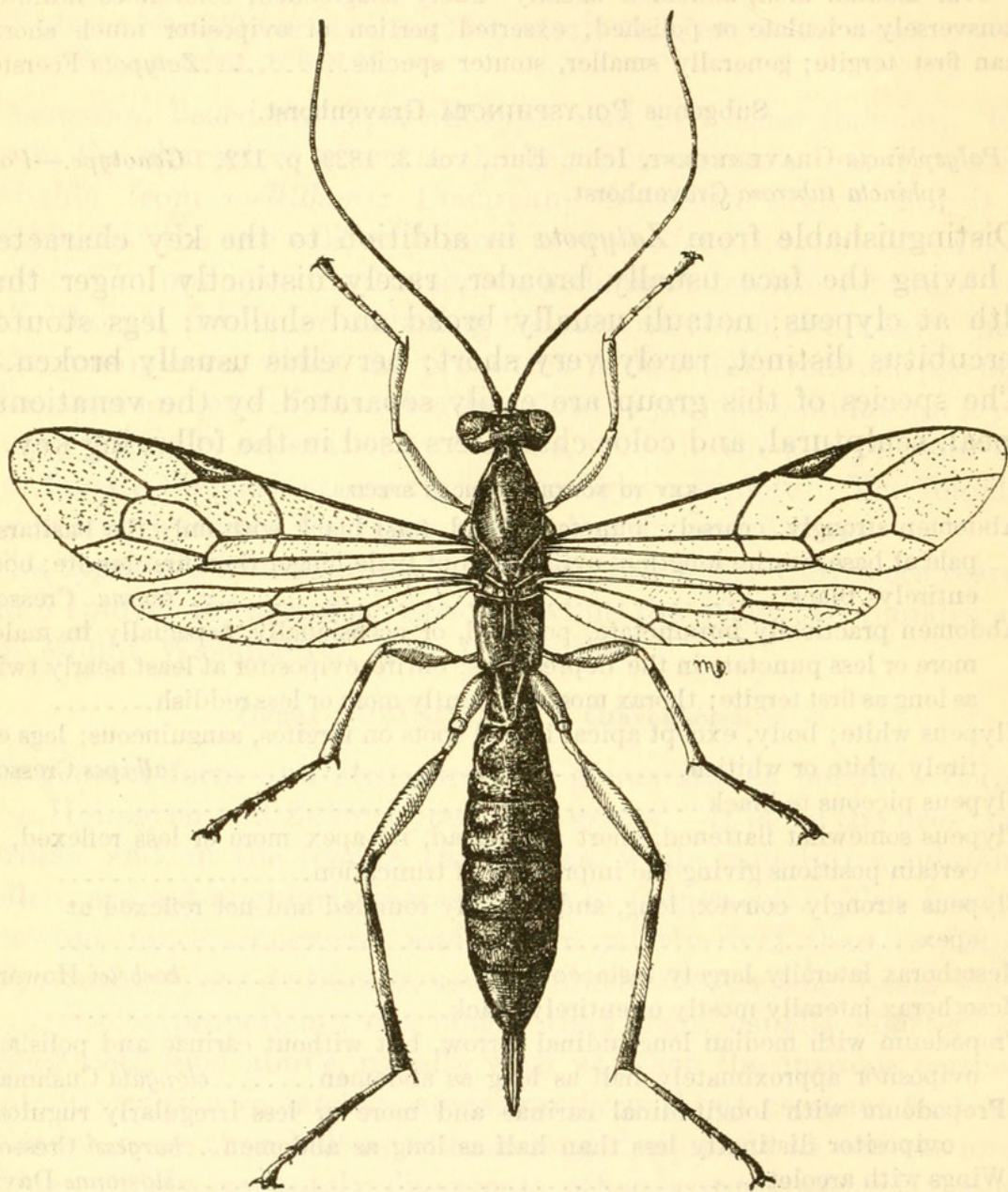


FIG. 5.—POLYSPHINCTA TEXANA CRESSON. FEMALE.

same as his *vicina*, but evidently still considered *vicina* as a valid species and *texana* as not occurring in his fauna. Dalla Torre (Cat Hym.) reduced *vicina* to synonymy with *texana*.

This species is very distinct from any of its subgeneric allies in its strong punctuation, intensely black hind tibiae and tarsi, the former with its white dorsal stripe and basal annulus and the latter with only the first joint white at base, and its snort ovipositor. The

repetition of the color pattern of the hind legs in the middle and front legs is also much stronger than in any of the other species.

Clypeus about two-thirds as long as wide, rather more strongly convex and apically rounded than its closet relatives; postocellar and ocell-ocular lines and diameter of lateral ocellus nearly equal; mesoscutum opaque, densely, finely pubescent; propodeum sub-opaque; polished apically, median carinae distinct, parallel but sharply divergent posteriorly and obscurely joining the short lateral carinae, setting off a rather distinct petiolar area; metapleura weakly punctate and, with the propodeum, clothed with long pubescence; thorax otherwise polished, impunctate and mostly without pubescence; mesopleural furrow weakly foveolate.

There is considerable variation in some characters; the propodeal carinae in one female are very weak, the median carinae being practically absent and the surface of the propodeum is subpolished; the nervellus is usually broken at about the middle and perpendicular, but occasionally, notably in the single male in the United States National Museum, it is broken far below the middle and is inclivous; the front coxae vary from piceous through testaceous to whitish; the females range in size from 7 to 9 mm.

This species has a very wide range. Cresson's type is from Texas, Davis's from Idaho, and Provancher's from Canada. The National Museum specimens are from Ithaca, New York; Boulder, Colorado; Plateau Creek, Colorado; Cadet, Missouri; Vienna, Virginia; Santa Fe, New Mexico; and Menlo Park, California; with additional specimens labelled simply Missouri, Colorado, and Minnesota. The only breeding record is based on a specimen reared by the writer at Vienna, Virginia, on May 12, 1913. The host was the common spider, *Steatoda borealis*. An account of this rearing appeared in the Proceedings of the Entomological Society of Washington (vol. 15, p. 157).

POLYSPHINCTA (POLYSPHINCTA) ALBIPES Cresson.

Polysphincta albipes CRESSON, Comstock, Rept. Ent., U. S., 1879 (1880), p. 208, male. *Type*.—Lost.

Careful search for the type of this species both in the Academy of Natural Sciences of Philadelphia and in the United States National Museum at the time Mr. Cresson was preparing the manuscript of his recent paper, *The Cresson Types of Hymenoptera*¹ failed to reveal it, and it has probably been destroyed. It was, however, a member of this subgenus and very closely allied to the next species if not the same.

The supposition that it was parasitic on a lepidopterous larva on the orange tree on which it was found in Florida is obviously erroneous.

¹ Mem. Amer. Ent. Soc., No. 1, 1916

POLYSPHINCTA (POLYSPHINCTA) KOEBELEI Howard.

Polysphincta (Zaglyptus) koebeleri HOWARD, Proc. Ent. Soc. Wash., vol. 2, 1892, p. 293, female. Type.—Cat. No. 2,684, U.S.N.M.

Discussion based on type, two other females, and two males.

From the description of *albipes* Cresson evidently closely allied to that species and very likely merely a darker form. Compared with the description of *albipes* a male and a female from Kansas differ only in color, the abdomen and propodeum being piceous with tergites black entirely across the apices, clypeus piceous, and coxae stramineous. These specimens are, however, much paler than the type both in body and leg coloration.

Female.—Polished with scattered, obscure punctures medially on tergites; clypeus much broader than long, deeply arched basally, broadly rounded and reflexed apically; malar space about half as long as basal width of mandible; face about as long as wide at clypeus; eyes slightly convergent below antennae, very weakly emarginate within; diameter of lateral ocellus, ocell-ocular, and postocellar lines about equal; temples and vertex rather strongly convex; notauli not especially strong but prescutum very long and low anteriorly; propodeum noncarinate but canaliculate medially; first tergite with carinae subobsolete beyond summit; tergites 2–5 strongly tuberculate laterally, 2–4 with deep apical and basal impressions, interrupted in middle; exerted portion of ovipositor twice as long as first tergite; stigma narrow, radius originating at basal two-fifths; intercubitus half as long as second abscissa of cubitus; nervellus weakly broken at about the lower third; hind basitarsus as long as next two joints together, last joint slightly shorter than third; antennae about three-fourths as long as body.

Male.—Very like female but more slender; temples nearly flat and less strongly sloping; antennae slightly longer.

Very variable in color. The type has the head, prothorax, upper hind angle of mesopleurum, metathorax except pleura, propodeum, and abdomen black to piceous; legs pale testaceous, front pair paler and hind pair darker, with front coxae, all trochanters in front, hind and middle femora at apices, and all tibiae and tarsi above whitish, darker below, hind tibiae and first two tarsal joints fuscous below and at apices. A female from Los Angeles, California, is very nearly typical, while one from Lawrence, Kansas, has the entire pro- and mesothorax testaceous, metathorax slightly darker, propodeum and abdomen piceous, the latter with the apices of the tergites black, and the legs pale stramineous, slightly darker basally and with the hind tarsal joints narrowly dark apically. A male from Lawrence, Kansas, is very like the female from the same locality, but slightly darker throughout, the hind tibiae displaying a very faint indication of the color-pattern of the type. A male from Los Angeles, California,

has the body-color of the type, but the legs very contrastingly colored, the stramineous being replaced by white and more extensive and the testaceous brighter.

In size the specimens are very uniform, the smallest male being 7 mm. and the largest female 8 mm. long.

The above enumerated five specimens constitute the entire representation of the species in the United States National Museum, the distribution being Santa Cruz Mountains, and Los Angeles, California, and Lawrence, Kansas.

The type was reared from *Epeira strix* or *sclopetaria*. The cocoon is 7 mm. long by 3 mm. broad, very loosely woven and netlike, and pinkish brown.

POLYSPHINCTA (POLYSPHINCTA) ELONGATA, new species.

Very closely allied to *burgessi* Cresson, from which species it differs in its somewhat more slender form, in lacking the median longitudinal carinae on the propodeum, and in the distinctly longer ovipositor.

Female.—Length 9.5 mm., antennae (broken), ovipositor 3 mm. Polished with a few weak punctures on mesosternum, laterally on propodeum, and in the impressions of the tergites, especially toward the apex of the abdomen; clypeus very broad and short with its apical rim so strongly reflexed as to give the appearance of truncation (this occurs to some extent in some specimens of *burgessi* Cresson, while in others it is not apparent); face distinctly longer than wide, eyes not convergent below antennae, weakly emarginate; ocell-ocular line shorter than postocellar line, diameter of lateral ocellus equal to the latter; temples flat; mesonotum highly polished, impunctate, and without pubescence, notauli weak posteriorly; propodeum with a deep longitudinal furrow in basal middle, but without carinae; first tergite considerably longer than wide at apex, its sides nearly straight and divergent, its carinae obsolete beyond the summit, not flattened dorsally; lateral tubercles strong on tergites 2-6, the apical impressions broad and interrupted in the middle, exerted portion of ovipositor very slightly decurved and very acute at apex, about half as long as abdomen; wings with transverse cubitus two-thirds as long as second abscissa of cubitus, nervellus distinctly broken not far below the middle; hind basitarsus barely as long as next two joints together.

Black; scutellum, postscutellum, and spots at bases of middle and hind legs piceous; apical part of clypeus and mandibles brown; palpi white; antennae blackish, somewhat paler beneath at base, especially at apex of scape; wing bases, tegulae and posterior angle of pronotum white; legs testaceous with the following pattern; front coxae apically, front trochanters, femora apically, apical segments of hind and middle trochanters and their basal joints at apex, all tibiae above, front tarsi, hind and middle tarsi above toward the

base whitish or pale; hind femora rufo-fuscos; hind tibiae and tarsal joints except as noted fuscous; middle and front tibiae stramineous below; middle tarsal joints infuscated below, the apical joint entirely fuscous.

Type locality.—Mount Washington, New Hampshire.

Type.—Cat. No. 19171, U.S.N.M.

One specimen without further labels except the number 53.

POLYSPHINCTA (POLYSPHINCTA) BURGESSI Cresson.

Polysphincta burgessi CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 149, male.

Type.—Acad. Nat. Sci. Phila., No. 1428.

Polysphincta limata CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 150, female.

Type.—Acad. Nat. Sci. Phila., No. 1429.

Polysphincta bruneti PROVANCHER, Nat. Can., vol. 5, 1873, p. 471, female.

Type.—Derniere Provancher collection, Public Museum, Quebec.

Polysphincta rufopectus PROVANCHER, Nat. Can., vol. 7, 1875, p. 140, female.

Type.—Probably in Public Museum, Quebec, and labeled *Polysphincta limata*, since Provancher himself indicated the synonymy.

Discussion based on types and other material.

Distinct from *koebeleri* Howard and *elongata* Cushman in its transversely roughened propodeum and the presence of the longitudinal carinae, from the former by its largely or entirely black mesothorax, and from the latter by its relatively shorter ovipositor and stouter form.

Clypeus, ocelli, and ocellar lines as in *koebeleri*; sculpture of the body as in the latter species except that the propodeal carinae are present, the propodeum is more or less transversely rugulose, and the mesopleural furrow is minutely foveolate; entire ovipositor about three-fifths as long as abdomen; hind tibiae marked much as in *koebeleri*, but more broadly blackish at apex and there is usually a more or less distinct subbasal dark annulus (in the type of *bruneti* the latter is entirely lacking); first three joints of hind tarsi white at base; color-pattern rather distinctly repeated on middle tibiae.

Except for slight differences in size, color, and sculpture of propodeum all the female specimens of this species are very much alike. The type of *rufopectus* is said to have the thoracic venter red. The same is true of two females in the Academy of Natural Sciences of Philadelphia and one in the United States National Museum, and of the male type of *burgessi*. In some other specimens the area immediately at the base of the middle coxae is somewhat reddish. The male differs from the female principally in its much more strongly sculptured, nearly opaque abdomen.

Apparently this species has never been reared. It appears to be largely northern in its range. Cresson's two types are from Massachusetts, Provancher's two types from Canada, of the seven specimens in the National Museum three are from Canada, one each from St. John, New Brunswick, Oswego, New York, and Terra Alta, West

Virginia, while in the Academy of Natural Sciences of Philadelphia there is one specimen each from New Hampshire, Pennsylvania, and Michigan.

POLYSPHINCTA (POLYSPHINCTA) SLOSSONAE Davis.

Polysphincta slossonae DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 368, female.

Type.—Acad. Nat. Sci. Phila., No. 169.

Discussion based on type, four other females, and three males.

Distinct from all other North American species of the genus in the possession of a complete areolet.

Female.—Clypeus strongly convex, not very deeply arched basally, strongly rounded and not reflexed apically; malar space very short; face distinctly longer than wide, barely convergent toward clypeus; inner margins of eyes weakly sinuous; temples weakly convex; notauli strong throughout; propodeum with dorsal carinae strong and extending more or less distinctly to apex, opaque laterally, posterior face transversely rugulose, polished above; legs very stout, tarsi very short, those of hind legs much shorter than tibiae, first joint as long as next three together, last joint fully as long as second; stigma fully a third as wide as long, radius originating in middle; nervellus strongly broken slightly below middle; first tergite with dorsal carinae strong and extending nearly to apex, irregularly rugulosely roughened; tergites 2-5 with decreasingly prominent lateral elevations and apical impressions, the latter broadly interrupted medially, more or less obscurely punctate basally; exerted portion of ovipositer about as long as first tergite.

Male.—Differs from female in having legs less stout, hind tarsi about as long as tibiae, basitarsus barely as long as next two joints together, tergites more strongly and extensively punctate, 2 and 3 entirely so except broad, polished apex.

Very variable in color, the female at one extreme having the body black to piceous except meso—and metapleura and sterna, scutellum, and large median posterior spot on mesoscutum, which are reddish; and small spot below each antenna, tegulae and spot in front, which are whitish. At the other extreme the head only is piceous, the thorax and abdomen testaceous, the latter more or less infusate; and with the same white markings. In the male the scutellum, face (but not clypeus), propleura, and lower angles of pronotum are also white; while in the darkest specimen the mesoscutum and metathorax are entirely black or piceous. In the female the legs are stramineous with the apices of the hind femora, basal and apical annuli of hind tibiae, and apices of hind tarsal joints dark, this color pattern being faintly repeated on the middle legs; in the hind femur the apical annulus extends well toward the base as a narrow line down the out-

side. Apparently the species is darker colored in the eastern part of its range and lighter in the western part.

Davis's types came from Mount Washington, New Hampshire; the National Museum material consists of two females and two males from Nerepis, New Brunswick (A. G. Leavitt), a female from Southern Illinois (Robertson), a female from Colorado, and a female from Sonoma County, California.

POLYSPHINCTA (POLYSPHINCTA) STRIGIS Howard.

Polysphincta (Zatypota) strigis HOWARD, Proc. Ent. Soc. Wash., vol. 2, 1892, p. 291, female. *Type*.—Cat. No. 2682, U.S.N.M.

Discussion based on type and three other females.

This species stands as a connecting link between the subgenera *Polysphincta* and *Zatypota*, but is referred to the former on account of the prominent lateral elevations of the tergites and the long oviposter. In the almost obliterated intercubitus, the complete apical furrows on the tergites, and the unbroken nervellus it is allied to *Zatypota*.

Head and thorax polished; clypeus strongly convex, apex and clypeal furrow evenly arched; malar space nearly as long as basal width of mandible; face much longer than wide below, weakly convergent toward clypeus, with a median longitudinal elevation; eye barely sinuate within; temples rather strongly rounded; mesoscutum obscurely punctate, notauli complete and strong; propodeum with dorsal carinae strong, parallel to middle where they curve outward and extend to the lateral carinae, which extend forward to about the middle; legs slender, hind tarsus nearly as long as tibia, basitarsus shorter than next two joints combined, last joint about as long as third; intercubitus very short, stigma rather broad, radius in middle; nervellus unbroken; first tergite with carinae strong to beyond middle and a very deep oblique impression apically on each side; tergites 2-5 with rather prominent lateral elevations, 2 and 3 with complete apical impressions; ovipositor more than one and a half times as long as first tergites.

Black to piceous, with mesothorax piceous to rufous; legs stramineous, with hind femur more or less fuscous outside, apices of hind and middle tibiae and their tarsi except basal half of basitarsi, and faint indication of basal annulus fuscous, darker on hind legs.

The type was reared from *Epeira strix* at Seacliff, Long Island. Dr. L. O. Howard has described its cocoon in connection with his description of the species. One of the other specimens is from Oswego, New York, one from Vancouver, British Columbia, and the third, which is in the Fitch collection, probably from New York.

Subgenus ZATYPOTA (Foerster) Schmiedeknecht.

Zatypota (Foerster) SCHMIEDEKNECHT, Verh. Nat. Verh. Preuss. Rheinl., vol. 25, 1868, p. 166; Zool. Jahrb., vol. 3, 1888, p. 433. *Genotype*.—*Ichneumon percontatoria* O. F. Muller.

Differs from the subgenus *Polysphincta* by the characters used in the subgeneric key and usually by the following: Face narrower, distinctly longer than wide at clypeus; notauli more deeply impressed and complete; legs more slender; intercubitus nearly or quite obliterated; nervellus not broken.

Most of the species have been described as species of *Polysphincta*. *Glypta parva* Cresson, *Clistopyga alborhombarta* Davis, and *Clistopyga nigrocephala* Davis belong here, while *Polysphincta* (*Zatypota*) *strigis* Howard is here referred to the subgenus *Polysphincta* because of its tuberculate tergites and long ovipositor.

KEY TO NORTH AMERICAN SPECIES.

1. Tergites polished with, or without transverse aciculations on median area . . . 2.
Tergites distinctly, finely shagreened 3.
2. Abdomen black with rhomboidal areas whitish; radius originating at middle of stigma *alborhombarta* (Davis).
Abdomen paler and with dark and light colors in reverse arrangement; radius originating before middle of stigma *dictynae* Howard.
3. Black or blackish without definite markings; carinae of first tergite strong nearly to apex, area between deeply impressed 4.
Brownish with yellowish markings; carinae of first tergite obsolescent beyond summit of tergite, space between flat 5.
4. Rhomboidal areas of tergites distinctly set off, impressions striate; hind femur at apex and tibia subbasally not black *theridii* Howard.
Rhomboidal areas not distinctly set off, impressions not striate; hind femur at apex and tibia subbasally black *pontiacci* Viereck.
5. Median carinae of propodeum present; petiolar area more or less defined 6.
Median carinae absent, sometimes replaced by a median groove; petiolar area not at all defined 8.
6. Temples nearly flat; postocellar line longer than ocell-ocular line, diameter of lateral ocellus about equal to latter; mesoscutum subpolished shagreened, much longer than wide, prescutum long *braucheri* Cushman.
Temples strongly rounded; postocellar and ocell-ocular lines subequal, diameter of lateral ocellus less than either 7.
7. Mesoscutum red, opaque shagreened, prescutum short and broad; hind tibia with a subbasal black annulus; apical carina of propodeum practically wanting, petiolar area shagreened *nigrocephala* (Davis).
Mesoscutum piceous, polished, prescutum long and narrow; hind tibia black only at apex; apical carina of propodeum strong, petiolar area polished *granulosa* Davis.
8. Temples flat; second tergite broader than long; first tergite a half wider at apex than at spiracles *californiensis* Cushman.
Temples rounded; second tergite about as broad at apex as long; first tergite much less than a half wider at apex than at spiracles 9.
9. Nervellus unbroken and strongly inclivous; hind tarsi much shorter than tibiae; mesoscutum granularly subopaque *crobyi* Cushman.
Nervellus broken, perpendicular; hind tarsi nearly as long as tibiae; mesoscutum polished *parva* (Cresson).

POLYSPHINCTA (ZATYPOTA) ALBORHOMBARTA (Davis).

Clistopyga alborhombarta DAVIS, Ent. News, vol. 6, 1895, p. 198, female. Type.—Acad. Nat. Sci. Phila.

Discussion based on type and one other female, the latter in the United States National Museum.

Female.—Length 5.5 mm., antennae 4 mm., ovipositor two-thirds the length of first tergite. Polished with propodeum posteriorly and metapleura slightly roughened; propodeum areolated, only the anterior transverse carina missing; first tergite much longer than wide, longitudinally striate and with dorsal carinae strong to apex; following tergites polished with deeply set-off rhomboidal areas, the furrows more or less striate; malar furrow present, nearly as long as basal width of mandible; temples slightly rounded, sharply sloping; radius originating at middle of stigma; nervellus unbroken; nervulus post-furcal; intercubitus nearly obliterated.

Black with face, upper orbits, mouth, scape and pedicel beneath, notauli, lateral margins of mesoscutum, margin of pronotum, tegulae, spot below, scutellum, postscutellum, rhomboidal areas of tergites except third, and legs (largely) white or whitish; sterna and pleura of mesothorax and metathorax red; hind femur with dark blotch above near apex; articulations of trochanters blackish; hind tibia black with broad white annulus; tarsi fuscous, the joints more or less whitish at base; same color pattern repeated on other legs, but paler.

The National Museum specimen differs from the type principally in having the white of the head and thorax less extensive, the legs more red, the metathorax entirely black, and the mesopleura and sternum piceous with only a small red spot below on pleurum.

Davis's type is from Florida, while the National Museum specimen was taken at Rosslyn, Virginia, by R. C. Shannon.

POLYSPHINCTA (ZATYPOTA) DICTYNAE Howard.

Polysphincta dictynae HOWARD, Ins. Life, vol. 1, 1888, p. 107, fig. 21, male. Type.—Cat. No. 2681, U.S.N.M.

Polysphincta minuta DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 369, female. Type.—Acad. Nat. Sci. Phila.

Discussion based on types of both names, a homotype of *minuta*, and one other female.

Originally described from a unique male, reared by J. H. Emerton, from *Dictyna volupis* at Waltham, Massachusetts. The type is very likely not fully colored, the darker colored portions of the body being a rather pale brown, while in the females mentioned above they are very dark brown to black. It was later redescribed in the female by Davis from a specimen from Agricultural College, Michigan.

Female.—Length 3.5 mm., antennae 2 mm.

Head polished, face with dense, short pubescence; malar furrow present, as long as basal width of mandible; clypeal suture weak; temples strongly convex; apex of scape barely oblique, pedicel nearly as long as scape; prothorax polished, thorax otherwise subpolished, obscurely punctate, and, especially above, pubescent; mesoscutum nearly as wide as long, prescutum short and broad; propodeum with a long dorsal median and a petiolar area more or less distinctly separated, the areas polished; first tergite hardly longer than wide, its sides straight and divergent, carinae obliterated shortly behind summit of tergite, longitudinally rugulose; tergites 2 to 4 with median areas polished or obscurely transversely rugulose, second nearly twice as wide as long; intercubitus very short; nervellus straight, perpendicular; hind tarsi stout, much shorter than tibia, basal joint about as long as next two together.

Piceous to black with yellowish markings and legs; head black with more or less of face below antennae, apex of clypeus, scape and pedicel, mandibles, and palpi yellow; thorax piceous with more or less extensive yellow markings as follows: Hind angles of pronotum, lateral margins of mesoscutum and notauli, mesopleura below tegulae, tegulae and scutellum; propodeum black; abdomen piceous, paler toward apex; tergites 2-5 with apical areas yellow, first with this reddish piceous; legs yellow with a tendency to testaceous on coxae and femora, hind tibiae at apex and tarsi fuscous.

Male.—Very like female, but thorax and abdomen more highly polished, practically without sculpture; carinae of first tergite strong to apex. Paler throughout than female, but with pale color somewhat more extensive, the face and clypeus being entirely yellow, and the legs paler with only the slightest indication of the dark color on hind tibiae and tarsi.

The National Collection contains two female specimens, one from Chiric Mountains, Arizona, H. G. Hubbard; and the other from Colorado, Baker. The former is a homotype of *minuta* Davis.

POLYSPHINCTA (ZATYPOTA) THERIDII Howard.

Polysphincta theridii HOWARD, Proc. Ent. Soc. Wash., vol. 2, 1892, p. 292, male.

Type.—Cat. No. 2683, U.S.N.M.

Both specimens are in very poor condition, being covered with a white substance that very largely obscures the characters. The following features can, however, be seen: malar space nearly as long as basal width of mandible; face medially longitudinally elevated; temples convex, sharply sloping; propodeum with well-defined median areas; rhomboidal areas of tergites distinctly set off, shagreened, impressions striate, apices polished; legs slender; intercubitus short but distinct; nervellus not broken.

Black; abdomen brownish; mouth and scape pale; tegulae and humeral angles of pronotum white; legs testaceous, anterior paler,

hind coxae inclined to piceous; hind tibiae white with apices dark fuscous, their tibiae fuscous.

POLYSPHINCTA (ZATYPOTA) PONTIACI Viereck.

Polysphincta pontiaci VIERECK, Hym. Conn., 1917, p. 318, male. *Type*.—Conn. Agr. Expt. Sta., New Haven, Conn.

Discussion based on notes by S. A. Rohwer, who has examined the type and only known specimen.

Differs from *theridii* Howard in the indistinctly defined rhomboidal areas of the tergites; in having the front and middle legs paler; the apices of the middle tibiae and hind femora brownish; and the hind tibia with a subbasal black annulus.

POLYSPHINCTA (ZATYPOTA) NIGROCEPHALA (Davis).

Clistopyga nigrocephala DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1898, p. 369. *Type*.—Acad. Nat. Sci. Phila.

Female.—Length 4 mm., antennae 2.8 mm., ovipositor 0.3 mm.

Discussion based on type, homotype, and one female.

Head polished, temples rounded, eyes converging slightly toward the mouth, barely emarginate; face slightly longer than wide; malar space about half as long as basal width of mandible; postocellar and ocell-ocular lines about equal and somewhat greater than diameter of lateral ocellus; thorax minutely shagreened, mesopleura subpolished; mesoscutum but little longer than wide, the prescutum before notauli about one-fourth the total length of mesoscutum; median carinae of propodeum present, the apical carina obscurely defined; abdomen short and broad, its sculpture the same as the thoracic, subpolished at apex and apices of tergites; first tergite a half longer than wide, its sides angulate at the spiracles, dorsal carinae obsolete beyond summit, space between depressed; tergites 1-4 with complete well-defined apical furrows, all tergites beyond first transverse; ovipositor very short, its exerted portion hardly half as long as first tergite; nervellus straight (left wing) or broken very near bottom (right wing); hind tarsus somewhat shorter than tibia, its basitarsus about as long as next two joints together.

Rufo-testaceous with head black and propodeum and abdomen blackish, the latter marked with yellow; palpi, mandibles, and apex of clypeus reddish; antennae brown, pale beneath at base; mesoscutum pale testaceous; scutellum stramineous; pronotum, mesopleura, metapleura rufo-testaceous, the first below and sterni infuscated; wing bases, tegulae, spot below, and posterior angle of pronotum white; metanotum and propodeum blackish as are also the tergites, except that tergites 2-4 incline to yellowish toward base; front and middle legs stramineous, the front pair somewhat paler, coxae and trochanters of both pairs white; hind coxae testaceous, whitish at apex, trochanters white, femora fusco-testaceous, whitish

at apex, tibiae fuscous with white annuli at base and in middle, tarsi fuscous, very narrowly pale at base of first joint.

Male.—Length 4 mm., antennae (broken).

Differs from the female principally in color, the dark color of the body being more inclined to piceous, and the red color having less of the red and more of the fuscous, the legs and mouth paler, scape and pedicel white, scutellum whitish; the tergites are proportionately narrower and the impressions less distinct; hind tarsi about equal in length to tibiae.

The type is somewhat more contrastingly colored than indicated in the above description, which is drawn from the homotype.

The type is from Illinois, the homotype from Indiana, and the female from Washington, District of Columbia.

POLYSPHINCTA (ZATYPOTA) GRANULOSA Davis.

Polysphincta granulosa DAVIS, Trans. Amer. Ent. Soc., vol. 24, 1897, p. 369, female.

Type—Acad. Nat. Sci. Phila., No. 170.

Discussion based on type.

Allied to *nigrocephala* (Davis), from which it differs in addition to the characters used in the key as follows: prescutum before notauli narrow, about one-third total length of mesoscutum; first tergite nearly as wide at apex as long, not angulate at spiracles, dorsal carinae rather strong; apical furrows of tergites weak, interrupted medially, rhomboidal areas rather weakly defined.

Piceous to black, without distinct yellow markings on thorax or abdomen; mouthparts, apex of clypeus, antennae below at base, tegulae, spot below and one in front white; legs as in *nigrocephala*, but paler and lacking basal black annulus on hind tibia.

The type is the only known specimen.

POLYSPHINCTA (ZATYPOTA) BRAUCHERI, new species.

Allied to *nigrocephala* (Davis), from which it differs as follows:

Female.—Length 5.5 mm., ovipositor 0.5 mm., therefore considerably larger; temples flat; postocellar line slightly longer than ocellular line, the latter about equal to diameter of lateral ocellus; mesoscutum considerably longer than wide, subpolished, prescutum much longer, about one-third total length of mesoscutum; second tergite nearly as long as wide, the abdomen as a whole more slender; nervellus curved at base; hind basitarsus nearly as long as next three combined.

Color pattern same as in *nigrocephala*, but pronotum, except dorsal and hind margins, and mesoscutum, except notauli and dorsal impressions, piceous; antennae beneath and mouthparts paler; hind femora testaceous.

Male.—Length 5.0 mm. Very like female with abdomen more slender and dorsal areas less well defined.

Type locality.—Douglas, Michigan.

Other locality.—Lafayette, Indiana.

Type.—Cat. No. 19173, U.S.N.M.

Described from one female and two males, the type, allotype, and paratype *a*, from the type-locality, where they were reared under Quaintance No. 5939, July 14-17, 1908, by R. W. Braucher "from cocoons attached by end to under side of large limbs in peach orchard"; and two males, paratypes *b* and *c*, reared under Webster No. 1186, from cocoons found on cedar, at Lafayette, Indiana.

Paratypes *b* and *c* are somewhat smaller than the allotype and *b* differs from that specimen in having the thorax except the scutellum and the region around the wing bases dark piceous.

The cocoons of the Michigan specimens are pure white, about a third of an inch long by a third as wide, coarse netlike. Those of the Indiana specimens are similar but smaller and yellowish.

POLYSPHINCTA (ZATYPOTA) CALIFORNIENSIS, new species.

Allied to *nigrocephala* (Davis) and *braucheri* Cushman, from both of which it can at once be distinguished by the lack of propodeal carinae.

Female.—Length 6 mm., antennae (broken), ovipositor 0.3 mm.

Head polished; temples flat; postocellar and ocell-ocular lines equal and about a half greater than diameter of lateral ocellus; malar space half as long as basal width of mandible; apex of scape much less oblique than usual; face slightly longer than wide; thorax subpolished, obscurely shagreened; propodeum finely shagreened and with a shallow furrow in basal middle; abdomen shagreened, subpolished at apex and at apices of tergites; first tergite one and a half times as long as wide, twice as wide at apex as at spiracles, its sides straight with spiracles barely protruding, its anterior basin very short with the carinae not extending beyond the summit, its dorsal surface with a weak median impression and strong oblique lateral impressions; rhomboidal areas strongly defined; second tergite but little wider than long; transverse cubitus subobsolete; nervellus straight; hind basitarsus barely longer than next two joints together.

Pale brownish rufous with head black; prescutum in front, pronotum in front both dorsally and laterally, prosternum and mesosternum, propodeum and first tergite, tergites 2-5 except basal third, which is yellow, and all of remaining tergites of varying shades of fuscous and rufo-fuscous, the paler shades being on apical tergites and disks of middle tergites; scutellum yellow; mandibles, apex of clypeus, palpi, scape, pedicel, wing bases, tegulae, humeral angle of pronotum, and spot below tegula white; front and middle legs whitish with femora and tarsi stramineous; hind coxae and femora testaceous,

the latter infuscated toward tip with extreme apex white, trochanters white, tibia white with an obscure brownish annulus near the base and a broad nearly black one at apex, tarsi fuscous the first joint whitish at extreme base.

Type locality.—Santa Cruz Mountains, California.

Type.—Cat. No. 19174, U.S.N.M.

A single female bearing the Bureau of Entomology No. 23502, which refers to a note in the Bureau files that records the specimen as having been reared, but from what host is not known.

The cocoon is about a third of an inch long by a third as wide, loosely woven and net-like, and pale pinkish-brown in color.

POLYSPHINCTA (ZATYPOTA) CROSBYI, new species.

Allied to *californiensis* Cushman but easily distinguished by its convex temples, longer second tergite, and generally more slender form and darker color.

Female.—Length 4.5 mm., antennae 3.5 mm., ovipositor 0.3 mm.

In addition to the above characters this species may be distinguished from *californiensis* by the following: First tergite with its sides concave between the spiracles and the apex, the latter prominent; second tergite about as long as wide at apex; transverse cubitus distinct.

Color pattern same as in *californiensis* but darker throughout, metasternum as well as prosternum and mesosternum black, all coxae and femora testaceous, those of front and middle legs somewhat paler, tibiae with the usual annuli, testaceous on middle and fuscous on hind tibiae; pale bands of abdomen narrower.

Male.—Length 4.0 mm., antennae 2.5 mm. Differs from female in having venter of thorax and appendages paler throughout, though dorsally not materially different, except that pale bands of abdomen are even less distinct; propodeum with furrow stronger, almost carinate; first and second tergites relatively somewhat shorter, the first with sides straight and spiracles not prominent.

Type locality.—Oswego, New York.

Other locality.—McLean, New York.

Type.—Cat. No. 19175, U.S.N.M.

Two specimens, the type collected July 1, 1897, and the allotype evidently reared under Cornell University No. 891 on November 3, 1911, by C. R. Crosby, for whom the species is named.

POLYSPHINCTA (ZATYPOTA) PARVA (Cresson).

Glypta? parva CRESSON, Trans. Amer. Ent. Soc., vol. 3, 1870, p. 155, female.

Type.—Acad. Nat. Sci. Phil., No. 1440.

(*Glypta?*) *Oxyrrhexis parva* (Cresson) VIERECK, Proc. U. S. Nat. Mus., vol. 42, 1912, p. 642.

Discussion based on the type, a female compared with the type, and one male.

Chiefly remarkable for its broken servellus and long tarsi.

Female.—Length 5.5 mm., antennae 4.0 mm., ovipositor 0.5 mm.

Head in front view very broad, the eyes large and prominent, strongly convergent within; oral region protuberant; malar space nearly as long as basal width of mandible; temples rather strongly convex; head polished. Thorax polished; notauli strong, prescutum long; propodeum shagreened, weakly, briefly canaliculate medially at base, noncarinate; legs long, slender, hind tarsus nearly as long as tibia; stigma broad with radius in middle; intercubitus very short; nervellus distinctly broken in lower third, perpendicular. Abdomen rather slender, shagreened, polished apically and on the apical areas of the tergites, median areas distinct on tergites 2–4, weak on 5; first tergite much longer than broad, sides rather weakly divergent, spiracles rather prominent; second tergite about as long as wide at apex.

Head black; mandibles, palpi, and scape and pedicel below white; face and clypeus piceous; thorax testaceous; pronotum and propodeum piceous; tegulae and humeral angles of pronotum white; front and middle coxae and all trochanters stramineous; hind tibiae white with small basal and large apical annuli fuscous, their tarsi fuscous except pale annulus at base of basitarsus; legs otherwise of various shades of testaceous; abdomen piceous, darker on apices of the tergites and with a tendency to yellowish at bases of tergites.

Male.—Length 5 mm.

Eyes even more prominent than in female; thorax bright reddish piceous; scutellum, mesopleura below, and mesisternum rufous; lower margin and humeral angle of pronotum, propleura, a large spot on upper angle of mesopleurum, and tegulae white; propodeum and abdomen as in female with a somewhat greater tendency to yellow at the bases of the tergites; legs white except extreme bases of hind coxae, base and obscure external stripe of hind femur, base and apex of hind tibiae, hind tarsus, except white basal half of basitarsus, and the same color pattern on the middle tibia and tarsus faintly indicated, all of which are more or less infusate.

The type is from Illinois, while of the National Museum specimens the female is from Los Angeles County, California, and the male from Bolton, New York.

SPECIES WRONGLY PLACED IN GENUS AND UNRECOGNIZABLE SPECIES.

Polysphincta acuta PROVANCHER, Nat. Can., vol. 12, 1880, p. 44, female.

S. A. Rohwer, who has examined the type, says that what is left of it (the abdomen and apices of the antennae are gone) is very like *Clistopyga canadensis* Provancher. But the shape of the abdomen and the long ovipositor as described by Provancher exclude it from that genus. From *Polysphincta* its long ovipositor and short first

tergite differentiate it. Except for the lack of an areolet it might be an *Epiurus*; or even without the areolet it may be a *Tromatobia*, though here the short first tergite is out of place.

(*Polysphincta cingulata* PROVANCHER) = *Tromatobia rufovariata* (Cresson).

Polysphincta nigriceps WALSH, and

Polysphincta nigrita WALSH, Trans. Acad. Sci., St. Louis, vol. 3, 1873, p. 144.

The types of the last two species have been destroyed and it is possible only to conjecture what they were. From Walsh's careful descriptions, however, it is evident that they were both species of *Zatypota* and closely allied to *nigrocephala* (Davis).

Polysphincta pimploides WALSH, Acad. Sci. St. Louis, vol. 3, 1873, p. 145,

If this is properly referred to the genus, as seems very doubtful, it is very distinct by reason of the very long ovipositor. I know of no species that approaches it in this respect.

(*Polysphincta pleuralis* PROVANCHER) = (*Bassus*) *Diplazon pulchripes* (Provancher).

(*Polysphincta rubricapensis* PROVANCHER) = (*Pimpla*) *Zaglyptus incompletus* (Cresson).

(*Polysphincta spinosa* DAVIS) = (*Pimpla*) *Zaglyptus incompletus* (Cresson).

Polysphincta rufigastra (ASHMEAD) = (*Pimpla*) *Zaglyptus animosus* (Cresson).

Isotypic, Ashmead having redescribed Cresson's type.

ZABRACHYPUS, new genus.

Differs from *Polysphincta* principally by the characters used in the foregoing key to genera. Its short, stout body with stout legs, very short tarsi, deep sternauli, and incomplete pentagonal areolet render it very easily recognizable.

Head distinctly narrower than thorax; malar space shorter than basal width of mandible; antennae stout; thorax nearly as high as long; propodeum very short, without either carinae or longitudinal groove; sternauli deep; legs stout, tarsi very short and thick; second intercubitus indicated by thickenings in cubitus and radius, the areolet irregularly pentagonal in position but open behind; first tergite broad with sides widely divergent; other tergites strongly transverse, elevations and impressions weak; exerted portion of ovipositor subequal in length to first tergite.

Genotype.—*Zabrachypus primus* Cushman, new species described below.

ZABRACHYPUS PRIMUS, new species.

Female.—Length 6.5 mm., antennae 4.25 mm., ovipositor 1.0 mm.

Head polished, rather densely pilose; face medially elevated and weakly punctured, about as long as wide; clypeus half as long as wide, arcuately subtruncate, rather weakly convex; malar space barely half as long as basal width of mandible; eyes large, convergent below, sinuate within; diameter of lateral ocellus, postocellar line,

and ocell-ocular line equal; temples convexly sloping; antennae stout, tapering slightly toward apex; thorax subpolished, weakly punctate; notauli deep, complete, prescutum rather low; metapleura and propodeum more coarsely and densely punctate, the latter polished medially; stigma narrow, radius in middle; nervulus postfurcal; nervellus perpendicular, strongly broken in middle; first tergite as broad at apex as long, with anterior basin broad and set off by rather strong carinae, with deep oblique apical impressions; following tergites rather densely, finely punctured, elevations transverse, apical tergites subpolished; exerted portion of ovipositor rather longer than first tergite.

Black; palpi white; clypeus, mandibles, and scape below piceous; antennae brown; tegulae yellow; wings faintly brownish; legs mostly testaceous, coxae piceous, those of front and middle legs reddish toward apex; hind tibiae and tarsi fuscous with subbasal annulus on tibia and basal annulus on basitarsus yellowish; apices of front and middle femora, bases of their tibiae, and all trochanters more or less yellow.

Type locality.—Montana.

Type.—Cat. No. 19172, U.S.N.M.

One female without other data.

Tribe THERONIINI Cushman and Rohwer.

The genera included in this tribe are *Theronia* Holmgren, *Neotheronia* Krieger, and *Epimecoideus* Ashmead. The first two have heretofore been placed in the (Pimplini) Ichneumonini, while Ashmead's genus was described in the Lissonotini. *Pseudacoenites* Kriechbaumer, synonymous with *Theronia*, was considered by its author to be related to *Acoenites* Gravenhorst, but was placed by Ashmead in the Lissonotini.

The closest relative of the Theroniini among the tribes is probably the Ephialtini, and from that tribe it is easily distinguished by the form of the ovipositor, the slit-like propodeal spiracles with their prominent surrounding carinae, the short, deep, parallel notauli, and the polished, usually light-colored body.

So far as definite information in regard to the host-relations of these insects is at hand, they are apparently secondary parasites through other Ichneumonidae, records of their having been reared from other Ichneumoninae and Ophioninae having been published.

Description.—Entire body almost unsculptured, smooth and polished; head transverse, narrow behind eyes, temples more or less convex; face broader than long, narrowed toward clypeus; eyes large, more or less distinctly emarginate or sinuate opposite antennae; ocelli large; frons slightly concave; malar space very short; clypeus truncate or rounded at apex; antennae long filiform, scape short and

strongly oblique at apex, pedicel about as long as scape, basal joint of flagellum nearly twice as long as second, those beyond middle as broad as long; thorax rather short, high anteriorly; notauli short and parallel, deep anteriorly with a ridge running back along the margin of the lateral lobe; prepectus broad, the carina turning sharply toward the promesothoracic suture about half way up the pleura; mesopleural suture angulate opposite the punctiform fovea; scutellum strongly convex, margined only at base; propodeum with at least a very strong apical carina, spiracle long and slit-like, the surrounding carina high; wings large, stigma narrow lanceolate, radius before middle, areolet broadly sessile, nervellus strongly reclivous and broken far above the middle; legs, especially posterior femora, stout, last tarsal joint in hind legs as long as first; abdomen fusiform, rather narrow at base; first tergite longer than broad and longer than second, others transverse, apical tergite short; ovipositor shorter than abdomen, subcylindrical, the lance nearly straight dorsally to apex; hypopygidium retracted.

Generic characters.—The three genera are separable by the structural and color characters used in the following key to genera. These are the only characters of any importance that have been discovered; and of these only two, the propodeal carinae and the infumation of the wing apices, are without exceptions within one or another of the genera as represented in the material examined. Krieger's very long and minute description of *Neotheronia*¹ applies almost equally as well, with these two exceptions, to *Theronia*. Even these two characters are more or less comparative, for some specimens of *Neotheronia* have the propodeum flattened medially with obsolete ridges in the normal positions of the carinae, and the infumation of the wings in that genus varies in intensity, sometimes almost to absence.

KEY TO GENERA.

1. Propodeum before apical carina divided into five areas, the lateral carina sometimes weak; prepectal carina only weakly curved at sternauli, not subangulate where it turns toward the promesothoracic suture, the sternauli weak; wings immaculate, stigma and costa usually red; face more or less elevated in middle, without longitudinal furrows; clypeus usually convex basally and impressed at apex.....*Theronia* Holmgren.
- Propodeum with longitudinal carinae wanting before apical carina; wings more or less infumate at apex, costa blackish, stigma usually so; face usually flat with two more or less distinct longitudinal furrows; clypeus flat, broadly rounded at apex and with a reflexed margin..... 2.
2. Prepectal carina as in *Theronia*; first tergite nearly parallel-sided, about four times as long as wide at apex, dorsal carinae obsolete; wings yellow with brilliant gold reflections, stigma except costal margin red; face slightly elevated medially and with very weak furrows.....*Epimecoideus* Ashmead.

¹ Krieger, R., Zeitschr. Hym. Dip., vol. 5, 1895, p. 289.

Prepectal carina deeply curved at sternauli and usually subangulate where it turns toward promesothoracic suture; first tergite broader with sides divergent, dorsal carinae distinct; wings at most slightly stained, stigma usually blackish; face usually flat with strong furrows, rarely elevated medially and without furrows.....*Neotheronia* Krieger.

Genus THERONIA Holmgren.

Theronia HOLMGREN, Öfvers. Vet.-Acad. Förh., vol. 16, 1859, p. 123. *Genotype*.—(*Pimpla flavicans* Fabricius) *Ichneumon atalantae* Poda.

Pseudacoenites KREICHBAUMER, Ent. Nachr., 1892, p. 219. *Genotype*.—(*Pseudacoenites moravicus* Kriechbaumer)=*Theronia laevigata* Tschek, according to Krieger, Zeitschr. Hym. Dip., vol. 3, 1902, p. 189-190.

As indicated above the difference between this and the other genera of the Theroniini is comparatively little and largely a matter of difference in degree of development of certain features. The carination of the propodeum and the immaculate wings will apparently, however, always distinguish *Theronia* from the other genera.

In our fauna the genus is represented by but two species. These are very distinct and easily identified by the characters employed in the following key. Both species were originally described in the genus *Pimpla* Gravenhorst.

KEY TO NORTH AMERICAN SPECIES.

Head largely yellow, more or less rufous dorsally and posteriorly; face not tuberculate; weakly punctate; first tergite in profile evenly curved above
.....*fulvescens* (Cresson).
Head black, face strongly punctate and medially tuberculate; first tergite elevated above
.....*melanocephala* (Brullé).

THERONIA FULVESCENS (Cresson).

Although a fairly common species and though originally misplaced in the genus *Pimpla*, this species has apparently escaped redescription, and it was not referred to its proper genus until thirty-two years later, when Howard recorded the rearing of a single male as a parasite of *Hemerocampa leucostigma* giving the author as Brullé. This mistake in authorship was not Howard's but Ashmead's, for the specimen on which the record is based is one of the series examined and was determined by Ashmead.

Krieger's variety *americana* of the European *atalantae* (Poda), based on a specimen from British Columbia, is undoubtedly this species; and a male labelled by Viereck with Krieger's name is a normal male of this species. In his latest mention of *fulvescens* Viereck¹ treated it as a variety of *atalantae*.

The present species is perhaps nothing more than a geographical race of *atalantae*, but judging from a comparison of the material at hand with 10 specimens of *atalantae* it differs in having the face slightly longer, the antennae fuscous above, the discocubital vein

¹ Hym. Conn., 1917, p. 323.

more or less angulate and sometimes even with a short ramulus, and the ovipositor more than half as long as the abdomen. In *atalantae* the antennae are concolorous above and below, the discocubital vein not at all angulate, and the ovipositor less than half as long as the abdomen.

Face rounded but not distinctly tuberculate medially, weakly, sparsely punctate; eyes distinctly, though broadly, emarginate opposite antennae; postocellar line and diameter of lateral ocellus subequal; epomia weak; sternauli obsoletely impressed; lateral carinae of propodeum weak basally, the costella not at all developed, the spiracle more than half as long as height of pleural area, its lower end very close to pleural carina, median carinae parallel; discocubital vein sinuate with a more or less distinct angulation in the middle, not strongly curved; hind femur with a distinct scrobe for the reception of the tibia, the scrobe flanked on the outside by a sharp ridge which is either scalloped or entire; first tergite in profile uniformly weakly arched above, but little longer than second.

Head mostly yellow, antennae reddish-brown, paler below, scape and pedicel yellow; thorax bright refescent varied with yellow below and on scutellum, three longitudinal stripes on mesoscutum darker, sometimes more or less brownish, prepectus with a more or less distinct brownish spot on each side, metasternum and thoracic sutures also sometimes brownish; abdomen darker rufescent, sometimes more or less piceous; wings more or less yellow; legs stramineous to pale testaceous, the lighter color on the front and middle coxae and trochanters and base of hind tibia, hind femur at base and apex more or less piceous, apical joint of hind tarsus concolorous with other joints.

This is a very widely distributed species and subject to great variation, especially in size and color of wings, and Viereck has described a variety, *mellipennis*, said to have the face medially finely rugulose and the wings strongly yellowish. The sculpture of the face varies somewhat in the series examined, and several specimens, including one from the same locality as Viereck's type, have very faint, fine rugulosity in the middle; but in the opinion of the writer neither this nor the depth of color of the wings is of even varietal significance. However, since Viereck's type has not been examined the variety *mellipennis* is treated as valid and separable from the typical form by the sculpture of the face as follows:

KEY TO VARIETIES.

- | | |
|---|------------------------------|
| Face not or very faintly rugulose medially..... | <i>fulvescens</i> (Cresson). |
| Face medially rugulose..... | <i>mellipennis</i> Viereck. |

THERONIA FULVESCENS FULVESCENS (Cresson).

Pimpla fulvescens CRESSON, Proc. Ent. Soc. Phila., vol. 4, 1865, p. 268, male.

Type.—No. 1541, Acad. Nat. Sci. Phila.

Theronia fulvescens (BRULLÉ) Howard, Bur. Ent. Tech. Ser. Bull. 5, U. S. Dept. Agr., 1897, p. 24.

Theronia fulvescens (CRESSON) Fiske, Tech. Bull. 6, N. H. Coll. Agr. Expt. Sta., 1903, p. 217.

Theronia atalantae, var. *americana* KRIEGER, Zeitschr. Hym. Dip., vol. 6, 1906, p. 240, male.

Theronia fulvescens (CRESSON) Morley, Rev. Ichn., pt. 3, 1914, p. 40.

Theronia atalantae fulvescens (CRESSON) Viereck, Hym. Conn., 1917, p. 323.

The difference between this and the variety *mellipennis* Viereck has already been discussed.

As indicated above, this species exhibits great variation. In the series examined the females range in length from 7 mm. to 13 mm. and the males from 7 to 15 mm. The color varies from almost stramineous to dark ferruginous, with more or less piceous on the abdomen, and the wing color from almost hyaline to deep yellow. The hind femur in the larger specimens has a high, sharp, scalloped ridge on the outer side of the scrobe, while in the smallest ones this is almost imperceptible and entirely lacks the scalloped edge; between these two extremes the variation is gradual.

The range of this species as represented in the National Museum is from coast to coast and from British Columbia and New Hampshire to New Mexico and District of Columbia. The type is from Colorado, and the types of Krieger's variety are from British Columbia.

Among these specimens are some said to have been reared from such hosts as *Hemerocampa leucostigma* Smith and Abbott, *Oreta rosea* Walker, *Tortrix fumiferana* Clemens, and tussock moth (California). Fiske records it as a secondary parasite on *Malacosoma americana* (Fabricius) through (*Pimpla*) *Itopectis conquisitor* (Say) and in one case as probably tertiary through *Itopectis* and (*Limneria*) *Hyposoter fugitivus* (Say). He states that it is externally parasitic. Fiske and Thompson¹ record it in connection with *Callosamia promethea* Drury, ascribing to it both primary and secondary parasitic habits, in the latter case through *Spilocryptus extrematis* (Cresson) and *Ophion macrurum* (Linnaeus). All of their records are based on examination of the cocoons of the host species, and in eighty per cent of all cases *Theronia* was positively proved secondary, while the statement that it was primary in the other cases is based on the fact that no remains of other parasites were found. To the present writer it seems impossible that a parasite can be both internally and externally parasitic. Its external habit

¹ Journ. Econ. Ent., vol. 2, 1909, p. 455-456.

was definitely proved by Fiske in his earlier work. Living as a primary parasite of pupae of lepidoptera it would of necessity be internal; and the writer believes that in the cases where Fiske and Thompson thought it to be primary the remains of the true primary were simply not found.

THERONIA FULVESCENS MELLIPENNIS Viereck.

Theronia fulvescens, variety *mellipennis* VIERECK, Trans. Amer. Ent. Soc., vol. 29, 1903, p. 87, female. Type.—Acad Nat. Sci. Phila.

This variety has already been discussed. It is based on a single female from Beulah, New Mexico.

THERONIA MELANOCEPHALA (Brullé).

Pimpla melanocephala BRULLÉ, Hist. Nat. Ins., Hym., vol. 4, 1846, p. 99, female.

Pimpla melanocephala Brullé, WALSH, Trans. St. Louis Acad. Sci., vol. 3, 1873, p. 131.

Theronia melanocephala (BRULLÉ) Cresson, Trans. St. Louis Acad. Sci., vol. 3, 1873, p. 132, note.

Discussion based on fifteen females and twelve males, all in the National Museum.

Differs from *fulvescens* as follows: Face medially tuberculate and strongly, densely punctate; eyes merely sinuate opposite antennae; postocellar line distinctly longer than lateral ocellus; epomia strong; sternauli wanting; lateral carinae of propodeum strong throughout, costella developed below, spiracle barely half as long as height of pleural area, its lower end distinctly removed from pleural carina, median carinae convergent basally; discocubital vein strongly curved, not at all angulate in middle; hind femur with at most an obsolete scrobe; first tergite in profile subangulate above, much longer than second. Head black, facial tubercle, clypeus, and mandibles more or less reddish-brown; color otherwise much as in *fulvescens* but generally darker, except abdomen, the yellow nearly absent and the piceous color if present on the thorax usually confined to the sides of the pronotum; apical joint of hind tarsus blackish.

In color this species is somewhat less variable than is *fulvescens*, but the variation in size is practically the same, females examined measuring from 7 to 13 mm. and males from 7 to 12 mm. in length.

The National Museum series includes specimens from Massachusetts, New York, Indiana, West Virginia, Maryland, and Virginia, while Provancher had it from Canada.

There are no biological records associated with any of the specimens examined, but it has been recorded as reared from *Porthetria dispar* (Linnaeus), *Malacosoma americana* (Fabricius), and *Halisidota maculata* Harris, in the second case associated with (*Pimpla*) *Ephialtes pedalis* (Cresson).

Genus *EPIMECOIDEUS* Ashmead.

Epimecoideus ASHMEAD, Proc. U. S. Nat. Mus., vol. 23, 1900, p. 52. *Genotype*.—*Epimecoideus apicalis* Ashmead, not described specifically.

This genus does not occur in North America, and is discussed here only to call attention to its proper position. Ashmead included it in his key to the Lissonotini. It is, however, closely allied to *Neotheronia* Krieger, so closely that it is doubtful if it is really generically distinct. Krieger¹ apparently included two allied species in *Neotheronia*, his *aurata* and *micans*. Ashmead's species is very likely synonymous with *micans*, but the tips of both front wings of the only specimen are missing and it is impossible to state whether or not it possessed the darker spot in the apex of the radial cell. Otherwise it agrees perfectly with the description of *micans*. It is from Ecuador, as is also Krieger's species.

(NEOTHERONIA) *EPIMECOIDEUS AURATUS* (Krieger).

(NEOTHERONIA) *EPIMECOIDEUS MICANS* (Krieger).

Genus *NEOTHERONIA* Krieger.

Neotheronia KRIEGER, Sitz. naturf. Ges. Leipzig, 1898, p. 119. *Genotype*.—*Theronia tolteca* Cresson.

The lack of all longitudinal carinae on the propodeum in front of the apical carina and the maculation of the wings serve to distinguish this genus from *Theronia*. To distinguish it from *Epimecoideus* only the characters used in the key, all of doubtful generic value, have been discovered.

Very largely neotropical in its range, whence Krieger² lists upward of 50 species, this genus is represented in North America by but two species, *septemtrionalis* Krieger and *winnamanae* Viereck. These two appear to be very likely synonymous, but using Krieger's key and Viereck's types as a basis for comparison the following differences are noted:

KEY TO NORTH AMERICAN SPECIES.

Prepectal carina strong above; face at clypeus less than four-fifths as broad as vertex;
first tergite with a dark band across middle..... *winnamanae* Viereck.
Prepectal carina weak above; face at clypeus four-fifths as broad as vertex; first tergite
without a dark band..... *septemtrionalis* Krieger.

NEOTHERONIA WINNAMANAE Viereck.

Neotheronia winnamanae VIERECK, Proc. U. S. Nat. Mus., vol. 44, 1913, p. 567, female. *Type*.—Cat. No. 15297, U.S.N.M.

Viereck separated this species from *septemtrionalis* Krieger by the difference in the number of antennal joints, the extent of the infumation of the wings, the presence of a dark band on the first tergite, and

¹ Zeitschr. Hym. Dip., Heft 5, 1905, p. 289.

² Idem, Heft 5, 1905, pp. 286-307, 333-338.

the black apical joint of the hind tarsus. There are in the United States National Museum, including Viereck's two types, ten specimens, four females and six males, which are without doubt conspecific. These show variation in the number of flagellar joints from 41 to 47, the number varying directly with size. The infumation of the wings is not as Viereck described it, but is perfectly normal for the genus, being faint entirely across the tip of the wing with a darker spot embracing the apex of the radial and upper outer corner of the third cubital cells. Krieger, by inference only, says that his species lacks the dark band on the first tergite; *winnamanae* has it, but in the series of specimens it varies from broad and distinct to nearly absent. In regard to the color of the apical joint of the hind tarsus in *septemtrionalis* Krieger says nothing.

The three characters used in the above key all show variation in the series examined, the width of the face and of the vertex being in the proportion of form 1:1.23 to 1:1.4.

In addition to the type females the National Collection contains another female from the type locality, Plummers Island, Maryland, September 29, 1912, P. R. Myers; one male, Cabin John, Maryland, June 25, 1917, E. L. Fouts; four males collected in Alabama by H. H. Smith, three at Pyziton, Clay County, and the other at Coleta; one female, Tallulah, Louisiana, V. I. Safro; and one male without locality.

NEOTHERONIA SEPTEMTRIONALIS Krieger.

Neotheronia septemtrionalis KRIEGER, Zeitschr. Hym. Dip., vol. 5, 1905, p. 305, male.

The differences between this species and *winnamanae* Viereck have already been discussed under the latter species and need not be repeated.

Krieger's material was from North Carolina.

HOST LIST.

ARACHNIDA.

Dictyna volupis.

Polysphincta (*Zatypota*) *dictynae* Howard.

Epeira sclopetaria.

Polysphincta (*Polysphincta*) *koebelei* Howard (?).

Epeira strix.

Polysphincta (*Polysphincta*) *koebelei* Howard (?).

Polysphincta (*Polysphincta*) *strigis* Howard.

Epeira trivittata.

Hymenoepimecis wiltii (Cresson).

Acrodactyla madida (Haliday). *Linyphia obscura*.

Steatoda borealis.

Polysphincta (Polysphincta) texana Cresson.

Tetragnathus, species.

Colpomeria kincaidii (Ashmead).

Theridium, species.

Polysphincta (Zatypota) theridii Howard.

HYMENOPTERA.

(*Pimpla*) *Ephialtes pedalis* (Cresson).

Theronia melanocephala (Brullé).

(*Limneria*) *Hyposoter fugitivus* (Say).

Theronia fulvescens fulvescens (Cresson).

(*Pimpla*) *Itopectis conquisitor* (Say).

Theronia fulvescens fulvescens (Cresson).

Ophion macrurum (Linnaeus).

Theronia fulvescens fulvescens (Cresson).

Spilocryptus extrematis (Cresson).

Theronia fulvescens fulvescens (Cresson).

LEPIDOPTERA.

Callosamia promethea Drury.

Theronia fulvescens fulvescens (Cresson). Primary and secondary.

Canarsia hammondi Riley.

Chlorolycorina albomarginata (Cresson).

Halisidota maculata Harris.

Theronia melanocephala (Brullé).

Hemerocampa leucostigma Smith and Abbott.

Theronia fulvescens fulvescens (Cresson).

Malcosoma americana (Fabricius).

Theronia fulvescens fulvescens (Cresson). Secondary.

Theronia melanocephala (Brullé).

Oreta rosea Walker.

Theronia fulvescens fulvescens (Cresson).

- Porthetria dispar* (Linnaeus).
- Theronia melanocephala* (Brullé).
- Tetralopha subcanalis* Walker.
- Chlorolycorina scitula* (Cresson).
- Tortricid on oak.
- Toxophoroides xanthozonata* (Ashmead).
- Tortrix fumiferana* Clemens.
- Theronia fulvescens fulvescens* (Cresson).
- Tussock moth (California).
- Theronia fulvescens fulvescens* (Cresson).
- Ypsolophus bipunctellus* Walsingham.
- Chlorolycorina albomarginata* (Cresson).

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