been bred by Sichel from the same host, and named and labeled by Dr. Arnold Foerster. Doctor Howard stated that three stations have been established in Russia and one in France for feeding gipsy and brown-tail moth larvæ in numbers in order to attract parasites to them. Doctor Howard then exhibited and explained an extensive series of photographs showing many of the interesting points along the journey.

The following papers have been presented and accepted for publication:

A PRELIMINARY REVIEW OF THE CLASSIFICATION OF THE ORDER STREPSIPTERA.

By W. Dwight Pierce.

Having practically completed the manuscript for my paper entitled "A monographic revision of the Order Strepsiptera Kirby" I am particularly desirous of paving the way for the classification therein proposed by publishing a brief synopsis of the general character of that classification.

The order was established by Kirby in 1813 and has subsequently been shifted from one position to another by various writers. The group has been placed in the Hymenoptera, Diptera, Coleoptera, and Neuroptera, and has been given ordinal value under the names of Rhipidoptera, Rhipiptera, and Rhiphiptera. The usual position has been to rank the group as the family Stylopidæ in the Coleoptera Heteromera. This is obviously false, for the Strepsiptera are all isomerous.

The Tertiary genus Mengea points out clearly the divergence of the group at that time and gives a strong basis for ordinal rank. The system of hypermetamorphosis, which is far more complicated than in any other order, the highly developed nervous system, the reduction of the prothorax, and many other characteristics, prove its claim to the highest rank. The proofs are given in detail in the forthcoming paper.

Order STREPSIPTERA Kirby, 1813.

An order of hypermetamorphic endoparasites with highly specialized reduction of certain functional organs, great spe-

cialization of other functional organs, and with dissimilar sexes.

♂.—Elytrophorous, winged, ephemeral, aerial. Head and thoracic segments united by elastic commissures. Head transverse, with eyes stalked and composed of regularly placed separated hexagonal ommatidia. Mouth parts specialized, rudimentary, vestigial, or lacking. Antennæ sensitive, with one or more joints laterally produced. Tarsi pulvilliform below; tarsal claws present only in genus Mengea.

♀.—Larviform, apodous, permanently endoparasitic, enclosed by the persistent skin of the pupa. Pupa larviform, apodous.

Reproduction prolific, ovoviviparous. Development endoparasitic and highly metamorphic. Alimentation osmotic. Hosts various, hexapodal.

TABLE OF SUPERFAMILIES—MALES.

1. Tarsi with five joints and two tarsal claws....MENGEOIDEA, n. superf.
   Tarsi with less than five joints.....2
2. Tarsi four-jointed; antennæ with third joint laterally produced, XENOIDEA, n. superf.
   Tarsi with less than four joints.....3
3. Tarsi three-jointed.....HALICTOPHAGOIDEA, n. superf.
   Tarsi two-jointed.....ELENCHOIDEA, n. superf.

TABLE OF FAMILIES—MALES.

Superfamily MENGEOIDEA Pierce.

Antennæ seven-jointed, third and fourth joints laterally produced, MENGEIDÆ, n. fam.

Superfamily XENOIDEA Pierce.

1. Antennæ seven-jointed, fourth joint short, others beyond elongate, MYRMECOLACIDÆ, n. fam.
   Antennæ not seven-jointed.....2
2. Antennæ six-jointed, last three joints not much surpassing the third, STYLOPIDÆ Kirby, redefined.
   Antennæ not six-jointed.....3
3. Antennæ five-jointed, with fourth joint very short, and fifth elongate, HYLECHTHRIDÆ, n. fam.
   Antennæ four-jointed, with third and fourth joints elongate, subequal, XENIDÆ Semenov, redefined.

Superfamily HALICTOPHAGOIDEA PIERCE.

Antennæ seven-jointed, having the third, fourth, fifth, and sixth joints produced laterally and the seventh elongate. HALICTOPHAGIDÆ, n. fam.
Antennæ four-jointed, with the third and fourth joints elongate, subequal.....DIOXOCERIDÆ, n. fam.

Superfamily ELENCHOIDEA Pierce.

Antennæ five-jointed, with third joint laterally produced, fourth and fifth elongate.....ELENCHIDÆ, n. fam.

TABLE OF GENERA—MALES.

Family I. MENGEIDÆ Pierce.

Mandibles, maxillæ, and maxillary palpi present, labial palpi absent; wings having eight primary veins from base, with one distal unattached vein between the second and third, and with the sixth and seventh apically united,

Mengea Grote, 1886 (*Triæna* Menge, 1866; nec Hübner, 1816).

Type of genus, *Mengea tertiaria* Menge, 1866, fossil in amber, Germany.

Family II. MYRMECOLACIDÆ Pierce.

Wings having eight primary veins from base, the fourth curved upward and branched at right angles.....*Myrmecolax* Westwood, 1858.

Type of genus, *Myrmecolax nietneri* Westwood, 1858, parasitic on a formicid, Ceylon.

Family III. STYLOPIDÆ Kirby, 1813.

Wings having eight primary veins from base, with two distal unattached veins between the third and fourth, and no distinct costal node.....*Stylops* Kirby, 1802.

Type of genus, *Stylops melittæ* Kirby, 1802, parasitic on *Andrena nigro-ænea* K., England, Germany, Hungary.

Described species:

kirbii Leach, 1814 = *melittæ* Kirby, 1802 (Saunders, 1872).

dalii Curtis, 1828, parasitic on *Andrena labialis* K., England.

hæworthi Stephens, 1829 = *melittæ* Kirby, 1802 (Saunders, 1872).

childreni Gray (Griffith, 1832), parasitic on *Andrena victima* Sm., Nova Scotia.

spencii Pickering, 1835, parasitic on *Andrena tibialis* K., England, Germany.

aterrima Newport, 1847, parasitic on *Andrena trimmerana* K., England.

trimmerana Smith, 1857 = *aterrima* Newport, 1847 (Saunders, 1872).

thwaitei Saunders, 1872, parasitic on *Andrena afzeliella* K., England, France, Germany, Switzerland, Hungary.

dahlii Friese, 1906 = *dalii* Curtis, 1828.

Family IV. Hylechthridæ Pierce.

Wings having seven primary veins from base, with two distal unattached veins between the third and fourth, and one between the fourth and fifth.....*Hylechthrus* Saunders, 1850.

Type of genus, *Hylechthrus rubi* Saunders, 1850, parasitic on *Prosopis rubicola* Saund., Epirus.

Described species:

quercus Saunders, 1850, parasitic on *Prosopis gibba* Saund., Epirus.

sieboldii Saunders, 1852, parasitic on *Prosopis variegata* Saund., Epirus.

rubi pustulatus Saunders, 1872.

Family V. Xenidæ Semenov, 1902.

1. Maxillæ unilobed.....2
   Maxillæ bilobed.....3
2. Maxillæ two-jointed.....Xeninæ, n. subfam., 4
   Maxillæ three-jointed.....Homilopinæ, n. subfam., 12
3. First lobe of maxillæ three-jointed, second one-jointed, Crawfordinæ, n. subfam., 13

Subfamily Xeninæ Pierce.

4. Wings having eight primary veins from base.....5
   Wings having seven primary veins from base.....11
5. Wings having two distal unattached veins between the third and fourth primaries.....6
   Wings having two distal unattached veins between the third and fourth primaries, and one unattached vein between the fourth and fifth primaries.....10
6. No distinct node on costal margin.....7
   Distinct node, or notch, on costal margin.....9
7. Antennæ tapering to tips of ramæ, short, hardly longer than head, ramæ equal, deflexed, compressed, somewhat ensiform; wings having eight primary veins from base, with two distal unattached veins between the third and fourth; œdeagus arising between two reflexed claws, broad at base, strongly reflexed toward apex, apically acute.....*Xenos* Rossi, 1790.

   Type of genus, *Xenos vesparum* Rossi, 1790, parasitic on *Polistes gallicus,* Italy.

   Described species:

   rossii Kirby, 1813 = *vesparum* Rossi, 1790.

   jurinei Saunders, 1872, n. nom. pro *vesparum* Jurine, 1818, parasitic on *Polistes gallicus,* Switzerland.

   Antennæ foliaceous, bluntly rounded at tips of ramæ (œdeagus not

bounded at base by two apical claws, simple, sinuate, reflexed); wings as in *Xenos*.....8

8. Palpi with basal joint short, robust, second elongate, subcylindrical, deflexed; œdeagus longitudinally ridged, *Pseudoxenos* Saunders, 1872.

Type of genus, *Pseudoxenos schaumii* Saunders, 1872, parasitic on *Ancistrocerus parietum* L., Corcyra.

Described species:

klugii Saunders, 1852, parasitic on *Hoplomerus lævipes* Shuck., Epirus.

corcyricus Saunders, 1872, parasitic on *Hoplomerus spinipes* L., Corcyra.

heydenii Saunders, 1852, parasitic on *Odynerus deflendus* Saund., Epirus, Corcyra.

Palpi with basal joint crassate, arcuate, second cylindrical, deflexed, *Paraxenos* Saunders, 1872.

Type of genus, *Paraxenos erberi* Saunders, 1872, parasitic on *Bembecinus peregrinus* Sm., Corcyra.

9. Œdeagus not arising between reflexed claws, short in proportion to the size of the ninth segment, not dilated near base, abruptly acute at apex; elytra longitudinally ridged, *Apractelytra,* n. gen.

Type of genus, *Apractelytra schwarzi,* n. sp., Washington, D. C.

10. First distal vein double.....*Eupathocera,* n. gen.

Type of genus, *Eupathocera lugubris,* n. sp., parasitic on *Sphex* (*Ammophila*) *extremitatus* Cress; Cincinnati, Ohio.

Described species:

sphecidarum Dufour, 1837, parasitic on *Sphex* (*Ammophila*) *sabulosa* L., France, Germany.

? *sieboldii* Saunders, 1872, parasitic on *Miscus campestris* Latr., Germany.

11. Two distal unattached veins between third and fourth primaries, one between fourth and fifth.....*Ophthalmochlus,* n. gen.

Type of genus, *Ophthalmochlus duryi,* n. sp., parasitic on *Prionotnyx atrata* Lep., Cincinnati, Ohio.

One distal unattached vein between third and fourth primaries, one between fourth and fifth; œdeagus considerably dilated at base, arising between two claws....*Acroschismus,* n. gen.

Type of genus, *Acroschismus hubbardi,* n. sp., parasitic on *Polistes crinitus* (*americanus*) Felt, Florida.

Described species:

X. nigrescens Brues, 1903, parasitic on *Polistes rubiginosus* Lep., Texas.

X. pallidus Brues, 1903, parasitic on *Polistes annularis* L., Texas.

wheeleri, n. nom. pro *Xenos peckii* Brues, 1903, nec Kirby, 1813, parasitic on *Polistes metricus* Say, Connecticut.

One distal unattached vein between third and fourth primaries, one between fourth and fifth; œdeagus cleft at apex, *Schistosiphon,* n. gen.

Type of genus, *Xenos peckii* Kirby, 1813, parasitic on *Polistes fuscatus* Fab., Newbury, Mass.

Subfamily Homilopinæ Pierce.

12. Genitalia consisting merely of a two-jointed plate-like exserted appendage (ninth and tenth segments), œdeagus not visible (according to Templeton).....*Homilops,* n. gen.

Type of genus, *Xenos westwoodi* Templeton, 1838, parasitic on *Proterosphex* (*Sphex*) *ichneumoneus aurifluus* Perty (*aurocapilla* Templ.), Brazil.

Subfamily Crawfordinæ Pierce.

13. Œdeagus not reflexed, nor bounded at base by claws, very narrow at base, vesiculate and bent at middle, tenuate and very acute at apex; wings having five primary veins from base, the fifth branched.....*Crawfordia,* n. gen.

Type of genus, *Xenos pulvinipes* Pierce, 1904, parasitic on *Panurginus* sp., West Point, Nebr.

Family VI. Halictophagidæ Pierce.

1. Prothorax band-like, not interrupted.....2

Prothorax disc-like, interrupted laterally by the mesothorax.....5

2. Prothorax simple, not arched forward; wings having six primary veins from base, with two distal unattached veins between the second and third.....3

Prothorax and mesothorax arched forward, fitting into excavation of head.....4

3. Third primary vein simple.....*Pentacladocera,* n. gen.

Type of genus, *Halictophagus schwarzi* Perkins, 1905, parasitic on *Agallia* sp., New South Wales.

Third primary vein broken, or with unattached vein commencing just before the apex on its anal side.*Halictophagus* Dale, 1832.

Type of genus, *Halictophagus curtisii* Dale, England.

4. Œdeagus large at base, acute and greatly reflexed at apex; wings with six primary veins from base, with two distal unattached veins between the second and third, and with the third primary vein branched apically. *Pentoxocera,* n. nom. pro *Bruesia* Perkins, 1905; nec Ashmead, 1903.

Type of genus, *Bruesia australensis* Perkins, 1905, parasitic on *Tettigonia parthaon* Kirk., Queensland.

Described species:

? *phœodes* Perkins, 1905, parasitic on *Hecalus immaculatus* Kirk., Queensland.

? *stenodes* Perkins, 1905, parasitic on *Paradorydium menalus* Kirk., Queensland.

5. Prothorax represented by a pronotal and prosternal disc placed in the excavation of the head and mesonotum; wings having six primary veins from base, with one distal unattached vein between the second and third.....*Anthericomma*, n. gen.

Type of genus, *Anthericomma barberi*, n. sp., New Mexico.

Family VII. Dioxoceridæ Pierce.

1. Thorax normal.....*Dioxocera*, n. gen.

Type of genus, *Dioxocera insularum*, n. sp., parasitic on *Xerophlœa viridis* Fab., Grenada, St. Vincent.

Family VIII. Elenchidæ Pierce.

1. Mouth parts consisting of mandibles and two-jointed maxillæ.....2

Mouth parts consisting of mandibles and two-jointed maxillæ, bearing on the first joint an elongate, knobbed, linear, chitinous filament 3

2. Species large; first antennal joint elongate, second very short and transverse; frontal process not prominent; oral cavity broad, semicircular .....*Deinelenchus* Perkins.

Type of genus, *Deinelenchus australensis* Perkins, 1905, parasitic on *Platybrachys* sp., Queensland.

Species small, first two antennal joints subequal; frontal process prominent; oral cavity triangular, wings having four primary veins from the base, with one distal unattached vein between the second and third, and two brief basal veins between the third and fourth.....*Elenchus* Curtis, 1831.

Type of genus, *Stylops walkeri* Curtis, 1829, England.

Described species:

tenuicornis Kirby, 1815, parasitic on Liburnia, England.

templetonii Westwood, 1835, Mauritius.

3. Species small; oral cavity triangular; wings having four primary veins from the base, with one distal unattached vein between the second and third; œdeagus somewhat dilated at base, very acute and with tip not greatly reflexed, *Mecynocera*, n. gen.

Type of genus, *Mecynocera koebelei*, n. sp. (*Elenchus tenuicornis* Perkins, 1905, nec Kirby, 1815), parasitic on *Liburnia*

campestris Van Duzee, and *Liburnia lutulenta* Van Duzee, Columbus, Ohio.

TABLE OF SUPERFAMILIES—FEMALES.

1. Cephalothoracic spiracles more or less easily discernible, generally prominent; four or five median unpaired genital tubes entering brood canal .....Xenoidea, n. superf.
   Cephalothoracic spiracles not usually discernible, never prominent..2
2. Tubercles of head apical.....Halictophagoidea, n. superf.
   Tubercles of head more or less obsolete, ventral; only three genital tubes entering brood canal.....Elenchoidea, n. superf.

TABLE OF GENERA—FEMALES.

Superfamily Xenoidea Pierce.

1. Head considerably narrower than metathorax at spiracles.....2
   Head not considerably narrower than metathorax at spiracles.....5
2. Hylechthridæ. Head not more than one-half as wide as metathorax at spiracles; lateral lobes of mesothorax indicating presence of supposed mesothoracic spiracles (auct. Saunders); lower lip (ventral) overhanging transverse slit, mandibles merely lobes. *Hylechthrus* Saunders.
   Head often much less than one-half as wide as the metathorax; no lateral lobes indicating presence of suppressed mesothoracic spiracles 3
3. Head about one-third width of metathorax at spiracles.....4
   Stylopidæ. Cephalothorax broadly truncate or rounded at apex; head about one-half width of metathorax at spiracles; five genital tubes entering brood canal.....*Stylops* Kirby.
4. Xenidæ. Halictoxeninæ, n. subf. Cephalothorax almost triangular, lateral margins sinuate, five genital tubes entering brood canal.....*Halictoxenos,* n. gen.
   Type of genus, *Halictoxenos jonesi,* n. sp., parasitic on *Halictus* (*Chloralictus*) *sparsus* Rob., Louisiana.
5. ? Crawfordinæ, n. subf. Cephalothorax with lateral lines extending from mandibles to spiracles.....*Crawfordia,* n. gen.
   Xeninæ, Homilopinæ, n. subff. Cephalothorax with head extending laterally not more than two-thirds of the distance to the spiracles, four genital tubes entering brood canal, *Acroschismus, Homilops,* n. gg.

Superfamily Halictophagoidea Pierce.

1. Transverse slit on cephalothorax narrow.....2
   Head subtruncate at apex, transverse slit very broad, cutting a deep

three-sided emargination in the head. ..*Agalliaphagus,* n. gen.
Type of genus, *Halictophagus americanus* Perkins, 1905, parasitic on *Agallia quadrinotata,* Ohio.

2. Mandibles prominent, toothed; thorax shorter than head, ventral slit turned posteriorly at sides.....*Dioxoccra,* n. gen.
Mandibles mere lobes.....3

3. Thorax shorter than head, rather suddenly narrowed to base; sides of head oblique.....*Pentoxoccra,* n. gen.
Thorax longer than head, gradually narrowed to base; sides of head convex.....*Megalechthrus* Perkins, 1905.
Type of genus *Megalechthrus tryoni* Perkins, 1905, parasitic on *Platybrachys?* sp., Queensland.

Superfamily ELENCHOIDEA Pierce.

Head trilobed, mouth seemingly on an elevation; transverse slit narrow, *Deinclenchus* Perkins.
Head presenting two obsolete areas; transverse slit very broad, deeply cutting a rounded emargination into the thorax; a thin curtain overhanging cavity at base.....*Mccynocera,* n. gen.

DESCRIPTIONS OF NEW SPECIES.

Apractelytra schwarzi, n. sp.

♂.—Length, 1.66 mm.; wing expanse, 4 mm.

Black, with whitish pubescence. Wings milky, very pubescent. Last ventral segment brownish; œdeagus yellow. Under parts lighter.

Genitalia consisting of tenth segment overlapping the trough-like cavity of the ninth segment, which is bounded by the flap-like edges of the last ventral segment and apically terminated by a short œdeagus. In the type specimen the œdeagus is not reflexed and shielded by the tenth segment, but is directed backward; the sinuation is slight until about the posterior one-fifth, where the tube is abruptly turned downward; the apex is abruptly acute.

Type.—No. 9827, U. S. National Museum. Two specimens.

Eupathocera lugubris, n. sp.

At present the only description which can be given this species is included in the generic table.

It is a parasite of *Sphex (Ammophila) fragilis* Sm., and was bred by Charles Dury at Cincinnati, Ohio, September 3 and October 2. The host defines the parasite.

Ophthalmochlus duryi, n. sp.

At present the only description which can be given this species is included in the generic table.

It is a parasite of *Prionony.x atrata* Lep., Cincinnati, Ohio, and was bred by Charles Dury, August 16 and September 21.

Acroschismus hubbardi, n. sp.

Xenos, sp. Hubbard, 1892.

♂.—Wing expanse, 5.5. mm., length, 2–3 mm.

Color brown. Antennæ apparently brown, but on closer inspection transparent yellow with blackish-brown pubescence, first joint yellow. Face fulvous, pubescent; mandibles transparent yellowish, glabrous. Vertex dark, head brown, eyes black. Prothorax and mesothorax dark, with elytra yellowish, pubescent, darker at club. Metathorax lighter, brownish, with exception of postscutellum, which is dark brown. Wings milky white, hyaline, iridescent, with dark brown costal margin; veining delicate yellowish brown, pubescence gray; last three veins very light. Legs yellowish. Abdomen yellow, with black borders.

Genitalia with the ninth ventral segment apparently uncovered, and apically cleft, forming two claws, from between which the siphonated œdeagus arises. Œdeagus reflexed and apically protected by the overhanging tenth segment. The genital pore through which the slender penis finds exit is situated at the basal one-third of the upturned tip of the œdeagus on the inner angle.

Described from specimens bred from *Polistes* (*americanus*) *crinitus* Felt by H. G. Hubbard at Crescent City, Fla., April 6.

Type.—No. 9825, U. S. National Museum.

Anthericomma barberi, n. sp.

♂.—Length, 1.25 mm.

Species stout, compact, with very large wings. General color black, wings milky white.

Pronotum obovate, disc-like, not connected with the prosternum, projecting about equally into emarginations of the head and mesothorax, medianly depressed longitudinally and transversely. Mesonotum transverse, anteriorly broadly emarginate for the admission of the pronotum; transversely depressed near apical margin. Metanotum very long.

Described from a single specimen collected by H. S. Barber at Santa Fé, N. Mex., May 6, 1904.

Type.—No. 9829, U. S. National Museum.

Halictoxenos jonesi, n. sp.

The single male of this species known was extracted from its puparium, but the antennæ proved it to be a xenid. In the forthcoming paper this species will be separated very clearly from any others by descriptions and illustrations of the female.

Parasitic on *Halictus* (*Chloralictus*) *sparsus* Rob. at Mound and Logansport, La.

ANNOUNCEMENT.

The descriptions given herewith are all very short, but sufficient to establish the genera. The complete revision of the group contains full descriptions of all species and many new species throughout the entire order.

DESCRIPTIONS OF NORTH AMERICAN TINEINA.

By August Busck.

Atteva edithella, n. sp.

Labial palpi black, sprinkled with light yellow at base and on exterior side. Antennæ purplish black. Thorax golden ochre-yellow, with two straw-yellow spots followed by two dark purple dots; collar dark purple; underside of thorax dark purple, with large straw-yellow spots. Ground color of fore wings light straw-yellow, with dark blue markings, some of which enclose ochre-yellow spots; entire costal edge dark blue; extreme base of wings ochre-yellow, limited by a transverse, irregular dark-blue line, which emits a short, slightly forked central spur; at basal fourth is an irregular, transverse, dark-blue fascia, or rather, two dark-blue lines coalescent in the middle of the wing and on costa, and enclosing two ochre-yellow spots, one shortly below costal edge and one on the dorsal edge; on the middle of the wing is another narrow dark-blue fascia, enclosing a small ochre-yellow dot near costa and dividing into a fork near dorsal edge, where it encloses a large ochre-yellow dorsal spot; at apical third begins a transverse dark-blue line which encloses a small round ochre-yellow spot shortly below costa and then becomes attenuate and ends before reaching the dorsal edge; a little before tornus is a large dark-blue dorsal spot, enclosing a round ochre-yellow dot; apex dark blue, with an ochre-yellow spot; between and connecting these larger margins are several narrow transverse dark-blue lines, connected with short cross bars of the same color and forming a net-work on the straw-yellow ground color. Hind wings dark fuscous, semitransparent, with dark veins and black edge. Abdomen purplish black above, with a ventral row of five transverse light-yellow spots. Legs dark purplish, with light-yellow annulations.

Alar expanse, 26 mm.

Maverick Co., Texas (J. D. Mitchell).