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U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

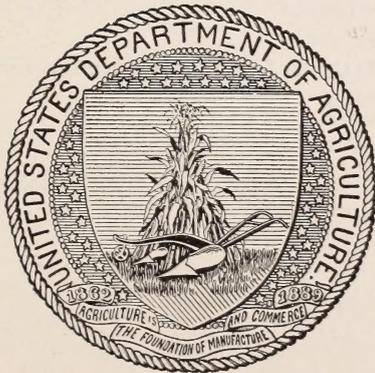
TECHNICAL PAPERS ON MISCELLANEOUS
FOREST INSECTS.

I. CONTRIBUTIONS TOWARD A MONOGRAPH
OF THE BARK-WEEVILS OF THE
GENUS *PISSODES*.

BY

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY,
Washington, D. C., July 25, 1910.

SIR: I have the honor to transmit herewith manuscript of the first part of a bulletin of the technical series to be entitled "Technical Papers on Miscellaneous Forest Insects. I. Contributions Toward a Monograph of the Bark-weevils of the Genus *Pissodes*," by Dr. A. D. Hopkins. Although the bark-weevils are among the most important enemies of coniferous forest trees, and especially of the young growth, comparatively little has been known heretofore of the species; hence the special need for this contribution as a basis for economic investigations and publications. It embodies the results of extensive systematic work by Doctor Hopkins on new material contained in the collections of the Bureau of Entomology and the United States National Museum and includes the descriptions of twenty-three species new to science.

I recommend the publication of this manuscript as Technical Series No. 20, Part I, of the Bureau of Entomology.

Respectfully,

L. O. HOWARD,
Entomologist and Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

PREFACE TO BULLETIN.

It is the purpose of this bulletin to include such miscellaneous technical papers on insects, other than the scolytid beetles, as are either injurious or beneficial and of more or less importance in their relation to American forests. These papers are based largely, if not entirely, on original observations and investigations, supplemented by material in the United States National Museum, and serve as a necessary basis for the nontechnical papers on the same insects. As they are intended to be of service especially to the economic entomologist and to the student of forest entomology, they are, as a rule, presented in a somewhat less formal style than if intended for the systematist only.

A. D. H.

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Division.	Subdivision.	Section.	Subsection.	Series.	Subseries.	Minor series.	Species number.	Technical name.	Common name.	Page.							
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30.	<i>curriei</i> Hopk.	30. Currie's bark-weevil.	37, 65														

Classification of the Genus *Pissodes*, Showing Technical and Common Names and Species Numbers. (Original.)

This diagram will enable the reader to refer at once to the technical and common names of any species number mentioned in the text, and will show at a glance the position and relations of the divisions, subdivisions, sections, subsections, series, subseries, minor series, and species into which the genus is divided.

TECHNICAL PAPERS ON MISCELLANEOUS FOREST INSECTS.

I. CONTRIBUTIONS TOWARD A MONOGRAPH OF THE BARK- WEEVILS OF THE GENUS *PISSODES*.

By A. D. HOPKINS,

In Charge of Forest Insect Investigations.

INTRODUCTORY.

The bark-weevils of the genus *Pissodes* represent an important class of enemies of pine, spruce, and fir trees. For this reason, in the future management of federal, state, and private forests there will be a demand for information on the species and on practical methods of preventing or reducing the damage from their attacks. Heretofore comparatively little has been known about the North American species, and consequently there has been much confusion in collections and in published information, due to the possession of insufficient facts relating to the destructive characters and habits of the described species, and especially because of the number of undescribed species which have not been recognized or have been wrongly identified.

It is the object of this contribution to revise the generic and specific descriptions, to describe the species recognized by the author as new to science, and to record some of the results of the more technical features of the investigations. This is part of a manuscript on the genus *Pissodes* which was prepared by the author in 1905, but which, owing to the pressure of other duties, was not completed.

The study of this group of beetles has made it plain to the author that there is urgent need for special work on the rhynchophorous beetles of the world, with a view to determining the more important characters on which to base a satisfactory classification of this important division of the Coleoptera. This is, however, too great a task to be undertaken by any one systematist until the principal genera have been thoroughly studied and monographed by specialists.

For a number of years the writer has given special attention to the family Scolytidæ, with a view to monographing it, and in connection

with this work the genus *Pissodes* has been studied in some detail and many other genera of the Rhynchophora and other Coleoptera have received attention in order that a broader knowledge of the order, and of the division to which the Scolytidæ belong, might be acquired, but there has been no idea of specializing on any but the Scolytidæ and possibly a few genera, like *Pissodes*, which are of special interest in connection with forest entomology.

The material which has served as a basis for this bulletin is that collected by the writer between 1890 and 1902, that collected by him and by the assistants in forest insect investigations, Bureau of Entomology, between 1902 and 1907, and that found in the collections of the United States Department of Agriculture and United States National Museum, especially in the Hubbard and Schwarz collection. Studies were made also of good series of specimens of 5 European species sent to the Bureau through the kindness of Dr. R. Heymons and Prof. H. Kolbe, of the Royal Zoological Museum of Berlin, and 3 European species represented in the United States National Museum collection.

The abbreviations adopted in this publication in referring to material in the different collections examined and that identified by the writer are as follows:

D. A.—Division and Bureau of Entomology, United States Department of Agriculture, Washington, D. C., other than *Hopk. U. S.*

Hopk. U. S.—Branch of Forest Insect Investigations, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

Hopk. W. Va.—West Virginia Agricultural Experiment Station, Morgantown, W. Va.

U. S. N. M.—United States National Museum, Washington, D. C.

H. & S.—H. G. Hubbard and E. A. Schwarz collection in the United States National Museum.

A. M. N. H.—American Museum of Natural History, New York, N. Y.

The author desires to acknowledge in this connection the assistance of Messrs. W. F. Fiske, H. E. Burke, and J. L. Webb in the collecting of material and recording of field observations, to Messrs. C. B. Dyar and E. J. Kraus for assistance in compiling the bibliography, and to Mr. J. F. Strauss for assistance in the preparation of the illustrations.

HISTORICAL REFERENCES.

The name *Pissodes* (pitch-colored) was first proposed by E. F. Germar (1817, p. 340) without description, but to include *Rhynchænus bufo* Fab., *Lixus notatus* Fab., and *Rhynchænus pini* L. Later (Germar, 1824, pp. 316–319) he described the genus, part of which was based on the mouth parts of *Pissodes pini* and *P. notatus*, but among the 10 species described only one, *P. nemorensis*, has been retained. A copy of the original description of the genus and of this species follows:

COPY OF ORIGINAL DESCRIPTION OF THE GENUS.

PISSODES. Genus novum.^a*Character generis.*

[p. 316] Rostrum thoraci subaequale aut longius, teres, scrobe sensim subtus flexa. Antennae pone medium rostri insertae, breves, funiculo septemarticulato, articulis subaequalibus. Oculi distantes, immersi. Thorax subtus integer. Scutellum distinctum. Coleoptera oblonga, abdomen et alas obtegentia. Pedes fortes, sub [p. 317] aequales, tibiis apice unco inflexo armatis, tarsis brevibus, latis, articulo penultimo bilobo.

Pissodis corpus oblongum, obscurum, maculis squamosis variegatum. Rostrum thoraci subaequale aut longius, tenue, arcuatum, teres, apicem versus planiusculum, scrobe lineari, sensim subtus flexa, basi rostri subtus connivente.

Antennae pone medium rostri insertae, breves, fractae, scapo recto, parum clavato, funiculo septemarticulato, articulis lenticularibus, 1. 2. sublongioribus, obconicis, clava ovali.

Caput parvum, rotundatum, oculis rotundis, lateralibus, immersis.

Mandibula valida, cornea, tridentata. Maxilla membranacea, intus biloba: lobo majore ovato, ciliato, denticulato, altero parvo, ensiformi, basali. Palpi quatuor aequales, conici. Glossarium corneum, oblongum, basi angustatum, intergerio parvo, basali, ciliato. Inveni instrumenta cibaria in *P. pini* et *P. notato*.

Thorax transversus, convexus, apice subito angustatus, coarctatus, subtus pone gulam leviter emarginatus, canali pro receptione rostri nullo praeditus.

Scutellum distinctum.

Coleoptera basi thorace parum latiora, oblonga, convexa, postice callosa, apice rotundata, abdomine haud breviora, alas obtegentia.

[p. 318] Pedes fortes, subaequales, antici approximati. Femora clavata, plerumque dentata, tibiae parum compressae, apice intus angulatae, extus unco magno introrsum flexo armatae, tarsi breves lati, articulis 1. 2. trigonis, penultimo latiore bilobo, ultimo clavato, biunguiculato.

Degunt species indigenae in truncis arborum resinosorum, captivi hostem tibiarum unco arcte complectuntur.

([No.] 456) PISSODES NEMORENSIS: femoribus muticis, piceus, thorace punctato rugoso, punctis duobus albis, elytris fulvo-subfasciatis, macula infra medium alba. Habitat in America boreali. (Kentucky.)

Affinis certe *P. notato*, paullo minor et macula elytrorum alba apici propius. Rostrum thorace longius, punctulatum, piceum. Thorax lateribus parum rotundatus, apice coarctatus, rugoso-punctatus, obsolete carinatus, piceus, punctis duobus disci albo-squamosis. Scutellum albido-squamosum. Coleoptera thorace paullo latiora, et latitudine sesqui longiora, lateribus recta, apice obtuse rotundata, utrinque impressa; convexa, striato-punctata, interstitiis alternis latioribus, elevatioribus, picea, brunneo parum squamosa, fasciis utrinque duabus obsoletis fulvis, posteriore juxta suturam macula alba terminata. Corpus subtus piceum, [p. 319] griseo-squamosum. Pedes picei, femoribus muticis, ante apicem griseo-annulatis.

[TRANSLATION OF ORIGINAL DESCRIPTION.]

PISSODES. New genus.

Generic characters. Beak not quite as long or longer than the prothorax, cylindrical, scrobe noticeably flexed under. Antennae

^aFrom "Insectorum species novae," by E. F. Germar, vol. 1 (Coleoptera), pp. 316-319, 1824.

inserted behind the middle of the beak, short, funiculus 7-segmented, the segments subequal. Eyes separate, sunken [impressed]. Thorax entire below. Scutellum distinct. The elytra oblong, covering the abdomen and wings. Feet strong, subequal, tibiæ armed at apex with an incurved hook, tarsi short, broad, the penultimate segment bilobed.

The body of *Pissodes* is oblong, obscure, variegated with spot-covered scales. The rostrum not quite equal to or longer than thorax, slender, curved, cylindrical, somewhat flattened toward the apex, scrobe linear, noticeably flexed under, in close approximation to the base of the rostrum below.

Antennæ inserted posterior to the middle of the beak, short, elbowed, scape straight, somewhat clavate, funiculus 7-segmented, the segments lenticular, 1 and 2 somewhat longer, obconical, club oval.

Head small, rounded, eyes round, lateral, sunken [margin impressed].

Mandibles strong, corneous, tridentate. Maxilla membranous, bilobed internally: the larger lobe ovate, ciliate, denticulate, the other small, ensiform, basal. Palpi four, equal, conical. Glossarium [labium] corneous, oblong, narrowed at base, intergerium [ligula] small, basal, ciliate. I have examined the mouth parts in *P. pini* and *P. notatus*.

Thorax transverse, convex, the apex slightly narrowed, coarctate, slightly emarginate below behind the gula, not provided with a canal for the reception of the rostrum.

Scutellum distinct.

Elytra slightly broader than the thorax at base, oblong, convex, posteriorly calloused, rounded at apex, not shorter than the abdomen, covering the wings.

Feet strong, subequal, approximate anteriorly. Femora clavate, frequently dentate,^a tibiæ hardly compressed, angulate interiorly at the apex, exteriorly armed with a large hook flexed inward, tarsi short, broad, segments 1 and 2 triangular, the penultimate broader, bilobed, the last clavate, with two claws.

The indigenous species live in the trunks of resinous trees; they are able to hold on to the host by the curved hook of the tibia.

[No.] 456. *PISSODES NEMORENSIS*: Femora shortened, piceous, thorax rugosely punctate, with two white spots, elytra subfasciate with yellow, a white spot below the middle. Lives in North America. (Kentucky.)

It is certainly similar to *P. notatus*, a little smaller, and the white spot of the elytra near the apex. Beak longer than the thorax, punctulate, piceous. Thorax with the sides somewhat rounded,

^a Relates to *Hylobius* and *Hilipus*.

coarctate at apex, rugosely punctate, obsoletely carinate, piceous, with two disklike spots of white scales. Scutellum with white scales. Elytra slightly broader than thorax and half again longer than wide. Sides straight, obtusely rounded at apex, impressed at either side; convex, striato-punctate, the alternate interspaces broader, more elevated, piceous, lightly clothed with brown scales, each with two obsolescent fulvous bands, posteriorly close to the suture terminated with a white spot. Body piceous below, with gray scales. Feet piceous, the femora shortened, annulated with gray before the apex.

Following are the names of the other species described and the genera and species to which they were later referred.

No. 457. *Pissodes macellus* = *Hylobius pales* Boh., Sch. Curc., II, 340.

No. 458. *Pissodes choicus* = *Hilipus choicus* (Germar).

No. 459. *Pissodes onychinus* = *Hilipus onychinus* (Germar).

No. 460. *Pissodes flammiger* = *Hilipus flammiger* (Germar).

No. 461. *Pissodes picturatus* = *Hilipus picturatus* (Germar).

No. 462. *Pissodes polymitus* = *Hilipus polymitus* (Germar).

No. 463. *Pissodes erythrorhynchus* = *Hilipus erythrorhynchus* (Germar).

No. 464. *Pissodes prodigialis* = *Hilipus prodigialis* (Germar).

No. 465. *Pissodes trachypterus* = *Hilipus trachypterus* (Germar).

Schoenherr (1826, pp. 225-226) was the first to subdivide the genus and to designate *Pissodes pini* (L.) as the type and *P. piceæ* (Ill.), *P. harcyniæ* (Herbst), *P. notatus* (Fab.), *P. piniphilus* (Herbst), and *P. nemorensis* Germ. as cotypes. Therefore, according to the rules of nomenclature (Stiles, 1905, pp. 26-27), *Pissodes pini* (L.) must stand as the type of the genus.

It appears that up to 1909 the genus was represented by 21 authentically recognized species, 7 from North America, 9 from Europe, 3 from eastern Siberia, and 2 from Japan, as follows:

LIST OF SPECIES OF PISSEDES DESCRIBED PREVIOUS TO 1909, WITH RECORDED DISTRIBUTION AND HOST TREES.

NORTH AMERICA.			
Species of Pissodes.	Reference to original description in bibliography.	Distribution.	Host.
<i>affinis</i> Randall.	1838, p. 24.	North America.	<i>Pinus</i> .
<i>costatus</i> Mannerheim.	1852, p. 363.	Sitka.	Pine (?)
<i>dubius</i> Randall.	1838, p. 24.	North America.	<i>Abies</i> .
<i>fasciatus</i> Le Conte.	1876, p. 143.	Oregon.	
<i>strobi</i> Peck.	1817, p. 205.	Maine to North Carolina.	<i>Pinus strobus</i> .
<i>nemorensis</i> Germar.	1824, p. 318.	Kentucky.	
<i>rotundatus</i> Le Conte.	1876, p. 143.	Lake Superior.	
EUROPE.			
<i>gyllenhali</i> Gyllenhal, in Schoenherr.	1836, p. 260.	North Germany, Sweden, eastern Siberia.	
<i>hareyniæ</i> Gyllenhal.	1813, p. 68.	Sweden.	
<i>harcyniæ</i> Herbst.	1795, Käf., vi, p. 294.	Middle northern Europe.	<i>Picea</i> .
<i>interstitiosus</i> Sahlberg.		Finland.	
<i>quadrinotatus</i> Panzer.	1801?	Germany.	
<i>notatus</i> Fabricius.	1787, p. 103.	Europe—Russia to Greece, Spain, Italy, Madeira, England.	<i>Pinus sylvestris</i> , <i>Pinus strobus</i> , <i>Picea</i> , <i>Larix</i> .
<i>var. castaneus</i> De Geer.	1775, p. 231.	Germany.	
<i>var. brunneus</i> Panzer.	1801?	Germany.	
<i>var. palmeus</i> Herbst.	1795, Käf., vi, p. 169.	Germany.	
<i>fabricii</i> Stephens.	1829, p. 88.	England.	
<i>pini</i> Olivier.	1807, p. 116.	France.	
<i>strobili</i> Redtenbacher.	1874, p. 417?	Germany.	
piceæ Illiger.	1807, p. 309.	Mountains of middle Europe; Caucasus.	<i>Abies pectinata</i> .
<i>fabricii</i> Leach, MSS., in litt.		England.	
<i>notatus</i> Sturm.	1826, Catalogue, p. 184.	Germany.	
<i>pini</i> Panzer.	1801?, 42, 1.	Germany.	
<i>piniphilus</i> Megele, MSS., in litt.		Hungary.	

- pini* Linnæus.....1798, p. 379.....Europe.....*Pinus sylvestris*, *Pinus strobus*,
Picea, *Larix*.
a. ferrugineus Rey.....1895.
abietis Schrank.....1798, p. 480.....Germany.
piniphilus Herbst.....1797, vii, p. 21.....Northern and middle Europe.....*Pinus*.
rotundicollis Desbrochers.....1810, p. 191.....Russia.
scabricollis Miller.....1859, p. 364.....Austria, Hungary, Bohemia.....*Picea*.
validirostris Gyllenhal, in Schoenherr.....1836, p. 259.....Northern Europe, Germany, Austria.....*Pinus sylvestris* (cones).
notatus Redtenbacher.....1874, p. 418.....Germany.
- ASIA (SIBERIA).
- cembrae* Motschulsky.....1860, p. 158.....Dauria (eastern Siberia) as far as the banks
of the Amur River.....*Pinus cembrae*.
insignatus Boheman.....Irkutsk (eastern Siberia).
Schoenherr.....Gen. Curc., vii, p. 133.
larvicinus Motschulsky.....1860, p. 159.....Dauria (eastern Siberia).....*Pinus* and *Larix*.
irroratus Reitter.....1899, p. 208.....Kamtschatka (eastern Siberia).
- JAPAN.
- nitidus* Roelofs.....1874, p. 121.....Japan.
obscurus Roelofs.....1874, p. 122.....Japan.

TAXONOMY.

CHARACTERS USED BY DIFFERENT AUTHORS.

Beginning with the second division of the Coleoptera or suborder Rhynchophora of most of the authors, the principal characters compiled from Lacordaire (1863), Le Conte and Horn (1876), Ganglbauer (1903), Kolbe (1903), and Bedel (1886-1888), which led up to the family Curculionidæ may be summarized as follows:

SUBORDINAL AND FAMILY CHARACTERS.

Head prolonged into a beak; maxillary palpi rigid, *4-jointed*, without *palparium* (see "Revisional notes," page 9); labial palpi 3-jointed; labrum absent; gular sutures wanting; prosternum with epimera extending across the base (see "Revisional notes," page 9); testicles globular; abdomen always with 5 (visible) ventral segments (see "Revisional notes," page 9); tibiæ without movable spines; *pygidium divided* (see "Revisional notes," page 9); elytra with strong fold toward inner edge; tarsi dilated, brushlike beneath, third joint bilobed, fourth obscure; mandibles without accessory pieces; antennæ geniculate, clubbed; beak more or less curved.

Continuing through the family Curculionidæ, the principal characters, adopted by one or more of the authors mentioned, which lead up to the subfamilies, tribes, or groups to which the genus *Pissodes* was referred, are as follows:

TRIBAL AND SUBFAMILY CHARACTERS.

Lacordaire (1863, pp. 442-464): Mentum leaving maxilla exposed; submentum forming a peduncle; anterior coxæ usually contiguous; pygidium covered by the elytra; metasternum more or less elongate; metepisternum at least moderately broad; antennal funiculus 7-jointed; beak variable, with antennal grooves; mesepimerum not ascending toward base of elytra; prothorax with anterior ventral margin usually emarginate. Tribe Hylobiides.

Tarsal claws free; elytra with elevations at base; mesepimerum usually large; body oblong, oval. Group Hylobiides.

Le Conte and Horn (1876, pp. 122, 137): Tibiæ with tooth of outer apical angle small; eyes not contiguous beneath; mandibles with 3 teeth; side pieces of metathorax distinct; lateral angles of first ventral segment not visible; mentum transverse; labial palpi large. Tribe Hylobiini.

Stierlin (1883, p. 403): Tibiæ compressed; inner edge bisinuate with apical hook. Subfamily Hylobiini.

Bedel (1888, p. 65): Tibiæ without distinct groove on the inner edge, but with an incurved apical tooth; ventral segments 2 and 4

with straight sutures; anterior coxæ separated, but without groove for beak; tarsal claws small. Tribe *Pissodini*.

Nüsslin (1905, p. 110): Beak with antennal insertion near the middle. Subfamily *Pissodini*.

REVISIONAL NOTES.

GENERIC CHARACTERS.

The anterior ventral margin of the prothorax is not slightly emarginate in any of the species examined by the writer. The reference to a dentate femur was based on the species of *Hylobius* and *Hilipus*. With these exceptions, the original description applies very well to all of the known species.

SUBORDINAL AND FAMILY CHARACTERS.

There has been considerable difference of opinion among systematists as to whether the palpus should be referred to as 4-jointed or 3-jointed.

It is evident to the writer that the lateral segment of the maxilla, which has been mistaken for the basal joint of the palpus, is homologous with the palpifer in other Coleoptera and orders of insects, and it would seem, therefore, that the rigid, 3-jointed palpi should be recognized as one of the important characters to distinguish the true Rhynchophora from the other Coleoptera. It would remove the Anthribidæ and some other groups which, on account of the absence of gular sutures, have been placed with the Rhynchophora, but the writer is inclined to agree with some recent authors that these really do not belong in the Rhynchophora. In representatives of the Curculionidæ, Scolytidæ, and several other families examined by the writer, the maxillary palpus is distinctly 3-jointed. In some, as in *Pissodes*, the palpifer closely resembles a basal joint of the palpus, but it joins the stipes and the apex does not extend beyond the base of the galea. Therefore it can not belong to the palpus, but is the part of the body of the maxilla to which the palpus is attached, designated as the palpifer.

ABDOMINAL SEGMENTS.

The abdominal tergites 7 and 8 have been referred to by various authors as the pygidium, propygidium, divided pygidium, etc. Indeed, the terms "pygidium" and "propygidium" have been extensively used in systematic entomology, and there is a very general lack of uniformity in their application to the apical or sub-apical tergite without regard to their numerical relation. There seems to be serious objection to this general application of these terms in classification, from the fact that in comparative anatomy

they have no meaning. Therefore in the use of the terms "pygidium" or "propygidium" it is important that the numerical position of the tergite should be mentioned.

In the Curculionidæ, for instance, tergite 7 of the female occupies the pygal position, while tergite 7 of the male occupies the propygal position, and tergite 8 the pygal. In the Curculionidæ, Scolytidæ, and many other Coleoptera abdominal tergite 7 is by far the most important of the series, owing to the fact that it presents important characters of structure, sculpture, stridulating accessories, sex, etc. (see Plate VI).

There is also some confusion with reference to the abdominal sternites, or ventral segments. The 5 segments often referred to as the first to fifth are the sternites of the third to seventh abdominal segments, the first and second being obscured by the coxal cavity (Hopkins, 1909, fig. 38). Therefore they should be referred to either in their proper numerical order or as the 5 visible abdominal sternites.

REVISED CLASSIFICATION.

It appears to the writer that it would contribute to a more convenient and natural arrangement if we would give the Curculionidæ of most authors the rank of superfamily, and thus promote the old subfamilies and tribes to families and subfamilies. Thus the genus *Pissodes* would fall in the superfamily Curculionoidea, family Curculionidæ, and subfamily Pissodinæ.

The subfamily Pissodinæ would come next to the group of genera comprising the subfamily Hylobiinæ. The two subfamilies are characterized as follows:

SUBFAMILY HYLOBIINÆ.

Anterior coxæ contiguous; prothorax with anterior ventral margin emarginate and produced toward the sides; beak stout, with antennal insertion in front of middle or toward the tip; eyes oval; tibiæ without tooth on inner apical angle. The North American genera of this subfamily are distinguished as follows:

- | | |
|-----------------------------------------------|-----------------------|
| I. Metasternum very short..... | <i>Paraplinthus</i> . |
| II. Metasternum long. | |
| A. Tibiæ with outer apical angle dilated..... | <i>Pachylobius</i> . |
| B. Tibiæ with outer apical angle not dilated. | |
| a1. Tibiæ commonly narrowed toward tip..... | <i>Hilipus</i> . |
| a2. Tibiæ not narrowed toward tip. | |
| b1. Femora not toothed..... | <i>Hypomolyx</i> . |
| | <i>Eudocimus</i> . |
| b2. Femora toothed..... | <i>Hylobius</i> . |

SUBFAMILY PISSODINÆ.

Anterior coxæ slightly separated; prothorax with anterior ventral margin not emarginate or produced toward sides; beak usually slender, with antennal insertion at or toward middle; eyes rounded; tibiæ with tooth on inner apical angle.

Metasternum long, femora not toothed..... *Pissodes*.

SUBORDINAL TO SUBFAMILY CHARACTERS.

Head behind the eyes without gular space; maxillary and labial palpi rigid, 3-jointed; labrum wanting or obscure.

Suborder Rhynchophora.

Beak or rostrum prominent; elytra with lateral fold or groove; abdomen of sexes with different number of tergites (8 in the males, 7 in the females); tarsi with fourth joint obscure, third bilobed, ventral surface of first to third densely clothed with fine velvety hairs, fifth joint with simple claws Superfamily Curculionoidea.

Gular peduncle (submentum) usually long; antennæ 11-jointed, geniculate..... Family Curculionidæ.

Prothorax with anterior ventral margin not distinctly emarginate; tibiæ with incurved apical tooth; femora unarmed; anterior coxæ not widely separated; abdominal tergites covered by the elytra; sternites 3 and 4 (1st and 2nd visible) very long, 5 and 6 short, 7 as long as 5 and 6 together; eyes rounded, widely separated.

Subfamily Pissodinæ.

GENERIC CHARACTERS.

Length, ranging from 3.7 to 10 mm.; body oblong, reddish brown to black, sparsely to thickly clothed with slender to broad scales, the latter often forming spots on the pronotum, elytra, and femora.

Pronotum variable; broader than long, rarely as long as broad, narrowed in front of middle and usually constricted toward head; posterior angles rounded, rectangular or acute; punctures of dorsal surface with intervening flat or elevated contiguous spaces which sometimes obscure the punctures.

Elytra variable, more than as long again, with the base as broad or slightly broader than the pronotum, the sides parallel or slightly narrowed posteriorly, and slightly constricted on each side of the declivity; interspaces convex to flat, the alternating ones often broader and more elevated; punctures of striæ regular or irregular in size. Declivity oblique, the third and ninth interspaces joined around a distinct impression at the apex of the fourth, seventh, and eighth interspaces; fifth strongly elevated at the vertex. Apex of each elytron rounded or subacute; striæ distinctly punctured.

Head (figs. 1, 2) behind the eyes globular, about one-half maximum width of prothorax, smooth, punctured, slightly impressed between the eyes and with a few scales on the front toward the margins of the eyes.

Beak slender, cylindrical, punctured, as long as prothorax or longer, with sides parallel or slightly narrowed toward middle, or slightly broader toward base of mandibles. Antennal insertion at or toward middle and the antennal groove beginning just in front of insertion and extending almost parallel with ventral margin to near eyes.

Antennæ (fig. 1).—Scape shorter than funicle, which is 7-jointed; first joint about as long as second and third together; second to seventh of about equal length, but slightly increasing in width toward club; first joint of club large, much longer on one side, and sparsely clothed with short hairs and long bristles; other joints of club slightly more flattened on one side, more densely clothed with fine hairs, and the sutures as shown in figures 1 and 2.

ANATOMICAL DETAILS OF THE ADULT.^a

THE HEAD.

The generic characters and anatomical details of the external skeleton and appendages of the head are shown in figures 1 and 2. When compared with the head of a scolytid beetle (figs. 3, 4), it is plain that the subordinal characters are common to both, but further than this there are certain features which at once refer them not only to different families but, in the writer's opinion, to different divisions of at least superfamily rank.

Mouth parts.—The *labrum* and *clypeus* are not represented, and the *epistoma* is only represented externally by a smoother area faintly defined by an obscure line and lateral bristles. As usual, the lateral angles, or area, support the dorsal articulation of the mandibles. The *hypostoma* also is obscurely defined externally, but is represented by the thickened declivous anterior margin of the ventral wall of the beak, by the sides of the submentum, and by a somewhat irregular apodeme, the anterior angles of which support the ventral articulation of the mandibles, the middle supporting the maxillary cardo, the inner anterior angle produced along the lateral area of the submentum, and the posterior angle ending just beneath the large hypostomal puncture. Thus the hypostomal area is that part of the ventral wall of the rostrum which lies anterior to the indistinct limit of the *pregula*. The *pleurostoma* is represented by the convex area surrounding the large mandibular scrobe. The solid *submentum*, or "gular peduncle" of authors, is evidently homologous with the bifid

^a For anatomical nomenclature, see Technical Series 17, Part I, Bureau of Entomology, U. S. Dept. of Agriculture, 1909.

submentum in *Dendroctonus*. Its apex is truncate or rounded, and supports the *labium*, the *mentum* of which is about as long as the

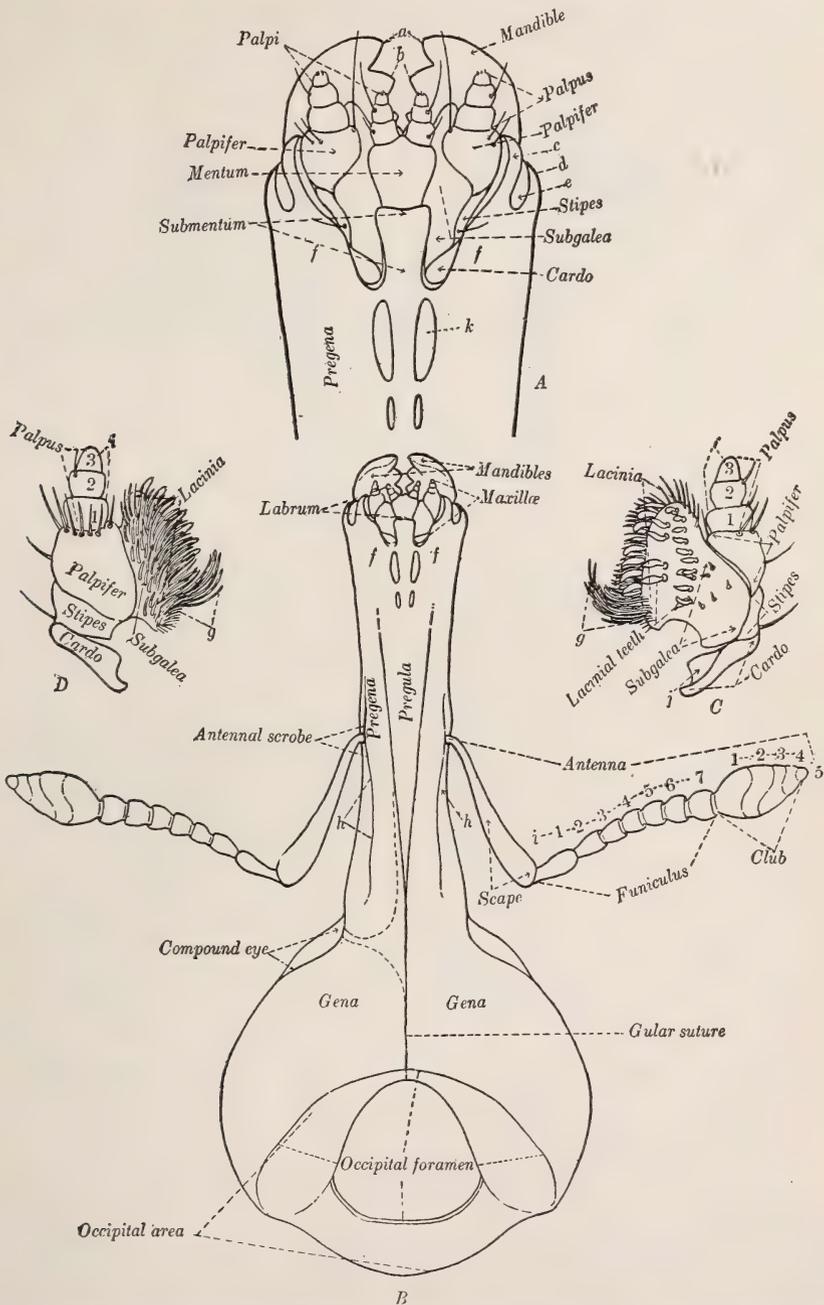


FIG. 1.—*Pissodes strobi*: Head, ventral aspect, and mouth parts. *A*, Ventral aspect of apical region of beak; *B*, ventral aspect of head; *C*, interno-lateral aspect of maxilla; *D*, externo-lateral aspect of maxilla; *a*, apical tooth; *b*, subapical tooth; *c*, lateral arm of hypostoma; *d*, pleurostoma; *e*, mandibular scrobe; *f*, hypostomal area; *g*, lacinial bristles; *h*, antennal groove; *i*, joints; *j*, fossa of cardo; *k*, hypostomal puncture. (Author's illustration.)

submentum and a little broader. The *labial palpifer* is not defined, but is represented by the anterior third of the mentum. The *labial*

palpi are stout, conical, and 3-jointed, and not so long as the mentum, the first and second joints of about equal length and the third short.

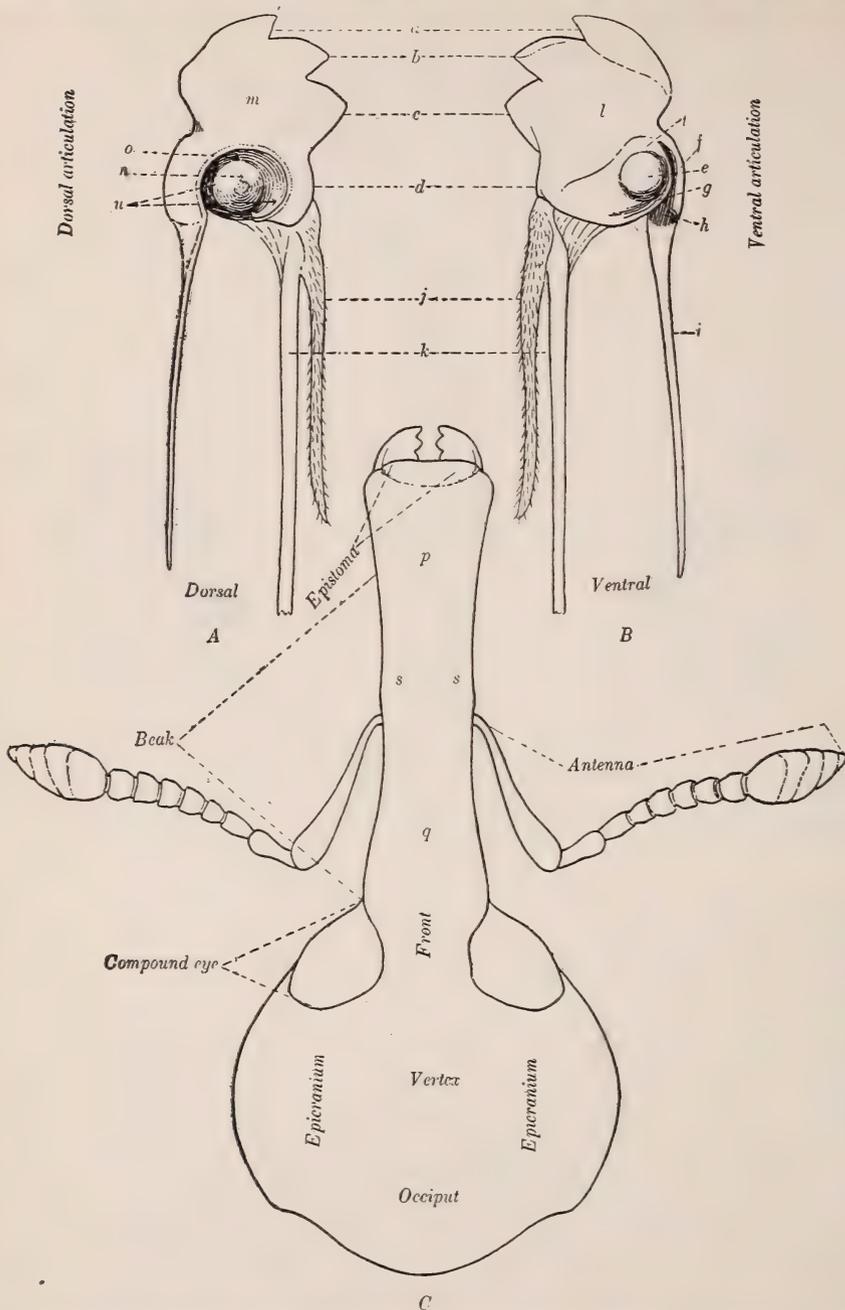


FIG. 2.—*Pissodes strobi*: Head, dorsal aspect, and mandibles. *A*, Dorsal aspect of left mandible; *B*, ventral aspect of left mandible; *C*, dorsal aspect of head; *a*, apical tooth; *b*, subapical tooth; *c*, median tooth; *d*, molar; *e*, median condyle; *f*, lateral muscle process; *g*, lateral condyle; *h*, lateral fossa; *i*, extensor tendon; *j*, pharyngeal bracon; *k*, retractor tendon; *l*, ventral area; *m*, dorsal area; *n*, median condyle; *o*, anterior fossa; *p*, anterior section of beak; *q*, posterior section of beak; *s*, dorsal area; *t*, anterior condyle; *u*, lateral fossa. (Author's illustration.)

The *ligula* is narrow and clothed with long bristles rising from the inner anterior margin of the mentum.

The form and relative proportions of the *maxillæ* are shown in figure 1, *C, D*, and in place in *A*. The *cardo* is short and stout, and articulates with the hypostomal apodeme. The *extensor*, *flexor*, and other *muscles* of the *cardo*, *maxilla*, and *labium* are attached to the

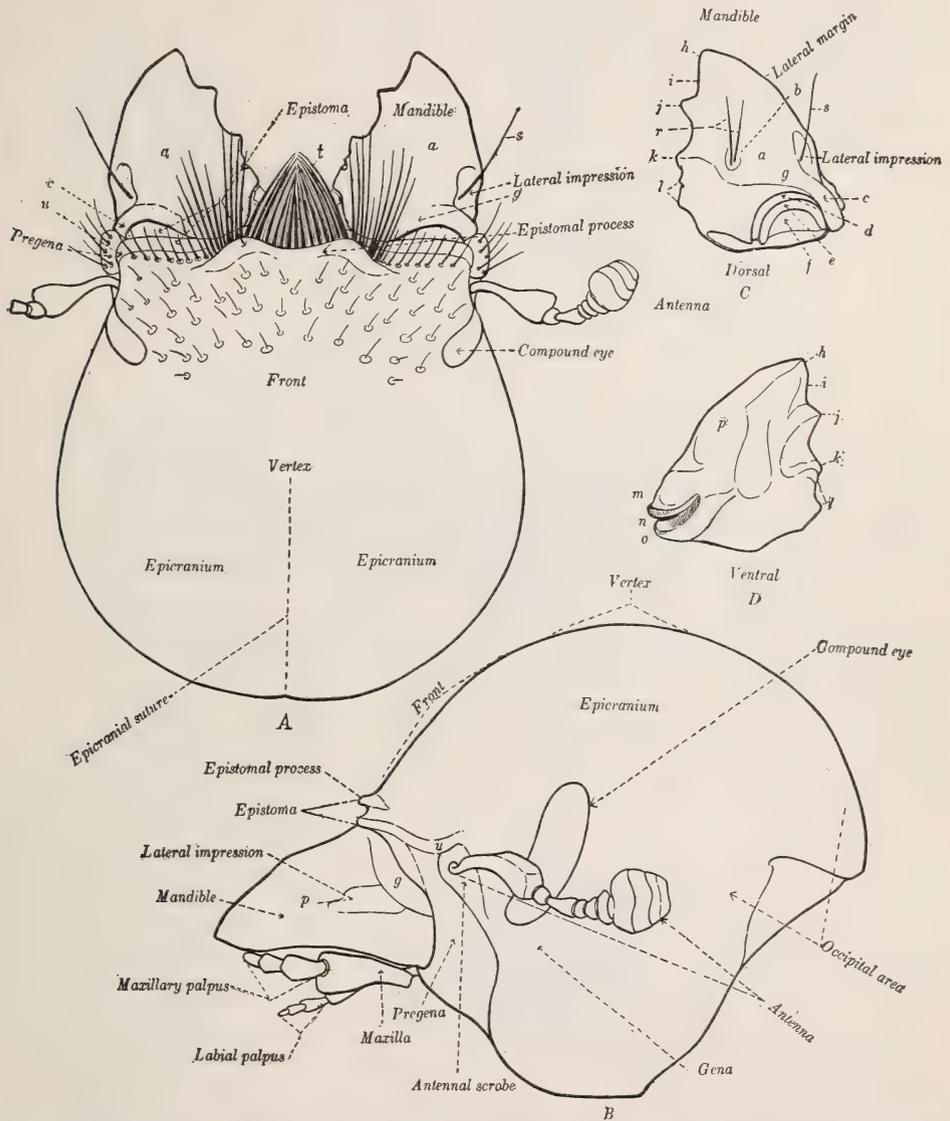


FIG. 3.—*Dendroctonus valens*: Head, dorsal and lateral aspects. *A*, Dorsal aspect of head; *B*, lateral aspect of head; *C*, dorsal aspect of right mandible; *D*, ventral aspect of right mandible; *a*, dorsal area; *b*, dorsal impression; *c*, anterior condyle; *d*, median fossa; *e*, median condyle; *f*, posterior fossa; *g*, basal ridge; *h*, apical tooth; *i*, acute margin; *j*, subapical tooth; *k*, median tooth; *l*, molar; *m*, anterior condyle; *n*, median fossa; *o*, posterior condyle; *p*, lateral area; *r*, dorsal bristles of mandible; *s*, lateral bristles of mandible; *t*, epistomal bristles; *u*, lateral angle of epistoma. (Author's illustration.)

inner ventral wall of the beak in a median triangular space between the hypostomal punctures and converging to a point near the anterior limit of the pregula. The *stipes* is clearly defined as a subbasal piece articulating with the *cardo* and joined to the palpifer and subgalea

by distinct sutures, and in this respect is very different from that in *Dendroctonus*, in which it is fused with the palpifer and subgalea. The *maxillary palpifer* is large and stout and from an interno-lateral

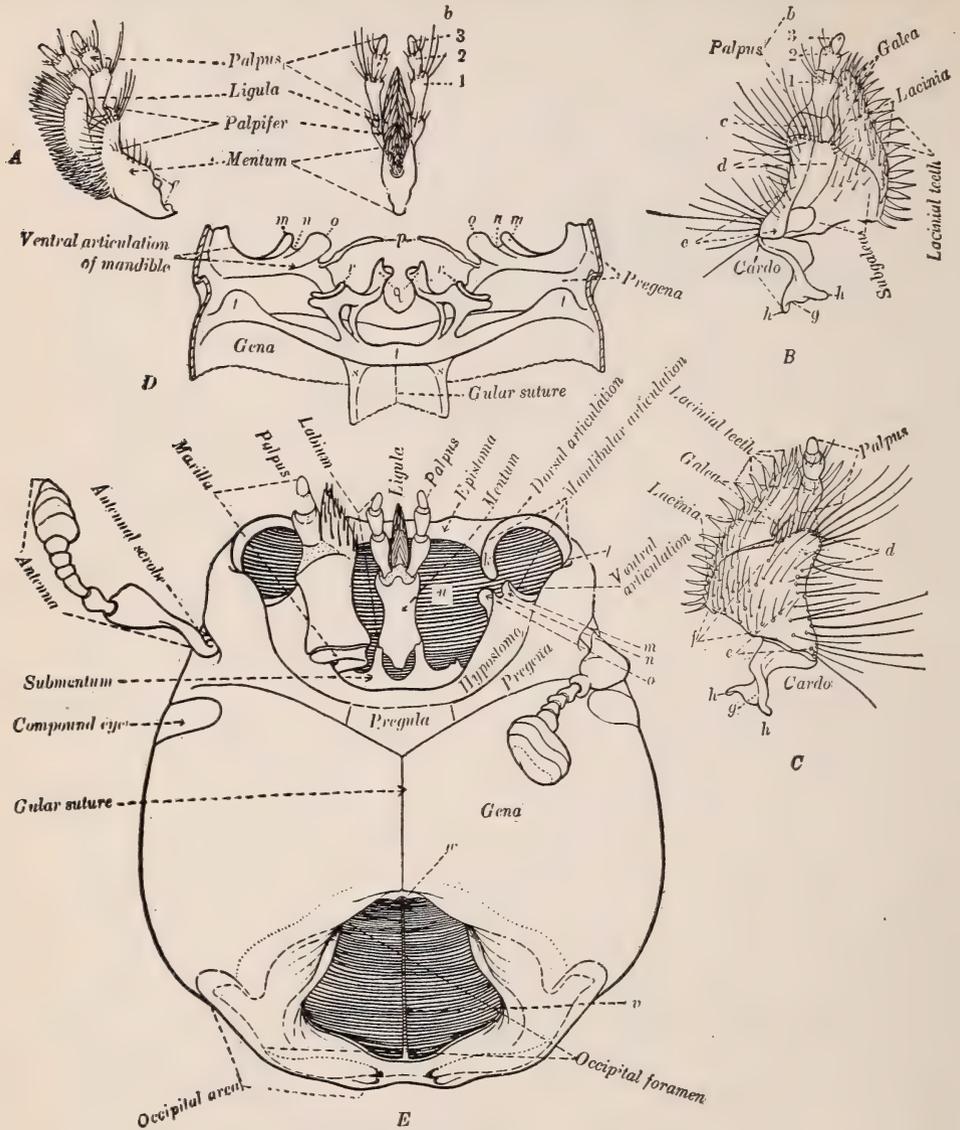


FIG. 4.—*Dendroctonus valens*: Head, ventral aspect, and mouth parts. *A*, Labium; *B*, maxilla, interno-lateral aspect; *C*, same, externo-lateral aspect; *D*, hypostomal region, dorsal aspect; *E*, head, ventral aspect; *a*, basal fossa of mentum; *b*, joints; *c*, basal membrane; *d*, palpiferal area; *e*, stipal area; *f*, subgaleal area; *g*, fossa; *h*, muscle processes; *k*, median condyle; *l*, lateral fossa; *m*, anterior condyle; *n*, median fossa; *o*, posterior condyle; *p*, hypopharyngeal bracon; *q*, submental process; *r*, maxillary condyle; *s*, gular apodeme; *u*, oral foramen; *v*, occipital apodeme; *w*, postgular piece. (Author's illustration.)

aspect is longer than the stipes and cardo together and much longer than the palpus. It is separated from the subgalea and stipes by distinct sutures, and resembles a very large first joint of the palpus.

The *subgalea*, *galea*, and *lacinia* are represented by one broad lobe without even the indication of sutures separating the lacinia from the subgalea as in *Dendroctonus*. The interno-lateral face and internal margin of the lobe are armed with stout lacinial teeth, while the externo-lateral face is clothed with bristles and hairs, those of the posterior angle being very long and curved. The palpus is stout, conical, 3-jointed, shorter than the palpifer, joints 1 and 2 of about equal length and 3 shorter.

The character of the *mandibles* is shown in figure 2, *A* and *B*. They are stout, subrectangular, and without a scar on the "outer surface." The inner edge has 3 prominent teeth; the apical, sub-apical, and median teeth are stout, triangular, and about equal in size, the molar not represented. The outer lateral area is deeply impressed at the base of the lateral muscle process, which is long and broad. The ventral articulation has a simple median "ball" condyle, while the dorsal articulation has a median "ball" condyle surrounded by a deep fossa. The *extensor* and *retractor muscles* are attached to the inner wall of the cranium, and are connected to the mandibles by long, very slender, subchitinous tendons (fig. 2, *i, k*). The *pharyngeal bracon* is also long and slender, and apparently subchitinous, thus serving as a rigid support or brace to the lateral wall of the *pharynx*.

The characters of the *antennæ* are shown in figures 1 and 2. The *scape* is slightly shorter than the *funiculus*, and the *club* is about half as long as either one. The funiculus is 7-jointed; joint 1 is about as long as joints 2 and 3 together; joints 2 to 7 are of about equal length and increase slightly in width toward the club. The club is subcylindrical, ovate, acuminate, with apex subacute and with 5 obscurely defined joints. Joint 1 is much longer on one side than on the other and sparsely clothed with short hairs and long bristles; the remaining 4 are about equal in length, slightly more impressed on the anterior face, and densely clothed with fine hairs which obscure the sutures; the sutures, according to the point of view, may be oblique, transverse, recurved, or procurved.

The *pregula* is clearly defined in the ventral area of the rostrum. The sutures diverge anteriorly from their junction with the median gular suture near the base of the rostrum. The *pregena* is represented by the longitudinal area between the pregular suture and the antennal groove.

THE THORAX.

The thorax, as is usual, consists of 3 distinct segments (fig. 9, p. 28). The prothorax articulates freely with the mesothorax, but the mesothorax and metathorax are firmly connected. The combined length of the sternal areas of the three thoracic segments is slightly greater than that of the sternal area of the abdomen, while the com-

bined length of the dorsal or tergal areas of the thoracic segments is also slightly greater than the tergal area of the abdomen. The pronotum is slightly longer than the mesotergum and metatergum together. The prosternal area is much longer than the mesosternal and about equal to that of the metasternal area. The metapleura show the same relative proportions as the sterna, and together are much longer than the abdominal pleura. The anterior dorsal margin of the pronotum is not greatly extended beyond that of the sternum, as it is in *Dendroctonus*; the posterior margin of the metatergum is but slightly extended anteriorly beyond the posterior ventral margin of the same segment, but it is much in advance of the posterior margin of the metapleura. (For a discussion of the divisions of the thoracic segments of insects and of the nomenclature, see Hopkins, 1909, pp. 23-35.)

THE PROTHORAX.

As is usual in the rhynchophorous beetles, the tergal, pleural, and sternal areas are fused into a continuous band. In addition to the preceding description of the *pronotum* there is usually a median elevated line extending from the anterior impression to the posterior margin, and each side of this line toward the middle there are two distinct impressions filled with whitish or yellowish scales, thus forming distinct subdorsal spots. There is also a broad, posterior, dorsal impression near the posterior margin. The lateral areas are usually marked with spots of scales, which are more or less distinct and variable in size and form. The anterior margin is usually evenly curved, but is sometimes slightly emarginate. The anterior ventral margin is never emarginate or distinctly produced toward the sides. The posterior dorsal margin is slightly bisinuate, and the posterior and lateral declivities of the notum are vertical. The posterior ventral margin is elevated and uniformly curved. The *episternal* and *epimeral areas* are not indicated by surface sculpture, but the *pre-episternal area* is plainly indicated by a transverse elevation anterior to a distinct transverse pleural groove. This groove also extends across the *sternal area* and thus defines the *presternal area*, which is strongly convex. The *sternum* is flat to subconvex, subdeclivous, the posterior section terminating in an acute point between the coxæ. The *sternellum* is represented by a small but distinct intercoxal piece and the *poststernellum* ("epimerum" of authors) by the narrow posterior area which incloses the coxæ. The coxal cavities are large, with the inner margins but slightly separated.

THE MESOTHORAX.

The mesothorax is short and partially hidden from view by the prothorax, which covers the anterior third of the sternites, pleurites, and tergites, while the base of the elytra normally covers the posterior

areas of the tergites, leaving only the scutellar process or scutellum exposed between the basal angles. This process is densely clothed with white or yellow scales.

When the prothorax and elytra are removed the *mesotergum* is found to be rectangular in form; the *prescutum* is clearly defined as a convex strongly chitinized notal plate, occupying about two-thirds of the tergal area. The anterior margin is acutely emarginate and the anterior angles strongly produced. The *prephragma* is strongly flexed beneath the posterior dorsal area. The *scutum* appears to be represented by a narrow dorsal area between the median process of the scutellum and the posterior limit of the prescutum, and by the lateral submembranous areas between the oblique lateral margin of the prescutum and the scutellum. The *scutellum* is represented by the prominent median process and laterally by the chitinous piece just posterior to the scutal area. The *postscutellum* is represented by the subventral and flexed margin of the scutellum and by a slender lateral arm.

Mesopleura.—The episternum, preepisternum, epimerum, and postepimerum are all clearly defined. The *preepisternum* is similar to that of *Dendroctonus*. It is nearly as large as the episternum, narrowed toward the sternum, and very broad toward the opposite extremity, where it projects over the anterior dorsal angles of the episternum and epimerum. The surface is testaceous and opaque. Its posterior margin is clearly defined by a distinct but narrow lateral impression, which is densely clothed with fine whitish scales. The anterior is strongly declivous, concave, shining, and the *preepisternal process* is prominent and broad, but not stout as it is in *Dendroctonus*. The oblique ventral margin is thickened, but the posterior dorsal section is very thin and without a distinct arm connecting it with the articulating condyles. In this respect and in the strongly dilated dorsal section the preepisternum is very different from that in *Dendroctonus*. The *episternum* forms an isosceles triangle with the anterior dorsal margin narrowly produced and disappearing beneath the dilated end of the preepisternum. The ventral and posterior angles are equal and acute. The surface is coarsely punctured and, as is common over the entire ventral area of the body, each puncture bears a broad scale. The *epimerum* is narrow, oblique, and broad at its junction with the anterior dorsal angle of the metepisternal plate. The ventral end is truncate, while the dorsal end is strongly narrowed and produced forward beneath the preepisternum, where it joins with the angle of the episternum to form the articulating processes. The *postepimerum* is narrow, declivous, and shining.

The *mesosternal area* is short, with the anterior margin bisinuate, the intercoxal piece elevated and truncate at apex, and the exocoxal pieces distinct. The *preepisternum* is represented by a narrow shining

area, but the *sternellum* and *poststernellum* are not represented by external areas. The coxal cavities are not widely separated. The mesothoracic spiracle is large and situated near the ventral edge of the preepisternal process where it is covered by the prothorax.

THE METATHORAX.

The *metatergum* is quite similar in general character to that in *Dendroctonus* (Hopkins, 1909, fig. 20); it is shorter and broad, and the *postscutellum* is very short and declivous. The membranous area of the *prescutum* is broad. The dorsal band is narrower. The scutellar groove is broad but less produced anteriorly. The metatergal costæ are not elevated above the scutum. The prescutal lobes are less prominent and the pleural hooks of the postscutellum are long and slender. Internally the median apodeme is more oblique and more acutely joined to the anterior apodeme. The longitudinal ridges formed by the deep lateral impressions of the scutellar groove are much more prominent and continuous from the anterior apodeme to near the posterior margin. The basal area of the wing and the articulating accessories are similar to those in *Dendroctonus*, differing only in minor details.

The *metapleura* are also similar to those in *Dendroctonus*, except that the *episternum* is narrower, the anterior ventral angle more produced and acute, the posterior end narrowed, and the exposed triangular plate of the *postepimerum* longer. The chitinous area of the *epimerum* is narrow, while the submembranous area or postepimeral area is correspondingly broad. The pleural clavicle is very long and the clavicle and coracoid processes are distinctly separated.

The *metasternal area* is a third longer than the mesosternal and twice as broad as long, without a median longitudinal groove, but with a median impression toward the posterior margin of the *sternum* proper. The *sternellum* is represented by an intercoxal piece covered by the median process of the abdominal sternite, and flexed beneath this is a plate which evidently represents the *poststernellum*. The coxal cavities are very large, widely separated, and suppress the first and second abdominal sternites. The metathoracic spiracle is situated in an open space between the metapleural clavicle and the mesepimerum.

THE ABDOMEN.

Tergites.—The abdominal tergites increase slightly in length from tergite 1 to tergite 4, inclusive, and also become more uniformly subchitinous; 5 and 6 are shorter than 4, and 6 is more membranous and has a pair of membranous lobes which are absent in the five preceding tergites; 7 and 8 are chitinous and clothed with short hairs. The epipleurites are membranous and quite clearly defined in living examples. The spiracle of segment 1 is very large, as usual, and the

others diminish slightly in size to and including the seventh. Spiracle 8 is evidently not represented. The character of abdominal tergites 7 and 8 in the males and females of different species is clearly shown in Plate VI. It will be noted that they are quite different from the corresponding tergites in *Dendroctonus*, both in form and vestiture. In those of *Pissodes* two or three hairs rise from each puncture instead of one, as in *Dendroctonus*, and in tergite 7 of the male the middle section of the posterior margin is broadly retuse, with the principal stridulating scrapers on the subacute lateral angles. In the female the posterior margin of tergite 7 is broadly rounded. The sensory tubercles in tergite 7 of both sexes appear to be of considerable taxonomic importance, especially in their number and arrangement.

Sternites.—The characteristic form and relative proportions of the abdominal sternites are shown in fig. 9 (p. 28). The intercoxal process of sternite 3 (first visible sternite) is broad, with a slightly produced acute apex. In addition to the description of the abdominal sternites on page 10, suture 3 (or the first visible suture) is bisinuate, with the middle section strongly curved forward. Sutures 4, 5, and 6 continue straight to the lateral margin. The apex of sternite 7 in the males is variously sculptured, as described in the synopsis of secondary sexual characters. Sternite 8 in the males (Plate IX, *f*) is small, separated in two sections, and forms the so-called genital plate, while in the females (Plate VII, *c*) it is solid and evidently fused with tergite 9, which is evidently represented by the chitinous rod on apodeme *d*, and the fork *j*.

The *hypopleurites* are completely covered by the elytra; 1 and 2 are fused with the anterior end of 3. The sides of 3 and 4 are nearly vertical and have the dorsal edges acute, to fit into the posterior lateral groove of the elytra; 5, 6, and 7 are oblique and increase in width to and including 7, the posterior margin of which is obliquely curved to fit around the lateral section of tergite 8 in the male or 7 in the female.

THE WINGS.

Mesothoracic wings (elytra).—In addition to the description on page 11, the mesothoracic wings, or elytra, have each 10 striæ and 11 interspaces, the latter including the costal and anal margins. The costal edge is deeply grooved for the reception of the produced dorsal edge of the metepisternum in the anterior section and of hypopleurites 3 and 4 in the posterior section. Beginning near the posterior end of this groove and extending obliquely to the apex there is a triangular area on the inner face of both elytra, which in the male is finely sulcate and serves as the stridulating rasp, while in the female the surface is roughened, with irregular elevations, apparently not available for producing sound. The subacute lateral angles of abdominal tergite 7 of the male evidently serve as the stridulatory scrapers.

Metathoracic wings.—The metathoracic wings are similar to those of *Dendroctonus*, but are at once distinguished by the two branches faintly connected with an evident cross-vein between the media and cubitus. The writer has not made a sufficient study of the modification of the veins in coleopterous wings to warrant anything more than the provisional interpretations indicated in the recently published figure (Hopkins, 1909, fig. 1).

INTERNAL ANATOMY.

The only parts of the internal anatomy that have been studied in detail by the writer are the reproductive organs of both sexes, which are of special interest, both from a systematic and from an economic point of view. These present taxonomic characters of last resort in the determination of the species. Those of the female are of interest from the fact that it is claimed that individuals must attain an age of several months before the ovaries are sufficiently matured for the development of eggs; also, that a single copulation may suffice for a long period; therefore it is important in our economic studies to be able to readily recognize the sexes and the approximate age of specimens collected at different times. The details of the male reproductive organs are shown in Plates VIII to XI, and require little explanation in addition to that given in the legends and synopsis. It will be seen that there are specific differences in the main body or stem (Plate XI), as well as in the fork (Plate X). The organs of reproduction in a very young female are shown in Plates VII and VIII, the parts of which are fully explained in the legends.

The profile of the abdomen (Plates VII and IX, *A*), with the parts *in situ*, shows the relation of the ventral and dorsal segments and genital plates to the different parts of the reproductive organs, certain parts of which are evidently direct modifications of the ninth and tenth dorsal and ventral segments. The figures are intended to illustrate the main features and are in some respects subdiagrammatical.

SECONDARY SEXUAL CHARACTERS.

Females.—In the females there are but 7 visible abdominal tergites, the eighth being completely covered by the seventh, which forms the pygidium. The beak is longer, smoother, and more slender than in the males. The apical or seventh abdominal sternite is usually shorter than the two preceding sternites together, which are usually less convex and more evenly punctured. The inner apical tooth of the tibiæ is also smaller.

Males.—In the males there are 8 visible abdominal tergites; the seventh is distinguished by the broadly retuse posterior margin, while the eighth is prominent, with the apex broadly rounded, and forms the pygidium. The abdominal sternites 3 and 4 are more con-

vex than in the female, less evenly punctured and more shining toward the middle. The beak is stout, shorter, less shining, and more distinctly punctured. The inner apical tooth of the tibiae is usually more prominent.

THE EGGS.

The eggs are pearly white, slightly oblong, and equally rounded at both ends.

THE LARVA.^a

The larva (Plate V, A) is yellowish-white, cylindrical, footless, with 3 thoracic and 9 distinct abdominal segments, the anal lobes representing the tenth; the thoracic segments not distinctly larger than the first abdominal. The hairs of the second prothoracic segment to the seventh abdominal segment are small and obscure; those of the head, first prothoracic, and eighth and ninth abdominal are longer and more conspicuous. The first thoracic segment has a shining dorsal plate and sometimes a distinct sternal plate. The ventral lobes of the three thoracic segments have inconspicuous foot calli, each with fine, erect hairs. The first thoracic segment has a distinct spiracle; the second and third segments are without spiracles, but the spiracles are distinct in the first to the eighth abdominal, and are round and not oblong or oval, as in *Hylobiinae*.

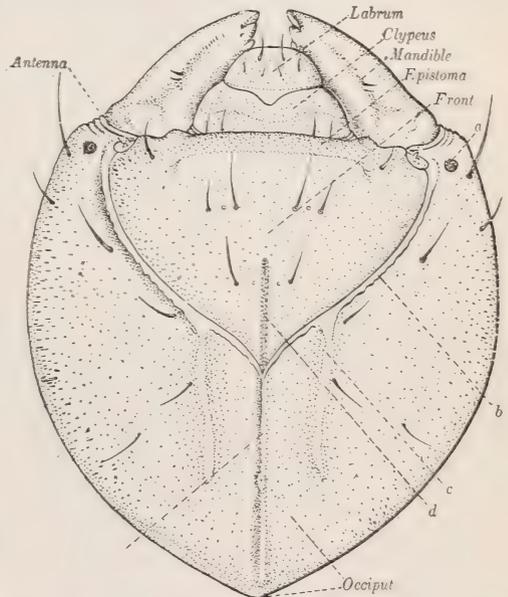


FIG. 5.—*Pissodes sitchensis*: Head of larva, dorsal aspect. a, Eye spot; b, frontal suture; c, subdorsal stripe; d, median line; e, epicranial suture. (Original.)

The head (figs. 5-8 and Plate V, A).—The head is light brown, the anterior margin and mandibles much darker. When removed, it is as broad as long (not including the mandibles), narrower in front than at middle, the sides broadly rounded from middle to apex, which is somewhat angular. The sides are nearly straight from the middle to the anterior angles, and the lateral area has an oblique, longitudinal, lighter area or stripe; the epicranial and frontal sutures are distinct and much lighter in color in fresh specimens. There are also 2 short, narrow, longitudinal stripes rising from the

^a For anatomical nomenclature, see Hopkins, 1909, pp. 57-64.

frontal suture. The anatomical details are very similar to those of *Dendroctonus*. The *frontal area* is triangular, with a distinct median line from the apex to or beyond the middle. The sutural margins are irregular or sinuate. The normal arrangement of the hairs is shown in figure 8. The *antennæ* are very small, conical, 1-jointed, and situated at the anterior extremity of the frontal suture. The *epistoma* is represented by the thickened anterior margin of the front, with which it is fused. It is usually darker in color, with the anterior margin declivous and nearly straight, and the lateral angles slightly produced and elevated where they support the dorsal articulation of the mandibles. The *pleurostoma* is represented by the thickened declivous area surrounding the mandibular foramen.

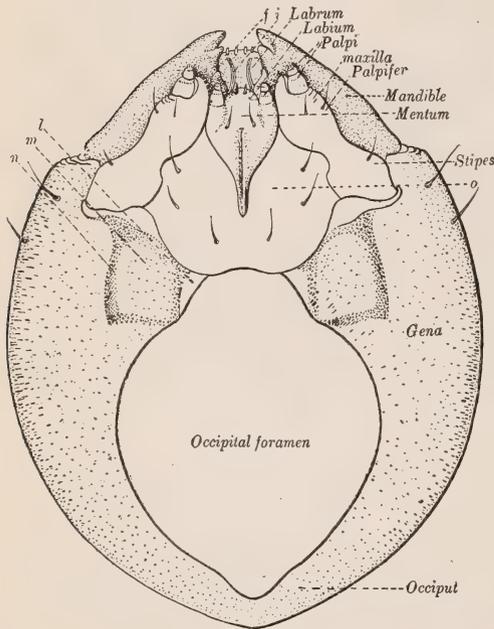


FIG. 6.—*Pissodes sitchensis*. Head of larva, ventral aspect. *f*, Apical papilla of labrum; *i*, labial hooks; *l*, gular plate; *m*, gular area; *n*, location of gular apodeme; *o*, submental lobe. (Original.)

The *mandibles* are rather stout, triangular, with 3 teeth on the anterior half of the inner edge. The apical tooth is usually acute, the subapical acute and near the apex, and the third or median tooth obtuse, emarginate, or triangular; usually the basal or molar tooth is not represented. The articulation is quite similar to that in larvæ of *Dendroctonus*. The dorso-lateral area of the mandible has a small impression and short bristle. The *eyes* are represented in some species by minute black spots beneath the exoskeleton, but apparently without lenses. The *maxillæ* (fig. 6) are much longer than broad, with a distinct *cardo*, and the *stipes*, *palpiger*, and

inner lobe are fused into one piece; the lateral area is elevated toward the base, as seen in balsam and when removed from the head. The palpi are 2-jointed, and the inner face of the lobes is armed with stout lacinial teeth. The *labium* (fig. 6), ventral aspect, has a large, membranous submental lobe (*o*) attached to and contiguous with the integument of the prothoracic sterna and laterally to that of the maxilla; it is also attached by ligaments to the intergular plate. The mentum is represented by a median triangular chitinous plate near the middle of the submentum. The mentum, *palpifer*, and *ligula* are fused, and the palpi are short, conical, and 2-jointed; the inner part of the *ligula* is membranous and contiguous with the pharynx. The arrangement of

the hairs on both the maxillæ and labium, as shown in figure 6, is characteristic and quite constant. The clypeus (fig. 5) is broad at base, the sides narrowed to the apical angles, and slightly to distinctly longer than the labrum. The *labrum* (fig. 5) is more chitinous, about three times as broad as long from apex of clypeus, the ventral posterior margin angular, and extending beyond the margin of the clypeus. The labral hooks are distinct (in balsam mounts), only slightly longer than the labrum, and, as usual, support the anterior portion of the epipharynx. An examination of the larvæ of 14 species showed that there is considerable specific variation in the form and proportion of the frontal area, clypeus, labrum, and mandibles. The last have characters of some divisional and subdivisional value, but the characters have not been sufficiently studied to present them in tabular form for the identification of the species. Certain characters common to one or more species of a division are given in a provisional synopsis on page 39.

THE PUPA.

(Plate V, B.)

An examination of the pupæ of 6 species of the first division and 3 species of the second division shows that the following characters are common to all: The apex of the posterior tarsus is even with the apex of the wing pad; the apex of the antenna extends toward the middle and in front of the anterior femur, but does not rest against it or touch the wing pad; the anterior, middle, and posterior femora have each 2 minute subapical spines; the head has 2 prominent spines toward the vertex, 2 smaller ones on the sides toward the eyes, and 2 small ones each side of the front between the eyes, and usually 3 pairs of smaller ones on the beak between the frontal ones and the base of the antennæ; the prothorax has 3 pairs of dorsal spines, one pair moderately closely placed on or toward the anterior margin, one widely separated pair on the median area, and the other pair situated toward the base and still more widely separated; the lateral area has 2 closely placed spines near the middle, and the basal angle has an oblique row of 3 spines; the mesoscutum and metascutum have each 2 rather closely placed spines on each side of the median space; the abdomen has 8 distinct dorsal tergites, and the dorsal area of each is armed with 2 spines, which slightly increase in prominence from the first segment to the sixth or seventh. In

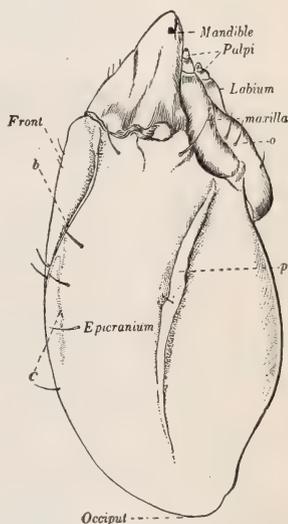


FIG. 7.—*Pissodes sitchensis*: Head of larva, lateral aspect. *b*, Frontal suture; *c*, subdorsal stripe; *o*, submental lobe; *p*, lateral stripe. (Original.)

some species there are alternating smaller, less regular spines between the dorsal and lateral ones. The lateral area of each tergite is armed with two spines and the epipleural lobes are each also distinctly or obscurely armed with one or two spines, and the ninth segment, as usual, is armed with two prominent pleural spines. (See Hopkins, 1909, figs. 37, 38, for anatomical nomenclature.)

HOST TREES.

The host trees of *Pissodes* are, so far as known, restricted to the conifers, and include *Pinus*, *Picea*, *Abies*, *Larix*, *Pseudotsuga*, and *Cedrus*. Some of the species infest both living and dying or newly felled trees, while others appear to confine their attack to those which are sickly, dying, or felled. Some of them infest the living terminals and upper branches, others the upper or middle, stem, or base; some prefer to infest the thick bark of large trees, while others show a preference for the thinner bark of saplings and poles. (See table, pp. 41-42.)

GENERAL HABITS.

The eggs are deposited in cavities excavated by means of the beak in the outer or inner portion of the inner bark. Some species deposit one or two eggs in a single cavity,

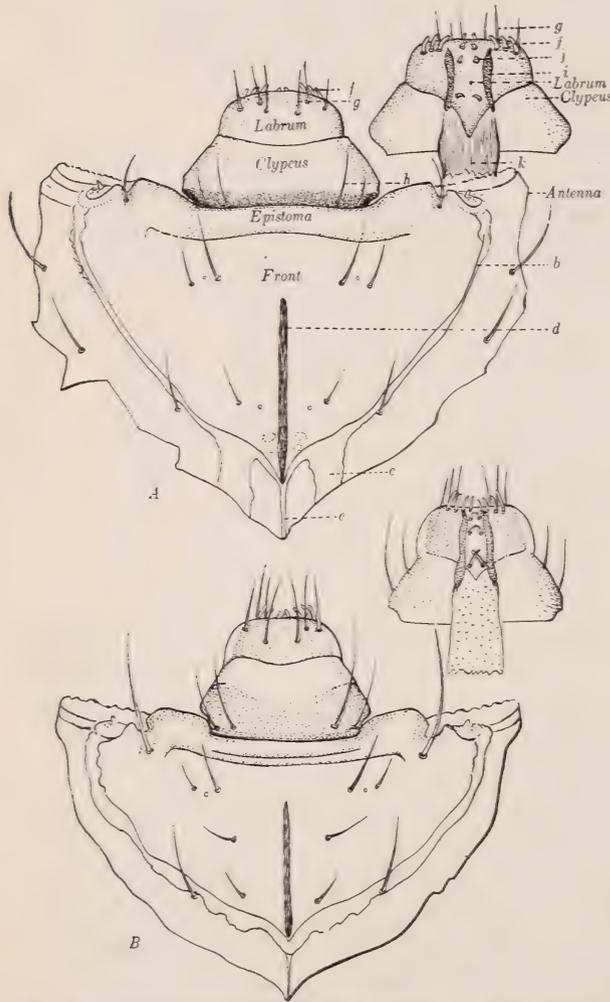


FIG. 8.—*A*: *Pissodes piperi*, front of head of larva. *b*, Frontal suture; *c*, subdorsal stripe; *d*, median line; *e*, epicranial suture; *f*, apical papilla; *g*, labial bristles; *h*, clypeal bristles; *i*, labral hooks or epipharyngeal bracons; *j*, epipharyngeal papilla; *k*, cesophagus. *B*: *Pissodes nemorensis*, front of head of larva. Nomenclature same as in *A*. (Original.)

while others deposit many. The larvæ obtain their food from the inner bark through which they extend their irregular mines (Plates XII to XVIII), and when they have completed their development

they excavate transformation cells, or pupal cases, in the outer portion of the wood, or, rarely, in the inner bark. These cells are inclosed by a thick covering of excelsior-like wood fiber, forming the so-called "chip cocoons," which are perhaps a more characteristic feature of the species of this genus than of any other.

GENERAL LIFE HISTORY.

The characteristic features in the life history of the species are the long life of the adult, the slow sexual maturity, the long period in which eggs may be deposited by a single female, and a single generation annually. In some species the broods develop within two or three months after the eggs are deposited, while in others it requires a longer period. The adults of some of the species emerge from the bark and hibernate in the ground, while others pass the winter in the bark.

GENERAL DISTRIBUTION.

The genus is represented in all sections of the United States characterized by natural growth of their host trees, and in other sections where such trees have been introduced to a sufficient extent to support them. (See table, pp. 40-41.)

THE NORTH AMERICAN SPECIES OF *PISSODES*.

NATURAL CLASSIFICATION OF THE SPECIES.

In the following key and synopses (pp. 30-38) an attempt is made toward a natural classification of the species of *Pissodes* into primary and secondary divisions, sections, series, etc., according to characters which indicate lines of specialization and natural affinities. It will be noted that the general modification, as in most Curculionidæ, is from a short or stout beak to a longer or more slender one, and in general from small to larger forms.

The characters of the pronotum, as commonly used to indicate species and groups of species, are found to be of little value in separating primary, or even secondary, divisions, but are of more importance in separating the subsections, series, and species. The specialization is plainly from a rounded, obtuse, to a rectangular and acute basal angle, but this specialization is confined to the smaller groups, and is therefore represented in the several sections as parallel developments. The pronotum is, in fact, quite variable in the individuals of the same species. In some reared specimens of the same species there is a wide range from a rounded to an acute basal angle, while in one specimen of *Pissodes nemorensis* the angle of one side is rectangular, while that of the other is acute. These radical departures from the normal may, however, be considered as deformities.

The length of the beak also varies; thus, in some of the females it is shorter than in some males of the same species. The elytra are more or less variable in form, but appear to be more constant than the other parts, and show little or no sexual difference.

The character and position of the spots of densely placed scales appear to be of special value in the classification of the genus, but these are sometimes rendered obscure in old, rubbed, and dirty specimens. The scales are so firmly attached, however, that they are often sufficiently retained in old specimens to be of value. Dirty specimens can be easily cleaned with chloroform or xylol, the latter being especially valuable for the removal of resin.

STATISTICAL TAXONOMY.

In a comparative study of the characters which distinguish the major and minor divisions and species of a genus or a larger group of

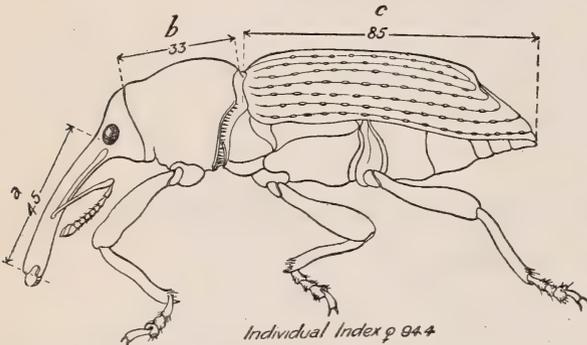


FIG. 9.—*Pissodes fraseri*: Lateral aspect, showing method of determining individual index. *a*, Length of beak; *b*, length of prothorax; *c*, length of elytra. (Original.)

organisms, a progressive modification of certain parts of the body structure is usually found to serve (*together with other characters*) as an index to a natural classification. Therefore the importance of having some clear and definite method of indicating the range and limit of such lines of modification or specialization is apparent.

The writer's experience with the statistical method in comparative studies of such modifications has convinced him that when it is accurately applied a mathematical formula may be determined to express the limit and relative taxonomic importance of a given modification in one or more structural characters, to indicate specific differences, and to show the relative position and rank the species occupy in a natural classification. Thus we may adopt for certain groups of insects a statistical taxonomy as a guide toward the classification of the species into natural divisions.

In the bark-weevils of the genus *Pissodes* we have a good example for the application of this method. One of the principal lines of modification available for statistical study is the progressive elongation of the beak. Therefore when we compare the average ratio or mode of the length of the beak to both the length of the prothorax and length of the elytra (fig. 9) in a number of individuals of one species with that of an equal number of individuals of another species,

no matter what differences there may be in the length of the body of the individuals, we get a mathematical expression, or index, of the difference in their relative proportions.

The following examples will serve to illustrate the application of the method:^a

Example 1.

Female individual of *Pissodes strobi*.

a, Length of beak, 29 micrometer divisions.

b, Length of prothorax, 31 micrometer divisions.

c, Length of elytra, 73 micrometer divisions.

$a \div b = .935$.

$a \div c = .397$, $+ .935 = 1.332$, $\div 2 = .666$ = Index of relative proportions of an individual.

Now, if 50 male individuals of this species show a range in the individual index of 61 to 64, with an average or mode of 63, and 50 females show a range of 65 to 69, with a mode of 68, the relative proportions for each sex and for the species are expressed by the formula, ♂ 63—♀ 68.

Example 2.

Female individual of *Pissodes fraseri* (fig. 9).

a, Length of beak, 45 micrometer divisions.

b, Length of prothorax, 33 micrometer divisions.

c, Length of elytra, 85 micrometer divisions.

$a \div b = 1.366$.

$a \div c = .529$, $+ 1.366 = 1.895$, $\div 2 = .947$ +. If 50 male individuals show an index range of 72 to 73 and a mode of 72, and 50 females show a range of 91 to 111, with a mode of .100, the formula would be ♂ 72—♀ 100.

P. strobi, formula ♂ 63—♀ 68.

P. fraseri, formula ♂ 72—♀ 100.

According to other characters, these two species fall in the same division of the genus, but in different subdivisions. The formulas for the species of the first division range from ♂ 57—♀ 62 to ♂ 72—♀ 100. Those of the first subdivision range from ♂ 57—♀ 62 to ♂ 74—♀ 79, while those of the second subdivision range from ♂ 64—♀ 70 to ♂ 72—♀ 100.

Thus the formulas for *P. strobi* and *P. fraseri*, together with the characters which refer them to their respective primary and minor divisions, indicate the natural position and rank they should occupy in the classification. (See Plate II.)

It is interesting to note that the Hylobiinae, which are plainly less modified in respect to the length of the beak than the Pissodinae, show their relative lower position in the determined formulas for representatives of the 4 principal genera (*Paraplinthus*, ♂ 47, ♀ 58; *Hilipus*, ♂ 35, ♀ 68; *Eudocimus*, ♂ 38, ♀ 49; *Hylobius*, ♂ 48, ♀ 56). It will be noted that the females of only two of the genera fall within the range of the Pissodinae, while *Hylobius*, which has some affinities

^aMeasurements up to 10 mm. may be made by means of a microscope with a micrometer eyepiece and a 2-inch objective, the tube adjusted so that each division in the micrometer scale equals five one-hundredths of a millimeter.

with *P. affinis* of the second division of the genus *Pissodes*, does not come within the range, but occupies the position probably held by the more primitive forms of the *affinis* division. (See Plate II.)

MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERS AND CHARACTERISTICS.

The plan of combining morphological characters and physiological characteristics as a basis for specific distinction, as discussed by the writer in the technical contribution on *Dendroctonus* (Hopkins, 1909, p. 64), has been followed in the study and classification of the species of *Pissodes*. The close resemblance of the adults of allied species and the wide range of specific variation render it very difficult and often practically impossible to refer some of the individuals to the species by external characters of the adults alone, but with information on the distribution, host, habit, seasonal history, etc., they can often be referred to their species without a moment's hesitation. Specimens without locality labels and some additional information are therefore of no value to the economic investigator, and will evidently become of less and less value to the systematists. The importance of utilizing bionomic data as guides to the identification of species will doubtless become more popular in the future and contribute to a more rapid advancement of the essential knowledge required by the systematic and economic entomologist in research work.

KEY TO THE SPECIES.

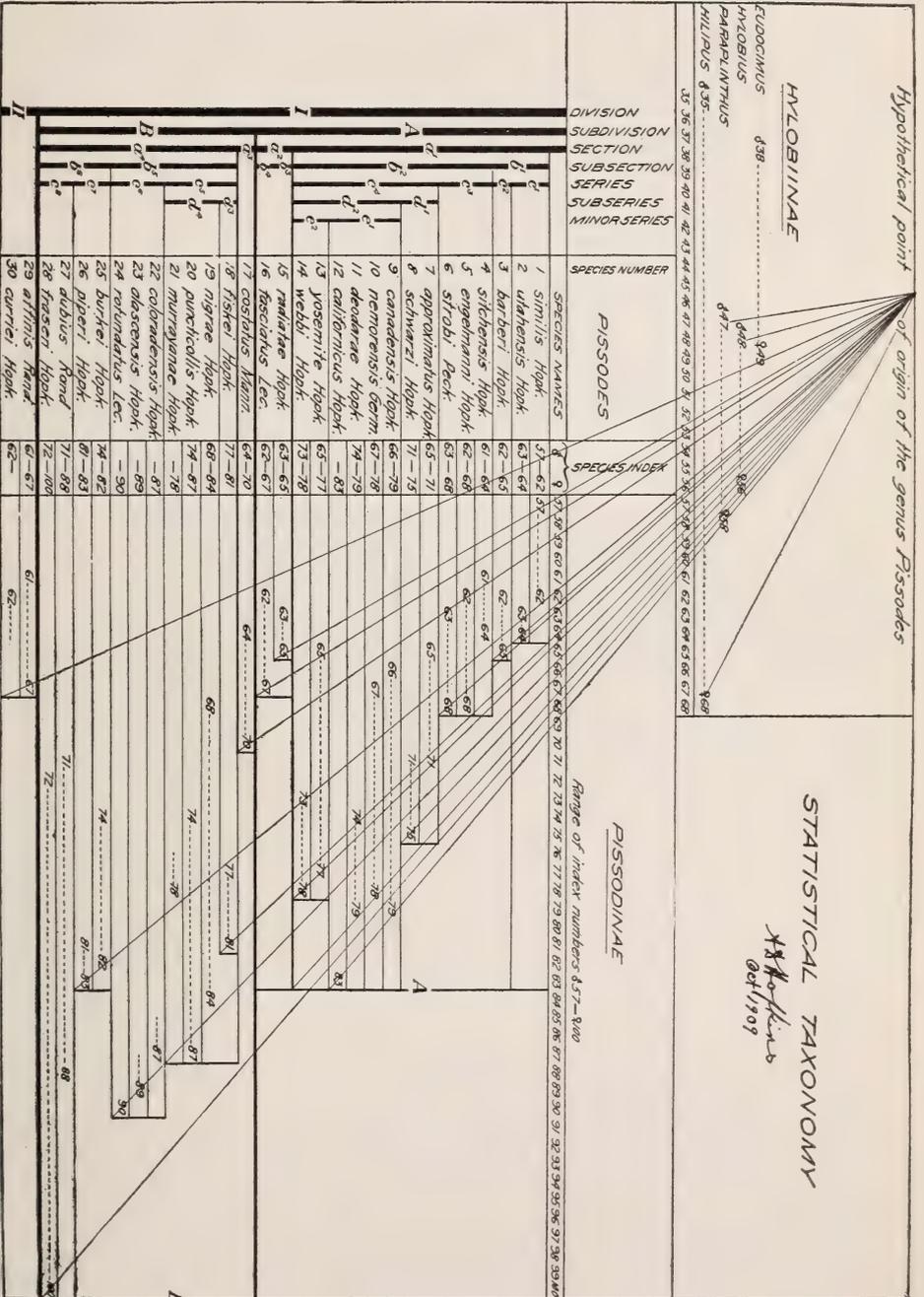
- I. Elytral interspaces 3 and 5 broader or more elevated than 2 and 4.
 - A. Elytra always with anterior and posterior spots.
 - a1. Elytra with distinct spots near vertex of declivity.
 - b1. Beak moderately stout, always shorter than prothorax.
 - c1. Elytra with distinct anterior spots and very large posterior ones.

Posterior spot with distinct dark border	1. <i>similis</i>
Posterior spot without distinct dark border	2. <i>utahensis</i> .
 - c2. Elytra with indistinct anterior spots and small posterior ones.

	3. <i>barberi</i> .
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 - b2. Beak slender, shorter or longer than prothorax.
 - c3. Elytra with anterior and posterior spots large.

Posterior spots of elytra without dark border.	Pacific Coast.
	4. <i>sitchensis</i> .
Posterior spots of elytra usually with dark border.	Rocky Mountains.....
	5. <i>engelmanni</i> .
Posterior spots of elytra with or without dark border.	Eastern U. S.....
	6. <i>strobi</i> .
 - c4. Elytra with small to moderately large anterior and posterior spots.
 - d1. Posterior brown spots moderately large.

Posterior brown and white spots usually separated.	Eastern and northern U. S.....
	7. <i>approximatus</i> .
Posterior brown and white spots fused.	Central and northern Rocky Mountains.....
	8. <i>schwarzi</i> .



STATISTICAL TAXONOMY OF PISODES. (ORIGINAL.)

d2. Posterior brown spots small.

e1. Elytral interspaces 3 and 5 elevated and broad.

Posterior spots fused, the yellow one larger. Manitoba 9. *canadensis*.

Posterior spots usually separated, yellow one small.

Elytra noticeably narrowed posteriorly from base. 10. *nemorensis*.

Elytra not noticeably narrowed posteriorly from base. South Atlantic States 11. *deodaræ*.

Elytra noticeably narrowed posteriorly; white and brown spots separated, the latter very small.

..... 12. *californicus*.

e2. Elytral interspaces 3 and 5 narrow, strongly elevated.

Pronotal punctures coarse but not dense. 13. *yosemite*.

Pronotal punctures coarse and dense. 14. *webbi*.

a2. Elytra with transverse band of white and yellow scales near vertex.

b3. Pronotum with posterior angles acute. 15. *radiatæ*.

b4. Pronotum with posterior angles subrectangular. 16. *fasciatus*.

B. Elytra usually without distinct anterior spots, and with posterior spot anterior to vertex of declivity.

a3. Pronotum with basal angles subrectangular. 17. *costatus*.

a4. Pronotum with basal angles rounded.

b5. Pronotal punctures distinctly separated.

c5. Pronotum not distinctly narrower than elytra.

d3. Pronotum stout, deeply constricted anteriorly. 18. *fiskei*.

d4. Pronotum subelongate, not deeply constricted anteriorly.

Pronotum moderately stout; elytral interspaces 3 and 5 scarcely elevated; with anterior spot. 19. *nigræ*.

Pronotum elongate.

Elytral interspaces 3 and 5 slightly elevated, flattened; with anterior spot. 20. *puncticollis*.

Elytral interspaces 3 broader and more elevated; without anterior spot. 21. *murrayanæ*.

c6. Pronotum distinctly narrower than elytra.

Pronotal punctures irregular, not dense; punctures of striæ irregular. 22. *coloradensis*.

Pronotal punctures regular, moderately dense; punctures of striæ coarse, irregular. 23. *alascensis*.

Pronotal punctures dense, regular; punctures of striæ irregular. 24. *rotundatus*.

b6. Pronotal punctures irregular, not distinctly separated.

c7. Elytral striæ with punctures very irregular.

Gray, densely clothed with scales; spots prominent. 25. *burkei*.

Black, not densely clothed with scales; spots obscure. 26. *piperi*.

c8. Elytral striæ with punctures moderately irregular; spots obscure. Pronotum convex, without dorsal impressions and elevations.

..... 27. *dubius*.

Pronotum moderately convex and usually with dorsal impressions and elevations. 28. *fraseri*.

II. Elytral interspaces 3 and 5 not broader or more elevated than 2 and 4.

Elytra with distinct posterior spots. 29. *affinis*.

Elytra with small posterior spots. 30. *curriei*.

SYNOPSIS OF ADULT CHARACTERS, WITH DESCRIPTIONS OF NEW SPECIES.^a

Elytral interspaces 3 and 5 broader or more elevated than 2 and 4.

Division I, pages 32, 43.

Elytral interspaces 3 and 5 not broader or more elevated than 2 and 4.

Division II, pages 36, 44.

DIVISION I.

Elytra always with distinct spots of densely placed scales on the anterior lateral area and always with spots or bands of scales situated near the vertex of the declivity.

Subdivision A, pages 32, 44.

Elytra usually without distinct spots on the anterior lateral area and with small spots situated between the vertex of the declivity and middle of elytra.

Subdivision B, pages 35, 56.

SUBDIVISION A.

Elytra with distinct spots near vertex of declivity.....Section a1, pages 32, 44.

Elytra with transverse band of white and yellow scales near vertex of declivity.

Section a2, pages 34, 55.

Section a1.

Beak moderately stout, shorter than prothorax; pronotum with basal angles sub-
obtuse; elytra with interspaces 3 and 5 strongly elevated and rugose.

Subsection b1, pages 32, 44.

Beak slender, shorter or longer than prothorax; pronotum with basal angles rectan-
gular; elytral interspaces 3 and 5 moderately to strongly elevated.

Subsection b2, pages 33, 46.

Subsection b1.

Elytra with distinct anterior spots and very large posterior ones; pronotum distinctly
narrower than elytra, punctures indistinct, irregular.....Series c1, page 32.

Elytra with indistinct anterior spots and small transverse posterior ones; pronotum
not distinctly narrower than elytra, punctures distinct and regular.

Series c2, page 32.

Series c1.

Length 3.7 to 4 mm.; brown; pronotal and elytral punctures moderately coarse; pos-
terior spot of elytra with distinct dark border. Maine and high mountains of
North Carolina, probably in *Abies fraseri*, and New Hampshire in *Abies balsamea*.

Species index, ♂ 57-♀ 62.....1. *similis* n. sp., page 44.

Length 3.9 mm.; dark brown; pronotal and elytral punctures coarse; posterior spot
of elytra without distinct dark border, third and fifth interspaces with acute
rugosities, spots prominent. Park City, Utah, and Bear Lake, British Columbia.

Species index, ♂ 63-♀ 64.....2. *utahensis* n. sp., page 45.

Series c2.

Length 5 to 5.5 mm.; black; pronotal and elytral punctures very coarse; elytra with
interspaces 3 and 5 broad and prominent. Humboldt, Cal., Astoria, Oregon,
and Tenino, Wash. Species index, ♂ 62-♀ 65.....3. *barberi* n. sp., page 45.

^a The divisional, subdivisional, sectional, subsectional, serial, and species characters constitute a complete description of each species; e. g., I, A, a1, b1, c1, and species 1.

Subsection b2.

Elytra with large anterior and posterior spots; sides parallel; beak never longer than prothorax.....Series c3, page 33.

Elytra with small to moderately large anterior and posterior spots; sides usually slightly narrowed posteriorly; beak sometimes longer than prothorax.

Series c4, page 33.

Series c3.

Length 4.2 to 5 mm.; brown; pronotum distinctly narrower than elytra, not distinctly shining, and the punctures moderately coarse and dense; posterior spots of elytra without dark border; punctures of striæ coarse, distinct. Hoquiam and Pialschie, Wash., in tops of *Picea sitchensis*. Species index, ♂ 61-♀ 64.

4. *sitchensis* n. sp., page 47.

Length 5 to 5.3 mm.; brown; pronotum not distinctly narrower than elytra, shining, and the punctures coarse; posterior spots of elytra usually with faint dark border; punctures of striæ indistinct, especially on lateral area. Smith's Ferry, Idaho, and Pikes Peak, Colo., in tops of *Picea engelmanni*. Species index, ♂ 62-♀ 68.....5. *engelmanni* n. sp., page 47.

Length 4.5 to 6 mm.; brown; pronotum slightly narrower than elytra, moderately shining, and the punctures dense; posterior spot of elytra with or without faint dark border. Eastern United States, in terminals of *Pinus strobus*, rarely in terminals of *Pinus resinosa* and terminals of *Picea*. Species index, ♂ 63-♀ 68.

6. *strobi* Peck, page 48.

Series c4.

Posterior brown spots of elytra moderately large; fork of male genitalia very stout.

Subseries d1, page 33.

Posterior brown spots of elytra small; fork of male genitalia long and slender.

Subseries d2, page 33.

Subseries d1.

Length 4.3 to 6.7 mm.; brown; pronotum not distinctly narrower than elytra, punctures moderately coarse; elytral interspace 3 broad, flattened, moderately rugose, and posterior white and yellow spots usually separated, the brown one smaller but not very small as in species 10, and the white one extending over the second interspace. Mountains of North Carolina northward to New Hampshire, and west to Lake Superior region, in *Pinus* under bark on stumps and logs and trunks of dying trees, and base of saplings. Species index, ♂ 65-♀ 71.

7. *approximatus* n. sp., page 49.

Length 5.2 to 6.7 mm.; brown; pronotum slightly narrower than elytra, punctures coarse; elytral interspaces 3 and 5 distinctly elevated and rugose, the punctures of striæ coarse, and the posterior white and yellow spots fused, not extending over the second interspace. Colorado, in *Pinus scopulorum*, thick bark on base, stems, tops, and terminals of saplings. Species index, ♂ 71-♀ 75.

8. *schwarzi* n. sp., page 50.

Subseries d2.

Elytral interspaces 3 and 5 distinctly elevated and broader than 2 and 4; pronotal punctures moderately coarse and densely placed.....Minor series e1, page 34.

Elytral interspaces 3 and 5 but slightly broader than 2 and 4, strongly elevated and acutely rugose; pronotum narrower than elytra, punctures very coarse.

Minor series e2, page 34.

Minor series e1.

- Length 6.2 to 7 mm.; brown; pronotum as broad as elytra, with sides rounded; elytra with sides scarcely narrowed posteriorly, interspaces 3 and 5 broad, elevated, rugose, the posterior spots fused, and the yellow one large; beak not longer than the prothorax in the males. Winnipeg, Manitoba, in *Pinus?* Species index, ♂ 66-♀ 79.....9. *canadensis* n. sp., page 51.
- Length 4.9 to 7.7 mm.; brown; pronotum with sides not strongly rounded; elytra with sides narrowed posteriorly from base, posterior spots usually separated, the yellow one very small and the white one extending to first interspace; beak usually longer than prothorax in both sexes. Boardman, N. C., and mountains of North Carolina, to Florida and Texas, in bark of *Pinus* logs, stumps, trunks of dying trees, and rarely in base of saplings. Species index, ♂ 67-♀ 78.
10. *nemorensis* Germar, page 51.
- Length 4.2 to 5.8 mm.; light brown; body slender; pronotum slightly narrower than elytra; elytra with sides nearly parallel, interspaces 3 and 5 but slightly elevated, posterior brown spot very small; beak longer than prothorax in both sexes. Experiment, Ga., in stems, branches, and tops of *Cedrus deodara*. Species index, ♂ 74-♀ 79.....11. *deodara* n. sp., page 52.
- Length 8.6 mm.; brown; pronotum broad, with sides broadly rounded; elytra with sides distinctly narrowed posteriorly, interspace 3 very broad, not coarsely rugose as in *yosemite*; posterior spots separated, the brown one very small; beak distinctly longer than prothorax. Yosemite Valley, Cal., in bark of living pine with *P. yosemite*. Species index, ♀ 83.....12. *californicus* n. sp., page 53.

Minor series e2.

- Length 5.1 to 7.7 mm.; brown; pronotal punctures very coarse, not dense; elytra with sides nearly parallel, interspaces 3 and 5 strongly elevated, acutely rugose, punctures of striae rather coarse, and posterior spots fused on lateral area. Yosemite Valley, Siskiyou County, and Lake Tahoe, Cal., in *Pinus ponderosa* and *Pinus lambertiana*. Species index, ♂ 65-♀ 77.....13. *yosemite* n. sp., page 53.
- Length 4.8 to 6.8 mm.; brown; pronotal punctures very coarse and dense; elytra with sides nearly parallel, interspaces 3 and 5 elevated and rugose, punctures of striae rather coarse, and posterior spots prominent and fused on the sides. Mountains of southern New Mexico and Arizona, in *Pinus strobiformis* and *Pinus ponderosa*. Species index, ♂ 73-♀ 78.....14. *webbi* n. sp., page 54.

Section a2.

- Pronotum with posterior angles acute.....Subsection b3, pages 34, 55.
Pronotum with posterior angles subrectangular.....Subsection b4, pages 34, 55.

Subsection b3.

- Length 5.1 to 7.4 mm.; brown; pronotum broader toward base, angles acute, sides converging anteriorly, slightly constricted toward head, punctures coarse, distinct; elytra with anterior spots small, yellow, and the posterior band principally of white scales. Monterey, Cal., in bark of logs and trunks of *Pinus radiata*; also one specimen from Easton, Wash. Species index, ♂ 63-♀ 65.
15. *radiata* n. sp., page 55.

Subsection b4.

- Length 5.1 to 8.3 mm.; brown; pronotum narrower than elytra, sides rounded and slightly narrowed anteriorly but not distinctly constricted toward head; elytra with anterior spots prominent, oblique, yellow, the posterior indistinct band composed of scattering white and yellow scales. Oregon, Washington, Idaho, and British Columbia, in *Pseudotsuga mucronata*. Species index, ♂ 62-♀ 67.
16. *fasciatus* Le Conte, page 56.

SUBDIVISION B.

Pronotum with basal angles subrectangular; beak rather stout, moderately long.

Section a3, pages 35, 57.

Pronotum with basal angles rounded; beak slender, moderately to very long.

Section a4, pages 35, 58.

Section a3.

Length 5.5 to 7.1 mm.; dark brown; pronotal punctures not distinctly separated; elytra with faint anterior spot toward the middle and indistinct spots of reddish brown and white scales behind the middle, interspaces with many minute white spots toward sides and on declivity. Hoquiam, Wash., in thick bark on trunks of dying trees and stumps of *Picea sitchensis*. Species index, ♂ 64-♀ 70.

17. *costatus* Mannerheim, page 57.

Section a4.

Pronotal punctures distinctly separated; punctures of elytral striæ small to coarse.

Subsection b5, pages 35, 59.

Pronotal punctures irregular, not distinctly separated; punctures of elytral striæ very coarse and irregular.....Subsection b6, pages 36, 62.

Subsection b5.

Pronotum not distinctly narrower than elytra.....Series c5, page 35.

Pronotum distinctly narrower than elytra.....Series c6, page 36.

Series c5.

Pronotum short, stout, sides strongly rounded and constricted toward the anterior margin; elytral interspaces strongly elevated with rather coarse rugosities.

Subseries d3, page 35.

Pronotum elongate, sides rounded, but not deeply constricted toward head; elytral interspaces with fine rugosities.....Subseries d4, page 35.

Subseries d3.

Length 4.2 to 5.2 mm.; dark brown; elytra without anterior spot but with broad posterior one, interspaces 3 and 5 strongly elevated, convex, rugose; punctures of striæ small. New Hampshire, in thin bark on dying *Picea mariana* and *Picea rubens*. Species index, ♂ 77-♀ 81.....18. *fiskei* n. sp., page 59.

Subseries d4.

Length 4.4 to 5.6 mm.; dark brown; pronotum short, broad; elytra with small obscure anterior spots and distinct posterior ones situated toward the middle, interspaces 3 and 5 flattened, scarcely elevated, rugosities fine; punctures of striæ coarse.

Webster, N. H., in *Picea mariana*, bark of small tree. Species index, ♂ 68-♀ 84.

19. *nigræ* n. sp., page 59.

Length 4.2 to 6.1 mm.; light brown; pronotum elongate, punctures coarse, irregular; elytra with small anterior spots and more distinct posterior ones just behind the middle, interspaces 3 and 5 slightly elevated and flattened; punctures of striæ moderately coarse. Mountains of West Virginia, in *Picea rubens*, thick bark on logs. Species index, ♂ 74-♀ 87.....20. *puncticollis* n. sp., page 60.

Length 4.1 mm.; dark brown; pronotum elongate, punctures moderately coarse, regular; elytra without anterior spots and with very small posterior ones each side behind the middle, interspace 3 distinctly broader, elevated; striæ coarser toward the base. Wallowa, Oregon, in *Pinus murrayana*; reared from bark. Species index, ♀ 78.

21. *murrayanæ* n. sp., page 60.

Series c6.

Length 6.9 to 7 mm.; dark brown; pronotal punctures irregular, elytra without distinct anterior spots, but with distinct spots of yellow scales behind the middle, interspaces 3 and 5 strongly elevated, and punctures of striae irregular. Leadville, Colo., National Park, Wyo., and Black Hills, S. Dak., in *Picea canadensis* thick bark on base of trees. Species index, ♀ 87.

22. *coloradensis* n. sp., page 60.

Length 6.5 mm.; black; pronotal punctures coarse, regular, closely placed and rather deep; elytra without anterior spots, but with small, rather distinct, posterior ones, punctures of striae coarse, irregular, and smaller on the lateral area, interspaces 3 and 5 reddish, strongly elevated, and broad. Arctic Circle, Alaska, and Montana in *Picea engelmanni*. Species index, ♀ 89.

23. *alascensis* n. sp., page 61.

Length 6 to 7.3 mm.; black; pronotal punctures dense, regular; elytra rarely with small anterior white spots, but with small white spots behind the middle, interspace 3 very broad, interspacial rugosities not coarse, punctures of striae irregular and not smaller on the lateral area. Marquette, Mich., Lake Superior region, probably in *Picea*. Species index, ♀ 90.....24. *rotundatus* Le Conte, page 61.

Subsection b6.

Punctures of elytral striae very irregular, spots of scales moderately distinct; pronotum not distinctly narrower than elytra.....Series c7, page 36.

Punctures of elytral striae moderately irregular, spots of scales evident but small and obscured by scattering white or yellow scales; pronotum distinctly narrower than elytra.....Series c8, page 36.

Series c7.

Length 6 to 7.7 mm.; gray; elytra and pronotum rather densely clothed with whitish scales; elytra with rather distinct anterior and posterior spots, and punctures of striae not very closely placed. Ouray, Colo., Alta and Park City, Utah, probably in *Abies*? Species index, ♂ 74-♀ 82.....25. *burkei* n. sp., page 62.

Length 7.4 to 10 mm.; black; elytra and pronotum sparsely clothed with whitish scales; elytra with anterior and posterior spots evident but small, and punctures of striae very deep and closely placed. Mount Rainier, Wash., and Center-ville, Idaho, in *Abies lasiocarpa* and *Abies concolor*; also at Glacier, B. C. Species index, ♂ 81-♀ 83.....26. *piperi* n. sp., page 62.

Series c8.

Length 4.8 to 5.7 mm.; black; beak moderately long; pronotum convex, without dorsal irregularities. Maine to Lake Superior, in *Abies balsamea*. Species index, ♂ 72-♀ 88.....27. *dubius* Le Conte, page 63.

Length 4.6 to 9.1 mm.; black; beak very long, even in the male; pronotum somewhat flattened, and usually with dorsal irregularities, sometimes distinctly impressed towards base. High mountains of North Carolina in *Abies fraseri*. Species index, ♂ 72-♀ 100.....28. *fraseri* n. sp., page 63.

DIVISION II.

Elytral interspaces 3 and 5 not more elevated or broader than 2 and 4; beak short, slender; pronotum broad, with sides behind the middle nearly parallel, and the basal angles rectangular; punctures of elytral striae moderately coarse, regular; posterior tibia of male fringed with long bristles.

- Length 5.5 to 8 mm.; black, elytra with or without faint anterior spots but with distinct transverse spots of white or yellow scales near vertex, and the punctures of striæ moderately coarse. Wisconsin to New Hampshire, in *Pinus strobus*.
 Species index, ♂ 61-♀ 67.....29. *affinis* Randall, page 64.
 Length 5.6 to 7.7 mm.; black, elytra with obscure anterior spots and small posterior ones, the punctures of striæ coarse and deep. Kaslo, B. C. Species index. ♂ 62,
 30. *curriei* n. sp., page 65.

SYNOPSIS OF PRIMARY SEXUAL CHARACTERS.

MALE GENITALIA.

- Stem with apex *uniformly rounded* Division I
 Stem with apex *not uniformly rounded* Division II

DIVISION I.

Section a1.

- Fork slender.....Species 4, 5, 6
 Fork short.....Species 4
 Fork long.....Species 5
 Fork moderately stout.....Species 6
 Fork long and stout.....Species 7, 8
 Fork long and slender.....Species 9, 10, 11, 13

Section a2.

- Stem narrowed toward apex, but not constricted.....Species 15
 Stem broad toward apex, slightly constricted anteriorly.....Species 16

Section a4.

- Fork long and slender.....Species 27, 28

DIVISION II.

- Fork very stout.....Species 29, 30

SYNOPSIS OF SECONDARY SEXUAL CHARACTERS.

- Beak longer and more slender in females than in males.....The Genus
 Hind tibia of male *without* long fringe of hairs.....Division I
 Hind tibia of male *with* long fringe of hairs.....Division II

DIVISION I.

- Beak in both sexes usually shorter than prothorax, rarely longer.....Subdivision A
 Beak in both sexes rarely shorter than prothorax, commonly much longer.....Subdivision B

SUBDIVISION A.

- Apical margin of abdominal sternite 7 sinuate or not in males.....Section a1
 Apical margin of abdominal sternite 7 not sinuate in males.....Section a2

Section a1.

- Apical margin of abdominal sternite 7 not sinuate in males.....
 Subsection b1, Species 1, 2, 3
 Apical margin of abdominal sternite 7 faintly sinuate in males.....Subsection b2

Subsection b2.

- Beak shorter than prothorax in males, rarely longer in females. Series c3, Species 4, 5, 6
 Beak as long as prothorax or longer in males, usually longer and often distinctly so,
 in females. Series c4, Species 7, 8, 9, 10, 11, 12, 13, 14

Section a2.

- Beak in both sexes shorter than prothorax. Species 15, 16

SUBDIVISION B.

- Apical margin of abdominal sternite 7 faintly sinuate, but without apical process in
 females. Section a3, Species 17
 Apical margin of abdominal sternite 7 without or with process in males. Section a4

Section a4, Subsection b5.

- Apical margin of abdominal sternite 7 sinuate, but without median process in
 males. Species 18
 Apical margin with median process in males. Species 20

Subsection b6.

- Apical margin of abdominal sternite 7 with apex uniformly rounded in males.
 Species 25, 26, 27, 28

DIVISION II.

- Beak shorter than prothorax in both sexes, apical margin of abdominal sternite 7 with
 truncate process rising from deep emargination in males. Species 29, 30

SYNOPSIS OF PUPAL CHARACTERS.

DIVISION I.

- Head *with* one or more minute spines on posterior margin of eyes. Subdivision A
 Head *without* minute spines on posterior margin of eyes. Subdivision B

SUBDIVISION A.

- Abdominal tergites with small spines alternating with larger ones, especially on
 tergites 3 to 6. Section a1
 Abdominal tergites without small spines alternating with larger ones. Section a2

Section a1, Series c3.

- Abdominal tergites 5 and 6 *with* small spines between the more prominent dorsal
 ones Species 4, 6
 Abdominal tergites 5 and 6 *without* small spines between the more prominent dorsal
 ones Species 5

Series c4.

- Abdominal tergites 5 to 6 without small spines between the more prominent dorsal
 ones. Species 7-14

Section a2.

- Abdomen with prominent epipleural spines. Series c5, Species 15
 Abdomen with small epipleural spines. Series c6, Species 16

SUBDIVISION B.

Abdominal tergites with small spines alternating with the larger ones and with small spines between the more prominent dorsal ones.

Epipleurite 9 with bristles.....Section a3

Epipleurite 9 without bristles.....Section a4

Section a3.

Abdominal tergites 4 to 5 with two small spines between the more prominent dorsal ones.....Species 17

Section a4.

Abdominal tergites 4 to 5 with four small spines between the more prominent dorsal ones.

Beak without pair of spines between middle and apex.....Species 25, 26

Beak with pair of small spines between middle and apex.....Species 27

DIVISION II.

Abdominal tergites 4 and 5 with two small spines between the more prominent dorsal ones; beak with pair of small spines between apex and middle.....Species 29

SYNOPSIS OF LARVAL CHARACTERS.

DIVISION I, SUBDIVISION A.

Mandibles with middle tooth emarginate.....Section a1

Mandibles with middle tooth triangular.....Sections a2, a3

Mandibles with middle tooth emarginate or triangular.....Section a4

Section a1.

Apical tooth acute.....Subsection b2

Abdominal spiracles distinct.

Head without distinct eye-spots.....Species 4, 5

Head with distinct eye-spots.....Species 6

Series c4.

Abdominal spiracles distinct.

Head without distinct eye-spots.....Species 7, 10

Head with distinct eye-spots.....Species 14

Section a2.

Apical tooth obtuse; head with distinct eye-spots.....Species 15

Apical tooth acute; head with distinct eye-spots.....Species 16

SUBDIVISION B.

Section a3.

Abdominal spiracles obscure; apical tooth acute; median tooth triangular; head with distinct eye-spots.....Species 17

*Section a4.**Series c5.*

Abdominal spiracles moderately distinct.

Apical tooth obtuse; middle tooth triangular; head without eye-spots..Species 18

Apical tooth acute; middle tooth emarginate; head without distinct eye-spots.

Species 20

Series c7.

Abdominal spiracles moderately distinct; apical, subapical, and median teeth obtuse; head with distinct eye-spots.....	Species 25
Abdominal spiracles obscure; apical tooth acute; middle tooth triangular; head without distinct eye-spots.....	Species 26

Series c8.

Abdominal spiracles obscure; apical tooth acute; median tooth emarginate.....	Species 27
Apical tooth obtuse; median tooth emarginate.....	Species 28

TABLE OF DISTRIBUTION.

THE WORLD.

In *Europe and Asia*, from Spain and England into eastern Siberia and Japan and northward into Sweden and Russia, probably to the Arctic Circle; in *North America*, from Mexico and Florida to the Arctic Circle in Alaska and eastward to the Atlantic.....The genus

NORTH AMERICA—DIVISION I.

SUBDIVISION A.

Section a1.

Maine to higher mountains of North Carolina.....	Species 1
Mountains of Utah to Bear Lake, British Columbia.....	Species 2
Coast of northwestern California to western Washington.....	Species 3
Coast of northwestern Oregon and western Washington.....	Species 4
Smiths Ferry, Idaho, to Pikes Peak, Colorado.....	Species 5
New Brunswick, southwest through mountains to Biltmore, N. C. (distribution of white pine).....	Species 6
Eastern United States, south through mountains to North Carolina and eastward to Maine.....	Species 7
Eastern Washington to Leadville, Colo., and Black Hills of South Dakota.....	Species 8
Winnipeg, Manitoba, to Michigan.....	Species 9
Atlantic coast region and Lower Austral life zone, northward probably to Long Island, New York, and westward through the Gulf States into Texas.....	Species 10
Georgia.....	Species 11
Yosemite Valley, California.....	Species 12
Mountains of northern California.....	Species 13
Southern New Mexico and Arizona, and probably mountains of western Texas, into Mexico.....	Species 14

Section a2.

Monterey and Palo Alto, Cal., Easton, Wash.....	Species 15
Northwestern California, into British Columbia.....	Species 16

SUBDIVISION B.

Section a3.

Coast of western Washington to Sitka.....	Species 17
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Section *a*1.

New Hampshire	Species 18
New Hampshire	Species 19
High mountains of West Virginia	Species 20
Northeastern Oregon	Species 21
Black Hills, South Dakota, and central Colorado	Species 22
Koyukuk River, Alaska, lat. 67° 69', long. 151°	Species 23
Northern Michigan	Species 24
Colorado and Utah	Species 25
Mount Rainier, Washington	Species 26
Maine to Northern Michigan	Species 27
Higher mountains of North Carolina	Species 28

DIVISION II.

New Hampshire to northern Pennsylvania, westward into Minnesota	Species 29
Kaslo, British Columbia	Species 30

TABLE SHOWING RELATIONS OF SPECIES TO HOST TREES.

<i>Pissodes</i> species numbers.	Hosts, etc.
1. <i>Abies balsamea</i> and <i>A. fraseri</i> .	Dying bark on branches and witch's broom.
2. <i>Abies?</i> (Not observed.)	
3. <i>Picea sitchensis?</i> (Not observed.)	
4. <i>Picea sitchensis</i> .	Living bark of terminals and tops of young trees, causing serious injury.
5. <i>Picea engelmanni</i> .	Living bark of terminals and tops of young trees, causing serious injury.
6. <i>Pinus strobus</i> , common; <i>Pinus rigida</i> , rare; <i>Pinus divaricata</i> , rare; <i>Picea rubens</i> , frequent; <i>Picea excelsa</i> , frequent.	Living terminals of saplings and small trees, causing serious damage to white pine.
7. <i>Pinus strobus</i> , <i>Pinus rigida</i> , <i>Pinus echinata</i> , <i>Pinus resinosa</i> , <i>Pinus virginiana</i> , and <i>Pinus pungens</i> .	Living and dying thick and thin bark on base and trunks of standing and felled trees, stumps, and base and stems of saplings. Injurious to the last.
8. <i>Pinus ponderosa</i> and <i>Pinus scopulorum</i> .	Living and dying bark on base, stems, tops (?), and terminals of saplings.
9. <i>Pinus?</i> (Not observed.)	
10. <i>Pinus palustris</i> , <i>Pinus tæda</i> , <i>Pinus virginiana</i> , and <i>Pinus echinata</i> .	Living and dying thick bark on standing and felled trees, stumps, and base and stems of saplings.
11. <i>Cedrus deodara</i> .	Living branches, tops, and terminals, causing serious injury.
12. <i>Pinus ponderosa</i> .	Living thick bark on trunks of small trees, evidently causing scars.
13. <i>Pinus ponderosa</i> and <i>Pinus lambertiana</i> .	Living and dying thick bark on standing and felled trees and stumps and on base and stems of saplings.
14. <i>Pinus strobiformis</i> , <i>Pinus scopulorum</i> , and <i>Pinus contorta (murrayana)</i> .	Living (?) and dying bark on base and stems of saplings and of standing and felled trees.
15. <i>Pinus radiata</i> and <i>Pinus sylvestris</i> .	Thick and dying bark on standing and felled trees and stumps and on base, stems, tops, and tops of saplings.
16. <i>Pseudotsuga taxifolia</i> .	Living and dying thick bark on standing and felled trees and stumps and on base and stems of saplings, causing serious injury to saplings.
17. <i>Picea sitchensis</i> .	Living and dying thick bark on standing girdled trees and stumps of felled ones.

Pissodes
species
numbers.

Hosts, etc.

18. *Picea rubens* and *Picea mariana*. Dying (?) thick bark on logs, stumps, and trunks of small standing trees.
19. *Picea mariana*. Dying bark on trunk of small tree.
20. *Picea rubens*. Dying bark on felled and standing trees.
21. *Pinus contorta* (*murrayana*). Thin bark on standing tree.
22. *Picea canadensis* and *Picea engelmanni*? Dying thick bark on base of standing trees.
23. *Picea*. Thick bark on living trees. (Brunner's notes.)
24. Probably in *Picea rubens*? and *Picea canadensis*? (Not observed.)
25. *Abies lasiocarpa* and *Abies concolor*? Living thick bark on trunks and base of living and dying trees. Injurious.
26. *Abies lasiocarpa* and *Abies concolor*. Living and dying thick bark on living and dying trees.
27. *Abies balsamea*. Living and dying bark on trunks of living and dying trees and snags of storm-broken trees; also in trunks of felled trees.
28. *Abies fraseri*. Living and dying bark on trunks of living and dying trees.
29. *Pinus strobus*. Thick bark on stump.
30. Host not observed; probably pine.

TABLE OF HOST TREES.

Tree species. (Britton classification, 1908.)	Common name.	<i>Pissodes</i> species number
<i>Pinus strobus</i>	White pine.....	6, 7, 29.
<i>lambertiana</i>	Sugar pine.....	13.
<i>strobiformis</i>	Mexican white pine.....	14.
<i>resinosa</i>	Red pine.....	7.
<i>ponderosa</i>	Western yellow pine.....	8, 12, 13.
<i>scopulorum</i>	Rock pine.....	8, 14.
<i>murrayana</i>	Lodgepole pine.....	14, 21.
<i>palustris</i>	Longleaf pine.....	10.
<i>rigida</i>	Pitch pine.....	6, 7.
<i>echinata</i>	Shortleaf pine.....	7, 10.
<i>tæda</i>	Loblolly pine.....	10.
<i>radiata</i>	Monterey pine.....	15.
<i>banksiana</i> (<i>divaricata</i>).....	Gray pine.....	6.
<i>virginiana</i>	Virginia or scrub pine.....	7, 10.
<i>pungens</i>	Table mountain pine.....	7.
<i>sylvestris</i> (introduced).....	Silver pine.....	15.
<i>Picea canadensis</i>	White spruce.....	22, 24?.
<i>rubens</i>	Red spruce.....	6, 18, 20.
<i>mariana</i>	Black spruce.....	19.
<i>excelsa</i> (introduced).....	Norway spruce.....	6.
<i>engelmanni</i>	Engelmann spruce.....	5, 22?, 23.
<i>sitchensis</i>	Sitka spruce.....	3?, 4, 17.
<i>Pseudotsuga mucronata</i> (<i>taxifolia</i>).....	Douglas spruce.....	16.
<i>Abies balsamea</i>	Balsam fir.....	1, 27.
<i>fraseri</i>	Fraser's balsam fir.....	1, 28.
<i>lasiocarpa</i>	White fir.....	25, 26.
<i>concolor</i>	Silver fir.....	25?, 26?.
<i>Cedrus deodara</i> (introduced).....	Deodar cedar.....	11.

CHARACTERS COMMON TO THE SPECIES OF THE GENUS.

Adults.—Prothorax with anterior ventral margin not distinctly emarginate; tibiæ with incurved apical tooth; femora unarmed; anterior coxæ not widely separated; abdominal tergites covered by elytra; sternites 3 and 4 (first and second visible) very long; 5 and 6 short; 7 as long as 5 and 6 together; eyes rounded, widely separated; body oblong, reddish brown to black, sparsely to thickly clothed with slender to broad scales, the latter often forming spots on the pronotum, elytra, and femora.

Sexes.—Females with but 7 visible abdominal tergites; beak longer, smoother, and more slender than in the males. Males with 8 visible abdominal tergites; beak shorter, stouter, less shining, and more distinctly punctured.

Eggs.—Pearly white, slightly oblong, and equally rounded at both ends.

Larvæ.—Elongate, cylindrical, yellowish white, footless; body with 12 closely wrinkled segments, those of the thorax not larger or more permanent than the first abdominal.

Pupæ.—Of the general size and form of the adults, with the beak folded on the mesosterna and metasterna; tips of the posterior tarsi even with tips of wing-pads; head, beak, and abdominal segments armed with spines, the ninth abdominal having 2 rather prominent epipleural spines.

Larval galleries.—Excavated in the inner bark and sometimes marking or grooving the surface of the wood; elongate, winding, and either in the bark or outer wood, ending in pupal cells which are lined with excelsior-like borings.

Host trees.—*Pinus*, *Picea*, *Abies*, *Cedrus*, and *Pseudotsuga*.

Distribution.—Spain and England into eastern Siberia and Japan; America north of Mexico.

CHARACTERS COMMON TO THE SPECIES OF THE MAJOR AND MINOR DIVISIONS.

DIVISION I.

(Species Nos. 1 to 28.)

Adults.—Elytral interspaces 3 and 5 broader and more elevated than 2 and 4.

Sexes.—Hind tibiæ of the males without long fringe of hairs.

Pupæ and larvæ.—Apparently without distinctive divisional characters, so far as observed.

SUBDIVISION A.

(Species Nos. 1 to 16.)

Adults.—Elytra always with a distinct spot of densely placed scales on the anterior lateral area, and always with a spot or band of scales near the vertex of the declivity.

Sexes.—Beak of both sexes usually shorter than the prothorax, rarely longer.

Pupæ.—Eyes with one or more minute spines on the posterior margin.

Larvæ.—The subdivisional characters of the larva have not been recognized.

SECTION a1.

(Species Nos. 1 to 14.)

Adults.—Elytra with distinct spots (instead of a continuous band) near the vertex of the declivity.

Sexes.—Apical margin of the seventh abdominal sternite of the male not sinuate, or rarely so.

Pupæ.—Abdominal tergites with small scutellar spines, alternating with larger ones.

Larvæ.—Median tooth of mandible emarginate.

Host trees.—*Abies*, *Picea*, *Pinus*, and *Cedrus*.

Distribution.—Eastern and western United States, from the Gulf States and Mexico into Canada and British Columbia.

SUBSECTION b1.

(Species Nos. 1 to 3.)

Adults.—Beak moderately stout, shorter than the prothorax; basal angles of pronotum subobtuse; third and fifth elytral interspaces strongly elevated and rugose. In species 1 and 2 the anterior spots on the elytra are distinct, the posterior ones are very large, and the pronotum is distinctly narrower than the elytra, while in species 3 the anterior and posterior spots are indistinct and the pronotum is not distinctly narrower than the elytra.

Sexes.—Apical margin of seventh abdominal sternite of male *not* emarginate.

Host trees.—*Abies*, so far as observed.

Distribution.—Species 1, North Carolina; species 2, British Columbia; species 3, California into Washington.

1. *Pissodes similis* n. sp.

(Plate III, fig. 1.)

The type specimen is labeled "Type No. 7424, U.S.N.M.;" name; "type of drawing; Black Mts., N. C., VI. 27-30; ♀." It was collected by Dr. William Beutenmuller in the spruce forest on

Black Mountain, North Carolina, in 1905. The type and one male are in the type collection of the U. S. National Museum. Three females and one male from the same locality, labeled, respectively, "VI-17," "VI-17," "VI-19," and "VI-30," were returned to the American Museum of Natural History, New York City. A dead specimen was collected by the writer at Camp Caribou, Maine, June 7, 1900, on dead branch of "witch's broom," on balsam fir. Larval mines and pupal cells were observed in adjoining twigs, and another dead specimen was taken at Waterville, N. H., May 4, 1906, from a pupal cell in dead branch of "witch's broom," on balsam fir. Several specimens had emerged from the same branch.

Distinctive characters.—This species is closely allied to *P. utahensis*, from which it is distinguished by the moderately coarse pronotal punctures and the very large posterior spot which extends anteriorly to the middle of the elytra, and is surrounded by a distinct dark border.

Variations.—The specimens vary in length from 3.7 to 4 mm., and in color from light brown to dark brown, with but slight variation in the spots. Eight adult specimens were examined.

Host trees.—*Abies balsamea*; *Abies fraseri*.

Distribution (Plate XIX, fig. 1).—(Hopk. U.S.) *Maine*: Camp Caribou, Parmachene Lake. *New Hampshire*: Waterville. (A.M.N.H.) *North Carolina*: Black Mountains.

2. *Pissodes utahensis* n. sp.

The type specimen is labeled "Type No. 7425, U.S.N.M.;" name; "type of drawing; Park City, Ut., 6.17; Coll. Hubbard & Schwarz; 952; ♂ 1."

Distinctive characters.—This species is closely allied to the preceding, from which it is distinguished by the coarser pronotal punctures and the smaller posterior spots, which do not extend forward to the middle of the elytra and do not have a distinct darker border.

Variation.—There is very little variation in size, but the scales vary from white to a yellowish brown. Five adult specimens, 4 males and 1 female, have been examined.

Host tree.—Unknown, probably *Abies*.

Distribution (Plate XIX, fig. 2).—(U.S.N.M.) *British Columbia*: Bear Lake (London Hill Mine). *Utah*: Alta, Park City.

3. *Pissodes barberi* n. sp.

The type specimen is labeled "Type No. 7426, U.S.N.M.;" name; "Bair's R[an]ch, Redw[oo]d Cr[ee]k; Humboldt Co., Cal., 13.6 [June 13, 1903]; H. S. Barber, collector; 327; ♀ 1."

Distinctive characters.—This species is at once distinguished from all of the other species of the first subdivision by its darker color, the very coarse punctures of the pronotum and elytral striæ, the

strongly elevated and acutely rugose third and fifth interspaces of the elytra, and the small posterior spot. The pronotal punctures are also more distinctly separated than in the other species.

Variations.—There is some variation in size—the length ranging from 5 mm. to 5.5 mm.—and in the elytral spots, color of scales, etc. Three adult specimens, 1 female and 2 males, have been examined.

Host tree.—Unknown, probably *Picea*.

Distribution (Plate XIX, fig. 3).—(U.S.N.M.) *California*: Humboldt County. *Oregon*: Astoria. *Washington*: Tenino.

SUBSECTION b2.

(Species Nos. 4 to 14.)

Adults.—The beak is slender and shorter than the prothorax in some species and longer in others. The basal angles of the pronotum are rectangular but not acute. The third and fifth elytral interspaces are moderately to strongly elevated and rugose. Species 4 to 6 have large anterior and posterior spots on the elytra. The sides of the elytra are parallel and the beak is never longer than the prothorax. Species 7 to 14 have small anterior and posterior spots on the elytra; the elytra are slightly narrowed anteriorly and the beak in some of the species is longer than the prothorax. Species 9 to 12 have the third and fifth interspaces of the elytra distinctly elevated and broader than the second and fourth, and the punctures of the pronotum are moderately coarse and densely placed. Species 13 and 14 have the third and fifth interspaces of the elytra only slightly broader than the second and fourth, but strongly elevated and acutely rugose. The pronotum is distinctly narrower than the elytra and the pronotal punctures are very coarse.

Sexes.—In species 4 to 6 the beak of the males is shorter than the thorax and that of the females is rarely longer, while in species 7 to 14 the beak of the males is as long as the prothorax, and in a few cases longer; that of the females is usually longer and often distinctly so.

Pupæ.—The fifth and sixth abdominal tergites of species 4 and 6 have small spines between the prominent dorsal ones, while in species 5 and 7 to 14 they are obscure or absent.

Larvæ.—The apical tooth of the mandibles is acute and the abdominal spiracles are distinct. In species 4, 5, and 7 to 10 the eye spots are distinct, while in species 6 and 14 they are not.

Hosts.—Species 4 and 5, *Picea*; species 6, *Pinus* and *Picea*; species 7, 8, 10, and 12 to 14, *Pinus*; species 11, *Cedrus*.

Distribution.—Species 4, Rocky Mountains; species 5, Pacific coast; species 6 and 7, eastern United States; species 8, northern Rocky Mountains; species 9, Canada; species 10, 11, Southern States; species 12, 13, California; species 14, southern Rocky Mountains.

4. *Pissodes sitchensis* n. sp.

(Plate V, fig. B; Plate XIII; text figs. 5-7.)

The type specimen is labeled "Type No. 7428, U.S.N.M.;" name; "Hoquiam, Wash.; H. E. Burke, collector; ♀; Hopk. U. S. 2289c." The species was described from a large series, including all stages, work, and parasites, collected and reared from terminals.

Distinctive characters.—This species is closely allied to *P. engelmanni* and *P. strobi*, from the first of which it is distinguished by the subopaque pronotum, the absence of dark band on the posterior spot of the elytra, and the rather coarse punctures of the elytral striæ; from the latter it is distinguished by its average smaller size and narrower prothorax, as well as by its distribution and habits.

Variations.—There is not very much variation in size—length 5 to 5.3 mm. The color ranges from light to dark brown. The spots of scales vary in size, color, and density, and there is some variation in the relative width of the prothorax and in the size of the punctures of the elytral striæ. More than 200 specimens have been examined, including both sexes, larvæ, pupæ, and work.

Host tree.—*Picea sitchensis*, infesting tops and terminals of saplings and small trees; quite injurious.

Extensive observations have been made by Mr. Burke on the habits and seasonal history of this species.

Distribution (Plate XIX, fig. 4).—(Hopk. U. S.) *Oregon*: Astoria. *Washington*: Hoquiam, North Bend, Pialschie. Satsop.

5. *Pissodes engelmanni* n. sp.

(Plate VI, fig. 5.)

The type specimen is labeled "Type No. 7427, U.S.N.M.;" name; "type of drawing; *Picea engelmanni*; Smith's Ferry, Idaho, Aug. 10, '05; J. L. Webb, collector; ♀ 3; Hopk. U. S. 5314." From a series of 50 adults reared August 23 to November 14 from section of top of spruce containing larvæ and pupæ collected August 10, 1905.

Distinctive characters.—This species is distinguished from the preceding in that the pronotum is shining, the posterior spot of the elytra has a dark border, and the punctures of the elytral striæ are indistinct, especially on the lateral area. From *P. strobi* it is distinguished by its generally smaller size, coarse punctures of the pronotum, and more obscure punctures of the elytral striæ, as also by its distribution, habits, and host.

Variations.—There is very little variation in size. The color ranges from light to dark brown, the spots of scales vary in size, color, and density, and the dark border of the posterior spot from distinct to obscure. The punctures of the pronotum and elytra vary considerably in size and distinctness. More than 150 specimens were examined, including both sexes, larvæ, pupæ, and work.

Host tree.—*Picea engelmanni*, infesting tops and terminals of saplings and small trees; quite injurious.

Extensive observations on the habits and seasonal history of this species have been made by Messrs. Burke and Webb.

Distribution (Plate XIX, fig. 5).—(Hopk. U. S.) *Colorado*: Manitou Park. *Idaho*: Smiths Ferry. *Montana*: Little Belt National Forest.

6. *Pissodes strobi* Peck.

(Plate III, fig. 6; Plate VI, fig. 6; Plate XIV; text figs. 1, 2.)

This species is represented in the collection by a typical specimen labeled with name, "type of drawing; *Pinus strobus*; Webster, N. H.; W. F. Fiske, collector; ♀ 6; Hopk. U. S. 3215b;" by 2 specimens labeled "*Pinus strobus*; Milford, Pa.; A. D. Hopkins, Nov. 14–25, bred; Hopk. U. S. 6077," and by one small specimen labeled "Edsallville, Pa."

Distinctive characters.—This species is most closely allied to *P. engelmanni*, from which it is distinguished by its average larger size, dense punctures of the pronotum and distinct punctures of the elytral striæ, as well as by its distribution and habits.

Variations.—There is considerable variation in size—4.5 to 6 mm. in length—but the average is nearer the latter extreme. The color ranges from dark to light brown. The spots of scales vary considerably in size, density, and color and in the presence or absence of a dark border to posterior lateral spot of the elytra. There is also considerable variation in the form of the pronotum and in the punctures of the pronotum and elytral striæ. More than 500 specimens were examined, including all stages and work.

Host trees.—*Pinus strobus*, *Pinus rigida*, *Pinus divaricata*, *Picea rubens*, and *Picea excelsa*; infesting terminals. Very injurious to white pine, much less so to the other species.

Distribution (Plate XIX, fig. 6).—(Hopk. U. S.) *Connecticut*: Hartford, Pomfret Center. *Maine*: Alfred, Bangor, Portland. *Massachusetts*: Framingham. *Michigan*: Grand Rapids. *New Hampshire*: Colebrook, Dover, Franconia, Keene, Monadnock, Newport, Penacook, Pike, Rochester, Tamworth, Webster, Wiers. *New York*: Kiamesha, Kidders. *North Carolina*: Biltmore (Davidsons River). *Pennsylvania*: Cisuarun, Milford, Mount Airy (Franklin County), Trucksville, Wilkesbarre. *West Virginia*: Kanawha Station, Cairo. *Wisconsin*: Ashland. *Canada*: Ontario—Guelph, Ottawa; New Brunswick—Chatham, Frederickton. (Hopk. W. Va.) *Massachusetts*: Middlesex Falls. *West Virginia*: St. George, Tucker County. (U.S.N.M.) *Massachusetts*: Boston. *Pennsylvania*: Edsallville. *Michigan*: Grand Ledge. *New Hampshire*: Contoocook. *New York*: New Baltimore.

BIBLIOGRAPHY AND SYNONYMY.

Rhynchænus strobi Peck, 1817, p. 2, pl. 2. Harris, 1841, pp. 63-64.

Pissodes strobi (Peck) Say, 1831, p. 14 (in part). Fitch, 1858, pp. 732-736, pl. 3, fig. 1. Say, 1859, p. 277 (in part). Walsh and Riley, 1869, p. 26, fig. 22. Gemminger and Harold, 1871, p. 2432. Le Baron, 1874, p. 139, fig. 63. Thomas, 1876, pp. 133-134 (in part). Le Conte, 1876, pp. 142-143 (in part). Fuller, 1880, pp. 5-6, fig. 2. Saunders, 1883, p. 55, fig. 23 (in part). Packard, 1886, pp. 322-325, pl. 9 (in part). Lintner, 1888, p. 24, figs. 6, 7. Packard, 1890, pp. 734-741 (in part). Riley and Howard, 1890, p. 348 (parasite); 1891, p. 468 (in part). Lintner, 1893, pp. 344-345, fig. 22 (in part). Hopkins, 1893, p. 205, No. 219 (in part); 1899, pp. 259-260, 345, 441 (in part). Chittenden, 1899, pp. 58-59, figs. 11, 12 (in part). Felt, 1906, pp. 397-401 (in part). Hopkins, 1906, pp. 252-253, figs. 61, 62; 1907, pp. 1-7, figs. 1-6; 1909, pp. 11, 16, 17, figs. 8, 9.

7. *Pissodes approximatus* n. sp.

(Plate VI, fig. 7; Plate XV, figs. A, B.)

The type specimen is labeled "Type No. 7430, U.S.N.M.;" name; "*Pinus strobus*; Lynn Woods, Mass.; A. D. Hopkins, June 11, '06, bred; ♀; Hopk. U. S. 6332." This specimen was reared from larvæ in bark from base of white pine sapling defoliated by the gipsy moth. The type series is represented by a male labeled the same as the type, one labeled "Camb.; Coll. Hubbard & Schwarz; ♂," and 2 males labeled "Marquette, Mich., 27.6; Coll. Hubbard & Schwarz."

Distinctive characters.—This species has been commonly confused with *P. strobi* in collections and literature, but is distinguished from it by the average large size, elongate body, the sides of the elytra more distinctly narrowed posteriorly. The beak is longer, and the spots of the elytra are uniformly smaller, the posterior ones rarely connected. It is also definitely separated by its marked difference in habits. It is distinguished from *P. nemorensis*, to which it is more closely allied, by its average smaller size, shorter beak, and larger posterior brown spot of the elytra, and, except in regions where the two species may overlap, it may be at once distinguished by its distribution. It is distinguished from its closest ally, *P. schwarzi*, by the moderately coarse pronotal punctures.

Variations.—There is much variation in size, the length ranging from 4.3 to 6.7 mm., but extremes are rare. The color ranges from dark brown, nearly black, to brown, but the prevailing color is dark. There is considerable variation in the structure of the pronotum and elytra and in the punctures, spots, etc., but the spots of scales, while variable in size and color, are commonly small, and never as large as in the average *P. strobi*. More than 140 specimens were examined, including all stages and work.

Host trees.—*Pinus strobus*, *Pinus rigida*, *Pinus echinata*, *Pinus resinosa*, *Pinus virginiana*, and *Pinus pungens*, occurring in thick bark on trunks of trees and base of saplings; sometimes injurious to the saplings.

Distribution (Plate XIX, fig. 7).—(Hopk. U. S.). *Maine*: Lake Moxie. *Massachusetts*: Lynn Woods, Springfield. *Michigan*: Grand Island, Munising. *New Hampshire*: Penacook, Waterville, Webster. *North Carolina*: Biltmore, Hendersonville, Pink Beds. *Pennsylvania*: Milford. *Virginia*: Rock Springs. *Wisconsin*: Lac du Flambeau. *Canada*: Guelph.

(Hopk. W. Va.) *West Virginia*: Deckers Creek, Greenbrier County, Greene Spring, Hampshire County, Harpers Ferry, Morgantown, Pendleton County, Romney, Tibbs Run, Tucker County. (U.S. N.M.) *Massachusetts*: Cambridge, Marion, Springfield. *Michigan*: Eagle Harbor, Marquette, Whitefish Point. *New Hampshire*: Durham, Hanover. *New York*: New York City and vicinity. *Wisconsin*: Bayfield.

8. *Pissodes schwarzi* n. sp.

(Plate III, fig. 8; Plate XVI, fig. B.)

The type specimen is labeled "Type No. 7455, U.S.N.M.;" name; "Veta Pass, Col., 24.6; Coll. Hubbard & Schwarz; ♀." This, together with another specimen, a male from the same locality, was evidently collected by Mr. E. A. Schwarz, for whom the species is named. The specimens were found in the United States National Museum under *P. costatus*.

Distinctive characters.—This species is evidently confused in collections under the name *P. costatus*. Specimens of *P. schwarzi* and *P. yosemite* had been referred to *P. costatus* by the writer until the specimens from Sitka spruce were recognized as representing the latter. With possibly a single exception, the specimens referred to by Le Conte under *P. costatus* evidently belonged to *P. yosemite*. *P. schwarzi* is not allied to the specimens I have referred to *P. costatus*. In general appearance it comes nearer *P. yosemite* and *P. webbi*, but according to the character of the fork of the male genitalia it falls in the series with *P. approximatus*, from which it is distinguished by the narrow pronotum with coarse punctures and by the larger posterior spots of the elytra. It is distinguished from *P. webbi* by its relatively broader pronotum, the punctures of which are less coarse and more densely placed, and from *P. yosemite* by the same character; also it is distinguished from both by its distribution.

Variations.—There is quite a wide range of variation in size, the length ranging from 5.2 to 6.7 mm., and in the density of the pronotal punctures, size and density of spots of scales, and relative elevation of elytral interspaces 3 and 5, so that some specimens may be found which appear to connect it with the other species, but it is the writer's opinion that when we know more of the habits and seasonal history of the northern Rocky Mountain *Pissodes* some of the species here included will be found to represent one or more undescribed species, and especially Hopk. U. S. 2386a, which was found ovipos-

iting in the terminal of a pine sapling. Forty-nine specimens have been examined, including all stages and work.

Host tree.—*Pinus ponderosa scopulorum*, in thick bark on trunks of trees, in base of saplings, and possibly in tops and terminals.

Distribution (Plate XIX, fig. 8).—(Hopk. U. S.). *Colorado*: Estes Park. *Idaho*: Centerville. *South Dakota*: Black Hills, Custer, Lead. *Washington*: Buckeye (U.S.N.M.) *Colorado*: Breckenridge, Estes Park, La Veta Pass, Leadville. *Montana*: Helena. *South Dakota*: Custer. *Washington*: Buckeye. *Canada*: Alberta, Banff Springs.

BIBLIOGRAPHY AND SYNONYMY.

Pissodes costatus (not of Mann.) Hopkins, 1906, p. 254, fig. 63.

9. *Pissodes canadensis* n. sp.

The type specimen is labeled "Type No. 7431, U.S.N.M.;" name; "Winnipeg, Man[itoba], Hanham; ♀ 1." This, with two other specimens, a male and a female, were found in the Wickham collection in the United States National Museum under *P. strobi*.

Distinctive characters.—This species may be easily confused with *P. approximatus* by its general external appearance, but the difference in the fork of the male genitalia indicates that it is distinct and more nearly related to *P. nemorensis*. It is distinguished from *P. approximatus* by the somewhat stouter body and prothorax. The alternate interspaces of the elytra are acutely rugose, the posterior spots are more completely fused on the lateral area, and the beak is longer. It is easily separated from *P. nemorensis* by the relatively shorter beak and stouter body and fused posterior spots of the elytra, as also by its distribution.

Variations.—There is not much variation in the three specimens except that the alternating elevated interspaces are less acutely rugose in one specimen than in the other two specimens. Three adult specimens were examined.

Host tree.—Not known, but it is evidently pine.

Distribution (Plate XX, fig. 9).—(U.S.N.M.). (Wickham Collection) *Canada*: Manitoba (Winnipeg).

10. *Pissodes nemorensis* Germar.

(Plate XV, fig. C; text fig. 8, B.)

The species is represented in the collection by a typical specimen labeled with rectangular red label; name; "*Pinus*; Calhoun, Ala.; A. D. Hopkins, Apr. 25, '05, bred; ♀ 1; Hopk. U. S. 1174d."

Distinctive characters.—There seems to be little doubt that this is the long unrecognized species described by Germar in connection with the description of the genus and commonly referred to as synonymous with *P. strobi*, with which it has been confused in col-

lections and literature. The reference in the description to the beak being longer than the prothorax is sufficient to distinguish it from *P. strobi*, and the type locality, "Kentucky," is sufficient to place it within the range of this common southern form. This species is very readily distinguished from *P. strobi* by its average larger size, much longer beak, smaller spots of scales on elytra, and by its habits and general distribution, although the ranges of the two species may overlap in some places. It is distinguished from *P. approximatus* (with which it may occur in the Transition zone around the Appalachian Mountain ranges) by its average larger size, longer beak, the elytra more distinctly narrowed posteriorly, and much smaller posterior brown spot. It is also distinguished from its closest ally (*P. deodaræ*), the only other species known to occupy the Gulf States region, by its average larger size and shorter beak, and by the posteriorly narrowed elytra and more distinctly elevated third and fifth elytral interspaces.

Variations.—There is much variation in size, the length ranging from 4.9 to 7.7 mm., and in color from nearly black to light brown, the darker areas predominating. There is also much variation in all of the structural and sculptural characters and in the size, density, and color of the spots. More than 250 specimens have been examined, including all stages and work.

Host trees.—*Pinus palustris* *Pinus tæda*, *Pinus virginiana*, and *Pinus echinata*, in thick bark on trunks of dying and felled trees, stumps, stems, and base of saplings, etc. Apparently it is not especially injurious.

Distribution (Plate XX, fig. 10).—(Hopk. U.S.) *Alabama*: Calhoun. *District of Columbia*: Langdon, Rock Creek Park. *Georgia*: Demorest, Macon, Thomasville. *Maryland*: Silver Spring. *North Carolina*: Boardman, Tryon. *South Carolina*: Lumber. *Texas*: Deweyville, Houston. *Virginia*: Hawlin, Princess Anne County, Virginia Beach. *West Virginia*: Kanawha Station. (Hopk. W. Va.) *West Virginia*: Lockheart's Run, Roosevelt. (U. S. N. M., under *P. strobi*.) *Alabama*: Prattville. *Florida*: Tallahassee. *Maryland*: Piney Point. *North Carolina*: Retreat, Graybeard Mountains.

BIBLIOGRAPHY AND SYNONYMY.

- Pissodes nemorensis* Germar, 1824, p. 318. Gemminger and Harold, 1871, p. 2431.
Pissodes strobi (not of Peck) Say, 1831, p. 14 (in part). Harris, 1841, p. 63 (in part).
 Say, 1859, p. 277 (in part). Le Conte, 1876, p. 142 (in part). Thomas, 1877, p. 134 (in part). Hopkins, 1893, p. 205, No. 219 (in part); 1899, p. 429 (parasite); 1899, p. 441 (in part).

11. *Pissodes deodaræ* n. sp.

The type specimen is labeled "Type No. 7433, U.S.N.M.;" name; "deodar; Experiment, Ga., Apr. 25, '03; Fiske, Col[lecto]r; ♀; Hopk. U. S. 1641c."

Distinctive characters.—This species is distinguished from *P. nemorensis* by its average smaller size, longer beak, less distinctly elevated elytral interspaces, and the sides of the elytra more distinctly parallel, but it is more distinctly separated by its habit and host. It is not improbable that this is an example of the origin of species through mutation and change of habit and host.

Variations.—There is considerable variation in size, the length ranging from 4.2 to 5.8 mm., but there is not very much variation in the grayish-brown color or in form, sculpture, and vestiture. In fact, it appears to be more constant in general character than almost any of the other species.

Host tree.—*Cedrus deodara*, in living branches, tops, and terminals, causing serious injury.

Distribution (Plate XX, fig. 11).—(Hopk. U. S.) *Georgia*: Experiment.

12. *Pissodes californicus* n. sp.

The type specimen is labeled "Type No. 7456, U. S. N. M.;" name; "*Pinus ponderosa*; Yosemite Val., Cal., June 13, '04; Hopkins, Col[lecto]r; ♀ 4; Hopk. U. S. 2808a." This specimen was collected by the writer at the same time and place as those referred to *P. yosemite*, and was not recognized at the time as distinct.

Distinctive characters.—This species is closely related to *P. nemorensis*, from which it is at once distinguished by the deeply emarginate anterior margin of the pronotum and by its very different habit and distribution. It is also readily distinguished from *P. yosemite* by the broad, closely punctured pronotum with its emarginate anterior margin and by the broad, flattened, third and fifth elytral interspaces. Indeed, it is so markedly different from any of the other western forms that we feel justified in basing our conclusion as to its distinctness on the single specimen.

Host tree.—*Pinus ponderosa*, in thick bark on living trees, causing serious scars.

Distribution (Plate XX, fig. 12).—(Hopk. U. S.) *California*: Yosemite Valley.

13. *Pissodes yosemite* n. sp.

(Plate XVI, fig. A.)

The type specimen is labeled "Type No. 7434, U. S. N. M.;" name; "*Pinus ponderosa*; Yosemite Val., Cal., June 13, '04; Hopkins, Col[lecto]r; ♂ 1; Hopk. U. S. 2808b." The specimen was collected near Mirror Lake in the thick bark of a tree which was apparently dying from injuries by this and possibly the preceding species.

Distinctive characters.—This species is more closely allied to *P. webbi*, from which it is distinguished by the narrower pronotum with the punctures less densely placed, and by its distribution.

Variations.—There is considerable variation in size, the length ranging from 5.1 to 7 mm., but not much in its reddish-brown color. The spots of whitish scales are usually conspicuous on the sides of the pronotum and near the declivity of the elytra, but there is considerable variation in their size, density, and color. The very coarse punctures of the pronotum and the strongly elevated third and fifth elytral interspaces are quite constant and characteristic. Fifty-one specimens were examined, including adults, larvæ, and work.

Host trees.—*Pinus ponderosa* and *Pinus lambertiana*, in living and dying thick bark on standing and felled trees, stumps, and base and stems of saplings. It is evidently quite injurious.

Distribution (Plate XX, fig. 13).—(Hopk. U. S.) *California*: Sumnerdale and Yosemite. (U. S. N. M.) *California*: Lake Tahoe, Placer County, Siskiyou County, under *P. costatus*. *Washington*: Easton, under *P. fasciatus*.

BIBLIOGRAPHY AND SYNONYMY.

Pissodes costatus (not of Mannerheim) Hopkins, 1906, p. 254, fig. 64.

14. *Pissodes webbi* n. sp.

The type specimen is labeled "Type No. 7459, U. S. N. M.;" name; "*Pinus strobiformis*; bred Nov. 12-7; Sta. Catalina Mts., Ariz.; J. L. Webb, collector; ♀; Hopk. U. S. 5722." The specimen was reared with others from larvæ in thick bark on small felled tree, August 20, 1908. It is named for the collector.

Distinctive characters.—This species is more closely allied to *P. yosemite*, from which it is distinguished by the broader pronotum, with the punctures more closely placed.

Variations.—There is considerable variation in size, the length ranging from 4.8 to 6.8 mm., and in color from nearly black to dark reddish-brown. There is less variation in the spots than usual, which have less white and more of the yellow scales. Over 70 specimens were examined, including all stages and work.

Host trees.—*Pinus strobiformis*, *Pinus scopulorum*, and *Pinus murrayana* (*contorta*) in living (?) and dying bark on base and stems of saplings and standing and felled trees. It is probably injurious.

Distribution (Plate XX, fig. 14).—(Hopk. U. S.) *Arizona*: Santa Catalina Mountains. *New Mexico*: Capitan Mountains and Cloudcroft.

BIBLIOGRAPHY AND SYNONYMY.

Pissodes strobi (not of Peck) Champion, 1902, p. 119. (May be above species; can not be *P. strobi* Peck.—A. D. H.)

SECTION a2.

SUBSECTIONS b3 AND b4.

(Species Nos. 15 and 16.)

Adults.—Elytra with a transverse band of white and yellow scales instead of a distinct spot near the vertex of the declivity; beak shorter than the prothorax. Species 15 has a broad pronotum with the posterior angles acute, while in species 16 the pronotum is narrow and the angles subrectangular.

Sexes.—Apical margin of seventh abdominal sternite of males not sinuate; beak slightly longer and more slender in the females than in the males.

Pupæ.—Abdominal tergites without distinct small spines alternating with the longer ones. Species 15 has distinct epipleural spines, while species 16. does not.

Larvæ.—Eye spots distinct; apical tooth of mandible obtuse in species 15 and acute in species 16.

Hosts.—Species 15, *Pinus*; species 16, *Pseudotsuga*.

Distribution.—Species 15, coast of California and Washington; species 16, northern California into British Columbia.

15. *Pissodes radiatæ* n. sp.

(Plate III, fig. 15.)

The type specimen is labeled "Type No. 7435, U. S. N. M.; name; *Pinus*; Del Monte, Cal., Sept. 4, '02; A. D. Hopkins, collector; ♀ 4; Hopk. U. S. 1089b." It was reared from a small branch of a transplanted small sapling of *Pinus sylvestris*, collected September 4, 1902, in the grounds of the Del Monte Hotel at Del Monte, Cal.; it was also found in *Pinus radiata*, for which the species is named.

Distinctive characters.—This is a very distinct species, separated from all other North American species by the acute posterior angles of the pronotum. It comes nearer to *P. notatus* of Europe than to any other foreign species, but from this species it is at once distinguished by the strongly elevated third and fifth elytral interspaces.

Variations.—There is considerable variation in size, the length being from .5.1 to 7.4 mm., but not much in color, markings, etc., of the specimens from Monterey and Palo Alto, but the single specimen from Easton, Wash., is small, dark brown, the punctures of the elytra coarser, and the posterior angles of the pronotum very acute. Further specimens from this northern locality and more information relating to their habit and host may show that the northern individuals represent a distinct species. More than 90 specimens have been examined, including all stages and work.

Host trees.—*Pinus radiata* (common) and *Pinus sylvestris* (rare), infesting the thick bark on standing and felled trees and stumps, and the base, stems, and tops of saplings.

Distribution (Plate XX, fig. 15).—(Hopk. U. S.) *California*; Del Monte, Monterey, Palo Alto. (U. S. N. M.) *Washington*: Easton, under *P. fasciatus*.

16. *Pissodes fasciatus* Le Conte.

(Plate III, fig. 16; Plate XVII.)

The species is represented in the collection by a typical specimen labeled with the name "type of drawing; *Pseudotsuga taxifolia*; Hoquiam, Wash.; Burke, collect[or]; ♀; Hopk. U. S. 2064b."

Distinctive characters.—This species is readily distinguished from *P. radiatæ*, to which it is somewhat remotely allied, by the posterior angles being rectangular instead of acute, the third and fifth interspaces less elevated, and also by its habit and host.

Variations.—There is considerable variation in size, from 5.1 to 8.3 mm. in length, and in color from nearly black to reddish and brown; there is also much variation in the size, density, and color of the spots of scales. More than 200 specimens have been examined, including all stages and work.

Host tree.—*Pseudotsuga taxifolia*, living and dying thick bark on standing and felled trees and stumps, and on the base of saplings.

Distribution (Plate XX, fig. 16).—(Hopk. U. S.) *Washington*: Ashford, Keyport, Hoquiam, Meredith, Pialschie. (Webb's collection) *Washington*: Sequim. (U. S. N. M.) *Washington*: Tenino, Easton. *Oregon*: Corvallis, Portland. *British Columbia*: Kaslo, North Bend, Victoria.

BIBLIOGRAPHY.

Pissodes fasciatus Le Conte, 1876, pp. 142–143. Hopkins, 1905, p. 253, figs. 65, 66.

SUBDIVISION B.

(Species Nos. 17 to 28.)

Adults.—Elytra usually without distinct spots on anterior lateral area and with small spots situated between the vertex of the declivity and the median area.

Seres.—Beak in both sexes rarely shorter than prothorax, commonly much longer, and always distinctly longer in females than in males.

Pupæ.—Eyes without minute spines on posterior margin (so far as observed).

Larvæ.—Without distinctive divisional characters (so far as observed).

Hosts.—*Picea* and *Abies*.

Distribution.—Section a3, coast of western Washington to Sitka; section a4, Canadian zone, eastern United States from mountains of North Carolina to Canada, and northern Rocky Mountains and Pacific Coast region northward into Alaska.

SECTION a3.

(Species No. 17.)

Adults.—Basal angles of pronotum subrectangular and beak rather stout and moderately long; apical margin of the seventh abdominal sternite of male without apical process, but faintly sinuate.

Pupæ.—Small spines alternating with the longer ones on abdominal tergites and ninth epipleurites with a few bristles.

Larvæ.—Abdominal spiracles obscure; apical tooth of the mandibles acute, the median emarginate, and the eye spots distinct. The host is *Picea sitchensis* from the coast of western Washington to Sitka.

17. *Pissodes costatus* Mannerheim.

This species is represented in the collection by a typical specimen labeled with the name: "*Picea*; Hoquiam, Wash.; A. D. Hopkins, collector; ♀ 2; Hopk. U.S. 2361g." The specimen was reared from among larvæ and pupæ found May 26, 1903, under thick bark in chip cocoons in outer wood of stump of a tree of *Picea sitchensis* felled in 1902. This evidently comes nearer to Mannerheim's species than anything yet recognized, and the fact that it is found in the Sitka spruce is additional evidence.

Distinctive characters.—This is the only representative of the first section (a3) of subdivision B, and therefore is not closely allied to any of the other species of the subdivision. It is distinguished by the closely placed punctures of the pronotum, which become coarser and more distinctly separated toward the posterior lateral section, by the moderately rounded posterior angles of the pronotum, and by the indistinct spots of reddish brown and white scales.

Variations.—The three matured adults examined range in length from 5.5 to 7.1 mm., and in color from dark brown to black. The spots of scales vary in size, color, and density. Three adults and the larva and pupa have been examined.

Host tree.—*Picea sitchensis*, in thick bark on dying and felled trees and stumps.

Distribution (Plate XXI, fig. 17).—(Hopk. U. S.) *Washington*: Hoquiam. *Alaska*: Sitka (the type locality).

BIBLIOGRAPHY.

Pissodes costatus Mannerheim, 1852, p. 354 (reprint p. 71).

SECTION a4.

(Species Nos. 18 to 28.)

Adults.—Basal angles of pronotum rounded; beak slender and moderately to very long.

Species 18 to 24 have the punctures of the pronotum distinctly separated and the punctures of the elytral striæ small to coarse. In species 18 to 21 the pronotum is not distinctly narrower than the elytra. Species 18 has a short, stout pronotum with the sides strongly rounded and constricted toward the anterior margin, the elytral interspaces with rather coarse rugosities. Species 19 to 21 have a more elongate pronotum with rounded sides but not distinctly constricted toward the head, and the elytral interspaces have fine rugosities. In species 22 to 24 the pronotum is distinctly narrower than the elytra. Species 25 to 28 have the punctures of the pronotum irregular in size and not distinctly separated and the stria punctures are very coarse and irregular. In species 25 and 26 the stria punctures are very irregular in size, the elytral spots moderately distinct, and the pronotum not distinctly narrower than the elytra. In species 27 and 28 the stria punctures are moderately irregular, the elytral spots are evident but small, and the pronotum is distinctly narrower than the elytra.

Sexes.—In species 18 the apical margin of the seventh abdominal sternite of the males is sinuate but without median process, while in species 20 there is a distinct median process, and in species 25 to 28 the apex is uniformly rounded as in the females.

Pupæ.—The fourth and fifth abdominal tergites have two small spines between the more prominent dorsal ones. In species 26 the rostrum is without a pair of spines between the middle and apex, while in 27 they are present. Head without distinct eye spots (so far as observed).

Larvæ.—In species 18 the abdominal spiracles are moderately distinct, the apical tooth of the mandibles obtuse, and the median tooth triangular. In species 20 the apical tooth is acute, and the median tooth is emarginate. In species 26 to 28 the abdominal spiracles are obscure. In species 26 the apical tooth is acute and the middle tooth triangular. In species 27 the apical tooth is acute and the median one emarginate, while in species 28 the apical tooth is obtuse and the median one emarginate.

Hosts.—Species 18, 19, 20, *Picea*; species 21, *Pinus*; species 22, *Picea*; species 25, 26 and 27, *Abies*.

Distribution.—Species 18, 19, 20, and 28, Canadian zone, West Virginia and New Hampshire; species 21 and 26, Cascade Mountains, Oregon and Washington; species 22 and 25, central Rocky Mountains; species 23, Alaska (Arctic Circle); species 24, northern Michigan; species 27, Maine to northern Michigan.

SUBSECTION b5.

(Species Nos. 18 to 24.)

18. *Pissodes fiskei* n. sp.

(Plate III, fig. 18; Plate XII.)

The type specimen is labeled "Type No. 7438, U.S.N.M.;" name; "type of drawing; *Picea*; Franconia, N. H., Oct. 16, '07; W. F. Fiske, collector; ♀ 1; Hopk. U. S. 3309." It was reared with other specimens from a section of a small spruce tree scorched by fire, collected October 16, 1907.

Distinctive characters.—This is a very distinct species, and may be known from its nearest ally, *P. nigræ*, by the strongly elevated third and fifth elytral interspaces, and the larger yellow posterior spot of densely placed scales, with no trace of an anterior spot. It is at once distinguished from *P. similis*, which may be associated with both species in the bark of the same tree, by its large size, short pronotum, and long beak.

Variations.—There is not much variation in size, the length ranging from 4.2 to 5.2 mm., nor in other characters. Eight specimens of adults and work were examined.

Host trees.—*Picea rubens* and *Picea mariana*, in thick bark on logs and trunks of small standing trees.

Distribution (Plate XXI, fig. 18).—(Hopk. U. S.) *New Hampshire*: Rye.

BIBLIOGRAPHY AND SYNONYMY.

Pissodes strobi (not of Peck) Packard, 1890, pp. 829–830. (Probably *P. fiskei* Hopk.—A. D. H.)

19. *Pissodes nigræ* n. sp.

The type specimen is labeled "Type No. 7458, U.S.N.M.;" name; "*Picea nigra*; Webster, N. H.; W. F. Fiske, collector; Hopk. U. S. 3725a." It was taken from a section of the trunk of a small dead tree, collected May 3, 1906.

Distinctive characters.—This species is distinguished from *P. fiskei* by the much less elevated and less rugose interspaces, longer beak, and small to obscure anterior white spot on the elytra. From *P. puncticollis* it is distinguished by its darker color, stout pronotum, and less distinctly elevated elytral interspaces. It is at once distinguished from *P. similis* by its long beak.

Variations.—The length varies from 4.4 to 6.6 mm. There is very little variation in the color. The anterior spots are obscure in some specimens and the posterior ones vary from yellowish to white.

Host tree.—*Picea mariana*.

Distribution (Plate XXI, fig. 19).—(Hopk. U. S.) *New Hampshire*: Webster.

20. *Pissodes puncticollis* n. sp.

(Plate IV, fig. 20.)

The type is labeled "Type No. 7437, U.S.N.M.;" name; "type of drawing; *Picea*; Randolph Co., W. Va.; A. D. Hopkins, collector; ♀ 1; Hopk. W. Va. 70." It was taken from the dead bark of a spruce log collected August 25, 1890.

Distinctive characters.—Closely allied to *P. murrayanæ*, but distinguished by its light reddish-brown color, irregular and less dense pronotal punctures, and larger size, with the alternating interspaces less distinctly elevated, an anterior spot present, and the posterior spot distinct.

Variations.—The length varies from 4.2 to 6.1 mm.; there is very little variation in the color. The anterior white spot, which is small and situated on the fourth interspace, is obscure in two specimens and situated on the fifth stria in the others. Four adults and 1 larva were examined.

Host tree.—*Picea rubens*, in dying bark on felled and standing trees.

Distribution (Plate XXI, fig. 20).—(Hopk. W. Va.) *West Virginia*: Cheat Bridge, Randolph County, Bayard, Tucker County.

21. *Pissodes murrayanæ* n. sp.

The type specimen is labeled "Type No. 7436, U.S.N.M.;" name; "*Pinus murrayana*; Wallowa, Oreg.; A. D. Hopkins, Apr. 10, '07, bred; Hopk. U. S. 6560a." It was reared from the section of a small tree received from correspondent, H. K. O'Brien, February 14, 1907.

Distinctive characters.—The single imperfect specimen representing this species is closely allied to *P. puncticollis*, from the type of which it is distinguished by its dark brown color, very small posterior spot, absence of an anterior spot, regular pronotal punctures, and broad third elytral interspace. It is probable that more specimens will show a wider range of variation from those of *P. puncticollis*.

Host tree.—*Pinus murrayana*, in thin bark.

Distribution (Plate XXI, fig. 21).—(Hopk. U. S.) *Oregon*: Wallowa.

22. *Pissodes coloradensis* n. sp.

The type specimen is labeled "Type No. 7439, U.S.N.M.;" name; "Leadville, Colo., H. F. Wickham, July 7-14, '96, 10,000-11,000 ft.; ♀; C. L. 39." (Abdomen removed and mounted on separate pin. Labeled "C L 39 ♀.") Specimen from Wickham's collection in the United States National Museum.

Distinctive characters.—Pronotum distinctly narrower than elytra and punctures irregular, not dense. Elytral scales distinct, giving

the surface a grayish appearance. Posterior spot prominent, this readily distinguishing it from its nearest allies, *P. alascensis* and *P. rotundatus*.

Variations.—Length 7.4 to 9.4 mm. The color ranges from dark brown to black. The color and density of the scales vary as usual, as do also the elevation and rugosities of the alternating interspaces, striae punctures, etc. Twenty-seven specimens of adults were examined.

Host trees.—*Picea canadensis* in the Black Hills of South Dakota. It will evidently be found also in *Picea engelmanni*.

Distribution (Plate XXI, fig. 22).—Black Hills of South Dakota; central Colorado.

23. *Pissodes alascensis* n. sp.

The type specimen is labeled "Type No. 7459, U.S.N.M.;" name; "Koyukuk R., Alas., Lt. 67-69, Lg. 151, summer 1901; W. J. Peters, collector."

Distinctive characters.—The darker color and closely placed yet separated pronotal punctures, sparse elytral scales, and small posterior spot on the elytra serve to distinguish the single specimen of this species from *P. coloradensis*, and the distinctly elevated and rugose elytral punctures distinguish it from *P. rotundatus*. One specimen only was examined.

Host tree.—Probably *Picea*.

Distribution (Plate XXI, fig. 23).—(Hopk. U. S.) *Alaska*: Koyukuk River, Arctic Circle.

24. *Pissodes rotundatus* Le Conte.

(Plate IV, fig. 24.)

This species is represented in the collection by a typical specimen labeled with name; "Marquette, Mich., 4, 7 [July 4]; Coll. Hubbard & Schwarz; ♀ 4."

Distinctive characters.—This species is closely allied to *P. alascensis* from which it is distinguished by the densely placed punctures of the pronotum and the broad and not strongly elevated third and fifth elytral interspaces, which also serve to distinguish it from *P. coloradensis*.

Variations.—The length varies from 6 to 7.3 mm.; there is not much variation in color except as it may be modified by the more numerous white scales on some specimens. Seven specimens of adults were examined.

Host trees.—Probably *Picea rubens* (?) and *Picea canadensis* (?)

Distribution (Plate XXI, fig. 24).—(U.S.N.M.) (H. & S.) *Michigan*: White Fish Point, Marquette, June and July.

BIBLIOGRAPHY.

Pissodes rotundatus Le Conte, 1876, pp. 142, 143-144. Hopkins, 1906, pp. 254, 256, fig. 69.

SUBSECTION b6.

Species Nos. 25 to 28.)

25. *Pissodes burkei* n. sp.

(Plate IV, fig. 25.)

The type specimen is labeled "Type No. 7440 U.S.N.M.;" name; "above Ouray, Colo., 9,000-10,000 ft., Mineral Point Trail, VII, 1897, H. F. Wickham; ♀ 4." From Wickham's collection. Additional specimens collected and host tree determined by H. E. Burke.

Distinctive characters.—This species is quite distinct from *P. rotundatus* but is more closely allied to *P. piperi*, from which it is distinguished by its decidedly grayish appearance and the distinct posterior spot of the elytra.

Variations.—The length varies from 6 to 7.7 mm., but there is comparatively little variation in the color, except in rubbed specimens which are darker. Thirty-two specimens were examined, including all stages and work.

Host tree.—*Abies lasiocarpa*, in thick bark on living and dying trees.

Distribution (Plate XXII, fig. 25).—(Hopk. U. S.) *Utah*: Kamas (Burke, collector). (U.S.N.M.) (H. & S.) *Utah*: Alta and Park City, June (under *P. costatus*). *Colorado*: Ouray (Wickham).

26. *Pissodes piperi* n. sp.

(Plate IV, fig. 26; Plate V, fig. A; Plate XVIII; text fig. 8, A.)

The type specimen is labeled "Type No. 7441, U.S.N.M.;" name; "type of drawing; Mt. Rainier, Wash.; collector, C. V. Piper; ♀ 1." Additional specimens were collected and host trees determined by Messrs. H. E. Burke and J. L. Webb.

Distinctive characters.—This species is at once distinguished from *P. burkei* by its large size, dark color, sparsely placed elytral scales, small posterior spot, and very coarse and deep punctures of elytral striae.

Variations.—The length varies from 7.4 to 10 mm. and the posterior spots of the elytra vary from obscure to distinct. Five adults and 128 specimens examined, including all stages and work.

Host trees.—*Abies lasiocarpa* and *Abies concolor*, in thick bark on trunks of living (?) and dying trees.

Distribution (Plate XXII, fig. 26).—(Hopk. U. S.) *Washington*: Paradise Valley. *Idaho*: Centerville. (U.S.N.M.) (H. & S.) *British Columbia*: Glacier. *Washington*: Mt. Rainier.

27. *Pissodes dubius* Randall.

(Plate IV, fig. 27.)

This species is represented in the collection by a typical specimen labeled with the name; "Marquette, Mich., 27.6 [June 27]; Coll. Hubbard & Schwarz; ♀ 1."

Distinctive characters.—This species is closely allied to *P. fraseri*, from which it is distinguished by its medium size, moderately long beak, and the regular convex pronotum without broad impressions.

Variations.—The length varies from 4.8 to 5.7 mm. and as usual there is considerable variation in color due to rubbed and immature specimens. Forty-one specimens were examined, including all stages and work.

Host tree.—*Abies balsamea*, in thick living and dying bark on trunks of living and dying trees and stumps of storm-broken trees.

Distribution (Plate XXII, fig. 27).—(Hopk. U. S.) *Maine*: Lake Parmachene, Beaver Pond (Boil Mountain). *New Hampshire*: Dartmouth College, Fabyan, Waterville. *Michigan*: Grand Island. (U.S.N.M.) (H. & S.) *Michigan*: Marquette and White Fish Point.

BIBLIOGRAPHY.

Pissodes dubius Randall, 1838, pp. 24–25. Le Conte, 1876, pp. 142, 143. Hopkins, 1906, pp. 254, 256, fig. 67. Felt, 1906, p. 401.

28. *Pissodes fraseri* n. sp.

(Plate VI, fig. 28; text fig. 9.)

The type specimen is labeled "Type No. 7442, U.S.N.M.;" name; "Pisgah Mt., N. C., altitude 5,000 ft.; A. D. Hopkins, collector; ♀; Hopk. U. S. 2868." It was collected June 29, 1904. Adults were common, pupæ frequent, and larvæ rare in pupal cells in inner bark on trunk of large Fraser fir tree, which had evidently died from root disease.

Distinctive characters.—Closely allied to *P. dubius*, from which it is distinguished by its large size, very long beak, and the moderately convex pronotum with basal and oblique subdorsal impressions.

Variations.—The length varies from 4.6 to 9.1 mm. and there is considerable variation in color, size of spots and punctures, length of beak, and impressions of pronotum. One hundred and six specimens were examined, including all stages and work.

Host tree.—*Abies fraseri*, thick living and dying bark on trunks of living and dying trees.

Distribution (Plate XXII, fig. 28).—(Hopk. U. S.) *North Carolina*: Pisgah Mountains (Silver Mountain). (A.M.N.H.) *North Carolina*: Black Mountains (Beutenmüller).

DIVISION II.

(Species Nos. 29 and 30.)

Adults.—Third and fifth elytral interspaces not broader or more elevated than second and fourth. Beak shorter than prothorax, slender. Pronotum broad, with sides behind the middle nearly parallel with the basal angles, rectangular. Punctures of elytral striae moderately coarse, regular.

Sexes.—Posterior tibiae of the males fringed with long hairs. Apical margin of the seventh abdominal sternite of the males with a truncate process arising from a deep emargination.

Pupæ.—Fourth and fifth abdominal tergites with two small spines between the more prominent dorsal ones. Rostrum with a pair of small spines between the apex and the middle.

Larvæ.—Not known.

Host.—*Pinus*.

Distribution.—Species 29, New Hampshire to northern Pennsylvania, westward into Minnesota; species 30, British Columbia.

29. *Pissodes affinis* Randall.

(Plate IV, fig. 29; Plate VI, fig. 29.)

This species is represented in the collection by a typical specimen labeled with name; "Marquette, Mich., 26.6 [June 26]; Coll. Hubbard & Schwarz; ♀ 2."

Distinctive characters.—This species is at once distinguished from all of the preceding ones of the genus by the equal width of the elytral interspaces, the third and fifth of which are not elevated; and from its nearest ally (*P. curriei*) by the long posterior spot on the elytra and by the moderately coarse stria punctures.

Variations.—The length varies from 5.5 to 8 mm., and while the sculpture and color are quite constant there is considerable variation in the spots of scales, both in color and density. Twenty-nine adult specimens were examined.

Host tree.—*Pinus strobus*, in thick bark on stump. (As determined by W. F. Fiske.)

Distribution (Plate XXII, fig. 29).—(Hopk. U. S.) (Fiske collector) *New Hampshire*: Webster or Penacook. (U.S.N.M.) *Minnesota*. (H. & S.) *Michigan*: Marquette (June and July); Eagle Harbor (Wickham). *Wisconsin*: Bayfield. *New Hampshire*: Hampton. *New York*: Ithaca (Chittenden). *Pennsylvania*; *Massachusetts*.

BIBLIOGRAPHY.

Pissodes affinis Randall, 1838, p. 24. Le Conte, 1876, pp. 142, 143. Schwarz, 1889, p. 176 (male character). Hopkins, 1906, pp. 254, 256, fig. 68. Felt, 1906, p. 402.

30. *Pissodes curriei* n. sp.

(Plate VI, fig. 30.)

The type specimen is labeled "Type No. 7443, U.S.N.M.;" name; "Kaslo, B. C., 2.7 [July 2, 1903]; R. P. Currie, collector; ♂ 1."

Distinctive characters.—This species is distinguished from *P. affinis* by the very sparsely placed scales, the obscure anterior spots, the small posterior spot on the elytra, and the coarse and deep striae punctures.

Variations.—The length varies from 5.6 to 7.7 mm. There is very little variation in sculpture, spots of scales, etc. Seven adult specimens were examined.

Host tree.—Unknown, probably *Pinus*.

Distribution (Plate XXII, fig. 30).—(U.S.N.M.) *British Columbia*: Kaslo.

LIST OF DESCRIBED SPECIES OF PISSODES.^a

Species No.	Name.	Habitat.	Host.
1.	<i>similis</i> Hopkins	North America	<i>Abies</i> .
2.	<i>utahensis</i> Hopkins	North America	<i>Abies</i> .
3.	<i>barberi</i> Hopkins	North America	<i>Picea</i> .
4.	<i>sitchensis</i> Hopkins	North America	<i>Picea</i> .
5.	<i>engelmanni</i> Hopkins	North America	<i>Picea</i> .
6.	<i>strobi</i> Peck	North America	<i>Pinus</i> and <i>Picea</i> .
	<i>validirostris</i> Gyllenhal	Europe	<i>Pinus</i> (cones).
7.	<i>approximatus</i> Hopkins	North America	<i>Pinus</i> .
8.	<i>schwarzi</i> Hopkins	North America	<i>Pinus</i> .
9.	<i>canadensis</i> Hopkins	North America	
10.	<i>nemorensis</i> Germar	North America	Pine.
11.	<i>deodaræ</i> Hopkins	North America	Pine.
12.	<i>californicus</i> Hopkins	North America	<i>Pinus</i> .
13.	<i>yosemite</i> Hopkins	North America	<i>Pinus</i> .
14.	<i>webbi</i> Hopkins	North America	<i>Pinus</i> .
	<i>notatus</i> Fabricius	Europe	<i>Pinus</i> , <i>Picea</i> , <i>Larix</i> (trunk).
15.	<i>radiatæ</i> Hopkins	North America	<i>Pinus</i> .
16.	<i>fasciatus</i> Le Conte	North America	<i>Pseudotsuga</i> .
	<i>scabricollis</i> Miller	{Austria Hungary Bohemia}	<i>Picea</i> (tops).
17.	<i>costatus</i> Mannerheim	North America	<i>Picea</i> .
18.	<i>fiskei</i> Hopkins	North America	<i>Picea</i> .
	<i>obscurus</i> Roelofs	Japan	
19.	<i>nigræ</i> Hopkins	North America	<i>Picea</i> .
20.	<i>puncticollis</i> Hopkins	North America	<i>Picea</i> .
21.	<i>murrayanæ</i> Hopkins	North America	<i>Pinus</i> .
22.	<i>coloradensis</i> Hopkins	North America	<i>Picea</i> ?
23.	<i>alascensis</i> Hopkins	North America	<i>Picea</i> ?
	<i>harcyniæ</i> Herbst	Europe	<i>Picea</i> (twigs).

^a North American species are numbered; foreign species are without numbers.

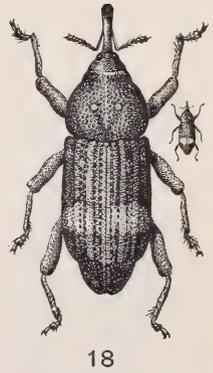
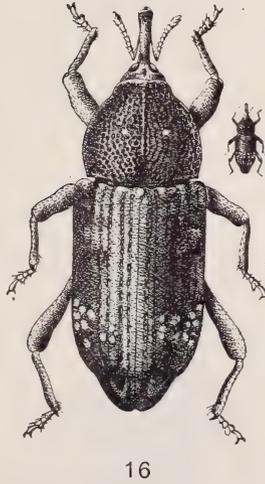
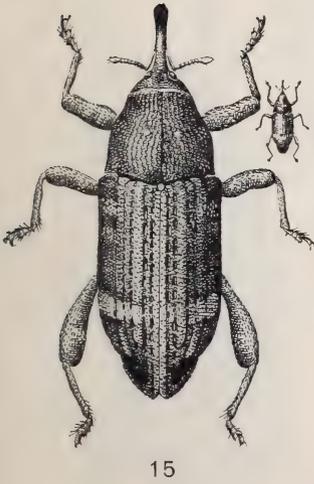
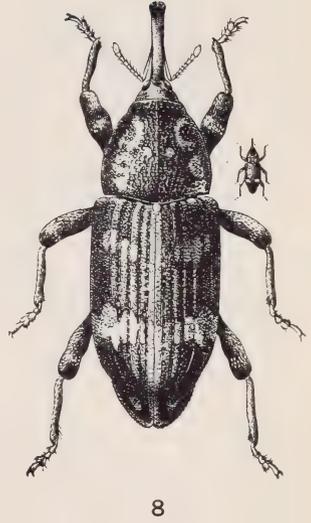
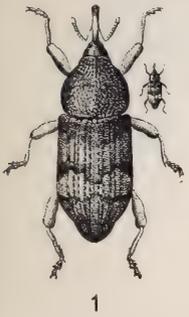
Species No.	Name.	Habitat.	Host.
24.	<i>rotundatus</i> Le Conte.....	North America.....	<i>Picea</i> .
	<i>rotundicollis</i> Desbrochers.....	Russia.....	
25.	<i>burkei</i> Hopkins.....	North America.....	<i>Abies</i> .
26.	<i>piperi</i> Hopkins.....	North America.....	<i>Abies</i> .
	<i>piceæ</i> Illiger.....	Middle Europe.....	<i>Abies</i> (twigs and trunk).
27.	<i>dubius</i> Le Conte.....	North America.....	<i>Abies</i> .
28.	<i>fraseri</i> Hopkins.....	North America.....	<i>Abies</i> .
	<i>insignatus</i> Boheman.....	Siberia.....	<i>Pinus, Larix</i> .
	<i>piniophilus</i> Herbst.....	Europe.....	Pine (terminals and trunk).
	<i>irroratus</i> Reitter.....	Siberia.....	
	<i>cembræ</i> Motschulsky.....	East Siberia.....	<i>Pinus</i> .
	<i>gyllenhali</i> Gyllenhal.....	{ Europe.....	
		{ Siberia.....	
	<i>pini</i> Linnæus.....	Europe.....	<i>Pinus</i> (thick bark), <i>Picea, Larix</i> .
29.	<i>affinis</i> Randall.....	North America.....	<i>Pinus</i> .
30.	<i>curriei</i> Hopkins.....	North America.....	

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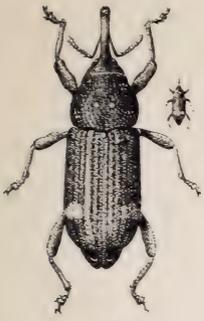
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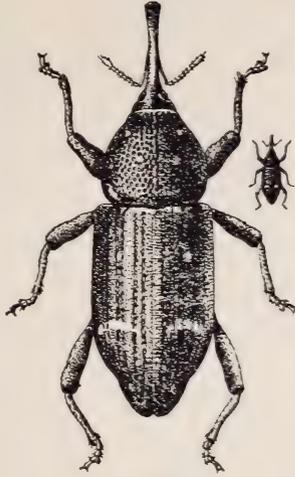


ADULTS OF PISSODES.

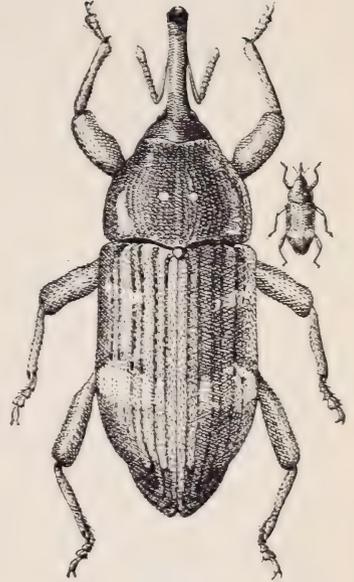
Fig. 1.—*P. similis*. (Original.) Fig. 6.—*P. strobi*. (Author's illustration.) Fig. 8.—*P. schwarzi*. (Author's illustration.) Fig. 15.—*P. radiata*. (Original.) Fig. 16.—*P. fasciatus*. (Author's illustration.) Fig. 18.—*P. fiskei*. (Original.)



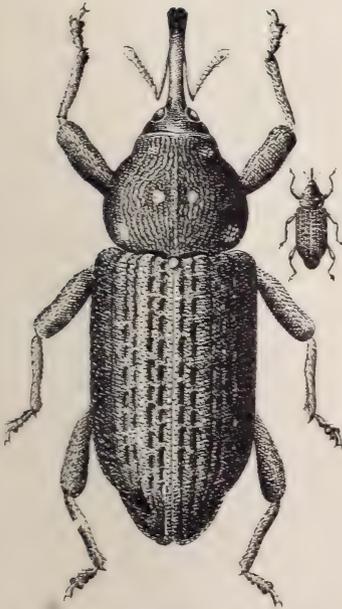
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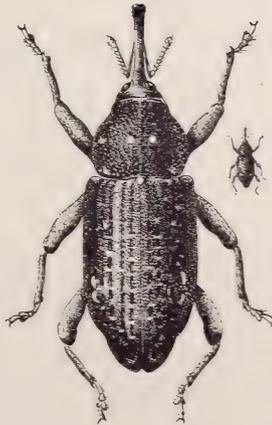
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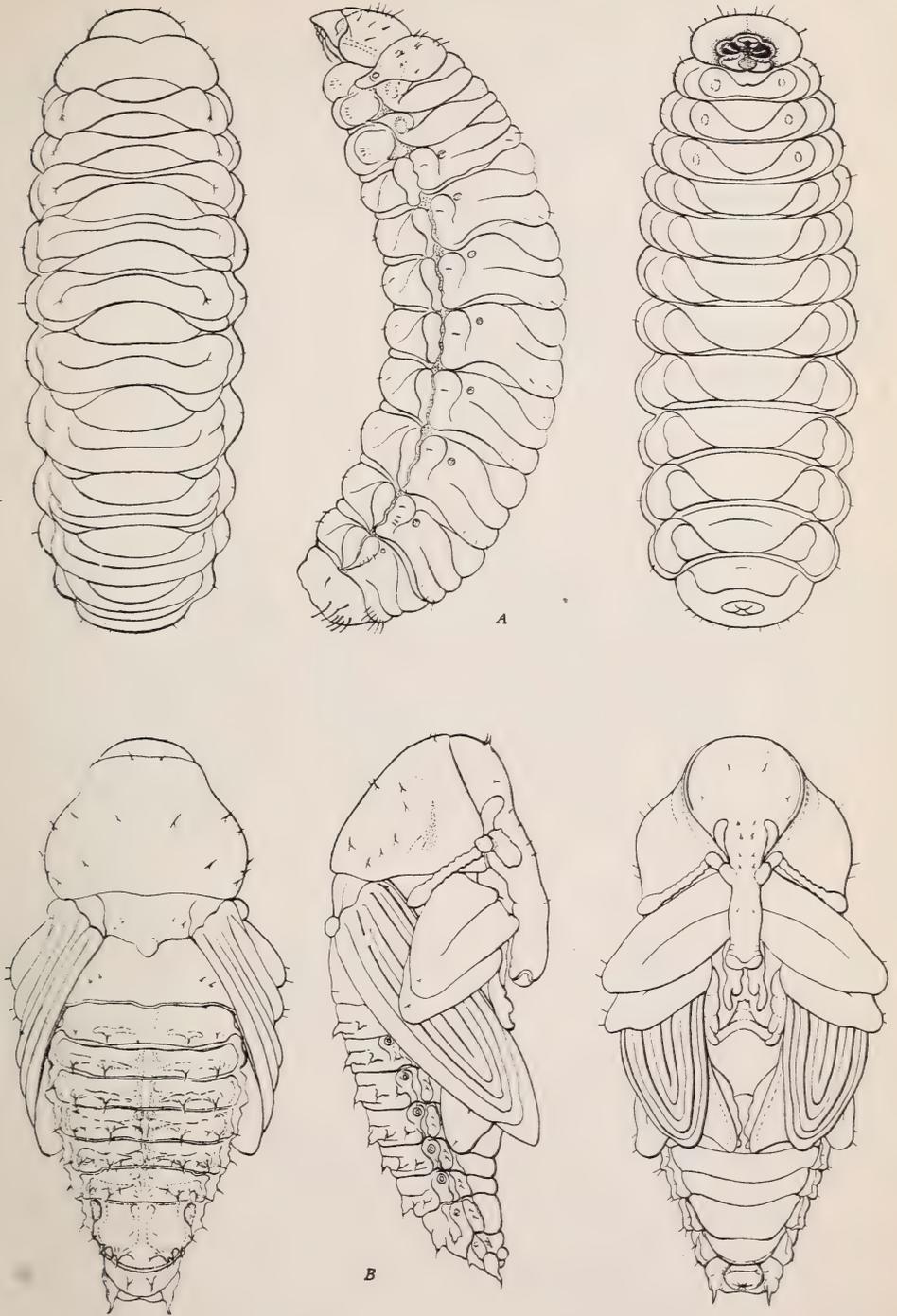
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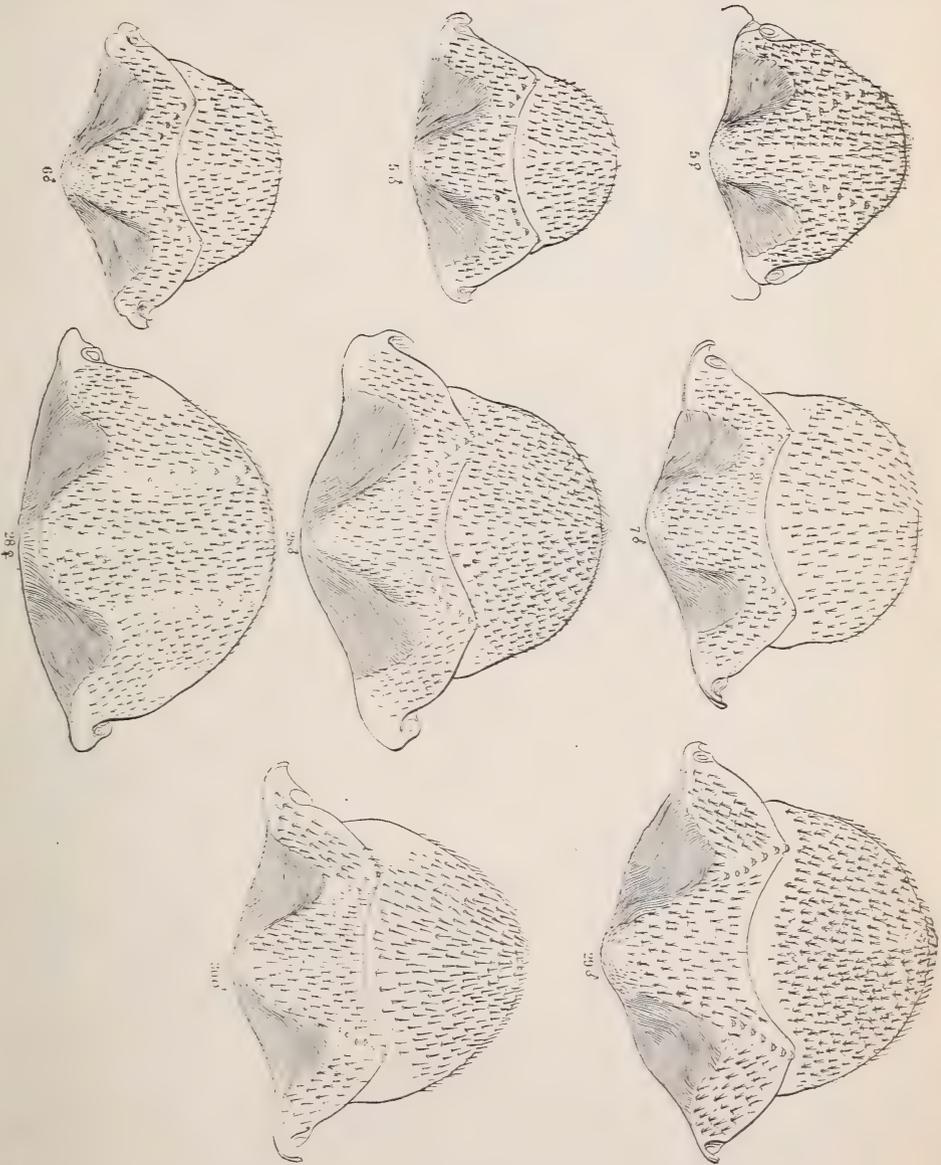
ADULTS OF PISSODES.

Fig. 20.—*P. puncticollis*. (Original.) Fig. 24.—*P. rotundatus*. (Author's illustration.) Fig. 25.—*P. burkei*. (Original.) Fig. 26.—*P. piperi*. (Original.) Fig. 27.—*P. dubius*. (Author's illustration.) Fig. 29.—*P. affinis*. (Author's illustration.)



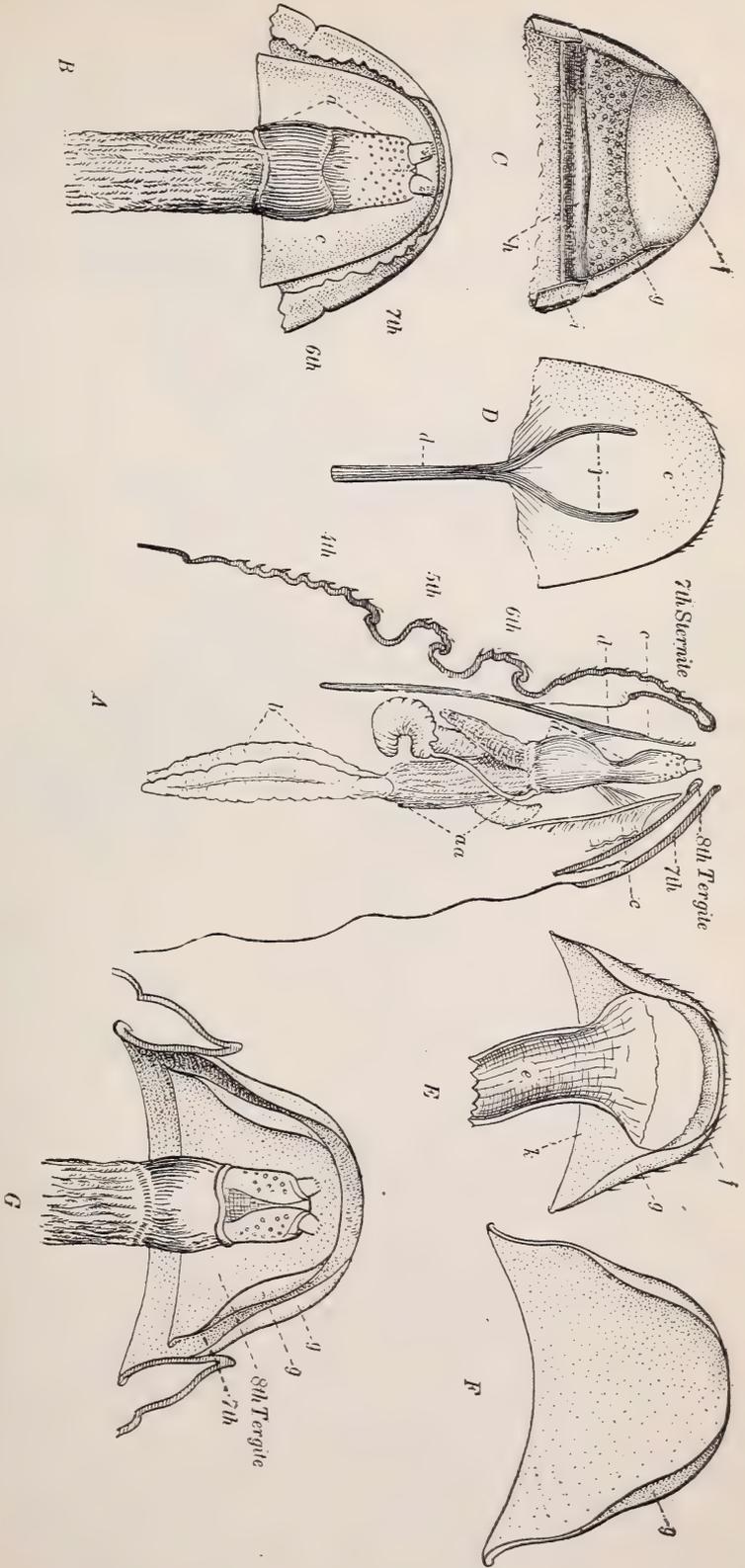
LARVA AND PUPA OF PISSODES.

A.—Larva of *P. piperi*, dorsal, lateral, and ventral aspects. B.—Pupa of *P. sitchensis*, dorsal, lateral, and ventral aspects. (Original.)



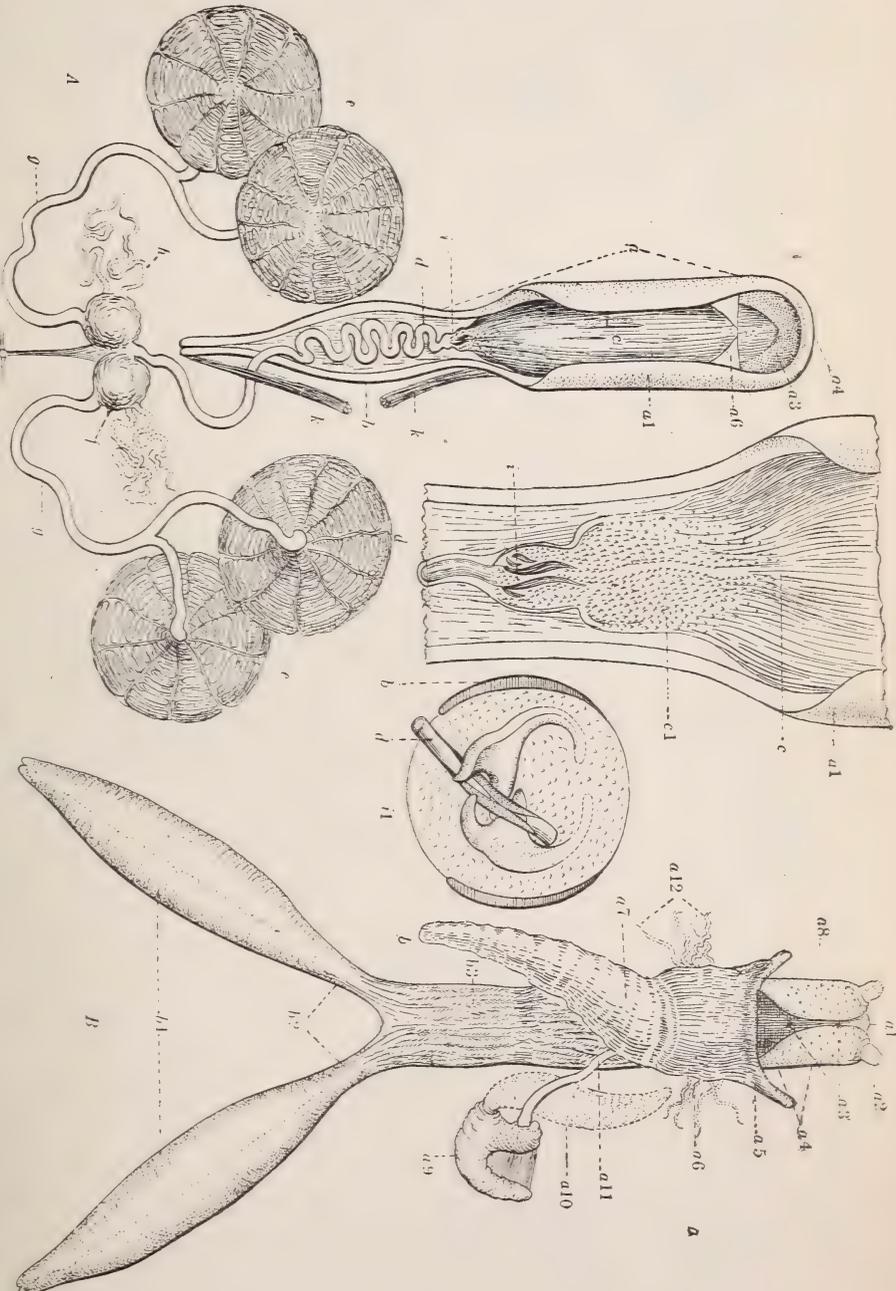
PYGAL TERGITES OF THE ABDOMEN OF PISSODES.

Fig. 5.9, ♀.—Tergite 7 of *P. engelmanni*. Fig. 5.8, ♂.—Tergites 7 and 8 of *P. engelmanni*. Fig. 6.2, ♀.—Tergites 7 and 8 of *P. strobi*.
Fig. 7.6, ♂.—Tergites 7 and 8 of *P. approximatus*. Fig. 29.3, ♂.—Tergites 7 and 8 of *P. affinis*. Fig. 29.2, ♀.—Tergite 7 of
P. fassettii. Fig. 29.1, ♂.—Tergites 7 and 8 of *P. affinis*. Fig. 30.0, ♂.—Tergites 7 and 8 of *P. curvata*. (Original.)



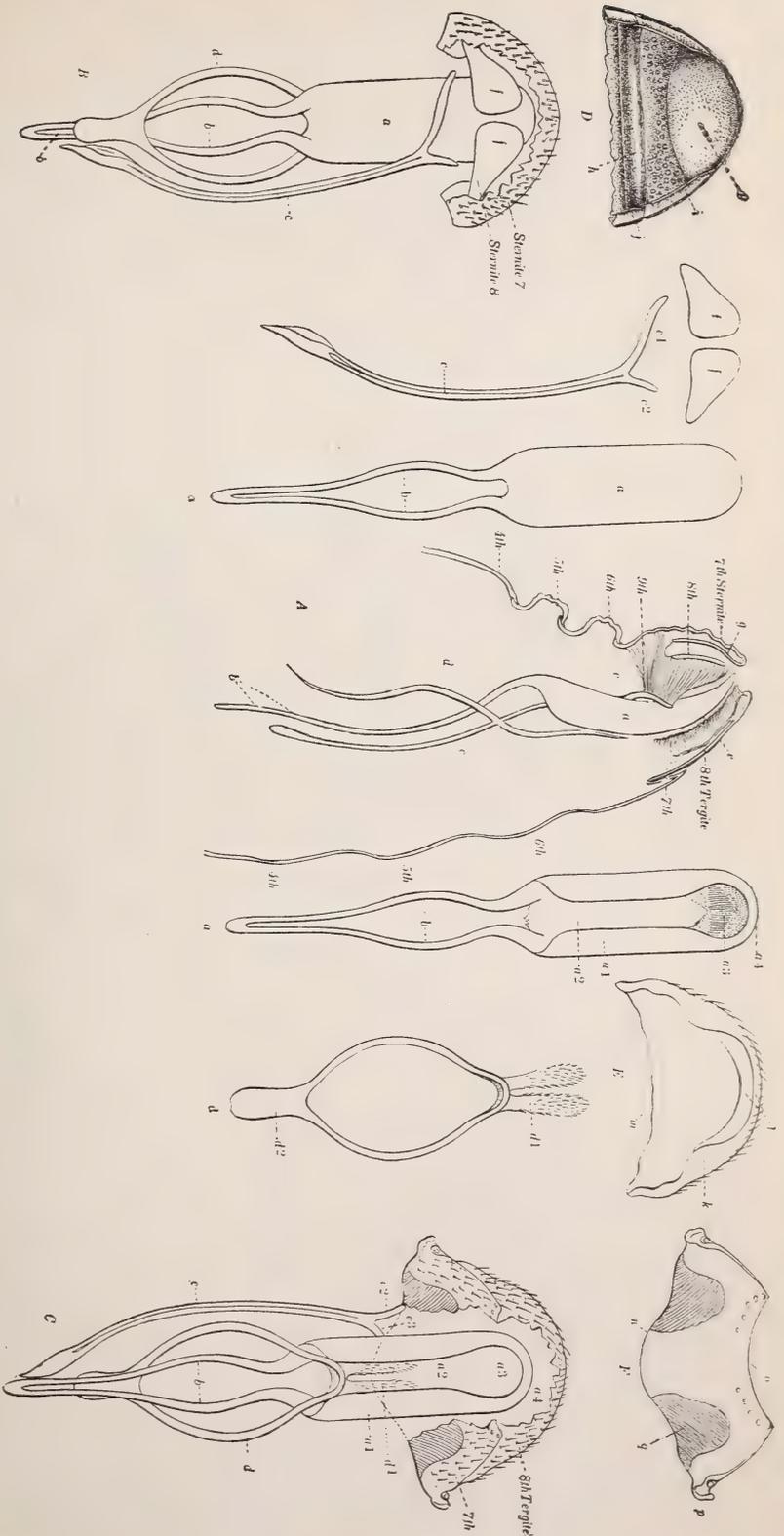
FEMALE REPRODUCTIVE ORGANS OF PISSODES.

A.—Longitudinal section of abdomen showing relative positions of parts; and lateral aspect of the female organs: *a*, posterior section of genitalia; *aa*, median section; *b*, posterior section and ovaries; *c*, genital plate or ninth sternite; *d*, apodeme of the ninth sternite; *e*, rectum. B.—Dorsal aspect of posterior part of organs showing relation to abdominal sternites. C.—Dorsal aspect of seventh sternite and junction with sixth sternite; *d*, apodeme of the ninth sternite; *e*, hectum; *f*, ventral fold; *g*, epipleurite 8. D.—Dorsal aspect of eighth sternite; *c*, genital plate; *d*, apodeme; *f*, fork. E.—Ventral aspect of eighth sternite; *c*, genital plate; *d*, apodeme; *f*, fork. F.—Ventral aspect of seventh tergite; *g*, Epipleurite 7. G.—Ventral aspect of anterior section of organs and relations to seventh and eighth tergites. (Original.)



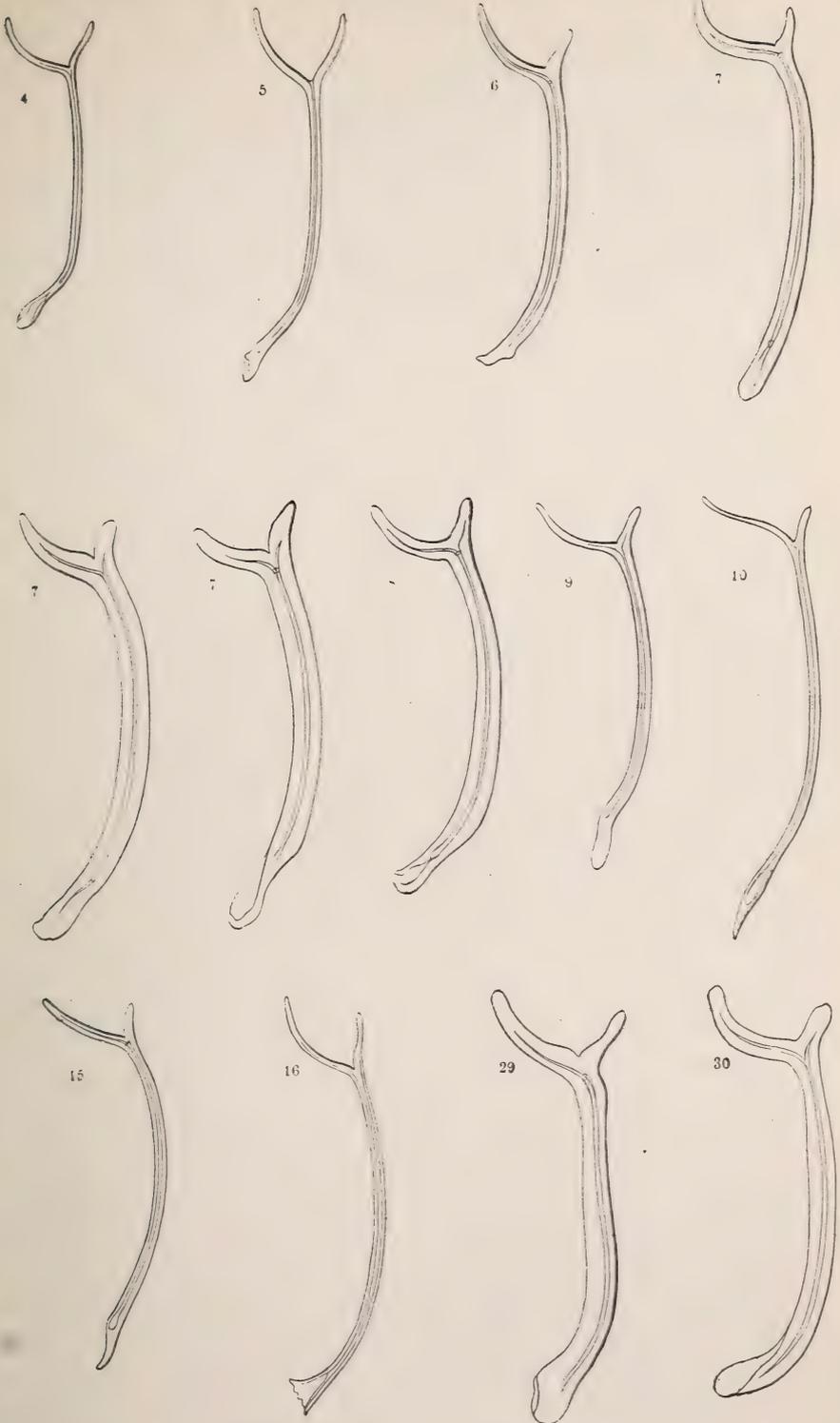
MALE AND FEMALE REPRODUCTIVE ORGANS OF PISODES.

4.—Male genitalia: *a*, Body; *a1*, internal fold; *a3*, apical opening; *a4*, apex; *b*, Janora or apodemes; *c*, ejaculatory duct; *c1*, denunciate area; *d*, seminal duct; *e*, testes; *f*, seminal vesicle; *g*, vas deferens; *h*, mucous glands; *i*, seminal valve; *i1*, transverse section, greatly enlarged, showing approximate structure of valve; *j*, Female genitalia of young adult; *k*, Ovaries (immature); *l*, paired oviducts; *m*, impaired oviduct; *n*, anal opening of ovipositor; *o*, ventral canal; *o1*, ovipositor; *o2*, vaginal opening; *o3*, vagina; *o7*, bursa copulatrix; *o9*, spermatheca; *a10*, spermathecal gland; *a11*, seminal duct; *a12*, mucous glands. (Original.)



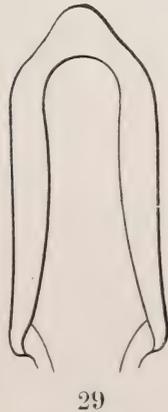
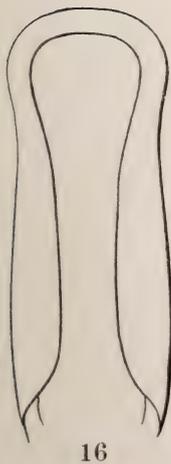
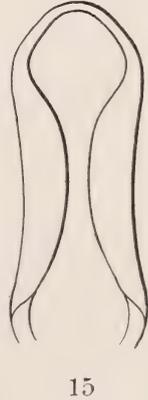
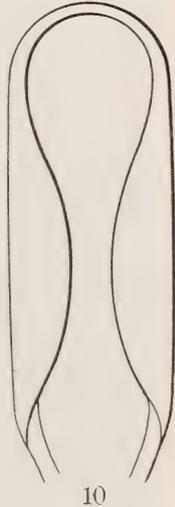
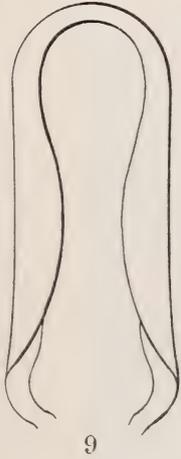
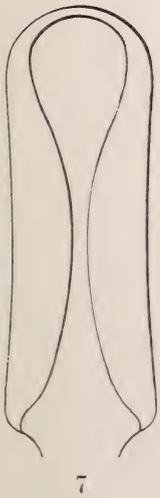
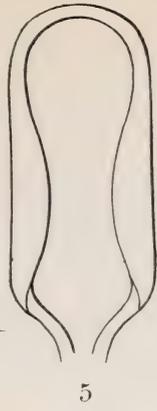
MALE REPRODUCTIVE ORGANS OF PISSODES.

1. Longitudinal section of abdomen showing relative position of segments and lateral aspect of chitinous parts of genitalia: *B*, ventral aspect of chitinous parts in relation to seventh sternite and genital plates; *C*, dorsal aspect of chitinous parts in relation to seventh and eighth tergites; *D*, dorsal aspect of seventh sternite and junction with sixth; *E*, ventral aspect of eighth tergite; *F*, ventral aspect of seventh tergite; *G*, Body (representing the ninth sternite); *a*₁, lateral fold; *a*₂, ejaculatory canal; *a*₃, apical opening; *b*₁, apex; *b*₂, femora; *c*₁, rod or fork (representing the ninth sternite); *c*₂, major prong; *c*₃, minor prong; *d*₁, ring (representing the apodeme of the ninth tergite); *d*₂, papilla; *d*₃, posterior process; *e*₁, rectum; *f*₁, eighth sternite or genital plates; *f*₂, sternal fold; *f*₃, hypopleurite; *g*₁, k, epipleurite; *g*₂, l, apical or ventral fold; *g*₃, anterior margin; *h*₁, anterior margin; *h*₂, posterior margin; *h*₃, lateral angle and articulating fold of lateral angle, also epipleurite; *i*₁, membraneous lobe. (Original.)



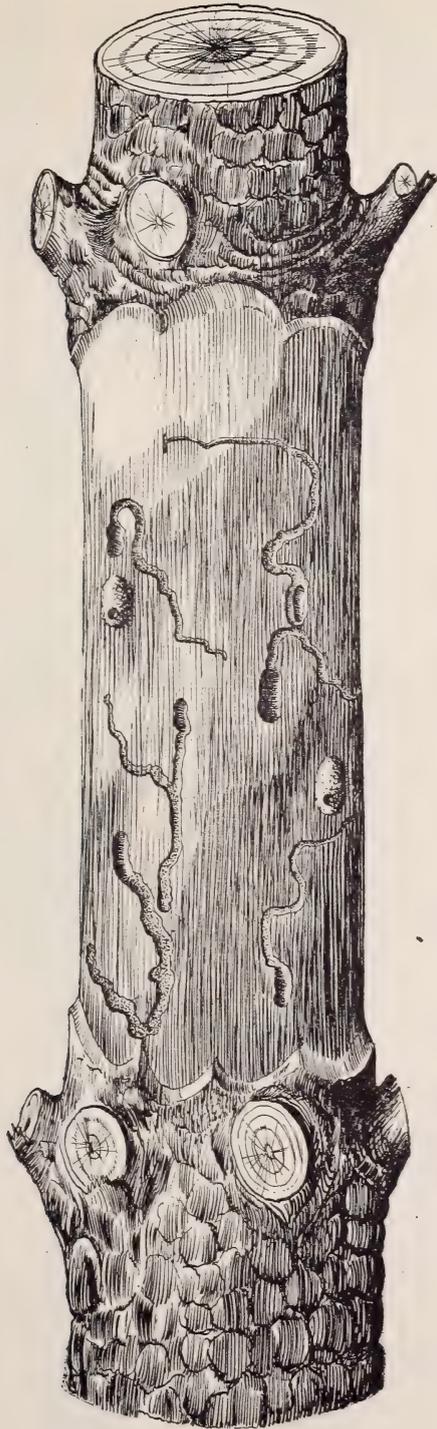
FORKS OF MALE GENITALIA OF PISSODES.

Fig. 4.—*P. sitchensis*. Fig. 5.—*P. engelmanni*. Fig. 6.—*P. strobi*. Fig. 7.—*P. approximatus*.
 Fig. 8.—*P. schwarzi*. Fig. 9.—*P. canadensis*. Fig. 10.—*P. nemorensis*. Fig. 15.—*P. radiatz*.
 Fig. 16.—*P. fasciatus*. Fig. 29.—*P. affinis*. Fig. 30.—*P. curriei*. (Original.)

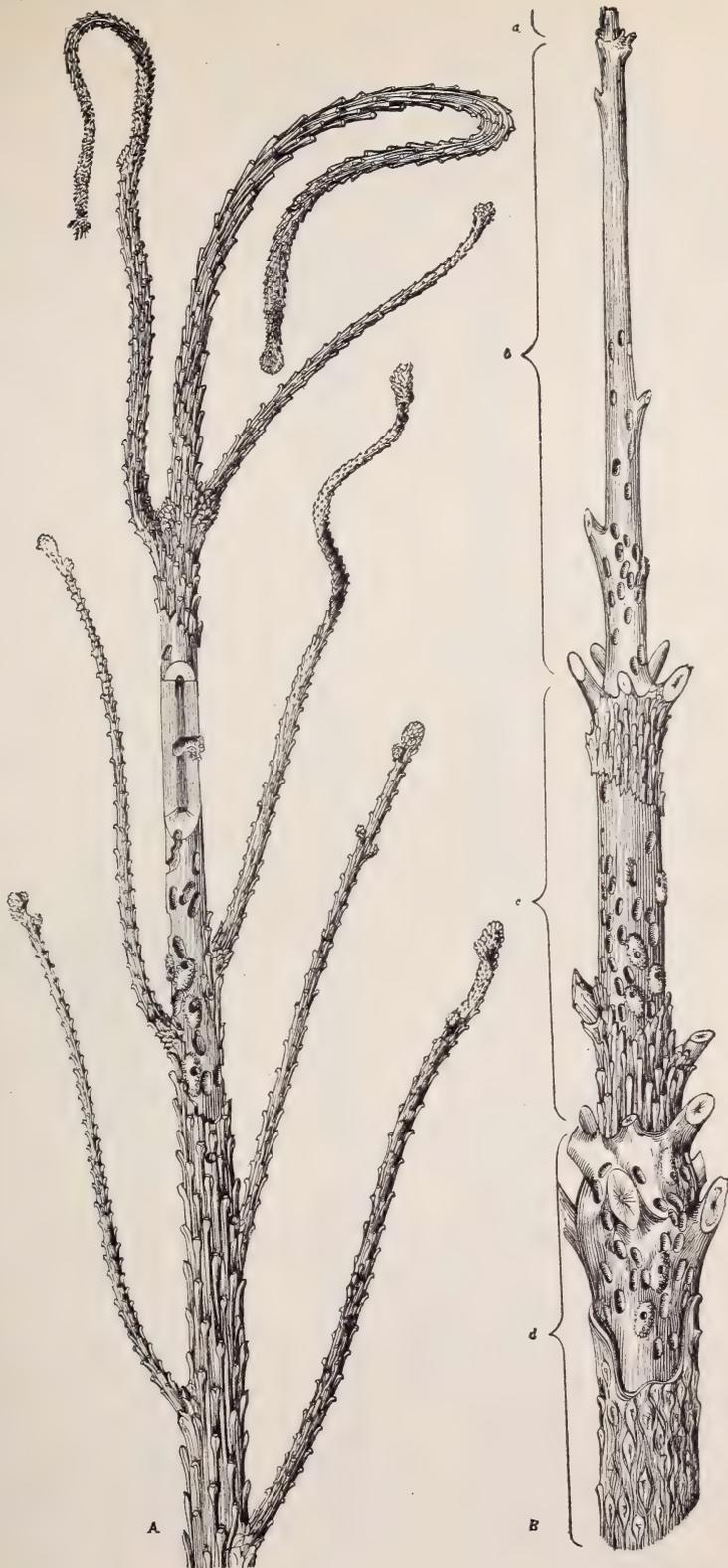


STEMS OF MALE GENITALIA OF PISSODES.

Fig. 4.—*P. sitchensis*. Fig. 5.—*P. engelmanni*. Fig. 6.—*P. strobi*. Fig. 7.—*P. approximatus*. Fig. 9.—*P. canadensis*. Fig. 10.—*P. nemorensis*. Fig. 15.—*P. radiatae*. Fig. 16.—*P. fasciatus*. Fig. 29.—*P. affinis*. Fig. 30.—*P. curriei*. (Original.)

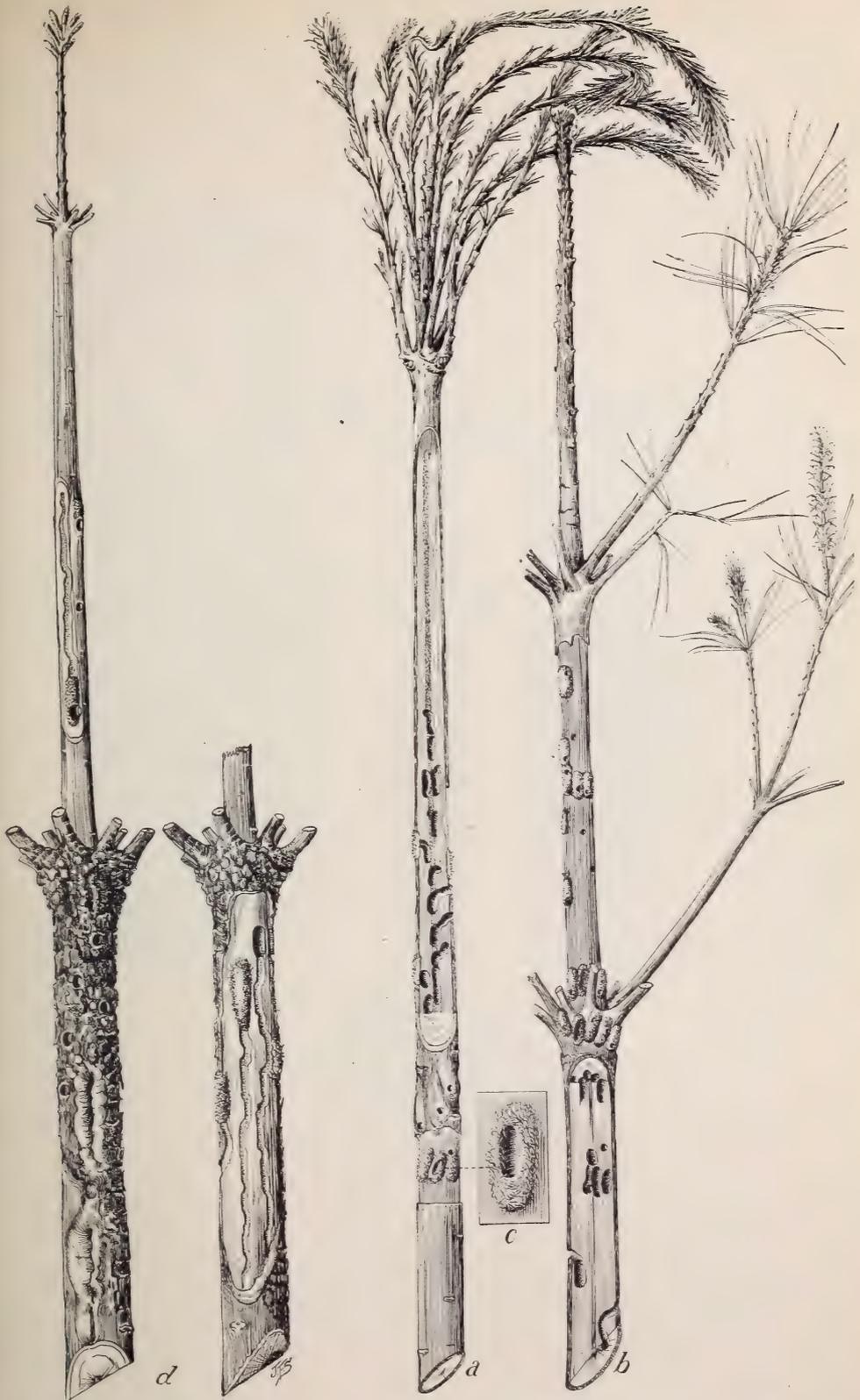


WORK OF *PISSODES FISKEI* IN INNER BARK AND OUTER WOOD. (ORIGINAL.)



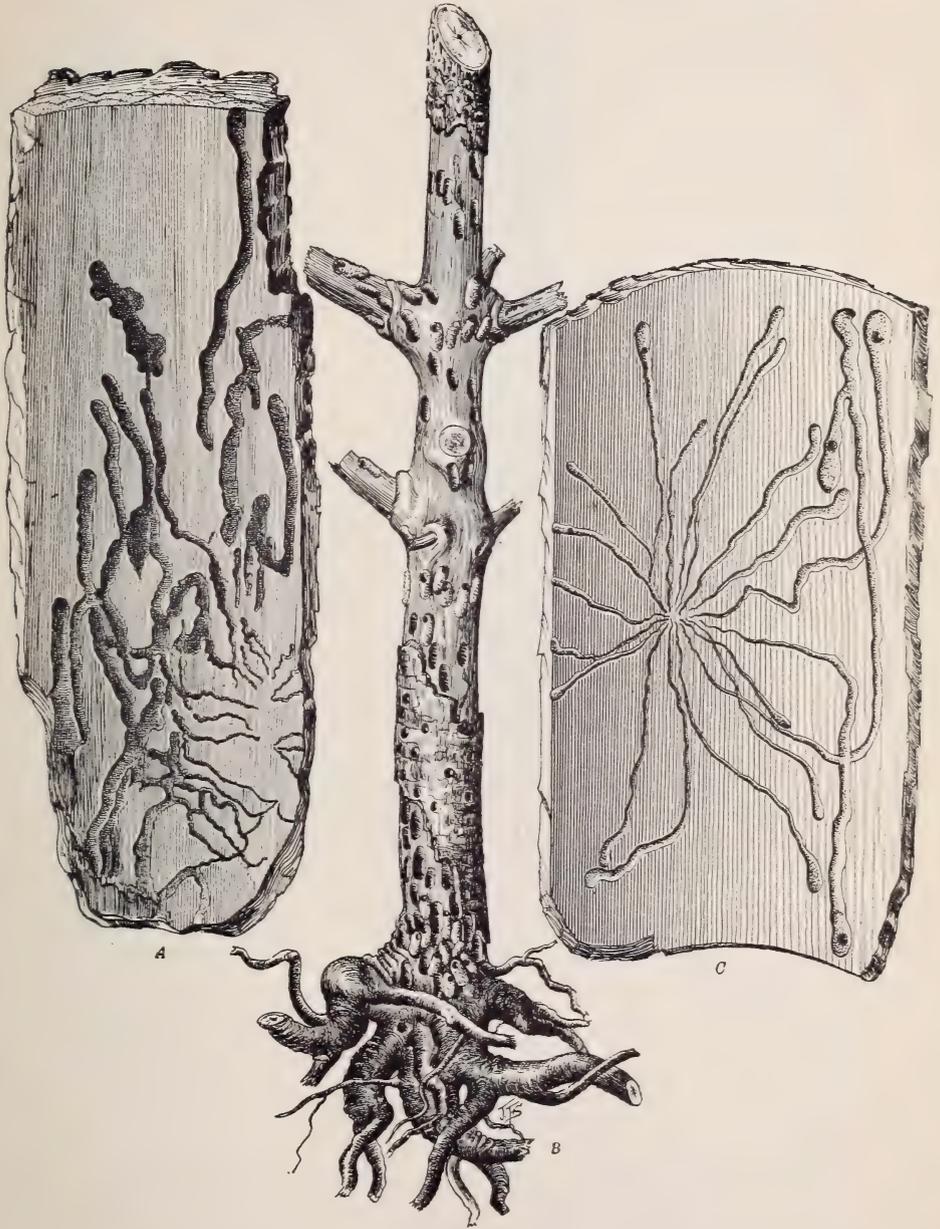
WORK OF *PISSODES SITCHENSIS* IN BARK AND WOOD OF TOPS.

A.—One-year terminal. B.—Four-year-old top: *a*, One-year internode; *b*, 2-year internode; *c*, 3-year internode; *d*, 4-year internode. (Original.)



WORK OF *PISSODES STROBI*, SHOWING CHARACTER OF INJURY, CHIP COCOONS, AND PUPAL CELLS.

a, Vigorous terminal shoot, showing condition of new growth at time pupæ are transforming to adults; *b*, 3-year-old top, showing how larvæ have migrated from terminal to the 2 and 3 year old internodes; *c*, chip cocoon and pupal cell, natural size; *d*, work in 2 and 3 year terminals, showing abnormal habit in the latter. (*a-c*, Author's illustrations; *d*, original.)



WORK OF PISSODES APPROXIMATUS AND P. NEMORENSIS.

A.—Work of *P. approximatus* in bark. B.—Work of *P. approximatus* in bark and wood of sapling.
C.—Work of *P. nemorensis* in bark. (Original.)



WORK OF PISSODES YOSEMITE AND P. SCHWARZI.

A.—*P. yosemitae*: Work in wood and bark. (Author's illustration.) B.—*P. schwarzi*:
Work in wood and bark. (Original.)

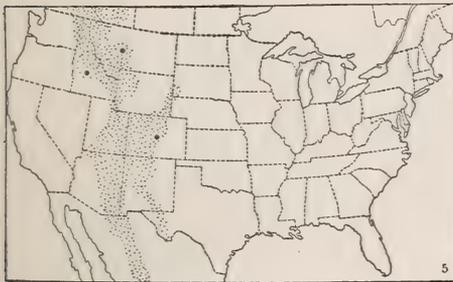


WORK OF PISSODES FASCIATUS.

A.—Work in bark and wood of stem of sapling. (Author's illustration.) B.—Work in thick bark. (Original.)

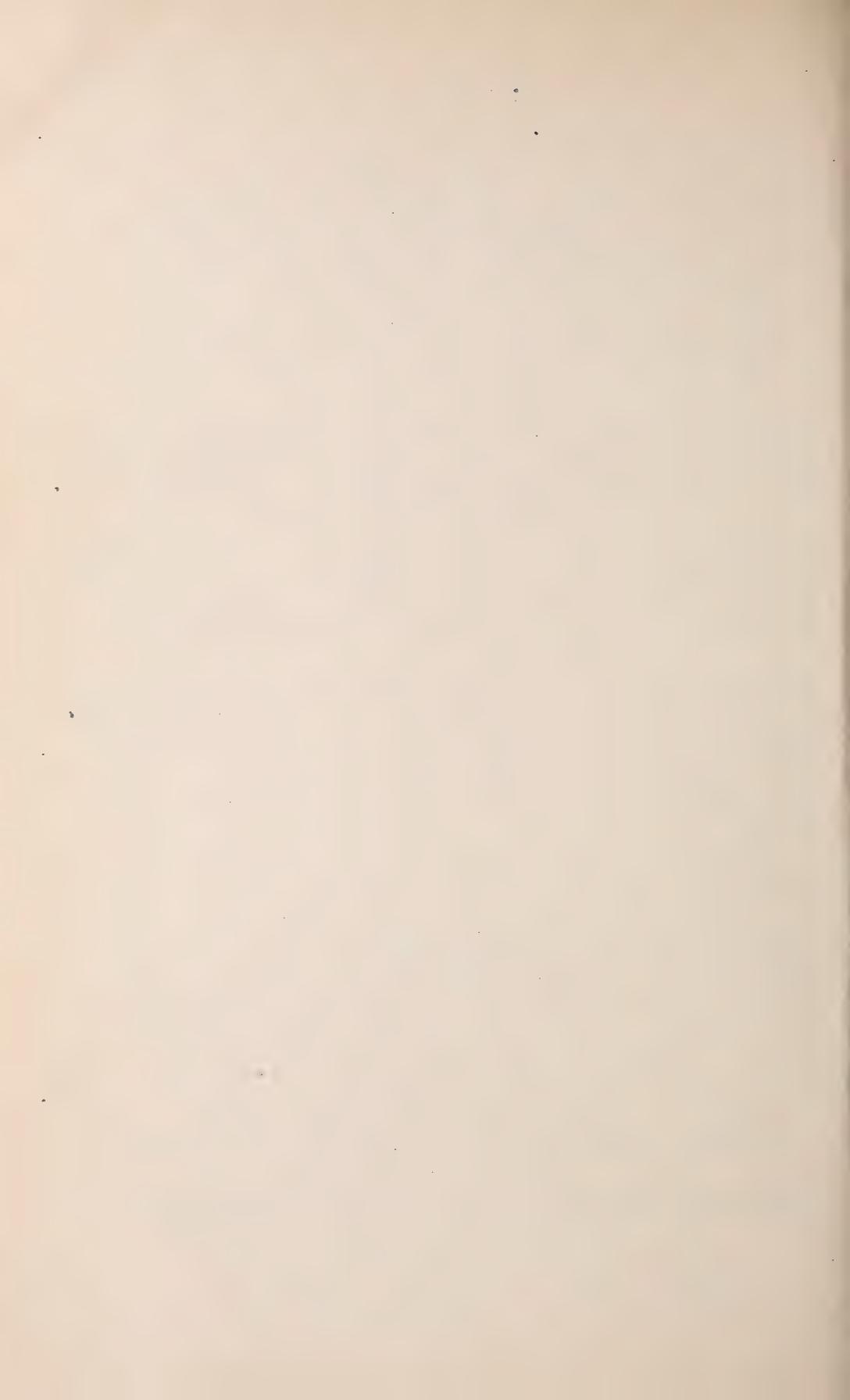


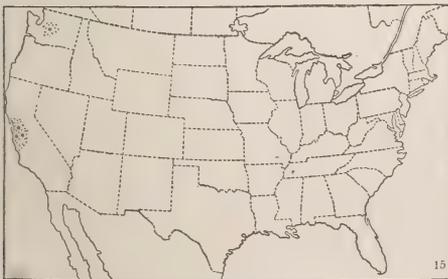
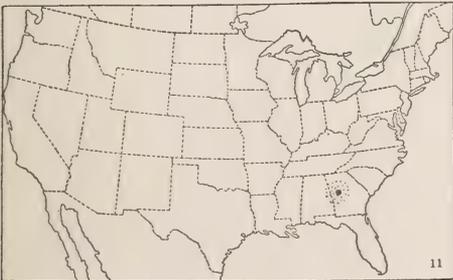
WORK OF *PISSODES PIPERI* IN BARK. (ORIGINAL.)



DISTRIBUTION MAPS OF PISSODES.

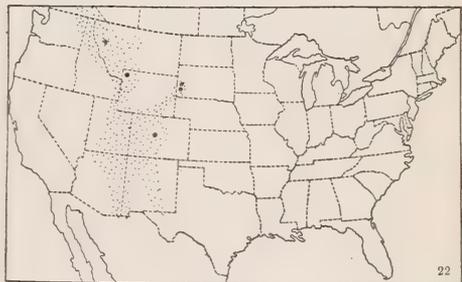
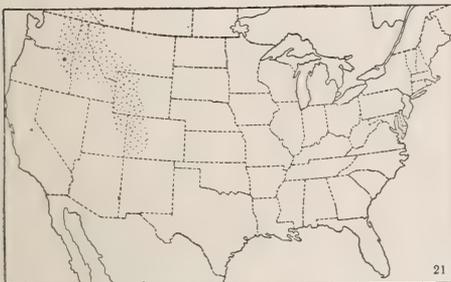
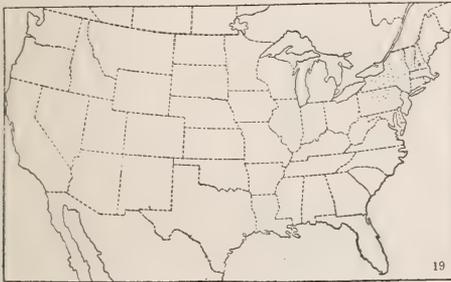
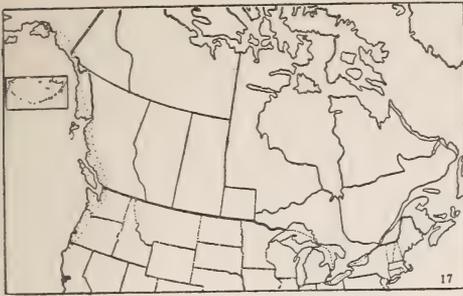
Fig. 1.—*P. similis*. Fig. 2.—*P. utahensis*. Fig. 3.—*P. barberi*. Fig. 4.—*P. sitchensis*. Fig. 5.—*P. engelmanni*. Fig. 6.—*P. strobi*. Fig. 7.—*P. approximatus*. Fig. 8.—*P. schwarzi*.





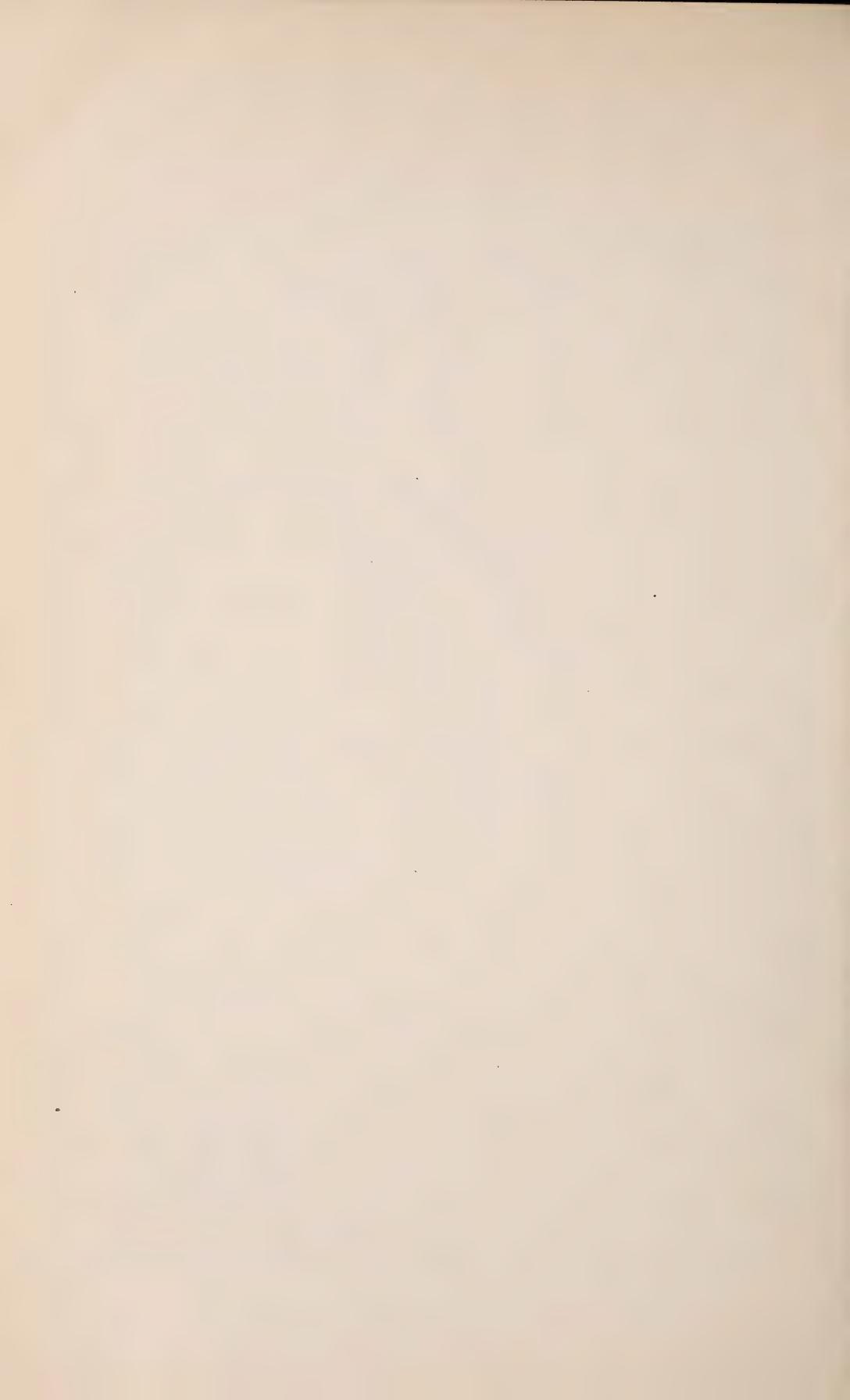
DISTRIBUTION MAPS OF PISSODES.

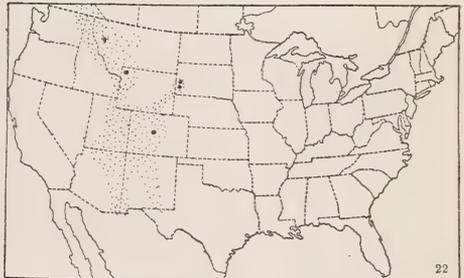
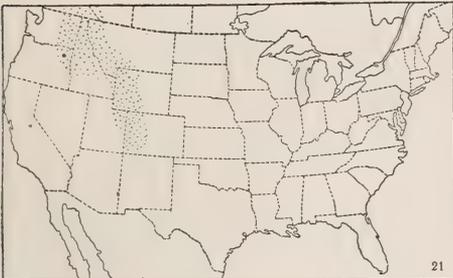
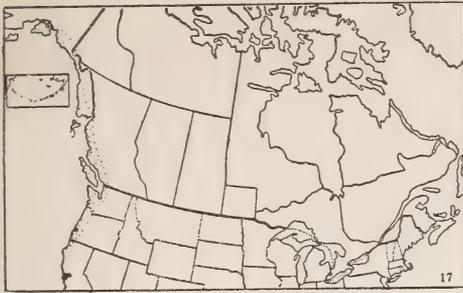
Fig. 9.—*P. canadensis*. Fig. 10.—*P. nemorensis*. Fig. 11.—*P. deodaræ*. Fig. 12.—*P. californicus*.
Fig. 13.—*P. yosemite*. Fig. 14.—*P. webbi*. Fig. 15.—*P. radiatæ*. Fig. 16.—*P. fasciatus*.



DISTRIBUTION MAPS OF PISSODES.

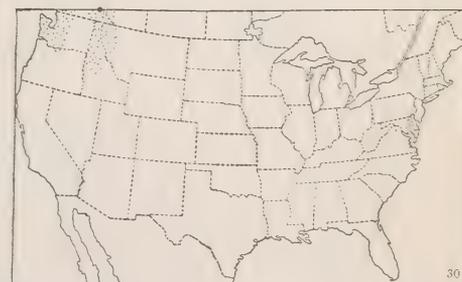
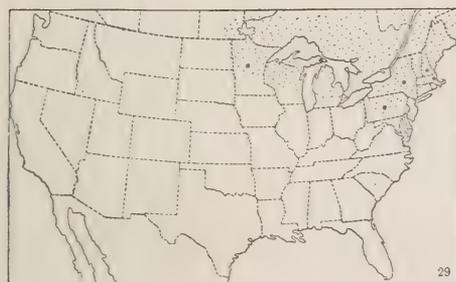
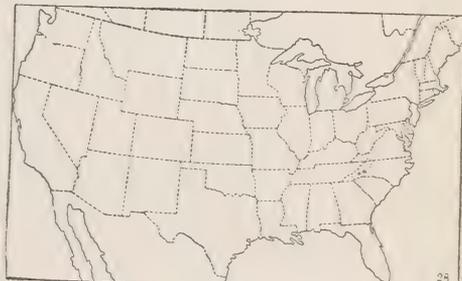
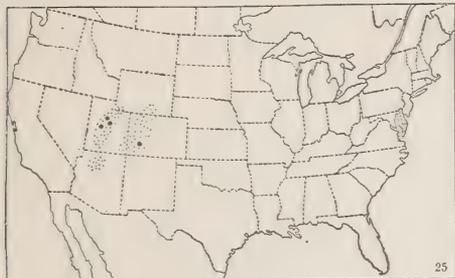
Fig. 17.—*P. costatus*. Fig. 18.—*P. fskei*. Fig. 19.—*P. nigræ*. Fig. 20.—*P. puncticollis*. Fig. 21.—*P. murrayanæ*. Fig. 22.—*P. coloradensis*. Fig. 23.—*P. alascensis*. Fig. 24.—*P. rotundatus*.





DISTRIBUTION MAPS OF PISSODES.

Fig. 17.—*P. costatus*. Fig. 18.—*P. fishci*. Fig. 19.—*P. nigrae*. Fig. 20.—*P. puncticollis*. Fig. 21.—*P. murrayanæ*. Fig. 22.—*P. coloradensis*. Fig. 23.—*P. alascensis*. Fig. 24.—*P. rotundatus*.



DISTRIBUTION MAPS OF PISSODES.

Fig. 25.—*P. burkei*. Fig. 26.—*P. piperi*. Fig. 27.—*P. dubius*. Fig. 28.—*P. fraseri*. Fig. 29.—*P. affinis*.
Fig. 30.—*P. curriei*.

TECHNICAL SERIES, No. 20, PART II.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

TECHNICAL PAPERS ON MISCELLANEOUS
FOREST INSECTS.

II. THE GENOTYPES OF THE SAWFLIES AND
WOODWASPS, OR THE SUPERFAMILY
TENTHREDINOIDEA.

BY

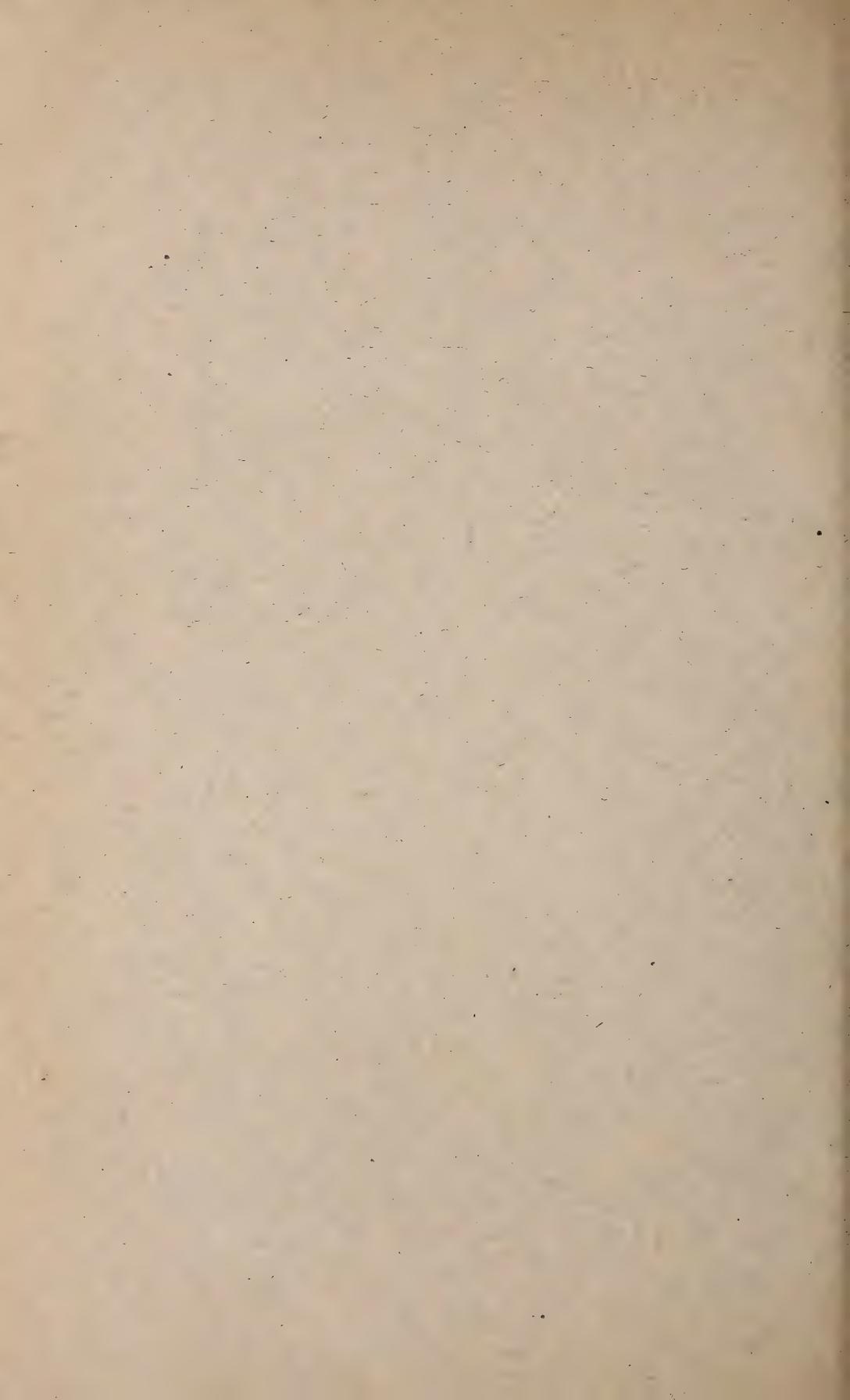
S. A. ROHWER,

Agent and Expert.

ISSUED MARCH 4, 1911.



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1911.



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BUREAU OF ENTOMOLOGY.

L. O. HOWARD, *Entomologist and Chief of Bureau.*
C. L. MARLATT, *Entomologist and Acting Chief in Absence of Chief.*
R. S. CLIFTON, *Executive Assistant.*
W. F. TASTET, *Chief Clerk.*

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A. D. HOPKINS, *in charge.*

H. E. BURKE, J. L. WEBB, JOSEF BRUNNER, S. A. ROHWER, T. E. SNYDER, W. D.
EDMONSTON, W. B. TURNER, *agents and experts.*
MARY E. FAUNCE, *preparator.*
WILLIAM MIDDLETON, MARY C. JOHNSON, *student assistants.*

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY,
Washington, D. C., October 22, 1910.

SIR: I have the honor to transmit herewith a manuscript entitled "The Genotypes of the Sawflies and Woodwasps, or the Superfamily Tenthredinoidea." These insects belong to this superfamily of the order Hymenoptera and include some of the important enemies of North American forest trees. The true sawflies, in their larval stage, destroy the foliage of coniferous and other trees and forest growths and some of them are exceedingly destructive, as, for example, the larch sawfly, which feeds upon the foliage of the larch timber of Europe and North America. The woodwasps, in their larval stage, bore in the wood of dying and dead standing and felled trees, causing defects and rapid deterioration.

In addition to the large number of species which are native to this country, there are some very destructive species which have found their way here from other countries, so that it is of the greatest importance to know all of the species and to guard against further introductions.

Both the systematic and economic knowledge of these insects is notably limited, especially as regards North American species, and it is of the utmost importance, as a basis for the best results in investigations of these insects in their relation to economic problems, that considerable purely technical work should be done on them.

Mr. Rohwer has been engaged to work on the sawflies on account of his extended expert knowledge of this group of insects and the work he had done on them before he came to the Bureau. As a collaborator of this Bureau, but at his own expense, Mr. Rohwer visited the principal collections of Europe in the summer of 1909 to study the types of described species and genera, all of which puts him in a position to carry on the research work assigned to him in the most thorough manner. Mr. Rohwer has found it necessary to devote considerable time to preliminary work on the entire group and on the genera of the world in order to have an authoritative basis for the further work of a monographic nature on the more

important groups represented by species which depredate on trees and forest growths. The present paper includes the partial results of his preliminary work, which has been prosecuted with such energy as to leave little more to be done in this line. Mr. Rohwer's future papers will deal with special groups which will be treated in a monographic manner in order that a basis may be formed for special papers on the economic features.

I recommend the publication of this manuscript as Technical Series No. 20, Part II, of the Bureau of Entomology.

Respectfully,

L. O. HOWARD,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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TECHNICAL PAPERS ON MISCELLANEOUS FOREST INSECTS.

II. THE GENOTYPES OF THE SAWFLIES AND WOODWASPS, OR THE SUPERFAMILY TENTHREDINOIDEA.

By S. A. ROHWER,

Agent and expert.

INTRODUCTION.

The following paper deals with the sawflies and horntails and comprises the superfamilies Tenthredinoidea and Siricoidea of Ashmead's classification; the Chalastogastra of Rev. F. W. Konow; the Phyllophaga (=Phytophaga) and Xylophaga of Cresson and authors; or the genera *Tenthredo* and *Sirex* of Linnæus. It is divided into two parts; the first part is an alphabetical catalogue of the generic names used in Tenthredinoidea and Siricoidea with their type species; the second part is composed of descriptions of the briefly characterized genera and species described by the late William H. Ashmead.

An effort has been made to include all the generic names used in these two superfamilies. In case of any omissions the author will be most pleased to have these called to his notice.^a

AN ALPHABETICAL CATALOGUE OF THE GENERIC NAMES USED IN THE TENTHREDINOIDEA, WITH THEIR TYPE SPECIES.

THE DESIGNATION OF THE TYPE SPECIES OF GENERA.

The necessity of having the types of genera fixed is now recognized by almost every working systematic entomologist. In the designation of the following genotypes the rulings and recommendations of the International Commission on Zoological Nomenclature have been followed. As these rulings and recommendations have never been finally codified, and there are in a few cases apparently contradictory statements, the personal equation has entered into

^a Address Bureau of Entomology, Department of Agriculture, Washington, D. C.

the interpretation to some extent. In all such cases an effort is made to follow the consensus of opinion. Article 2, page 11, of the International Code of Zoological Nomenclature as applied to medicine^a says: "The scientific designation of animals is uninominal for subgenera and all higher groups, binominal for species, and trinominal for subspecies." Does this mean that a genus can be founded without included species? In article 30, page 26, and the correction in *Science* for October 18, 1907, pages 521-522, it is stated that a genus must have a type and the type must be an included species. In this paper a genus is considered to be without standing until it contains a species; and genera which were founded without species take the first species placed in them as the type and date from the time when that species was placed in them. In such cases the name of the first author of the genus is given first in parentheses, and, following the parenthesis, the name of the author who first included a species.^b

With the exception of monobasic genera the first designation of genotypes in Tenthredinoidea and Siricoidea was done by Latreille in 1810.^c This has been definitely ruled on by the International Commission on Zoological Nomenclature as follows:

The Designation of Genotypes by Latreille 1810.—The "Table des genres avec l'indication de l'espèce qui leur sert de type" in Latreille's (1810) "Considérations Générales" should be accepted as designation of types of the genera in question.^d

The next entomologist to fix the types of genera was John Curtis, in his *British Entomology*, which was published from 1824 to 1839. In this work Curtis says "type of the genus," which makes it very evident that the author endeavored to fix the types of the genera he treated.

J. O. Westwood, in his *Synopsis of the Genera of British Insects*,^e gives after each genus what he calls a "typical species."^f In most cases this species can be taken as the type of the genus in question, and in many it is the first indication of the fixing of a type for many of the genera. Inasmuch as the International Commission on Zoological Nomenclature^g has said "the meaning of the expression 'select type' is to be rigidly construed; mention of a species as an illustration or example of a genus does not constitute a selection of

^a Bul. no. 24, Hygienic Laboratory, Public Health and Marine-Hospital Service of United States, September, 1905.

^b See synonyms of *Hartigia Schiodte* and *Boie*, p. 80.

^c *Considérations Générales sur l'Ordre Naturel des Animaux composant les Classes des Crustacés, des Arachnides et des Insectes*, Paris, 1810.

^d *Science*, n. s. vol. 31, no. 787, p. 150, January 28, 1910.

^e Published as an appendix to "An Introduction to the Modern Classification of Insects," vol. 2, London, 1840.

^f *Synopsis*, p. 1, footnote.

^g *Science*, n. s. vol. 26, no. 668, p. 521, October 18, 1907.

a type," the "typical species" of Westwood are not given as the types of genera except in those cases where no type has been given and the species given by Westwood can be the genotype according to the rules. In the following list, however, the words "Westwood 1840" are placed after the genotypes of certain genera, for the convenience of the student, should any ruling be given on these "typical species."

With the exception of a few types designated by Brullé^a and Shipp,^b few genotypes were named except in the works of the two American writers Ashmead and MacGillivray.

It was hoped to verify every reference given, but in some few cases this was not possible. In such cases the reference is that given by Dalla Torre. The original descriptions of the following genera have not been seen: *Xiphiura* Fallén, *Hybonotus* Klug, *Nycteridium* Fischer-Waldheim, *Pompholyx* Freymuth.

RULES OF ZOOLOGICAL NOMENCLATURE FOR THE DESIGNATION OF TYPE SPECIES OF GENERA.

The ruling of the International Commission on Zoological Nomenclature^c is reprinted here for ready reference. Some of the recommendations which do not deal with any cases found in Tenthredinoidea and which are not of general importance have been omitted.

ART. 30. The designation of type species of genera shall be governed by the following rules (*a-g*), applied in the following order of precedence:

I. Cases in which the generic type is accepted solely upon the basis of the original publication.

(*a*) When in the original publication of a genus, one of the species is definitely designated as type, this species shall be accepted as type regardless of any other considerations. (Type by original designation.)

(*b*) If, in the original publication of a genus, *typicus* or *typus* is used as a new specific name for one of the species, such use shall be construed as "type by original designation."

(*c*) A genus proposed with a single original species takes that species as its type. (Monotypical genera.)

(*d*) If a genus, without originally designated (see *a*) or indicated (see *b*) type, contains among its original species one possessing the generic name as its specific or subspecific name, either as valid name or synonym, that species or subspecies becomes *ipso facto* type of the genus. (Type by absolute tautonomy.)

II. Cases in which the generic type is not accepted solely upon basis of the original publication:

(*e*) The following species are excluded from consideration in selecting the types of genera:

(α) Species which were not included under the generic name at the time of its original publication.

^a Histoire Naturelle des Insectes. Hyménoptères, vol. 4, Paris, November, 1846.

^b Entomologist, vol. 27, pp. 339-340, 1894.

^c See Science, n. s. vol. 26, no. 668, pp. 521-522, October 18, 1907.

(*β*) Species which were *species inquirendæ* from the standpoint of the author of the generic name at the time of its publication.

(*γ*) Species which the author of the genus doubtfully referred to it.

(*f*) In case a generic name without originally designated type is proposed as a substitute for another generic name, with or without type, the type of either, when established, becomes *ipso facto* type of the other.

(*g*) If an author, in publishing a genus with more than one valid species, fails to designate (see *a*) or to indicate (see *b*, *d*) its type, any subsequent author may select the type, and such designation is not subject to change. (Type by subsequent designation.)

The meaning of the expression "select a type" is to be rigidly construed. Mention of a species as an illustration or example of a genus does not constitute a selection of a type.

III. *Recommendations*.—In selecting types by subsequent designation, authors will do well to govern themselves by the following recommendations:

(*h*) In the case of Linnæan genera select as type the most common or the medicinal species.

(*i*) If a genus, without designated type, contains among its original species one possessing as a specific or subspecific name, either as valid name or synonym, a name which is virtually the same as the generic name, or of the same origin or same meaning, preference should be shown to that species in designating the type, unless such preference is strongly contra-indicated by other factors. (Type by virtual tautonomy.)

(*k*) If some of the original species have later been classified in other genera, preference should be shown to the species still remaining in the original genus. (Type by elimination.)

(*n*) Show preference to the best described, best figured, best known, or most easily obtainable species, or to one of which a type specimen can be obtained.

(*o*) Show preference to a species which belongs to a group containing as large a number of the species as possible.

(*q*) All other things being equal, show preference to a species which the author of the genus actually studied at or before the time he proposed the genus.

(*r*) In case of writers who habitually place a certain leading or typical species first as "chef de file," the others being described by comparative reference to this type, this fact should be considered in the choice of the type species.

(*s*) In case of those authors who have adopted the "first species rule" in fixing generic types, the first species named by them should be taken as types of their genera.

(*t*) All other things being equal, page precedence should obtain in selecting a type.

CATALOGUE.

The various genera accredited to Jurine (Nouv. Meth. Hym. Ins., vol. 1, 1807) have been accredited to Panzer (Krit. Revis., vol. 2, 1806). Panzer accredits the genera to Jurine, but they are in none of Jurine's earlier papers, while he treated them rather fully in 1807.

All references to Encyclopédie Méthodique, Insectes, vol. 10. 1825, have been changed to "vol. 10, pt. 2, 1828." Volume 10 came out in two numbers, the second, containing the Tenthredinidæ, appearing in 1828.

The word "isogenotypic" is used when two genera have the same species as the genotype.

The word "monobasic" is used to indicate that a genus was founded on one originally included species.

The plan in the following list is to give the generic name first, the name of the author second, the original reference third, the type species fourth, the authority for the type fifth. In case the genus was monobasic, an asterisk is placed after the type species; in case the genotype was originally designated, the word "designated" is placed in parentheses; in case the genus was not monobasic and no genotype has been designated, the type has been chosen and no authority is given (see *Amauronematus* Konow). Certain apparent synonymy, as in the case of isogenotypic genera, is also given. All such synonymy has been verified, and synonymy not verified is not given.

The list of genera is believed to be complete, in as far as publications have been received in Washington, D. C., up to January 1, 1911. All the new generic names proposed in this paper are included in the alphabetical catalogue with the reference, "see p. —."

Abia Leach, Zool. Misc., vol. 3, p. 113, no. 5, 1817.

Type: *Tenthredo sericea* Linnæus (Curtis, 1825).

Acantholyda A. Costa, Pros. Hym. Ital., vol. 3, p. 232, 1894.

Type: *Tenthredo erythrocephala* Linnæus (Rohwer, 1910).

Acanthoperga Shipp, Ent., vol. 27, pp. 338; 339, 1894.

Type: *Perga cameroni* Westwood (designated).

Acanthoptenos Ashmead, Can. Ent., vol. 30, p. 212, 1898.

Type: *Acanthoptenos weithii* Ashmead (designated).

Acherdocerus W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 92, no. 42, 1882.

Type: *Acherdocerus fumipennis* W. F. Kirby.*

Acidiophora Konow, Ent. Nachr., vol. 25, p. 361, 1899.

Type: *Acidiophora decora* Konow.*

Acordulecera Say, Bost. Journ. Nat. Hist., vol. 1, no. 3, p. 209, 1836.

Type: *Acordulecera dorsalis* Say.*

Adirus Konow, Ent. Nachr., vol. 25, p. 74, 1899.

Type: *Cephus trimaculatus* Say.*

Agencimbex Rohwer, Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 104, 1910.

Type: *Cimbex maculata* Marlatt (designated).

Aglaostigma W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 325, no. 104, 1882.

Type: *Aglaostigma eburneiguttatum* W. F. Kirby.*

Allantus Panzer, Krit. Revis., vol. 2, p. 25, 1806.

Type: *Tenthredo scrophulariæ* Linnæus (Curtis, 1839; Brullé, 1846; Westwood, 1840).

=*Tenthredo* Linnæus (isogenotypic).

Allomorpha Cameron, Trans. Ent. Soc. Lond., p. 463, 1876.

Type: *Allomorpha incisa* Cameron.*

Amasis Leach, Zool. Misc., vol. 3, p. 114, no. 6, 1817.

Type: *Tenthredo obscura* Linnæus (Westwood, 1840).

Amauronematus Konow, Deutsch. ent. Zeitschr., p. 237, 1890.

Type: *Nematus fallax* Lepeletier.

Ametastegia A. Costa, Rendic. Accad. Sci. Fis. Napoli, vol. 21, pt. 10, p. 198, 1882.

Type: *Ametastegia fulvipes* A. Costa.*

=*Tenthredo glabrata* Fallén.

=*Taxonus* Hartig.

- Anachoreta** Gistel, "Naturgeschichte des Thierreichs," p. ix, 1848 (n. n. for *Lophyrus* Latreille).
Type: *Tenthredo pini* Linnæus.
=Diprion Schrank.
- Anapeptamena** Konow, Ent. Nachr., vol. 24, p. 271, 1898.
Type: *Anapeptamena albipes* Konow.*
- Ancyloneura** Cameron, Trans. Ent. Soc. Lond., p. 91, 1877.
Type: *Ancyloneura varipes* Cameron.*
- Aneugmenus** Hartig, Fam. Blatt. Holzwesp., p. 253, 1837.
Type: *Tenthredo (Emphytus) coronata* Klug.*
- Anisoarthra** Cameron, Trans. Ent. Soc. Lond., p. 461, 1876.
Type: *Anisoarthra cærulea* Cameron.*
(preocc., =**Senoclia** Cameron.)
- Anisoneura** Cameron, Trans. Ent. Soc. Lond., p. 463, 1876.
Type: *Anisoneura stigmatalis* Cameron.*
(preocc., =**Beleses** Cameron.)
- Anoplolyda** A. Costa, Pros. Hym. Ital., vol. 3, p. 233, 1894.
Type: *Lyda alternans* O. Costa (Rohwer, 1910).
- Anoplonyx** Marlatt, U. S. Dept. Agr., Bur. Ent., Tech. Ser. no. 3, p. 18, 1896.
Type: *Nematus pectoralis* Lepeletier.
- Antholcus** Konow, Zeitschr. syst. Hym. Dipt., vol. 4, p. 3, 1904.
Type: *Tenthredo varinervis* Spinola.*
- Aomodictium** Ashmead, Can. Ent., vol. 30, p. 309, December, 1898.
A genus without a species.
- Aphadnurus** O. Costa, Fauna Napoli, Tenthred., p. 40, 1859.
Type: *Aphadnurus tantillus* O. Costa.*
= *Emphytus pumila* Klug.
= **Fenusa** Leach.
- Aphanisus** MacGillivray, Can. Ent., p. 295, August, 1908.
Type: *Aphanisus lobatus* MacGillivray (designated).
- Aphilodyctium** Ashmead, Can. Ent., vol. 30, p. 310, 1898.
Type: *Strongylogaster rubripes* Cresson (designated).
- Aprosthemina** Konow, Ent. Nachr., vol. 25, p. 149, 1899.
Type: *Hylotoma brevicornis* Fallén.
- Ardis** Konow, Wien. ent. Zeit., vol. 5, pp. 184, 188, no. 4, 1886.
Type: *Tenthredo (Allantus) bipunctata* Klug.
- Arge** Schrank, Fauna Boica, vol. 2, p. 209, no. 231, 1802.
Type: *Tenthredo enodis* Linnæus.
- Astatus** Jurine, Fauna Insect. Germ., vol. 7, p. 83, fig. 12, 1801.
Type: *Sirex troglodyta* Fabricius.
- Asticta** E. Newman, Ent. Mag., vol. 5, p. 484, 1838.
Type: *Asticta ianthe* E. Newman.*
= *Harpiphorus lepidus* Klug.
= **Harpiphorus** Hartig (isogenotypic).
- Ateuchopus** Konow, Wien. ent. Zeit., vol. 15, p. 174, 1896.
Type: *Ateuchopus armenius* Konow.
- Athalia** Leach, Zool. Misc., vol. 3, p. 128, no. 2, 1817.
Type: *Tenthredo spinarum* Fabricius (Curtis, 1836).
- Athermantus** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 54, no. 32, 1882.
Type: *Hylotoma imperialis* F. Smith.*

- Athlophorus** Burmeister, *Athlophorus*, eine neue Gattung der Blattwespen, pp. 1-9, 1847.
Type: *Athlophorus klugii* Burmeister.*
- Atocus** Scudder, *Bul. U. S. Geol. Surv.*, vol. 93, p. 24, pl. 2, fig. 5, 1892.
Type: *Atocus defessus* Scudder.*
- Atomacera** Say, *Bost. Journ. Nat. Hist.*, vol. 1, no. 3, p. 212, 1836.
Type: *Atomacera debilis* Say.*
- Aulacomerus** Spinola, *Ann. Ent. Soc. France*, vol. 9, p. 137, 1840.
Type: *Aulacomerus buquetii* Spinola.*
- Bactroceros** Konow, *Ann. k. k. Hofmus.*, Wien., vol. 12, p. 21, 1897.
Type: *Tenthredo vafer* Linnæus (Rohwer, 1910).
= *Anoplolyda* A. Costa.
- Bathyblepta** Konow, *Zeitschr. syst. Hym. Dipt.*, vol. 6, p. 123, 1906.
Type: *Bathyblepta procer* Konow.*
- Beldonea** Cameron, *Mem. & Proc. Manchester Lit. & Phil. Soc.*, vol. 43, no. 3, p. 35, 1899.
Type: *Beldonea rugifrons* Cameron.*
- Beleses** Cameron, *Trans. Ent. Soc. Lond.*, p. 88, 1877 (n. n. for *Anisoneura* Cameron, 1876).
Type: *Anisoneura stigmatalis* Cameron.*
- Bergiana** Konow, *Anal. Mus. Buenos Aires*, vol. 6, p. 397, 1899.
Type: *Syzygonia cyanocephala* Klug (designated, p. 398).
= *Syzygonia* Klug (isogenotypic).
- Bivena** MacGillivray, *Can. Ent.*, vol. 26, p. 327, 1894.
Type: *Bivena maria* MacGillivray (designated).
= *Tenthredo delta* Provancher.
- Blasticotoma** Klug, *Jahrb. Insectenkunde*, vol. 1, p. 270, no. 7, 1834.
Type: *Blasticotoma filiceti* Klug.*
- Blennocampa** Hartig, *Fam. Blatt. Holzwesp.*, p. 266, 1837.
Type: *Tenthredo (Allantus) pusilla* Klug.
- Brachycolus** Konow, *Termes. Fuzetek*, vol. 28, pt. 3, p. 166, 1895.
Type: *Nematus viduatus* Zetterstedt.
- Brachyphatnus** Konow, *Zeitschr. syst. Hym. Dipt.*, vol. 6, p. 250, 1906.
Type: *Brachyphatnus debilicornis* Konow.
- Brachytoma** Westwood, *Thes. Ent. Oxon.*, p. 109, 1874 (non Swainson, 1840).
Type: *Brachytoma fumipennis* Westwood (Ashmead, 1898).
- Brachyxiphus** Philippi, *Stett. ent. Zeit.*, vol. 32, p. 285, 1871.
Type: *Brachyxiphus grandis* Philippi.
- Braunsiola** Konow, *Ent. Nachr.*, vol. 25, p. 312, 1899.
Type: *Braunsiola truculenta* Konow.*
= *Micrarge* Ashmead.
- Busarbia** Cameron, *Mem. & Proc. Manchester Lit. & Phil. Soc.*, vol. 43, no. 3, p. 37, 1899.
Type: *Busarbia viridipes* Cameron.*
- Cacosyndia** W. F. Kirby, *Trans. Ent. Soc. Lond.*, p. 203, 1883 (n. n. for *Pompholyx* Freymuth).
Type: *Pompholyx dimorpha* Freymuth (designated).
- Cænocephus** Konow, *Wien. ent. Zeit.*, vol. 15, p. 151, 1896.
Type: *Cænocephus jakowleffi* Konow.*
- Cænolyda** Konow, *Ann. k. k. Hofmus.*, Wien., vol. 12, p. 15, 1897.
Type: *Tenthredo reticulata* Linnæus (Rohwer, 1910).

- Cænoneura** Thomson, Opusc. Ent., vol. 2, p. 270, 1870.
Type: *Cænoneura dahlbomi* Thomson.*
- Calameuta** Konow, Wien. ent. Zeit., vol. 15, p. 159, 1896.
Type: *Cephus filiformis* Eversmann.
- Caliroa** O. Costa, Fauna Napoli, Tenthred., p. 59, 1859.
Type: *Caliroa sebetia* O. Costa.*
= *Allantus cinxia* Klug.
- Caloptilia** Ashmead, Can. Ent., vol. 30, p. 212, 1898.
Type: *Caloptilia townsendi* Ashmead (designated).
- Calozarca** Ashmead, in Dyar, Journ. N. Y. Ent. Soc., p. 129, 1898; also Can. Ent., vol. 30, p. 252, October, 1898.
Type: *Selandria fascipennis* Norton (designated).
= **Parazarca** Ashmead.
- Camponiscus** E. Newman, Ent., vol. 4, p. 215, 1869.
Type: *Camponiscus healxi* E. Newman.*
= *Tenthredo luridiventris* Fallén.
= **Platycampus** Schiödte.
- Camptoperga** Shipp, Ent., vol. 27, pp. 339–340, 1894.
Type: *Perga cressoni* Westwood (designated).
- Camptoprium** Spinola, Ann. Soc. Ent. France, vol. 9, p. 134, 1840.
Type: *Camptoprium leprieuri* Spinola.*
- Canonias** Konow, Termes. Fuzetek, vol. 24, p. 65, 1901.
Type: *Canonias inopinus* Konow.*
- Celidoptera** Konow, Ann. k. k. Hofmus., Wien., vol. 12, p. 20, 1897.
Type: *Lyda maculipennis* Stein.*
- Cephaleia** Panzer, Fauna Ins. Germ., vol. 8, p. 36, 1805.
Type: *Tenthredo signata* Fabricus (Rohwer, 1910).
- Cephalocera** Klug, Jahrb. Insectenkunde, vol. 1, p. 251, no. 8, 1834.
Type: *Cephalocera pumila* Klug.*
(preocc., = **Corynophilus** W. F. Kirby).
- Cephites** Heer, Denkschr. schweiz. Ges. Naturwiss., vol. 11, p. 173, no. 18, 1850.
Type: *Cephites æningensis* Heer.
- Cephosoma** Gradl, Ent. Nachr., vol. 7, p. 294, 1881.
Type: *Cephosoma syringæ* Gradl.*
= **Hartigia** Schiödte and Boie.
- Cephus** Latreille, Hist. Nat. Crust. Ins., vol. 3, p. 303, 1802.
Type: *Sirex pygmæus* Linnæus (Latreille, 1810; Brullé, 1846; Westwood, 1840).
- Ceratulus** MacGillivray, Can. Ent., vol. 40, p. 454, 1908.
Type: *Ceratulus spectabilis* MacGillivray (designated).
- Cerealces** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 31, no. 11, 1882.
Type: *Cerealces scutellata* W. F. Kirby.*
- Cerobactrus** O. Costa, Fauna Napoli., Cephid., p. 9, 1860.
Type: *Cerobactrus major* O. Costa.*
= *Astatus satyrus* Panzer.
= **Hartigia** Schiödte and Boie.
- Cerospastus** Konow, Anal. Mus. Buenos Aires, vol. 6, p. 404, 1899.
Type: *Cerospastus volupis* Konow.*
- Chalinus** Konow, Termes. Fuzetek, vol. 20, p. 605, 1897.
Type: *Oryssus plumicornis* Guérin.
- Characophygus** Konow, Ent. Nachr., vol. 25, p. 73, 1899.
Type: *Characophygus moricei* Konow.*

- Cibdela** Konow, Ent. Nachr., vol. 25, p. 76, 1899.
Type: *Hylotoma jantheria* Klug.
- Cimbex** Olivier, Encyl. Méthod., Ins., vol. 5, p. 762, 1790.
Type: *Tenthredo lutea* Linnæus (Latreille, 1810).
- Cladiucha** Konow, Zeitschr. syst. Hym. Dipt., vol. 2, p. 389, 1902.
Type: *Cladiucha insolita* Konow.*
- Cladius** Rossi, Fauna Etrusca, ed. 2^a, vol. 2, p. 27, 1807.
Type: *Tenthredo difformis* Panzer (Latreille, 1810).
- Cladomacra** F. Smith, Ann. Mag. Nat. Hist., (3) vol. 6, p. 256, 1860.
Type: *Cladomacra macropus* F. Smith.*
- Claremontia** Rohwer, Can. Ent., vol. 41, p. 397, November, 1909.
Type: *Claremontia typica* Rohwer (designated).
- Clarissa** W. F. Kirby, Ann. Mag. Nat. Hist., (6) vol. 14, p. 46, 1894.
Type: *Clarissa divergens* W. F. Kirby.*
- Clavellaria** Lamarck, Syst. des Animaux sans vertébrés, p. 264, 1801.
Type: *Tenthredo lutea* Linnæus.*
= **Cimbex** Olivier.
- Clavellarius** Olivier, Encycl. Méthod., vol. 4, p. 22, 1789; vol. 6, p. 18, 1791. No species.
- Clydostomus** Konow, Zeitschr. syst. Hym. Dipt., vol. 8, p. 19, 1908.
Type: *Clydostomus cestatus* Konow.
- Cockerellonis** MacGillivray, Can. Ent., vol. 40, p. 365, October, 1908.
Type: *Cockerellonis occidentalis* MacGillivray (designated).
= **Eriocampidea** Ashmead.
- Colochelyna** Konow, Ent. Nachr., vol. 24, p. 280, 1898.
Type: *Colochelyna magrettii* Konow.
- Conaspidia** Konow, Ent. Nachr., vol. 24, p. 279, 1898.
Type: *Conaspidia sikkemensis* Konow.*
- Corymbas** Konow, Ann. Mus. St. Petersbourg, p. 120, 1903.
Type: *Corymbas koreana* Konow.
- Coryna** Lepeletier, Encyl. Méthod., Ins., vol. 10, pt. 2, p. 567, 1828.
Type: *Tenthredo (Coryna) scapularis* Lepeletier.
= *Tenthredo flavans* Klug.
= **Selandria** Leach.
- Corynia** Imhof et Labram, Insect. Schweiz., vol. 1, pl. 23, 1836.
Type: *Corynia rosarum* Imhof et Labram.
= **Arge** Schrank.
- Corynophilus** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 32, no. 15, 1882 (n. n. for *Cephalocera* Klug, non Latreille).
Type: *Cephalocera pumila* Klug.*
- Cræsus** Leach, Zool. Misc., vol. 3, p. 129, no. 1, 1817.
Type: *Tenthredo septentrionalis* Linnæus.*
= **Nematus** Jurine.
- Cryptocampus** Hartig, Fam. Blatt. Holzwesp., p. 221, March, 1837.
Type: *Nematus (Cryptocampus) medullaris* Hartig.
= **Euura** Newman.
- Cryptus** Panzer, Krit. Revis., vol. 2, p. 21, 1806 (non Fabricus, 1804).
Type: *Tenthredo furcata* Villers (Curtis, 1825).
= **Schizocera** Lepeletier (isogenotypic).

- Cyphona** Dahlbom, Conspect. Tenthred. Scand., p. 6, 1835.
Type: *Tenthredo furcata* Villers.
= **Schizocera** Lepeletier.
- Decameria** (Lepeletier) W. F. Kirby, Lepeletier, Encycl. Méthod., Ins., vol. 10, pt. 2, p. 371, 1828; W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 93, no. 43, 1882.
Type: *Decameria testacea* W. F. Kirby (designated).
- Decatria** Stephens, Illustr. Brit. Ent., Mandib., vol. 7, p. 94, 1835.
Type: *Heterarthus ochropoda* Stephens.
- Derecyrta** F. Smith, Ann. Mag. Nat. Hist., (3) vol. 6, p. 255, 1860.
Type: *Derecyrta pictipennis* F. Smith.*
- Dictynna** Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 662, 1846.
Type: *Dictynna westwoodii* Brullé.*
= **Decameria** (Lepeletier).
- Dictynna** Westwood, Arcana Ent., vol. 1, p. 24, pl. 7, fig. 4, 1841.
Type: *Dictynna læta* Westwood.*
= **Eurys** Newman.
- Didocha** Konow, Zeitschr. syst. Hym. Dipt., vol. 7, p. 306, 1907.
Type: *Didocha braunsi* Konow.*
- Didymia** Lepeletier, Encycl. Méthod., Ins., vol. 10, pt. 2, p. 574, 1828.
Type: *Hylotoma martini* Lepeletier.*
- Dielocerus** Curtis, Trans. Linn. Soc. Lond., vol. 19, pt. 1, p. 248, 1844.
Type: *Dielocerus ellisii* Curtis.
- Dimorphopteryx** Ashmead, Can. Ent., vol. 30, p. 308, 1898.
Type: *Strongylogaster pinguis* Say (designated).
- Dinax** Konow, Wien. ent. Zeit., vol. 16, p. 182, 1897.
Type: *Dinax jakowleffi* Konow.*
- Dineura** Dahlbom, Conspect. Tenthred. Scand., p. 13, no. 6, 1835.
Type: *Tenthredo degeeri* Klug (Westwood, 1846).
- Diphadnus** Hartig, Fam. Blatt. Holzwesp., p. 225, 1837.
Type: *Nematus fuscicornis* Hartig.*
= *Nematus appendiculatus* Hartig.
- Diphamorphos** Rohwer, Ent. News, vol. 22, p. 473, 1910.
Type: *Diphamorphos nigrescens* Rohwer (designated).
- Diprion** Schrank, Fauna Boica, vol. 2, pp. 209, 252-254, 1802.
Type: *Tenthredo pini* Linnæus (Rohwer, 1910).
- Dipteromorpha** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 324, no. 102, 1882.
Type: *Macrophya rotundiventris* Cameron.*
- Distega** Konow, Zeitschr. syst. Hym. Dipt., vol. 4, p. 224, 1904.
Type: *Distega sjostedti* Konow.*
- Dolerus** Panzer, Krit. Revis., vol. 2, p. 40, 1806.
Type: *Dolerus gonager* Jurine (Latreille, 1810).
- Dosytheus** Leach, Zool. Misc., vol. 3, p. 128, no. 4, 1817.
Type: *Tenthredo eglanteriæ* Fabricius (Brullé, 1846).
= **Dolerus** Panzer.
- Druida** E. Newman, Ent. Mag., vol. 5, p. 484, 1838.
Type: *Druida parviceps* E. Newman.*
= *Phyllotoma nemorata* Fallén.
- Dulophanes** Konow, Zeitschr. syst. Hym. Dipt., vol. 7, p. 132, 1907.
Type: *Dulophanes morio* Konow.*

- Ebolia** O. Costa, Fauna Napoli, Tenthred., p. 105, 1859.
Type: *Ebolia floricola* O. Costa.*
- Electrocephalus** Konow, Ent. Nachr., vol. 23, p. 37, 1897.
Type: *Electrocephalus strahlendorffi* Konow.*
- Emphytoides** Konow, Ent. Nachr., vol. 24, p. 274, 1898.
Type: *Emphytoides perplexus* Konow.
= **Athlophorus** Burmeister.
- Emphytus** Klug, Mag. Ges. naturf. Berlin, vol. 7, p. 273, 1813.
Type: *Tenthredo cincta* Linnæus (Curtis, 1833; Westwood, 1840).
- Empria** Lepeletier, Encycl. Méthod., Ins., vol. 10, pt. 2, p. 571, 1828.
Type: *Dolerus (Empria) pallimacula* Lepeletier (Brullé, 1846).
- Encarsioneura** Konow, Deutsch. ent. Zeitschr., p. 239, 1890.
Type: *Tenthredo sturnii* Klug.*
= **Siobla** Cameron.
- Endelomyia** Ashmead, Can. Ent., vol. 30, p. 256, 1898.
Type: *Monostegia rosæ* Harris (designated).
= *Caliroa æthiops* (Fabricius).
= **Caliroa** O. Costa.
- Eniscia** Thomson, Opusc. Ent., pt. 2, p. 299, 1870.
Type: *Tenthredo consobrina* Klug.
- Entodecta** Konow, Wien. ent. Zeit., vol. 5, pp. 184, 243, 1886.
Type: *Tenthredo (Allantus) pumila* Klug (MacGillivray, 1909).
- Epitactus** Förster, Verh. naturh. Ver. preuss. Rheinl., vol. 11, p. 435, 1854.
Type: *Epitactus præcox* Förster.*
- Ephippinotus** O. Costa, Fauna Napoli, Cephid., p. 10, 1860.
Type: *Ephippinotus luteiventris* O. Costa.
= *Sirex compressus* Fabricius.
- Epitaxonus** MacGillivray, Can. Ent., vol. 40, p. 365, October, 1908.
Type: *Taxonus albodictus* Norton (designated).
- Eriglenum** Konow, Termes. Fuzetek, vol. 24, p. 60, 1901.
Type: *Eriglenum crudum* Konow.*
- Eriocampa** Hartig, Fam. Blatt. Holzwesp., p. 279, 1837.
Type: *Tenthredo ovata* Linnæus.
- Eriocampidea** Ashmead, Can. Ent., vol. 30, p. 256, 1898.
Type: *Eriocampidea arizonensis* Ashmead (designated).
- Eriocampoides** Konow, Deutsch. ent. Zeitschr., p. 239, 1890.
Type: *Tenthredo limacina* Retzius (MacGillivray, 1908).
- Ermilia** O. Costa, Fauna Napoli, Tenthred., p. 106, 1859.
Type: *Ermilia pulchella* O. Costa.*
= *Tenthredo agrorum* Fallén.
= **Taxonus** Hartig (isogenotypic).
- Erythraspides** Ashmead, in Dyar, Journ. N. Y. Ent. Soc., p. 128, 1898; also Can. Ent., vol. 30, p. 252, 1898.
Type: *Blennocampa pygmaea* Say (designated).
- Eumetabolus** Schulz, Spolia Hymen., p. 211, 1906.
Type: *Sirex troglodyta* Fabricius.
= *Sirex niger* Harris.
= **Astatus** Panzer.

- Euryopsis** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 95, no. 45, 1882.
Type: *Euryopsis nitens* W. F. Kirby.*
- Eurys** E. Newman, Ent., p. 90, 1841.
Type: *Eurys æratus* E. Newman.*
- Euura** E. Newman, Ent. Mag., vol. 4, p. 259, January, 1837.
Type: *Euura gallæ* Newman.
- Eversmannella** Jakowlew, Horæ Soc. Ent. Ross., vol. 26, p. 15, no. 3, 1891.
Type: *Cephus cruentatus* Eversmann.*
- Fenella** Westwood, Introd. Mod. Class. Ins., vol. 2, Gen. Synop., p. 54, 1840.
Type: *Fenella nigrata* Westwood.*
- Fenusa** Leach, Zool. Misc., vol. 3, p. 126, no. 4, 1817.
Type: *Tenthredo (Emphytus) pumila* Klug.*
- Fethalia** Cameron, Journ. Bombay Soc. Nat. Hist., vol. 14, p. 439, 1902.
Type: *Fethalia nigra* Cameron.*
- Gongylocorsia** Konow, Ann. k. k. Hofmus., Wien, vol. 12, p. 19, 1897.
Type: *Lyda mandibularis* Zaddach.*
- Gymnia** Spinola, Mem. Accad. Sci. Torino, (2) vol. 13, p. 23, 1851.
Type: *Gymnia apicalis* Spinola.
- Gymniopterus** Ashmead, Can. Ent., vol. 30, p. 213, 1898.
Type: *Gymniopterus singularis* Ashmead (designated).
- Gymnonychus** Marlatt, U. S. Dept. Agr., Div. Ent., Tech. Ser. 3, p. 122, 1896.
Type: *Gymnonychus californicus* Marlatt (designated).
= **Diphadnus** Hartig.
- Haplostegus** Konow, Termes. Fuzetek, vol. 24, p. 70, 1901.
Type: *Haplostegus epimelas* Konow.
- Harpiphorus** Hartig, Fam. Blatt. Holzwespe., p. 253, 1837.
Type: *Tenthredo (Emphytus) lepidus* Klug.*
- Hartigia** (Schiödte) Boie. Schiödte, Kroyers Naturhistorisk Tidsskrift., vol. 2, p. 332, 1838; Boie, Stett. Ent. Zeit., vol. 16, p. 49, 1855.
Type: *Astutus satyrus* Rossi.
- Hemichroa** Stephens, Illustr. Brit. Ent., Mandib., vol. 7, p. 55, no. 18, 1835.
Type: *Tenthredo alni* Linnæus (Westwood, 1840; Brullé, 1846).
- Hemidianeura** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 48, no. 28, 1882.
Type: *Hemidianeura nigricornis* W. F. Kirby.
- Hemitaxonus** Ashmead, Can. Ent., vol. 30, p. 311, 1898.
Type: *Taxonus dubitatus* Norton (designated).
- Hennedyia** Cameron, Mem. & Proc. Manchester Lit. Phil. Soc., vol. 4, no. 4, p. 9, 1891.
Type: *Hennedyia annulitarsis* Cameron.*
- Heptacola** Konow, Zeitschr. syst. Hym. Dipt., vol. 5, p. 167, 1905.
Type: *Heptacola buyssoni* Konow.
- Heptamelus** Haliday, Nat. Hist. Rev., vol. 2, p. 60, 1835.
Type: *Melicerta ochroleuca* Stephens.*
- Heterarthus** Stephens, Illustr. Brit. Ent., Mandib., vol. 7, p. 94, no. 25, 1835.
Type: *Tenthredo (Emphytus) ochropoda* Klug.*
- Holcocneme** Konow, Deutsch. ent. Zeitschr., p. 238, 1890.
Type: *Tenthredo crassa* Fallén.
- Homœoneura** Ashmead, Can. Ent., vol. 30, p. 313, 1898.
Type: *Tenthredo delta* Provancher (designated).
= **Bivena** MacGillivray.

- Hoplocampa** Hartig, Fam. Blatt. Holzwesp., p. 276, 1837.
Type: *Tenthredo (Allantus) brevis* Klug.
- Hybonotus** Klug, Mon. Siric. Germ., p. 8, no. 2, 1803.
Type: *Ichneumon camelus* Linnæus.
= **Xiphydria** Latreille.
- Hylotoma** Latreille, Hist. Nat. Crust. Ins., vol. 3, p. 302, 1802.
Type: *Tenthredo rosæ* Linnæus.*
= **Arge** Schrank.
- Hypargyricus** MacGillivray, Can. Ent., vol. 40, p. 290, August, 1908.
Type: *Hypargyricus infuscatus* MacGillivray (designated).
- Hyperoceros** Konow, Zeitschr. syst. Hym. Dipt., vol. 6, p. 369, 1906.
Type: *Hyperoceros peruanus* Konow.*
- Hypolæpus** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 324, no. 103, 1882.
Type: *Hypolæpus abbotii* W. F. Kirby.*
- Hypotaxonus** Ashmead, Can. Ent., vol. 30, p. 311, 1898.
Type: *Strongylogaster pallipes* Say (designated).
- Incalia** Cameron, Trans. Ent. Soc. Lond., p. 143, 1878.
Type: *Incalia hirticornis* Cameron.*
- Ischyroceraea** Kiær, Tromsø Mus. Aarsk., vol. 19, p. 67, 1896 (pub. 1898).
Type: *Ischyroceraea hyperborea* Kiær.*
- Isodyctium** Ashmead, in Dyar, Journ. N. Y. Ent. Soc., p. 127, 1898; Can. Ent., vol. 30, p. 251, October, 1898.
Type: *Isodyctium corycolum* Dyar (designated).
- Itycorsia** Konow, Ann. k. k. Hofmus., Wien, vol. 12, p. 13, 1897.
Type: *Tenthredo hieroglyphica* Christ. (Rohwer, 1910).
- Janus** Stephens, Illustr. Brit. Ent., Mandib., vol. 7, p. 107, no. 30, 1835.
Type: *Janus connectus* Stephens (Westwood, 1840).
= *Janus cynosbati* (Fabricius).
- Jermakia** Jakowlew, Horæ Ent. Soc. Ross., vol. 26, pts. 1-2, p. 58, no. 68, 1891.
Type: *Allantus cephalotes* Jakowlew.*
- Kaliofenusa** Viereck, Ann. Rep. N. J. State Mus., p. 591, 1909 (1910).
Type: *Fenusa ulmi* Sundevall.
- Kaliosysphinga** Tischbein, Stett. ent. Zeit., vol. 7, p. 79, 1846.
Type: *Kaliosysphinga dohrnii* Tischbein.*
= **Fenusa** Leach.
- Kelidoptera** Konow, Ann. k. k. Hofmus. Wien, vol. 12, p. 20, 1897.
Type: *Lyda maculipennis* Stein.*
- Kokujewia** Konow, Rev. Ent. Russe, vol. 2, p. 3, 1902.
Type: *Kokujewia ectrapela* Konow.
- Konowia** Brauns, Wien. ent. Zeit., vol. 3, p. 220, 1884.
Type: *Konowia megalopolitana* Brauns.*
- Labidarge** Konow, Ent. Nachr., vol. 25, p. 309, 1899.
Type: *Labidarge bolivari* Konow.
= **Caloptilia** Ashmead.
- Labidia** Provancher, Addit. Faune Can. Hym., p. 21, 1886.
Type: *Labidia columbiana* Provancher.*
= *Allantus opinus* Cresson.
- Lagideus** Konow, Zeitschr. syst. Hym. Dipt., vol. 5, p. 160, 1905.
Type: *Lagideus crinitus* Konow.*

- Lagium** Konow, Zeitschr. syst. Hym. Dipt., vol. 4, p. 246, 1904.
Type: *Tenthredo atrovioleaceum* Norton (designated).
- Laurentia** A. Costa, Rendic. Accad. Sci. Fis., Napoli, (2) vol. 4, p. 173, 1890.
Type: *Laurentia craverii* A. Costa.*
= *Tenthredo gibbosa* Fallén.
- Leptocerca** Hartig, Fam. Blatt. Holzwesp., p. 228, 1837.
Type: *Tenthredo alni* Linnæus.
= **Hemichroa** Stephens.
- Leptocercus** Thomson, Hym. Scand., vol. 1, p. 76, 1871 (an emended spelling of *Leptocerca*).
Type: *Tenthredo alni* Linnæus.
= **Hemichroa** Stephens.
- Leptocimbex** Semenow, Ann. Mus. St. Petersburg, p. 95, 1896.
Type: *Leptocimbex potanini* Semenow.
- Leptopus** Hartig, Fam. Blatt. Holzwesp., p. 104, 1837 (non Latreille, 1809).
Type: *Nematus (Leptopus) hypogastricus* Hartig.*
= *Tenthredo luridiventris* Fallén.
= **Platycampus** Schiödte.
- Liolyda** Ashmead, Can. Ent., vol. 30, p. 209, 1898.
Type: *Lyda frontalis* Westwood (designated).
= **Cephaleia** Panzer.
- Lisconeura** Rohwer, Bul. Amer. Mus. Nat. Hist., vol. 24, p. 529, 1908.
Type: *Scolioneura vexabilis* Brues (designated).
- Lithoryssus** Brues, Bul. Amer. Mus. Nat. Hist., vol. 20, p. 492, fig. 1, 1906.
Type: *Lithoryssus parvus* Brues (designated).
- Lithracia** Cameron, Journ. Bombay Soc., vol. 14, p. 441, 1902.
Type: *Lithracia flavipes* Cameron.*
- Loboceras** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 79, no. 35, 1882.
Type: *Loboceras mexicanum* W. F. Kirby.
- Loderus** Konow, Deutsch. ent. Zeitschr., p. 240, 1890.
Type: *Tenthredo pratorum* Fallén.
- Lophyridea** Ashmead, Can. Ent., vol. 30, p. 226, 1898.
Type: *Lophyrus tropicus* Norton (designated).
= **Lophyroides** Cameron.
- Lophyroides** Cameron, Ent. Monthl. Mag., vol. 19, p. 133, 1882.
Type: *Lophyrus tropicus* Norton (designated).
- Lophyrotoma** Ashmead, Can. Ent., vol. 30, p. 230, 1898.
Type: *Pterygophorus interruptus* Klug (designated).
= **Pterygophorus** Klug.
- Lophyrus** Latreille, Hist. Nat. Crust. Ins., vol. 3, p. 302, 1802 (non Poli).
Type: *Tenthredo pini* Linnæus.*
= **Diprion** Schrank (isogenotypic).
- Lycaota** Konow, Zeitschr. syst. Hym. Dipt., vol. 3, p. 147, 1903.
Type: *Selandria sodalis* Cresson.*
- Lycosceles** Konow, Zeitschr. syst. Hym. Dipt., vol. 5, p. 159, 1905.
Type: *Lycosceles herbsti* Konow.*
- Lyda** Fabricius, Syst. Piez., p. 43, no. 5, 1804.
Type: *Tenthredo sylvatica* Linnæus (Curtis, 1831).
= **Pamphilius** Latreille.

- Lygæonematus** Konow, Deutsch. ent. Zeitschr., p. 238, 1890.
Type: *Nematus pini* Retzius.
- Macgillivraya** Ashmead, Can. Ent., vol. 30, p. 257, 1898 (preoccupied).
Type: *Macgillivraya oregonensis* Ashmead (designated).
=**Macgillivrayella** Ashmead.
- Macgillivrayella** Ashmead, in Smith, Cat. Ins. N. J., p. 606, 1899 (n. n. for *Macgillivraya* Ashmead).
Type: *Macgillivraya oregonensis* Ashmead.
- Macremphytus** MacGillivray, Can. Ent., vol. 40, p. 368, October, 1908.
Type: *Harpiphorus varianus* Norton (designated).
- Macrocephus** Schlechtendal, Ent. Nachr., vol. 4, p. 153, 1878.
Type: *Macrocephus ulmaria* Schlechtendal.*
=*Tenthredo linearis* Schrank, 1781.
=**Hartigia** Schiodte and Boie.
- Macroclada** Konow, Genera Insectorum, Fasc. 29, p. 46, 1906.
(An emended name for *Cladomacra* F. Smith.)
=**Cladomacra** F. Smith.
- Macrophya** Dahlbom, Conspect. Tenthred. Scand., p. 11, no. 3, 1835.
Type: *Tenthredo rusticus* Linnæus (Westwood, 1840).
- Macroxyela** W. F. Kirby, List. Hym. Brit. Mus., vol. 1, p. 351, no. 109, 1882.
Type: *Xyela ferruginea* Say (designated).
- Manoxyela** Ashmead, Can. Ent., vol. 30, p. 206, 1898.
Type: *Manoxyela californica* Ashmead (designated).
=**Pleroneura** Konow.
- Marlattia** Ashmead, Can. Ent., vol. 30, p. 287, 1898.
Type: *Hoplocampa laricis* Marlatt (designated).
- Mastigocera** Klug, 18— Reference unknown, a synonym of *Xyela* by Lepeletier, Encycl. Method., vol. 10, pt. 2, p. 577, 1828.
- Megalodontes** Latreille, Hist. Nat. Crust. et Ins., vol. 3, p. 302, 1802.
Type: *Tenthredo cephalotes* Fabricius (Latreille, 1810).
- Megaxyela** Ashmead, Can. Ent., vol. 30, p. 206, 1898.
Type: *Xyela major* Cresson (designated).
- Melanopus** Konow, Ann. k. k. Hofmus., Wien., vol. 12, p. 12, 1897.
Type: *Tarpa fabricii* Leach.*
- Melanoselandria** (Ashmead) MacGillivray, in Smith, Cat. Ins. N. J., p. 606, 1899;
Can. Ent., vol. 41, p. 404, November, 1909.
Type: *Melanoselandria zabriskiei* Ashmead.*
=**Hypargyricus** MacGillivray, 1908.
- Melicerta** Stephens, Illustr. Brit. Ent., Mandib., vol. 7, p. 95, no. 26, 1835 (preocc.).
Type: *Melicerta ochroleucus* Stephens.*
=**Heptamelus** Haliday, 1855.
- Melinia** O. Costa, Fauna Napoli, Tenthred., p. 41, 1859.
Type: *Melinia minutissima* O. Costa.
- Mesoneura** Hartig, Fam. Blatt. Holzwespe., p. 229, 1837.
Type: *Tenthredo opaca* Fabricius.*
- Messa** Leach, Zool. Misc., vol. 3, p. 126, no. 3, 1817.
Type: *Tenthredo (Emphytus) hortulana* Klug.*
- Metallus** Forbes, 14th Rep. St. Ent. Ill. for 1884, p. 87, 1885.
Type: *Metallus rubi* Forbes.*

- Micrarge** Ashmead, Can. Ent., vol. 30, p. 213, 1898.
Type: *Atomocera ruficollis* Norton (designated).
- Miocephala** Konow, Zeitschr. syst. Hym. Dipt., vol. 7, p. 162, 1907.
Type: *Miocephala chalybea* Konow.*
- Micronematus** Konow, Deutsch. ent. Zeitschr., p. 239, 1890.
Type: *Nematus pullus* Förster.
= *Nematus monogynia* Hartig.
- Mocsarya** Konow, Termes. Fuzetek, vol. 20, p. 608, 1897.
Type: *Oryssus metallicus* Mocsary.*
- Mogerus** MacGillivray, Can. Ent., vol. 27, p. 281, October, 1895.
Type: *Tenthredo (Allantus) lineolata* Klug.
= *Periclista* Konow.
- Monoctenus** Dahlbom, Conspect. Tenthred. Scand., p. 7, 1835.
Type: *Tenthredo juniperi* Linnæus.*
- Monophadnoides** Ashmead, Can. Ent., vol. 30, p. 253, October, 1898.
Type: *Monophadnus rubi* Harris (designated).
- Monophadnus** Hartig, Fam. Blatt. Holzwesp., p. 271, 1837.
Type: *Tenthredo albipes* Gmelin (Ashmead, 1898).
- Monoplopus** Konow, Wien. ent. Zeit., vol. 15, p. 173, 1896.
Type: *Tenthredo saltuum* Linnæus.
- Monosoma** Viereck, Ann. Rep. N. J. State Mus., p. 583, 1909 (1910).
Type: *Pæcilostoma inferentia* Norton.*
= **Monsoma** MacGillivray.
- Monostegia** O. Costa, Fauna Napoli, Tenthred., p. 60, 1859.
Type: *Tenthredo abdominalis* Fabricius (MacGillivray, 1908).
- Monsoma** MacGillivray, Can. Ent., vol. 40, p. 368, October, 1908.
Type: *Pæcilostoma inferentia* Norton (designated).
- Nematoceros** Konow, Wien. ent. Zeit., vol. 15, pp. 54, 52, 1896.
Type: *Tenthredo luteola* Klug.*
= **Monostegia** Costa (isogenotypic).
- Nematoneura** E. André, Spec. Hym. Europe, vol. 1, pt. 2, p. 576, no. 7^b, 1881.
Type: *Nematoneura violaceipennis* André.*
- Nematinus** Rohwer, see p. 99.
Type: *Tenthredo abdominalis* Panzer (designated).
- Nematus** Panzer, Krit. Revis., vol. 2, p. 44, 1806.
Type: *Tenthredo septentrionalis* Linnæus (Latreille, 1810).
- Neocharactus** MacGillivray, Can. Ent., vol. 40, p. 293, August, 1908.
Type: *Neocharactus bakeri* MacGillivray (designated).
- Neoeurys** Rohwer, Ent. News, vol. 22, p. 472, 1910.
Type: *Neoeurys metallica* Rohwer (designated).
- Neopareophora** MacGillivray, Can. Ent., vol. 40, p. 289, August, 1908.
Type: *Neopareophora martini* MacGillivray (designated).
- Neoperga** Ashmead, Can. Ent., vol. 30, p. 232, 1898.
Type: *Perga amenaida* Kirby (designated).
- Neoptilia** Ashmead, Can. Ent., vol. 30, p. 213, 1898.
Type: *Neoptilia mexicana* Ashmead (designated).
- Neopus** Viereck, Ann. Rep. N. J. State Mus., p. 585, 1909 (1910).
Type: *Tenthredopsis quatuordecimpunctata* Norton.
- Neotomostethus** MacGillivray, Can. Ent., vol. 40, p. 290, August, 1908.
Type: *Neotomostethus hyalinus* MacGillivray (designated).

- Nesodiprion** Rohwer, Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 104, 1910.
Type: *Lophyrus japonicus* Marlatt (designated).
- Nesoselandria** Rohwer, Proc. U. S. Nat. Mus., vol. 38, no. 1722, p. 657, 1910.
Type: *Paraselandria imitatrix* Ashmead (designated).
- Nesotaxonus** Rohwer, Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 111, 1910.
Type: *Phyllotoma? flavescens* Marlatt (designated).
- Nesotomostethus** Rohwer, Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 106, 1910.
Type: *Blennocampa religiosa* Marlatt (designated).
- Netroceros** Konow, Wien. ent. Zeit., vol. 15, p. 51, 1896.
Type: *Eriocampa (Netroceros) rufiventris* Konow.
- Neurotoma** Konow, Ann. k. k. Hofmus., Wien, vol. 12, p. 18, 1897.
Type: *Tenthredo flaviventris* Linnæus (Rohwer, 1910).
- Nortonella** Rohwer, Bul. Amer. Mus. Nat. Hist., vol. 24, p. 582, 1908.
Type: *Nortonella typica* Rohwer (designated).
- Nycteridium** Fischer-Waldheim, Mém. Soc. Nat. Moscou, vol. 1, p. 286, 1806.
Type: *Nycteridium fischeri* Fischer.
- Odontophyes** Konow, Wien. ent. Zeit., vol. 18, p. 42, 1899.
Type: *Pleroneura avingrata* Dyar.*
- Ophrynopus** Konow, Termes. Fuzetek, vol. 20, p. 605, 1897.
Type: *Ophrynopus andrei* Konow.
- Opisthoneura** Ashmead, Can. Ent., vol. 30, p. 287, 1898.
Type: *Opisthoneura crevecoeuri* Ashmead (designated).
= *Hoplocampa montana* Cresson.
= **Zaschizonyx** Ashmead.
- Oryssus** Latreille, Préc. Car. Génér. Ins., p. 111, no. 10, 1796.
Type: *Oryssus coronatus* Fabricius (Latreille, 1810).
- Pachycephus** J. P. Stein, Stett. ent. Zeit., vol. 37, p. 60, 1876.
Type: *Pachycephus smyrnensis* Stein.*
- Pachylosticta** Klug, Ent. Mon., p. 171, 1824.
Type: *Pachylosticta tibialis* Klug.
- Pachylota** Westwood, Arc. Ent., vol. 1, p. 24, pl. 7, fig. 3, 1841.
Type: *Pachylota audouinii* Westwood.*
- Pachynematus** Konow, Deutsch. ent. Zeitschr., p. 238, 1890.
Type: *Nematus caprææ* Panzer.
= *Nematus trisignatus* Förster.
- Pachyrotasis** Hartig, Fam. Blatt. Holzwesp., p. 295, 1837.
Type: *Tenthredo rapæ* Linnæus (Westwood, 1840).
- Palæotaxonus** Brues, Bul. Mus. Comp. Zool., vol. 51, no. 10, p. 266, March, 1908.
Type: *Palæotaxonus typicus* Brues (designated).
- Pamphilus** Latreille, Hist. Nat. Crust. Ins., vol. 3, p. 303, 1802.
Type: *Tenthredo silvatica* Linnæus.*
- Pampsilota** Konow, Ent. Nachr., vol. 25, p. 76, 1899.
Type: *Pampsilota afer* Konow.
- Parabatus** MacGillivray, Ann. Ent. Soc. Amer., vol. 2, p. 262, 1909.
Type: *Parabates histrionicus* MacGillivray (designated).
- Parabia** Semenow, Horæ. Soc. Ent. Ross., vol. 25, p. 174, 1890.
Type: *Parabia jokowlewi* Semenow (designated).
- Paracharactus** MacGillivray, Can. Ent., p. 292, August, 1908.
Type: *Paracharactus obscuratus* MacGillivray (designated).

- Paralypia** W. F. Kirby, List. Hym. Brit. Mus., vol. 1, p. 33, no. 17, 1882.
Type: *Paralypia picipes* Kirby.*
- Paraperga** Ashmead, Can. Ent., vol. 30, p. 232, 1898.
Type: *Perga jucunda* Kirby (designated).
- Paraselandria** Ashmead, Can. Ent., vol. 30, p. 255, 1898.
Type: *Tenthredo flavans* Klug (designated).
= **Selandria** Leach.
- Parasiobla** Ashmead, Can. Ent., vol. 30, p. 308, 1898.
Type: *Strongylogaster rufocinctus* Norton (designated).
- Parastatis** W. F. Kirby, Ent. Monthly Mag., vol. 18, p. 107, 1881.
Type: *Parastatis indica* W. F. Kirby.*
- Parasyzygonia** Rohwer (see p. 102).
Type: *Syzygonia cyanoptera* Klug (designated).
- Parataxonus** MacGillivray, Can. Ent., vol. 40, p. 367, October, 1908.
Type: *Taxonus multicolor* Norton (designated).
= **Aphilodyctium** Ashmead.
- Parazarca** Ashmead, in Dyar, Journ. N. Y. Ent. Soc., p. 128, 1898; also Can. Ent., vol. 30, p. 252, October, 1898.
Type: *Parazarca fumipennis* Ashmead (designated).
- Paremphytus** Brues, Bul. Mus. Comp. Zool., vol. 51, no. 10, p. 264, March, 1908.
Type: *Paremphytus ostentus* Brues.*
- Pareophora** Konow, Wien. ent. Zeit., vol. 5, pp. 184, 187, no. 3, 1886.
Type: *Pareophora luridiventris* Konow.
= *Tenthredo (Allantus) nigripes* Klug.
- Paururus** Konow, Wien. ent. Zeit., vol. 15, p. 43, 1896.
Type: *Sirex juvenis* Linnæus.
- Pectinia** Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 664, 1846.
Type: *Tenthredo (Allantus) aterrima* Klug (designated).
= **Phymatocera** Dahlbom.
- Pelmatopus** Hartig, Fam. Blatt. Holzwesp., p. 244, 1837.
Type: *Dolerus (Pelmatopus) minutus* Hartig.*
- Perantherix** Westwood, Thes. Ent. Oxon., p. 109, 1874.
Type: *Perantherix pumilio* Westwood.*
- Perga** Leach, Zool. Misc., vol. 3, p. 115, 1817.
Type: *Perga dorsalis* Leach (Shipp, 1894).
- Pergadopsis** Shipp, Ent., vol. 27, pp. 339, 340, 1894.
Type: *Perga dahlbomi* Westwood (designated).
- Periclista** Konow, Wien. ent. Zeit., vol. 5, pp. 184, 186, no. 2, 1886.
Type: *Tenthredo (Allantus) lineolata* Klug.
- Periclistoptera** Ashmead, Can. Ent., vol. 30, p. 255, 1898.
Type: *Monostegia quercus-alba* Norton (designated).
Ashmead gave the type as *alba*.
= **Eriocampoides** Konow.
- Perineura** Hartig, Fam. Blatt. Holzwesp., p. 303, 1837.
Type: *Tenthredo rubi* Panzer.*
- Peronistilus** Chigi, Ann. Mus. Zool. R. Univ. Napoli, n. s. vol. 1, no. 21, p. 26, 1904.
Type: *Cephus politissimus* A. Costa.*
- Perreyia** Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 661, 1846.
Type: *Perreyia lepida* Brullé.*
- Pëus** Konow, Zeitschr. syst. Hym. Dipt., vol. 3, p. 315, 1903.
Type: *Pëus privus* Konow.*

- Phænusa** Cameron, Ent. Monthly Mag., vol. 12, p. 131, 1875.
Type: *Phænusa albipes* Cameron.
=**Messa** Leach..
- Philomastix** Froggatt, Proc. Linn. Soc. N. S. Wales, (2) vol. 5, p. 467, 1890.
Type: *Philomastix naucarrowi* Froggatt.
- Phlebotrophia** MacGillivray, Can. Ent., p. 345, October, 1909.
Type: *Phlebotrophia mathesoni* MacGillivray (designated).
- Phenacoperga** Cockerell, Science, n. s. vol. 27, p. 113, 1908.
Type: *Perga coloradensis* Cockerell (designated).
- Phrontosoma** MacGillivray, Can. Ent., vol. 40, p. 366, October, 1908.
Type: *Phrontosoma atrum* MacGillivray (designated).
- Phylacteophaga** Froggatt, Proc. Linn. Soc. N. S. Wales, vol. 24, p. 130, 1899.
Type: *Phylacteophaga eucalypti* Froggatt.*
- Phyllæcus** E. Newman, Ent. Mag., vol. 5, p. 485, 1838.
Type: *Phyllæcus faunus* E. Newman.
=**Janus** Stephens.
- Phyllotoma** Fallén, Mon. Tenthred. Suec., p. 25, 1829.
Type: *Phyllotoma vagans* Fallén.
- Phymatocera** Dahlbom, Conspect. Tenthred. Scand., p. 11, no. 2, 1835.
Type: *Tenthredo (Allantus) aterrima* Klug.*
- Pinicola** Brébisson, Bul. Soc. Philom. Paris, p. 116, 1818 (non Vieillot, 1805).
Type: *Pinicola julii* Brébisson.
=**Xyela** Dalman.
- Plagiocera** Klug, Jahrb. Insectenkunde, vol. 1, p. 227, no. 2, 1834.
Type: *Plagiocera thoracica* Klug.*
- Plagioperga** Shipp, Ent., vol. 27, pp. 339, 340, 1894.
Type: *Perga mayrii* Westwood (designated).
- Platycampus** Schiödte, Mag. Zool., vol. 9, p. 20, 1839 (footnote).
Type: *Nematus (Leptopus) hypogastricus* Hartig.
- Pleroneura** Konow, Ent. Nachr., vol. 23, p. 56, 1897.
Type: *Xyela dahli* Hartig.
- Pœcilosoma** Thomson, Scand. Hym., vol. 1, p. 227, 1871.
Emended spelling of *Pœcilstoma*.
- Pœcilstoma** Dahlbom, Conspect. Tenthred. Scand., p. 13, no. 8, 1835.
Type: *Tenthredo guttatum* Fallén.
=**Empria** Lepeletier.
- Pœcilstomidea** Ashmead, Can. Ent., vol. 30, p. 256, 1898.
Type: *Pœcilstoma maculata* Norton (designated).
=**Empria** Lepeletier.
- Polybates** MacGillivray, Ann. Ent. Soc. Amer., vol. 2, p. 264, 1909.
Type: *Polybates slossonæ* MacGillivray (designated).
- Polyclonus** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 97, no. 48, 1882.
Type: *Polyclonus atratus* W. F. Kirby.*
- Polystichophagus** Ashmead, Can. Ent., vol. 30, p. 310, 1898.
Type: *Tenthredo filicis* Klug (designated).
=**Pseudotaxonus** A. Costa.
- Pompholyx** Freymuth, Protoc. 47^{me} Séance Soc. Anthropol. Moscou, vol. 8, p. 216, 1870.
Type: *Pompholyx dimorpha* Freymuth.*
preocc., =**Cacosyndia** Kirby.

- Pontania** O. Costa, Fauna Napoli, Tenthred., p. 20, 1859.
Type: *Nematus gallicola* Stephens (Marlatt, 1896).
- Poppia** Konow, Zeitschr. syst. Hym. Dipt., vol. 4, p. 263, 1904.
Type: *Poppia athaloides* Konow.*
- Praia** (Wankowitz) André, Spec. Hym. Europe et Algérie, vol. 1, pt. 6, 1880; p. 572, n. 3^b, 1881.
Type: *Praia taczanowskii* (Wankowitz) André.*
- Priophorus** Dahlbom, Conspect. Tenthred. Scand., p. 4, no. 1, 1835.
Type: *Priophorus pilicornis* Dahlbom.
= *Tenthredo padi* Linnæus.
- Pristiphora** Latreille, Consid. Générales, p. 294, 1810.
Type: *Pteronus testaceus* Jurine (designated).
- Pristis** Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 665, 1846.
Type: *Tenthredo punctigera* Lepeletier.
= *Tenthredo opaca* Fabricius.
= **Mesoneura** Hartig.
- Probleta** Konow, Zeitschr. syst. Hym. Dipt., vol. 8, p. 161, 1908.
Type: *Probleta langei* Konow.
- Prototaxonus** Rohwer, Can. Ent., vol. 42, p. 49, February, 1910.
Type: *Prototaxonus typicus* Rohwer (designated).
- Protemphytus** Rohwer, Can. Ent., vol. 41, p. 92, March, 1909.
Type: *Emphytus coloradensis* Weldon (designated).
- Pseudabia** Schrottky, Ent. Rundschau, vol. 27, no. 23, p. 168, December 1, 1910.
Type: *Pseudabia fusca* Schrottky (designated).
- Pseudoclavellaria** Schultz, Spolia Hym., p. 87, 1906.
Type: *Tenthredo amerinæ* Linnæus.
- Pseudocimbex** Rohwer, Bul. Amer. Mus. Nat. Hist., vol. 24, p. 526, 1908.
Type: *Pseudocimbex clavatus* Rohwer (designated).
- Pseudocyphona** Ashmead, Can. Ent., vol. 30, p. 211, 1898.
Type: *Pseudocyphona mexicana* Ashmead (designated).
- Pseudodineura** Konow, Wien. ent. Zeit., vol. 4, p. 297, 1885.
Type: *Tenthredo (Allantus) parvula* Klug.
- Pseudoperga** Guérin, Icon. Regne Anim., vol. 7, Insectes, p. 398, 1845.
Type: *Perga lewisii* Westwood (Shipp, 1894).
- Pseudoperga** Ashmead, Can. Ent., vol. 30, p. 232, 1898 (non Guérin).
Type: *Perga polita* Leach (designated).
- Pseudosiobla** Ashmead, Can. Ent., vol. 30, p. 308, 1898.
Type: *Macrophya excavata* Norton (designated).
- Pseudosirex** Weyenbergh, Arch. Mus. Teyler, vol. 3, p. 238, 1873.
Type: *Pseudosirex darwinii* Weyenbergh.
- Pseudotaxonus** A. Costa, Proc. Sist. Imenott. Ital., p. 157, 1894.
Type: *Tenthredo filicis* Klug.*
- Ptenos** Norton, Trans. Amer. Ent. Soc., vol. 4, p. 77, 1872.
Type: *Ptenos niger* Norton.
- Pteronidea** Rohwer (see p. 98).
Type: *Nematus ventralis* Say (designated).
- Pteronus** Panzer, Krit. Revis., vol. 2, p. 46, 1806.
Type: *Tenthredo pini* Linnæus.
= **Diprion** Schrank.

- Pterygophorinus** Ashmead, Can. Ent., vol. 30, p. 230, September, 1898.
Type: *Pterygophorus analis* O. Costa (designated).
=**Pterygophorus** Klug.
- Pterygophorus** Klug, Mag. Ges. naturf. Freunde Berlin, vol. 6, p. 276, 1812.
Type: *Pterygophorus cinctus* Klug (Ashmead, 1898).
- Ptilia** Lepeletier, Mon. Tenthred., p. 49, 1823.
Type: *Ptilia braziliensis* Lepeletier.
- Rethrax** Cameron, Mem. & Proc. Manchester Lit. Phil. Soc., vol. 43, no. 3, p. 32, 1899.
Type: *Rethrax carinata* Cameron.*
- Rhadinoceræa** Konow, Wien. ent. Zeit., vol. 5, pp. 184, 211, no. 5, 1886.
Type: *Tenthredo (Allantus) micans* Klug.
- Rhagonyx** Konow, Zeitschr. syst. Hym. Dipt., vol. 3, p. 108, 1903.
Type: *Rhagonyx lituratus* Konow.*
- Rhipidioceros** Konow, Ann. k.k. Hofmus., Wien., vol. 12, p. 2, 1897.
Type: *Tarpa flabellicornis* Germar.
- Rhogogaster** Konow, Deutsch. ent. Zeitschr., p. 338, 1884.
Type: *Tenthredo viridis* Linnæus.
- Rhogogastera** Konow, Wien. ent. Zeit., vol. 4, p. 123, 1885.
(An emended spelling for *Rhogogaster*.)
- Rhopographus** Konow, Ent. Nachr., vol. 25, p. 79, 1899 (n. n. for *Rhoproceros*).
Type: *Rhoproceros procinctus* Konow.
- Rhoproceros** Konow, Ent. Nachr., vol. 24, p. 276, 1898.
Type: *Rhoproceros procinctus* Konow.*
preocc., =**Rhopographus** Konow.
- Rusobria** Cameron, Trans. Ent. Soc. Lond., p. 150, 1878.
Type: *Rusobria carinata* Cameron.
- Schizocera** Lepeletier, Encycl. Méthod., Ins., vol. 10, pt. 2, p. 572, 1828.
Type: *Hylotoma fuscata* Villers (Westwood, 1840).
- Sciapteryx** Stephens, Illustr. Brit. Ent., Mandib., vol. 7, p. 56, no. 19, 1835.
Type: *Tenthredo costalis* Fabricius.*
Sciapteryx is an incorrect spelling.
- Scobina** Lepeletier, Encycl. Méthod., Ins., vol. 10, pt. 2, p. 574, 1828.
Type: *Hylotoma melanocephala* Lepeletier.*
- Scolioneura** Konow, Deutsch. ent. Zeitschr., p. 249, 1890.
Type: *Tenthredo (Allantus) betuleti* Klug (MacGillivray, 1909).
- Selandria** Leach, Zool. Misc., vol. 3, p. 126, no. 3, 1817.
Type: *Tenthredo serva* Fabricius (Brullé, 1846).
- Senoclia** Cameron, Trans. Ent. Soc. Lond., p. 88, 1877 (n. n. for *Anisoarthra* Cameron).
Type: *Anisoarthra cærulea* Cameron.
- Sericocera** Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 669, 1846.
Type: *Sericocera spinolæ* Brullé.
- Siobla** Cameron, Trans. Ent. Soc. Lond., p. 88, 1877.
Type: *Siobla mooreana* Cameron (Ashmead, 1898).
- Sirex** Linnæus, Fauna Suec., ed. 29, p. 396, 1761.
Type: *Sirex gigas* Linnæus.
- Sjoestedtia** Konow, Schwed. Zool. Exp., Kilimandjaro, p. 1, 1907.
Type: *Sjoestedtia meruensis* Konow.*
- Sphæcophilus** Provancher, Addit., Faun. Canad., p. 427, 1889.
Type: *Sphæcophilus crawii* Provancher.*

Stevenia Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 667, 1846.

No species.

Stirocorsia Konow, Ent. Nachr., vol. 23, p. 372, 1897.

Type: *Stirocorsia kohli* Konow.*

Stelidarge Konow, Termes. Fuzetek, vol. 24, p. 58, 1901.

Type: *Stelidarge diptycha* Konow.*

Stromboceros Konow, Wien. ent. Zeit., vol. 4, pp. 19, 20, 1885.

Type: *Tenthredo delicatulus* Fallén.

Strongylogaster Dahlbom, Conspect. Tenthred. Scand., p. 13, no. 7, 1835.

Type: *Tenthredo cingulata* Fabricius (MacGillivray, 1908).

Strongylogasteroidea Ashmead, Can. Ent., vol. 30, p. 308, 1898.

Type: *Strongylogaster aprilis* Say (designated).

Sunoxa Cameron, Mem. & Proc. Manchester Lit. Phil. Soc., vol. 43, no. 3, p. 39, 1899.

Type: *Sunoxa purpureifrons* Cameron.*

Synairema Hartig, Fam. Blatt. Holzwesp., p. 314, 1837.

Type: *Tenthredo delicatula* Klug.*

Synaptoneura Konow, Zeitschr. syst. Hym. Dipt., vol. 8, p. 160, 1908.

Type: *Synaptoneura boliviensis* Konow.*

Syrista Konow, Wien. ent. Zeit., vol. 15, p. 152, 1896.

Type: *Cephus parreyssi* Spinola.*

Syzygonia Klug, Ent. Monogr., p. 175, 1824.

Type: *Syzygonia cyanocephala* Klug (Ashmead, 1898).

Syzygonidea Ashmead, Can. Ent., vol. 30, p. 230, September, 1898.

Type: *Syzygonia cyanea* Brullé (designated).

Tanymeles Konow, Zeitschr. syst. Hym. Dipt., vol. 6, p. 244, 1906.

Type: *Tanymeles hilarulus* Konow.*

Tanyphatna Konow, Zeitschr. syst. Hym. Dipt., vol. 6, p. 187, 1906.

Type: *Tanyphatna pellos* Konow.

Tarpa Fabricius, Syst. Piez., p. 19, no. 2, 1804.

Type: *Tarpa cephalotes* Fabricius (Westwood, 1840).

=**Megalodontes** Latreille.

Taxonus Hartig, Fam. Blatt. Holzwesp., p. 297, 1837.

Type: *Tenthredo (Allantus) nitida* Klug (= *Tenthredo agorum* Fallén) (Konow, 1896).

Rohwer's remarks (Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 111, 1910) are incorrect. The type must be *Tenthredo agorum* Fallén. *Ermilia* O. Costa is a synonym, being isogenotypic with *Taxonus*.

Tenthredella Rohwer, Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 117, 1910.

Type: *Tenthredo atra* Linnæus (designated).

=**Tenthredo** authors, not Linnæus.

Tenthredina Rohwer, Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 116, 1910.

Type: *Tenthredo flavida* Marlatt (designated).

Tenthredo Linnæus, Syst. Nat., ed. 10, vol. 1, p. 343, no. 213, p. 555, no. 214, 1758.

Type: *Tenthredo scrophulariæ* Linnæus (Latreille, 1810).

Tenthredopsis O. Costa, Fauna Napoli, Tenthred., p. 98, 1859.

Type: *Tenthredo tessellata* Klug.

Teredon Norton, Trans. Amer. Ent. Soc., vol. 2, p. 366, 1869.

Type: *Tremex cubensis* Cresson.

Teredonia W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 386, no. 7, 1882 (n. n. for *Teredon* Norton).

Type: *Tremex cubensis* Cresson.

- Tetratneura** Ashmead, Can. Ent., vol. 30, p. 256, 1898.
Type: *Monostegia ignota* Norton (designated).
= *Empria* Lepeletier.
- Themos** Norton, Trans. Amer. Ent. Soc., vol. 1, p. 58, no. 19, 1867.
Type: *Themos hyalinus* Norton.*
- Thomsonia** Konow, Deutsch. ent. Zeitschr., p. 227, 1884.
Type: *Perineura thomsonia* Konow.
- Thrinax** Konow, Wien. ent. Zeit., vol. 4, pp. 19, 22, 1885.
Type: *Strongylogaster contigua* Konow (MacGillivray, 1908).
- Thulea** Say, Bost. Journ. Nat. Hist., vol. 1, no. 3, p. 214, 1836.
Type: *Thulea nigra* Say.*
- Tomostethus** Konow, Wien. ent. Zeit., vol. 5, pp. 184, 214, no. 7, 1886.
Type: *Tenthredo nigrita* Fabricius.
- Topotrita** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 48, no. 27, 1882.
Type: *Hylotoma (Schizocera) leucocephala* Klug.*
- Trachelus** Jurine, Nouv. Méthod. Class. Hym., p. 70, pl. 2, fig. 9, 1807.
Type: *Sirex tabidus* Fabricius.
- Trailia** Cameron, Trans. Ent. Soc. Lond., p. 148, 1878.
Type: *Trailia analis* Cameron.
- Tremex** Jurine, Nouv. Méthod. Class. Hym., p. 80, 1807.
Type: *Sirex fuscicornis* Fabricius (Latreille, 1810).
- Trichiocampus** Hartig, Fam. Blatt. Holzwesp., p. 176, 1837.
Type: *Nematus grandis* Lepeletier.
= *Tenthredo viminalis* Fallén.
- Trichiosoma** Leach, Zool. Misc., vol. 3, p. 108, no. 2, 1817.
Type: *Tenthredo lucorum* Linnæus (Curtis, 1824).
- Trichiosomites** Brues, Bul. Mus. Comp. Zool., vol. 51, no. 10, p. 259, March, 1908.
Type: *Trichiosomites obliviosus* Brues.*
- Trichorhachus** W. F. Kirby, List Hym. Brit. Mus., vol. 1, p. 39, no. 21, 1882.
Type: *Trichorhachus nitidus* W. F. Kirby.
- Trichorrhachus** Konow, Genera Insectorum, fasc. 29, p. 15, 1906.
Misspelling of *Trichorhachus*.
- Trichotaxonus** Rohwer, Proc. Ent. Soc. Wash., vol. 12, p. 30, 1910.
Type: *Trichotaxonus readi* Rohwer (designated).
- Tristactus** Konow, Ann. k. k. Hofmus., Wien., vol. 12, p. 12, 1897.
Type: *Lyda judaicus* Lepeletier.*
- Tristegus** Konow, Zeitschr. syst. Hym. Dipt., vol. 6, p. 370, 1906.
Type: *Tristegus mimarius* Konow.*
- Tritokreion** Schilling, Übers. Arbeit. schles. Ges. Vaterl. cultur., i, j, p. 43, 1825.
No species.
- Trochophora** Konow, Zeitschr. syst. Hym. Dipt., vol. 5, p. 158, 1905.
Type: *Trochophora duckei* Konow.*
- Urocrites** Heer, Denkschr. schweiz. Ges. Natur., vol. 22, p. 36, 1867.
Type: *Urocrites spectabilis* Heer.
- Urocerus** (Geoffroy) Latreille. Geoffroy, Hist. Abr. Ins., vol. 2, p. 264, 1762;
Latreille, Hist. Nat. Crust. Ins., p. 304, 1802.
Type: *Sirex gigas* Linnæus (Westwood, 1840).
= *Sirex* Linnæus.
- Waldheimia** Brullé, Hist. Nat. Ins. Hym., vol. 4, p. 665, 1846.
Type: *Waldheimia braziliensis* Lepeletier (designated).

- Xenapates** W. F. Kirby, List. Hym. Brit. Mus., vol. 1, p. 180, no. 67, 1882.
Type: *Dineura* (?) *africana* Cameron.*
- Xeris** A. Costa, Prosp. Sist. Imenn. Ital., vol. 3, p. 259, 1894.
Type: *Ichneumon spectrum* Linnæus.*
- Xiphidion** Provancher, Nat. Can., vol. 7, p. 374, 1875.
Type: *Xiphidion canadense* Provancher.*
= *Xiphidria provancheri* Cresson.
- Xiphiura** Fallén, Spec. Nov. Hym. Disp. Method, p. 11, no. 7, 1813.
No species included.
- Xiphidria** Latreille, Hist. Nat. Crust. Ins., vol. 3, p. 304, 1802.
Type: *Ichneumon camelus* Linnæus.*
- Xyela** Dalman, Svensk. Vet.-Akad. Handl., vol. 40, p. 122, no. 3, pl. 6, figs. 1-11, 1899.
Type: *Xyela pusilla* Dalman (Curtis, 1824).
- Xyloecermatium** L. Heyden, Berl. ent. Zeitschr., vol. 12, p. 227, 1868, (n. n. for *Xyloterus* Hartig, non Erichson).
Type: *Sirex fuscicornis* Fabricius.
= **Tremex** Jurine.
- Xyloperga** Shipp, Ent., vol. 27, pp. 339, 340, 1894.
Type: *Perga hallidayi* Westwood (designated).
- Xyloterus** Hartig, Fam. Blatt: Holzwesp., p. 385, 1837 (non Erichson, 1836).
Type: *Sirex fuscicornis* Fabricius.
= **Tremex** Jurine.
- Zaræa** Leach, Zool. Misc., vol. 3, p. 113, no. 4, 1817.
Type *Tenthredo fasciata* Linnæus.*
- Zarca** Cameron, Trans. Ent. Soc. Lond., p. 142, 1878.
Type: *Zarca apicalis* Cameron.*
- Zaschizonyx** Ashmead, Can. Ent., vol. 30, p. 257, 1898.
Type: *Hoplocampa montana* Cresson (designated).

AN INDEX TO THE GENOTYPES.

EXPLANATORY.

The following index includes (1) the name of the species, (2) the name of its author, (3) the name of the genus in which it was originally described, and (4) the name of the genus of which it is the genotype. When a species given in the index is a synonym of another genotype, a cross-reference is given to the genotype of which it is a synonym. When a species was originally placed in the genus of which it is the genotype, only one generic name is given. Species placed in subgenera by older writers are cited in the subgenus only.

- | | |
|------------------------------------------------|----------------------------------------------|
| abbotii W. F. Kirby (Hypolæpus). | agrorum Fallén (Tenthredo, Ermilia). |
| abdominalis Fabricius (Tenthredo, Monostegia). | "alba" Norton (Monostegia, Periclistoptera). |
| abdominalis Panzer (Tenthredo, Nematinus). | albipes Cameron (Phænusa). |
| aeratus Newman (Eurys). | albipes Konow (Anapeptamena). |
| æthiops Fabricius (Tenthredo, Endelomyia). | albipes Gmelin (Tenthredo, Monophadnus). |
| afer Konow (Pampsilota). | albiventris Klug (Allantus, Periclista). |
| africana Cameron (Dineura?, Xenapates). | albodipictus Norton (Taxonus, Epitaxonus). |

- alni* Linnæus (*Tenthredo*, *Hemichroa*).
alni Linnæus (*Tenthredo*, *Leptocerca* [=*Hemichroa*]).
alni Linnæus (*Tenthredo*, *Leptocercus* [=*Hemichroa*]).
alternans A. Costa (*Anoplolyda*).
amenaïda W. F. Kirby (*Perga*, *Neoperga*).
amerinæ Linnæus (*Tenthredo*, *Pseudoclavellaria*).
analís Cameron (*Trailia*).
analís O. Costa (*Pterygophorus*, *Pterygophorinus*).
andrei Konow (*Ophrynopus*).
annulitarsis Cameron (*Hennedyia*).
apicalis Cameron (*Zarca*).
apicalis Say (*Strongylogaster*, *Strongylogasteroidea*).
apicalis Spinola (*Gymnia*).
armeniús Konow (*Ateuchopus*).
arizonensis Ashmead (*Eriocampidea*).
arizonensis Ashmead (*Eriocampidea*, *Cockerellonis* [=*Eriocampidea*]).
aterrima Klug (*Allantus*, *Pectinia*).
athalioides Konow (*Poppia*).
atra Linnæus (*Tenthredo*, *Tenthredella*).
atratus W. F. Kirby (*Polyclonus*).
atroviolaceum Norton (*Tenthredo*, *Lagium*).
atrum MacGillivray (*Phrontosoma*).
aterrima Klug (*Allantus*, *Phymatocera*).
audouinii Westwood (*Pachylota*).
avingrata Dyar (*Pleroneura*, *Odontophyes*).
bakeri MacGillivray (*Neocharactus*).
betuleti Klug (*Allantus*, *Scolioneura*).
bipunctata Klug (*Allantus*, *Ardis*).
boliviensis Konow (*Synaptoneura*).
bolivari Konow (*Labidarge*).
braunsi Konow (*Didocha*).
braziliensis Lepeletier (*Ptilia*).
braziliensis Lepeletier (*Waldheimia*).
brevicornis Fallén (*Hylotoma*, *Aprosthema*).
brevis Klug (*Allantus*, *Hopllocampa*).
buquetii Spinola (*Aulacomerus*).
buyssoni Konow (*Heptacola*).
californica Ashmead (*Manoxyela*).
californicus Marlatt (*Gymnonychus*).
camelus Linnæus (*Ichneumon*, *Hybonotus*).
camelus Linnæus (*Ichneumon*, *Xiphodria*).
cameroni Westwood (*Perga*, *Acanthoperga*).
canadense Provancher (*Xiphidion*).
capræ Panzer (*Tenthredo*, *Pachynematus*).
carinata Cameron (*Rethrax*).
carinata Cameron (*Rusobria*).
cephalotes Fabricius (*Tarpa*).
cephalotes Fabricius (*Tenthredo*, *Megalodontes*).
cephalotes Jakowlew (*Allantus*, *Jermakia*).
cestatus Konow (*Clydostomus*).
chalybea Konow (*Miocephala*).
cinctus Klug (*Pterygophorus*).
cinctus Linnæus (*Tenthredo*, *Emphytus*).
cingulata Fabricius (*Tenthredo*, *Strongylogaster*).
cinxia Klug (*Allantus*, *Caliroa*).
clavatus Rohwer (*Pseudocimbex*).
cœrulea Cameron (*Anisoarthra* [*Senoclia*]).
cœrulea Cameron (*Anisoarthra*, *Senoclia*).
coloradensis Cockerell (*Perga*, *Phenacoperga*).
coloradensis Weldon (*Emphytus*, *Protemphytus*).
columbiana Provancher. (*Labidia*. See *opimus* Cresson.)
compressus Fabricius (*Sirex*, *Ephippinotus*).
connectens Stephens (*Janus*).
consobrina Klug (*Tenthredo*, *Eniscia*).
contigua Konow (*Strongylogaster*, *Thrinax*).
coronatus Fabricius (*Tenthredo*, *Orysus*).
coronatus Klug (*Emphytus*, *Aneugmenus*).
coryiculum Dyar (*Isodyctium*).
costalis Fabricius (*Tenthredo*, *Sciapteryx*).
crassa Fallén (*Tenthredo*, *Holcocneme*).
craverii A. Costa (*Laurentia*).
crawii Provancher (*Sphacophilus*).
cressoni Westwood (*Perga*, *Camptoperga*).
crevecoeuri Ashmead (*Opisthoneura*. See *montana* Cresson).
crinitus Konow (*Lagideus*).
crudum Konow (*Eriglenum*).
cruentatus Eversmann (*Cephus*, *Eversmannella*).
cubensis Cresson (*Tremex*, *Teredon* [= *Teredonia*]).
cubensis Cresson (*Tremex*, *Teredonia*).
cyanea Brullé (*Syzygonia*, *Syzygonidea*).

- cynocephala* Klug (Syzygonia).
cynocephala Klug (Syzygonia, Bergiana).
cyanoptera Klug (Syzygonia, Parasyzygonia).
cynosbati Linnæus (Cephus, Janus).
cynosbati Linnæus (Cephus, Phyllocus [=Janus]).
dahlbomi Thomson (Cænoneura).
dahlbomi Westwood (Perga, Pergadopsis).
dahli Hartig (Xyela, Pleroneura).
darwinii Weyenbergh (Pseudosirex).
debilicornis Konow (Brachyphatnus).
debilis Say (Atomacera).
decora Konow (Acidiophora).
defessus Scudder (Atocus).
degeeri Klug (Allantus, Dineura).
delicatulus Fallén (Tenthredo, Stromboceros).
delicatula Klug (Tenthredo, Synairema).
delta Provancher (Tenthredo, Bivena).
delta Provancher (Tenthredo, Homœoneura [=Bivena]).
difformis Panzer (Tenthredo, Cladius).
dimorpha Freymuth (Pompholyx [=Cacosyndia]).
dimorpha Freymuth (Pompholyx, Cacosyndia).
diptycha Konow (Stelidarge).
divergens W. F. Kirby (Clarissa).
dohrnii Tischbein (Kaliosysphinga).
dorsalis Say (Acordulecera).
dorsalis Leach (Perga).
dubitatus Norton (Taxonus, Hemitaxonus).
duckeii Konow (Trochophora).
eburneiguttatum W. F. Kirby (Aglao stigma).
ectrapela Konow (Kokujewia).
eglanteriae Fabricius (Tenthredo, Dositheus).
ellisii Curtis (Dielocerus).
epimelas Konow (Haplostegus).
equiseti Fallén (Tenthredo, Taxonus).
erythrocephala Linnæus (Tenthredo, Acantholyda).
eucalypti Froggatt (Phylacteophaga).
excavata Norton (Macrophya, Pseudosio bla).
fabricii Leach (Tarpa, Melanopus).
fallax Lepeletier (Nematus, Amaurone matus).
fasciata Linnæus (Tenthredo, Zaræa).
fascipennis Norton (Selandria, Calozarca. faunus Newman. (Phyllocus. See cynosbati Linnæus).
ferruginea Say (Xyela, Macroxyela).
filiceti Klug (Blasticotoma).
filiformis Eversmann (Cephus, Calameuta).
filicis Klug (Tenthredo, Polystichophagus [=Pseudotaxonus]).
filicis Klug (Tenthredo, Pseudotaxonus).
flabellicornis Germar (Tarpa, Rhipidioceros).
flavescens Marlatt (Phyllotoma?, Nesotaxonus).
flavida Marlatt (Tenthredo, Tenthredina).
floricola O. Costa (Ebolia).
flavens Klug (Tenthredo, Paraselandria).
flavipes Cameron (Lithracia).
flaviventris Linnæus (Tenthredo, Neurotoma).
frontalis Westwood (Lyda, Liolyda).
fulvipes A. Costa (Amestastegia).
fumipennis Ashmead (Parazarca).
fumipennis Westwood (Brachytoma).
fumipennis W. F. Kirby (Acherdocerus).
furcata Fabricius (Hylotoma, Cyphona).
furcata Villers (Hylotoma, Schizocera).
fusca Schrottky (Pseudabia).
fuscicornis Hartig (Diphadnus).
fuscicornis Fabricius (Sirex, Tremex).
fuscicornis Fabricius (Sirex, Xylocer matium [=Tremex]).
fuscicornis Fabricius (Sirex, Xyloterus [=Tremex]).
gallicola Stephens (Nematus, Pontania).
gallæ Newman. (Euura. See medullaris Hartig).
gigas Linnæus (Sirex).
gigas Linnæus (Sirex, Urocerus [=Sirex]).
gonager Jurine (Dolerus).
grandis Lepeletier. (Trichocampus. See viminalis Fallén.)
grandis Philippi (Brachyxiplus).
guttatum Fallén (Tenthredo, Pœcilstoma).
hallidayi Westwood (Perga, Xyloperga).
healæi E. Newman. (Camponiscus. See luridiventris Fallén.)
herbsti Konow (Lycosceles).
hieroglyphica Christ (Tenthredo, Itycorsia).
hilarulus Konow (Tanymeles).
hirticornis Cameron (Incalia).
histrionicus MacGillivray (Parabates).

- hortulana* Klug (Emphytus, Messa).
hyalinus MacGillivray (Neotomostethus).
hyalinus Norton (Themus).
hyperborea Kiaer (Ischyroceræa).
hypogastricus Hartig. (See *luridiventris* Fallén.)
ianthe E. Newman (Fenusa, Asticta).
ignota Norton (Monostegia, Tetratneura).
imitatrix Ashmead (Paraselandria, Nesoselandria).
imperialis Smith (Hylotoma, Athermanthus).
incisa Cameron (Allomorpha).
indica W. F. Kirby (Parastitis).
inferentia Norton (Pœcilostoma, Monsoma).
inferentia Norton (Pœcilostoma, Monsoma [=Monsoma]).
infuscatus MacGillivray (Hypargyricus).
inopenus Konow (Canonias).
insolita Konow (Cladiucha).
interruptus Klug (Pterygophorus, Lophyrotoma).
jakowleffi Konow (Cænocephus).
jakowleffi Konow (Dinax).
jakowlewi Semenow (Parabia).
jantheria Klug (Hylotoma, Cibdela).
japonica Marlatt (Lophyrus, Nesodiprion.)
jucunda W. F. Kirby (Perga, Paraperga).
judaicus Lepeletier (Lyda, Tristactus).
julii Brébisson (Pinicola [=Xyela]).
julii Brébisson (Pinicola, Xyela).
juniperi Linnæus (Tenthredo, Monocetus).
juvencus Linnæus (Sirex, Paururus).
klugii Burmeister (Athlophorus).
kohli Konow (Stirocorsia).
koreana Konow (Corymbas).
læta Westwood (Dictynna).
langei Konow (Probleta).
laricis Marlatt (Hoplocampa, Marlattia).
lepida Brullé (Perreyia).
lepidus Klug (Emphytus, Asticta [=Harpiphorus]).
lepidus Klug (Emphytus, Harpiphorus).
leprieurii Spinola (Camptoprium).
leucocephala Klug (Schizocera, Topotrita).
lewisii Westwood (Perga, Pseudoperga).
limacina Retzius (Tenthredo, Eriocampoides).
lituratus Konow (Rhagonyx).
lobatus MacGillivray (Aphanisus).
lucorum Linnæus (Tenthredo, Trichiosoma).
luridiventris Fallén (Tenthredo, Camponicus [=Platycampus]).
luridiventris Fallén (Tenthredo, Leptopus [=Platycampus]).
luridiventris Fallén (Tenthredo, Platycampus).
luridiventris Konow. (Pareophora. See *nigripes* Klug.)
lutea Linnæus (Tenthredo, Clavellaria).
lutea Linnæus (Tenthredo, Cimbex).
luteola Klug (Tenthredo, Nematoceros).
luteiventris O. Costa. (Ephippinotus. See *compressus* Fabricius.)
macropus Smith (Cladomacra).
maculata Marlatt (Cimbex, Agenocimbex).
maculata Norton (Pœcilostoma, Pœcilostomidea).
maculipennis Stein (Lyda, Celidoptera).
maculipennis Stein (Lyda, Kelidoptera).
magrettii Konow (Colochelyna).
major Cresson (Xyela, Megaxyela).
major O. Costa. (See *satyrus* Panzer.)
mandibularis Zaddach (Lyda, Gongylocorsia).
maria MacGillivray. (Bivena. See *delta* Provancher.)
martini Lepeletier (Hylotoma, Didymia).
martini MacGillivray (Neopareophora).
mathesoni MacGillivray (Phlebotrophia).
mayrii Westwood (Perga, Plagioperga).
medullaris Hartig (Cryptocampus).
megapolitana Brauns (Konowia).
melanocephala Lepeletier (Hylotoma, Scobina).
meruensis Konow (Sjoestedtia).
metallica Rohwer (Neoeurys).
metallicus Mocsary (Oryssus, Mocsarya).
mexicana Ashmead (Neoptilia).
mexicana Ashmead (Pseudocypbona).
mexicanum W. F. Kirby (Loboceras).
nigripes Klug (Allantus, Pareophora).
mimarius Konow (Tristegus).
minutissima O. Costa. (Melina. See *nigrita* Westwood.)
minutus Hartig (Pelmatopus).
montana Cresson (Hoplocampa, Opisthoneura [=Zaschizonyx]).
montana Cresson (Hoplocampa, Zaschizonyx).
mooreana Cameron (Siobla).
moricei Konow (Characophygus).

- morio Konow (Dulophanes).
 multicolor Norton (Taxonus, Parataxon-
 us).
 naucarrowi Froggatt (Philomastix).
 nemorata Fallén (Phyllotoma, Druida).
 niger Norton (Ptenos).
 nigra Cameron (Fethalia).
 nigra Say (Thulea).
 nigrescens Rohwer (Diphamorphos).
 nigrita Fabricius (Tenthredo, Tomoste-
 thus).
 nigrita Westwood (Fenella).
 nigrita Westwood (Fenella, Melinia).
 nigricornis W. F. Kirby (Hemidianeura).
 nitens W. F. Kirby (Euryopsis).
 nitidus W. F. Kirby (Trichorhachus).
 obliuiosus Brues (Trichiosomites).
 obscura Linnæus (Tenthredo, Amasis).
 obscuratus MacGillivray (Paracharactus).
 occidentalis MacGillivray. (Cockerel-
 lonis. See arizonensis Ashmead.)
 ochroleucus Stephens (Melicerta [= Hep-
 tamelus]).
 ochroleuca Stephens (Melicerta, Hep-
 tamelus).
 ochropoda Stephens (Heterarthus, De-
 catia).
 ochropoda Klug (Emphytus, Heterar-
 thus).
 oeningensis Heer (Cephites).
 opaca Fabricius (Tenthredo, Mesoneura).
 opaca Fabricius (Tenthredo, Pristis [= Me-
 soneura]).
 opimus Cresson (Allantus, Labidia).
 oregonensis Ashmead (Macgillivraya [=
 Macgillivrayella]).
 oregonensis Ashmead. (Macgillivraya,
 Macgillivrayella).
 ostentus Brues (Paremphytus).
 ovata Linnæus (Tenthredo, Eriocampa).
 padi Linnæus (Tenthredo, Priophorus).
 parreyssi Spinola (Cephus, Syrsta).
 pallimacula Lepeletier (Empria).
 pallipes Say (Strongylogaster, Hypotaxo-
 nus).
 parviceps Newman. (See nemorata
 Fallén.)
 parvulus Klug (Allantus, Pseudo-
 dineura).
 parvus Brues (Lithoryssus).
 pectoralis Lepeletier (Nematus, Ano-
 plonyx).
 pellos Konow (Tanyphatna).
 perplexus Konow (Emphyoides).
 peruanus Konow (Hyperoceros).
 picipes W. F. Kirby (Paralyptia).
 pictipennis Smith (Derecyrtia).
 pilicornis Dahlbom. (Priophorus. See
 padi Linnæus.)
 pinguis Say (Strongylogaster, Dimorpho-
 pteryx).
 pini Linnæus (Tenthredo, Anachoreta
 [= Diprion]).
 pini Linnæus (Tenthredo, Diprion).
 pini Linnæus (Tenthredo, Lophyrus
 [= Diprion]).
 pini Retzius (Nematus, Lygæonematus).
 plumicornis Guérin (Oryssus, Chalinus).
 polita Leach (Perga, Pseudoperga).
 politissimus A. Costa (Cephus, Peronis-
 tilus).
 pratorum Fallén (Tenthredo, Loderus).
 præcox Föerster (Epitactus).
 privus Konow (Pëus).
 procer Konow (Bathyblepta).
 procinctus Konow (Rhoptroceros [= Rho-
 pographus]).
 procinctus Konow (Rhoptroceros, Rho-
 pographus).
 pulchella O. Costa. (Ermilia. See agorum
 Fallén.)
 pullus Föerster (Nematus, Micronema-
 tus).
 pumila Klug (Allantus, Entodecta).
 pumila Klug (Cephalocera [= Corynophi-
 lus]).
 pumila Klug (Cephalocera, Corynophi-
 lus).
 pumila Klug (Emphytus, Aphadnurus
 [= Fenusa]).
 pumila Klug (Emphytus, Fenusa).
 pumilio Westwood (Perantherix).
 punctigera Lepeletier. (Pristis. See
 opaca Fabricius.)
 purpureifrons Cameron (Sunoxa).
 pusilla Dalman. (Xyela. See julii Bré-
 bisson).
 pusilla Klug (Allantus, Blennocampa).
 pygmæus Linnæus (Sirex, Cephus).
 pygmæa Say (Blennocampa, Erythra-
 spides).
 quattuordecimpunctata Norton (Ten-
 thredo, Neopus).
 rapæ Linnæus (Tenthredo, Pachyrotasis).
 reedi Rohwer (Trichotaxonus).
 reitteri Konow (Rhadinoceræa).
 religiosa Marlatt (Blennocampa, Neso-
 tomostethus).
 reticulata Linnæus (Tenthredo, Cæno-
 lyda).

- rosæ* Harris. (*Endelomyia*. See *æthiops* Fabricius.)
rosæ Linnæus (*Tenthredo*, *Corÿnia* [= *Hylotoma*]).
rosæ Linnæus (*Tenthredo*, *Hylotoma*).
rosarum Imhof et Labram. (See *rosæ* Linnæus.)
rotundiventris Cameron (*Macrophya*, *Dipteromorpha*).
rubi Forbes (*Metallus*).
rubi Harris (*Hoplocampa*, *Monophadnoides*).
rubi Panzer (*Tenthredo*, *Perineura*).
rubripes Cresson (*Strongylogaster*, *Aphilo-dyctium*).
rufocinctus Norton (*Strongylogaster*, *Parasiobla*).
ruficollis Norton (*Atomacera*, *Micrarge*).
rufiventris Konow (*Netroceros*).
rugifrons Cameron (*Beldonea*).
rusticus Linnæus (*Tenthredo*, *Macrophya*).
saltuum Linnæus (*Tenthredo*, *Monopopus*).
satyrus Panzer (*Astatus*, *Cerobactrus* [= *Hartigia*]).
satyrus Panzer (*Astatus*, *Hartigia*).
scapularis Lepeletier (*Coryna*).
scrophulariæ Linnæus (*Tenthredo*).
scrophulariæ Linnæus (*Tenthredo*, *Allantus* [= *Tenthredo*]).
scutellata W. F. Kirby (*Cerealces*).
sebetia O. Costa (*Caliroa*).
septentrionalis Linnæus (*Tenthredo*, *Cresus* [= *Nematus*]).
septentrionalis Linnæus (*Tenthredo*, *Nematus*).
sericea Linnæus (*Tenthredo*, *Abia*).
serva Fabricius (*Tenthredo*, *Selandria*).
signata Fabricius (*Tenthredo*, *Cephaleia*).
sikkemensis Konow (*Conaspidia*).
singularis Ashmead (*Gymniopterus*).
sjustedti Konow (*Distega*).
slossonæ MacGillivray (*Polybates*).
smyrnensis Stein (*Pachycephus*).
sodalium Cresson (*Selandria*, *Lycaota*).
spectabilis Heer (*Urocerites*).
spectabilis MacGillivray (*Ceratulus*).
spectrum Linnæus (*Ichneumon*, *Xeris*).
spinarum Fabricius (*Tenthredo*, *Athalia*).
spinolæ Brullé (*Seriocera*).
stigmatalis Cameron (*Anisoneura* [= *Belleses*]).
stigmatalis Cameron (*Anisoneura*, *Belleses*).
strahlendorffi Konow (*Electrocephalus*).
sturnii Klug (*Tenthredo*, *Encarsioneura*).
sylvatica Linnæus (*Tenthredo*, *Lyda* [= *Pamphilius*]).
sylvatica Linnæus (*Tenthredo*, *Pamphilius*).
syringæ Gradl (*Cephosoma*).
tabidus Fabricius (*Sirex*, *Trachelus*).
taczanowskii André (*Praia*).
tantillus O. Costa (*Aphadnurus*).
tessellata Klug (*Tenthredo*, *Tenthredopsis*).
testaceus Jurine (*Pteronus*, *Pristiphora*).
testacea W. F. Kirby (*Decameria*).
thomsoni Konow (*Perineura*, *Thomsonia*).
thoracica Klug (*Plagiocera*).
tibialis Klug (*Pachylosticta*).
trimaculatus Say (*Cephus*, *Adirus*).
troglydites Klug (*Astatus*).
tropicus Norton (*Lophyrus*, *Lophyridea* [= *Lophyroides*]).
tropicus Norton (*Lophyrus*, *Lophyroides*).
truculenta Konow (*Braunsiola*).
townsendi Ashmead (*Caloptilia*).
typica Rohwer (*Claremontia*).
typica Rohwer (*Nortonella*).
typicus Brues (*Palæotaxonus*).
typicus Rohwer (*Prototaxonus*).
ulmi Sundevall (*Fenusa*, *Kaliofenusa*).
vafer Linnæus (*Tenthredo*, *Bactroceros*).
vagans Fallén (*Phyllotoma*).
varianus Norton (*Harpiphorus*, *Macremphytus*).
varinervis Spinola (*Tenthredo*, *Antholeus*).
varipes Cameron (*Ancyloneura*).
ventralis Say (*Nematus*, *Pteronidea*).
vexabilis Brues (*Scolioneura*, *Lisconeura*).
viduatus Zetterstedt (*Nematus*, *Brachycolus*).
viminalis Fallén (*Tenthredo*, *Trichio-campus*).
violaceipennis André (*Nematoneura*).
viridipes Cameron (*Busarbia*).
viridis Linnæus (*Tenthredo*, *Rhogogaster*).
volupis Konow (*Cerospastus*).
ulmariæ Schlechtendal (*Macrocephus*).
ustulatus Linnæus (*Tenthredo*, *Cryptus*).
weithii Ashmead (*Acanthoptenos*).
westwoodii Brullé (*Dictynna*).
zabriskiei Ashmead (*Melanoselandria*).

SYNONYMY OF CERTAIN GENERA.

By cross-reference in the index to the genotypes it was found that certain genera were isogenotypic. In some of these cases new names were needed. New names and certain synonymy are given below.

THE SYNONYMS OF HARTIGIA SCHIÖDTE AND BOIE.

Schiödte (Kroyers Naturhistorisk Tidsskrift, vol. 2, p. 332, 1838) gave the name *Hartigia* for a certain cephid insect which differed from *Cephus pygæmus* in characters of the antennæ. This species was not named, however, so the genus was without standing until 1855, when F. Boie (Stett. ent. Zeit., vol. 16, p. 49) stated that *Astutus satyrus* was the species which Schiödte had. This gives *Hartigia* standing and makes *satyrus* the type—the genus being monobasic.

The genotypes of the genera *Cerobactus* O. Costa and *Cephosoma* Gradl are identical specifically with *satyrus*; consequently these generic names fall to the older name *Hartigia*. The species *satyrus* is also congeneric with *Macrocephus ulmarix* Schlechtendal (= *Tenthredo linearis* Schrank), so *Macrocephus* is a synonym of *Hartigia*. The synonymy, therefore, is as follows:

Hartigia Schiödte and Boie, 1855.

Cerobactus O. Costa, 1860.

Macrocephus Schlechtendal, 1878.

Cephosoma Gradl, 1881.

PTERONUS Panzer=DIPRION Schrank.

Panzer, in the original description of *Pteronus*, included the following species in the order named: *Hylotoma frutetorum* Fabricius, *Hylotoma dorsata* Fabricius, *Hylotoma juniperi* Fabricius, *Tenthredo pini* Linnæus, and *Tenthredo difformis* Panzer. As the present-day conception of *Pteronus* has to be changed, no species originally included belonging to *Pteronus* Konow and authors, *Tenthredo pini* Linnæus has been chosen as the type, making *Pteronus* Panzer and *Diprion* Schrank isogenotypic. *Diprion* is the older name, so *Pteronus* Panzer is a synonym of *Diprion* Schrank.

Diprion Schrank, 1802.

Pteronus Panzer, 1806.

PTERONIDEA, N. N. FOR PTERONUS Konow and authors.

Pteronus Panzer being a synonym of *Diprion* Schrank, *Pteronus* Konow and authors is without a name. For this the name PTERONIDEA may be used. The type of *Pteronidea* is *Nematus ventralis* Say, which is congeneric with Konow's interpretation of *Tenthredomyosotides* Fabricius.

THE SYNONYMS OF *PLATYCAMPUS* SCHIÖDTE.

Hartig, in 1837 (Fam. Blatt. Holzwesp., p. 184), described the subgenus *Leptopus* for a new species, *hypogastricus*, which has proved to be the same as *Tenthredo luridiventris* Fallén (1808). The name *Leptopus* had already (Latreille, 1809) been used for a genus of Hemiptera. Schiödte (Magasin de Zool., vol. 9, p. 20, footnote, 1839) proposed the name *Platycampus* for *Leptopus* Hartig.

E. Newman (Ent., vol. 4, pp. 215–217, 1869) describes the larva and adult of a sawfly under the name *Camponiscus healæi*. The adult is very poorly characterized and unrecognizable, but in 1873 (Ent. Monthl. Mag., vol. 10, p. 84) P. Cameron says he has reared the same larva as Newman describes, and that the adult is the same as *Nematus* (*Leptopus*) *hypogastricus* Hartig. This synonymy establishes the genus *Camponiscus* and makes it the same as *Leptopus* Hartig, the two genera being isogenotypic.

F. W. Konow (Genera Insectorum, Fasc. 29, p. 48, 1906) uses the name *Leptocercus* Thomson (a changed spelling for *Leptocerca* Hartig) for this genus, but in this he is wrong, because Thomson divides *Leptocercus* into *Leptocercus* s. s., which contains *Tenthredo alni* Linnæus, *Tenthredo rufa* Panzer, and *Leptocercus nigriceps* Thomson, and is Hartig's genus *Leptocerca*. The second division of Thomson's *Leptocercus* is *Leptopus* Hartig and contains *Tenthredo luridiventris* Fallén. The *Leptocercus* Thomson s. s. is *Leptocerca* Hartig, not *Leptopus* Hartig as Konow would have it.

The synonymy of this group is as follows:

Platycampus Schiödte, 1839.

Leptopus Hartig, 1837 (non Latreille, 1809).

Camponiscus E. Newman, 1869.

Leptocercus Konow, 1906 (non Thomson, 1871).

CRÆSUS Leach=**NEMATUS** Jurine.

Latreille (Considérations Générales, p. 435, 1810) fixed the type of *Nematus* as *Tenthredo septentrionalis* Jurine. *Nematus septentrionalis* Jurine is the same as *Tenthredo septentrionalis* Linnæus. Leach (Zool. Misc., vol. 3, p. 129, no. 1, 1817) based his genus *Cræsus* on *Tenthredo septentrionalis* Linnæus; so *Cræsus* Leach is a synonym of *Nematus*, the genera being isogenotypic.

Nematus Jurine, 1807.

Cræsus Leach, 1817.

NEMATINUS, N. N. FOR **NEMATUS** Konow.

The fixing the type of *Nematus* as *Tenthredo septentrionalis* Linnæus and making *Cræsus* synonym of it necessitates a new name for *Nematus* of Konow and authors. For *Nematus* Konow and authors the name **NEMATINUS** may be used.

The type of *Nematinus* is *Tenthredo abdominalis* Panzer.

GYMNONYCHUS Marlatt=DIPHADNUS Hartig.

In 1837 Hartig (Fam. Blatt. Holzwesp., p. 225) formed a new subgenus (*Diphadnus*) of *Nematus* for a species he called *fuscicornis*. Later European writers have proved that *Nematus* (*Diphadnus*) *fuscicornis* Hartig is an aberrant form of his *Nematus appendiculatus*, which for some time was placed in the genus *Pristiphora*.

Mr. C. L. Marlatt,^a in his Revision of the Nematinae of North America, described a new genus, *Gymnonychus*, for certain species near *Pristiphora*, which have simple tarsal claws. *Nematus appendiculatus* Hartig belongs to this genus, but in 1837 a generic name was given to an aberrant form of this species, so Mr. Marlatt's name must fall as a synonym of *Diphadnus* Hartig.

Diphadnus Hartig, 1837.

Gymnonychus Marlatt, 1896.

CALIROA O. Costa AND ERIOCAMPOIDES Konow.

In 1859 (Fauna Napoli, Tenthred., p. 59) O. Costa described the genus *Caliroa* and included one species, *C. sebetia* O. Costa, which is therefore the genotype. Later it was proved that *Caliroa sebetia* is the same as *Tenthredo* (*Allantus*) *cinxia* Klug.

Rev. F. W. Konow in 1890 (Deutsch. ent. Zeitschr., 1890, p. 239) described his genus *Eriocampoides* and in his list of species, page 248, considers *sebetia* O. Costa as a synonym of *cinxia* Klug, but makes no mention of the genus *Caliroa*.

Dr. William H. Ashmead in 1898 (Can. Ent., p. 256) divided Konow's genus *Eriocampoides* into two genera, naming *Monostegia rosæ* Harris as the type of his new genus *Endelomyia*.

The group of species placed in the genus *Eriocampoides* by Konow can well be separated into two distinct sections, one of which, Konow to the contrary notwithstanding (for he says *Caliroa* was founded on a male and not sufficiently characterized, Genera Insectorum, Fasc. 29, p. 75, 1906), must be called *Caliroa*. The type of *Eriocampoides* being the common pear slug *limacina*, that subgenus will contain those species which have the clypeus emarginate, the pedicel subequal in length with the scape, and the hind wings with usually two closed discal cells in the female. The type of *Endelomyia* Ashmead is *Monostegia rosæ* Harris, which is the same as the European rose slug *æthiops* Fabricius. The subgenus *Endelomyia* is characterized as having the clypeus truncate, the pedicel shorter than the scape (much wider than long), and the hind wings with usually only one discal cell in the female. *Endelomyia* is, however, a synonym of *Caliroa*, their genotypes being strictly congeneric.

^a U. S. Dept. Agr., Div. Ent., Tech. ser. 3, 1896.

The differences between these two groups are hardly of generic importance and could better be treated as subgenera, the arrangement being as follows:

Genus *Caliroa* O. Costa, 1859.

Subgenus *Caliroa* O. Costa, 1859.

Endelomyia Ashmead, 1898.

Subgenus *Eriocampoides* Konow, 1890. (See *Periclistoptera*, p. 86.)

CIMBEX AND ALLIES.

Olivier (Encycl. Méthod., vol. 4, p. 22, 1789) characterized his genus *Clavellarius*, but included no species in it. No species was ever placed in the genus, but in 1791 (Encycl. Méthod., vol. 6, p. 18) Olivier says that he changed the name to *Cimbex* because of the resemblance to the botanical genus *Clavaria*. In the Encyclopédie Méthodique, volume 5, page 764, 1790, the genus *Cimbex* is described and sixteen species are placed in it. Since *Clavellarius* had no standing until 1791 it must rank as a synonym of *Cimbex* as Olivier would have it.

Lamarck (Système des Animaux sans vertébrés, p. 264, 1801) characterized the genus *Clavellaria*, accrediting it to Olivier, but Olivier's genus was *Clavellarius*. The only species placed in *Clavellaria* by Lamarck was *Tenthredo lutea* Linnæus, the genus being monobasic with *Tenthredo lutea* as the type. Latreille (Considérations Générales, 1810), however, gave, as the type of *Cimbex*, *Tenthredo lutea* Linnæus, so *Clavellaria* Lamarck is a synonym of *Cimbex*, the genera being isogenotypic.

W. A. Schultz (Spolia Hymenopterologica, p. 87, 1906) proposed the name *Pseudoclavellaria* for *Clavellaria* Leach and authors.

The synonymy is as follows:

Cimbex Olivier (Encycl. Méthod., vol. 5, p. 764, 1790).

Clavellarius Olivier (Encycl. Méthod., vol. 4, p. 22, 1789; Encycl. Méthod., vol. 6, p. 18, 1791).

Clavellaria Lamarck (Syst. Anim. sans. Vert., p. 264, 1801).

Pseudoclavellaria Schultz (Spolia Hym., p. 87, 1906).

Clavellaria Leach (Zool. Misc., vol. 3, p. 111, 1817; and authors).

The above conclusions differ somewhat from those reached by Schultz (Spolia Hym., 1906), but it is believed that they are correct.

SYZYGONIA AND ALLIES.

Klug (Ent. Mon., p. 175, 1824) described his genus *Syzygonia* and included two species, *cyanoptera* Klug and *cianocephala* Klug. Dr. William H. Ashmead (Can. Ent., p. 230, September, 1898) fixed the type of Klug's genus as *cianocephala* and described a genus which he called *Syzygonidea* for *Syzygonia cyanea* Brullé. Brullé (Hist. Nat. Ins. Hym., vol. 4, p. 671, 1846), in his remarks on *Syzygonia*, mentions no species, but refers to plate 48 (fig. 2), where he figures *Syzygonia*

cyanea and accredits it to Klug, but Klug described no such species and the figure must stand as a description of *cyanea* Brullé, as it does not agree with any described species.

Rev. F. W. Konow (Anal. Mus. Buenos Aires, vol. 6, pp. 397, 398, 1899) argues that *Syzygonia cyanoptera* Klug should be taken as the type of *Syzygonia*, as this species came first in the list and forms the first group. On these grounds he makes a new genus, *Bergiana*, for *Syzygonia cyanocephala* Klug. *Bergiana* and *Syzygonia* are isogenotypic, so *Bergiana* falls as a synonym of *Syzygonia*.

PARASYZYGONIA, N. N. FOR SYZYGONIA Konow.

Since *Bergiana* Konow is a synonym of *Syzygonia*, *Syzygonia* Konow must have a new name, as it is different from *Syzygonidea* Ashmead. For *Syzygonia* Konow PARASYZYGONIA may be used.

The above-mentioned genera may be separated in the following manner:

Radial cell of the fore wings not appendiculate (four cubital cells, the second and third each receiving a recurrent nervure; antennæ 6-jointed, the third joint longer than the fourth, and the club gradually formed)

Syzygonidea Ashmead.

Radial cell of the fore wings distinctly appendiculate.

Antennæ 5-jointed; third cubital cell receiving the second recurrent nervure.....*Syzygonia* Klug.

Antennæ 6-jointed; the second recurrent nervure interstitial with the second transverse cubitus.....*Parasyzygonia* Rohwer.

Syzygonidea Ashmead.

Syzygonia cyanea Brullé.

Syzygonia Klug (Syn., *Bergiana* Konow).

Syzygonia cyanocephala Klug.

Parasyzygonia n.

Syzygonia cyanoptera Klug (type).

Syzygonia ænea Perty.

THE WORK OF WILLIAM H. ASHMEAD ON THE TENTHREDINOIDEA.

The late Dr. William H. Ashmead's work on Tenthredinoidea was confined almost entirely to the genera, very little being done on the species. It was Doctor Ashmead's desire to give generic tables to all the genera of Hymenoptera. Such an enormous task would never have been undertaken by one less enthusiastic or energetic than Doctor Ashmead. With all the routine duties connected with the position held by this untiring worker there was but a limited time for his researches, so of necessity a great deal of the work was done in a hurry. This hurry caused mistakes, and the founding of genera on what would seem to be trivial characters; but the greater number of the genera founded by Ashmead are at least of subgeneric importance. In unpublished manuscript many of the mistakes and omis-

sions were corrected by Doctor Ashmead, and it is most unfortunate that these were not left in condition in which they could be published.

In the tables of the genera of Tenthredinoidea many genera were described as new, and some of these were based on species hitherto undescribed. The characters given in the tables are sufficient to satisfy the technical requirements, so the generic and specific names should date from their publication in the tables. Various writers have considered the characters given in the tables to be of no value, and in some cases this is correct. On this basis they have sunk into the synonymy genera which have as good standing as many which they recognize.

In the present paper the new genera founded on new species in the tables in the Canadian Entomologist for 1898 are characterized more completely, and a list of all the genera described, with the synonymy, as far as it has been determined, is given. Unless otherwise stated the types have been studied, and the conclusions based on these studies.

AN ALPHABETICAL LIST OF THE GENERA OF TENTHREDINOIDEA DESCRIBED BY WILLIAM H. ASHMEAD, WITH THE DETERMINED SYNONYMY.

1. *Acanthoptenos* Ashmead. (= *Arge* Schrank.)
2. *Aomodyctium* Ashmead. (A genus without a species.)
3. *Aphilodyctium* Ashmead. (Syn.: *Parataxonus* MacGillivray.)
4. *Caloptilia* Ashmead. (Syn.: *Labidarge* Konow.)
5. *Calozarca* Ashmead. (= *Parazarca* Ashmead.)
6. *Dimorphopteryx* Ashmead.
7. *Endelomyia* Ashmead. (= *Caliroa* O. Costa.)
8. *Eriocampidea* Ashmead. (Syn.: *Cockerellonis* MacGillivray.)
9. *Erythraspides* Ashmead.
10. *Gymniopterus* Ashmead. (Type species lost.)
11. *Hemitaxonus* Ashmead.
12. *Homeoneura* Ashmead. (= *Bivena* MacGillivray.)
13. *Hypotaxonus* Ashmead.
14. *Liolyda* Ashmead. (= *Cephaleia* Panzer.)
15. *Lophyridea* Ashmead. (= *Lophyroides* Cameron.)
16. *Lophyrotoma* Ashmead. (= *Pterygophorus* Klug.)
17. *Macgillivraya* Ashmead. (= *Macgillivrayella* Ashmead.)
18. *Macgillivrayella* Ashmead.
19. *Manoxyela* Ashmead. (= *Pleroneura* Konow.)
20. *Marlattia* Ashmead.
21. *Megaxyela* Ashmead.
22. *Melanoselandria* Ashmead. (= *Hypargyricus* MacGillivray.)
Listed in Catalogue of Insects from New Jersey and without standing until 1909, when Doctor MacGillivray stated that it was a synonym of *Hypargyricus* MacGillivray. The synonymy is:
Melanoselandria (Ashmead) MacGillivray, 1909, = *Hypargyricus* MacGillivray, 1908.
23. *Micrarge* Ashmead. (Syn.: *Braunsiola* Konow.)
24. *Monophadnoides* Ashmead.

25. *Neoperga* Ashmead.
26. *Neoptilia* Ashmead.
27. *Opisthoneura* Ashmead. (= *Zaschizonyx* Ashmead.)
28. *Paraperga* Ashmead.
29. *Paraselandria* Ashmead. (= *Selandria* Leach.)
30. *Parasiobla* Ashmead.
31. *Parazarca* Ashmead. (Syn.: *Calozarca* Ashmead.)
32. *Periclistoptera* Ashmead. (= *Eriocampoides* Konow.)
33. *Pœcilostomidea* Ashmead. (= *Empria* Lepeletier.)
34. *Polystichophagus* Ashmead. (= *Pseudotaxonus* A. Costa.)
35. *Pseudoperga* Ashmead (non Guérin).
36. *Pseudosiobla* Ashmead.
37. *Pterygophorinus* Ashmead. (= *Pterygophorus* Klug.)
38. *Strongylogasteroidea* Ashmead.
39. *Syzygonidea* Ashmead.
40. *Tetratneura* Ashmead. (= *Empria* Lepeletier.)
41. *Zaschizonyx* Ashmead.

In all, Ashmead described 41 genera of Tenthredinoidea. Of these 41 genera, 17 have been determined to be synonyms of older genera and 5 have later genera for synonyms. Some of the segregates of *Perga* defined by Ashmead will be classed as synonyms of the segregates formed by Shipp. These will be discussed in a later paper.

BIBLIOGRAPHY OF THE MORE IMPORTANT WRITINGS OF WILLIAM H. ASHMEAD ON TENTHREDINOIDEA.

- Table of genera of Xyelidæ. < In Dyar: *Psyche*, vol. 8, p. 214, 1898.
- A generic table of the Blennocampinæ. < In Dyar: *Journ. N. Y. Ent. Soc.*, vol. 6, pp. 127-129, 1898.
- Classification of the horn-tails and sawflies, or the suborder Phytophaga. In 7 parts.
< *Can. Ent.*, vol. 30, 1898 (1), pp. 141-145; (2) pp. 177-188; (3) pp. 205-213; (4) pp. 225-232; (5) pp. 249-257; (6) pp. 280-287; (7) pp. 305-316.
- Order Hymenoptera. < In Smith: *Insects of New Jersey*, pp. 501-613, 1900.
- A new oryssid from Chatham Islands, Bismarck Archipelago. < *Psyche*, vol. 10, p. 73, 1903.
- Two new phytophagous Hymenoptera. < *Can. Ent.*, vol. 35, p. 233, 1903.
- Descriptions of four new horn-tails. < *Can. Ent.*, vol. 36, pp. 63-64, 1904.

DESCRIPTION OF THE GENERA AND SPECIES.

MANOXYELA Ashmead=PLERONEURA Konow.

The type of *Manoxyela californica* Ashmead belongs to the genus *Pleroneura* Konow, so *Manoxyela* is a synonym of *Pleroneura*.

Pleroneura Konow, *Ent. Nachr.*, vol. 23, p. 56, 1897.

Manoxyela Ashmead, *Can. Ent.*, vol. 30, p. 206, 1898.

PLERONEURA CALIFORNICA (Ashmead).

Manoxyela californica Ashmead, *Can. Ent.*, vol. 30, p. 206, 1898.

Length to the end of the second abdominal segment, 2.5 mm.; length of fore wing, 4 mm. Lateral angles and middle production of the clypeus rounded; antennal furrows wanting above the anterior ocellus; middle foveæ elongate; anterior ocellus in a slightly depressed basin, which is sharply angled above; postocellar line slightly

shorter than the ocellocular line, but longer than the ocelloccipital line; right mandible with 2 inner teeth; head and parts of the thorax irregularly granular; tarsal claws with a long bristle near the middle; stigma more than twice as long as wide, angled below; venation very like *Xyela julii*; four posterior legs and abdomen beyond the third segment wanting. Black; antennæ, palpi, and legs reddish-yellow; wings hyaline, venation pallid.

Type locality.—Alameda County, California. One specimen collected in June.

Type.—Cat. No. 8887, U. S. National Museum.

Related to *Pleroneura fulvicornis* Rohwer.

ACANTHOPTENOS Ashmead=ARGE Schrank.

Ashmead (Can. Ent., p. 212, 1898) described his genus *Acanthoptenos* for *Acanthoptenos weithii* Ashmead. The genus is founded upon an aberrant specimen of *Arge macleayi* authors, the intercostal vein being absent in the only perfect fore wing. *Acanthoptenos* is therefore a synonym of *Arge*.

Arge Schrank, 1802.

Acanthoptenos Ashmead, 1898.

CALOPTILIA Ashmead.

Caloptilia Ashmead, Can. Ent., vol. 30, p. 212, 1898.

Type.—*Caloptilia townsendi* Ashmead.

Ashmead placed his genus *Caloptilia* in his subfamily Schizocerinae, but in this he is wrong. The type of *Caloptilia townsendi* Ashmead has the cross-vein in the intercostal cell present and belongs to his Hylotominae. It is the same as *Labidarge* Konow.

LABIDARGE Konow=CALOPTILIA Ashmead.

The error of Doctor Ashmead in placing *Caloptilia* in the Schizocerinae caused Rev. F. W. Konow to form a new genus *Labidarge* for the same group of species. As Konow's genus was described a year later than Ashmead's, it must rank as a synonym of *Caloptilia*.

Caloptilia Ashmead, Can. Ent., vol. 30, p. 212, 1898.

Labidarge Konow, Ent. Nachr., vol. 25, p. 309, 1899.

CALOPTILIA TOWNSENDI Ashmead.

Caloptilia townsendi, Can. Ent., vol. 30, p. 212, 1898.

Reddish-yellow; head, spot on lateral lobe, four posterior tibiae and tarsi, and apex of abdomen black; wings dusky hyaline with a broad yellow band behind the stigma.

Female.—Length, 8 mm. Labrum arcuately emarginate anteriorly; clypeus with a V-shaped notch in the middle; supraclypeal area in cross section triangular; the usual frontal basin sharply defined, the middle foveal area separated from the upper area by a low, complete, transverse carina; the middle fovea with a spherical tubercle; postocellar furrow angled; the postocellar area with longitudinal impressed line; flagellum hairy, very slightly thickening apically; transverse median vein received beyond the middle of the first discoidal cell; stigma elongate, rounded on the lower

margin; saw with regular triangularly-shaped teeth; sheath at the apex obliquely truncate. Reddish-yellow; flagellum, head (labrum and palpi excepted), a spot on the lateral lobe of the mesonotum, four posterior tibiæ and tarsi, and apical four abdominal segments black; anterior tarsi dusky. Wings dusky hyaline, with a broad yellow band behind the stigma; venation in the dusky part brown, in the yellow part yellowish, basal part of the stigma yellowish.

Male.—Length, 8 mm. The male agrees with the characters given for the female except that the supraclypeal area and clypeus are pale. Hypopygidium rounded apically.

Type locality.—San Rafael, Jicoltepec, Mexico. Five females and one male collected by C. H. T. Townsend (from the Ashmead collection). Also two females from Cordoba, Mexico, collected by Mr. Frederick Knab.

Type.—Cat. No. 13134, U. S. National Museum.

PSEUDOCYPHONA Ashmead.

Pseudocyphona Ashmead, Can. Ent., vol. 30, p. 211, 1898.

Type.—*Pseudocyphona mexicana* Ashmead.

This genus belongs to the Schizocerinæ and is related to *Schizocera*, but is readily separated from *Schizocera* and allies by the toothed tarsal claws. Habitus similar to *Schizocera*. Clypeus and labrum emarginate; antennal carina present; eyes elongate oval, slightly converging to the clypeus; malar space almost wanting; ocelli in a low triangle, the lateral ones very little before the supraorbital line; antennæ inserted near the middle of the face, the third joint simple in the female and somewhat flattened; thorax and abdomen normal for the group; tibiæ without lateral spurs; postbasitarsis shorter than the following joints; claws with an erect inner tooth near the middle; radial cell not appendiculate; four cubital cells, the second receiving both recurrent veins; basal vein joining the subcosta at the origin of the cubitus; transverse median received near the middle of the first discoidal cell; anal cell broadly contracted; radial cell of the hind wings open at the apex; two closed discal cells in the hind wing; the anal cell longly petiolate, the petiole longer than the cell.

PSEUDOCYPHONA MEXICANA Ashmead.

Pseudocyphona mexicana Ashmead, Can. Ent., vol. 30, p. 211, 1898.

Black; mesonotum, scutellum, and upper part of the pleuræ reddish; legs black; wings dark.

Female.—Length, 7 mm. Labrum and clypeus very slightly arcuately emarginate; supraclypeal area convex, triangular in outline, meeting the prominent middle carina between the antennæ; antennal foveæ large and joining the supraclypeal fovea; antennal furrows not well defined; ocellar basin represented by a gently depressed area; postocellar furrow almost wanting; postocellar line shorter than the ocellocular line; antennæ short, the third joint broad, flattened; thorax normal; transverse median slightly beyond the middle of the first discoidal cell; third cubital cell about one-third longer on the radius than on the cubitus; stigma robust, broadest at the base; sheath with the lower margin marginate; saw with very small, close teeth. Black; pronotum, mesonotum, scutellum, tegulæ, and upper part of the mesopleuræ reddish; wings and venation blackish-brown.

Type locality.—San Rafael, Jicoltepec, Mexico. One female from the Ashmead collection, collected by Mr. C. H. T. Townsend.

Type.—Cat. No. 13135, U. S. National Museum.

NEOPTILIA Ashmead.

Neoptilia Ashmead, Can. Ent., vol. 30, p. 213, 1898.

Type.—*Neoptilia mexicana* Ashmead.

Belongs to the Schizocerides of Konow, and runs, in Konow's tables (Genera Insectorum, Fasc. 29, p. 13, 1906), in with *Hemidianeura* W. F. Kirby and *Ptilia* Lepeletier, or to *Rhagonyx* Konow. Elongate, robust species; head not especially small or transverse, not as wide as the thorax, much broader than high; clypeus and labrum emarginate anteriorly; ocelli in a curved line, the lateral ones in front of the supraorbital line; eyes slightly converging to the clypeus; malar space very narrow, antennal furrows present; ocellocular line subequal with the postocellar line; antennæ inserted in the middle of the face, ciliate, furcate in the male, simple in the female and scarcely thickening apically; tibiæ without lateral spurs; post-basitarsis not as long as the following joints; tarsal claws cleft, the inner tooth larger and shorter in the female; thorax normal for the group. Venation of females as follows: Intercostal cell without a cross-vein; radial cell with a strong appendiculation; four cubital cells, the second receiving both recurrent veins, the second near the middle, the first near the base; basal vein slightly basad of the origin of the cubitus, bent basally and not exactly parallel with the first recurrent; transverse median slightly basad of the middle of the first discoidal; anal cell very broadly contracted; in the hind wings the radial cell is long and not closed at the apex; two closed discal cells, the upper one much longer; transverse median at right angles with the anal vein; anal cell shorter than the rest of the anal vein. The venation of the male differs from that of the female in the absence of the second transverse cubitus. Basal plate with a narrow longitudinal suture.

Rhagonyx Konow (Zeitschr. syst. Hym. Dipt., vol. 3, p. 108, 1903) has the claws cleft, and is perhaps related to *Neoptilia* Ashmead.

NEOPTILIA MEXICANA Ashmead.

Neoptilia mexicana Ashmead, Can. Ent., vol. 30, p. 213, 1898.

Colored simliarly to *Hylotoma biramosa* Klug, which has been placed in different genera by different authors. There are some minor differences, however, and the standing of *biramosa* is so uncertain that *mexicana* should be held distinct until Klug's type can be studied.

Female.—Length, 11 mm. Labrum deeply arcuately emarginate; clypeus with a deep V-shaped notch; labrum, clypeus, and supraclypeal area with rather large punctures; front with small well-separated punctures; vertex impunctate; supraclypeal area broadly convex, triangular; carina between the antennæ high but not sharp; postocellar area parted, with a median furrow, wider than the cephalocaudad length; postocellar furrow not sharply defined; postocellar line subequal with the ocellocular line; thorax shining; third cubital cell more than twice as long on the radius as on cubitus. Black; angles of the pronotum broadly pallid; abdomen, except the black second and third dorsal segments, pallid at the base and reddish yellow at the apex; legs, except the anterior tibiæ at base beneath, black; wings beyond the basal nervure distinctly brown, basad hyaline; venation black; head with pale hair.

Male.—Length, 9.5 mm. The male differs from the female in the usual sexual characters and the arcuately emarginate clypeus. Hypopygidium very large, apex truncate.

Type locality.—San Rafael, Jicoltepec, Mexico. Three females and one male in the collection of Dr. William H. Ashmead.

Type.—Cat. No. 13133, U. S. National Museum.

MARLATTIA Ashmead.

Marlattia Ashmead, Can. Ent., vol. 30, p. 287, 1898.

Type.—*Hemichroa laricis* Marlatt.

Clypeus shallowly emarginate; malar space present; pentagonal area present; antennæ slender, filiform, fourth joint longer than the third; thorax normal for the group; legs normal except for the simple tarsal claws; venation normal except the intercostal vein, which is interstitial with the basal, and the third cubital cell, which is short as in *Pteronus*.

Easily known from *Hemichroa* by the simple tarsal claws.

OPISTHONEURA Ashmead=**ZASCHIZONYX** Ashmead.

The type of *Opisthoneura crevecoeurii* Ashmead is the same as *Hoplocampa montana* Cresson, which is the type of *Zaschizonyx* Ashmead.

Zaschizonyx Ashmead, Can. Ent., vol. 30, p. 257, 1898.

Opisthoneura Ashmead, Can. Ent., vol. 30, p. 287, 1898.

PARAZARCA Ashmead.

Parazarca Ashmead, in Dyar, Journ. N. Y. Ent. Soc., p. 128, 1898; Can. Ent., p. 252, October, 1898. (Type, *Parazarca fumipennis* Ashmead.)

Calozarca Ashmead, in Dyar, Journ. N. Y. Ent. Soc., p. 129, 1898; Can. Ent., p. 252, October, 1898. (Type, *Selandria fascipennis* Norton.)

Eyes large, subparallel or slightly converging to clypeus; malar space very narrow so as to be nearly wanting; clypeus truncate, rather large as is the labrum; lateral ocelli below the supraorbital line, the posterior orbits therefore rather narrow; antennæ hairy, pedicellum much longer than wide, third joint the longest, apical joints short and narrowing apically; mesosternum with a distinct, triangular-shaped præsternum; mesopleuræ without a suture separating off a prepectus, metanotum with a distinct "scutellum;" tarsal claws with a large inner tooth appearing cleft, also a small post-basal tooth, basitarsis subequal with the following joints; wings of the normal blennocampid type; transverse median in the middle of first discoidal cell; third cubital cell longer on the radius than the first and third combined; radial cell of the hind wings appendiculate; no closed discal cell in the hind wings and the anal cell distinctly petiolate.

PARAZARCA FUMIPENNIS Ashmead.

Parazarca fumipennis Ashmead, through Dyar, Journ. N. Y. Ent. Soc., p. 128, 1898.

Female.—Length, 7 mm. Lateral angles of the clypeus rounded; frontal foveæ broad, shallow, the lateral ones somewhat circular in outline; the middle fovea joining with the ocellar basin and forming a broad, shallow, depressed area; antennal furrows obsolete; postocellar furrow faintly indicated; lateral boundaries of the postocellar area sharply defined; postocellar line a very little shorter than the ocelloccipital line; stigma broadest at base, tapering gradually to the apex; second recurrent vein quite free from the second transverse cubitus; sheath very robust, straight above, the apex truncate, the oblique lower part emarginate; saw obliquely ribbed, the teeth small; sharp, and regular. Shining reddish yellow; flagellum, spot inclosing ocelli, apex of saw, and four posterior legs below middle of tibiæ black; anterior tarsi brownish, wings brown, venation brownish black.

Male.—Length, 6 mm. Almost exactly as in female. Hypopygidium one and one-fourth times as long as wide, the apex gently rounded.

Type locality.—Frontero, Tabasco, Mexico. A male and female from the Ashmead collection.

Type.—Cat. No. 13136, U. S. National Museum.

COCKERELLONIS MacGillivray=**ERIOCAMPIDEA** Ashmead.

Comparison of a specimen, from the original lot collected by Prof. T. D. A. Cockerell and sent to the U. S. National Museum, of *Cockerellonis occidentalis* MacGillivray proves that this species is the same as *Eriocampidea arizonensis* Ashmead. *Cockerellonis* MacGillivray is therefore a synonym of *Eriocampidea* Ashmead.

Eriocampidea Ashmead, Can. Ent., vol. 30, p. 256, 1898.

Cockerellonis MacGillivray, Can. Ent., vol. 30, p. 365, 1908.

Inasmuch as MacGillivray has described *Cockerellonis occidentalis* (Can. Ent., p. 365, 1908) completely, a description of *Eriocampidea arizonensis* is not given here.

HYPOTAXONUS Ashmead.

Rohwer^a gave this genus as a synonym of *Ermilia* O. Costa. As his remarks on the type of *Taxonus* Hartig^b are incorrect, this is wrong, and for the present *Hypotaxonus* should be treated as a good subgenus.

^a Proc. U. S. Nat. Mus., vol. 38, no. 1739, p. 203, 1910.

^b Proc. U. S. Nat. Mus., vol. 39, no. 1777, p. 111, 1910.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

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III. A REVISION OF THE POWDER-POST BEETLES
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BY

E. J. KRAUS,

Expert Preparator, Forest Insect Investigations.

APPENDIX.

NOTES ON HABITS AND DISTRIBUTION WITH
LIST OF DESCRIBED SPECIES.

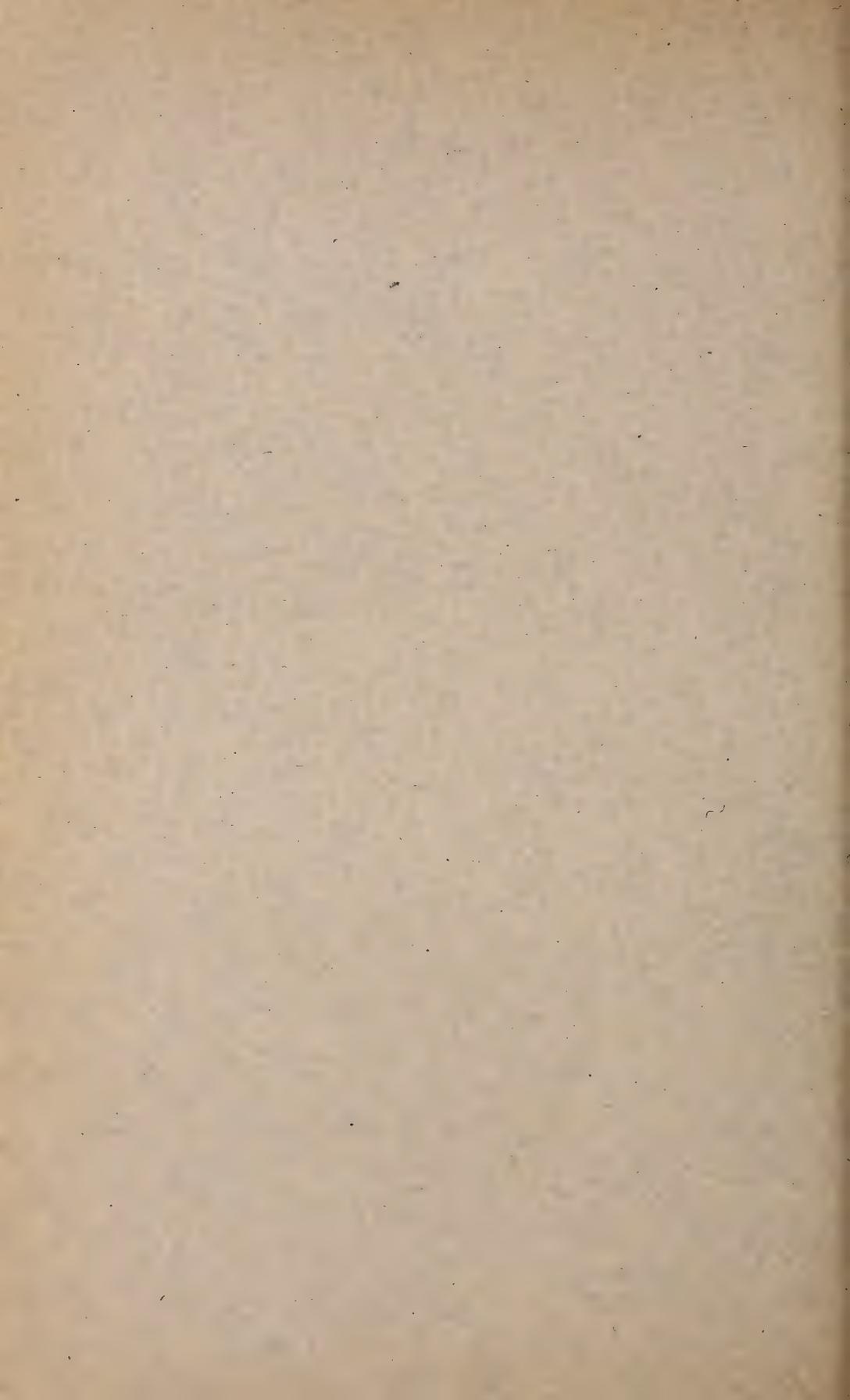
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^a Resigned June 19, 1909.

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TECHNICAL PAPERS ON MISCELLANEOUS FOREST INSECTS.

II. A REVISION OF THE POWDER-POST BEETLES OF THE FAMILY LYCTIDÆ OF THE UNITED STATES AND EUROPE.

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INTRODUCTORY NOTE.

[By A. D. HOPKINS.]

This contribution by Mr. Kraus is based on a study (1) of the material in the forest insect collection and general collections of the Bureau of Entomology and of the United States National Museum and (2) of the types of species described by Doctor Le Conte and Colonel Casey, and of specimens of European species submitted by Mr. Edmund Reitter, of Austria. The family Lyctidæ is represented in North America by certain species which are of special economic importance as causing the injury to seasoned wood products known as "powder post." These species have been the subject of extended investigation by the writer and his associates to determine their habits, seasonal history, and practical methods of control. There has, therefore, been special need of a revision of the group to bring the knowledge of systematic facts up to date and to furnish a reliable basis for working up the biological data.

INTRODUCTION.

Much has been written regarding the members of the family Lyctidæ, especially with respect to their economic importance. There has, however, been considerable doubt as to the correct identity of some of the species, perhaps more especially on account of their enormous variability. In this paper the author has attempted to point out the more prominent specific characters and give something of the range of variation within the species as he has recognized them. For the determination of some of the species he has had occasion to examine a series of several hundred specimens.

Through the courtesy of Col. T. L. Casey, the author has been permitted to examine the types of his species. Mr. Samuel Henshaw, of the Museum of Comparative Zoology at Cambridge, Mass., has kindly permitted him to make a personal examination of the Le Conte types; Dr. Henry Skinner, of the Academy of Natural Sciences, Philadel-

phia, has generously afforded him a like privilege with the Horn collection, and Mr. Edmund Reitter, of Paskau, Austria, has sent him representatives of some of the European species.

In this connection the author desires to express his appreciation of the facilities offered by Mr. E. A. Schwarz, of the Bureau of Entomology, of the valuable assistance rendered by him in the study of the material in the U. S. National Museum, and of his helpful advice in the systematic work, and by Dr. A. D. Hopkins in allowing unlimited use of the large series of specimens and notes of the forest insect collection of the Bureau of Entomology.

HISTORY.

The genus *Lyctus* and allied genera constitute a group which has always been a source of perplexity to systematists, and the opinions as to their relationship have been almost as many and varied as the number of writers who have ventured them, as may in a general way be gained from the following summary:

The first reference to an insect belonging to the present family Lyctidæ was made by Geoffroy (1762), whose description reads thus:

Dermestes oblongus fuscus, elytris striatis. Le dermeste levrier à stries.

The next reference is by Goeze (1777), who described the same insect as *Dermestes linearis*. In 1783 Herbst again described and figured the species as *Dermestoides unipunctatus*. Olivier, first in 1790, and again in 1792, describes it as *Ips oblonga* and gives a very good figure of it. Fabricius (1792) erected the genus *Lyctus* and referred to it 13 species, only one of which, *L. canaliculatus* Fabricius (*linearis* Goeze), belongs to the genus as now recognized. *L. linearis* (Goeze) is therefore the type of the genus. Herbst (1793) erected the genus *Bitoma*, to which he referred his *Dermestoides unipunctatus*, together with three other species. Latreille (1803) placed *Lyctus*, together with *Bostrichus* and several other genera, in the family Xylophages, and in 1807 under the Bostrichini. In 1830 Stephens described another species, *brunneus*, and erected for it the genus *Xylotrogus*, and referred both this genus and *Lyctus* to the Engidæ, to which family Melsheimer (1844) also referred several new species of *Lyctus* and *Xylotrogus* (*Trogoxylon*) described by him. Wollaston (1854), after comparison and dissection, considered *Xylotrogus* as synonymous with *Lyctus* and placed it in the Colydiadæ. Lacordaire (1857) considered *Lyctus*, including *Xylotrogus* Stephens, under the Cissides, but remarked that the forms are in many ways aberrant and not well placed there, especially because of the 5-segmented tarsi. He placed (*Xylotrogus*) *Trogoxylon parallelopipedus* Melsheimer in *Pycnomerus* under the Colydiidæ. Mellié (1848), in his monograph of the old genus *Cis*, does not mention *Lyctus*. Thomson (1863), in his sequence

of families, followed the Bostrichidæ with the Lyctidæ, of which he gives the following synopsis:

Caput pone oculos rotundos valde prominulos in collum globosum constrictum; sulcis antennariis nullis; clypeo sutura frontali discreta; mento magno lato. Trochanteres apice fere recta truncato. Antennæ sub tuberculo frontali insertæ, clava 2-3 articulata, compressa, prothoracis basin haud attingentes. Mesopleura coxas intermedias haud attingentia. Coxæ anticæ subglobosæ, parum exsertæ, contiguæ, posticæ marginem elytrorum attingentes, transversæ, parum distantes. Episterna metathoracis linearis, libera. Tibiæ calcari antico uncinato. Tarsi 5-articulati, compressi, articulo 1:0 obsoleto, 5:0 reliquis simul sumtis longiore.

He divided the family into two tribes, Dinoderina and Lyctina, the latter of which he diagnosed thus:

Antennæ 11-articulatæ, clava biarticulata. Labrum transversum, apice emarginato, libero. Coxæ anteriores rotundæ parum, posticæ, latius distantes. Tibiæ externe haud denticulatæ. Acetabula antica oclusa.

Pascoe (1863) described the genus *Minthea* and remarked that in Erichson's arrangement this genus, owing to the position of the coxæ and the large basal abdominal segment, would be placed with *Bothrideres* and *Sosylus* in the Colydiidæ. Redtenbacher (1874) placed *Lyctus* in the Cryptophagides. In 1877 Kiesenwetter, in his revision of the Anobiadæ, divides the family into the Bostrichini, Anobiini, and Ptinini, and again divides the Bostrichini into five groups, Psoini, Sphindini, Lyctini, Bostrichini veri, and Hendecatomini. *Lyctus*, in which he included *Xylotrogus* Stephens, was the only representative of the Lyctini. He further remarked that while this group is related to the Bostrichini it might well be considered as a connection between the Anobiadæ and the Colydii, but that it was widely separated from *Cis* by its mouthparts and the antennal and tarsal structure, and that eventually a separate family might well be erected for it. He probably had not seen Thomson's work. The following year (1878) Reitter published an article, "Beitrag zur Kenntniss der Lyctidæ." He assigned no characters to the family, but referred to it *Lyctus* Fabricius, *Trogoxylon* Le Conte, *Lyctoxylon* Reitter, new genus, and *Lyctopholis* Reitter, new genus (*Minthea* Pascoe), and described several new species. Le Conte and Horn (1883) divided the Ptinidæ into four subfamilies, Ptininæ, Anobiinæ, Bostrichinæ, and Lyctinæ. To the Lyctinæ are assigned *Lyctus* Fabricius and *Trogoxylon* Le Conte. In 1885 Reitter again gave a synopsis of the European species of *Lyctus* and *Trogoxylon* and assigns them as before to the family Lyctidæ. Casey (1890) described several new species of *Lyctus* under the Ptinidæ, but in the appendix of the same paper referred the genus to his more broadly conceived Cucujidæ, and gave a discussion on its apparent relationship to other families and genera. Lesne (1896-1898), in his revision of the Bostrichidæ, divided that family into four tribes—

Psoinæ, Polycaoninæ, Dinoderinæ, and Bostrychinæ, but made no mention of *Lyctus*. Kolbe (1901) has retained the Lyctidæ as a family and placed it in his Heterorrhabden under the suborder Heterophaga; and Ganglbauer (1903) placed the family between the Anobiidæ and Sphindidæ in his Diversicornia under the suborder Polyphaga. Reitter, in 1906, has the family between the Bostrychidæ and the Anobiidæ.

Without doubt the family Lyctidæ is a valid one, its members possessing characters which will not readily admit of their being placed in any other family. The family Ptinidæ of Le Conte and Horn is a composite one, and the subfamilies Ptininæ, Anobiinæ, Bostrichinæ, and Lyctinæ are deserving of family rank and in fact have already been so treated by European coleopterists. While it is not intended to treat extensively on the exact position of the Lyctidæ, it may be said that the family is apparently most closely allied to the Bostrychidæ, especially by the pentamerous tarsi with the first segment very short, the method and point of insertion of the antennæ, and the only too well-known destructive habits of the larvæ, which bore into the solid wood. The larva possesses three pairs of well-developed prothoracic legs, and in form and structure is scarcely to be distinguished from the bostrychid larva, but is totally different from any scolytid larva to which it has been likened, the resemblance being scarcely even superficial. The mouthparts of the adult *Lyctus* are very similar to those of *Dinoderus*, especially in the structure of the labium, maxillæ, and the broad mentum. The family has very little in common with the Cucujidæ. As pointed out above, the larva is of a wholly different character in form and habits, and the adults, while agreeing in one character or another with those found in certain other genera included by Colonel Casey in his broadly conceived Cucujidæ, have probably derived those characters independently of any real connection with them. The family seems best placed as in the latest (1906) edition of the *Catalogus Coleopterorum Europæ*, i. e., immediately after the Bostrychidæ and preceding the Ptinidæ.

THE PRINCIPAL CHARACTERS OF THE FAMILY LYCTIDÆ.

Mentum large, transverse, corneous; glossa coriaceous, ciliated; palpi with 3 flexible segments.

Maxillæ not exposed at base; galea subchitinous, densely ciliate at apex, more strongly chitinized at base; lacinia subchitinous, fringed with long ciliæ; palpi moderately short, with four rather stout segments.

Antennæ at the sides of the head beneath the produced frontal angles and before the eyes, eleven-segmented, clavate, the club two-segmented and without porous sensitive areas.

Head prominent, constricted behind the eyes; oral organs small; epistoma distinct, labrum distinct.

Prothorax with the episterna and epimera fused; lateral margin distinct or obsolete; coxal cavities rounded, closed behind.

Mesosternum small, surrounding the coxæ anteriorly and at the sides; mesepisternum and mesepimeron not attaining the coxa.

Metasternum long.

Elytra entire, completely covering the abdomen, epipleuræ narrow.

Abdomen with five visible ventral segments, the first ^a always longer than the second.

Anterior coxæ subcontiguous or widely separated, subglobose, moderately prominent; middle coxæ similar to anterior; posterior coxæ widely separated, transverse, subprominent internally, externally grooved for the reception of the thighs.

Legs not contractile, slender; tibiæ slender; tarsi five-segmented, the first segment very short.

SYNOPSIS OF GENERA.

At present but three distinct genera belonging to this family are recognized. They may be separated as follows:

Antennal club with both segments subequal, neither decidedly elongated; pronotum varying in shape from subquadrate with all angles acute to cordate with the angles rounded; elytra punctate, the punctures confused or distinctly seriate; pubescence confused or seriate; anterior tibiæ slender, acutely produced externally; tarsi slender..... *Lyctus* Fabricius.

Antennal club with both segments very strongly elongated, the segments much longer than broad, the terminal one very much narrower than the preceding; sides of head with three hooklike teeth; the prothorax as in *Lyctus* (*Trogoxylon*), the margins, however, clothed with bristles; elytra punctured in not very regular rows, the pubescence, however, scarcely in rows; anterior tibiæ on either side strongly widened into a tooth externally, with a large tooth, straight at the base and hooklike at the apex; tarsi rather slender; claw-segment simple..... *Lyctoxylon* Reitter.

Antennal club with terminal segment elongate, sides of head with three weak teeth at either side; margins of pronotum denticulated and, like the margins of the body, with bristles; elytra striately punctured, with rows of erect bristles. Tibiæ at the outer angle unequal, curved, the anterior widened into a tooth at the apex, with a somewhat large curved spine; tarsal segments short, claw segment strongly clavately thickened, claws simple, rather small; form of body and prothorax as in *Lyctus* *Minthea* Pascoe.

REVISIONAL NOTES.

In the foregoing generic synopsis *Trogoxylon* Le Conte has been placed with *Lyctus*, as has been done by Colonel Casey (1891). Le Conte, in separating the genera, did so on the ground that *Trogoxylon* did not have the anterior tibiæ prolonged at the outer apical

^a The first visible ventral segment in the Lyctidæ is the third abdominal sternite. (See Hopkins, Tech. Ser. 17, Pt. I, Bur. Ent., U. S. Dept. Agr., p. 55, fig. 38, 1909.)

angle. As stated by Reitter, later by Casey, and as is easily seen, they are produced and in some species as strongly as in any true *Lyctus*. Reitter in his synopsis states that in *Trogoxylon* the sides of the head are provided with *three* hooklike teeth, that the pronotum has all its angles sharp, and that the elytra are without rows of punctures or hairs, but that these are irregularly disposed. As a matter of fact, *Lyctus (Trogoxylon) impressus* Comolli does have the three elevations mentioned, but in all the species so far recognized in the United States not only the tooth over the eye is obsolete, but the posterior angles and margin of the epistoma are closely joined to the angles of the front, so that the epistoma is but slightly depressed below the level of the front, and the two elevations seen in many species of *Lyctus* are not traceable—a character also observable in *L. (Xylotrogus) politus* n. sp. The shape of the pronotum is of little value; in *L. brunneus* Stephens all the angles are acute. The elytral punctures in *L. (Trogoxylon) californicus* Casey are decidedly striate and there is a tendency to the same thing in *L. curtulus* Casey.

The first visible ventral segment in most species which would fall in *Trogoxylon* is as long as the second and third combined, but in others it is not longer than the second and one-half of the third.

Xylotrogus has long since been shown by Wollaston (1854) and other writers to be synonymous with *Lyctus*, and *Trogoxylon* must also be so considered, though it might well be regarded as representing a well-marked subgenus.

The species of the family Lyctidæ are very variable, especially in size. Well-developed individuals are frequently four or five times larger than others, the difference in size perhaps depending largely on food supply; for the offspring of those individuals which have bred in the same piece of wood for four, five, or six generations are very much smaller and quite different in some of the structural details from the first individuals reared. Accompanying the decrease in size are found such changes as in the shape and punctuation of the pronotum and the punctuation and pubescence of the elytra. As a result, one must allow for much variation within the limits of the species, and characters which might be of specific importance in groups more constant in character can only be held to be individual.

SYNOPSIS OF SPECIES OF THE GENUS LYCTUS.

- Elytral pubescence confused over the entire surface or sometimes in single rows, never in double series separated by wide intervals; apical angles of the prothorax usually decidedly prominent—if not, at least subprominent and the sides of pronotum decidedly convergent posteriorly. Division I, pages 117-119.
- Elytral pubescence always arranged in distinct series, the series at the sides at least separated by a double row of fine, deep punctures or a single row of large, shallow, circular punctures. Division II, pages 119-120.

DIVISION I.

- Elytral punctures confused, or somewhat striate, but if so, the series never impressed.
 Subdivision A, pages 117-118.
- Elytral punctures distinctly seriate, the series distinctly impressed.
 Subdivision B, pages 118-119.

SUBDIVISION A. (*Trogoxylón* Le Conte.)

- Head with a distinct tubercle over the eye; pronotum quadrate, with the sides not convergent posteriorly Section a1, page 117.
- Head without tubercle over the eye; pronotum with the sides more or less convergent posteriorly Section a2, page 117.

Section a1.

Length 3 to 4.5 mm.; ferruginous. Pronotum opaque, very densely, evenly punctured; anterior margin slightly trisinate; sides sinuate, scarcely convergent posteriorly; anterior and posterior angles very prominent, right, not at all rounded; median impression narrow, deep near the center of the disk, broadly expanded toward anterior and posterior margins. Elytra subparallel, just visibly wider at base than prothorax, extremely finely, densely, confusedly punctured; pubescence fine, decumbent, confused. Head with front subconvex, densely, evenly punctured; frontal angles very prominent, narrowly rounded; side margins of epistoma forming an acute, slightly reflexed tooth; antennæ slender, club feeble, ovate. Abdomen slightly shiny below, excessively minutely punctured.

impressus Comolli, page 121.

Section a2.

- Pronotum broader than long, the vestiture very short, coarse, and bristling; prosternum distinctly punctured throughout Subsection b1, page 117.
- Prothorax as long or longer than wide anteriorly, the pubescence rather long, fine, and decumbent or subdecumbent; prosternum not punctured or but very feebly so near its side margins Subsection b2, page 117.

Subsection b1.

Length 3 mm.; body nigro-piceous, short, broad, stout, subconvex, densely clothed with short, stiff bristles. Prothorax feebly shiny; side margins strongly convergent posteriorly; anterior margin broadly rounded; punctures large, deep, more dense posteriorly; median impression shallow, broad; pro-episternal area coarsely, distinctly punctured. Elytra broad, shiny, subparallel, densely, coarsely punctured, the punctures feebly seriate. Head with front subconvex, densely, evenly punctured; epistoma slightly depressed, side margins scarcely reflexed, with a dense fringe of coarse bristles, which also occur on the angles of the front; antennæ stout. Abdomen subopaque below.

punctatus Le Conte, page 121.

Subsection b2.

- Elytral punctures in distinct series; epistoma with side margins strongly reflexed.
 Series c1, page 117.
- Elytral punctures confused, without distinct serial arrangement; epistoma not reflexed at sides Series c2, page 118.

Series c1.

Length 2.2 to 2.5 mm.; very slender, parallel, compressed, castaneous throughout, strongly shining. Prothorax with side margins rather strongly convergent posteriorly; anterior margin strongly arcuate; anterior angles strongly rounded,

posterior obtusely rounded; median impression very broad and shallow; punctures coarse, rather dense, sparser and finer anteriorly. Elytra elongate, the punctures small and arranged in distinct series, becoming confused toward suture and base, the pubescence sparse and recumbent. Head with front scarcely convex, densely, finely punctured; epistoma depressed, side margins strongly reflexed; antennæ slender. Abdomen shiny below, densely, exceedingly finely punctured..... *californicus* Casey, page 121.

Series c2.

Length 2 to 4 mm.; elongate, rather slender, ferruginous to nigro-piceous. Prothorax with side margins strongly convergent posteriorly; anterior margin strongly trisinate; anterior angles acutely rounded; posterior right, not at all rounded; median impression very shallow, broad, deeper posteriorly; punctures fine and dense. Elytra subparallel, slightly narrowed posteriorly; punctures very fine, dense, confused; pubescence yellowish, fine, and dense. Head with front subconvex, finely, densely punctured, the pubescence very short, reflexed at the sides; antennæ slender, the club large and prominent. Abdomen subopaque below, densely, coarsely punctured..... *parallelopipedus* Melsheimer, page 121.

Length 2.7 to 3.3 mm.; stout, comparatively broad, castaneous to nigro-piceous. Prothorax with the sides slightly convergent posteriorly; anterior margin broadly rounded or faintly trisinate; anterior angles acutely rounded; posterior obtuse and blunt; median impression broad, rather deep, more so posteriorly; punctures coarse and dense, less so anteriorly. Elytra stout, slightly narrowed toward the base; punctures coarse, dense, faintly, subseriately arranged toward sides; pubescence rather coarse, sparse, decumbent, and arranged in faint series. Head with front convex, densely, subrugosely punctured, the pubescence short and fine; epistoma nearly flat, coarsely punctured, side margins very faintly reflexed; antennæ stout, the club robust, small, oval. Abdomen polished below, extremely finely and sparsely punctured..... *curtulus* Casey, page 122.

SUBDIVISION B. (*Xylotrogus* Stephens.)

Length 2.5 to 3.5 mm.; castaneous throughout. Pronotum shiny, strongly punctured posteriorly, the punctures becoming very small or obsolete anteriorly; side margins strongly sinuate; anterior angles very broadly rounded. Elytra with the sides nearly parallel; stria punctures fine, close-set, confused near suture; interspaces flat; pubescence fine, decumbent, sparse. Head with front densely, evenly punctured, feebly shiny, scarcely impressed before the eyes; epistoma convex, finely punctured, not at all elevated at lateral margins.

politus n. sp., page 122.

Length 3 to 5 mm.; rufo-fuscous throughout. Pronotum subopaque; side margins nearly straight, densely, finely serrulate and strongly convergent posteriorly; anterior angles acute, slightly prominent, blunt, but scarcely rounded; punctures more dense posteriorly, finer, not becoming obsolete anteriorly. Elytra with the sides nearly parallel; stria punctures fine, impressed; interspaces, especially toward sides, subconvex; pubescence fine, decumbent. Head with front densely, rather coarsely punctured, convex, strongly impressed at the sides before the eyes; epistoma subconvex, its anterior angles distinctly elevated.

brunneus Stephens, page 123.

Length 4.5 to 5 mm.; rufo-testaceous, head and prothorax piceous. Pronotum opaque, punctato-scabrous; anterior margin very broadly curved; side margins feebly sinuate, rather strongly convergent posteriorly; anterior angles subprominent, obtuse, very broadly rounded, posterior obtuse, not rounded; median impression merely a narrow, feebly impressed furrow extending from near anterior

margin to posterior margin. Elytra shiny, subparallel, a little broader than prothorax; punctures large, distinct, deep, circular, strongly seriate, the series impressed; interspaces slightly convex; pubescence fine, sparse, seriate. Head with front convex, opaque, densely, rugosely punctate; epistoma strongly depressed, not at all elevated at the sides; antennæ stout, the club large, elongate oval..... *pubescens* Panzer, page 123.

DIVISION II.

Elytral striæ composed of a double or sometimes a single row of fine, elongate, deeply impressed punctures.....Subdivision C, pages 119-120.

Elytral striæ each composed of a single row of large, shallow, circular punctures.

Subdivision D, page 120.

SUBDIVISION C.

Prothorax anteriorly distinctly narrower than the elytra at base.

Section a3, pages 119-120.

Prothorax fully as wide anteriorly as the elytra at their base...Section a4, page 120.

Section a3.

Pronotum distinctly longer than wide, its anterior angles not at all prominent, very broadly rounded; median impression merely a narrow, faintly impressed groove from anterior to posterior margins; elytral interspaces frequently subconvex, especially toward sides.....Subsection b1, page 119.

Pronotum quadrate or subquadrate; anterior angles distinct, subprominent but not acute; median impression large, broadly oval, deep; elytral interspaces not at all or but feebly convex.....Subsection b2, pages 119-120.

Subsection b1.

Length 2.1 to 4 mm.; castaneous. Pronotum opaque, punctato-scabrous; anterior margin broadly rounded; side margins straight or slightly sinuate and convergent posteriorly; anterior angles subobsolete; posterior sharp, everted. Elytra slightly narrowed toward base; interspaces toward the sides feebly to rather strongly elevated; punctures coarse, elongate, and in double series between the interspaces; pubescence fine, short, dense, decumbent. Head with front strongly convex, densely punctured and granulose; epistoma narrow, depressed, side margins strongly divergent posteriorly, anterior deeply emarginate, its anterior angles not elevated; antennæ slender, the club stout, narrowly oval. Abdomen subopaque below, densely, finely, granulately punctured.

opaculus Le Conte, pages 123-124.

Subsection b2.

Length 3 to 5 mm.; ferruginous, head and prothorax slightly darker. Pronotum opaque, punctate, scabrous; anterior margin broadly rounded; side margins nearly straight, finely denticulate, acute, parallel or very faintly convergent posteriorly; anterior angles subprominent, obtuse, blunt; posterior angles right, prominent, not rounded; median impression broadly oval, deep. Elytra subparallel, scarcely narrower anteriorly, convex but not more noticeably so at their middle; stria punctures very fine, elongate, arranged in single or sometimes in double series, especially toward sides; pubescence seriate, fine, sparse, decumbent. Head with front strongly convex, opaque, densely punctato-granulate, sides slightly elevated over the eye; epistoma strongly depressed, narrow, its anterior angles not elevated; antennæ stout, the club strong, oval. Abdomen subopaque below, densely, finely punctured...*suturalis* Faldermann, page 124.

Length, 3.5 to 4.5 mm.; ferruginous. Pronotum shiny, rather densely, but not at all scabrous or rugosely punctured, the punctures smaller and less dense anteriorly; median impression broadly oval, deep, not approaching anterior margin; anterior margin broadly rounded, sides parallel, straight or faintly sinuate; anterior angles obtusely rounded; posterior angles right, prominent, not at all or very feebly rounded. Elytra broad, distinctly narrowed toward base, more strongly convex at about their middle; interspaces not at all elevated; punctures very fine, elongate, seriate as in *opaculus*; pubescence of medium length, fine, decumbent, strongly seriate in arrangement. Head with front strongly convex, smooth, shiny, evenly but not densely punctured; epistoma depressed, its anterior margin broadly emarginate, the anterior angles elevated and with coarse pubescence; antennæ very slender, the club weak, narrowly oval. Abdomen feebly shiny below, exceedingly finely, densely punctured.

cavicollis Le Conte, page 124.

Section a4.

Length, 2.5 to 5.5 mm.; black. Pronotum shiny, rather densely but not at all rugosely punctured, median impression broad, shallow, narrow from posterior margin to middle, where it becomes broadly, gradually expanded to the anterior margin, rarely deep, suboval and scarcely expanded anteriorly; anterior margin broadly rounded; side margins strongly arcuate and convergent posteriorly or nearly straight and subparallel; anterior angles broadly rounded, not at all prominent, posterior obtuse and feebly rounded or subrectangular and sharp. Elytra elongate, convergent toward base, the interspaces flat or just visibly convex; punctures very fine, seriate as in *opaculus*; pubescence fine, sparse, decumbent, distinctly seriate. Head with front strongly convex, densely, subrugosely punctured; epistoma depressed, anterior margin broadly emarginate, anterior angles not elevated; antennæ stout, club prominent; abdomen shiny below, densely, finely punctured. *planicollis* Le Conte, pages 124-125.

Length, 2.4 to 4.7 mm.; black. Pronotum opaque, punctato-scabrous; median impression reduced to a shallow, narrow line from anterior to posterior margin; anterior margin very strongly, broadly arcuate; side margins strongly curved and convergent posteriorly; anterior angles very broadly, obtusely rounded; posterior angles obtuse, not rounded. Elytra narrowed toward base; interspaces noticeably convex; punctures coarse, narrow, elongate, deep, seriate; pubescence fine, sparse, seriate. Head with front strongly convex, scabrous; epistoma small, depressed; anterior margin broadly emarginate; antennæ slender, club strong, compact, oval. Abdomen subopaque below, very densely, finely punctured.

parvulus Casey, page 125.

SUBDIVISION D.

Length 2.5 to 5 mm.; ferruginous. Pronotum opaque; surface very finely granulate and pubescent; median impression oval, deep, extending from anterior fourth to posterior fourth and thence very narrowly to posterior margin; anterior margin strongly arcuate, sides straight or feebly sinuate, not at all or but scarcely narrowed behind; anterior angles obtuse, broadly rounded; posterior angles right, not at all rounded. Elytra just visibly narrowed toward base; interspaces flat; punctures shallow, circular, arranged in single series except at costal border, where they are in double series; pubescence sparse, fine, decidedly seriate in arrangement. Head with front strongly convex, side margins distinctly elevated over the eye, densely, finely granulato-punctate; epistoma narrow, its anterior margin broadly, deeply emarginate; anterior angles not elevated; antennæ slender, noticeably pubescent, club large and prominent. Abdomen feebly shiny below, densely, finely punctate. *linearis* Goeze, pages 125-126.

SYSTEMATIC NOTES.

Genus LYCTUS Fabricius.

Lyctus Fabricius, 1792, p. 502.

Xylotrogus Stephens, 1830, pp. 116-117.

Trogoxylon Le Conte, 1861, p. 209.

Lyctus impressus Comolli.

Lyctus impressus Comolli, 1837, pp. 40-85; Seidlitz, 1875, p. 160; Erichson, 1877, p. 17.

Trogoxylon impressus (Comolli) Reitter, 1885, p. 100.

This species is the largest of the *Trogoxylon* group which the author has seen. It is very distinct in the quadrate prothorax and in the possession of the three elevations at the sides of the head, one over the eye, another just before it at the frontal angle, and another at the lateral angle of the epistoma.

Material examined.—A series of 5 specimens, very constant in character, except in size. The species occurs in southern Europe, but has not as yet been recorded from the United States.

Lyctus punctatus (Le Conte).

Trogoxylon punctatum Le Conte, 1866, p. 104.

Lyctus punctatus (Le Conte) Casey, 1891, pp. 13, 16.

This species is easily known by its short, broad form, coarse punctation of the pronotum and elytra, and the stiff, short, almost squamose pubescence.

Material examined.—A single specimen from Santa Rosa, Lower California, and Le Conte's type, which is from Cape San Lucas, Lower California.

Lyctus californicus Casey.

Lyctus californicus Casey, 1891, p. 14.

This species is readily recognized by its elongate, highly polished body, and by the finely but definitely striated punctures of the elytra, the pubescence of which is fine and sparse. It is easily distinguished from *L. curtulus*, to which it is probably most closely allied, by its more slender, parallel, elongate form, finer elytral punctures, and other minor details. There is some variation in size and density of color, but other characters are quite constant.

Material examined.—A series of 5 specimens from Santa Rosa, Lower California. Colonel Casey's specimens are from Fort Yuma, Cal.

Lyctus parallelopipedus (Melsheimer).

Xylotrogus parallelopipedus Melsheimer, 1844, p. 112.

Trogoxylon parallelopipedum (Melsheimer) Le Conte, 1861, p. 209; Le Conte and Horn, 1883, p. 229.

Lyctus parallelopipedus (Melsheimer) Casey, 1891, p. 13.

Most readily recognized by the very finely, densely, confusedly punctured elytra, with the pubescence long, dense, fine, and decumbent, and the margin of the prothorax strongly trisinate.

There is great variation in size, as usual. The side margins of the prothorax are generally straight, sometimes slightly curved inward, and the prothoracic punctures are generally fine.

Material examined.—A series of more than 100 specimens. Distributed throughout the eastern and southeastern United States.

***Lycetus curtulus* Casey.**

Lycetus curtulus Casey, 1891, p. 15.

One of the smaller species, easily separated from *parallelopipedus* Melsheimer by its coarse elytral punctation, average smaller size, and prothoracic structure, and from *californicus* Casey by its much shorter, robust form, denser elytral pubescence, coarser and less sinuate arrangement of elytral punctures, and in being much less shiny.

There is considerable variation, more especially in size and coloration, and likewise in the density and size of the prothoracic and elytral punctures, in the convergence of the sides of pronotum, in the situation of its anterior margin (the latter sometimes becoming feebly trisinate), and in the degree of depression of the epistoma. A single specimen from Bonner, Mont., differs quite noticeably in several respects from the more typical examples of *curtulus*, and may represent an undescribed species. However, it is placed here until more specimens show it to be distinct.

Material examined.—A series of more than 300 specimens. Distributed throughout the southwestern United States.

***Lycetus politus* n. sp.**

Type.—Cat. No. 7432, United States National Museum; U. S. Department of Agriculture, No. 7414; one of 21 specimens collected and reared by Dr. F. H. Chittenden from licorice at Washington, D. C.

This species is readily separated from *brunneus* Stephens by its much shorter, broader form, more shiny, finely and less densely punctured prothorax, and by the structure of the front as outlined in the synopsis (p. 118).

There is considerable variation in size, and to a less extent in the convergence of the sides of the prothorax posteriorly, and in the pronotal punctation.

It is possible that this species has been already described, but the author has been unable to place it in any of the species of which he has had specimens or descriptions and has, in consequence, described it as being new.

Lyctus brunneus (Stephens).

Lyctus parasiticus Stephens, 1829, p. 94.

Xylotrogus brunneus Stephens, 1830, p. 116, pl. 18, fig. 4; Seidlitz, 1875, p. 160.

Lyctus glycyrrhizæ Chevrolat, 1829–1838, pp. 191–192, pl. 41, fig. 3.

Lyctus rugulosus Montrouzier, 1861, p. 266.

Lyctus brunneus (Stephens) Wollaston, 1854, p. 152; Erichson, 1877, p. 17; Reitter, 1885, p. 100; Reitter, 1906, p. 423.

Lyctus carolinæ Casey, 1891, pp. 13–14.

This species, while allied to *L. politus* n. sp., is readily distinguished by its larger size and coarser structure throughout and more acute anterior angles of prothorax; the epistoma also is more depressed, its posterior angles as in *planicollis* Le Conte. The series of specimens is very constant, except that there is the usual variation in size and color. A single specimen from Philadelphia, Pa., is more slender, the prothorax narrower and more constricted behind, with the sides straight, and the anterior margin more strongly arcuate. It is probably best placed here for the present. A series of 3 specimens from Mr. Reitter shows considerable variations, more especially in the shape of the prothorax, and one individual has the pronotum much more coarsely punctured.

Material examined.—A series of 14 specimens. The species is widely distributed throughout the world.

Lyctus pubescens Panzer.

Lyctus pubescens Panzer, 1793, fasc. 4, fig. 17; Erichson, 1877, p. 16; Reitter, 1878, p. 196; Reitter, 1885, p. 99.

Lyctus bicolor Comolli, 1837, p. 41; Seidlitz, 1875, p. 160.

Lyctus caucasicus Tournier, 1874, p. 412; Reitter, 1878, p. 196; Reitter, 1885, p. 99.

Lyctus pubescens v. *caucasicus* (Tournier) Reitter, 1906, p. 423.

The species is very distinct. It is perhaps more closely allied to *brunneus* Stephens than any other, both in elytral and prothoracic structure, though very distinct from it. It is remarkable in having the prothorax very much darker than the elytra, a character seldom met with in this family.

Material examined.—Two specimens from Mr. Reitter are labeled "Silesia, on Willow." One of them has the prothorax strongly narrowed posteriorly, the other much less, although distinctly so. The species occurs in Europe, but up to the present time it has not been recorded from the United States.

Lyctus opaculus Le Conte.

Lyctus opaculus Le Conte, 1866, p. 103; Casey, 1890, p. 324; Casey, 1891, p. 13.

This species is remarkably distinct and easily separated by the narrow, convex prothorax, the anterior angles being very broadly rounded, the side margins strongly convergent posteriorly, the surface opaque and very densely subrugosely punctured, the median

impression long, shallow, and narrow, and the strial punctures of the elytra deep and coarse.

There is considerable variation, more especially in size, in the acuteness of the posterior angles of the prothorax, in the convergence of its side margins posteriorly, and in the elevation of the elytral interspaces.

Material examined.—A series of 60 specimens. The species is distributed throughout the eastern United States.

***Lyctus suturalis* Faldermann.**

Lyctus suturalis Faldermann, 1837, p. 225; Reitter, 1878, p. 196; Reitter, 1885, p. 99; Reitter, 1906, p. 423.

Lyctus deyrollei Tournier, 1874, p. 411.

This species is related to *linearis* Goeze in prothoracic structure, but is wholly different in elytral structure, resembling, in this respect, *planicollis* Le Conte, though quite different in that for the most part the striae are made up of but a single row of exceedingly fine punctures.

The specimens are quite constant in character, though there is considerable variation in the prominence and roundness of the anterior angles of the prothorax.

Material examined.—A series of four specimens from Mr. Reitter. The species occurs in the Caucasus. Up to the present time it has not been recorded from the United States.

***Lyctus cavicollis* Le Conte.**

Lyctus cavicollis Le Conte, 1866, p. 103; Casey, 1890, p. 324; Casey, 1891, p. 13.

This species is very distinct, and is readily separated from the other species by the shining, narrow, subquadrate, subconvex prothorax with the sides parallel, the posterior angles sharply rectangular, and the form generally stout. It is not closely allied to any other species. It resembles *planicollis* Le Conte in elytral structure, but the prothorax is totally different. There is some variation in size, but the structural details are quite constant.

Material examined.—A series of 25 specimens, all from California.

***Lyctus planicollis* Le Conte.**

Lyctus planicollis Le Conte, 1858, p. 74; Le Conte, 1866, p. 103; Dugès, 1883, pp. 54-58; Casey, 1890, p. 324; Casey, 1891, p. 13.

(?)*Lyctus carbonarius* Waltl, 1832, p. 167.

This species is extremely variable; perhaps more so than any others of the genus. Individuals range in length from 2.5 to 5.5 mm. The prothorax varies from broader than long, with the side margins strongly sinuate and convergent posteriorly, to subquadrate and the sides parallel; it is, however, always as wide anteriorly as the elytra at base, the anterior angles always rounded, the posterior never so.

The pronotum may be densely, evenly punctured over the entire surface, or have the punctures less dense and the surface polished anteriorly, but is never scabrous; the median impression varies from very deep and becoming broadly expanded anteriorly, with a small circular impression at either side, to subobsolete in the smaller specimens.

Whether this species and *carbonarius* Waltl are synonymous the author can not say, since he has not seen Waltl's description. However, he has 2 specimens which Mr. E. A. Schwarz tells him are from Mexico, received through Dr. E. Dugès from Guanajuato. These specimens are probably from among the series on which Doctor Dugès based his "Metamorphoses du *Lyctus planicollis*." They differ in some of the minor details from *planicollis*, more especially in having the pronotal punctures coarser and less dense; and the median impression is deep, oval, and not broadly expanded anteriorly. Should these characters prove constant in a larger series they might well be considered as representing a distinct species, probably *carbonarius* Waltl, very closely allied to *planicollis*.

Material examined.—A series of over 500 specimens. The species is found widely distributed throughout the entire United States at least.

***Lyctus parvulus* Casey.**

Lyctus parvulus Casey, 1884, p. 175; Casey, 1890, p. 325; Casey, 1891, p. 13.

This species is remarkably distinct and is separated at once from the other species by the broad cordate prothorax and its dense, coarse, subrugose punctation.

There is great variation in size and to a less degree in the shape of the prothorax and in the acuteness of the posterior angles. In general form it resembles *planicollis* Le Conte, but in structural details resembles *opaculus* Le Conte. It is readily separated from either, and is far removed from *linearis* Goeze, with which species it has very little in common.

Material examined.—A series of about 50 specimens. Distributed throughout the western and southwestern United States.

***Lyctus linearis* (Goeze).**

Dermestes oblongus fuscus, elytris striatis, Geoffroy, 1762, p. 103.

Dermestes linearis Goeze, 1777, p. 148; Thunberg, 1784, p. 4, no. 4.

Lyctus linearis (Goeze) Reitter, 1906, p. 423.

Dermestes oblongus (Olivier) Fourcroy, 1785, p. 19, no. 9.

Ips oblonga Olivier, 1790, vol. 2, no. 18, sp. 8, pl. 1, fig. 5, *a, b*; 1792, p. 405, no. 9.

Lyctus oblongus (Olivier) Latreille, 1804, p. 241; Latreille, 1807, p. 16, sp. 1; Stephens, 1830, p. 117.

Dermestoides unipunctatus Herbst, 1783, p. 40, pl. 21, fig. *H, h*.

Bitoma unipunctata Herbst, 1793, p. 26, pl. 46, fig. 3.

Lyctus unipunctatus (Herbst) Kiesenwetter, 1877, p. 15; Reitter, 1885, p. 99.

Lyctus canaliculatus Fabricius, 1792, p. 504, no. 11; Panzer, 1793, fasc. 4, fig. 16; Paykull, 1800, p. 332, no. 9; Fabricius, 1801, vol. 2, p. 562, no. 13; Gyllenhal, 1813, vol. 1, pt. 3, pp. 408-409, no. 1; Thomson, 1863, vol. 5, p. 204; Tournier, 1874, vol. 6, p. 411, no. 103.

Synchita canaliculata (Fabricius) Hellwig, 1792, vol. 4, p. 405, no. 8.

Lyctus striatus Melsheimer, 1844, vol. 2, p. 112; Casey, 1890, vol. 5, p. 324; Casey, 1891, vol. 6, p. 13.

Lyctus axillaris Melsheimer, 1844, vol. 2, p. 113.

Lyctus pubescens Duitschmid, 1825, vol. 3, p. 148.

Lyctus fuscus Seidlitz, 1875, p. 16.

This species is at once and easily recognized by its peculiar, large, shallow, circular punctures of the elytral striæ, not observable in any other of our species. There is considerable variation in size, but in other respects the species is quite constant.

Material examined.—A series of several hundred specimens. Occurs throughout the United States, Europe, and probably the entire world.

Genus **LYCTOXYLON** Reitter.

Lyctoxyton Reitter, 1878.

Lyctoxyton japonum Reitter.

Lyctoxyton japonum Reitter, 1878, p. 199.

Subdepressed, ferruginous, feebly shiny, rather densely clothed with very short subsquamose bristles. Segments 1-4 of the antennæ subelongate, 5-9 subtransverse, club strongly elongate, cylindrical, segments nearly three times as long as broad, the terminal one a little narrower than the preceding. Head and prothorax densely confusedly punctured, the punctures subpapillate. Prothorax a little broader than long, more narrow toward the base, anterior angles obtuse, posterior right, the sides setulose-ciliate, at the middle of the dorsum longitudinally foveately impressed and with a short, strongly excavate line before the scutellum. Elytra a little broader than prothorax, parallel, more than twice as long as wide, either elytron seriatly, near the suture irregularly punctured, with short, dense, just visibly seriate, subsetulose scales. Length 1.5 to 2 mm. [Reitter.]

Material examined.—A series of 4 specimens from New Jersey, reared from Japanese cane. The species was described from specimens from Japan and China.

Genus **MINTHEA** Pascoe.

Minthea Pascoe, 1863, p. 97; Reitter, 1906, p. 423.

Lyctopholis Reitter, 1878, p. 196; Everts, 1899, p. 565.

***Minthea rugicollis* (Walker).**

Ditoma rugicollis Walker, 1858, p. 206.

Minthea similata Pascoe, 1863, p. 141.

Minthea rugicollis (Walker) Waterhouse, 1894, p. 68; Arrow, 1904, pp. 35-36; Reitter, 1906, p. 423.

Eulachus hispidus Blackburn, 1885, p. 141.

Lyctopholis foveicollis Reitter, 1878, p. 199.

Prothorax at the middle of the dorsum with an oblong-oval, deeply impressed foveola. Subcylindrical, ferruginous, feebly shiny, somewhat densely clothed with erect, white, subsquamose bristles thickened at the apex. First segment of club of antennæ subquadrately transverse, the terminal half again as long as it, elongate oval. Prothorax somewhat densely punctate, the punctures scarcely separated, not at all deeply impressed; elytra a little wider than prothorax, parallel, lightly seriatly punctured, the punctures very feebly impressed, interspaces just visibly rugose, feebly shining, the alternate ones with erect seriate bristles. Length about 2 mm. [Translated from Reitter's original description of *foveicollis*.]

***Minthea stichothrix* (Reitter).**

Lyctopholis stichothrix Reitter, 1878, p. 199.

Thorax with the dorsum scarcely excavated, but with an almost obsolete longitudinal line at the middle, becoming less anteriorly at the apex. Subcylindrical, ferruginous, rather densely clothed with long, white, erect setæ thickened at the apex. First segment of antennal club transverse, the terminal segment three times as long as the former, subcylindrical. Head and thorax confusedly, rugosely punctured, opaque, the sides of the latter evidently denticulate and ciliate; elytra seriatly punctate, interspaces densely, rather strongly, rugosely punctured, the alternate ones with seriate erect setæ. Length 2.7 mm. [Reitter.]

Described from specimen from Bogota, Colombia. The species occurs also in Europe.

Material examined.—One specimen from Mr. Reitter, labeled "Styria;" another in the Horn collection, without name, labeled "N. Y.," and with light-green square.

Representatives of the genus occur throughout the world, *M. rugicollis* Walker being recorded from the West Indies, Ceylon, Malay Archipelago, Hawaiian Islands, and Europe. The single specimen in the Horn collection, mentioned above, is, so far as the author is aware, the only record of the genus in the United States.

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APPENDIX.

NOTES ON HABITS AND DISTRIBUTION, WITH LIST OF DESCRIBED SPECIES.^a

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HABITS.

So far as known, the species of the family Lyctidæ live in dead and dry wood of natural growth, in the seasoned sapwood of commercial products, and in the pith of vines and the dried roots of herbaceous plants, but do not infest the wood of coniferous trees.

Some of the species appear to prefer the dead and dry wood of standing trees, shrubs, and vines under natural conditions, and therefore are rarely found in the commercial articles; for this reason they are not subject to temporary or permanent removal from the natural range of the species. The other species, which infest commercial products, are subject to wide distribution over the world.

The following notes relate to species represented in the collections of the United States National Museum and United States Department of Agriculture, the habits of which have been observed by the writer or recorded in connection with the specimens.^b

THE GENUS LYCTUS

DIVISION I.

SUBDIVISION A.

SECTION a1.

L. impressus Comolli.—This species has been found in an umbrella handle, in which it was evidently introduced into Mississippi.

SECTION a2.

Subsection b1.

L. punctatus (Le Conte).—Habits not recorded.

^a This portion of the paper was prepared some months after Mr. Kraus submitted his manuscript and includes data on additional specimens.

^b The primary and secondary divisions, sections, and genus are included under "habits" and "distribution" in order to aid in the comparison of facts concerning allied groups and species.

Subsection b2.

Series c1.

L. californicus Casey.—Recorded as breeding in adobe wall.

L. præustus Erichson.—Habits not recorded.

Series c2.

L. parallelopedus (Melsheimer).—Extensive observations have been made on the habits of this species. It infests the seasoned sapwood of commercial products made from persimmon, hickory, ash, oak, and bamboo; it also lives in the dead wood or natural growth of osage orange, sassafras, and fig.

L. curtulus Casey.—Common in dead wood or natural growth of mesquite, *Parkinsonia*, mimosa, hackberry, cotton stems, and fig.

SUBDIVISION B.

L. politus Kraus.—Found in dried licorice roots.

L. brunneus (Stephens).—In seasoned wood and dried herbaceous roots.

L. pubescens Panzer.—Habits not recorded in connection with specimen.

SUBDIVISION C.

SECTION a3.

Subsection b1.

L. opaculus Le Conte.—In pith of dead grapevines.

Subsection b2.

L. suturalis Faldermann.—Habits not recorded.

L. cavicollis Le Conte.—In commercial products, seasoned orange wood and hickory, tanbark oak, and cordwood of live oak.

SECTION a4.

L. cinerius Blanchard.—Habits not recorded.

L. planicollis Le Conte.—Extensive observations have been made on the habits of this species. It is common in commercial products of seasoned ash, oak, hickory, persimmon, and sycamore. Rearing records show that it may breed continually in the same wood during a period of at least six years, or until all the wood tissue has been converted into powder.

L. carbonarius Waltl.—In seasoned oak and bamboo, in natural growth and in commercial products.

L. parvulus Casey.—In dead and dry wood of locust (*Robinia neomexicana*), according to Schwarz.

DIVISION II.

SUBDIVISION D.

L. linearis (Goeze).—Extensive observations have been made on the habits of this species. It is common in commercial products of seasoned hickory, oak, walnut, and ash, and occasionally in poplar, wild cherry, and locust. It is not recorded from natural growth in this country, but is said to infest such growth, as well as commercial products, in Europe.

THE GENUS LYCTOXYLON.

L. japonum Reitter.—Found in walking stick from Japan and in commercial articles made from bamboo in China.

THE GENUS MINTHEA.

M. rugicollis (Walker).—Habits not recorded in specimens in the national collection.

M. stichothrix (Reitter).—Habits not recorded.

DISTRIBUTION.

The distribution of the species of the family Lyctidæ presents some interesting features, especially in regard to the natural habitat and the temporary and permanent introductions.

The habits of some of the species which infest commercial products make it possible for them to be widely distributed outside of their natural range, but it does not necessarily follow that a species introduced to another country in commercial products will become established in its new environment. Therefore we find many records in literature of localities in which specimens of a species have been collected, some of which evidently represent accidental or temporary introductions. Some other records may be held in doubt as to permanent introduction until they are verified by observations which would indicate that the localities are either within the natural range of the species or that the species has become established.

It would appear that the most reliable guide to the natural distribution of the species is their habit of living in natural growth and under natural conditions of exposure to climatic influences at all seasons of the year.

In a study of the records represented by specimens in the national collection and of the evidently authentic records in literature, it would appear that the distribution of the species of the family Lyctidæ in the western continent is between about the forty-eighth parallel north and the thirtieth parallel south, and in the eastern continent

and Australia, from about the fifty-fifth parallel north to the fortieth parallel south. The genus *Lyctus* has practically the same range as the family; the genus *Lyctoxyton* seems to have its natural distribution in eastern India and Asia between the twentieth and fortieth parallels north; while in the genus *Minthea* one species is from Rodriguez Island and the Philippines, with a record from southern Europe, and the other species is from Bogota, Colombia, South America.

It appears that the center of distribution of the greatest number of species of the family is between the twentieth and fortieth parallels north in both continents.

The available evidence would indicate that the natural distributions of the species studied by the writer are approximately as follows:

THE GENUS LYCTUS

DIVISION I.

SUBDIVISION A.

SECTION a1.

L. impressus Comolli.—Northern Africa, southern Italy, Greece, Spain, and the Caucasus. Probably temporarily introduced into central Europe and southern North America.

SECTION a2.

Subsection b1.

L. punctatus (Le Conte).—Lower California.

Subsection b2.

Series c1.

L. californicus Casey.—Lower California.

L. præustus Erichson.—Peru and Brazil.

Series c2.

L. parallelopipedus (Melsheimer).—Florida, Texas, Louisiana, Georgia, South Carolina, Virginia, West Virginia, District of Columbia, Long Island, N. Y., Ohio, and Missouri. The natural distribution of the species is evidently in the South Atlantic and Gulf States, and in part of the Mississippi and Ohio valleys, from which it has been temporarily introduced into other States.

L. curtulus Casey.—California, Arizona, Texas, and Guatemala. This evidently represents its natural distribution. One record from Montana indicates temporary introduction, and a record from the Sandwich Islands may represent a permanent introduction.

SUBDIVISION B.

L. politus Kraus.—Temporarily introduced into the District of Columbia, probably from northern Spain or Italy, from which the commercial product of licorice is exported.

L. brunneus (Stephens).—Paraguay, Brazil, Cuba, and Mexico. This evidently indicates the natural range of the species, from which it has probably been introduced and become established in Europe, Asia, Africa, and Australia. It has been recorded from South Carolina, from Philadelphia, Pa., and from Chicago, Ill., which probably represent temporary introductions, although it is not at all improbable that it may become permanently established in the Gulf States, especially in Florida and Texas.

L. pubescens Panzer.—Recorded as common in southern and middle Europe, which may be its natural distribution.

SUBDIVISION C.

SECTION a3.

Subsection b1.

L. opaculus Le Conte.—Michigan, Iowa, Nebraska, Ohio, Long Island and Staten Island, N. Y., District of Columbia, and North Carolina. This probably represents the natural distribution, and since the species lives in natural growth it is not likely to be distributed out of its natural range.

Subsection b2.

L. suturalis Faldermann.—Caucasus, southern Russia.

L. cavicollis Le Conte.—California, several localities, with doubtful record from Oregon.

SECTION a4.

L. cinereus Blanchard.—Chile.

L. planicollis Le Conte.—Arizona, Nevada, Texas, and the Gulf and South Atlantic States. This range probably represents the natural distribution of the species, but it is frequently introduced temporarily into the Northern and Middle States and evidently into other countries, since there is a definite record from Capetown, South Africa, in lumber from the southern United States. This species is evidently derived from one or more subtropical forms, of which *L. carbonarius* is a representative.

L. carbonarius Waltl.—Mexico and Florida. This species is evidently distinct from *L. planicollis*, as indicated by a large series not observed by Mr. Kraus, which had been reared by Mr. H. G. Hubbard from winter-killed bamboo in Florida. The specimens from Florida and Mexico are readily distinguished from average specimens of *planicollis* by their more reddish color but otherwise agree

with characters mentioned by Mr. Kraus. It is probable that there is some overlapping of the ranges of these two allied species in Florida and from Texas to California, and that in such localities occasional specimens will be found which occupy an intermediate position.

L. parvulus Casey.—Arizona, California, and Utah. This evidently indicates the natural distribution of the species.

DIVISION II.

SUBDIVISION D.

L. linearis (Goeze).—This species is recorded in literature as extending over Europe, and especially England, France, and Germany, where it lives in natural growth, cordwood, etc. This evidently represents its natural habitat, from which it has been introduced in commercial wood products to many other countries of the world, but it would appear from observations and records in the United States that it becomes permanently established only in those countries with climates similar to that of central and northern Europe. The species appears to be permanently established in the States north of North Carolina, Tennessee, and Arkansas. There are a great many records from this area, including Maine, Massachusetts, New York, Pennsylvania, Virginia, West Virginia, Ohio, Indiana, Michigan, Illinois, Missouri, Iowa, and Minnesota. The specimens in the national collection show but a single record from the South Atlantic and Gulf States, and that is evidently a temporary introduction. Undoubtedly the species is frequently carried into the southern region, but evidently does not survive there.

THE GENUS LYCTOXYLON.

L. japonum Reitter.—Japan, China, and India. This probably represents the natural range of the species, from which it has been introduced into Europe, America, and other countries, possibly becoming established in those with climatic conditions similar to that of its original habitat. The recorded introductions into the United States are from China into California and Massachusetts, and probably from Japan into New Jersey.

THE GENUS MINTHEA.

M. rugicollis (Walker).—Philippine Islands, Siam, China, Ceylon, and the Malay Archipelago. This probably represents the natural habitat, from which it may have been introduced into Europe, the West Indies, and the Hawaiian Islands.

M. stichothrix (Reitter).—Bogota, Colombia, South America.

THE LYCTIDÆ REPRESENTED IN THE COLLECTIONS EXAMINED
BY KRAUS AND HOPKINS.

(Classification according to Kraus.)

Genus **LYCTUS** Fabricius.

Division I.

Subdivision A (*Trogoxylon*).

Section a1.

impressus Comolli.

Section a2.

Subsection b1.

punctatus Le Conte.

Subsection b2.

Series c1.

californicus Casey.

præustus Erichson.

Series c2.

parallelopipedus Melsheimer.

curtulus Casey.

Subdivision B (*Xylotrogus*).

politus Kraus.

brunneus Stephens.

pubescens Pänzer.

Subdivision C (*Lyctus*).

Section a3.

Subsection b1.

opaculus Le Conte.

Subsection b2.

suturalis Faldermann.

cavicollis Le Conte.

Section a4.

cinereus Blanchard.

planicollis Le Conte.

carbonarius Waltl.

parvulus Casey.

Division II.

Subdivision D.

linearis Goeze.

Genus **LYCTOXYLON** Reitter.

japonum Reitter.

Genus **MINTHEA** Pascoe.

rugicollis Walker.

stichothrix Reitter.

LIST OF DESCRIBED SPECIES, WITH SYNONYMY ACCORDING TO THE LITERATURE AND RECENT STUDIES BY THE AUTHORS.

Genus LYCTUS Fabricius.

- æqualis* Wollaston. S. Jago.
africanus Lesne. Africa.
brunneus (Xylotrogus) Stephens. England; Australia; Japan; Paraguay; Brazil; Cuba; Mexico; Philadelphia, Pa.
carolinæ Casey. South Carolina.
colydioides Dejean. France.
glycyrrhizæ Chevrolat.
parasiticus Stephens.
rugulosus Montrouzier. Woodlark Islands (near Australia).
californicus Casey. Lower California.
carbonarius Waltl. Mexico; Florida.
caucasicus Tournier. Caucasus (Russia).
cavicolis Le Conte. California; Missouri; Oregon.
cinereus Blanchard. Chile.
cornifrons Lesne. Obock, Africa (Red Sea).
costatus Blackburn. Australia.
curtulus Casey. Arizona; California; Montana; Texas; Guatemala; Sandwich Islands.
depressicatus White. New Zealand.
discedens Blackburn. Australia.
disputans Walker. Ceylon.
fœricollis Reitter. Santo Domingo, West Indies.
griseus Gorham. Guatemala.
hispidus Kiesenwetter.
serie-hispidus Kiesenwetter. Japan.
impressus Comolli. Cordova, Mex.; Corinth, Greece; Gallia; Meridian, Miss.
var. capitalis Schauf. Algeria, Africa; Mallorca (Mediterranean).
castaneus Perroud. Middle Europe.
glabriatus Villa. Lombardia, Italy.
lærei Galeazzi. Lombardia, Italy.
læripennis Faldermann. Caucasus; Greece.
leococianus Wollaston. Madeira.
linearis Goeze. Canada; District of Columbia; Illinois; Iowa; Indiana; Massachusetts; Maine; Michigan; Minnesota; Missouri; New York; Ohio; Pennsylvania; Texas; West Virginia; Virginia; Middle Europe.
var. axellarius Melsheimer. Pennsylvania.
canaliculatus Fabricius. Lampa, South America (Chile).
duftschmidti Des Grozes.
fuscus Seidlitz.
var. fuscus Melsheimer. Pennsylvania.
linearis Thunberg.
var. nitidus Dahl. Hungaria, Austria.
oblongus (Dermestes) Olivier.
pubescens Duftschmid.
striatus Melsheimer. Pennsylvania.
unipunctatus (Dermestoides) Herbst. Austria?
longicornis Reitter. Bogota, South America.
nitidicollis Reitter. Bogota, Colombia; Chile.

- obsetus** Wollaston. S. Jago.
- opaculus** Le Conte. District of Columbia; Iowa; Long Island; Michigan; North Carolina; Nebraska; Ohio; Pennsylvania; Texas; West Virginia.
- parallelocollis** Blackburn. Australia
- parallelopipedus** (Xylotrogus) Melsheimer. District of Columbia; Florida; Georgia; Louisiana; Missouri; Ohio; South Carolina; Texas; West Virginia; Virginia; New York.
- parvulus** Casey. Arizona; California; Utah.
- planicollis** Le Conte. Arizona; California; Colorado; District of Columbia; Florida; Georgia; Illinois; Iowa; Mexico; Michigan; Minnesota; Missouri; Nevada; Ohio; Oregon; South Carolina; Tennessee; Texas; Cape Town, Africa.
- politus** Kraus. (Reared at Washington, D. C.)
- præustus** Erichson. Brazil; Peru.
- prostomoides** Gorham. Guatemala; Panama.
- pubescens** Panzer.
bicolor Comolli. Middle Europe.
caucasicus Tournier.
subarmatus Megerle. Austria.
- punctatus** (Trogoxylon) LeConte. Cape San Lucas and Santa Rosa, Lower California.
- punctipennis** Fauvel. Caen; New Caledonia; Sumatra.
- reticollis** (Trogoxylon) Reitter. La Plata.
- retractus** Walker. Ceylon.
- simplex** Reitter. Colombia.
- suturalis** Faldermann. Caucasus.
deyrollei Tournier. Mingrelia (Russia).
- tomentosus** Reitter. Mexico.

Genus LYCTOXYLON Reitter.

- japonum** Reitter. Hindostan; Europe; China; California; Massachusetts; New Jersey; New York.
- jalnophæ** Wollaston. San Antao.

Genus MINTHEA Pascoe.

- rugicollis** Walker. Philippine Islands.
Lyctopholis færicollis Reitter. Santo Domingo.
Eulachus hispitus Le Conte.
Ditoma rugicollis Walker. Rodrigues Is.; Missouri; Madagascar.
Minthea similata Pascoe. Styria Marhunaland, near Austria.
- stichothrix** Reitter.
Lyctopholis stichothrix Reitter. Bogota (Colombia); Africa; South Germany; Austria.

TECHNICAL SERIES, No. 20, PART IV.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

TECHNICAL PAPERS ON MISCELLANEOUS
FOREST INSECTS.

IV. STUDIES IN THE SAWFLY GENUS
HOPLOCAMPA.

BY

S. A. ROHWER,
Agent and Expert.

ISSUED MAY 27, 1911.



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TECHNICAL PAPERS ON MISCELLANEOUS FOREST INSECTS.

IV. STUDIES IN THE SAWFLY GENUS HOPLOCAMPA.

By S. A. ROHWER,
Agent and expert.

INTRODUCTORY NOTE.

[By A. D. HOPKINS.]

This second contribution by Mr. Rohwer to technical information on the sawflies, while not treating of species of known economic importance in their relation to forest growth, conforms to our plan of giving in one series of publications the results of the necessary general studies, by a specialist, of the entire group represented by species and genera which are of special economic importance. This not only gives the economic entomologist a comprehensive view of the whole group, but makes available information on species which may prove to be injurious to indigenous or cultivated plants.

INTRODUCTION.

In the Canadian Entomologist^a the author has a paper treating the sawfly genus *Hoplocampa* Hartig through the subgenus *Macgillivrayella* Ashmead. The present paper treats the Nearctic species of the subgenus *Hoplocampa*, including also a description of a new species belonging to the subgenus *Macgillivrayella*.

The accompanying map (fig. 10) gives, in general, the distribution of the genus. *Macgillivrayella* apparently does not occur in the Palæarctic region. In America the species of the genus will probably be found to occur from the Lower Austral Zone to the lower border of the Boreal Zone.

The species of this genus are small, closely related, and without striking specific characters. The characters used in the following table were found to be reliable, but the saw of the female should be examined when possible. Lacking a large number of males, the male genitalia were not studied, but, judging from the genitalia in other genera of sawflies, they may be expected to possess good specific

^a Can. Ent., vol. 42, pp. 242-244, July, 1910.

characters. The color, in details, is not constant, although a normally black or brownish species was never found to be uniformly pale, or vice versa. The venation, as in many genera, is constant to the typical form. The length of the upper and lower discal cells of the hind wing apparently varies within a species (as in *Hoplocampa marlatti*).

The descriptions were drawn up under a Carl Zeiss binocular with a magnification of 35 diameters, although a Zeiss hand lens, magnifying 27 and 16 diameters, was used for the color description and checking up.

The generic description given in the Canadian Entomologist^a should be corrected and elaborated as follows:

Proepimerum (Epm₁) present.

Mesoprepectus (Ppct₂) present.

Pleural suture of metathorax (PS₃) straight from the coxal process (CxP₃) to the wing process (WP₃), not curved as in Nematinae.

Metascutellum (Scl₃) rather large.

Metapostnotum (PN₃) as in Nematinae.

***Hoplocampa* (*Macgillivrayella*) *pallida* n. sp.**

Runs in the table in the Canadian Entomologist^b to *lacteipennis* Rohwer, but may be separated from that species by the large depressions between the ocelli and orbits, higher, narrower occiput, paler color, etc.

Female.—Length 5.5 mm. Head distinctly higher than broad, broadest just above the antennæ; labrum rather broadly rounded; clypeus with a deep, obtusely V-shaped emargination, lobes obtusely triangular; supraclypeal area more convex near the clypeus; eyes diverging toward the clypeus; lateral foveæ close to the antennæ, small, punctiform; antennal furrows not continuous; crest rather well developed; frontal area raised; ocellar basin and middle fovea wanting; postocellar area not defined; vertex depressed on each side of ocelli, so that the occiput is much narrowed; antennæ slender, third and fourth joints subequal; shining, practically impunctate, cerci tapering; sheath straight above, gently rounded below; stigma broad, slightly broader basad of middle; transverse radius received in middle of cell, nearly at right angles with the radius; upper discal cell of hind wings slightly exceeding lower on the outer margin. Pallid; legs, antennæ, front, and dorsulum pale yellowish; wings strongly milky-hyaline; venation pallid-hyaline, except stigma, which is yellowish.

Type locality.—Michigan. One female from C. F. Baker collection.

Type.—Cat. No. 13469, U. S. National Museum.

***Hoplocampa* (*Hoplocampa*) *orbitalis* n. sp.**

(Plate XXIII, fig. 3; Plate XXIV, fig. 10.)

Female.—Length 4 mm. Labrum broadly rounded apically; clypeus rather deeply emarginate, lobes obtusely triangular; supraclypeal area convex, polished; antennal furrows and postocellar area as in *koebelii*; middle fovea elongate; ocellar

^a Can. Ent., vol. 42, p. 242, July, 1910. ^b Can. Ent., vol. 42, p. 243, July, 1910.

basin V-shaped, open below; crest poorly defined; head with small, scattered punctures; antennæ rather robust, third and fourth joints equal; stigma broadest at base, tapering to apex; transverse radius normal; sheath and saw as in Plate XXIV, figure 10, and Plate XXIII, figure 3. Black; antennæ brownish; head (except between antennal furrows above antennæ), tegulæ, spot on lower angle of pronotum, apex of venter, sheath, and legs below coxæ reddish-yellow; posterior tibiæ pallid, posterior tarsi dusky; wings hyaline, iridescent; venation pale brown, stigma and costa yellowish.

Type locality.—Montana.

Type.—Cat. No. 13472, U. S. National Museum.

Hoplocampa (Hoplocampa) koebelei n. sp.

(Plate XXIII, fig. 6; Plate XXIV, fig. 3.)

Female.—Length 3.5 mm. Labrum broad, obtusely triangular; clypeus broadly, triangularly emarginate, lobes broad, sharply triangular; supraclypeal area convex, polished; antennal foveæ not sharply defined; antennal furrows nearly continuous; middle fovea transversely oval; crest poorly defined; ocellar basin reduced to a pit below the ocellus; postocellar area well defined, the furrows punctiform laterally; antennæ wanting; head with small, distinct, separate punctures; stigma gently rounded below, broadest a little basad of middle; transverse radius normal; upper discal cell of hind wings slightly longer than lower; sheath and saw as in Plate XXIV, figure 3, and Plate XXIII, figure 6. Black; head (except inside antennal furrows to postocellar furrow), pronotum, tegulæ, venter, apex of tergum, and legs below trochanters reddish-yellow; posterior tarsi dusky; wings hyaline, iridescent; venation pale brown, stigma pallid.

Type locality.—Oregon. One female collected by Mr. Albert Koebele.

Type.—Cat. No. 13473, U. S. National Museum.

Hoplocampa (Hoplocampa) alpestris n. sp.

(Plate XXIII, fig. 5; Plate XXIV, fig. 5; Plate XXV, fig. 1.)

Female.—Length 4.5 mm. Labrum obtusely angulate; clypeus with a shallow, narrow, arcuate emargination, lobes broad, obtuse; supraclypeal area convex, polished; antennal foveæ poorly defined; antennal furrows nearly wanting; middle fovea broad, shallow, better defined below; ocellar basin reduced to a circular depression in front of the anterior ocellus; postocellar very poorly defined; head polished, nearly impunctate, punctures very small and scattered; antennæ slender, the third and fourth joints subequal; mesothorax shining, polished; stigma broadest at base, tapering to apex; transverse radius normal; sheath and saw as in Plate XXIV, figure 5, and Plate XXIII, figure 5. Black; orbits (except at upper middle), clypeus, labrum, mandibles, supraclypeal area, tegulæ, a small spot on pronotum, ventral part of tergal segments 6–9, and legs below coxæ reddish-yellow; wings hyaline; venation rather dark brown, stigma and costa yellowish.

Male.—Length 3.5 mm. Structurally not differing in any important characters from the female; hypopygium broadly rounded to an obtusely angulate middle. Reddish-yellow; antennæ brownish; spot around the ocelli, anterior part of mesoprescutum, metanotum, and most of tergum black; wings as in female.

Type locality.—Veta Pass, Colo. Two females and one male collected June 6, by Mr. E. A. Schwarz.

Type.—Cat. No. 13474, U. S. National Museum.

Hoplocampa (Hoplocampa) californica n. sp.

Allied to *bioculata* Rohwer, but may be separated by the table (p. 147).

Female.—Length 3.5 mm. Clypeus broadly, shallowly, angulately emarginate, lobes broad, obtusely triangular; supraclypeal area convex, finely granular; antennal furrows wanting, antennal foveæ small; middle fovea elongate, shallow, not well defined; ocellar depression small, distinct, not sharply defined; postocellar area well defined on all sides; head and mesoscutum with small, separate, well-defined punctures; antennæ rather slender, third and fourth joints equal; sheath slightly concave above, slender, convex below from apex; cerci short, stout; stigma broadest near base, strongly tapering to apex; transverse radius strongly oblique, in apical third of cell; third cubital cell longer than the first and second combined. Black; clypeus, labrum, mandibles (except piceous apices), orbits, occiput (except postocellar area), tegulæ, anterior legs (except coxæ), intermediate femora, and part of posterior femora reddish-yellow; posterior femora in part, most of four hind tibiæ, and tarsi black or brownish; wings hyaline, iridescent; venation pale brown, stigma in part pallid.

Paratopotypes show that the four hind legs may be mostly black, the posterior orbits pale and the pale spots on the occiput reduced in size.

Male.—Length 3 mm. Clypeus more obtusely emarginate than in female; third joint shorter than fourth; stigma not strongly tapering; hypopygidium narrowly rounded at apex. Black; antennæ, head (except interocellar area), margin of mesoprescutum, latr. pectus, legs, and venter reddish-yellow; wings as in female.

Type locality.—Suisun, Cal., March 10, 1910 (R. W. Braucher); eight females and one male.

Type.—Cat. No. 13471, U. S. National Museum.

Hoplocampa (Hoplocampa) marlatti n. sp.

(Plate XXIV, fig. 7.)

Female.—Length 3 mm. Labrum short, broadly rounded; clypeus shallowly emarginate, lobes broad, obtuse; supraclypeal area shining, convex; middle fovea broad, not sharply defined, spreading over the antennæ; antennal furrows interrupted by the rather well-defined crest; ocellar basin represented by a small fovea in front of the anterior ocellus; postocellar area scarcely narrowing apically; postocellar furrow strongly arcuate; front shining, with separate, well defined, small punctures; antennæ slender, third joint distinctly longer than fourth; venation very like *montanicola* (Plate XXVI, fig. 3); upper discal cell much exceeding the lower on the outer margin; sheath as in Plate XXIV, figure 7; saw concealed. Color reddish-yellow; antennæ brownish; spots on mesoscutum, the metanotum, and the tergum (except apex) black; tarsi dusky; wings hyaline, iridescent; venation pale brown, stigma yellowish pallid.

Male.—Length 2.5 mm. Very like the female. Hypopygidium broadly rounded.

Type locality.—Riley County, Kans. Four specimens collected by Mr. C. L. Marlatt in April.

Paratype locality.—Baldwin, Kans. Two females collected by Mr. J. C. Bridwell.

Type.—Cat. No. 13477, U. S. National Museum.

Hoplocampa (Hoplocampa) nevadensis n. sp.

(Plate XXIII, fig. 10; Plate XXIV, fig. 4; Plate XXV, fig. 4.)

Female.—Length 4.5 mm. Labrum short, broadly rounded apically; clypeus shallowly, arcuately emarginate, lobes short, broad, obtusely rounded apically; supraclypeal area shining, not strongly convex; middle foveæ poorly defined; antennal

furrows not well defined; ocellar basin practically wanting; postocellar area well defined, the postocellar furrow curved; head with small, distinct, rather close punctures; antennæ rather slender, third joint distinctly longer than fourth; venation nearly as in *montanicola* (Plate XXVI, fig. 3); sheath and saw as in Plate XXIV, figure 4, and Plate XXIII, figure 10. Color reddish-yellow; antennæ above, interocellar area with two prongs before, posterior face of mesoscutum, metathorax (except scutellum), and tergum (except apex and sides) black; wings hyaline, iridescent; venation yellowish pallid.

Type locality.—Nevada. One female.

Type.—Cat. No. 13475, U. S. National Museum.

Hoplocampa (Hoplocampa) xantha n. sp.

(Plate XXIII, fig. 9; Plate XXIV, fig. 1.)

Female.—Length 4 mm. Labrum rather narrow, broadly rounded; clypeus somewhat squarely emarginate, lobes broad, subtruncate; supraclypeal area shining, rather strongly convex; middle fovea deep, well defined, rather small; antennal furrows interrupted by the rather distinct crest; ocellar basin very shallow, practically wanting; postocellar area somewhat convex, narrowing slightly posteriorly; postocellar furrow somewhat arcuate; front shining, with small, separate, well-defined punctures; antennæ rather robust, third and fourth joints equal; venation of fore wing about as in *montanicola* (Plate XXVI, fig. 3), but the stigma is broader, the second and third cubital cells subequal in length; upper discal cell much exceeding the lower on the outer margin; sheath and saw as in Plate XXIV, figure 1, and Plate XXIII, figure 9. Color reddish-yellow; antennæ and basal part of tergum brownish; wings hyaline, iridescent; venation yellowish-pallid.

Paratopotypes indicate that the tergum, except apex and sides, is normally black; venation normally as in *haleyon* (Plate XXVI, fig. 2), with a narrower stigma. The interocellar area may be black; the middle fovea smaller than in type.

Type locality.—Ottawa, Canada. Four females from the Ashmead collection.

Type.—Cat. No. 13478, U. S. National Museum.

Hoplocampa (Hoplocampa) occidentalis n. sp.

(Plate XXIV, fig. 8; Plate XXV, fig. 5.)

Female.—Length 4 mm. Labrum narrowly rounded apically; clypeus angulately marginate, lobes triangular, narrowly obtuse; supraclypeal area convex dorsally, shining; middle fovea spreading over the antennæ, shallow; antennal furrows interrupted by the broad rounded crest; ocellar basin large, well defined, rectangular in outline; postocellar area scarcely narrowed posteriorly, flat; postocellar furrow nearly straight; front with rather close small punctures; antennæ rather robust, the third and fourth joints equal; venation nearly as in *montanicola* (Pl. XXVI, fig. 3); sheath as in Plate XXIV, figure 8; saw not exerted. Color reddish-yellow; antennæ brownish above; interocellar area, large spot on mesoprescutum, small spots on mesoscutum, the metanotum, and the tergum (except sides and apex) black; wings hyaline, iridescent; venation very pale brown, stigma and costa pallid.

Paratypes show that the mesonotum may be entirely pale, or the mesoscutum may have two spots on each lobe. The black of the interocellar area is wanting in some specimens.

Male.—Length 3 mm. Very like the female. Hypopygidium subtruncate, with an angulate middle. The series shows the color to vary as follows: Mesoprescutum without black, or spotted; mesoscutum spotted or not; interocellar area pale or black. In the Oregon specimens the head and mesonotum are usually entirely pale.

Type locality.—Colorado. Two females and three males from the C. F. Baker collection.

Paratype locality.—Oregon. Males and females collected by Mr. A. Koebele. Also a male from Placer County, Cal., June, which seems to be the same species.

Type.—Cat. 13479, U. S. National Museum.

Hoplocampa (Hoplocampa) montanicola n. sp.

(Plate XXIII, fig. 4; Plate XXIV, fig. 6; Plate XXV, figs 3, 6; Plate XXVI, fig. 3.)

Female.—Length 4 mm. Labrum broadly rounded; clypeus rather deeply, subangulately emarginate, lobes triangular, obtusely rounded; supraclypeal area shining, somewhat convex; middle fovea small, well defined; antennal furrows interrupted by the rounded frontal crest; ocellar basin shallow, well defined, rectangular in outline; postocellar area narrowing posteriorly, well defined; postocellar furrow arcuate; front with sparse, small punctures; antennæ rather robust, third and fourth joints subequal; venation as in Plate XXVI, figure 3; upper discal cell exceeding the lower on the outer margin; sheath and saw as in Plate XXIV, figure 6, and Plate XXIII, figure 4. Color reddish yellow; antennæ beyond scape, posterior part of mesoscutum, the mesoscutellum, the metanotum, and the tergum except apex black; wings hyaline, iridescent; venation yellowish pallid.

Paratopotypes show that the scape and interocellar area may be black.

Male.—Length 3.5 mm. Sufficiently like the female to be easily associated with it. In the following color characters it differs from the female: Antennæ reddish yellow, interocellar area black, mesonotum black. Hypopygidium rounded apically to an obtuse angle.

Type locality.—Montana. Four females and two males.

Type.—Cat. No. 13476, U. S. National Museum.

Hoplocampa (Hoplocampa) halcyon (Norton).

(Plate XXIII, fig. 8; Plate XXIV, fig. 9; Plate XXV, fig. 2; Plate XXVI, fig. 2.)

Selandria (Hoplocampa) halcyon Norton, Proc. Boston Soc. Nat. Hist., vol. 8, p. 222, 1861, no. 10, ♂ ♀; Norton, Trans. Amer. Ent. Soc., vol. 1, p. 252, 1867, no. 16, ♂ ♀.

In the collection of the American Entomological Society *Hoplocampa (Hoplocampa) halcyon* (Norton) was confused with *Hoplocampa (Macgillivrayella) lacteipennis* Rohwer. That which agreed with Norton's original description, and was from the type locality, has been considered the type. Agreeing with this type, specimens have been seen from the following localities: Ithaca, N. Y. (two females); Canada (one female); McLean, N. Y., May 8, 1891 (male and female); Washington, D. C., April 22, 1885 (one male); Clementon, N. J., April 25, 1909, Harbeck (one male which has the mesoscutum dark brown). Norton records this species from Maine, Massachusetts, Maryland, and Saskatchewan.

Konow^a states that this species feeds on *Amelanchier canadensis*. The only statement which seems to indicate such a habit is by Nor-

^aZeitschr. syst. Hym. Dipt., vol. 1, p. 174, 1901; or Syst. Zusam. Chalastogastra, p. 46, 1901.

ton:^a "Taken in April for successive years in Baltimore, by Mr. Uhler, on *Amelanchier canadensis*." Konow's statement needs verification.

Hoplocampa (Hoplocampa) bioculata Rohwer.

Hoplocampa bioculata Rohwer, Can. Ent., vol. 40, p. 179, 1908, ♀.

In the collection of the U. S. National Museum there are many females of this species from Colorado, two females from Pullman, Wash. (C. V. Piper), and one female from Oregon (Koebele). There are also males from Colorado.

Male.—Length 3.5 mm. Structurally like the female. Hypopygidium truncate apically. Antennæ orange color; head with more reddish-yellow than the female, the postocellar area always black; legs below coxæ, venter, and apical tergalsegments orange color; mesoprescutum sometimes margined with pale.

Hoplocampa (Hoplocampa) pallipes MacGillivray.

(Plate XXIII, fig. 7; Plate XXIV, fig. 2.)

Hoplocampa pallipes MacGillivray, Can. Ent., vol. 25, p. 239, 1893.

Two females which have been determined as this species are from Pullman, Wash. (C. V. Piper). MacGillivray's specimens came from Skokomish River, Wash.

Selandria canadensis Provancher.

Selandria canadensis Provancher, Add. Fauna Ent. Canada, pt. 2, p. 7, 1895; l. c., p. 351.

This has been placed in *Hoplocampa*, but does not seem to belong in this genus. Provancher says: "La cellule lancéolée fermée au milieu; ailes inférieures avec une cellule discoïdale." *Hoplocampa* always has two discoïdal cells. Nothing in the collection agrees with this. On page 351 (l. c.), after defining *Hoplocampa* on page 349 (l. c.) as follows: "Cellule lancéolée contractée au milieu; ailes inférieures à 2 cellules discoïdales," Provancher places *Selandria canadensis* in *Hoplocampa*.

Selandria flavicornis Provancher.

Selandria flavicornis Provancher, Nat. Can., vol. 10, p. 100, 1878.

Provancher^b placed this as a synonym of *Hoplocampa halcyon* Norton. The original description says: "Cellule lancéolée pétiolée." The types of this and the above species may place these species in different genera.

^a Catalogue of the described Tenthredinidæ and Uroceridæ of North America. <Trans. Amer. Ent. Soc., vol. 1, p. 252, 1867 (catalogue, p. 119).

^b Add. Fauna Ent. Can., pt. 2, p. 351, 1888.

Hoplocampa (?) **atriceps** Kirby.

Hoplocampa (?) *atriceps* Kirby, List Hym. Brit. Mus., vol. 1, p. 168, 1882, no. 19, ♀;
pl. 8, fig. 18.

Examination of the type of this species proves that it is the same as *Strongylogaster uncus* Norton.

Hoplocampa lenis (Cresson).**Hoplocampa spissipes** (Cresson).

These two species placed in Cresson's catalogue (1887) in *Hoplocampa* belong to *Lycaota* Konow.

Hoplocampa gentilis (Cresson).**Hoplocampa montana** (Cresson).

These two species placed in *Hoplocampa* by Cresson (1887) belong to *Zaschizonyx* Ashmead.

Tenthredo (**Allantus**) **obtusa** Klug.

Tenthredo (*Allantus*) *obtusa* Klug, Mag. ges. Nat. Berlin, vol. 3, p. 55, 1814.

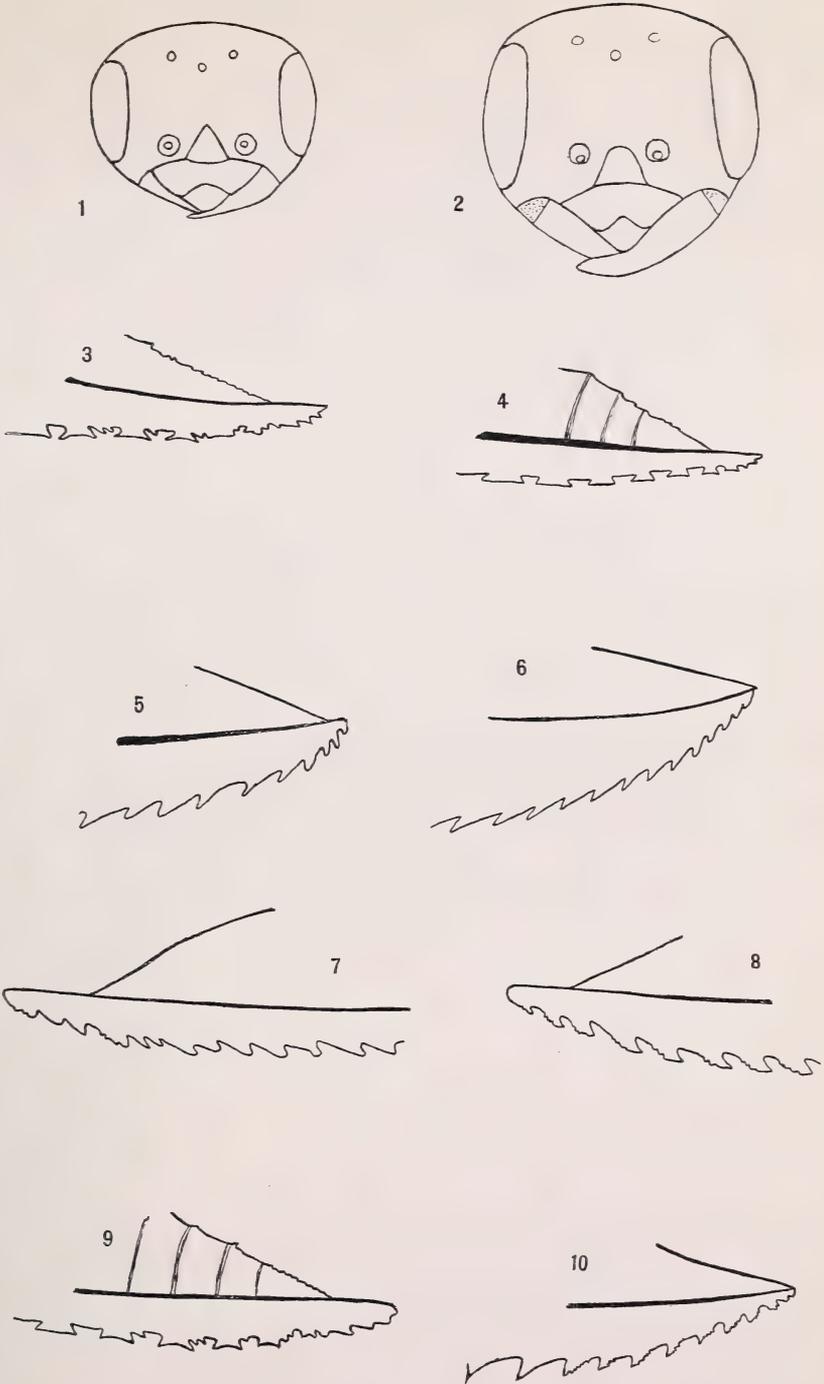
This species has been placed in *Hoplocampa* by Konow (1905). Klug's original description says: "Die zweite Kubitalzelle nimmt zwei zurücklaufende Nerven auf, von welchen der zweite dicht von dem Anfang der dritten Zelle sich einsenkt," which excludes it from *Hoplocampa*.

**SYNOPTIC TABLE TO THE NEARCTIC SPECIES OF THE SUBGENUS
HOPLOCAMPA.**

Males.....	1.
Females.....	7.
1. Hypopygidium not regularly rounded apically, more or less angled at the sides and apical middle.....	2.
Hypopygidium regularly rounded apically ^a	3.
2. Antennæ very slender; mesonotum almost entirely pale; hypopygidium obtusely angled apically.....	<i>occidentalis</i> Rohwer.
Antennæ more robust; mesonotum black; hypopygidium more acutely angled apically.....	<i>montanicola</i> Rohwer.
3. Clypeus nearly truncate, broadly arcuately emarginate (ocellar basin almost wanting).....	4.
Clypeus deeply emarginate, the emargination subangulate.....	5.
4. Mesopleuræ and pectus black; hypopygidium truncate....	<i>bioculata</i> Rohwer.
Mesopleuræ and pectus pale; hypopygidium rounded....	<i>californica</i> Rohwer.
5. Third antennal joint distinctly longer than the fourth; stigma narrow, broadest basad of middle.....	<i>marlatti</i> Rohwer.
Third antennal joint subequal in length with the fourth.....	6.

^a To determine this the hypopygidium should be viewed at right angles. When the hypopygidium is not regularly rounded, the sides are subparallel and the apex slopes off obliquely to an angulate middle.

6. Postocellar area well defined, twice as wide as the cephalo-caudal length, flat, stigma narrow; lanceolate cell of the fore-wings narrowly contracted (see figure)..... *alpestris* Rohwer.
 Postocellar area convex, not so sharply defined; stigma broader; contraction of the lanceolate cell distinctly longer than the width of the cell (see figure),
halcyon Norton.
7. Mesopleuræ and pectus black..... 8.
 Mesopleuræ and pectus pale..... 12.
8. Legs entirely fulvo-ferruginous; orbits continuously pale..... 9.
 Legs more or less black or dusky, especially the posterior pair; orbits not continuously pale..... 11.
9. Ocellar basin of the normal type, open below, poorly defined; saw with very long truncate teeth which are narrower at their bases; (clypeus deeply emarginate, lobes narrow)..... *orbitalis* Rohwer.
 Ocellar basin small, punctiform present only just in front of the anterior ocellus; saw with narrow teeth..... 10.
10. Clypeus broadly, angulately emarginate, lobes sharply triangular; head distinctly punctured; stigma gently rounded below..... *koebeleri* Rohwer.
 Clypeus arcuately emarginate, lobes broad, obtusely rounded; head shining, very sparsely punctured; stigma strongly tapering..... *alpestris* Rohwer.
11. Supraclypeal area shiny, flattened, or but slightly convex; stigma rounded on the lower margin; clypeus very shallowly emarginate..... *bioculata* Rohwer.
 Supraclypeal area roughened, strongly convex; stigma strongly tapering; clypeus rather deeply, angulately emarginate..... *californica* Rohwer.
12. Third antennal joint distinctly longer than the fourth..... 13.
 Third and fourth antennal joints subequal..... 14.
13. A small circular fovea in front of the anterior ocellus; mesoscutum with black spots laterally..... *marlatti* Rohwer.
 No small fovea in front of the anterior ocellus; mesoscutum immaculate,
nevadensis Rohwer.
14. Ocellar basin practically wanting..... 15.
 Ocellar basin large, distinct..... 16.
15. Middle fovea wanting; sheath narrowly rounded apically.. *pallipes* MacGillivray.
 Middle fovea represented by a large shallow depression; sheath narrowly truncate apically..... *xantha* Rohwer.
16. Sheath narrowly rounded apically; stigma broadest at base, tapering to apex,
halcyon Norton.
 Sheath obtusely rounded or subtruncate apically; stigma narrower, gently rounded below..... 17.
17. Scape black; sheath subtruncate apically; front of head closely punctured,
occidentalis Rohwer.
 Scape pale; sheath obtusely rounded apically; front of head with separate, small, distinct punctures..... *montanicola* Rohwer.



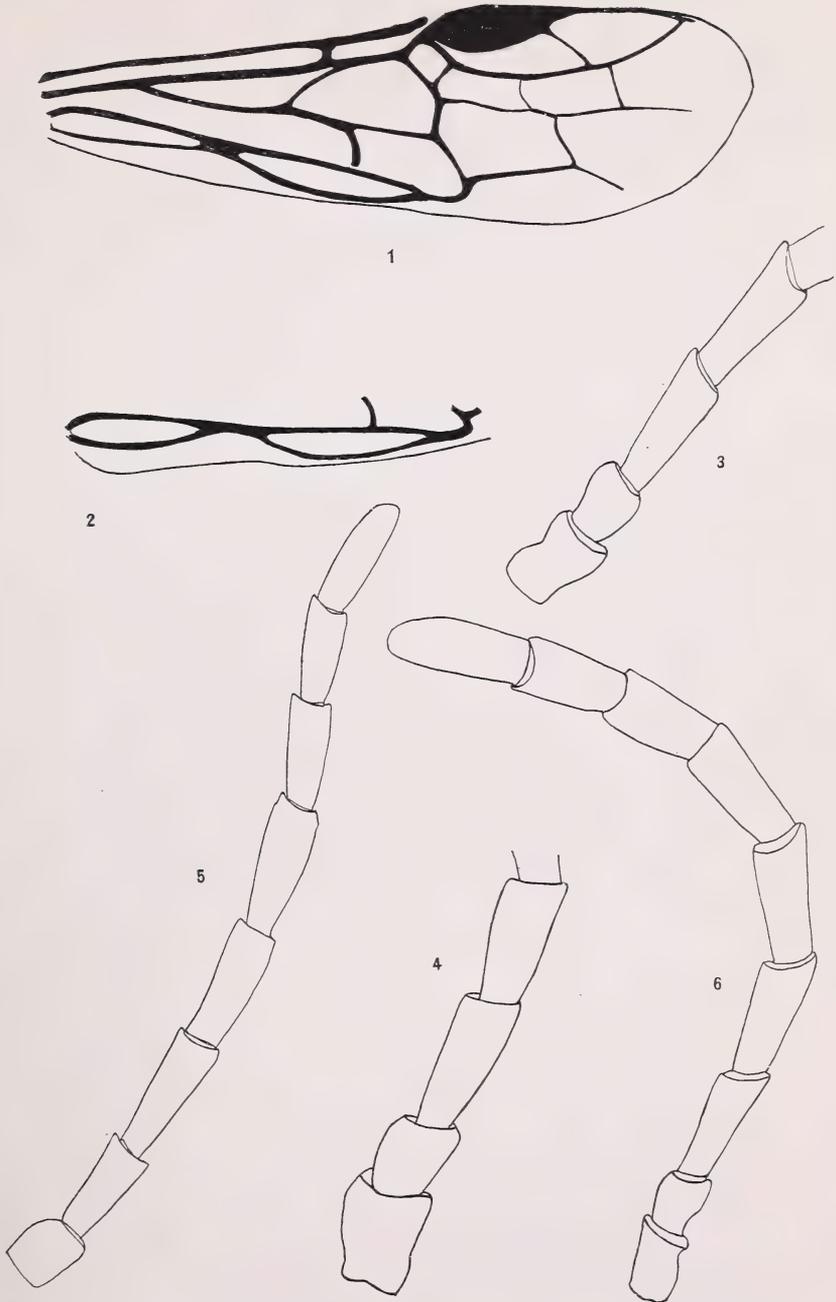
THE SAWFLY GENUS HOPLOCAMPA.

Fig. 1.—*Hoplocampa (Macgillivrayella) oregonensis*: Front view of head. Fig. 2.—*Hoplocampa (Hoplocampa) flava*: Front view of head. Fig. 3.—*Hoplocampa (Hoplocampa) orbitalis*: Saw. Fig. 4.—*Hoplocampa (Hoplocampa) montanicola*: Saw. Fig. 5.—*Hoplocampa (Hoplocampa) alpestris*: Saw. Fig. 6.—*Hoplocampa (Hoplocampa) koebeli*: Saw. Fig. 7.—*Hoplocampa (Hoplocampa) pallipes*: Saw. Fig. 8.—*Hoplocampa (Hoplocampa) halcyon*: Saw. Fig. 9.—*Hoplocampa (Hoplocampa) xantha*: Saw. Fig. 10.—*Hoplocampa (Hoplocampa) nevadensis*: Saw. (Original.)



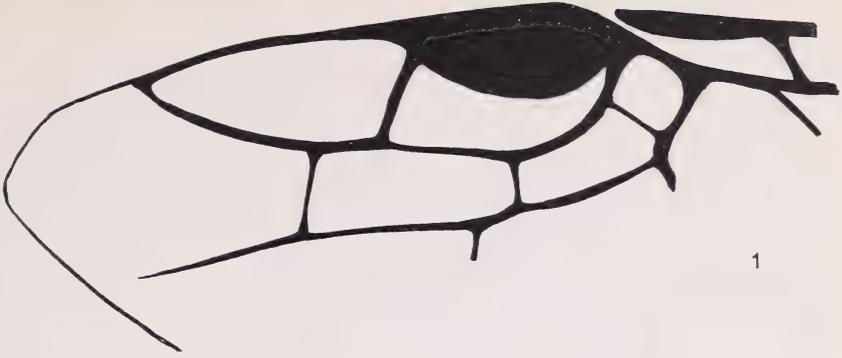
THE SAWFLY GENUS HOPLOCAMPA.

Fig. 1.—*Hoplocampa (Hoplocampa) xantha*: Sheath. Fig. 2.—*Hoplocampa (Hoplocampa) pallipes*: Sheath. Fig. 3.—*Hoplocampa (Hoplocampa) koebelei*: Sheath. Fig. 4.—*Hoplocampa (Hoplocampa) nevadensis*: Sheath. Fig. 5.—*Hoplocampa (Hoplocampa) alpestris*: Sheath. Fig. 6.—*Hoplocampa (Hoplocampa) montanicola*: Sheath. Fig. 7.—*Hoplocampa (Hoplocampa) marlatti*: Sheath. Fig. 8.—*Hoplocampa (Hoplocampa) occidentalis*: Sheath. Fig. 9.—*Hoplocampa (Hoplocampa) haleyon*: Sheath. Fig. 10.—*Hoplocampa (Hoplocampa) orbitalis*: Sheath. (Original.)



THE SAWFLY GENUS HOPLOCAMPA.

Fig. 1.—*Hoplocampa (Hoplocampa) alpestris*: Male, anterior wing. Fig. 2.—*Hoplocampa (Hoplocampa) halcyon*: Male, anal cell of fore wing. Fig. 3.—*Hoplocampa (Hoplocampa) montanicola*: Female, four basal antennal joints. Fig. 4.—*Hoplocampa (Hoplocampa) nevadensis*: Female, four basal antennal joints. Fig. 5.—*Hoplocampa (Hoplocampa) occidentalis*: Male antenna. Fig. 6.—*Hoplocampa (Hoplocampa) montanicola*: Male antenna. (Original.)



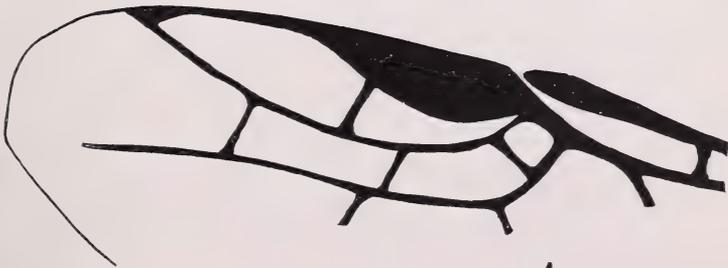
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THE SAWFLY GENUS HOPLOCAMPA.

Fig. 1.—*Hoplocampa (Hoplocampa) flava*: Female, radial area in fore wing. Fig. 2.—*Hoplocampa (Hoptocampa) halcyon*: Female, radial area in fore wing. Fig. 3.—*Hoplocampa (Hoplocampa) monticola*: Female, radial area in fore wing. Fig. 4.—*Hoplocampa (Macgillivrayella) lacteipennis*: Female, radial area in fore wing. (Original.)

TECHNICAL SERIES, No. 20, PART V.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

TECHNICAL PAPERS ON MISCELLANEOUS
FOREST INSECTS.

V. A PRELIMINARY SYNOPSIS OF
CERAMBYCID LARVÆ.

BY

J. L. WEBB,
Entomological Assistant.

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¹ Transferred to Southern Field Crop Insect Investigations.

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TECHNICAL PAPERS ON MISCELLANEOUS FOREST INSECTS.

V. A PRELIMINARY SYNOPSIS OF CERAMBYCOID LARVÆ.

By J. L. WEBB,
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INTRODUCTION.

In this study of cerambycoid larvæ the writer has adopted the primary groups defined by Schiødte,¹ but has given them family rank under a superfamily. Schiødte's primary groups, namely, Prionini, Asemini, Cerambycini, Lepturini, and Lamiini, are easily recognized, and up to the present time no other author has given a better division of the family into primary groups. The writer proposes the raising of these groups to family rank under the superfamily Cerambycoidea, designating the families as Lamiidæ, Cerambycidæ, Lepturidæ, Prionidæ, and Asemidæ. Schiødte gives most excellent plates showing the characteristics of these different groups. He fails, however, to give any tables of genera or to subdivide his primary groups. He does give a morphological conspectus of the genera known to him, but it is not in the form of a table by which the identity of any of the genera treated can be definitely determined. And, so far as the writer has been able to determine, no author has ever attempted such a table for the entire superfamily as here recognized, and for a very good reason, namely, the great difficulty experienced in finding suitable characters upon which to base a table of genera. Perris alone gives a table separating the genera *Spondylis*, *Tetropium*, *Criocephalus*, and *Asemum*, but further than this he does not go, although he divides the entire family into groups, subgroups, etc., without indicating the characters by which his divisions are made. Specific descriptions innumerable are given by different authors, but these are practically worthless when it comes to identifying isolated larvæ.

The need for such a table is all too apparent. The larvæ of the Cerambycoidea are much more commonly met with in an economic way than are the adults. Thus larvæ of a given species may be found

¹ De Metamorphosi Eleutheratorum Observationes: Bidrag til Insekternes Udviklingshistorie ved J. C. Schiødte.

within their host perhaps during the greater part of the year, while the adults are to be found in the host only within a very short period of the year, namely, just before they leave the host. A tree or piece of wood may be found to be badly infested and damaged by Cerambycoid larvæ, and no adults present to give a clue to the identity of the species. In fact, there may be several species present. The question immediately arises, "Which is the destructive species and what is it? What are the known habits of the species? And what relation to the damage done, and to the primary enemy, do the other species bear?" Without knowing the identity of the destructive species one is at sea as to its known habits and the methods which may have been used to combat it. This necessitates the working out of life history and habits in each case. It can thus be seen that much time and labor would be saved if the larvæ could be readily identified.

As indicated above, the making of a table by which the genera of cerambycoid larvæ can be recognized is extremely difficult. The first requisite is, of course, the possession of authentically identified specimens of the different genera. To gather together such a collection is in itself a stupendous task. Cerambycoid larvæ are to be found in abundance, and in many cases in situations which seem to indicate the identity of the species. But right here is where extreme care must be exercised to avoid making serious mistakes. The fact that a certain larva is taken from a piece of wood or bark, and that later a certain adult Cerambycoid is reared from the same host, is by no means proof that the larva and adult are the same species. In fact, adults of two or three species are often reared from the same piece of wood. The most conclusive proof of the identity of a given larva is obtained by rearing it to the adult stage in a vial or other receptacle, where it is kept entirely to itself until the adult stage is reached. In order to do this the larva must be taken from its host only after it has practically completed its growth. If the collector cuts out a half-grown larva there is practically no chance of rearing it to the adult stage. It can not complete its growth and go through its metamorphoses outside of its natural environment. However, the building up of a collection of larvæ identified by this method is such a slow process that for practical purposes the writer has accepted as authentic, identifications made in other ways. Thus, where several larvæ, exactly similar morphologically, have been found together with pupæ and adults, all of which are the same species, he has considered the larvæ to be the same species as the adults.

In all, the writer has studied the larvæ of 46 genera of Cerambycoidea; 15 in the family Lamiidæ, 18 in the family Cerambycidæ, 5 in the family Lepturidæ, 5 in the family Prionidæ, and 3 in the family Asemidæ. Henshaw lists 175 genera of Cerambycidæ for America north of Mexico. Therefore it is readily seen that the present effort

is a bare beginning of the work. The material studied has for the most part been collected by the members of the Branch of Forest Insect Investigations of the Bureau of Entomology, United States Department of Agriculture.

The 46 genera referred to above are as follows: In the family Lamiidæ: *Ptychodes*, *Monohammus*, *Leptostylus*, *Dorcaschema*, *Acanthoderes*, *Liopus*, *Hyperplatys*, *Oncideres*, *Goes*, *Lepturges*, *Plectrura*, *Synaphæta*, *Saperda*, *Graphisurus*, and *Acanthocinus*. In the family Cerambycidæ: *Chion*, *Æme*, *Tylonotus*, *Phymatodes*, *Euderces*, *Opsimus*, *Clytanthus*, *Cyrtophorus*, *Hylotrupes*, *Smodicum*, *Elaphidion*, *Callidium*, *Romaleum*, *Physocnemum*, *Cyllene*, *Neoclytus*, *Xylotrachus*, and *Notorhina*. In the family Lepturidæ: *Desmocerus*, *Bellamira*, *Leptura*, *Rhagium*, and *Ulochætes*. In the family Prionidæ: *Tragosoma*, *Prionus*, *Ergates*, *Orthosoma*, and *Mallodon*. In the family Asemidæ: *Asemum*, *Tetropium*, and *Atimia*.

The following table is based upon these genera and beyond the family characters may not be found applicable to the entire superfamily. (See also Plate XXVII.)

Superfamily CERAMBYCOIDEA.

Head much longer than broad, deeply invaginated into the prothorax.... Division I.
Head as broad as long, or broader than long, not deeply invaginated into the prothorax..... Division II.

DIVISION I.

Labrum large; clypeus large, filling frontal margin..... Family Lamiidæ.

DIVISION II.

Labrum small; clypeus small, not filling frontal margin..... Subdivision A.

Labrum large; clypeus large, filling frontal margin..... Subdivision B.

SUBDIVISION A.

Without spines or tubercles on anal and ninth abdominal segments.

Family Cerambycidæ.

SUBDIVISION B.

Head somewhat flattened; sides of head behind epistoma separated, angulate. Legs quite long..... Family Lepturidæ.

Head not flattened; sides of head not separated immediately behind epistoma. Legs moderate..... Section a1.

Section a1.

Sides of head behind epistoma fused for some distance, later separating, angulate.

Head invaginated into prothorax almost to base of maxillæ. Usually larvæ of very large size..... Family Prionidæ.

Sides of head behind epistoma fused almost to apex, farther back each one rounded.

Head not invaginated into prothorax to base of maxillæ. Larvæ of medium size. Family Asemidæ.

Family LAMIIDÆ.

- Abdominal segments bearing fleshy tubercles..... Division I.
 Abdominal segments without fleshy tubercles..... Division II.

DIVISION I.

- Dorsal aspect of ninth abdominal segment smooth..... Subdivision A.
 Dorsal aspect of ninth abdominal segment bearing one or more spines or chitinous tubercles..... Subdivision B.

SUBDIVISION A.

- Sternum of prothorax not separated from sternellum by well-defined, deep suture. Section a1.
 Sternum of prothorax separated from sternellum by well-defined, deep suture. Section a2.

Section a1.

- Pleural folds present on at least seven abdominal segments..... Subsection b1.
 Pleural folds not present on more than three abdominal segments.... Subsection b2.

Subsection b1.

- Anal segment bearing a group of small spines on ventral aspect..... *Ptychodes*.
 Anal segment without spines..... *Monohammus*.

Subsection b2.

- Gular suture or sutures present..... Series c1.
 Gular suture or sutures lacking..... Series c2.

Series c1.

- Posterior half of protergum alutaceous..... *Leptostylus*.
 Posterior half of protergum smooth and shining..... *Dorcaschema*.
 Posterior half of protergum rugose and shining..... *Acanthoderes*.

Series c2.

- Epipleural sutures of prothorax deep at posterior end and extending almost entire length of segment. Anterior half of protergum sparsely but evenly clothed with long erect hairs..... *Liopus*.
 Epipleural sutures of prothorax extending only about half the length of segment. Anterior half of protergum with only a few straggling hairs..... *Hyperplatys*.

Section a2.

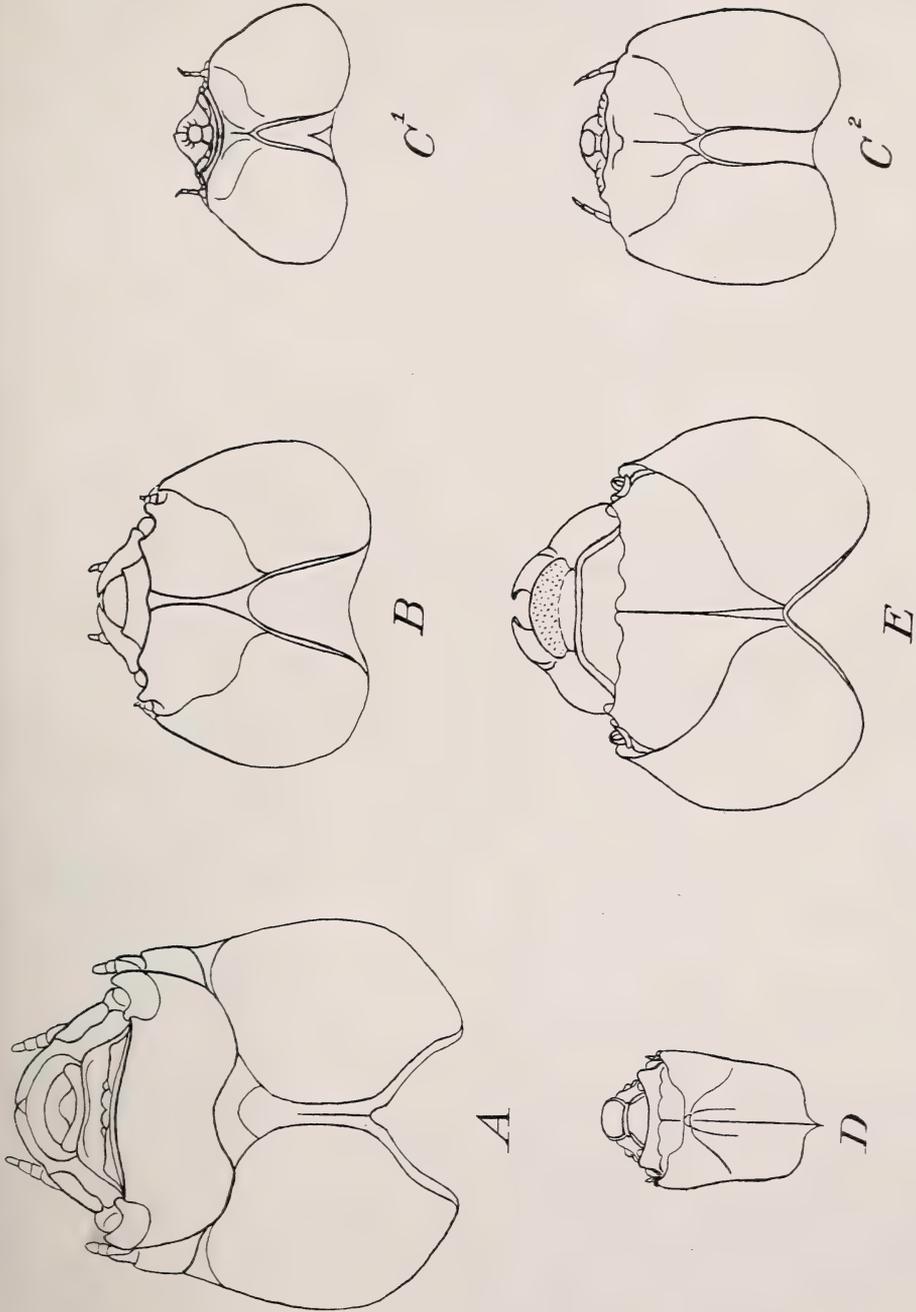
- Epistoma with many parallel longitudinal carinæ..... *Oncideres*.
 Epistoma without parallel longitudinal carinæ..... *Goes*.

SUBDIVISION B.

- Ninth abdominal segment bearing a single, slender, strongly chitinized spine pointing dorsally..... *Lepturges*.
 Ninth abdominal segment bearing a more or less fleshy spine pointing posteriorly. *Plectrura*.
 Ninth abdominal segment bearing two very small, closely placed, chitinized points sometimes apparently merged into one..... *Synaphæta*

DIVISION II.

- All abdominal segments bearing pleural folds..... *Saperda*.
 Pleural folds borne only on posterior three abdominal segments..... Subdivision C.



CERAMBYCOID LARVÆ.

Dorsal aspect of heads of representative larvæ of each family of Cerambycoidea: *A*, *Prionus*, Family Prionidae; *B*, *Tetropium*, Family Asemeidae; *C*¹, *Cyrtomerus*, Family Cerambycidae; *C*², *Phenates*, Family Cerambycidae; *D*, *Liopus*, Family Lamidae; *E*, *Rhagium*, Family Lepturidae. (After Schiödt.)

SUBDIVISION C.

- Ninth abdominal segment with blunt chitinized tubercle on posterior dorsal margin. *Graphisurus.*
 Ninth abdominal segment without chitinized tubercle..... *Acanthocinus.*

Family CERAMBYCIDÆ.

- Epipleural lines on protergum distinct for entire length of prothorax..... Division I.
 Epipleural lines on protergum indistinct, or faintly impressed on anterior part of protergum..... Division II.

DIVISION I.

- Legs present..... Subdivision A.
 Legs lacking..... Subdivision B.

SUBDIVISION A.

- Legs long..... Section a1.
 Legs short..... Section a2.

Section a1.

- Long hairs on anterior part of protergum dense. Median line of protergum showing for entire length of segment..... *Chion.*

Section a2.

- Head bearing long, dense hairs near base of antennæ..... *Eme.*
 Head not bearing long, dense hairs near base of antennæ..... Subsection b1.

Subsection b1.

- Median line on protergum distinct only on anterior portion of segment... *Tylonotus.*
 Median line on protergum distinct on posterior portion of segment..... Series c1.

Series c1.

- Head with an ocellus near base of each antenna..... *Phymatodes.*
 Head without ocelli..... *Euderes.*

SUBDIVISION B.

- Median line of protergum indistinct..... *Opsimus.*
 Median line of protergum distinct..... Section a3.

Section a3.

- Median line of protergum deeply impressed on anterior half of segment... *Clyanthus.*
 Median line of protergum not deeply impressed on anterior half of segment.

Cyrtophorus.

DIVISION II.

- Sternum and sternellum of prothorax differentiated..... Subdivision C.
 Sternum and sternellum of prothorax not differentiated..... Subdivision D.

SUBDIVISION C.

- Body robust. Abdominal segments 3, 4, 5, and 6 not constricted near middle. *Hylotrupes bajulus.*
 Body slender. Abdominal segments 3, 4, 5, and 6 constricted near middle. *Smodicum.*

SUBDIVISION D.

Legs long.....	Section a4.
Legs short.....	Section a5.
Legs lacking.....	Section a6.

Section a4.

Body very slender.....	<i>Elaphidion.</i>
Body robust.....	Subsection b2.

Subsection b2.

Anterior part of protergum with scarcely any hairs.....	<i>Callidium antennatum.</i>
Anterior part of protergum sparsely clothed with long hairs.....	Series c2.

Series c2.

Scutum, scutellum, and postscutellum of both mesotergum and metatergum plainly differentiated.....	<i>Romaleum.</i>
Scutum, scutellum, and postscutellum of mesotergum and metatergum not differentiated.....	Subseries d1.

Subseries d1.

Head with an ocellus near base of each antenna.....	<i>Physocnemum.</i>
Head without ocelli.	

Sides of thoracic and abdominal segments bearing long, dense, yellowish hairs.

Callidium æreum.

Sides of thoracic and abdominal segments not bearing long, dense, yellowish hairs.

Hylotrupes (ligneus and amethystinus).

Section a5.

Head with 3 ocelli at each side.....	<i>Cyllene (robinix, crinicornis and antennatus).</i>
Head with not more than one ocellus at each side.....	<i>Neoclytus.</i>

Section a6.

Xylotrechus, Notorhina, and Cyllene caryæ, impossible of separation by the author.

Family LEPTURIDÆ.

Abdominal segments bearing fleshy tubercles.....	Division I.
Abdominal segments without fleshy tubercles.....	Division II.

DIVISION I.

Mandibles very finely sulcate on middle third. Long hairs on eighth and ninth abdominal segments arising from small tubercles.....	<i>Desmocerus.</i>
Mandibles not finely sulcate on middle third.....	Subdivision A.

SUBDIVISION A.

Tubercles on first seven segments not closely placed, but separated from each other and spherical.....	<i>Bellamira.</i>
Tubercles closely grouped.....	<i>Leptura (with the exception of L. nitens).</i>

DIVISION II.

Head very much flattened. Mandibles tridentate.....	<i>Rhagium.</i>
Head not extremely flattened. Mandibles bidentate.....	Subdivision B.

SUBDIVISION B.

- Each mandible with a rather prominent groove or sulcus extending longitudinally on anterior third..... *Ulochætes*.
Mandibles without prominent groove on anterior third..... *Leptura nitens*.

Family PRIONIDÆ.

- Sternum and sternellum of prothorax divided by a well defined, curved suture. Division I.
Sternum and sternellum of prothorax not divided by a well defined, curved suture. Division II.

DIVISION I.

- Presternum and sternum of prothorax not divided..... *Tragosoma*.
Presternum and sternum of prothorax divided..... Subdivision A.

SUBDIVISION A.

- Scutellum of mesothorax short, dorsal. Presternum of prothorax in form of an equilateral triangle..... *Prionus*.
Scutellum of mesothorax not showing. Presternum of prothorax small, transverse. *Ergates*.

DIVISION II.

- Epistoma bearing four more or less well-defined teeth or tubercles. Presternum of prothorax not differentiated..... *Orthosoma*.
Epistoma without teeth or tubercles. Presternum small, triangular..... *Mallodon*.

Family ASEMIIDÆ.

- Labrum longer than broad..... Division I.
Asemum.
Labrum broader than long..... Division II.

DIVISION II.

- Ninth abdominal segment bearing two small, narrowly separated, chitinized points on dorsal aspect..... *Tetropium*.
Ninth abdominal segment bearing two chitinized points on dorsal aspect, widely separated, and curved toward each other in the form of hooks..... *Atimia*.

The foregoing classification is based entirely upon the characters of the larvæ, irrespective of adult characters. Thus the genus *Atimia* falls in the family Asemiidæ instead of in the Cerambycidæ proper, where it has been placed in the classification of the adults.

The writer realizes fully the imperfections and deficiencies of this work. And it is only with the hope that it may prove the basis of a more complete and perfect classification of cerambycoid larvæ that he now offers it for publication.

TECHNICAL SERIES No. 20, PART VI.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ENTOMOLOGY.

L. O. HOWARD, Entomologist and Chief of Bureau.

TECHNICAL PAPERS ON MISCELLANEOUS
FOREST INSECTS.

VI. CHALCIDIDS INJURIOUS TO
FOREST-TREE SEEDS.

BY

S. A. ROHWER,
Entomological Assistant.

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II

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TECHNICAL PAPERS ON MISCELLANEOUS FOREST INSECTS.

VI. CHALCIDIDS INJURIOUS TO FOREST-TREE SEEDS.¹

By S. A. ROHWER,
Entomological Assistant.

INTRODUCTION.

For a long time entomologists were loath to give up the theory that all chalcidids were parasitic, and most of the species which attacked the seeds of forest trees were originally described as being parasitic on some other insect which either lived within the seeds of the trees or lived within the cones, but in 1893 Wachtl recorded definitely that *Megastigmus spermatrophus* lives within the seeds of Douglas fir and is phytophagous. Even after this statement entomologists were loath to believe that any chalcidids are not parasitic, and many of the foremost authorities on these insects believed up to the time of their death that some day it would be proven that all chalcidids, with the exception of certain few belonging to the genus *Isosoma* and its allies, are parasitic. Of late years, however, most entomologists have come to believe that the phytophagous habit in many of the chalcidids is not uncommon. We know at present phytophagous species of the family Collimanidæ (*olim* Torymidæ), of the subfamilies Collimaninæ and Megastigminæ, and of the family Eurytomidæ, the phytophagous species being in the tribes Isosomini and Eurytomini. To these also may be added certain genera which have been assigned to the family Perilampidæ.

The species that attack seeds of forest trees are confined to the Collimanidæ, and most of them belong to the subfamily Megastigminæ. Summing up the literature on phytophagous Chalcidoidea belonging to this family, it is possible to outline the life history of every species which may live within the seeds of forest trees. This would be as follows: The egg is laid in the early summer or late spring,

¹ Although certain hymenopterous insects belonging to the superfamily Chalcidoidea have been shown to be very injurious to the seeds of certain forest trees, very little work has been done on these insects in America. The present paper is a résumé of the literature which deals with these insects, with a bibliography of the literature. It is prepared to facilitate the work of field men and to call the attention of entomologists in general to the damage done by these insects.

the larva feeding within the seed until it reaches maturity, passing the winter within the seed as a prepupal larva, transforming into a pupa early in the spring, and emerging as an adult in time to oviposit in the rather young seeds of the trees. The egg-laying habit of some of the chalcidids which attack the seeds of shrubs or vines differs in a measure from that of those attacking the seeds of trees; for instance, the grape-seed chalcidid (*Evoxysona vitis* Saund.) oviposits in the seeds that are quite hard, and the only way that the female is able to deposit eggs within the seed of the grape is by finding a soft portion of the shell which is known as the chalaza. This is also the case with the seed chalcidid of Virginia creeper (*Prodecatoma phytophaga* Crosby). The oviposition of species of *Megastigmus* which live within the seeds of coniferous trees has never been observed, but owing to the heavy, leathery texture of the cones it is possible that oviposition occurs when the cones are very small.

Species of chalcidids feeding within the seeds of various plants have proven in some cases to be of much economic importance. A few examples will suffice to show this. Forty pounds of apple seed planted at Budapest failed to give even a good standing of apple seedlings, the seeds having been destroyed by the apple-seed chalcidid (*Syntomaspis druparum*). The seeds of the Douglas fir usually gathered in Aberdeenshire, Scotland, and amounting to over 300 bushels were, according to a letter from Mr. John Crosier published by MacDougall in 1906, not worth gathering, owing to the attack of the Douglas fir seed chalcidid (*Megastigmus spermotrophus*). According to a letter published by Riley in 1893, the seeds of the silver fir (*Abies pectinata*) in the forests of Denmark were so completely destroyed during the years 1886 and 1888 by species of the genus *Megastigmus* that not a single healthy seed could be found. As a great many of the species of *Megastigmus* which are troublesome in Europe come from the seed of the American conifers it is very likely that difficulty will be found in North America on account of the attacks of these insects. No parasite of the species of the genus *Megastigmus* is as yet known.

SYNTOMASPIS DRUPARUM (Boheman).

This species, which normally attacks the apple but is known to attack the seeds of mountain ash (*Sorbus scandica*, and probably *Sorbus latifolia*) and hawthorn (*Crataegus*), is very elaborately treated by Crosby in his paper entitled "Certain seed-infesting chalcid flies," where an account is given of practically the entire life history of this insect. The egg is deposited by the female within the seed of an apple when the apple is about three-fourths of an inch in diameter. The young larva feeds within the seed and develops until it hibernates as a larva within the seed, pupating early in the spring and emerging as an adult in June. As this species is not of any economic importance

so far as forest trees are concerned, no more details concerning it need be given, but any one wishing to obtain information regarding this insect may consult the above-mentioned paper by Crosby.

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MEGASTIGMUS SP.

A species of *Megastigmus* is recorded by Riley through rearings conducted by Borries, from the Japanese *Abies mariesii*. Nothing more is known about this species.

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MEGASTIGMUS BREVICAUDIS Ratzburg.

This insect is considered by its original describer as probably a parasite of a gall fly inhabiting the fruit of mountain ash (*Sorbus scandica*), but Crosby has proven the species as entirely phytophagous in habit, and has reared it from seeds of *Sorbus aucuparia*. Crosby describes the larva as white, smaller than the larva of *Syntomaspis druparum*, from which it may be distinguished by the mandibles having four teeth on their inner margin and by the absence of brown tubercules on the face. The oviposition habit and the egg of this species are unknown, but it may be presumed that they are similar to those of the foregoing species.

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MEGASTIGMUS STROBILOBIUS Ratzburg.

The original describer of this insect considered it to be parasitic on *Tortrix strobilotina*, but since then it has been shown by Judeich and Nitsche that this species lives, as do other species of *Megastigmus*, within the seeds of plants, this species choosing the amabilis fir (*Abies*

amabilis). They also state that this species is distinct from *Megastigmus spermotrophus*, and that the larva is about 4 millimeters long, whitish in color, and that the mandibles have three inner teeth. Crosby records this species in *Abies pectinata*. Riley records it from Hooker hemlock (*Tsuga mertensiana hookeriana*) and from *Abies excelsa*.

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MEGASTIGMUS PINUS Parfitt.

This species was considered by its original describer to be a parasite on some species of *Cynips* which infested the seeds of the bristle-cone fir (*Abies venusta*) (according to the original describer this was considered as *Picea bracteata*), of a new species of *Tsuga*, and of the noble fir (*Abies nobilis*). In the original account "etc." is added after the foregoing list, which implies that other coniferous seeds are attacked by this insect. Riley, in referring to material reared by Mr. Borries, of Copenhagen, Denmark, adds that this species has been reared from the seeds of Shasta fir (*Abies magnifica*), from the white fir (*Abies concolor*), from the grand fir (*Abies grandis*), and from the amabilis fir (*Abies amabilis*), but as Riley allows great variation within this species it may be that some of these rearings actually contained some of the other species of *Megastigmus*. Other than the above mentioned list of food plants nothing is published concerning the biology of this species.

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 Dalla Torre, 1898, p. 287.
 Riley, 1893, p. 360.
 Crosby, 1909, p. 368.

MEGASTIGMUS SPERMOTROPHUS Wachtl.

This insect was originally described in 1893 by Wachtl, and at that time Wachtl stated with assurance that this species of *Megastigmus* was phytophagous and lived within the seeds of the Douglas fir (*Pseudotsuga taxifolia*). Since then two papers have treated this insect in some detail. The first of these was by MacDougall in 1906. MacDougall knew the larva and felt reasonably sure that this species was phytophagous. Some of his statements as to emergence are not without interest; he states that from a lot of seeds harvested in October, 1904, he found larvæ in May, June, July, August, September, Octo-

ber, and November, 1905, and seemed to be of the opinion that the great variation in the dates of emergence of this insect was due to the irregularity of the hatching of the eggs and the coming to maturity of the larvæ. It may be, however, that the females which had emerged in the receptacle containing the seeds oviposited within the seeds, thus accounting for the larvæ found in the months of July, August, September, October, and November, 1905, when the larvæ which would be adults in the spring of 1906 should be feeding within the seeds. MacDougall does not give sufficient information to make his statement concerning variation in emergence conclusive, while rearings by Crosby, Crosier, and Wachtl confirm this last supposition.

The egg has been obtained by Crosby by dissection of a female and is described by him as "white, smooth, and spindle-shaped with a very long pedicel at the anterior end and the vestige of one at the opposite end. Length of body of egg, .36 mm.; tail-like process, .9 to 1.2 mm." The larva described by Crosby is as follows: "The full-grown larva is yellowish white with brownish mouth parts; its length varies from 2.5 to 3.5 millimeters. The surface is smooth without apparent sculpture, and the hairs are very sparse and microscopic in size. The inner margin of the mandibles is provided with three sharp teeth." The pupa is described by Crosby as follows: "The pupa is yellowish white and in the female has the ovipositor curved over the back and reaching to about the middle of the thorax. Length of female pupa, 3 mm.; of male, 2.5 mm."

The oviposition of this species is unknown, and the shape of the egg after having been deposited is not known. Neither has this insect been recorded as having been reared from the seeds of any Douglas fir raised in the United States. All seeds from which it has been reared were collected in Aberdeenshire, Scotland, on the estate of Mr. John Crosier. In this statement we must except the seeds from which the species was reared by Wachtl, as it is presumed that these were collected somewhere in the northwestern United States. Crosby also records the larvæ within the seeds of Douglas fir in Colorado, but these seeds came from a nursery firm and definite locality could not be secured.

Up to the present time this is the most injurious chalcidid on forest trees which has received the attention of any entomologist. The attention which this insect has received in America, with the exception of the work done by Crosby, has been nil. MacDougall recommends as protection from this species that the cones be gathered as soon as ripe, and that, as soon as they will permit, the seed be thrashed from them, and that this be fumigated without delay with bisulphid of carbon. No experiments have been published concerning the results of such fumigation, but except for killing the larvæ within the seed and preventing another generation of adults this method can not be considered as valuable.

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SUMMARY.

Up to the present time there are seven species of chalcidid flies which are known to attack the seeds of the following forest trees:

Mountain ash.....	{ <i>Sorbus scandica</i> . <i>Sorbus aucuparia</i> . <i>Sorbus latifolia?</i>
Amabilis fir.....	<i>Abies amabilis</i> .
White fir.....	<i>Abies concolor</i> .
Great silver fir.....	<i>Abies grandis</i> .
Shasta fir.....	<i>Abies magnifica</i> .
Bristlecone fir.....	<i>Abies venusta</i> .
Noble fir.....	<i>Abies nobilis</i> .
Three exotic firs.....	{ <i>Abies excelsa</i> . <i>Abies pectinata</i> . <i>Abies mariesii</i> .
Hooker hemlock.....	<i>Tsuga mertensiana hookeriana</i> .
Unknown Tsuga.....	<i>Tsuga</i> sp. (?)
Douglas fir.....	<i>Pseudotsuga taxifolia</i> .

Of these seven species the eggs of two are known, the larvæ of four, the pupæ of two, the oviposition habit of one, and the emergence dates of three. The only species of which the life history has been completely traced is that of the apple-seed chalcidid (*Syntomaspis druparum*) which is also known to attack the seeds of mountain ash.

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