

## The Male Genitalia of the New Zealand Tortricidae.

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THE named Tortricidae of the world probably now comprise between 1,300 and 1,400 species. To this total New Zealand contributes rather more than 100 forms, all but a few of the 112 described species on our list being endemic. Taking the number of known (named) insects in the world as 471,000 (see Tillyard, *Insects of Australia and New Zealand*, p. 8), we find that the Lepidoptera represent about 19.5 per cent. of that total. The number of Tortricidae now listed being set down as 1,350 (Meyrick, *Genera Insectorum*, 1913, tabulates 1,031 species) gives the per centage of this family to the whole of the Order as about 1.5. The proportion of New Zealand Tortricids to the total New Zealand Lepidoptera is about 8 per cent., thus showing that the family is quite well represented specifically. Of the 15 genera found in New Zealand seven are endemic, namely, *Ochetarcha* Meyrick, *Eurythecta* Meyrick, *Ascerodes* Meyrick, *Epalxi-phora* Meyrick, *Gelophaula* Meyrick, *Ecclitica* Meyrick, and *Philocryptica* Meyrick, three, *Capua* Stephens, *Tortrix* Linnaeus and *Cnephasia* Curtis, are practically cosmopolitan, and the remainder chiefly of Australian and New Zealand distribution.

During the course of the present study it has become apparent that several species have been heretofore misplaced generically; the necessary nomenclatural changes will be indicated in the body of the paper and will be more formally dealt with in a descriptive paper appearing elsewhere in this volume.

### GENITALIA CHARACTERS OF THE FAMILY.

The most recent text-book dealing with the Lepidoptera (Tillyard, *The Insects of Australia and New Zealand*, 1926) treats the Tortricid groups as forming a section of the super-family Tineoidea. The male genitalia of the Tortricids are, however, of so different a type from those of the Tineoids proper that there seems to be sufficient reason for bestowing on them super-family rank. The development of the socii and transtilla, with the hinged aedeagus, are the chief characters which serve to distinguish the Tortricids, though with the exception of the last mentioned these are not invariably present. The eighth segment is normally unmodified, but occasionally, as in *Ascerodes*, the tergite may be clothed dorsally with long hair-scales which project above the tegumen. The tegumen is usually moderately broad and does not fuse with the vinculum, but connects membranously with the upper basal angles of the harpes, its lateral extremities being suddenly narrowed and slightly incurved. The uncus is small to moderately large, thus offering a distinction from

the Euscosmidæ, where this organ is usually absent or very weakly developed. In the Tortricidæ the part is always more or less bent downwards, sometimes almost at right angles; frequently it is dilated apically and more or less indented; occasionally it is so expanded laterally as to become battledore-shaped. Almost invariably the lateral apical areas of the uncus are clothed with short stiff hairs beneath. The socii are normally well developed though occasionally vestigial. They are most commonly long, narrow, and somewhat drooping, but in some species they form rounded or reniform plates. They are always covered with long, thin, backwardly-directed hair. The gnathos is, for the most part, uniform in shape, being more or less foot-like from a lateral view, an appearance caused by the pair of arms meeting on the meson, fusing, and turning sharply caudad. The aedeagus is generally fairly stout and more or less curved or bent; the anellus projects beneath and connects with the rounded or shield-shaped juxta, thus forming the carinate or "hinged" aedeagus of Pierce (*The Genitalia of the British Tortricidæ*, xviii). Cornuti are frequently present, but as Pierce states (op. cit., xx) that these are in some instances deciduous, care must be exercised in using them as a systematic character. Further, as they are attached to the penis (apical portion of the ductus ejaculatorius) which is capable of movement within the aedeagus, the position of cornuti as shown in figures must not be given much weight. The orifice of the aedeagus is not usually completely apical, but extends for some distance down the right side. The harpes are invariably broad and usually simple; the sacculus is nearly always defined, but is seldom apically free except for a very short distance. The outer surface is usually thickly scaled and the inner surface clothed more or less with rather weak hair; stout spines are not present. The transtilla is not here an extension of the costal angle of the harpe, but is composed of a pair of chitinous processes arising just caudad of it. These expand into angular plates which bear series of small spines and project above the aedeagus, meeting on the meson and being either membranously connected or completely fused there. The vinculum is greatly reduced, being only a narrow strip of chitin with the saccus undeveloped; the arms do not usually meet the arms of the tegumen, but are more or less firmly attached to the bases of the harpes. A peculiar development occurs in some genera, the basal part of the vinculum being dechitinised and the lateral pieces connected by membrane only. Pierce (op. cit. xviii) notes the same structure in certain Phaloniidæ and suggests that the condition indicates that the vinculum is "really a development of the two projections which hinge the body segments together and which are so conspicuously developed in the anal segments of the female." It is not clear what "projections" are here referred to, but to the writer it seems certain that the vinculum is the ninth sternite and that the "arms" are simply the lateral portions thereof, these being greatly narrowed and not fused to the tegumen (9th tergite), while the ventral area has become membranous.

GENITALIA CHARACTERS OF THE GENERA AND SPECIES.

**Ochetarcha** Meyrick.

Monotypic. Endemic. Only a few examples of this interesting form have been taken and I have been unable to examine the genitalia.

**Cnephasia** Curtis. (Figs. 1 to 7.)

A large genus; practically cosmopolitan. Ten New Zealand species have been described, of which seven have been available for dissection.

Tegumen small to moderate; uncus usually thin and sharply bent, never, except in *latomana*, dilated apically. Socii small and narrow (in *latomana* vestigial) or dilated into a rounded plate covered with long hair. Gnathos normal, porrect, except in *imbriferana*, where it is reduced and merges with the anal tube. Aedeagus short to moderately long, moderately curved or sinuate, pointed or subtruncate. Anellus and juxta normal. Harpes broad, not much narrowed apically; transtilla a plain or lobed band bearing minute spines. Vinculum much reduced, short and narrow.

Considered on the genitalia characters, the species do not form a closely related assemblage. *Latomana*, *imbriferana* and *microbathra* are all more or less isolated, *jactatana* and *incessana* form a more nearly related pair, while *sphenias* and *fastigata* (formerly placed in *Tortrix*) exhibit more affinity than any of the others.

KEY TO THE SPECIES OF *CNEPHASIA*.

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|---|----------------------|
| 1. Socii large, rounded or apically dilated . . . . .   | 2.                   |
| Socii small, vestigial, finger-like or short and rounded . . . . .                                    | 4.                   |
| 2. Uncus very narrow, pointed; socii covered with dense long hairs . . . . .                          | 3.                   |
| Uncus much broader, apex rounded; socii moderately haired . . . . .                                   | <i>microbathra</i>   |
| 3. Harpes pointed at apex . . . . .   | <i>jactatana</i> .   |
| Harpes subtruncate at apex . . . . .  | <i>incessana</i> .   |
| 4. Uncus very narrow on dorsal view; socii very short but broad . . . . .                             | <i>imbriferana</i> . |
| Uncus moderate or very broad on dorsal view . . . . .   | 5.                   |
| 5. Uncus very broad; socii vestigial . . . . .  | <i>latomana</i> .    |
| Uncus moderately broad . . . . .  | 6.                   |
| 6. Socii very short; juxta with apices rather produced; lobes of transtilla rounded . . . . .         | <i>sphenias</i> .    |
| Socii moderately long; juxta with apices not produced; lobes of transtilla somewhat angular . . . . . | <i>fastigata</i> .   |

**Harmologa** Meyrick. (Figs. 8 to 17.)

A rather small genus, most numerous in New Zealand, but with a few Australian and Indian species and one in North America. Thirteen New Zealand species have been described, ten of which are here dealt with.

Tegumen moderate to broad; uncus moderate to very broad, apex frequently more or less indented. Socii generally small or vestigial. Gnathos normal or with projections at "heel." Aedeagus curved or bent, usually swollen basally, frequently with a small hook on margin of orifice. Anellus and juxta normal. Harpes broad, hardly

narrowed apically; sacculus extending to near apex of harpe, tip usually shortly free; transtilla usually rather weak, seldom fused into complete band. Vinculum weak and narrow.

KEY TO SPECIES OF *HARMOLOGA*.

- |  |                     |
|--|---------------------|
| 1. Socii vestigial or absent   | 2.                  |
| Socii more or less developed   | 3.                  |
| 2. Socii absent; gnathos basally expanded into a pair of broad rounded plates                              | <i>tenebrosa.</i>   |
| Socii vestigial; gnathos with cephalic process   | <i>oblongana.</i>   |
| 3. Apex of uncus not indented  | 4.                  |
| Apex of uncus more or less indented  | 6.                  |
| 4. Uncus broad, subtruncate or rounded apically  | 5.                  |
| Uncus rather narrow, rounded apically  | <i>sanguinea.</i>   |
| 5. Uncus gradually dilated to apex; transtilla fused; aedeagus without barb                                | <i>festiva.</i>     |
| Uncus more strongly dilated at apex; transtilla not fused; aedeagus with strong barb towards apex on right | <i>reticularis.</i> |
| 6. Uncus strongly constricted basally  | <i>petrias.</i>     |
| Uncus not strongly constricted basally   | 7.                  |
| 7. Uncus with apex deeply indented, not constricted basally  | <i>amplexana.</i>   |
| Uncus with apex not deeply indented, slightly constricted basally  | 8.                  |
| 8. Socii very small; aedeagus much swollen basally   | <i>columella.</i>   |
| Socii moderately large; aedeagus not swollen basally   | 9.                  |
| 9. Aedeagus sinuate, moderately long, with few short cornuti; socii very narrow.                           | <i>scoliastris.</i> |
| Aedeagus rather short, not sinuate, with bunch of very long and stout cornuti; socii broader               | <i>pontifica.</i>   |

**Gelophaula** Meyrick. (Figs. 18 to 22.)

Endemic. A subalpine genus of which eight species have been described; four of these are here dealt with, together with a new species described elsewhere in this volume. There is little difficulty in recognizing members of this group, but several of the different forms tend to run into each other, making specific determination by superficial characters no easy matter. Nor do the genitalia offer a great deal of assistance, the organs being remarkably uniform and the points of distinction slight and easily overlooked.

Tegumen broad; uncus broad, roundly dilated apically. Socii short, narrow. Gnathos well developed, normal in shape. Aedeagus stout, regularly curved, not tapered apically or swollen basally. Anellus and juxta normal. Harpes very broad, usually narrowed towards apex; sacculus well developed, reaching to about  $\frac{4}{5}$ , where the apex is shortly free; transtilla normal. Vinculum narrow, weak.

KEY TO THE SPECIES OF *GELOPHAULA*.

- |                                      |    |                    |
|--------------------------------------|----|--------------------|
| 1. Aedeagus with "keel" at base      | .. | <i>tributaria.</i> |
| Aedeagus without "keel"              | .. | 2.                 |
| 2. Aedeagus with apical hook or barb | .. | 3.                 |
| Aedeagus without apical hook or barb | .. | 4.                 |

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|---|-----------------------|
| 3. Uncus rather strongly dilated apically; ventral margin of harpe strongly rounded | <i>trisculca.</i>     |
| Uncus less dilated apically; ventral margin or harpe less strongly rounded          | .. <i>siraea.</i>     |
| 4. Harpes with apex narrow and rounded  | .. <i>palliatata.</i> |
| Harpes with apex wider and subtruncate  | .. <i>n. sp.</i>      |

**Ctenopseustis** Meyrick. (Fig. 23.)

A genus containing only two species, one in New Zealand and the other in South America.

Tegumen broad; uncus narrow, spoon-shaped. Socii narrow. Gnathos normal. Aedeagus curved, base not swollen, a dense bundle of long cornuti occupying almost entire length. Anellus normal. Juxta a rounded plate with apex deeply emarginate. Harpes broad, oblong; transtilla normal in structure but small. Vinculum very narrow and weak.

**Epalxiphora** Meyrick. (Fig. 24.)

Monotypic. Endemic.

Tegumen small, narrow; uncus short, narrow, not much curved, with rather long hair above. Socii long, broad basally thence narrow, sinuate. Gnathos weak, slightly upcurved, apex acute. Aedeagus stout, short, pistol-shaped, pointed and with a dense bunch of long, stout cornuti, a small hook near apex on right. Anellus normal. Juxta broadly rounded beneath, divided into two lobes apically. Harpes broad, irregularly tapered to rather narrow apex; sacculus strong, extending to about  $\frac{4}{5}$ , where it ends in free rounded point; a patch of dense hair in centre towards base. Vinculum small and weak.

**Ecclitica** Meyrick. (Figs. 25 and 26.)

A small endemic genus containing two species. On a consideration of all the characters I have removed *incendiaria* Meyr. to *Tortrix* and placed *torogramma* (formerly under *Tortrix*) in this genus. It seems improbable that two species exhibiting such close resemblance in genitalia characters as *torogramma* and *hemichlita* should not be congeneric and, on the other hand, that *incendiaria* should belong to *Ecclitica* while showing no affinity to the genitalia characters of the type species, but in this regard much more closely approaching *Tortrix*.

Tegumen moderate; uncus narrow or of moderate breadth, pointed. Socii very small. Gnathos strong, deeply cleft horizontally on meson. Aedeagus long, thin or moderately stout, pointed. Juxta shield-shaped, upper angles more or less produced. Harpes broad, slightly narrowed apically, sacculus well developed; transtilla normal. Vinculum weak.

KEY TO THE SPECIES OF *ECCLITICA*.

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|--|-----------------------|
| Uncus narrow, not constricted basally, apex blunt-pointed; aedeagus rather stout; harpes broad, sacculus shortly free apically   | <i>torogramma.</i>    |
| Uncus moderately broad, constricted basally, apex produced; aedeagus thin, sinuate; harpes moderately broad, sacculus apically produced as a free lobe directed obliquely across harpe | .. <i>hemichlita.</i> |

**Philocryptica** Meyrick. (Fig. 27.)

Monotypic. Endemic. Apparently the example on which this genus was founded was of abnormal venation as 4 and 5 are stated to be short-stalked. This character, however, does not hold in any of the specimens (4) which I have examined, 4 and 5 being separate in origin, though 4 is nearer to 5 than to 3. But apart from the venation the genus seems to be a valid one, characterized by the form of the palpi and the strong double posterior thoracic crest. The genitalia are of the same type as *Harmologa*.

Tegumen moderately broad; uncus broad, hardly dilated apically, apex subtruncate. Socii long, narrow. Gnathos normal. Aedeagus rather long, moderately stout, bent, a small barb on orifice near apex. Juxta angular, apex lobed. Harpes rather broad, slightly tapered, apex subtruncate; sacculus to about  $\frac{2}{3}$ , apex shortly free; transtilla normal. Vinculum narrow, weak.

**Ascerodes** Meyrick. (Fig. 28.)

Monotypic. Endemic.

Eighth tergite clothed dorsally with long hair which projects above tegumen. Tegumen broad; uncus very broad, slightly dilated apically, apex subtruncate and slightly indented. Socii vestigial, represented by a tuft of hair on a minute process. Gnathos normal. Aedeagus small, curved, base not swollen. Juxta angular, divided above into a pair of large lobes. Harpes broad, slightly tapered, apex evenly rounded; sacculus reaching to about  $\frac{1}{2}$ , tip free; transtilla a simple very narrow band. Vinculum short, weak.

**Epichorista** Meyrick. (Figs. 29 to 40.)

A moderate genus, "chiefly characteristic of Australia, New Zealand, and South Africa, but one Indian species is known and probably others will be discovered, India being presumably the place of origin." (Meyrick). Thirteen New Zealand species have been described, twelve of which have been available for dissection.

Tegumen narrow to moderately broad; uncus narrow to broad. Socii usually developed, narrow or moderate. Gnathos usually normal. Aedeagus usually rather slender, curved or bent. Anellus and juxta normal. Harpes broad, rather short; transtilla seldom fused. Vinculum very small.

KEY TO THE SPECIES OF *EPICHORISTA*.

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|--|-------------------|
| 1. Gnathos bent rectangularly upwards on meson and continued as a long sinuate process . . . . .                     | <i>abdita</i> .   |
| Gnathos not so formed . . . . .  | 2.                |
| 2. Apex of uncus rounded . . . . .   | 3.                |
| Apex of uncus indented . . . . .   | 8.                |
| 3. Socii very short and narrow . . . . .   | <i>speciosa</i> . |
| Socii moderate or long . . . . .   | 4.                |
| 4. Uncus broadly lanceolate; aedeagus with 2 or 3 cornuti occupying more than half the length of the organ . . . . . | <i>persecta</i> . |
| Uncus not lanceolate; aedeagus without long cornuti . . . . .  | 5.                |
| 5. Harpes hardly tapered; apex subtruncate . . . . .   | 6.                |
| Harpes considerably narrowed apically; apex rounded . . . . .  | <i>allogama</i> . |

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|---|---------------------|
| 6. Uncus strongly dilated apically; juxta more or less angular                  | 7.                  |
| Uncus slightly dilated apically; juxta rounded                                  | <i>emphanes.</i>    |
| 7. Aedeagus roundly swollen at base, apex rounded                               | <i>siriana.</i>     |
| Aedeagus not roundly swollen at base; apex obliquely pointed                    | <i>elephantina.</i> |
| 8. Uncus very broad, slightly constricted basally                               | <i>fraudulenta.</i> |
| Uncus not broad   | 9.                  |
| 9. Uncus much dilated apically  | 10.                 |
| Uncus hardly dilated apically   | 11.                 |
| 10. Aedeagus tapered apically   | <i>aspistana.</i>   |
| Aedeagus much dilated apically  | <i>hemionana.</i>   |
| 11. Aedeagus long and acute; harpes with lower margin roundly dilated near base | <i>eribola.</i>     |
| Aedeagus of normal length, blunt at apex; harpes normal                         | <i>zatrophana.</i>  |

**Eurythecta** Meyrick. (Figs. 41 to 46.)

Endemic. There are 6 species, all of which have been examined. On the characters of the genitalia the genus falls into two well-defined groups, each comprising three species. This division, however, does not agree with that indicated by the presence or absence of vein 7 in the forewing, there being four species—*robusta*, *zelaea*, *eremana*, and *paraloxa*—in which the vein is absent. Three species—*potamias* Meyr., *trimaculata* Philp., and *varia* Philp.—formerly placed in this genus, have been removed to the Eucosmidae.

A. Tegumen broad; uncus broad, spatulate. Socii vestigial or moderate. Gnathos normal. Aedeagus moderately long, pointed, rather contracted basally. Anellus normal. Juxta band-like or shield-shaped, broadly lobed apically. Harpes triangular, densely clothed with very long hair within; sacculus broad, reaching to  $\frac{2}{3}$  or  $\frac{3}{4}$ ; transtilla large, irregular, with rather long spines. Vinculum dechitinised on the meson, arms somewhat dilated basally.

B. Tegumen moderate; uncus broad, more or less dilated apically, apex indented. Socii moderate. Gnathos normal. Aedeagus short or moderate, curved. Anellus normal. Juxta shield-shaped, strongly lobed apically. Harpes rather short, broad, apex rounded or subtruncate; sacculus and transtilla normal. Vinculum normal, not dechitinised on meson.

KEY TO SPECIES OF *EURYTHECTA*.

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|--|------------------|
| 1. Harpes triangular, inner surface with very long caudally-directed hair; vinculum dechitinised on meson                        | 2.               |
| Harpes not triangular, inner surface with short hair directed obliquely towards upper margin; vinculum not dechitinised on meson | 4.               |
| 2. Socii vestigial   | <i>paraloxa.</i> |
| Socii moderate   | 3.               |
| 3. Juxta large, like v-shaped band; apex of harpe rounded  | <i>zelaea.</i>   |
| Juxta moderate, shield-shaped; apex of harpe pointed   | <i>robusta.</i>  |
| 4. Uncus strongly dilated  | 5.               |
| Uncus hardly dilated   | <i>eremana.</i>  |
| 5. Harpe with apex evenly rounded; juxta rounded   | <i>loxias.</i>   |
| Harpe tapering to upper apical angle; juxta angular  | <i>curva.</i>    |

**Tortrix** Linne. (Figs. 47 to 65.)

A large cosmopolitan genus comprising between 200 and 300 species. There are 29 species known from New Zealand, two of which, *T. postvittana* Walk. and *T. indigestana* Meyr., are also found in Australia. As in the preceding genus, the species fall into two groups; these will be dealt with separately.

A. Tegumen small; uncus usually dilated apically. Socii vestigial or absent. Gnathos normal, usually rather evenly curved. Aedeagus moderate, curved, obliquely pointed, base not, or hardly, swollen. Anellus normal. Juxta more or less angular, usually strongly lobed. Harpes more or less triangular, inner surface clothed with long hair directed caudally; sacculus variable, strong or weak, apex free or fused; transtilla normal, not fused. Vinculum normal. On the conjunctiva beyond the eighth segment, towards the ventral surface, is a bunch of long hair which reaches to or beyond the apex of the harpe. When the genitalia are exerted the tightening of the membrane causes these hairs to stand out in a rosette.

B. Tegumen moderate or broad; uncus ranging from narrow to very broad. Socii usually normal, sometimes plate-like, occasionally absent. Gnathos usually normal. Aedeagus usually short, not strongly curved, usually obliquely truncate at apex. Anellus normal. Juxta shield-shaped, angular or rounded, more or less bilobed apically. Harpes broad, more or less oblong, hair on inner surface moderate or short, directed obliquely towards upper margin; sacculus rather short, apex free or fused; transtilla normal, sometimes well fused. Vinculum normal, occasionally dechitinised on meson.

KEY TO THE SPECIES OF *TORTRIX*.

- |   |                      |
|---|----------------------|
| 1. Harpes triangular, hair on inner surface directed caudally; a turf of long hair on conjunctiva beyond eighth segment | 2.                   |
| Harpes oblong, hair on inner surface directed towards upper margin; tuft of long hair absent                            | 7.                   |
| 2. Uncus narrow at apex   | <i>leucaniana</i> .  |
| Uncus broad at apex   | 3.                   |
| 3. Uncus slightly dilated at apex, spatulate; harpes with long finger-like apical process                               | <i>postvittana</i> . |
| Uncus strongly dilated at apex; harpes without finger-like process  | 4.                   |
| 4. Harpes with apical portion evenly tapered, long, acute   | <i>argentosa</i> .   |
| Harpes with apical portion not evenly tapered to acute point  | 5.                   |
| 5. Uncus battledore-shaped  | <i>subdola</i> .     |
| Uncus triangular apically   | 6.                   |
| 6. Harpes with very long hairs; aedeagus scobinate on right   | <i>indigestana</i> . |
| Harpes with hairs of moderate length; aedeagus not scobinate  | <i>maculosa</i> .    |
| 7. Uncus very broad, apex widely indented; socii absent   | <i>molybditis</i> .  |
| Uncus narrow or moderate; socii present   | 8.                   |
| 8. Uncus battledore-shaped; harpes broad, not narrowed apically   | <i>excessana</i> .   |
| Uncus not battledore-shaped   | 9.                   |
| 9. Socii moderate to long, narrow   | 10.                  |
| Socii expanded into rounded plate   | 16.                  |



|   |       |       |                      |
|---|-------|-------|----------------------|
| 10. Uncus with apex deeply indented; juxta almost circular  | ..... | ..    | <i>tigris.</i>       |
| Uncus with apex rounded   | ..... | ..    | 11.                  |
| 11. Uncus narrow  | ..... | ..    | 12.                  |
| Uncus moderate  | ..... | ..    | 14.                  |
| 12. Gnathos with upturned portion laterally compressed to form a broad plate  | ..... | ..... | <i>vestodes.</i>     |
| Gnathos normal  | ..... | ..... | 13.                  |
| 13. Uncus dilated before apex, apex pointed   | ..... | ..... | <i>orthropis.</i>    |
| Uncus not dilated, apex rounded   | ..... | ..... | <i>pictoriana.</i>   |
| 14. Uncus a little dilated then narrowed to apex  | ..... | ..... | 15.                  |
| Uncus not narrowed to apex  | ..... | ..... | 16.                  |
| 15. Uncus with apex subtruncate; socii rather long and densely haired; harpes with apex flatly rounded, angles noticeable | ..... | ..... | <i>spatiosa.</i>     |
| Uncus with apex narrower and more rounded; socii shorter and with less hair; harpes evenly rounded, angles not noticeable | ..... | ..... | <i>conditana.</i>    |
| 16. Gnathos short, very thin; uncus circularly expanded apically  | ..... | ..... | <i>incendiaria.</i>  |
| Gnathos moderately large; uncus gradually expanding to apex   | ..... | ..... | <i>characterana.</i> |
| 17. Uncus with apex rounded   | ..... | ..... | 18.                  |
| Uncus with apex truncate  | ..... | ..... | <i>crypsidora.</i>   |
| 18. Uncus lanceolate with blunt apex  | ..... | ..... | <i>flavescens.</i>   |
| Uncus finger-like   | ..... | ..... | <i>fervida.</i>      |

*T. inusitata* Philp. agrees almost exactly with *T. flavescens* Butl., but in view of the small number of the former which have been captured it is not thought advisable to unite the species at this juncture.

**Capua** Stephens. (Figs. 66 to 71.)

Practically cosmopolitan. A fairly large genus represented by 8 New Zealand species, one of which, *C. intractana* Walk., is a recent introduction from Australia. The group as here considered is a somewhat incongruous one and probably will ultimately be split up into two or three genera. It therefore seems best to treat each different type separately.

*C. semiferana* Walk.

Tegumen moderate; uncus short and rather narrow, armed beneath with a dense tuft of short spines and clothed laterally with long hair. Socii weak, somewhat rounded plates. Gnathos normal. Aedeagus not curved, slightly swollen basally, a pair of very large, spear-headed, curved cornuti. Juxta oval with apex deeply emarginate. Harpes rather short, broad, apex rounded; transtilla well developed with spiny apices closely united on meson and an inward hook; sacculus weak, opposite the sacculus the harpe is deeply and widely cleft, leaving a narrow strip of chitin between the sacculus and transtilla. Vinculum normal.

*C. cyclobathra* Meyr.

Tegumen moderate; uncus strongly curved, very thin. Socii weak, drooping. Gnathos dilated beneath towards meson. Aedeagus long, tapering, a spine-like process projecting obliquely from about  $\frac{2}{3}$  and reaching nearly to apex. Juxta a small weak plate. Harpes

moderately broad, rather long, tapering slightly and evenly rounded at apex; sacculus weak; transtilla a rather large well chitinised concave structure fitting round aedeagus and only membranously attached to the harpes; probably the normal processes which have become fused, altered in shape and detached from the harpes. Vinculum normal.

*C. intractana* Walk.

Tegumen rather narrow; uncus very narrow, slightly dilated apically. Socii broad irregular plates. Gnathos normal, much depressed. Aedeagus short, curved apex expanded and irregularly spinose. Anellus projecting ventrally very little. Juxta kite-shaped. Harpes broad, apex evenly rounded; sacculus short, extending to about  $\frac{1}{2}$ , apex expanding into inner and outer conical processes; transtilla very slight. Vinculum dechitinised on meson, arms roundly dilated at apex.

*C. arcuata* Philp.

*C. plinthoglypta* Meyr.

*C. plagiata* Walk.

Tegumen moderate; uncus moderately broad, hardly dilated apically, apex rounded. Socii rather small. Gnathos normal. Aedeagus rather small, bent, "heel" long, small cornuti present. Anellus and juxta normal. Harpes rather short, broad, hardly narrowed apically; sacculus weak, short; transtilla of normal shape but small. Vinculum normal.

KEY TO THE PRECEDING SECTION OF *CAPUA*.

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|---|------------------------|
| 1. Upper apical angle of harpes pointed . . . . .                                 | <i>plinthoglypta</i> . |
| Upper apical angle of harpes rounded . . . . .                                    | 2.                     |
| 2. Aedeagus sharply bent; juxta rounded; harpes subtruncate apically . . . . .    | <i>plagiata</i> .      |
| Aedeagus less sharply bent; juxta angular; harpes more rounded apically . . . . . | <i>arcuata</i> .       |

**Catamacta** Meyrick. (Figs. 72 to 74.)

A small genus with 7 New Zealand representatives, only 3 of which have been available for examination.

Tegumen moderately broad; uncus narrow to moderately broad. Socii of normal length, narrow or broad. Gnathos normal. Aedeagus moderately curved, tapering, apex obliquely pointed. Anellus and juxta normal. Harpes broad, oblong, apex subtruncate; sacculus weak, extending to about  $\frac{1}{2}$ ; transtilla normal. Vinculum normal.

KEY TO THE SPECIES OF *CATAMACTA*.

- |   |                   |
|---|-------------------|
| 1. Uncus tapering to narrow apex; socii expanding into broad plate; a patch of long hair on eighth tergite extending over tegumen . . . . . | <i>latomana</i> . |
| Uncus not tapering; socii narrow; eighth tergite without long hair . . . . .  | 2.                |
| 2. Uncus moderately broad; apex subtruncate; harpes with upper apical angle rectangular . . . . .   | <i>rureana</i> .  |
| Uncus narrow, apex rounded; harpes with upper apical angle rounded . . . . .  | <i>gavisana</i> . |

**Pyrgotis** Meyrick. (Figs. 75 to 76.)

A small genus with 3 New Zealand and some Australian species. The rare *P. eudorana* Meyr. has not been available for examination.

Tegumen moderately broad; uncus broad. Socii narrow, rather short. Gnathos normal. Aedeagus rather small, not swollen basally, curved. Anellus and juxta normal. Harpes broad, not narrowed apically; sacculus, reaching to about  $\frac{3}{4}$ ; transtilla normal. Vinculum normal.

KEY TO THE SPECIES OF *PYRGOTIS*.

- Uncus gradually expanding to subtruncate apex; aedeagus without barbs above; juxta rounded . . . . . *consentiens*.  
 Uncus not dilated apically; aedeagus with row of minute barbs on upper surface; juxta angular . . . . . *pyramidias*.

**Proselena** Meyrick. (Figs. 77 and 78.)

A small Australian and New Zealand genus; two species have been described from New Zealand.

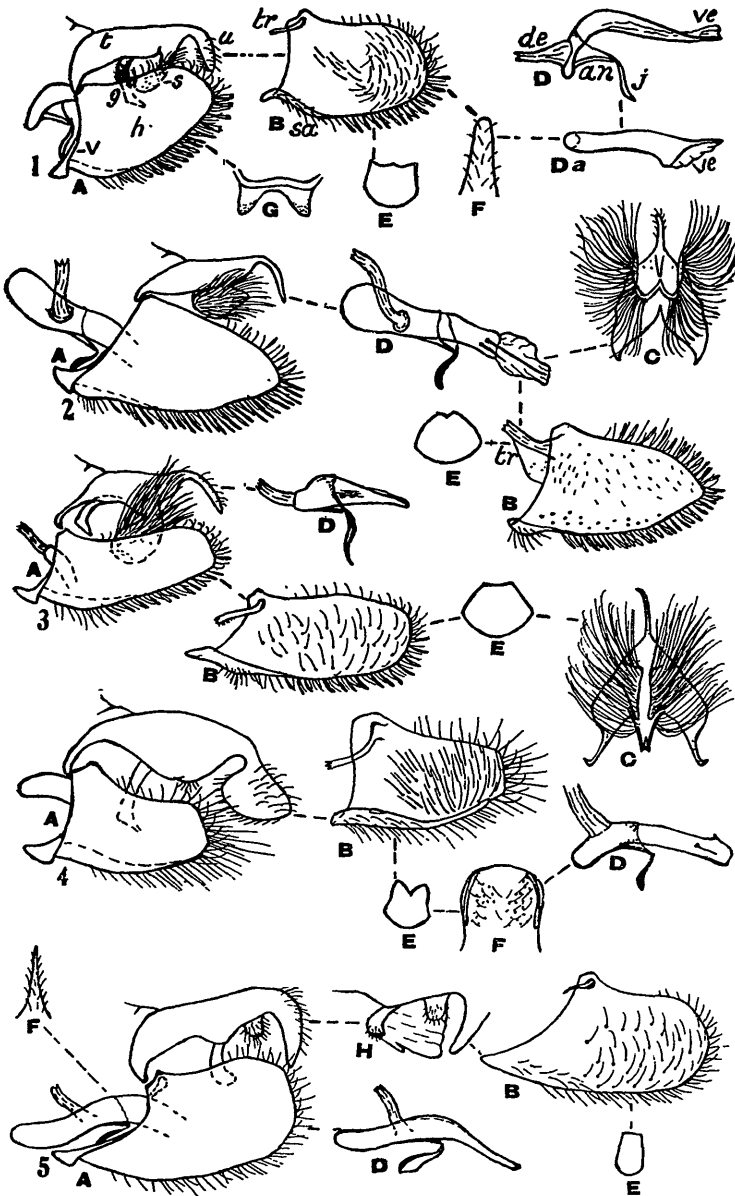
Tegumen short, moderately broad, remote from vinculum and articulating with the transtillae; socii rather weak, rounded, hairy plates. Gnathos forming a plain narrow band, slightly upturned on the meson. Aedeagus short, curved, basally swollen. Juxta a small plate passing into the anellus, which stands out above the aedeagus as a bifid plate, the apices of which articulate with the transtilla. Harpes long, narrow, slightly tapering to rounded apex; sacculus undefined; transtilla formed by the produced basal angle of the harpe, not a separate process as in the rest of the family. Vinculum moderate, broader than in other genera.

KEY TO THE SPECIES OF *PROSELENA*.

- Socii very small; juxta angular; anellus not bifid above; vinculum broad at apex . . . . . *niphostrota*.  
 Socii moderate; juxta rounded; anellus bifid above; arms of vinculum not broad at apex . . . . . *antiquana*.

## LETTERING.

(Lettering: a, anus; ae, aedeagus; an, anellus; b, barb on aedeagus; c, cornuti; de, ductus ejaculatorius; g, gnathos; h, harpe; ht, hair-tuft beyond eighth segment; j, juxta; s, socii; sa, sacculus; t, tegumen; tr, transtilla; u, uncus; ua, upper extension of anellus; v, vinculum; ve, vesica. Unless otherwise stated the views of the genitalia (A) and the aedeagus (D) are from the lateral aspect, that of the harpe (B) is from within, and that of the uncus a dorsal one.)



- FIG. 1.—*Cnephasia microbathra* Meyr. A, male genitalia. B, harpe. D, aedeagus. Da, aedeagus, ventral view. E, juxta. F, uncus. G, transtilla.
- FIG. 2.—*C. jactatana* Walk. A, male genitalia. B, harpe. C, tegumen, ventral view. D, aedeagus. E, juxta.
- FIG. 3.—*C. incessana* Walk. A, male genitalia. B, harpe. C, tegumen, ventral view. D, aedeagus. E, juxta.
- FIG. 4.—*C. latomana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 5.—*C. imbriferana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii, gnathos and anal tube, lateral view.

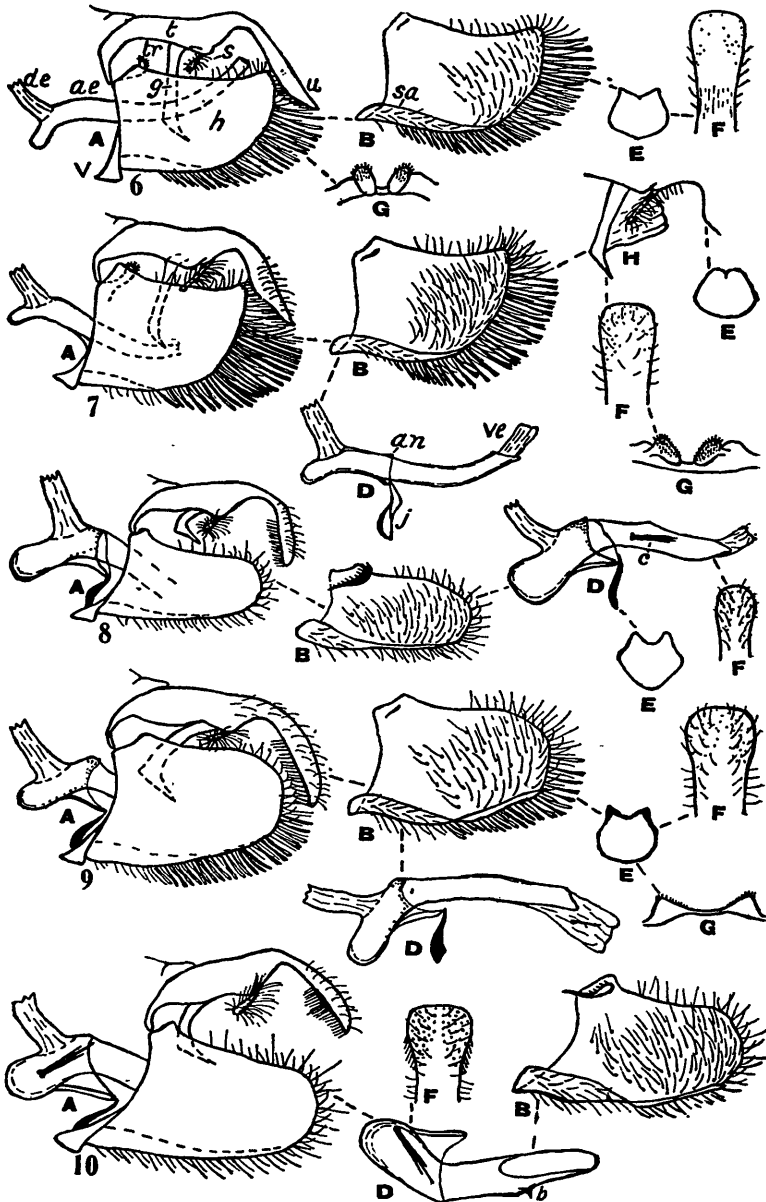


FIG. 6.—*C. sphenias* Meyr. A, male genitalia. B, harpe. E, juxta. F, uncus. G, transtilla.  
 FIG. 7.—*C. fastigata* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. G, transtilla. H, socii, gnathos and anal tube, lateral view.  
 FIG. 8.—*Harmologa sanguinea* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 9.—*H. festiva* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. G, transtilla.  
 FIG. 10.—*H. reticularis* Philp. A, male genitalia. B, harpe. D, aedeagus. F, uncus.

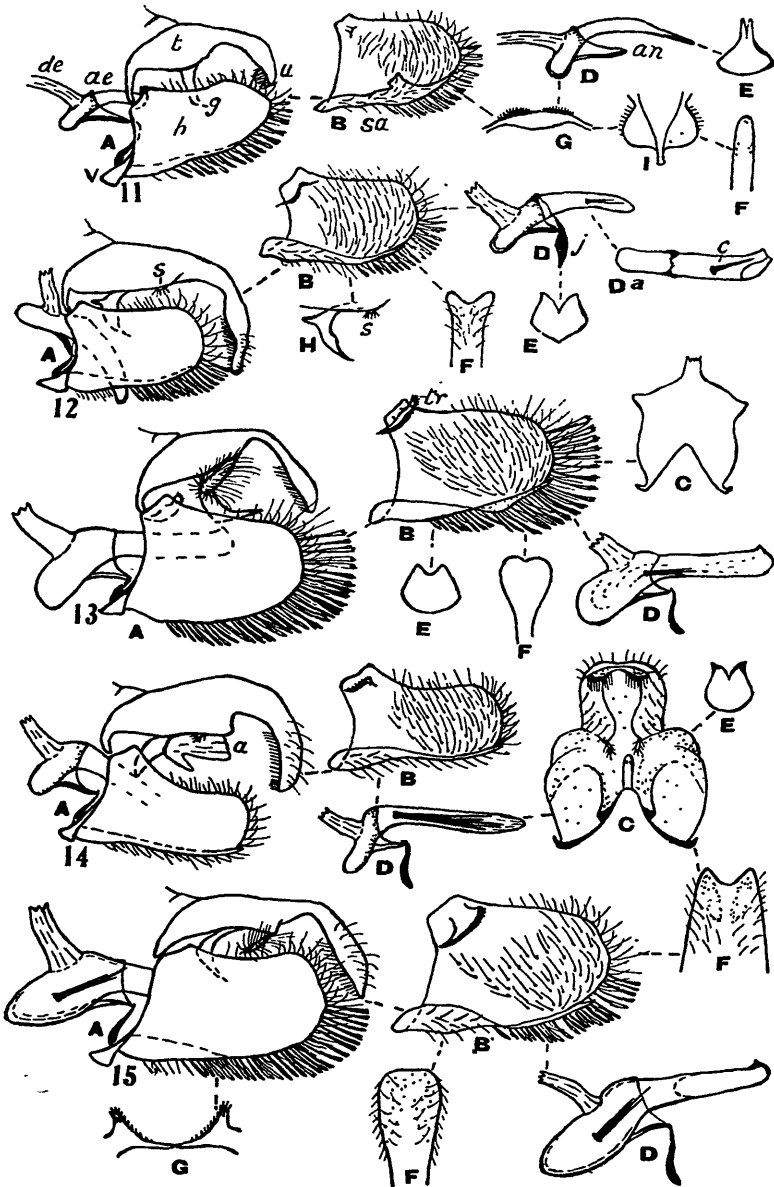


FIG. 11.—*H. tenebrosa* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. G, transtilla. I, gnathos, caudal view.  
 FIG. 12.—*H. oblongana* Walk. A, male genitalia. B, harpe. D, aedeagus. Da, aedeagus, ventral view. E, juxta. F, uncus. H, socii and gnathos, lateral view.  
 FIG. 13.—*H. petrius* Meyr. A, male genitalia. B, harpe. C, tegumen, dorsal view. D, aedeagus. E, juxta. F, uncus.  
 FIG. 14.—*H. amplexana* Z. A, male genitalia. B, harpe. C, tegumen, ventral view. D, aedeagus. E, juxta. F, uncus.  
 FIG. 15.—*H. columella* Meyr. A, male genitalia. B, harpe. D, aedeagus. F, uncus. G, transtilla.

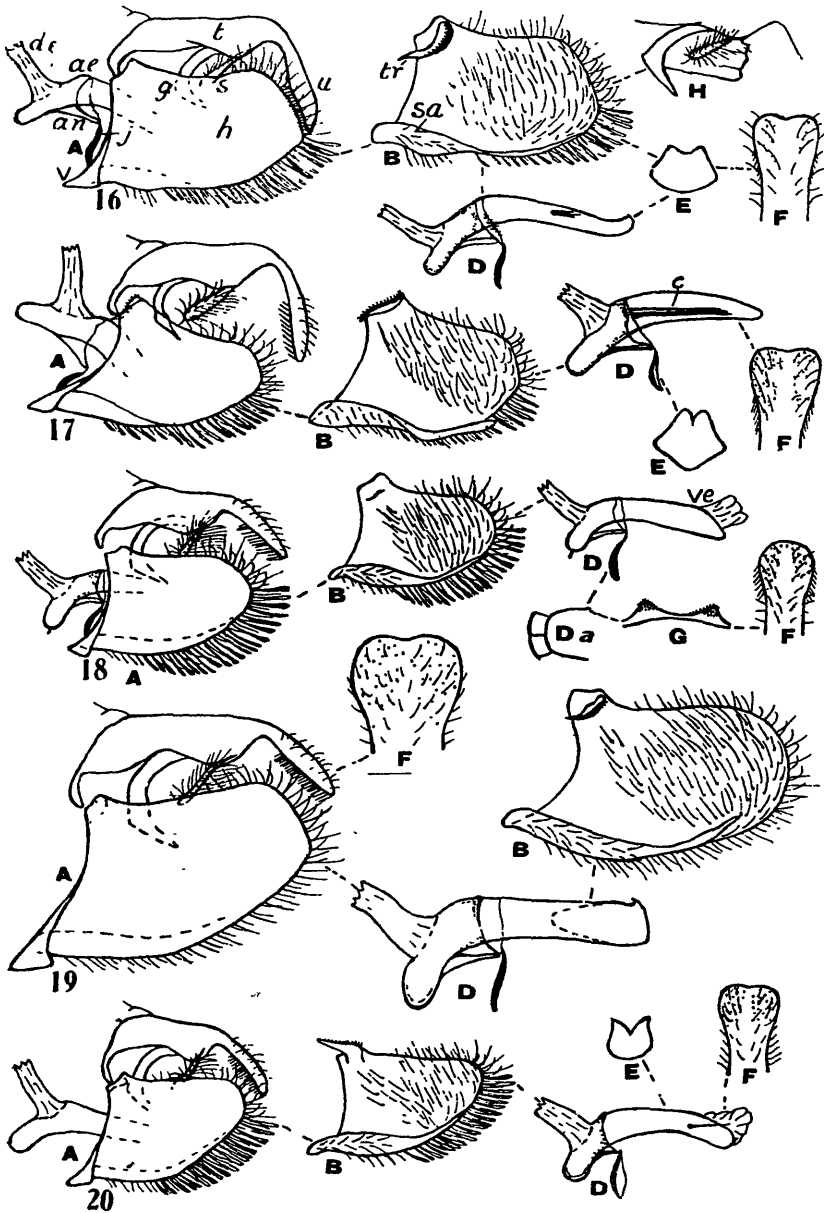


FIG. 16.—*H. scoiastis* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii, gnathos and anal tube, lateral view.  
 FIG. 17.—*H. pontifica* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 18.—*Gelophaula tributaria* Philp. A, male genitalia. B, harpe. D, aedeagus. Da, aedeagus, basal portion, ventral view. G, transtilla.  
 FIG. 19.—*G. trisulca* Meyr. A, male genitalia. B, harpe. D, aedeagus. F, uncus.  
 FIG. 20.—*G. palliata* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.

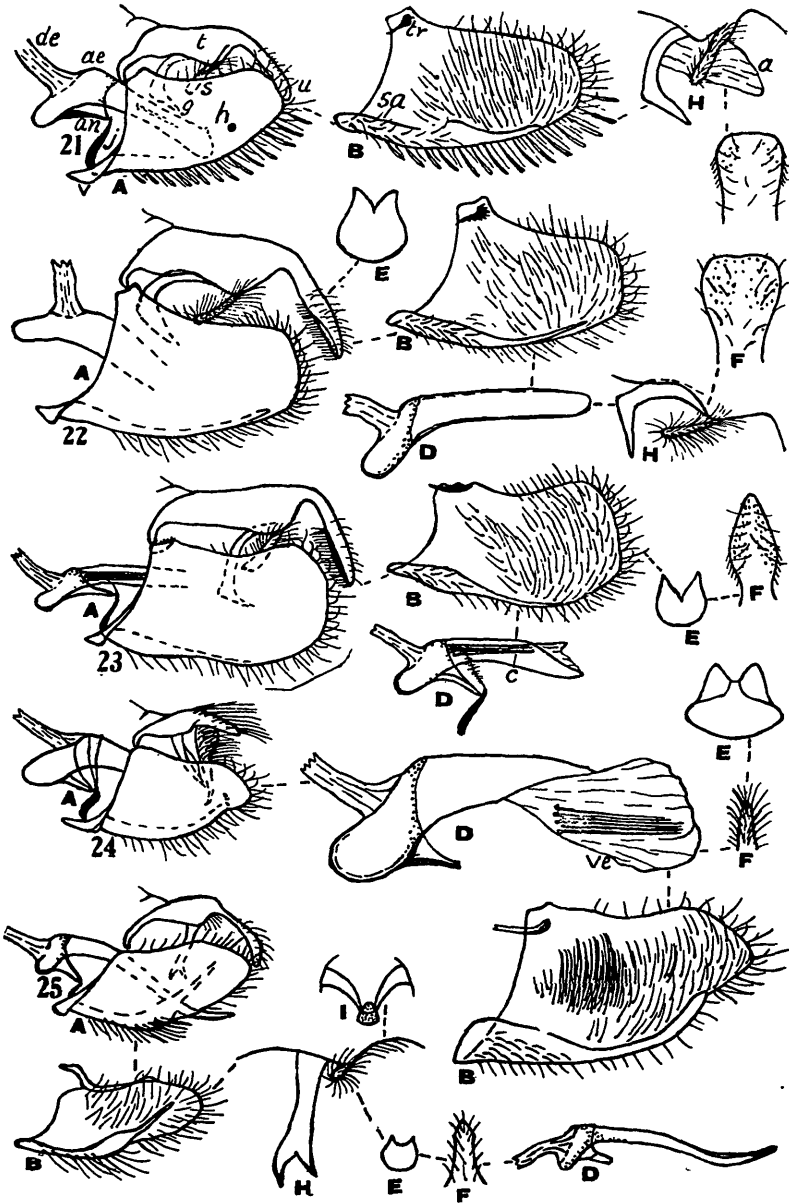
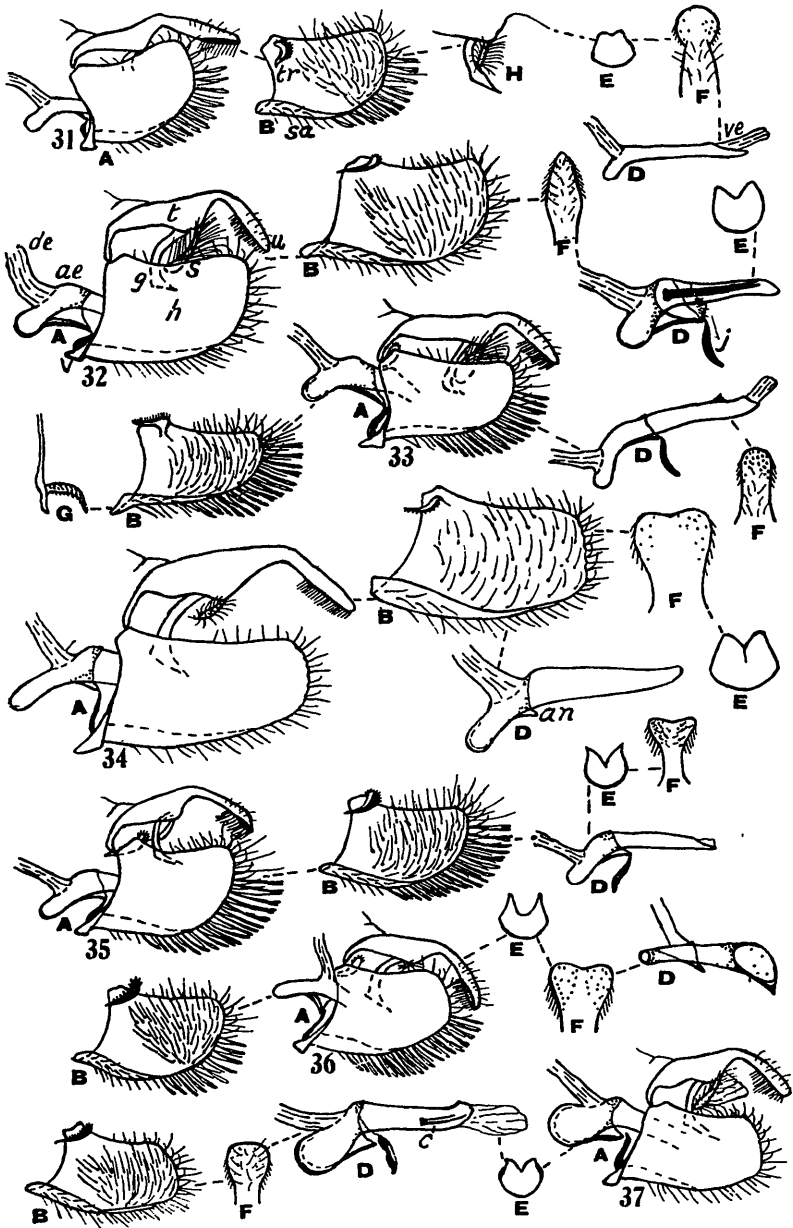


FIG. 21.—*G. siraea* Meyr. A, male genitalia. B, harpe. F, uncus. H, socii, gnathos and anal tube, lateral view.  
 FIG. 22.—*G. n. sp.* A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii and gnathos, lateral view.  
 FIG. 23.—*Ctenopseustis obliquana* Walk. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 24.—*Epalaxiphora axenana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 25.—*Ecclitica hemichlista* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii and gnathos. I, gnathos, dorso-caudal view.







- FIG. 31.—*E. speciosa* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii and gnathos, lateral view.
- FIG. 32.—*E. persecta* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 33.—*E. allogama* Meyr. A, male genitalia. B, harpe. D, aedeagus. F, uncus. G, transtilla, dorsal view.
- FIG. 34.—*E. fraudulenta* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 35.—*E. aspistana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 36.—*E. hemionana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 37.—*E. siriana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.

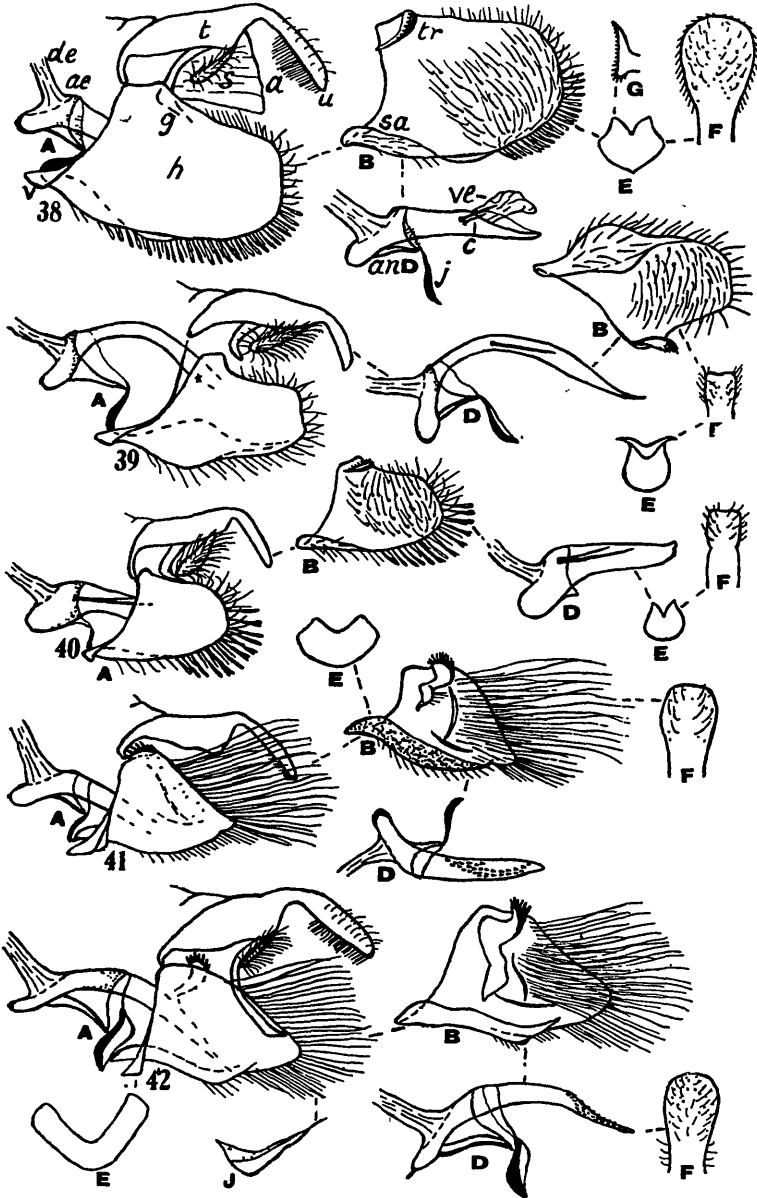
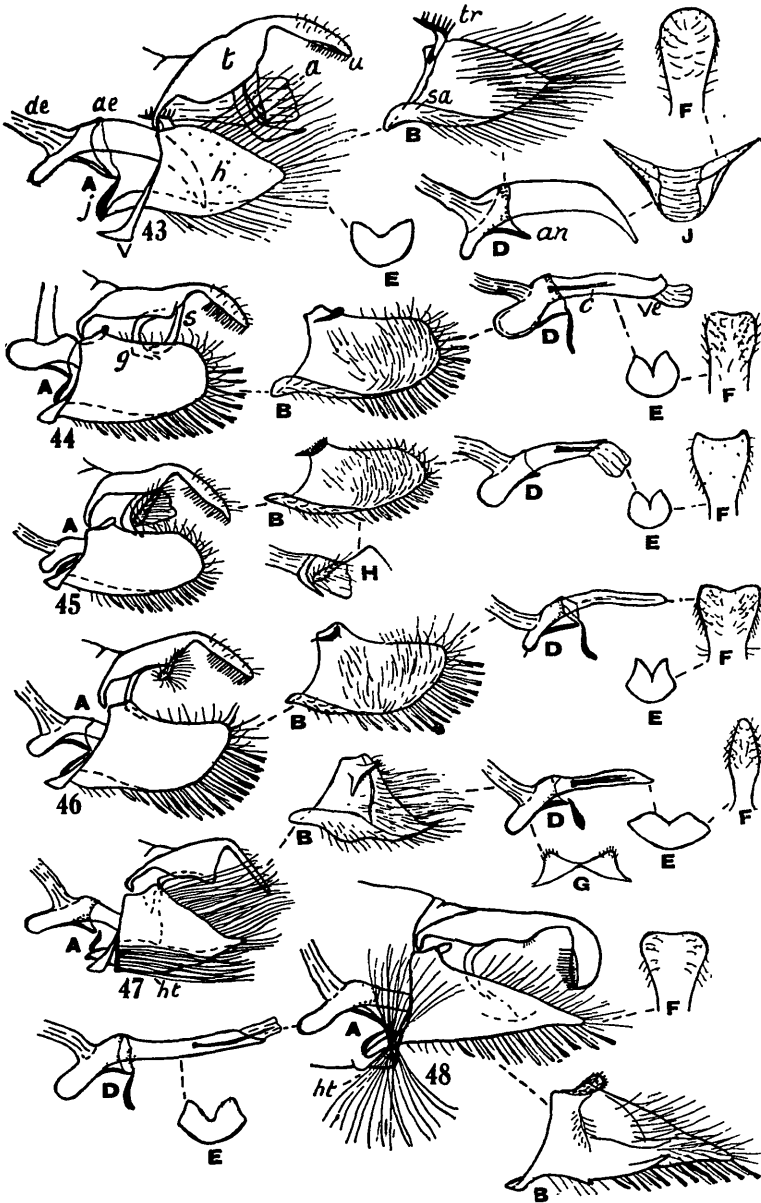


FIG. 38.—*E. elephantina* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. G, transtilla.  
 FIG. 39.—*E. eribola* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 40.—*E. zatrophana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 41.—*Eurythecta paraloxa* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 42.—*E. zelaea* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. J, arm of vinculum.



- FIG. 43.—*E. robusta* Butl. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. J, vinculum.
- FIG. 44.—*E. eremana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 45.—*E. loxias* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii, gnathos and anal tube, lateral view.
- FIG. 46.—*E. curva* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 47.—*Tortrix leucaniana* Walk. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. G, transtilla.
- FIG. 48.—*T. argentosa* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.

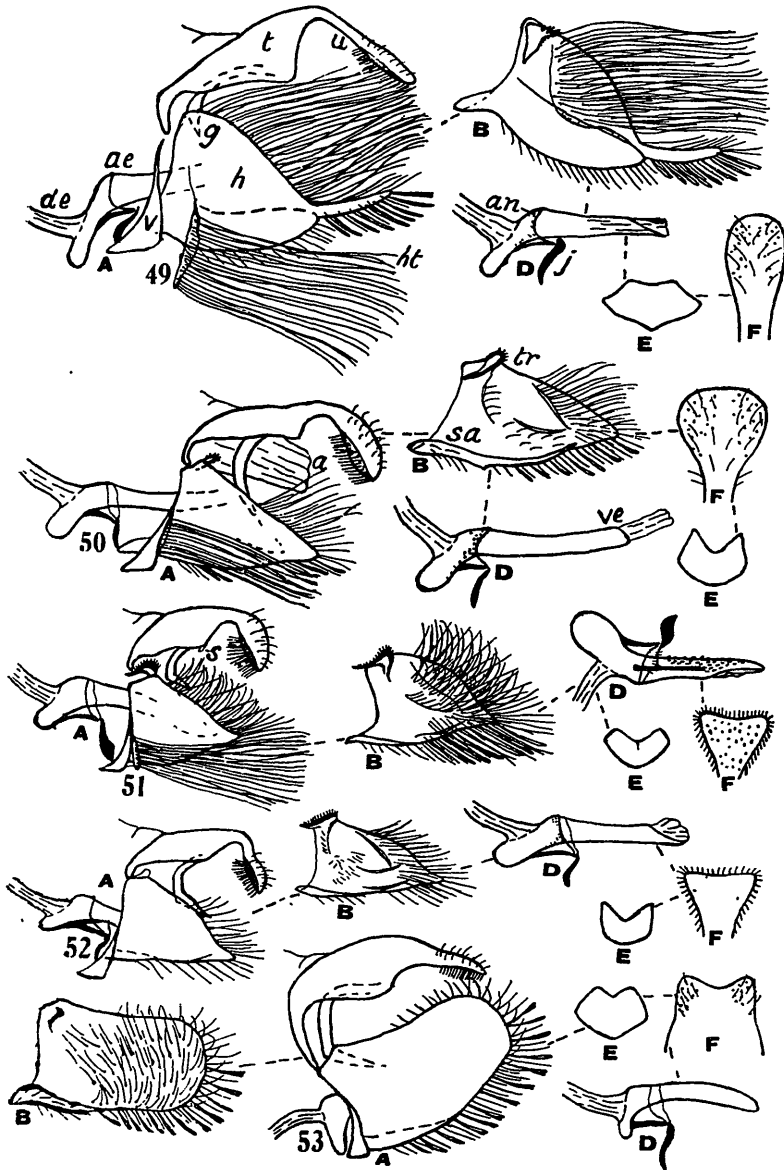


FIG. 49.—*T. postvittana* Walk. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 50.—*T. subdola* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 51.—*T. indigestana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 52.—*T. maculosa* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 53.—*T. molybditis* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.

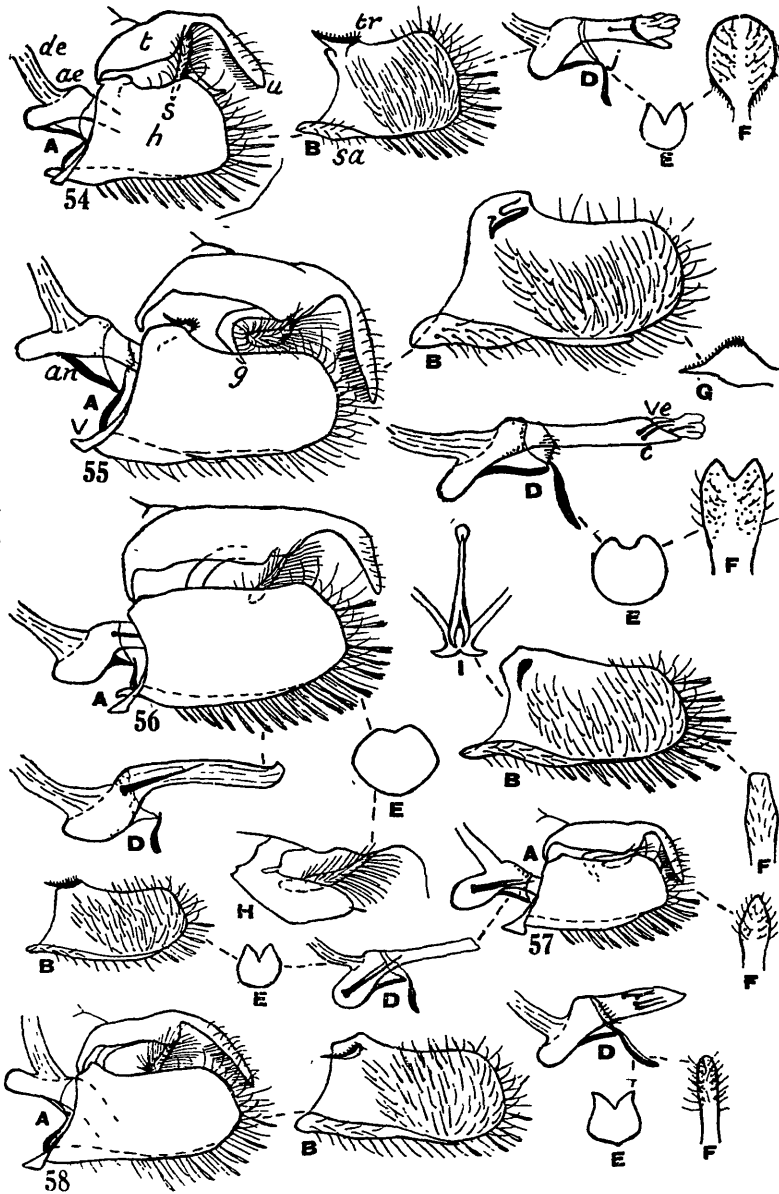


FIG. 54.—*T. excessana* Walk. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 55.—*T. tigris* Philp. A, male genitalia. B, harpe. D, eadeagus. E, juxta. F, uncus. G, transtilla.  
 FIG. 56.—*T. vestodes* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii and gnathos, lateral view. I, gnathos, ventral view.  
 FIG. 57.—*T. orthropis* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 58.—*T. pictoriana* Feld. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F uncus.

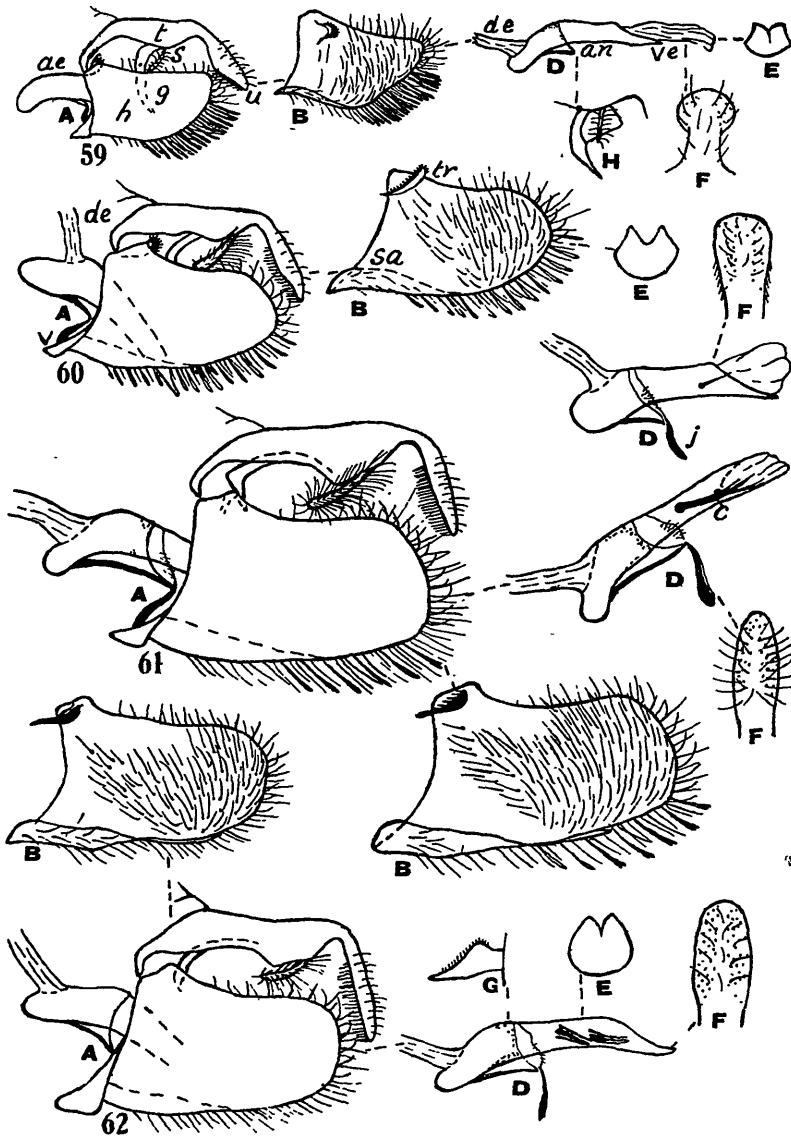
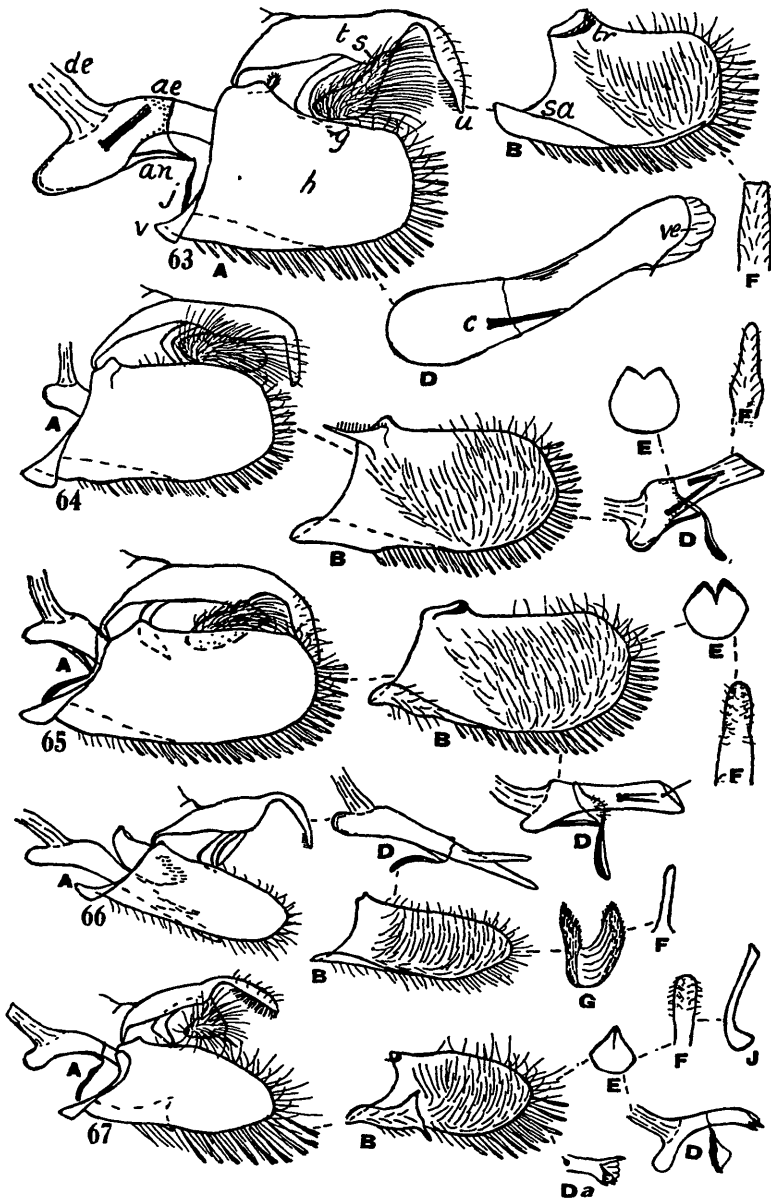


FIG. 59.—*T. incendiaria* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socioi, gnathos and anal tube, lateral view.  
 FIG. 60.—*T. charactana* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 61.—*T. spatiosa* Philp. A, male genitalia. B, harpe. D, aedeagus. F, uncus.  
 FIG. 62.—*T. conditana* Walk. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. G, transtilla.



- FIG. 63.—*T. crypsidora* Meyr. A, male genitalia. B, harpe. D, aedeagus. F, uncus.
- FIG. 64.—*T. flavescens* Butl. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 65.—*T. fervida* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 66.—*Capua cyclobathra* Meyr. A, male genitalia. B, harpe. D, aedeagus. F, uncus. G, transtilla, obliquely ventral view.
- FIG. 67.—*C. intractana* Walk. A, male genitalia. B, harpe. D, aedeagus. Da, apex of aedeagus, ventral view. E, juxta. F, uncus. J, arm of vinculum.



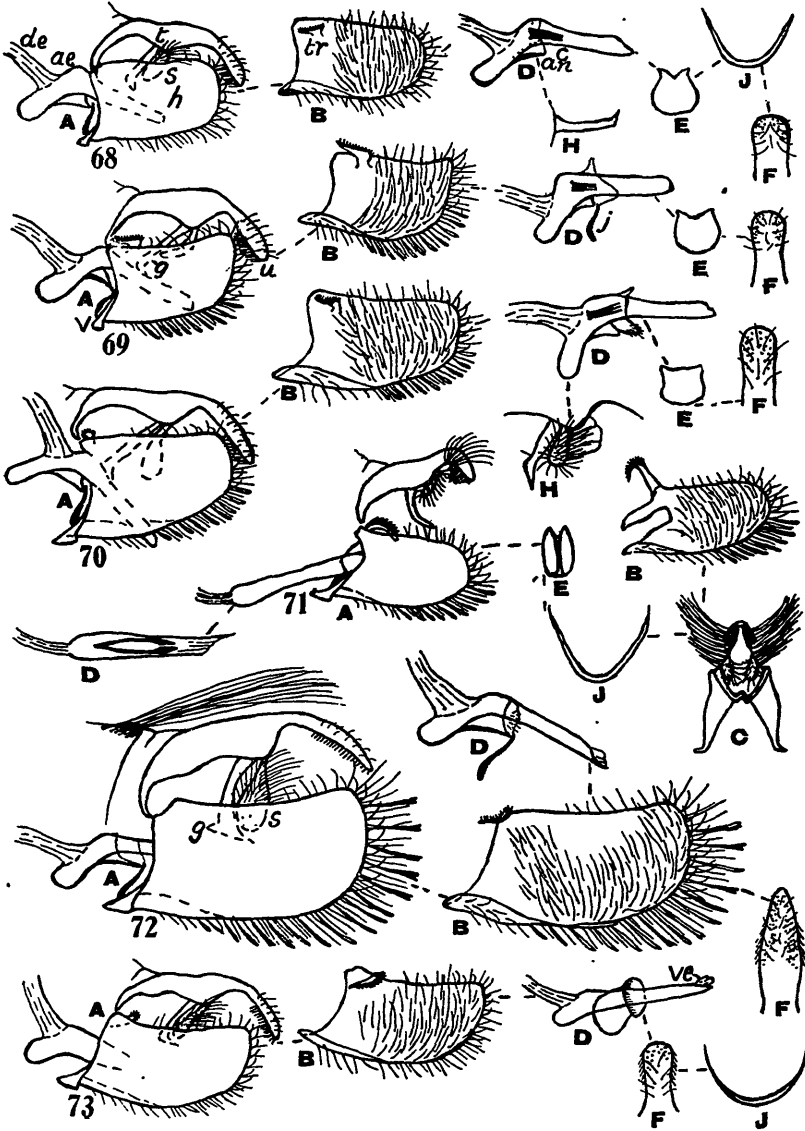
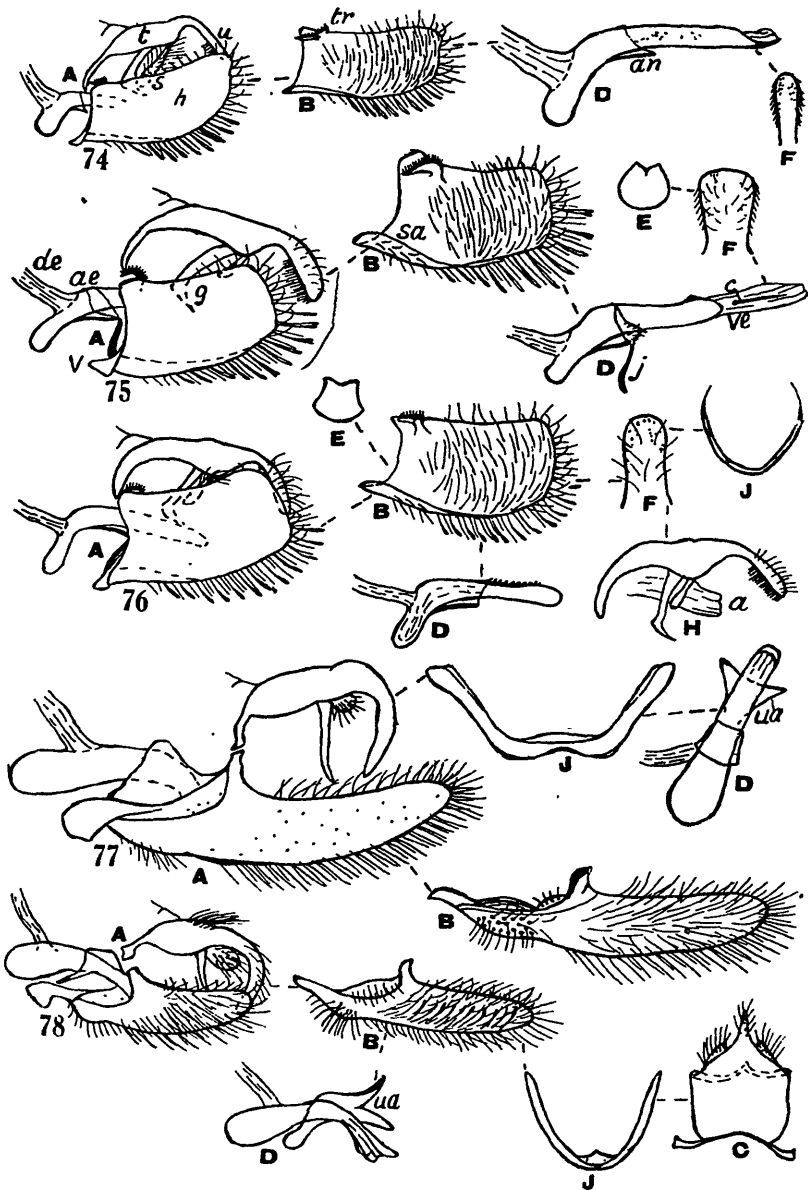


FIG. 68.—*C. arcuata* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. I, gnathos, lateral view. J, vinculum.  
 FIG. 69.—*C. plinthoglypta* Meyr. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.  
 FIG. 70.—*C. plagiata* Walk. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus. H, socii, gnathos and anal tube, lateral view.  
 FIG. 71.—*C. semiferana* Walk. A, male genitalia. B, harpe. C, tegumen, lateral view. D, aedeagus, dorsal view. E, juxta. J, vinculum.  
 FIG. 72.—*Catamacta lotinana* Meyr. A, male genitalia. B, harpe. D, aedeagus. F, uncus.  
 FIG. 73.—*C. rureana* Feld. A, male genitalia. B, harpe. D, aedeagus, obliquely lateral view. F, uncus. J, vinculum.



- FIG. 74.—*C. gavisana* Walk. A, male genitalia. B, harpe. D, aedeagus. F, uncus.
- FIG. 75.—*Pyrgotis consentiens* Philp. A, male genitalia. B, harpe. D, aedeagus. E, juxta. F, uncus.
- FIG. 76.—*P. pyramidias* Meyr. A, male genitalia. B, harpe. C, tegumen, lateral view. D, aedeagus. E, juxta. F, uncus. J, vinculum.
- FIG. 77.—*Proselena niphostrota* Meyr. A, male genitalia. B, harpe. D, aedeagus, ventral view. J, vinculum.
- FIG. 78.—*P. antiquana* Walk. A, male genitalia. B, harpe. C, tegumen, dorsal view. D, aedeagus, obliquely lateral view. J, vinculum.