

5. Tentorial cross-arm internal. (Palpiger large, bearing lacinia and palpus; epipleurum protuberant on all abdominal segments; legs present) *Lepturinae* (pls. 99 G, H, 100 H-L)
- Tentorial cross-arm (tb pl. 100 M) in the same plane as the hypostoma, bridging the ventral surface of the head. (Larva very elongate and slender; legs present)
Disteniinae (pl. 100 M)

R. BOSTRICHODEA

KEY TO FAMILIES

1. Head protracted; mandible dentate. (Terga hairy or not, often with rows or patches of asperities) 2
- Head retracted; mandible not dentate, usually with gouge-shaped distal end. (Terga without asperities) 3
2. Thoracic spiracle pushed forward to anterior margin of prothorax. (Spiracles bearing a single spoutlike prolongation (prl pl. 101 E); a small, often curved, transverse sclerome present at the end of a median groove between the longitudinally placed anal lobes (ats pl. 101 G); terga without asperities) *Ptinidae* (pl. 101 A, B, E)
- Thoracic spiracle not reaching anterior margin of prothorax. (Spiracles without single spoutlike prolongations, except in *Anobium*, where they are large; with or without a small, transverse sclerome at the end of a longitudinal, median anal groove; straight, curved, or hook-shaped tergal asperities on all or some of the segments, except in *Ozognathus* and *Lasioderma*) *Anobiidae* (pl. 101 C, D, F-N, X, Ae, Oe)
3. Mandible without a dorsal, molarlike process; epipharynx without a large sclerome; lacinia mandibulae absent
*Bostrichidae*⁷⁷ (pl. 101 O-W, Y, Z)
- Mandible with a dorsal, molarlike process, grinding against a large sclerome in epipharynx; lacinia mandibulae present and fleshy 4
4. Abdominal spiracles subequal in size
*Psoidae*⁷⁸ (pl. 102 A-E)

⁷⁷ The family includes all the genera usually placed in the family Bostrichidae, except the genera which are here tabulated in the family Psoidae.

⁷⁸ The family Psoidae includes the following genera, usually placed in the Bostrichidae: *Stephanopachys* (Saalas, U., Die Fichtenkäfer Finlands, part 2, 1923, pp. 179 and 700, figs. 115-120), *Rhizophorthera*, *Dinoderus*, and *Dinoderopsis* (Lesne, P., Les coléoptères Bostrychides de l'Afrique tropicale française, Paris, 1924, pp. 47 and 77), *Polycaon*, and *Psoa*.

Last abdominal spiracle much larger than the others
Lyctidae (pl. 102 F-K)

S. CHRYSOMELOIDEA

KEY TO FAMILIES AND SUBFAMILIES

1. Mandible simple, distally either with a broad, transverse, gougelike cutting edge, or with a simple apex 2
- Mandible dentate, distally with from two to five teeth 5
2. Prementum and mentum fused, bearing a common, median, escutcheonlike sclerome with a pair of light, circular areas anteriorly. (Labial palpi either (in *Pachymerinae*) rudimentary, one-jointed, and placed in the light, circular areas of the escutcheon (pl. 103 D), or (in *Bruchinae*) completely absent; mandible short, strong, gouge-shaped, with rounded, distal edge; body curved and plump; legs vestigial except in the first larval instar (pl. 103 N). Ocelli three in *Pachymerinae*, one in *Bruchinae*)
Bruchidae (= *Mylabridae*) (pl. 103 A-N)
- Prementum and mentum without escutcheonlike sclerome. (Labial palpi present, except in a few *Halticinae* as *Dibolia* and *Sphaeroderma* (pl. 114 H, and N)) 3
3. Legs present and fully developed; body curved and plump. (Mandible with excavated inner side and single, pointed apex; prementum distinct and covered with an unpaired subtriangular sclerite; mentum distinct, free laterally; labial palpi inserted well apart) *Sagridae* (pl. 104 A-H)
- Legs absent; body straight. (Leaf miners with distinct ninth abdominal segment) 4
4. Prementum and mentum not fused; labial palpi inserted well apart at the base of ligula; mandible with excavated inner side and single, pointed apex
Orsodacnidae-Orsodacninae (pl. 105 A-E)
- Prementum, mentum, and submentum fused; labial palpi close together; ligula absent; mandible with transverse, approximately gouge-shaped, and slightly scalloped distal edge
Orsodacnidae-Zeugophorinae (pl. 105 F-H)
5. Spiracles of eighth abdominal segment biforous, terminal, and projecting like a pair of spurs. (Mentum free laterally and fused posteriorly with submentum; galea and lacinia adapted for sucking of plant juice; larva club-shaped and curved, feeding on submerged parts of fresh-water plants and swamp plants) *Donaciidae* (pl. 106 A-R)
- Spiracles of eighth abdominal segment not projecting like spurs 6

6. Labrum small, or indistinct and fused with frons and clypeus. (Legs very long, slender, and without pulvillus; abdomen swollen posteriorly, doubled back upon itself, and adapted for carrying a case made either from the excrement of the larva, or, in *Lamprosoma*,⁷⁹ from fine particles of wood glued together with the excrement of the larva and with resin from the host tree)7
 Labrum well-developed and free9
7. Tarsungulus short, strongly hamate, with a large heel. (Antenna two-jointed, with conical sensory appendix (sj pl. 107 G); third joint represented only by a strong seta)
Camptosomatidae - Chlamydyinae
 (pl. 107 G, H)
 Tarsungulus slender, somewhat curved and awl-shaped; heel absent or insignificant8
8. Antenna two-jointed, with a broad, pillbox-shaped sensory appendix (sj pl. 107 A, B); third joint represented only by a seta*Camptosomatidae - Clytrinae* (pl. 107 A-F)
 Antenna three-jointed, with a conical sensory appendix; third joint seta-bearing and shorter than the appendix. (Frons almost circular in outline and flat)
Camptosomatidae - Cryptocephalinae and *Camptosomatidae - Lamprosominae*
9. Maxillary palpus three- or four-jointed, excluding palpiger;⁸⁰ eighth abdominal pair of spiracles present and laterally placed; eighth abdominal segment not terminal, its hind margin connected with the front margin of the ninth abdominal segment10
 Maxillary palpus two-jointed or less; eighth abdominal pair of spiracles either present, but dorsally placed, or absent; eighth abdominal segment terminal with free hind margin15
10. Tarsungulus long, slender, and without pulvillus; mandible compressed, with two to three distal teeth; epicranial suture long; ocelli absent. (Larva white; abdominal segments without dorsal scleromes and ventrally often with rounded, projecting lobes with many stiff setae)
Eumolpidae (pl. 108 A-M)
 Tarsungulus of moderate length, curved, and usually with pulvillus (pon pl. 109 M); mandible palmate, with four to five distal teeth; combination of a long epicranial suture and lack of ocelli not found11

⁷⁹ The larva of *Lamprosoma bicolor* Kirby and its pointed, hood-shaped case are described by Carlos Moreira (Ann. Soc. Ent. France, vol. 82, 1913, pp. 743-745, one plate).

⁸⁰ Very rarely two-jointed, as in *Sphaeroderma* (pl. 114 N).

11. More than one ocellus on each side of head, usually five or six ocelli; antenna three-jointed12
 One ocellus on each side, or none; antenna two-jointed or less13
12. First eight abdominal segments with a transverse, ventral region with ambulatory warts (pl. 109 G); anal opening dorsal; labial palpus one-jointed. (Spiracles annular or biforous; larva covered with excrement or slimy exudation).....
Crioceridae (pl. 109 A-G)
 First eight abdominal segments without any ambulatory warts; anal opening ventral and placed in the middle of the sucking disk of the tenth abdominal segment; labial palpus two-jointed *Chrysomelidae* (pl. 109 H-M)
13. With a combination of the three following characters: Epicranial suture well-developed or long; one ocellus on each side of head; dorsal region of each of first to seventh abdominal segments distinctly subdivided into two or three transverse areas (pl. 110 C and G)
*Galerucidae - Galerucinae*⁸¹ (pl. 110 A-M)
 With a different combination of the three characters14
14. Epicranial suture present, but usually short; ocelli absent; dorsal region of each of first to seventh abdominal segments subdivided into three transverse areas. (Intersegmental membranes often large; spiracles annular, except in *Exosoma*, (pl. 111 M), where they are biforous)
*Galerucidae - Diabroticinae*⁸²
 (*Diabrotica*, *Cerotoma*, *Phyllobrotica*, and *Exosoma lusitanica*) (pl. 111 A-M)
 Different combination. (Spiracles always annular)
*Galerucidae - Halticinae*⁸³ (pls. 112 A-R, 113 A-X, 114 A-O)

⁸¹ In the present subfamily Galerucinae are included all of the genera which usually are placed in the subfamily Galerucinae, with the exception of the ones tabulated in the following subfamily, Diabroticinae.

⁸² This subfamily, which probably includes more genera than the ones listed above, but whose larvae are unknown, is more closely connected with the Halticinae tribes, Crepidoderini, Chaetocnemini, Systemini, and Psylliodini than with the subfamily Galerucinae, as here conceived.

⁸³ The subfamily Halticinae includes genera with remotely related larvae such as *Blepharida*, (112 L, O, Q, R), *Oedionychis* (113 A-E), *Haltica* (112 A, B), *Psylliodes* (112 M, N), and *Sphaeroderma* (114 I-O). When better studied, the classification of the entire family Galerucidae will unquestionably be changed.

15. Eighth pair of abdominal spiracles well-developed and dorsal, in some genera biforous, in others annular, eighth abdominal segment terminal, with free hind margin
Hispidae (pl. 115 A-K)
 Eighth pair of abdominal spiracles vestigial; tergum of eighth abdominal segment often provided with an upright fork bearing the cast skins or the excrement of the larva (pl. 116 G) *Cassididae* (pl. 116 A-I)

T. PLATYSTOMOIDEA

KEY TO SUBFAMILIES

1. Legs present, one-, two-, or three-jointed, always without a claw-shaped tarsungular joint. (Spiracles annular, uniform, or biforous) *Platystomidae - Brachytarsinae* (pl. 117 A-K)
 Legs absent, semiglobular pedal lobes occupying their place. (Mesothoracic spiracle biforous (pl. 117 O, N); abdominal spiracles uniform; body profusely covered with long hairs) *Platystomidae-Choraginae* (*Araecerus*) (pl. 117 L-Q)

U. CURCULIONOIDEA

KEY TO FAMILIES AND SUBFAMILIES

1. Mentum-portion of fused subfacial region free laterally; legs present, but small, and usually two-jointed
Brenthidae (pl. 118 A-G)
 Mentum connected laterally with maxillary stipes; legs absent; pedal lobes, occupying their place, often bulging 2
 2. Head capsule elongate, broadening posteriorly, and with straight sides. (Head deeply retracted; spiracles uniform with the mouthpiece equipped with a spoutlike prolongation (pl. 119 A) *Proterhinidae* (pl. 119 A-H)
 Head capsule narrowing posteriorly, and with curved sides 3
 3. Abdominal hypopleurum subdivided into at least two lobes, one superposed upon the other 7
 Abdominal hypopleurum not subdivided 4
 4. Abdominal segments with no more than two transverse, dorsal plicae 5
 Abdominal segments with three or four transverse, dorsal plicae 6
 5. More than two ocelli on each side; head retracted; frons indistinct; mentum bearing a median, unpaired plate more or less completely fused with a subtriangular, unpaired plate borne by prementum; labial palpus distinctly two-jointed
Attelabidae - Rhynchitinae and
Attelabidae - Attelabinae (pl. 118 H-M)

- One ocellus on each side; head protracted; frons distinct; mentum without a plate and prementum without a subtriangular, unpaired plate; basal joint of labial palpus reduced or absent, distal joint distinct
Apionidae (not including *Cylas*)
 pl. 120 A-D)
 6. Spiracles on second to seventh abdominal segments not projecting and not placed dorsally
Curculionidae and *Scolytidae*⁸⁴
 (pls. 120 E-G, 121 A-U, 123 A-E)
 Spiracles on second to seventh abdominal segments projecting, hook-shaped, and placed dorsally. (Larva submerged, living between the leaves of rice)..... *Curculionidae - Lissorhoptrinae* (*Lissorhoptrus simplex*) (pl. 122 A-V)
 7. Maxillary palpus two-jointed; spiracles either biforous with large, oval spiracular opening, or, in the single genus *Rhynchophorus*, bilabiate *Calendridae* (pl. 123 F-H)
 Maxillary palpus one-jointed with the dome-shaped, soft end covered with fine, short hairs; spiracles uniform, with spoutlike prolongation from a ring-shaped mouthpiece. (Prothoracic tergum armed in the middle with a transverse ridge composed of a series of ring-shaped scleromes of different sizes) *Platypodidae*⁸⁵ (pl. 123 I-P)

V. LYMEXYLOIDEA

The systematic position of this series has been discussed in a footnote²⁰. It contains only the one family Lymexylidae which is

⁸⁴ The larvae of the Curculionidae and Scolytidae can not be separated. In most of the larvae of these two families, the body is whitish, fleshy, subcylindrical, more or less curved, without abdominal prolegs, and not clothed with long hair. However, in the leaf-mining genera *Orchestes* and *Prionomerus*, (pl. 120 E, F), the body is rather straight and either flat both on the dorsal and ventral side, or only flat ventrally but projecting laterally into broad, rounded processes on most of the segments (Trägårdh, Ivar, Arkiv for Zoologi, vol. 6, No. 7, 1910, pp. 1-22, English text, two plates); in the slimy larva of *Cionus solani* Fab. (pl. 120 G), which is free-living on the leaves of *Verbascum*, and in larvae of Hyperini paired prolegs are found on the underside of the abdominal segments; and in the hyperine species *Phelypera distigma* Boheman, from Guatemala, (pl. 121 U), the body is beset on the back with dark hairs as long or considerably longer than the width of the larva.

⁸⁵ Hubbard, H. G., The Ambrosia Beetles of the United States, U. S. Dept. Agr., Div. Ent., Bul. 7, New Series, 1897, pp. 14-16 with figures.

PLATE 110

Galerucidae-Galerucinae

- A. *Galeruca tanacetii* L. (Denmark) : Head. Dorsal view.
- B. *Sermylassa halensis* L. (Denmark) : Left mandible. Ventral view.
- C. *Agelastica alni* L. (Denmark) : Larva. Lateral view.
- D. *Monoxia consputa* Lec. : Spiracle.
- E. *Agelastica alni* : Left mandible. Ventral view.
- F. *Galerucella luteola* Müller : Larva. Dorsal view.
- G. *Galeruca tanacetii* : Larva. Lateral view.
- H. *Monocesta coryli* Say : Antenna and ocellus.
- I. " " : Left figure, showing lacinia, galea and hypopharynx facing the buccal cavity; right figure, showing galea, mentum, and labium viewed from below.
- J. " " : Leg.
- K. " " : Left mandible. Ventral view.
- L. " " : Tenth abdominal segment from below, showing anus in center and six anal lobes.
- M. " " : Larva. Lateral view.

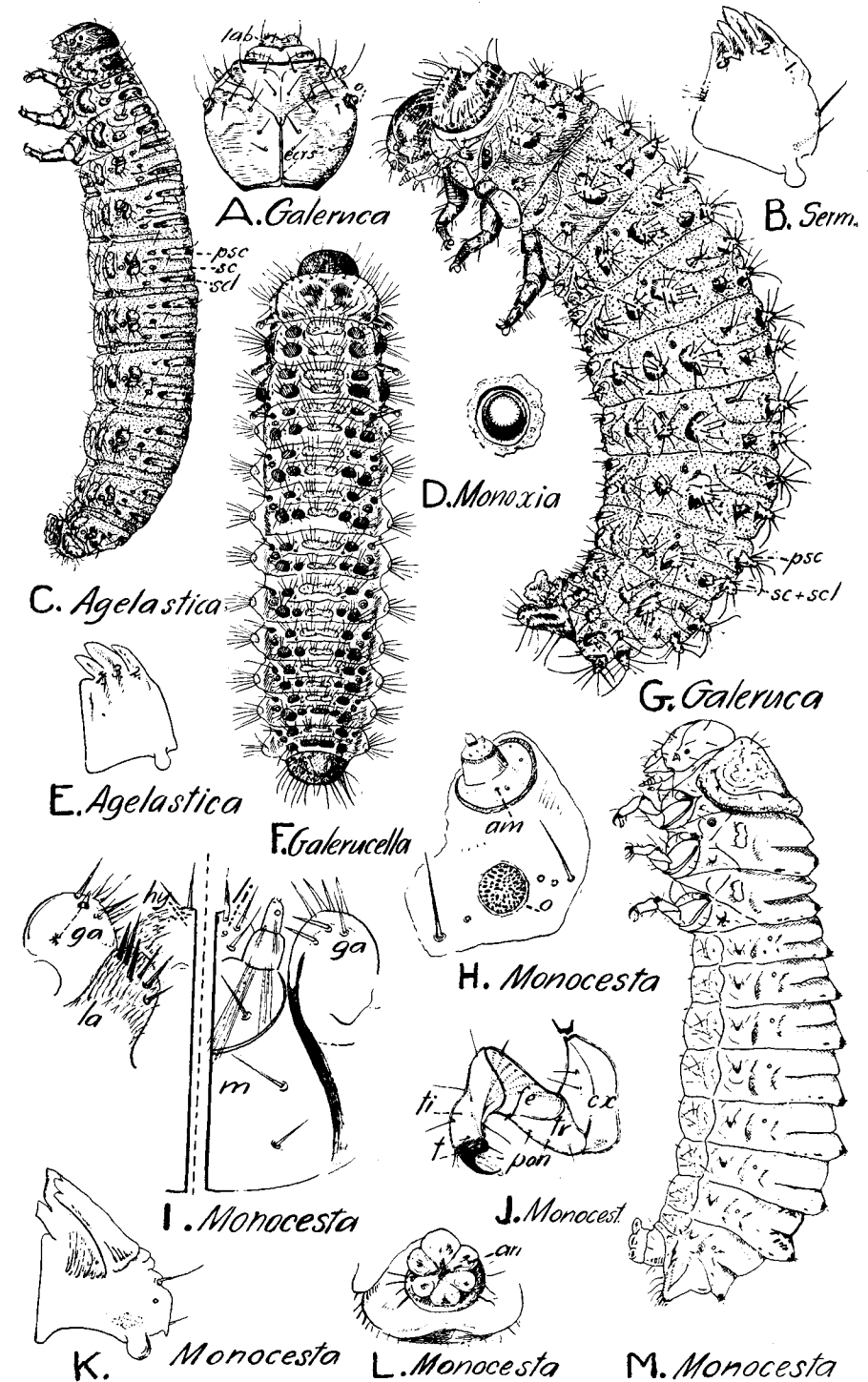


PLATE 111

Galerucidae-Diabroticinae

- A. *Phyllobrotica quadrimaculata* L. (Denmark) : Head, prothorax and mesothorax. Dorsal view.
- B. " " : Larva. Lateral view.
- C. *Diabrotica duodecimpunctata* Fab. : Left mandible. Ventral view.
- D. " " : Head capsule. Dorsal view.
- E. *Phyllobrotica quadrimaculata* : End of abdomen. Dorsal view.
- F. *Diabrotica duodecimpunctata* : Pulvillus on posterior side of tarsungulus.
- G. " " : Ventral mouthparts. Dorsal view (left figure) ; ventral view (right figure).
- H. *Diabrotica longicornis* Say : End of abdomen. Dorsal view.
- I. *Diabrotica duodecimpunctata* : End of abdomen. Dorsal view.
- J. *Diabrotica vittata* F. : End of abdomen. Lateral view.
- K. *Diabrotica duodecimpunctata* : Anterior part of larva. Lateral view.
- L. *Diabrotica vittata* : End of abdomen. Dorsal view.
- M. *Exosoma lusitanica* L. (Marocco) : Anterior part of larva. Lateral view.

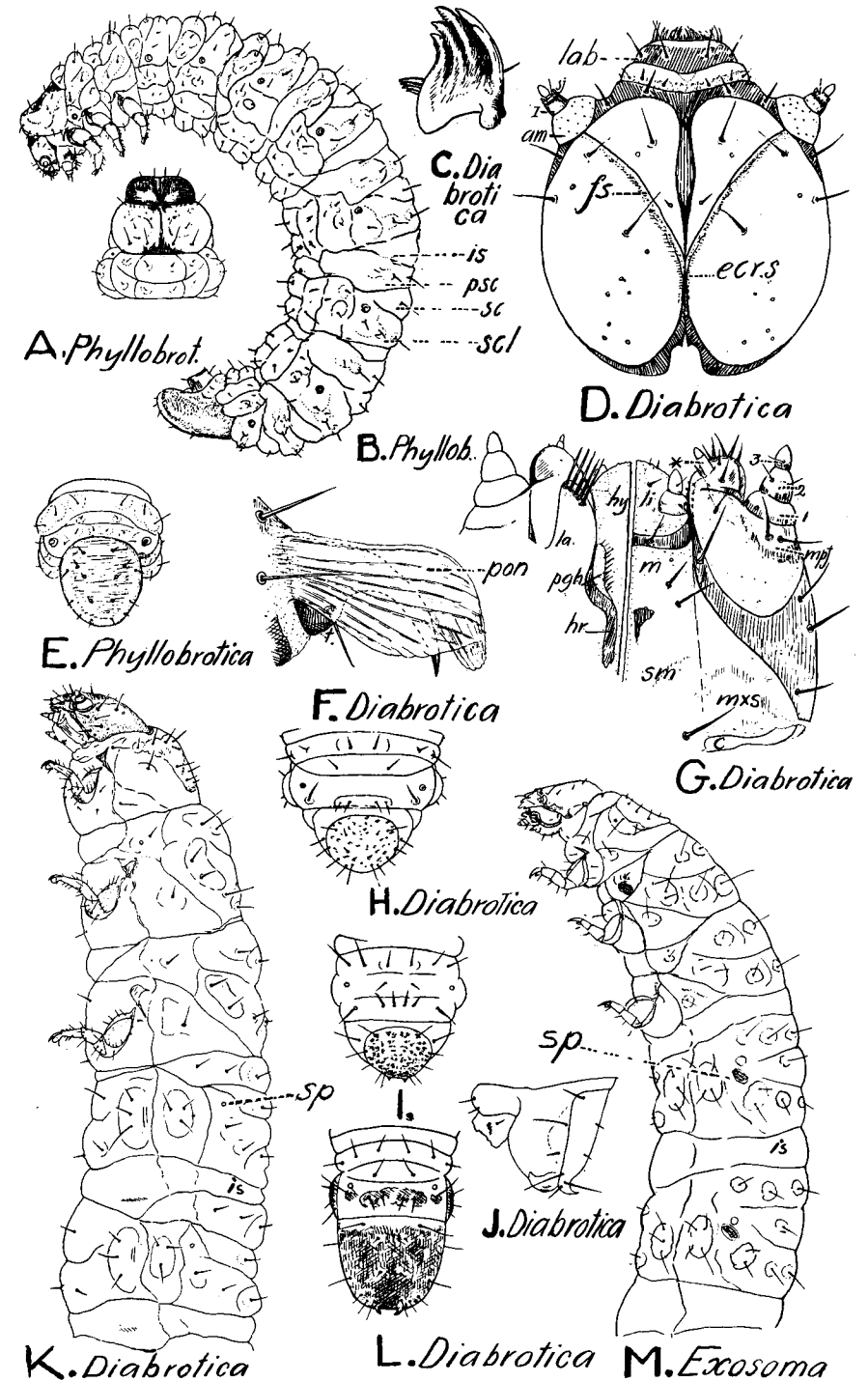


PLATE 112

Galerucidae-Halticinae

- A. *Haltica bimarginata* Say : Head. Ventral view.
- B. " " : Left maxilla.
- C. *Longitarsus menthaphagus* Gentner: Antenna.
- D. " " : Left mandible.
- E. " " : Peglike appendix of galea.
- F. " " : Distal end of maxilla.
- G. *Chaetocnema (denticulata* Ill.?) : Anterior part of larva.
- H. *Longitarsus menthaphagus* : Anterior part of larva.
- I. " " : Larva. Dorsal view.
- J. *Phyllotreta armoraciae* Koch (Denmark) : Anterior part of larva.
- K. *Chaetocnema (denticulata*?) : Larva. Dorsal view.
- L. *Blepharida rhois* Forst. : Spiracle.
- M. *Psylliodes chrysocephala* L. : Head. Dorsal view.
- N. " " : Larva. Lateral view.
(Copy from figure by George H. Carpenter, 1906).
- O. *Blepharida rhois* : Right maxilla.
- P. *Phyllotreta armoraciae* : Posterior end of body. Dorsal view.
- Q. *Blepharida rhois* : Mandible.
- R. " " : Larva; notice the dorsal position of anus as in *Crioceris* (pl. 109G).
- R* " " : Sucking disk; without an anal opening in the center.

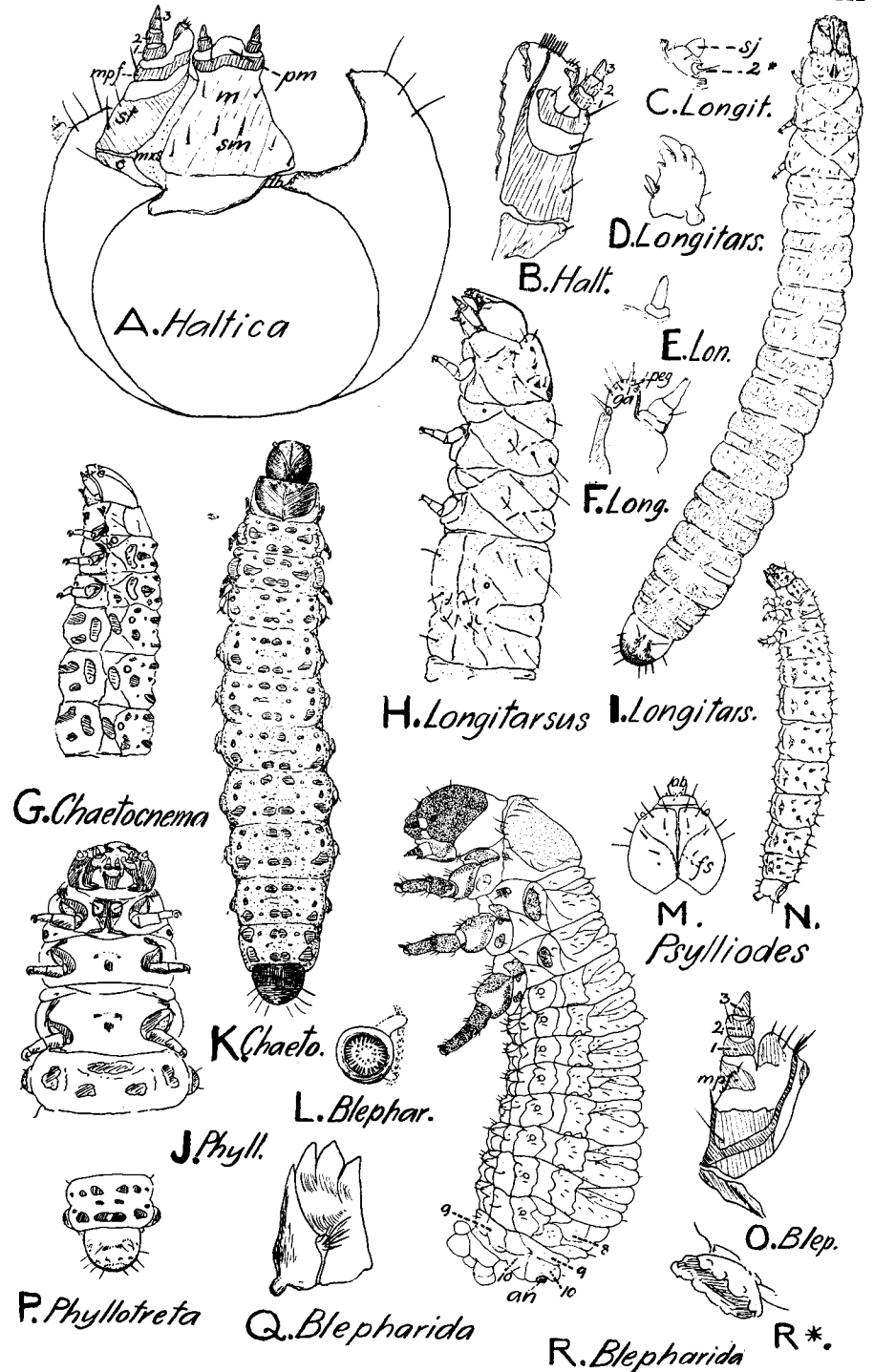


PLATE 113

Galerucidae-Halticinae

- A. *Oedionychis gibbitarsa* Say : Antenna; a, ring shaped sclerome at base of the tactile appendix; at, membranous part of tactile appendix; b, first antennal joint; c, rudiment of second joint.
- B. " " : Tip of labium.
- C. " " : Distal part of maxilla.
- D. " " : Eighth and ninth abdominal segments. Dorsal view.
- E. " " : Larva. Lateral view.
- F. " " : Mandible. Ventral view.
- G. " " : Last abdominal segments. Ventral view.
- H. *Disonycha xanthomelaena* Dalm.: End of body. Lateral view.
- I. *Phydanis bicolor* Horn. : Head. Dorsal view.
- J. *Mantura floridana* Cr. : Left mandible.
- K. " " : Tip of maxillary mala with peg indicating galea, lacinia absent.
- L. *Phydanis bicolor* : Eighth and ninth abdominal segments. Dorsal view.
- M. *Mantura floridana* : Tip of leg.
- N. *Phydanis bicolor* : Larva. Lateral view.
- O. *Mantura floridana* : Larva. Lateral view.
- P. " " : Ventral mouthparts.
- Q. " " : Larva. Dorsal view.
- R. *Argopistes scyrtooides* Lec. : Mandible. Buccal view.
- S. " " : Head. Dorsal view.
- T. " " : Thorax and first abdominal segment. Dorsal view.
- U. " " : Thorax and first abdominal segment. Ventral view.
- V. " " : End of body. Ventral view.
- X. " " : Ventral mouthparts.

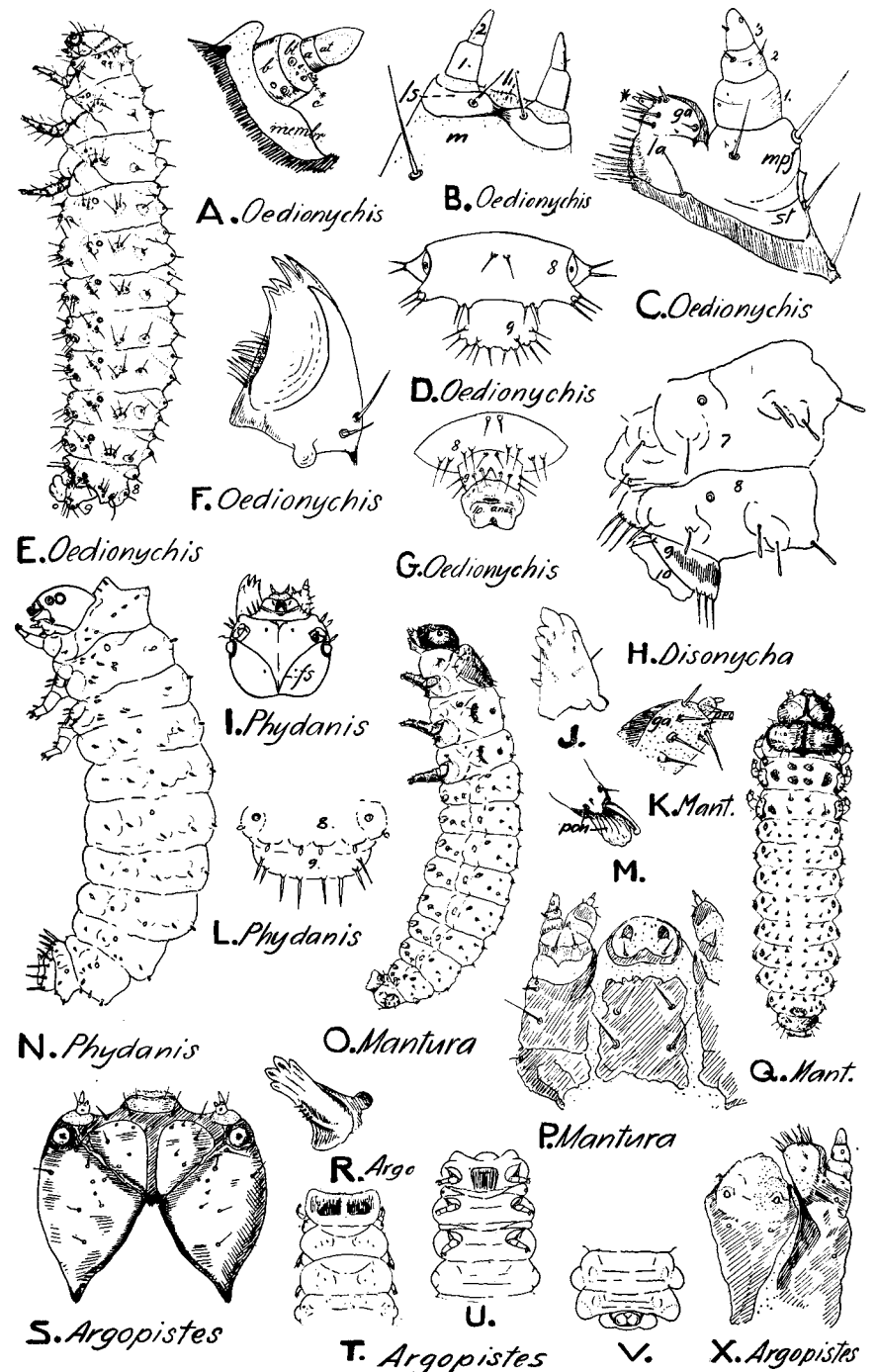


PLATE 114

Galerucidae-Halticinae

- A. *Dibolia cynoglossi* Koch (Denmark): Antenna.
- B. " " : Anterior part of body. Dorsal view.
- C. " " : Left mandible. Ventral view.
- D. " " : Posterior end of body. Dorsal view.
- E. *Dibolia borealis* Chev. : Posterior end of body. Dorsal view.
- F. *Dibolia cynoglossi* : Anterior end of body. Ventral view.
- G. " " : Head. Dorsal view.
- H. *Dibolia borealis* : Head. Ventral view.
- I. *Sphaeroderma testaceum* F. (Denmark): Head; notice shape of frons and large ocelli. Dorsal view.
- J. *Sphaeroderma testaceum* F. : Leg.
- K. " " : Antenna.
- L. " " : Larva. Dorsal view.
- M. " " : Left mandible. Ventral view.
- N. " " : Ventral mouthparts. Ventral view.
- O. " " : Mala maxillaris.

