

AN ILLUSTRATED SYNOPSIS OF THE PUPARIA OF 100 MUSCOID FLIES (DIPTERA).

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INTRODUCTION.

Those who have ever been engaged in the interesting pursuit of rearing parasitic insects doubtless have been impressed with the great desirability of having at hand some means of determining before the issuance of the adult insect the probable identity of the species under observation. This advance information often would not only render possible the collection of additional valuable material of the same kind but enable the observer in many cases to know months in advance of the issue of the adult parasite the species with which he was dealing. All students of the Muscoidean flies who have attempted to rear the larvae of this group, as well as other students of insect biology engaged in the study of the parasitology of any insect, have experienced the pangs of disappointment caused by the death of a unique specimen after pupation has occurred. In most such cases in the past this has resulted in the complete loss of the notes accumulated previous to the death of the parasite, but it is believed that by using the means proposed in this brief preliminary paper such losses may largely be overcome in the future, at least where the species treated in this paper are involved.

Several years ago, while engaged in studies of the Muscoidean flies in relation to their hosts, Mr. W. R. Walton became greatly impressed with the great variety and seeming constancy of the characters presented by the puparia of the members of this vast complex, which came under his notice. This suggested the possible construction of an illustrated synopsis, based on puparial characters, for the determination of some of the forms most commonly reared in the study of economic insects. With this in view he began to accumulate material and prepare drawings as opportunity offered. After 32 drawings had been made, in 1916, the assignment of administrative work compelled the abandonment of these plans, and all of the material, drawings, and notes were turned over to the present author, with the idea that he might proceed with them as he saw fit. The

preparation of the remainder of the plates, the drawing of descriptions, the construction of the synopsis, and arrangement of the illustrations, as well as the synonymy, are the work of the author, except as may be specifically indicated hereafter. Only those puparia from which the adult fly issued and was authoritatively determined have been used as a basis for this work, and such specimens have been preserved for future reference in the United States National Museum.

This paper is based on the puparia of one hundred species of Muscoidean flies, of which 99 have been figured, two species being so closely similar as not to be separable by this means. The puparia of a considerably greater number were examined in order to test the characters upon which the present work is based, and, with a single exception, the determination of the species of the puparium in hand was easily accomplished by means of the following synopsis. The exception referred to is that of *Frontina aletiae*, which it has been found impossible to separate from that of *Frontina archipivora*. Apparently these species are very closely allied.

The principal characters used are as follows:

Stigmal plate. (Pl. 1, fig. 1.)—The posterior stigmata are heavily chitinized and divided into two distinct areas, each area being called a *stigmal plate*. Each plate has two or more openings for respiration, and these openings are called *slits*, which connect with the main tracheae.

Slits. (Pl. 1, fig. 3.)—Various terms are used herein to designate the different types or styles of slits, as follows:

Serpentine. (Pl. 4, figs. 15–17.)—This term means a long winding slit somewhat resembling a snake or serpent. It may have few or many curves.

Brain coral. (Pl. 3, fig. 12.)—This term means that the slits are so formed that the surface of the stigmal plate has a great resemblance to brain coral (*Meandrina*, various species).

Plain slits. (Pl. 1, fig. 1.)—These vary from straight to slightly curved or angulated.

Button. (Pl. 1, fig. 2.)—This character varies in shape from round to nearly square and may be slightly raised or depressed. Its position varies a little, but it is always to be found on the inner half of the stigmal plate, or that half nearest the vertical axis. The button, according to Dr. J. C. H. De Meijere,¹ is the vestigial remains or scar of the posterior stigmata of the first stage larva. The stigmal plate afterwards forms around this scar and becomes heavily chitinized in the last stage of the larva.

Ridges. (Pl. 1, fig. 3.)—Elevations on the dorsum of the stigmal plate and upon each ridge is located a slit. The ridge is always

¹ Tijdschr. v. Entom., vol. 38, 1894, pp. 65–100.

longer than broad and its general contour follows that of the slit. The ridges are heavily chitinized and are a part of the stigmal plate.

Leaf-shaped.—Plate shaped like digitate leaf (see fig. 31).

By the application of the characters given above, which are all of a structural nature, the forms under treatment separate naturally into five primary divisions or groups, some of which subsequently are subdivided. The puparium of a given species may vary greatly in size as well as in color. The size, of course, is variable in direct proportion to the variation in the food supply, as shown by W. R. Walton in a former paper.² But the shape of the puparium, regardless of its size, is quite constant, while the form of the stigmal plates is remarkably constant. The latter, of course, vary in size with the puparium, but their outline is practically invariable in form. The location of the stigmal plates and also of the anal opening in relation to the longitudinal axis of the puparium constitute a group of characters which are not only easy of application but whose constancy renders them exceedingly reliable for diagnostic purposes. The author has found the stigmal plates of the full-grown larvae in several species to be fully as reliable as in the puparia.

The author solicits puparia of the Tachinidae and Dexiidae new to the National Collection for study purposes, and will especially appreciate the receipt of such puparia as can not be determined by means of this synopsis. He will agree to determine such material so near as may be possible and return such duplicates as are not required for further study. It is his intention to publish additional synopses of similar character as material and opportunity offer.

EXPLANATION OF TERMS USED IN SYNOPSIS.

Hairy type. (Pl. 1, figs. 1-5.)—Surface of the puparium entirely covered with short, nearly erect hairs, sometimes very short.

Smooth type. (Pl. 2, figs. 6-10.)—Puparium is practically without hairs, excepting the usual abdominal fusiform areas. The surface may be dull or shining.

Pit or cavity. (Pl. 2, figs. 9-10.)—A depression on the posterior end of certain puparia, in which are located the stigmal plates. It may be very shallow or deep. In some cases its depth is about equal to the diameter or greatest width of its opening at the surface of puparium.

Protuberant. (Pl. 10, fig. 45.)—Rising above the general surface of the puparium. Viewed from the side it may be either obtusely curved, conical, or truncate in form.

Tuberculate.—A cylindrical projection, of varying length, above the surface (see fig. 32).

² Proc. Ent. Soc. Wash., vol. 15, 1913, pp. 21-28.

Longitudinal axis.—A line drawn through the center of the greatest diameter of the puparium and emerging at the pole or center of the anal end thereof (see drawing fig. 1, pl. 1).

In view of the purely preliminary character of this paper and the fact that the arrangement of the synopsis is highly artificial, it has been deemed advisable to make use of the nomenclature most familiar to the greater number of workers. The author has reason to believe that the names found in Mr. D. W. Coquillett's "Revision of the Tachinidae" fulfill this requirement, and for this reason they have been adopted; but for the benefit of those who prefer the Townsendian names, and also for the information of those students who may be unacquainted with the synonymy of the two systems, the names used by Dr. C. H. T. Townsend are given in parentheses immediately following the preferred name.

The obligation of the author to Dr. J. M. Aldrich for his kind assistance in the determination of specimens, as well as for many useful suggestions, is most willingly acknowledged. Doctor Aldrich has also donated valuable material from his private collection of the Muscoidean flies. Mr. Harrison E. Smith has been most generous in donations of material, the remainder of which came from the several branches of Cereal and Forage Insect, Deciduous Fruit Insect, and Forest Insect Investigations of the Federal Bureau of Entomology, with the inclusion of some material from the private collection of Mr. W. R. Walton, which has now been presented to the United States National Museum, and where all the material used in the preparation of this paper has been deposited. I am also indebted to Mr. Walton for his many suggestions and his friendly criticism.

SYNOPSIS OF PUPAL CHARACTERS.

KEY TO THE GROUPS.

- | | |
|--|---------|
| 1. Puparium bearing spine-like hairs..... | Group A |
| Puparium without spines..... | 2 |
| 2. Spiracles below the surface of the puparium, in a pit or cavity..... | Group B |
| Spiracles above the surface of the puparium, not in a pit or cavity..... | 3 |
| 3. Spiracular slits resembling brain coral..... | Group C |
| Spiracular slits plain or serpentine..... | 4 |
| 4. Spiracular slits serpentine..... | Group D |
| Spiracular slits plain (straight or only slightly curved)..... | Group E |

GROUP A.

Puparium distinctly hairy; bearing spine-like hairs.

KEY TO THE SPECIES.

- | | |
|---|---|
| 1. Puparium truncate posteriorly..... | (No. 1) <i>Sturmia sociabilis</i> Greene. |
| Puparium not truncate posteriorly..... | 2 |
| 2. Oblique posteriorly, in profile..... | 3 |
| Not oblique posteriorly..... | 4 |

3. Posterior spiracles with two slits; protuberance roughly granular.
(No. 16) (*Leucostoma*) *Dionea atra* Townsend.
Posterior spiracles with three slits..... 4
4. Spiracles almost on the dorsum; the puparium large.
(No. 17) *Microphthalma disjuncta* Wiedemann.
Spiracles on the longitudinal axis line..... 5
5. Spiracles somewhat cylindrical; widely divergent; segmental lines distinct.
(No. 18) *Exorista lobeliae* Coquillett.
Spiracular protuberances close together..... 6
6. Puparium enlarged on caudal half; spiracles contiguous at the base.
(No. 19) *Gymnosoma fuliginosa* Desvoidy.
Puparium slightly pointed on caudal end; spiracles touch at the base; from above, they are separated by a V-shaped space.
(No. 20) *Ocyptera carolinae* Desvoidy.
7. Segmentation very distinct; a prominent elevation between the spiracles.
(No. 21) *Exorista confinis* Fallén.
Segmentation not distinct..... 8
8. Spiracles distinctly raised above the surface..... 9
Spiracles very slightly raised above the surface..... 10
9. Spiracles located at the apex of the puparium; slits not located on definite ridges..... (No. 22) *Trichopoda pennipes* Fabricius.
Spiracles located below the apex; slits located on a definite narrow ridge.
(No. 23) *Trichopoda lanipes* Fabricius.
10. With four slits..... 11
With three slits..... 13
11. Spiracular plates very small, on the longitudinal axis line.
(No. 24) *Phorocera saundersii* Williston.
Spiracular plates larger, not on the longitudinal axis..... 12
12. Spiracular plates quite close together; second slit from the bottom rather long..... (No. 25) *Exorista boarmiae* Coquillett.
Spiracular plates quite small and widely separated; second slit from the bottom is S-shaped..... (No. 26) *Hyphantrophaga hyphantriae* Townsend.
13. Spiracles widely separated; a high elevation between the spiracles; elevation much wider at the bottom and pointed on both sides.
(No. 27) *Exorista eudryadae* Townsend.
Spiracles widely separated; a large elevation between and below the plates; the elevation notched above on each side.
(No. 28) *Frontina frenchii* Williston.
Not as above..... 14
14. Spiracles close together on the longitudinal axis line; a transverse, elliptical elevation with pointed ends at the base of the spiracles.
(No. 29) *Linnaemyia fulvicauda* Walton
Spiracles well separated; three distinct lobes; only a slight elevation below spiracles.
(No. 30) *Frontina aletiae* Riley; *Frontina archippivora* Williston.

GROUP E.

KEY TO THE SECTIONS.

- End of puparium with a large rounded tubercle..... Section 1
End of puparium without a large rounded tubercle..... Section 2

SECTION 1.

End of puparium with a large rounded tubercle.

KEY TO THE SPECIES.

- | | |
|---|---|
| 1. Spiracular plates each have five slits..... | 2 |
| Spiracular plates each have three slits..... | 3 |
| 2. Stigmal plate located on a large tubercle, which is below the longitudinal axis line..... | (No. 31) <i>Clausicella tarsalis</i> Coquillett. |
| Stigmal plates with short slits, each plate on top of a tube-like projection located on a rounded tubercle far above the longitudinal axis. | (No. 32) <i>Tachinophyto tortricis</i> Coquillett. |
| 3. Tubercle very large; diameter nearly equal to the end of the puparium..... | a |
| Tubercle much smaller..... | b |
| 4. Stigmal plates reddish in the center; located below the longitudinal axis..... | (No. 33) <i>Sturmia pilatei</i> Coquillett. |
| Stigmal plates nearly round, black; located above the longitudinal axis. | (No. 34) <i>Exorista pyste</i> Walker. |
| 5. Tubercle near bottom surface of the puparium..... | 6 |
| Tubercle much higher up..... | 7 |
| 6. Tubercle very large; longitudinal axis line near upper edge. | (No. 35) <i>Tachinophyto variabilis</i> Coquillett. |
| Tubercle small; bottom surface of puparium nearly straight. | (No. 36) <i>Tachinophyto floridensis</i> Townsend |
| 7. Tubercle directed obliquely upward. | (No. 37) <i>Phorichaeta cinerosa</i> Coquillett. |
| Tubercle small, very prominent; puparium quite small. | (No. 38) <i>Actia pilipennis</i> Fallén |
| Tubercle not so prominent..... | 8 |
| 8. Puparium very small; tubercle divided vertically on the apex; each plate has three small slits..... | (No. 39) <i>Siphona geniculata</i> de Geer. |
| Puparium slightly larger; stigmal plates nearly rectangular; slits very narrow..... | (No. 40) <i>Siphona plusiae</i> Coquillett. |
| Puparium not as above..... | 9 |
| 9. Posterior end of the puparium tapering into the tubercle..... | 10 |
| Posterior end rounded; tubercle distinct but not tapered..... | 11 |
| 10. Puparium rather slender; ventral surface slightly concave. | (No. 41) <i>Panzeria penitalis</i> Coquillett. |
| Puparium more robust; apex bifid; button very large, size nearly equal to ridges containing the slits..... | (No. 42) <i>Leskiomima tenera</i> Wiedemann. |
| 11. Posterior end of puparium with a round tubercle above the center of the apex; slits parallel..... | (No. 43) <i>Paraplagia spinulosa</i> Bigot. |
| Posterior end flat; spiracles slightly raised; three curved slits, not parallel. | (No. 44) <i>Metachaeta helymus</i> Walker. |

SECTION 2.

End of puparium without a large rounded tubercle; spiracles distinctly protuberant or slightly or distinctly raised above the surface.

KEY TO THE SPECIES.

- | | |
|--|---|
| 1. Spiracles distinctly protuberant..... | 2 |
| Spiracles slightly or distinctly raised above the surface of the puparium..... | 7 |

2. Puparium very small; spiracular protuberance entirely smooth and shining----- 3
 Puparium of medium size or larger; protuberance only partly smooth... 4
3. Posterior spiracular protuberance, cone-shaped, with a groove between the stigmal plates----- (No. 45) *Alophora pulverea* Coquillett.
 Posterior spiracular protuberance deeply bifid on apical half and pointing obliquely downward----- (No. 46) *Phorantha occidentis* Walker. 5
4. Protuberance granular at base only----- 5
 Protuberance entirely granular or spiny----- 6
5. Spiracles widely separated, granular on the basal half only.
 (No. 47) *Frontina ancilla* Walker.
 Spiracles solid and granular at the base, deeply bifid on apical half.
 (No. 48) *Clytiomyia flava* Townsend
6. Spiracles quite spiny on the sides, subdorsal; anterior spiracles prominent.
 (No. 49) *Plagia americana* Van der Wulp.
 Spiracles very rugose on the sides; slits with short branches; spiracles at the apex----- (No. 50) *Acemyia dentata* Coquillett.
7. Spiracles subdorsal; three lobes somewhat claw-shaped.
 (No. 51) *Eutrixa exile* Coquillett.
 Spiracles near the apex of puparium----- 8
8. With four slits; stigmal plates very small.
 (No. 52) *Phorocera erecta* Coquillett.
 With three or six slits in each plate----- 9
9. With six slits in each plate----- 10
 With three slits in each plate----- 12
10. Puparium cylindrical, slightly concave on the dorsum; slits nearly straight.
 (No. 53) *Cryptomeigenia theutis* Walker.
 Puparium greatly enlarged on the posterior end----- 11
11. Stigmal plates contiguous; slits angulated.
 (No. 54) *Biomyia lachnosternae* Townsend.
 Stigmal plates small, widely separated; slits simple, only faintly curved.
 (No. 55) *Cryptomeigenia aurifacies* Walton
12. Segmentation distinct on the dorsocaudal end, concave on dorsocephalic half; stigmal plate triangular, with three very small slits.
 (No. 56) *Hyalomyodes triangulifera* Loew.
 Segmentation indistinct----- 13
13. Button on stigmal plate very large, protruding----- 14
 Button on stigmal plate normal----- 16
14. Button quadrate----- (No. 57) *Admontia hylotomae* Coquillett.
 Button rounded----- 15
15. Two upper slits nearly parallel; posterior end of puparium tapering.
 (No. 58) *Masicera, species (near exilis.)*
 Two upper slits divergent; posterior end not tapering.
 (No. 59) *Frontina armigera* Coquillett.
16. Posterior end of puparium very rugose; slits wide, nearly parallel.
 (No. 60) *Amobia confundens* Townsend.
 Posterior end not rugose----- 17
17. Stigmal plates flush with surface; located in a triangular area.
 (No. 61) *Exorista amplexa* Coquillett.
 Stigmal plates above the surface of the puparium; puparium large----- 18
18. Puparium with a constriction near the posterior end forming a segment- 19
 Puparium without a constriction----- 20

19. Apical segment narrow, of equal width.
 (No. 62) *Chaetogaedia analis* Van der Wulp.
 Apical segment hemispherical.....(No. 63) *Archytas analis* Fabricius.
 Apical segment much wider below.....(No. 64) *Archytas hystrix* Fabricius.
20. Puparium obliquely flat on posterior end; stigmal plate with three long slits.
 (No. 65) *Archytas lateralis* Macquart.
 Puparium not as above..... 21
21. Bottom slit about horizontal..... 22
 Bottom slit not horizontal..... 23
22. The three slits of equal length.....(No. 66) *Gonia capitata* de Geer.
 The upper slit much longer than either of the other two.
 (No. 67) *Gonia exul* Williston.
23. Stigmal plates round; a large, prominent, transverse elevation below the
 stigmal plates.....(No. 68) *Blepharipeza adusta* Loew.
 Stigmal plates not round..... 24
24. Stigmal plate elliptical or oval; slits narrow.
 (No. 69) *Masicera eufitchiae* Townsend.
 Stigmal plate not as above..... 25
25. Stigmal plates small, subdorsal; two short ridges, with a groove between
 them vertically between the plates.
 (No. 70) *Linnaemyia comta* Fallén.
 Stigmal plates larger, not subdorsal..... 26
26. Upper slit horizontal, other two slits pointing obliquely downward; button
 near upper edge of plate.....(No. 71) *Peleteria robusta* Wiedemann.
 Not as above..... 27
27. Puparium with a prominent elevation at base of stigmal plates..... 28
 Puparium without such elevation..... 29
28. A large transverse elevation below the stigmal plates, extending up narrowly
 between them.....(No. 72) *Tachina mella* Walker.
 Elevation rounded, depressed in center; at base of plates only.
 (No. 73) *Euphorocera claripennis* Macquart.
29. Puparium quite small..... 30
 Puparium medium to large size..... 32
30. Stigmal plates elliptical; slits small and the ridges narrow.
 (No. 74) *Hypochoaeta longicornis* Schiner.
 Stigmal plates not elliptical; slits and ridges large..... 31
31. Stigmal plates widely separated; an elevation below and between plates;
 anal opening remote from stigmal plates.
 (No. 75) *Phorocera tortricis* Coquillett.
 Stigmal plates contiguous; no elevation below plates; anal opening much
 nearer stigmal plates.....(No. 76) *Phorichaeta sequax* Williston.
32. Stigmal plates somewhat flattened; slits and ridges very small, on the outer
 edge; button large, round.....(No. 77) *Dichaetoneura leucoptera* Johnson.
 Stigmal plate not as above..... 33
33. Inner slits and ridges noticeably larger than the others..... 34
 Slits nearly equal in size..... 35
34. Two lower slits nearly parallel.....(No. 78) *Tachina rustica* Meigen.
 Two lower slits not parallel.....(No. 79) *Tachina robusta* Townsend.
35. Slits faintly elevated; ridges indistinct..... 36
 Slits located on ridges..... 42
36. Slits small, close together..... 37
 Slits larger, remote..... 38
37. Stigmal plate broader above; puparium not very long.
 (No. 80) *Masicera myoidea* Desvoidy.

- Stigmal plate not broader above; puparium elongated.
(No. 81) *Sturmia nigrita* Townsend.
38. Stigmal plates near apex of puparium; two upper slits nearly parallel__ 39
Stigmal plates remote from apex; two upper slits not parallel_____ 40
39. All three slits of equal length; button fairly distinct.
(No. 82) *Frontina tenthredinidarum* Townsend.
Two outer slits converge toward the button; inner slit slightly longer than
either of the other two_____ (No. 83) *Exorista nigripalpis* Townsend.
40. Stigmal plates round or oval; slits large_____ 41
Stigmal plates small_____ 42
41. Two outer slits straight, slightly bent at the base.
(No. 84) *Exorista griseomicans* Van der Wulp.
Inner slit large, straight, nearly perpendicular, other slits small, close to-
gether_____ (No. 85) *Phorocera flavicauda* Van der Wulp.
42. Stigmal plates very small; ridges low and weak.
(No. 86) *Panzeria radicum* Fabricius.
Stigmal plates large; ridges strong and prominent_____ 43
43. Ridges of plate touching each other; middle slit horizontal.
(No. 87) *Zelia*, species.
Ridges of plate not touching_____ 44
44. Puparium with a depression dorsally_____ 45
Puparium without a depression dorsally_____ 46
45. Ridges very broad and well separated___ (No. 88) *Exorista*, species (13675b).
Ridges much longer and close together___ (No. 89) *Masicera rutila* Meigen.
46. Lower slit in stigmal plate horizontal_____ 47
Lower slit in stigmal plate not horizontal_____ 52
47. Button on inner edge of plate_____ 48
Button not on inner edge of plate _____ 49
48. Puparium slightly depressed dorsally on the posterior end.
(No. 90) *Admontia demylus* Walker.
Puparium slightly flattened on posterior end; an elevation below the stigmal
plates_____ (No. 91) *Phorocera*, species (near *macra*).
49. Ridges taper to a narrow point at one end_____ 50
Ridges do not taper to a point_____ 51
50. All the ridges taper to a point at one end.
(No. 92) *Panzeria ampelus* Townsend.
Middle ridge tapers to a point at one end.
(No. 93) *Exorista futilis* Osten Sacken.
51. Ridges about equal in size; a round elevation centrally depressed below the
plates_____ (No. 94) *Phorocera claripennis* Macquart.
Not as above_____ 52
52. Stigmal plate with a very narrow ridge nearly encircling it.
(No. 95) *Winthemia quadripustulata* Fabricius.
Stigmal plate not as above_____ 53
53. Puparium and ridges large_____ 54
Puparium and ridges not large_____ 55
54. Lower slit directed obliquely downward; puparium elongated.
(No. 96) *Uromacquartia halisidotae* Townsend.
Lower slit perpendicular__ (No. 97) *Trichophora ruficauda* Van der Wulp.
55. Puparium small; ridges large, well developed.
(No. 98) *Sturmia occidentalis* Coquillett.
Puparium larger; ridges narrow, not well defined.
(No. 99) *Sturmia albifrons* Walker.

DESCRIPTIONS OF SPECIES.

1. *STURMIA SOCIABILIS* Greene.

Small, dull reddish yellow; surface covered with short, erect hairs; posterior end bare and rather blunt; segmentation rather distinct. Spiracles distinctly raised above surface, widely separated, and shining black. Three slits located on the upper surface of well-defined ridges. Spiracles located on longitudinal axis. Button round, located near outer slit. Anal opening small, located just below spiracles.

Length, 5 mm.; diameter, 2 mm.

2. *STURMIA DISTINCTA* Wiedemann (*Zygoturmia distincta* Wiedemann).

Medium sized; dull, dark red. Surface covered with short hairs; stigmal area bare, somewhat tuberculate at lower end. Spiracles subshining, black, slightly raised above surface of puparium; three yellowish slits, each located on top of a well-defined ridge. Button large, round, well-defined, and located near center. Spiracles located well above; anal opening located on longitudinal axis.

Length, 7 mm.; diameter, 3 mm.

3. *PHOROCERA MERACANTHAE* Greene.

Medium sized; dull, dark reddish brown; surface, except the stigmal area, covered with very minute spine like hairs. Spiracles shining black, smooth above, granular around the base; widely separated and distinctly raised above the surface. Three slits, each located on very prominent ridges. Button small but distinct. Spiracles touching upper side of longitudinal axis. Anal opening very remote from spiracles.

Length, 9.5 mm.; diameter, 4 mm.

4. *STURMIA INQUINATA* Van der Wulp (*Zygoturmia inquinata* Van der Wulp).

Medium sized; dull, dark red; segmentation distinct; surface covered with short hairs. Spiracles shining black, nearly circular, raised slightly above the surface, with three slits located on well-defined ridges. Button round, well defined. A small area around the spiracles faintly rugose and destitute of short hairs; a faint tubercle at the base of this area. Spiracles located on longitudinal axis. Anal opening remote, located on basal segmental line of penultimate segment.

Length, 8 mm.; diameter, 3.25 mm.

5. *CELATORIA DIABROTICAE* Shimer.

Small; dull, dark red; entire surface covered with spine like hairs. Some spines are in clusters, and these clusters are arranged in

transverse rows. Spiracles black, slightly raised above the surface and located on the longitudinal axis. Three slits, reddish yellow, located on well-defined ridges. Button round and well formed. Anal opening very small, located far below the spiracles.

Length, 2.75 mm.; diameter, 1.25 mm.

6. *PTILODEXIA TIBIALIS* Desvoidy.

Very large; finely rugose, dull, dark red. Dorsum of puparium nearly straight, the bottom broadly curved. Spiracles shining black, with three slits, each slit located on top of a well-defined ridge. A well-defined button. Spiracles located in a pit which is quite rugose and chitinous. This pit is located in a protruded area which, from the side view, appears like two large folds. Edges of pit broadly rounded. Pit located entirely above the longitudinal axis. Near the cephalic end on each side of the puparium is a horn-like projection. Anal opening just below longitudinal axis.

Length, 13 mm.; diameter, 4.75 mm.

7. *HILARELLA SIPHONINA* Zetterstedt.

Small; smooth, dull, light red, with a depression on dorsum at about the apical fifth. Bottom edge nearly straight. Cephalic end of puparium slightly pointed and showing a trace of three segments. Spiracles are dark brown and located on the upper part of a deep pit. This pit is located mostly below the longitudinal axis, with but the upper edge of the pit touching the axis. The edge of this elliptical opening is black. Each spiracle has three slits nearly perpendicular and a definite button. Anal opening located on the lower or ventral edge of puparium.

Length, 5.25 mm.; diameter, 1.75 mm.

8. *PACHYOPHTHALMUS FLORIDENSIS* Townsend.

Small; elongate, dull, reddish yellow, tapering slightly towards the caudal end, which has a small, deep pit of a darker red color; black around the edge of this pit; the ventral surface slightly depressed. Spiracles located inside the pit, on the upper surface. The plates are separated by a space nearly equal to the width of one plate. Stigmal plates are black around the edge, with the central part deep reddish yellow. The plate is broad above, tapering down to a very broadly rounded point below. Each plate has three straight, parallel slits pointed at their lower end. Button large, round, and located at the lower end of the plate. Pit and spiracles are located on but entirely below the longitudinal axis. Anal opening large, located a short distance below the pit.

Length, 5 to 6.5 mm.; diameter, 1.5 to 2 mm.

9. MEGAPARIA OPACA Coquillett (*Megapariopsis opaca* Coquillett).

Large; elongated, very finely rugose, dark red. Upper surface faintly depressed. Spiracles shining black, located on the sides of a deep depression, which is coarsely rugose. The upper edge of this pit-like depression is rounded, lower part more flattened and projects off rather sharply, along the bottom, from the puparium. Below the edge of this depression is a prominent, rugose surface. Anal opening just below this prominence. Each spiracle has three slits, which are slightly yellowish; also a prominent button. On each side of the puparium, about the apical fourth, is a cylindrical, reddish yellow tubercle.

Length, 11 mm.; diameter, 3.5 mm.

10. ZELIA VERTEBRATA Say.

Very large, subshining, dark red. Upper surface in profile, nearly straight. The upper half of the posterior end flattened. Spiracles black, slightly raised above the surface and located in a shallow pit-like depression; the depression above the longitudinal axis. Each plate has three slits nearly parallel, each slit on top of a well-defined ridge. Button round. Anal opening very remote from spiracles, well below the longitudinal axis. On the side, near the apex, is a small, horn-like projection, the anterior spiracle.

Length, 13.75 mm.; diameter, 4 mm.

11. BESKIA AELOPS Walker.

Elongated; shining, yellowish red, tapering gradually, smaller toward the caudal end. Spiracles decidedly tuberculate, shining red, diverging, nearly touching at the base. The tubercles are roughly granular. The upper portion slightly larger, smooth, shining and divided into three sections or lobes. Each lobe has from about nine to eleven very small slits, each on a small elevation or ridge. Button very small, round. Spiracles located on the longitudinal axis, mostly below the line. Anal opening very small, on the under side of the puparium, the distance a little more than the length of one tubercle.

Length, 7 mm.; diameter, largest, 2 mm.; smallest, 1 mm.

12. OESTROPHASIA OCHRACEA Bigot (*Ormia ochracea* Bigot).

Large; dull-red puparium. Spiracles subshining, black, protuberant, well separated at the base, slightly larger at the base. Spiracles located on apex of tubercles. Each plate has three serpentine slits and a round button near the middle. Spiracles located just above longitudinal axis. Anal opening small, located quite remote from the spiracles.

Length, 7 mm.; diameter, 3.75 mm.

13. *PHASMOPHAGA ANTENNALIS* Townsend.

Medium-sized; dull, black puparium. Some specimens have a faint reddish tinge. Spiracles somewhat triangular in form, located on very prominent protuberances, which touch at the base and are separated by nearly their own width at the apex. Each spiracular plate has three lobes, and each lobe has very irregular, dark-yellow slits located on a shiny, black surface. Button well defined, located centrally on longitudinal axis. Anal opening small, located some distance below the spiracles.

Length, 7.5 mm.; diameter, 3 mm.

14. *COQUILLETINA PLANKII* Walton (*Hemithrixion plankii* Walton).

Medium-sized; dull, blackish-red puparium. Spiracles shining black, located on well-defined protuberances, which touch at base and are separated at apex by nearly their own width. Slits are angular and located on top of well-defined ridges. Button well marked. Protuberances located above but touching longitudinal axis. Anal opening very small, located near middle of lower half of end view.

Length, 6.5 mm.; diameter, 2.75 mm.

15. *BELVOSIA BIFASCIATA* Fabricius (*Latreillemyia bifasciata* Fabricius).

Very large; dull black puparium. Caudal end larger than anterior end. Spiracles located on the dorsum from one-quarter to one-third the distance from the caudal end; slightly raised above the surface of the puparium, with three very long serpentine slits, which are slightly yellowish. Button round, distinct. Segmental lines plainly seen on the dorsum. Anal opening small, indistinct, crescent-shaped, located just above longitudinal axis.

Length, 14 mm.; diameter, 6.5 mm.

16. *LEUCOSTOMA ATRA* Townsend (*Dionea atra* Townsend).

Small; smooth, elliptical, dull yellowish red. Spiracles protuberant, black, shining at apex, dull and finely granular at base, located on longitudinal axis, mostly below the line, each with two serpentine slits situated on top of a prominent protuberance, these protuberances narrowly separated at base; inside flat surfaces nearly parallel. Anal opening less than width of the protuberance from same.

Length, 4 mm.; diameter, 1.5 mm.

17. *MICROPHTHALMA DISJUNCTA* Wiedemann.

Very large; dull, dark red, with a slight depression on the dorsum. Spiracles protuberant, located high up, subdorsally. They are shining black; three serpentine slits and a well-defined button to each;

separated by a space equal to the length of one spiracle. Anal opening large, located far below the spiracles.

Length, 12.5 mm.; diameter, 5 mm.

18. *EXORISTA LOBELIAE* Coquillett.

Large; subshining, dark red or reddish black; segmentation fairly well marked with small punctures. Spiracles tuberculate. Stigmal plates blackish, located on distinct tubercles. These tubercles are separated at their base by a distance equal to one and one-half times the length of one plate. Each plate has three serpentine slits, one above and two below. Button distinct, round, located near center of plate. Immediately below the spiracles is a well-defined, rounded, deep reddish-yellow tubercle, with an indentation on the apex. Spiracles located on longitudinal axis. Anal opening small, very remote from spiracles.

Length, 6.75 mm.; diameter, 3 mm.

19. *GYMNOSOMA FULIGINOSA* Desvoidy.

Medium size; dull, dark red to a very dark reddish brown. Some specimens vary slightly by having the caudal end somewhat enlarged. In other specimens, the general outline is more elliptical. Spiracles are shining black, protuberant, touching at the base, separated by a V-shaped space. Each spiracle has three serpentine slits. Button large, round, not very well defined. Anal opening small, just beneath the spiracles. Spiracles located on the longitudinal axis.

Length, 6.5 mm.; diameter, 3 mm.

20. *OCYPTERA CAROLINAE* Desvoidy.

Medium size; elongated, dull, dark red; caudal end slightly pointed; surface microscopically rugose. Spiracles protuberant, shining black, with a granular, narrow area at the base. Spiracles are connected at the base and the plates are separated by a V-shaped space. Each plate is divided into three lobes. Each lobe has a reddish-yellow, serpentine slit. Button large, round. Anal opening small, located just below the spiracles. Spiracles located on the longitudinal axis.

Length, 7 mm.; diameter, 2.4 mm.

21. *EXORISTA CONFINIS* Fallén (*Aplomyia confinis* Fallén).

Large; shining, dark red, with the segments well marked with puncture-like marks. Largest diameter about the posterior third; posterior end somewhat pointed. Stigmal plates blackish, located about the length of one plate below the longitudinal axis; plates slightly raised above surface and separated by a space about half

the width of one plate. Each plate has three yellowish, serpentine slits, one above and two, S-shaped, below. Button round, well defined. Area between the plates with a slight ridge broadening below, becoming somewhat tubercular, with an uneven depression in the center.

Length, 7 mm.; diameter, 3.25 mm.

22. *TRICHOPODA PENNIPES* Fabricius (*Trichopodopsis pennipes* Fabricius).

Large; dull, dark red. Spiracles raised well above the surface of puparium, shining black, each with three serpentine slits and a well-defined button; located on longitudinal axis narrowly separated at the base and more widely separated at the apex. Anal opening quite close to spiracles.

Length, 8 mm.; diameter, 3.75 mm.

23. *TRICHOPODA LANIPES* Fabricius (*Galactomyia lanipes* Fabricius).

Quite large; dull, dark reddish. Upper surface very faintly depressed. Spiracles shining black, slightly raised above surface, with three serpentine, well-defined slits. Button not very clearly defined. Spiracles located nearly the length of one plate below the longitudinal axis. Inner edges of the spiracular plates parallel and separated by a very narrow space. Anal opening small, close to spiracles; anal plate transversely elliptical.

Length, 10 mm.; diameter, 5 mm.

24. *PHOROCERA SAUNDERSII* Williston (*Madremyia saundersii* Williston).

Medium size; dull, dark red. Spiracles shining black, slightly raised above the surface; plates separated by a space equal to one half the width of one plate. Between the plates are two well-marked grooves the same length as the plates. Each plate has four very small, serpentine, yellow slits. Button large, round, well defined. Spiracles located on the upper side of the horizontal axis. Below them is a prominent, transverse elevation slightly blackened. Anal opening small, far below the spiracles.

Length, 7 mm.; diameter, 3 mm.

25. *EXORISTA BOARMIAE* Coquillett (*Eusisyropa boarmiae* Coquillett).

Medium size; subshining, yellowish red. Spiracles shining black, deep reddish in center, slightly raised above the surface, widely separated, space equal to one-half the width of one plate. Each plate has four serpentine, yellowish slits; sides of plate very finely rugose. Button large, round, deep red. Spiracles located nearly the height of one plate above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 5.5 mm.; diameter, 2.5 mm.

26. *HYPHANTROPHAGA HYPHANTRIAE* Townsend.

Medium size; subshining, yellowish red. Spiracles shining black, very dark red in the center, slightly raised above the surface, widely separated, the space nearly equal to the width of one plate. Each plate has four serpentine, yellowish slits. The two bottom slits resemble the letter **S**, with a long tail. Spiracles located a little more the height of one plate above the longitudinal axis. Button rather large, round, flat, and reddish. Anal opening small, far below the spiracles.

Length, 6 mm.; diameter, 2.25 mm.

27. *EXORISTA EUDRYAE* Townsend (*Oxexorista eudryae* Townsend).

Medium size; rather shining, dark red. Spiracles shining black, slightly raised above the surface, widely separated, the space about equal to twice the width of one plate. Between and below the spiracles is a prominent, ridgelike elevation much higher than the stigmal plates. Each plate has three serpentine, yellowish slits. (Sometimes the two slits at the bottom are connected and form one long slit.) Button large, round, well defined. Anal opening large, far below the spiracles. Spiracles are located on the upper side of the longitudinal axis.

Length, 7 mm.; diameter, 3 mm.

NOTE.—In one specimen, on one plate only, the two bottom slits are united, showing only two slits instead of three.

28. *FRONTINA FRENCHII* Williston (*Achaetoneura frenchii* Williston).

Large; dull, deep red to nearly black. Spiracles only slightly raised above puparia; black on sides and yellowish red on upper surface; located about the width of one stigmal plate above the longitudinal axis and separated by a space nearly equal to width of one plate. Three serpentine slits to each stigmal plate and a well-defined button. Anal opening very remote, quite near the lower edge of the end view.

Length, 8.5 mm.; diameter, 4 mm.

29. *LINNAEMYIA FULVICAUDA* Walton (*Gymnochaetopsis fulvicauda* Walton).

Medium-sized; faintly rugose, dull reddish puparium. Spiracles slightly raised above surface, shiny black above and faintly granular around lower edge, located on longitudinal axis, mostly above, nearly touching above and more widely separated below. Each spiracle divided into three lobes, each lobe with a serpentine, nearly black slit. A distinct round button. At the bottom of and between the stigmal plates is a prominent, raised area which terminates in a

point on each side; a transverse depression in the middle of same. Anal opening small and located at the lowest fourth in the end view.

Length, 5.5 mm.; diameter, 2.25 mm.

30. FRONTINA ALETIAE Riley (*Rileyella aletiae* Riley). **FRONTINA ARCHIPPIVORA** Williston (*Xyophaemyia malacosomae* Townsend).

The puparia of these two species are almost identical; small, smooth, elliptical, dull, dark yellowish red. Spiracles slightly raised above surface of pupa, reddish black, located slightly above longitudinal axis, each having three serpentine slits. Button large, round, and near center of spiracular plate. Anal opening directly on center.

Length, 5.25 mm.; diameter, 2 mm.

31. CLAUSICELLA TARSALIS Coquillett (*Phylacteropoda tarsalis* Coquillett).

Very small; subshining, yellowish red. Caudal end decidedly protuberant, smooth, dark red. On each side at the base of the tubercle is a large, blackish tubercle; above are two smaller tubercles, near the center; spiracles located on the apex of this large protuberance widely separated. Each plate is blackish, somewhat leaf-shaped, with five slits, each on a small ridge. Button large, round. Protuberance below the longitudinal axis, the upper edge at the base touching the axis line. Anal opening very small, some distance below the tubercle.

Length, 3 mm.; diameter, 1.5 mm.

32. TACHINOPHYTO TORTRICIS Coquillett (*Tortriciophaga tortricis* Coquillett).

Small; yellowish red, decidedly tuberculate on the posterior end. Spiracles very protuberant, nearly cylindrical, contiguous at the base, widely divergent at apex, shining black, with a roughened, granular band in the middle, located on top of a large tubercle the height of which is about half its diameter. Spiracular plates on top of the cylindrical protuberances. Each plate has five very small, reddish slits, each on top of a faintly defined ridge. Button large, round, fairly well defined, and near the center of the plate. Anal opening very small, far below the spiracles. Spiracles located far above the longitudinal axis.

Length, 4 mm.; diameter, 1.75 mm.

33. STURMIA PILATEI Coquillett.

Small; reddish yellow, subshining, and nearly straight on the ventral surface. Just below the apex of the posterior end is a faint depression, giving the posterior end a faint appearance of being a large tubercle. Spiracles are subshining, black, and faintly reddish in the center, widely separated, the space almost equal to the width of one plate. Each plate has three yellow slits, each on a broad,

poorly defined ridge. Button large, round, red, and with a faint depression in the center. Between the spiracles is an elongated depression, which is wider at each end. Spiracles located slightly below the longitudinal axis. Anal opening quite large, decidedly raised above the surface of the puparium, located far below the spiracles. Anterior spiracles small, tuberculate, and reddish.

Length, 5 mm.; diameter, 1.5 mm.

34. EXORISTA PYSTE Walker.

Medium size; shining, dark red; posterior end, in profile, slightly depressed dorsally and broadly rounded on the lower half. Stigmal plates shining black, slightly raised above the surface, separated by a space nearly equal to the width of one plate. Each plate has three dark-reddish slits, the upper and middle ones slightly arcuate, the middle and lower slits closer together. Button large, round, well defined. Spiracles located a short distance above the longitudinal axis. Anal opening very small, far below the spiracles.

Length, 6.75 mm.; diameter, 3 mm.

35. TACHINOPHYTO VARIABILIS Coquillett (*Euzenillia variabilis* Coquillett).

Small; subshining, yellow or red; posterior end tuberculate; tubercle located on lower half of puparium, viz, mostly below the longitudinal axis. Stigmal plates shining black, slightly raised above the surface and separated by a space nearly equal to the width of one plate. Each plate has three short slits, which are nearly straight; slits yellow, each located on a broad, slightly flattened, deep-reddish ridge. Button large, round, and located near the center of the stigmal plate. Spiracles located just below the longitudinal axis. Anal opening large, located far below the stigmal plates.

Length, 5 mm.; diameter, 1.75 mm.

36. TACHINOPHYTO FLORIDENSIS Townsend.

Small; dull, reddish yellow; posterior end tuberculate; bottom surface of puparium nearly straight. Spiracles shining black, widely separated, the space nearly equal to the width of one plate. Each plate has three slits, each located on top of a well-defined ridge. Button large, round. Spiracles located on a tubercle far below the longitudinal axis. Anal opening small, located below near the base of the large tubercle.

Length, 4.25 mm.; diameter, 1.25 mm.

37. PHORICHAETA CINEROSA Coquillett (*Polideosoma cinerosa* Coquillett).

Small; dull, dark yellowish red. Spiracles shining black, narrowly separated and located on a very prominent, rugose protuberance, which is darker than the puparium. This protuberance is at an

oblique angle to the puparium from a lateral view. Each stigmal plate has three slits, each on top of a well-defined ridge. Button large, round. Spiracles located on longitudinal axis. Anal opening small, located just below the protuberance.

Length, 5 mm.; diameter, 2 mm.

38. *ACTIA PILIPENNIS* Fallén (*Gymnophthalma pilipennis* Fallén).

Small; shining, yellowish red; posterior end with a large tubercle. Spiracles shining, dark red, with a blackish tinge, especially around the base; plates touching; located on the large tubercle. Each plate has three slits, each located on top of a broad, well-defined ridge. Button large, round, not distinctly defined. Spiracles located slightly below the longitudinal axis. Anal opening small, just below the spiracles.

Length, 4 mm.; diameter, 1.75 mm.

39. *SIPHONA GENICULATA* De Geer (*Crocuta illinoisensis* Townsend).

Very small; dull, very dark red; posterior end narrowed down to a large tubercle, with the apex bilobed. Upon each lobe is located the spiracle or stigmal plate, which is black and subshining. These plates are separated by a distance equal to the length of one plate. Each plate has three small, yellowish slits. Button small, not very distinct. Spiracles located on longitudinal axis. Anal opening small, located at the base of the large tubercle.

Length, 4 mm.; diameter, 1.75 mm.

40. *SIPHONA PLUSIAE* Coquillett (*Siphonopsis plusiae* Coquillett).

Very small; dull, dark red; posterior end narrowed down to a large tubercle, upon which the spiracles are located. Spiracles small, dull black, slightly raised above the surface, widely separated, the space between equal to width of one plate. Each plate has three yellowish slits, nearly straight. Button large, not very well marked. Spiracles located on longitudinal axis. Anal opening small and far below the stigmal plates.

Length, 3.5 mm.; diameter, 1.5 mm.

41. *PANZERIA PENITALIS* Coquillett (*Pyraustomyia penitalis* Coquillett).

Medium size; elongate, subshining, yellowish red; bottom surface with a broad indentation; posterior end rather sharply tuberculate. Spiracles small, shining black, separated by a distance about equal to the width of one plate. Each plate has three slits, each located on a rather broad, flat ridge. Button large, round, well defined. Spiracles located on top of tubercle, which is mostly above the longitudinal axis. Anal opening small, located just below the tubercle.

Length, 7 mm.; diameter, 2 mm.

42. *LESKIOMIMA TENERA* Wiedemann.

Medium size; dull, yellowish red; posterior end tuberculate; tubercle bent slightly upward. Spiracles protuberant, shining black, about or nearly touching at the base. Stigmal plates widely separated by a V-shaped space between them. Each plate has three small, nearly straight slits, each located on a rounded, well-developed ridge, which is nearly round; upper and lower ridge higher and more developed than the middle one. Button large, round, located on the inner side of each plate. Anal opening large, located far below the spiracles. Spiracles located on but mostly above the longitudinal axis.

Length, 6 mm; diameter, 2 mm.

43. *PARAPLAGIA SPINULOSA* Bigot (*Blepharigenia spinulosa* Bigot).

Medium size; dull, nearly black; posterior end with a large round tubercle, the bottom of which is on the longitudinal axis. Spiracles shining black, raised above the surface; stigmal plates touching. Each plate has three slits located on well-marked ridges. Button round, located on inner edge of plate, and well marked. Spiracles located on the large tubercle, above its center. Anal opening fairly large and far below the tubercle.

Length, 7 mm; diameter, 3.5 mm.

44. *METACHAETA HELYMUS* Walker.

Small; dull, dark yellowish red; posterior end slightly tuberculate, the apex of which is faintly depressed; spiracles shining reddish black, narrowly separated and located on the longitudinal axis. Each spiracle has three slits. Each slit is located on top of a small, well-defined ridge. Button round, well defined. Anal opening fairly large and at the base of the tubercle.

Length, 4.75 mm.; diameter, 1.75 mm.

45. *ALOPHORA PULVEREA* Coquillett (*Oedematopteryx pulverea* Coquillett).

Very small; dull, pale yellow; upper surface of puparium nearly straight, lower surface broadly rounded. Spiracles shining black, protuberant, conical, with a small, vertical groove on the apex between the stigmal plates. Each plate is long, narrow, slightly triangular, with three yellowish slits, each located on a well-defined ridge; the two inner slits rather long, the middle one much shorter. Button quite small. Anal opening small and reddish. Spiracles located slightly above the longitudinal axis.

Length, 3.5 mm.; diameter, 1.25 mm.

46. PHORANTHA OCCIDENTIS Walker (*Phoranthella morrisoni* Townsend).

Very small; dull, reddish yellow; sharply pointed on posterior end. Spiracles protuberant, shining black, faintly reddish along the apical edge and pointing downward. From above the spiracles are solid at the base, and the spiracular plates are well separated by a V-shaped space. Each plate is triangular in shape and has three slits, each on top of a well-defined reddish-yellow ridge; the upper slit the longest and the middle the shortest. Between the slits the surface is deep reddish. Button large, rounded, and reddish. Spiracles located on the longitudinal axis. Anal opening small, just below the spiracles.

Length, 2 mm.; diameter, 1 mm.

47. FRONTINA ANCILLA Walker (*Frontiniella parancilla* Townsend).

Small; subshining, dark red. Spiracles shining black, located on prominent protuberances, which are granular around the basal half, smooth on upper half. They are separated by a space equal to the length of one stigmal plate. Each plate has three small tubercles on the surface. On the top of each is located the slit. Button small, round, and rather weak. Spiracles located on the longitudinal axis. Anal opening small, located below about twice the length of the protuberance.

Length, 5 mm.; diameter, 1.75 mm.

48. CLYTIOMYIA FLAVA Townsend.

Small; dull red. Spiracles protuberant, shining black, roughly granular at the base. From above they are widely separated by a V-shaped space. Spiracles triangular, each having three faintly-yellow slits, each slit on top of a very well-defined ridge. Button round, well defined. Anal opening very small and quite close to spiracles. Spiracles located on the longitudinal axis.

Length, 5 mm.; diameter, 2.25 mm.

49. PLAGIA AMERICANA Van der Wulp.

Medium size; dull, dark red; posterior end of the puparia noticeably larger than the anterior end. Spiracles are decidedly protuberant, shining black, touching at the base and widely divergent at the apex. The bases of these protuberances are covered with small spines. Stigmal plates on top of the protuberances. Each plate has three small slits, each on top of a well-defined ridge. Anterior spiracles well developed, shining black, tuberculate, and widely separated. Button large, located on the inner edge of the plate. Anal opening small, far below the spiracles, and slightly below the longitudinal axis. Spiracles located far above the longitudinal axis.

Length, 6.25 mm.; diameter, large, 3 mm.; small, 2 mm.

50. *ACEMYIA DENTATA* Coquillett (*Acemyiopsis dentata* Coquillett).

Medium size; dull, blackish red, very finely rugose; posterior end slightly tuberculate. Spiracles black, protuberant, touching at the base; apex separated by a space nearly equal to the width of one plate; the sides roughly granular; apex shining, divided into three lobes. The slits are yellowish and located on these lobes. Button large and round. Spiracles located above on the longitudinal axis. Anal opening located below, about the length of one stigmal plate.

Length, 6 mm.; diameter, 2.75 mm.

51. *EUTRIXA EXILE* Coquillett.

Medium size; shining, dark red; posterior end greatly enlarged; anterior half of the dorsum with a deep depression. Spiracles black, on small tubercles, which have a granular surface. Spiracles widely separated, the distance nearly equal to twice the basal diameter of the tubercles. Each stigmal plate has three slits, each one of which is on top of a sharply defined ridge. Button small, round, located on upper edge. Spiracles located far above longitudinal axis. Anal opening large, located just below the longitudinal axis.

Length, 7 mm.; diameter, 2.75 mm.

52. *PHOROCERA ERECTA* Coquillett.

Medium-sized; subshining, yellowish red. Spiracles shining, mostly dark, yellowish red, blackish around the edge, widely separated, the space equal to about three-fourths the width of one plate. Each plate has four slits. The three upper ones are concaved and the lower slit convex. Each slit on top of a broad, yellow, flat ridge. Button very large, round, reddish yellow. Spiracles are located very slightly above the longitudinal axis. Anal opening large, far below the spiracles.

Length, 5.5 mm.; diameter, 2 mm.

53. *CRYPTOMEIGENIA THEUTIS* Walker.

Medium to large size; dull, dark red; concave on the dorsum; spiracles shining black, distinctly raised above the surface, well separated, the space equal to the width of one plate. Each plate has six (rarely five) nearly straight, deep-yellow slits. Button large, round, well defined. Spiracles located above the longitudinal axis, a little more than the length of one stigmal plate. Anal opening large, far below the spiracles.

Length, 6.5 to 9 mm.; diameter, 2.75 to 4.5 mm.

54. *BIOMYIA LACHNOSTERNAE* Townsend (*Viviania lachnosternae* Townsend).

Medium size; subshining, dark red; posterior end much larger diameter than the anterior end. Spiracles shining black, slightly

raised above the surface, narrowly separated by a space about one-fourth the width of one plate. Each plate has six small, slightly angular, yellowish slits on a flattened surface. Button large, round, near inner edge. Anal opening small, far below the spiracles. Spiracles located little more than the length of one plate above the longitudinal axis.

Length, 7 mm.; diameter, large, 3.65 mm.; small, 2.5 mm.

55. *CRYPTOMEIGENIA AURIFACIES* Walton.

Medium size; dull, dark red; surface of puparium roughened or granular to nearly rugose; caudal end much larger in diameter. Stigmal plates shining black, widely separated, space equal to width of one plate. Each plate is flattened on the dorsal surface and deep reddish to black. Each plate has six yellowish slits, which are nearly straight. Some specimens show the slits more angulated than shown in the drawing. Buttons large, round. Anal opening large, located far below the stigmal plates. Spiracles located far above the longitudinal axis.

Length, 6.5 mm.; diameter, 3 mm. at largest diameter.

56. *HYALOMYODES TRIANGULIFERA* Loew.

Very small; dull, yellowish red; a depression on the dorsum of the anterior half; segmental lines of the last three or four segments plainly seen on the dorsum. Spiracles shining black, narrowly separated at the base; slightly raised above surface. Each stigmal plate has three very small, yellowish slits. Button small, not very plainly seen. Spiracles located on longitudinal axis. Anal opening small, far below the spiracles.

Length, 3 mm.; diameter, 1.4 mm.

Some puparia do not have the segmental lines and the dorsal depression.

57. *ADMONTIA HYLOTOMAE* Coquillett (*Hylotomyia hylotomae* Coquillett).

Medium-sized; subshining, red to reddish yellow. Spiracles shining black, slightly raised above the surface, widely separated, space equal to one-half of one plate; each plate with three yellowish slits, each located on top of a well-defined ridge. Button reddish, prominent, rather quadrate in shape. Spiracles far above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 7 mm.; diameter, 3 mm.

58. *MASICERA*, species (near *EXILIS*).

Medium-sized; dull yellow; somewhat pointed on posterior end. Spiracles shining black, slightly raised above the surface and separated by a very narrow space at the bottom. Each plate has three slits, each on top of a well-defined ridge; slits yellowish red. Button

large, prominent, and red. Spiracles located a short distance above the longitudinal axis. Anal opening small, reddish, located some distance below the spiracles.

Length, 5.5 mm.; diameter, 2 mm.

59. *FRONTINA ARMIGERA* Coquillett (*Eucelatoria armigera* Coquillett).

Small; dull, yellowish red. Spiracles shining black, slightly raised above the surface, separated by a space equal to one-half the width of one plate. Each plate has three reddish slits, each on top of a well-defined ridge. Button large, round, prominent, extending beyond the edge of the plate. Spiracles located some distance above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 6 mm.; diameter, 2.25 mm.

60. *AMOBIA CONFUNDENS* Townsend (*Amobiopsis confundens* Townsend).

Medium-sized; subshining, dark red; posterior end distinctly rugose. Spiracles black, subshining, slightly raised above the surface, widely separated by a space equal to about one and one-half times the width of one spiracular plate. Each plate has three broad, yellowish slits nearly parallel and depressed along the center, each on a distinct ridge. Button small, round. Anal opening small, far below the spiracles. Spiracles located just above the longitudinal axis.

Length, 7.25 mm.; diameter, 3 mm.

61. *EXORISTA AMPLEXA* Coquillett (*Masiceropsis amplexa* Coquillett).

Large; dull, dark red. Spiracles about flush with the surface of the puparium, in a faint triangular depression. Spiracles shining black, well separated; three slits reddish. Button round. Just below the spiracles is a broad tubercle. Spiracles located on longitudinal axis. Anal opening far below the spiracles. Posterior end of puparium around the stigmal area is rugose.

Length, 10 mm.; diameter, 4 mm.

62. *CHAETOGAEDIA ANALIS* Van der Wulp.

Very large; cylindrical, dull, dark red, darker on caudal end. Slightly but broadly constricted on the dorsum near posterior end. Caudal end rather blunt. Spiracles decidedly raised, shining black, and each formed into three well-defined lobes, and each lobe with a well-defined slit on the dorsal ridge; the inner and outer slit with an indentation at the middle. Button well defined. Spiracles located on longitudinal axis and separated by a space about equal to the inner lobe. Anal opening located at about the lowest fourth of the end view.

Length, 10 mm.; diameter, 4 mm.

63. *ARCHYTAS ANALIS* Fabricius.

Large; dull, dark red, with a faint indication of a depression or stricture near the posterior end. Spiracles shining black, slightly raised above the surface, separated by a space nearly equal to the width of one plate. Each plate has three slits, each located on top of a well-defined ridge. Button fairly large, round. Spiracles above longitudinal axis, about two-thirds the width of one plate. Anal opening very small, far below the spiracles.

Length, 10.5 mm.; diameter, 4.75 mm.

64. *ARCHYTAS HYSTRIX* Fabricius (*Jurinopsis floridensis* Townsend).

Very large; cylindrical, dull, dark red; constricted near the caudal end, forming a distinct lobe or segment at the end of the puparium, which is much larger at the base. Spiracles shining black, well raised, and on longitudinal axis; three reddish-yellow slits, each located along the upper edge of a well-defined ridge. Button round, well defined. Spiracles separated by a distance nearly equal to the width of one spiracle. Anal opening down near lower edge of end view.

Length, 14 mm.; diameter, 6 mm.

65. *ARCHYTAS LATERALIS* Macquart (*Makasinocera lateralis* Macquart).

Large; subshining, dark red, rugose, upper surface nearly flat; posterior end flattened on the upper half. Spiracles shining black, located above the longitudinal axis a distance about equal to the width of one plate. Each plate has three slits, each on top of a well-defined ridge. Button small, round. Anal opening small, far below the spiracles.

Length, 12.5 mm.; diameter, 5.75 mm.

66. *GONIA CAPITATA* De Geer.³

Large; dull, dark red. Spiracles shining black, slightly raised above the surface, separated by a space equal to one-half the width of one plate. Each plate has three slits, each on top of a well-defined ridge. Button round, well defined. Spiracles located just above the longitudinal axis. Anal opening small, far below the stigmal plates.

Length, 10 mm.; diameter, 4.25 mm.

67. *GONIA EXUL* Williston.

Large; dull, dark red. Spiracles shining black, decidedly raised above the surface, widely separated at the base, the distance equal to about one-half to two-thirds the width of one plate. Each plate has three slits, black, each located on top of a very well-defined

³ The adult, a female, has the characters of *Gonia sequax* Williston.

ridge. Button large, round. Spiracles slightly above the longitudinal axis. Anal opening large, far below the spiracles.

Length, 10.5 mm.; diameter, 4.75.

68. *BLEPHARIZEPA ADUSTA* Loew (*Rileymyia adusta* Loew).

Large; dull, dark red. Spiracles black, shining, slightly raised above the surface. Stigmal plates separated by a distance equal to about one-third the width of one plate. Each plate has three reddish slits, each at the top of a well-defined ridge. Button large, round. Spiracles above, almost on the longitudinal axis. Anal opening small, far below the spiracles. Just below the stigmal plates is a somewhat diamond-shaped elevation with a median depression.

Length, 8 mm.; diameter, 4.5 mm.

69. *MASICERA EUFITCHIAE* Townsend (*Phrynolydella eufitchiae* Townsend).

Very large; dull, dark red, very finely rugose. Spiracles shining black, slightly raised above the surface, separated by space nearly equal to the width of one stigmal plate. A small indentation just above and between the stigmal plates and one below each plate. Below the spiracles is a transverse elongated elevation with an elongated, central depression. Spiracles located on longitudinal axis. Anal opening small, far below the spiracles.

Length, 9.5 mm.; diameter, 4.5 mm.

70. *LINNAEMYIA COMTA* Fallén (*Bonnetia comta* Fallén).

Large; dull, reddish yellow. Spiracles shining black, slightly raised above the surface, widely separated, the space nearly equal to one-half the width of one plate. Each plate has three curved slits, each on top of a well-defined ridge. Button large, round. An elongated ridge extending up between the plates, larger and broader at the base. Spiracles far above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 10 mm.; diameter, 4 mm.

71. *PELETERIA ROBUSTA* Wiedemann (*Sphyromyia robusta* Wiedemann).

Very large; robust, dull, dark red. Spiracles shining black, decidedly raised above the surface of the puparium. Stigmal plates well separated; space between them nearly equal to the width of one plate. Each plate has three long slits, each slit on a large, well-defined ridge. Two upper slits are nearly parallel; the upper one is horizontal. Button large, round, flat. Anal opening large, located far below the spiracles. Spiracles located just above the longitudinal axis.

Length, 11.5 mm.; diameter, 5 mm.

72. *TACHINA MELLA* Walker (*Exorista mella* Walker).

Small; dull, yellowish red. Spiracles subshining, slightly raised above the surface, separated by a distance equal to about one-half of one plate. Each plate has three reddish slits, each on a well-defined ridge. Button large, round, and reddish. Just below the spiracles is a prominent elevation with an indentation in the center. Spiracles located slightly above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 5 mm.; diameter, 2 mm.

73. *EUPHOROCERA CLARIPENNIS* Macquart (*Neophorocera claripennis* Macquart).

Small to large; dull, light red to very dark red, slightly lighter red above and between the spiracles. Spiracles shining black, widely separated, the space nearly equal to the height of one plate. Each plate has three dark-yellow slits, each on top of a well-defined ridge. Button large, round. Spiracles located on the upper side of the longitudinal axis. Below and between the spiracles is a large, dark, rugose elevation with a central depression. Anal opening small, far below the spiracles.

Length, 5 to 8 mm.; diameter, 2 to 4 mm.

74. *HYPOCHAETA LONGICORNIS* Schiner.

Very small; dull yellowish red. Spiracles black, faintly shining, narrowly separated, slightly raised above the surface. Each plate with three slits, each slit located on a rather flattened, faint ridge. Button large, somewhat elliptical. Anal opening small, located nearly twice the length of one plate, below the stigmal plates. Spiracles located slightly above the longitudinal axis.

Length, 3.5 mm.; diameter, 1.5 mm.

75. *PHOROCERA TORTRICIS* Coquillett.

Very small; dull, reddish yellow. Spiracles shining black, slightly raised above the surface, separated by a space equal to about one-third the width of one plate. Each plate has three yellowish slits, each located on a well-marked ridge. Button round, well marked. Between, at the base of the stigmal plates, is an elevation nearly as large as one stigmal plate. The sides of the elevation are brownish, and it is pointed on the upper edge. Spiracles located on longitudinal axis. Anal opening small, quite far below the stigmal plates.

Length, 3.75 mm.; diameter, 1.25 mm.

76. *PHORICHAETA SEQUAX* Williston (*Polideosoma sequax* Williston).

Small; dull, yellowish red. Posterior end of puparium faintly tuberculate. Spiracles reddish, located on this faint tubercle. Each spiracle has three slits, each slit on top of a ridge; spiracles nearly

touching and located on the longitudinal axis. Button large, round, close to inside edge. Anal opening small, remote from spiracles.

Length, 3.75 mm.; diameter, 1.5 mm.

77. *DICHAETONEURA LEUCOPTERA* Johnson.

Medium size; subshining, yellowish red. Spiracles black, subshining, separated by a space equal to about one-third the width of one plate. Each plate has three short slits toward the outer edge, each on a very narrow, poorly defined ridge. Button large, round, somewhat indistinct. Spiracles located below the longitudinal axis, but just about touching it. Anal opening very small, far below the spiracles.

Length, 6 mm.; diameter, 2 mm.

78. *TACHINA RUSTICA* Meigen (*Exorista simulans* Meigen).

Small to medium; dull, yellowish red. Spiracles shining black, red in the center, widely separated, space nearly equal to width of one plate. Each plate has three yellowish slits, each on top of a well-defined ridge. Button large, round, and blackish. Spiracles very slightly above the longitudinal axis. Between the spiracles, at the pole, is a diamond-shaped elevation with a depression in the center. Anal opening small, far below the spiracles.

Length, 5 to 6.5 mm.; diameter, 2 to 2.5 mm.

79. *TACHINA ROBUSTA* Townsend (*Tachinomyia robusta* Townsend).

Medium to large size; dull, reddish to nearly black, finely rugose. Spiracles shining black, widely separated, space nearly equal to width of one plate. Each plate has three reddish-yellow slits, each slit on top of a well-defined ridge, which is striated; inner slit noticeably larger than the other two. Spiracles far above the longitudinal axis. Area around the spiracles with larger rugosities. Anal opening small, far below the spiracles.

Length, 6.5 to 12 mm.; diameter 3 to 5.5 mm.

80. *MASICERA MYOIDEA* Desvoidy.

Medium-sized; dull, dark red, with a grayish tinge, nearly smooth. Spiracles shining black, slightly raised above the surface, separated by a distance equal to about one-half of one plate. Each plate has three slits. Button small, round, well defined. Spiracles located on longitudinal axis. Anal opening small, far below the spiracles.

Length, 7.5 mm.; diameter, 3 mm.

81. *STURMIA NIGRITA* Townsend.

Medium size, elongate; dull, dark red. Spiracles black, subshining, slightly raised above surface, separated by a distance equal to one-half the width of one stigmal plate. Each plate has three

yellowish slits. Button small, round. Spiracles located just above the longitudinal axis. Anal opening small, located far below the stigmal plates.

Length, 8.5 mm.; diameter, 3 mm.

82. *FRONTINA TENTHREDINIDARUM* Townsend (*Myrsina tenthredinidarum* Townsend).

Small; dull, yellowish red. Spiracles shining black, slightly reddish in the middle, slightly raised above the surface, widely separated by a space nearly equal to the width of one plate. Each plate has three yellowish slits, each on top of a narrow ridge. Button small, rounded, and not very distinct. Spiracles located very slightly above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 5 mm.; diameter, 2 mm.

83. *EXORISTA NIGRIPALPIS* Townsend.

Small; subshining, yellowish red. Spiracles shining, black around the edge, reddish, in the center, slightly raised above the surface. Each plate has three reddish-yellow slits, each on top of a poorly defined ridge. Button large, round, deep red. Spiracles located slightly above the longitudinal axis. Anal opening fairly large, far below the spiracles.

Length, 5 mm.; diameter, 2 mm.

84. *EXORISTA GRISEOMICANS* Van der Wulp (*Masiceropsis amplexa* Coquillett).

Medium-sized; subshining, dark red. Spiracles shining black, dark reddish in center, slightly raised above the surface. Each plate has three reddish slits, each on top of a broad, flattened, indistinct ridge. Button large, round, deep red. Spiracles located some distance above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 6 mm.; diameter, 3 mm.

85. *PHOROCERA FLAVICAUDA* Van der Wulp.

Medium size; subshining, yellowish red; broadly rounded posteriorly, faintly depressed on the anterior dorsal portion. Spiracles black, subshining on the sides, deep reddish in the middle, slightly raised above the surface, widely separated, space equal to about one-half the width of one plate. Each plate has three reddish-yellow slits, the two lower slits closer together. Button large, round, reddish, slightly blackish near the middle. Spiracles located above the longitudinal axis slightly more than the height of one plate. Anal opening very small, far below the spiracles.

Length, 7.5 mm.; diameter, 2.75 mm.

86. *PANZERIA RADICUM* Fabricius (*Varichaeta aldrichi* Townsend).

Medium-sized; dull red, with a very faint depression on the dorsal surface. Spiracle dull black, very small, separated by a space nearly equal to the width of one plate, very slightly raised above the surface. Each plate has three very small slits, each on top of a faintly raised surface. Button large and round. Spiracles some distance above longitudinal axis. Anal opening small, far below the spiracles.

Length, 6 mm.; diameter, 2.25 mm.

87. *ZELIA*, species (near *GENUINA*).

Medium size; subshining, rugose, especially on the posterior end. Spiracles subshining, black, decidedly raised above the surface, narrowly separated at the base, more widely so at the apex. Each plate has three dull-yellow slits, each slit located on top of a broad, well-defined ridge. Button small, round, depressed. Spiracles located only a short distance above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 7.5 mm.; diameter, 2.75 mm.

88. *EXORISTA*, species (Hopk. U. S. 13675b).

Medium-sized; subshining, dark red; caudal end slightly depressed dorsally at about one-third the length from the end. Spiracles shining black, widely separated, the space equal to the width of one plate. Each plate has three reddish slits, each on top of a well-defined ridge, the upper one much longer than either of the other two. Button red, large, well defined. A prominent elevation just below and between the spiracles. Anal opening large, far below the spiracles, on the flat under surface of the puparium. Spiracles located just below the longitudinal axis.

Length, 6.5 mm.; diameter, 2.65 mm.

89. *MASICERA RUTILA* Meigen.

Medium-sized; dull, yellowish red. Spiracles shining black, raised above the surface. Each plate has three reddish slits, each located on a well-defined ridge. Stigmal plates separated by a distance equal to about one-fifth of one plate. Button large, round. Spiracles just slightly above the longitudinal axis. Just below the stigmal plates is a broadly rounded, flattened tubercle with a depression near the apex. Anal opening small, far below the spiracles.

Length, 6.25 mm.; diameter, 2.75 mm.

90. *ADMONTIA DEMYLUS* Walker (*Spathimeigenia spinigera* Townsend).

Medium-sized; dull, reddish yellow. Spiracles shining black, slightly raised above the surface, narrowly separated, the space equal to about one-third the width of one plate. Each plate has three

yellow slits, each located on a well-defined ridge. Button large, round, red. Spiracles located a short distance above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 7 mm.; diameter, 2.75 mm.

91. PHOROCERA, *species* (near MACRA).

Medium-sized; subshining. Stigmal plates shining black, slightly raised above surface. Plates separated by a space equal to one-half of one plate. Each plate has three red slits, each on top of a ridge. Button round, fairly distinct. Spiracles located on longitudinal axis. Between and partly below the stigmal plates is a large, rugose tubercle. Anal opening small, far below the spiracles.

Length, 7 mm.; diameter, 2.75 mm.

92. PANZERIA AMPELUS Walker (*Varichaeta ampelus* Walker).

Medium-sized; dull, dark red, very minutely rugose. Spiracles shining black, slightly raised above the surface, separated by a space equal to one-third of one stigmal plate. Each plate has three reddish slits. Button medium-sized, round. Spiracles located on longitudinal axis. Just below the spiracles is a transverse, diamond-shaped elevation with a median depression.

Length, 7.5 mm.; diameter, 2.5 mm.

93. EXORISTA FUTILIS Osten Sacken (*Euexorista futilis* Osten Sacken).

Medium-sized; dull, dark red. Spiracles shining black, slightly raised above the surface, divided by a space nearly equal to one-half of one stigmal plate; area between plates smooth and shining. Each stigmal plate has three slits, each of which are located on a well-defined ridge. Button round, well defined. Spiracles located on the longitudinal axis. Anal opening small, far below spiracles.

Length, 8 mm.; diameter, 3.75 mm.

94. PHOROCERA CLARIPENNIS Macquart (*Euphorocera tachinomoides* Townsend).

Large; dull, dark red. Spiracles black, subshining, slightly raised above the surface, widely separated, the space between equal to about one-half the width of one plate. Each plate has three dark-red slits, each located on top of a well-defined groove. Button round, reddish, rather well defined. Spiracles located above the longitudinal axis, a distance about equal to the length of one plate. At the base and between the spiracular plates is a rugose, rounded, blackish elevation with a central depression. Anal opening small, far below the spiracles.

Length, 8 mm.; diameter, 3.5 mm.

95. *WINTHEMIA QUADRIPUSTULATA* Fabricius.

Medium size; dull, dark red. Spiracles shining black, faintly raised above the surface; stigmal plates separated by a distance equal to one-half of one stigmal plate. Each plate has three slits, each on top of a faint elevation. Spiracles just above the longitudinal axis. Button large, round. Anal opening small, far below the longitudinal axis.

Length, 8 mm.; diameter, 3 mm.

96. *UROMACQUARTIA HALISIDOTAE* Townsend.

Medium size, elongated; dark red and subshining. Spiracles shining black, narrowly separated and located on horizontal axis. Three slits, each on top of a well-defined ridge. Button small, round, located near inner edge. Anal opening far below spiracles.

Length, 9 mm.; diameter, 3.5 mm.

97. *TRICHOPIHORA RUFICAUDA* Van der Wulp (*Copecrypta ruficauda* Van der Wulp).

Medium sized; dull, dark red. Spiracles shining black, tuberculate, separated by a distance nearly equal to the width of one stigmal plate. Three slits, each located on a well-defined ridge. Button small, round. Spiracles located on longitudinal axis. Anal opening far below the spiracles.

Length, 8 mm.; diameter, 3 mm.

98. *STURMIA OCCIDENTALIS* Coquillett.

Small; dull, reddish yellow; posterior end finely rugose. Spiracles shining black, slightly raised above the surface, widely separated, space equal to about one-third the width of one plate. Each plate has three reddish slits, each located on top of a well-defined ridge. Button fairly large, black, rounded. Spiracles located less than their own height above the longitudinal axis. Anal opening small, far below the spiracles.

Length, 5 mm.; diameter, 1.75 mm.

99. *STURMIA ALBIFRONS* Walker (*Gymnocarcellia ricinorum* Townsend).

Medium size; dull, dark red. Spiracles shining black, faintly raised above the surface, widely separated, the space equal to one-half the width of one plate. Each plate has three dark-yellow slits. The two outer slits form a **U**, and the middle one is oblique. Button large, round. Below the spiracles is a large, dark, rugose elevation with a central depression. Anal opening small, far below the spiracles. Spiracles located a short distance above the longitudinal axis.

Length, 8.5 mm.; diameter, 4 mm.

EXPLANATION OF PLATES.

Figures 1, 2, 3, 5, 11, 12, 14, 15, 16, 17, 19, 24, 25, 26, 29, 30, 42, 43, 44, 49, 50, 51, 52, 55, 68, 70, 71, 72, 73, 74, 77, and 95 were drawn by Mr. W. R. Walton. All the other figures were drawn by Mr. C. T. Greene. All drawings read from left to right.

PLATE 1.

- FIG. 1. *Sturmia sociabilis* Greene.
 2. *Sturmia distincta* Wiedemann.
 3. *Phorocera meracanthæ* Greene.
 4. *Sturmia inquinata* Van der Wulp.
 5. *Celatoria diabroticæ* Schiner.

PLATE 2.

- FIG. 6. *Ptiloderia tibialis* Desvoidy.
 7. *Hilarella siphonina* Zetterstedt.
 8. *Pachyophthalmus floridensis* Townsend.
 9. *Megapriopsis opaca* Coquillett.
 10. *Zelia vertebrata* Say.

PLATE 3.

- FIG. 11. *Beskia aelops* Walker.
 12. *Oestrophasia ochracea* Bigot.
 13. *Phasmophaga antennalis* Townsend.
 14. *Coquillettina plankii* Walton.

PLATE 4.

- FIG. 15. *Latreillemys bifasciata* Fabricius.
 16. *Leucostoma atra* Townsend.
 17. *Microphthalma disjuncta* Wiedemann.
 18. *Exorista lobeliae* Coquillett.

PLATE 5.

- FIG. 19. *Gymnosoma fuliginosa* Desvoidy.
 20. *Ocyptera carolinae* Desvoidy.
 21. *Exorista confinis* Fallén.
 22. *Trichopoda pennipes* Fabricius.
 23. *Trichopoda lanipes* Fabricius.

PLATE 6.

- FIG. 24. *Neopales saundersii* Williston.
 25. *Exorista boarmiae* Coquillett.
 26. *Hyphantrophaga hyphantriae* Townsend.
 27. *Exorista eudryadis* Townsend.
 28. *Frontina frenchii* Williston.

PLATE 7.

- FIG. 29. *Linnaemyia fulvicanda* Walton.
 30. *Frontina aletiae* Riley; *Frontina archippivora* Williston.
 31. *Clausicella tarsalis* Coquillett.
 32. *Tachinophyto tortricis* Coquillett.
 33. *Sturmia pilatei* Coquillett.

PLATE 8.

- FIG. 34. *Exorista pyste* Walker.
 35. *Tachinophyto variabilis* Coquillett.
 36. *Tachinophyto floridensis* Townsend.
 37. *Phorichaeta cinerosa* Coquillett.
 38. *Actia pilipennis* Fallén.

PLATE 9.

- FIG. 39. *Siphona geniculata* De Geer.
 40. *Siphona plusiae* Coquillett.
 41. *Panzeria penitatis* Coquillett.
 42. *Leskiomima tenera* Wiedemann.
 43. *Paraplagia spinulosa* Bigot.

PLATE 10.

- FIG. 44. *Metachaeta helymus* Walker.
 45. *Alophora pulvereae* Coquillett.
 46. *Phorantha occidentis* Walker.
 47. *Frontina ancilla* Walker.
 48. *Clytiomyia flava* Townsend.

PLATE 11.

- FIG. 49. *Plagia americana* Van der Wulp.
 50. *Acemyia dentata* Coquillett.
 51. *Eutrixa exile*. Coquillett.
 52. *Neopales erecta* Coquillett.

PLATE 12.

- FIG. 53. *Cryptomeigenia theutis* Walker.
 54. *Biomyia lachnosternae* Townsend.
 55. *Cryptomeigenia aurifacies* Walton.
 56. *Hyalomyodes triangulifera* Loew.
 57. *Admontia hylotomae* Coquillett.

PLATE 13.

- FIG. 58. *Masicera*, species (near *exilis*).
 59. *Frontina armigera* Coquillett.
 60. *Amobia confundens* Townsend.
 61. *Exorista amplexa* Coquillett.
 62. *Chaetogaedia analis* Van der Wulp.

PLATE 14.

- FIG. 63. *Archytas analis* Fabricius.
 64. *Archytas hystrix* Fabricius.
 65. *Archytas lateralis* Macquart.
 66. *Gonia capitata* De Geer.

PLATE 15.

- FIG. 67. *Gonia exul* Williston.
68. *Blepharipeza adusta* Loew.
69. *Masicera eufitchiae* Townsend.
70. *Bonnetia (Linnaemyia) comta* Fallén.
71. *Peleteria robusta* Wiedemann.

PLATE 16.

- FIG. 72. *Tachina mella* Walker.
73. *Phorocera claripennis* Macquart.
74. *Hypochaeta longicornis* Schiner.
75. *Neopales tortricis* Coquillett.
76. *Phorichaeta sequax* Williston.
77. *Dichaetoneura leucoptera* Johnson.

PLATE 17.

- FIG. 78. *Tachina simulans* Meigen.
79. *Tachina robusta* Townsend.
80. *Masicera myoidea* Desvoidy.
81. *Sturmia nigrita* Townsend.
82. *Frontina tenthredinidarum* Townsend.

PLATE 18.

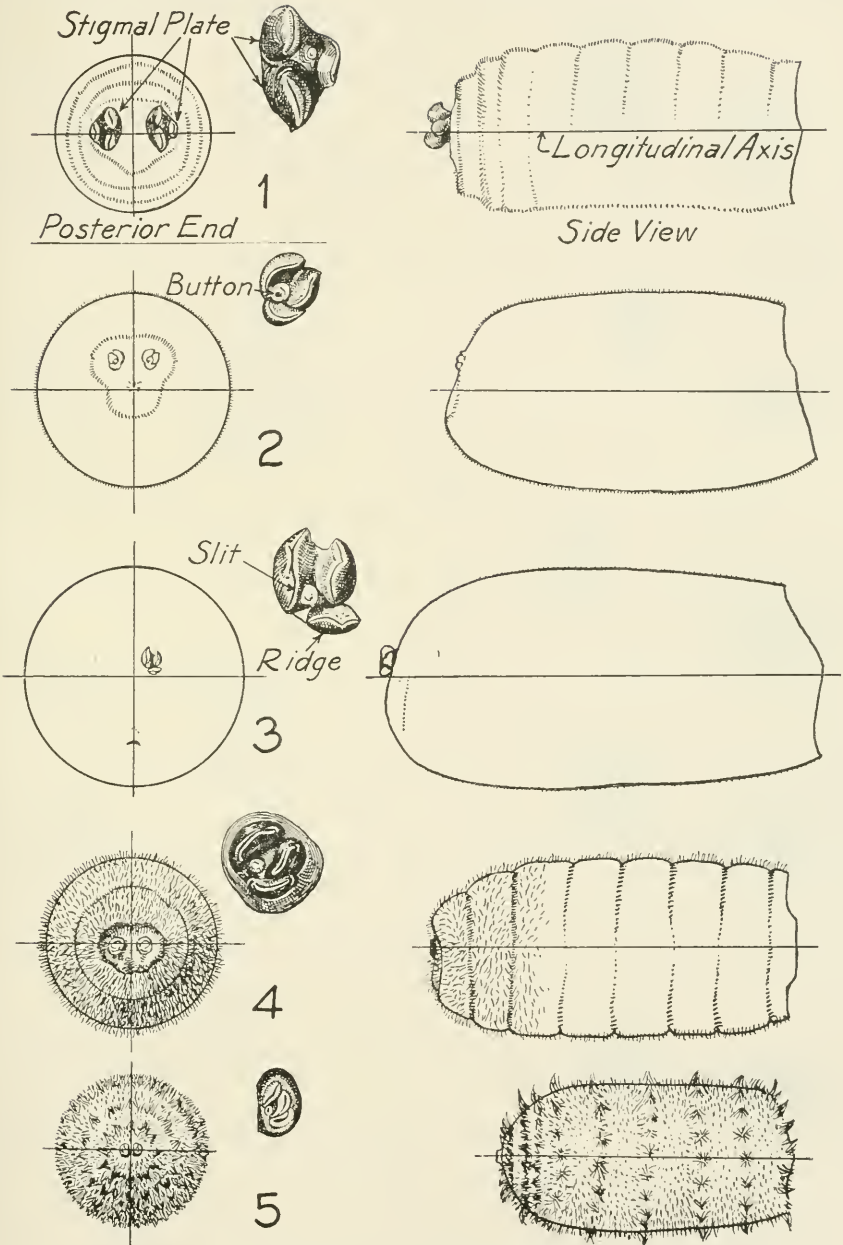
- FIG. 83. *Exorista nigripalpis* Townsend.
84. *Exorista griseomicans* Van der Wulp.
85. *Neopales flavicauda* Van der Wulp.
86. *Panzeria radicum* Fabricius.
87. *Zelia*, species (near *genuina*).

PLATE 19.

- FIG. 88. *Exorista*, species (13675b).
89. *Masicera rutila* Meigen.
90. *Spathimeigenia spinigera* Townsend.
91. *Phorocera* species (near *macra*).
92. *Varichdeta amplexa* Townsend.
93. *Exorista futilis* Osten Sacken.

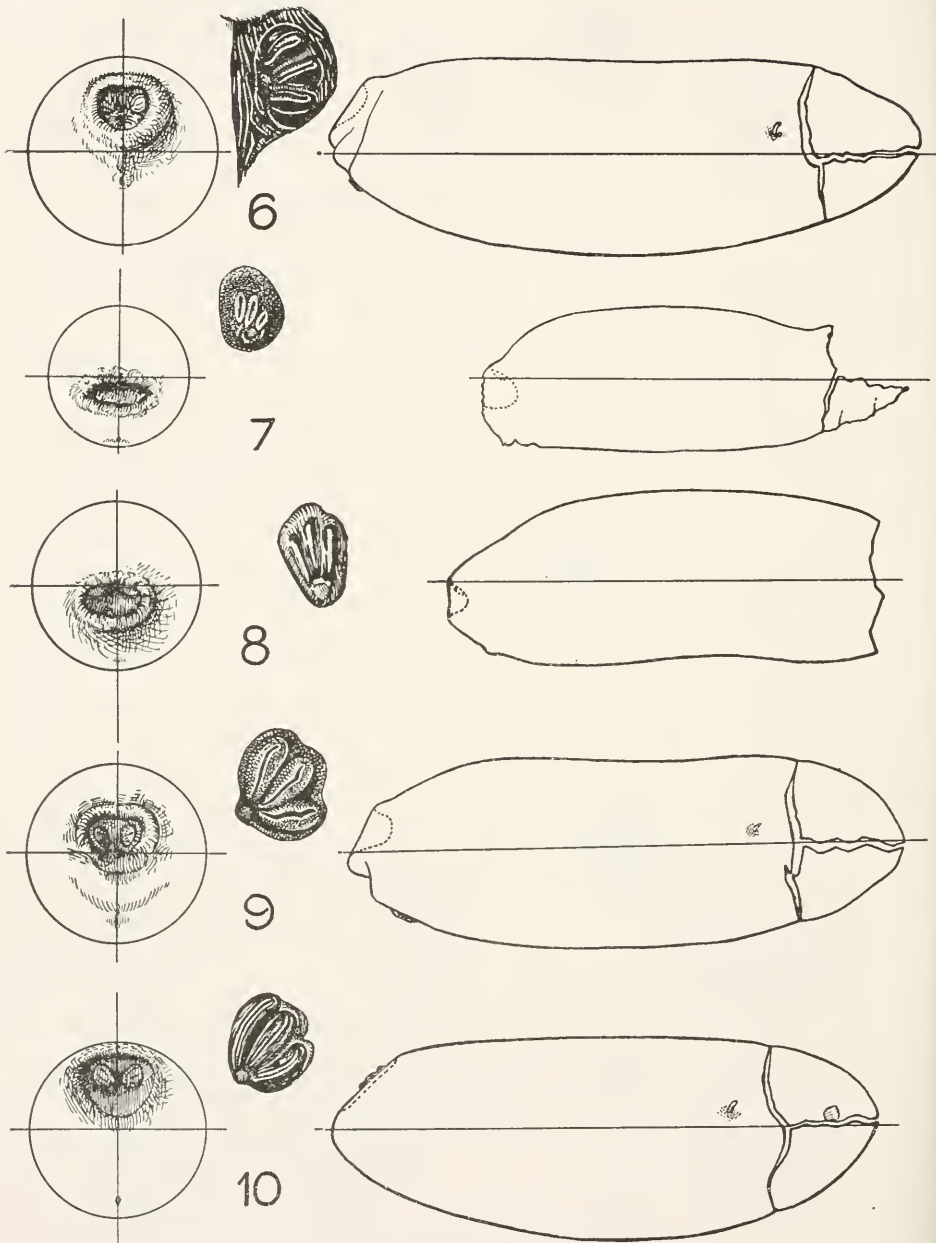
PLATE 20.

- FIG. 94. *Phorocera tachinomoides* Townsend.
95. *Winthemia quadripustulata* Fabricius.
96. *Uromacquartia halisidotae* Townsend.
97. *Cuphocera ruficauda* Van der Wulp.
98. *Sturmia occidentalis* Coquillett.
99. *Sturmia albifrons* Walker.



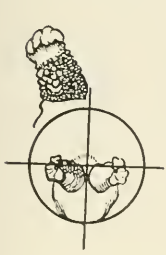
PUPARIA OF MUSCOID FLIES.

FOR EXPLANATION OF PLATE SEE PAGE 34.

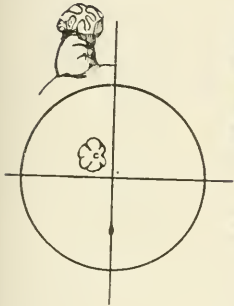
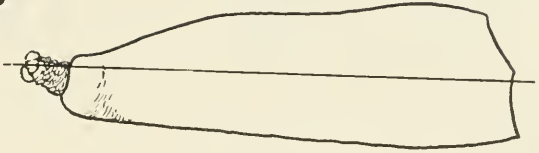


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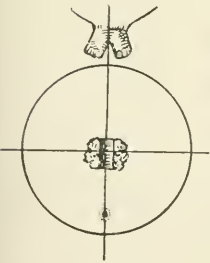
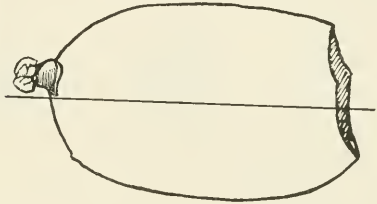
FOR EXPLANATION OF PLATE SEE PAGE 34.



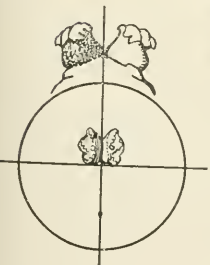
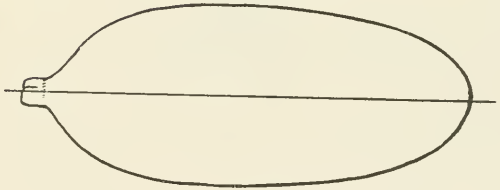
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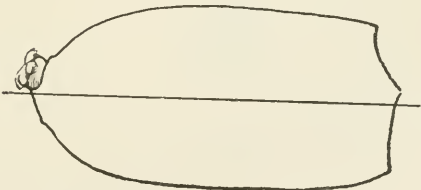
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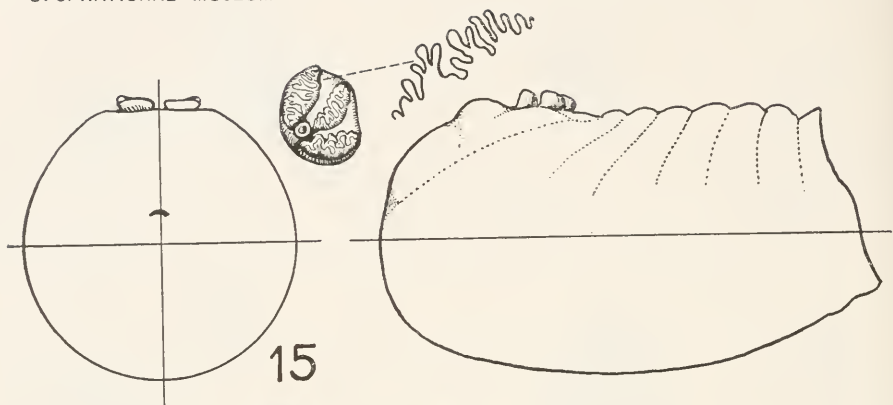


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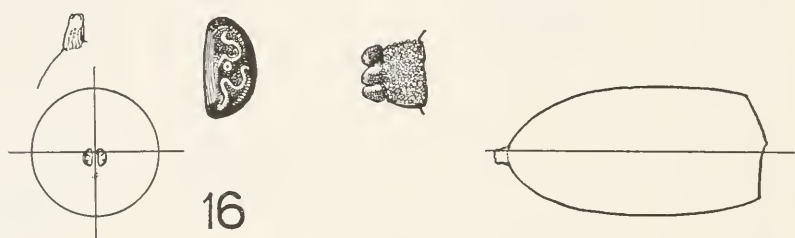


PUPARIA OF MUSCOID FLIES.

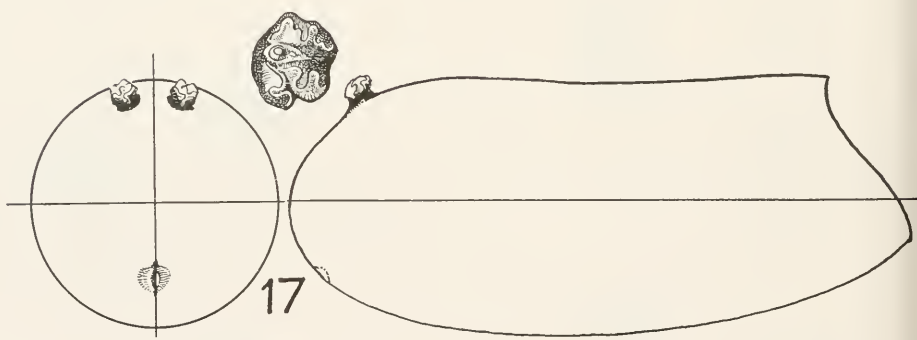
FOR EXPLANATION OF PLATE SEE PAGE 34.



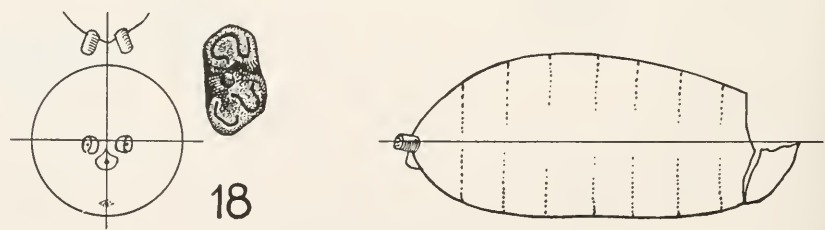
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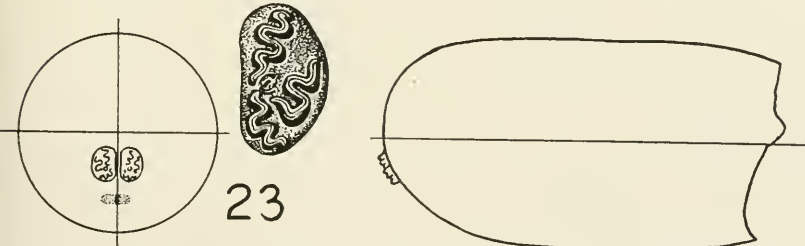
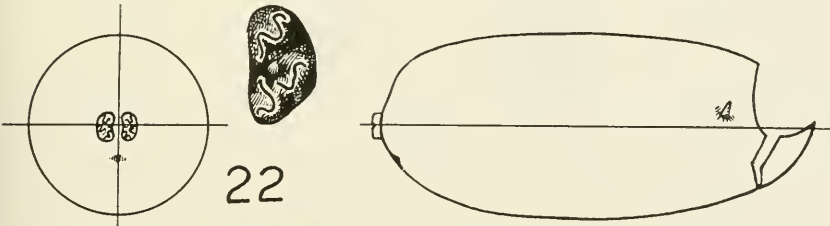
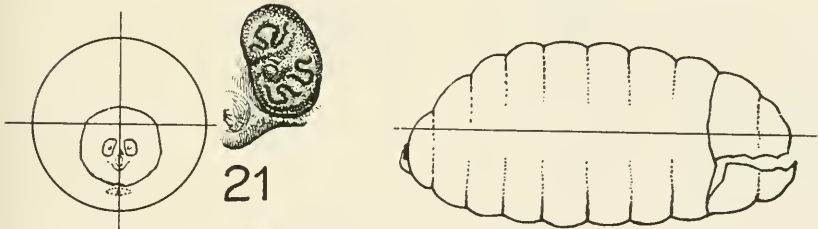
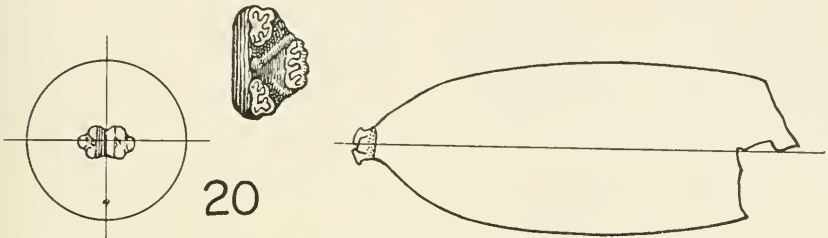
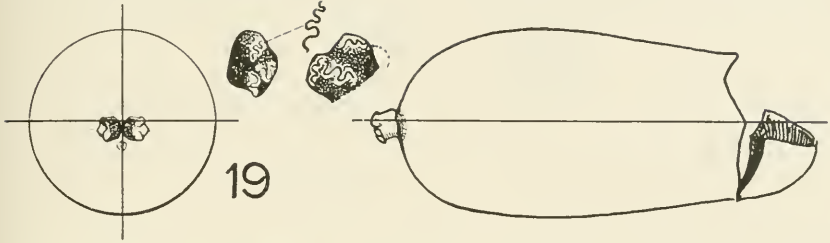
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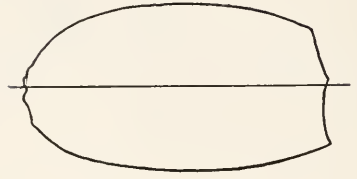


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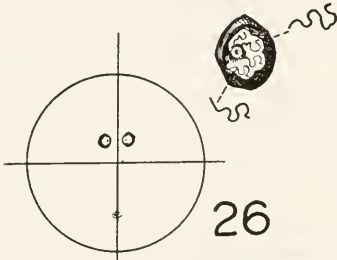
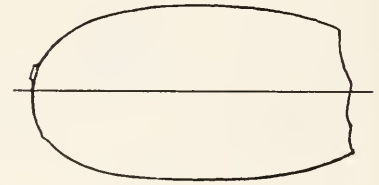
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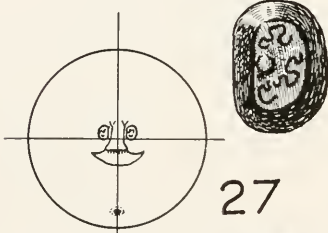
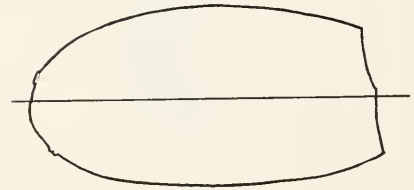
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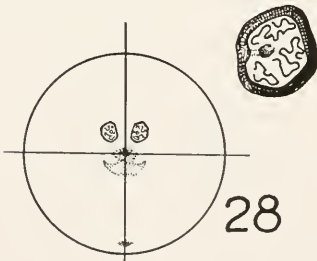
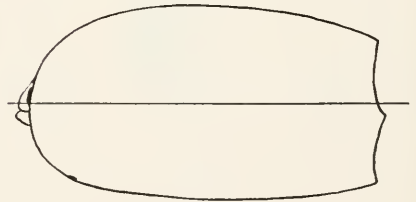
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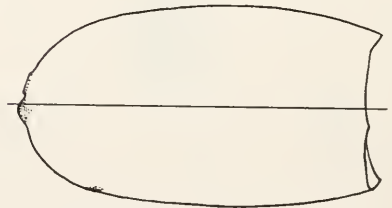
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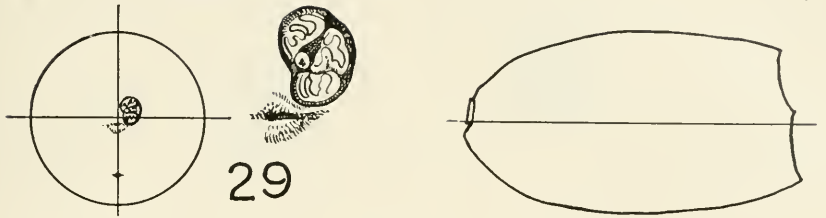


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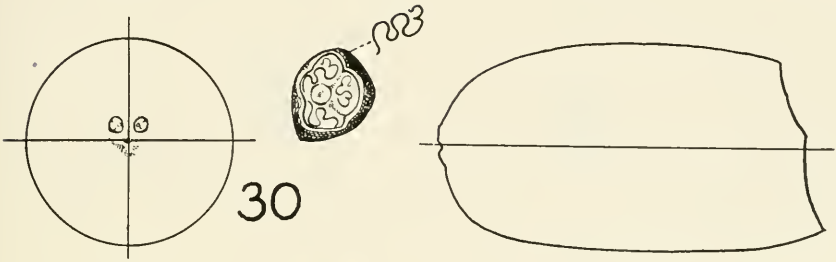


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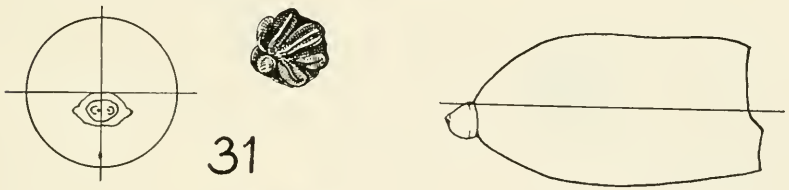
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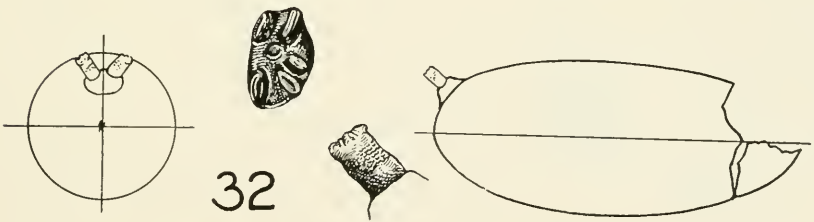
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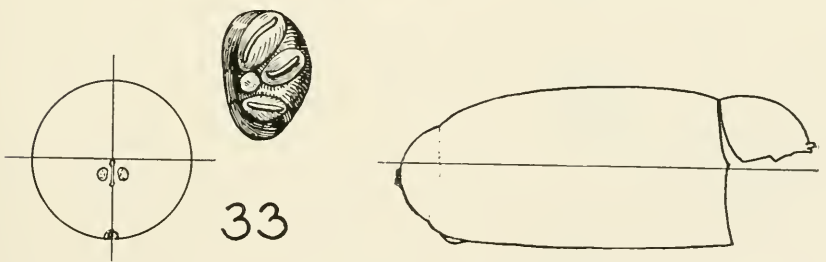
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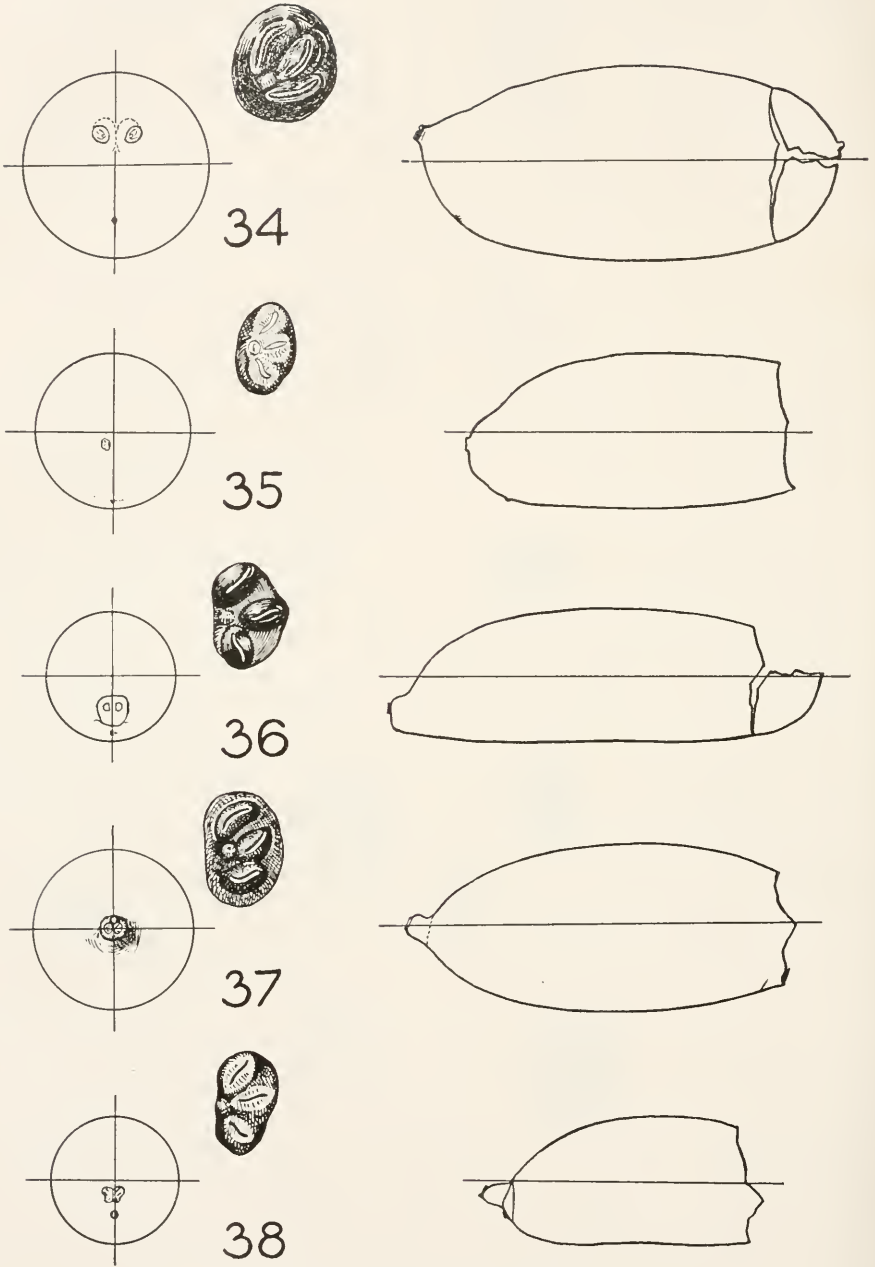


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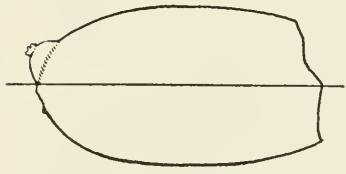
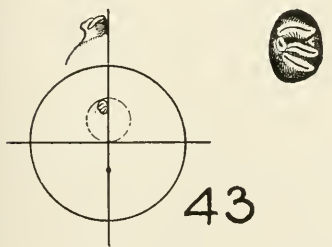
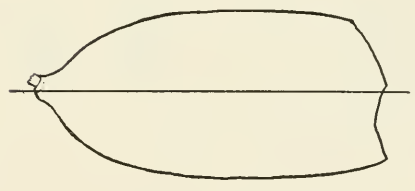
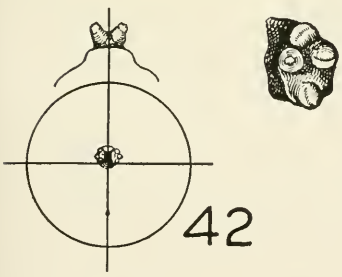
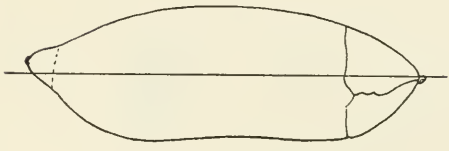
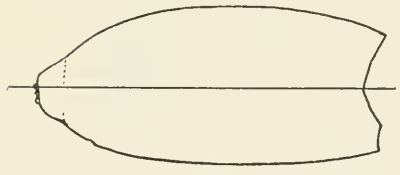
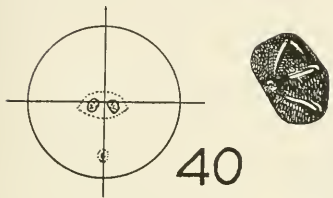
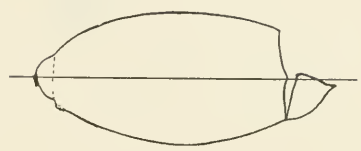
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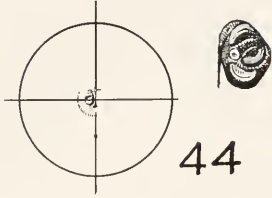
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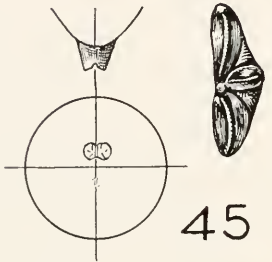
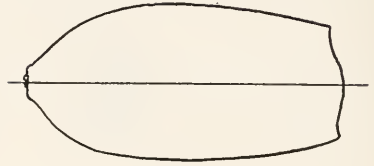


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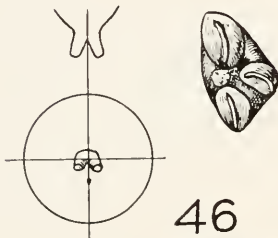
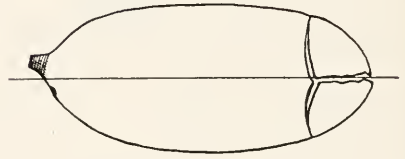
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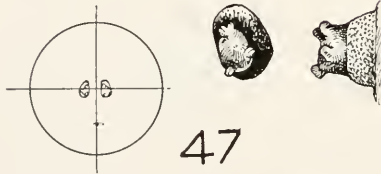
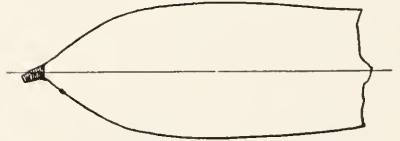
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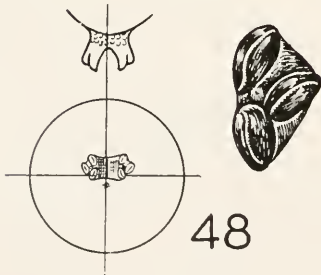
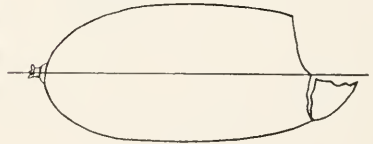
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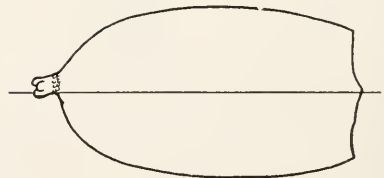
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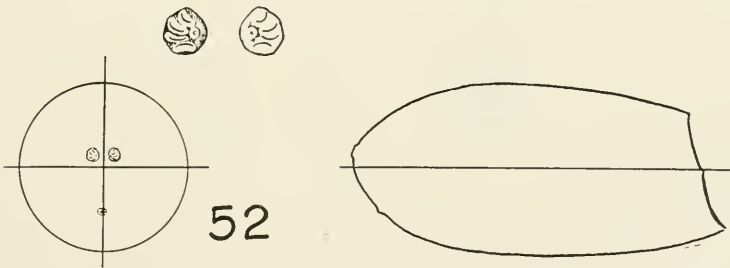
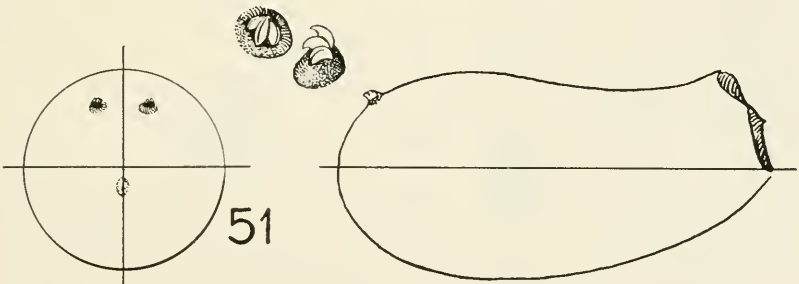
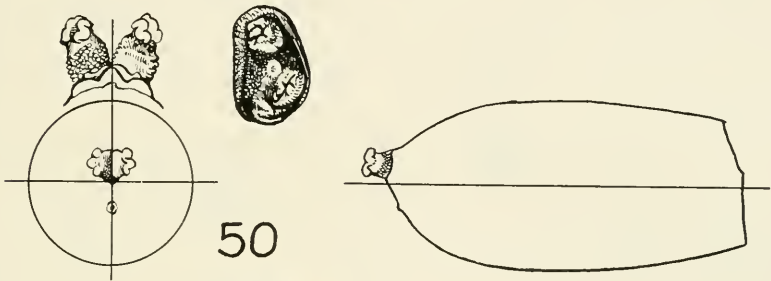
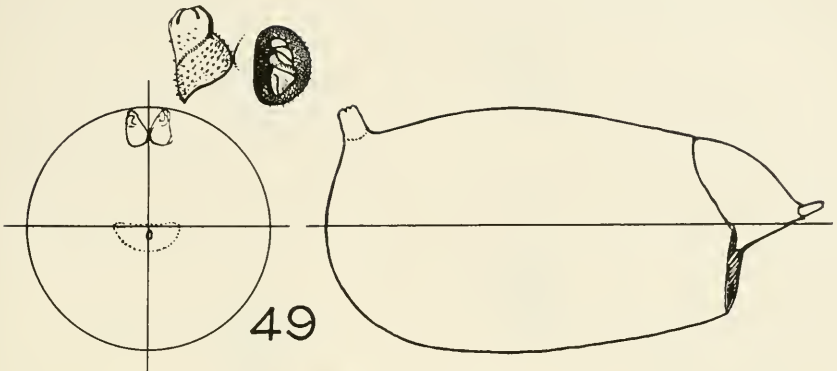


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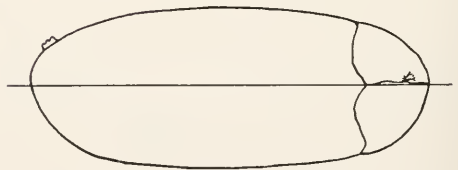
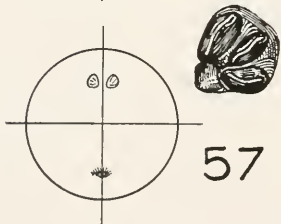
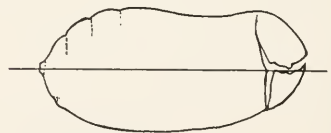
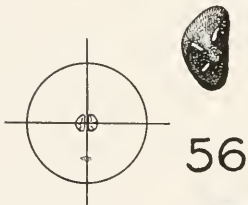
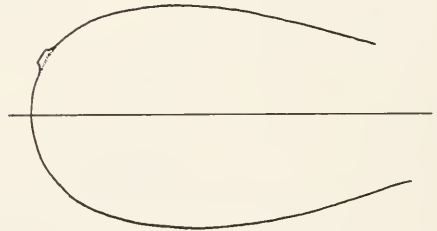
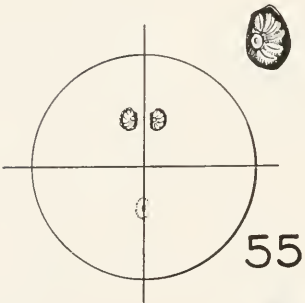
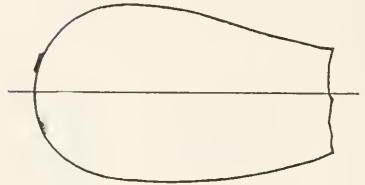
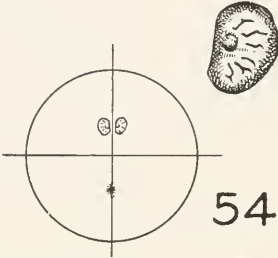
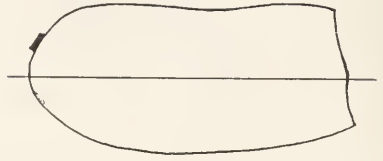
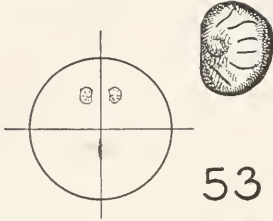
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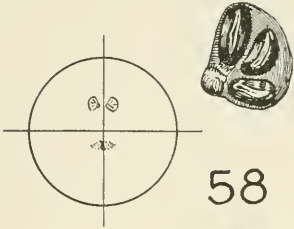
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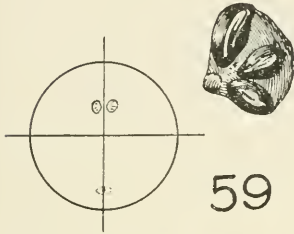
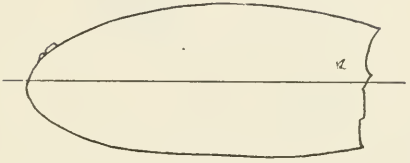


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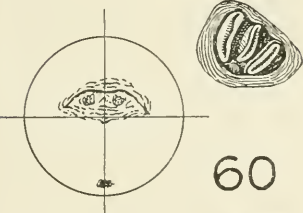
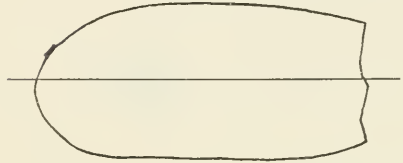
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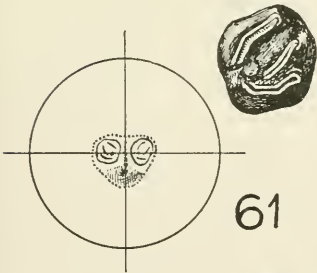
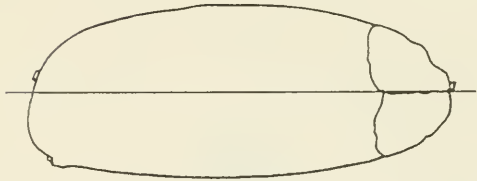
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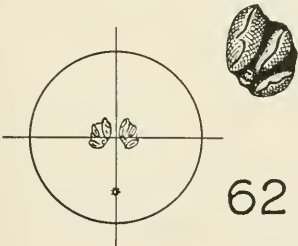
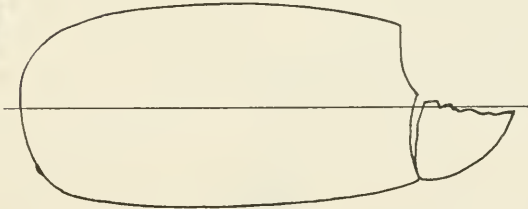
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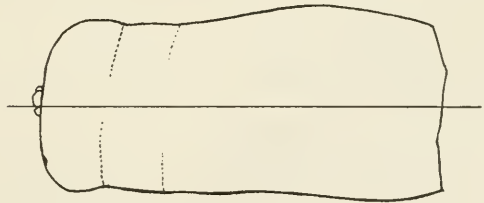
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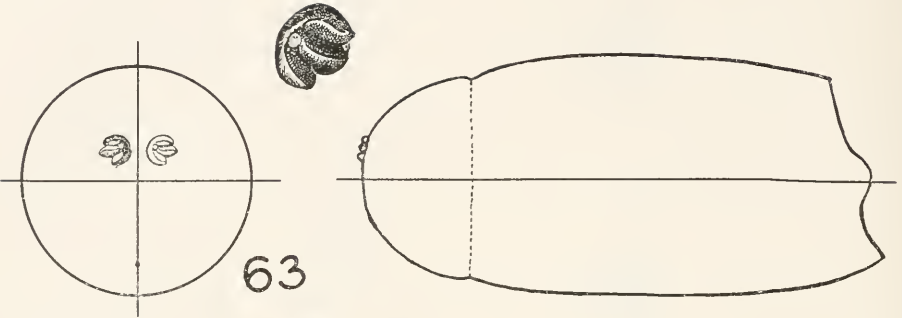


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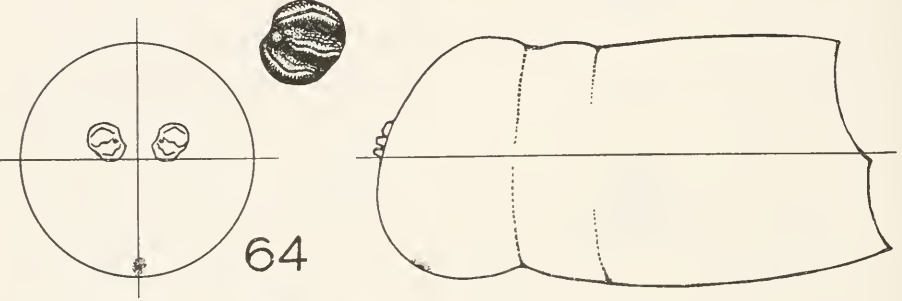


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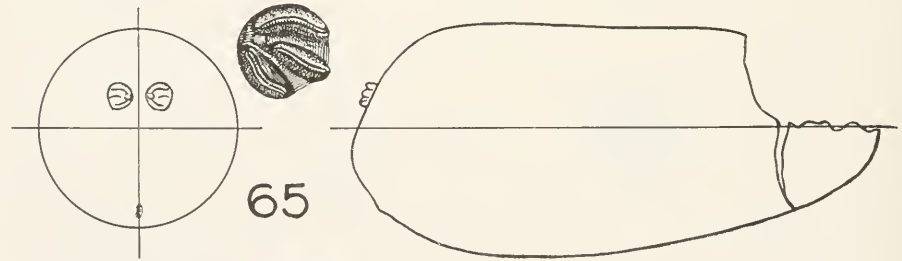
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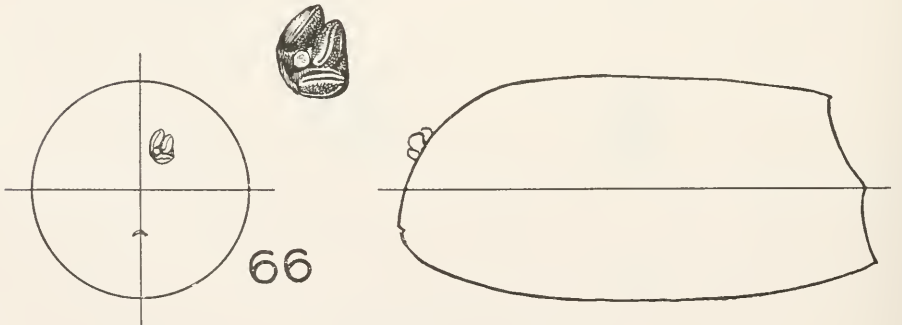
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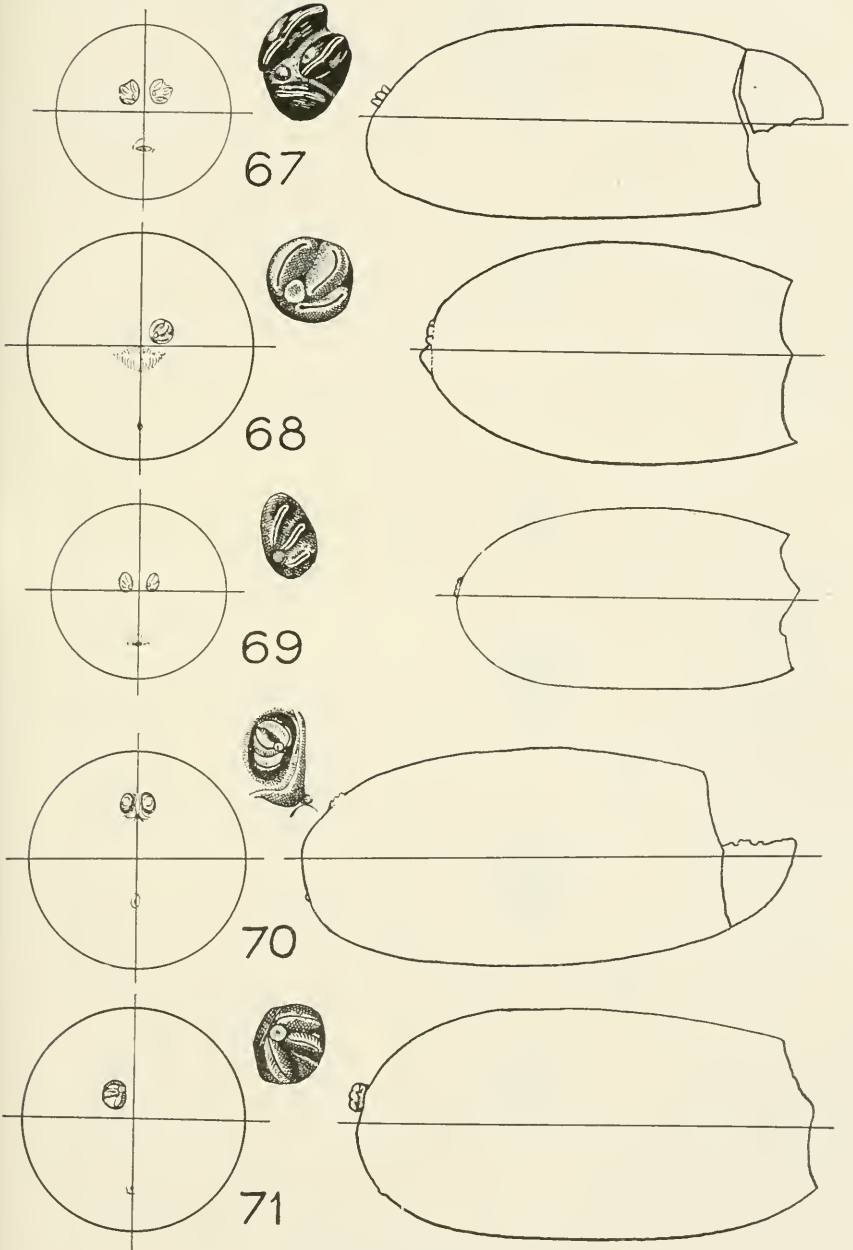
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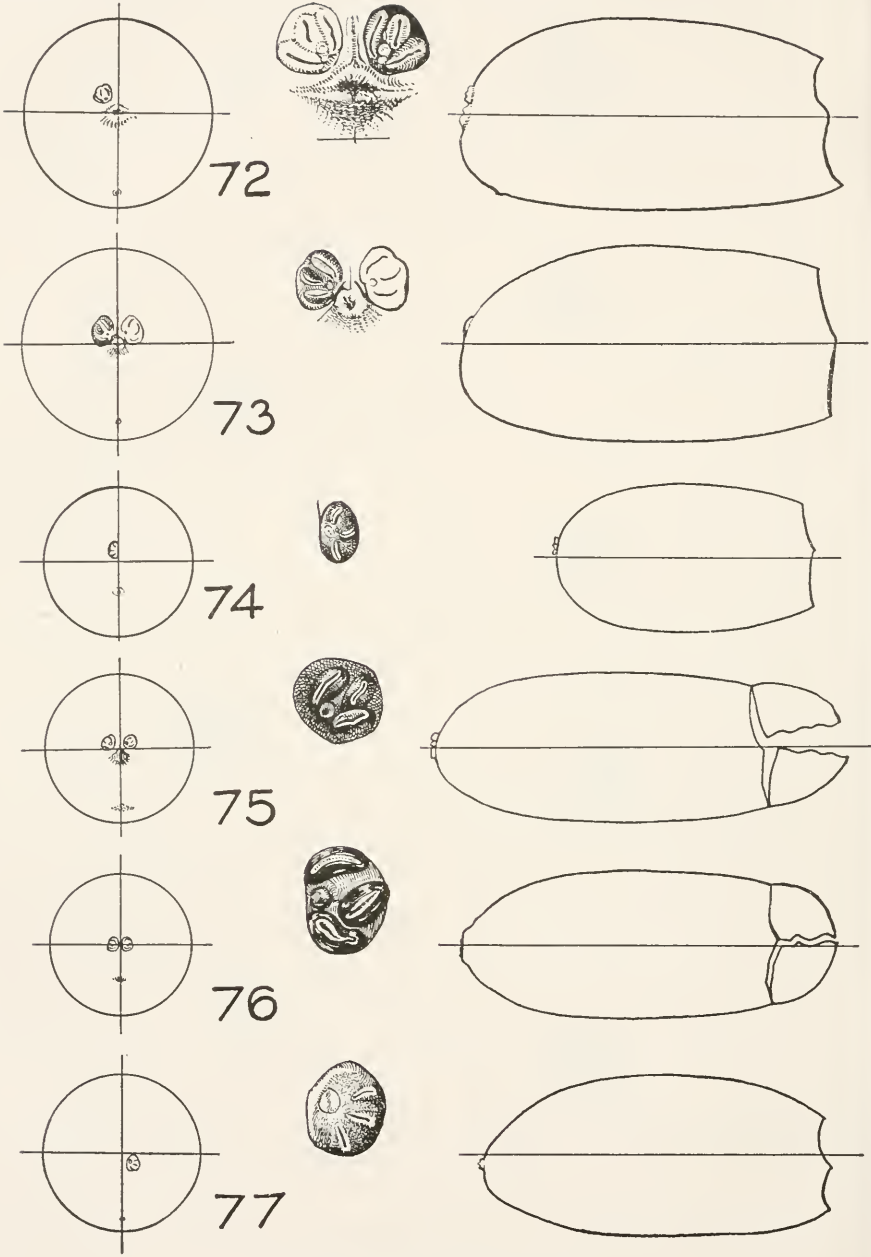
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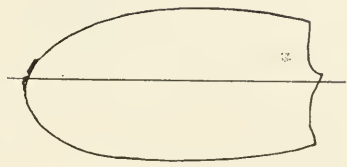


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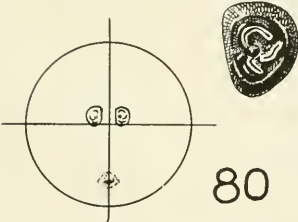
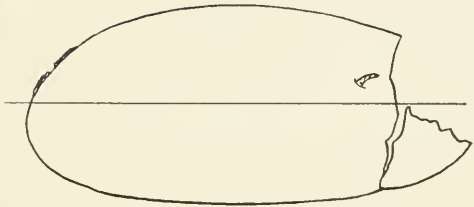
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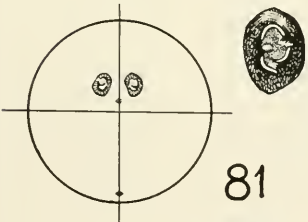
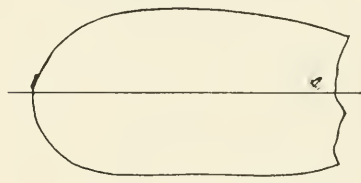
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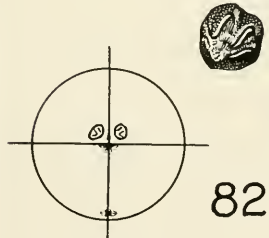
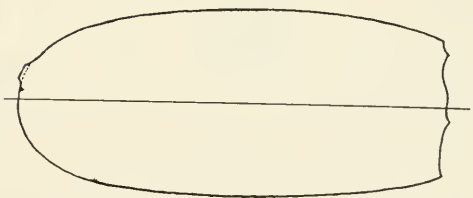
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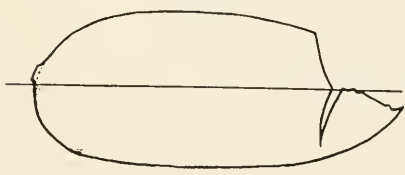
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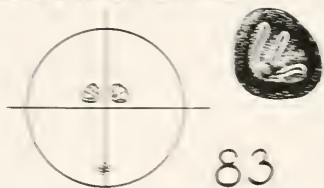


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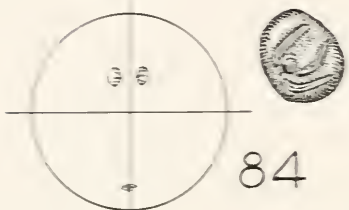


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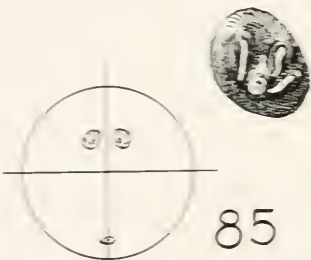
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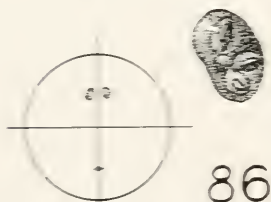
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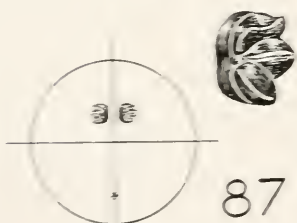
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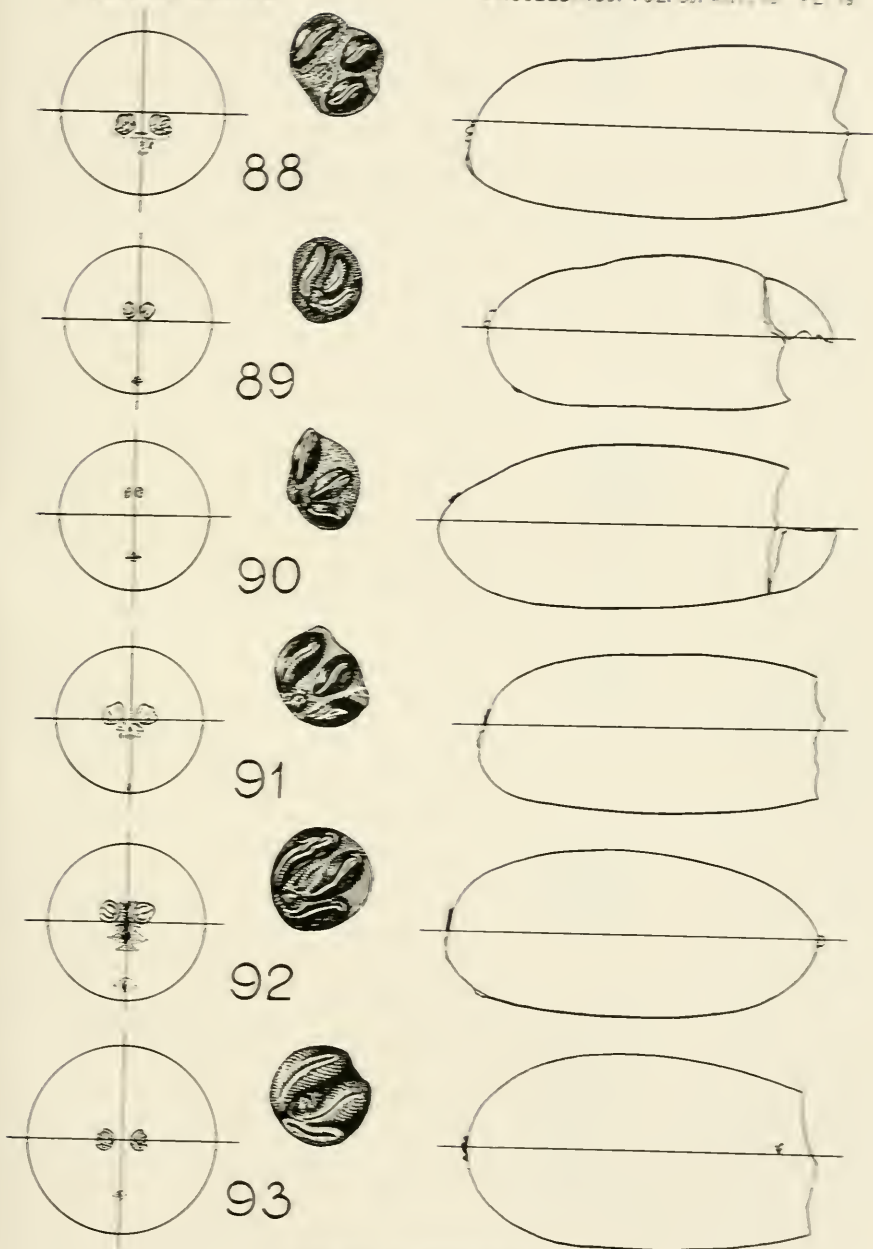
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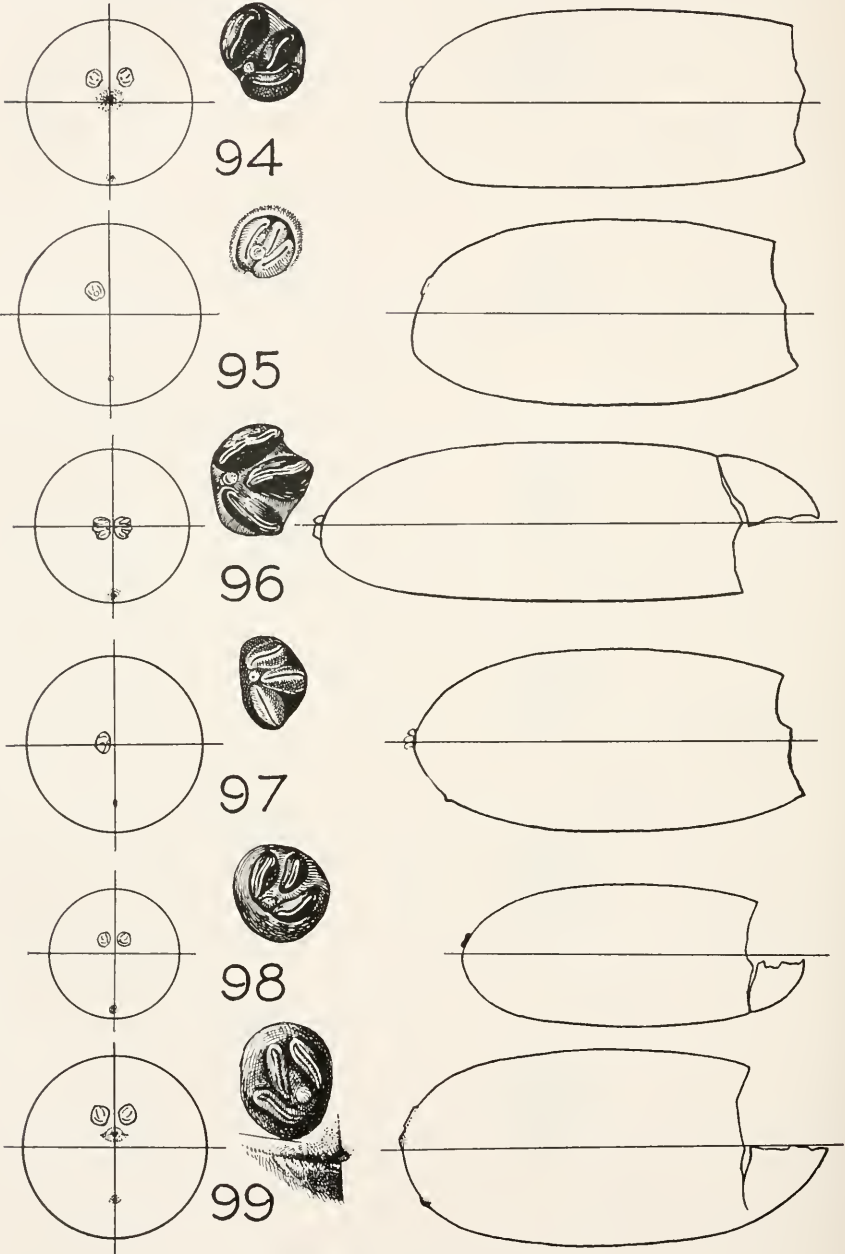
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