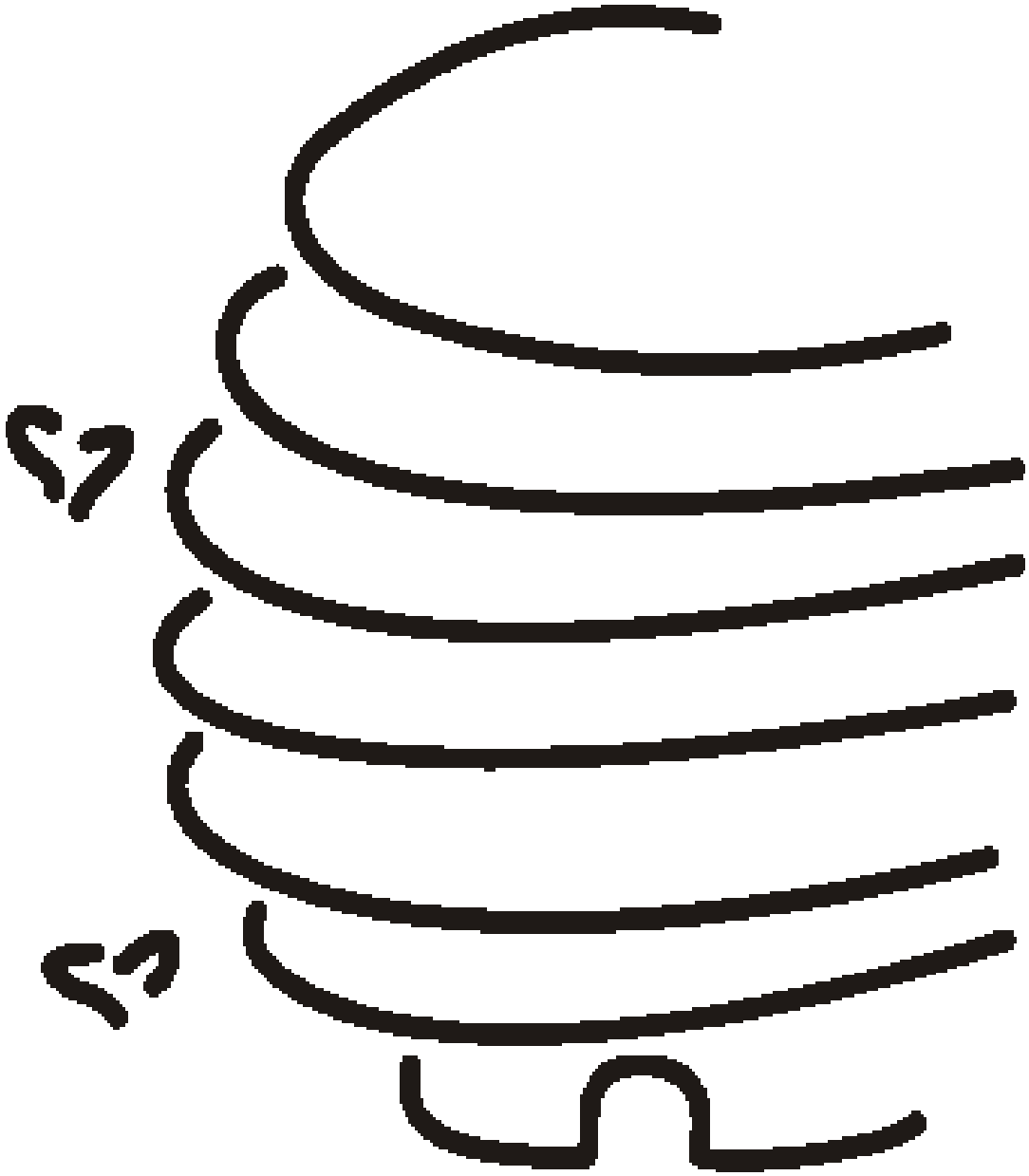


CHAPTER 4
ARTHROPODS, REPTILES, BIRDS AND MAMMALS OF PUBLIC HEALTH IMPORTANCE (PICTORIAL KEYS)

See http://www.entomology.cornell.edu/Faculty_Staff/Danforth/322LabManual/322Lab.html. A free Adobe Reader can be downloaded from: http://www.adobe.com/products/acrobat/readstep2.html.

ARTHROPODS OF PUBLIC HEALTH IMPORTANCE: KEY TO COMMON CLASSES AND ORDERS

Harold George Scott and Chester J. Stojanovich

1. Three or 4 pairs of walking legs (Fig. 1 A & B).....2

   Five or more pairs of walking legs (Fig. 1 C & D).....33

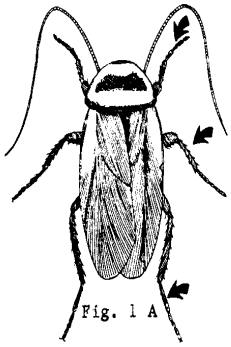


Fig. 1 A

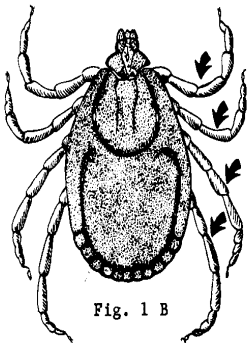


Fig. 1 B

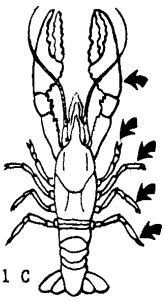


Fig. 1 C

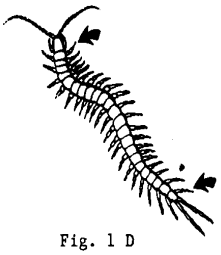


Fig. 1 D

2. Three pairs of walking legs (Fig. 2 A).....3

   Four pairs of walking legs (Fig. 2 B).....25

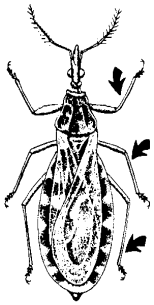


Fig. 2 A

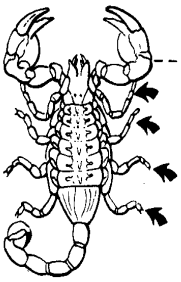


Fig. 2 B

3. Wings present, well developed (Fig. 3 A).....4

   Wings absent or rudimentary (Fig. 3 B & C).....13

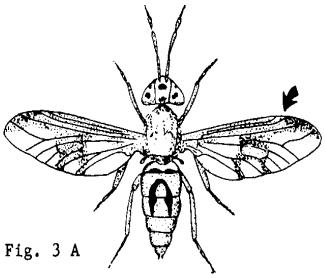


Fig. 3 A

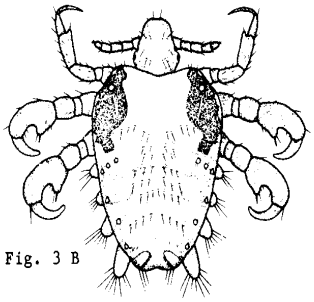


Fig. 3 B

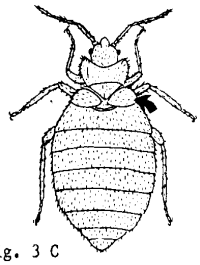


Fig. 3 C

4. With one pair of membranous wings (Fig. 4 A). ORDER DIPTERA.....5

   With two pairs of wings (Fig. 4 B & C).....6

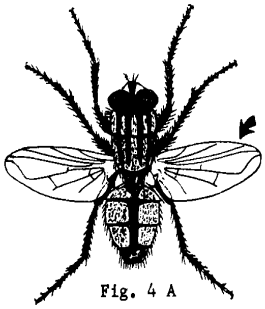


Fig. 4 A

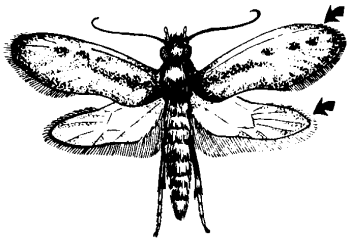


Fig. 4 B

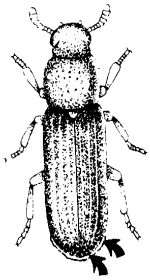


Fig. 4 C

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

5. Wings with scales (Fig. 5 A). FAMILY CULICIDAE.....MOSQUITO

Wings without scales (Fig. 5 B). DIPTERA OTHER THAN MOSQUITOES.....FLY

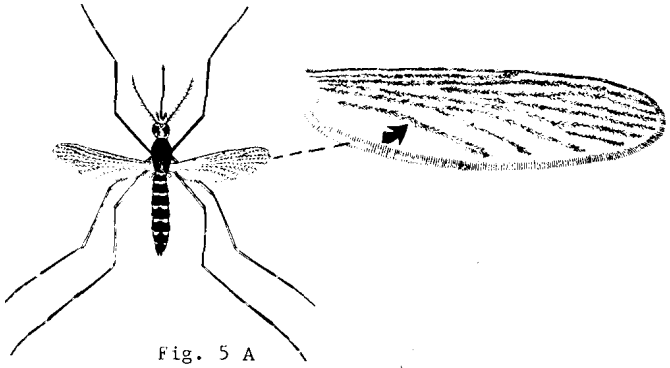


Fig. 5 A

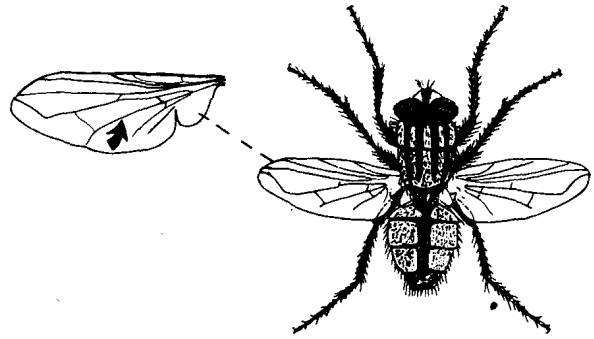


Fig. 5 B

6. *Mouthparts adapted for sucking, with elongate proboscis (Fig. 6 A).....7*

Mouthparts adapted for chewing, without elongate proboscis (Fig. 6 B).....9

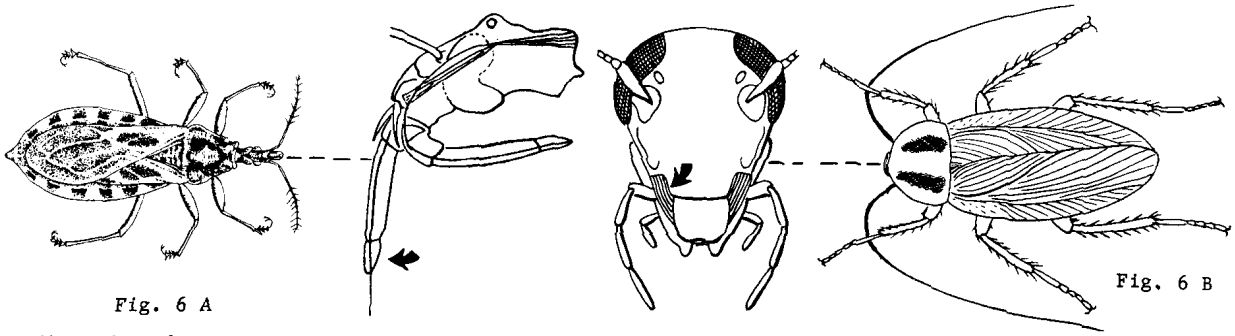


Fig. 6 A

Fig. 6 B

7. Wings densely covered with scales; proboscis coiled (Fig. 7 A). ORDER LEPIDOPTERA.....
.....MOTH OR BUTTERFLY

Wings not covered with scales; proboscis not coiled (Fig. 7 B).....8

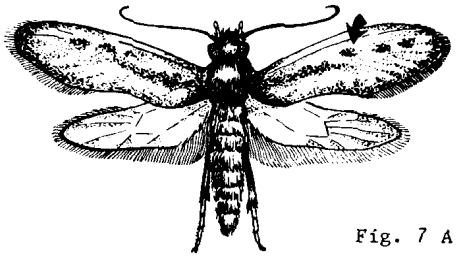


Fig. 7 A

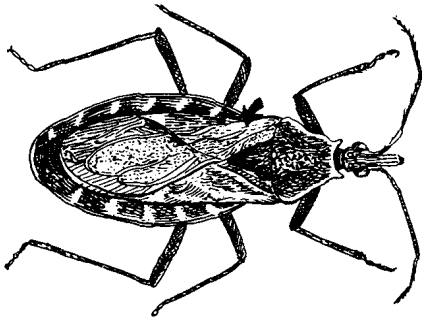


Fig. 7 B

8. Wing with fringe of long hair (Fig. 8 A). ORDER THYSANOPTERA.....THRIPS

Wing without long hair (Fig. 8 B). ORDER HEMIPTERA.....KISSING BUG

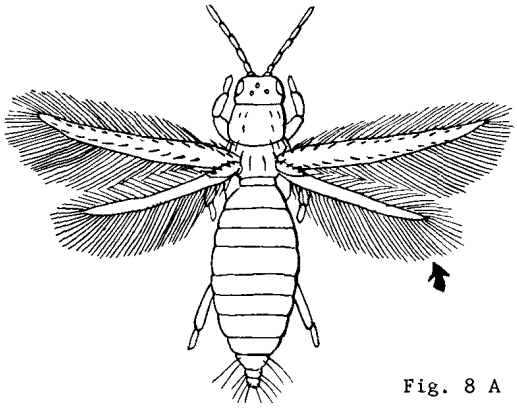


Fig. 8 A

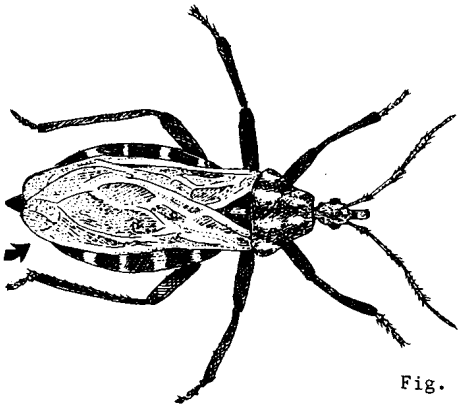


Fig. 8 B

9. Both pair of wings membranous and similar in structure (Fig. 9 A).....10

Front pair of wings shell-like or leathery, serving as covers for the second pair (Fig. 9 B).....11

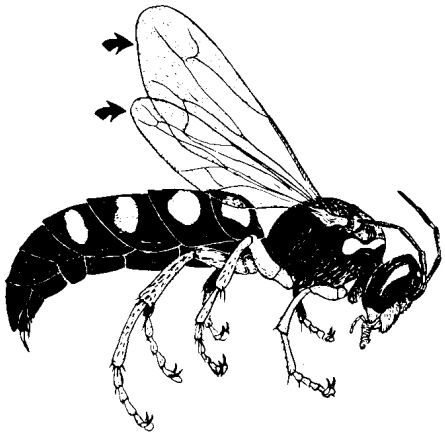


Fig. 9 A

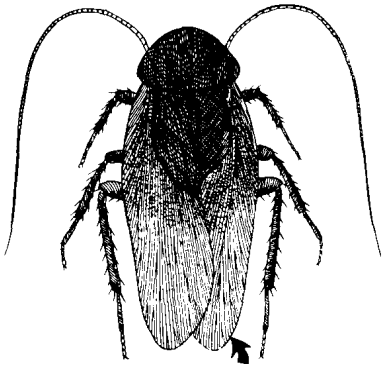


Fig. 9 B

10. Both pairs of wings similar in size (Fig. 10 A). ORDER ISOPTERA.....TERMITE

Hind wing much smaller than front wing (Fig. 10 B). ORDER HYMENOPTERA.....
.....BEE, HORNET, WASP, YELLOW JACKET, OR ANT

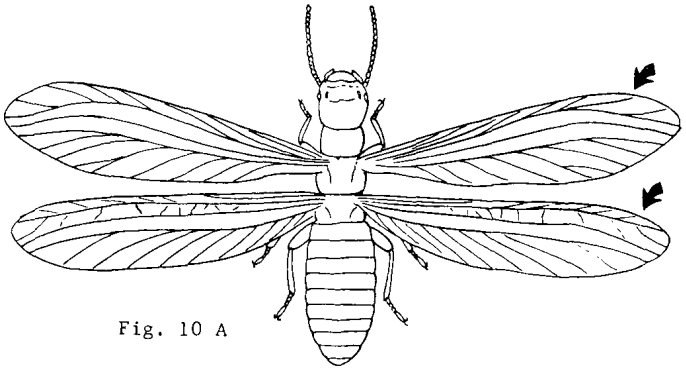


Fig. 10 A

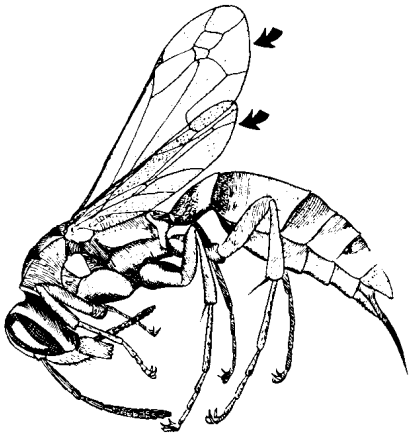


Fig. 10 B

11. Front wings horny or leathery, without distinct veins (Fig. 11 A).....12

Front wings leathery or paper-like, with distinct veins (Fig. 11 B). ORDER ORTHOPTERA.....COCKROACH

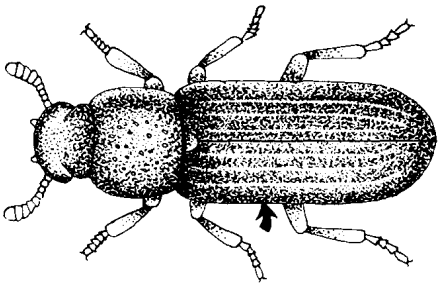


Fig. 11 A

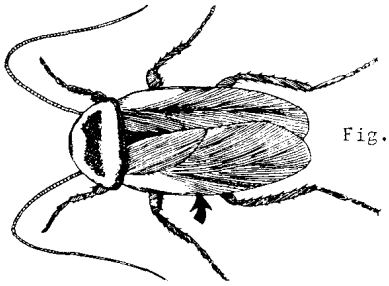


Fig. 11 B

12. Abdomen with prominent cerci; wings shorter than abdomen (Fig. 12 A). ORDER DERMAPTERA.....EARWIG

Abdomen without prominent cerci; wings covering abdomen (Fig. 12 B). ORDER COLEOPTERA.....BEETLE

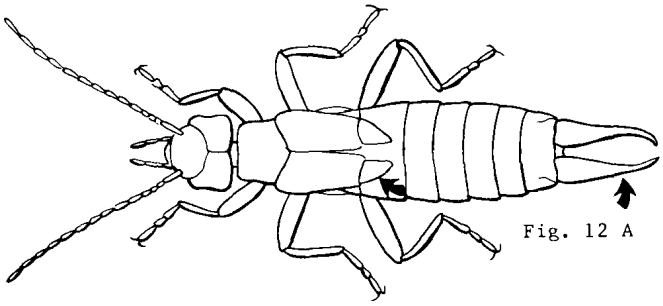


Fig. 12 A

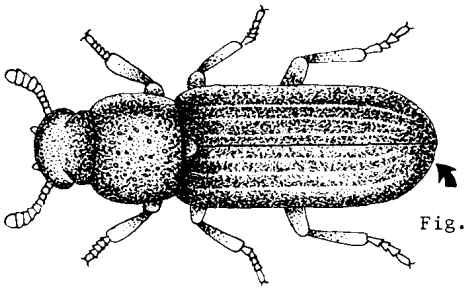


Fig. 12 B

13. Mouthparts with jaws for chewing (Fig. 13 A).....14

Mouthparts with a long beak or stylets for sucking up food (Fig. 13 B).....21

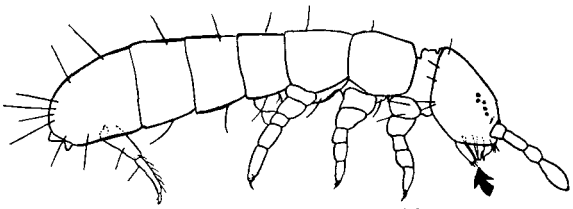


Fig. 13 A

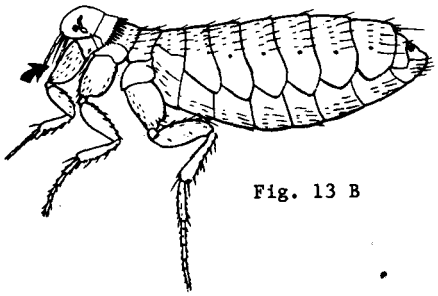


Fig. 13 B

14. With three long terminal tails (Fig. 14 A). ORDER THYSANURA.....SILVERFISH AND FIREBRAT

Without three long terminal tails (Fig. 14 B).....15

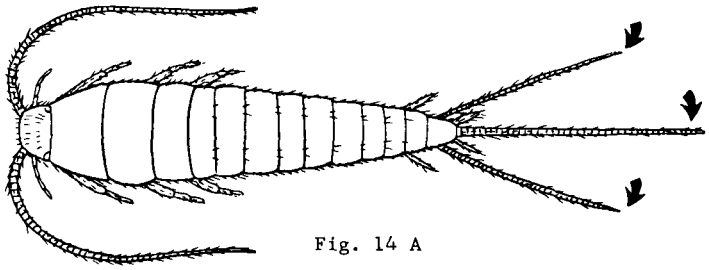


Fig. 14 A

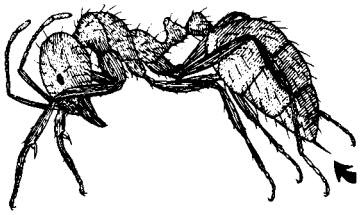


Fig. 14 B

15. Abdomen with prominent pair of cerci (Fig. 15 A). ORDER DERMAPTERA.....EARWIG

Abdomen without prominent pair of cerci (Fig. 15 B).....16

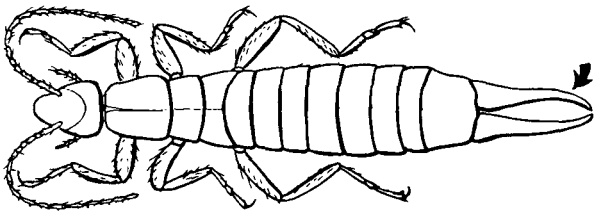


Fig. 15 A

Fig. 15 B

16. With narrow waist (Fig. 16 A). ORDER HYMENOPTERA.....ANT

Without narrow waist (Fig. 16 B).....17

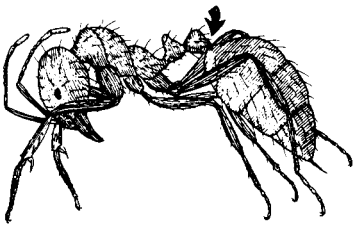


Fig. 16 A

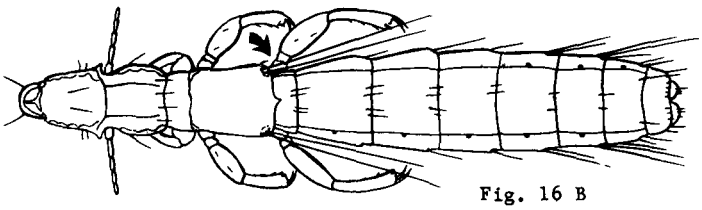


Fig. 16 B

17. Antenna with fewer than 8 segments (Fig. 17 A).....18

Antenna with more than 8 segments (Fig. 17 B).....19

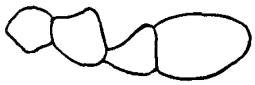


Fig. 17 A

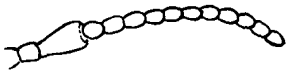


Fig. 17 B

18. Abdomen with 6 or fewer segments (Fig. 18 A). ORDER COLLEMBOLA.....SPRINGTAIL

Abdomen with more than 6 segments (Fig. 18 B). ORDER MALLOPHAGA.....CHEWING LOUSE

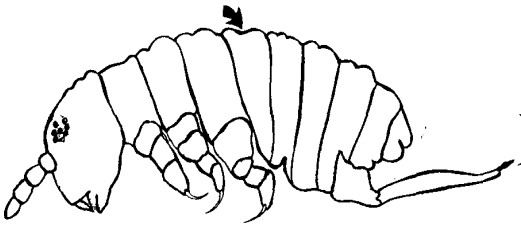


Fig. 18 A

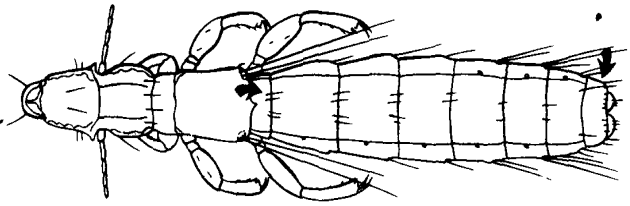


Fig. 18 B

19. Tarsus with 4-5 segments (Fig. 19 A).....20

Tarsus with 1-3 segments (fig. 19 B). ORDER PSOCOPTERA.....BOOK LOUSE OR PSOCID

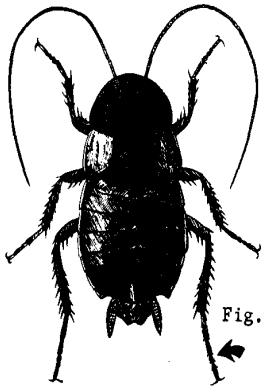


Fig. 19 A

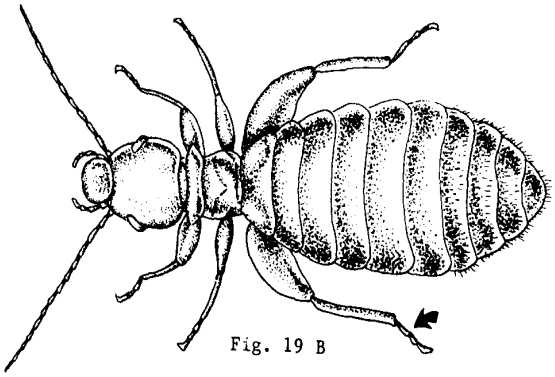


Fig. 19 B

20. Pronotum narrower than head, never covering head (Fig. 20 A). ORDER ISOPTERA.....TERMITE

Pronotum broader than head, often covering head (Fig. 20 B). ORDER ORTHOPTERA.....COCKROACH

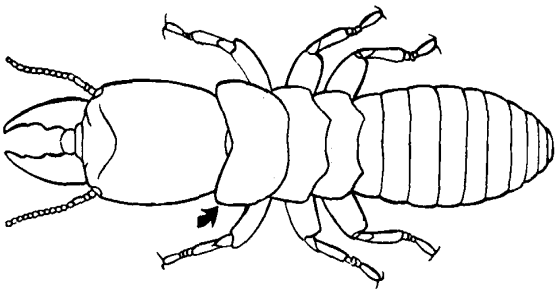


Fig. 20 A

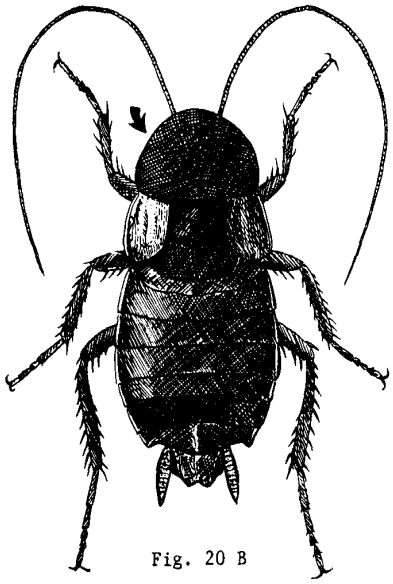


Fig. 20 B

21. Flattened laterally (Fig. 21 A). ORDER SIPHONATERA.....FLEA

Flattened dorso-ventrally (Fig. 21 B).....22

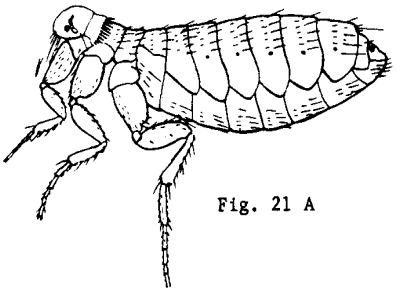


Fig. 21 A

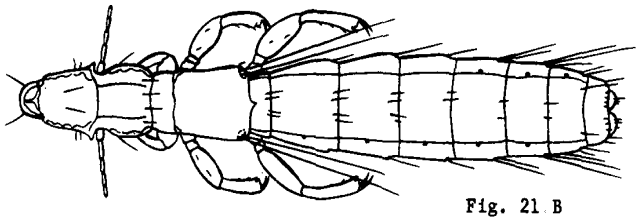


Fig. 21 B

22. Foot terminating in protrusible bladder (Fig. 22 A). ORDER THYSANOPTERA.....THRIPS

Foot not terminating in protrusible bladder (Fig. 22 B).....23

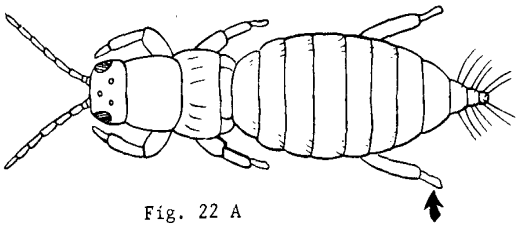


Fig. 22 A

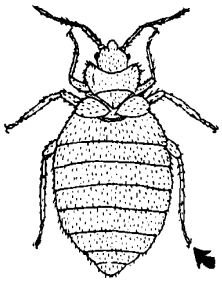


Fig. 22 B

23. Beak jointed (Fig. 23 A). ORDER HEMIPTERA.....BEDBUG

Beak not jointed (Fig. 23 B).....24

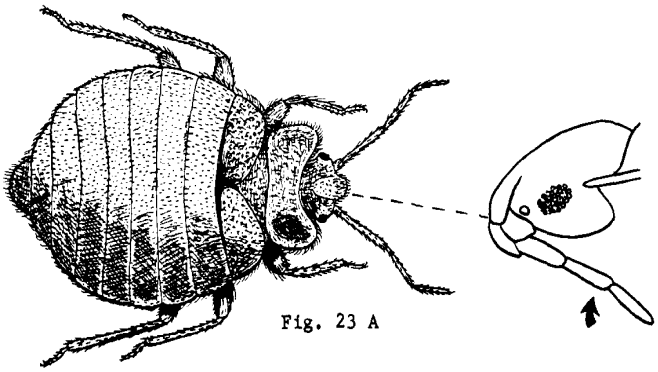


Fig. 23 A

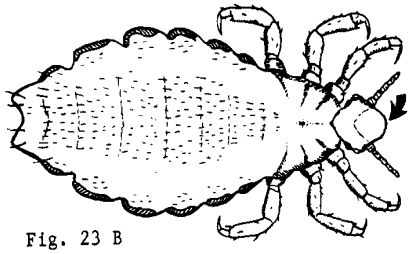


Fig. 23 B

24. Mouthparts retracted into head (Fig. 24 A). ORDER ANOPLURA.....SUCKING LOUSE

Mouthparts not retracted into head (Fig. 24 B). ORDER DIPTERA.....KED OR LOUSE FLY

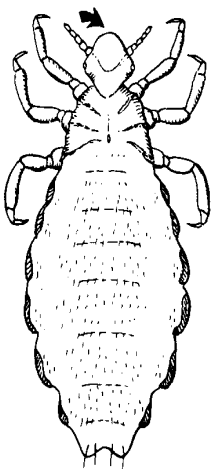


Fig. 24 A

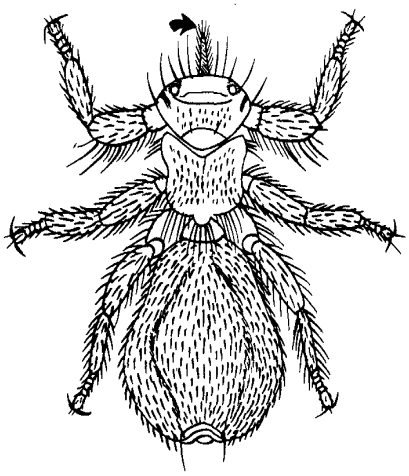


Fig. 24 B

25. Abdomen well-developed (Fig. 25 A). CLASS ARACHNIDA.....26

Abdomen peg-like (Fig. 25 B). CLASS PYCNOGONIDA.....SEA SPIDER

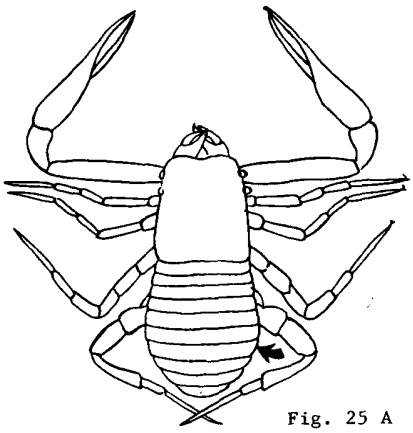


Fig. 25 A

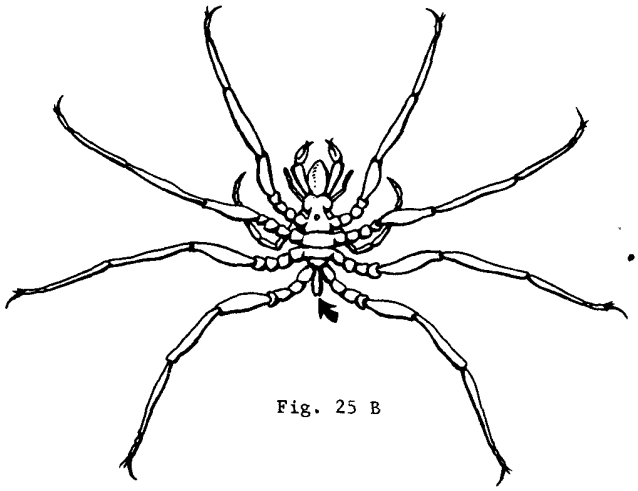


Fig. 25 B

26. Abdomen distinctly segmented (Fig. 26 A).....27

Abdomen not distinctly segmented (Fig. 26 B).....31

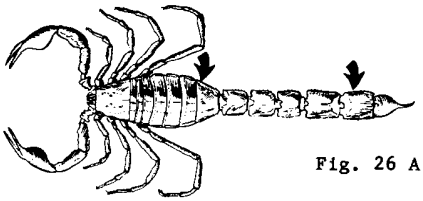


Fig. 26 A

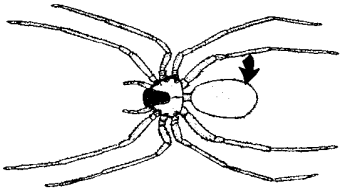


Fig. 26 B

27. Abdomen lengthened to form a long tail (Fig. 27 A).....28

Abdomen not lengthened to form a long tail (Fig. 27 B).....29

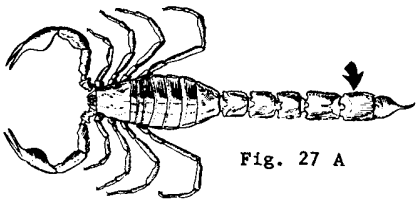


Fig. 27 A

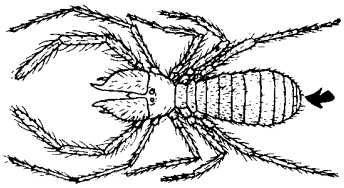


Fig. 27 B

28. Tail with stinger (Fig. 28 A). ORDER SCORPIONIDA.....SCORPION

Tail without stinger (Fig. 28 B). ORDER PEDIPALPIDA.....WHIP SCORPION

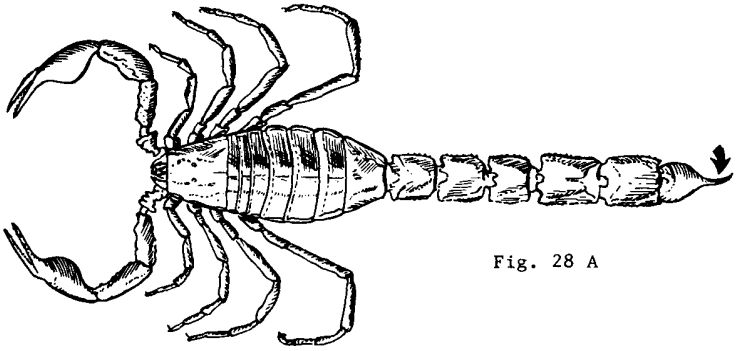


Fig. 28 A

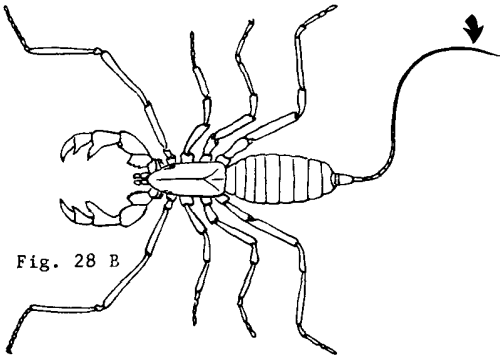


Fig. 28 B

29. With large pincer-like claws (Fig. 29 A). ORDER PSEUDOSCORPIONIDA.....PSEUDOSCORPION

Without large pincer-like claws (Fig. 29 B).....30

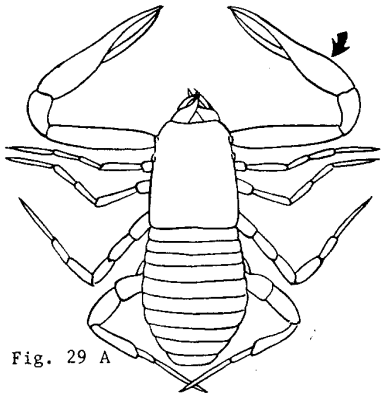


Fig. 29 A

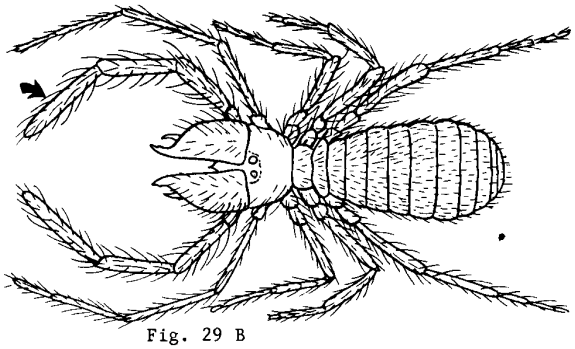


Fig. 29 B

30. Legs not longer than body (Fig. 30 A). ORDER SOLPUGIDA.....SUN SPIDER

Legs much longer than body (Fig. 30 B). ORDER PHALANGIDA.....DADDY LONG-LEG SPIDER

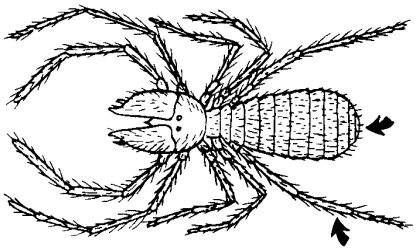


Fig. 30 A

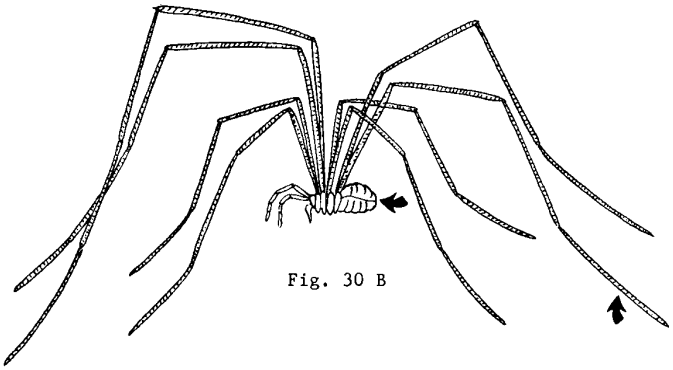


Fig. 30 B

31. Abdomen constricted to form a narrow waist (Fig. 31 A). ORDER ARANEIDA.....SPIDER

Abdomen not constricted (Fig. 31 B).....32

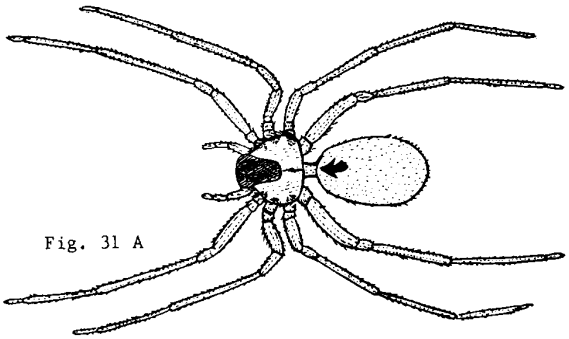


Fig. 31 A

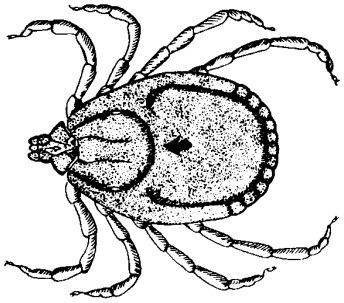


Fig. 31 B

32. Body with long hair; Haller's organ absent (Fig. 32 A). ORDER ACARINA.....MITE

Body without hair or short hair; Haller's organ present (Fig. 32 B). ORDER ACARINA.....TICK

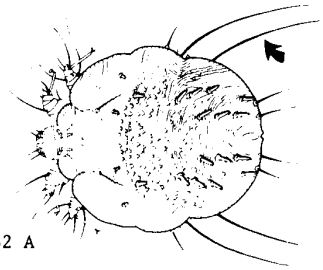


Fig. 32 A

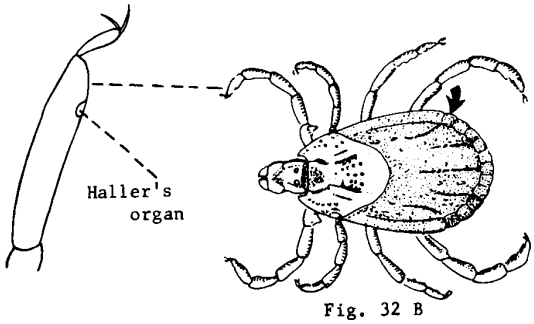


Fig. 32 B

33. Five to 7 pairs of walking legs (Fig. 33 A). CLASS CRUSTACEA.....34

More than 14 pairs of walking legs (Fig. 33 B).....36

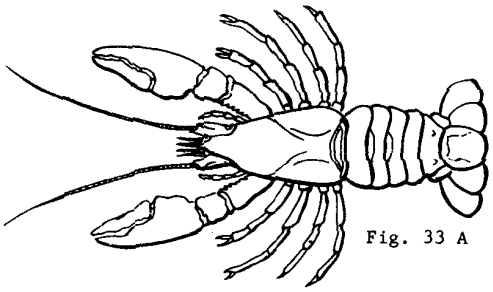


Fig. 33 A

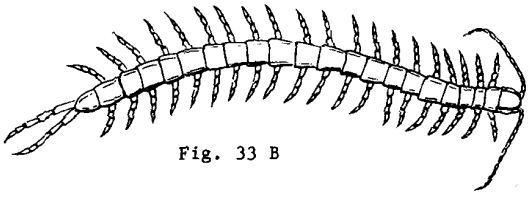


Fig. 33 B

34. Abdomen without appendages (Fig. 34 A). ORDER COPEPODA.....COPEPOD

Abdomen with appendages (Fig. 34 B).....35

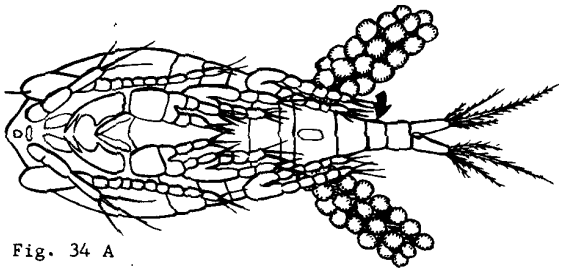


Fig. 34 A

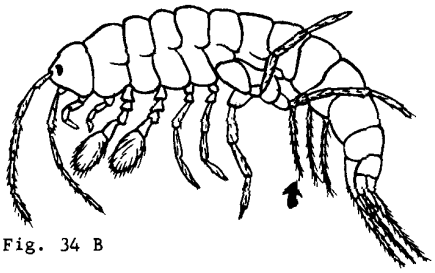


Fig. 34 B

35. Thorax covered with a fused plate; eyes, when present, on movable stalks (Fig. 35 A & B).....
ORDER DECAPODA.....LOBSTER, CRAB, CRAYFISH, SHRIMP, ETC.

Thorax not covered with a fused plate; eyes, when present, not on movable stalks (Fig. 35 C & D)...
ORDER ISOPODA.....SOWBUG, PILLBUG

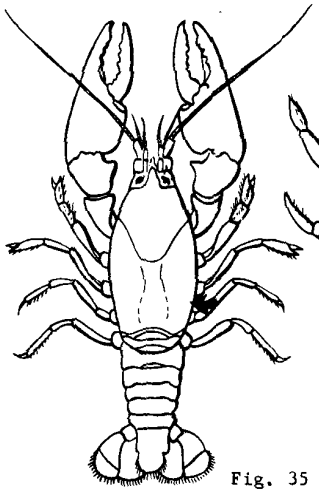


Fig. 35 A

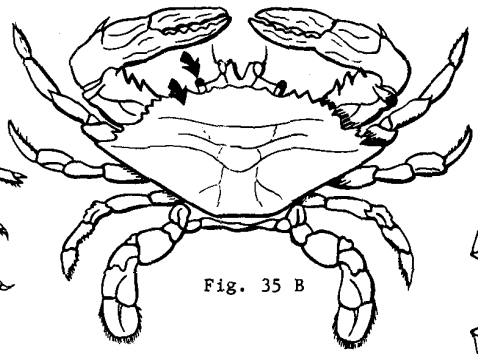


Fig. 35 B

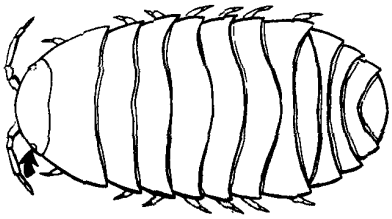


Fig. 35 C

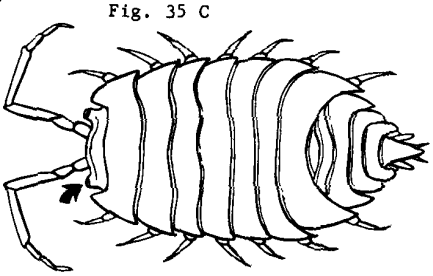


Fig. 35 D

36. One pair of legs per body segment (Fig. 36 A). CLASS CHILOPODA.....CENTIPEDE

Two pairs of legs per body segment (Fig. 36 B). CLASS DIPLOPODA.....MILLIPEDE

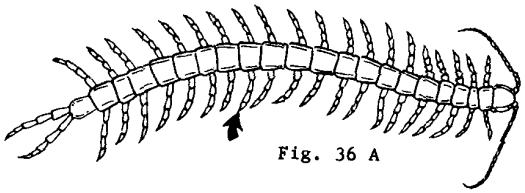


Fig. 36 A

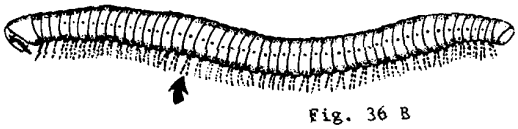
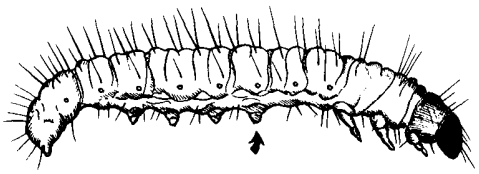


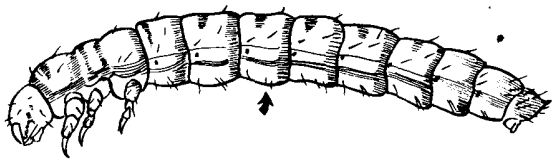
Fig. 36 B

HOUSEHOLD AND STORED-FOOD PESTS: PICTORIAL KEY TO COMMON LARVAE

Chester J. Stojanovich & Harold George Scott

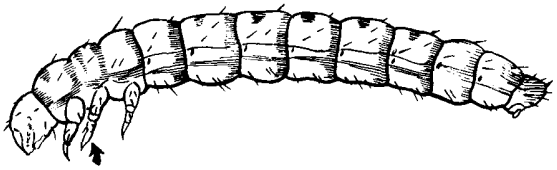
abdominal legs present | abdominal legs absent





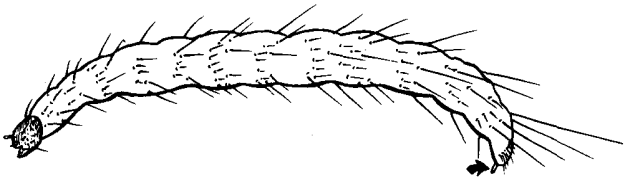
MOTH LARVAE

thoracic legs present | thoracic legs absent



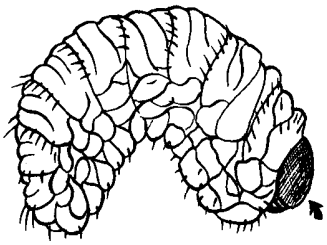
BEETLE, BORER & MEALWORM LARVAE

with fleshy lobes at ends of body | without fleshy lobes at ends of body



FLEA LARVAE

head capsule present | head capsule absent



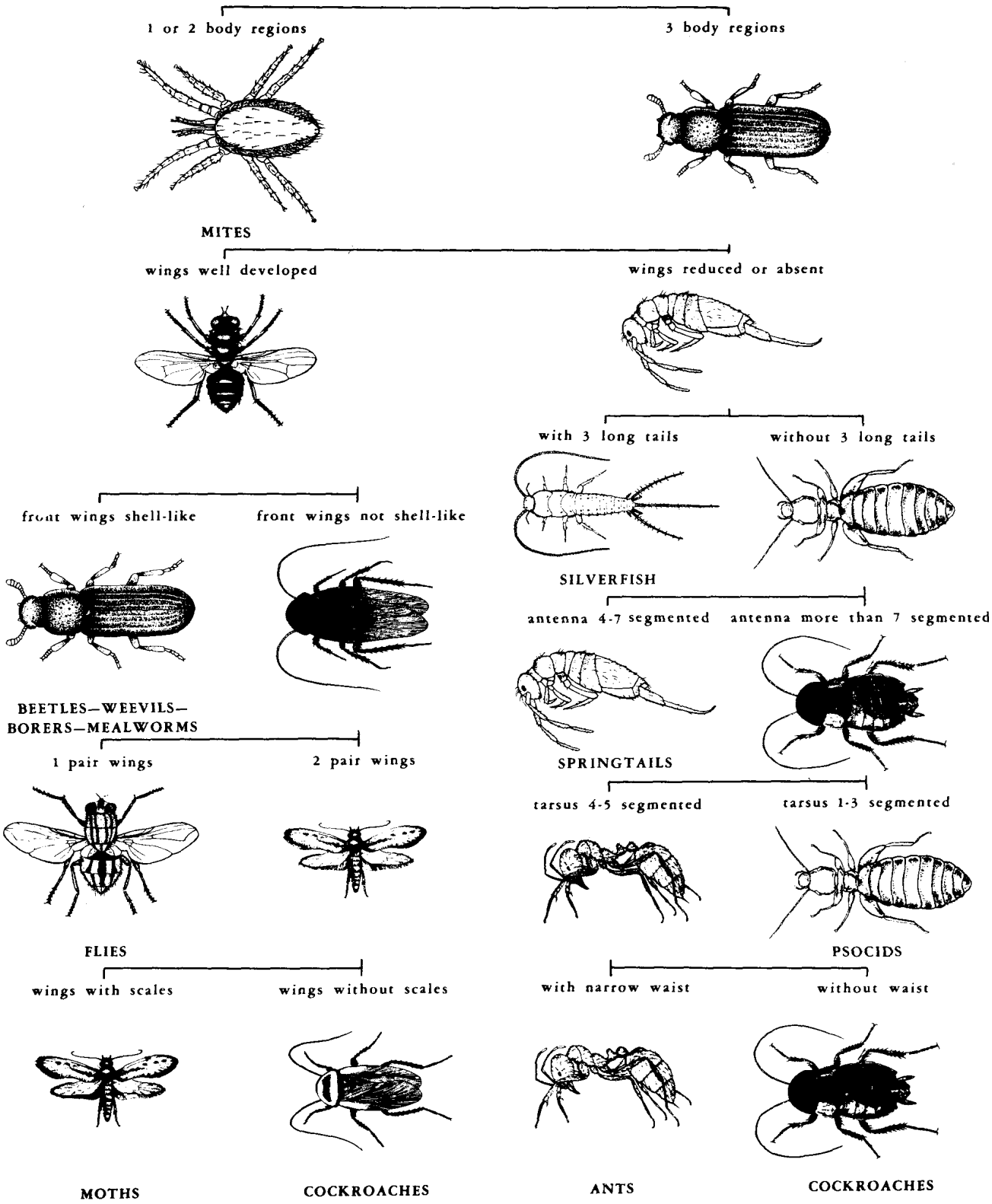
WEEVIL LARVAE

MUSCOID FLY LARVAE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia 1962

HOUSEHOLD AND STORED-FOOD PESTS: KEY TO COMMON ADULTS

Harold George Scott & Chester J. Stojanovich



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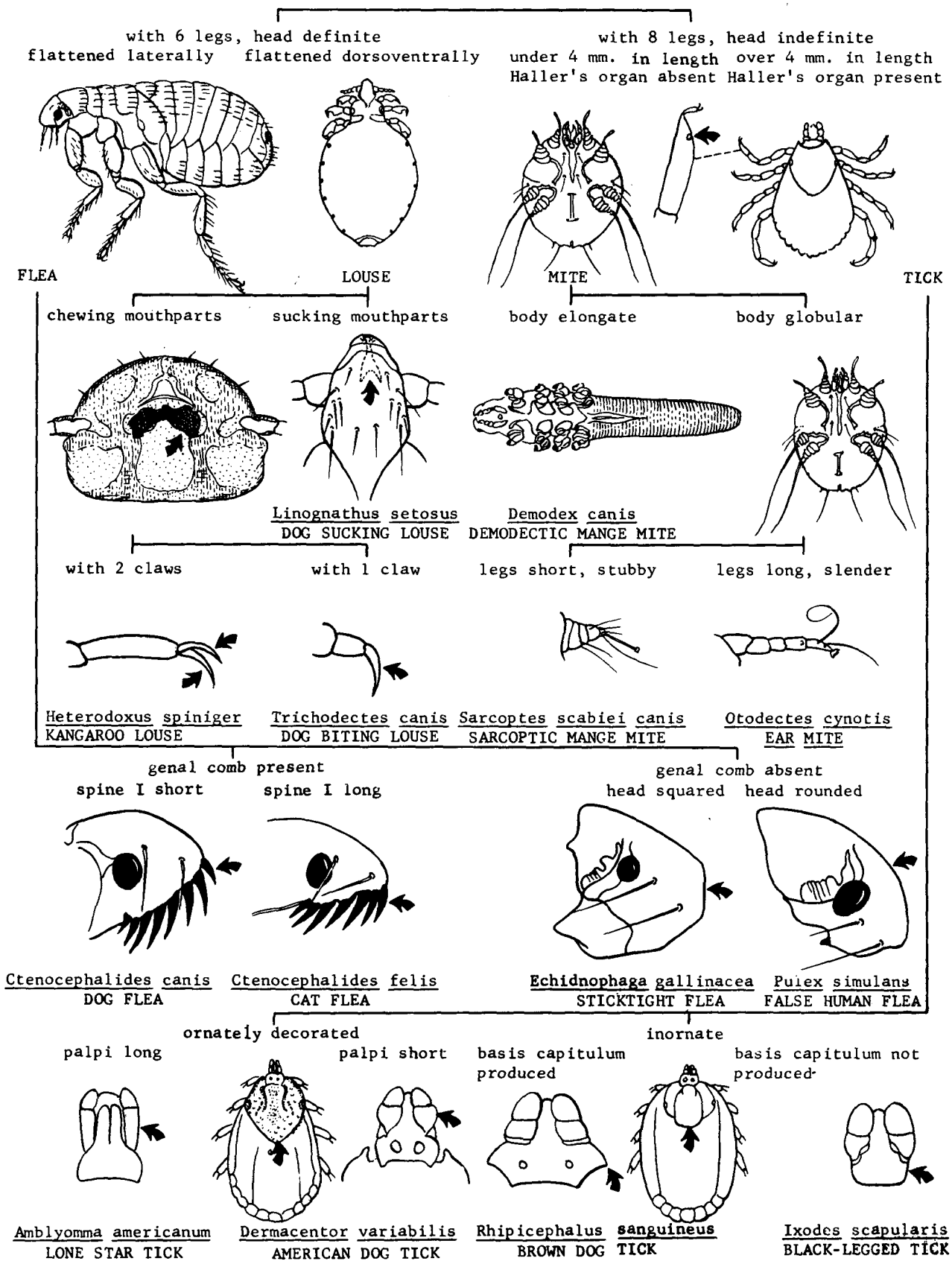
ECTOPARASITES OF THE DOG: PICTORIAL KEY TO COMMON SPECIES

Harold George Scott & Chester J. Stojanovich



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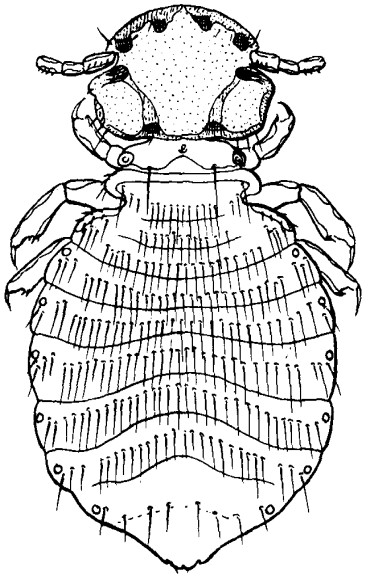
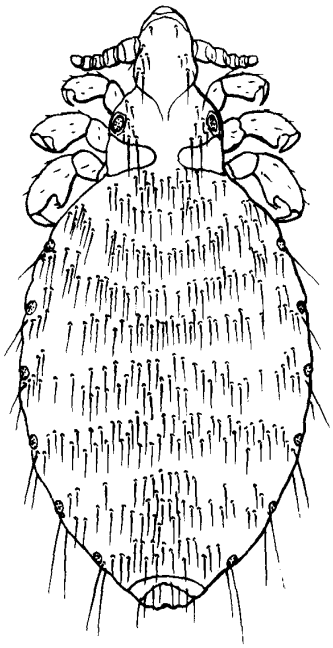
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

REPRESENTATIVE ECTOPARASITES OF THE DOG

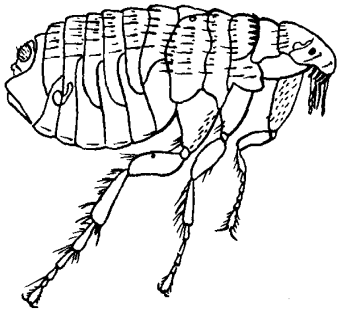
Chester J. Stojanovich



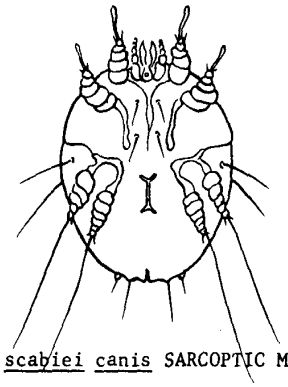
Trichodectes canis DOG BITING LOUSE



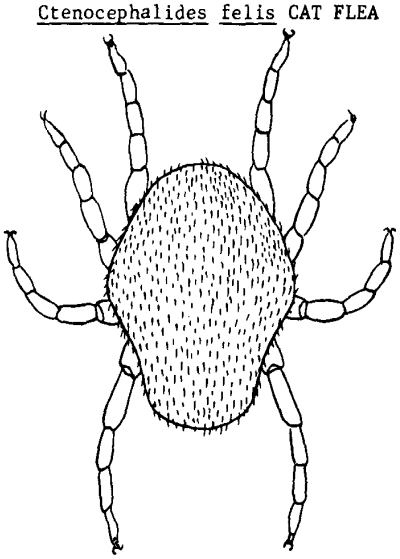
Linognathus setosus DOG SUCKING LOUSE



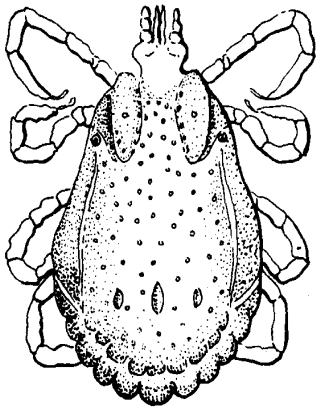
Ctenocephalides felis CAT FLEA



Sarcoptes scabiei canis SARCOPTIC MANGE MITE



Otobius megnini SPINOSE EAR TICK



Rhipicephalus sanguineus BROWN DOG TICK

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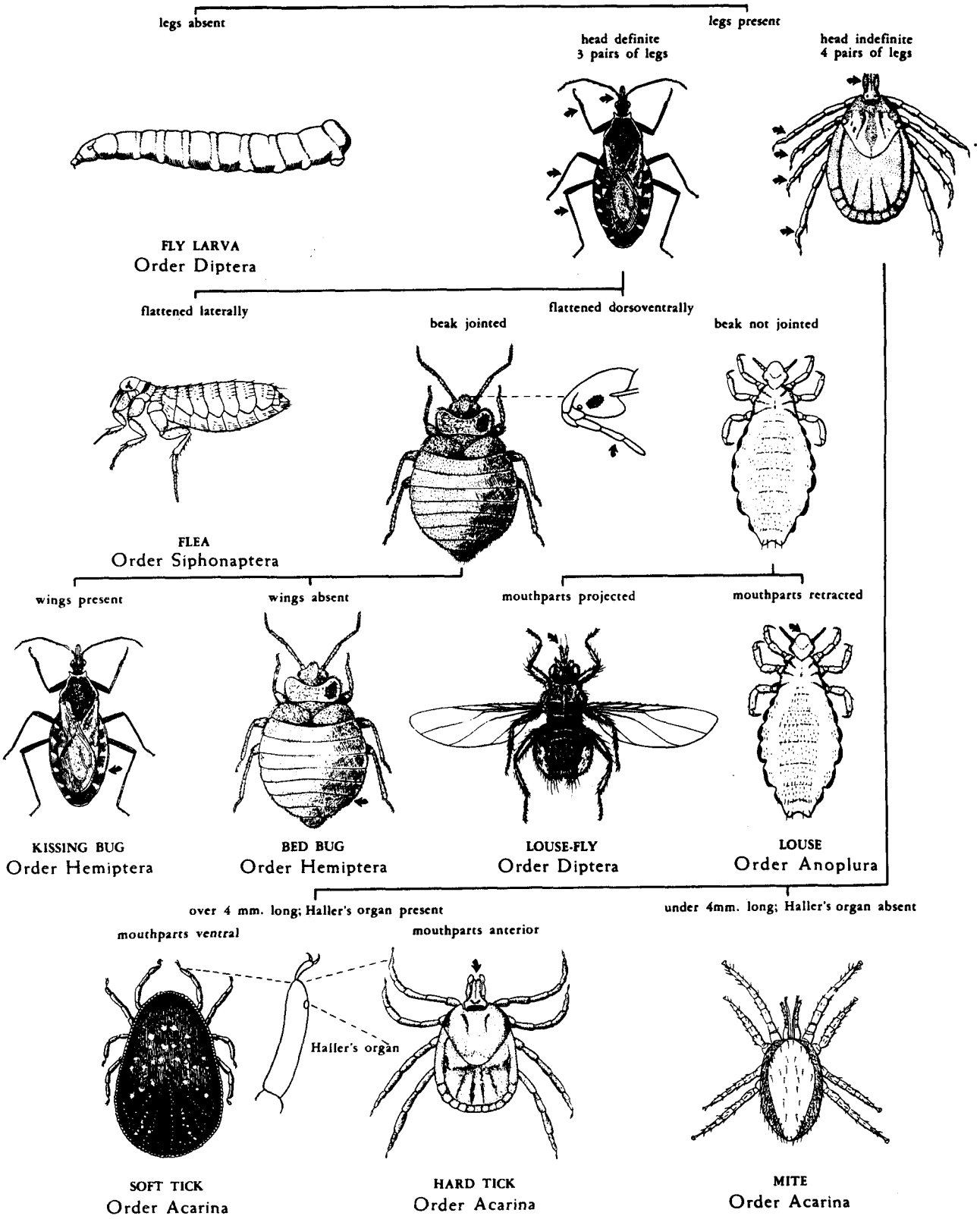
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

HUMAN ECTOPARASITES: KEY TO COMMON GROUPS

Chester J. Stojanovich and Harold George Scott



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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

CRUSTACEA: KEY TO SOME MAJOR ORDERS

Chester J. Stojanovich and Harold George Scott

1. With abdominal appendages (Fig. 1 A) 2

   Without abdominal appendages (Fig. 1 B) 7

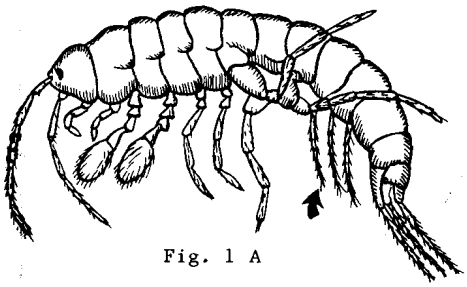


Fig. 1 A

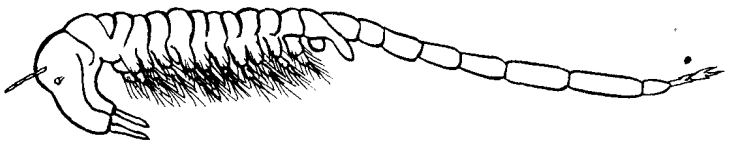


Fig. 1 B

2. Carapace present (Fig. 2 A) 3

   Carapace absent (Fig. 2 B) 6

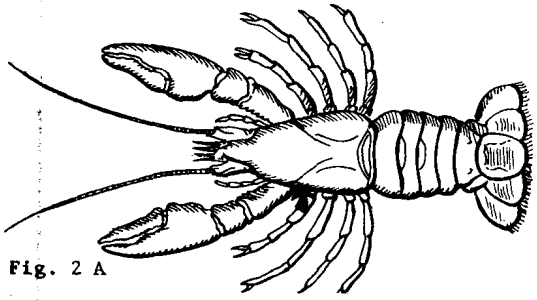


Fig. 2 A

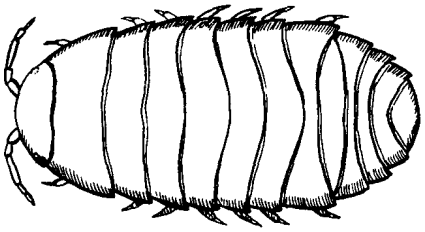


Fig. 2 B

3. With dorsal shield (Fig. 3 A). SHIELD SHRIMP ..... Order NOTOSTRACA

   Without dorsal shield (Fig. 3 B) 4

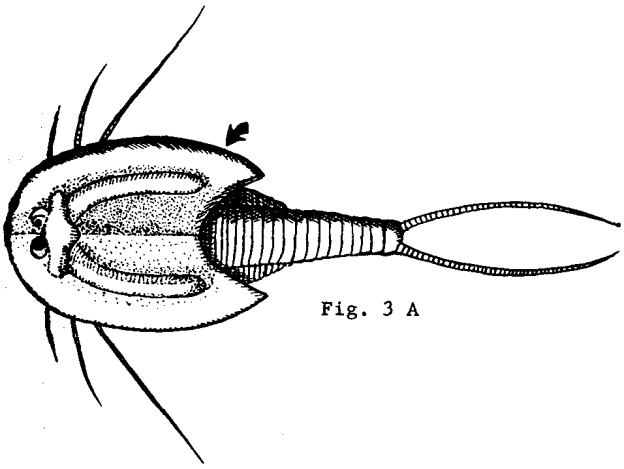


Fig. 3 A

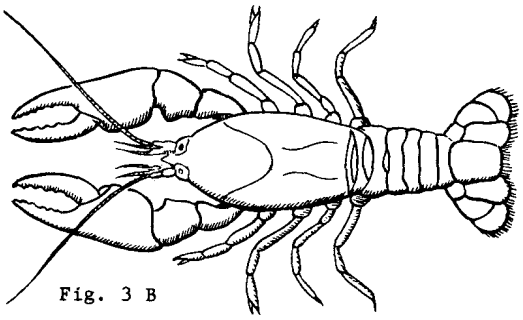


Fig. 3 B

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

4. With bivalve shell (Fig. 4 A). SHELL SHRIMP.....Order CONCHOSTRACA

Without bivalve shell (Fig. 4 B).....5

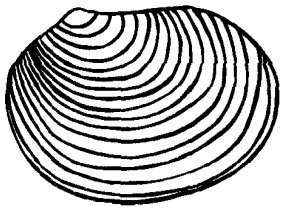
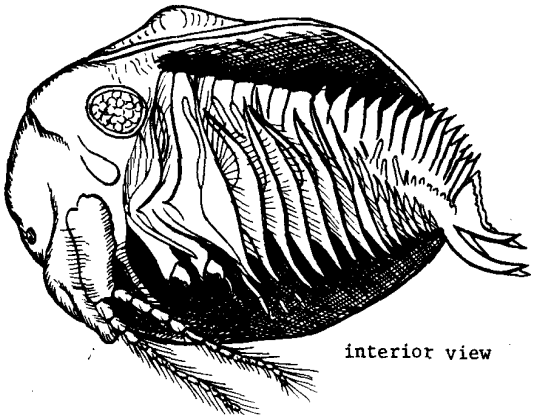


Fig. 4 A



interior view

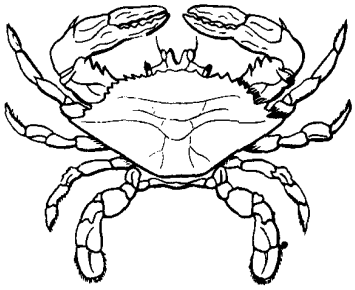


Fig. 4 B

5. First pleopod rudimentary (Fig. 5 A). OPOSSUM SHRIMP.....Order MYSIDACEA

First pleopod well-developed (Fig. 5 B, C & D). SHRIMP, CRAYFISH, LOBSTERS, CRABS.....
.....Order DECAPODA

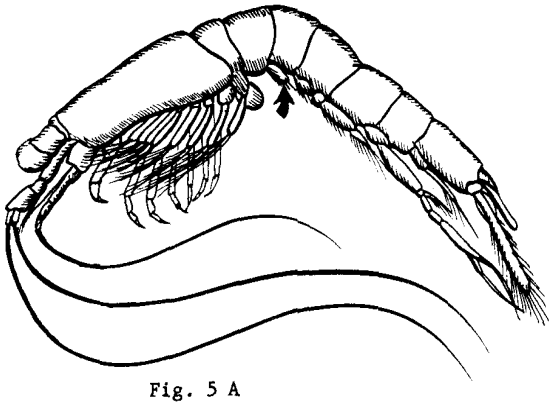


Fig. 5 A

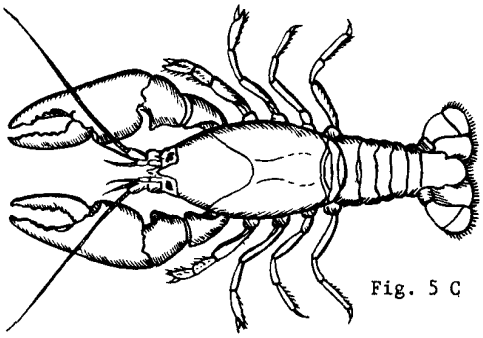


Fig. 5 C

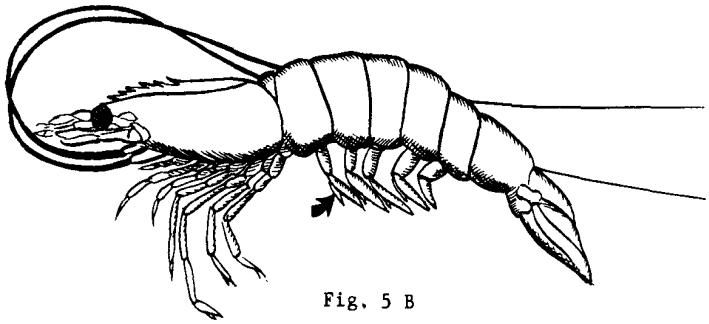


Fig. 5 B

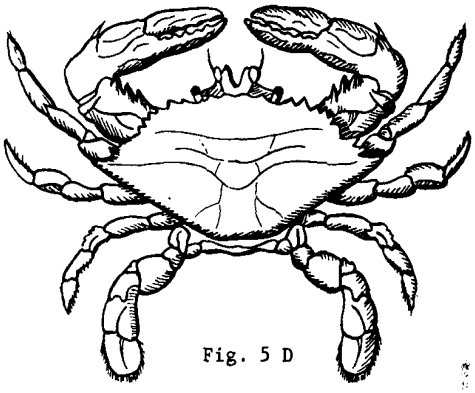


Fig. 5 D

6. Body laterally compressed (Fig. 6 A). SAND FLEAS, ETC..... Order AMPHIPODA

Body dorso-ventrally compressed (Fig. 6 B). SOWBUGS, PILLBUGS, ETC.....Order ISOPODA

Fig. 6 A

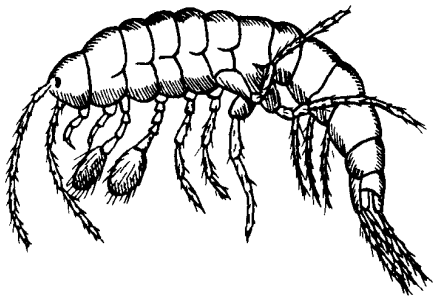
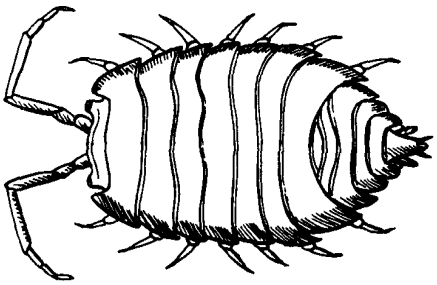


Fig. 6 A



7. Body not completely enlosed in a bivalve shell (Fig. 7 A).....8

Body completely enclosed in a bivalve shell (Fig. 7 B). OSTRACODS..... Order PODOCOPA

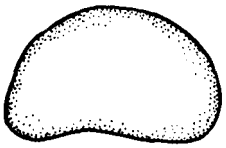


Fig. 7 B

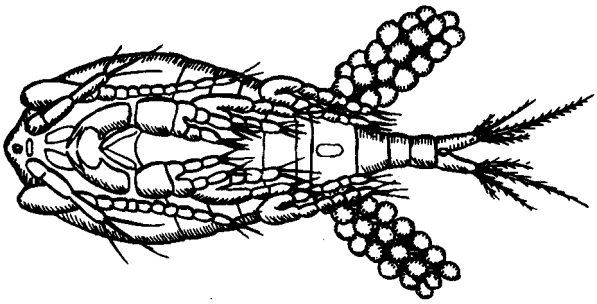
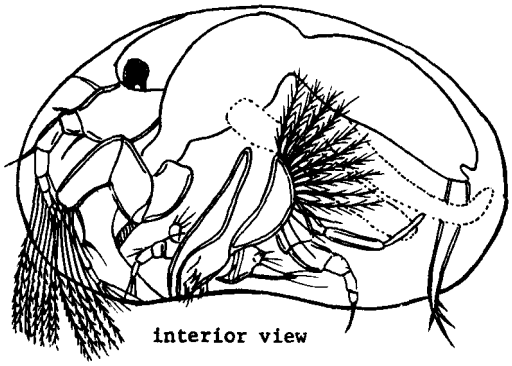


Fig. 7 A



interior view

8. Body segmented (Fig. 8 A).....9

Body not segmented (Fig. 8 B). WATER FLEAS,.....Order CLADOCERA

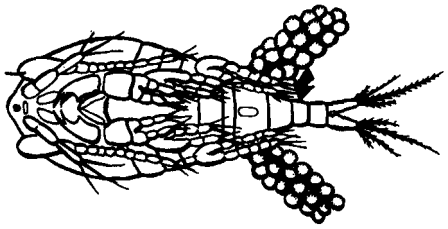


Fig. 8 A

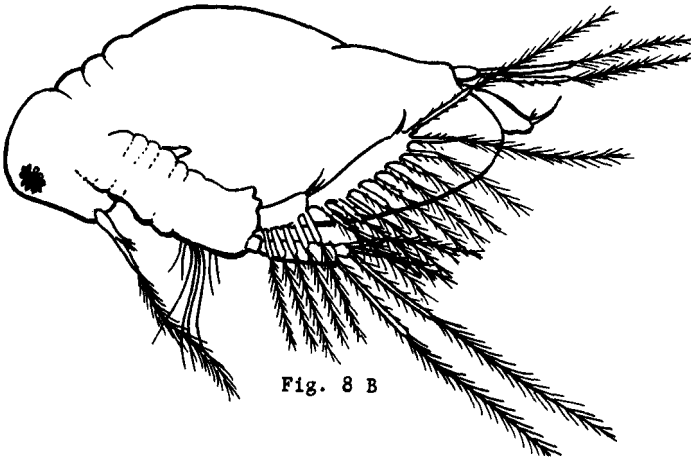


Fig. 8 B

9. Eyes stalked (Fig. 9 A). FAIRY SHRIMP.....Order ANOSTRACA

Eyes not stalked (Fig. 9 B). COPEPODS.....Order EUCOPEPODA

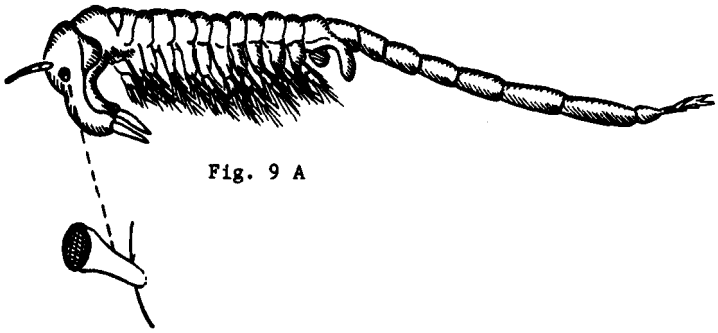


Fig. 9 A

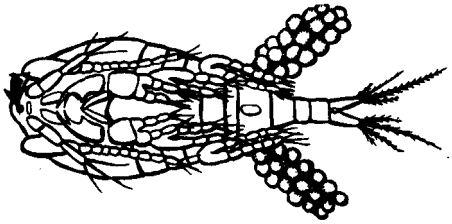


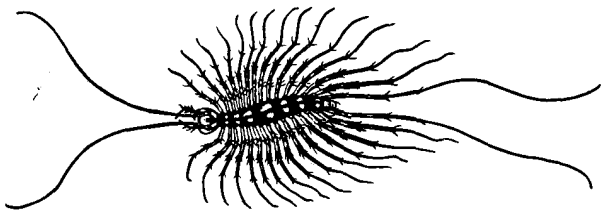
Fig. 9 B

CENTIPEDES: KEY TO SOME IMPORTANT UNITED STATES SPECIES

Harold George Scott

1. 8 dorsal plates: 15 pairs of long legs. . . . EASTERN HOUSE CENTIPEDE, *Scutigera cleoptrata*

   More than 14 dorsal plates. 2



Scutigera cleoptrata

2. 15 pairs of legs (*Lithobius*). 3

   21-23 pairs of legs (*Scolopendra*) 4

   More than 30 pairs of legs (*Geophilus*) 5

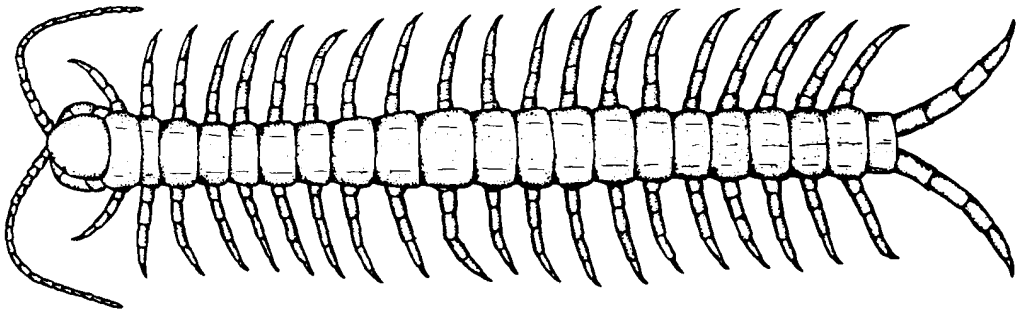
3. Antenna 19-23 segmented . . . . . .*Lithobius multidentatus*

   Antenna 33-43 segmented . . . . . *Lithobius forficatus*

4. Anal legs as long as or longer than 3 terminal body segments. . . . . .

   . . . . . WESTERN HOUSE CENTIPEDE, *Scolopendra heros*

   Anal legs shorter than 3 terminal body segments . . . . . *Scolopendra morsitans*



Scolopendra heros

5. 47-53 pairs of legs. 6

   64-67 pairs of legs. . . . . *Geophilus californicus*

6. With 2 longitudinal black lines . . . . . .*Geophilus rubens*

   Without longitudinal black lines . . . . . .*Geophilus umbraticus*

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

MILLIPEDES: KEY TO SOME IMPORTANT UNITED STATES SPECIES

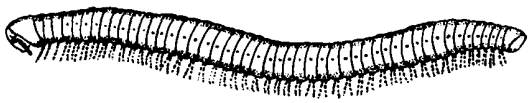
Harold George Scott, Ph.D.

1. 20-21 body segments 2

   More than 29 body segments 3

2. Legs with basal spines . . . . . *Pleurolomia butleri* (=*Fontaria virginiensis*)

   Legs without basal spines . . . . . *Pseudopolydesmus serratus*



Narceus americanus

3. Body segment 3 with legs . . . . . *Narceus americanus* (=*Spirobolus marginatus*)

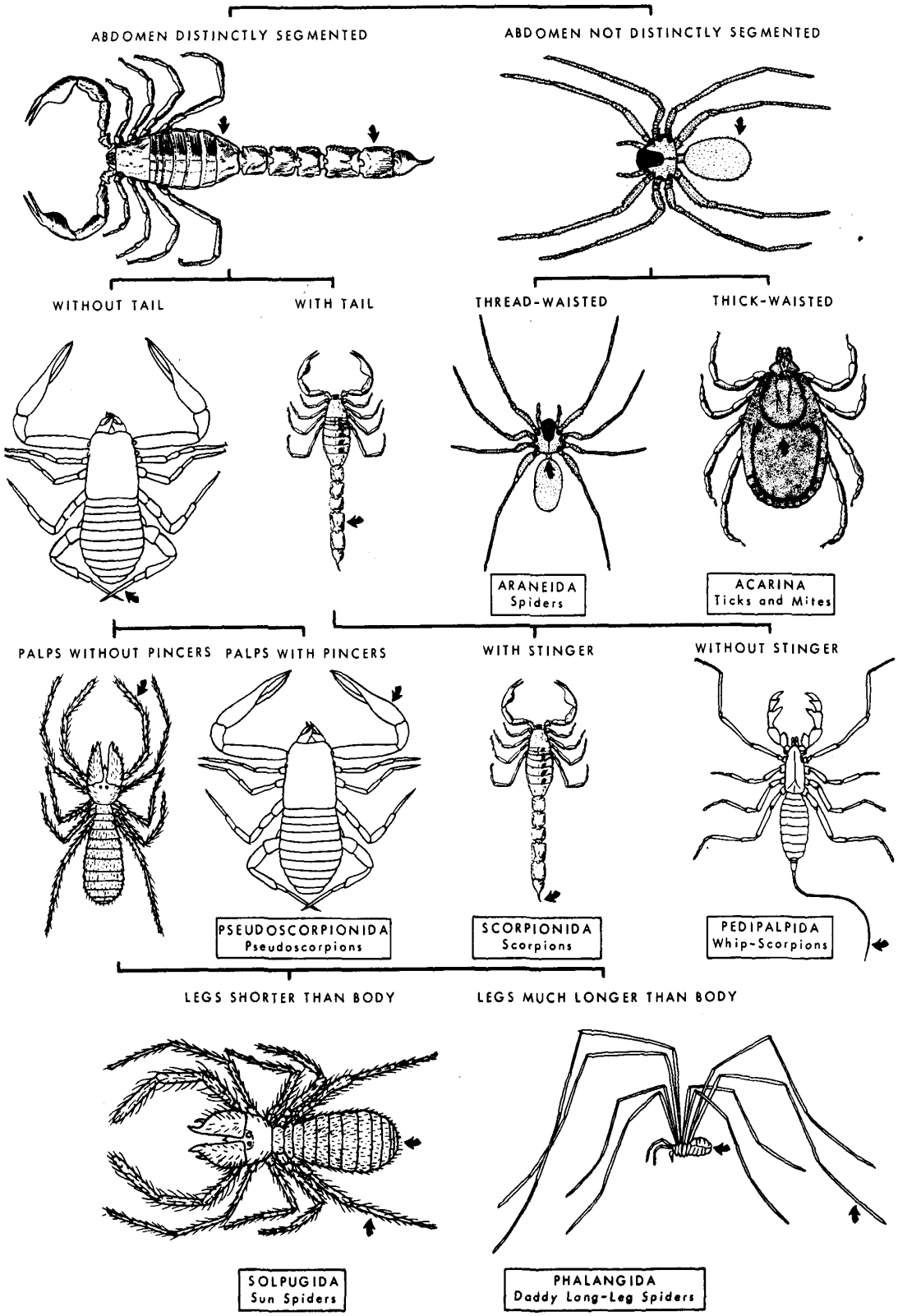
   Body segment 3 without legs . . . . . *Brachyiulus pusillus* (=*Julus virgatus*)

Brachyiulus pusillus

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia
1964

ARACHNIDA: KEY TO COMMON ORDERS OF PUBLIC HEALTH IMPORTANCE

Harold George Scott & Chester J. Stojanovich



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SPIDERS: KEY TO SOME IMPORTANT UNITED STATES SPECIES

Harold George Scott & Chester J. Stojanovich

1. Fangs projecting horizontally (Fig. 1 A). (abdomen without tergites; tarsus with claw tufts and 2 claws) ..... Dugesiella hentzi and others, TARANTULAS

   Fangs projecting vertically (Fig. 1 B) 2

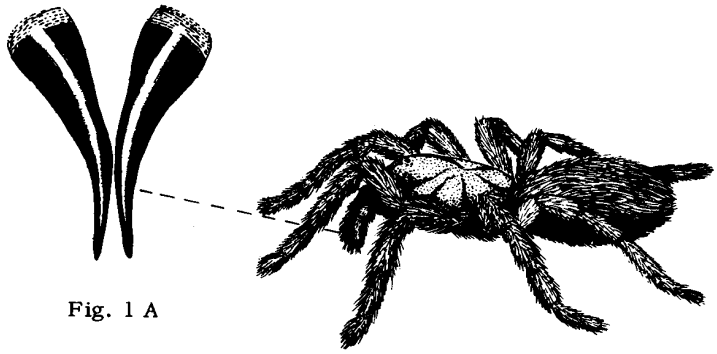

Fig. 1 A

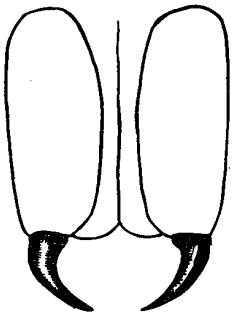

Fig. 1 B

2. Six eyes in 3 pairs; fiddle-shaped marking on cephalothorax (Fig. 2 A) ..... Loxosceles reclusa ..... BROWN RECLUSE SPIDERS

   Eight eyes (shiny black with red spots; usually with red hourglass on underside of abdomen) (Fig. 2 B). Latrodectus mactans ..... BLACK WIDOW SPIDER

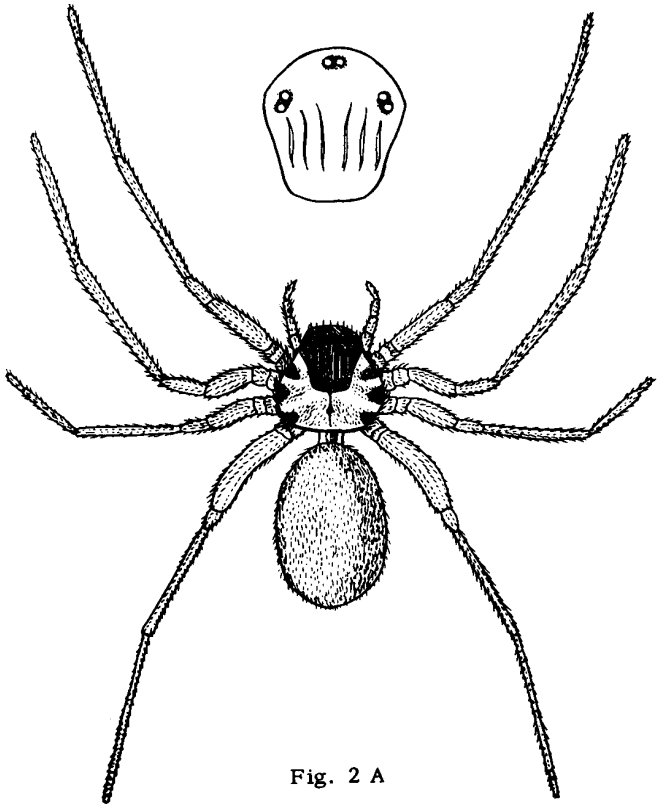

Fig. 2 A

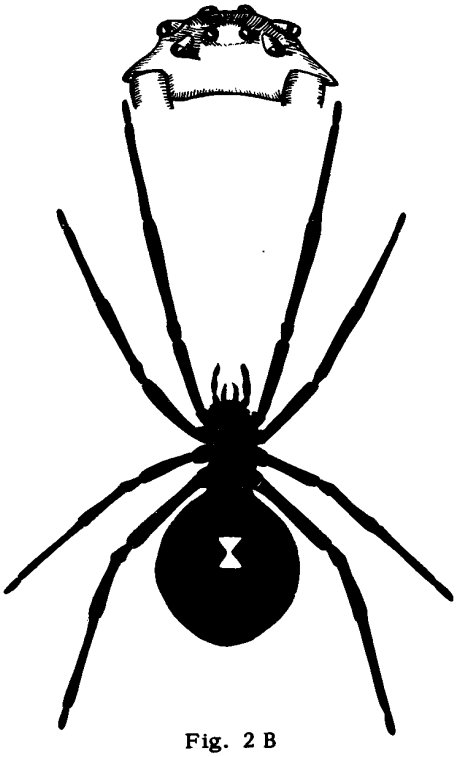

Fig. 2 B

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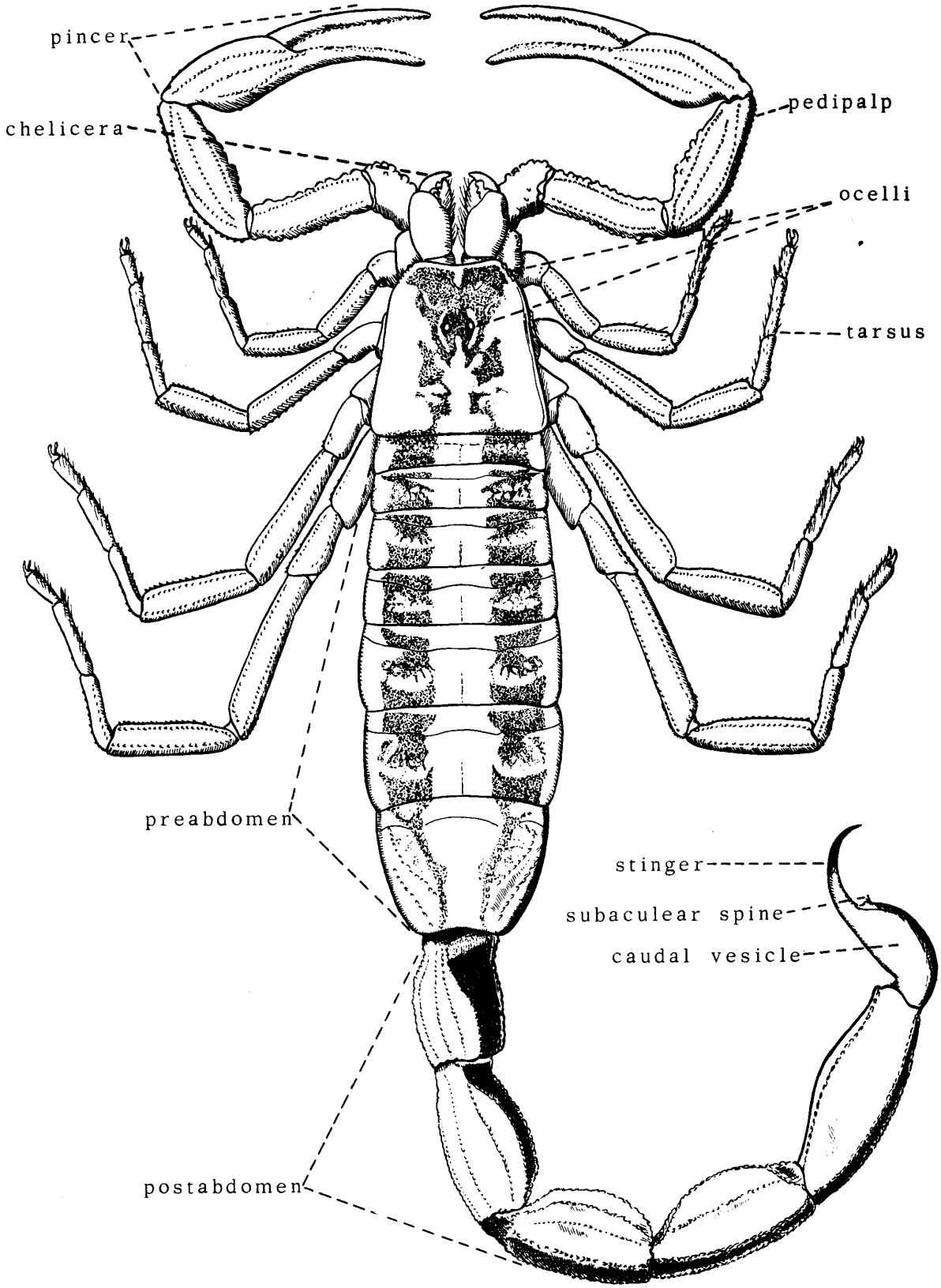
SCORPION DIAGRAM: DORSAL VIEW OF CENTRUROIDES VITTATUS

Chester J. Stojanovich



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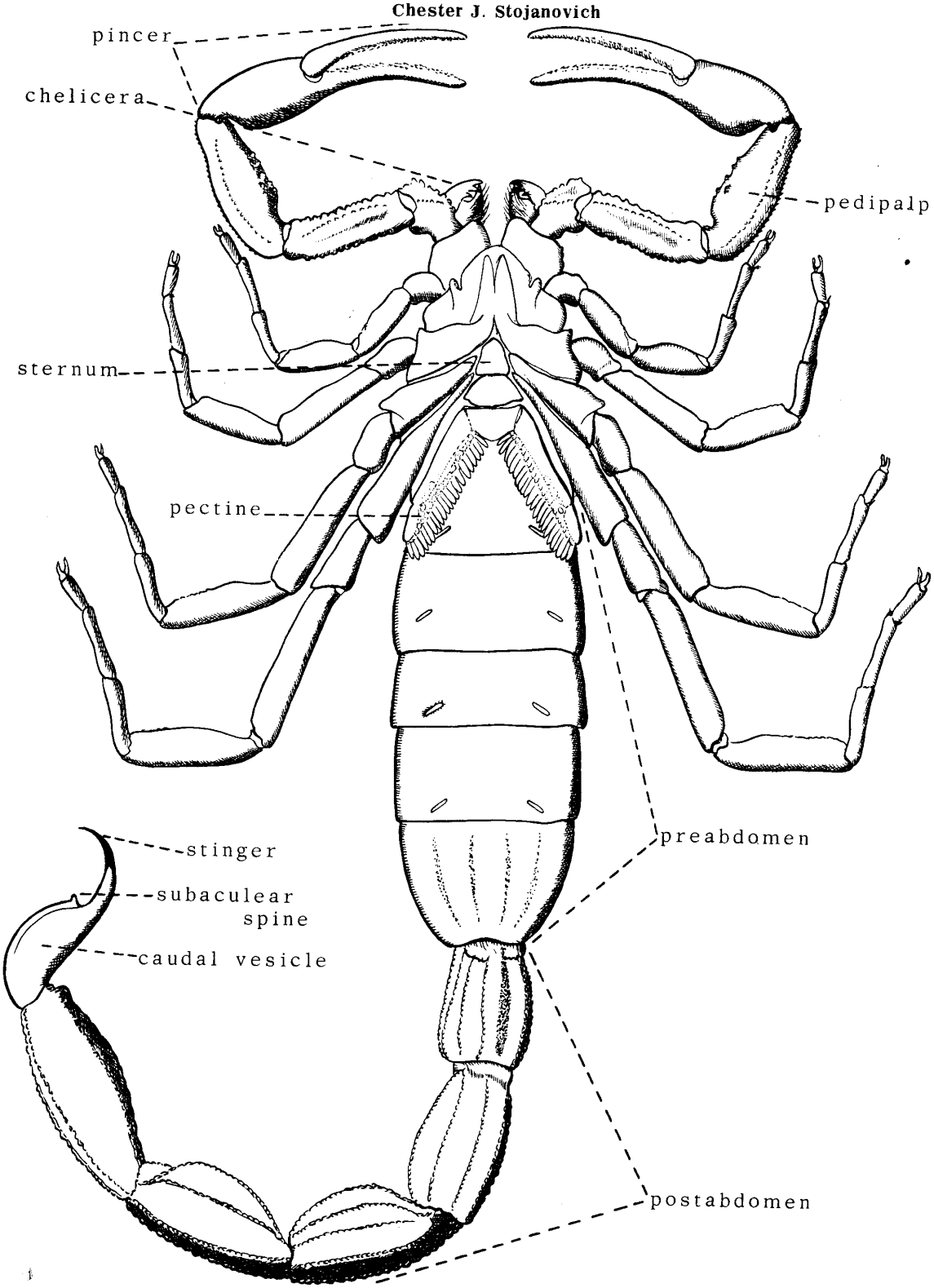
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

SCORPION DIAGRAM: VENTRAL VIEW OF CENTRUROIDES VITTATUS

Chester J. Stojanovich



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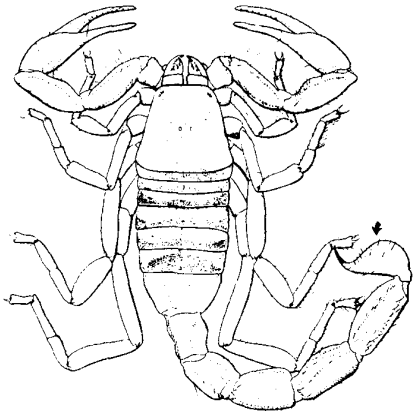
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

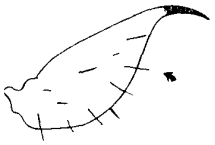
SCORPIONS: PICTORIAL KEY TO SOME COMMON UNITED STATES SPECIES

Chester J. Stojanovich and Harold George Scott

stinger with many setae

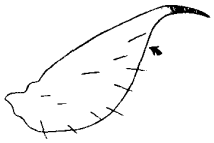
stinger with few setae

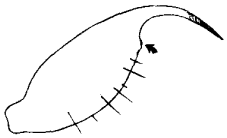




stinger without subaculear tooth

stinger with subaculear tooth



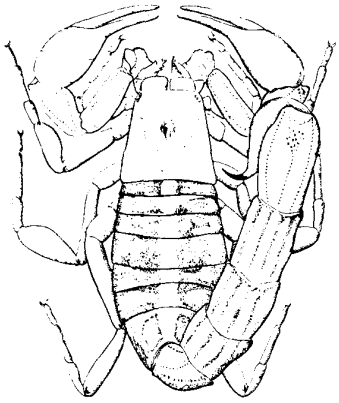


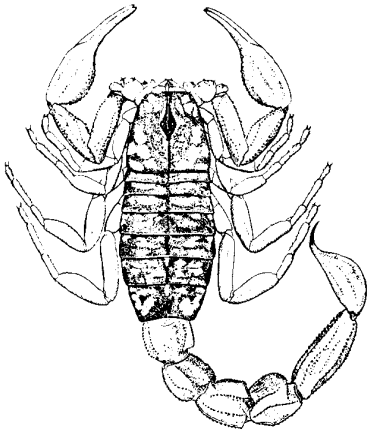
Hadrurus arizonensis
OLIVE HAIRY SCORPION

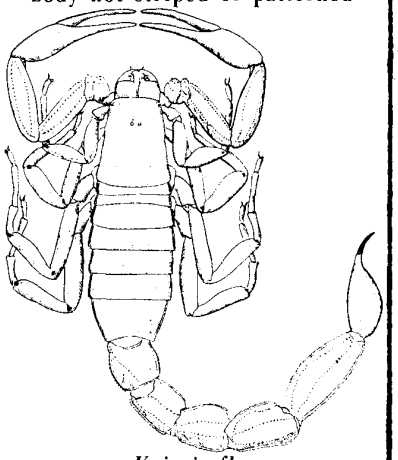
body striped dorsally

body patterned dorsally

body not striped or patterned







Vejovis spinigerus
STRIPE-TAIL DEVIL SCORPION

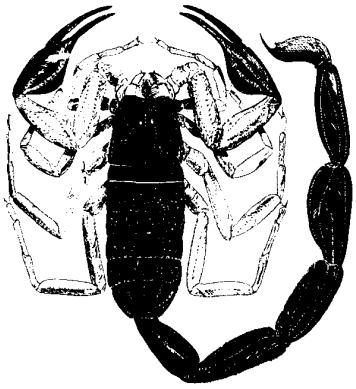
Vejovis carolinianus
SOUTHERN DEVIL SCORPION

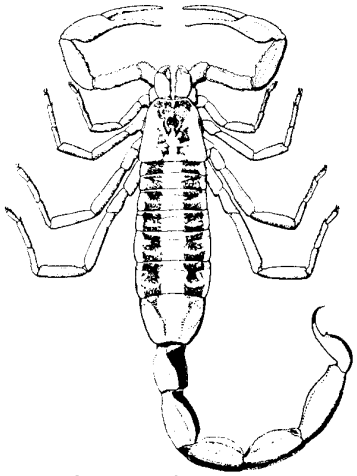
Vejovis flavus
SLENDER DEVIL SCORPION

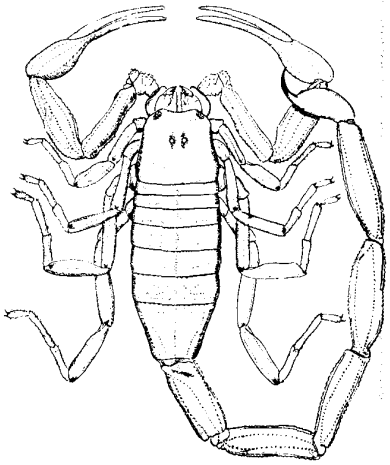
body black dorsally

body striped dorsally

body yellow dorsally







Centruroides gracilis
MARGARITE SCORPION

Centruroides vittatus
STRIPE-BACK SCORPION

Centruroides sculpturatus
DEADLY SCULPTURED SCORPION

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

ACARINA: ILLUSTRATED KEY TO SOME COMMON ADULT FEMALE MITES AND ADULT TICKS

Harry D. Pratt and Chester J. Stojanovich

1. Last segment of first leg with a depression known as Haller's organ; most species with a toothed hypostome on capitulum; size usually over 4 mm. (Fig. 1 A). Ticks 21

   Last segment of first leg without such a depression known as Haller's organ; hypostome not toothed; most species less than 4 mm. long (Fig. 1 B). Mites.....2

Fig. 1 A

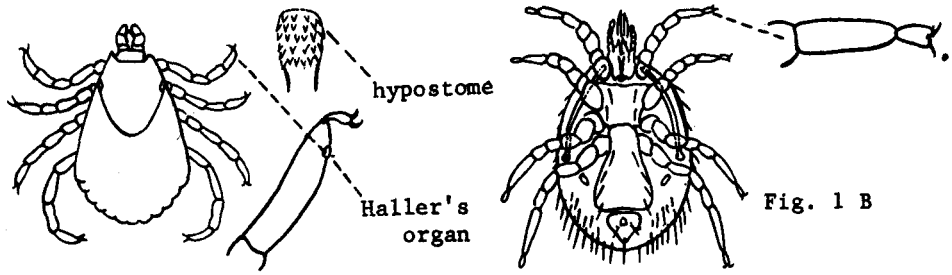
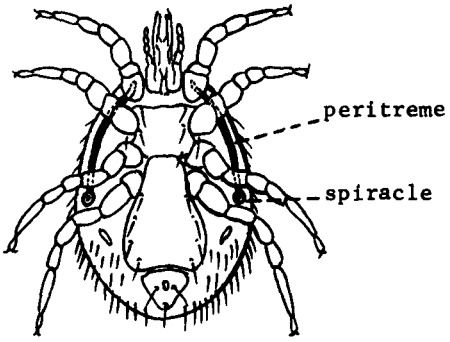


Fig. 1 B

2. Respiratory system with a spiracle on each side opening lateral to the bases of the 3rd or 4th pair of legs, frequently spiracles leading into slender tubes that extend forward laterally to the bases of the 1st or 2nd pairs of legs Fig. 2 A). Mesostigmatid Mites. 3

   Respiratory system without spiracles, or with spiracles opening near bases of the chelicerae (Fig. 2 B).....13

Fig. 2 A



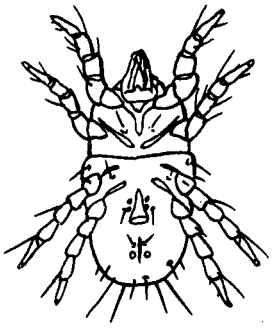
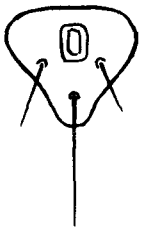


Fig. 2 B

3. Anus surrounded by a plate bearing only 3 setae, one on each side and one behind the anal opening; first tarsus bearing caruncle and claws at tip (Fig. 3 A).....4

   Anus surrounded by a plate bearing more than 3 setae; first tarsus without caruncle and claws (Fig. 3 B)..... Many species of Macrocheles

Fig. 3 A



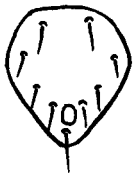


Fig. 3 B

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– Revised 1966 by Harold George Scott

4. Anal opening more than its length behind anterior margin of anal plate; chelicerae strongly narrowed apically, needle-like, movable chela absent or extremely small (Fig. 4 A). Genus Dermanyssus 5

Anal opening less than its length or about its length, behind anterior margin of anal plate; chelicerae not narrowed apically and needle-like, shear-like, bearing conspicuous shear-like chelae at tip which may or may not bear teeth (Fig. 4 B)..... 7

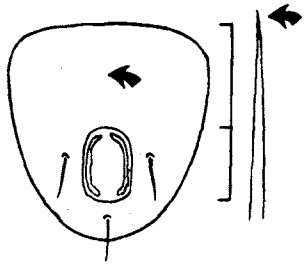


Fig. 4 A

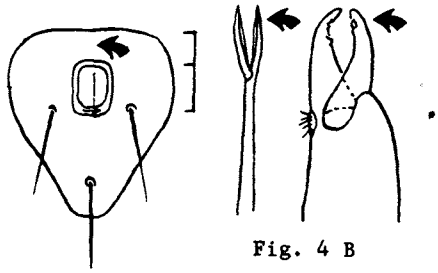


Fig. 4 B

5. Dorsal surface of body with a single plate (Fig. 5 A).....6

Dorsal surface of body with two plates, a large anterior plate and a small posterior plate (Fig. 5 B). Dermanyssus sanguineus..... HOUSE MOUSE MITE

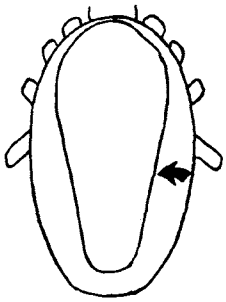


Fig. 5 A

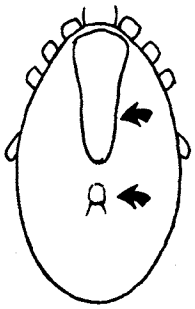


Fig. 5 B

6. Peritreme tube somewhat sinuous and extending anteriorly to a point opposite coxa 2 (Fig. 6 A). Dermanyssus gallinae..... CHICKEN MITE

Peritreme tube short, extending forward for a distance less than half the diameter of coxa 3 (Fig. 6 B). Dermanyssus americanus..... AMERICAN BIRD MITE

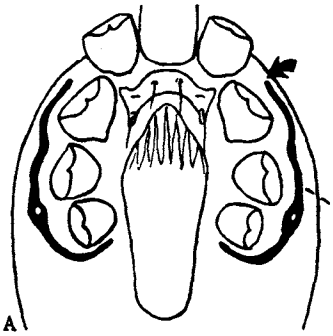


Fig. 6 A

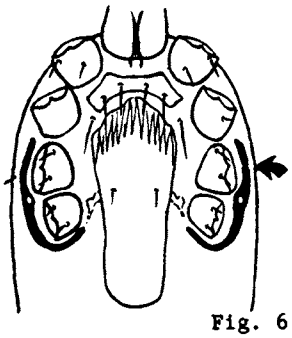


Fig. 6 B

7. Dorsal plate not covering entire dorsal surface of mite; genito-ventral plate typically narrowed posteriorly behind 4th coxae; chelae on chelicerae without teeth or setae (Fig. 7 A). Genus Ornithonyssus 8

Dorsal plate almost covering entire dorsal surface of mite; genito-ventral plate typically expanded posterior to 4th coxae; one or both chelae of chelicerae with teeth and a seta (Fig. 7 B). Family Laelaptidae 10

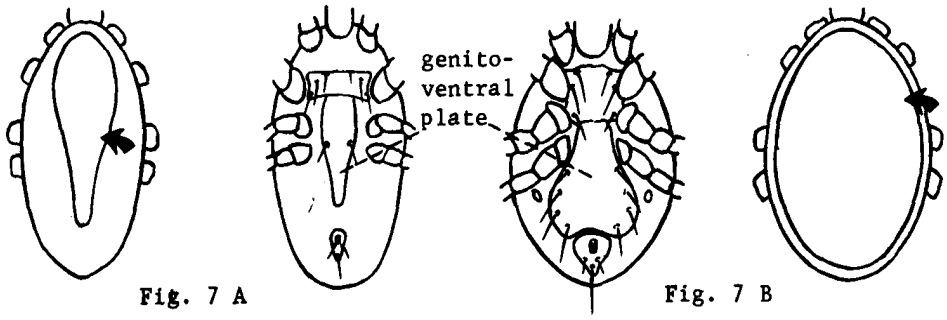


Fig. 7 A Fig. 7 B

8. Sternal plate with anterior and middle pairs of sternal setae on the plate, posterior pair usually just off the plate (Fig. 8 A). On Birds... Ornithonyssus sylviarum ..... NORTHERN FOWL MITE

Sternal plate with the usual three pairs of setae on the plate (Fig. 8 B) 9

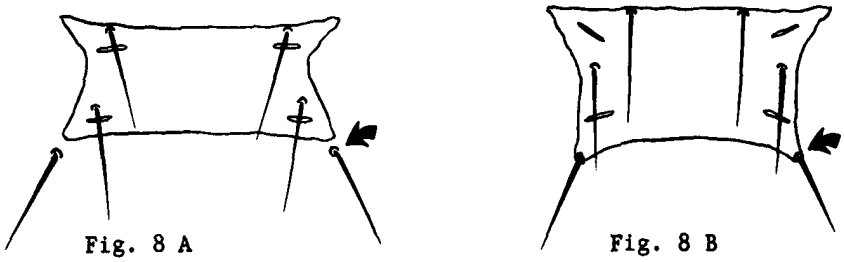


Fig. 8 A Fig. 8 B

9. Dorsal plate narrowed posteriorly; setae in middle dorsal row of plate longer than the distance between their bases (Fig. 9 A). Normally on mammals or man..... Ornithonyssus bacoti ..... TROPICAL RAT MITE

Dorsal plate broader posteriorly; setae in middle dorsal row of plate much shorter than the distance between their bases (Fig. 9 B). Normally on birds..... Ornithonyssus bursa..... TROPICAL BIRD MITE

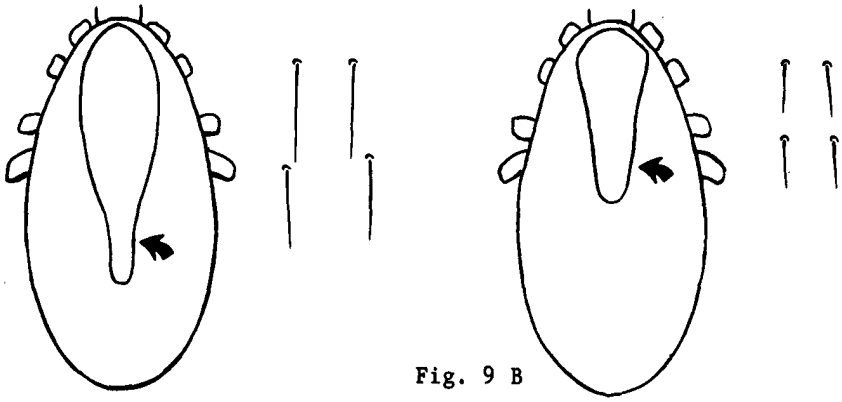


Fig. 9 A Fig. 9 B

10. Genito-ventral plate with many fine setae; anal plate transverse, wider than long (Fig. 10 A). On domestic rats and a wide variety of wild mammals..... Eulaelaps stabularis

Genito-ventral plate with one to four pairs of setae; anal plate longer than wide (Fig. 10 B).....11

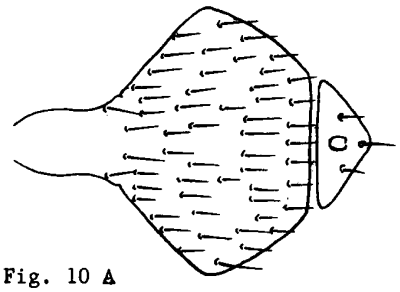


Fig. 10 A

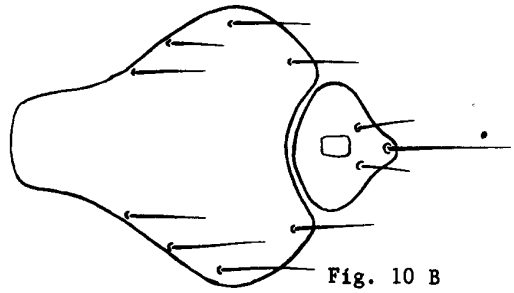


Fig. 10 B

11. Genito-ventral plate with only a single pair of setae (Fig. 11 A). On domestic rats and mice and a wide variety of mammals and birds..... Haemolaelaps glasgowi.....COMMON RODENT MITE

Genito-ventral plate with four pairs of setae (Fig. 11 B). Normally on domestic rats..12

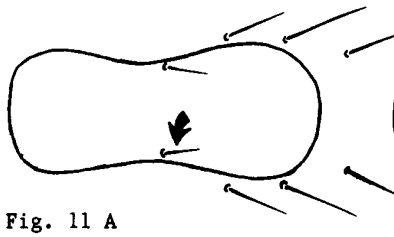


Fig. 11 A

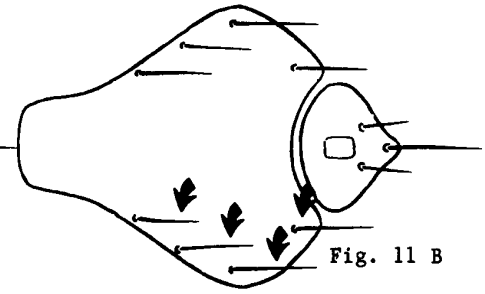


Fig. 11 B

12. Anal plate contiguous with the genito-ventral plate, anterior margin rounded and fitting into a strong concavity in genito-vental plate; larger species averaging 1-2 mm. long. (Fig. 12 A). Echinolaelaps echidninus.....SPINY RAT MITE

Anal plate somewhat separated from genito-ventral plat, anterior margin almost straight with definite anterior-lateral corners; small species averaging 0.5-1 mm long (Fig. 12 B). Laelaps nuttalli.....DOMESTIC RAT MITE

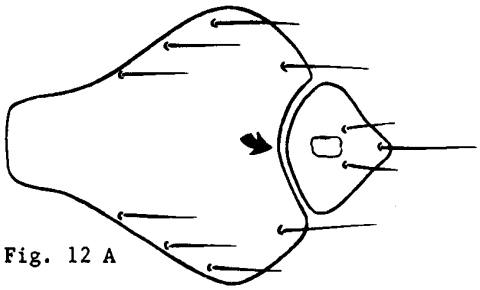


Fig. 12 A

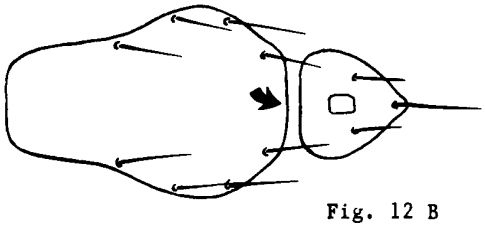


Fig. 12 B

13. First pair of legs very long, much longer than other three pairs; anterior margin of body with four distinct flattened scales and somewhat flattened scales on other dorsal surfaces of body (Fig. 13 A). Plant feeders which invade buildings but do not bite man. Bryobia praetiosa ..... CLOVER MITE

First pair of legs not markedly longer than the other three pairs of legs; no flattened scales on body (Fig. 13 B) 14

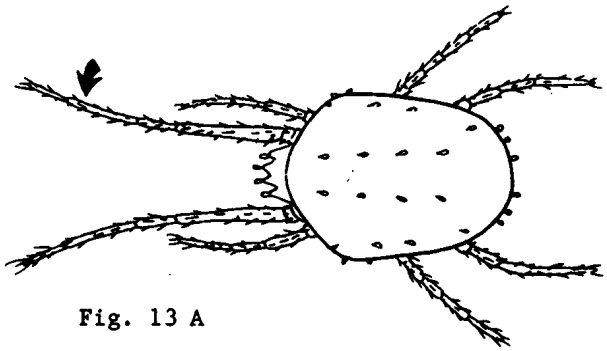


Fig. 13 A

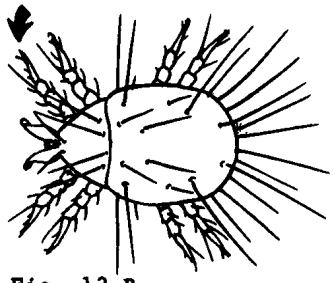


Fig. 13 B

14. Surface of body without fine parallel lines or folds; tarsi without stalked suckers (Fig. 14 A). Adults never true parasites (Cheese or Flour mites) 15

Surface of body with fine parallel lines or folds; tarsi often provided with stalked suckers (Fig. 14 B). Scabies or mange mites parasitic in all stages, chiefly on vertebrates 16

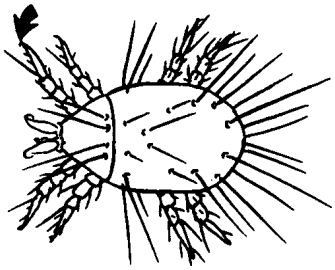


Fig. 14 A

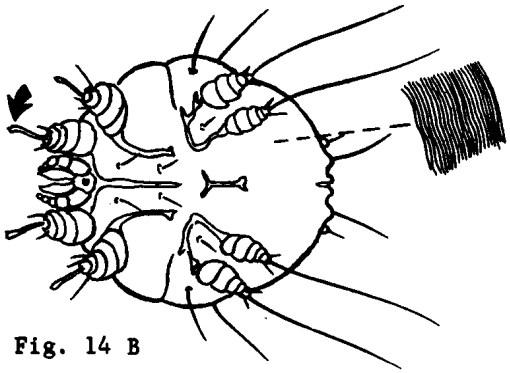


Fig. 14 B

15. Tarsi tapering markedly to tip (Fig. 15 A) ..... Glycyphagus prunorum

Tarsi not tapering markedly to tip (Fig. 15 B). Many cheese and flour mites which are difficult to separate except with very specialized literature and a reference collection. ..... Genus Tyrophagus, Genus Caloglyphus, Etc.

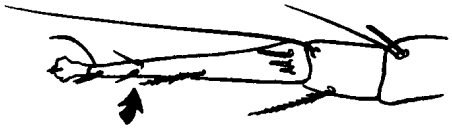


Fig. 15 A

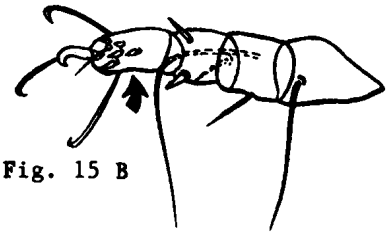


Fig. 15 B

16. Body elongate, somewhat cigar-shaped and prolonged behind; the abdomen somewhat ringed; legs very short, apparently three-segmented; tiny species less than 1 mm. (Fig. 16 A). In hair follicles or sebaceous glands of mammals..... Demodex folliculorum.....PORE OR FOLLICLE MITE

Body not prolonged behind and cigar-shaped (Fig. 16 B). Occasionally female grain itch somewhat balloon-shaped; larger species not found in hair follicle or sebaceous glands of mammals..... 17

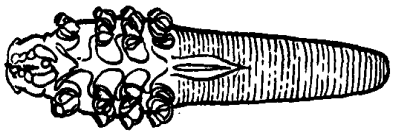


Fig. 16 A

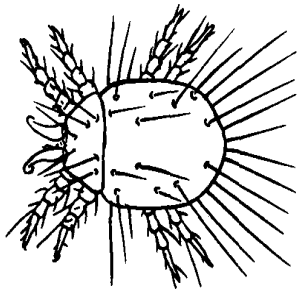


Fig. 16 B

17. A club-shaped or clavate hair between bases of first and second pairs of legs, body divided into cephalothorax and abdomen, the latter often enormously enlarged (Fig. 17 A) Pyemotes ventricosus formerly Pediculoides ventricosus.....STRAW ITCH MITE

Setae on cephalothorax normal, no club-shaped or clavate hair between bases of first and second pairs of legs; no distinct division into cephalothorax and abdomen (Fig. 17 B) 18

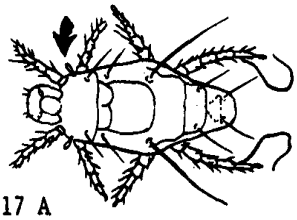


Fig. 17 A

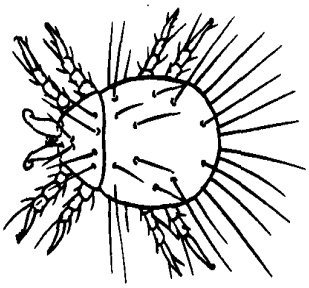


Fig. 17 B

18. Legs short and stubby (Fig. 18 A).....20

Legs longer and more slender (Fig. 18 B).....19

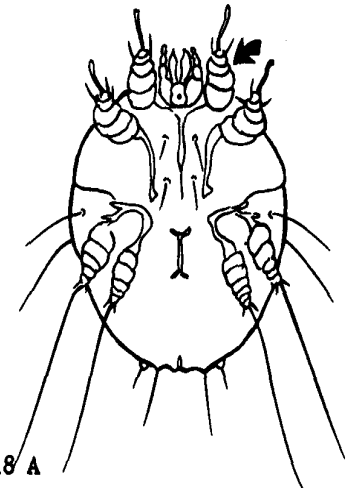


Fig. 18 A

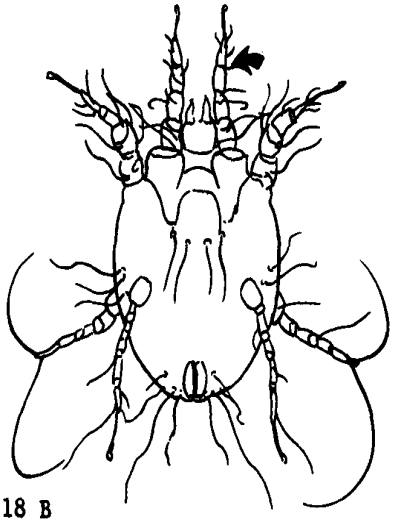


Fig. 18 B

13. First pair of legs very long, much longer than other three pairs; anterior margin of body with four distinct flattened scales and somewhat flattened scales on other dorsal surfaces of body (Fig. 13 A). Plant feeders which invade buildings but do not bite man. Bryobia praetiosa ..... CLOVER MITE

First pair of legs not markedly longer than the other three pairs of legs; no flattened scales on body (Fig. 13 B) 14

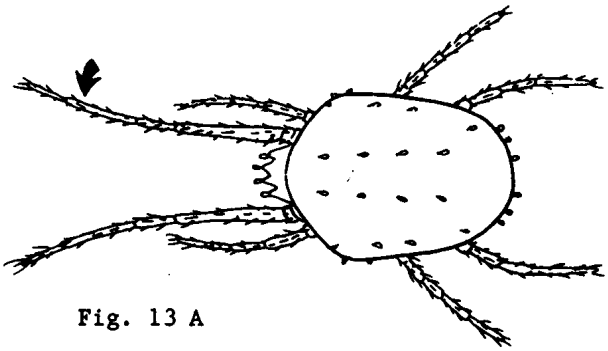


Fig. 13 A

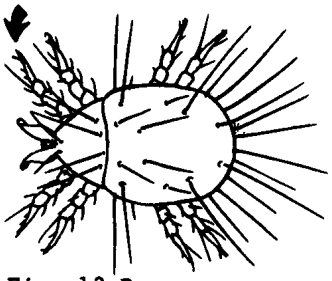


Fig. 13 B

14. Surface of body without fine parallel lines or folds; tarsi without stalked suckers (Fig. 14 A). Adults never true parasites (Cheese or Flour mites) 15

Surface of body with fine parallel lines or folds; tarsi often provided with stalked suckers (Fig. 14 B). Scabies or mange mites parasitic in all stages, chiefly on vertebrates 16

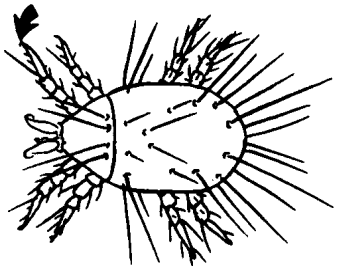


Fig. 14 A

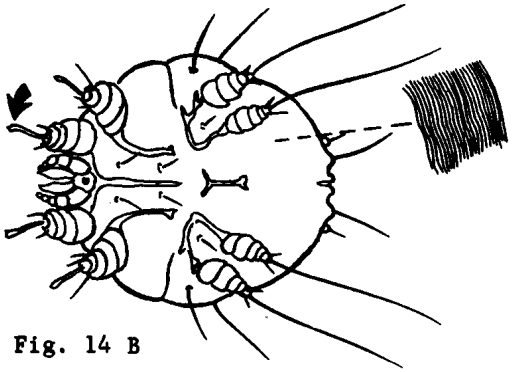


Fig. 14 B

15. Tarsi tapering markedly to tip (Fig. 15 A) ..... Glycyphagus prunorum

Tarsi not tapering markedly to tip (Fig. 15 B). Many cheese and flour mites which are difficult to separate except with very specialized literature and a reference collection. ..... Genus Tyrophagus, Genus Caloglyphus, Etc.

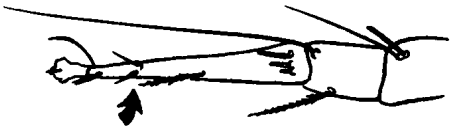


Fig. 15 A

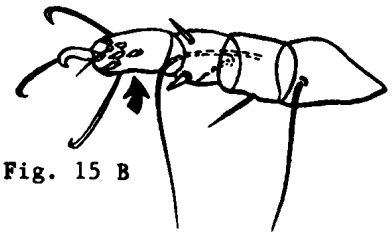


Fig. 15 B

21. Capitulum at anterior end of body, visible from above and below; scutum or dorsal shield present, short in female, long in male (Fig. 21 A & B). Family Ixodidae..HARD TICKS...22

Capitulum on under side of body, hidden by body when seen from above though palpi may project anteriorly; scutum absent (Fig. 21 C & D). Family Argasidae.....SOFT TICKS....31

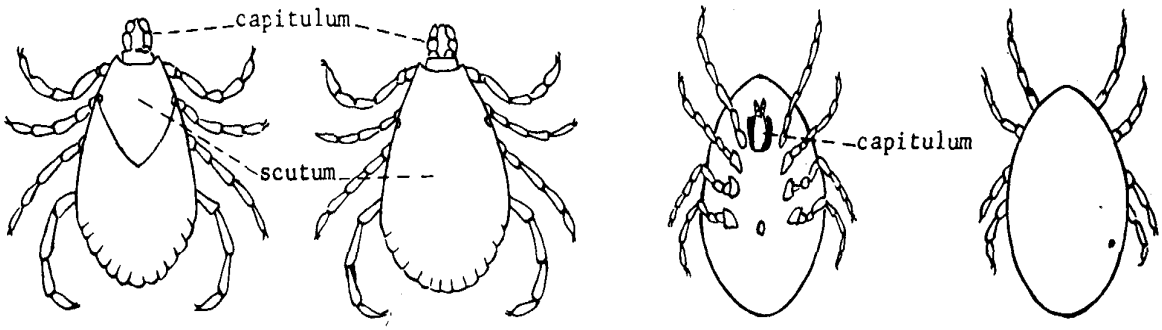


Fig. 21 A Fig. 21 B Fig. 21 C Fig. 21 D

FAMILY IXODIDAE - HARD TICKS

22. Ornate ticks, with some white markings on dorsal shield (Fig. 22 A).....23

Inornate ticks, without white markings on dorsal shield (Fig. 22 B).....28

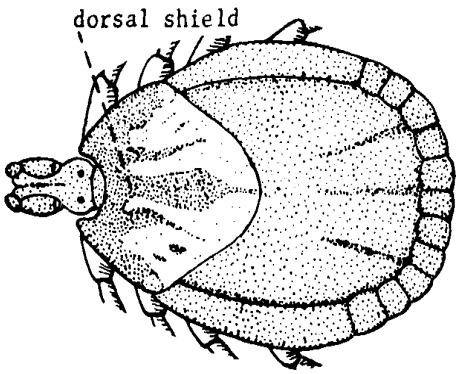


Fig. 2 A

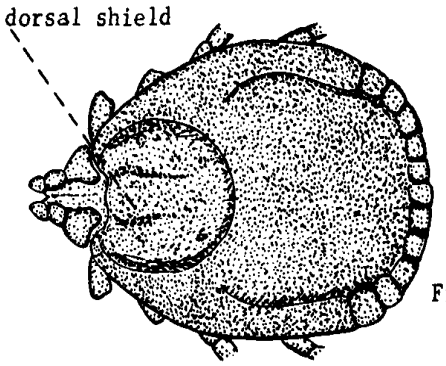


Fig. 2 B

23. Palpi long, much longer than basis capituli; second segment of palpus about twice as long as wide (Fig. 23A). Genus Amblyomma.....24

Palpi short, about as long as basis capituli; second segment of palpus about as long as wide (Fig. 23 B). Genus Dermacentor.....25

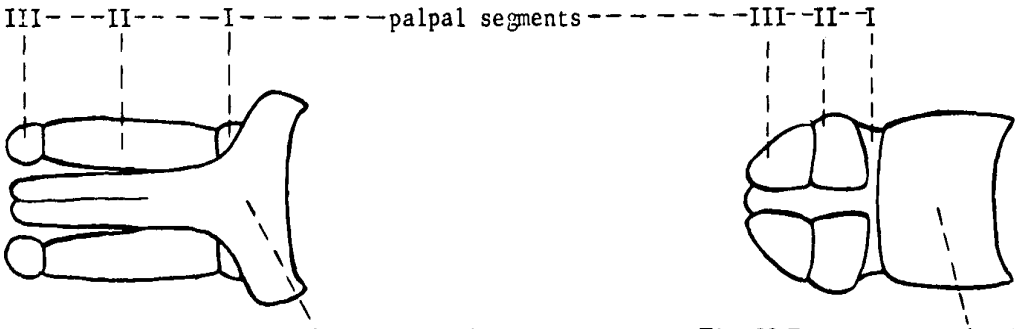


Fig. 23A Fig. 23 B

24. Next to last segment of second, third, and fourth pairs of legs without paired terminal spurs; female with a distinct pale marking near posterior end of dorsal shield (Fig. 24 A). Amblyomma americanum.....LONE STAR TICK

Next to last segment of second, third, and fourth pairs of legs with long, paired terminal spurs; female with more diffuse markings on dorsal shield (Fig. 24 B)..... Amblyomma maculatum.....GULF COAST TICK

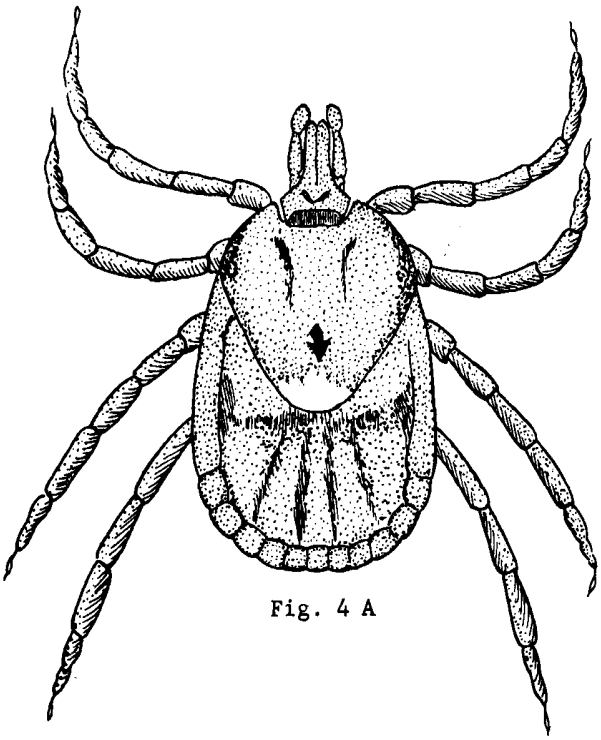


Fig. 4 A

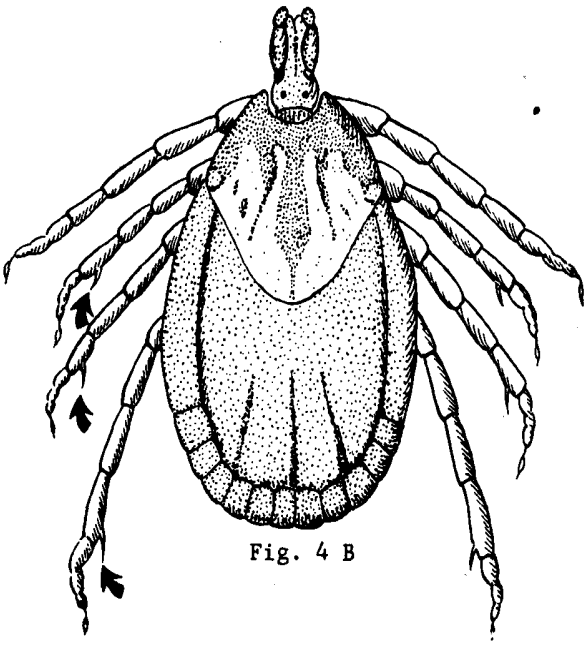


Fig. 4 B

25. Spiracular plate without dorsal prolongation (Fig. 25 A). Dermacentor albipictus..... .....WINTER TICK

Spiracular plate with dorsal prolongation (Fig. 25 B).....26

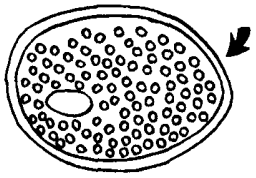


Fig. 25 A

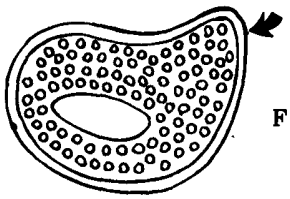


Fig. 25 B

26. Basis capituli with long cornua (Fig. 26 A). Dermacentor occidentalis.PACIFIC COAST TICK

Basis capituli with short cornua (Fig. 26 B)..... 27

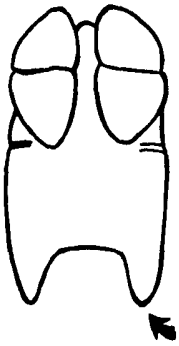


Fig. 26 A

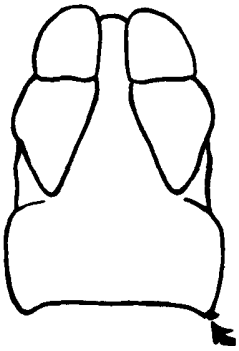


Fig. 26 B

27. Goblets of spiracular plate large and less numerous; Rocky Mountain species. (Fig. 27 A) Dermacentor andersoni.....ROCKY MOUNTAIN WOOD TICK

Goblets of spiracular plate very small and numerous; east of the Rocky Mountains and on the Pacific coast. (Fig. 27 B). Dermacentor variabilis.....AMERICAN DOG TICK

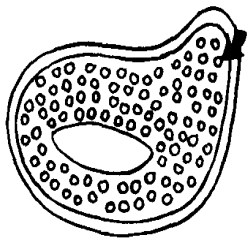


Fig. 27 A

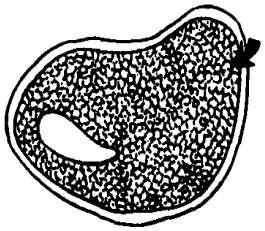


Fig. 27 B

28. Sides of basis capituli laterally produced; distinctly angulate; eyes present on sides of scutum (Fig. 28 A & B).....29

Sides of basis capituli not laterally produced; more or less parallel (Fig. 28 C); eyes absent.....30

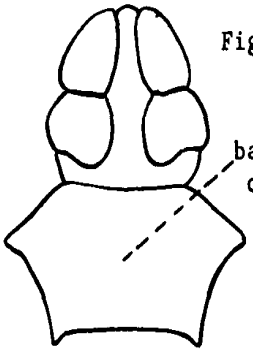


Fig. 28 A

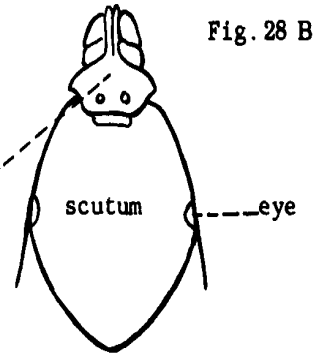


Fig. 28 B

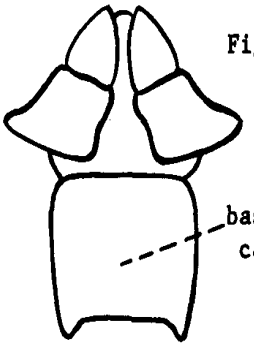


Fig. 28 C

29. Fore coxa deeply cleft; festoons present; easily seen in unengorged specimens; anal groove distinct in unengorged specimens (Fig. 29 A). (principally on dogs or in houses) Rhipicephalus sanguineus.....BROWN DOG TICK

Fore coxa not deeply cleft; festoons absent; anal groove indistinct (Fig. 29 B). (On cattle and deer). Boophilus annulatus.....CATTLE TICK

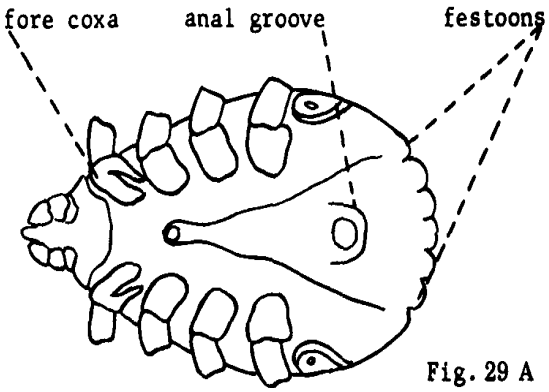


Fig. 29 A

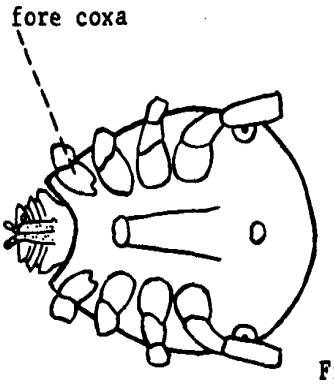


Fig. 29 B

30. Second segment of palpus laterally produced; anal groove behind anus, not attaining posterior margins of body (Fig. 30 A & B). Haemaphysalis leporispalustris.....RABBIT TICK

Second segment of palpus not laterally produced; anal groove extending as an inverted U from in front of anus to posterior margins of body (Fig. 30 C).....Genus Ixodes

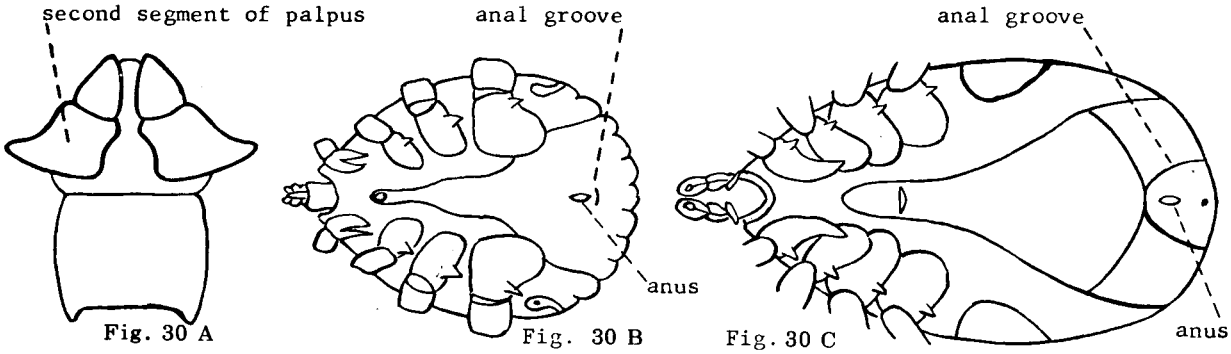


Fig. 30 A Fig. 30 B Fig. 30 C

FAMILY ARGASIDAE - SOFT TICKS

31. Margin of body with a definite sutural line separating dorsal and ventral surfaces; dorsal surface with conspicuous "discs" arranged somewhat in radiating lines (Fig. 31 A) Argas persicus.....FOWL TICK

Margin of body lacking definite sutural line, thick and rounded (Fig. 31 B).....32

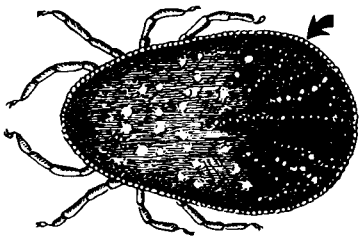


Fig. 31 A

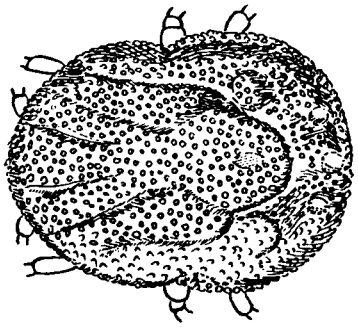


Fig 31 B

32. Hypostome with well-developed teeth (Fig. 32 A); integument not spinose..... Genus Ornithodoros.....33

Hypostome of adult vestigial or without effective teeth; integument of nymph (stage usually seen) spinose (Fig. 32 B). Usually on cattle and horses..... Otobius megnini.....SPINOSE EAR TICK

Fig. 32 A

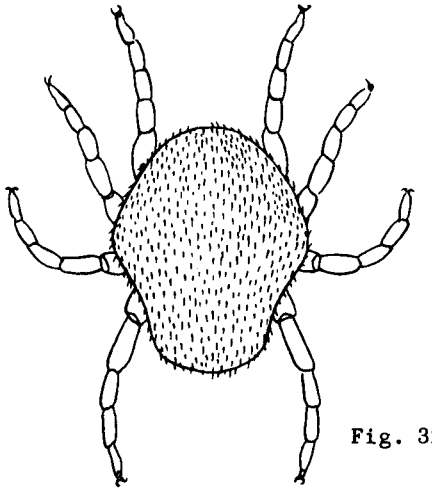


Fig. 32 B

33. Strong dorsal humps absent on all tarsi (Fig. 33 A).....34

Strong dorsal humps present on tarsi of first, second and third legs (Fig. 33 B).....35

Fig. 33

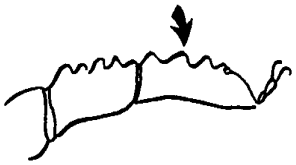


Fig. 33 B

34. Cheeks absent (Fig. 34 A). Ornithodoros hermsi.....HERMS' RELAPSING FEVER TICK

Cheeks present (Fig. 34 B).....Ornithodoros talaje

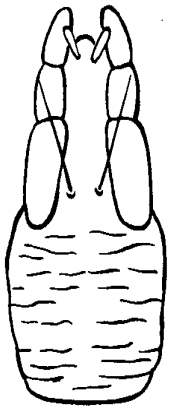


Fig. 34 A

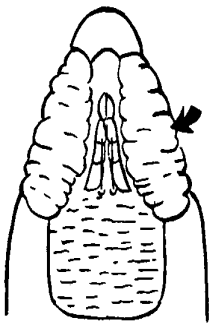


Fig. 34 B

35. Eyes present on sides of body above second and third coxae (Fig. 35 A); tarsus of fourth leg with a prominent, pointed subterminal spur (Fig. 35 B).....
Ornithodoros coriaceus.....PAJAROELLO TICK

Eyes absent; tarsus of fourth leg without such subterminal spur (Fig. 35 C).....15

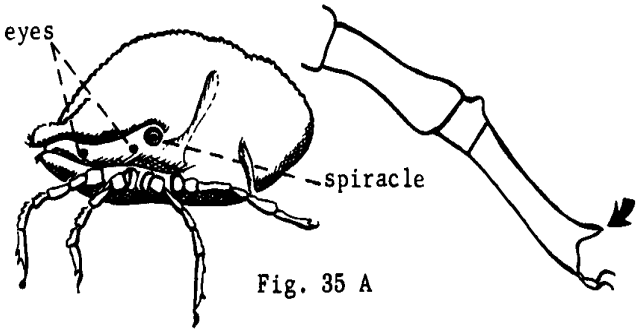


Fig. 35 A

Fig. 35 B

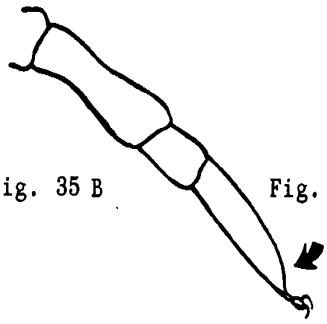


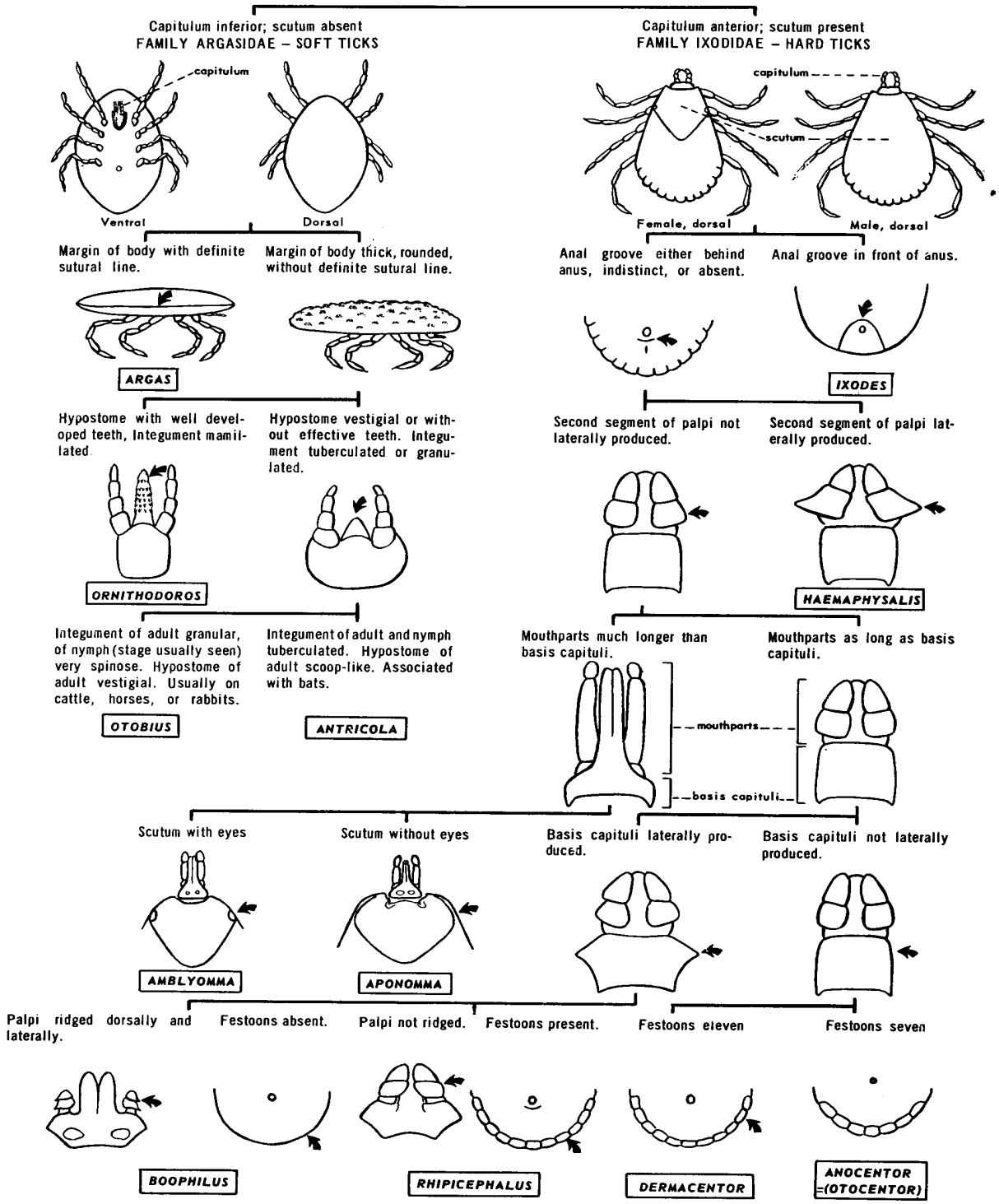
Fig. 35 C

36. Mammillae large, relatively few and not crowded; in mid-dorsal region about 10 per linear mm.; hypostome over 1/2 mm. long. Southeastern United States and Mexico north to Kansas and Florida. Ornithodoros turicata.....RELAPSING FEVER TICK

Mammillae small, crowded, and numerous; in mid-dorsal region about 18 per linear mm.; hypostome less than 1/2 mm. long. Pacific coast and Rocky Mountain states.....
Ornithodoros parkeri.....PARKER'S RELAPSING FEVER TICK

TICKS: KEY TO GENERA IN UNITED STATES

Harry D. Pratt



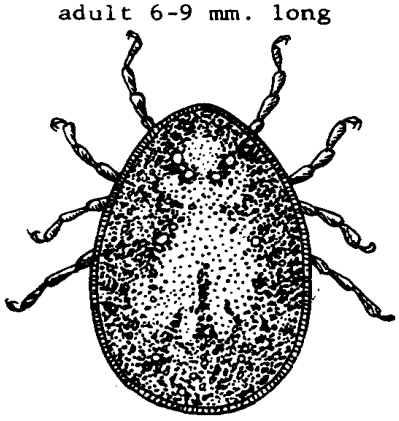
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1961

TICKS AND MITES: KEY TO SPECIES COMMONLY INFESTING PIGEONS

Harold George Scott & Chester J. Stojanovich

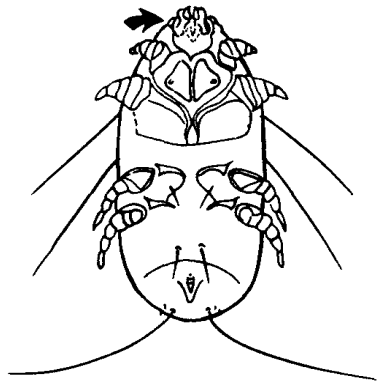
mouthparts ventral

adult 6-9 mm. long



Argas reflexus
PIGEON TICK

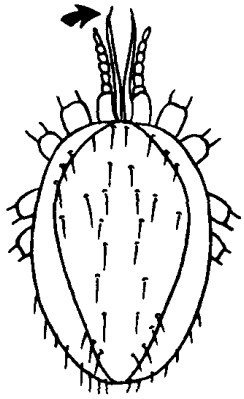
adult 0.25 mm. long



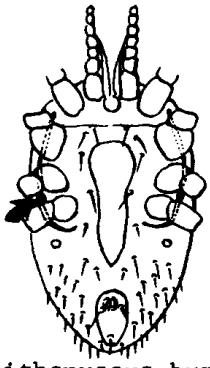
Laminosioptes cysticola
FOWL CYST MITE

mouthparts anterior

under 0.6 mm. long



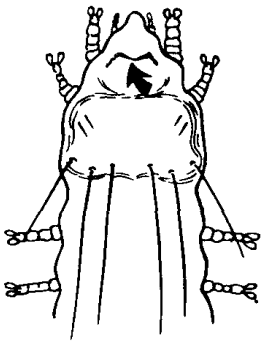
with lateral spiracles



Ornithonyssus bursa
TROPICAL FOWL MITE or
Dermanyssus gallinae
CHICKEN MITE

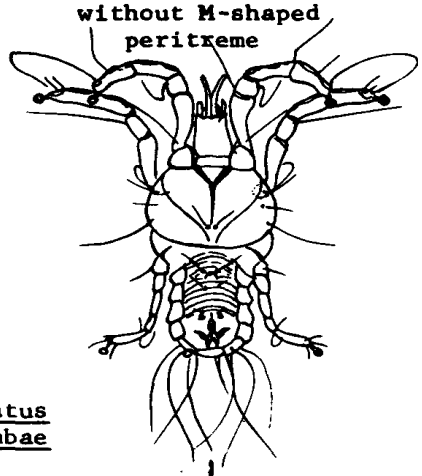
without lateral spiracles

with M-shaped peritreme

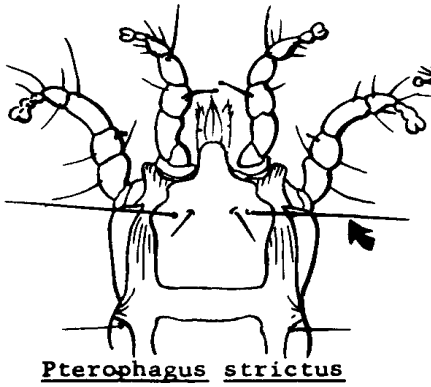


Syringophilus bipectinatus
or *Syringophilus columbae*
PIGEON QUILL MITES

without M-shaped peritreme



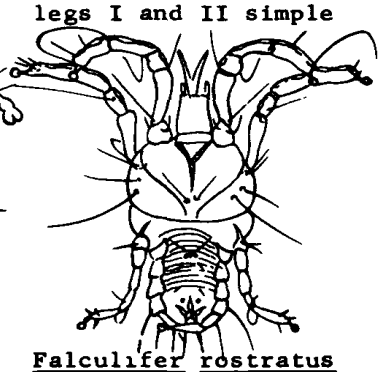
with horizontal setae



Pterophagus strictus
BODY-FEATHER MITE

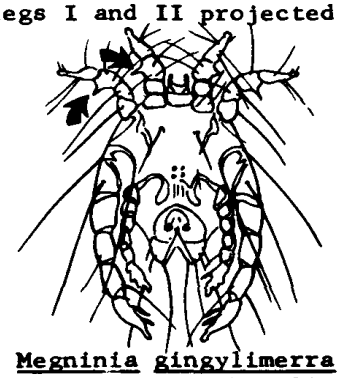
without horizontal setae

legs I and II simple



Falculifer rostratus
WING-FEATHER MITE

legs I and II projected



Megninia gingylimerra
or *Megninia cubitalis*
CONTOUR-FEATHER MITES

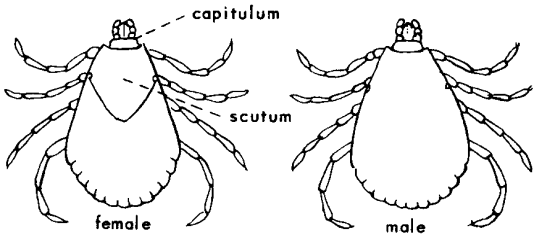
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia — 1963

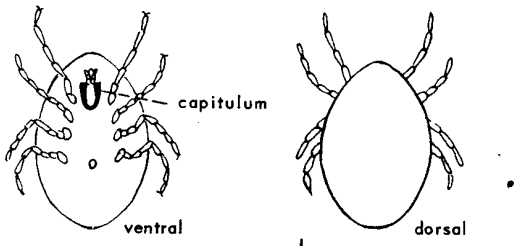
TICKS: PICTORIAL KEY TO SOME COMMON SPECIES

Harry D. Pratt

capitulum visible from above, scutum present, family Ixodidae, HARD TICKS

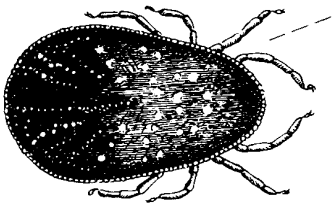
capitulum not visible from above, scutum absent, family Argasidae. SOFT TICKS

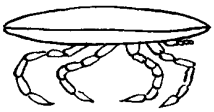




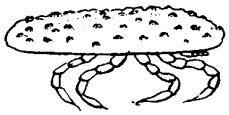
sutural line present

sutural line absent





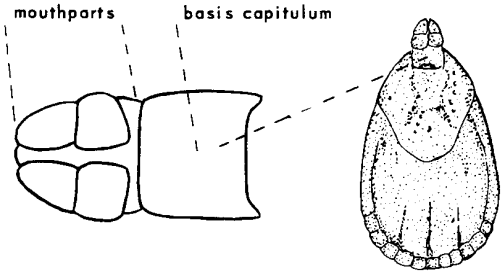
Argas persicus
FOWL TICK

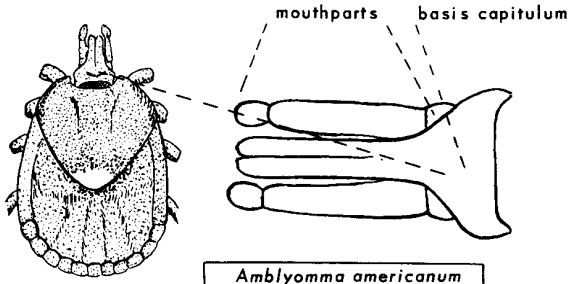


Ornithodoros
RELAPSING FEVER TICK

mouthparts short, about as long as basis capituli

mouthparts much longer than basis capituli white spot on tip of scutum of female

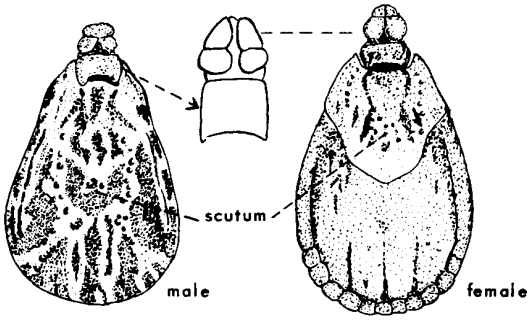


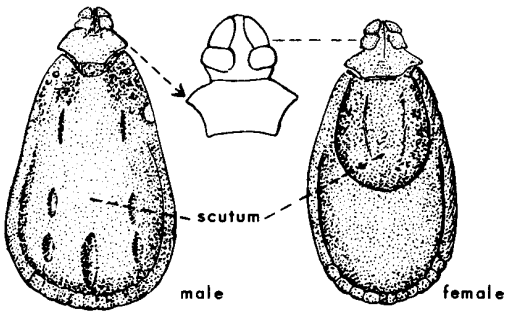


Amblyomma americanum
LONE STAR TICK

scutum with white markings; basis capituli with parallel sides

scutum without white markings; basis capituli produced laterally to form an angle



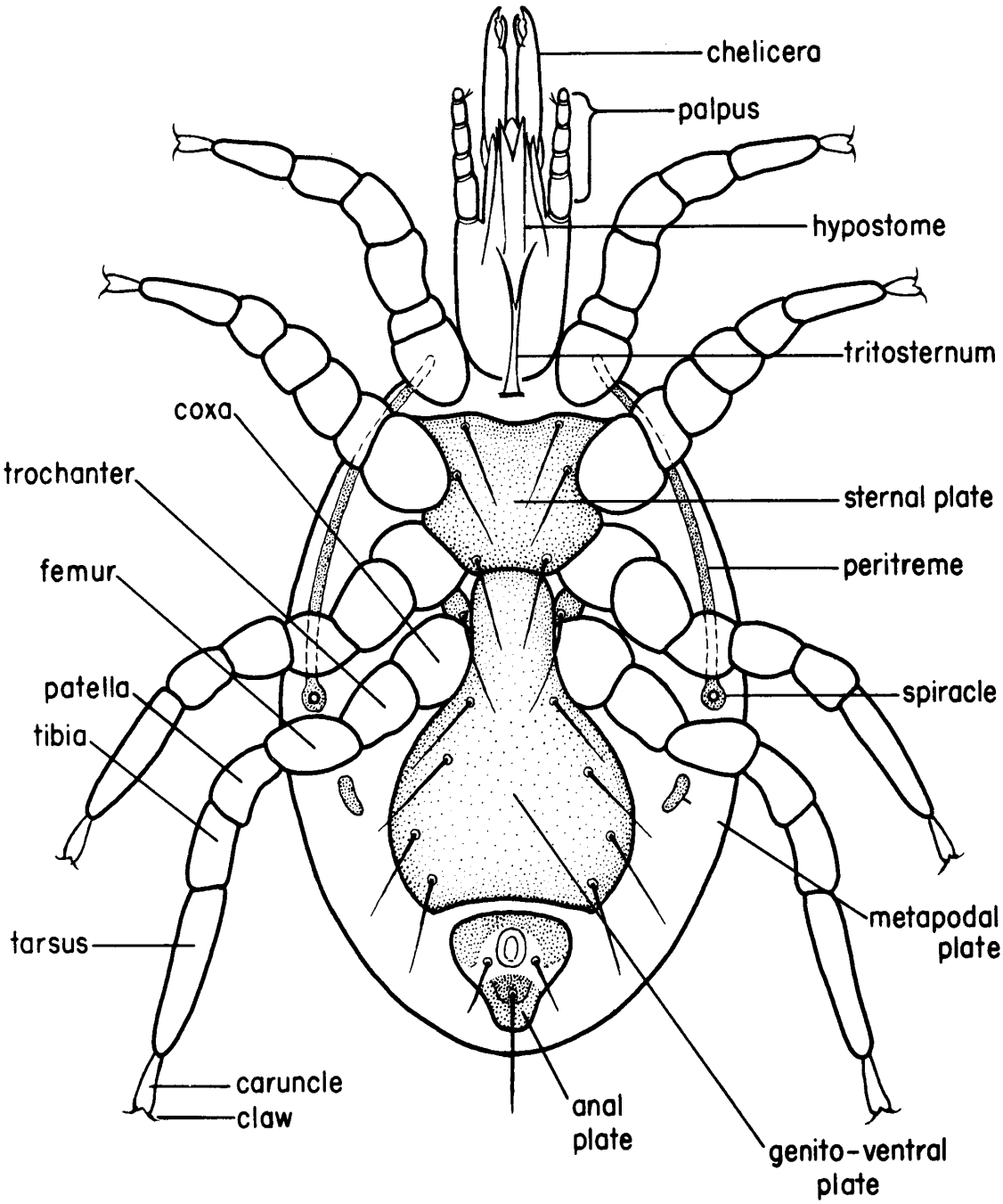


Dermacentor variabilis and *D. andersoni*
AMERICAN DOG TICK AND WOOD TICK

Rhipicephalus sanguineus
BROWN DOG TICK

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1961

MITE DIAGRAM WITH STRUCTURES LABELED
Harry D. Pratt

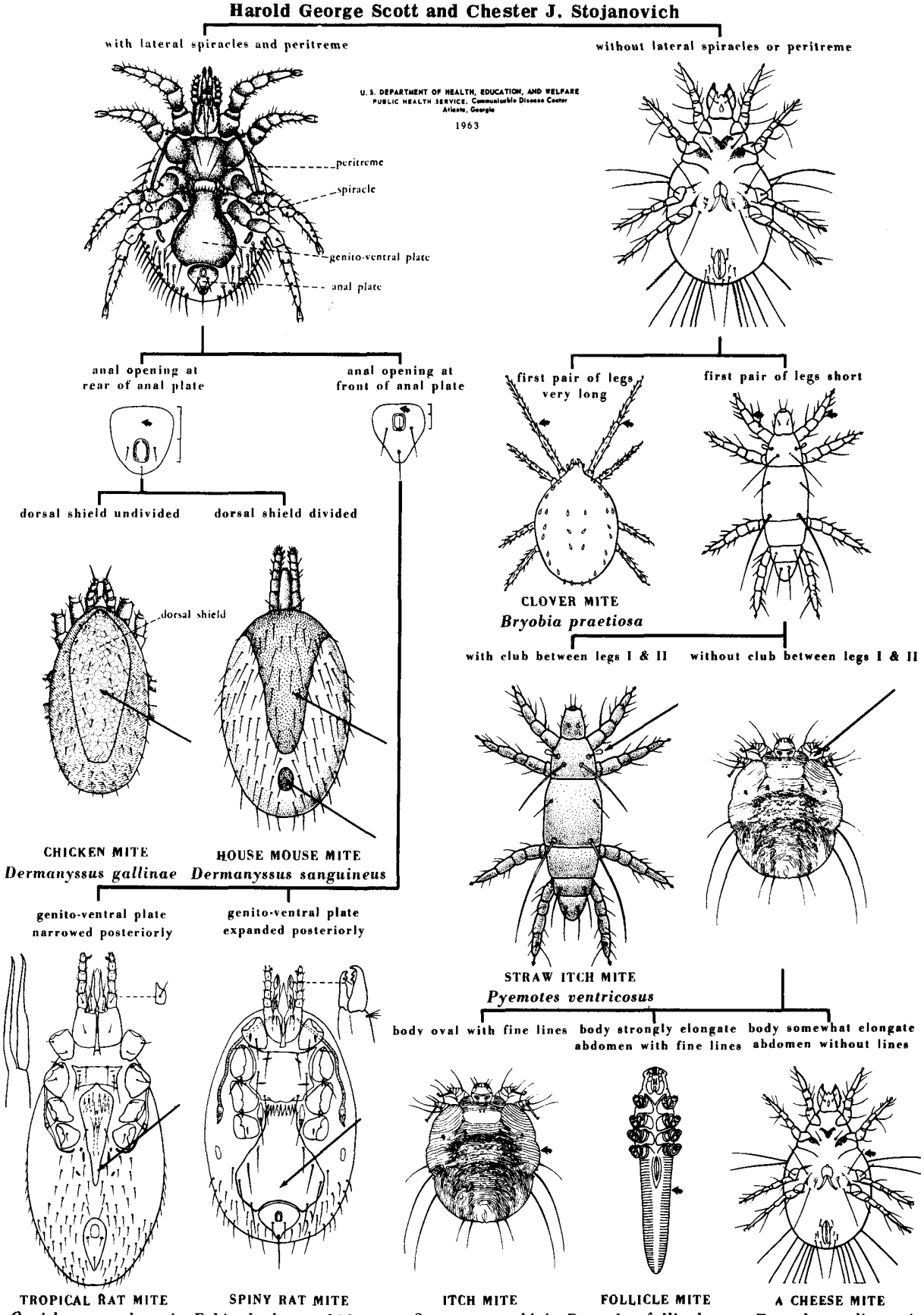


U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

MITES: PICTORIAL KEY TO SOME COMMON SPECIES OF PUBLIC HEALTH IMPORTANCE

Harold George Scott and Chester J. Stojanovich

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center
Atlanta, Georgia
1963



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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

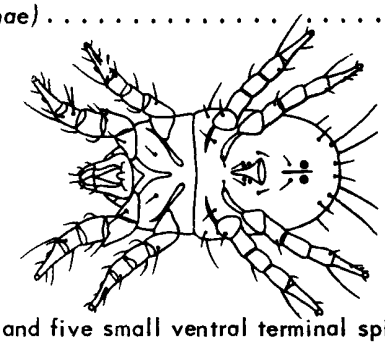
MITES: KEY TO SOME SPECIES COMMONLY INFESTING HOUSEHOLDS AND STORED FOOD

Harold George Scott

1. With club-like hair between bases of legs I and II 5
   Without club-like hair between bases of legs I and II 2

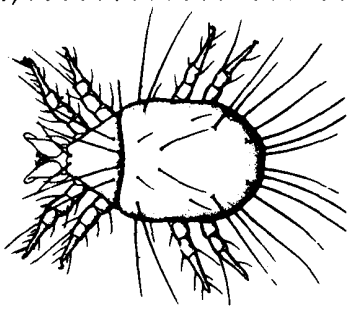
2. Claws, if present, not on stalks (*Glycyphagus domesticus*, formerly . . . . . *Glyciphagus prunorum*) . . . . . SUGAR MITE
   Claws on stalks 3

3. Internal apical hair (on joint between femur I and tibia I) less than three times as long as external apical hair 4
   Internal apical hair (on joint between femur I and tibia I) more than three times as long as external apical hair (*Acarus farinae*, formerly *Tyroglyphus farinae*) . . . . . HAM MITE



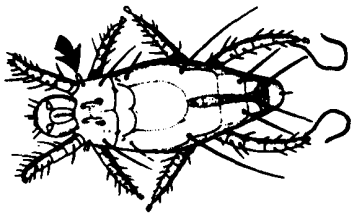
Acarus farinae

4. Tarsus with one stout dorsal and five small ventral terminal spines (*Acarus siro*, formerly *Tyroglyphus siro*) . . . . . GRAIN MITE
   Tarsus with only three small ventral spines (*Tyrophagus castellani*, formerly *Tyroglyphus longior*) . . . . . CHEESE MITE



Tyrophagus castellani

5. Tarsus IV of female ending in claws and a fleshy protuberance; leg IV of male smoothly curved inwards (*Pyemotes ventricosus*, formerly *Pediculoides ventricosus*) . . . . . STRAW ITCH MITE
   Tarsus IV of female ending in two long hairs of unequal length; leg IV of male sharply bent (*Tarsonemus floricolus*) . . . . . FLORICOLUS GRAIN MITE



Pyemotes ventricosus

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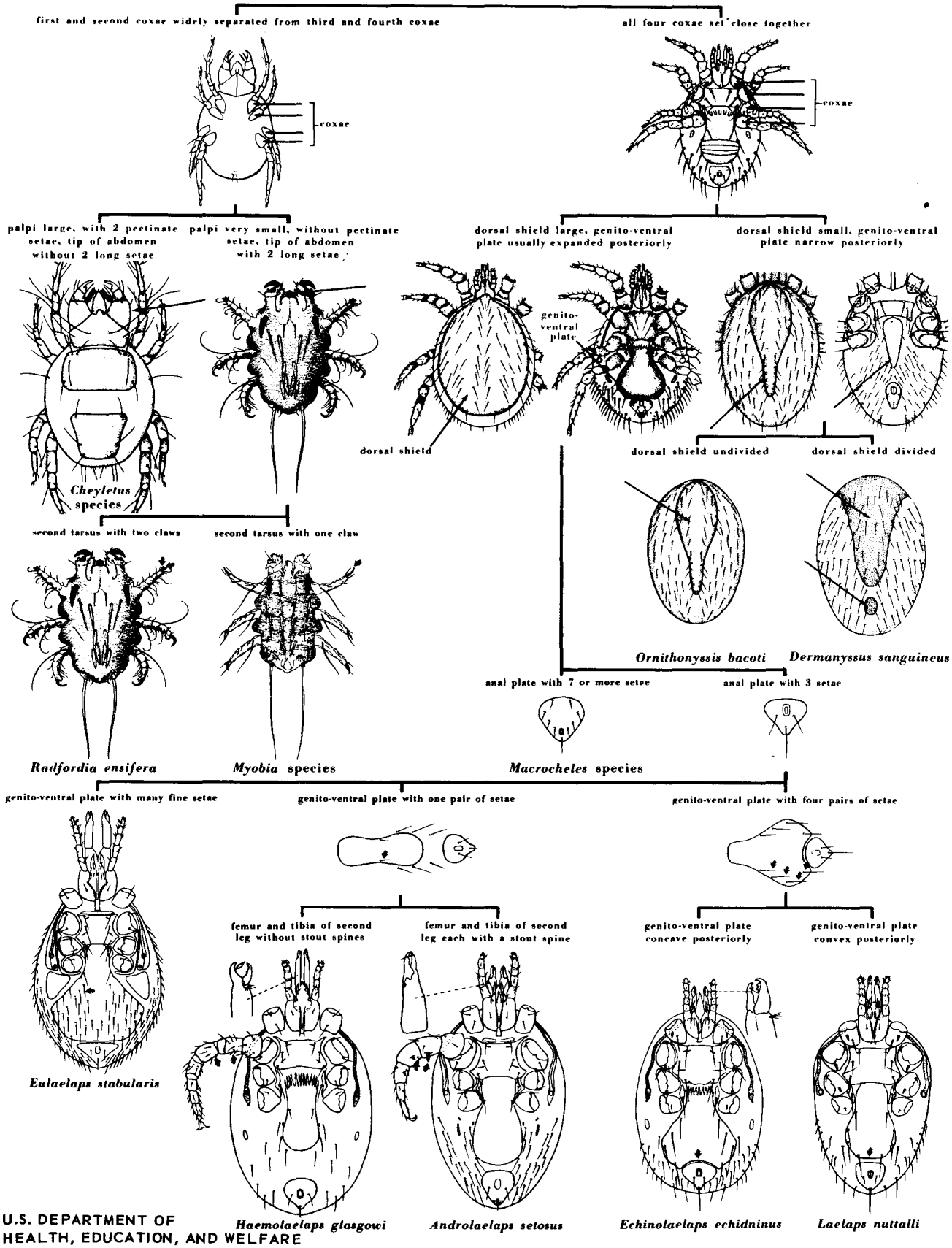
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

MITES: PICTORIAL KEY TO ADULT FEMALES COMMONLY FOUND ON DOMESTIC RATS IN SOUTHERN UNITED STATES

Harry D. Pratt and Chester J. Stojanovich



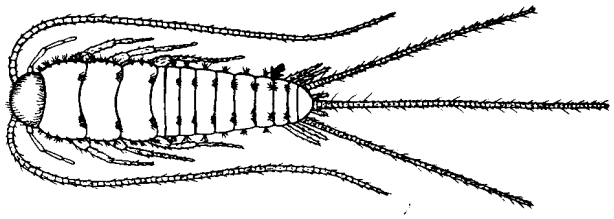
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

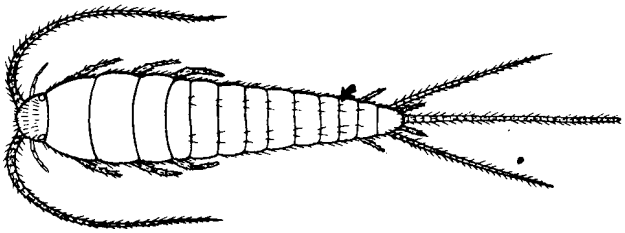
SILVERFISH. PICTORIAL KEY TO DOMESTIC SPECIES

Chester J. Stojanovich and Harold George Scott

setae in tufts
color brown

setae single

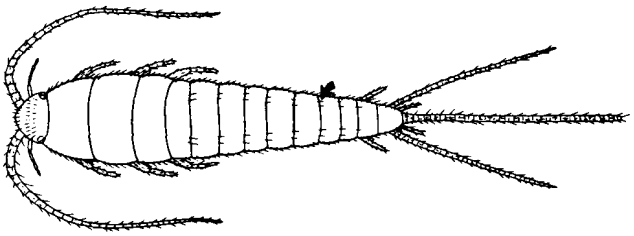


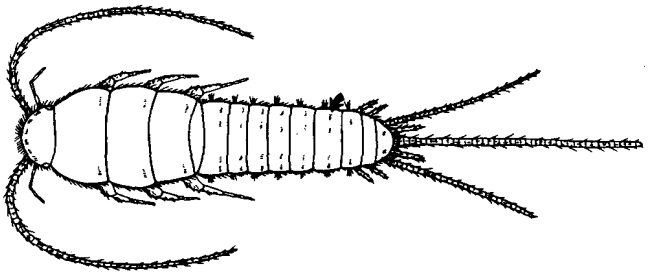


Thermobia domestica
FIREBRAT

without setal combs
color silver

with setal combs

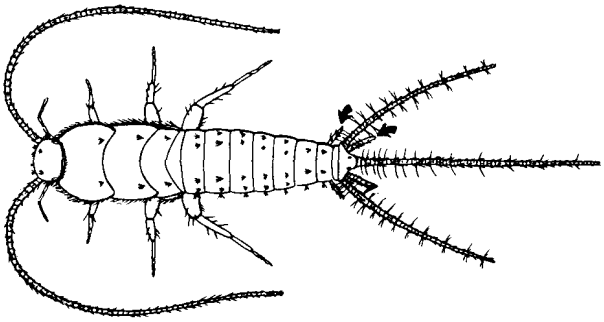


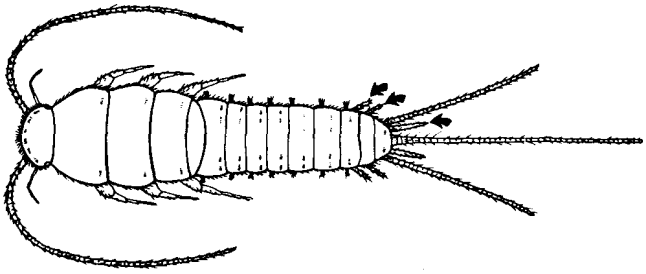


Lepisma saccharina
COMMON SILVERFISH

2 pairs of styli
color gray

3 pairs of styli
color brown





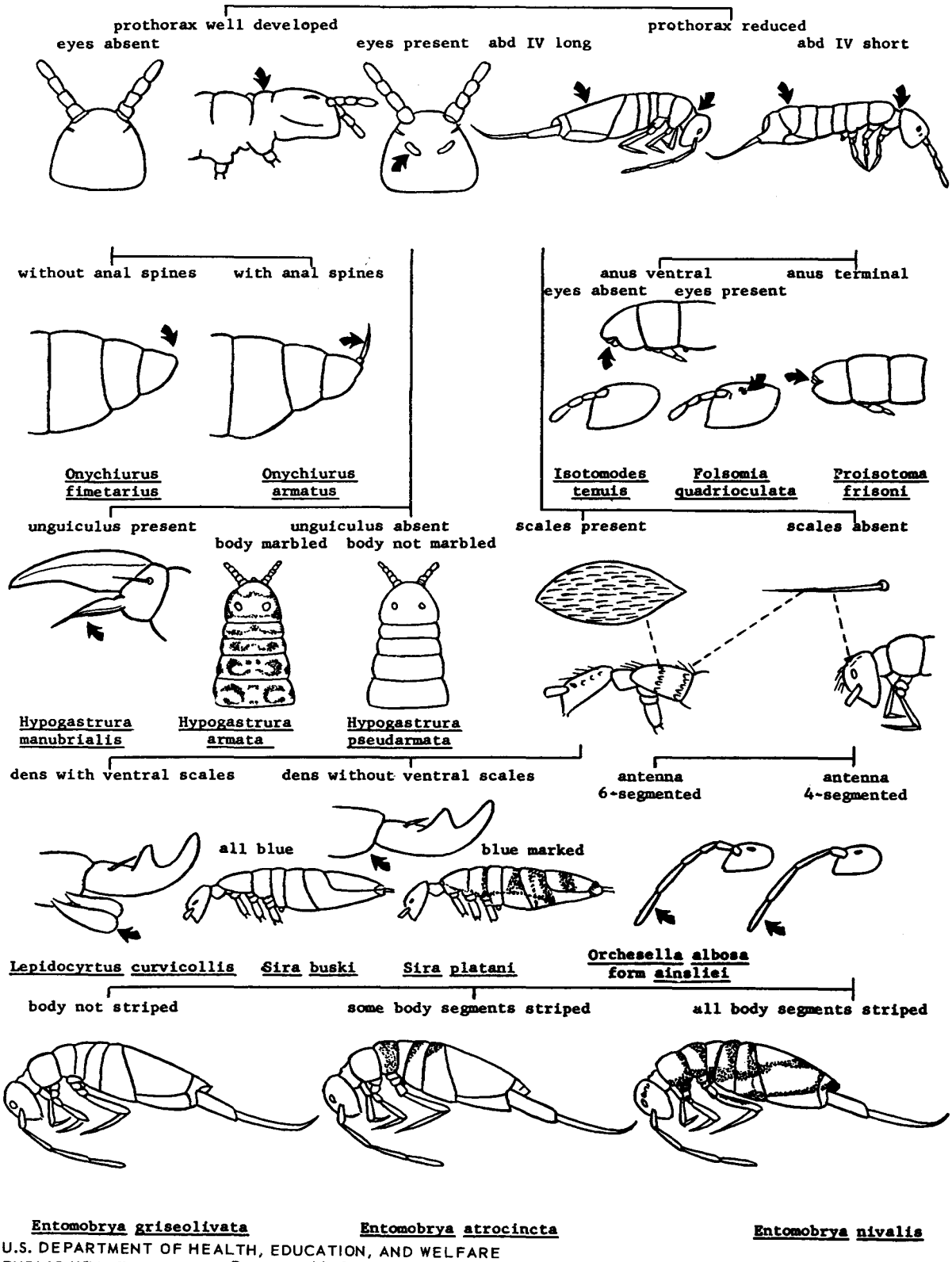
Ctenolepisma urbana
GIANT SILVERFISH
Ctenolepisma longicauda of some authors

Ctenolepisma quadriseriata
FOUR-LINED SILVERFISH

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

COLLEMBOLA: PICTORIAL KEY TO COMMON DOMESTIC SPECIES

Harold George Scott, and Chester J. Stojanovich



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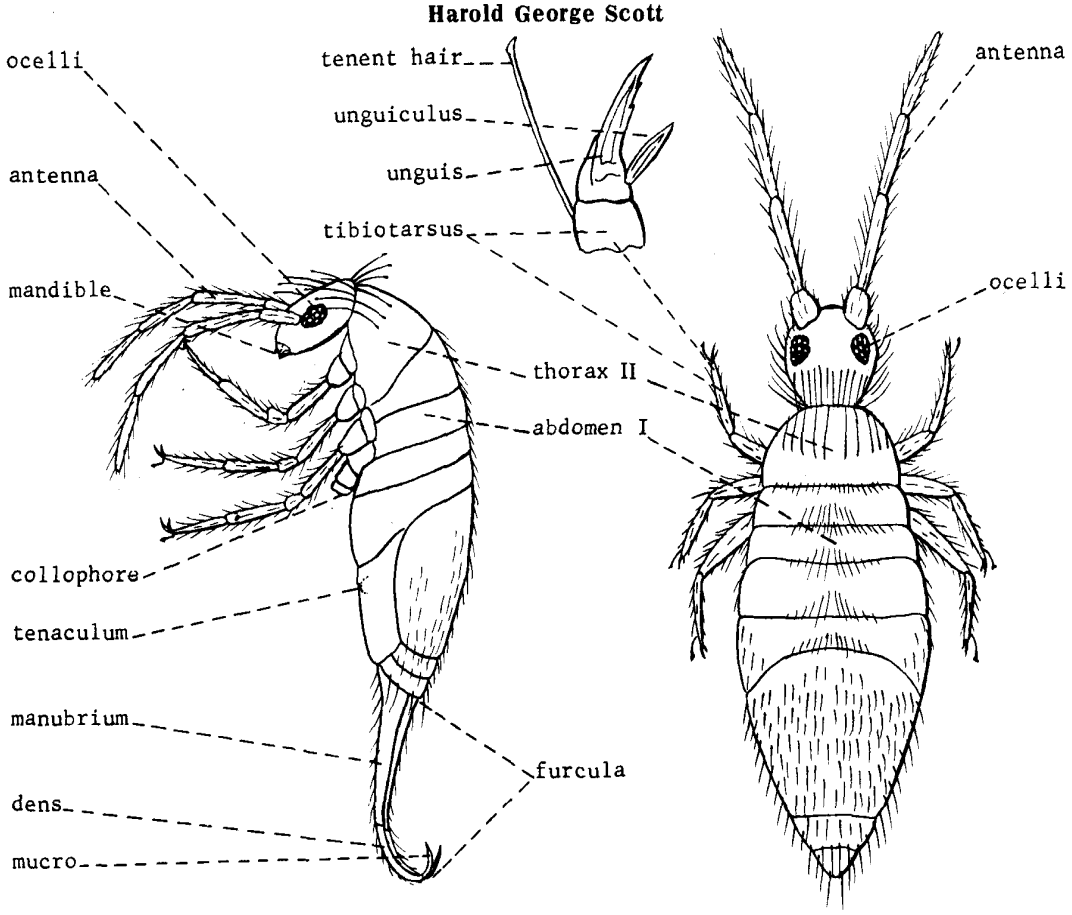
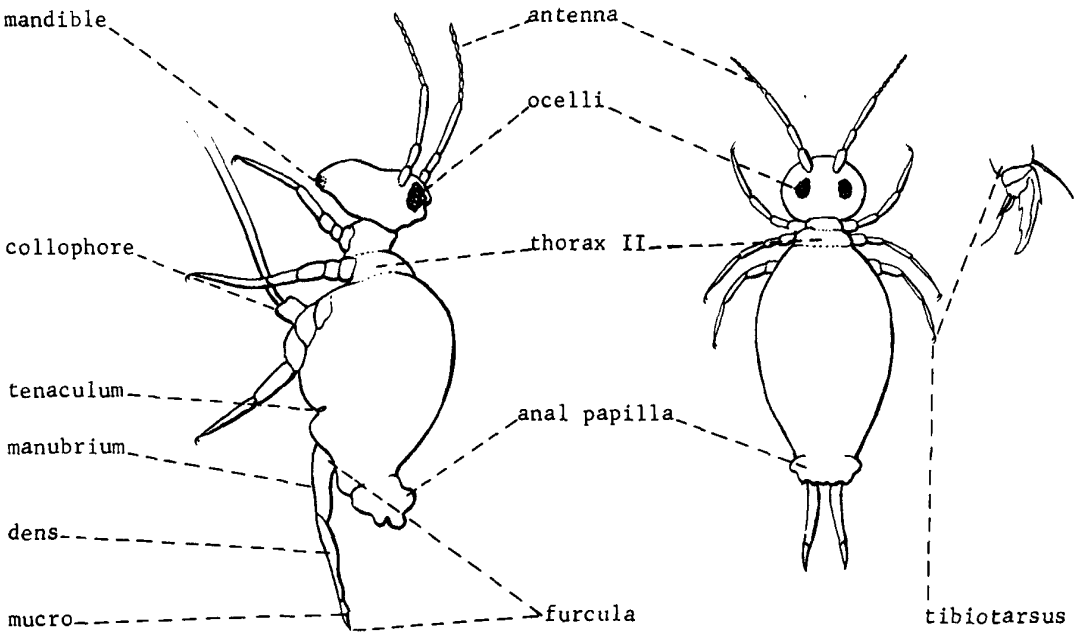
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia — 1961

COLLEMBOLA DIAGRAMS
Harold George Scott



SUBORDER ARTHROPLEONA



SUBORDER SYMPHYPLEONA

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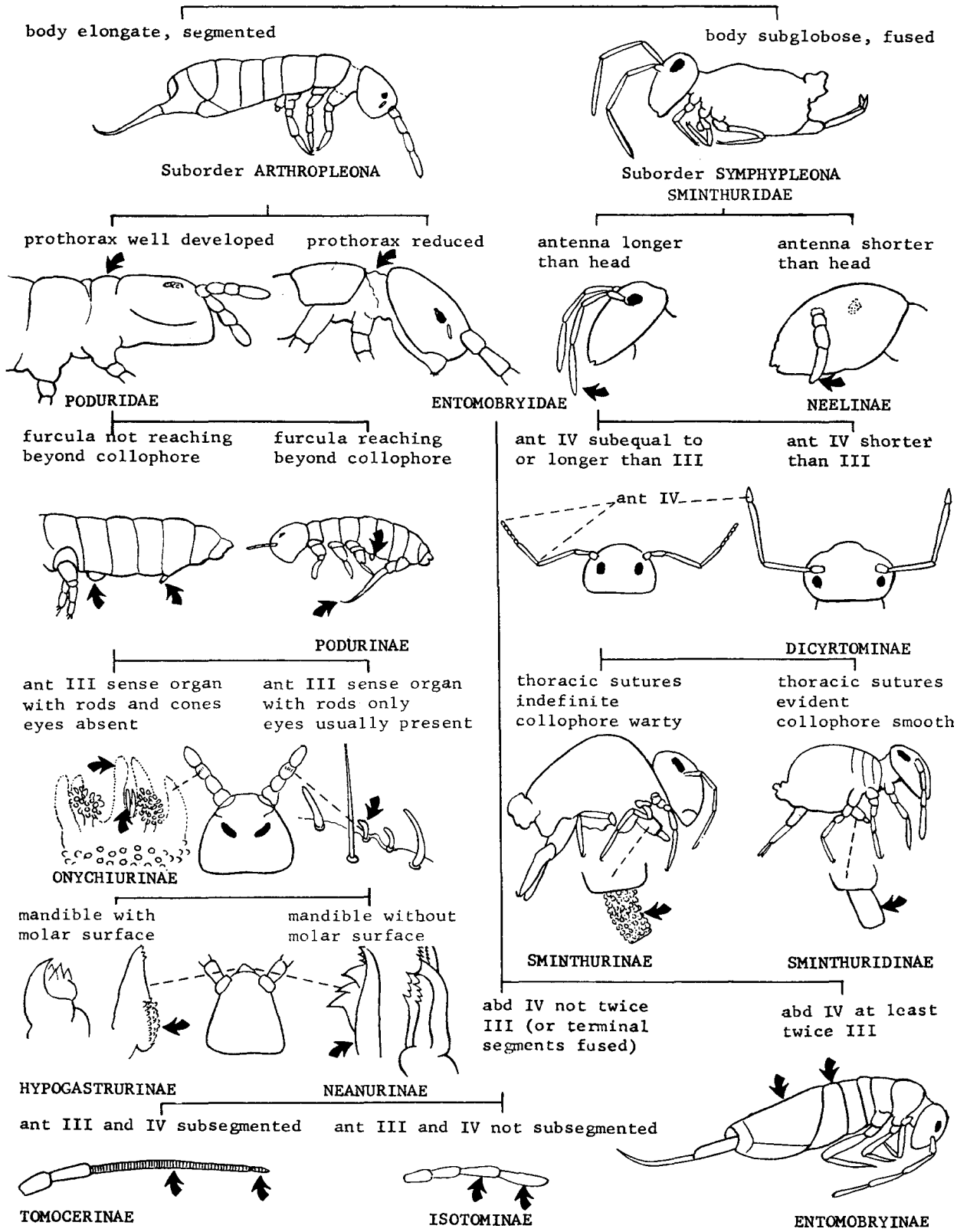
COLLEMBOLA: PICTORIAL KEY TO WORLD SUBFAMILIES

Harold George Scott, Ph.D.



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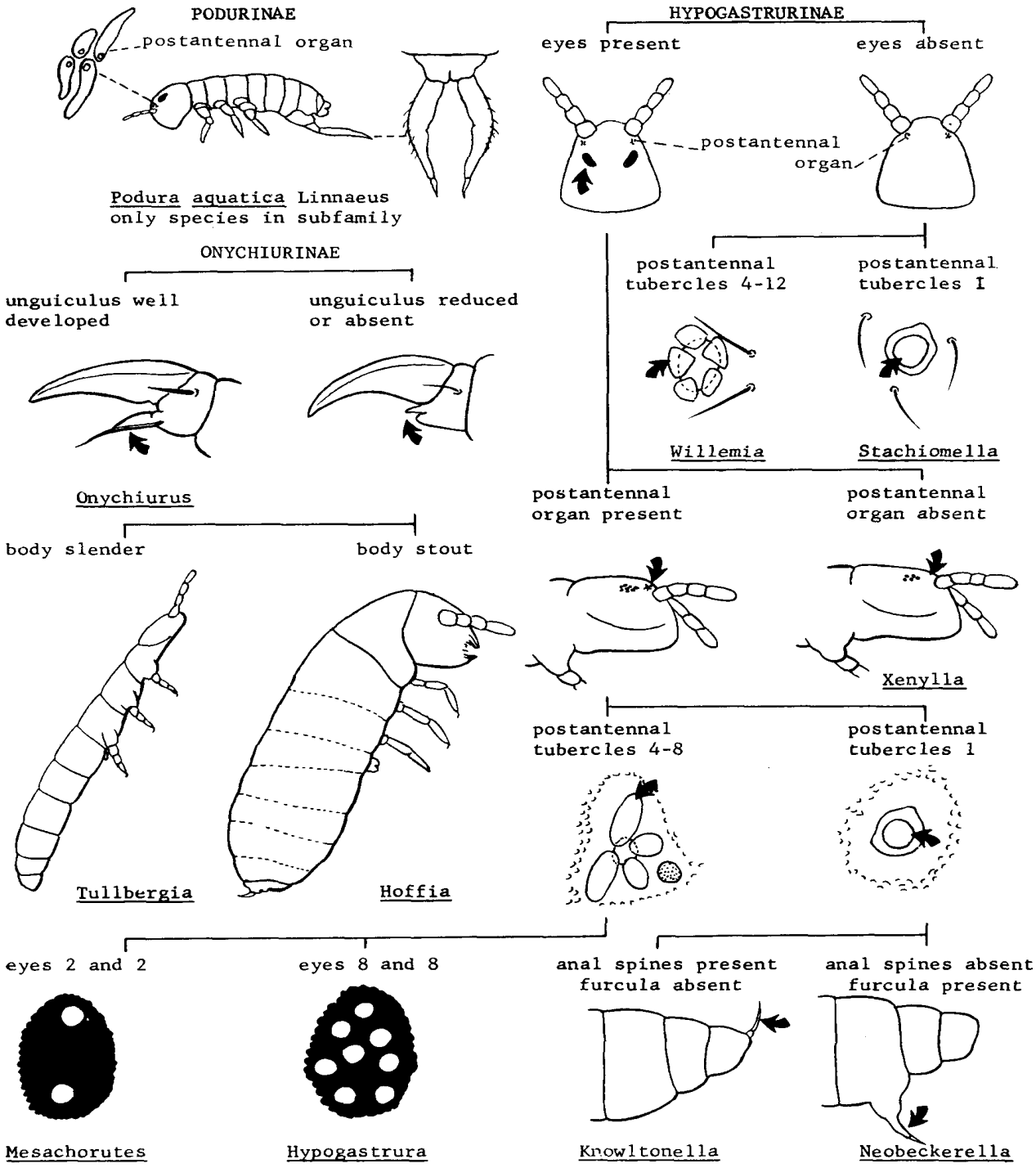
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

SUBFAMILIES PODURINAE, HYPOGASTRURINAE, AND ONYCHIURINAE



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COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

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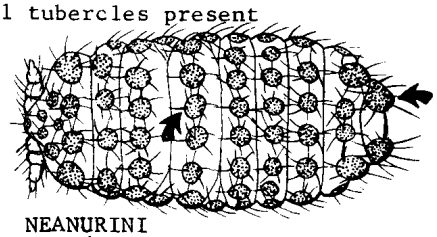
SUBFAMILY NEANURINAE

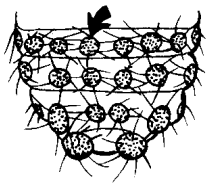
abd VI large, bilobed
segmental tubercles present



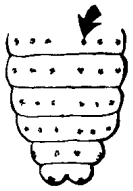
abd VI small, rounded
segmental tubercles absent

NEANURINI

segmental tubercles large



segmental tubercles small

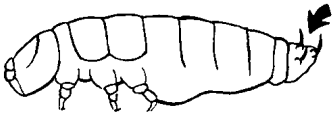


Neanura

Neanurodes

PSEUDACHORUTINI

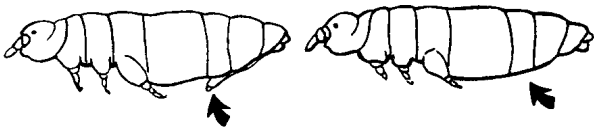
anal spines present



anal spines absent

furcula present

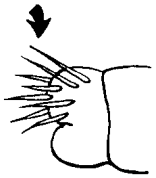
furcula absent



anal spines 2

anal spines 3-5

anal spines 8



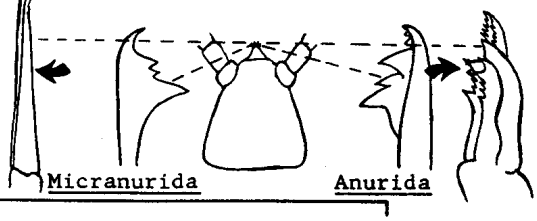
Xenyllodes

Friesea

Prospinanura

maxilla untoothed

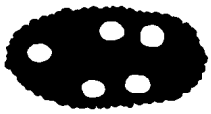
maxilla toothed



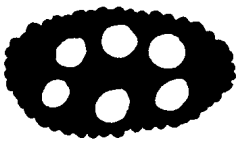
Micranurida

Anurida

eyes 5 and 5

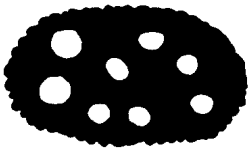


eyes 6 and 6

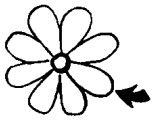


Microgastrura

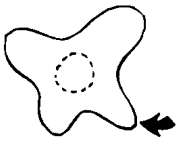
eyes 8 and 8



postantennal tubercles 8



postantennal tubercles 4-5



with buccal cone

without buccal cone

Logacanura

Odontella

Brachystomella

Pseudachorutes

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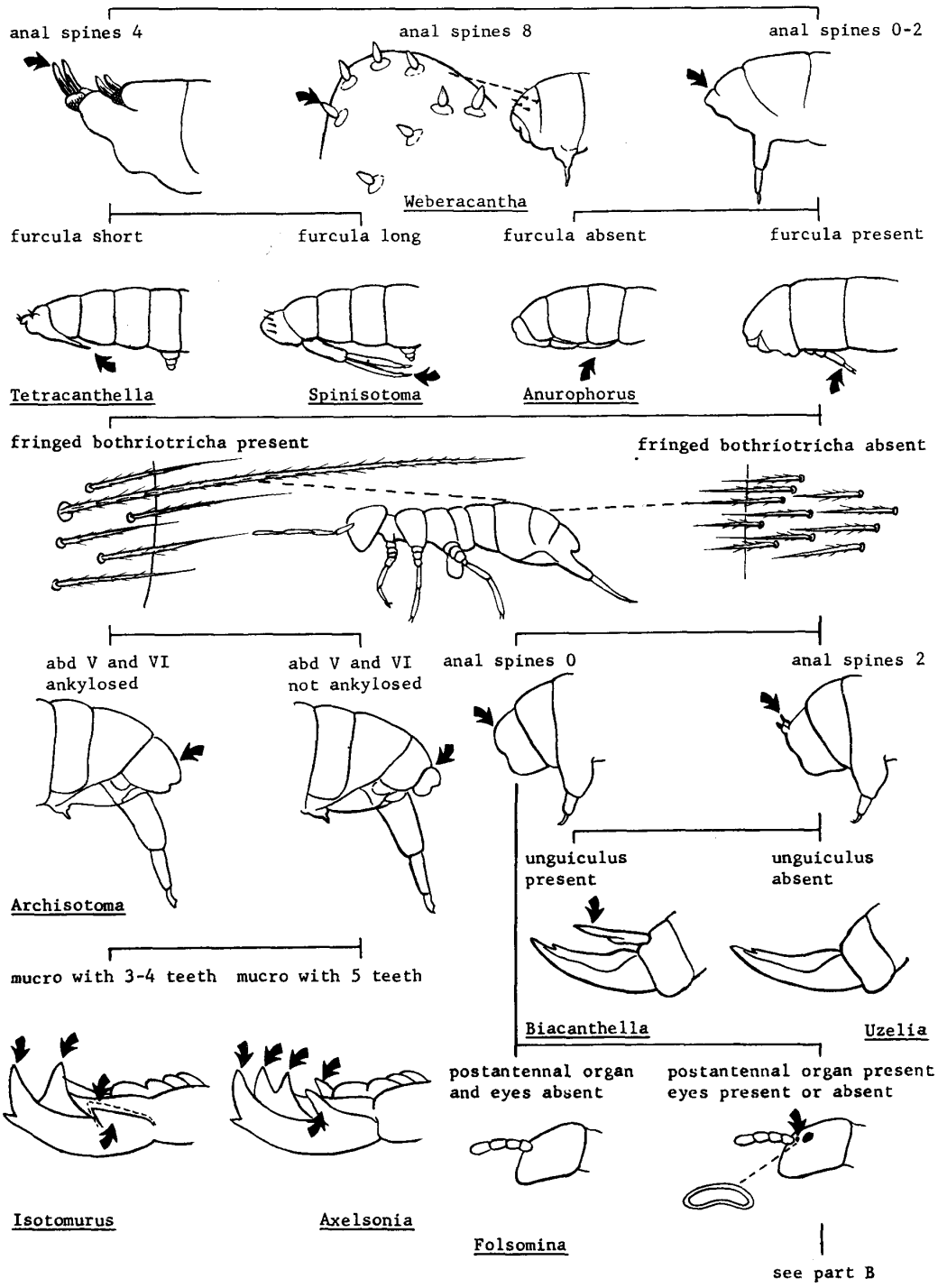
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

SUBFAMILY ISOTOMINAE - Part A



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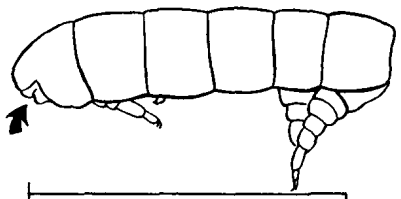
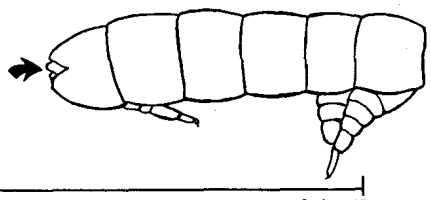
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

SUBFAMILY ISOTOMINAE - Part B

continued from part A

anus ventral — anus terminal

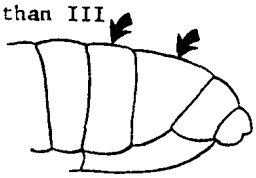


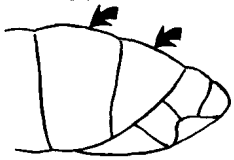


manubrium with hooks — manubrium without hooks

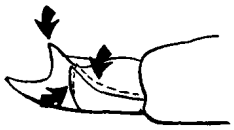
Isotomodes — Folsomia

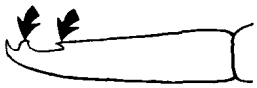
abd IV not shorter than III — abd IV shorter than III





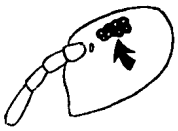
mucro with 0-3 teeth — mucro with 4 teeth — mucro with 2 teeth — mucro with 3-4 teeth

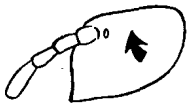




Proisotoma — Metisotoma

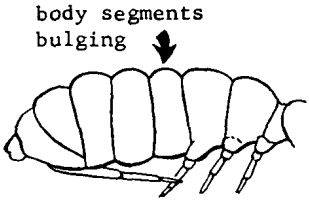
eyes 8 and 8 — eyes 2 and 2 to 4 and 4 — eyes absent

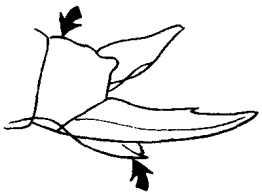


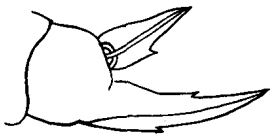


Folsomides — Micrisotoma

body segments bulging — body segments not bulging — unguis tunicate — unguis not tunicate



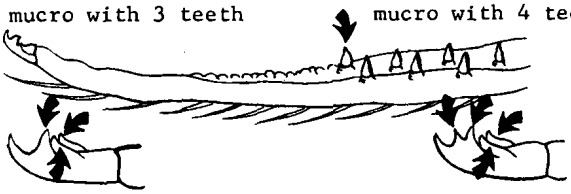




Guthriella — Isotomina — Agrenia

with dental spines — without dental spines

mucro with 3 teeth — mucro with 4 teeth



Semicerura — Tomocerura — Isotoma

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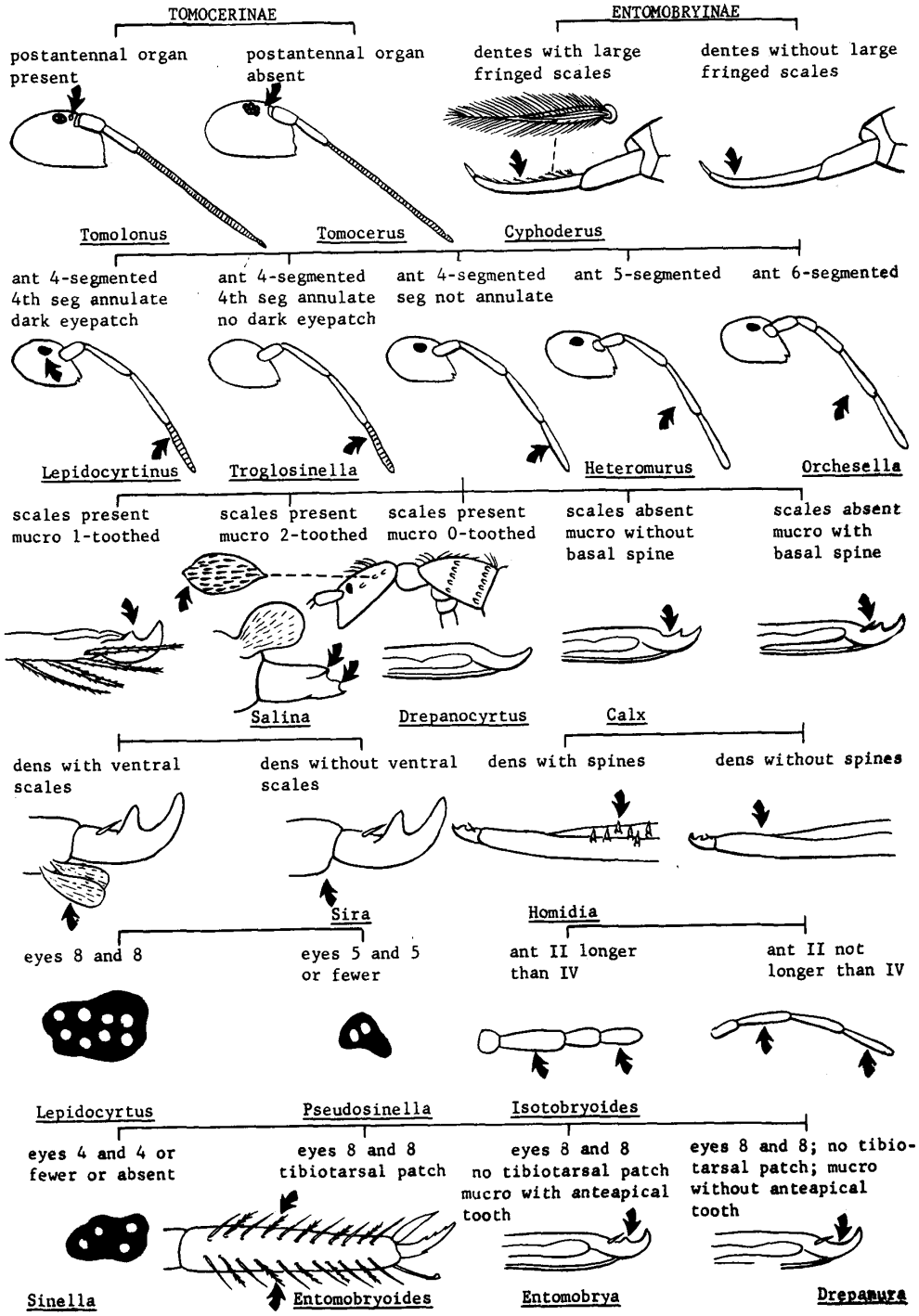
Harold George Scott, Ph.D.

SUBFAMILIES TOMOCERINAE AND ENTOMOBRYINAE



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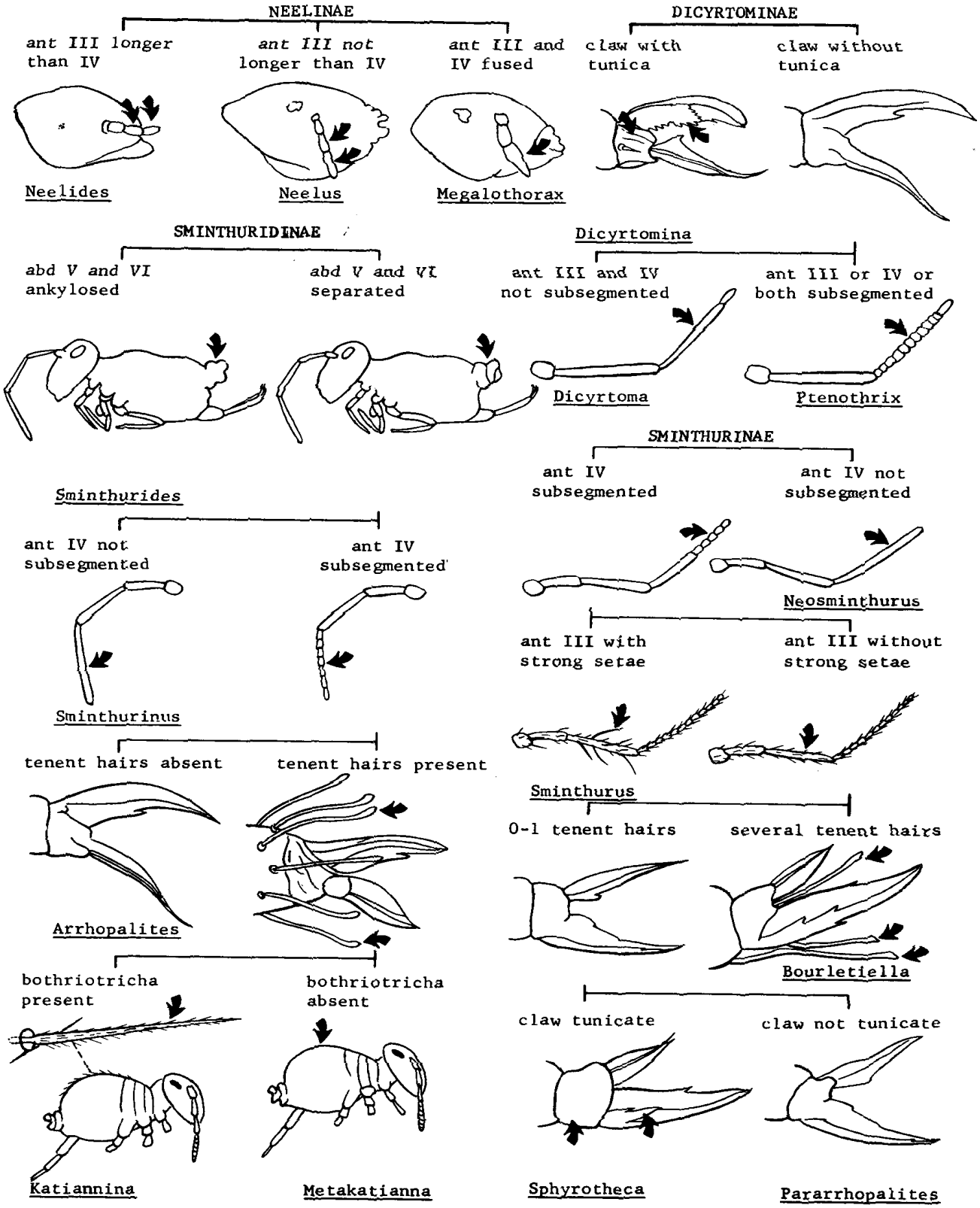
FAMILY SMINTHURIDAE



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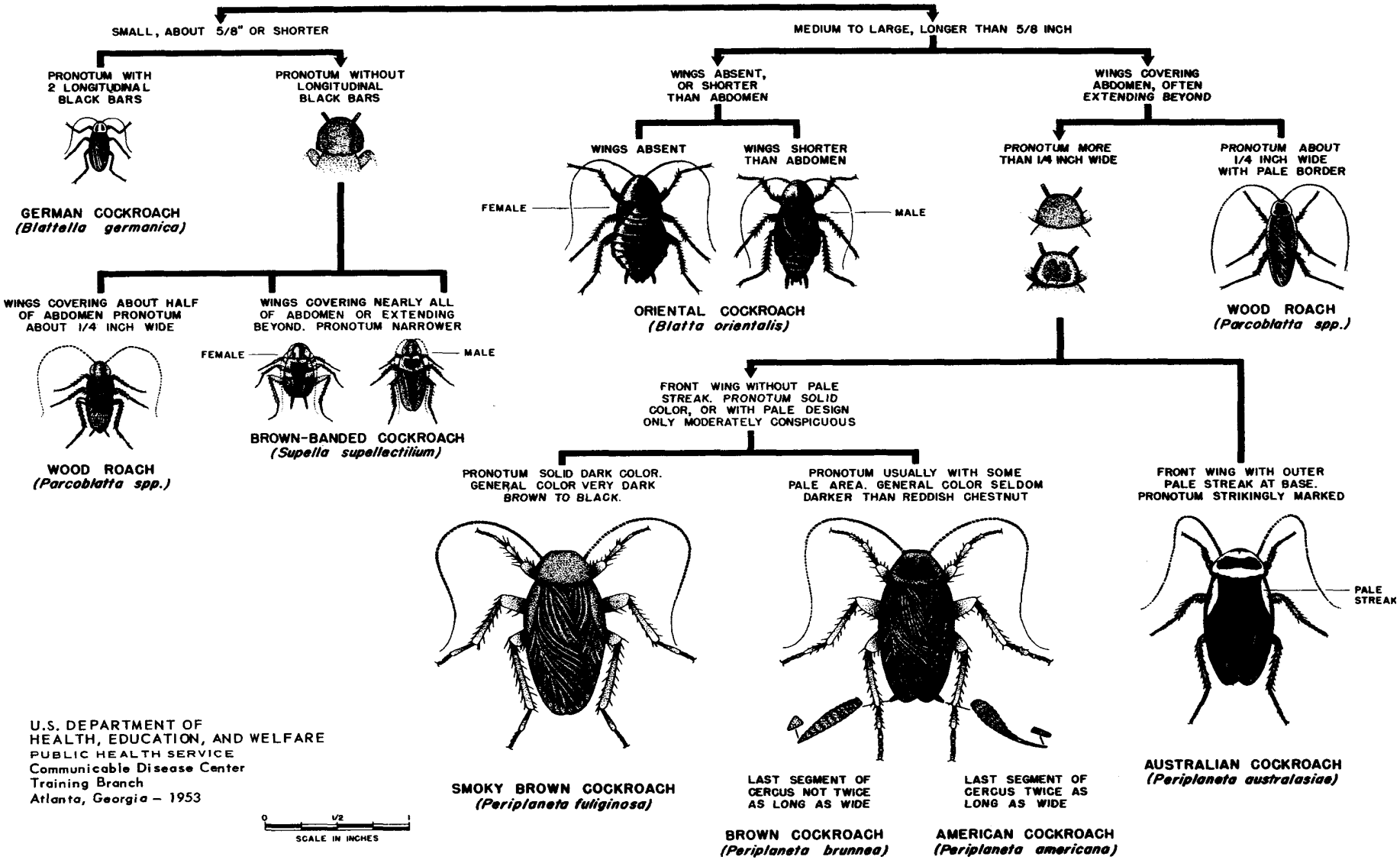
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia — 1961

COCKROACHES: PICTORIAL KEY TO SOME COMMON SPECIES

Harry D. Pratt



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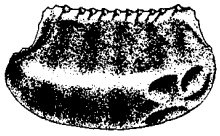
PUBLIC HEALTH SERVICE
Communicable Disease Center
Training Branch
Atlanta, Georgia – 1953

COCKROACHES: KEY TO EGG CASES OF COMMON DOMESTIC SPECIES

Harold George Scott, Ph.D. and Margery R. Borom

less than ¼" long
subsegments apparent

more than ¼" long
subsegments inapparent



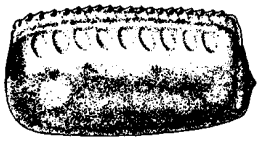
with about 16 subsegments
length more than twice width

Blatella germanica
GERMAN COCKROACH

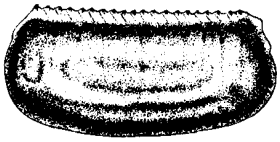
with about 8 subsegments
length less than twice width

Supella supellectilium
BROWN-BANDED COCKROACH

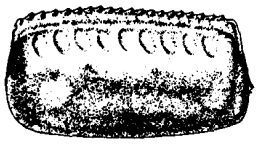
with lateral indentations



without lateral indentations

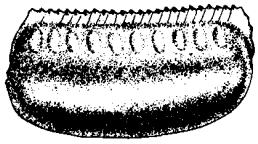


terminal point strong



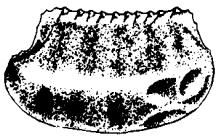
Periplaneta brunnea
BROWN COCKROACH

terminal point weak



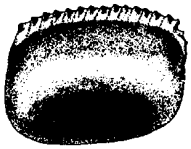
Periplaneta fuliginosa
SMOKY-BROWN COCKROACH

not symmetrical



Blatta orientalis
ORIENTAL COCKROACH

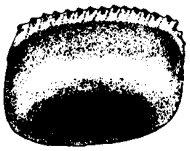
symmetrical



length more than twice width

Periplaneta australasiae
AUSTRALIAN COCKROACH

length less than twice width



Periplaneta americana
AMERICAN COCKROACH

U.S. DEPARTMENT OF
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PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia – 1965

COCKROACHES: KEY TO SOME COMMON SPECIES FOUND IN THE UNITED STATES

Harry D. Pratt & Chester J. Stojanovich

1. Middle and hind femora both with numerous strong spines along the ventral margin (Fig. 1 A)..2

   Middle and hind femora without strong spines along the ventral margin (Fig. 1 B).....12

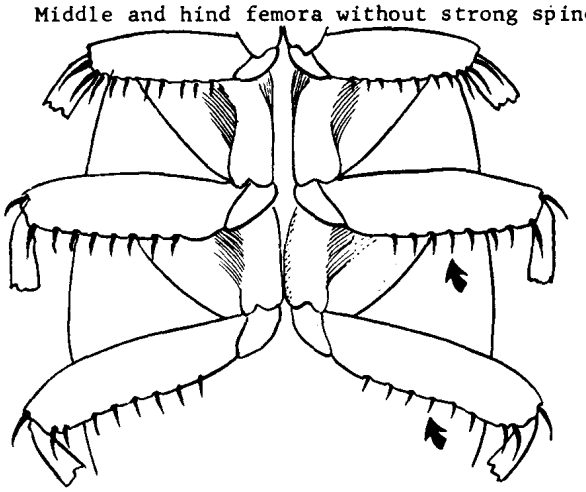

Fig. 1 A

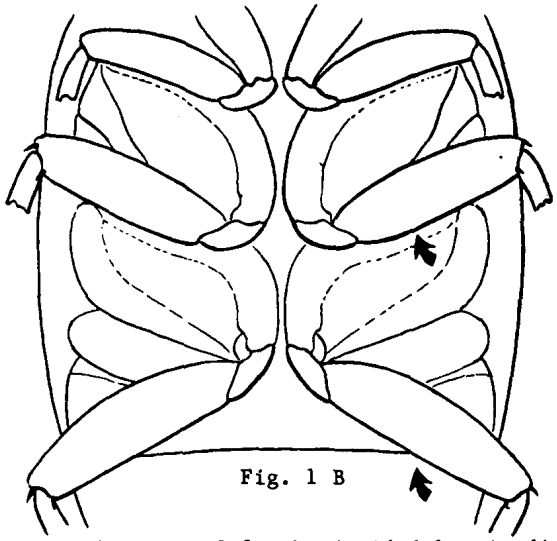

Fig. 1 B

2. Comparatively large species 18 mm. or longer; subgenital plate of female divided longitudinally, valvular (Fig. 2 A); male styli similar, slender, elongate and straight (Fig. 2 B).....3

   Species usually less than 18 mm. long; or, if longer, anterior-ventral margin of front femur with several large stout spines on basal portion, followed by a row of smaller spines (Fig. 2 C); female subgenital plate simple, not divided (Fig. 2 D); male styli variable, frequently modified, asymmetrical, or unequal in size (Fig. 2 E).....8

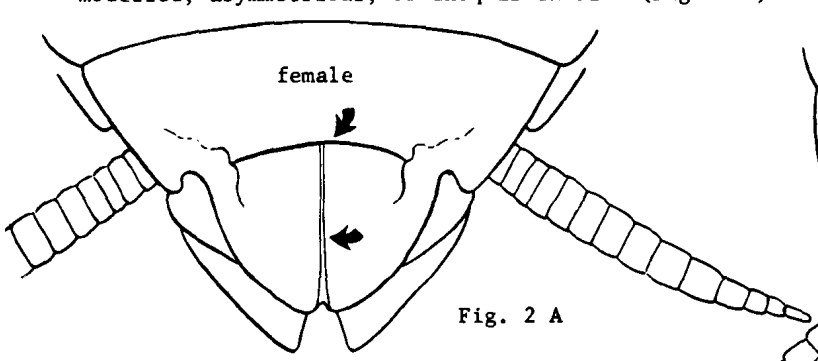

Fig. 2 A

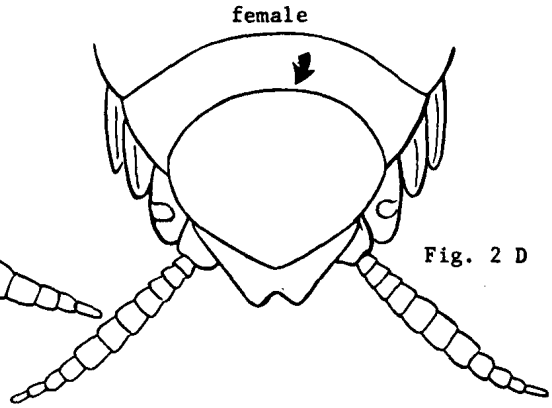

Fig. 2 D

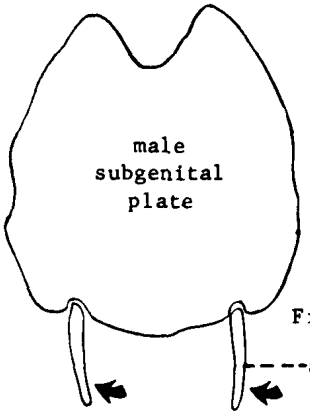

Fig. 2 B

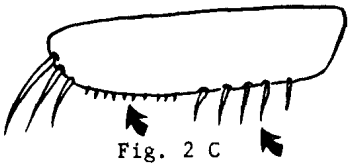

Fig. 2 C

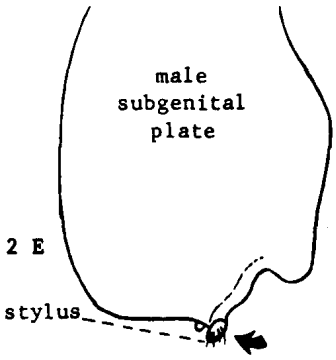

Fig. 2 E

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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

3. Front wing in both sexes extending beyond tip of abdomen (Fig. 3 A).....4

Front wing in both sexes not reaching tip of abdomen (Fig. 3 B).....7

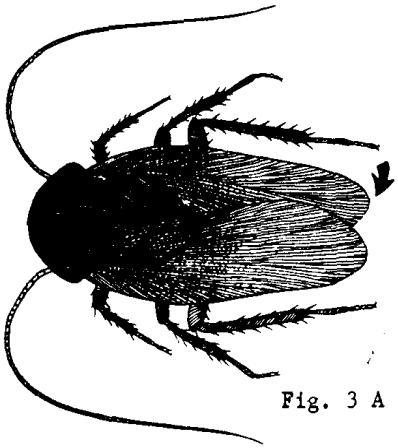


Fig. 3 A

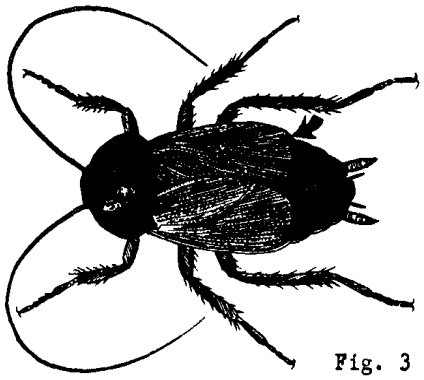


Fig. 3 B

4. Uniformly dark blackish-brown, shining species (Fig. 4 A)..... .....(Periplaneta fuliginosa) SMOKY BROWN COCKROACH

Species with some yellowish markings on pronotum or front wing or both (Fig. 4 B).....5

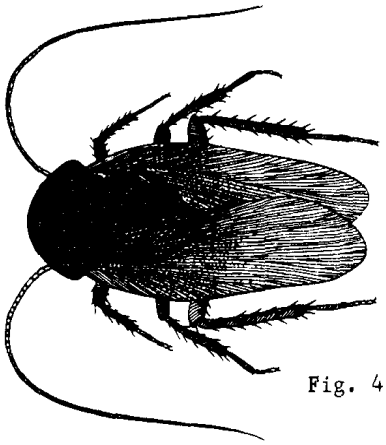


Fig. 4 A

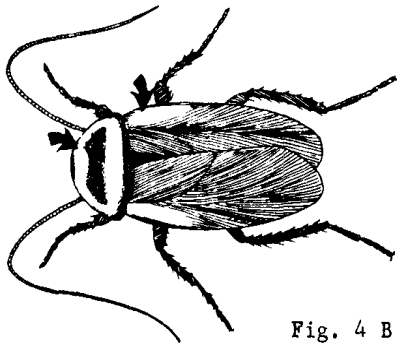


Fig. 4 B

5. Front wing with yellowish stripe; pronotum with yellowish and darker areas very contrastingly marked (Fig. 5 A).....(Periplaneta australasiae) AUSTRALIAN COCKROACH

Front wing entirely brownish; pronotum with yellowish and darker areas less contrastingly marked (Fig. 5 B).....6

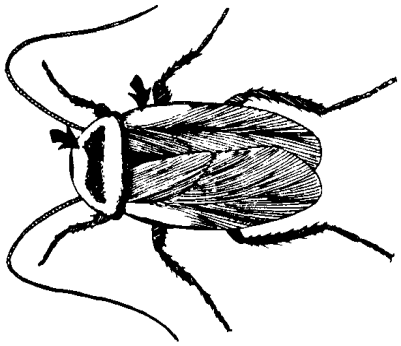


Fig. 5 A

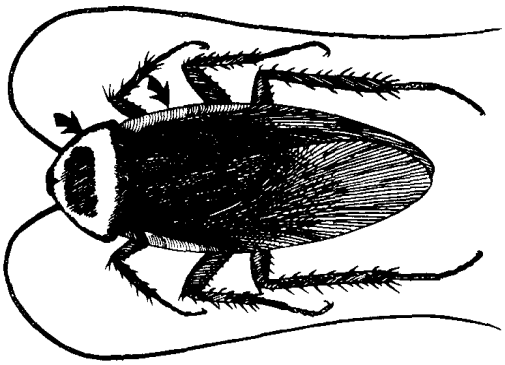


Fig. 5 B

6. Styli very long and slender, longer than space between their bases (Fig. 6 A); cercus long and slender particularly in the male; male supra-anal plate deeply notched (Fig. 6 B)..... .....(Periplaneta americana) AMERICAN COCKROACH

Styli shorter, not as long as space between their bases (Fig. 6 C); cercus stouter and more evenly spindle-shaped; male supra-anal plate truncate or feebly notched (Fig. 6 D)..... .....(Periplaneta brunnea) BROWN COCKROACH

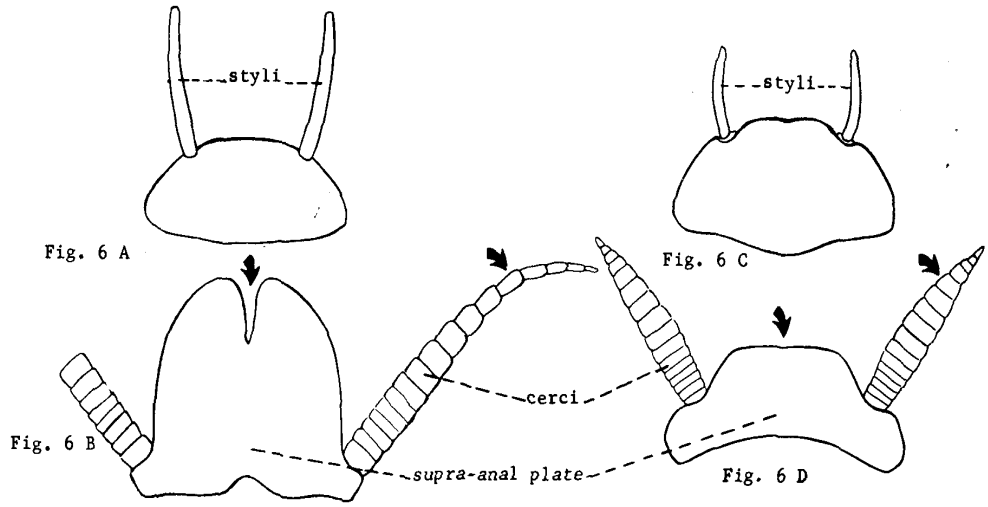


Fig. 6 A

Fig. 6 C

Fig. 6 B

Fig. 6 D

7. Blackish species, 15-27 mm. long; male front wings covering two-thirds of abdomen (Fig. 7 A); female front wings widely separated pads (Fig. 7 B); first segment of hind tarsus longer than segments 2-5 combined, pulvilli of second and third segments small (Fig. 7 C)..... .....(Blatta orientalis) ORIENTAL COCKROACH

Mahogany brownish species, 30-40 mm. long; front wings reduced to short pads, not widely separated (Fig. 7 D); first segment of hind tarsus shorter than segments 2-5 combined, pulvilli of second and third segments large (Fig. 7 E)....(Eurycotis floridana) LARGE FLORIDA COCKROACH

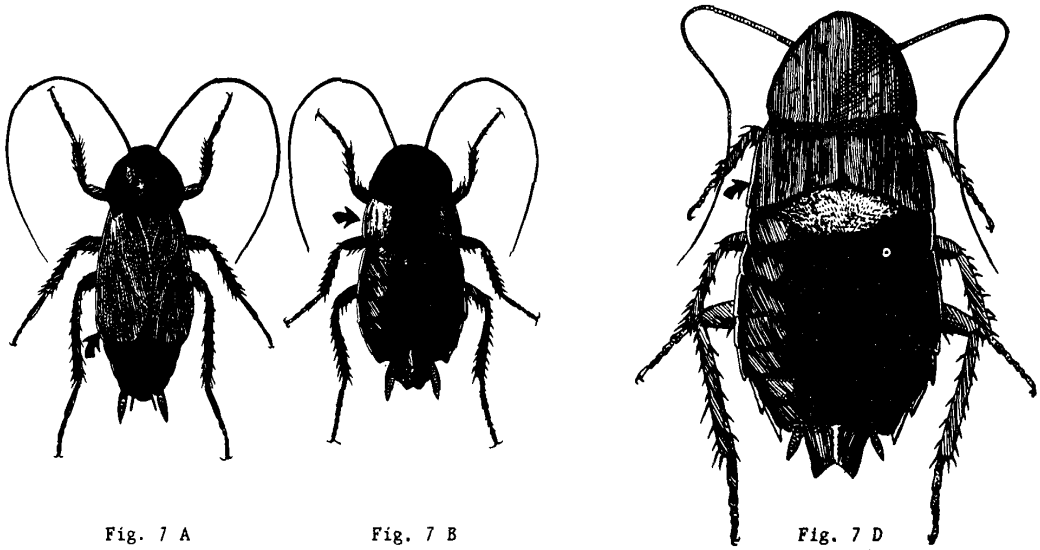


Fig. 7 A

Fig. 7 B

Fig. 7 D

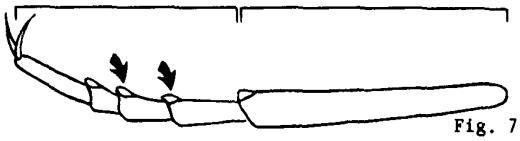


Fig. 7 C

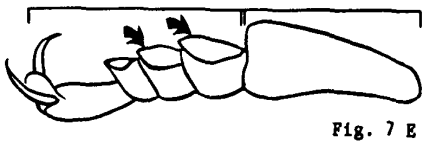


Fig. 7 E

8. Pronotum with two conspicuous longitudinal dark bars on a pale background (Fig. 8 A).....9

Pronotum variously marked, but without two conspicuous dark longitudinal bars (Fig. 8 B)....10

Fig. 8 A

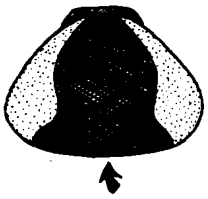


Fig. 8 B

9. Face pale (Fig. 9 A); male subgenital plate asymmetrical, styli very unequal, short and rounded (Fig. 9 B).....(Blattella germanica) GERMAN COCKROACH

Face dark; male subgenital plate almost symmetrical, styli somewhat elongate and subequal in size (Fig. 9 C).....(Blattella vaga) FIELD COCKROACH

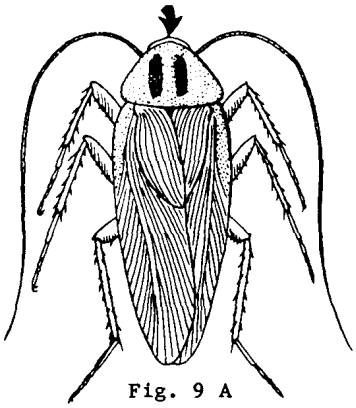


Fig. 9 A

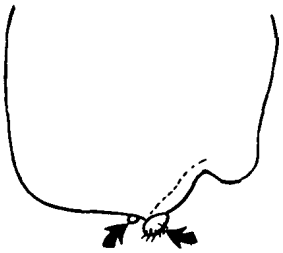


Fig. 9 B

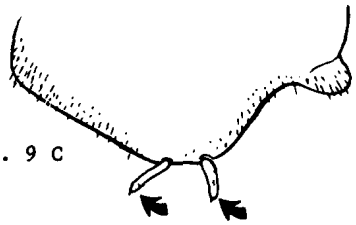


Fig. 9 C

10. Pronotum with a broad dark central stripe; front wings of both sexes appearing to have two transverse brownish bars, some pale specimens showing bars poorly (Fig. 10 A). Width of pronotum usually not exceeding 4.5 mm.....(Supella supellectilium) BROWN-BANDED COCKROACH

Pronotum and front wings otherwise, or, if pronotum is so marked, its width exceeding 4.5 mm. (Fig. 10 B).....11

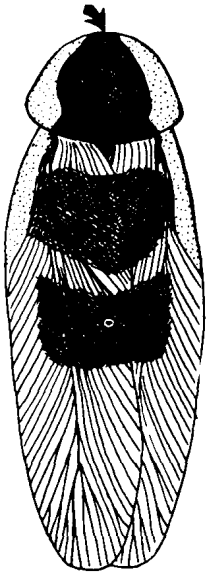


Fig. 10 A

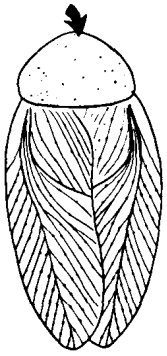


Fig. 10 B

11. Larger species 9-25 mm. or more in length; front wing without small dark spots in winged specimens (Fig. 11 A); claws equal (Fig. 11 B); ventral anterior margin of front femur with 3 long apical spines (Fig. 11 C).....(Parcoblatta species) WOOD COCKROACHES

Small species, 8-9 mm. long; front wing with small dark spots (Fig. 11 D); claws unequal (Fig. 11 E); ventral anterior margin of front femur with 2 long apical spines (Fig. 11 F)... .....(Ectobius pallidus) SPOTTED MEDITERRANEAN COCKROACH

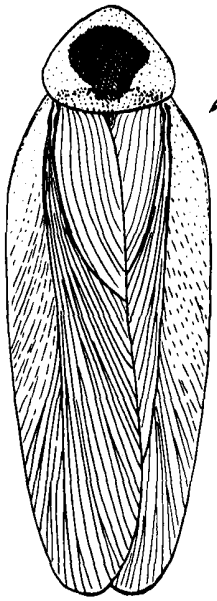


Fig. 11 A

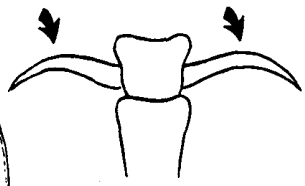


Fig. 11 B

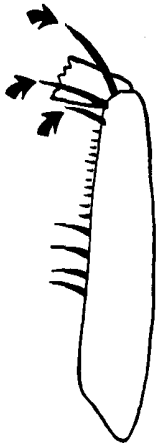


Fig. 11 C

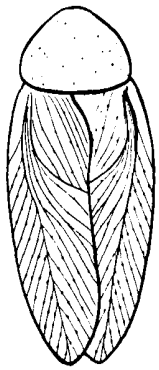


Fig. 11 D

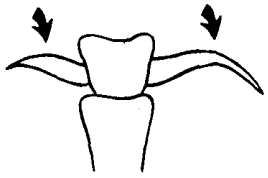


Fig. 11 E

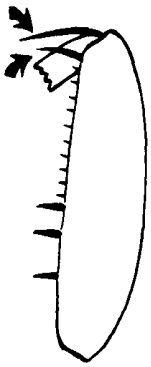


Fig. 11 F

12. Top of eyes close together (Fig. 12 A); general color a nearly uniform greenish; posterior margin of pronotum somewhat angularly produced (Fig. 12 B) (Panchlora nivea) CUBAN COCKROACH

Top of eyes sometimes distant (Fig. 12 C); general color various shades of brown and gray; pronotum usually not angularly produced posteriorly (Fig. 12 D).....13

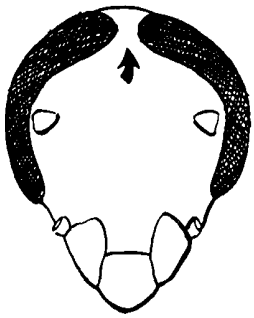


Fig. 12 A

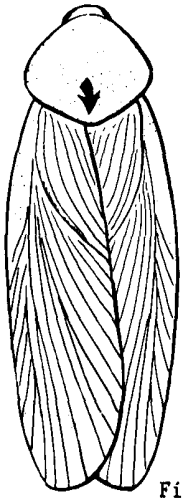


Fig. 12 B

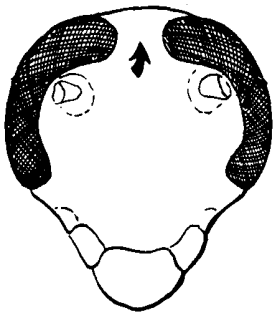


Fig. 12 C

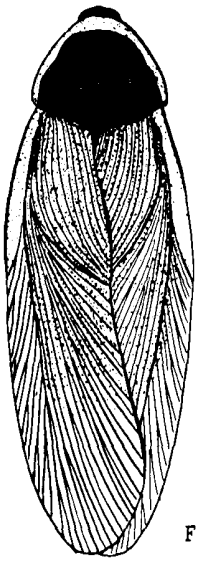


Fig. 12 D

13. Medium sized species, 30 mm. or less in length, including folded wings (Fig. 14 A & B).....14

Large species 40 mm. or more in length, including folded wings (Fig. 15 A & C).....15

14, Pronotum uniformly blackish except a narrow yellowish band along anterior and lateral margins (Fig. 14 A).....(Pycnoscelus surinamensis) SURINAM COCKROACH

Pronotum pale with a narrow dark longitudinal submarginal band on each side and irregular brownish blotches on disc (Fig. 14 B).....(Nauphoeta cinerea) CINEREOUS COCKROACH

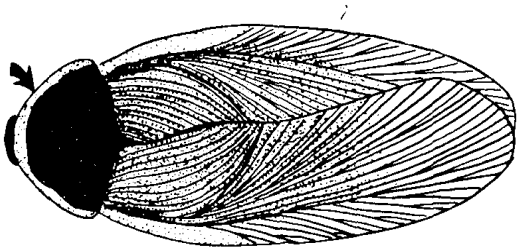


Fig. 14 A

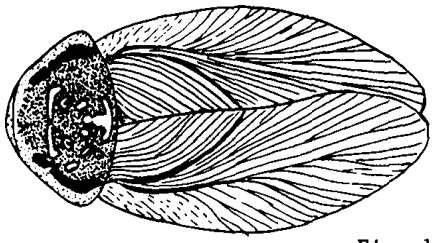


Fig. 14 B

15. Disc or pronotum with shield-like design, sometimes skull-like design (Fig. 15 A); front femur with one or more stout spurs on underside (Fig. 15 B).....(Blaberus giganteus; Blaberus craniifer) GIANT COCKROACH

Disc of pronotum with shield-like design darkened in outline only, not solid black (Fig. 15 C); front femur with a line of stiff hairs on anterior-ventral margin (Fig. 15 D).....(Leucophaea maderae) MADEIRA COCKROACH

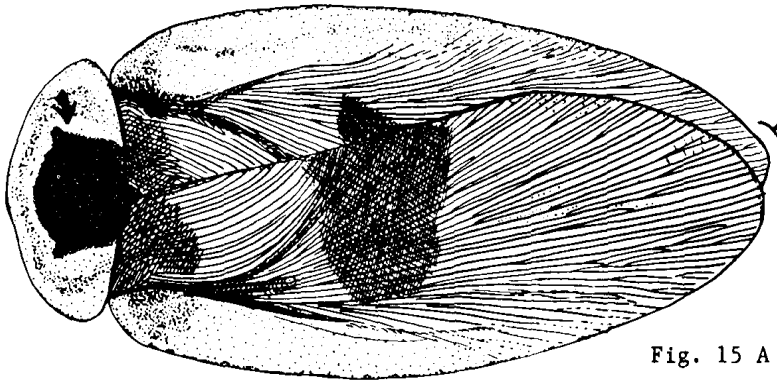


Fig. 15 A

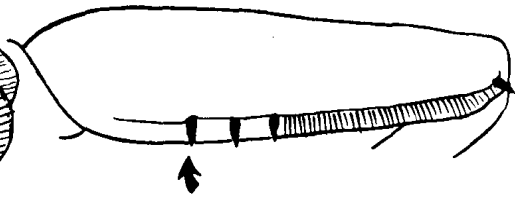


Fig. 15 B

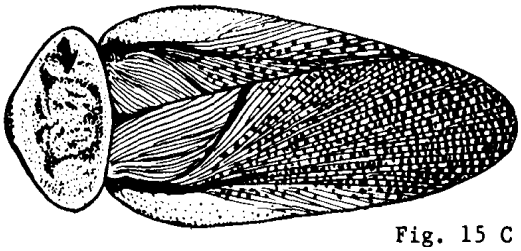


Fig. 15 C

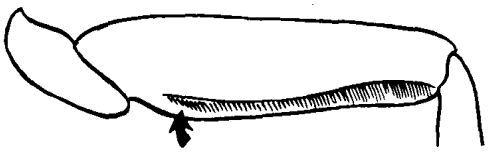


Fig. 15 D

TERMITES: KEY TO SOME COMMON NORTH AMERICAN SPECIES

Harold George Scott

Fig. A - Winged Adult

Fig. B - Soldier

Fig. C - Worker

Key to Winged Adults

1. Radius without branches; fontanel (fig. E) usually present 2
   Radius (fig. D) with branches; fontanel absent 4

2. Tibia (fig. F) slightly to plainly blackish 3
   Tibia entirely pale; Ontario to Guatemala, west to Utah and Arizona
   (*Reticulitermes flavipes*) ..... EASTERN SUBTERRANEAN TERMITE

3. Tibia slightly darkened; length 9 mm.; British Columbia to Baja California, east to Idaho and Sonora
   (*Reticulitermes hesperus*) ..... WESTERN SUBTERRANEAN TERMITE
   Tibia generally darkened; length 9.5- 10 mm.; Oregon and Montana to western Mexico, Missouri, and Texas
   (*Reticulitermes tibialis*) ..... ARID SUBTERRANEAN TERMITE

4. Ocelli (fig. E) present 5
   Ocelli absent; western Canada to Baja California
   (*Zootermopsis angusticollis*) ..... WESTERN ROTTEN-WOOD TERMITE

5. Body yellow to light brown 6
   Body blackish; California to Baja California, east to Arizona and Utah
   (*Kalotermes minor*) ..... WESTERN DRY-WOOD TERMITE

6. Transverse rows of long hairs on tergites; South Carolina to Florida, west to eastern Texas (*Kalotermes snyderi*) ..... EASTERN DRY-WOOD TERMITE
   No transverse rows of hairs on tergites; Arizona and California
   (*Procryptotermes hubbardi*) ..... ARID DRY-WOOD TERMITE

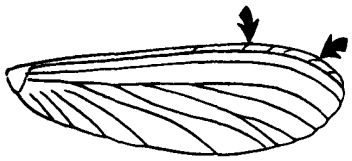


Fig. D - Wing

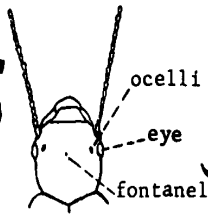


Fig. E - Head

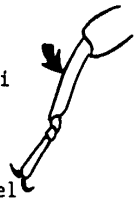


Fig. F - Leg

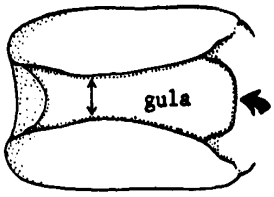


Fig. G - Throat

Key to Soldiers

1. Fontanel (fig. E) present; eyes usually absent 2
   Fontanel absent; eyes (fig. E) present 4

2. Gula (fig. G) not twice as broad in front as in middle ..... ARID SUBTERRANEAN TERMITE
   Gula twice as broad in front as in middle 3

3. Head twice as long as broad ..... WESTERN SUBTERRANEAN TERMITE
   Head less than twice as long as broad ..... EASTERN SUBTERRANEAN TERMITE

4. Antenna (fig. E) with 23-31 segments 5
   Antenna with 10-20 segments ..... WESTERN ROTTEN-WOOD TERMITE

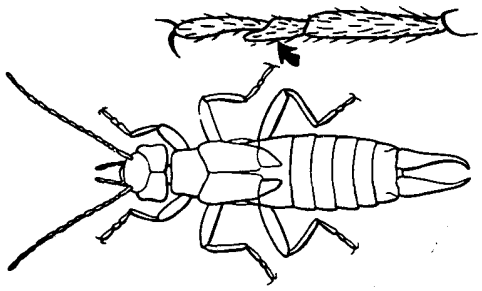
5. Third antennal segment as long as next 3 combined ..... EASTERN DRY-WOOD TERMITE
   Third antennal segment shorter than next 3 combined ..... WESTERN DRY-WOOD TERMITE
   Third antennal segment as long as next 4 combined ..... ARID DRY-WOOD TERMITE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

EARWIGS: PICTORIAL KEY TO COMMON DOMESTIC SPECIES

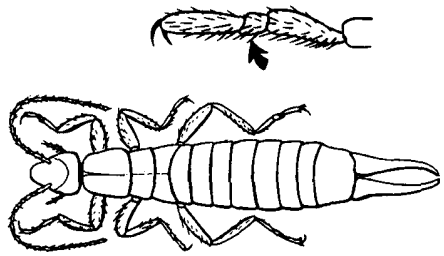
Chester J. Stojanovich and Harold George Scott

tarsus II prolonged beneath III

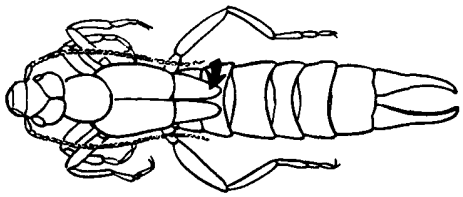


EUROPEAN EARWIG
Forficula auricularia

tarsus II not prolonged beneath III

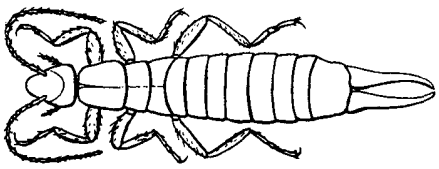


wings present

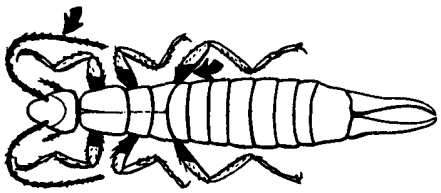


SHORE EARWIG
Labidura riparia

wings absent

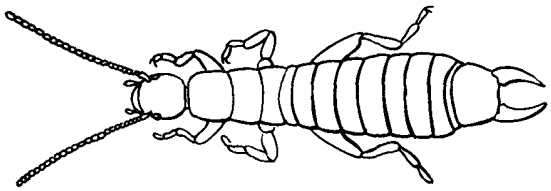


legs and antennae banded



RING-LEGGED EARWIG
Euborellia annulipes

legs and antennae not banded



SEASIDE EARWIG
Anisolabis maritima

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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

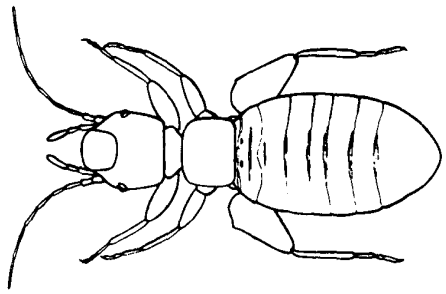
PSOCIDS: KEY TO SOME SPECIES COMMONLY INFESTING STORED FOOD

Harold George Scott and Chester J. Stojanovich

1. Two distinct thoracic segments 2
   Three distinct thoracic segments (*Trogium pulsatorium*) ..... DEATH WATCH

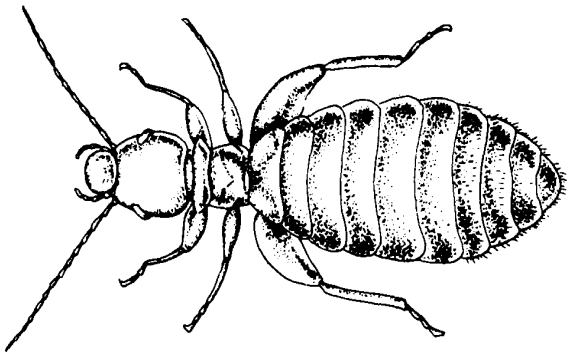
2. Without large pronotal bristles 3
   With large pronotal bristles 4

3. Eye with 7 facets; head and body brown (*Liposcelis bostrychopilus*) ..... BANDED PSOCID
   Eye with 2–4 facets; head brown, body yellow (*Liposcelis paetus*) ..... WAREHOUSE PSOCID



Warehouse Psocid

4. Two to 5 large pronotal bristles (*Liposcelis entomophilus*) ..... GRAIN PSOCID
   One large pronotal bristle (*Liposcelis terricolus*) ..... BOOK LOUSE



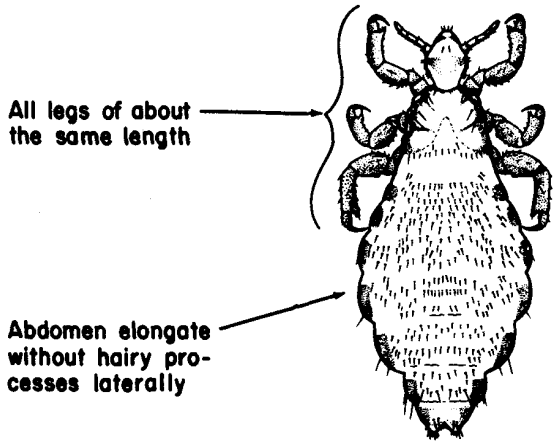
Book Louse

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

LICE COMMONLY FOUND ON MAN

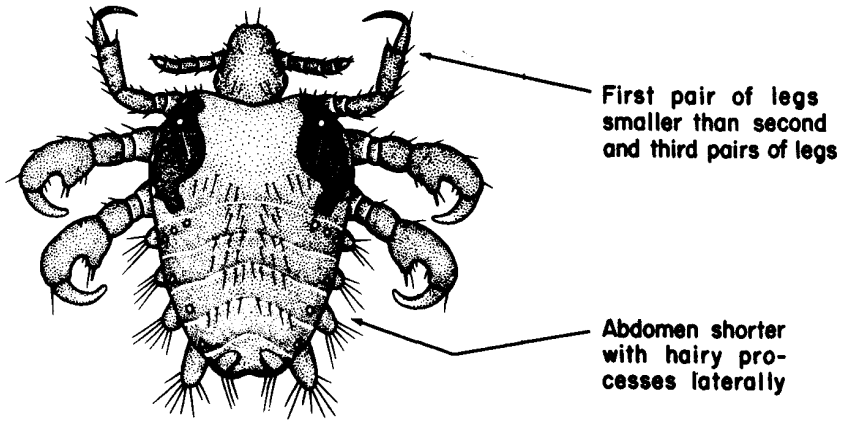
Harry D. Pratt

BODY LOUSE AND HEAD LOUSE



PEDICULUS HUMANUS

CRAB LOUSE



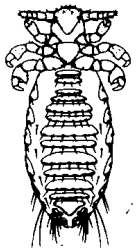
PHTHIRUS PUBIS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – Revised Aug. 1953, Oct. 1948

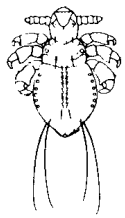
ANOPLURA: PICTORIAL KEY TO SPECIES ON DOMESTIC RATS IN SOUTHERN UNITED STATES

Roy F. Fritz and Harry D. Pratt

Abdomen with well defined ventral, lateral and dorsal plates

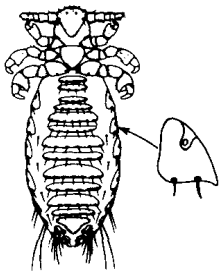


Abdomen with plates poorly defined or absent



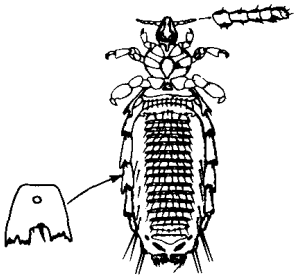
ADULTS

Lateral plates small, subtriangular. Segment II of antenna as long as wide



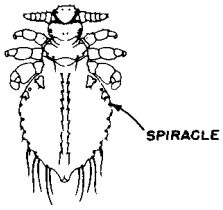
Polyplax spinulosa

Lateral plates large, emarginate posteriorly. Segment II of antenna longer than wide



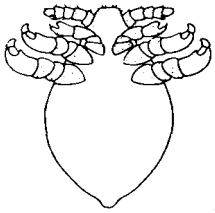
NYMPHS

Abdomen with spiracles and two parallel rows of setae



Polyplax spinulosa

Abdomen without spiracles or parallel rows of setae



Hoplopleura spp.

Lateral plates 4-6 with one large and one minute seta

Hoplopleura oenomydis

Lateral plates 4-6 with two large setae

Lateral plates broadly emarginate; Apical processes thorn-like

Hoplopleura hirsuta

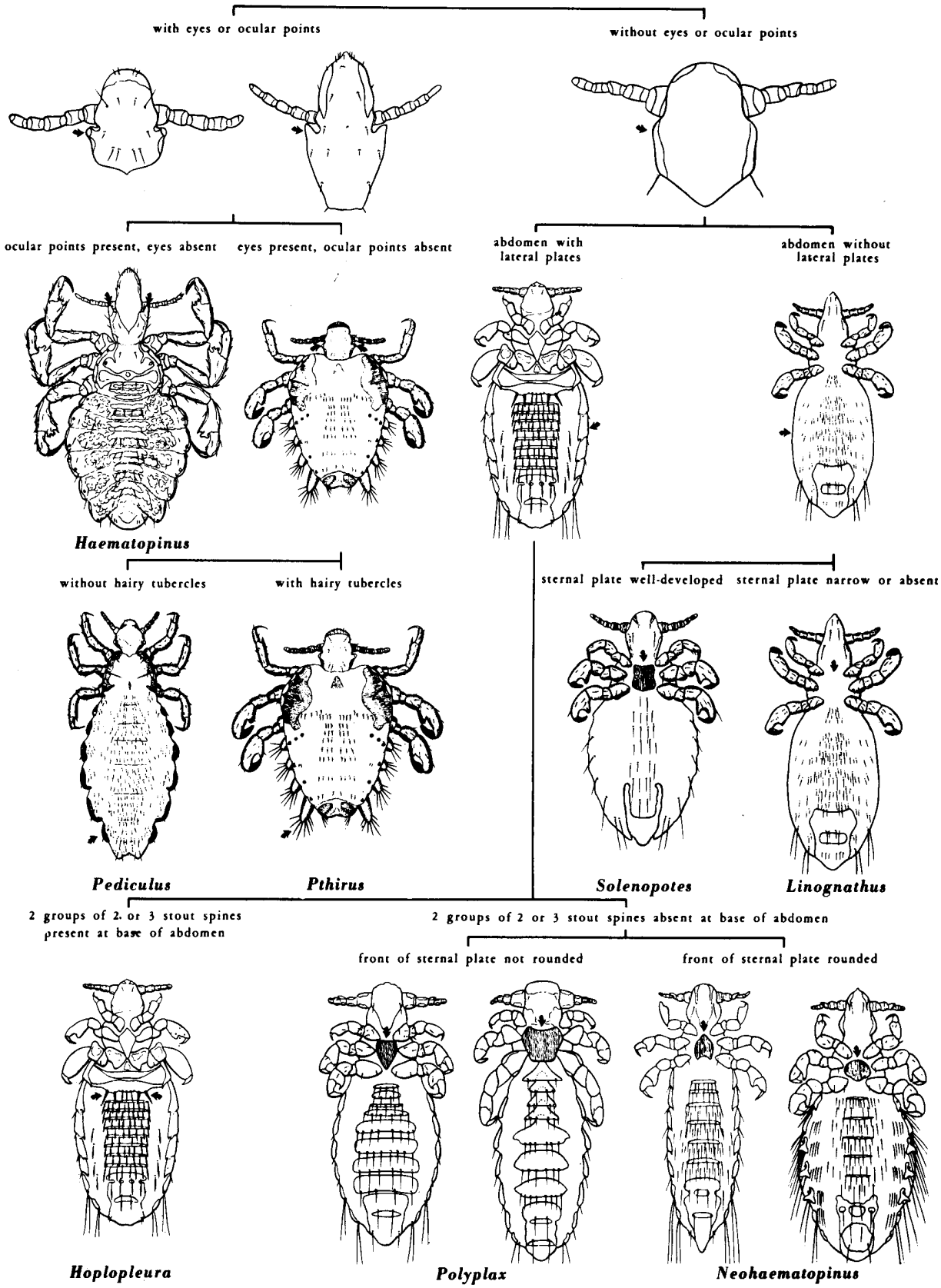
Lateral plates narrowly emarginate; Apical processes broad

Hoplopleura acanthopus

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia — 1947

ANOPLURA: PICTORIAL KEY TO SOME COMMON GENERA OF SUCKING LICE

Chester J. Stojanovich and Harry D. Pratt



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

ANOPLURA: KEY TO NORTH AMERICAN SPECIES

Chester J. Stojanovich and Harry D. Pratt

Key to Families of Anoplura

1. Head and thorax more or less thickly covered with setae; in some species the setae are modified into scales (Fig. 1 A). On marine animals.....FAMILY ECHINOPHTHIRIIDAE

   Head and thorax with only a few setae (Fig. 1 B).....2

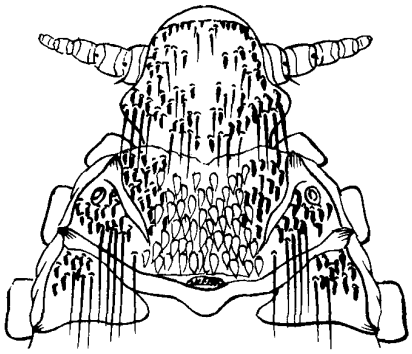


Fig. 1 A

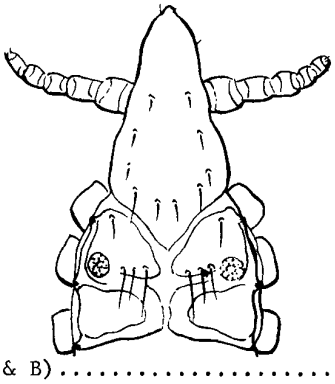


Fig. 1 B

2. Eyes present or with prominent ocular points (Fig. 2 A & B).....3

   Eyes and ocular points absent (Fig. 2 C).....4

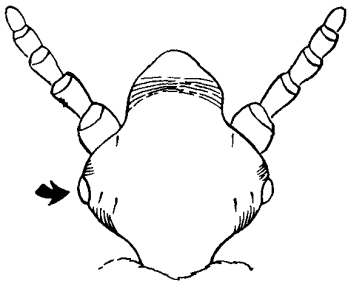


Fig. 2 A

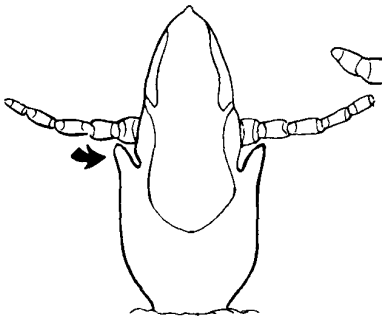


Fig. 2 B

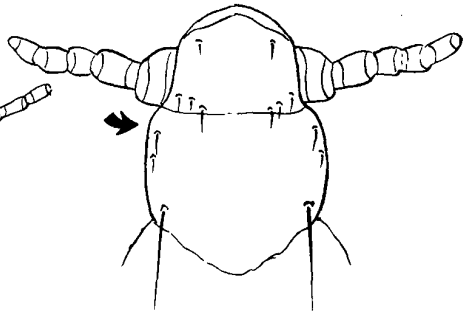


Fig. 2 C

3. Abdomen without irregular sclerotized plates on dorsum and venter (Fig. 3 A). On man. .....FAMILY PEDICULIDAE

   Abdomen with irregular sclerotized plates on dorsum and venter (Fig. 3 B). On hoofed animals.....FAMILY HAEMATOPINIDAE

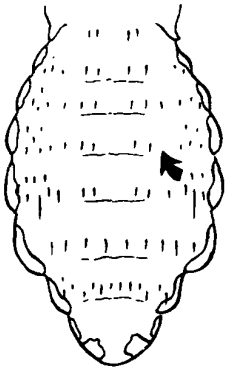


Fig. 3 A

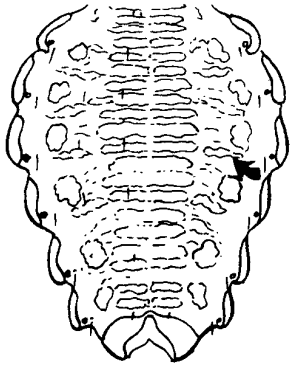


Fig. 3 B

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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

4. Paratergal plates absent (Fig. 4 A). On hoofed animals or carnivores.....
.....FAMILY LINOGNATHIDAE

Paratergal plates present (Fig. 4 B). On rodents and lagomorphs...FAMILY HOPLOPLEURIDAE

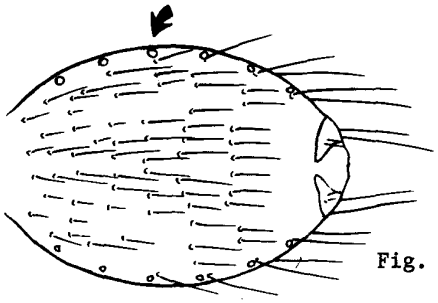


Fig. 4 A

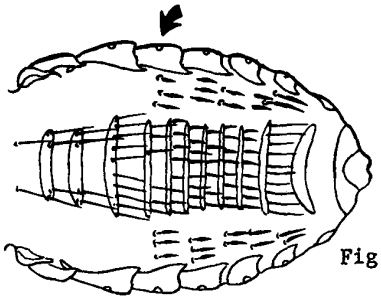


Fig. 4 B

Key to Genera of Echinophthiriidae

1. Antennae four-segmented; abdomen without scale-like setae (Fig. 1 A).....2

Antennae five-segmented; abdomen with scale-like setae (Fig. 1 B).....Antarctophthirus

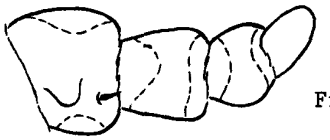


Fig. 1 A

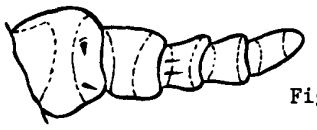


Fig. 1 B

2. Legs all essentially the same size (Fig. 2 A).....Echinophthirius horridus (von Olfers)

Anterior legs small; second and third legs stout (Fig. 2 B).....
.....Proechinophthirus fluctus (Ferris)

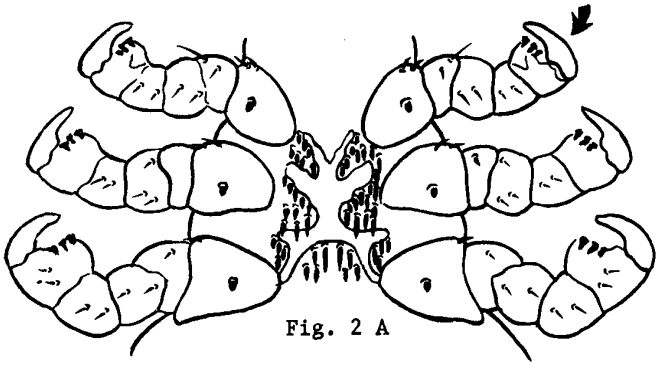


Fig. 2 A

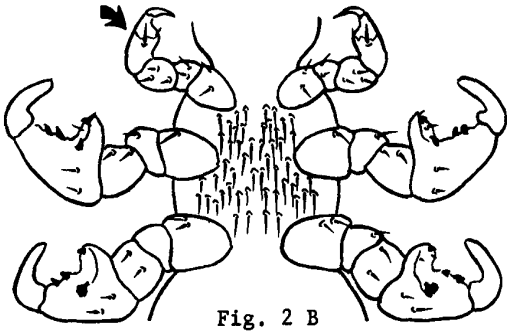


Fig. 2 B

Key to Species of Antarctophthirus

1. Scale-like setae present only on abdomen (Fig. 1 A).*Antarctophthirus callorhini* (Osborn)

   Scale-like setae present on thorax and abdomen (Fig. 1 B).....2

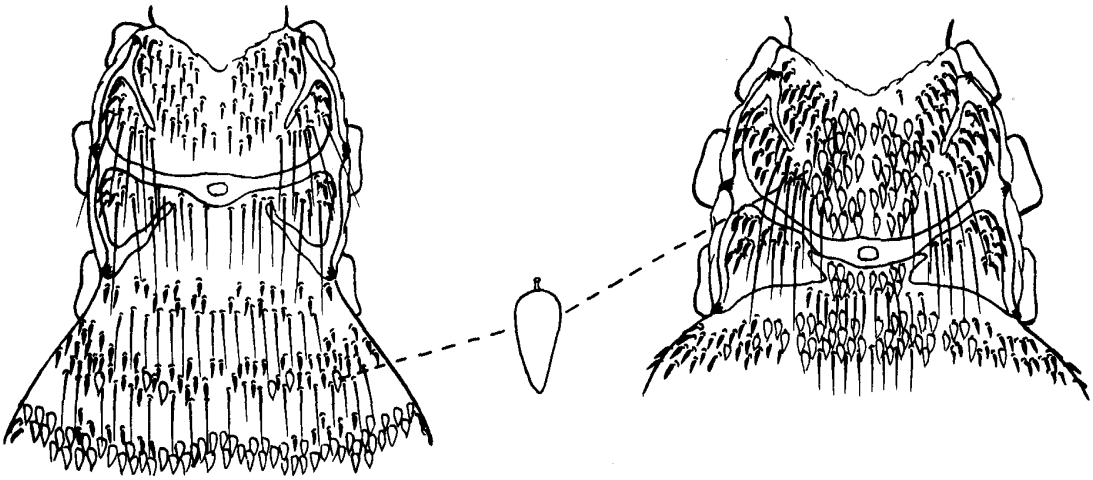


Fig. 1 A Fig. 1 B

2. Thoracic sternum with a few long setae on posterior border (Fig. 2 A).....
   .....*Antarctophthirus microchir* (Troussart & Neumann)

   Thoracic sternum without long setae on posterior border (Fig. 2 B).....
   .....*Antarctophthirus trichechi* (Bohemann)

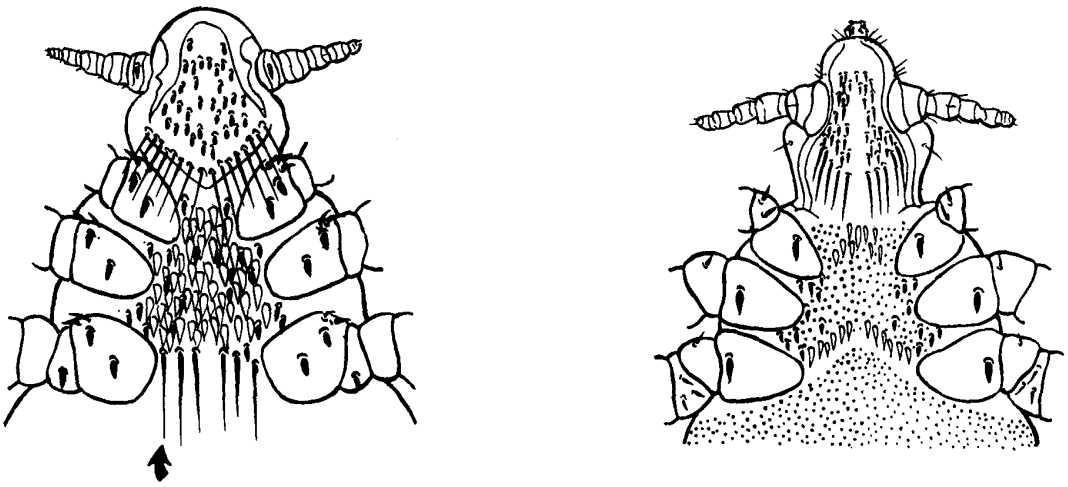


Fig. 2 A Fig. 2 B

Key to Genera of Haematopinidae

1. Sternal plate of thorax present; eyes absent but with prominent ocular points (Fig. 1 A) .....Haematopinus

   Sternal plate of thorax absent; eyes present (Fig. 1 B). On peccary..... .....Pecaroecus javalii Babcock & Ewing

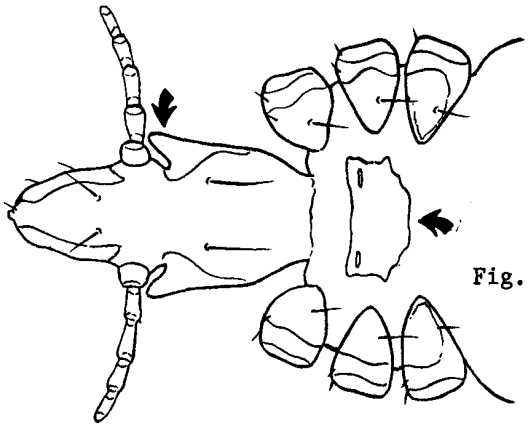


Fig. 1 A

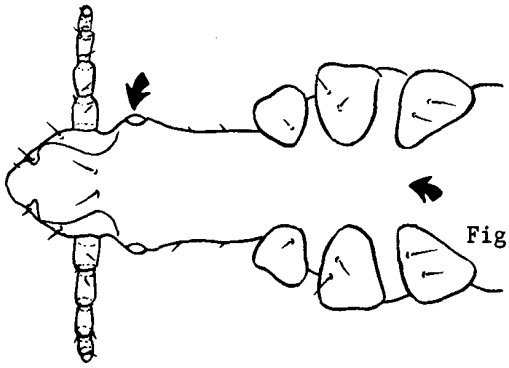


Fig. 1 B

Key to Species of Haematopinus

1. Thoracic sternal plate wider than long, sternal pits on plate (Fig. 1 A). Hog louse.... .....Haematopinus suis (Linnaeus)

   Thoracic sternal plate longer than wide; sternal pits off plate (Fig. 1 B).....2

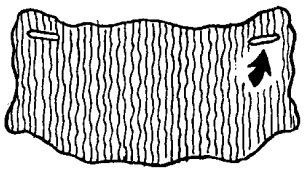


Fig. 2 A

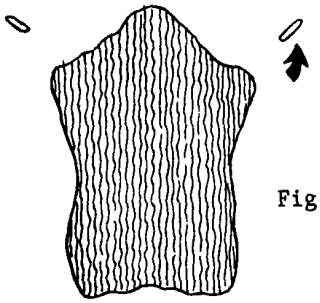


Fig. 2 B

2. Head at least two times as long as wide at ocular points; sternal plate without a median projection (Fig. 2 A & B). On equines. Horse sucking louse..... .....Haematopinus asini (Linnaeus)

   Head not two times as long as wide at ocular points; sternal plate with a median projection (Fig. 2 C & D). On cattle.....3

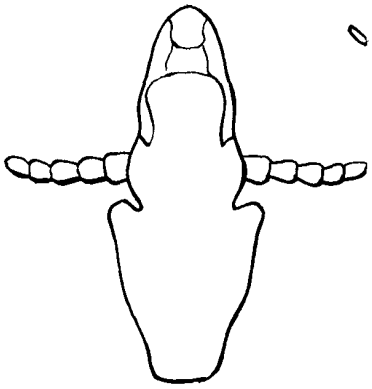


Fig. 2 A

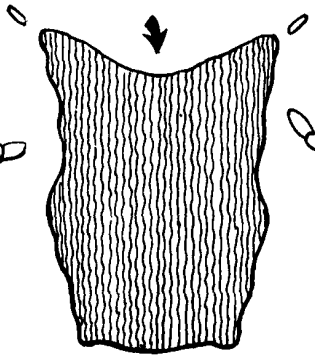


Fig. 2 B

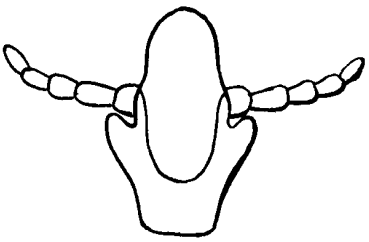


Fig. 2 C

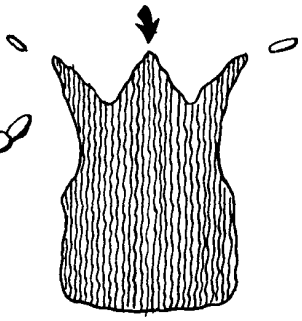


Fig. 2 D

3. Thoracic sternal plate with median projection blunt and rounded; male genital plate with six setae (Fig. 3 A & B). Short-nosed cattle louse.....
.....Haematopinus eurysternus (Nitzsch)

Thoracic sternal plate with median projection more acute and longer; male genital plate with four setae (Fig. 3 C & D). Cattle tail louse.....
.....Haematopinus quadripertusus Fahrenholz

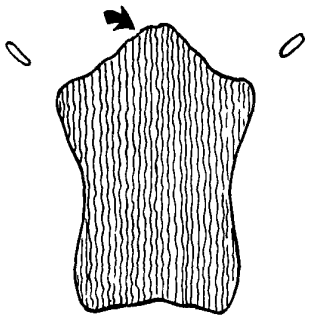


Fig. 3 A

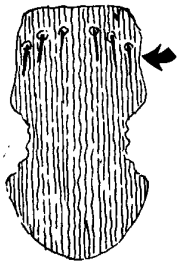


Fig. 3 B

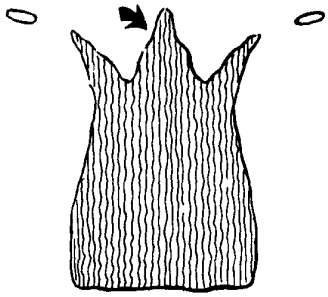


Fig. 3 C

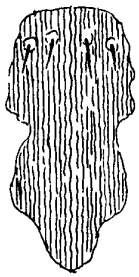


Fig. 3 D

Key to Genera of Hoplopleuridae

1. Paratergal plates very small being merely slightly sclerotized points (Fig. 1 A).....
.....Haemodipsus

Paratergal plates on at least one abdominal segment usually as long as, or at least half as long as, the sternal plate (Fig. 1 B).....2

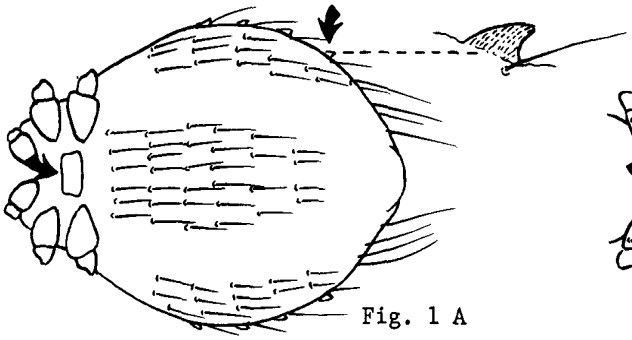


Fig. 1 A

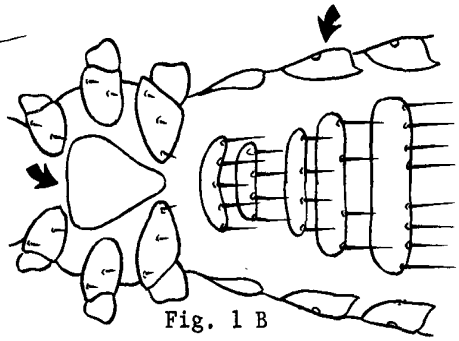


Fig. 1 B

2. First and second pair of legs of the same size and form, both being more slender and smaller than the third pair of legs (Fig. 2 A).....3

First pair of legs smallest of the three pairs; the second pair with stouter claws (Fig. 2 B).....4

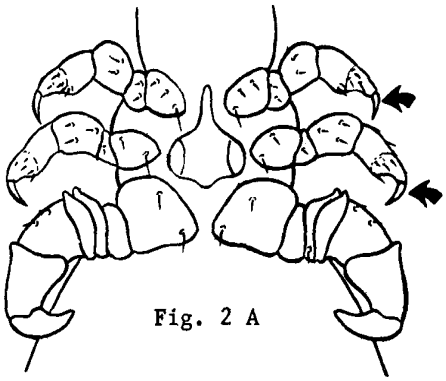


Fig. 2 A

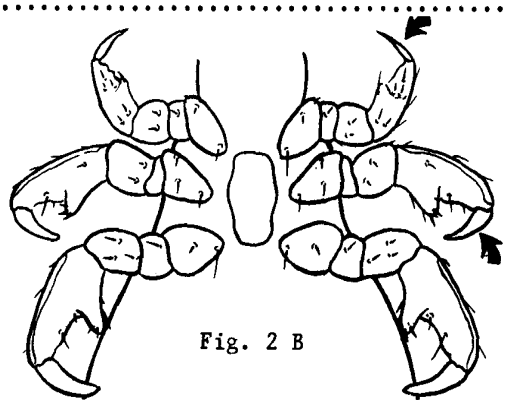


Fig. 2 B

3. A pair of small sclerotized plates present on venter of abdominal segment 2 (Fig. 3 A); antennae and head without hook-like processes.....Enderleinellus

Sclerotized plates entirely lacking on venter of abdominal segment 2; antennae and head with hook-like processes (Fig. 3 B).....Microphthirus uncinatus (Ferris)

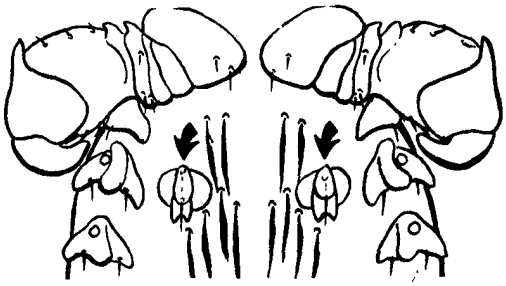


Fig. 3 A

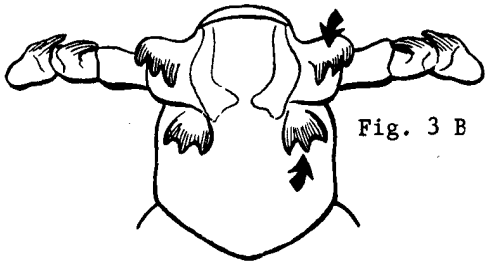


Fig. 3 B

4. Antennae four-segmented (sometimes appearing three-segmented); bladder-like expansions on third leg (Fig. 4 A & B).....Haematopinoides squamosus Osborn

Antennae five-segmented; bladder-like expansions lacking on third leg (Fig. 4 C).....5

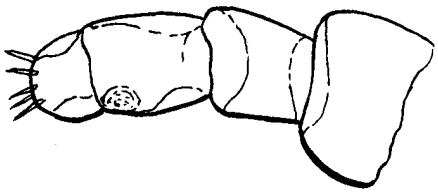


Fig. 4 A

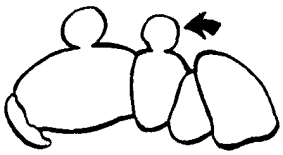


Fig. 4 B

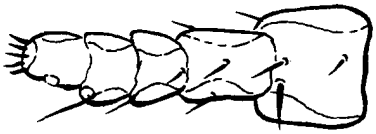


Fig. 4 C

5. First sternite of abdominal segment 3 extended laterally to articulate with its corresponding paratergal plate; this sternite bearing two groups of two or three stout setae (Fig. 5 A).....Hoplopleura

First sternite of abdominal segment 3 never articulating with paratergal plate (Fig. 5 B).....6

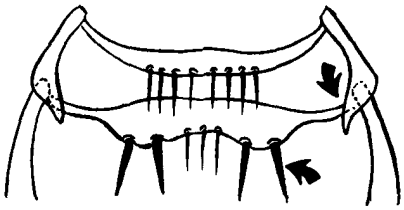


Fig. 5 A

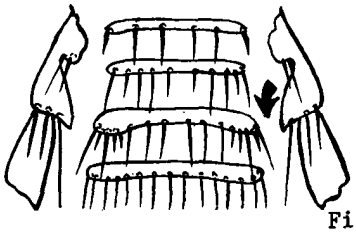


Fig. 5 B

6. Paratergal plate 2 completely divided longitudinally, one plate on the dorsum and the other on the venter of the abdomen (Fig. 6 A).....Fahrenholzia

Paratergal plate 2 never completely divided to form two distinct plates (Fig. 6 B)....7

Fig. 6 A

Fig. 6 B

7. Sternal plate of thorax usually pointed posteriorly or, if truncate, always associated with a huge enlargement of the first antennal segment (Fig. 7 A & B).....Polyplax

Sternal plate of thorax usually emarginate posteriorly or sometimes quadrate in shape (Fig. 7 C & D).....Neohaematopinus

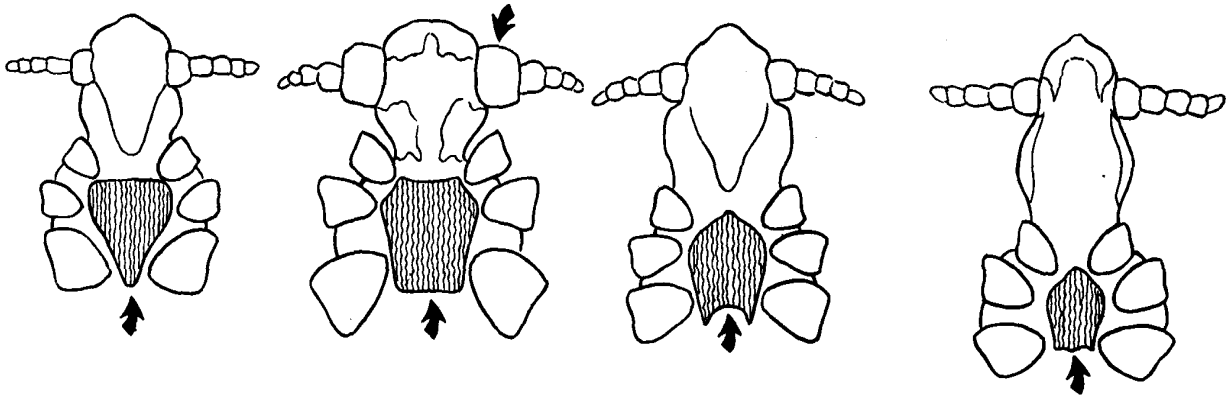
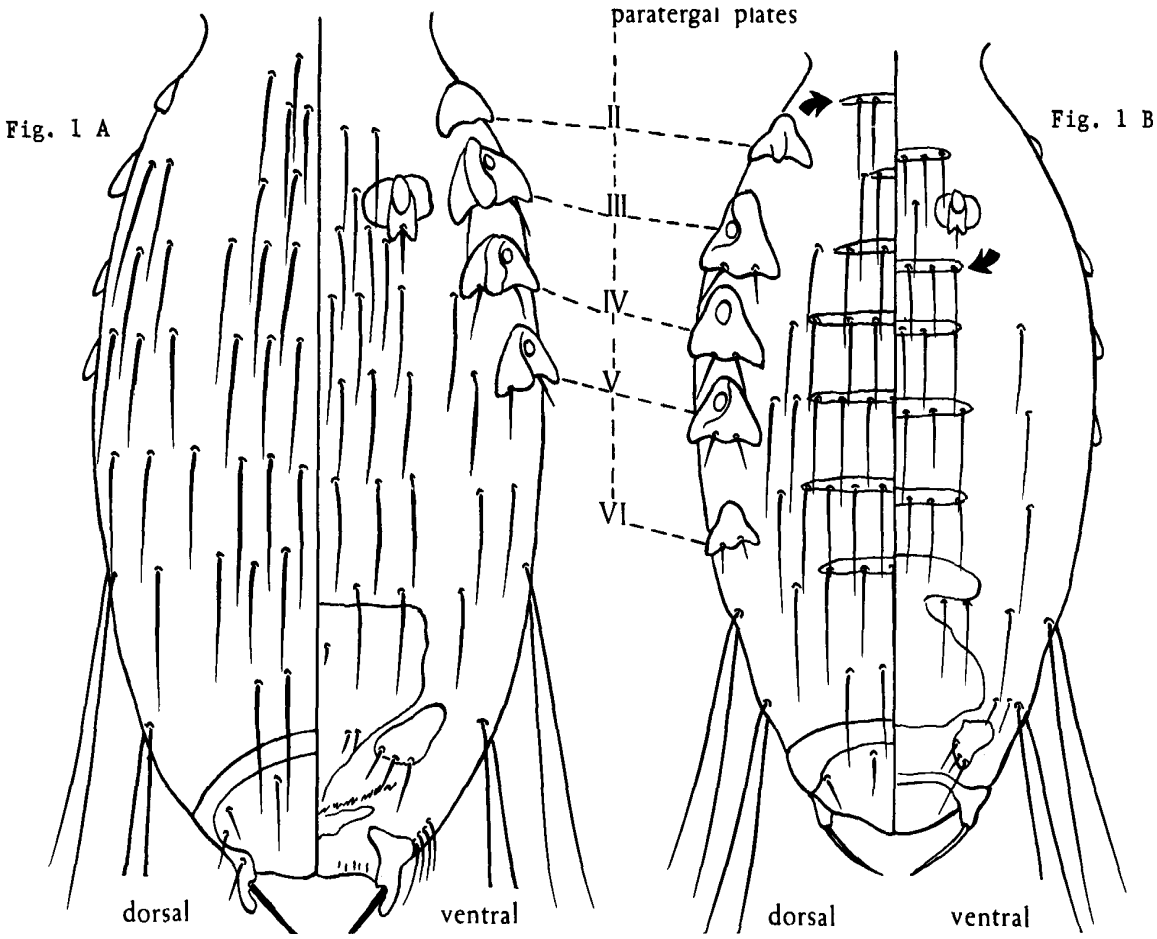


Fig. 7 A Fig. 7 B Fig. 7 C Fig. 7 D

Key to Species of Enderleinellus

1. Paratergal plates present on abdominal segments 2-5 (Fig. 1 A).....2

Paratergal plates present on abdominal segments 2-6; abdominal sternites and tergites present in both sexes (Fig. 1 B). On Sciurus.....Enderleinellus nitzschi Fahrenholz



2. Paired ventral plates of abdominal segment 2 completely detached from its corresponding paratergal plate; each ventral plate bearing a single seta (Fig. 2 A). On Sciurus....3

Paired ventral plates of abdominal segment 2 each extending laterally to unite with its corresponding paratergal plate; ventral plates without setae (Fig. 2 B).....5

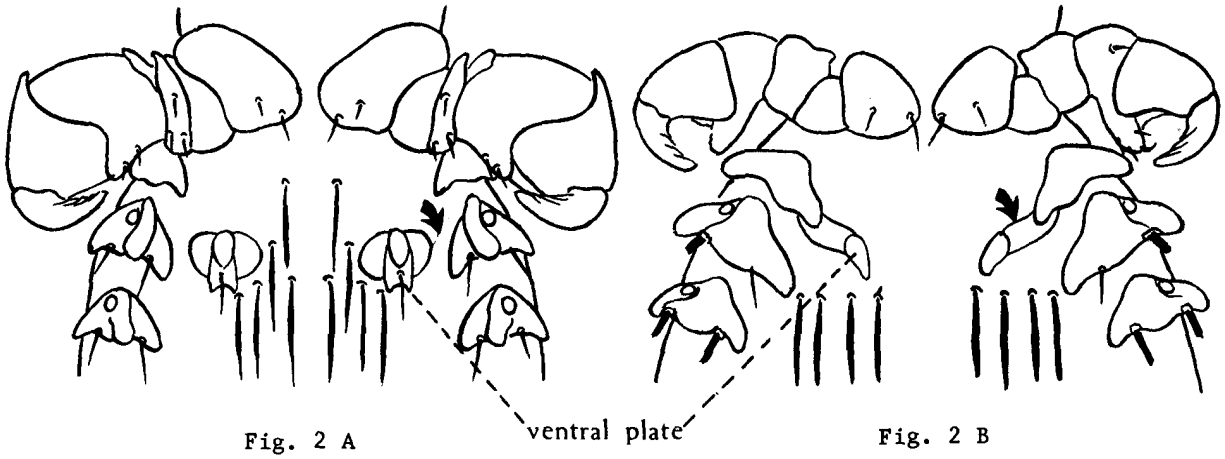


Fig. 2 A Fig. 2 B

3. Spermatheca present; arms of basal plate apically bilobed (Fig. 3 A & B).....4

Spermatheca absent; arms of basal plate not apically bilobed (Fig. 3 C)..... .....Enderleinellus kelloggi Ferris

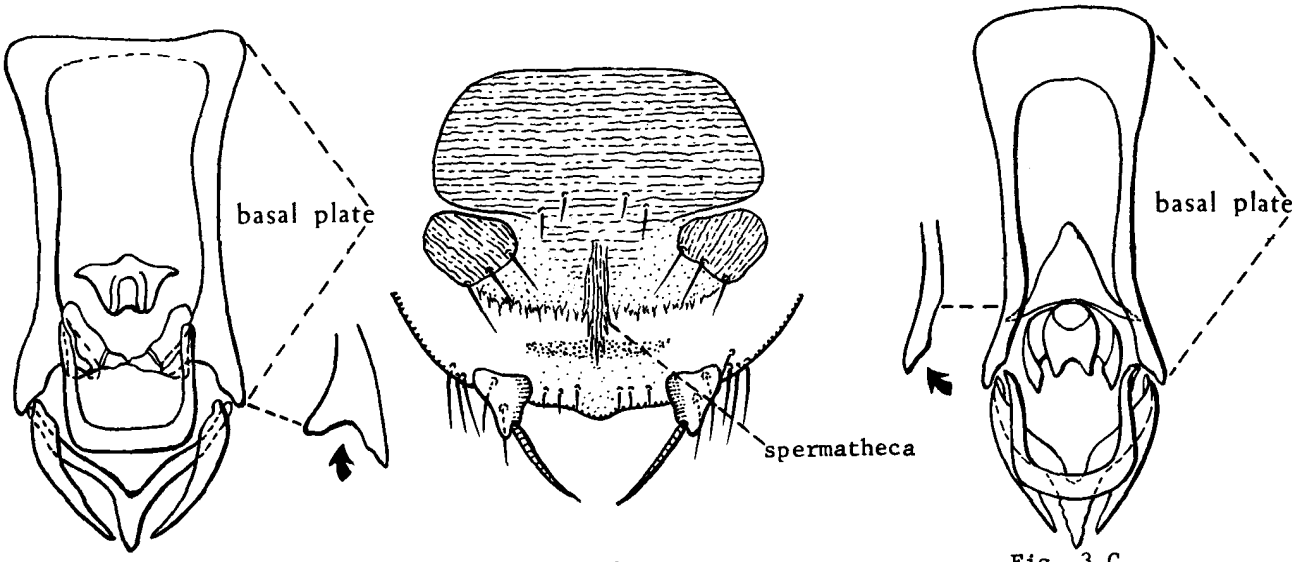


Fig. 3 A Fig. 3 B Fig. 3 C

4. Spermatheca a straight slightly tapering tube; arms of basal plate apically bilobed but not expanded (Fig. 4 A & B).....Enderleinellus longiceps (Kellogg & Ferris)

Spermatheca bent and with its ends expanded; arms of basal plate apically expanded and strongly bilobed (Fig. 4 C).....Enderleinellus arizonensis Werneck

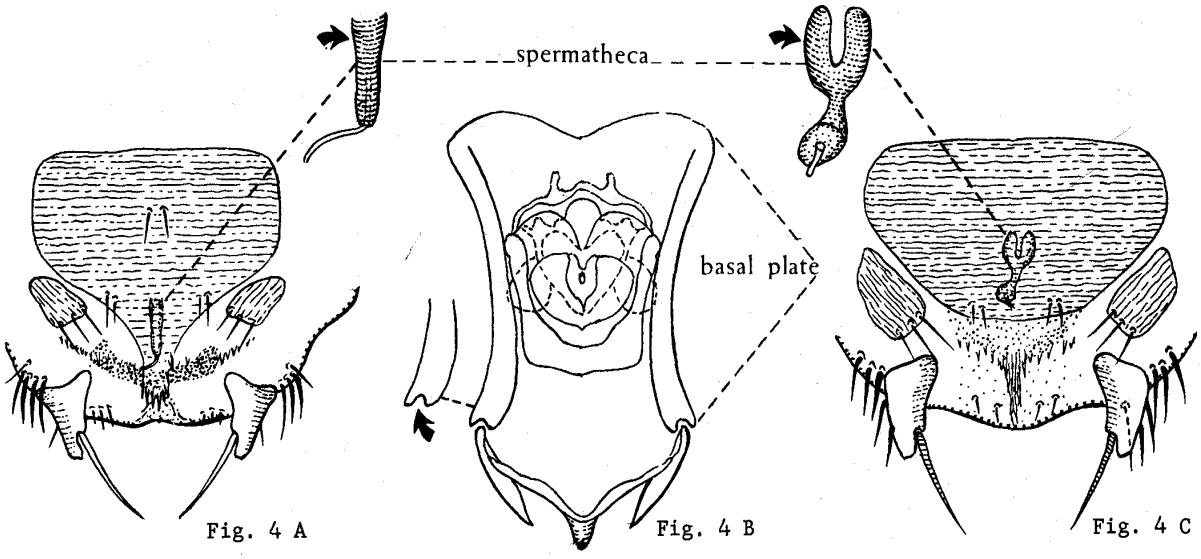


Fig. 4 A Fig. 4 B Fig. 4 C

5. Paratergal plate 5 and lateral margin of abdominal segment 6 without a pair of long setae (Fig. 5 A).....6

Paratergal plates or lateral margins of abdominal segments 4-8 with a pair of long setae (Fig. 5 B). On Marmota.....Enderleinellus marmotae Ferris

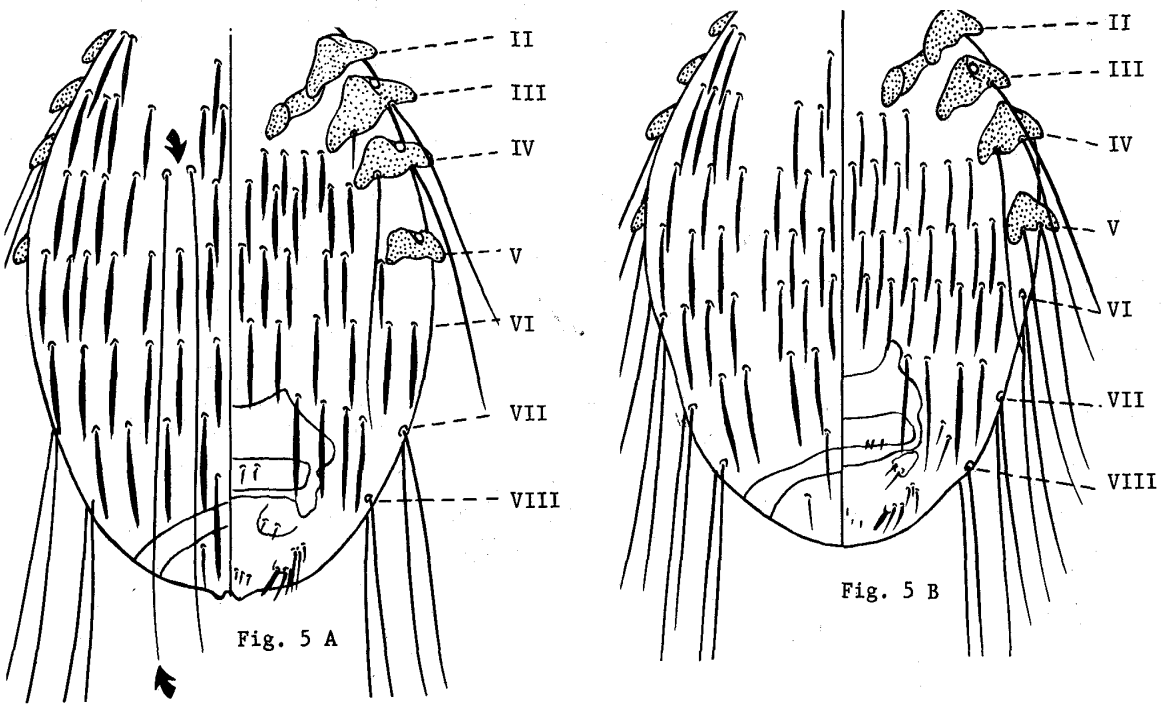


Fig. 5 A Fig. 5 B

6. Female with 2-4 long setae on dorsum of abdominal segment 4 reaching to apex of body (Fig. 5 A). On Citellus and Cynomys.....Enderleinellus osborni (Kellogg & Ferris)

Female without such setae. On Citellus.....Enderleinellus suturalis (Osborn)

Key to Species of Fahrenholzia

1. Paratergal plates present only on abdominal segments 2 to 4 (Fig. 1 A).....2

   Paratergal plates present on at least abdominal segments 2-6 (Fig. 1 B).....6

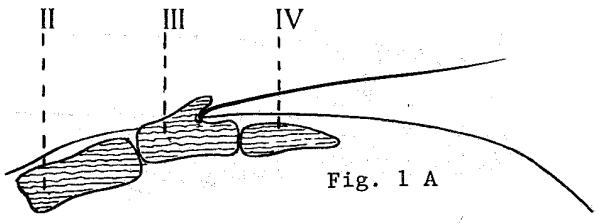


Fig. 1 A

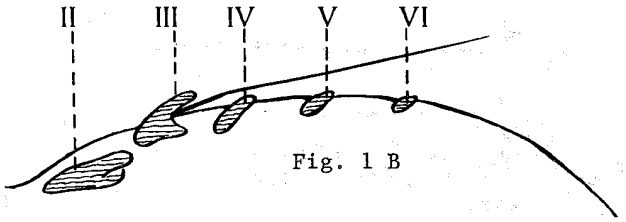


Fig. 1 B

2. Dorsal surface of abdomen with a narrow, sclerotized, median, longitudinal plate between paratergal plates 2 (Fig. 2 A). On Liomys.....3

   Dorsal surface of abdomen without such a plate (Fig. 2 B). On Perognathus and Dipodomys 5

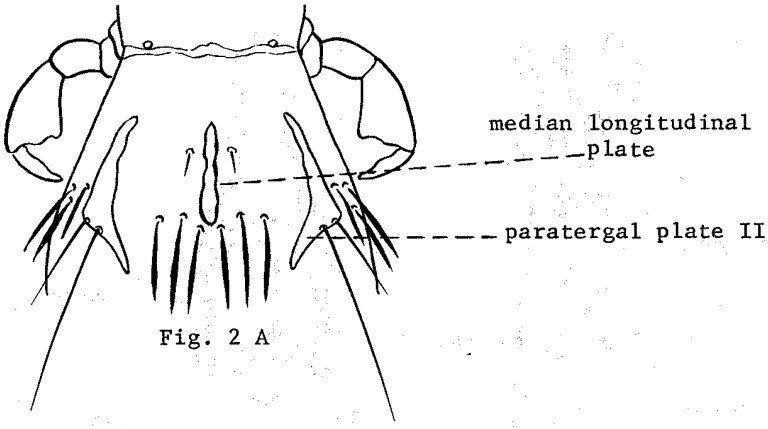


Fig. 2 A

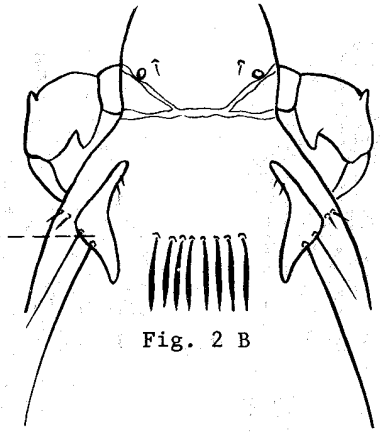


Fig. 2 B

3. Thoracic sternal plate concave on anterior margin; dorsal lobe of paratergal plate 3 pointed apically (Fig. 3 A & B).....Fahrenholzia texana Stojanovich & Pratt

   Thoracic sternal plate convex on anterior margin; dorsal lobe of paratergal plate 3 apically truncate (Fig. 3 C & D).....4

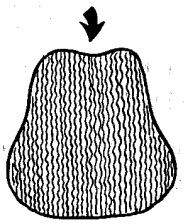


Fig. 3 A

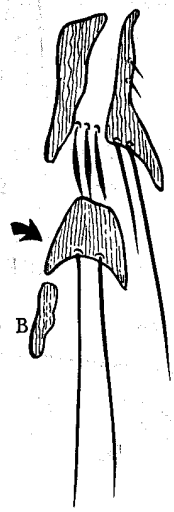


Fig. 3 B

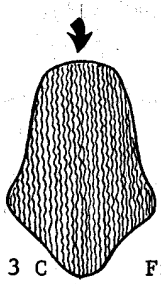


Fig. 3 C

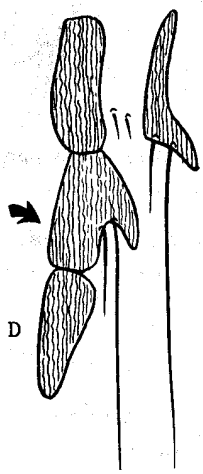


Fig. 3 D

4. Dorsal lobe of paratergal plate 2 with the smaller seta about as long as the plate (Fig. 4 A).....Fahrenholzia ehrlichi Johnson

Dorsal lobe of paratergal plate 2 with the smaller seta minute, much shorter than the plate (Fig. 4 B).....Fahrenholzia microcephala Ferris

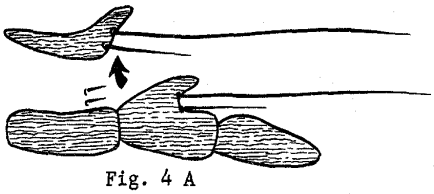


Fig. 4 A

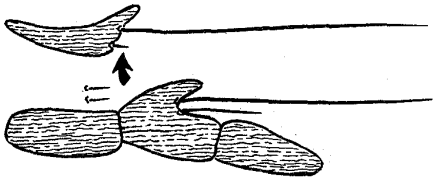


Fig. 4 B

5. Paratergal plates of abdominal segment 2 with a single pair of setae between dorsal and ventral lobes; male genitalia with parameres greatly expanded; female genital plate present (Fig. 5 A, B, & C).....Fahrenholzia pinnata Kellogg & Ferris

Paratergal plates of abdominal segment 2 with 6 to 8 long setae between dorsal and ventral lobes; parameres of male genitalia not expanded; female genital plate absent (Fig. 5 D & E).....Fahrenholzia reducta Ferris

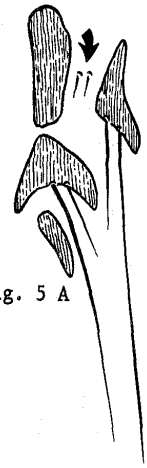


Fig. 5 A

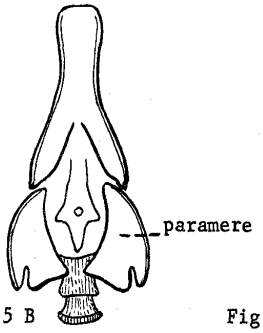


Fig. 5 B

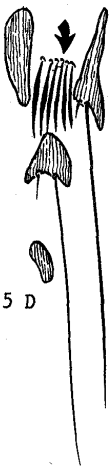


Fig. 5 D

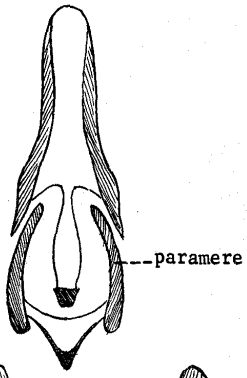


Fig. 5 E

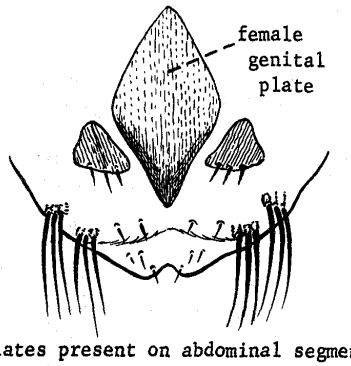


Fig. 5 C

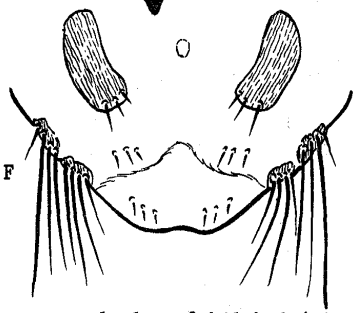


Fig. 5 F

6. Paratergal plates present on abdominal segments 2 to 6; paratergal plate 3 bilobed (Fig. 6 A).....Fahrenholzia zacatecae Ferris

Paratergal plates present on abdominal segments 2 to 7; paratergal plate 3 not bilobed (Fig. 6 B).....Fahrenholzia tribulosa Ferris

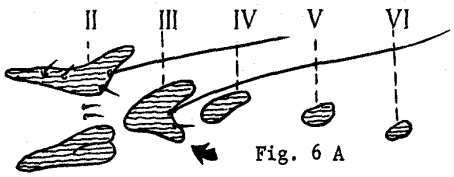


Fig. 6 A

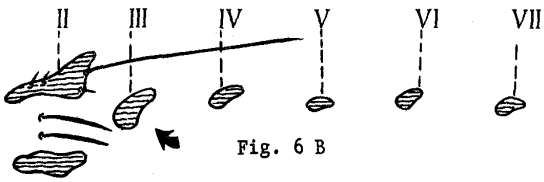


Fig. 6 B

Key to Species of Hoplopleura

1. Third abdominal sternal plate with two groups of two stout setae (Fig. 1 A).....2

   Third abdominal sternal plate with two groups of three stout setae (Fig. 1 B)..... On Glaucomys.....Hoplopleura trispinosa Kellogg & Ferris

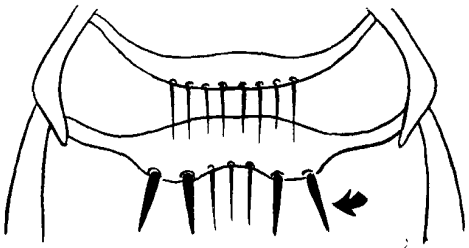


Fig. 1 A

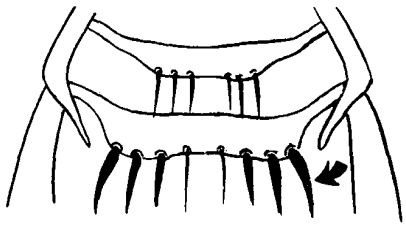


Fig. 1 B

2. Posterior margins of paratergal plates 3-5 with a broad or pointed lobe on each side (Fig. 2 A & B).....3

   Posterior margins of paratergal plates 3-5 with four rounded lobes (Fig. 2 C)..... On Oryzomys.....Hoplopleura oryzomydis Pratt & Lane

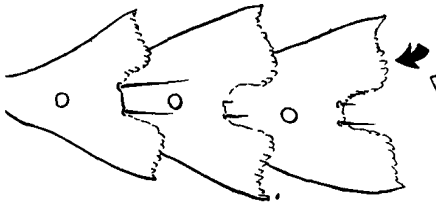


Fig. 2 A

Fig. 2 B

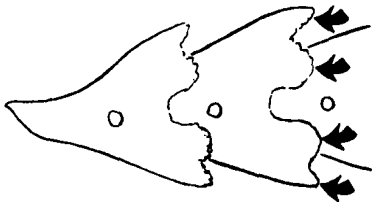


Fig. 2 C

3. Paratergal plates 4 and 5 with broad lobes on posterior margin (Fig. 3 A).....4

   Paratergal plates 4 and 5 with pointed lobes on posterior margin (Fig. 3 B).....7

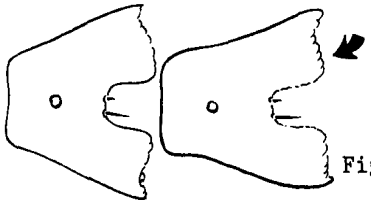


Fig. 3 A

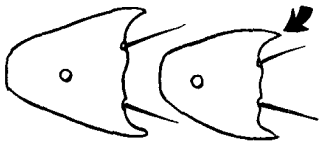


Fig. 3 B

4. Paratergal plates 4 and 5 with one large and one minute seta on posterior margin (Fig. 4 A).....5

   Paratergal plates 4 and 5 with two large setae on posterior margin (Fig. 4 B)..... On field rodents.....Hoplopleura acanthopus (Burmeister)

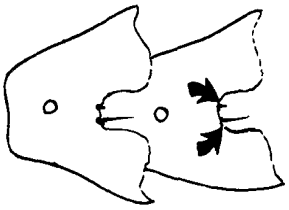


Fig. 4 A

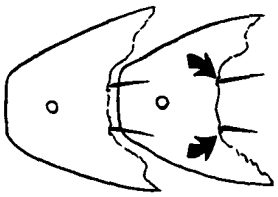


Fig. 4 B

5. Abdomen with setae in some of the membrane between sternal and paratergal plates (Fig. 5 A). On Rattus.....Hoplopleura oenomydis Ferris

Abdomen without setae in membrane between ends of sternal and paratergal plates (Fig. 5 B).....6

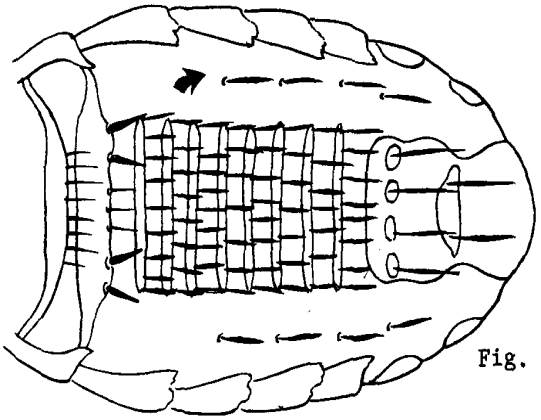


Fig. 5 A

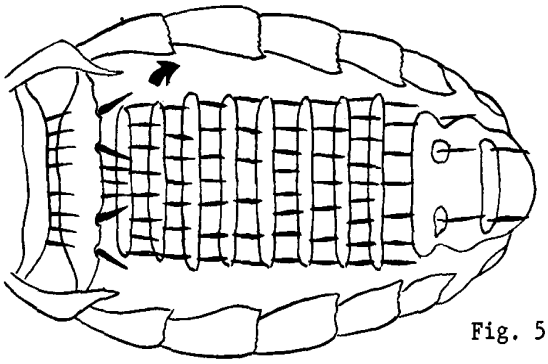


Fig. 5 B

6. Thoracic sternal plate pointed posteriorly (Fig. 6 A). On Peromyscus..... .....*Hoplopleura hesperomydis (Osborn) and *Hoplopleura ferrisi Cook & Beer

Thoracic sternal plate blunt posteriorly (Fig. 6 B). On Onychomys..... .....Hoplopleura onychomydis Cook & Beer

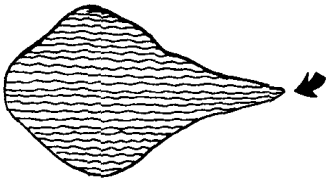


Fig. 6 A

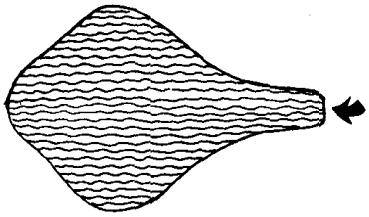


Fig. 6 B

7. Thoracic sternal plate about as long as broad; first sternal plate on abdominal segment 3 with two stout setae usually set close together on each side (Fig. 7 A).....8

Thoracic sternal plate definitely longer than broad; first sternal plate on abdominal segment 3 with two stout setae more widely spaced on each side (Fig. 7 B).....9

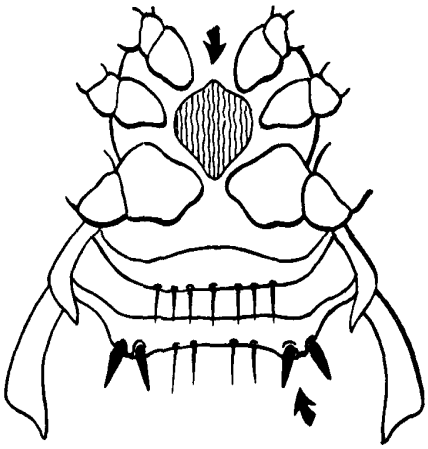


Fig. 7 A

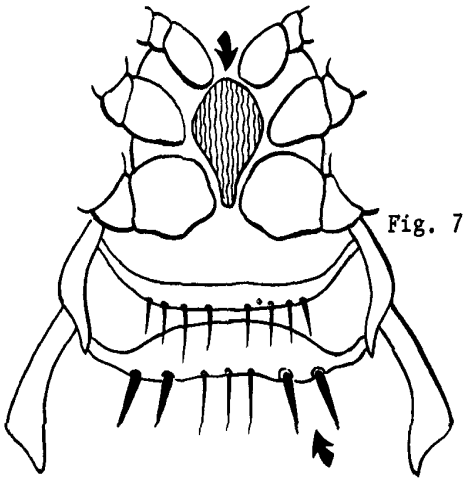


Fig. 7 B

*These species are separated only in the immature stages.

8. Paratergal plate 6 with posterior angles produced into points (Fig. 8 A). On Eutamias .....Hoplopleura arboricola Kellogg & Ferris

Paratergal plate 6 without points on posterior angles (Fig. 8 B). On Tamias..... .....Hoplopleura erratica (Osborn)

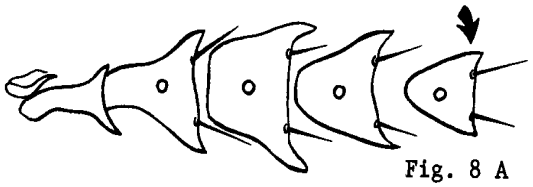


Fig. 8 A

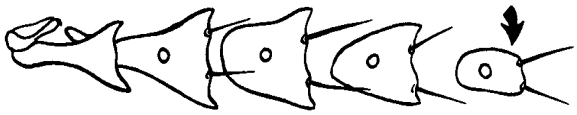


Fig. 8 B

9. Posterior margin of paratergal plate 6 with angles produced to form a deep emargination (Fig. 9 A). On Sciurus.....Hoplopleura sciuricola Ferris

Posterior margin of paratergal plate 6 with angles not produced to form a deep emargination (Fig. 9 B). On Sigmodon.....10

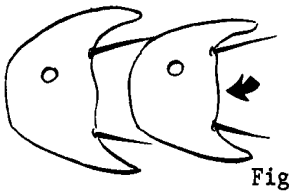


Fig. 9 A

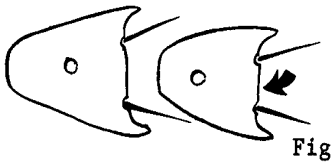


Fig. 9 B

10. Female with paratergal plates 4-6 elongated; male with 11 tergal plates bearing a row of setae (Fig. 10 A & B).....Hoplopleura arizonensis Stojanovich & Pratt

Female with paratergal plates 4-6 only slightly elongated; male with only 7 tergal plates bearing a row of setae (Fig. 10 C & D).....Hoplopleura hirsuta Ferris

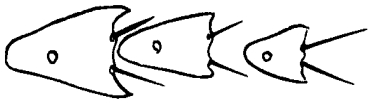


Fig. 10 A

Fig. 10 C

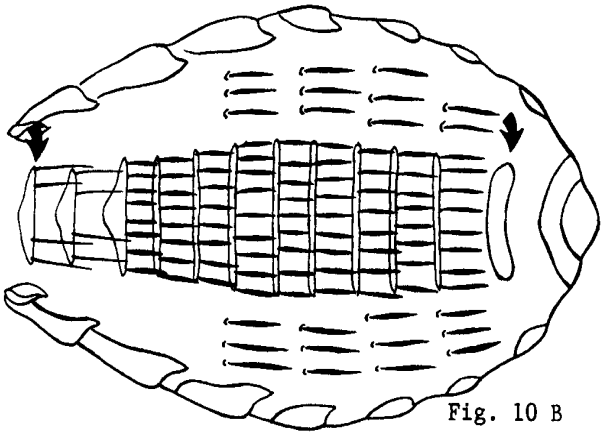


Fig. 10 B

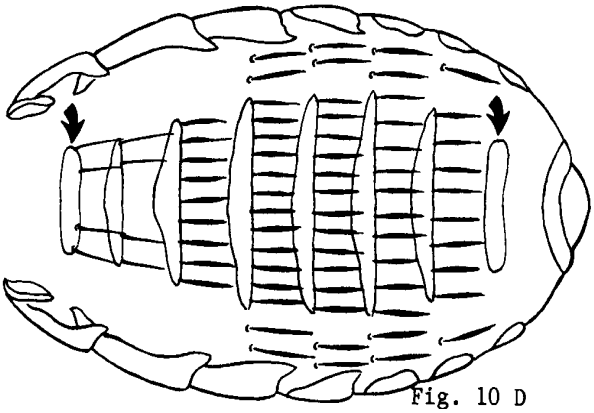


Fig. 10 D

Key to Species of Haemodipsus

1. Thoracic sternal plate almost three times as wide as long (Fig. 1 A). On domestic rabbits (Oryctolagus).....Haemodipsus ventricosus (Denny)

   Thoracic sternal plate hexogonal, being almost as long as wide (Fig. 1 B). On wild rabbits and hares (Sylvilagus and Lepus).....Haemodipsus setoni Ewing

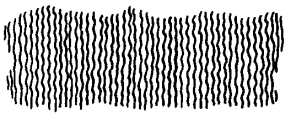


Fig. 1 A

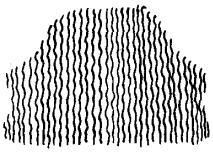


Fig. 1 B

Key to Species of Neohaematopinus

1. Thoracic sternal plate concave on posterior margin (Fig. 1 A).....2

   Thoracic sternal plate somewhat oval, and convex on posterior margin (Fig. 1 B).....11

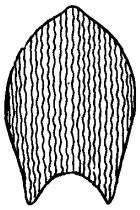


Fig. 1 A

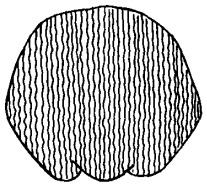


Fig. 1 B

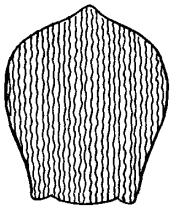


Fig. 1 C

2. Paratergal plates 3 to 6 with three spines on posterior margins (Fig. 2 A).....3

   Paratergal plates 3 to 6 with two spines on posterior margins (Fig. 2 B).....5

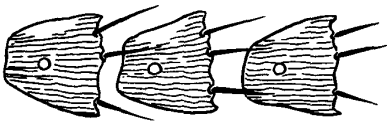


Fig. 2 A

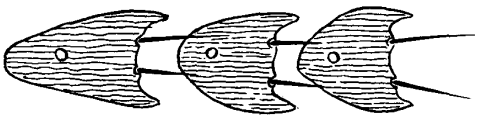


Fig. 2 B

3. Posterior angle of first antennal segment with a stout spine (Fig. 3 A). On Eutamias... .....Neohaematopinus pacificus (Kellogg & Ferris)

   Posterior angle of first antennal segment without a stout spine (Fig. 3 B).....4

Fig. 3 A

Fig. 3 B

4. Abdominal tergal and sternal plates present on each segment in both sexes (Fig. 4 A).... On Citellus tereticaudus.....Neohaematopinus citellinus Ferris

Abdominal tergal and sternal plates absent in the middle segments of female; male with only sternal plates absent (Fig. 4 B). On Citellus spilosoma..... .....Neohaematopinus spilosomae Stojanovich & Pratt

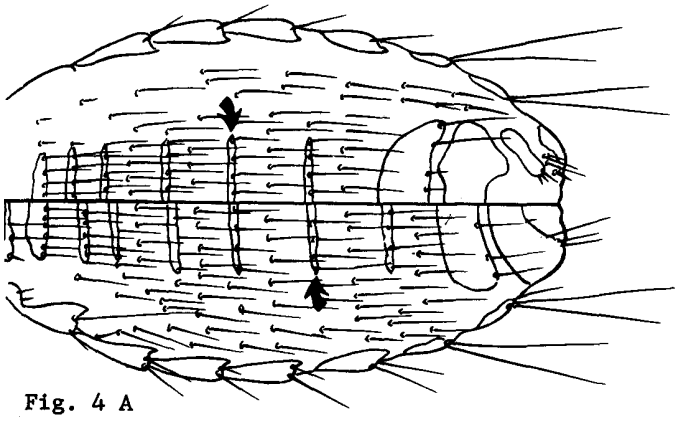


Fig. 4 A

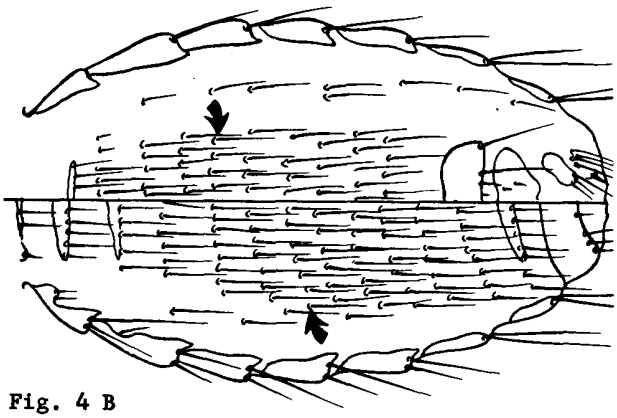


Fig. 4 B

5. First antennal segment prolonged posterio-apically, with stout spine (Fig. 5 A).....6

First antennal segment without such a prolongation (Fig. 5 B).....8

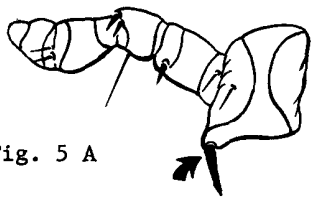


Fig. 5 A

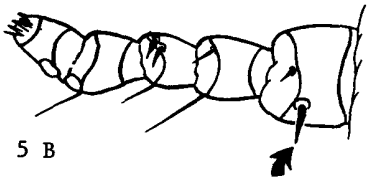


Fig. 5 B

6. Female without sternal and tergal plates on abdominal segments except for the normal terminal and genital segments (Fig. 6 A). On Sciurus griseicolus..... .....Neohaematopinus griseicolus Ferris

Female with sternal and tergal plates on all abdominal segments (Fig. 6 B).....7

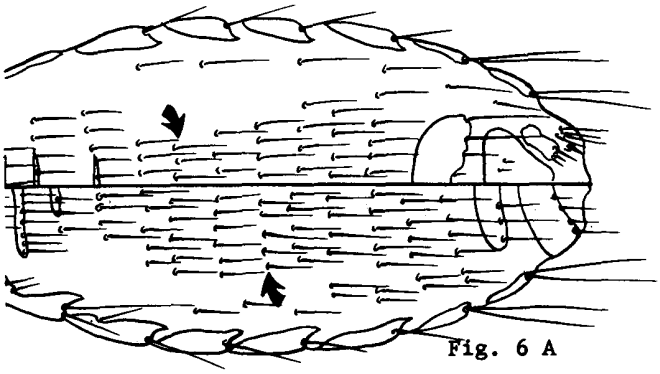


Fig. 6 A

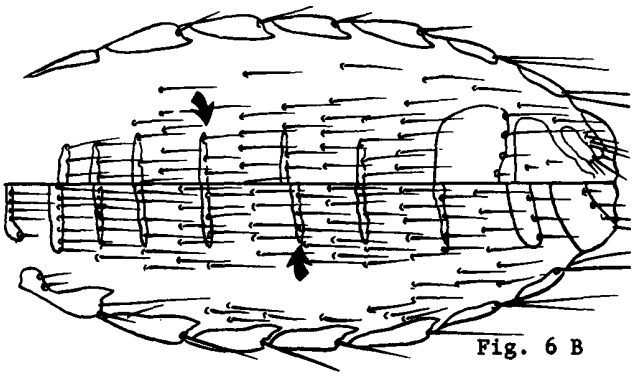


Fig. 6 B

7. Second antennal segment with short spine-like seta on posterior margin (Fig. 7 A)..... On Tamias hudsonicus.....Neohaematopinus semifasciatus Ferris

Second antennal segment without spine-like seta (Fig. 7 B). On Sciurus niger..... .....Neohaematopinus sciurinus Mjöberg

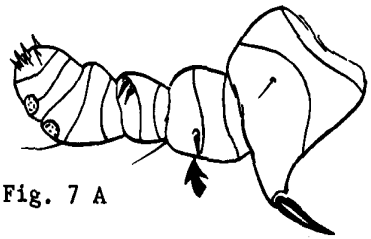


Fig. 7 A

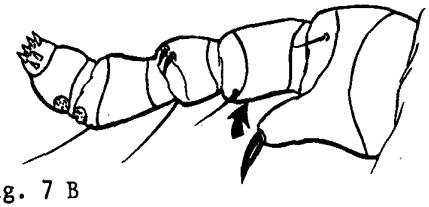


Fig. 7 B

8. Abdominal sternal and tergal plates absent in female; male with only sternal plates absent (Fig. 8 A). On Neotoma cinerea.....Neohaematopinus inornatus Ferris

Abdominal sternal and tergal plates present in both sexes (Fig. 9 A).....9

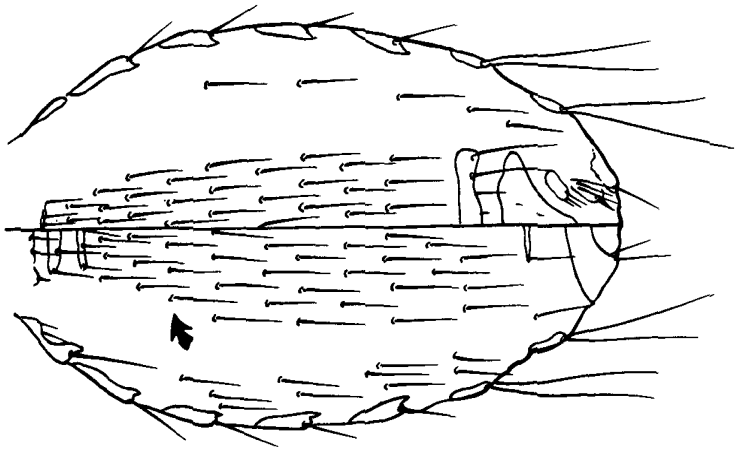


Fig. 8 A

9. A row of setae present on membrane between most of the sternal and tergal plates of abdomen (Fig. 9 A).....10

Membrane between the abdominal sternal and tergal plates without a row of setae (Fig. 9 B). On Glaucomys.....Neohaematopinus sciuropteri (Osborn)

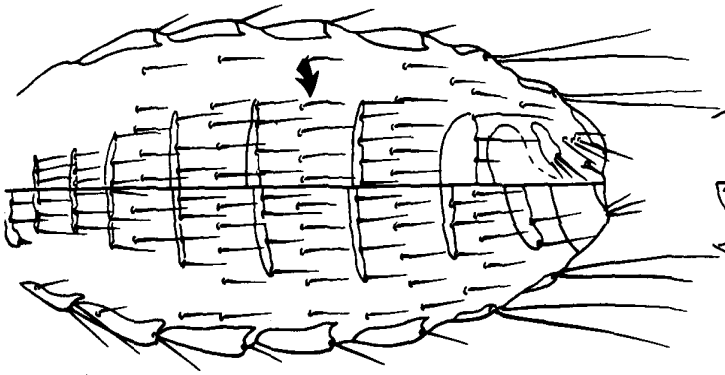


Fig. 9 A

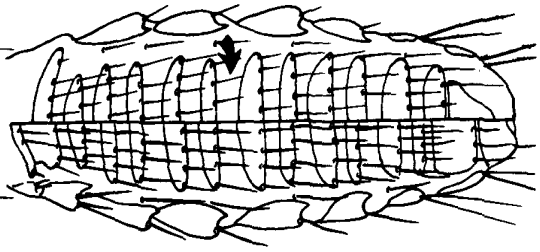


Fig. 9 B

10. First antennal segment with a spine-like seta at the posterio-apical angle (Fig. 10 A) On Sciurus carolinensis.....Neohaematopinus sciuri Jancke

First antennal segment with a spine-like seta set somewhat away from the margin in the posterio-apical angle (Fig. 10 B). On Neotoma albigula, streatori and micropus..... .....Neohaematopinus neotomae Ferris

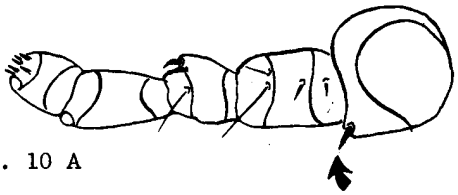


Fig. 10 A

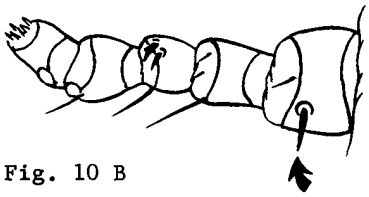


Fig. 10 B

11. Thoracic spiracle small, about one-fourth length of second coxa (Fig. 11 A)..... On Citellus and Cynomys.....Neohaematopinus laeviusculus (Grube)

Thoracic spiracle larger, almost one-half length of second coxa (Fig. 11 B)..... On Marmota.....Neohaematopinus marmotae Ferris

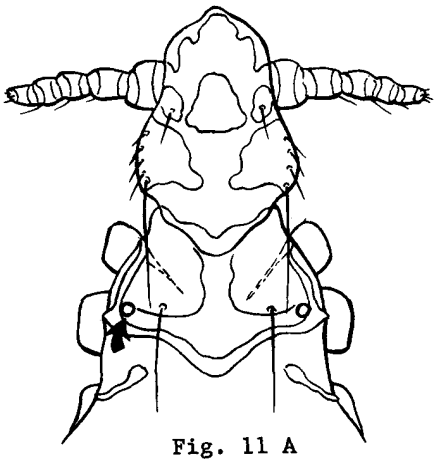


Fig. 11 A

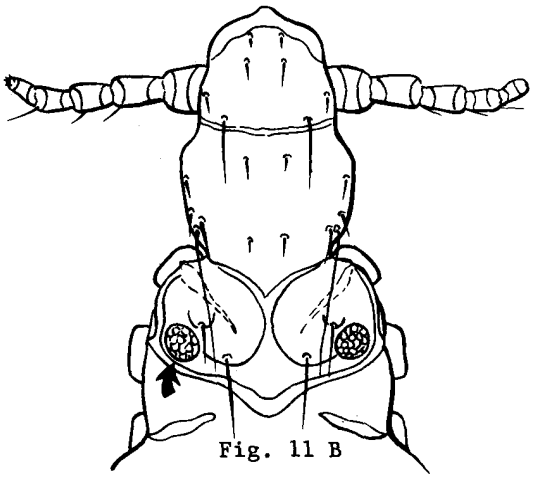


Fig. 11 B

Key to Species of Polyplax

1. Sternal plate of thorax rounded or pointed posteriorly (Fig. 1 A).....2

   Sternal plate of thorax truncate posteriorly (Fig. 1 B). On Peromyscus and Onychomys... .....Polyplax auricularis Ferris

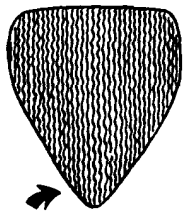


Fig. 1 A

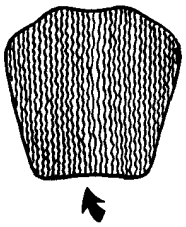


Fig. 1 B

2. Paratergal plate 4 with both setae short or subequal (Fig. 2 A).....3

   Paratergal plate 4 with dorsal seta longer than ventral seta; usually as long or longer than plate (Fig. 2 B). On house mouse.....Polyplax serrata (Burmeister)

Fig. 2 A

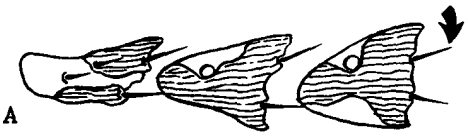
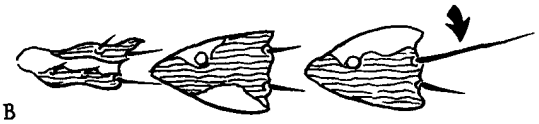


Fig. 2 B



3. Paratergal plates 3-5 with both apical angles produced into points (Fig. 3 A)..... On microtene mice.....4

   Paratergal plates 3-5 with only dorsal apical angle produced into a point (Fig. 3 B).... On Rattus.....Polyplax spinulosa (Burmeister)

Fig. 3 A

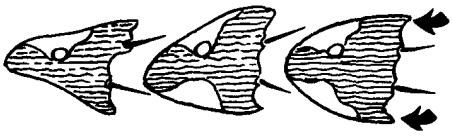
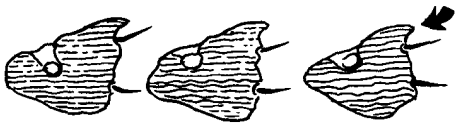


Fig. 3 B



4. First abdominal sternal plate strongly arcuate and with its lateral angles somewhat prolonged (Fig. 4 A).....Polyplax borealis Ferris

   First abdominal sternal plate not arcuate, its posterior margin almost straight and lateral angles not produced (Fig. 4 B).....Polyplax alaskensis Ewing

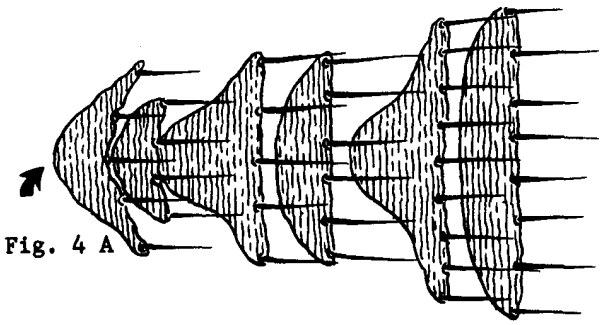


Fig. 4 A

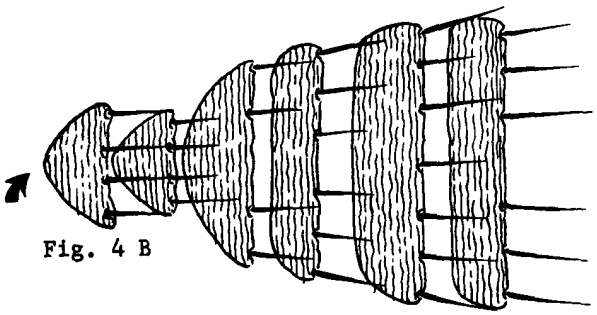


Fig. 4 B

Key to Genera of Linognathidae

1. Sternal plate of thorax at least half as wide as long (Fig. 1 A).....Solenopotes

   Sternal plate of thorax small and slender or completely lacking (Fig. 1 B)..Linognathus

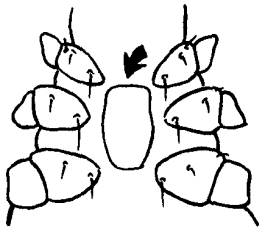


Fig. 1 A

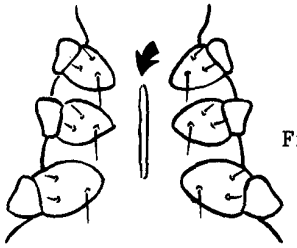


Fig. 1 B

Key to Species of Linognathus

1. Head about as broad as long; antennae almost as long as head (Fig. 1 A).....2

   Head almost twice as long as wide or longer; antennae noticeably shorter than head (Fig. 1 B).....3

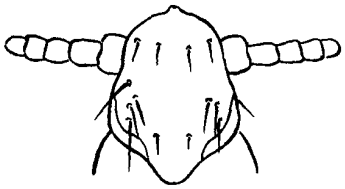


Fig. 1 A

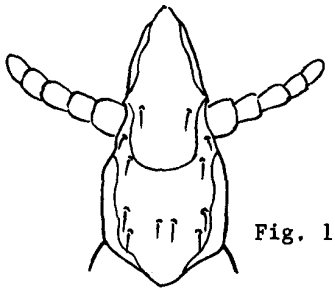


Fig. 1 B

2. Thoracic dorsum with four long setae; head slightly longer than broad (Fig. 2 A). On dogs, foxes and ferrets. Dog sucking louse.....Linognathus setosus (von Olfers)

   Thoracic dorsum with two long setae; head definitely as broad as long (Fig. 2 B)..... Sheep foot louse.....Linognathus pedalis (Osborn)

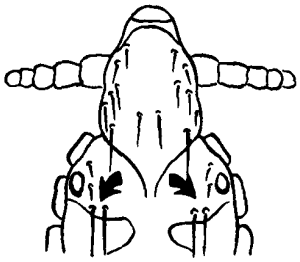


Fig. 2 A

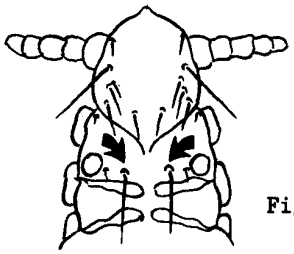


Fig. 2 B

3. Fore head acutely conical and much elongated; female gonopod with a sclerotized hook (Fig. 3 A & B). On cattle. Long-nosed cattle louse.....Linognathus vituli (Linnaeus)

Fore head rounded (Fig. 3 C); female gonopod rounded or with a slight tooth (Fig. 5 B & C). On sheep and goats.....4

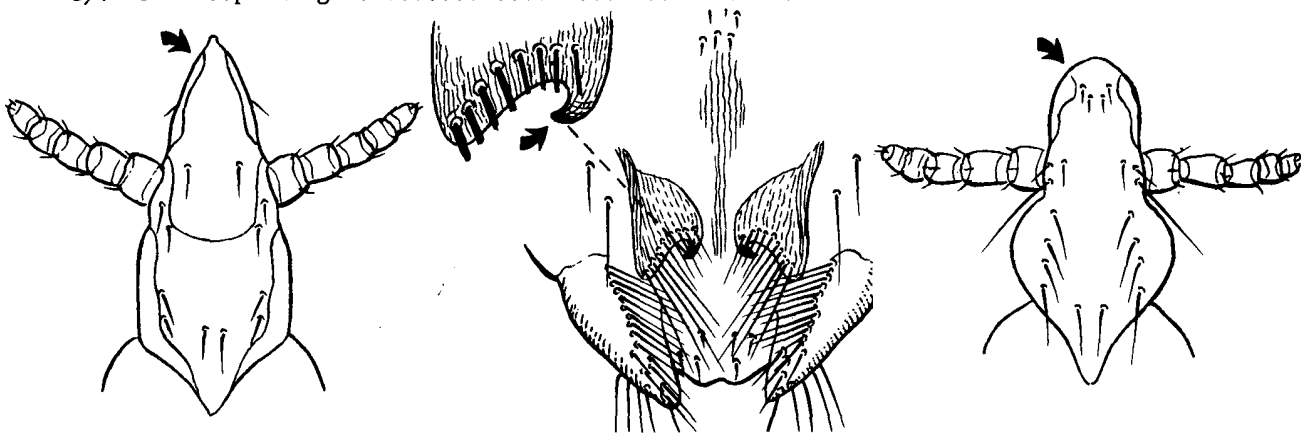


Fig. 3 A Fig. 3 B Fig. 3 C

4. Head greatly expanded behind antennae; female gonopod rounded (Fig. 4 A & B). Goat sucking louse.....Linognathus africanus (Kellogg & Paine)

Head not greatly expanded behind antennae (Fig. 4 C).....5

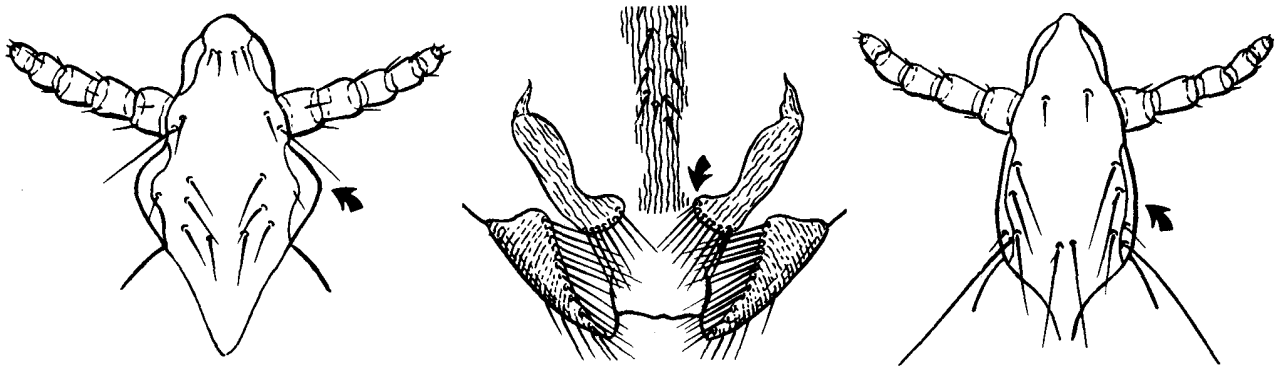


Fig. 4 A Fig. 4 B Fig. 4 C

5. Thoracic spiracle large and conspicuous; female gonopod rounded (Fig. 5 A & B). Sheep louse.....Linognathus ovillus (Neumann)

Thoracic spiracle not large and conspicuous; female gonopod with a slight tooth (Fig. 5 C & D). Goat sucking louse.....Linognathus stenopsis (Burmeister)

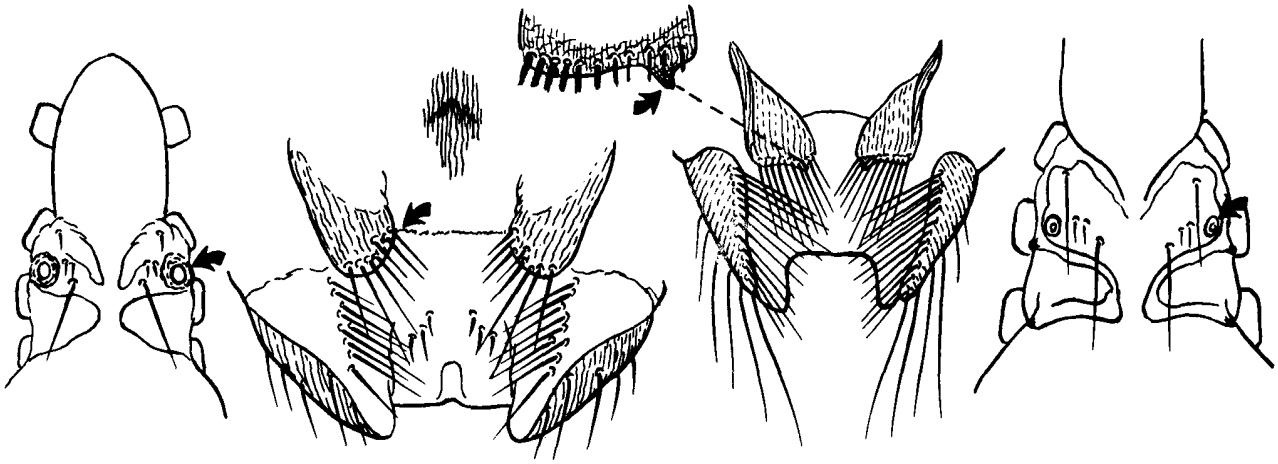


Fig. 5 A Fig. 5 B Fig. 5 C Fig. 5 D

Key to Species of Solenopotes

1. Abdominal spiracles strongly protuberant (Fig. 1 A); female genitalia with apical processes strongly constricted near middle (Fig. 1 B);-male genitalia as in figure 2 E. On cattle. Little blue cattle louse.....Solenopotes capillatus Enderlein

   Abdominal spiracles only slightly protuberant (Fig. 1 C); female genitalia with apical processes not constricted (Fig. 1 D & E); male genitalia as in figures 2 C & D. On deer.....2

Fig. 1 A

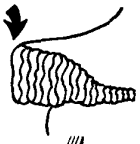


Fig. 1 C

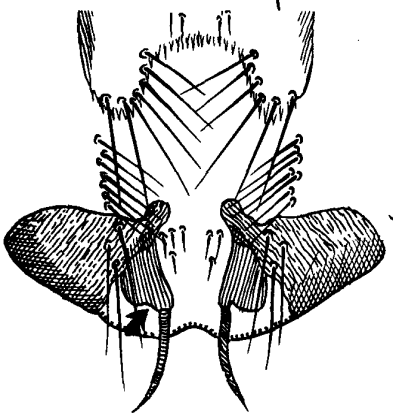


Fig. 1 B (capillatus)

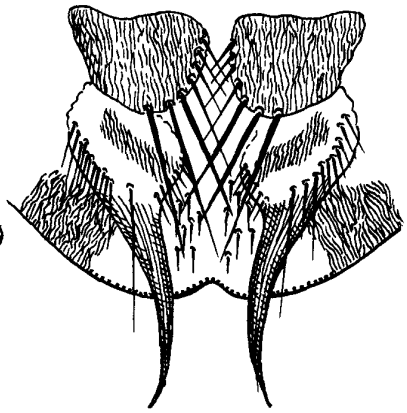


Fig. 1 D (binipilosus)

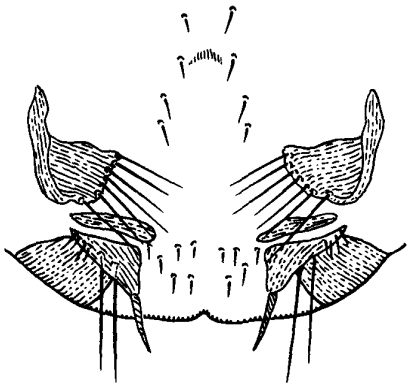


Fig. 1 E (ferrisi)

2. Neck present, head with distinct posterior-lateral angles (Fig. 2 A); female genitalia as in figure 1 E; male genitalia as in figure 2 C.....Solenopotes ferrisi (Fahrenholz)

   Head without distinct posterior-lateral angles (Fig. 2 B); female genitalia as in figure 1 D ; male genitalia as in figure 2 D.....Solenopotes binipilosus (Fahrenholz)

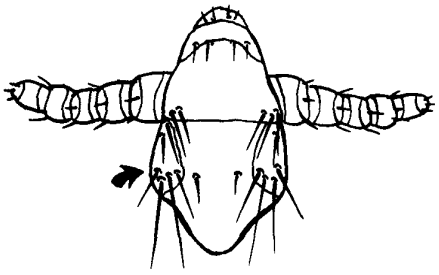


Fig. 2 A

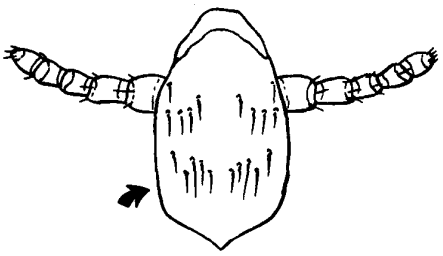


Fig. 2 B

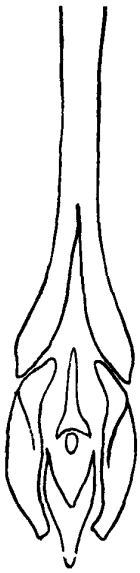


Fig. 2 C (ferrisi)

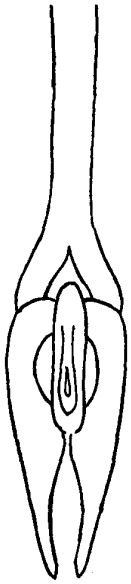


Fig. 2 D (binipilosus)

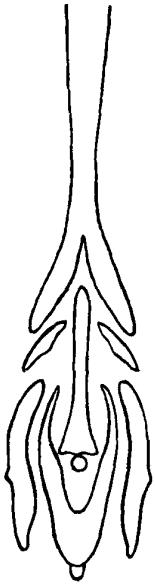


Fig. 2 E (capillatus)

Key to Genera of Pediculidae

1. Abdomen much longer than basal width; without hairy tubercles (Fig. 1 A). Head and body louse.....*Pediculus humanus* Linnaeus

   Abdomen about as long as basal width; with hairy tubercles (Fig. 1 B). Crab louse.... .....*Pthirus pubis* (Linnaeus)

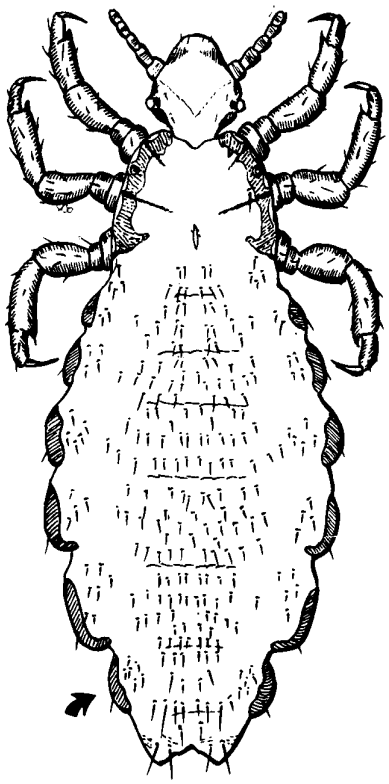


Fig. 1 A

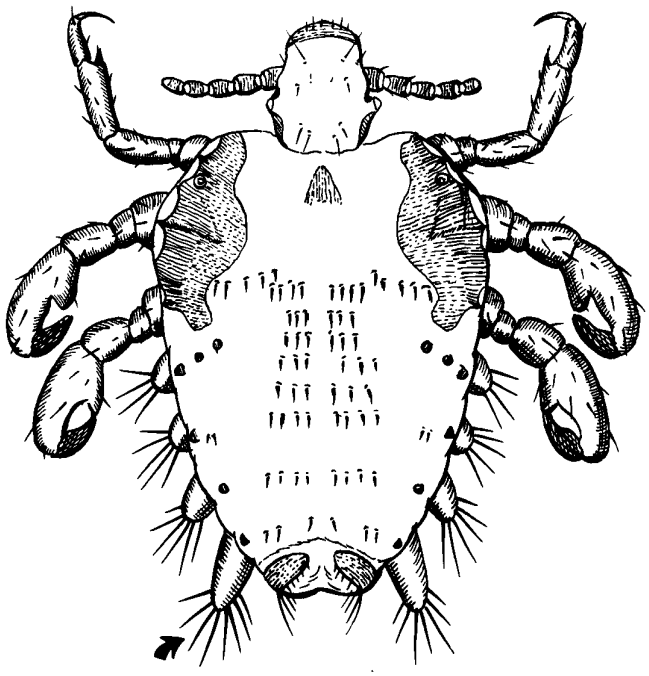
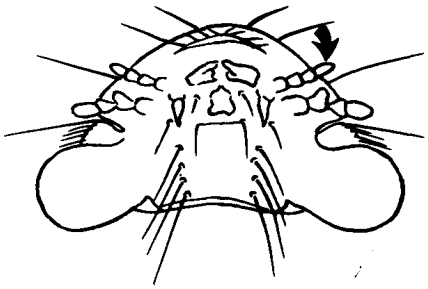


Fig. 1 B

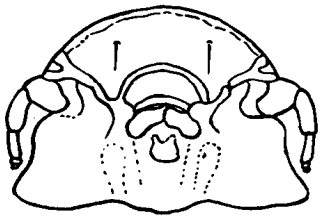
MALLOPHAGA: PICTORIAL KEY TO SPECIES INFESTING PIGEONS

Harold George Scott and Chester J. Stojanovich

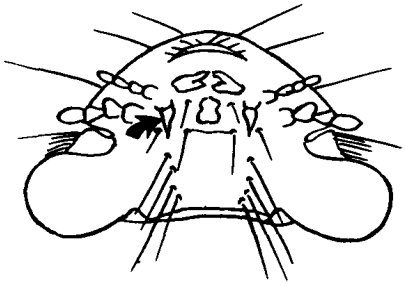
maxillary palps present



maxillary palps absent

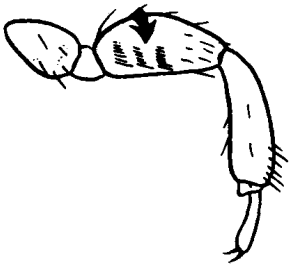


forehead with spines

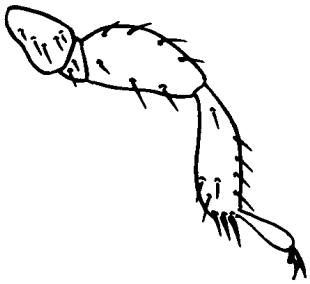


forehead without spines

femur III with comb



femur III without comb

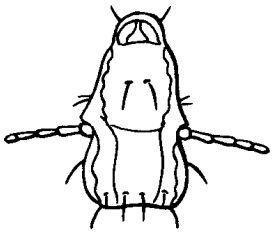


Hohorstiella lata
LARGE PIGEON BODY LOUSE

Colpocephalum turbinatum
SMALL PIGEON BODY LOUSE

Bonomiella columbae
PIGEON VENT LOUSE

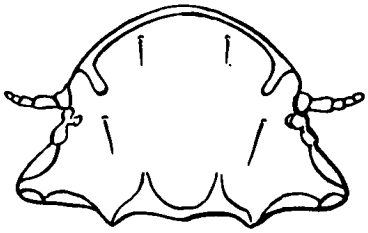
head longer than wide



head wider than long

forehead with spines

forehead without spines

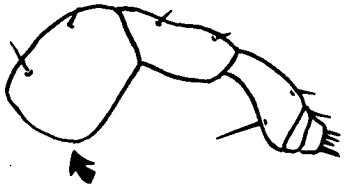


Columbicola columbae
SLENDER PIGEON LOUSE

Physconelloides zenaidurae
PIGEON HEAD LOUSE

male basal antennal segment small

male basal antennal segment large



Campanulotes bidentatus compar
SMALL PIGEON FEATHER LOUSE

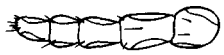
Coloceras damicorne fahrenholzi
LARGE PIGEON FEATHER LOUSE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE. Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

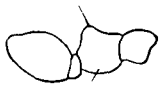
MALLOPHAGA: PICTORIAL KEY TO SOME COMMON SPECIES ON CHICKENS

Chester J. Stojanovich and Harry D. Pratt

antenna 5 segmented



antenna 4 segmented

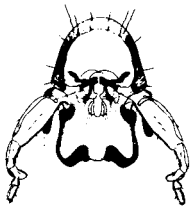


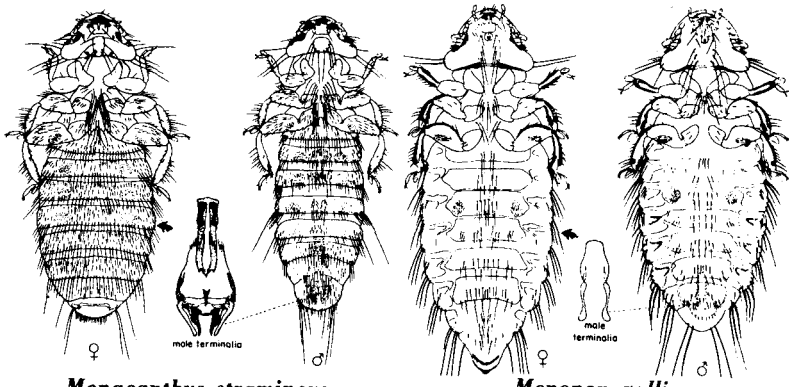
head longer than wide

head not longer than wide

abdomen densely covered with setae

abdomen not densely covered with setae





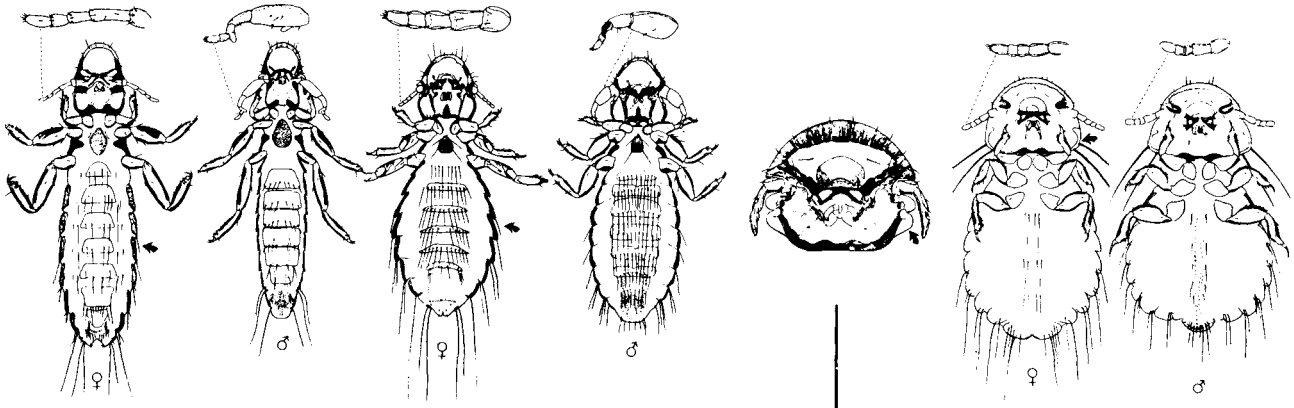
Menacanthus stramineus ***Menopon gallinae***

abdomen slender

abdomen oval

temples not evenly rounded

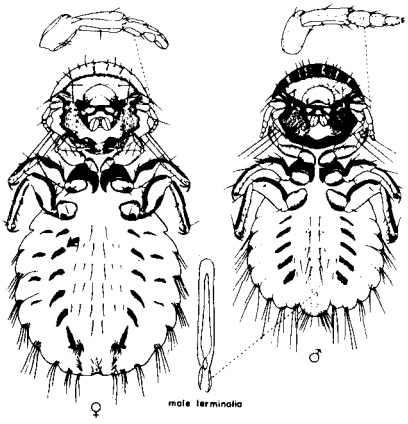
temples evenly rounded



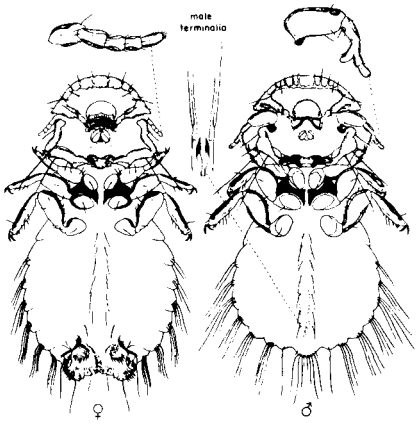
Lipeurus caponis ***Cuclutogaster heterographus*** ***Goniocotes hologaster***

abdomen with sclerotized markings

abdomen without sclerotized markings



Goniodes gigas



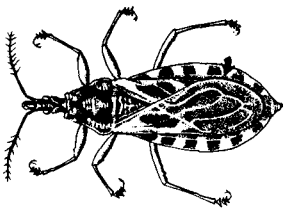
Goniodes dissimilis

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

BUGS: PICTORIAL KEY TO SOME SPECIES THAT MAY BITE MAN

Harry D. Pratt and Chester J. Stojanovich

wings usually well-developed; body elongate-oval

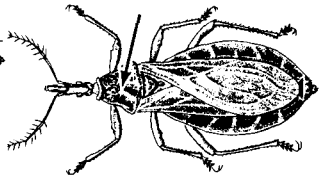


ASSASSIN AND KISSING BUGS-FAMILY REDUVIIDAE

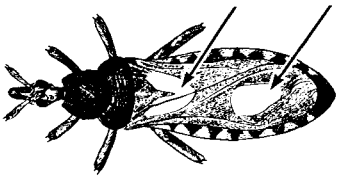
thorax with cog-wheel crest

WHEEL BUG
Arilus cristatus

thorax without crest

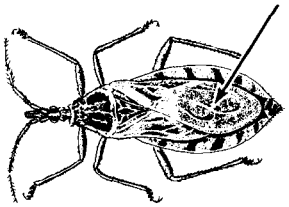


fore-wing with 2 yellow spots

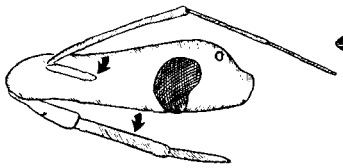


CORSAIR
Rasahus biguttatus

fore-wing dark in U. S. species

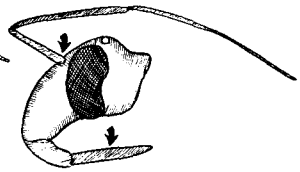


antenna inserted midway between eye and tip of head; beak slender, straight

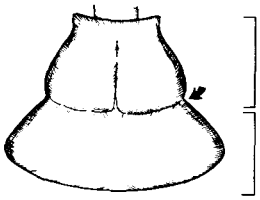


KISSING BUG
Triatoma spp

antenna inserted near eye; beak stout, curved

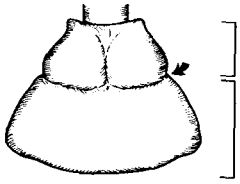


pronotum constricted behind middle



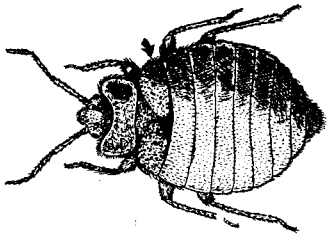
BLACK BUG
Melanolestes picipes

pronotum constricted before middle



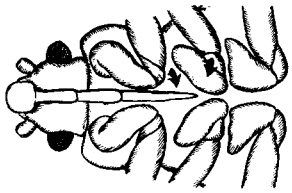
MASKED HUNTER
Reduvius personatus

wings reduced; body broadly-oval

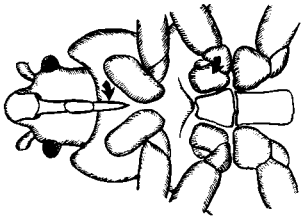


BED BUGS-FAMILY CIMICIDAE

middle coxae nearly touching
beak reaching 2nd coxa



middle coxae widely separated
beak not reaching 2nd coxa



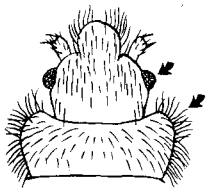
POULTRY BUG
Haematosiphon inodorus

3rd and 4th antennal segments equal

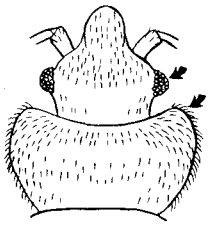
4th antennal segment shorter than 3rd

BARN SWALLOW BUG
Oeciacus vicarius

fringe hairs on pronotum longer than, or equal to, width of eye

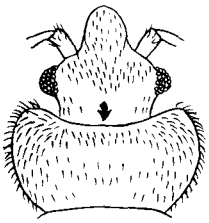


fringe hairs on pronotum shorter than width of eye



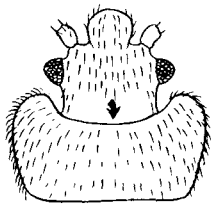
BAT BUGS
Cimex adjunctus E. N. AM.
Cimex pilosellus W. N. AM.

pronotum with anterior margin moderately excavated



TROPICAL BED BUG
Cimex hemipterus
SO. U.S. & TROPICS

pronotum with anterior margin deeply excavated



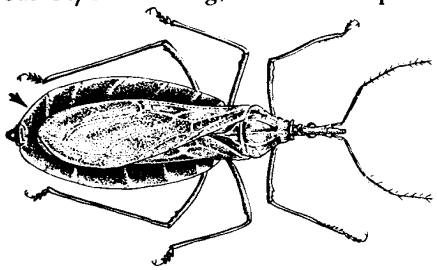
BED BUG
Cimex lectularius
TEMPERATE AREAS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

KISSING BUGS: PICTORIAL KEY TO SOME COMMON SPECIES IN THE UNITED STATES

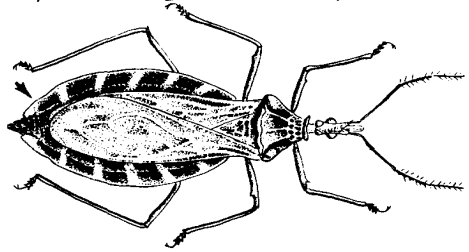
Harold George Scott and Margery R. Borom

about 1-1/4 inch long; connexivum pale



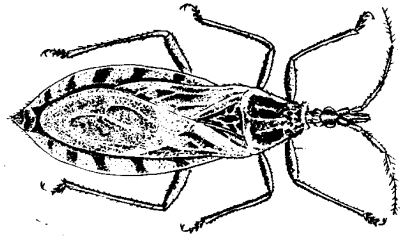
Triatoma recurva

about 1-1/8 inch long; connexivum yellow banded

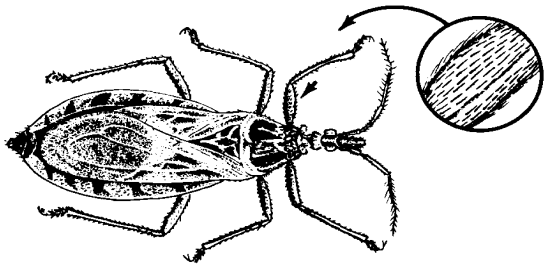


Triatoma gerstaeckeri

less than 1 inch long

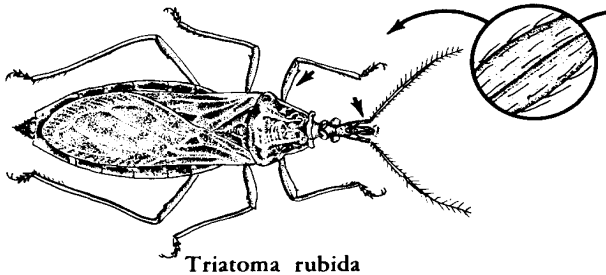


first femur with thick hair

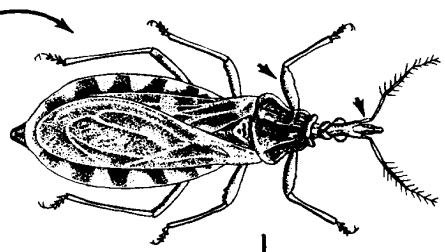


Triatoma lecticularius

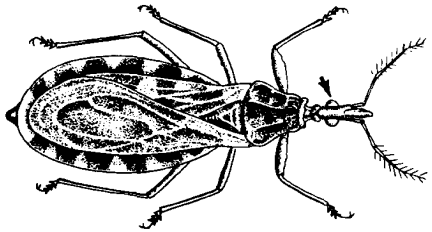
first antennal segment long ← first femur with sparse hair → first antennal segment short



Triatoma rubida

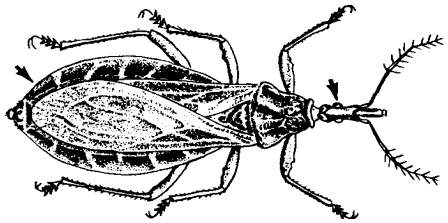


eyes large

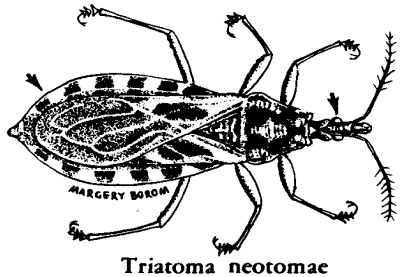


Triatoma sanguisuga

connexivum brown, pale banded or not ← eyes small → connexivum yellow banded



Triatoma protracta



Triatoma neotomae

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia — 1961

STINGING CATERPILLARS:
PICTORIAL KEY TO SOME IMPORTANT UNITED STATES SPECIES

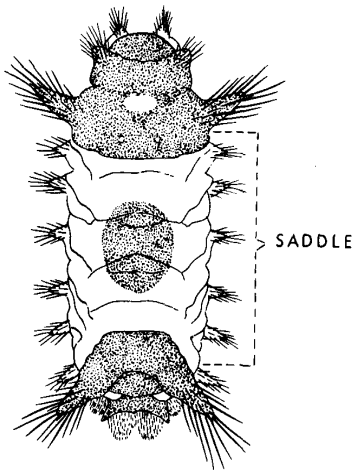
Harold George Scott & Chester J. Stojanovich

WITH DORSAL SADDLE

WITHOUT DORSAL SADDLE

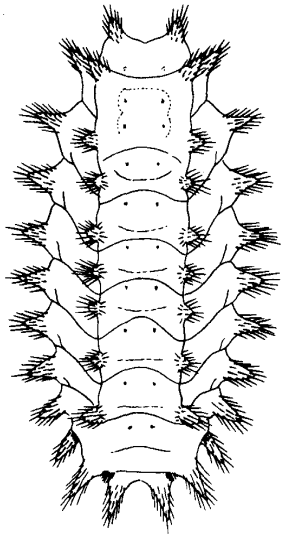
BODY FUR-LIKE

BODY NOT FUR-LIKE



SADDLEBACK CATERPILLAR
Sibine stimulae

PUSS CATERPILLAR
Megalopyge opercularis

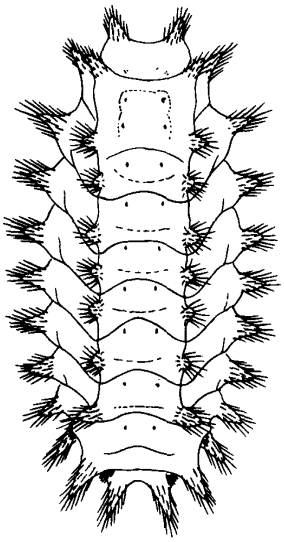


5 PROLEGS

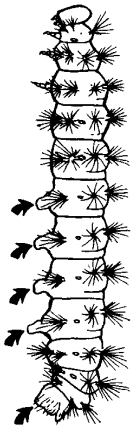
7 PROLEGS

ABOUT 3/4-INCH LONG, YELLOWISH GREEN

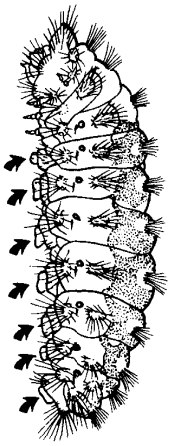
ABOUT 2 INCHES LONG, RED AND WHITE



A SLUG CATERPILLAR
Euclea chloris



IO MOTH CATERPILLAR
Automeris io



A FLANNEL MOTH CATERPILLAR
Norape cretata

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

MOTHS: KEY TO SOME SPECIES COMMONLY ASSOCIATED WITH STORED FOOD

Harold George Scott

1. Caterpillars 2
   Adult moths 5

2. Pinkish larvae up to 3/5-inch long living in silken tubes and producing matter webbing in the infested food *(Anagasta kuhniella)* . . . . . MEDITERRANEAN FLOUR MOTH
   Whitish larvae with or without black or orange markings 3

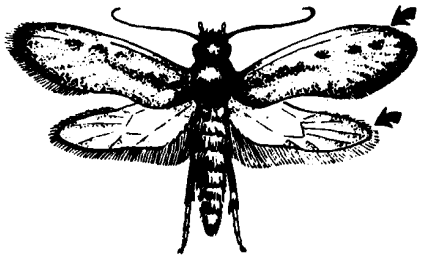
3. Black head and prothorax; orange markings at both ends of the body; living in silken tubes *(Pyralis farinalis)* . . . . . MEAL MOTH
   Without black head and prothorax 4

4. White to greenish-white larvae producing matter webbing in the infested food *(Plodia interpunctella)* . . . . . INDIAN MEAL MOTH
   Whitish; not producing matted webbing; living inside kernels of grain *(Sitotroga cerealella)* . . . . . ANGOUMOIS GRAIN MOTH

5. Wings unicolorous to slightly spotted; long fringe at rear of wings *(Sitotroga cerealella)* . . . . . ANGOUMOIS GRAIN MOTH
   Wings heavily dark marked 6

6. Distal half of front wings dark; basal half light *(Plodia interpunctella)* . . . . . INDIAN MEAL MOTH
   Wings not so marked 7

7. Basal and distal thirds of front wings dark; middle portion of front wings light *(Pyralis farinalis)* . . . . . MEAL MOTH
   Front wings pale gray with transverse wavy black markings *(Anagasta kuhniella)* . . . . . MEDITERRANEAN FLOUR MOTH



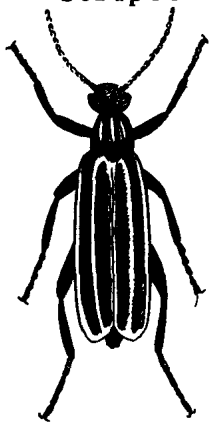
Angoumois Grain Moth

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch,
Atlanta, Georgia – 1963

BLISTER BEETLES: KEY TO SOME COMMON UNITED STATES SPECIES

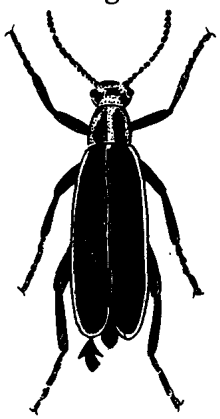
Harold George Scott and Chester J. Stojanovich

striped



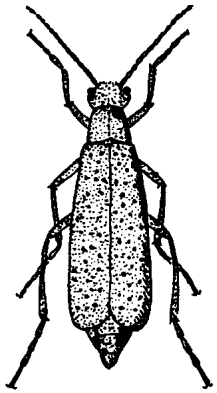
Epicauta vittata
STRIPED BLISTER BEETLE

margined



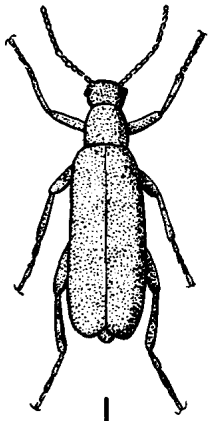
Epicauta pestifera
MARGINED BLISTER BEETLE

spotted

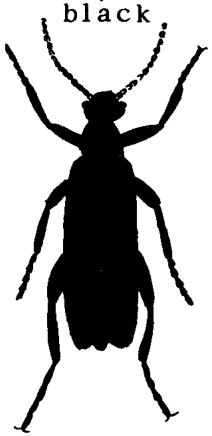


Epicauta cinerea maculata
SPOTTED BLISTER BEETLE

essentially unicolorous

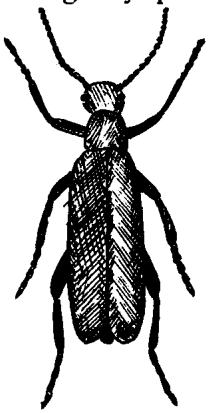


black



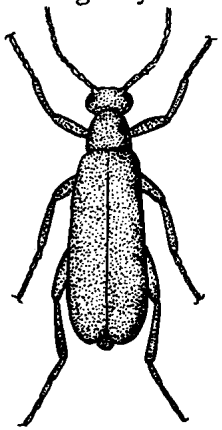
Epicauta pennsylvanica
BLACK BLISTER BEETLE

black with gray pubescense



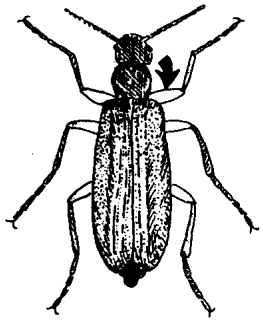
Epicauta cinerea cinerea
CLEMATIS BLISTER BEETLE

gray



Epicauta fabrici
ASH-GRAY BLISTER BEETLE

metallic blue with red-yellow leg bases

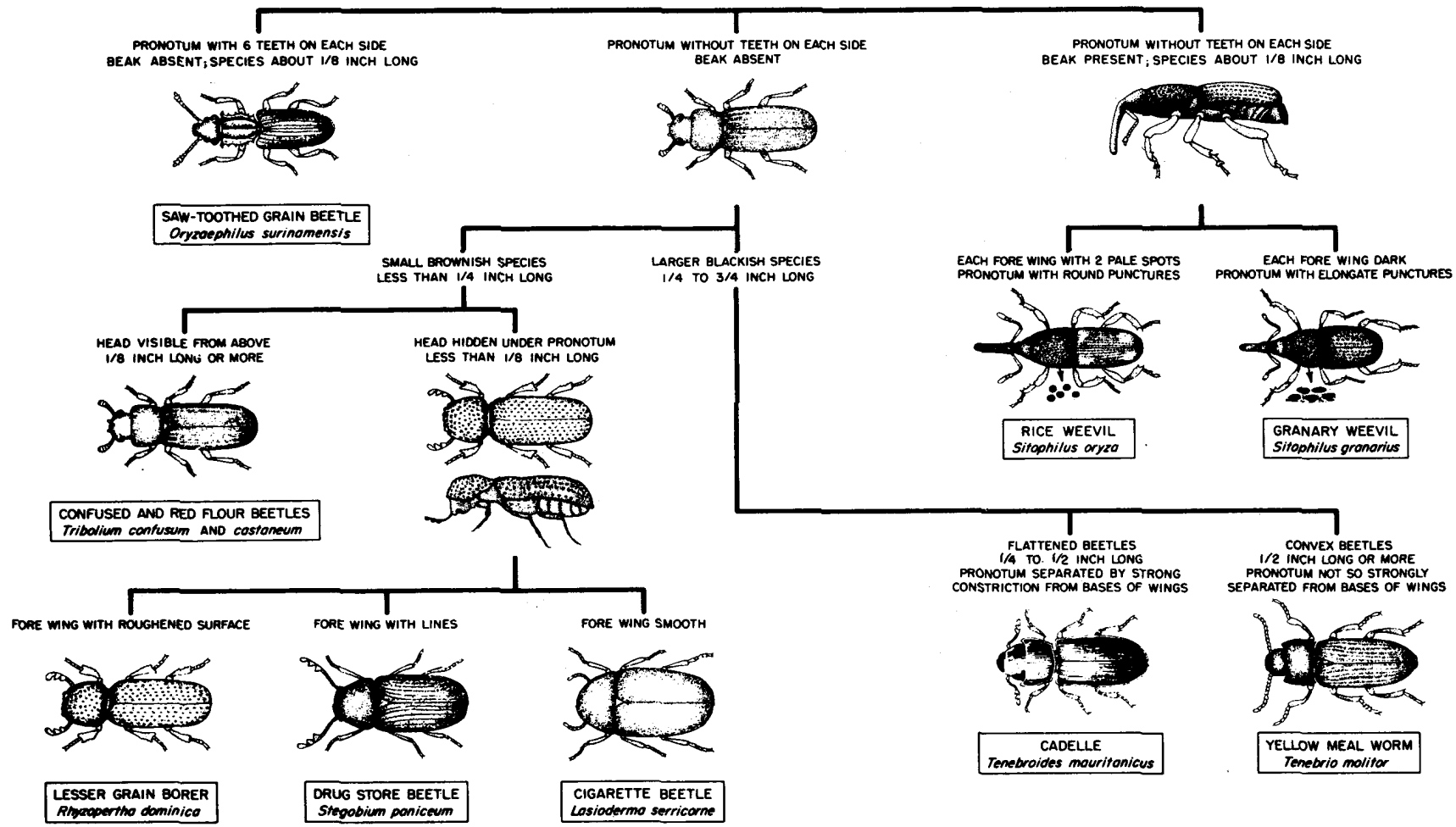


Pomphopoea sayi
SAY BLISTER BEETLE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

BEETLES: PICTORIAL KEY TO SOME SPECIES COMMONLY ASSOCIATED WITH STORED FOODS

Harry D. Pratt



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1958

STINGING HYMENOPTERA:
PICTORIAL KEY TO SOME COMMON UNITED STATES FAMILIES

Harold George Scott and Chester J. Stojanovich

wings absent

body fur-like
without node

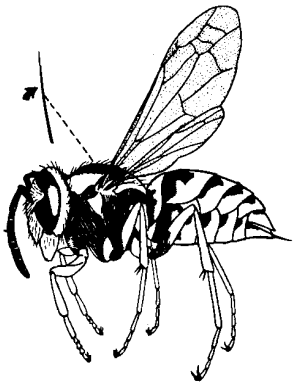
Mutillidae
VELVET ANTS

body not fur-like
with node

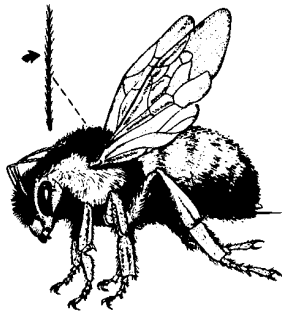
Formicidae
ANTS

wings present

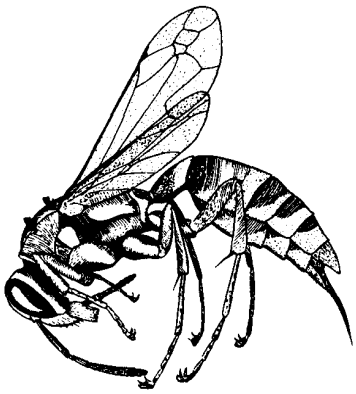
hairs not feathered
(use 20 X magnification)



hairs feathered
(use 20 X magnification)

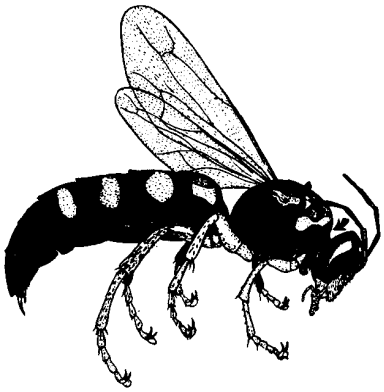


pronotum long, reaching tegula



Vespidae
WASPS, YELLOW JACKETS, HORNETS

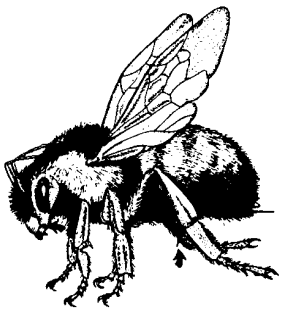
pronotum short, not reaching tegula



Sphecidae
SPHECID WASPS

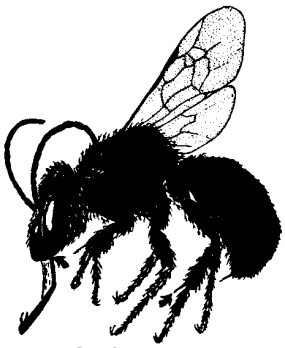
hind tibia with spurs

eye not reaching mandible



Bombidae
BUMBLE BEES

eye reaching mandible



Andrenidae
SWEAT BEES

hind tibia without spurs

Apidae
HONEY BEES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

DIAGRAM OF SOCIAL WASP

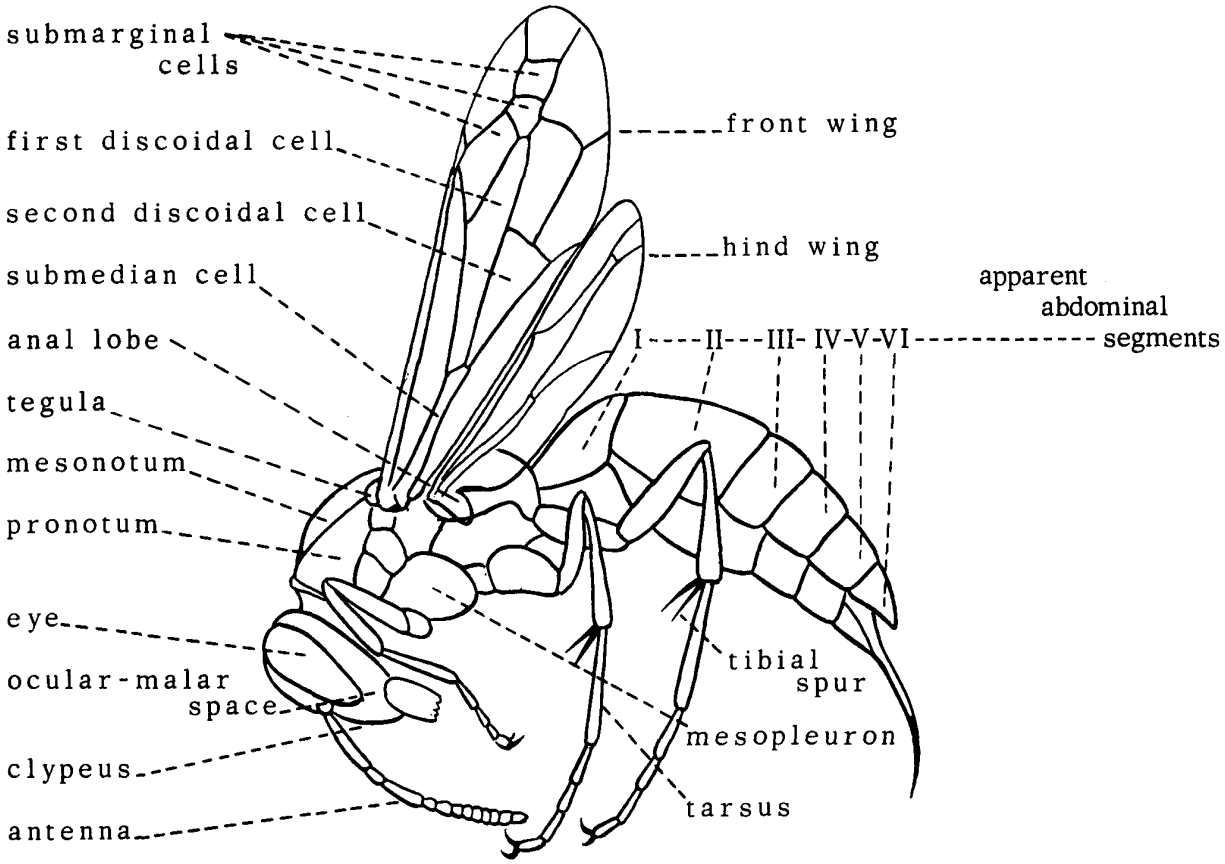
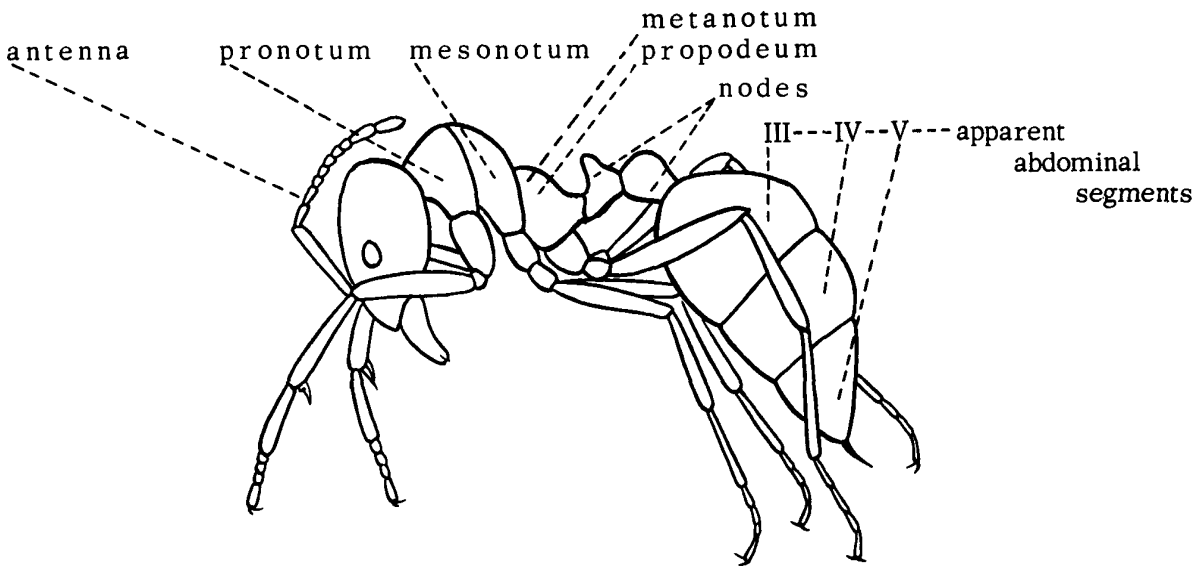


DIAGRAM OF FIRE ANT



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963. **Chester J. Stojanovich**

HYMENOPTERA: KEY TO SOME COMMON SPECIES WHICH STING MAN

Harry D. Pratt and Chester J. Stojanovich

1. With wings (Fig. 1 A).....2

   Without wings (Fig. 1 B).....32

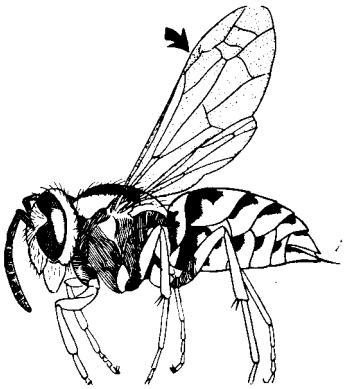


Fig. 1 A

Fig. 1 B

2. First (and sometimes second) segment of the abdomen node-like, clearly separated above and below from rest of abdomen (Fig. 2 A). Nest in ground, wood, or buildings (Family Formicidae).....ANT

   Abdomen with or without some constriction of first abdominal segments, but without true node formation of basal abdominal segments (Fig. 2 B).....3

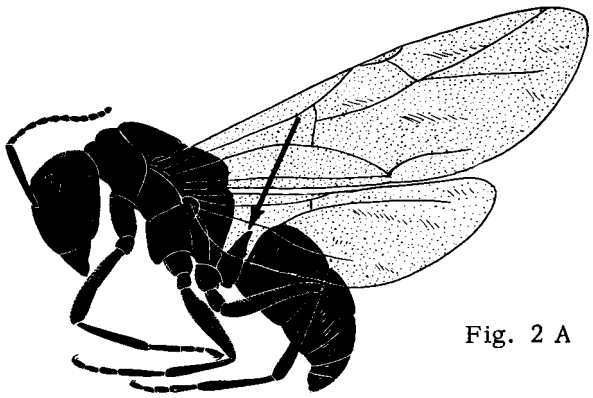


Fig. 2 A

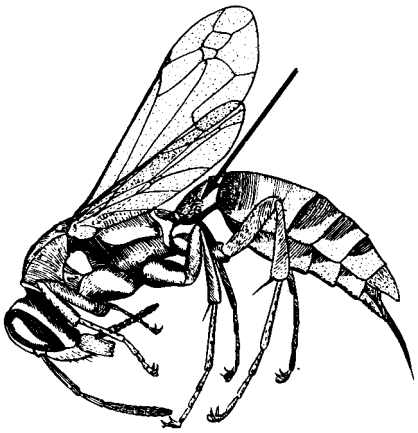


Fig. 2 B

3. All hairs on body simple, unbranched; hind tarsus slender, first segment not broadened or thickened (Fig. 3 A). (Superfamilies Vespoidea and Sphecoidea). Wasps and Hornets.....4

   At least some hairs on thorax branched or plumose; hind tarsus with first segment broadened and thickened, often densely hairy (Fig. 3 B). (Superfamily Apoidea). Bees.....27

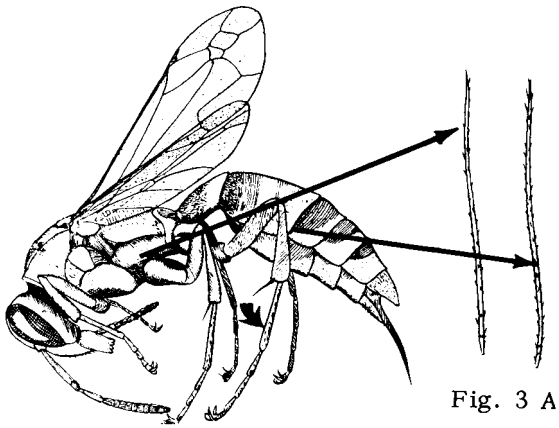


Fig. 3 A

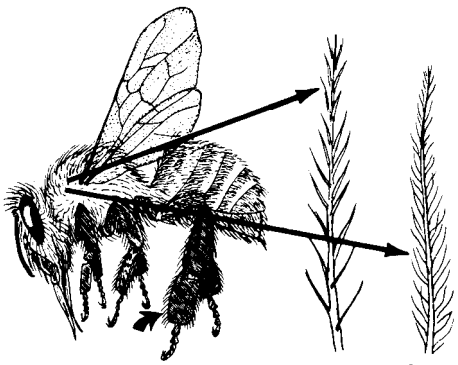


Fig. 3 B

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

4. Pronotum extending entirely, or almost back, to the tegula (the scale covering base of fore-wing), its hind angles not lobed (Fig. 4 A). (Superfamily Vespoidea).....5

Pronotum shortened, more or less collar-like, not extending back to tegula, its hind angles often produced into lobes (Fig. 4 B). (Superfamily Sphecoidea).....22

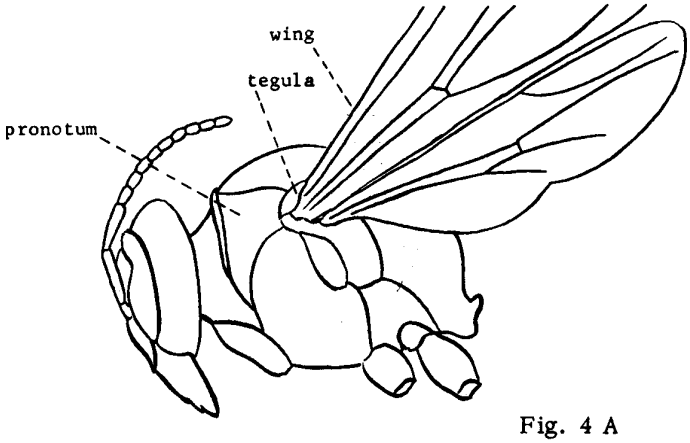


Fig. 4 A

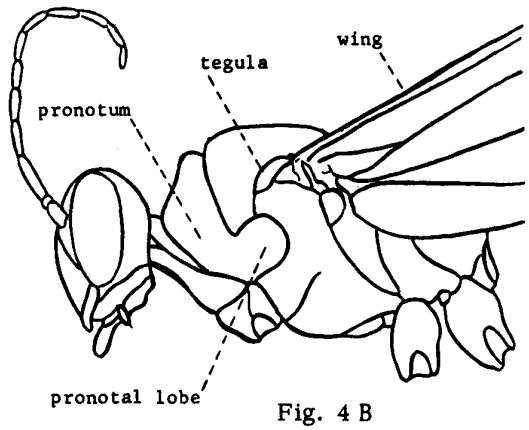


Fig. 4 B

5. Fore wing almost always folded when in repose; first discoidal cell very long, as a rule much longer than the submedian cell (Fig. 5 A). Both solitary and colonial species (Family Vespidae).....6

Fore wing very rarely folded; first discoidal cell shorter than submedian cell (Fig. 5 B). Solitary species.....21

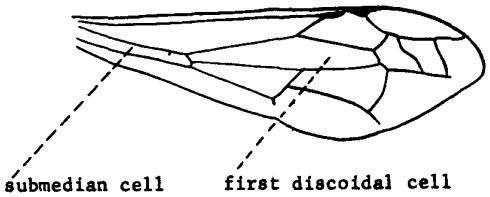


Fig. 5 A

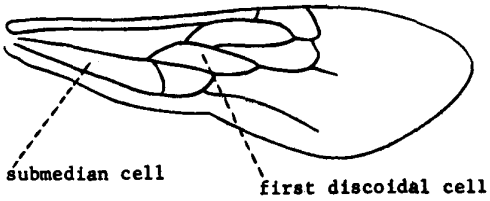


Fig. 5 B

6. One spur at tip of middle tibia; claws bifid, split at tip (Fig. 6 A). (Subfamily Eumeninae)..... Solitary Wasps.....18

Two spurs at tip of middle tibia; claws tapering to point (Fig. 6 B).....7

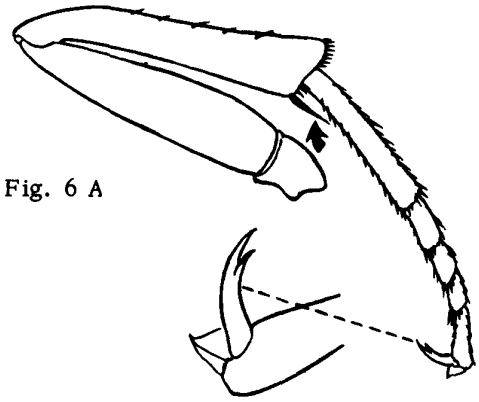


Fig. 6 A

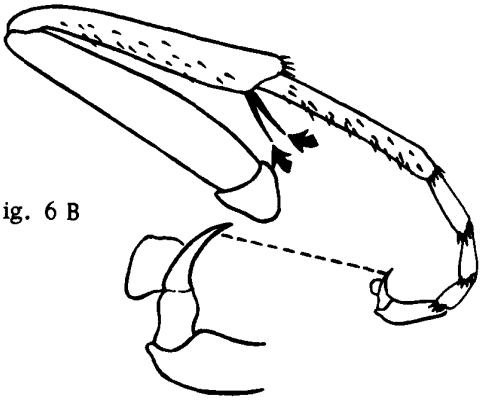


Fig. 6 B

7. Clypeus (upper lip) broadly truncate and more or less notched at apex (Fig. 7 A); hind wing without a lobe at anal angle (Fig. 7 B). (Subfamily Vespinae). Hornets, Yellow Jackets.....8

Clypeus somewhat pointed at apex (Fig. 7 C); hind wing with a lobe at anal angle (Fig. 7 D)..... (Subfamily Polistinae). Paper Wasps.....15

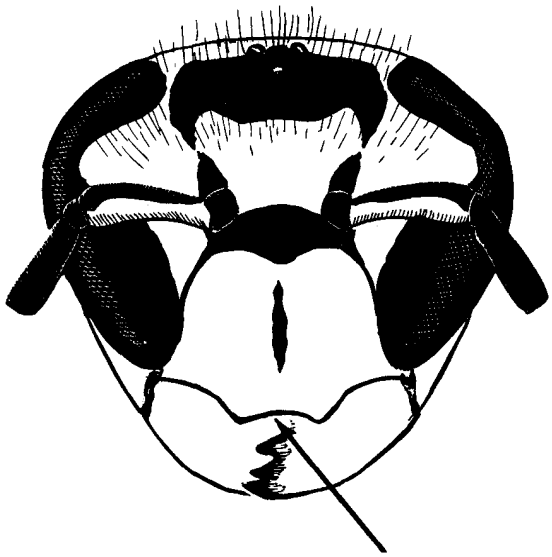


Fig. 7 A

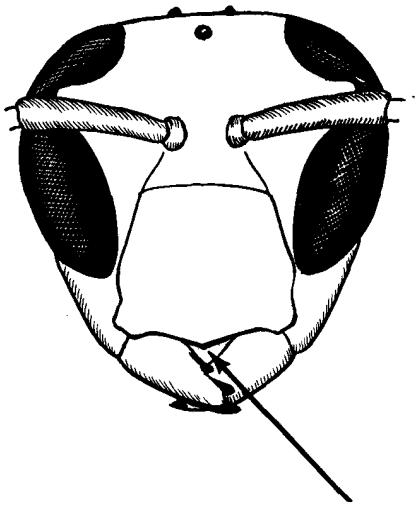


Fig. 7 C

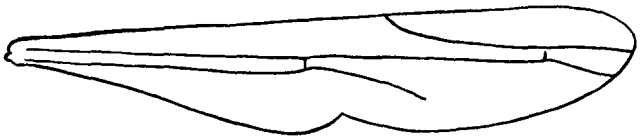


Fig. 7 B

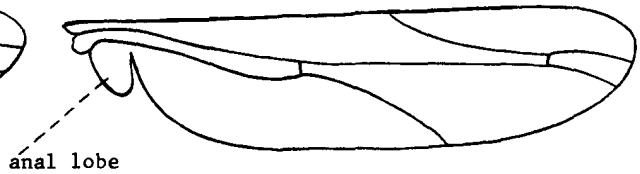


Fig. 7 D

8. Oculo-malar space long, more than half the length of next to last antennal segment; vertical carina on pronotum (Fig. 8 A).....9

Oculo-malar space short, less than half the length of next to last antennal segment; no vertical carina on pronotum (Fig. 8 B).....11

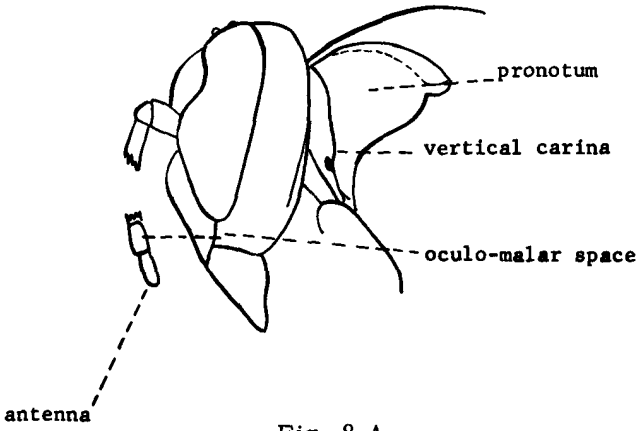


Fig. 8 A

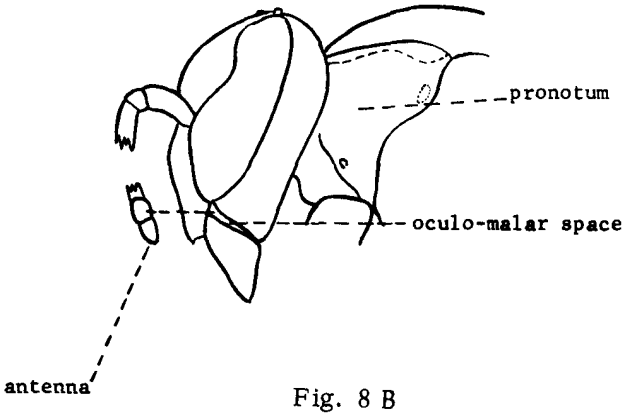


Fig. 8 B

9. Very large species, 20-30 mm. long, extensively reddish-brown; postocellar area of vertex at least as long as ocellar triangle in dorsal view (Fig. 9 A). Builds paper nest in homes or hollow trees. (Vespa crabo germana). . . . . GIANT HORNET

Smaller species, 8-20 mm. long; black species with white, ivory white, or yellowish markings; postocellar area of vertex not as long as ocellar triangle (Fig. 9 B). 10

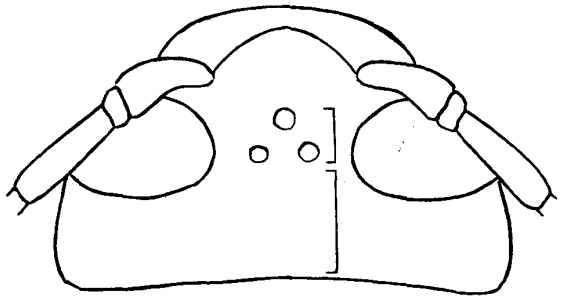


Fig. 9 A

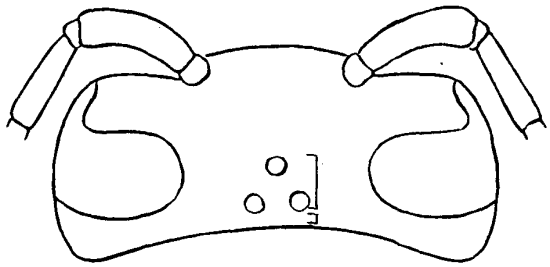
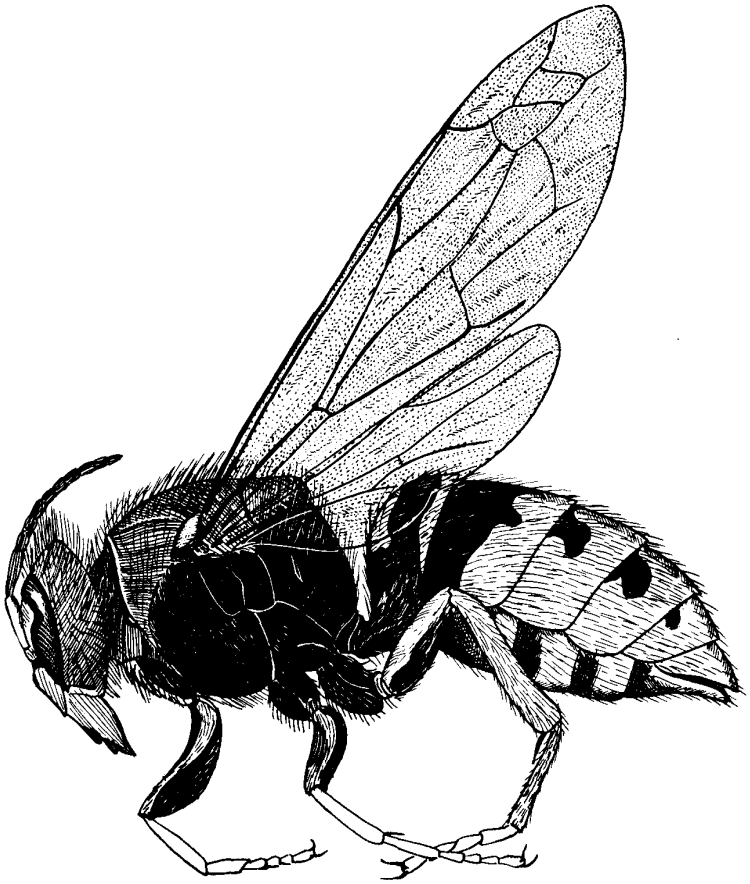


Fig. 9 B



10. Black and white species; first and second abdominal segments entirely black, sometimes with very narrow pale markings at tip of first segments in some males (Fig. 10 A). Builds enclosed globular nests under eaves or in trees. (Vespula maculata).....BALD-FACED HORNET

Black and yellow species; yellowish posterior margins of first and second abdominal segments deeply notched (Fig. 10 B). Builds globular paper nests under eaves or in trees..... (Vespula arenaria).....A YELLOW JACKET

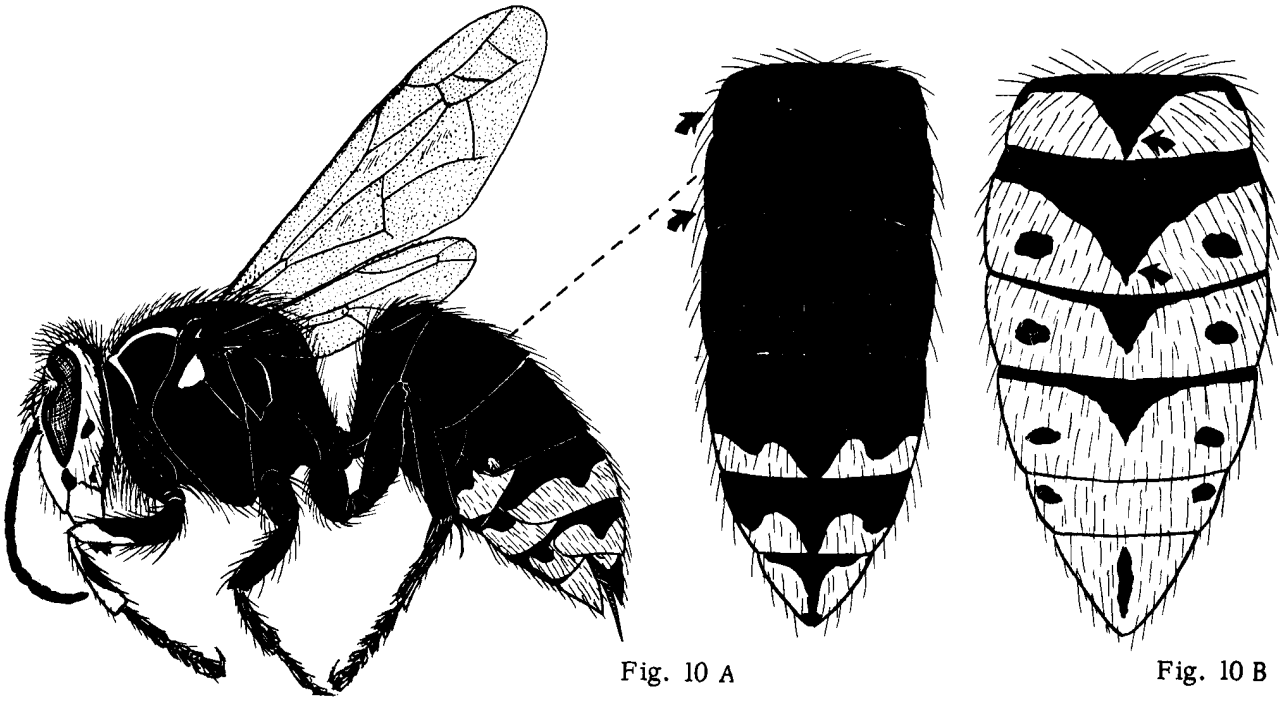


Fig. 10 A

Fig. 10 B

11. Black and white species (Fig. 11 A). Builds paper nest in ground or on trees..... (Vespula consobrina).....A HORNET

Black and yellowish species (Fig. 11 B). All build paper nests in ground.....12

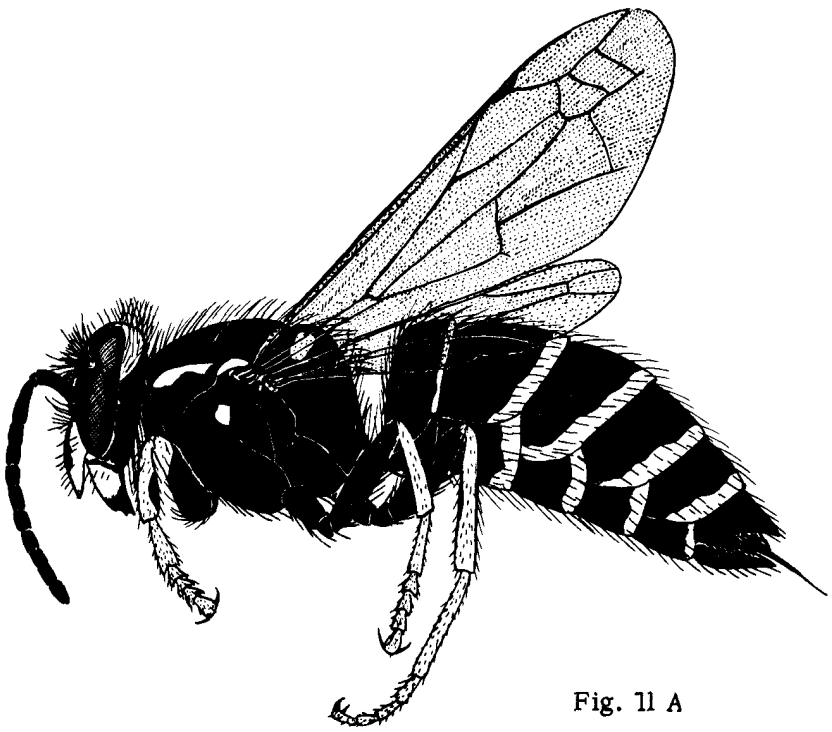


Fig. 11 A

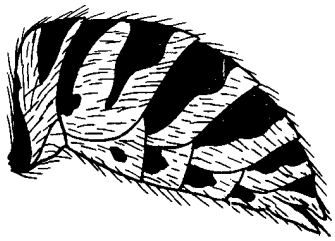


Fig. 11 B

12. Mesonotum with two, broad, longitudinal, curved yellowish stripes reaching almost from front to hind margins (Fig. 12 A). Eastern species (Vespula squamosa). California and Oregon species (Vespula sulphurea)..... A YELLOW JACKET

Mesonotum entirely black, or with two short yellowish stripes near scutellum (Fig. 12 B).....13

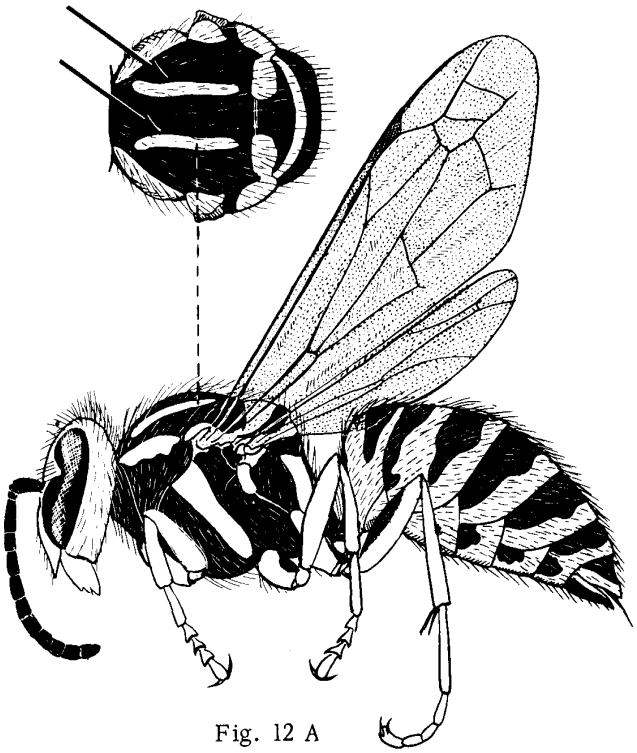


Fig. 12 A

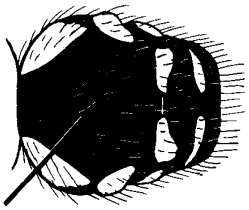


Fig. 12 B

13. Yellowish postero-lateral margins of pronotum usually even, parallel-sided; clypeus with broad, dark, longitudinal stripe, often anchor-shaped (Fig. 13 A & B). Northern species..... (Vespula vulgaris)..... A YELLOW JACKET

Yellowish postero-lateral margin of pronotum not parallel-sided; clypeus with short dark median stripe or one or more small dark spots (Fig. 13 C & D).....14

Fig. 13 A

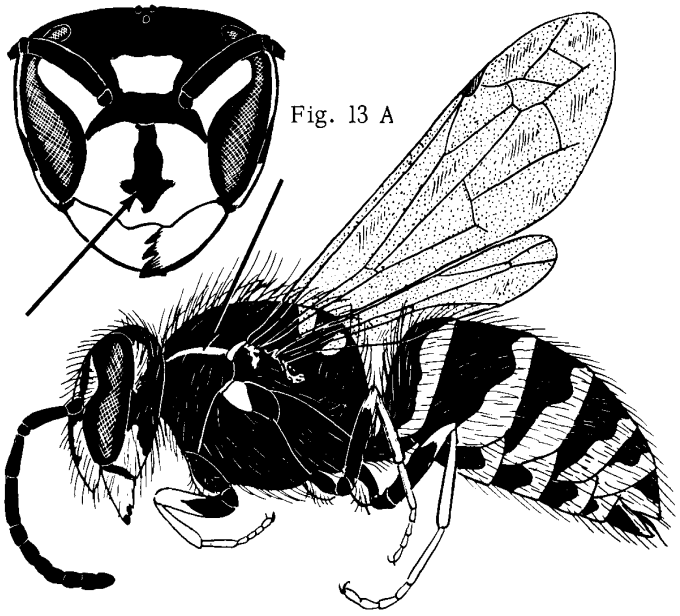


Fig. 13 B

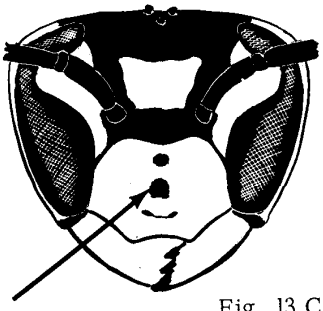


Fig. 13 C

Fig. 13 D

14. First antennal segment largely yellowish in front; eyes encircled by yellowish band on upper three-fourths (Fig. 14 A). Western species (Vespula pennsylvanica)..... A YELLOW JACKET

First antennal segment largely or entirely blackish; eyes with a blackish area dorsally separating pale anterior and posterior orbital bands (Fig. 14 B). Eastern species (Vespula maculifrons).... ..... A YELLOW JACKET

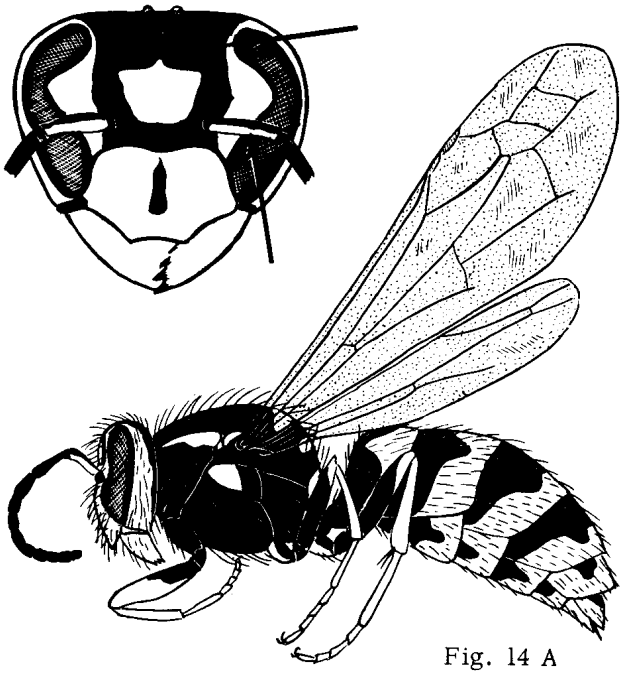


Fig. 14 A

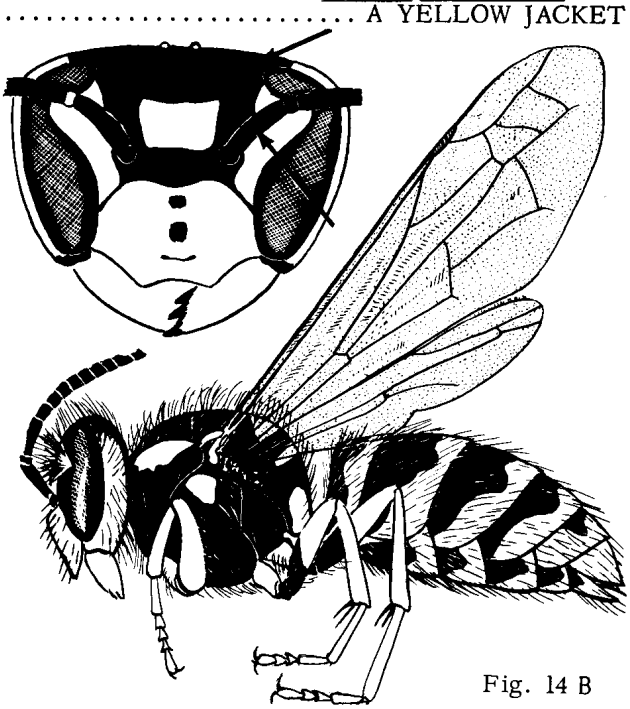


Fig. 14 B

15. Body and all legs entirely or largely orange-colored (Fig. 15 A). Builds paper combs in walls of house or hollow trees. (Polistes rubiginosus)..... ORANGE PAPER WASP

Body with some blackish markings; at least hind tarsi pale-colored (Fig. 15 B)..... 16

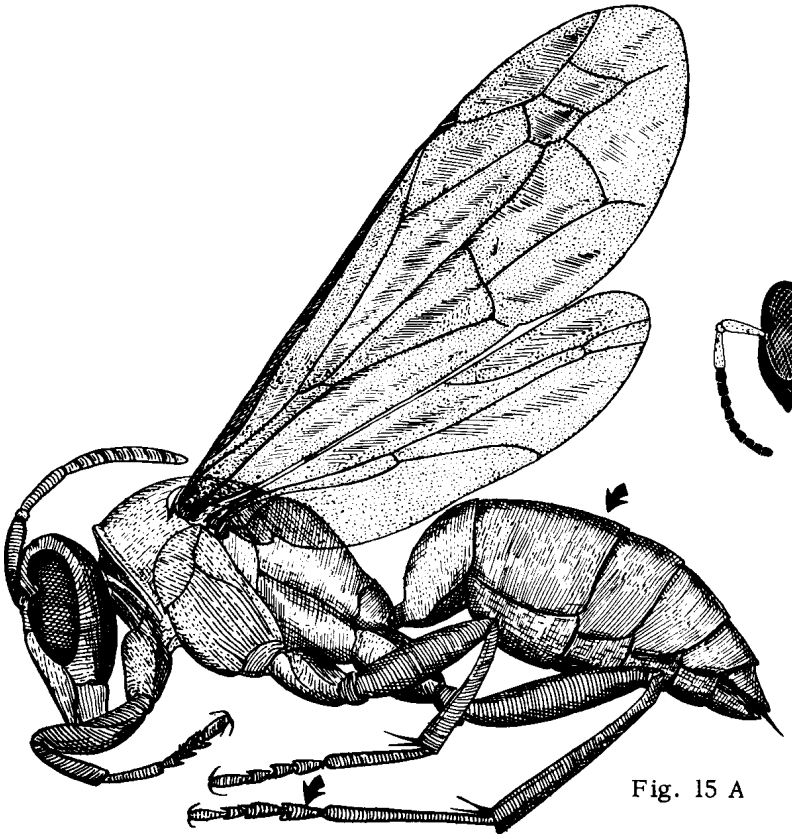


Fig. 15 A

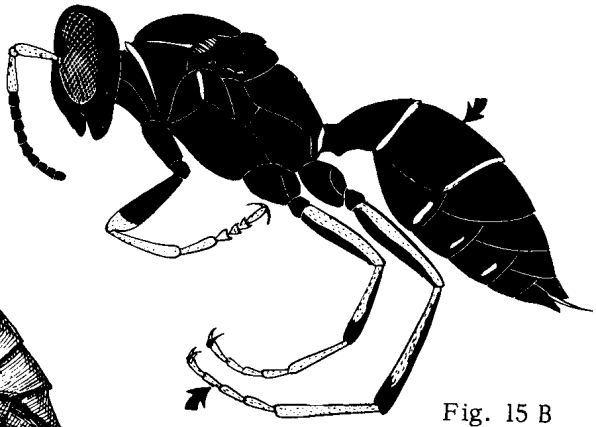


Fig. 15 B

16. Abdominal segments with blackish, yellowish, and reddish markings; mesonotum reddish; a yellowish band behind ocelli (Fig. 16 A). Builds single or double paper combs under eaves or in outbuildings. (Polistes exclamans)..... ZEBRA PAPER WASP

Abdomen largely blackish, with one or more pale bands starting at posterior margin of first or second segment; mesonotum largely blackish; no yellowish band behind ocelli (Fig. 16 B)..... 17

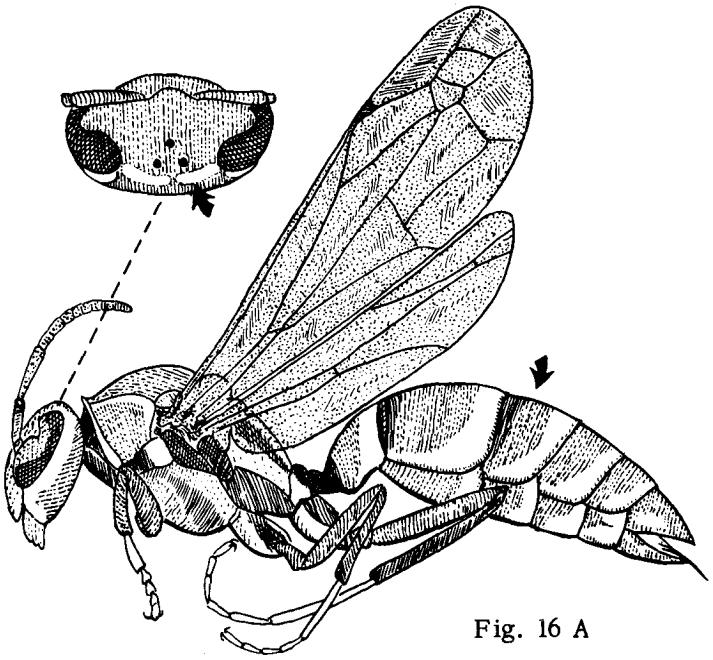


Fig. 16 A

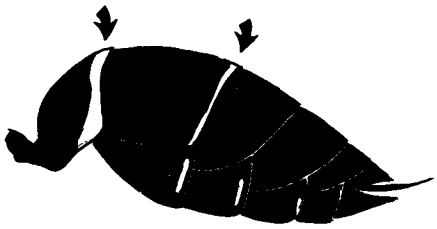


Fig. 16 B

17. Large species 20-25 mm. long, propodeum with coarse transverse striae (Fig. 17 A). Builds paper combs in bushes or trees. (Polistes annularis)..... LARGE PAPER WASP

Medium-sized species, 12-17 mm. long; propodeum with fine striae or essentially smooth (Fig. 17 B). Builds paper combs under eaves or in buildings. (Polistes fuscatus pallipes)..... ..... DARK PAPER WASP

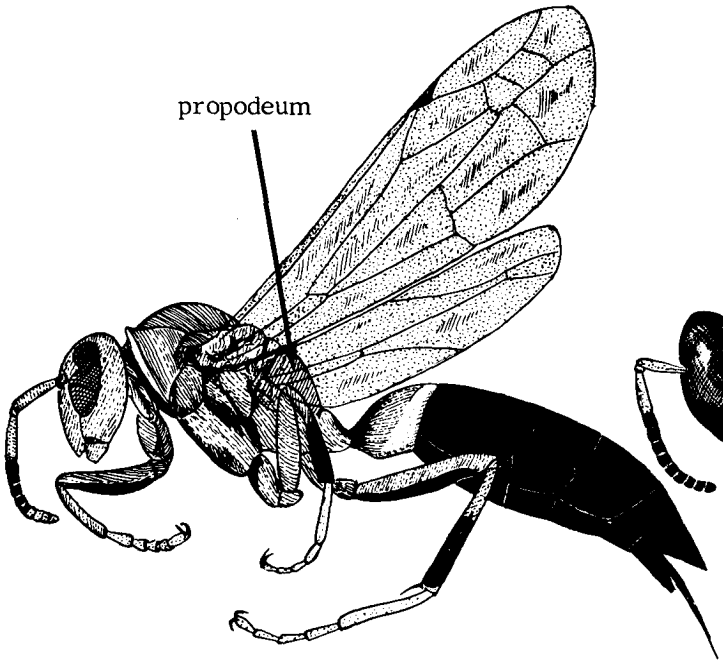


Fig. 17 A

Fig. 17 B

18. Slender species with extremely elongate first abdominal segment (Fig. 18 A). Builds small mud, potter nests provisioned with caterpillars. (Eumenes fraterna)..... POTTER WASP

Stocky species, with stout first abdominal segment (Fig. 18 B). Nest in holes in ground or wood, or old mud-dauber nests provisioned with caterpillars. (Odynerus species and Monobia species) ..... SOLITARY WASPS

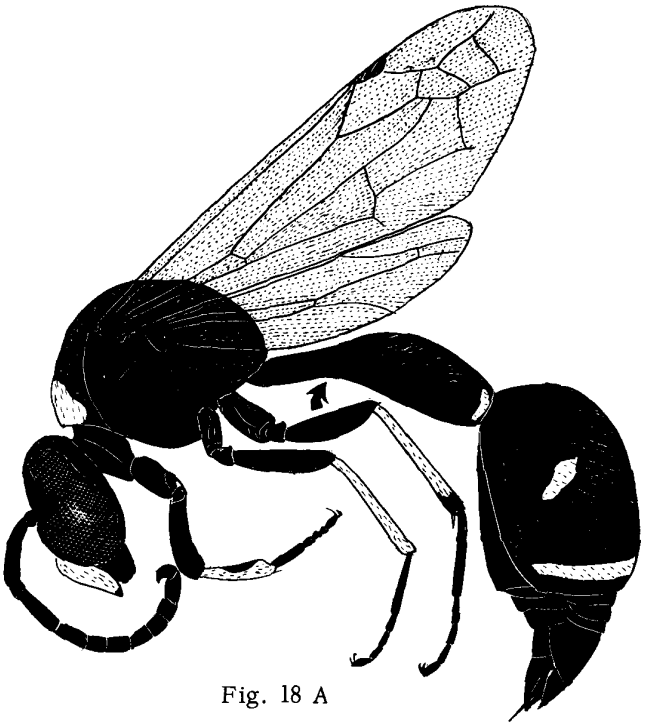


Fig. 18 A

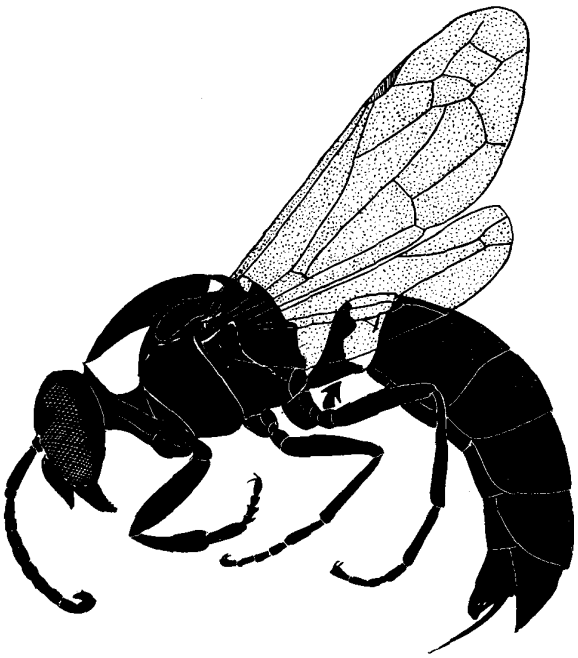


Fig. 18 B

19. Mesopleuron divided by an oblique suture into upper and lower parts (Fig. 19 A). Usually nest in holes in ground provisioned with spiders or tarantulas (Family Psammocharidae)..... ..... SPIDER AND TARANTULA WASPS

Mesopleuron not divided by such an oblique suture (Fig. 19 B)..... 20

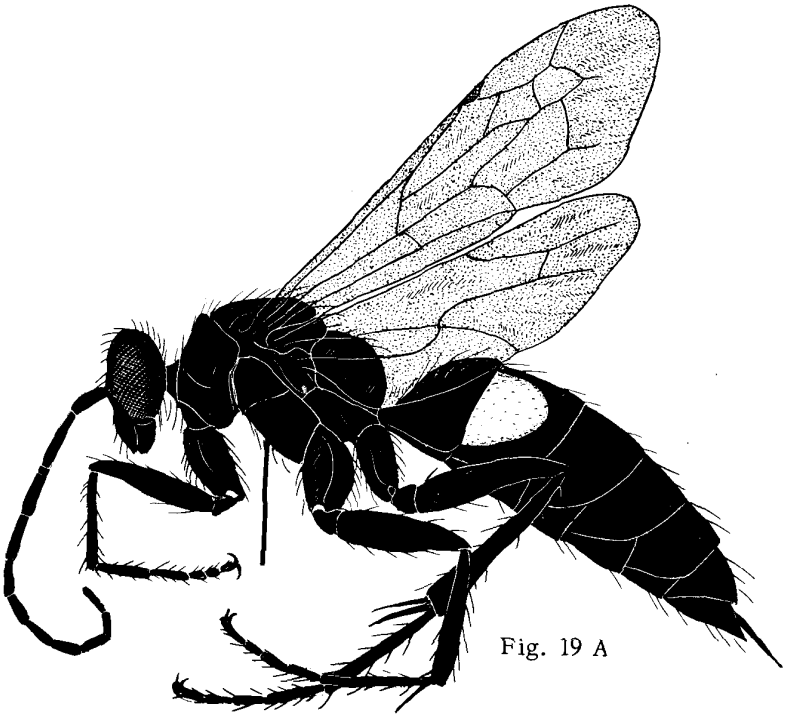


Fig. 19 A

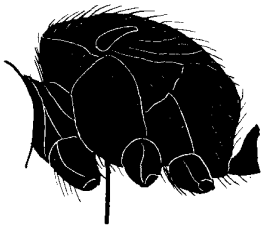


Fig. 19 B

20. Bases of middle and hind coxae not covered by plates (Fig. 20 A). Parasites of other wasps and bees nesting in ground..... VELVET ANTS

Bases of middle, and sometimes hind, coxae covered by plates (Fig. 20 B)..... 21

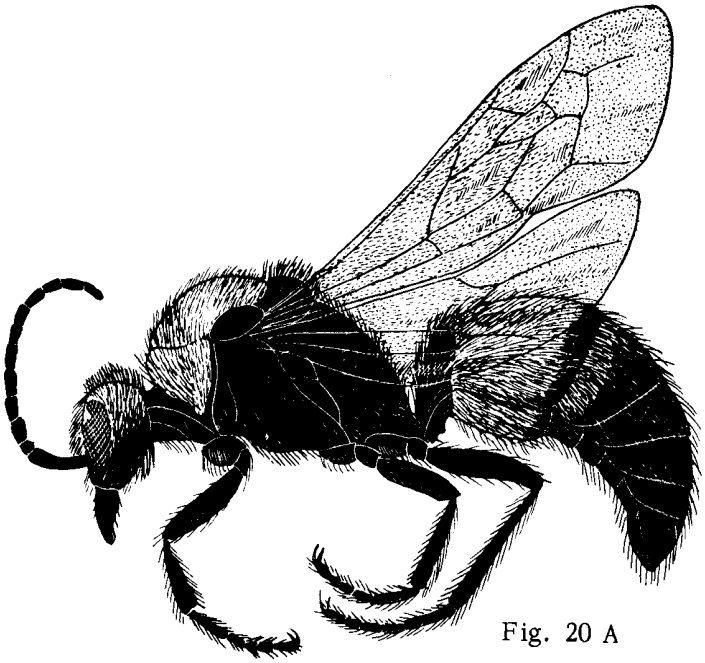


Fig. 20 A

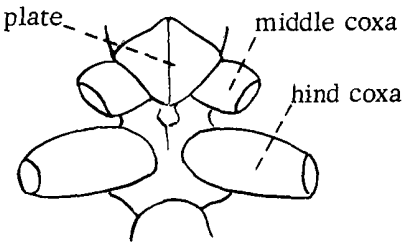


Fig. 20 B

21. Wing membrane beyond cells with wrinkles; inner margin of eye with a sinus; bases of middle and hind coxae covered by plates (Fig. 21 A & B). Male with three spines at tip of abdomen..... (Family Scoliidae)..... SCOLIID WASPS

Wing membrane beyond cells without wrinkles; inner margin of eye essentially straight; bases of middle coxae covered by plates (Fig. 21 C & D). Male with a single upturned spine at tip of abdomen. (Family Tiphiidae)..... TIPHIID WASPS

Fig. 21 B

Fig. 21 D

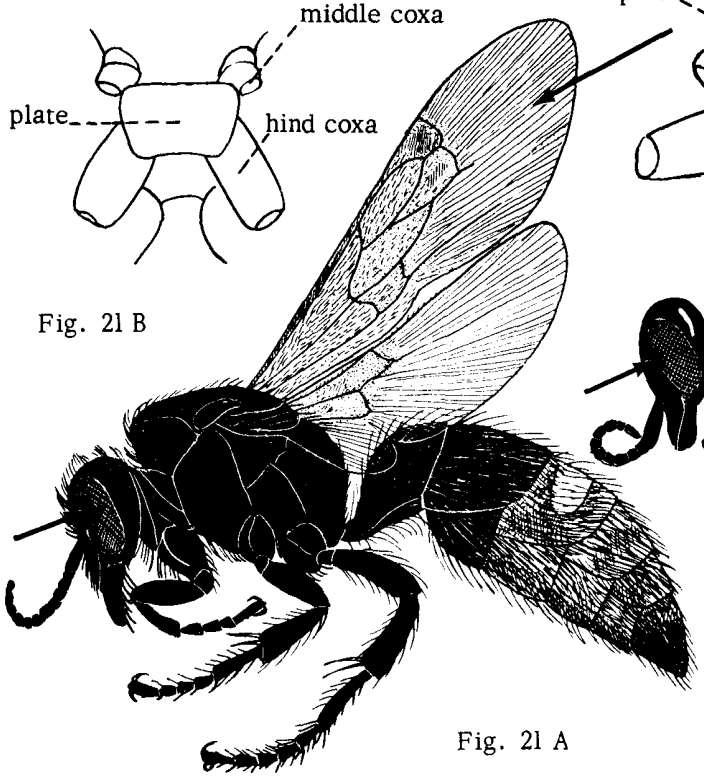


Fig. 21 A

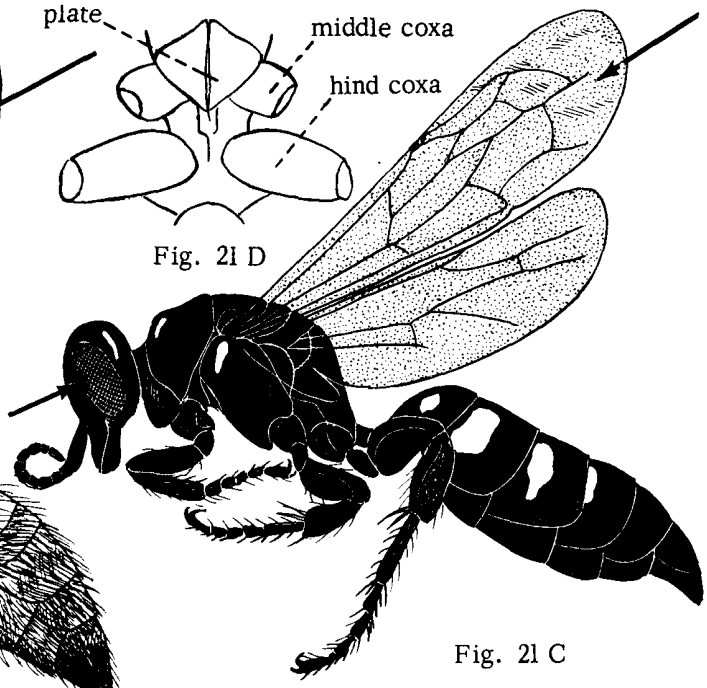


Fig. 21 C

22. Very large species, 30 mm. long or more; first abdominal segment broad and sessile (Fig. 22 A) Nest in holes in ground provisioned with cicadas. (Sphecius speciosus).....CICADA KILLER

Smaller species, less than 25 mm. long; first abdominal segment longer and more slender (Fig. 22 B).....23

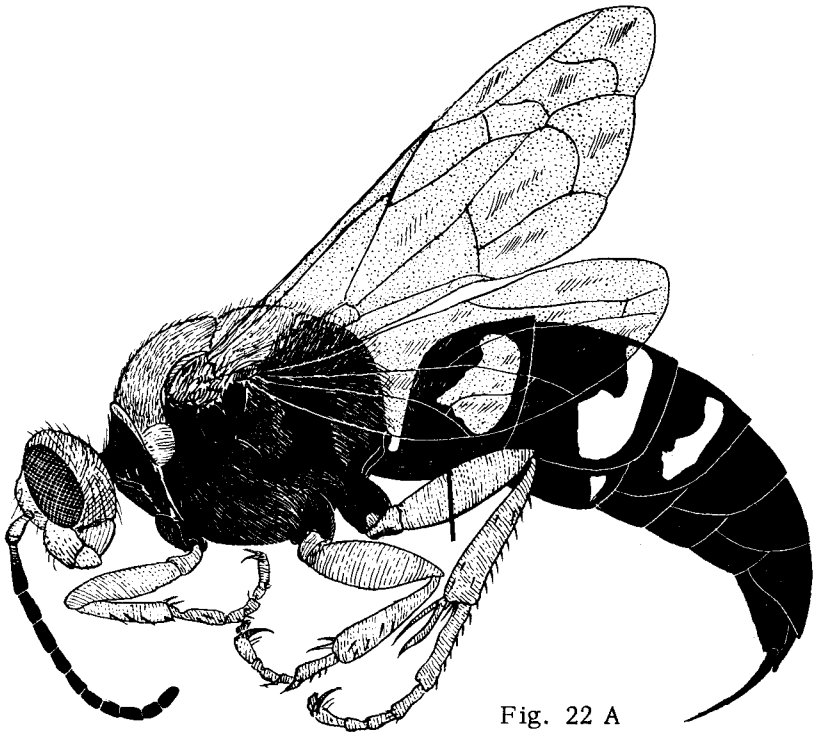


Fig. 22 A

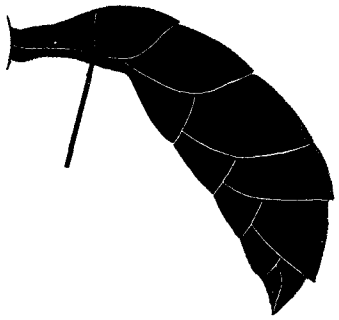


Fig. 22 B

23. Eyes with deep sinus on inner side; one or two clearly defined submarginal cells; dark species with whitish tarsus (Fig. 23 A). Builds organ-pipe mud nests. (Trypoxylon species)..... .....PIPE ORGAN MUD-DAUBER

Eyes nearly straight on inner side; three well-defined submarginal cells; metallic blue, or species with some pale markings on abdomen (Fig. 23 B & C).....24

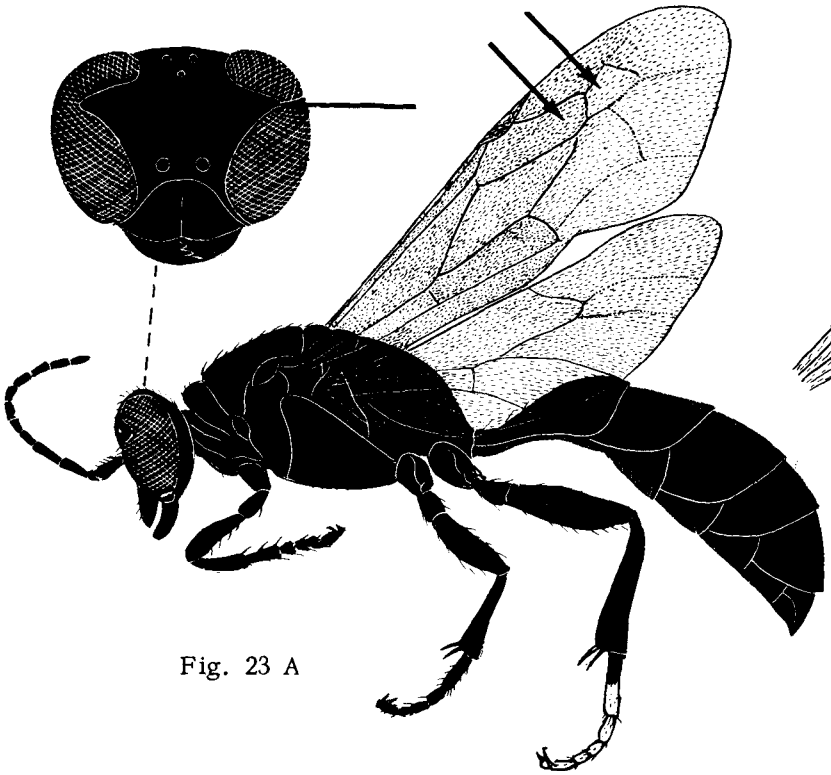


Fig. 23 A

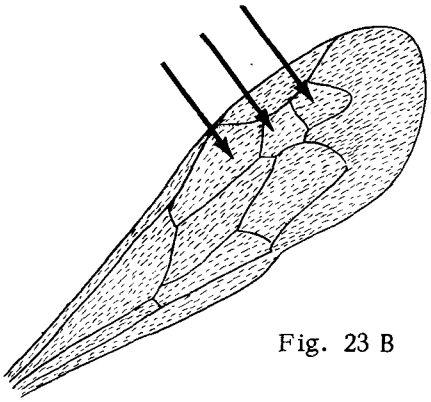


Fig. 23 B

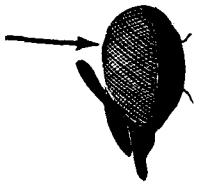


Fig. 23 C

24. Petiole of abdomen two-segmented (Fig. 24 A). Nest in holes in ground. (Sphex species) .... SOLITARY WASP

Petiole of abdomen one-segmented (Fig. 24 B)..... 25

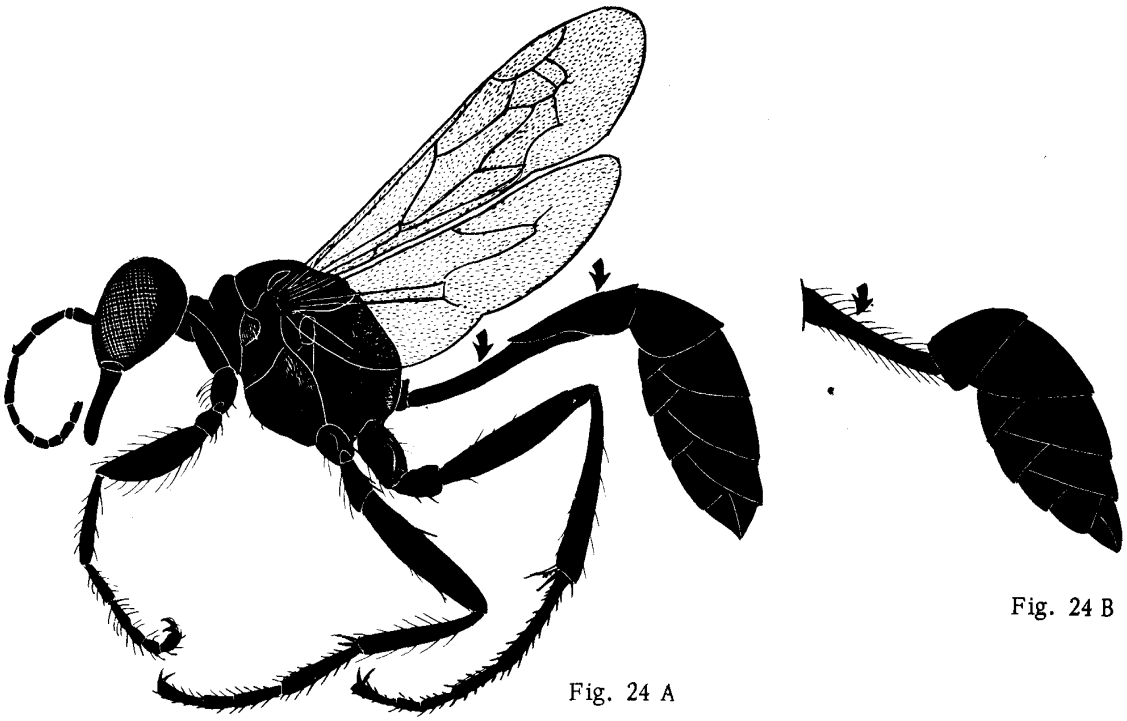


Fig. 24 B

Fig. 24 A

25. Bright metallic-bluish species (Fig. 25 A). Builds mud nests provisioned with spiders..... (Chalybion californicum)..... BLUE MUD-DAUBER

Darker species with yellowish or orange markings (Fig. 25 B)..... 26

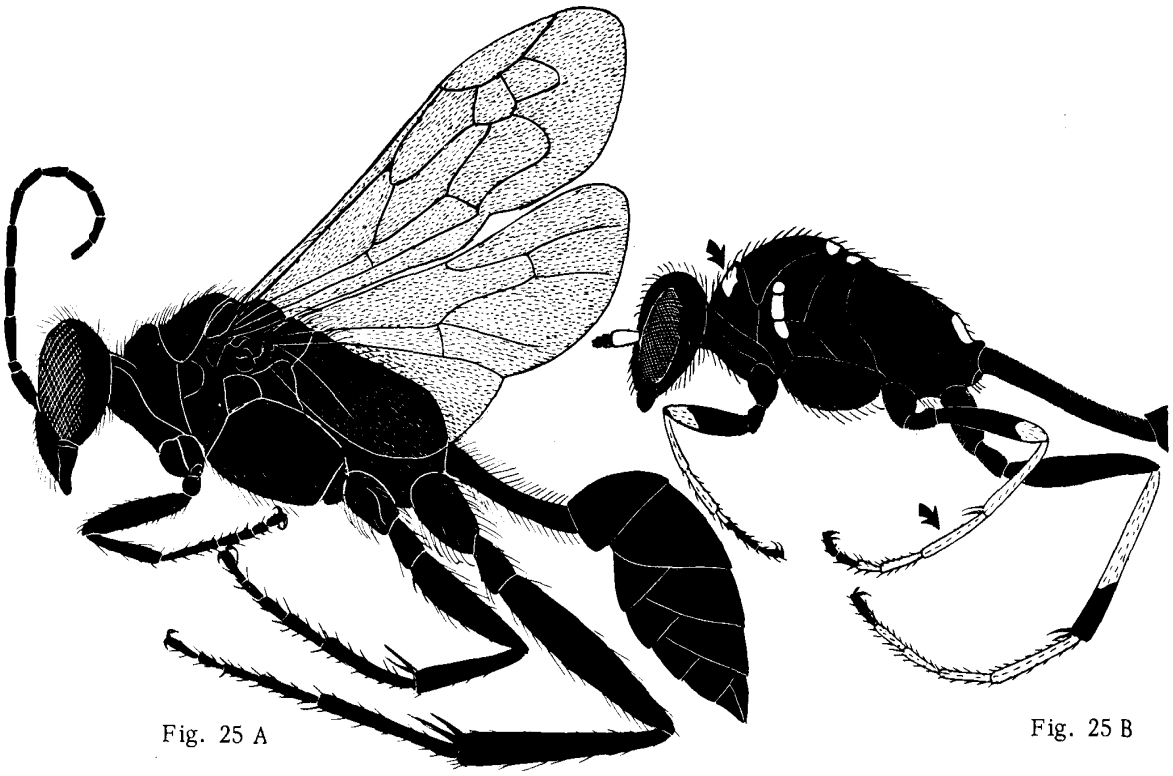


Fig. 25 A

Fig. 25 B

26. Dark species with yellowish markings (Fig. 26 A). Builds mud nests provisioned with spiders.. (Sceliphron caementarium).....COMMON MUD-DAUBER

Dark hairy species with orange markings (Fig. 26 B). Nest in holes in ground..... (Chlorion ichneumonea).....ORANGE THREAD-WAISTED WASP

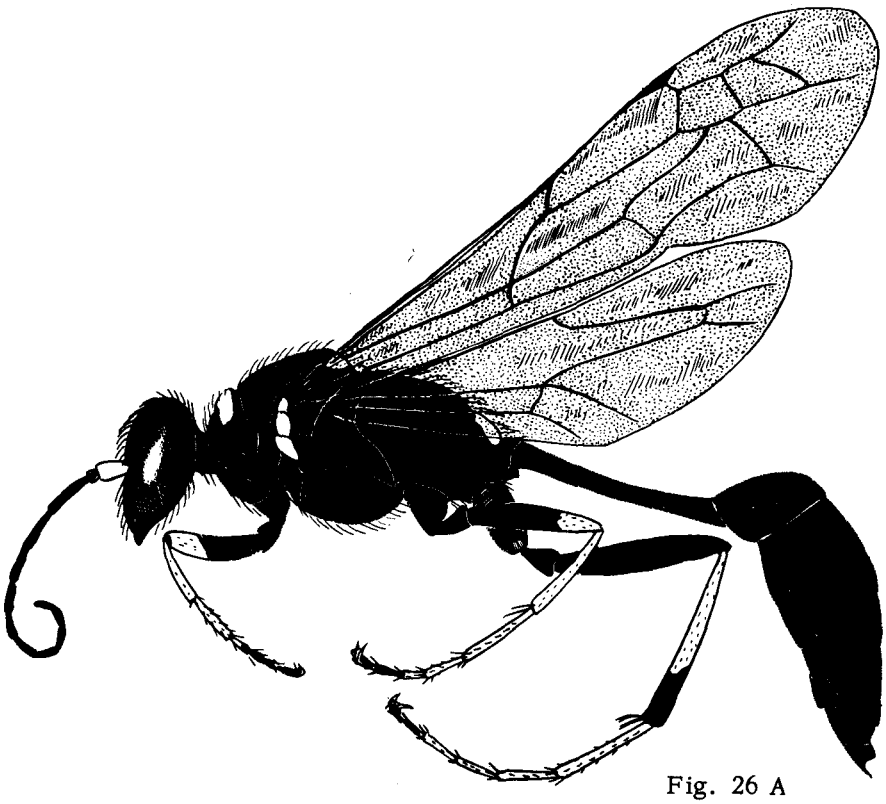


Fig. 26 A

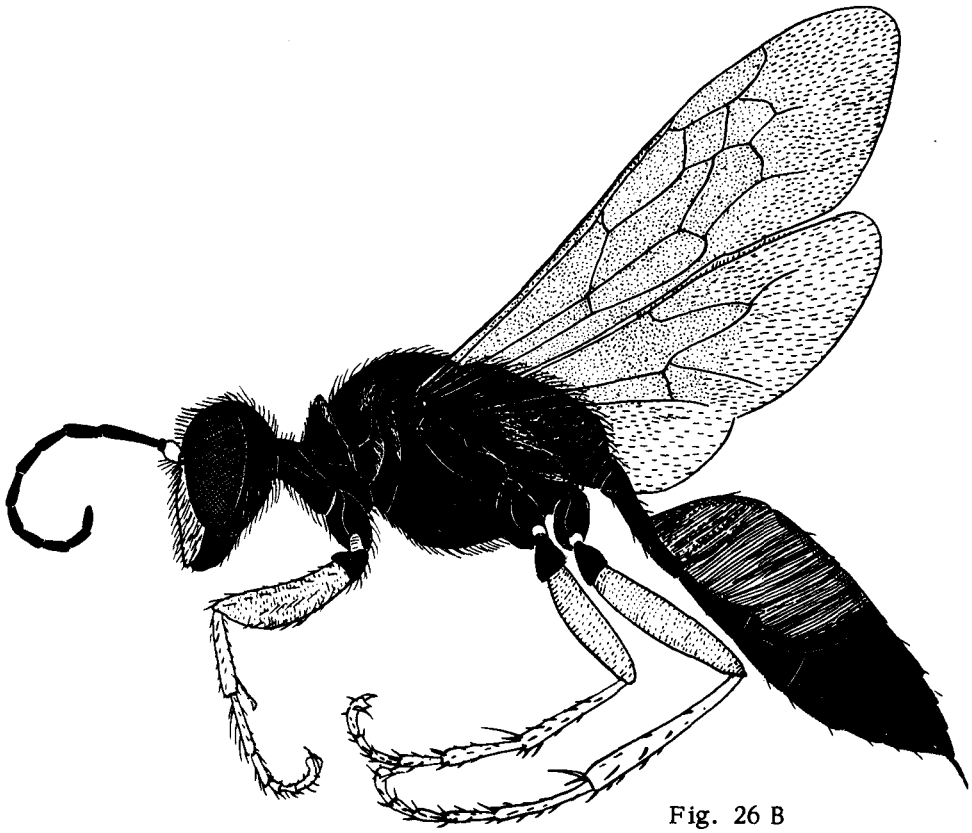


Fig. 26 B

27. Hind tibia without spurs (Fig. 27 A). Colony builds wax combs in bee hives, in houses, and in trees. (Apis mellifera) ..... HONEY BEE

Hind tibia with one or two spurs (Fig. 27 B) 28

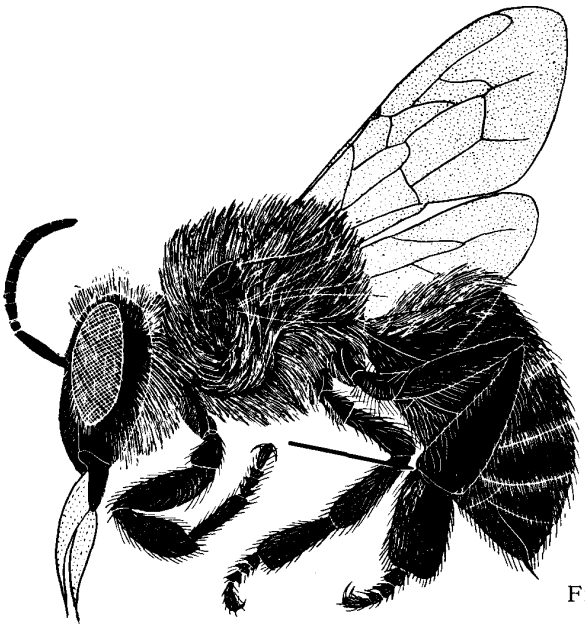


Fig. 27 A

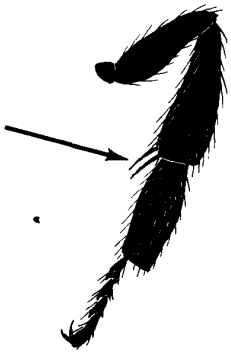


Fig. 27 B

28. Oculo-malar space longer than second segment of antenna; large hairy species with contrasting blackish and yellowish (sometimes reddish) pile (Fig. 28 A). Colony builds wax combs in nests in ground or logs, often in old mouse nests. (Family Bombidae; Bombus sp.) ..... BUMBLEBEES

Oculo-malar space short, eye reaching (or nearly reaching) base of mandible (Fig. 28 B) 29

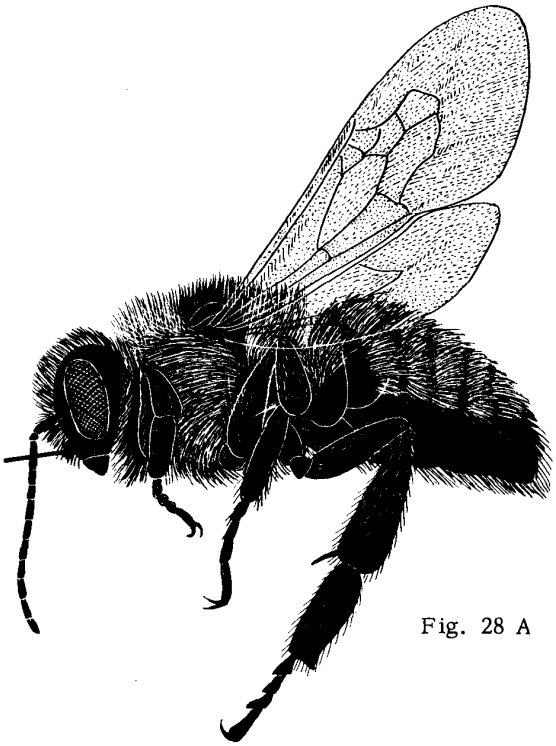


Fig. 28 A

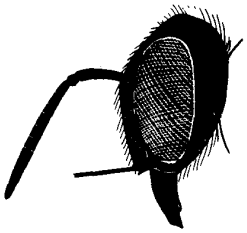


Fig. 28 B

29. Very large species 15-25 mm. long with shiny bluish, nearly hairless upper abdomen; second submarginal cell strongly narrowed anteriorly (Fig. 29 A). Nest in holes bored in wood. (Xylocopa virginica) ..... CARPENTER BEE

Smaller species 2-14 mm. long, usually with some hairs on upper surface of abdomen, shiny greenish species; second submarginal cell not narrowed anteriorly (Fig. 29 B & C) 30

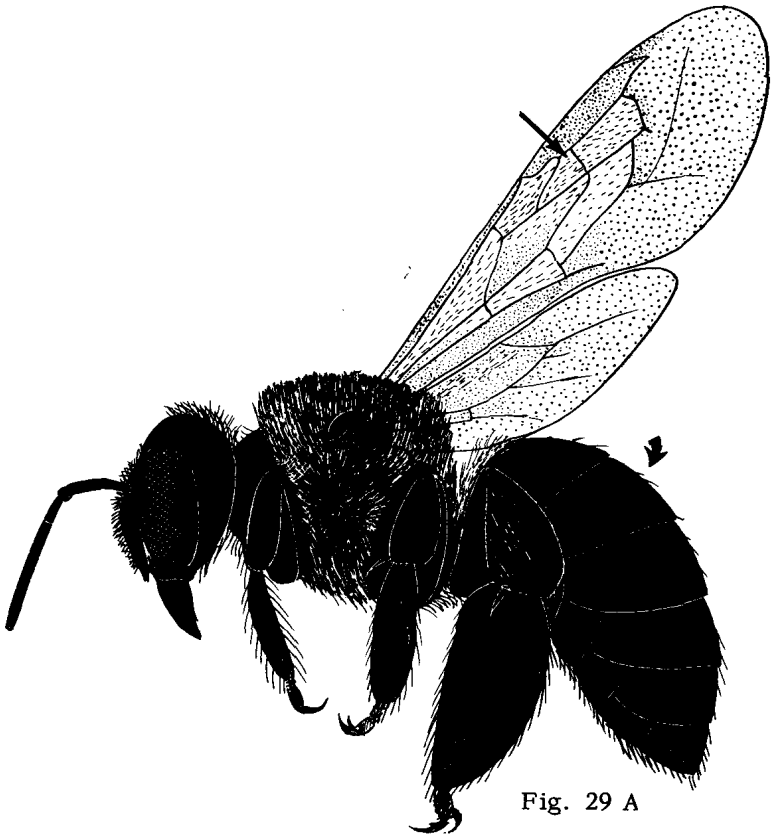


Fig. 29 A

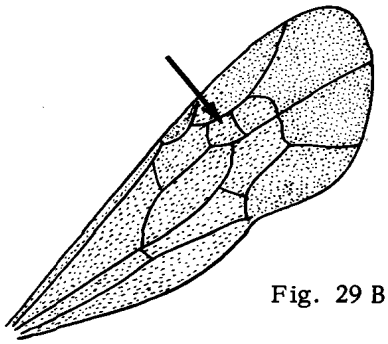


Fig. 29 B

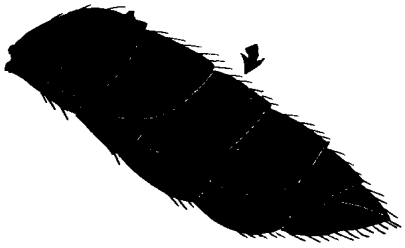


Fig. 29 C

30. Fore-wing with two submarginal cells; abdomen of female with dense hairy patches on underside (Fig. 30 A). Builds nest out of leaves in tree holes (Megachile species)... LEAFCUTTER BEES

Fore-wing with three submarginal cells; abdomen without dense hairy patches on underside (Fig. 30 B & C) 31

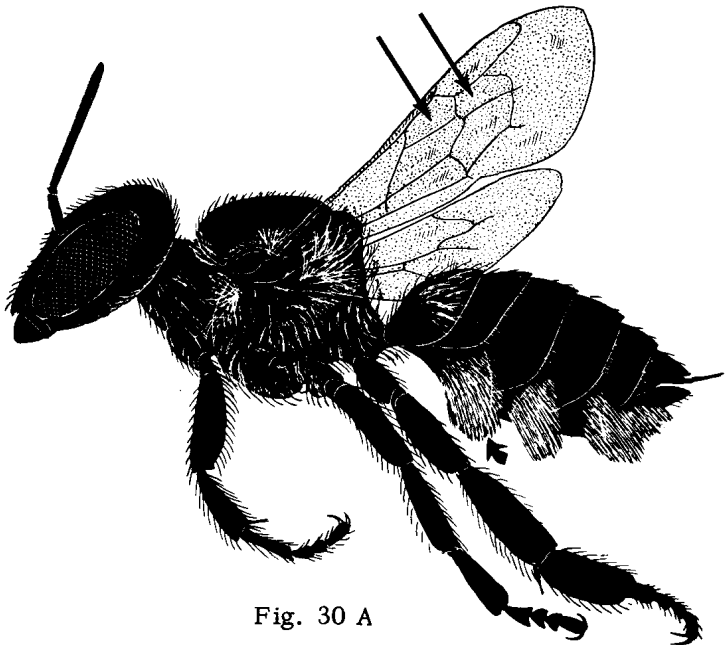


Fig. 30 A

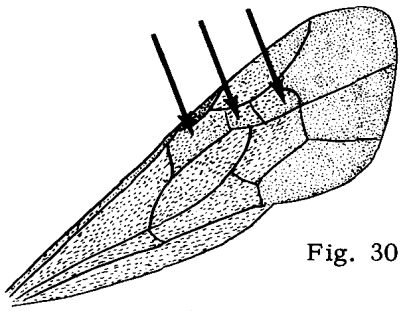


Fig. 30 B

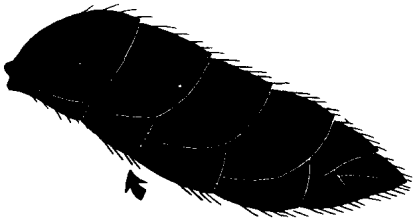


Fig. 30 C

31. Shiny greenish species (Fig. 31 A). Nest in ground. (Augochlora species)..... METALLIC SOLITARY BEES

Duller species (Fig. 31 B). Nest in ground. (Halictus and Andrena species).... SOLITARY BEES

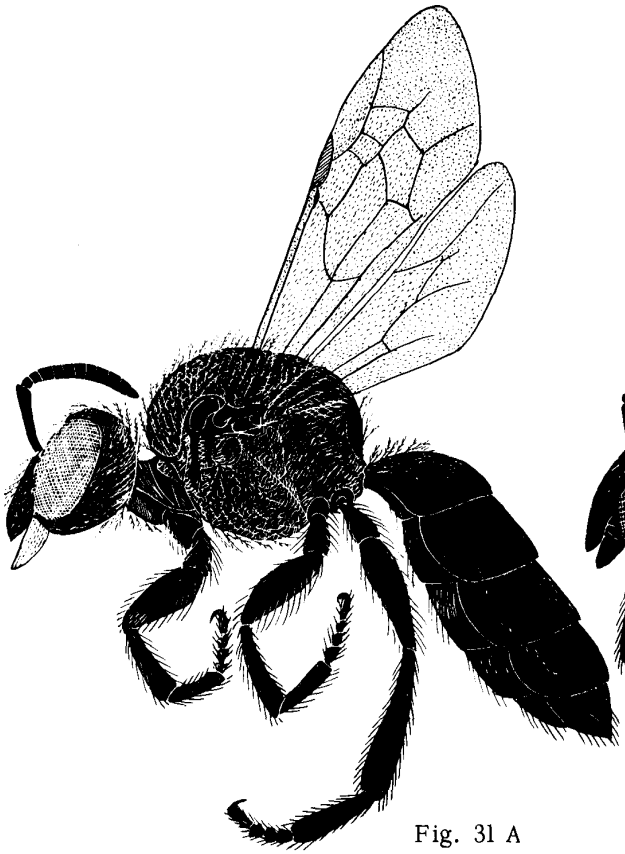


Fig. 31 A

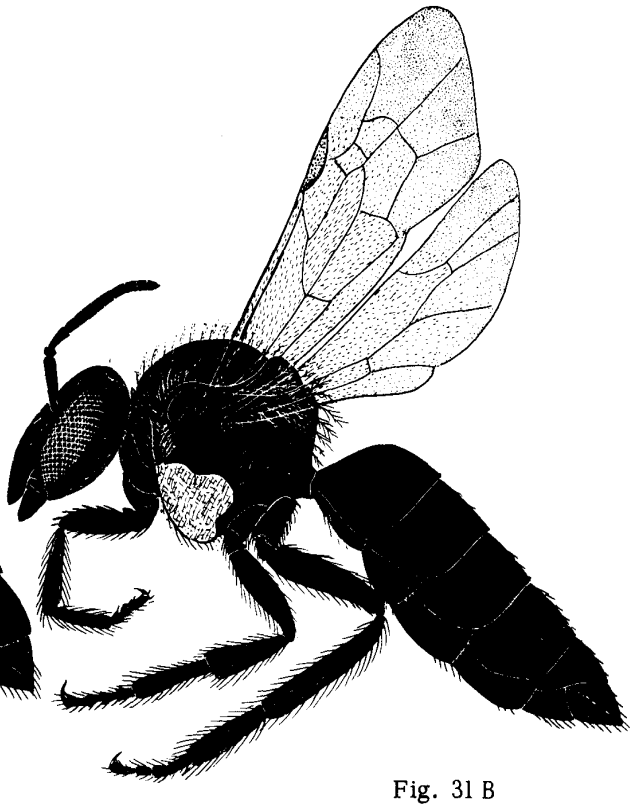


Fig. 31 B

32. First (and sometimes second) segment of abdomen node-like (Fig. 32 A). Build colony nests in ground, under stones, in wood, or in buildings (Family Formicidae).....ANTS

First and second segments of abdomen not node-like (Fig. 32 B)..... 33

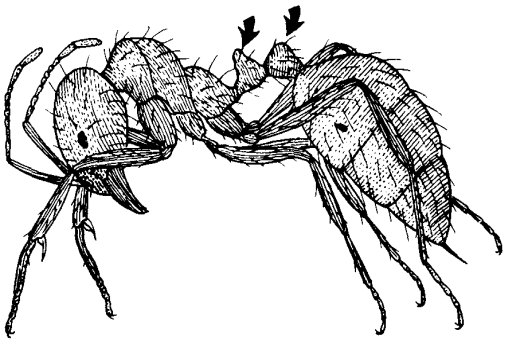


Fig. 32 A

Fig. 32 B

33. Larger species 3-25 mm. long, usually with definite dark and reddish or orange-colored hairs (Fig. 33 A). Parasites of ground-nesting bees and wasps (Family Mutillidae)... VELVET ANTS

Smaller species 1-2 mm. long, with few sparse hairs; body various shades yellowish to brownish (Fig. 33 B). Parasites of wood-boring beetles (Family Bethylidae, Scleroderma species... .....PARASITIC WASPS

Fig. 33 A

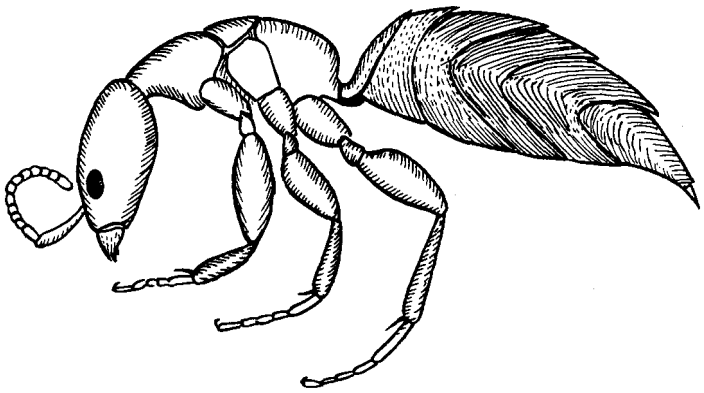


Fig. 33 B

ANTS: KEY TO SOME COMMON SPECIES

Harold George Scott

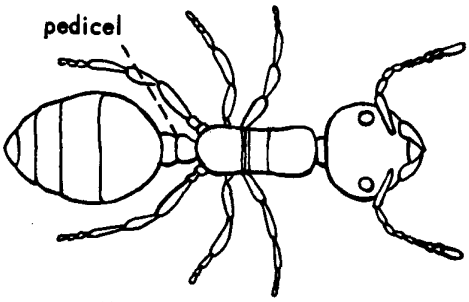
1. Pedicel ("waist") 1-segmented 2
   Pedicel 2-segmented 4

2. Petiole (scale on pedicel) poorly developed, hidden beneath abdomen
   (Tapinoma sessile) . . . . ODOROUS HOUSE ANT
   Petiole well-developed, erect, not hidden beneath abdomen 3

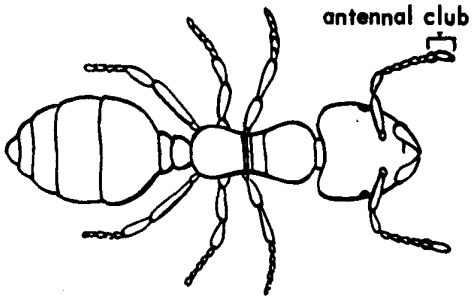
3. Tip of abdomen without circlet of hairs *(Iridomyrmex humilis)* . . . . ARGENTINE ANT
   Tip of abdomen with circlet of hairs *(Camponotus herculeanus pennsylvanicus)* . . . . BLACK CARPENTER ANT

4. Head and thorax with numerous spines *(Atta texana)* . . . . TEXAS LEAF-CUTTING ANT
   Head and thorax spineless or with 1 pair of spines on the posterior thorax 5

5. Thorax and head covered with "fingerprints"; posterior thorax with single pairs of spines *(Tetramorium caespitum)* . . . . PAVEMENT ANT
   Thorax and head without "fingerprints"; posterior thorax without spines 6



Monomorium pharaonis



Solenopsis molesta

6. Antennal club 2-segmented 8
   Antennal club 3-segmented 7

7. Shiny-black *(Monomorium minimum)* . . . . LITTLE BLACK ANT
   Yellowish-red *(Monomorium pharaonis)* . . . . PHARAOH ANT

8. House infesting ants *(Solenopsis molesta)* . . . . THIEF ANT
   Outdoor mound-building ants 9

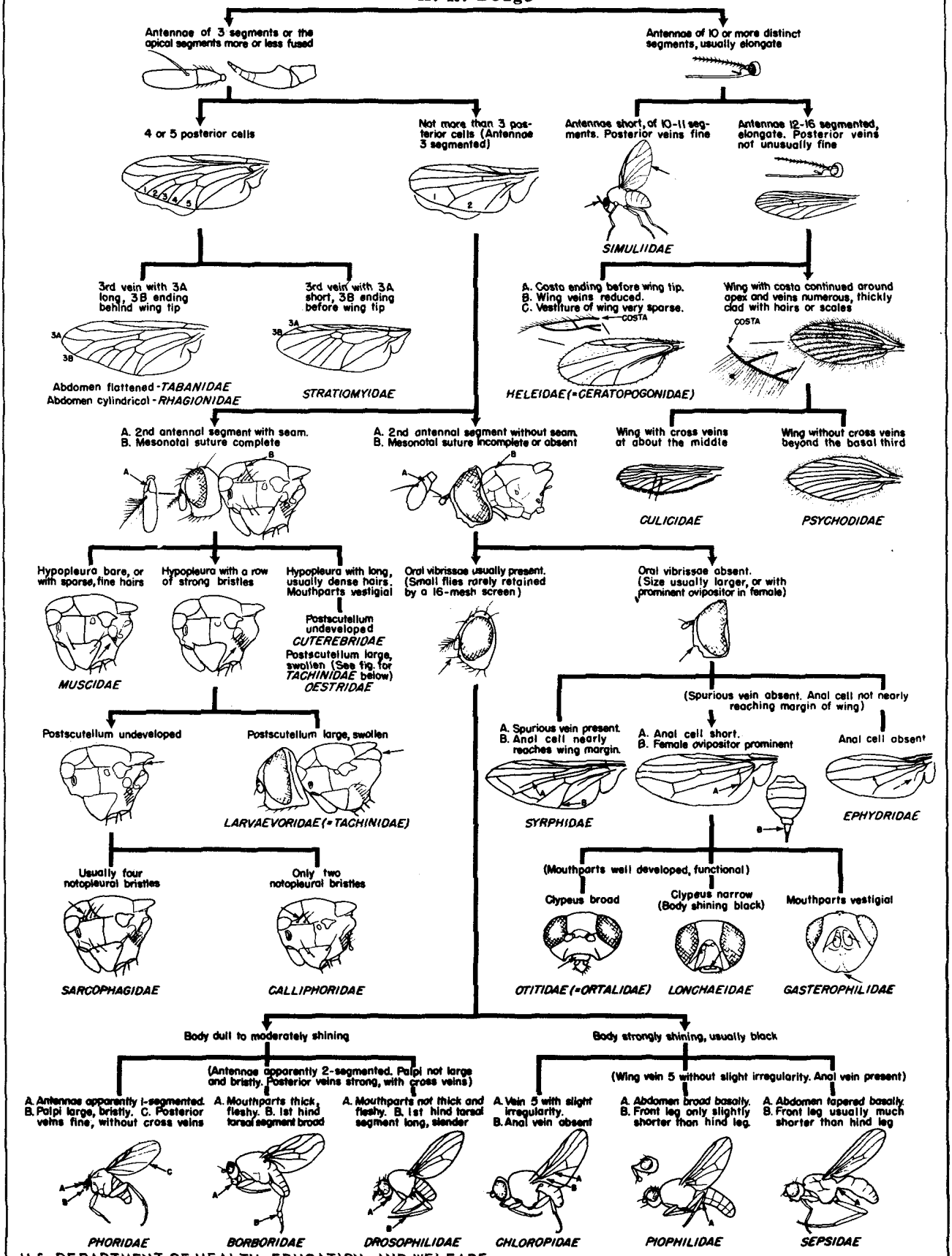
9. Mandibles strongly incurved *(Solenopsis geminata)* . . . . TROPICAL FIRE ANT
   Mandibles not strongly incurved 10

10. Dorsal surface of head with large coarse, scattered punctures
    (Solenopsis saevissima var. richteri) . . . . IMPORTED FIRE ANT
    Dorsal surface of head without punctures *(Solenopsis xyloni)* . . . . SOUTHERN FIRE ANT

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

DIPTERA: PICTORIAL KEY TO PRINCIPAL FAMILIES OF PUBLIC HEALTH IMPORTANCE

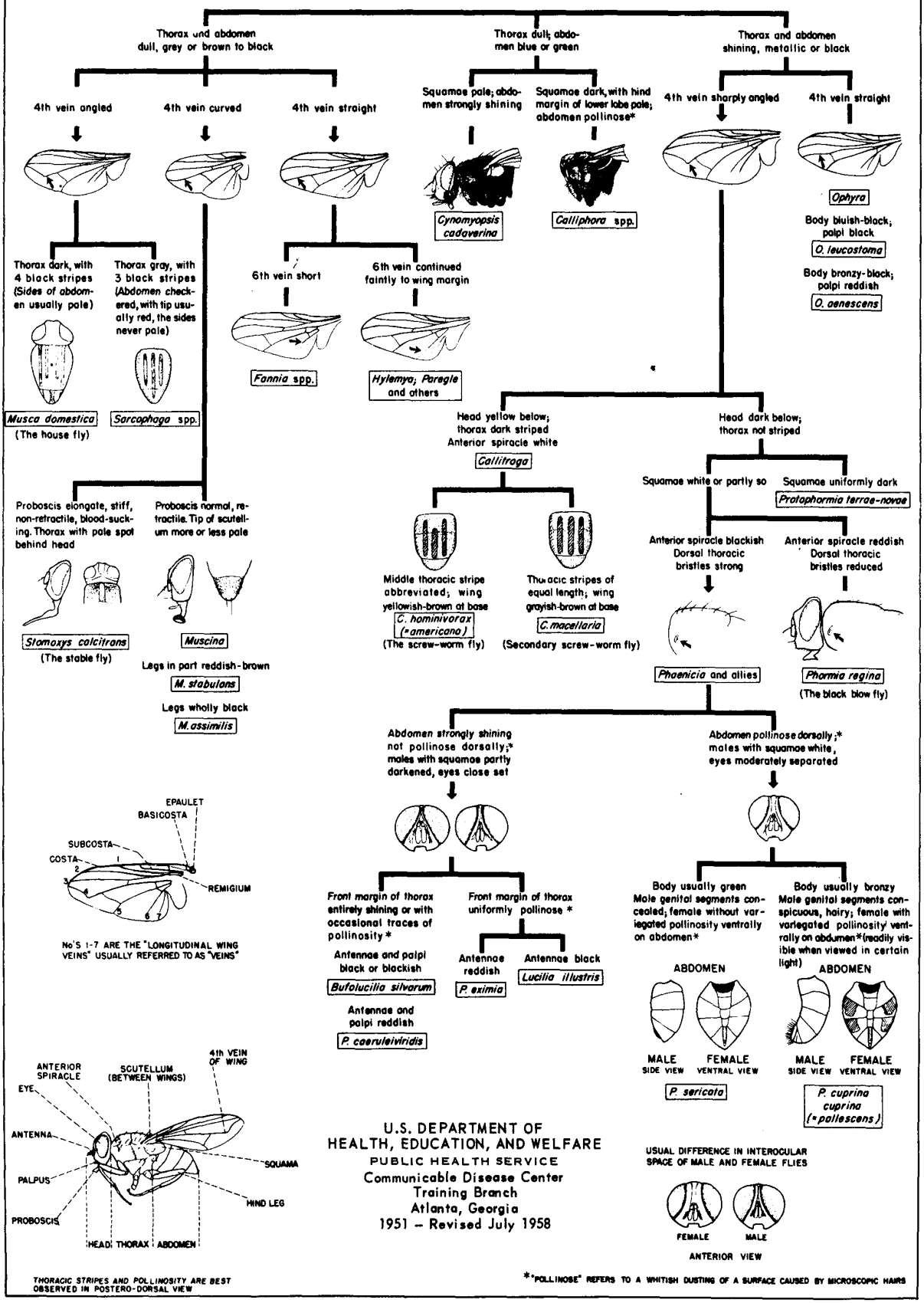
H. R. Dodge



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1948, Revised May 1953

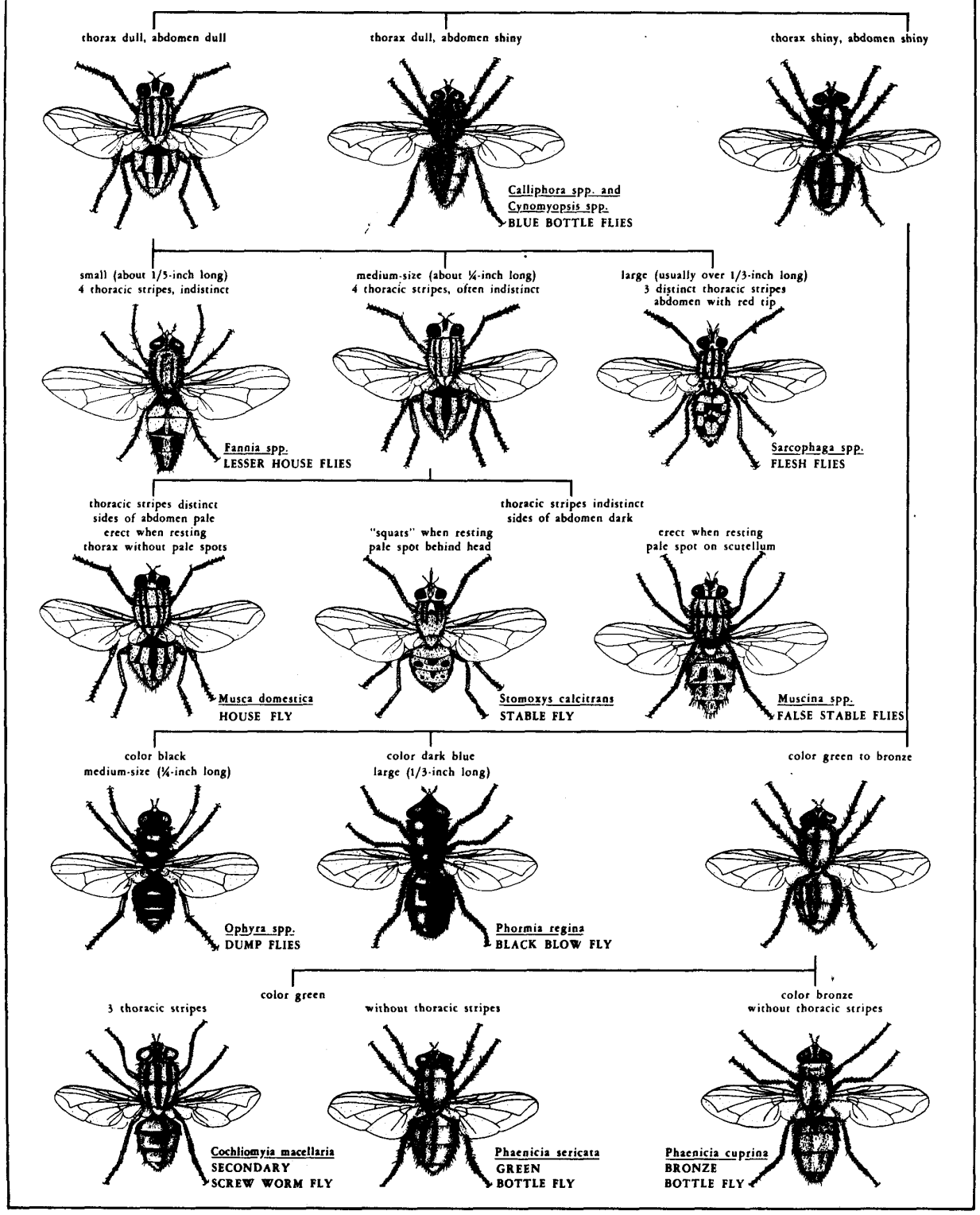
DOMESTIC FLIES: PICTORIAL KEY TO COMMON SPECIES IN THE U.S.

H. R. Dodge



DOMESTIC FLIES: PICTORIAL KEY TO COMMON SPECIES

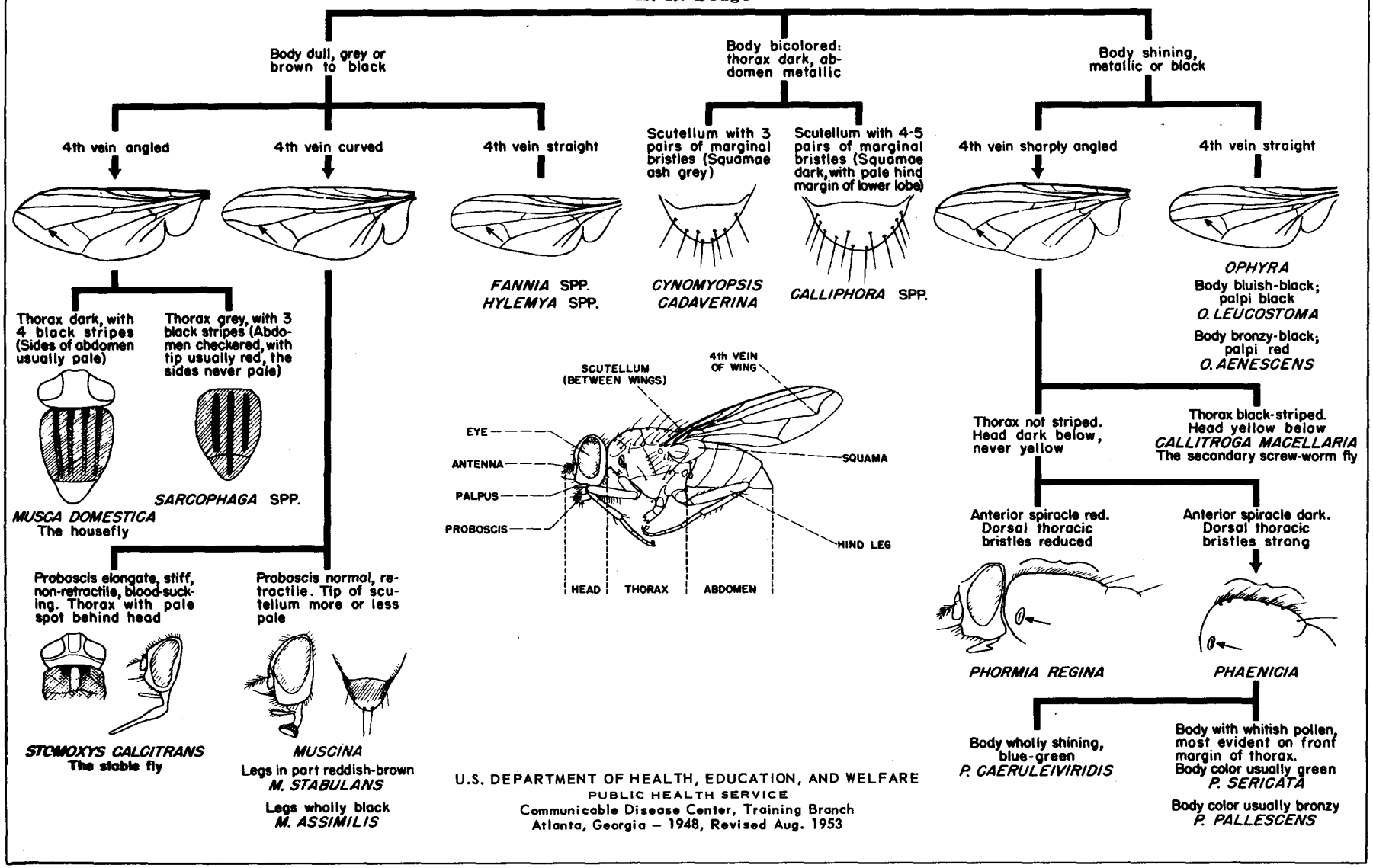
Harold George Scott and Margery R. Borom



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

DOMESTIC FLIES: PICTORIAL KEY TO COMMON SPECIES IN SOUTHERN U.S.

H. R. Dodge



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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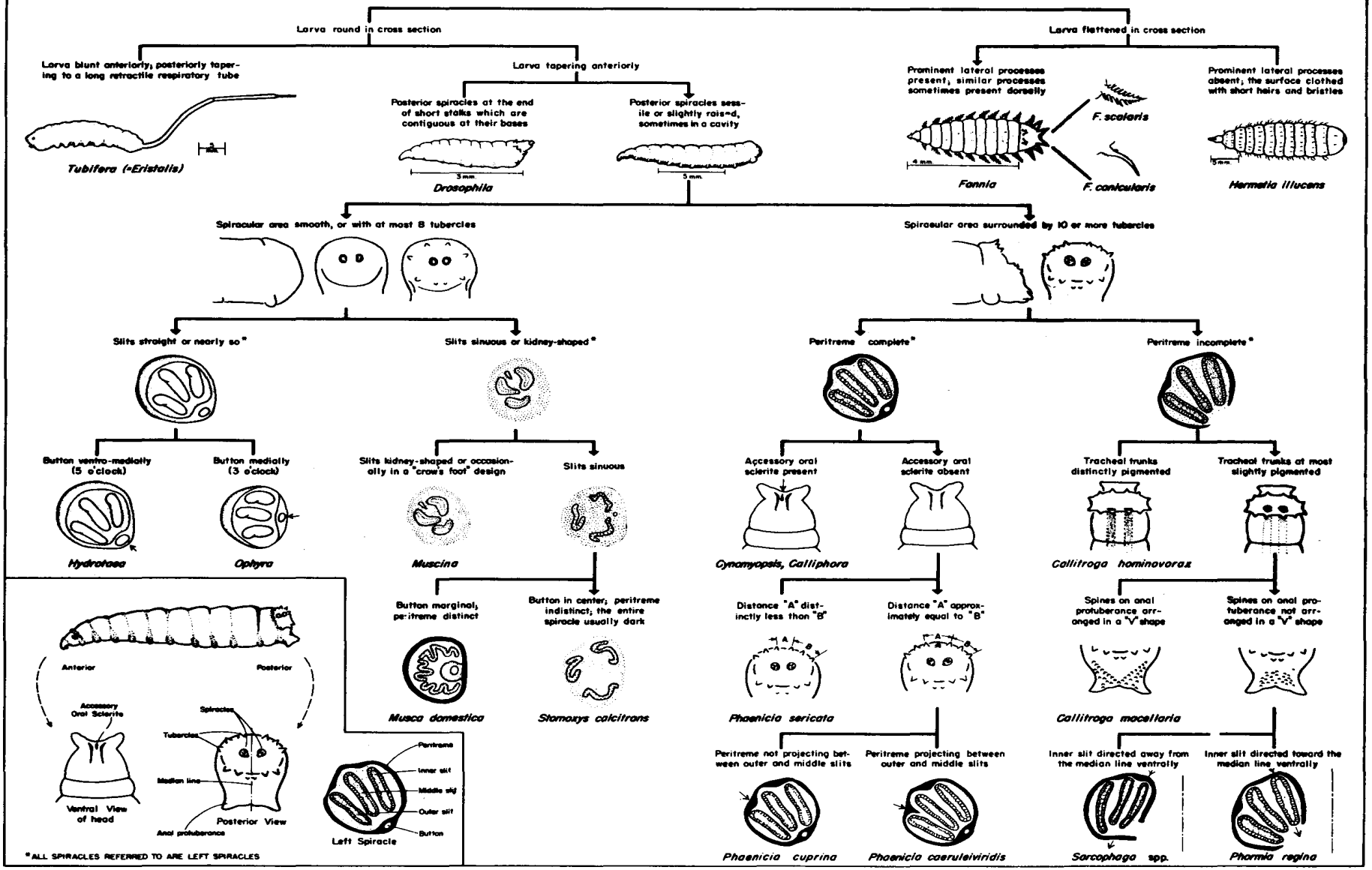
Communicable Disease Center, Training Branch
Atlanta, Georgia – 1948, Revised Aug. 1953

FLY LARVAE: PICTORIAL KEY TO SOME COMMON SPECIES — J. M. Seago



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia — 1952 — Revised 1953

FLY LARVAE: KEY TO SOME SPECIES OF PUBLIC HEALTH IMPORTANCE

Chester J. Stojanovich – Harry D. Pratt – Elwin E. Bennington

1. Larva with a definite, hard, sclerotized head capsule (Fig. 1 A).....2

   Larva without a definite, hard, sclerotized head capsule (Fig. 1 B).....3

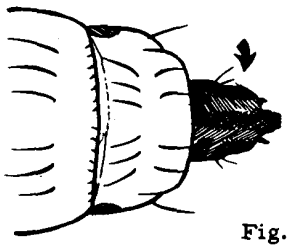


Fig. 1 A

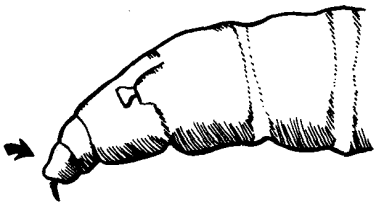


Fig. 1 B

2. Body flattened; large larvae 12-20 mm. long (Fig. 2 A)... (Hermetia illucens) SOLDIER FLY

   Body cylindrical with spiracles opening in a tubular segment at posterior end of body, last segment modified into a sclerotized air tube (Fig. 2 B)..... .....(Genus Psychoda & allies) FILTER FLIES

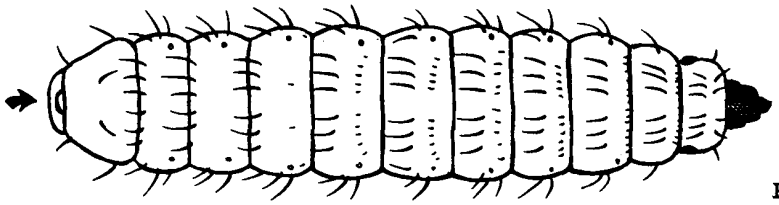


Fig. 2 A

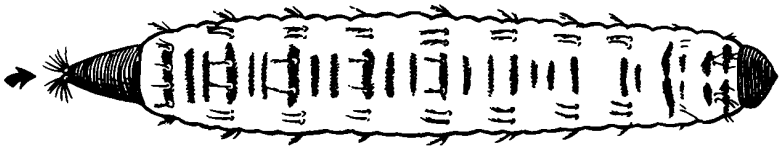


Fig. 2 B

3. Body with spine-like dorsal and lateral processes on each segment; posterior spiracles on small elevations (Fig. 3 A).....(Genus Fannia)...4

   Body smooth, or with short spines, but no long lateral processes (Fig. 3 B)..... 5

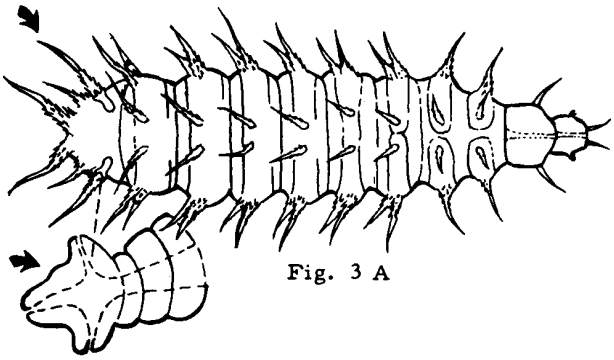


Fig. 3 A

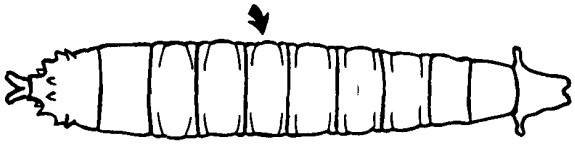


Fig. 3 B

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4. Processes branched or feathery (Fig. 4 A)..... (Fannia scalaris) LATRINE FLY

Processes without branches, spiny (Fig. 4 B).. (Fannia canicularis) LESSER HOUSE FLY

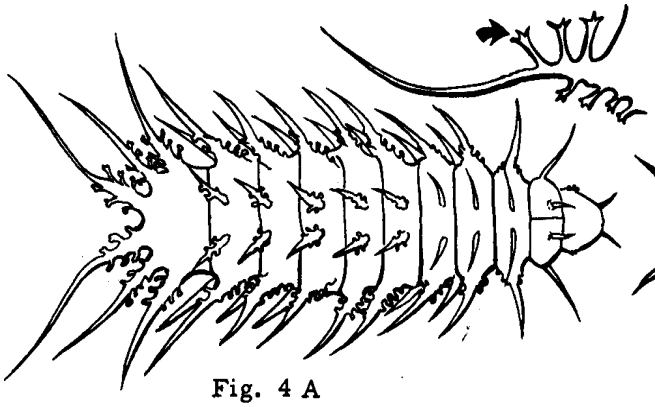


Fig. 4 A

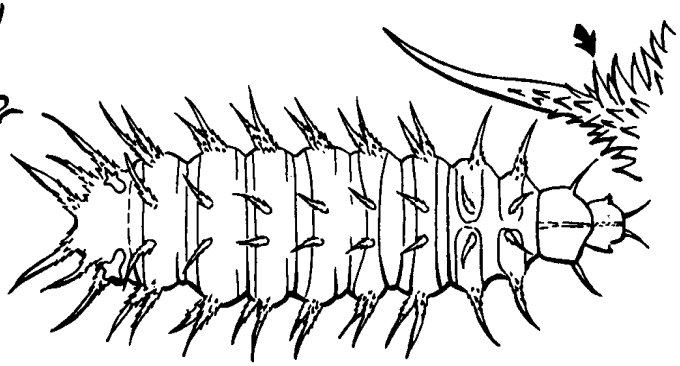


Fig. 4 B

5.. Posterior spiracles on peg-like tubercles or cones; smaller larvae, usually 6-9 mm. long (Fig. 5 A)..... 6

Posterior spiracles not on peg-like tubercles; larger larvae, usually 9-18 mm. long (Fig. 5 B)..... 7

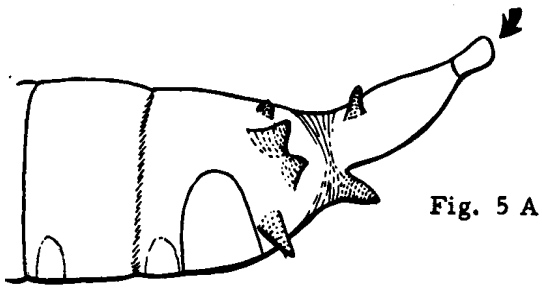


Fig. 5 A

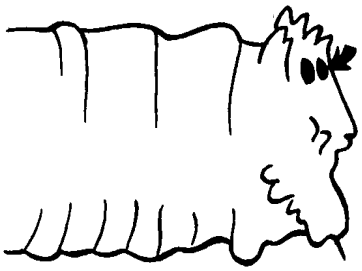


Fig. 5 B

6. Posterior spiracles at ends of long tubercles (Fig. 6 A)..... (Genus Drosophila) VINEGAR FLIES

Posterior spiracles on short cones, last segment with short finger-like lateral process (Fig. 6 B).....(Piophila casei) CHEESE SKIPPER

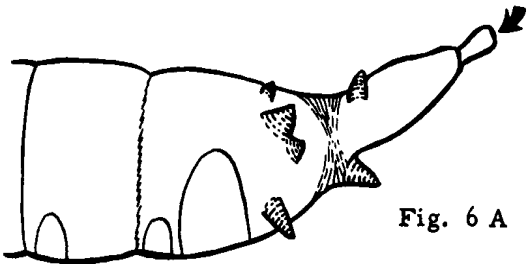


Fig. 6 A

Fig. 6 B

7. Posterior end of body extended to form a tail (Fig. 7 A)..... (*Eristalis tenax*) RAT-TAILED MAGGOT

Body swollen or tapered posteriorly, but never extended into a tail like process (Fig. 7 B).. 8

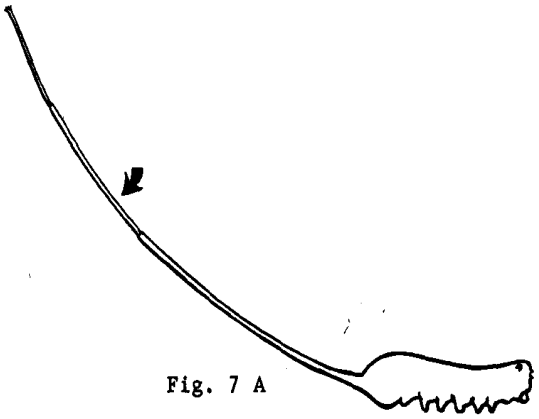


Fig. 7 A

Fig. 7 B

8. Peritreme present, with 3 distinct slits (Fig. 8 A).....9

Peritreme absent; or if present without 3 distinct slits (Fig. 8 B & C)..... 23

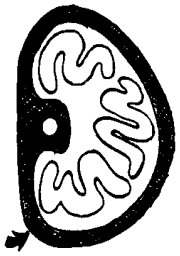
Fig. 8 A 

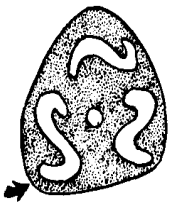
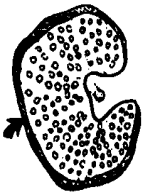
Fig. 8 B 

Fig. 8 C 

9. Slits of posterior spiracles straight (Fig. 9 A).....10

Slits of posterior spiracles strongly sinuous (Fig. 9 B).....22

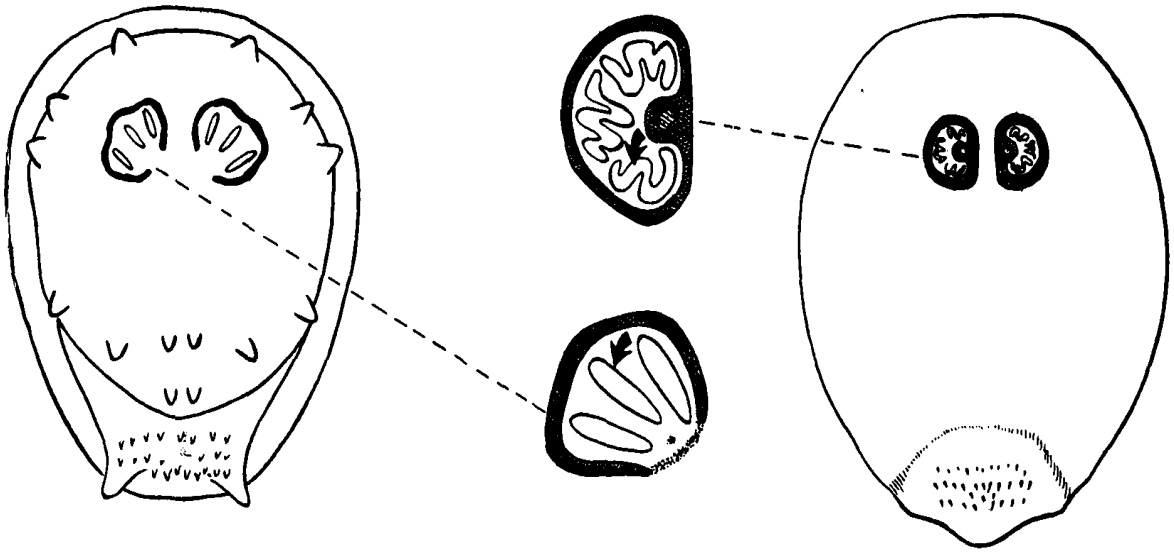


Fig. 9 A

Fig. 9 B

10. Dorsal and ventral arms of cephaloskeleton almost equal (Fig. 10 A); peritreme with two non-sclerotized areas away from the button (Fig. 10 B).. (Genus Ophyra) DUMP FLY

Dorsal arm of cephaloskeleton longer than ventral arm (Fig. 10 C); peritreme complete or with one weakly sclerotized area (Fig. 10 D & E)..... 11

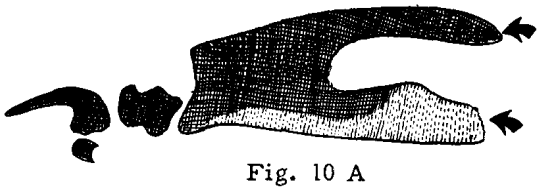


Fig. 10 A

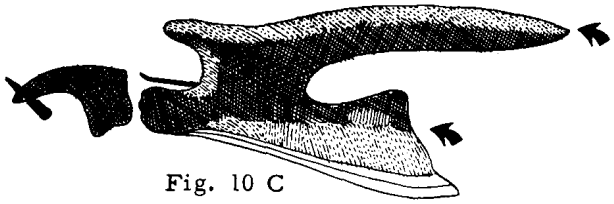


Fig. 10 C

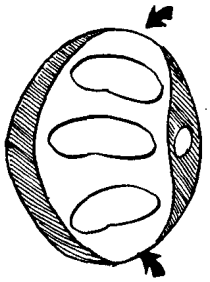


Fig. 10 B

Fig. 10 D

Fig. 10 E

11. Posterior spiracles with peritreme complete, sometimes weak in area of button (Fig. 11 A) 12

Posterior spiracles with peritreme incomplete, not enclosing a sometimes ill-defined button (Fig. 11 B)..... 16

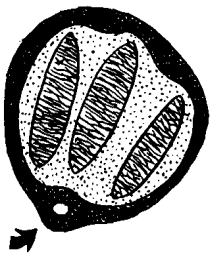


Fig. 11 A

Fig. 11 B

12. Spiracular plate and button heavily sclerotized; accessory oral sclerite present (Fig. 12 A & B)..... 13

Spiracular plate and button not heavily sclerotized; accessory oral sclerite absent (Fig. 12 C & D)..... 14

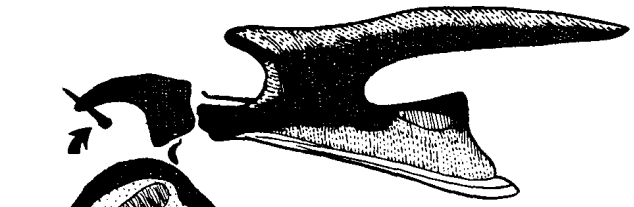


Fig. 12 A

Fig. 12 B

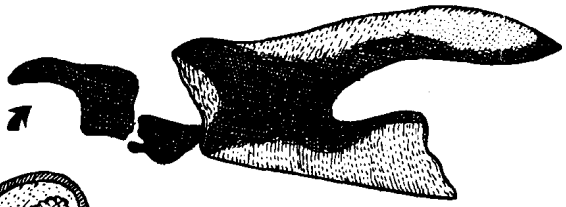
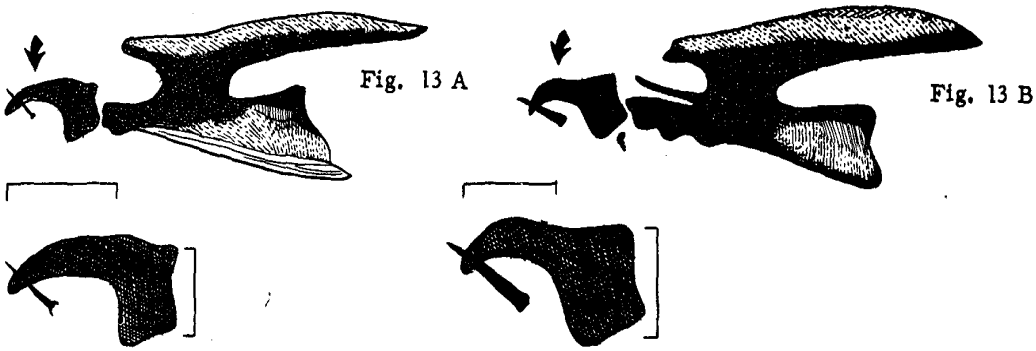


Fig. 12 C

Fig. 12 D

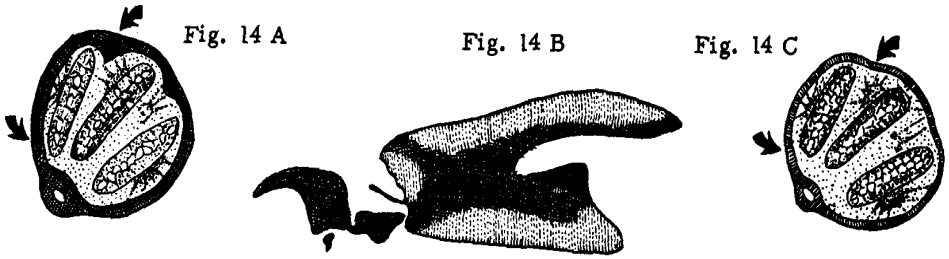
13. Mandibular sclerite with tooth longer than greatest width of basal portion (Fig. 13 A)..... ..... (Calliphora vicina) A BLUE BOTTLE FLY

Mandibular sclerite with tooth only as long as greatest width of basal portion (Fig. 13 B).. .....(Cynomyopsis cadaverina) A BLUE BOTTLE FLY



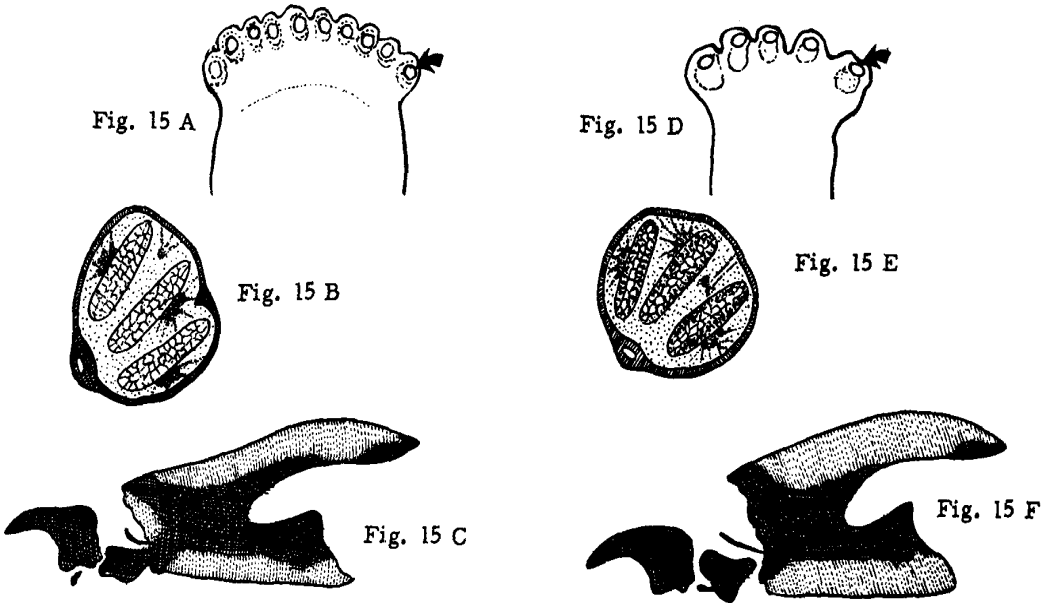
14. Peritreme thick with rounded or sharp projections which extend inward toward spiracular slits (Fig. 14 A); cephaloskeleton as in figure 14 B..... .....(Phaenicia caeruleiviridis) A GREEN BOTTLE FLY

Peritreme thin, usually with no projections or if present only slightly sclerotized (Fig. 14 C).....15



15. At least one of the prothoracic spiracles with 8 or more openings (Fig. 15 A); peritreme and cephaloskeleton as in figures 15 B & C. .(Phaenicia sericata) A GREEN BOTTLE FLY

At least one of the prothoracic spiracles with 6 or less openings (Fig. 15 D); peritreme and cephaloskeleton as in figures 15 E & F..... (Syn. P. pallescens).....(Phaenicia cuprina)A BRONZE BOTTLE FLY



16. Spiracular slits not pointing toward opening in peritreme (Fig. 16 A).....17

Spiracular slits pointing toward opening in peritreme (Fig. 16 B)..... 18

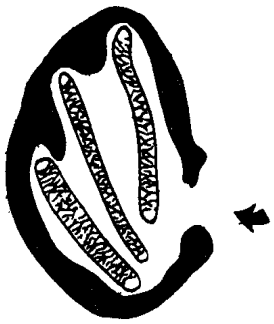


Fig. 16 A

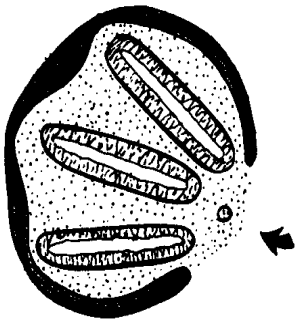


Fig. 16 B

17. Very large size, about 20 mm. long; mandibular sclerite as in figure 17 A.....
.....(Sarcophaga clitellivora or S. bullata) A FLESH FLY

Smaller size, about 10 mm. long; mandibular sclerite as in figure 17 B.....
..... (Sarcophaga haemorrhoidalis) A FLESH FLY

Fig. 17 A

Fig. 17 B

18. At least one of the prothoracic spiracles with 9 or less openings (Fig. 18 A).....19

At least one of the prothoracic spiracles with 10 or more openings (Fig. 18 B).....20

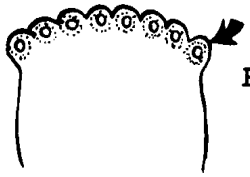


Fig. 18 A

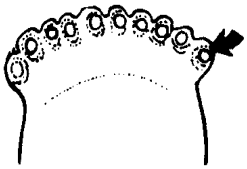


Fig. 18 B

19. Mandibular sclerite with tooth longer than width of basal portion (Fig. 19 A).....
.....(Wohlfahrtia opaca) A FLESH FLY

Mandibular sclerite with tooth only as long as greatest width of basal portion (Fig. 19 B)..
..... (Wohlfahrtia vigil) A FLESH FLY

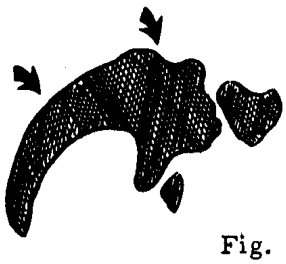


Fig. 19 A

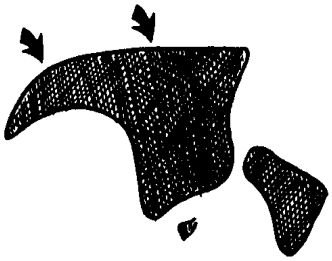


Fig. 19 B

20. Button indistinct or absent; walls of slits with lateral swellings (Fig. 20 A).....21

Button present; walls of slits without lateral swellings (Fig. 20 B)..... ..... (Phormia regina) BLACK BLOW FLY

Fig. 20 A

Fig. 20 B

21. Tracheal trunks pigmented (Fig. 21 A)..... .....(Cochliomyia hominivorax) PRIMARY SCREW-WORM

Tracheal trunks not pigmented (Fig. 21 B)..... .....(Cochliomyia macellaria) SECONDARY SCREW-WORM

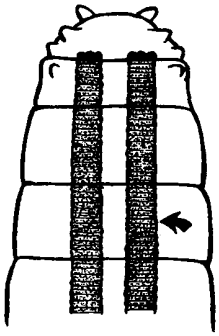


Fig. 21 A

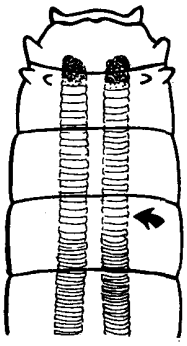


Fig. 21 B

22. Peritreme thick (Fig. 22 A).....(Musca domestica) HOUSE FLY

Peritreme thin (Fig. 22 B).....(Haematobia irritans) HORN FLY

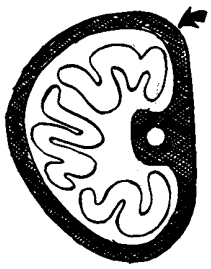


Fig. 22 A

Fig. 22 B

23. Small or slender, round larvae, usually less than 13 mm. long, tapering anteriorly (Fig. 23 A).....24

Large, robust larvae, over 15 mm long, with very stout spines (Fig. 23 B)..... 26

Fig. 23 A

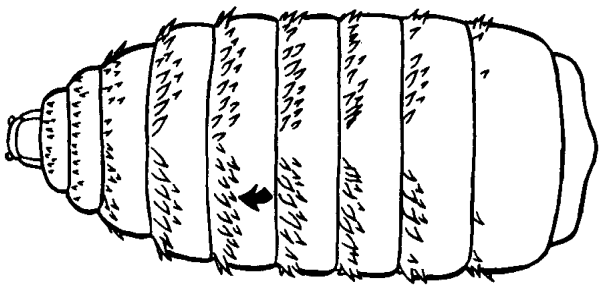


Fig. 23 B

24. Button centrally located (Fig. 24 A)..... (Stomoxys calcitrans) STABLE FLY

Button not centrally located (Fig. 24 B).....25

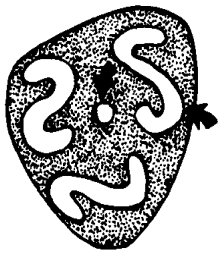


Fig. 24 A

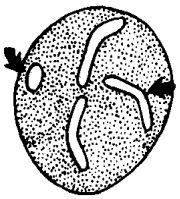


Fig. 24 B

25. Slits of posterior spiracles strongly sinuous (Fig. 25 A).....(Musca autumnalis) FACE FLY

Slits of posterior spiracles not strongly sinuous (Fig. 25 B).....
.....(Genus Mucina) FALSE STABLE FLY

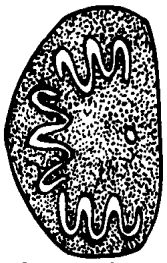


Fig. 25 A

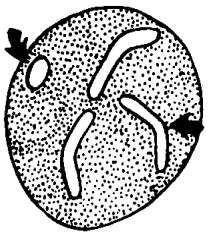


Fig. 25 B

26. Posterior spiracles with 3 distinct slits (Fig. 26 A).....27

Posterior spiracles without 3 distinct slits (Fig. 26 B).....28

Fig. 26 A

Fig. 26 B

27. Spiracular slits straight and sunken in deep cavity (Fig. 27 A); body shape as in figure 27 B. .....(Genus Dermatobia) HUMAN BOT FLY

Spiracular slits curved and at most in shallow cavity (Fig. 27 C); body shape as in figure 27 D.....(Genus Gasterophilus) HORSE BOT FLY

Fig. 27 A

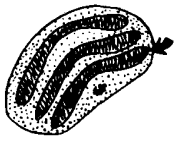


Fig. 27 C

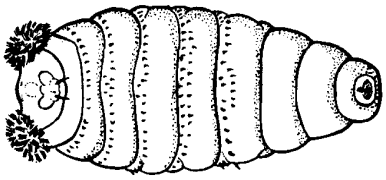


Fig. 27 B

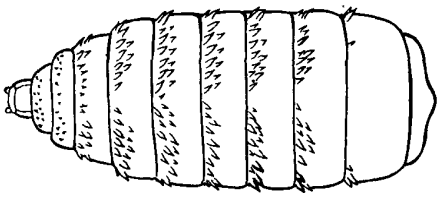


Fig. 27 D

28. Each spiracle divided into several plates (Fig. 28 A)..... (Genus Cuterebra) RABBIT AND RODENT BOT FLY

Each spiracle not divided into several plates (Fig. 28 B).....29

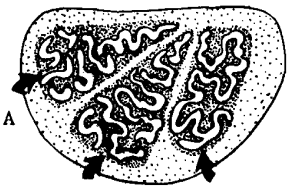


Fig. 28 A

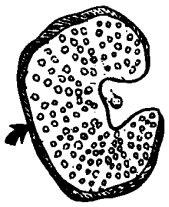


Fig. 28 B

29. Button centrally located (Fig. 29 A).....(Oestrus ovis) SHEEP BOT FLY

Button not centrally located (Fig. 29 B).....30

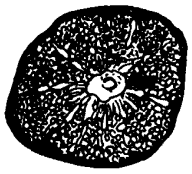


Fig. 29 A

Fig. 29 B

30. Opening toward button narrow (Fig. 30 A).... (Hypoderma bovis) NORTHERN CATTLE GRUB

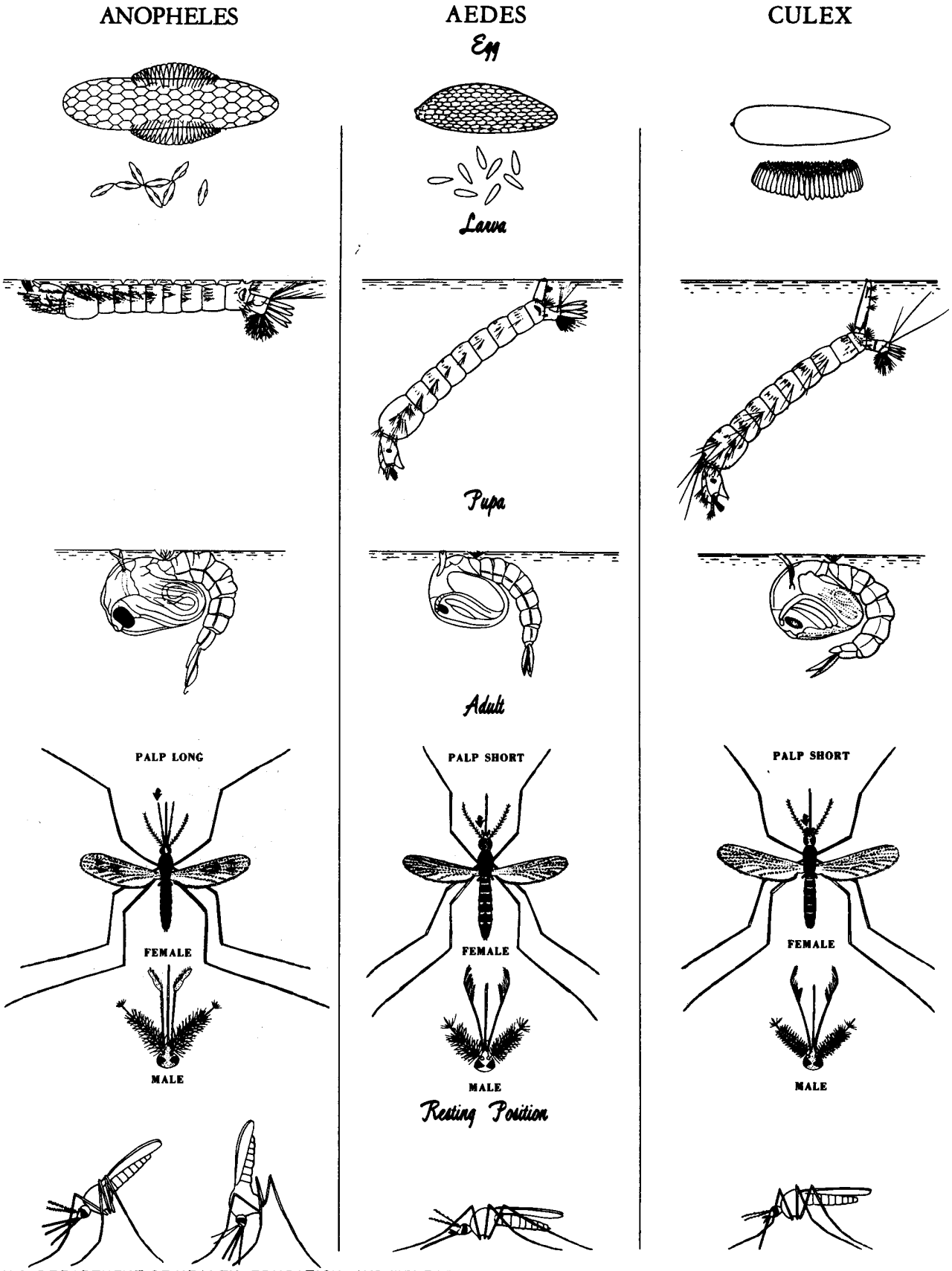
Opening toward button wide (Fig. 30 B).....(Hypoderma lineatum) CATTLE GRUB

Fig. 30 A

Fig. 30 B

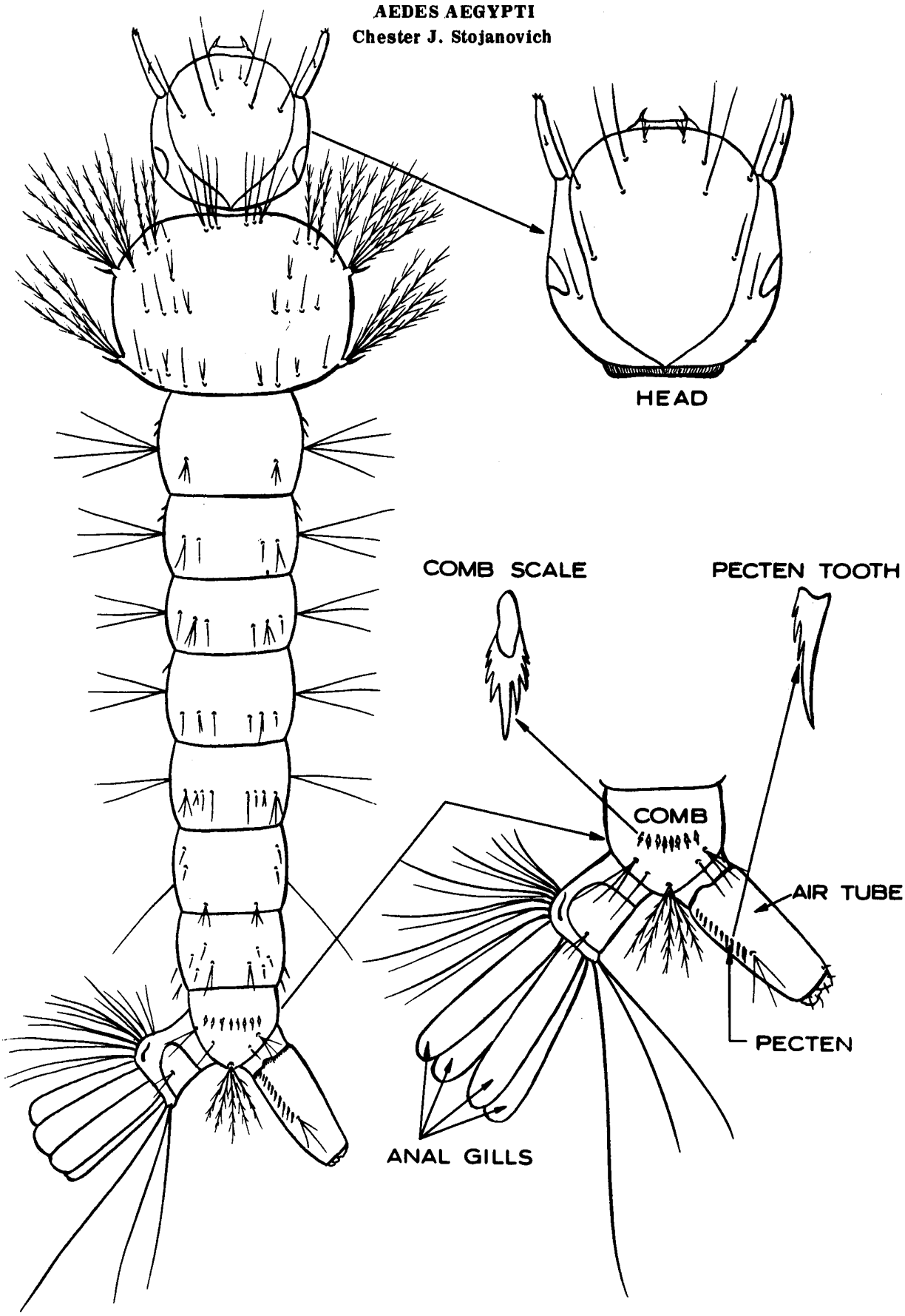
MOSQUITOES: CHARACTERISTICS OF ANOPHELINES AND CULICINES

Kent S. Littig and Chester J. Stojanovich



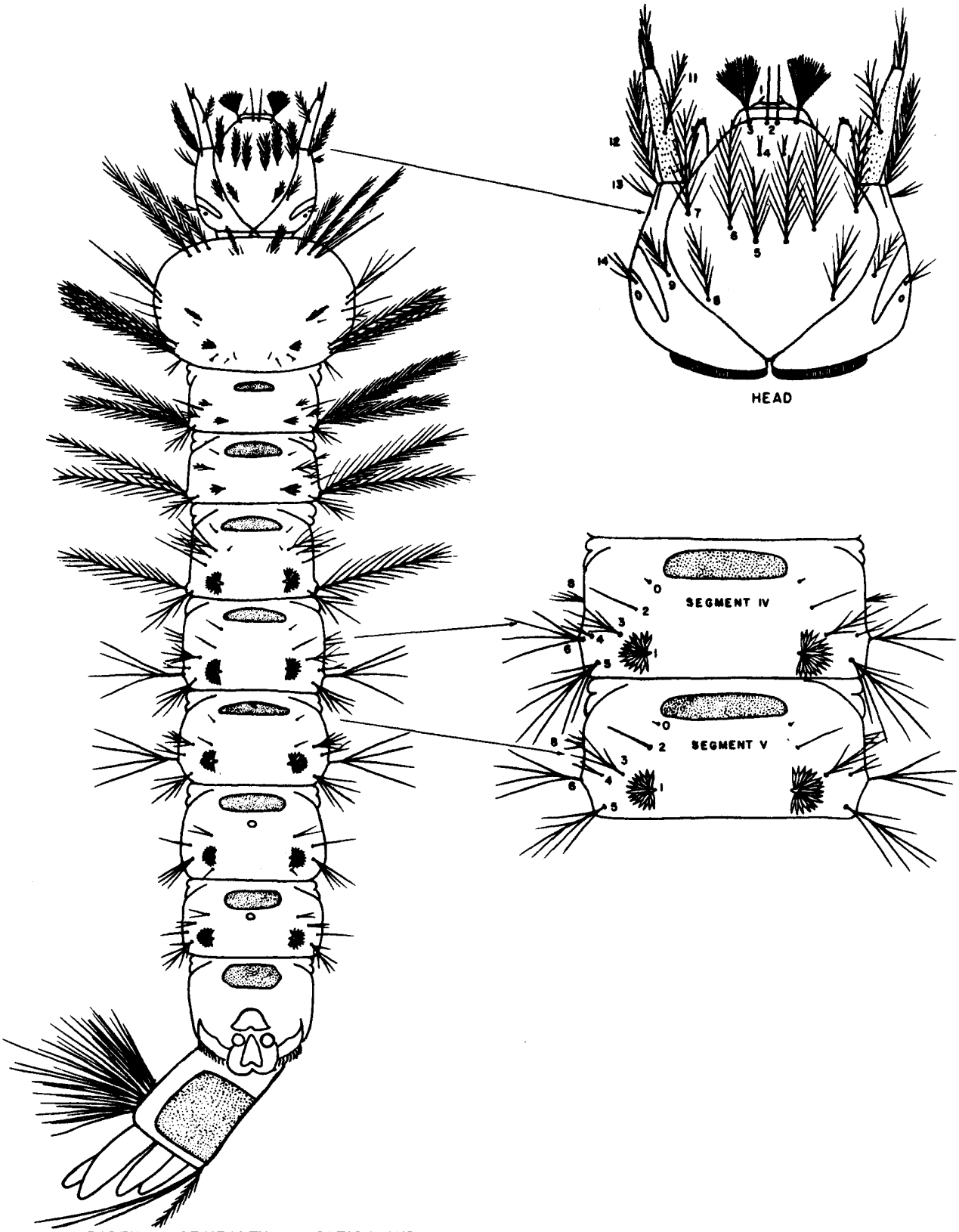
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

AEDES AEGYPTI
Chester J. Stojanovich



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

ANOPHELES QUADRIMACULATUS
Harry D. Pratt



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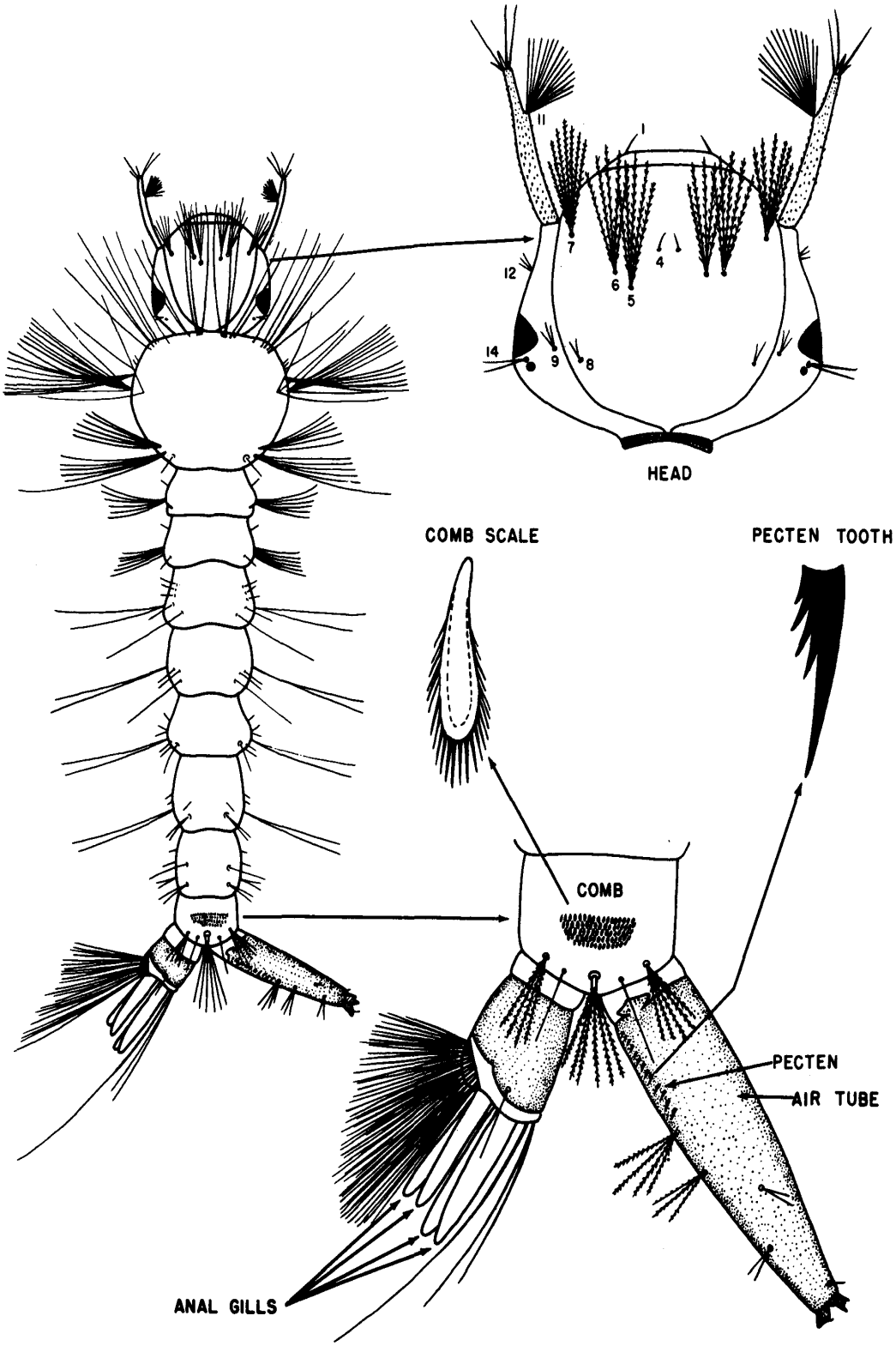
CULEX QUINQUEFASCIATUS
Harry D. Pratt



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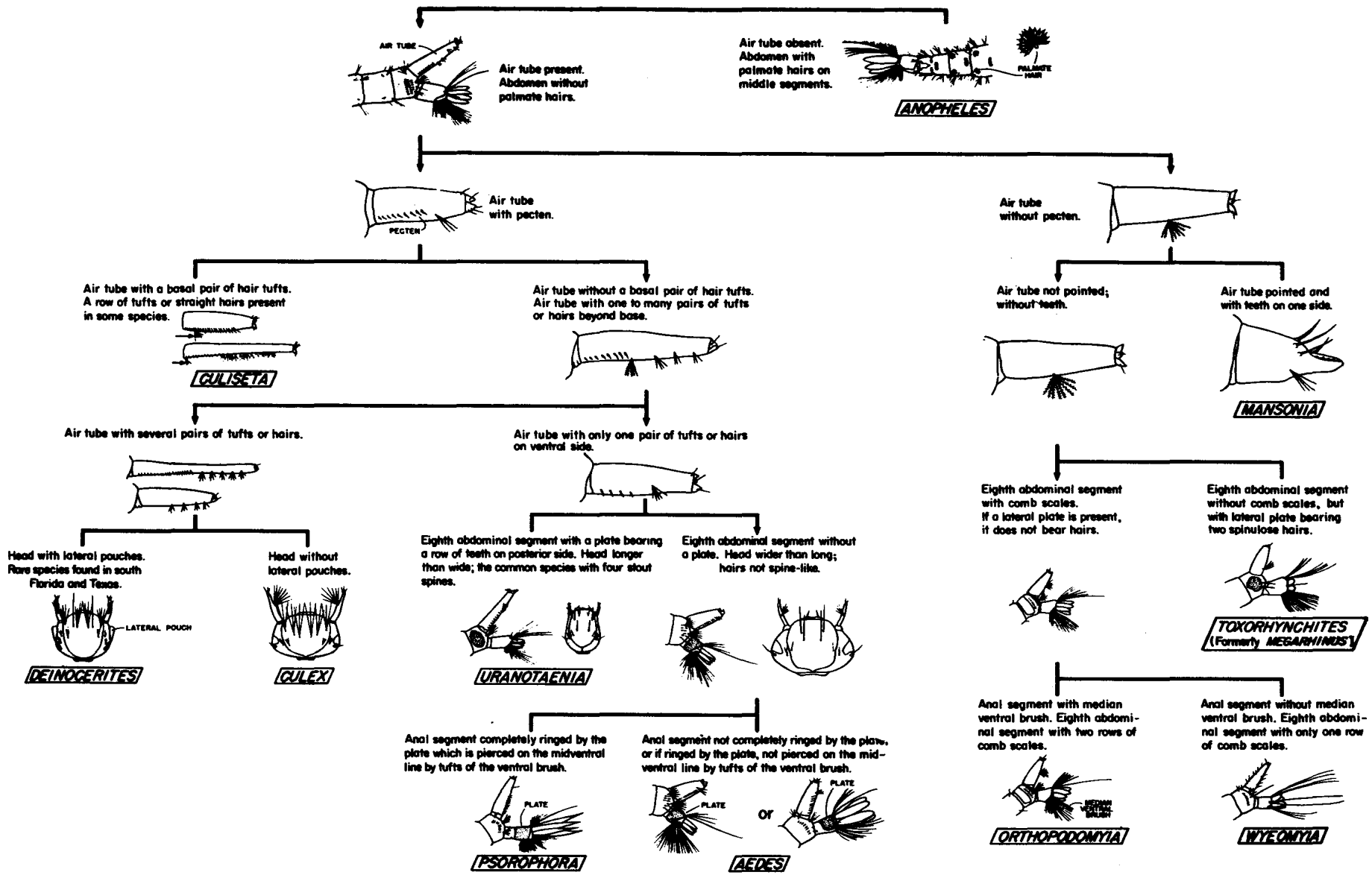
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

MOSQUITOES: PICTORIAL KEY TO U.S. GENERA OF LARVAE

Harry D. Pratt



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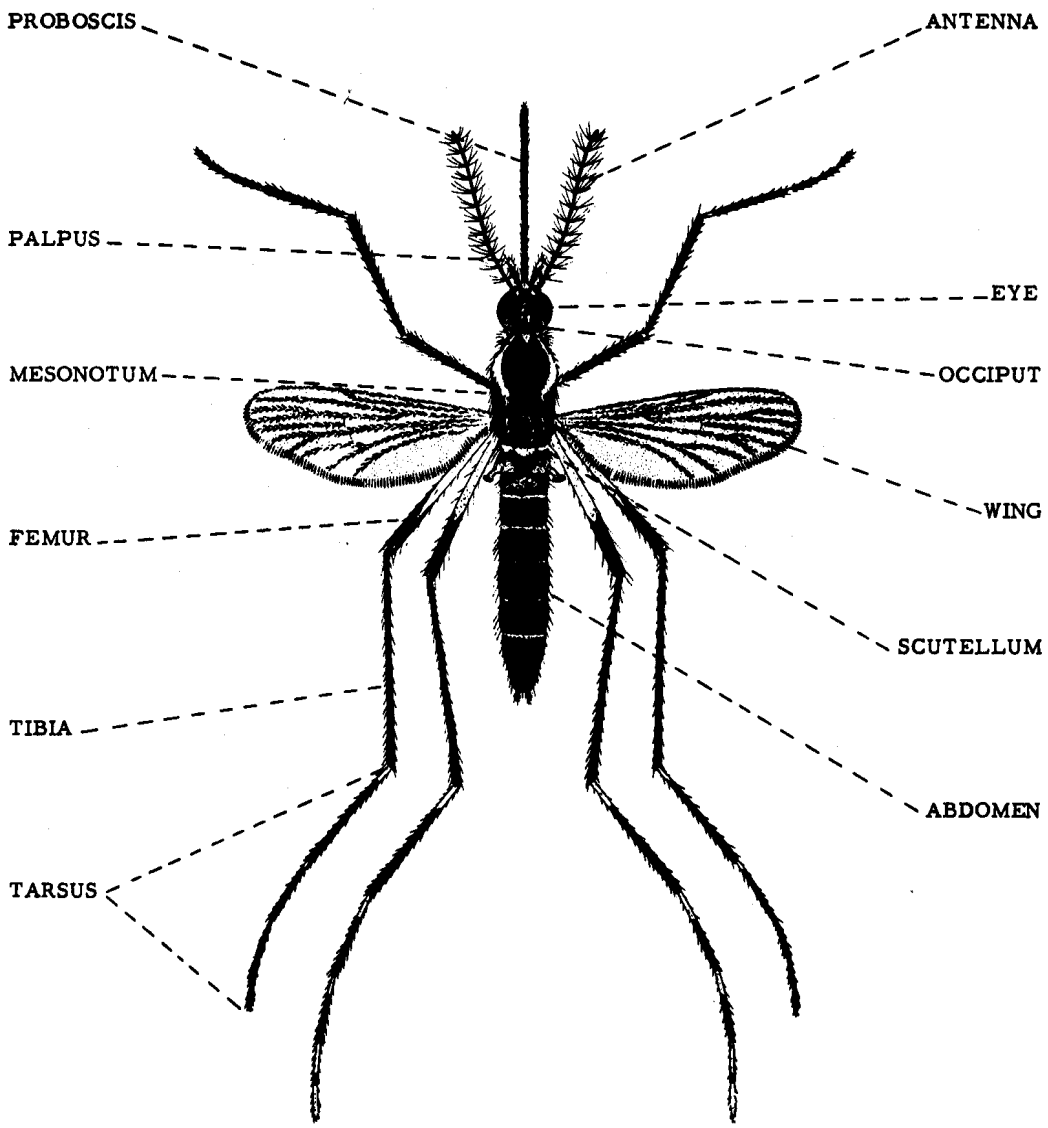
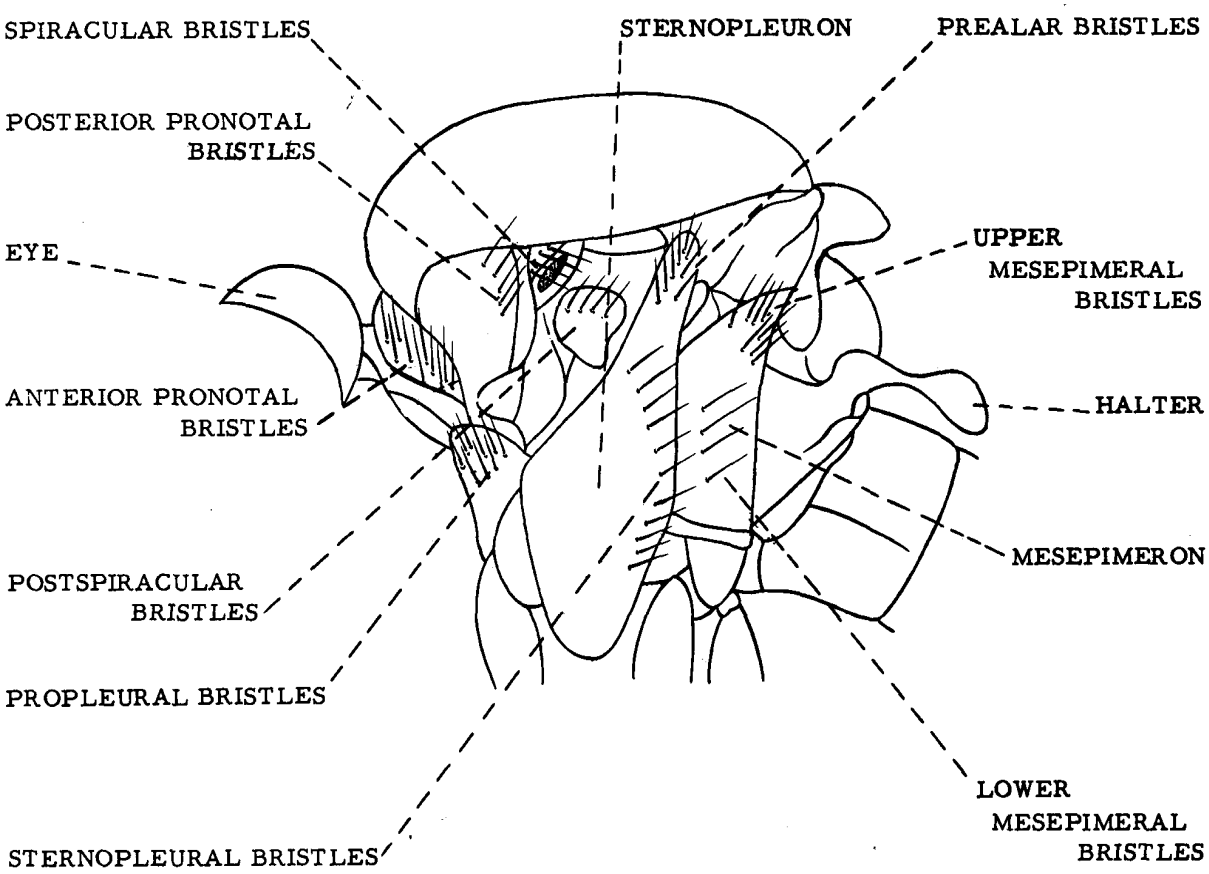
MOSQUITO DIAGRAM – ADULT FEMALE AEDES
Chester J. Stojanovich and Harold George Scott



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1966

MOSQUITO DIAGRAM – LATERAL ASPECT OF MOSQUITO THORAX

Chester J. Stojanovich



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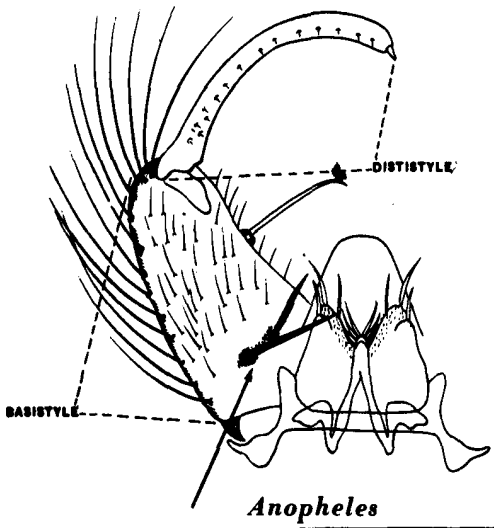
MOSQUITOES: PICTORIAL KEY TO UNITED STATES GENERA BASED ON MALE GENITALIA
PART I

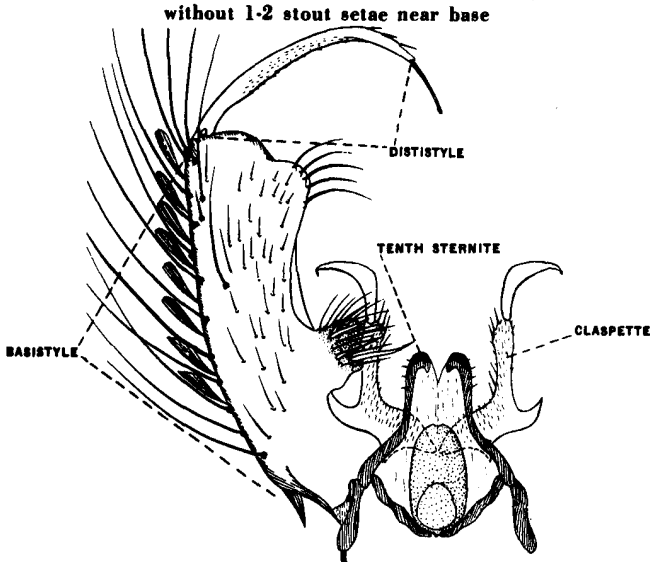
Chester J. Stojanovich

basistyle about equal in length to dististyle and with 1-2 stout setae near base

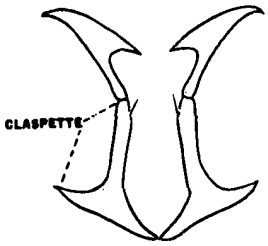


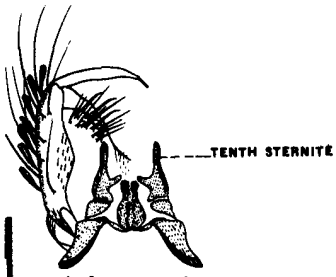
Anopheles

basistyle usually much shorter than dististyle, without 1-2 stout setae near base



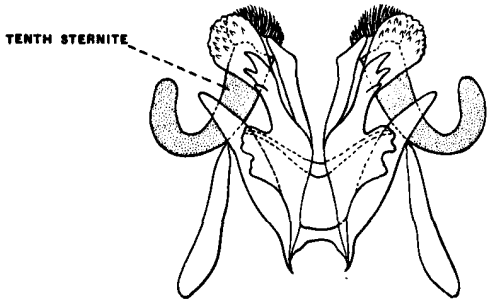
claspettes present 'absent only in *Aedes aegypti* as shown below'





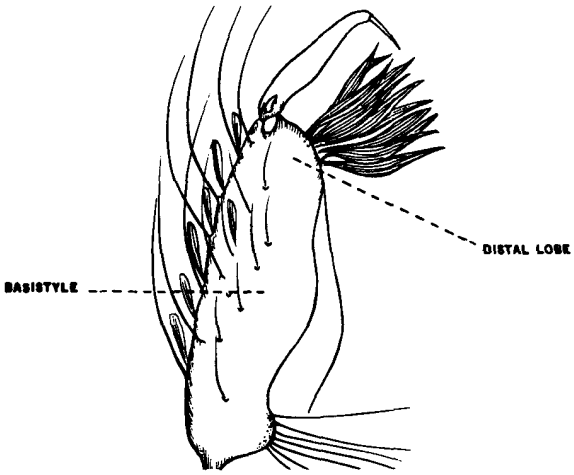
Aedes aegypti

claspette absent



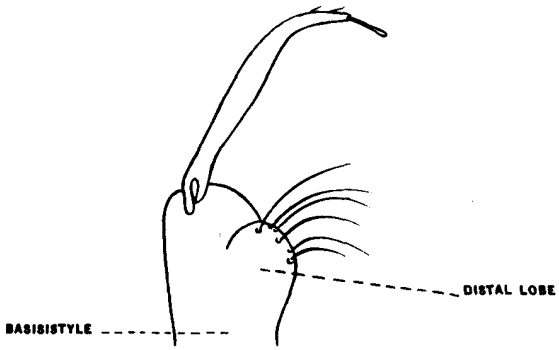
SEE PART II SECTION II

distal lobe of basistyle with leaf-like scales



Haemogogus

distal lobe when present without leaf-like scales



SEE PART II SECTION I

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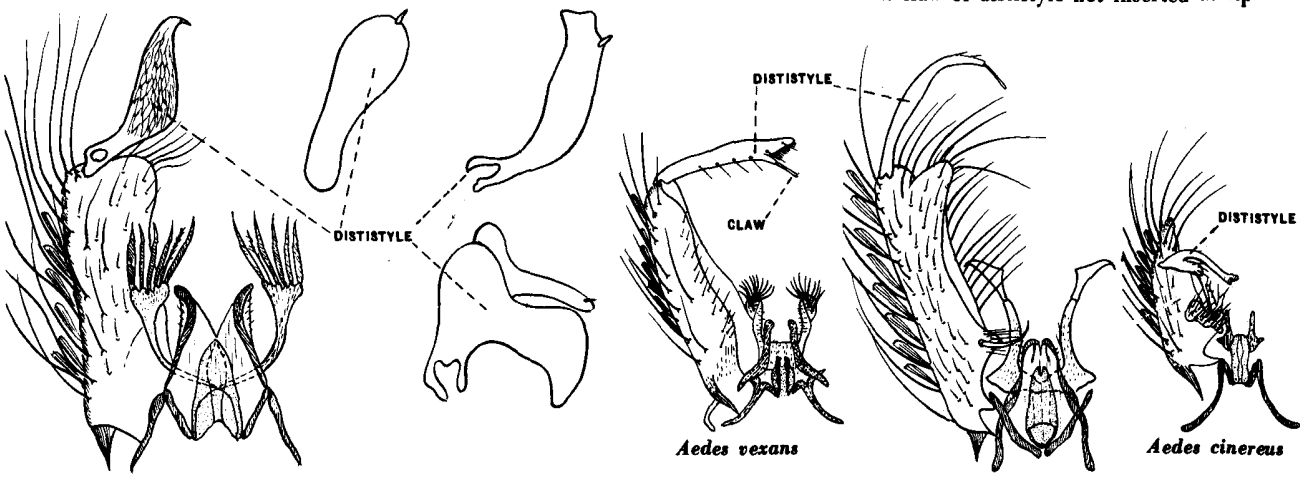
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

PART II

PART II SECTION I

dististyle not slender but variously shaped as shown below

dististyle slender 'exceptions being
Aedes cinereus with dististyle furcate at base and
Aedes vexans with claw of dististyle not inserted at tip



Psorophora *Aedes*

PART II SECTION II

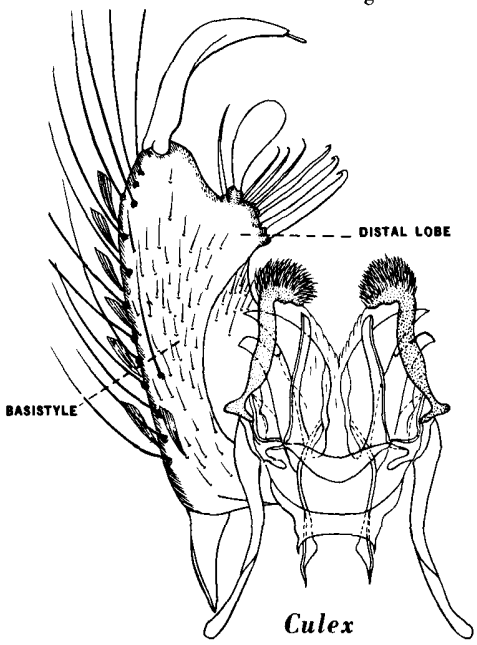
tenth sternite crowned with teeth or tuft of spines

tenth sternite simple or with few teeth

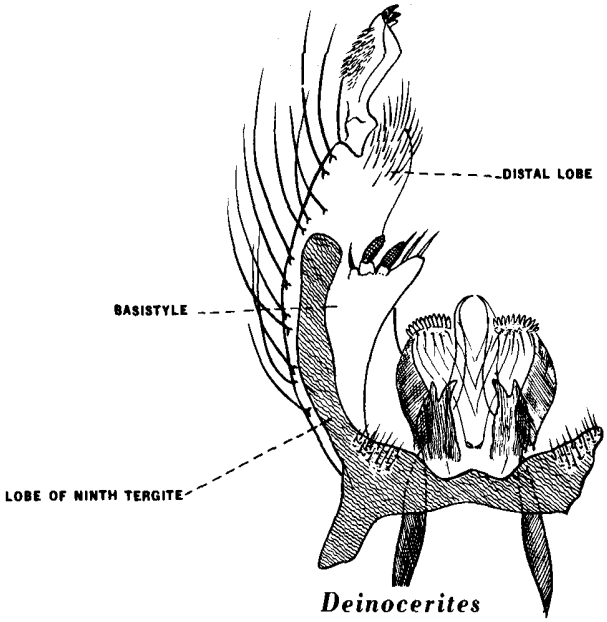
SEE PART III

distal lobe of basistyle with leaf-like scales or rods
lobe of ninth tergite short

distal lobe of basistyle without leaf-like scales or rods
lobe of ninth tergite half as long as basistyle



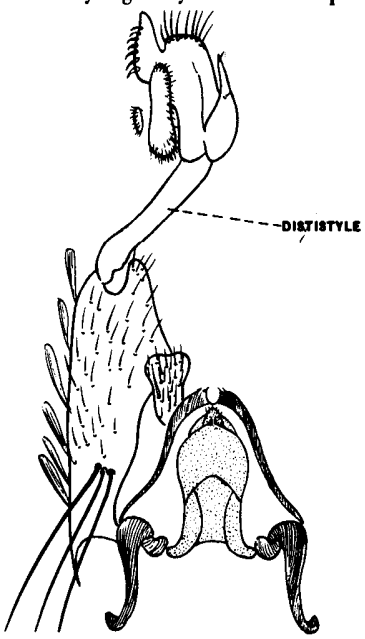
Culex



Deinocerites

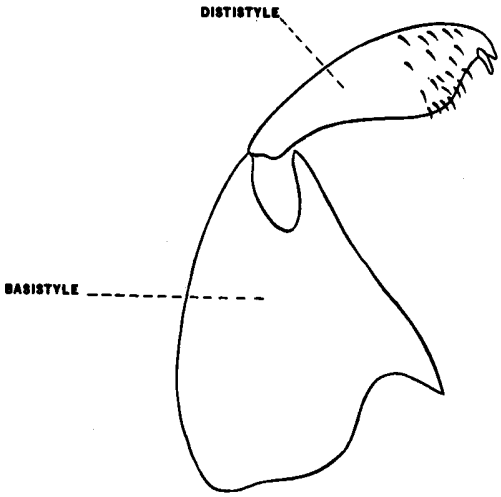
PART III

dististyle greatly modified at apex

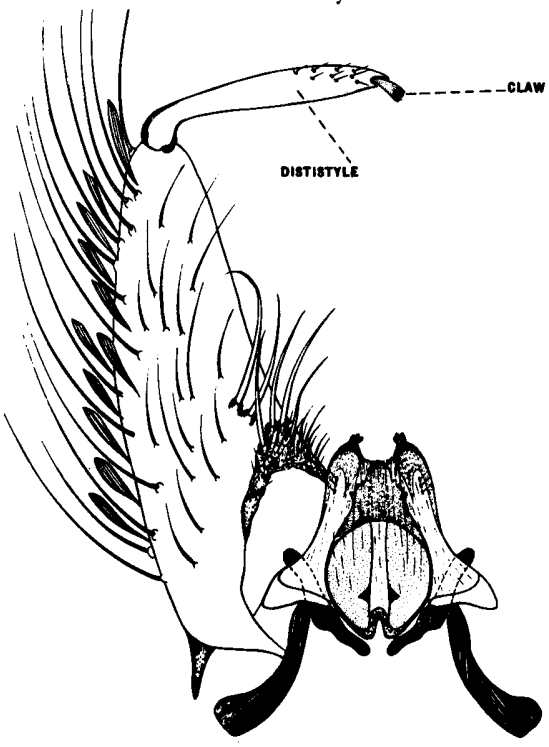


Wyeomyia

dististyle not greatly modified at apex

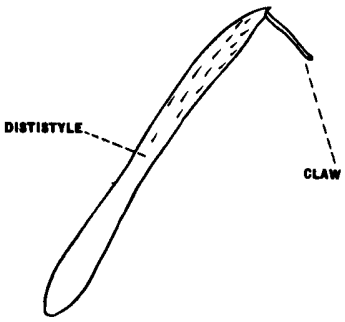


claw of dististyle comb-like



Orthopodomyia

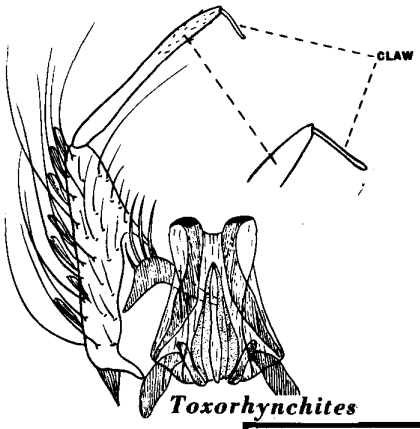
claw of dististyle not comb-like



SEE PART IV

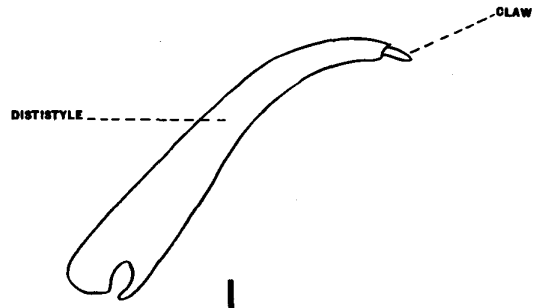
PART IV

claw of dististyle elongated

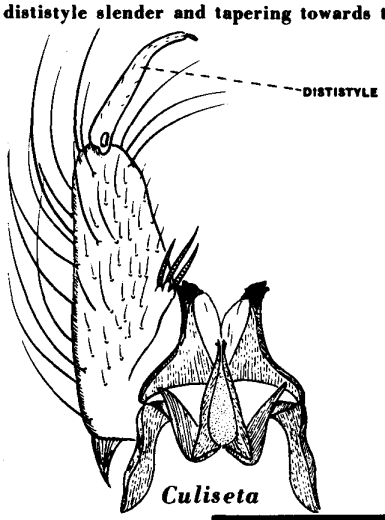


Toxorhynchites

claw of dististyle short

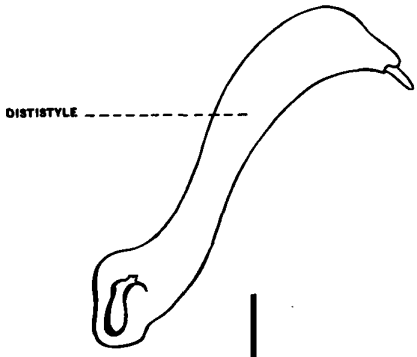


dististyle slender and tapering towards tip

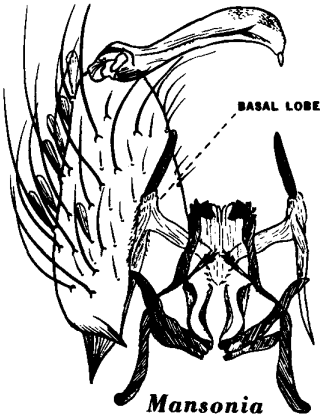


Culiseta

dististyle stout

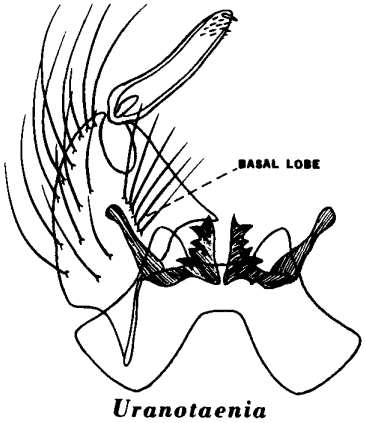


basal lobe long and slender, if not long bearing a rod-like seta



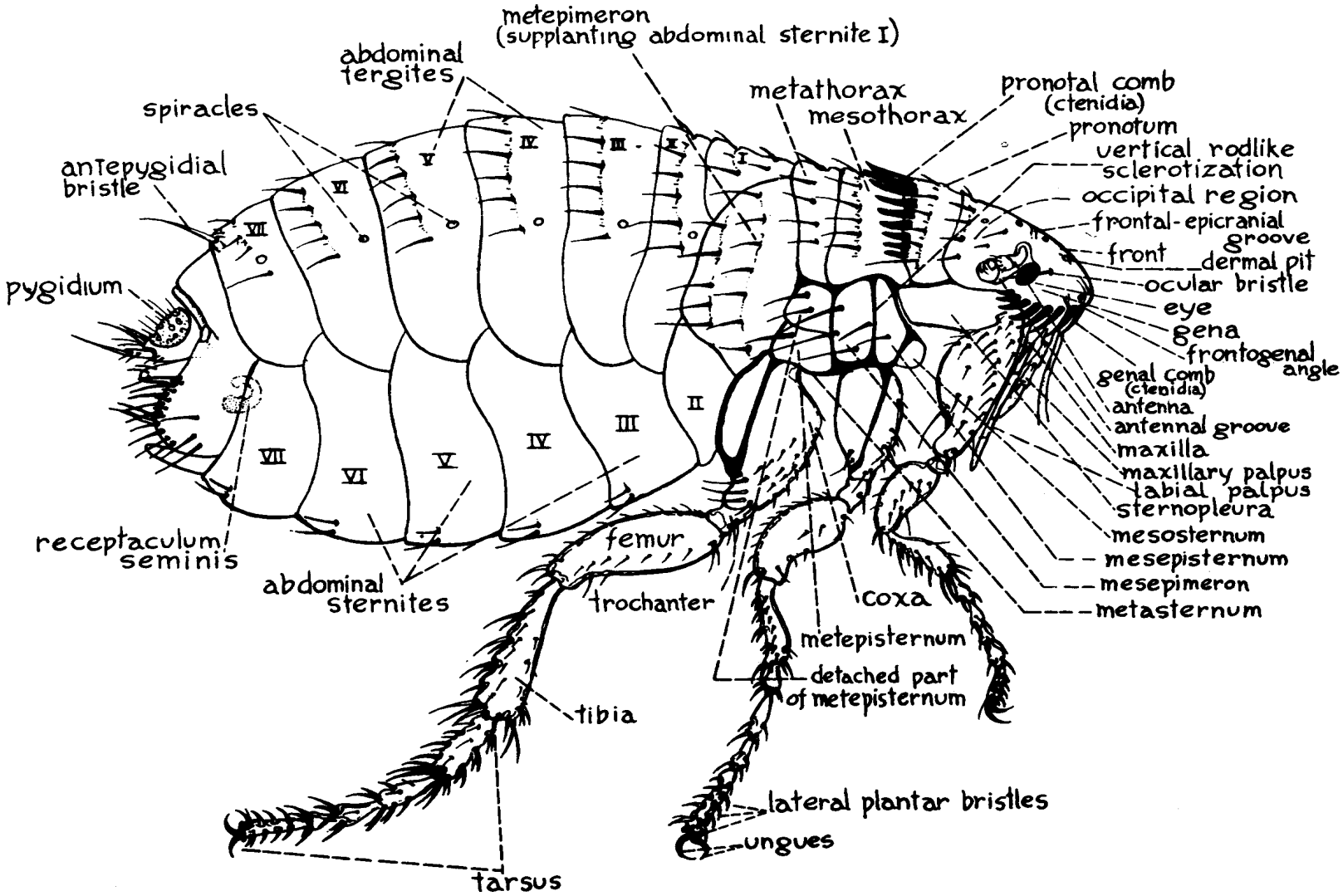
Mansonia

basal lobe not long and slender and without rod-like seta



Uranotaenia

CAT FLEA — CTENOCEPHALIDES FELIS
adult female



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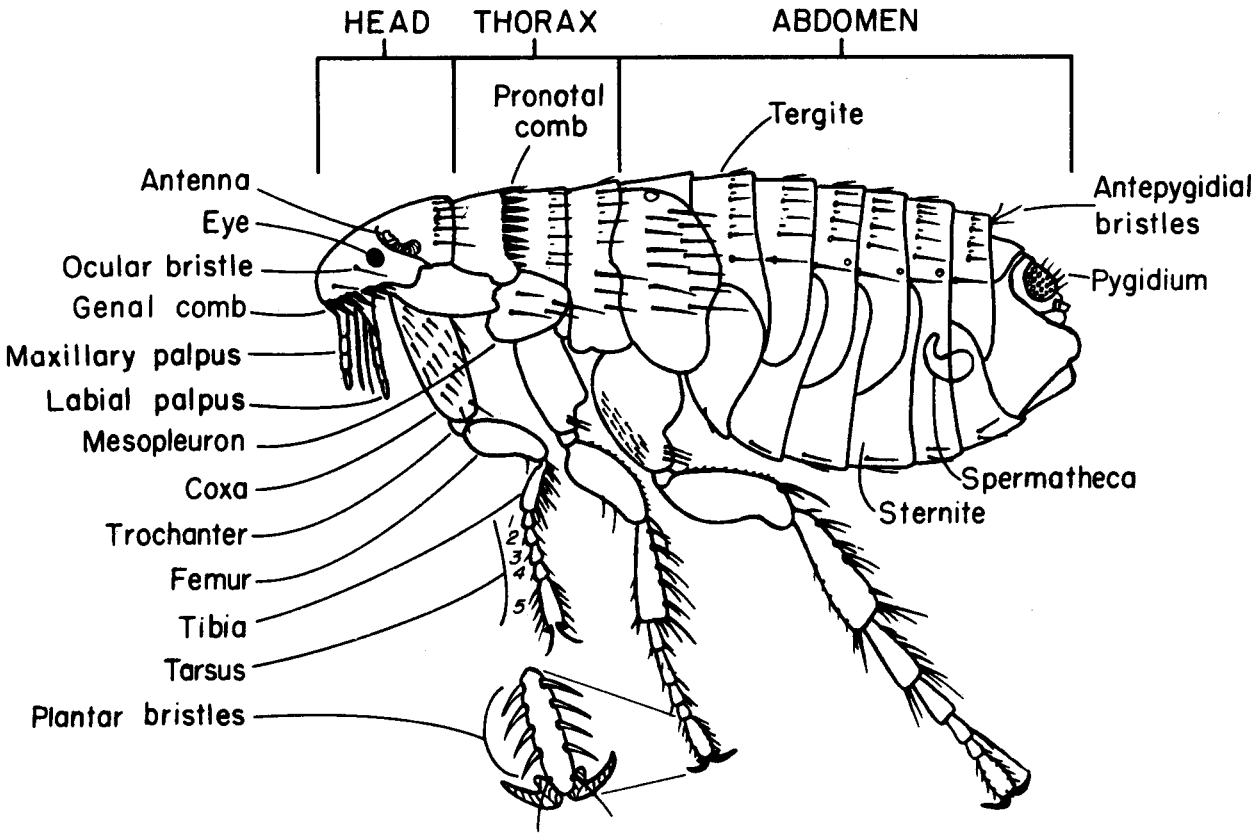
FLEA DIAGRAM – WITH STRUCTURES LABELED

Harry D. Pratt



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FLEAS: ILLUSTRATED KEY TO SPECIES FOUND DURING PLAGUE INVESTIGATIONS

Harry D. Pratt and Chester J. Stojanovich

1. Pronotal and genal combs absent (Fig. 1 A).....2

   Pronotal combs present; genal comb present or absent (Fig. 1 B & C)...5

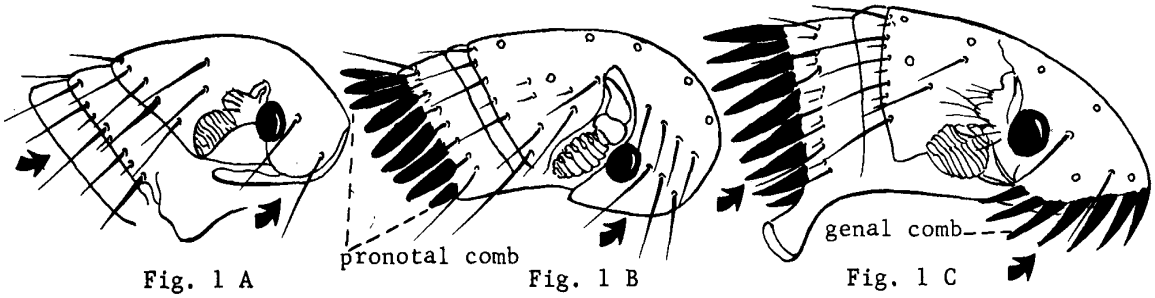

Fig. 1 A Fig. 1 B Fig. 1 C

2. Front margin of head with two angles; three thoracic tergites together shorter than the first abdominal tergite (Fig. 2 A). (Echidnophaga gallinacea).....STICKTIGHT FLEA

   Front margin of head rounded; three thoracic tergites together longer than the first abdominal tergite (Fig. 2 B).....3

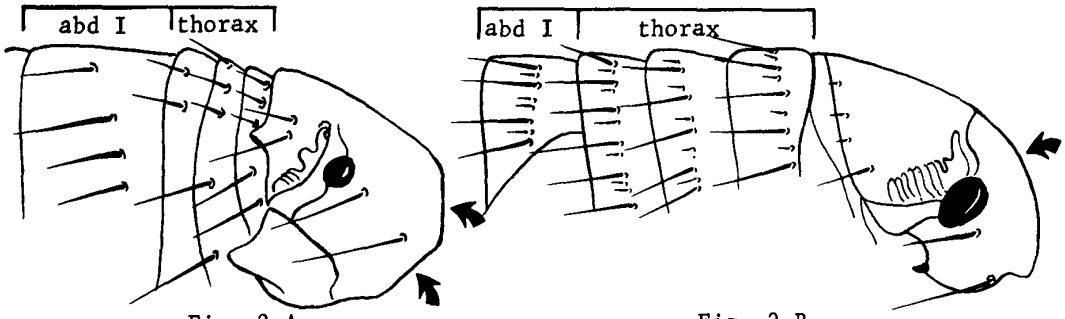

Fig. 2 A Fig. 2 B

3. Ocular bristle in front of eye; mesopleuron divided by internal sclerotization; female with spermatheca partially pigmented (Fig. 3 A & B)... .....(Genus Xenopsylla).....4

   Ocular bristle beneath eye; mesopleuron without internal sclerotization; female with spermatheca entirely without pigment (Fig. 3 C & D)..... (Pulex irritans).....HUMAN FLEA

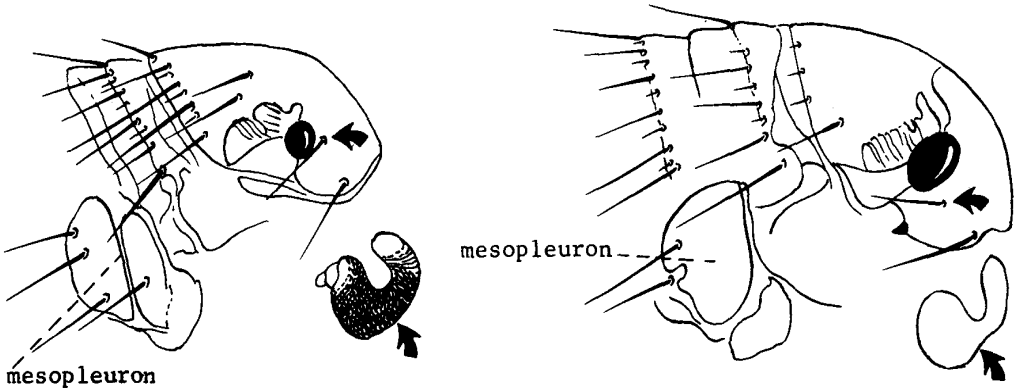

Fig. 3 A Fig. 3 B Fig. 3 C Fig. 3 D

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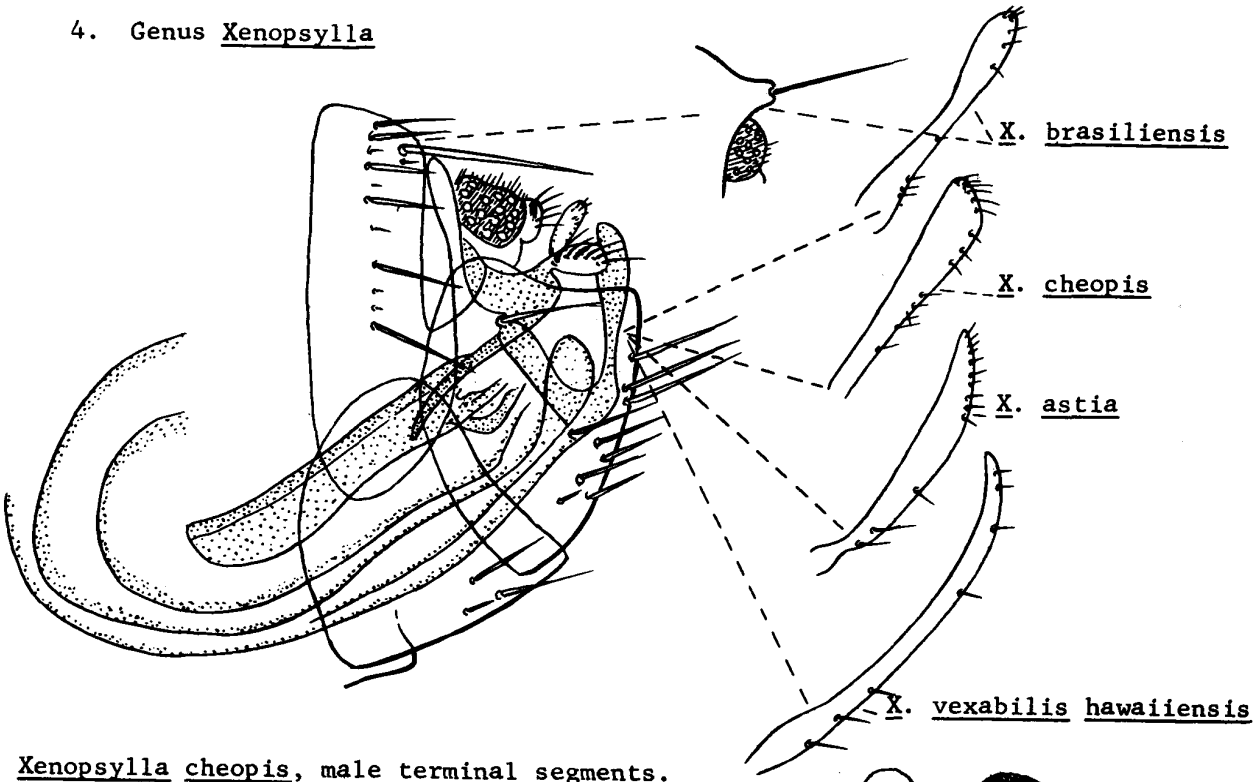
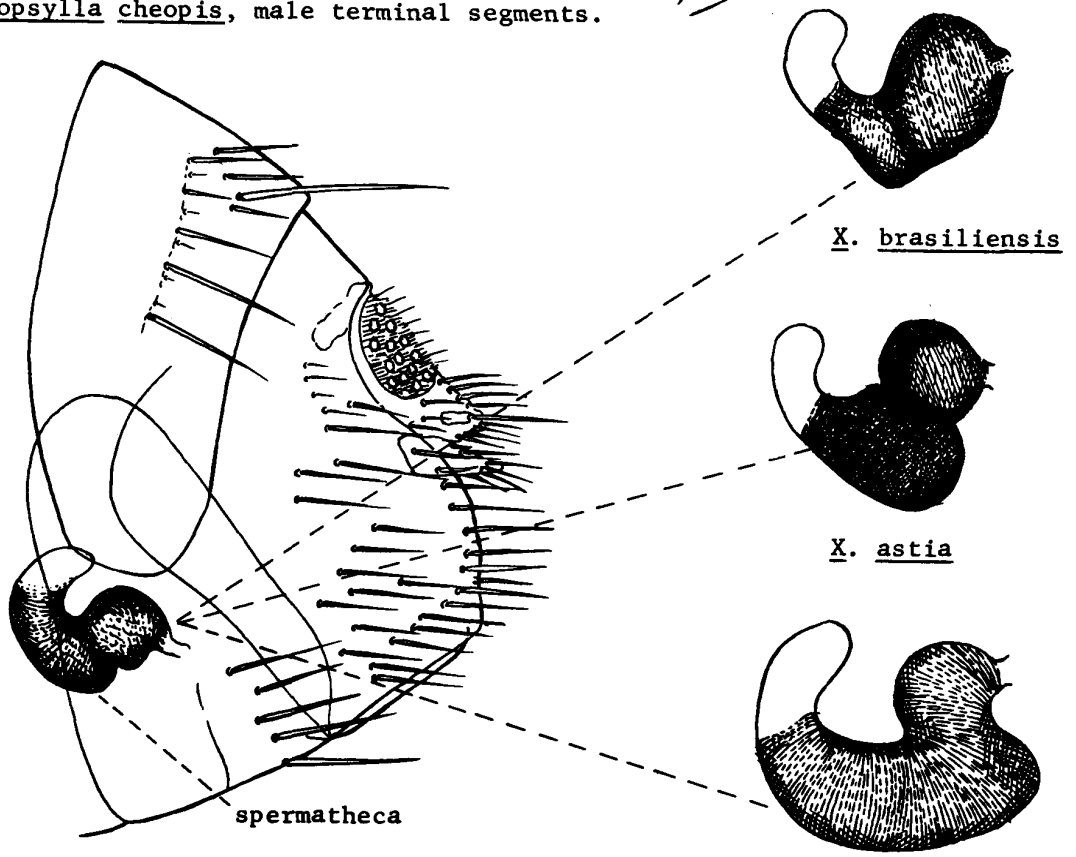
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1960

4. Genus Xenopsylla



Xenopsylla cheopis, male terminal segments.



Xenopsylla cheopis, female terminal segments

5. Genal comb absent (Fig. 5 A).....6

Genal comb present (Fig. 5 B).....8

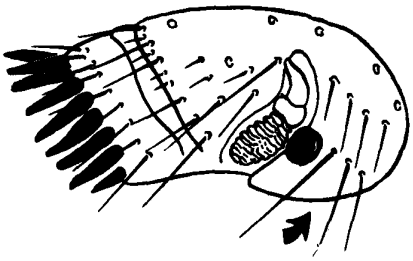


Fig. 5 A

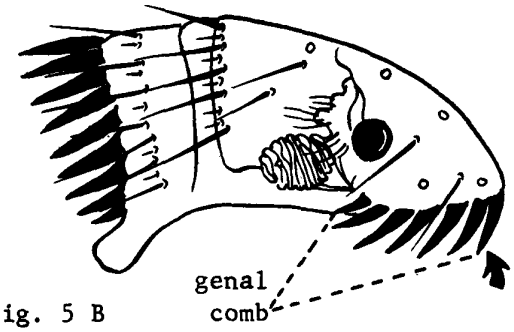


Fig. 5 B

6. Pronotal comb with about 12 teeth on each side (Fig. 6 A). India.....
.....*Stivalius ahalae*

Pronotal comb with 5 to 10 teeth on each side (Fig. 6 B).....7

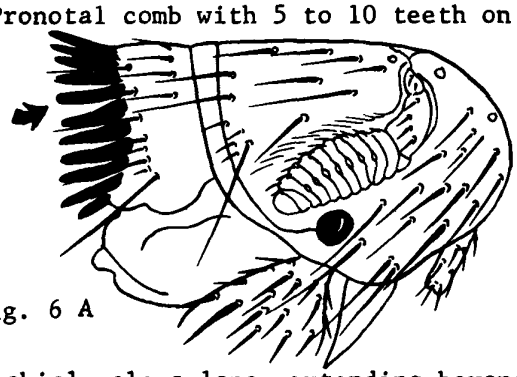


Fig. 6 A

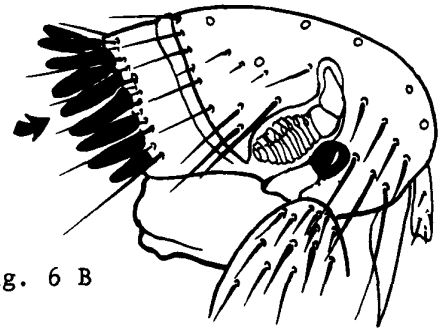


Fig. 6 B

7. Labial palpus long, extending beyond trochanter of first leg (Fig. 7 A).
Diamanus montanus.....ROCK SQUIRREL FLEA

Labial palpus short, not extending to tip of coxa of first leg (Fig. 7 B).
Nosopsyllus fasciatus.....NORTHERN RAT FLEA

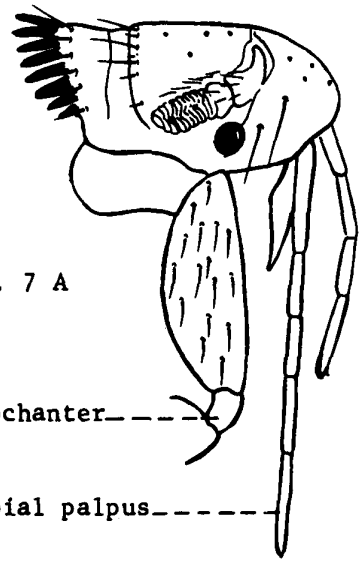


Fig. 7 A

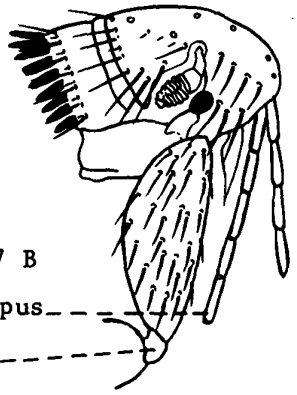


Fig. 7 B

8. Genal comb with two teeth (Fig. 8 A).....(Genus Neopsylla)
Neopsylla setosa important in U. S. S. R., Mongolia and Manchuria.

Genal comb with three teeth (Fig. 8 B).....(Genus Ctenophthalmus)
Ctenophthalmus breviatus and pollex potential vectors in U. S. S. R.

Genal comb with four teeth (Fig. 8 C).....(Genus Leptopsylla)
Leptopsylla segnis is cosmopolitan.

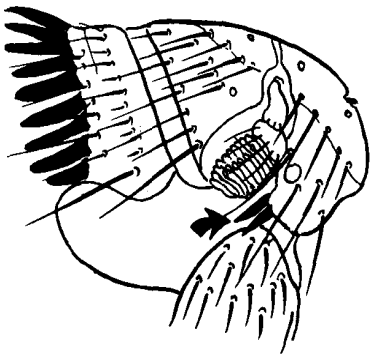


Fig. 8 A

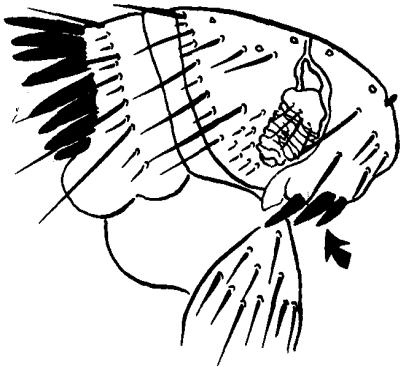


Fig. 8 B

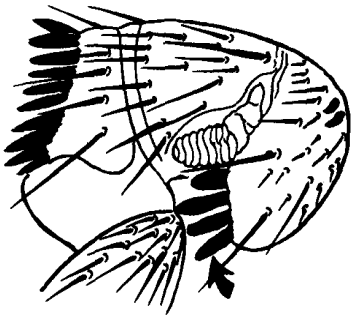


Fig. 8 C

Genal comb with more than five teeth.....(Genus Ctenocephalides). 9

9. Head strongly rounded anteriorly; first spine of genal comb about half as long as second; hind tibia with the spiniform setae A and B (Fig. 9 A & B).
Ctenocephalides canis.....DOG FLEA

Head not strongly convex anteriorly; first spine of genal comb almost as long as second spine; hind tibia with spiniform seta B, spiniform seta A replaced by a minute seta which may be absent in some specimens (Fig. 9 C & D). Ctenocephalides felis.....CAT FLEA

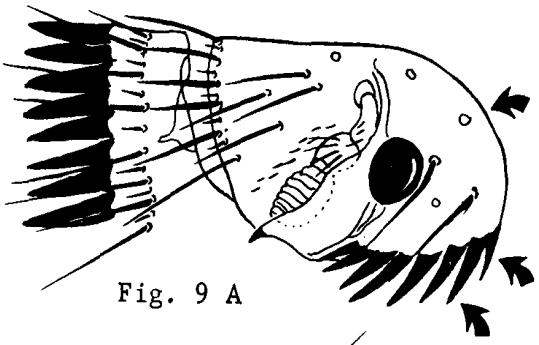


Fig. 9 A

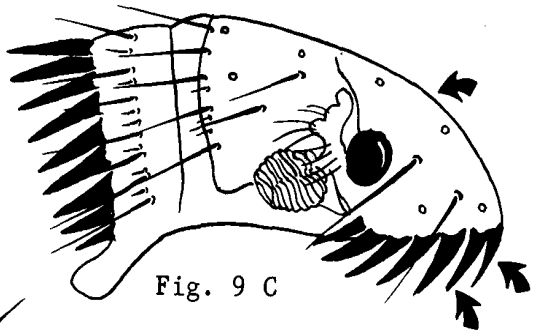


Fig. 9 C

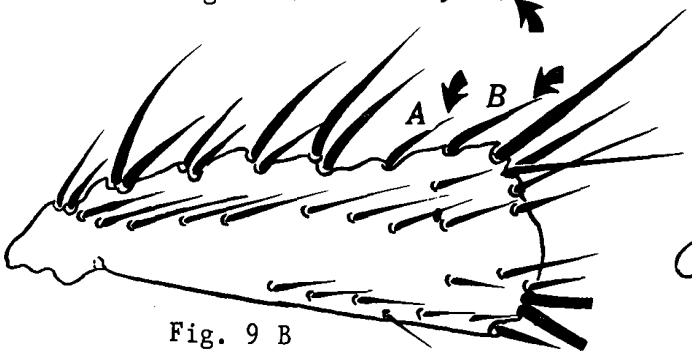


Fig. 9 B

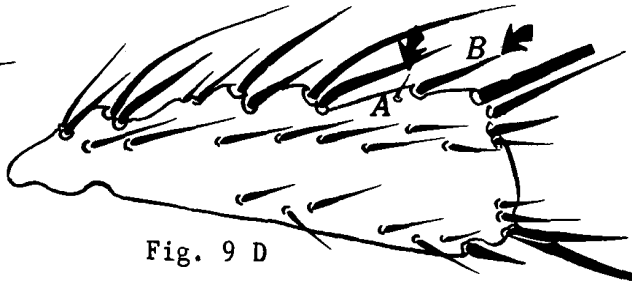
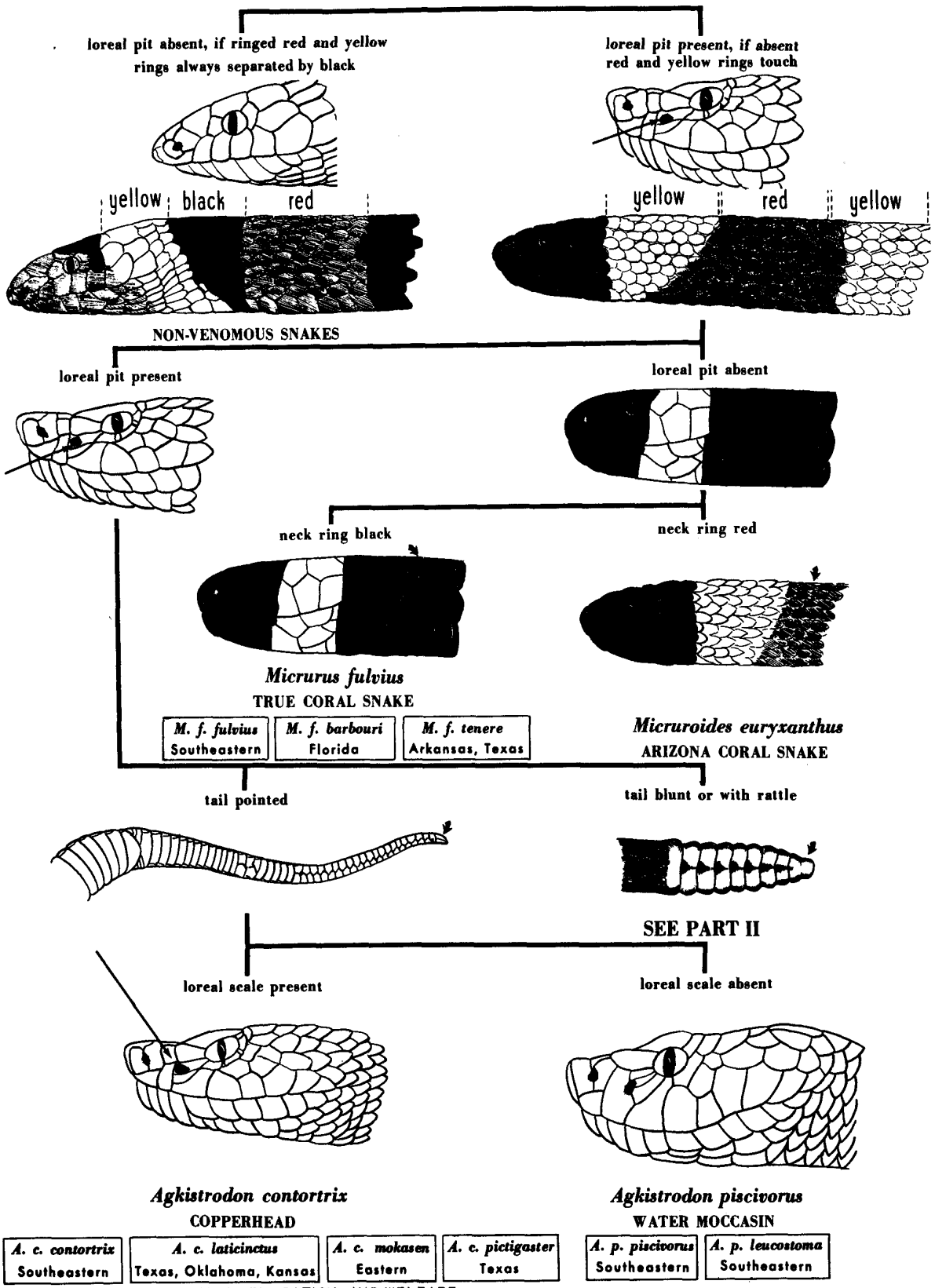


Fig. 9 D

SNAKES: PICTORIAL KEY TO VENOMOUS SPECIES IN UNITED STATES
PART I

Chester J. Stojanovich and Margaret A. Parsons



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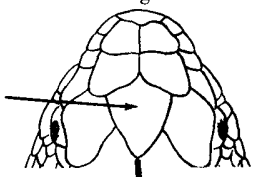
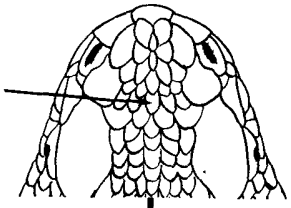
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964, Revised June 1965

PART II

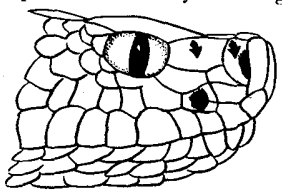
head with large scales medially



head with small scales medially



upper preocular usually touching postnasal



Sistrurus catenatus
MASSASAUGA RATTLESNAKE

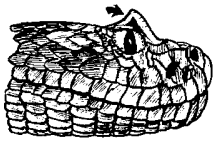
S. c. catenatus Great Lakes & Central U.S.	*S. c. edwardsii* Arizona, Colorado, New Mexico, Texas
S. c. tergeminus Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas	

upper preocular and postnasal separated

Sistrurus miliarius
PIGMY RATTLESNAKE

S. m. miliarius Southeastern	*S. m. barbouri* Southeastern	*S. m. streckeri* Southeastern

supraocular scale modified into a hornlike ridge

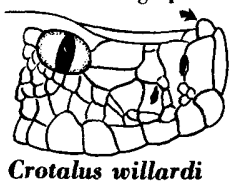


Crotalus cerastes
SIDEWINDER RATTLESNAKE

C. c. cerastes Arizona, California, Nevada, Utah	*C. c. cercobombus* Arizona	*C. c. laterorepens* Arizona, California

supraocular scale not modified into a hornlike ridge

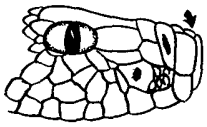
internasal ridge present



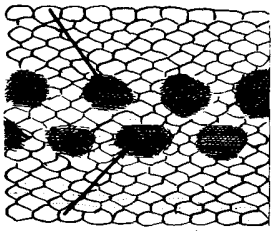
Crotalus willardi
RIDGE-NOSED RATTLESNAKE

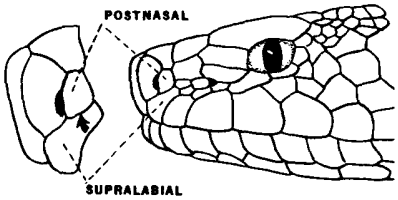
C. w. silus New Mexico	*C. w. willardi* Arizona,

internasal ridge absent



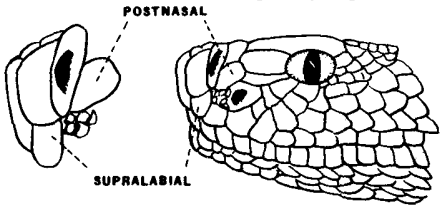
dorsal blotches on body divided into 2 parallel rows
first supralabial scale broadly attached to postnasal scale





Crotalus pricei
TWIN-SPOTTED RATTLESNAKE Arizona

dorsal blotches on body not divided into 2 parallel rows
first supralabial scale not broadly attached to postnasal scale, sometimes completely separated

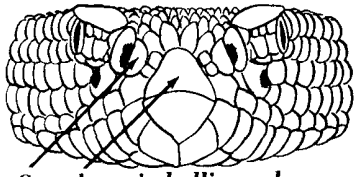


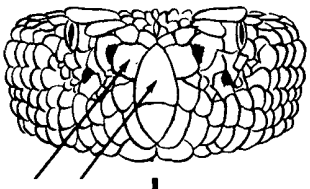
SEE PART III

PART III

prenasal and rostral usually separated

prenasal and rostral attached



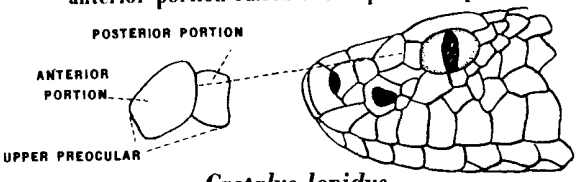


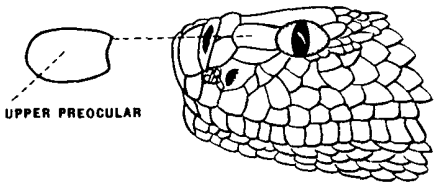
Crotalus mitchelli pyrrhus

SOUTHWESTERN SPECKLED RATTLESNAKE Arizona, California, Nevada, Utah

upper preocular usually separated vertically, anterior portion raised above posterior portion

upper preocular usually not separated, if separated anterior portion not raised above posterior portion





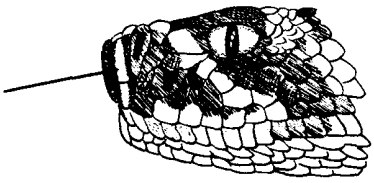
Crotalus lepidus

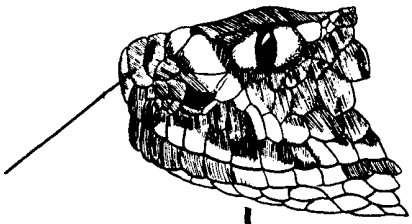
ROCK RATTLESNAKE

C. l. lepidus New Mexico, Texas	*C. l. klauberi* Arizona, New Mexico, Texas

prenasal and supralabial scales with pale stripe

prenasal and supralabial scales without pale stripe



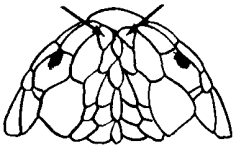


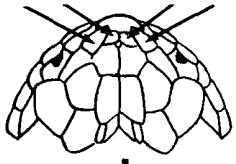
Crotalus adamanteus

EASTERN DIAMONDBACK RATTLESNAKE Southeastern

with 2 internasals

with more than 2 internasals





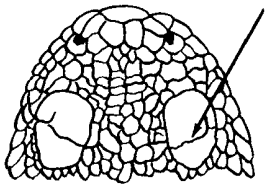
Crotalus viridis

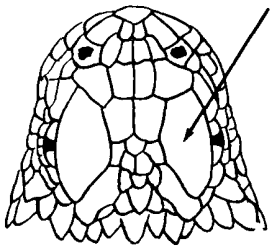
WESTERN RATTLESNAKE

C. v. viridis West Central U.S.	*C. v. abyssus* Arizona	*C. v. cerberus* Arizona	*C. v. concolor* Colorado, Utah
C. v. helleri California	*C. v. lutosus* Nevada & adjoining states	*C. v. nuntius* Arizona	*C. v. oreganus* California, Idaho, Oregon, Washington

supraocular scale divided, pitted or margins uneven

supraocular scale not divided, pitted or margins uneven





Crotalus mitchelli stephensi

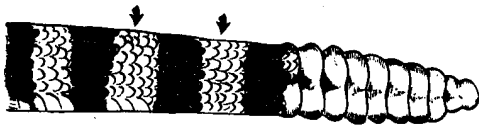
PANAMINT RATTLESNAKE California, Nevada

SEE PART IV

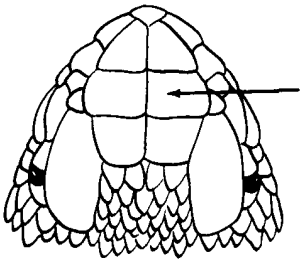
PART IV

tail without distinct rings

tail with distinct rings

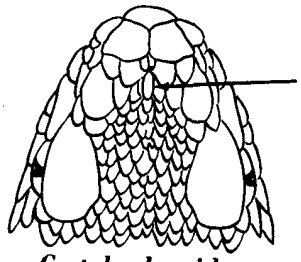


anterior frontal area with large scales



Crotalus molossus
BLACK-TAILED RATTLESNAKE Southwestern

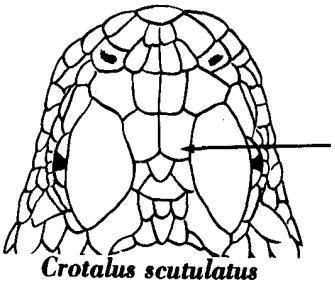
anterior frontal area with scales not much larger than posterior scales



Crotalus horridus
CANEBRAKE OR TIMBER RATTLESNAKE

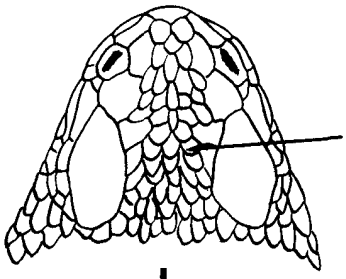
C. h. horridus Eastern	*C. h. atricaudatus* Southeastern

scales between supraoculars usually 2



Crotalus scutulatus
MOHAVE RATTLESNAKE Arizona, California, Nevada, New Mexico, Texas

scales between supraoculars usually 4, or more

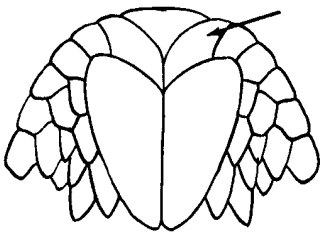


tail not in sharp contrast to posterior part of body

Crotalus tigris
TIGER RATTLESNAKE Arizona

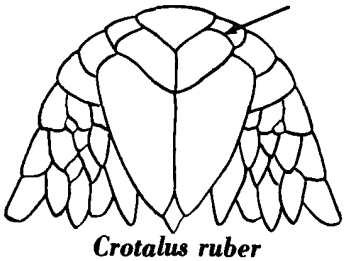
tail in sharp contrast to posterior part of body

first infralabial scale rarely divided, body color grayish



Crotalus atrox
WESTERN DIAMONDBACK RATTLESNAKE Southwestern

first infralabial scale usually divided, body color pink or red

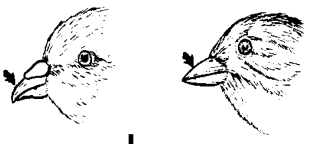


Crotalus ruber
RED DIAMONDBACK RATTLESNAKE California

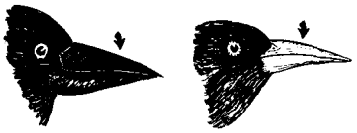
BIRDS: PICTORIAL KEY TO SOME COMMON PEST SPECIES OF PUBLIC HEALTH IMPORTANCE

Margaret A. Parsons and Chester J. Stojanovich

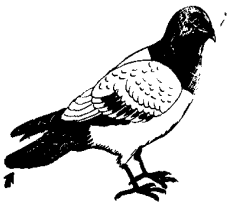
bill short



bill long



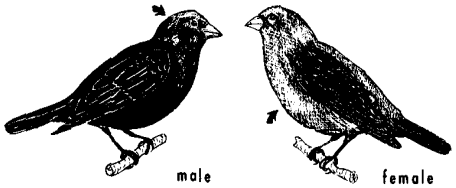
male and female. body plump, tail fan-like



COMMON PIGEON

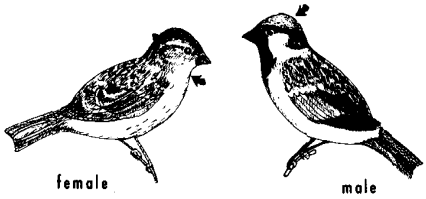
body trim, tail not fan-like

male. body black, head brown
female. overall dull grey color



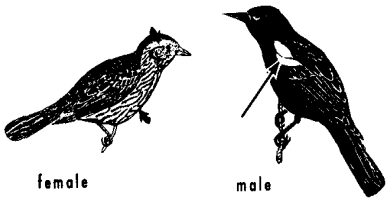
COMMON COWBIRD

male. black throat, grey crown
female. whitish throat, dull eye stripe



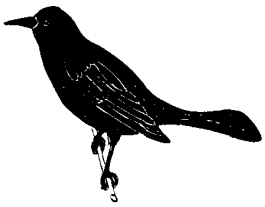
HOUSE SPARROW

male. wing with red 'epaulettes'
female. breast heavily striped, light eye stripe



RED-WINGED BLACKBIRD

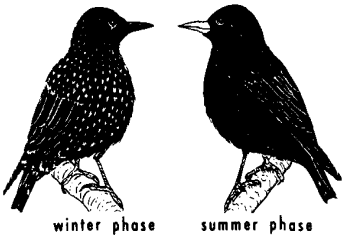
wing without 'epaulettes'
breast not heavily striped



males. plain bronze or
dull purple back, tail long
females: less iridescent, smaller size

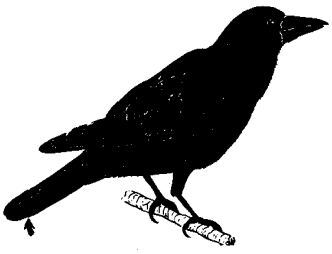
GRACKLES

winter. bill dark, body heavily speckled with light dots
spring. bill yellow, color purple and green



STARLING

male and female.
very large size, coal
black color, tail flat

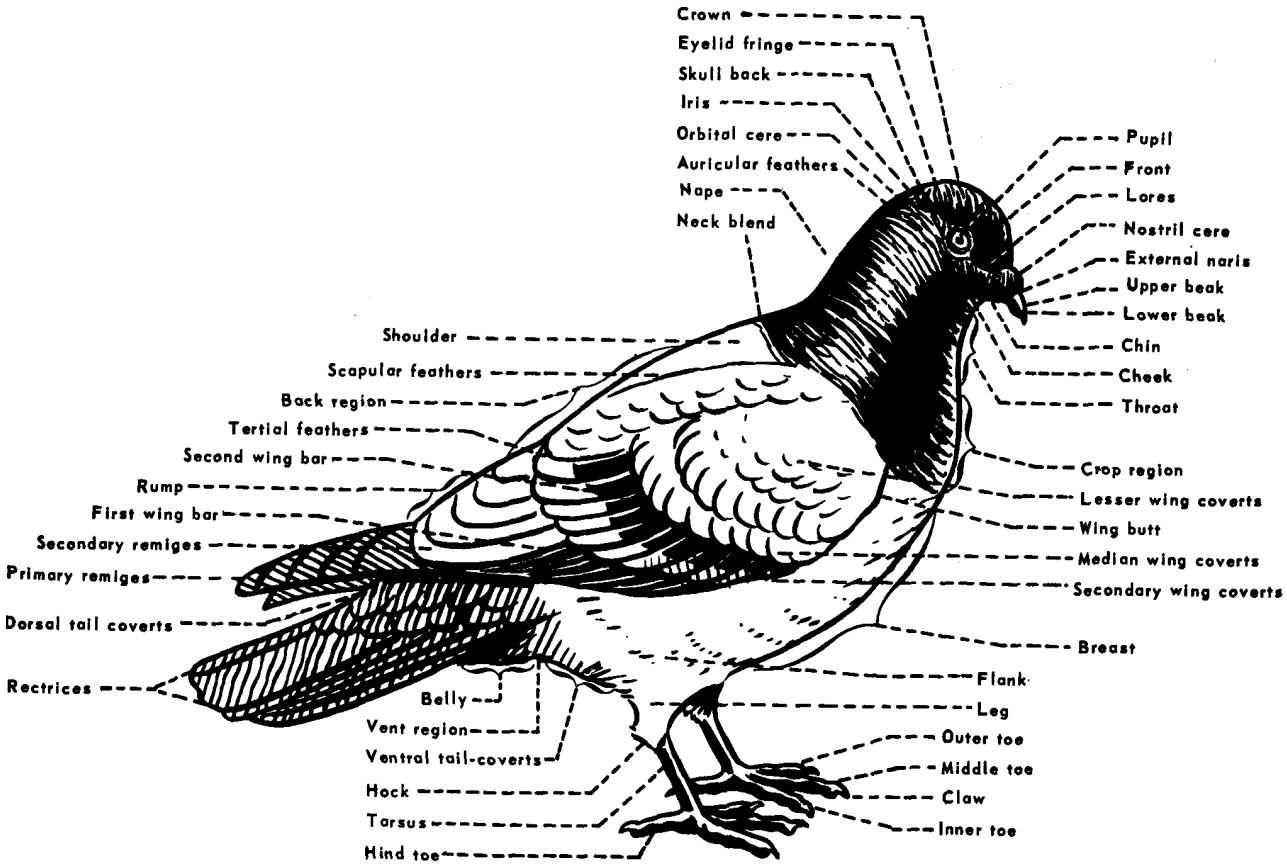


CROWS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

PIGEON, COLUMBA LIVIA – EXTERNAL MORPHOLOGY

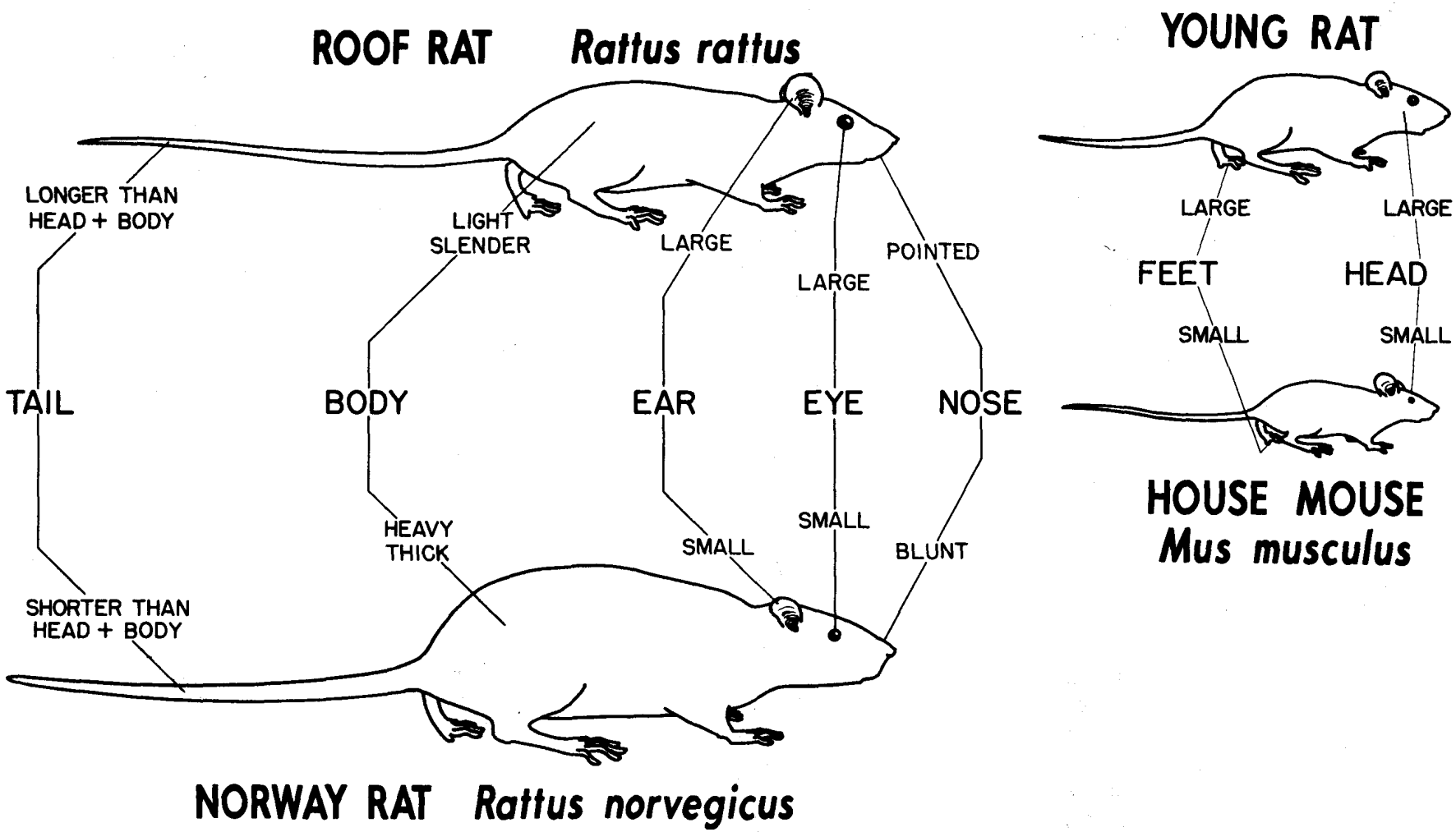
Harold George Scott and Walter S. Dougherty



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

DOMESTIC RODENT FIELD IDENTIFICATION

Robert Z. Brown



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1953

DOMESTIC RODENTS AND COCKROACHES: PICTORIAL KEY TO DROPPINGS

Harold George Scott and Margery R. Borom

length over 1/3-inch*

rectangular, blunt

Rattus norvegicus
NORWAY RAT

elongate, pointed

Rattus rattus
ROOF RAT

length under 1/4-inch*

elongate, pointed

without ridges
length about 1/4-inch

Mus musculus
HOUSE MOUSE

with ridges
length about 1/16-inch

Blatella germanica
GERMAN COCKROACH

rectangular, blunt
with ridges

ovoid, pointed
with ridges

length about 1/8-inch

Periplaneta americana
AMERICAN COCKROACH

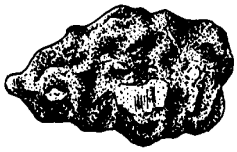
length about 1/16-inch

Blatta orientalis — ORIENTAL COCKROACH or
Periplaneta fuliginosa — SMOKY BROWN COCKROACH

length about 1/8-inch

Periplaneta australasiae
AUSTRALIAN COCKROACH

length about 1/16-inch



Periplaneta brunnea
BROWN COCKROACH

length about 1/32-inch

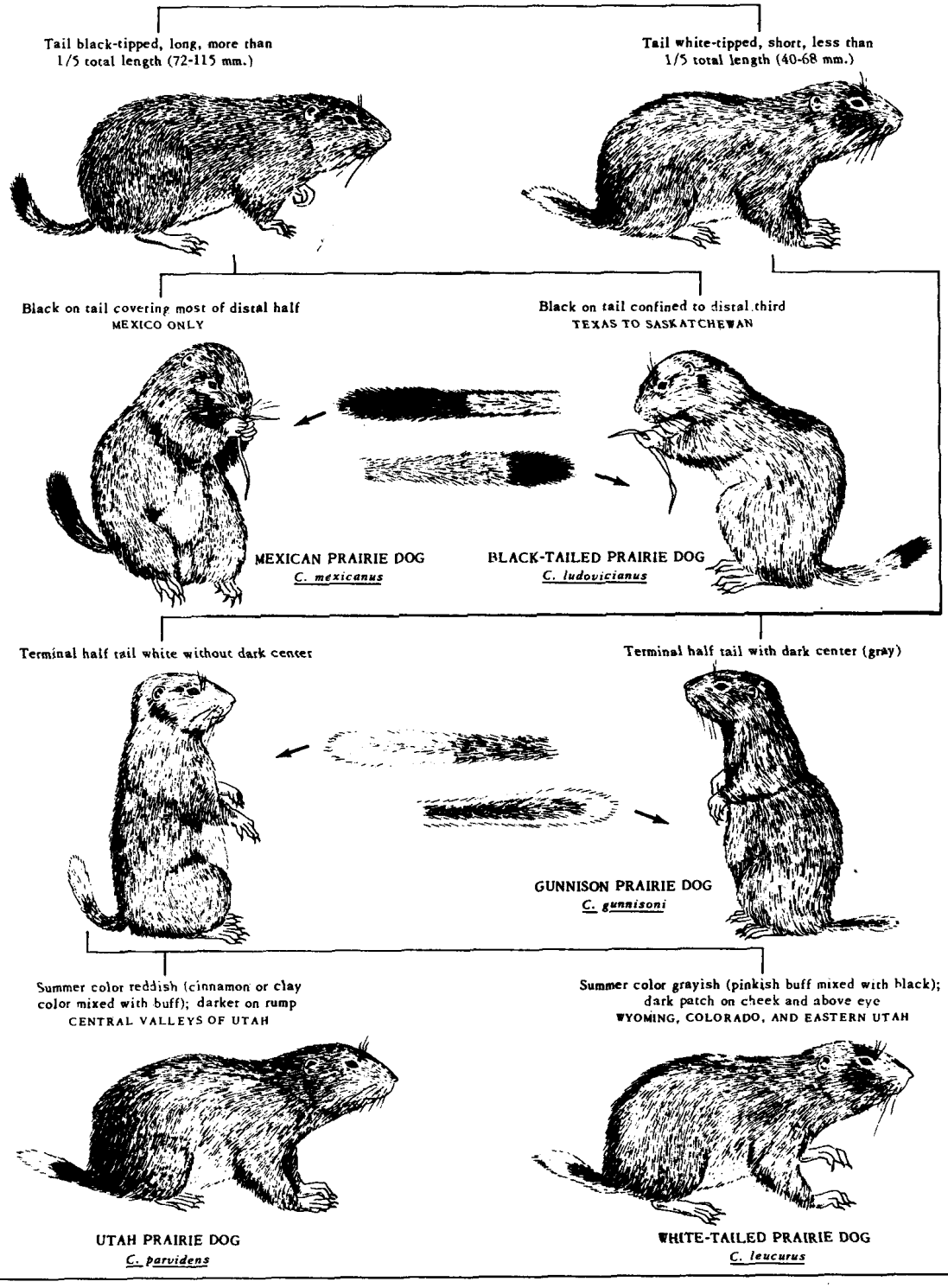
Supella supellectilium
BROWN-BANDED COCKROACH

*All characteristics for average, dry, adult droppings. Study groups, not individual droppings.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

PRAIRIE DOGS: PICTORIAL KEY TO COMMON NORTH AMERICAN SPECIES
(Cynomys)

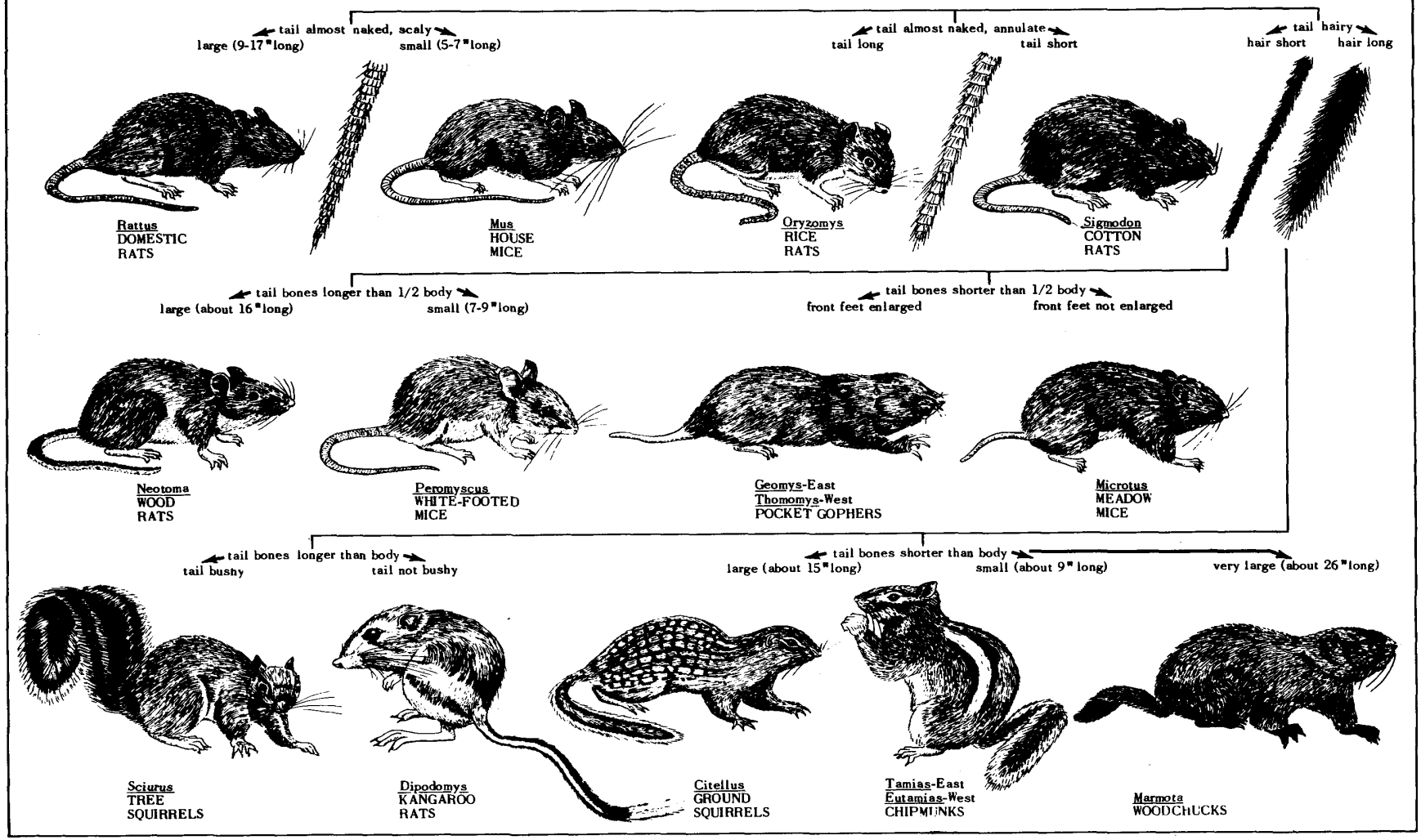
Harry Weinburgh and Margery R. Borom



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

RODENTS: PICTORIAL KEY TO SOME COMMON UNITED STATES GENERA

Harold George Scott and Margery R. Borom



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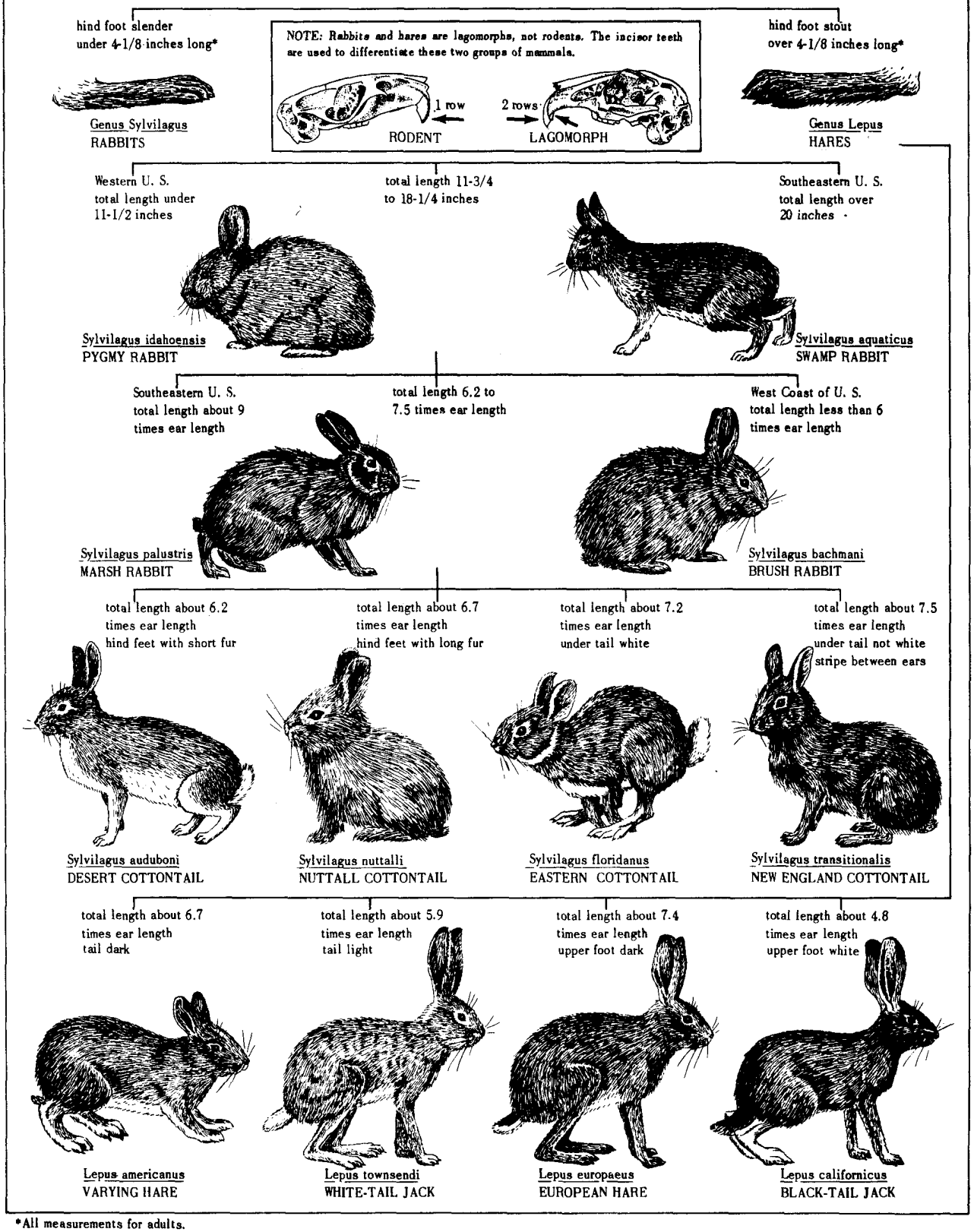
RABBITS AND HARES: PICTORIAL KEY TO COMMON UNITED STATES SPECIES

Harold George Scott and Margery R. Borom



*All measurements for adults.

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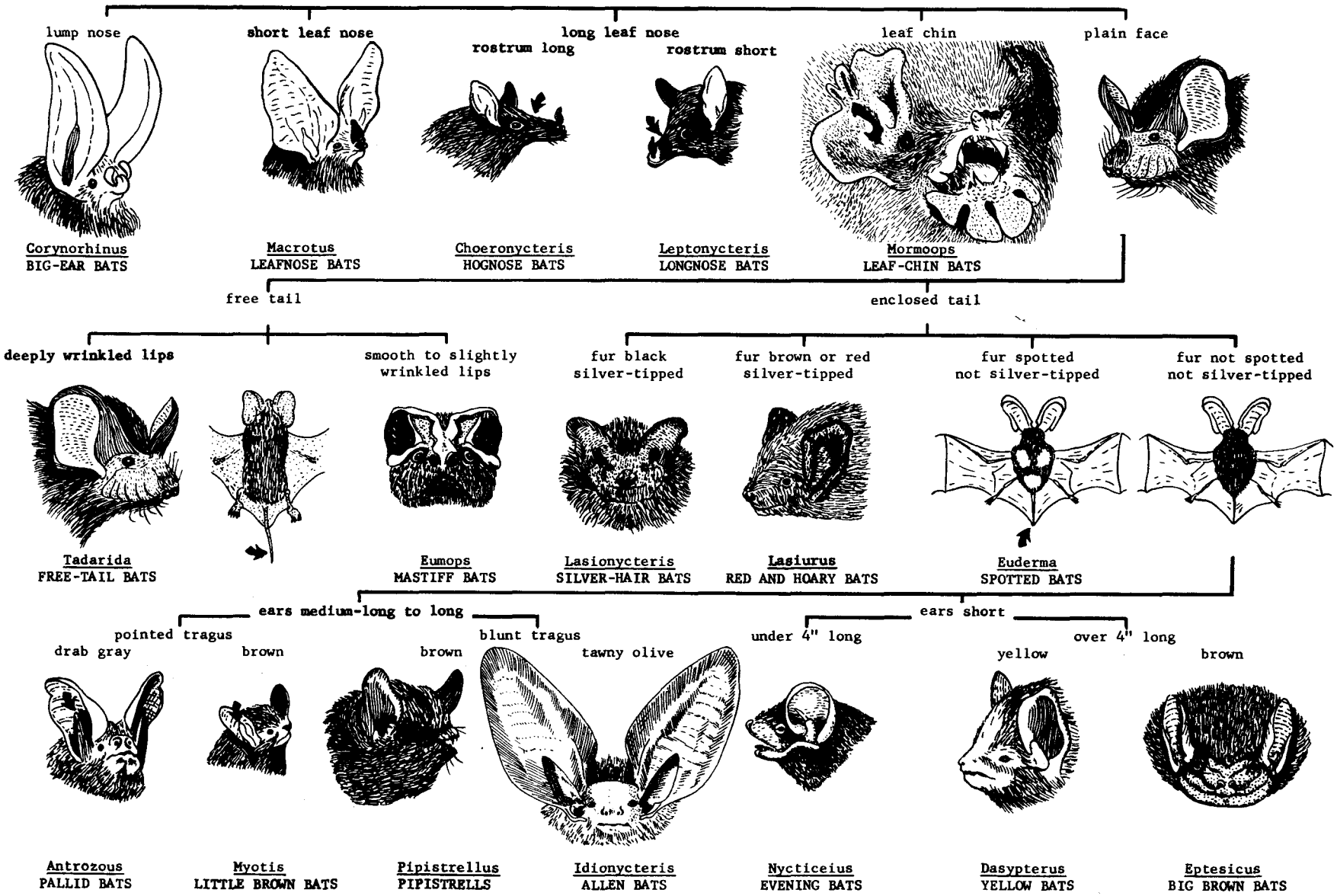
BATS: PICTORIAL KEY TO UNITED STATES GENERA

Harold George Scott and Chester J. Stajanovich



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