

AMERICAN MUSEUM NOVITATES

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY
CITY OF NEW YORK JULY 24, 1951 NUMBER 1530

RECORDS AND DESCRIPTIONS OF FLEAS FROM NEW MEXICO (SIPHONAPTERA)¹

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The recent discovery of the occurrence of human plague in New Mexico emphasizes the need for knowledge of the ectoparasitic fauna, particularly fleas from rodents. This paper includes records of 22 species of fleas, mainly from indigenous rodents, and the description of two new species.

It is of interest that fleas are extremely scarce during the summer months in the desert and semi-desert areas, even though the normal hosts are very abundant. The experience of the junior author in this regard in New Mexico and Chihuahua was duplicated by the senior author in southern California.

The data are presented by first listing the localities where collections were made, and citing the hosts and fleas taken in each case. Subsequently the species of fleas are listed by family and subfamily, and reference is made to the locality by means of a code letter.

All the drawings for the figures were made by the senior author.

ABBREVIATIONS USED IN TEXT AND FIGURES

- A.A.R., aedeagal apodemal rod
- A.B., antepygial bristle
- AE.A., aedeagal apodeme
- A.I.T., armature of inner tube of aedeagus
- A.M.S., apical or apicomedian sclerite of aedeagus

¹ Published under the auspices of the Surgeon General, Department of the Army, who does not necessarily assume responsibility for the professional opinions expressed by the authors.

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AP.R.9, apodemal rod of ninth sternum
 A.S., anal stylet
 B.C., bursa copulatrix
 CR., crochet of aedeagus
 C.S., crescent sclerite
 D.A.9, distal arm of ninth sternum
 D.A.L., dorsal anal lobe
 D.L.P., dorsal lobe of proctiger
 D.S., dorsal lobe of apodemal strut of aedeagus
 F., digitoid or movable finger
 I.R., ventral intramural rod of endophallus
 L.L., lateral lobes of aedeagus
 L.M., lateral metanotal area
 L.S., lateroventral lobe of apodemal strut of aedeagus
 MB., manubrium
 M.D.L., median dorsal lobe
 MPM., mesepimere
 MPS., mesepisternum
 M.S., submedian mesal lobe of apodemal strut of aedeagus
 MST., mesosternum
 MTM., metepimere
 MTS., metepisternum
 P., immovable process of clasper
 P.A.9, proximal arm of ninth sternum
 PL.A., pleural arch of metathorax
 P.R., penis rod
 P.W., wall of aedeagal pouch
 R., dorsal ridge of lateral metanotal area
 7S., seventh sternum
 8S., eighth sternum
 S.I.T., sclerotized inner tube
 SN., sensillum
 SP., spermatheca
 1T., first tergum
 2T., second tergum
 8T., eighth tergum
 9T., ninth tergum
 T.AP.9, ventral margin of apodeme of ninth sternum
 V.A.L., ventral anal lobe of proctiger
 VC.1, first vinculum
 VC.2, second vinculum
 V.P., proximal ventral sclerite of proctiger
 V.R., ventral ridge of lateral metanotal area

DATA LISTED BY LOCALITIES

- A. New Mexico: 6 to 25 miles east of Albuquerque, February–April, 1949,
 collected by H. H. Lewis or C. C. Hoff
Ex Peromyscus maniculatus (Wagner)
Malariaeus sinomus (Jordan, 1925)..... 1 ♀

	<i>Micropsylla sectilis</i> (Jordan and Rothschild, 1923).....	1 ♂
	<i>Monopsyllus w. wagneri</i> (Baker, 1904).....	1 ♂, 1 ♀
Ex	<i>Peromyscus t. truei</i> (Schufeldt)	
	<i>Anomiopsyllus novomexicanensis</i> Williams and Hoff, 1951.....	1 ♀
	<i>Epitedia stanfordi</i> Traub, 1944.....	1 ♂
	<i>Malaraeus sinomus</i> (Jordan, 1925).....	2 ♂, 3 ♀
	<i>Peromyscopsylla hesperomys</i> (Baker, 1904).....	2 ♂, 3 ♀
	<i>Stenistomera alpina</i> (Baker, 1895).....	1 ♂, 1 ♀
Ex	<i>Peromyscus leucopus</i> (Rafinesque)	
	<i>Malaraeus sinomus</i> (Jordan, 1925).....	2 ♀
	<i>Megarhroglossus bisetis</i> (Jordan and Rothschild, 1915).....	1 ♀
	<i>Peromyscopsylla hesperomys</i> (Baker, 1904).....	4 ♀
Ex	<i>Peromyscus nasutus</i> (Allen)	
	<i>Hystrihopsylla dippiei</i> (Rothschild, 1902).....	1 ♀
	<i>Malaraeus sinomus</i> (Jordan, 1925).....	3 ♀
	<i>Monopsyllus w. wagneri</i> (Baker, 1904).....	2 ♂, 1 ♀
	<i>Peromyscopsylla hesperomys</i> (Baker, 1904).....	1 ♀
Ex	<i>Peromyscus boylii rowleyi</i> (Allen)	
	<i>Malaraeus sinomus</i> (Jordan, 1925).....	2 ♂, 2 ♀
Ex	<i>Peromyscus</i> sp.	
	<i>Atyphlocerus echis</i> Jordan and Rothschild, 1915.....	1 ♂
	<i>Callistopsyllus</i> sp.....	1 ♀
	<i>Malaraeus sinomus</i> (Jordan, 1925).....	4 ♂, 3 ♀
	<i>Monopsyllus w. wagneri</i> (Baker, 1908).....	1 ♂, 2 ♀
Ex	<i>Neotoma albigula albigula</i> Hartley	
	<i>Anomiopsyllus novomexicanensis</i> Williams and Hoff, 1951.....	3 ♂, 1 ♀
	<i>Malaraeus</i> sp.....	2 ♀
	<i>Orchopeas sexdentatus</i> (Baker, 1904).....	1 ♀
	<i>Peromyscopsylla hesperomys</i> (Baker, 1904).....	1 ♂
	<i>Stenistomera alpina</i> (Baker, 1895).....	10 ♂, 22 ♀
Ex	<i>Eutamias q. quadrivittatus</i> (Say)	
	<i>Monopsyllus eumolpi</i> (Rothschild, 1905).....	3 ♂, 2 ♀
B.	New Mexico: 6 to 25 miles east of Albuquerque, May-June, 1949, collected by H. H. Lewis or C. C. Hoff	
Ex	<i>Peromyscus maniculatus</i> (Wagner)	
	<i>Anomiopsyllus novomexicanensis</i> Williams and Hoff, 1951.....	1 ♂
	<i>Catallagia decipiens</i> (Rothschild, 1915).....	7 ♂, 5 ♀
	<i>Monopsyllus w. wagneri</i> (Baker, 1904).....	35 ♂, 58 ♀
	<i>Peromyscopsylla</i> sp.....	1 ♀
Ex	<i>Neotoma mexicana</i> Baird	
	<i>Orchopeas neotomae</i> Augustson, 1943.....	1 ♂
Ex	<i>Eutamias q. quadrivittatus</i> (Say)	
	<i>Hystrihopsylla dippiei</i> (Rothschild, 1902).....	1 ♂, 1 ♀
	<i>Monopsyllus eumolpi</i> (Rothschild, 1905).....	12 ♂, 6 ♀
	<i>Stenistomera alpina</i> (Baker, 1895).....	1 ♂
C.	New Mexico: 7 miles south of Alamogordo, June 12, 1949, collected by C. C. Hoff	
Ex	<i>Peromyscus maniculatus</i> (Wagner)	
	<i>Orchopeas leucopus</i> (Baker, 1904).....	2 ♂

- D. New Mexico: 2 to 4 miles west of Columbus, April 16-17, 1949, collected by C. C. Hoff
- Ex Onychomys leucogaster* (Wied)
- Echidnophaga gallinacea* (Westwood, 1875)..... 6 ♀
- Meringis arachis* (Jordan, 1929)..... 1 ♀
- Meringis*, new species (described below)..... 2 ♀
- Thrassis* sp..... 1 ♀
- Ex Dipodomys spectabilis* Merriam
- Meringis arachis* (Jordan, 1929)..... 4 ♂, 12 ♀
- Meringis*, new species (described below)..... 1 ♂, 4 ♀
- Ex Dipodomys merriami* Mearns
- Meringis*, new species (described below)..... 2 ♂, 3 ♀
- E. New Mexico: Alemada, Bernalillo County, February 20, 1949, collected by the State Game Department
- Ex Mustela frenata neomexicana* (Barber and Cockerell)
- Foxella ignotus* (Baker, 1895)..... 1 ♂, 4 ♀
- F. New Mexico: Bernalillo County, in a cave near Isleta, July 25, 1949, collected by E. Mann
- Ex Myotis t. thysanodes* Miller
- Myodopsylla*, new species (described below)..... 1 ♂
- G. Mexico: near Vado de Fusiles, Chihuahua (vicinity of the United States border), April 15, 1949, collected by C. C. Hoff
- Ex Peromyscus maniculatus* (Wagner)
- Anomiopsyllus* sp..... 1 ♀
- Ex Dipodomys merriami* Mearns
- Meringis*, new species (described below)..... 1 ♂, 1 ♀
- H. Mexico: 35 miles south of Juarez, June 10, 1949, collected by C. C. Hoff
- Ex Onychomys leucogaster* (Wied)
- Thrassis pansus* (Jordan, 1925)..... 1 ♂

LIST OF FLEAS COLLECTED

Superfamily Ceratophylloidea

Family Hystrichopsyllidae

Subfamily Anomiopsyllinae

Anomiopsyllus novomexicanensis Williams and Hoff, 1951

Ex Peromyscus t. truei; Locality A; 1 ♀

Ex Neotoma a. albigula; Locality A; 3 ♂, 1 ♀

Ex Peromyscus maniculatus; Locality B; 1 ♂

Callistopsyllus sp.

Ex Peromyscus sp.; Locality A; 1 ♀

Megarhroglossus bisetis (Jordan and Rothschild, 1915)

Ex Peromyscus leucopus; Locality A; 1 ♀

Stenistomera alpina (Baker, 1895)

Ex Peromyscus t. truei; Locality A; 1 ♂, 1 ♀

Ex Neotoma a. albigula; Locality A; 10 ♂, 22 ♀

Ex Eutamias q. quadrivittatus; Locality B; 1 ♂

Subfamily Hystrichopsyllinae

Atyphloceras echis Jordan and Rothschild, 1915

Ex Peromyscus sp.; Locality A; 1 ♂

Hystriochopsylla dippiei (Rothschild, 1902)

Ex *Peromyscus nasutus*; Locality A; 1 ♀

Ex *Eutamias q. quadrivittatus*; Locality B; 1 ♂, 1 ♀

Subfamily Neopsyllinae

Catallagia decipiens (Rothschild, 1915)

Ex *Peromyscus maniculatus*; Locality B; 7 ♂, 5 ♀

Epitedia stanfordi Traub, 1944

Ex *Peromyscus t. truei*; Locality A; 1 ♂

Meringis arachis (Jordan, 1929)

Ex *Onychomys leucogaster*; Locality D; 1 ♀

Ex *Dipodomys spectabilis*; Locality D; 4 ♂, 12 ♀

Meringis, new species (data and description below)

Subfamily Rhadinopsyllinae

Micropsylla sectilis (Jordan and Rothschild, 1923)

Ex *Peromyscus maniculatus*; Locality A; 1 ♂

Family Ceratophyllidae

Subfamily Ceratophyllinae

Malaræus sinomus (Jordan, 1925)

Ex *Peromyscus maniculatus*; Locality A; 1 ♀

Ex *Peromyscus t. truei*; Locality A; 2 ♂, 3 ♀

Ex *Peromyscus leucopus*; Locality A; 2 ♀

Ex *Peromyscus nasutus*; Locality A; 3 ♀

Ex *Peromyscus boylii rowleyi*; Locality A; 2 ♂, 2 ♀

Ex *Peromyscus* sp.; Locality A; 4 ♂, 3 ♀

Monopsyllus eumolpi (Rothschild, 1905)

Ex *Eutamias q. quadrivittatus*; Locality A; 3 ♂, 2 ♀

Ex *Eutamias q. quadrivittatus*; Locality B; 12 ♂, 6 ♀

Monopsyllus w. wagneri (Baker, 1904)

Ex *Peromyscus maniculatus*; Locality A; 1 ♂, 1 ♀

Ex *Peromyscus nasutus*; Locality A; 2 ♂, 1 ♀

Ex *Peromyscus* sp.; Locality A; 1 ♂, 2 ♀

Ex *Peromyscus maniculatus*; Locality B; 35 ♂, 58 ♀

Orchopeas leucopus (Baker, 1904)

Ex *Peromyscus maniculatus*; Locality C; 2 ♂

Orchopeas neotomae Augustson, 1943

Ex *Neotoma mexicana*; Locality B; 1 ♂

Orchopeas sexdentatus (Baker, 1904)

Ex *Neotoma a. albigula*; Locality A; 1 ♀

Thrassis pansus (Jordan, 1925)

Ex *Onychomys leucogaster*; Locality H; 1 ♂

Subfamily Foxellinae

Foxella ignotus (Baker, 1895)

Ex *Mustela frenata neomexicana*; Locality E; 1 ♂, 4 ♀

Subfamily Leptopsyllinae

Peromyscopsylla hesperomys (Baker, 1904)

Ex *Peromyscus t. truei*; Locality A; 2 ♂, 3 ♀

Ex *Peromyscus leucopus*; Locality A; 4 ♀

Ex *Peromyscus nasutus*; Locality A; 1 ♀

Ex *Neotoma a. albigula*; Locality A; 1 ♂

Family Ischnopsyllidae
 Subfamily Ischnopsyllinae
Myodopsylla, new species (data and descriptions below)
 Superfamily Pulicoidea
 Family Pulicidae
 Subfamily Pulicinae
Echidnophaga gallinacea (Westwood, 1875)
Ex Onychomys leucogaster; Locality D; 6 ♀

DESCRIPTIONS OF NEW SPECIES

FAMILY HYSTRICHOPSYLLIDAE

SUBFAMILY NEOPSYLLINAE

***Meringis altipecten*, new species**

TYPES

Holotype male; *ex* Kangaroo Rat, *Dipodomys merriami* Mearns; New Mexico, 4 miles west of Columbus; April 17, 1949; collected by C. C. Hoff. Allotype female; *ex* same host; Mexico, Vado de Fusiles, Chihuahua, 20 miles south of Columbus, New Mexico; April 15, 1949; collected by C. C. Hoff. Holotype and allotype deposited in the collections of the American Museum of Natural History.

Paratypes: One male and three females with same data as holotype; one male with same data as allotype; two males and one female with same data as holotype but from *Dipodomys spectabilis* Merriam; two females from *Onychomys leucogaster* (Wied), New Mexico, 2 miles west of Columbus, April 16, 1949; all collected by C. C. Hoff; deposited in the United States National Museum, the Chicago Natural History Museum, and in the collection of the senior author.

DIAGNOSIS

Distinct from known *Meringis* in that the pronotum (fig. 1) is produced dorsocaudad so that the top of the ctenidium is at a level far higher than that of the head at the interantennal ridge; the pronotal ctenidium is strongly curved; and the dorsal margin of the head is typically markedly oblique, sloping towards the apex of the pronotum. Otherwise quite similar to *M. arachis* (Jordan, 1929) but further readily separable in that the male crochet (fig. 10, CR.) has a decidedly recurved apex and a dorsal spur, resulting in a biconcave margin, whereas in *M. arachis* the crochet (fig. 9) has an apex that is only slightly upturned and a

mildly sinuate dorsal margin. In the new species the median dorsal lobe of the aedeagus narrows abruptly near the apex, producing a short beak (fig. 10, M.D.L.), whereas in *M. arachis* the median dorsal lobe (fig. 9, M.D.L.) is acuminate and elongate. In the new species the pronotal ctenidial teeth, especially the dorsalmost, are quite concave, not virtually straight, while the female seventh sternum (fig. 8, 7S.) bears a large, distinct, sub-ventral sinus, instead of being only slightly sinuate.

DESCRIPTION

HEAD (FIG. 1, MALE): Frontoclypeal margin evenly rounded. Micropunctations or pores scattered from first row of bristles to margin of head and dorsad to and above base of antennal groove. First pre-antennal row consisting of three short thin bristles; second with four long bristles, the dorsalmost of which is near the antennal groove, the second at the level of the reduced eye. Ventral tooth of genal ctenidium extending slightly beyond base of procoxa. Ctenidium arising immediately ventral to eye; with mesal spine acuminate, extending apicad for a distance almost equal to length of apically rounded, overlapping lateral spine. Genal process with apex just visible caudad to ctenidium. Maxillary lobe extending to apex of third segment of maxillary palpi. Labial palpi five-segmented, extending about three-fourths of length of fore coxae. Scape of antenna with approximately three tiny bristles at base and three or four median small bristles. Second antennal segment with an apical fringe of bristles which are too short to extend beyond second segment of fairly symmetrical club. Antennal fossa dorsally bordered by a row of small hairs. Postantennal region with three rows of bristles arranged 3-5-5(6); the ventral two of the second row much longer than the upper bristles; the ventralmost of the caudal row the longest of all; the uppermost two or three of the last row crowded together near dorsal margin.

THORAX: Pronotum with one row of about six large bristles on a side; row with smaller and thinner intercalary bristles. Dorsal margin of pronotum extending dorso-caudad, convex. Pronotal comb with a total of about 14 spines, most of which are slightly concave; the uppermost three spines shorter than the next three; the comb itself flared. Mesonotum with two or three distinct rows of bristles preceded by scattered small bristles; bristles of last row much larger than the others and with small intercalaries.

Mesonotal flange on each side with four or five pseudosetae, probably representing vestigial spiniforms. Mesepisternum (fig. 4, MPS.) with but one bristle, and that median. Mesepimere (MPM.) with six bristles arranged 3-3. Metanotum with two rows of bristles, those of posterior row longer; small intercalary bristles between bases of those of second row. Lateral metanotal area (L.M.) well demarcated, with a well-developed dorsal ridge (R.) and ventral ridge (V.R.). Lateral metanotal area with one very small bristle and two long bristles. Metepisternum (MTS.) with a very long bristle near posterodorsal angle; at times this bristle accompanied by a tiny one. Pleural arch (PL.A.) strongly convex, well developed. Metepimere (MTM.) typically with nine bristles arranged 3-4-2 or 4-4-1.

LEGS: Procoxa with many lateral bristles scattered over entire length of segment. Mesocoxae and metacoxae with relatively few such bristles and these submarginal or subapical. Metacoxae with a mesal row of five or six spiniforms near anterior margin at apical fifth. Profemur with eight or nine small thin lateral bristles. All femora with two longish ventromarginal subapical bristles. Hind tibia with long dorsolateral bristles, some equal to segment in length. Measurements (in microns) of tibiae and segments of tarsi (petiolate base deleted) of holotype:

LEG	TIBIA	TARSAL SEGMENTS				
		I	II	III	IV	V
Pro-	143	46	46	32	32	87
Meso-	234	119	73	46	32	87
Meta-	308	234	161	82	46	96

Tibiae with an apical bristle extending beyond apex of first tarsal segment. First segment of hind tarsus with an apical bristle extending beyond apex of second segment. Distal bristles of second hind tarsal segment extending well beyond apex of third segment. Third hind tarsal segment with an apical bristle reaching nearly to apex of fifth segment.

ABDOMEN: First tergum (fig. 4, 1T.) with two rows of bristles. Basal sternum with a somewhat faint striarium in each sex; in female with but two bristles and those ventromarginal. Typical terga with two rows of bristles; those of first row smaller in size; one bristle of first row and two of second inserted ventrad to subovate spiracle. Unmodified sterna in male typically with a row of four bristles on a side, although sometimes with five or six; at

times the row preceded by a smaller bristle. Unmodified sterna in female usually with two rows of bristles arranged 2-4. With three antepygial bristles; in male (fig. 5, A.B.) middle bristle approximately thrice length of uppermost; ventral bristle slightly longer than dorsal; in female (fig. 8, A.B.) middle bristle about twice as long as uppermost; ventral bristle much longer than dorsal one.

MODIFIED ABDOMINAL SEGMENTS, MALE (FIG. 5): Eighth tergum (8T.) fairly small, extending from near base of antepygial bristles ventrad to below apex of proximal arm of ninth sternum and caudad to a point at level of proximal third of clasper; with five or six small thin bristles near the relatively somewhat reduced spiracle. Eighth sternum (8S.) very large, extending dorsad of apex of proximal arm of ninth sternum and caudad to beyond base of digitoid; with three or four median small bristles and a posterior row of four larger ones, all on ventral half.

Immovable process of clasper (P. and fig. 6) large, several times as broad and almost as high as digitoid; with two very long bristles at apex, preceded by a dorsomarginal row of five smaller ones, a submarginal one below the first dorsomarginal; a more proximal, more median bristle near level of subanal sclerite (V.P.); a bristle ventrad and cephalad to lower long apical bristle; with about six very small thin bristles along or near dorsal or caudal margin and near above bristles. Immovable process with a slight subapical sinus; remainder of posterior margin fairly evenly rounded; with a small thin acetabular bristle near ventral margin of digitoid. Movable finger or digitoid (F. and fig. 6) with apical two-thirds roughly conical but with apex slightly rounded; base with proximal margin concave, but with truncate ends at insertion; ventrocaudal margin strongly rounded; with a narrow sinus where anterior margin curves dorsad to meet caudal margin of expanded base. Digitoid about two and a half times as long as broad at maximum; with two subapical small bristles (one on each margin), with about eight longer thin bristles on posterior margin, of which six are in close proximity below the middle; the upper bristles well spaced; with a few scattered tiny bristles as in figure. Manubrium (MB.) very long and narrow, mildly sinuate; apex subacute. Ninth tergum (9T.) apparent as a rectangular sclerite between P. and the tergal apodeme, which is quite reduced and extends cephalad at about level of spiracle.

Ninth sternum with proximal arm (P.A.9) about three or four

times as long as broad, apex subtruncate; remainder of ninth sternum much broader. Distal arm of ninth sternum (D.A.9 and fig. 6) about twice as broad as proximal arm; with dorsal margin fairly straight; ventral margin becoming somewhat convex beyond midpoint and broadly curving at apex; with two subapical spiniforms, the ventral one almost twice as broad as, and somewhat longer than, the upper, although both fairly short; with two or three very small apical or subapical bristles and with a row of three or four short thin bristles along curve of ventral margin.

Aedeagal apodeme (fig. 10, AE.A.) long, the aedeagal portion apicad of apodemal strut only about half the length of the portion proximad. Median dorsal lobe (M.D.L.) bifid; suddenly narrowing subapically into a short beak; dorsal margin fairly straight before gently arching subapically. Lateral lobes (L.L.) conspicuous, each produced into a long, narrow, apical projection and extending proximad as well-developed walls of the aedeagal pouch (P.W.). Crochets (CR.) highly developed and shaped like inverted and recurved talons, with the claw elongated. Sclerotized inner tube (S.I.T.) fairly straight; quite broad, only about twice as long as broad; dorsal margin with a conspicuous spur at basal third, then becoming straight; ventral margin sinuate, extending more apicad than dorsal margin. Armature of inner tube (A.I.T.) lying above the base of the sclerotized inner tube and reduced to a slightly convex, short sclerite, with a proximal circular thickening. Apodemal strut supporting inner tube consisting of a broad dorsal lobe (D.S.), a longer mesal lobe (M.S.), and a curved lateroventral lobe (L.S.). Crescent sclerite (C.S.) well developed. Penis rods (P.R.) short, uncoiled. Ventral intramural rod (I.R.) of endophallus sclerotized, distinct. Aedeagal apodemal rod (A.A.R.) fairly well sclerotized.

Tenth abdominal segment with dorsal lobe of proctiger (fig. 5, D.L.P.) bearing a dorsomarginal fringe of small bristles and about two median ones. Ventral lobe of proctiger inconspicuous. Subanal sclerite (V.P., proximal ventral sclerite of proctiger) relatively well developed.

FEMALE (FIG. 8): Seventh sternum (7S.) with a broad, fairly shallow sinus near ventral margin; with an anterior row of six bristles (the row at times with one subdorsal bristle displaced) and a posterior row of five longer bristles. Eighth tergum (8T.) with a row of bristles anterior to the long thin spiracle; with two or three smaller ones near dorsal margin below antepygial bristles;

the ante-spiracular row continuing onto median portion as four large bristles, the lowest near the ventral margin; with six smaller median bristles anterior to the ventral three of the above set of four; with five or six smaller and thinner bristles anterior to the set of six; caudal margin with about six lateral, fairly long bristles; with about 10 mesal bristles near caudal margin. Eighth sternum (8S.) represented as an oblong structure bearing two or three tiny apical bristles. Dorsal anal lobe of proctiger (D.A.L.) with a marginal fringe of small bristles; about 10 scattered, median, small bristles and four or five ventromarginals. Anal stylet (A.S. and fig. 2) about three times as long as broad; with a long apical bristle and a very small dorsal subapical bristle; at times with a very small subapical bristle near ventral margin. Ventral anal lobe (V.A.L. and fig. 3) not heavily sclerotized nor markedly angulate; with six evenly spaced marginal bristles, four of which are long, the bristle at apex quite small; with four submarginal bristles and with two subdorsal bristles. Spermatheca (SP. and fig. 7) with head and tail subequal; tail gently upturned; dorsal margin of head with a shallow median sinus; ventral margin convex. Bursa copulatrix (B.C.) well developed, with a sclerotized ventral extension, a somewhat stout coiled duct, and an associated, deeply sclerotized, subovate structure with a characteristic shape.

COMMENT

It is believed that the Kangaroo Rat, *Dipodomys merriami*, will prove to be the characteristic host of this new species.

FAMILY ISCHNOPSYLLIDAE

SUBFAMILY ISCHNOPSYLLINAE

Myodopsylla nordina, new species

TYPES

Holotype male; *ex* a bat, *Myotis t. thysanodes* Miller; New Mexico, from mouth of cave near Bernalillo County line, vicinity of Isleta; July 25, 1949; collected by E. Mann. Allotype, *ex Myotis velifer*; Colorado, Costillo County, 5 miles north-northeast of Blanca, elevation 8300 feet; August, 1941; collected by William Longhurst. Holotype and allotype deposited in the collections of the American Museum of Natural History.

One paratype male, with same data as allotype, in the collection of the senior author.

DIAGNOSIS

Near *Myodopsylla gentilis* Jordan and Rothschild, 1921, but readily separated as follows: aedeagal crochets (fig. 15, CR., and fig. 20) with dorsal acuminate apex down-curved, fang-like, extending far apicad of the cleaver-like expansion, instead of with dorsal portion of crochet divided into an apical, fairly straight, acuminate process and a huge, cleaver-like blade extending more apicad than the dorsal process (fig. 19). Distal arm of male ninth sternum (fig. 16) with the two large bristles separated by a distance equal to the length of the relatively short broad spur bearing the ventral bristle, whereas in *M. gentilis* (fig. 19) the distance is equal to twice the length of the more elongate narrower spur. In the new species the mesal patch of modified bristles near the apex of the male eighth sternum (fig. 12) extends only over part of the height of this region of the segment, instead of covering virtually completely the ventro-apical portion. In the new species the male digitoid (fig. 14, F., and fig. 18) has a more concave anterior margin and the structure is broader in proportion to height. The females are difficult to separate, but in the new species (only one female known) the ventral third of the eighth tergum has only eight bristles (ignoring marginals), whereas *M. gentilis* has 10 to 14.

DESCRIPTION

HEAD (FIG. 11, MALE): Frontoclypeal margin evenly curved. With a submarginal group of micropunctations above the slipper-shaped lacuna which extends obliquely from near base of genal ctenidium to antennal groove and which is about four times as long as broad at maximum. With a row of small bristles in this relatively non-sclerotized area, the row extending the length of the lacuna, but all the bristles except the dorsal three or four (near or at antennal groove) so tiny as to be virtually vestigial. Rest of pre-antennal region with about 15 bristles, of which 12 are very small and scattered over the median portion; of the remaining three, the longest bristle is inserted along the antennal ridge above the vestigial eye; a second long bristle also along ridge but more dorsal and shorter; a fairly long bristle near antennal ridge, near apex of lacuna. Maxillary lobe with truncate expanded apex not extending to apex of first segment of labial palpi. Base of maxillary lobe fairly long, and clothed with dense, very fine, small hairs. Maxillary palpi extending to near apex of the five-segmented

labial palpi, which in turn do not reach beyond the proximal third of the fore coxae. First flap of ctenidium subtruncate, second apically more ovate, extending to base of maxillary palpus. Scape of antenna with six or seven small, subapical bristles near apex at dorsocaudal margin. Second antennal segment with a fringe of apical bristles which do not reach third segment of the club. Postantennal region with three irregular rows of bristles: a caudomarginal row of six bristles, the ventralmost of which is very long; a more anterior row of about five bristles, of which again the ventralmost is by far the longest; the first row consisting of three or four small bristles, but this is preceded by two or three scattered small bristles. With a row of very small bristles delimiting antennal fossa, those two or three bristles at ventrocaudal angle stout and longer than the others. Link to prothorax (first vinculum, VC.1) relatively long and narrow, rod-like, received in a very distinct sinus in prosternosome.

THORAX: Pronotum with three rows of bristles, the first row incomplete, represented by only about three bristles, the first two rows irregular. Pronotal comb with about 15 spines on a side. Link to mesothorax (second vinculum, fig. 11, and fig. 13, VC.2) long, upturned at distal third; with apex truncate and expanded as it enters mesepisternum. Mesonotum with four or five rows of bristles, the first row (or first two) very incomplete, and the first three rows irregular; the dorsalmost bristles of the ultimate row the longest. Mesonotal flange on each side with two pseudosetae, probably representing vestigial spiniforms. Mesepisternum (MPS.) with five or six bristles. Mesosternum (MST.) apparently enlarged, so that it appears as if the mesepisternum is divided into dorsal and ventral portions by an oblique sclerotization. Mesepimere (MPM.) with five or six bristles, distributed as follows: one in anterodorsal angle; one somewhat median and subdorsal; two almost contiguous, in ventrocaudal angle, and one or two subventral, anterior to or near base of link joining mesothorax to metathorax. Metanotum, together with its flange, only slightly more than half of length of mesonotum; with three rows of bristles, the first abbreviated; last row with dorsalmost five bristles very broad, flattened, forming a false comb. Metanotal flange with a subdorsal apical tooth. Lateral metanotal area (L.M.) well demarcated, about twice as long as broad; with a large median bristle and two small ventromarginal bristles. Metepisternum (MTS.) with one long bristle in posterodorsal region.

Lacking a pleural arch at junction of lateral metanotal ridge and pleural ridge (cf. fig. 4, PL.A.). Metepimere (MTM.) apparently with about 11 bristles, arranged roughly 3-3-3-2, the last two of which are marginal (apparently with only eight metepimeral bristles in allotype).

LEGS: Procoxa with short, subspiniform bristles at antero-dorsal angle; with many lateral bristles scattered over length of segment. Mesocoxae and metacoxae with very few lateral bristles and these marginal or submarginal. Protrochanter and mesotrochanter with one lateral and three marginal bristles. Metatrochanter with two lateral, two mesal, and three marginal bristles. Profemur with one and perhaps two ventromarginal subapical bristles. Mesofemora and metafemora with four lateral subapical bristles, of which one is ventromarginal. (Allotype with one fewer bristle on trochanters and femora.) Measurements (in microns) of tibiae and segments of tarsi (petiolate base deleted) of the holotype:

LEG	TIBIA	TARSAL SEGMENTS				
		I	II	III	IV	V
Pro-	220	110	105	88	50	115
Meso-	368	276	202	128	69	138
Meta-	487	386	230	147	78	138

Legs long and narrow, e.g., metatarsal segment I nearly eight times as long as broad. None of tarsal bristles reaching beyond apex of following segment. Fifth tarsal segment in each instance with three pairs of lateral plantar bristles; an additional two pairs displaced ventrad, of which one pair is inserted between the first pair of laterals, the second displaced pair slightly apicad, but well proximad, of second laterals; with a median pair near apex of segment.

ABDOMEN: First tergum with three rows of bristles, the first row somewhat irregular; the dorsalmost four or five in caudal row modified, forming a false comb; flange with an apical tooth on each side. Basal sternum in male with one ventromarginal bristle; female with two. Terga II to VI with false combs, those of more posterior rows reduced (two modified bristles on a side), especially in male. Terga II to VI with two rows of bristles; the ventralmost bristle of second row inserted slightly below level of the subovate spiracles. Typical sterna in male apparently with one or two bristles per side, those marginal or submarginal; females with

three or four. Male with one antepygial bristle (fig. 14, A.B.), its base inserted on a prominent pedicel. Antepygial bristles broken off in only female extant.

MODIFIED ABDOMINAL SEGMENTS, MALE (FIG. 14): Eighth tergum (ST.) very large, enclosing most of genitalia; with a dorsal fringe of about 16 dorsomarginal bristles; with about five larger submarginal bristles below fringe; with 13 larger subdorsal or median bristles. Eighth sternum (fig. 12) very large, extending dorsad of aedeagus and caudad to beyond base of crochets. Eighth sternum with anterior margin convex; dorsal margin with a broad sinus; caudal and ventral margins concave; with a broad lateral subtriangular process bearing seven to 11 lateromedian bristles and two patches of elongate modified hairs, one patch dorsal, the other mesal and subapical; the hairs frequently with expanded ends, somewhat filamentous.

Immovable process of clasper (P. and fig. 18) broad, subrounded; with caudal margin mildly but doubly sinuate; with two dorsomarginal apical bristles; dorsal part of P. more heavily sclerotized so that at first glance the process appears to be recurved towards base of digitoid. Two large acetabular bristles inserted at margin of P. below insertion of exopodite. Movable finger or digitoid (F.) somewhat triangular, but with anterior margin with a deep sinus at apical two-thirds; ventral margin shallowly concave; posterior margin convex; angles rounded except for dorsal one. Digitoid with a bristle near midpoint of caudal margin; a mesal submarginal bristle near ventrocaudal angle; four marginal bristles at this point, all but one very small; with a small apical bristle; with a submedian mesal bristle; with a patch of about seven mesal bristles near middle of anterior margin. Manubrium (MB.) quite broad; apex bluntly rounded. Tergal apodeme of ninth segment (T.AP.9) very long and narrow, more than seven times as long as broad at maximum.

Ninth sternum with proximal arm indistinct, feebly sclerotized (fig. 15, P.A.9), subrectangular, about five times as long as broad. Distal arm of ninth sternum (D.A.9, and fig. 16) with a recurved subpyriform or subovate apical portion which bears an apical bristle; posterior (morphological ventral) margin of basal portion with a prominent pedestal or spur at proximal third which bears a long bristle; another such bristle inserted at margin at a distance apicad equal to length of pedestal; with an irregularly shaped semimembranous portion extending caudad of what appears as the

posterior margin; with two thin bristles near the sclerotized margin.

Aedeagal apodeme (fig. 15, AE.A.) very long, the portion proximal of the modified aedeagal sclerites about six times as long as broad at maximum. Median dorsal lobe (M.D.L.) mildly sinuate, simple but relatively deeply bifid, on each side with a pair of contiguous, somewhat fusiform, small, apicomedian sclerites (A.M.S.). Crochets (CR. and fig. 20) very large, almost as long as D.A.9 and very much broader; with a ventral process arising apicad of prominent, peg-like sclerotization and extending straight ventrad only to curve distad at right angles, narrowing somewhat towards apex; the arms of the ventral process almost equal in length. Dorsal part of crochet extended apicad as a sinuate acuminate process that may be bifid and fang-like at apex; dorsal process with a median, cleaver-like, feebly sclerotized expansion which has a serrate edge; with one or more acuminate apical extensions distad of cleaver. Sclerotized inner tube (S.I.T.) fairly short, subvertical, its armature (A.I.T.) represented as a stout dorsal sclerotization. Crescent sclerite (C.S.) very long and narrow, deeply convex. Penis rods (P.R.) uncoiled. Third apodemal rod (AP.R.9) arising from base of ninth sternum.

Sensillum (fig. 14, SN.) very flat, under pedestal base of antepygidial bristle; pseudosetae on margin appearing relatively short and thick. Dorsal lobe of proctiger (D.L.P.) with a median patch of about 12 short lateral bristles; with a more proximal subdorsal patch of about 15 short mesal bristles; with about 20 short dorsomarginal bristles. Ventral lobe of proctiger with eight dorsomarginal bristles and an apical tuft of about eight bristles.

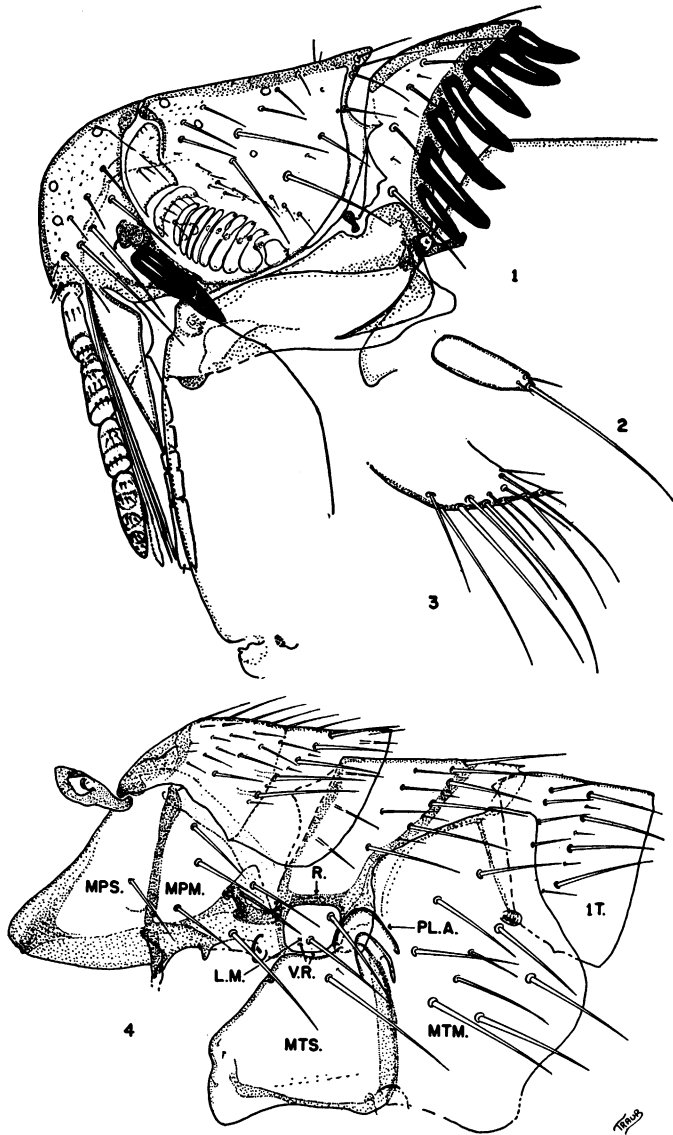
FEMALE (FIG. 17): Seventh sternum (7S.) with caudal margin mildly sinuate, the slight concavity subventral; with a row of seven bristles, the ventralmost of which is slightly displaced and about half as long as the others; with three or four very small bristles preceding and parallel to the conspicuous row. Eighth tergum with bristles arranged as in figure. Eighth sternum (8S.) reduced, without bristles. Dorsal anal lobe of proctiger (D.A.L.) with a dorsomarginal row of small bristles and about four or five median ones. Anal stylet (A.S.) about three times as long as broad. Ventral anal lobe (V.A.L.) with caudal margin well sclerotized, concave; other details unascertainable. Spermatheca (SP.) in position masking true outlines, but apparently subovate

or subspherical, with tail upturned, much longer than head. Bursa copulatrix (B.C.) well sclerotized, vermiform, with a globular apex.

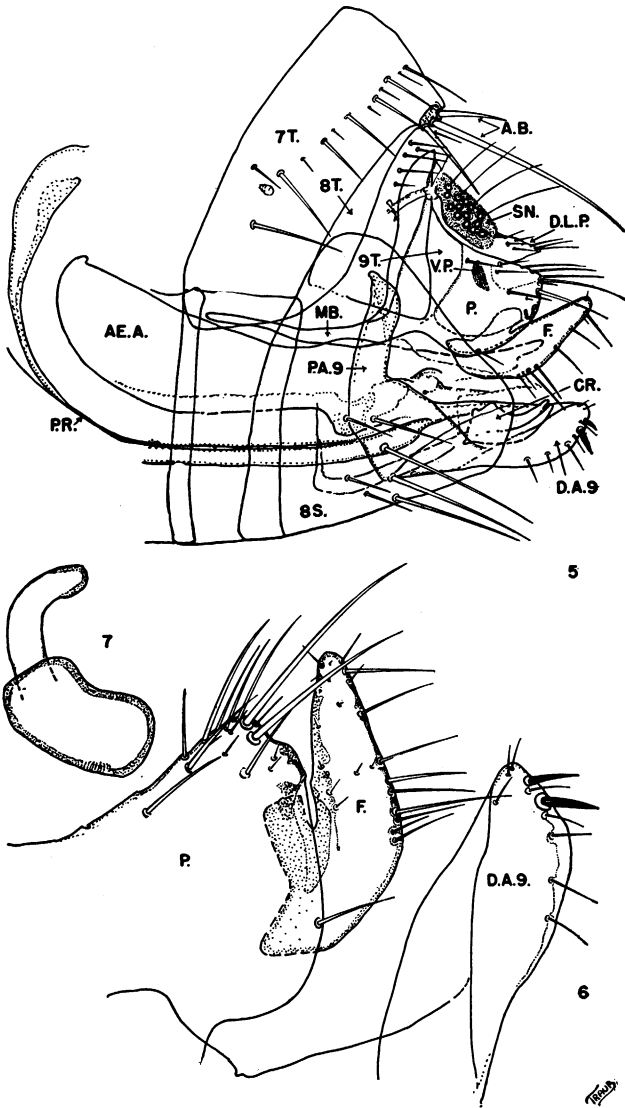
ACKNOWLEDGMENTS

The field work in central New Mexico was conducted by the junior author with the aid of a faculty Research Grant from the University of New Mexico, while the field work along the Mexican border and in the State of Chihuahua was supported by a grant from the Division of Research Grants and Fellowships of the National Institutes of Health, United States Public Health Service. The authors appreciate the efforts of Dr. David H. Johnson, United States National Museum, in determining the mammals collected in Mexico. Thanks are also due Mr. Larry Gordon for aiding in the field work, and to Mr. Hilliard Lewis for assistance in determining the mammals from New Mexico.

We are indebted to Lieut. Vernon Tipton and Miss Phyllis T. Johnson of the Department of Entomology, Army Medical Service Graduate School, for critical review of the manuscript and for examining the type material of the new species. Specimens of *Meringis* were received for examination through the courtesy of Messrs. Frank M. Prince and Harold Stark of the Communicable Disease Center, Public Health Service, San Francisco, California, and from Dr. William L. Jellison of the Rocky Mountain Laboratory of the Public Health Service, Hamilton, Montana. Dr. Jellison and Mr. Glen M. Kohls, of that same institution, kindly read the manuscript. The Colorado bat fleas were received through the cooperation of Dr. E. W. Jameson, Division of Zoology, University of California.



FIGS. 1-4. *Meringis altipecten*, new species. 1. Head, male. 2. Anal stylet, female. 3. Ventral anal lobe, female. 4. Thorax, male.



FIGS. 5-7. *Meringis altipecten*, new species. 5. Modified abdominal segments, male. 6. Clasper and distal arm of ninth sternum. 7. Spermatheca.

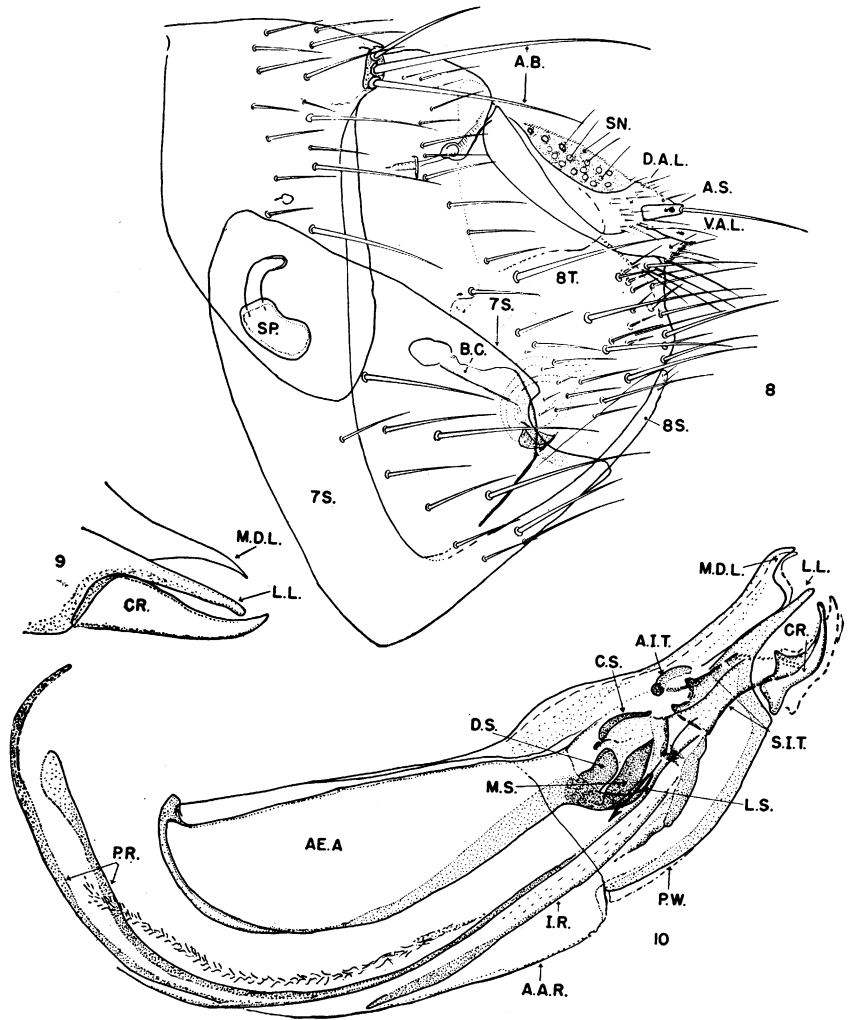


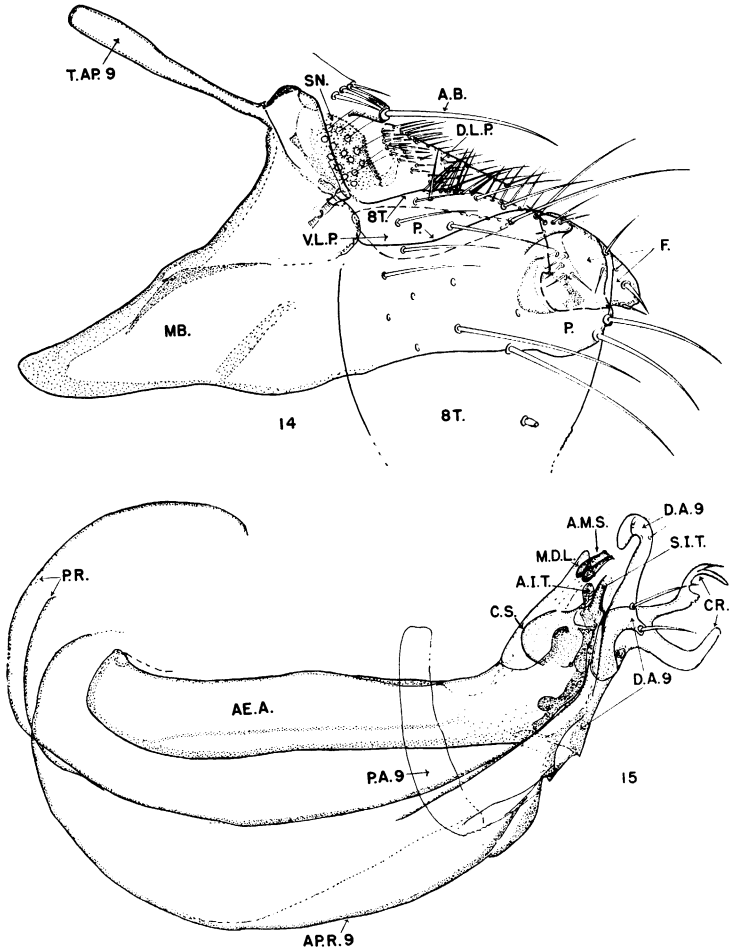
FIG. 8. *Meringis altipecten*, new species. Modified abdominal segments, female.

FIG. 9. *Meringis arachis* (Jordan). Apex of aedeagus.

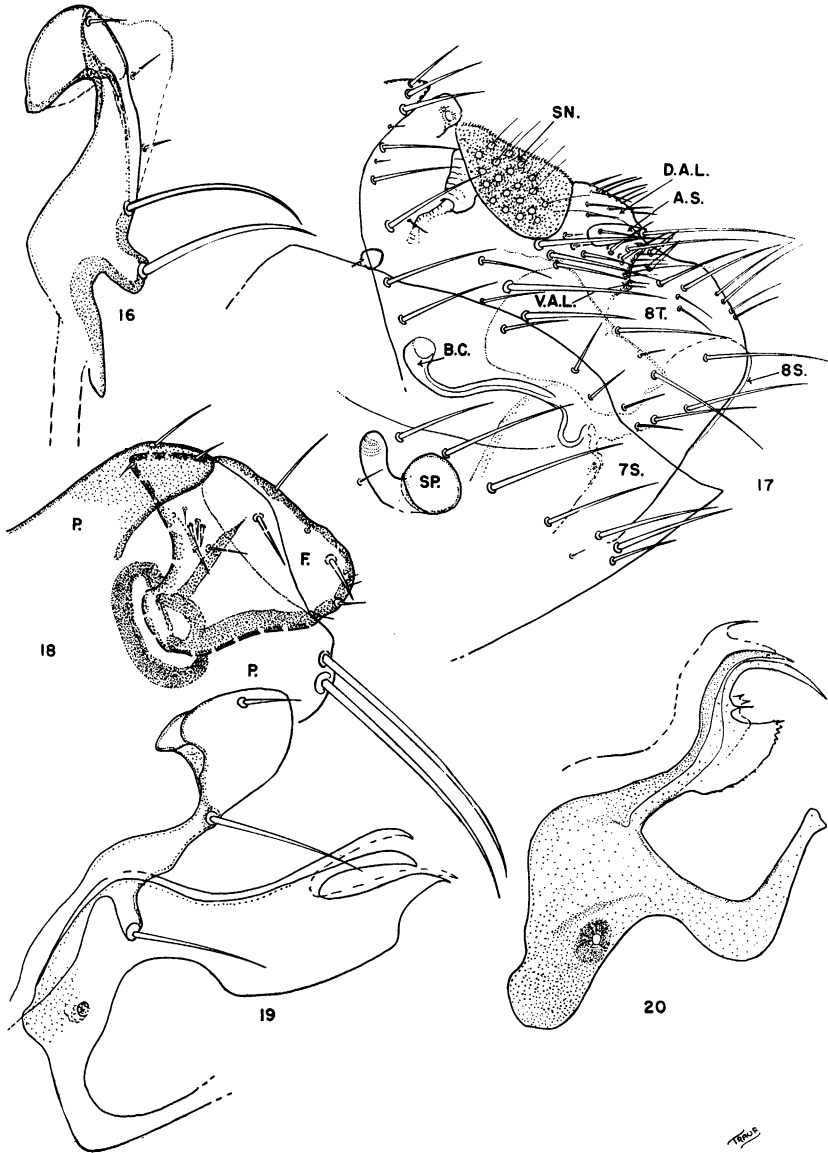
FIG. 10. *Meringis altipecten*, new species. Aedeagus.



FIGS. 11-13. *Myodopsylla nordina*, new species. 11. Head, male. 12. Eighth sternum, male. 13. Thorax, male.



FIGS. 14, 15. *Myodopsylla nordina*, new species. 14. Modified abdominal segments, male. 15. Aedeagus and ninth sternum.



FIGS. 16-18. *Myodopsylla nordina*, new species. 16. Distal arm of ninth sternum. 17. Modified abdominal segments, female. 18. Process and digitoid of clasper.

FIG. 19. *Myodopsylla gentilis* (Jordan and Rothschild). Crochet and distal arm of ninth sternum.

FIG. 20. *Myodopsylla nordina*, new species. Crochets of aedeagus.

