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of the Sucking Lice

PART III.

BY

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SYSTEMATIC TREATMENT (Cont.)

Genus *HOPLOPLEURA* Enderlein (Cont.).

Since the publication of Part II¹ of this series I have found in my material two more species of *Hoplopleura*. One of these had been overlooked, the other had mistakenly been set aside as belonging to another genus. The addition of these two species brings the number of forms in the genus to 43. In addition to this material there have come to hand specimens necessitating further notes on one of the species previously dealt with.

37. *Hoplopleura emarginata* n. sp.

FIGS. 90, 91.

SPECIMENS EXAMINED. Numerous males and females from *Sciurotamias davidianus*, Shensi, China (U. S. N. M. 200873). Holotype a male. The host is a member of the rodent family *Sciuridae*.

FEMALE (Fig. 90). Length 1.75 mm. *Head* relatively large, acute anteriorly, with slight post-antennal angles and with the posterior-lateral margins but slightly convergent. Anterior portion with a pair of slender, longitudinal, chitinized bars extending to the posterior margin of the antennæ. Ventral side with a pair of small, oval, chitinized areas between the antennæ.

Thorax and legs of ordinary form, the posterior tibiæ without an olecranon process. *Sternal plate* (Fig. 91B) large and broad.

Pleural plates (Fig. 91A) overlapping but little, not scaly or reticulate; first pair of ordinary form; second with a rather short and stout ventral tooth; third to sixth each with a small tooth at each angle; seventh and eighth very small, without teeth; second to sixth each with two slender setæ, of which the dorsal is quite long; seventh and eighth each with the usual pair of long setæ.

Tergal and sternal plates weakly developed, with for the most part six to ten rather slender setæ, the second plate of the second sternite not extending across the segment and without the usual enlarged, paired setæ. On the dorsal side, between the ends of the tergal plates and the corresponding pleurites of the third to eighth segments, are from one to five stout setæ, and on the ventral side there are from two to four such setæ between the ends of each sternal plate and the pleurites on the fourth to eighth segments.

MALE (Fig. 90). Length 1 mm. *Head and thorax* practically as in the female except the former without the dorsal, longitudinal, chitinized areas and the third antennal segment with a stout seta at the anterior distal angle.

¹Part II was issued October 14, 1921.

Pleural plates essentially as in the female. *Tergites* of the abdomen with but one plate except on the second segment, where there are two. The second plate of this segment is emarginate posteriorly and bears three quite

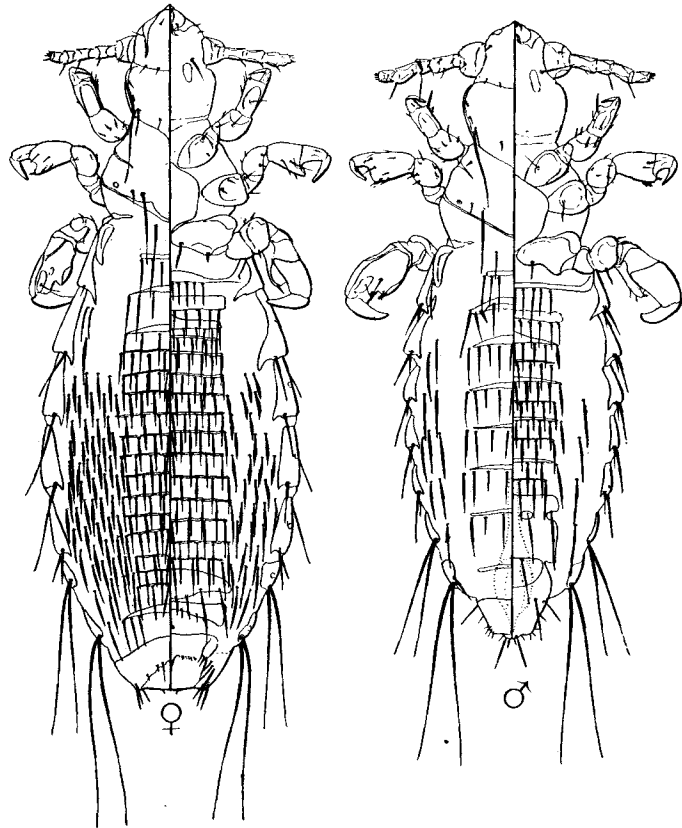


Fig. 90.—*Hoplopleura emarginata* n. sp., male and female.

stout setæ at each end, the remaining plates for the most part bear from six to eight slender setæ, and between the ends of the plates and the corresponding pleurites on the third to seventh segments are from one to three quite stout setæ. *Sternites* with two plates on the second to sixth segments, the second plate of the second segment without enlarged, paired setæ and

not extending across the segment, the plates with for the most part six to ten setæ. Between the ends of the plates and the corresponding pleurites on the fourth to seventh segments is a single seta.

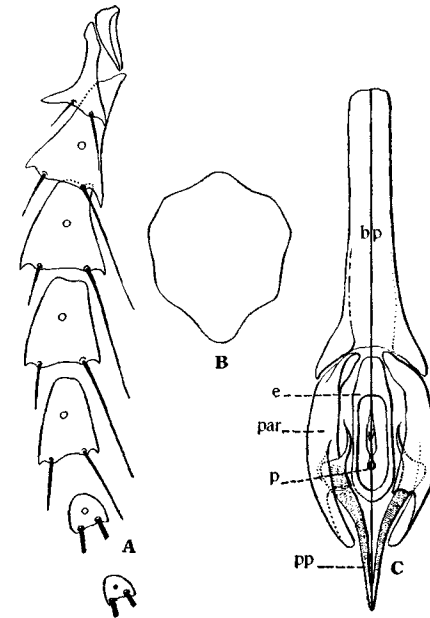


Fig. 91.—*Hoplopleura emarginata* n. sp.: A, pleural plates of female; B, sternal plate; C, genitalia of male.

Genitalia (Fig. 91C), with the basal plate (*bp*) slender, expanded only at the apex; parameres (*par*) stout, receiving the base of the pseudopenis in a deep recess and with a flattened, toothed ventral lobe at some distance from the tip; pseudopenis (*pp*) large, V-shaped, with the arms transversely striate; within the parameres a ring-like piece, the endomeres (*e*) which encloses the penis (*p*).

NOTES.—In certain respects, notably the emarginate second tergal plate of the second abdominal segment of the male, the tendency toward a sexual dimorphism in the antennæ and the absence of the paired setæ on the second plate of the second sternite, together with the character of this plate, this species approaches the genus *Neohæmatopinus*. A too hasty conclusion led to its having been set aside as a member of the latter genus, but this is certainly in error. It is undoubtedly a *Hoplopleura* belonging to the *H. erratica* group but easily separable by the characters given.

38. *Hoplopleura ochotonae* n. sp.

FIG. 92.

SPECIMENS EXAMINED. Females only. Type from *Ochotona cansus*, Taochao, China (U. S. N. M. 144032). Also from *Ochotona roylei*, Braldu Valley, Baltistan (U. S. N. M.) and *O. danurica*, Tabool, Mongolia (U. S. N. M. 176274).



Fig. 92.—*Hoplopleura ochotonae* n. sp.: A, female; B, sternal plate; C, pleural plates.

FEMALE (Fig. 92A). Length 1.3 mm. *Head* rather large, rounded anteriorly and with the lateral margins of the hind head almost parallel; ventral side with a pair of narrow, submedian, chitinized areas.

Thorax and legs of ordinary form, the posterior tibiae without an olecranon process; sternal plate (Fig. 92B) quite large and broad, the anterior

margin rounded, the lateral margins almost parallel, the posterior margin produced into a point.

Pleural plates (Fig. 92C) as follows: First pair of ordinary form; second with the ventral posterior angle produced into a slender, curved, tapering tooth, the dorsal angle with a shorter tooth; third to fifth pairs with each posterior angle produced into a tapering tooth; sixth with the posterior angles but slightly produced; seventh small; eighth lacking; second to sixth each with a pair of small setae on the posterior margin; spiracles small.

Tergal and sternal plates not chitinized except for the second sternite and the first two plates of the third sternite. First plate of the third sternite without enlarged, paired setae. Both dorsally and ventrally there are for the most part ten to fourteen setae in each row.

MALE. Not known.

NOTES.—This is a somewhat isolated species, resembling most closely the members of the *erratica* group but differing especially in the absence of the paired setae on the third sternite and in the shape of the sternal plate. The hosts are members of the family *Ochotonidae*, the "rock rabbits," or "little chief hares," a family that is most closely related to the rabbits.

1a. *Hoplopleura acanthopus acanthopus* (Burm.) (cont.)

1905. *Polyplax villosa* Galli-Valerio, *Zool. Anz.* 28: 521-2.

1908. *Polyplax villosa* Galli-Valerio, Dalla Torre, "Anoplura," *Gen. Ins.*, p. 14.

1916. *Polyplax villosa* Galli-Valerio, Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 177.

NOTES.—Through the kindness of Dr. Galli-Valerio I have been enabled to examine a male from the type lot of *Polyplax villosa*. The species proves to be a synonym of *Hoplopleura acanthopus*.

Genus **SCHIZOPHTHIRUS** new genus.

Anoplura without eyes; with five-segmented antennae which are not sexually dimorphic; legs with the tibia produced into a thumb-like process opposing the claw, the anterior pair small and weak, with slender claw, the middle pair of the same form as the anterior, but much larger; the posterior pair very stout, with the tarsus flattened and the claw very stout; pleural plates present on the first to eighth segments, the first pair not lying upon the dorsum; female with the fourth to eighth tergites and the fourth to seventh sternites with three rows of setae; male with the second tergite alone bearing two rows, the remainder with but one; second sternite in both sexes with a large, chitinized plate, which is divided medially and bears two groups of short, stout setae; head with pronounced post-antennal angles and with a constricted occipital region.

HOSTS. Occurring on rodents of the families *Muscardinida* and *Graphurida*.

TYPE OF THE GENUS. *Pediculus pleurophæus* Burmeister. But one other species, *S. graphiuri* n. sp., is included.

NOTES.—This is a very distinct little genus that I consider to have its nearest relative in the genus *Euhæmatopinus*. In fact, in spite of the peculiar character of the latter, I am inclined to regard the two as really quite closely related. Aside from the reduction of the number of segments in the antennæ and the extraordinary structures of the posterior legs in *Euhæmatopinus*, the two are very similar. More remotely both appear to be related to *Hoplopleura*.

The most distinctive feature common to *Schizopthirus* and *Euhæmatopinus* is that of the character of the second sternal plate of the abdomen. In both genera this plate is much enlarged, is divided medially and has so far encroached upon the third sternite that it appears really to belong to the third segment. This appearance is further heightened by the development upon the second sternite of enlarged setæ such as appear upon the first plate of the third segment in *Hoplopleura*. However, a direct comparison of this region in the two genera leaves no room for doubt as to the true homologies. In Fig. 93 is shown such a comparison of *Schizopthirus graphiuri* n. sp. and *Hoplopleura acanthopus* (Burm.).

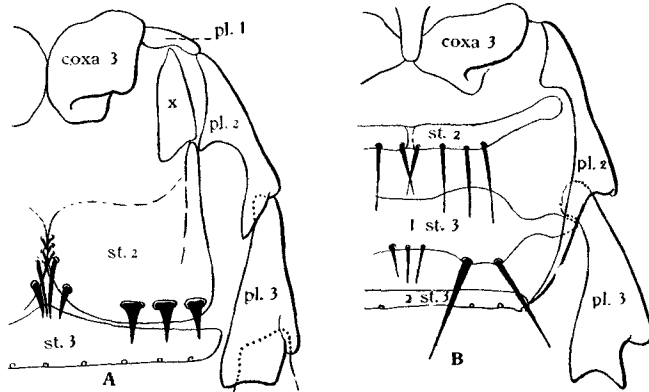


Fig. 93.—Second and third abdominal sternites of: A, *Schizopthirus graphiuri* n. sp.; B, *Hoplopleura acanthopus* (Burm.).

The two species that I have included under *Schizopthirus* are strikingly different as regards the character of the pleural plates, but nevertheless I do not hesitate to place them in the same genus. They are certainly closely related, and to separate them generically would merely obscure this relationship.

Of the immature stages there are present only examples of the penultimate stage of *S. graphiuri* n. sp. These differ from the adult chiefly in the form of the pleural plates. These are strongly developed but lack the pronounced lobing of the posterior margin that appears in the adult.

1. *Schizopthirus pleurophæus* (Burmeister).

FIGS. 94, 95.

1839. *Pediculus pleurophæus* Burmeister, Gen. Rhynchota, No. 7.
 1864. *Pediculus pleurophæus* Burm., Nitzsch, *Zeit. f. ges. Naturw.* 23: 27.
 1874. *Hæmatopinus leucophæus* (Burm.), Giebel, "Insecta Epizoa," p. 37.
 1880. *Hæmatopinus leucophæus* (Burm.), Piaget, "Les Pediculines," p. 640.
 1904. *Polyplax pleurophæa* (Burm.), Enderlein, *Zool. Anz.* 28: 142.
 1908. *Polyplax pleurophæa* (Burm.), Dalla Torre, "Anoplura," *Gen. Ins.*, p. 13.
 1916. *Polyplax* (?) *pleurophæa* (Burm.), Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 174.

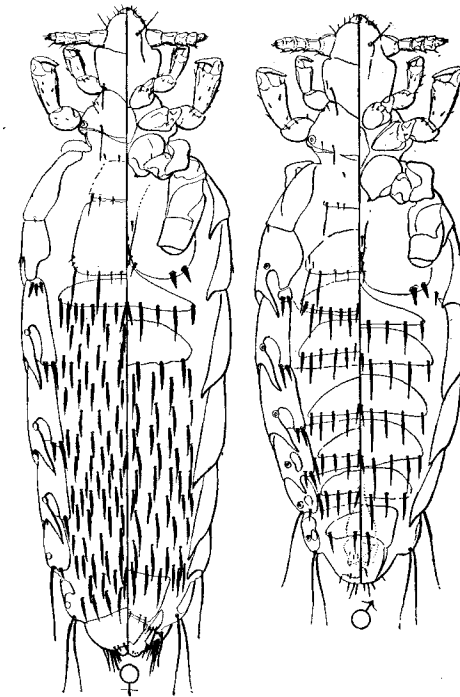


Fig. 94.—*Schizopthirus pleurophæus* (Burm.), male and female.

PREVIOUS RECORDS. From some subspecies of *Eliomys quercinus* (= *Myoxys nitella*), family *Muscardinida*, Europe. The only authors who appear to have seen specimens were Burmeister, Nitzsch, and Giebel.

SPECIMENS EXAMINED. From *Eliomys pallidus*, Sorrento, Italy (U. S. N. M. 103031) and *Muscardinus axellarius*, Wolfsheim, Schlesien, Germany (U. S. N. M. 112908).

FEMALE (Fig. 94). Length 1.3 mm. Head slightly longer than wide, with moderately prominent post-antennal angles. Thorax shorter than the head, with the lateral margins strongly angulate; sternal plate (Fig. 95C) small, elongate, with the lateral margins angulate; posterior leg (Fig. 95D) with the inner, apical angle of the tarsus somewhat produced, acute.

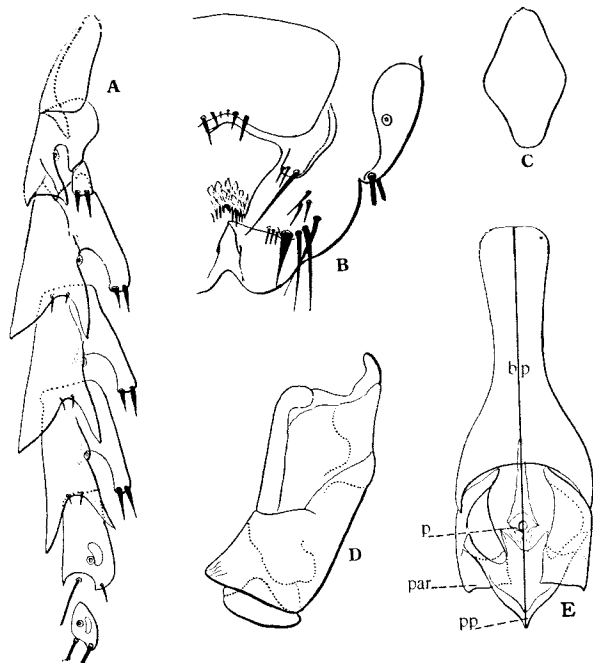


Fig. 95.—*Schizophthirus pleurophæus* (Burm.): A, pleural plates; B, genital region of female; C, sternal plate; D, posterior tibia and tarsus; E, genitalia of male.

Pleural plates (Fig. 95A) of a very peculiar type. First pair small, not free; second with a tapering ventral process; third to sixth deeply divided into two very unequal parts, the dorsal part slender, truncate, with a pair of short, stout setæ at the apex; the ventral portion again divided by a deep emargination into two tapering lobes and with a pair of small setæ at the base of the emargination; seventh and eighth smaller, without lobes, the seventh with a single long and one small seta, the eighth with two long setæ.

Tergal plates developed only on the second, third, and ninth segments, the second with one plate, the third with two, of which the anterior is

much the larger, and the ninth with one. Rows of setæ tending to be more or less irregular, for the most part with eight to ten in a row.

Sternal plates developed only on the second to fourth and eighth and ninth segments, those on the eighth and ninth forming the genital plate (Fig. 95B). The sternal plate of the second segment is enlarged, as described for the genus, and bears two pairs of short, stout setæ. The third and fourth segments have each a single plate. The rows of setæ are much as on the dorsum. Gonapods (Fig. 95B) very small.

MALE (Fig. 94). Length 1 mm. Head, thorax and pleural plates as in the female. *Tergal and sternal plates* strongly developed, arranged as described for the genus, for the most part with eight to ten setæ. *Genitalia* (Fig. 95E) with the basal plate (*bp*) expanded posteriorly; parameres (*par*) much flattened; penis (*p*) borne at the tip of a slender statumen penis; pseudopenis (*pp*) very small, broadly V-shaped.

NOTES.—From the only other species of the genus, *S. graphiuri* n. sp., this differs most strikingly in the remarkable form of the pleural plates. The redescription is based upon specimens from *Eliomys quercinus*.

2. *Schizophthirus graphiuri* n. sp.

FIGS. 93A, 96, 97.

SPECIMENS EXAMINED. Holotype, a female, and allotype from *Graphiurus murinus isolatus*, Mt. Mbololo, British East Africa (U. S. N. M. 182834). Also from *Graphiurus raptor*, Mt. Kenia, British East Africa (U. S. N. M. 164265), and *G. nanus*, Mtabamhlope, Natal (Lawrence Hill).

FEMALE (Fig. 96). Length 1.4 mm. Head but slightly longer than broad, with prominent post-antennal angles and with the lateral margins of the hind head somewhat convergent. Thorax shorter than the head, with the lateral margins somewhat angulate; sternal plate (Fig. 97D) elongate oval; middle legs strikingly large and long; posterior legs with the inner apical angle somewhat produced and acute.

Pleural plates (Fig. 97A) as follows: first pair very small; second with a short ventral process; third to seventh each divided by a shallow emargination into two broad lobes with rounded or obtuse angles; eighth with but the dorsal lobe present; second to sixth each with a pair of small setæ in the emargination; seventh with one small and one long seta, eighth with two long setæ.

Tergal plates developed on the second, third, and ninth segments, the second segment with two plates, the others with one. Rows of setæ very irregular, for the most part with six to ten setæ. *Sternal plates* developed on the second, third, and eighth segments, each with one plate. Sternal plate of the second segment (Fig. 93A) with two groups of three enlarged setæ. Rows of setæ much as on the dorsum. Gonapods (Fig. 97C) very small.

MALE (Fig. 96). Length 1.1 mm. *Head, thorax, and pleural plates* as in the female. *Tergal and sternal plates* strongly developed, arranged as described for the genus, for the most part with ten or more setæ. *Geni-*

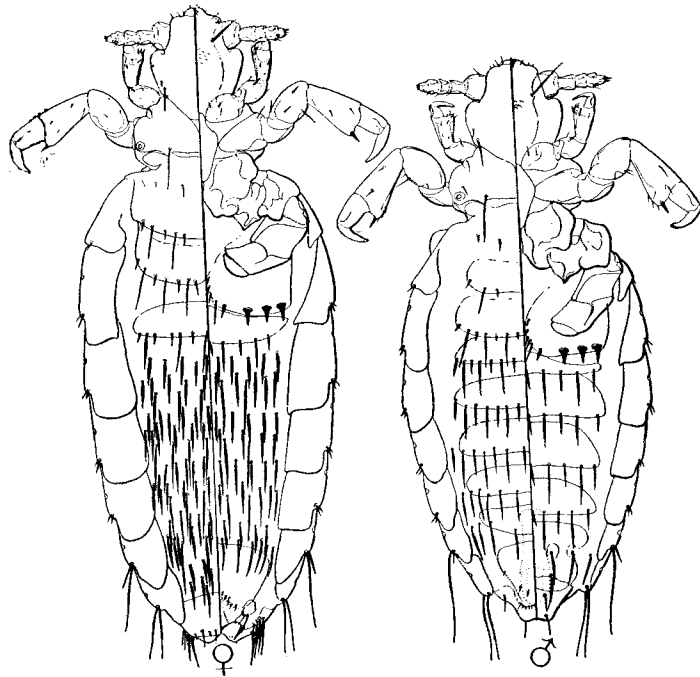


Fig. 96.—*Schizophthirus graphiuri* n. sp., male and female.

talía (Fig. 97B) with the basal plate (*bp*) quite broad, not expanded posteriorly, parameres (*par*) curved, flattened at the tips; penis (*p*) borne at the tip of an expanded statumen penis; pseudopenis (*pp*) very small, V-shaped.

NOTES.—The character of the pleural plates distinguishes this sharply from the other species of this genus, *S. pleurophaus* (Burm.)

Genus EUHÆMATOPINUS Osborn.

1896. Osborn, *U. S. Dept. Agric., Div. Ent., Bull. (n. s.)* 5: 186.
 1904. Enderlein, *Zool. Anz.* 28: 140.
 1908. Dalla Torre, "Anoplura," *Gen. Ins.*, p. 16.
 1915. Kellogg and Ferris, "Anoplura and Mall. N. Amer. Mam.," *Stanford Univ. Publ.*, p. 46.
 1916. Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 179.

Anoplura without eyes; with four-segmented antennæ, which appear superficially as three-segmented and which are not sexually dimorphic; legs with the tibia produced into a thumb-like process opposing the claw, the first pair small and weak, the second of the same form as the first but much larger, the third with the tarsus much flattened and with a membranous appendage arising from the femur and the tibia; pleural plates present on the first to eighth segments, the first pair not lying upon the dorsum; female with two rows of setæ on the third to seventh tergites and the fourth sternite of the abdomen, the male with two rows of setæ on the third tergite only, the remaining tergites and sternites with but one; second sternal plate in both sexes enlarged, divided medially; head with distinct post-antennal angles and with the occipital region slightly constricted.

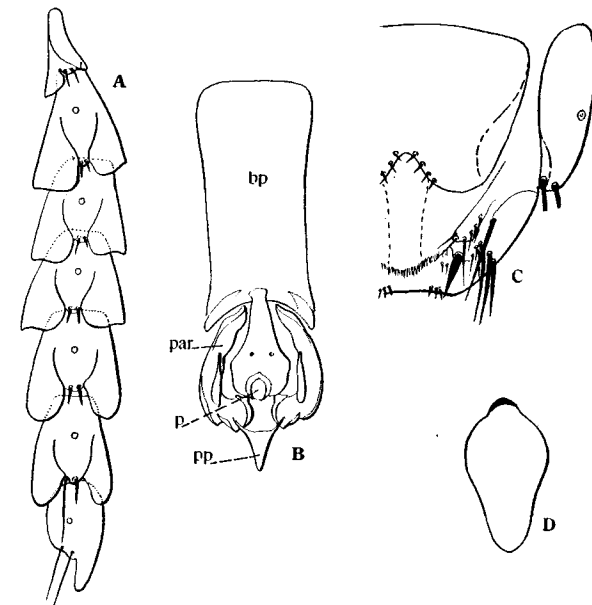


Fig. 97.—*Schizophthirus graphiuri* n. sp.: A, pleural plates; B, genitalia of male; C, genital area of female; D, sternal plate.

Hosts. Occurring as far as known only on insectivores of the genus *Scalopus*, the "moles," in North America.

TYPE OF THE GENUS. *Euhæmatopinus abnormis* Osborn. This is the only included species.

NOTES.—As I have pointed out under the discussion of *Schizopthirus*, I regard these two genera as quite closely related, in spite of the peculiar characters of *Euhæmatopinus*.

The antennæ in this genus have heretofore been described as three-segmented, but in well-stained preparations it is evident that they are really four-segmented. The curious, swollen, membranous appendages on the posterior legs are quite unique. They appear simply as membranous expansions arising from the femur and tibia. I am not prepared at present to discuss at length the systematic position of the genus, but I may note that I am not inclined to give it any such isolated position as has heretofore been accorded it.

As has previously been pointed out (Kellogg and Ferris, ref. cited), the genus *Euhæmatopinus* is in all probability a synonym of *Hæmatopinoidea* Osborn, and *E. abnormis* is probably a synonym of *H. squamosus* Osborn. The description given for *Hæmatopinoidea squamosus* applies exactly to *Euhæmatopinus abnormis*, excepting only for the character of the posterior legs, which in *Hæmatopinoidea* are not described as having the membranous appendages. Even though the two species were described by the same author, it appears highly probable that an error was made. The types of *Hæmatopinoidea squamosus* are said to have been lost, and the matter can not now be settled.

1. *Euhæmatopinus abnormis* Osborn.

FIGS. 98, 99.

1896. *Euhæmatopinus abnormis* Osborn, U. S. Dept. Agric., Div. Ent., Bull. (n. s.) 5: 187.

1904. *Euhæmatopinus abnormis* Osborn, Enderlein, Zool. Anz. 28: 140.

1908. *Euhæmatopinus abnormis* Osborn, Dalla Torre, "Anoplura," Gen. Ins., p. 16.

1915. *Euhæmatopinus abnormis* Osborn, Kellogg and Ferris, "Anoplura and Mall. N. Amer. Mam.," Stanford Univ. Publ., p. 47; tf. 16; pl. 3, f. 3; pl. 5, f. 4, 9.

1916. *Euhæmatopinus abnormis* Osborn, Ferris, "Cat. Anoplura," Proc. Cal. Acad. Sci. (4) 6: 179.

PREVIOUS RECORDS. From *Scalopus aquaticus machrinus* (= *Scalops argentatus*), Ames, Iowa, U. S. A.

SPECIMENS EXAMINED. From *Scalopus aquaticus machrinus*, Illinois (U. S. N. M. 19616); *S. aquaticus machrinoides*, Elk River, Minnesota (U. S. N. M. 67601); and Ft. Leavenworth, Kansas (U. S. N. M. 91588); "mole," Rochester, New York. I have previously examined the types.

FEMALE (Fig. 98). Length 1.3 mm. Head (Fig. 99D) elongate, pointed anteriorly, with small post-antennal angles and a somewhat constricted occipital region. Antennæ (Fig. 99C) with a large sensorium on the third segment, the third and fourth segments appearing superficially as a single segment.

Thorax shorter than the head, with the lateral margins arcuate; sternal plate (Fig. 99F) oval, pointed posteriorly. Posterior legs (Fig. 99B) scarcely reaching beyond the margin of the body.

Pleural plates (Fig. 99G) strongly developed; first pair very small; second with a tapering ventral process; third to sixth with the posterior

margin divided into two rounded lobes with a smaller lobe between, the middle lobe bearing a pair of small setæ; seventh and eighth without lobes, each with two slender setæ; spiracles small.

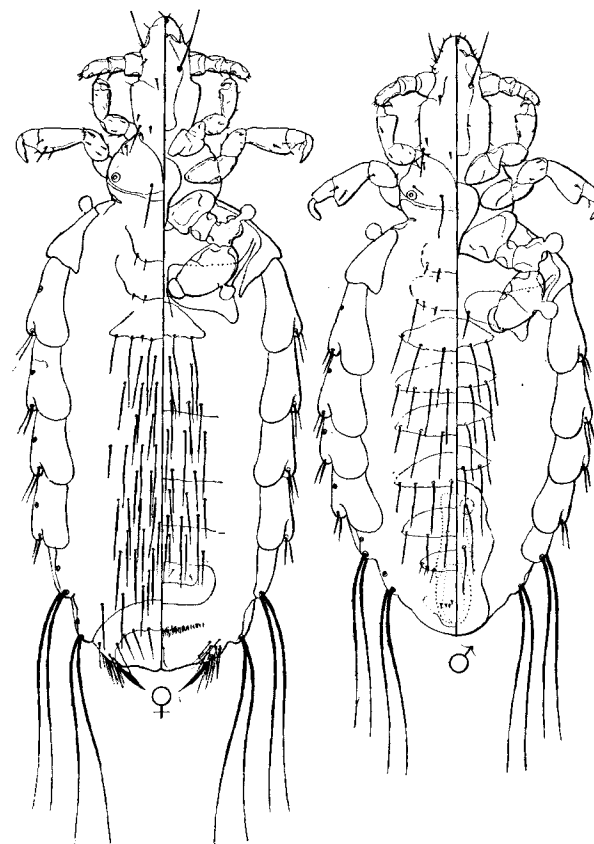


Fig. 98.—*Euhæmatopinus abnormis* Osborn, male and female.

Tergal plates weakly developed, the second segment with one, the third with two, and the ninth with one. Setæ small, slender, for the most part six to eight in a row. Sternal plates developed only on the second, third, and eighth segments, each with one. Sternite of the second segment without enlarged setæ. Setæ of the ventral side arranged much as on the dor-

sum. Gonapods apparently lacking; ninth segment (Fig. 99H) with a cluster of slender setae near the lateral margins beneath and with a large, flattened seta at each apical angle.

MALE (Fig. 98). Length 1 mm. Head, thorax, and pleural plates as in the female. Tergal and sternal plates quite strongly developed, arranged as described for the genus, with for the most part four to eight setae. Genitalia (Fig. 99A) with the basal plate (bp) broad, not expanded pos-

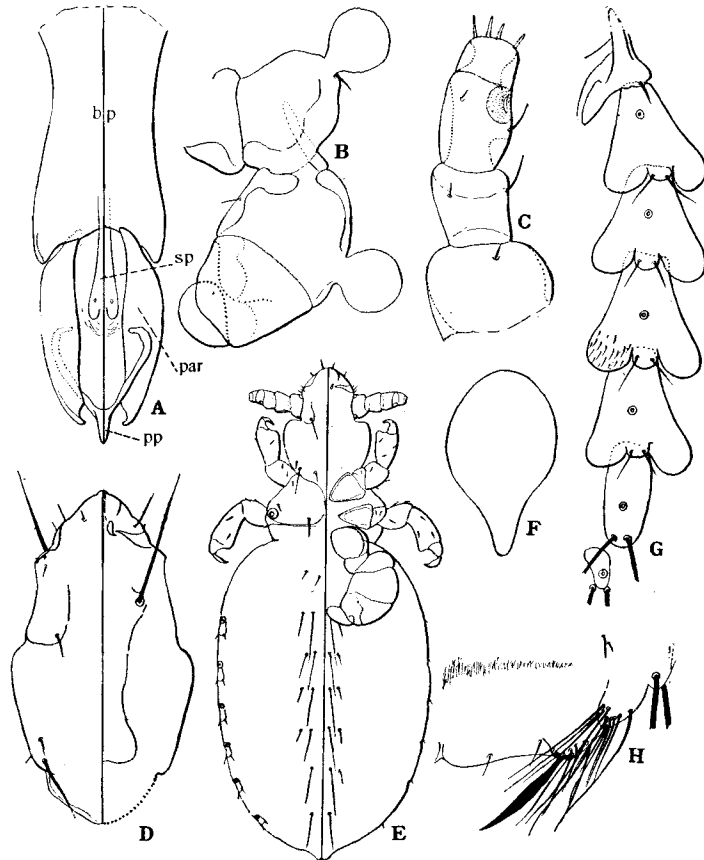


Fig. 99.—*Euhamatopinus abnormis* Osborn: A, genitalia of male; B, posterior leg; C, antenna; D, head; E, immature stage; F, sternal plate; H, ventral side of ninth abdominal segment.

teriorly; parameres (*par*) elongate, somewhat flattened, enclosing the slender statumen penis (*sp*); pseudopenis Y-shaped, with the shaft quite short.

IMMATURE STAGE. A single immature stage is represented in my material, this possibly being of the second instar (Fig. 99E). The antennae and legs are as in the adult, except that the appendages of the posterior pair of legs are lacking. The tergal and sternal plates are undeveloped. The pleural plates are present on the third to eighth segments but are extremely small.

Genus CTENOPHTHIRUS new genus.

Anoplura without eyes; with five-segmented antennae, which are not sexually dimorphic; legs with the tibia produced into a thumb-like process opposing the claw, the anterior pair small and weak, the middle and posterior pairs much larger, with the tarsus somewhat flattened and with stout claw; pleural plates present on the second to eighth segments; female with three plates and two rows of setae on the fourth to sixth tergites and third to sixth sternites, two plates and two rows of setae on the second, seventh, and eighth tergites and seventh and eighth sternites, the posterior row of setae on the third to eighth tergites and third to sixth sternites much flattened and expanded and arranged in a comb-like series; male with two rows of setae on the third tergite and the third to seventh sternites and one on the remainder, the setae of the posterior row in each case, expanded as in the female; genitalia of male with no specially distinctive characters.

HOSTS. Known only from a single species of the rodent family *Octodontida*.

TYPE OF THE GENUS. *Ctenophthirus cercomydis* n. sp.

NOTES.—The rows of flattened setae are the most distinctive character of this genus. Taken by themselves they would hardly be sufficient to justify its separation from *Polyplax* or *Hoplopleura*, but taken in conjunction with the other characters given the establishment of the genus appears to be justified. It is possibly most closely related to *Polyplax*.

1. *Ctenophthirus cercomydis* n. sp.

Figs. 100, 101.

SPECIMENS EXAMINED. Several males and females from *Cercomys fosteri*, Sapucay, Paraguay (U. S. N. M. 121408). Holotype a female.

FEMALE (Fig. 100). Length 1.6 mm. Head (Fig. 101A) slightly longer than broad, truncate anteriorly, with slight post-antennal angles and without a constricted occipital region; ventral side and first segment of antennae with a number of small, sharp, backward-pointing tubercles.

Thorax about as long as the head and but slightly wider, with the lateral margins slightly arcuate; sternal plate (Fig. 101D) broad, somewhat shield-shaped with the apex anteriorly; legs as described for the genus.

Pleural plates (Fig. 101G) as follows: first pair lacking; second small, quadrate, with a pair of setæ on the posterior margin; third to sixth narrow, elongate, with the posterior angles produced into small teeth and with a pair of large, stout setæ on the posterior margin; seventh and eighth with large setæ but without teeth.

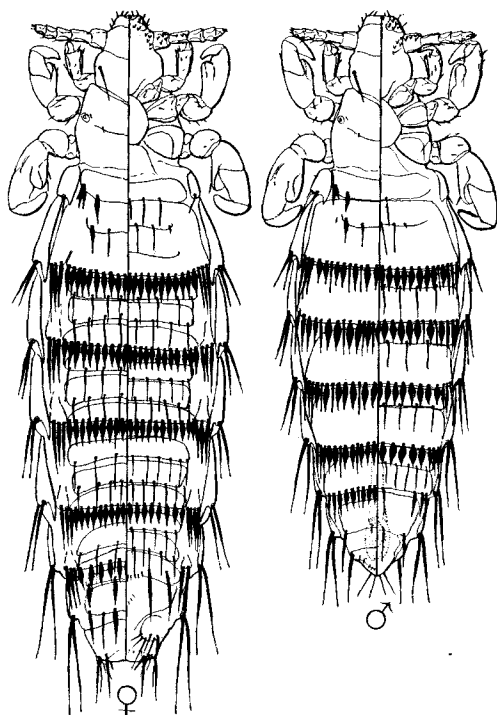


Fig. 100.—*Ctenophthirus cercomydis* n. sp., male and female.

Tergal and sternal plates well developed; posterior row of each segment for the most part with as many as twenty flattened setæ (Fig. 101B, C) the others with but six to ten small, slender setæ. Between the ends of the last plate and the corresponding pleurite on the third to seventh segments, both dorsally and ventrally, there is a small, detached plate bearing three or four moderately stout setæ. Spiracles small. Gonapods (Fig. 101F) apparently lacking.

MALE (Fig. 100). Length 1.5 mm. *Head, thorax, and pleural plates* as in the female. *Tergal and sternal plates* strongly developed, the anterior

plate of each sternite much smaller than the posterior, and with very small setæ. The isolated plates, between the ends of the tergal and sternal plates, and the pleurites, seen in the female, are lacking.

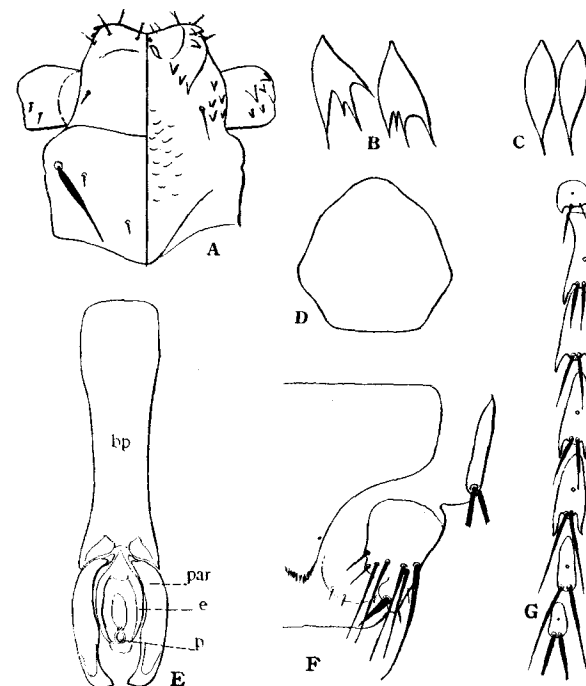


Fig. 101.—*Ctenophthirus cercomydis* n. sp.: A, head; B, setæ from second tergite; C, setæ from third tergite; D, sternal plate; E, genitalia of male; F, genital region of female; G, pleural plates.

Genitalia (Fig. 101E) with the basal plate (*bp*) quite long, not expanded posteriorly, the parameres (*par*) quite stout, slightly curved, enclosing a ring-like piece, which appears to be composed of the fused endomeres (*e*), and the penis (*p*). The pseudopenis appears to be lacking.

IMMATURE STAGES. A single specimen, representing possibly the second stage, is present in my material. This specimen is damaged, the legs being broken off, but is here figured (Fig. 102) as completely as possible. The head (Fig. 102B) is very much as in the adult. The abdomen (Fig. 102A) is entirely membranous and bears setæ only on the last four segments, the last segment, which is heavily chitinized, having a single seta at

each lateral margin and the others a pair of setæ. The penultimate segment likewise bears a median pair of dorsal setæ which are probably quite large, but are broken in my specimen.

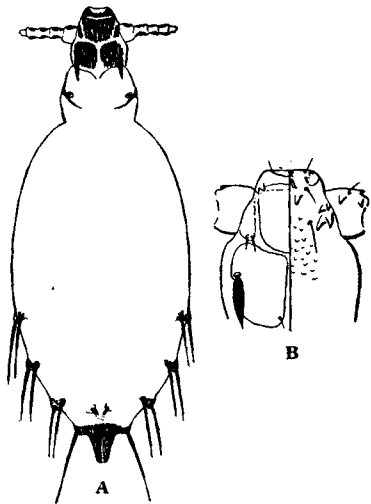


Fig. 102.—*Ctenophthirus cercomydis* n. sp.: A, immature stage; B, head of same.

Genus **RATEMIA** Fahrenholz.

1916. Fahrenholz, *Archiv f. Naturgeschichte*, Abt. A, 81, 11: 31.

Anoplura without eyes; with five-segmented antennæ; legs with the tibia produced into a thumb-like process opposing the claw, the anterior pair moderately small, middle and posterior legs of much the same form as the anterior pair but somewhat larger; pleural plates present on the fourth to sixth segments; tergal and sternal plates undeveloped except for the ninth tergite and the genital plate on the eighth sternite, the abdomen membranous, the segments, both dorsally and ventrally either with a confused group of setæ or with a single row which merges medially into an irregular group; head without distinct post-antennal angles but with a constricted occipital region.

HOSTS. Unknown.

TYPE OF THE GENUS. *Hæmatopinus (Linognathus) squamulatus* Neumann. This is the only included species.

NOTES.—This is a peculiar genus of somewhat doubtful affinities. It is possibly related to the forms now placed under *Linognathoides* rather than to *Linognathus* as was suggested by Neumann. The number of pleural plates is perhaps the most distinctive character.

1. *Ratemia squamulata* (Neumann).

FIG. 103.

1911. *Hæmatopinus (Linognathus) squamulatus* Neumann, *Archives de Parasitologie* 14: 401; f. 1-4.
 1916. *Hæmatopinus (Linognathus) (?) squamulatus* Neumann, Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 179.
 1916. *Ratemia squamulatus* (Neum.), Fahrenholz, *Archiv f. Naturgeschichte*, Abt. A, 81, 11: 31.

PREVIOUS RECORDS. Known only from the original record, from unknown host, Dire-Daoua, Abyssinia.

SPECIMENS EXAMINED. A single female co-type, received through the kindness of Dr. A. Martin of the Ecole Veterinaire of Toulouse.

FEMALE (Fig. 101A). Length 6.1 mm. Head relatively small, acute anteriorly, slightly swollen behind the antennæ and with the occipital region sharply constricted. Antennæ (Fig. 101C) without distinctive characters.

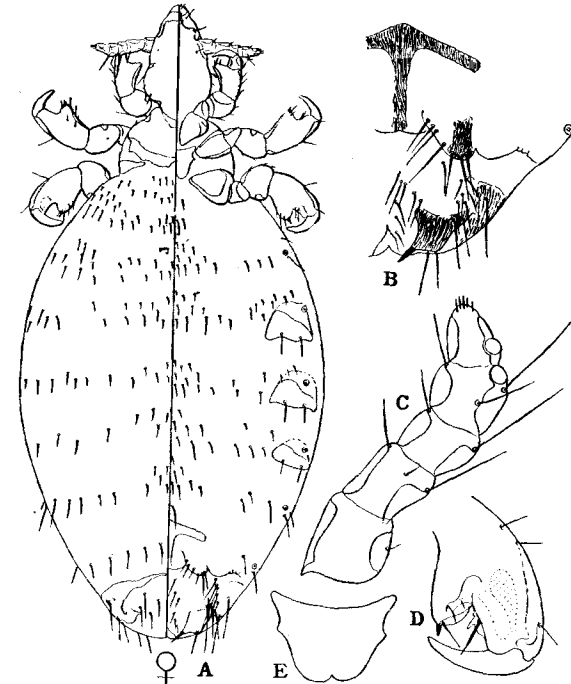


Fig. 103.—*Ratemia squamulata* (Neum.): A, adult female; B, genital region; C, antenna; D, tibia and tarsus of posterior leg.

Thorax likewise relatively small, shorter than the head, with the lateral margins strongly arcuate, the whole nearly semicircular in form; dorsum with a strong, transverse chitinized bar; sternal plate (Fig. 101E) quite broad.

Pleural plates roughly rectangular, the posterior margin nearly straight and bearing two small setæ. Dorsally the second segment is quite thickly beset with small setæ; the third bears an irregular transverse group, the fourth to seventh each bear a transverse row which merges medially into an irregular group; the eighth bears a single transverse row. On the ventral side the arrangement is much the same except that the second segment bears but few setæ. *Genital plate* (Fig. 101B) T-shaped; gonapods small; ninth segment with a pair of flattened lobes each bearing a small, stout seta. MALE. Unknown.

Genus **FAHRENHOLZIA** Kellogg and Ferris.

1915. Kellogg and Ferris, "Anoplura and Mall. N. Amer. Mam.," *Stanford Univ. Publ.*, p. 32.

1916. Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 150.

Anoplura without eyes; with five-segmented antennæ, which are not sexually dimorphic; legs with the tibia produced into a thumb-like process opposing the claw, the anterior pair small and weak, the middle and posterior pairs much larger, subequal, with the tarsus flattened and bearing a tooth-like process at the outer basal angle and with the claw stout; pleural plates present on a variable number of segments beginning with the second, the second pair divided longitudinally into two parts, one of which lies upon the dorsum, the other on the venter; abdomen in both sexes almost entirely membranous, with a single transverse row of large setæ on each segment, both dorsally and ventrally; head relatively small, with very slight or no post-antennal angles and without a constricted occipital region.

HOSTS. Occurring as far as known only on rodents of the family *Heteromyidae*, the "jumping" or "kangaroo" rats and mice. This is a small family that is confined to the western hemisphere.

TYPE OF THE GENUS. *Fahrenholzia pinnata* Kellogg and Ferris.

SYNONYMICAL LIST OF NAMES PREVIOUSLY USED IN THE GENUS:

pinnata Kellogg and Ferris.

tribulosa Ferris.

tribulosa Ferris (part).

Fahrenholzia tribulosa reducta n. ssp.

NOTES.—The members of this genus, like the members of their host family, constitute a small and isolated group. With the three new forms herein described there are but five forms in the genus, and it is not probable that the number will be very greatly increased. The position of the genus is doubtful, and I am not prepared to discuss this point until the entire Order has been reviewed. The most distinctive char-

acter lies in the divided pleural plates of the second segment. I may note that in most of the species of *Polyplax* there is a strong tendency in the direction of a similar division of this pair of plates, although the two genera are certainly sufficiently distinct otherwise.

Of the immature forms I have seen only examples representing the penultimate stage. This stage (Fig. 107E) is practically the same in all the species, differing from the adult in the almost complete absence of setæ, except for the long marginal setæ on the penultimate and ante-penultimate segments and on the pleural plates.

1. *Fahrenholzia pinnata* Kellogg and Ferris.

FIGS. 104, 105.

1915. *Fahrenholzia pinnata* Kellogg and Ferris, "Anoplura and Mall. N. Amer. Mam.," *Stanford Univ. Publ.*, p. 32; tf. 13; pl. 3, f. 2; pl. 5, f. 5; pl. 6, f. 10.

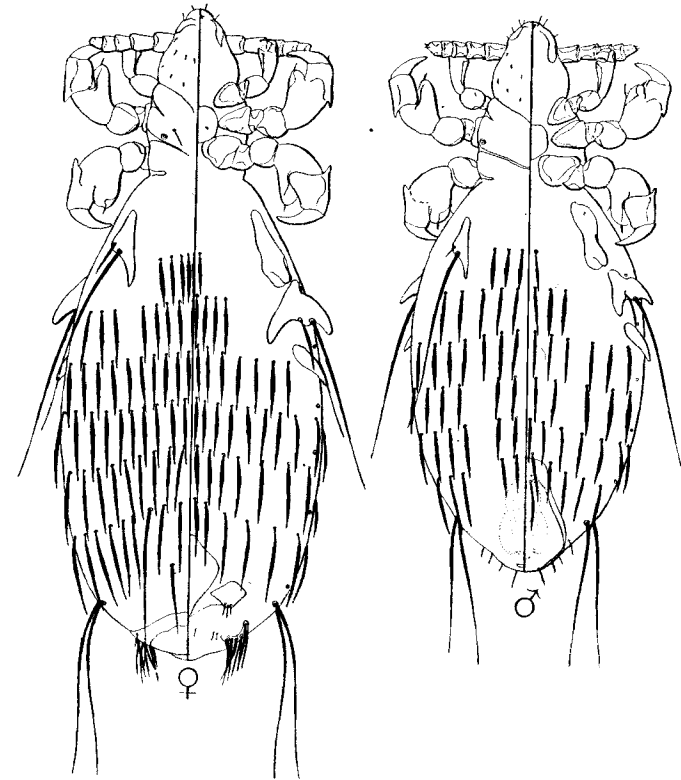


Fig. 104.—*Fahrenholzia pinnata* Kellogg and Ferris, male and female.

1916. *Fahrenholzia pinnata* K. and F., Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 150.

1916. *Fahrenholzia pinnata* K. and F., Ferris, *Psyche* 23: 102.

PREVIOUS RECORDS. Type from *Dipodomys californicus*, Covelo, California. Recorded by Ferris from the following hosts and localities, all in California: *Dipodomys merriami cimiolus*, Independence; *D. deserti*, Mecca; *Perodipus* sp., Coulterville; *Microdipodops polionotus*, Benton; and from *Perognathus parvus olivaceous*, Pine Forest Mountains, Nevada.

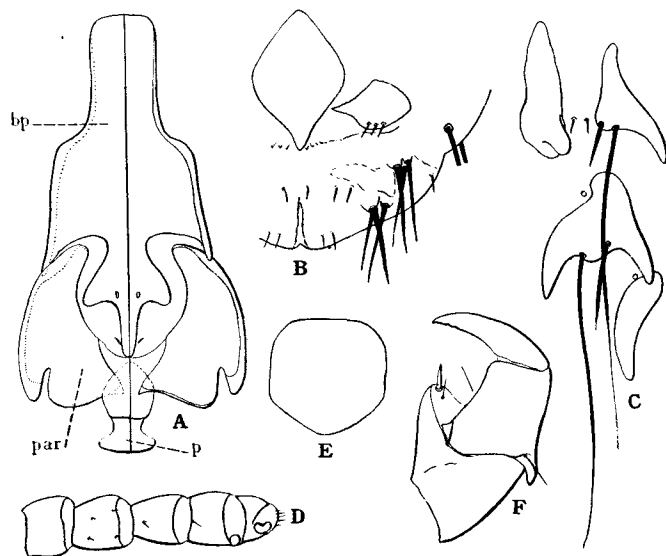


Fig. 105.—*Fahrenholzia pinnata* Kellogg and Ferris: A, genitalia of male; B, genital region of female; C, pleural plates; D, antenna; E, sternal plate; F, posterior tibia and tarsus.

° SPECIMENS EXAMINED. All those upon which the above records are based and the following: *Dipodomys phillipsi*, Amecameca, Mexico (U. S. N. M. 52036); *D. ornatus*, Valparaiso, Zacatecas, Mexico (U. S. N. M. 91939); *D. deserti*, Ludlow, California (U. S. N. M. 136616); *D. merriami nevadensis*, Pahrump Valley, Nevada (U. S. N. M. 26053); *Perodipus richardsoni*, Alva, Oklahoma (F. C. M. 6807).

FEMALE (Fig. 104). Length 1.1 mm. Head slightly longer than wide, acute anteriorly. Thorax about as long and but little wider than the head, with the lateral margins nearly straight and parallel; sternal plate (Fig. 105E) roughly pentagonal.

Pleural plates (Fig. 105C) present on but the second to fourth segments; those of the second segment divided as characteristic of the genus, both the parts rather slender, the dorsal part consisting of a single, curved lobe, the ventral part an elongated, slender piece with a small, free lobe; between the two parts are two small setae, and the dorsal part bears one very long and one short seta; plates of the third segment quite large, roughly triangular with the apical angles produced into tapering lobes and with a pair of long setae on the posterior margin; plates of the fourth segment consisting merely of a curved, tapering lobe with the apex free.

Abdomen with the setae all quite large and stout; second tergite with about ten, third to seventh with as many as twenty, the eighth with two; eighth segment with a pair of long setae at each lateral margin; ninth with a chitinized tergal plate. On the ventral side the setae are arranged much as on the dorsum. *Genital plate* (Fig. 105B) quite large; gonapods with but two or three small setae, lateral margins of the ninth segment with two clusters of moderately large setae.

MALE (Fig. 104). Length 0.9 mm. Head, thorax, and pleural plates as in the female. *Abdomen* with the number of setae somewhat smaller than in the female. *Genitalia* (Fig. 105A) with the basal plate (bp) sharply and strongly expanded at about its middle and with a trident-shaped median posterior prolongation; parameres (par) much flattened; pseudo-penis (pp) strongly reduced; penis not evident.

NOTES.—The form of the pleural plates permits the separation of this from *F. microcephala* n. sp., which has somewhat similar genitalia, and the form of the genitalia distinguishes it from *F. tribulosa zacateca* n. ssp., which has somewhat similar pleural plates.

2. *Fahrenholzia microcephala* n. sp.

Figs. 106, 107.

SPECIMENS EXAMINED. Holotype, a male, and allotype from *Heteromys pictus obscurus*, San Carlos, Vera Cruz, Mexico (F. C. M. 11099). Also from *Heteromys goldmani*, Achotal, Vera Cruz, Mexico (U. S. N. M. 14353); *Liomys irroratus jaliscensis*, Atamejac, Jalisco, Mexico (U. S. N. M. 34131); *L. irroratus canus*, Valparaiso, Zacatecas, Mexico (U. S. N. M. 91883); *L. texensis*, Brownsville, Texas (U. S. N. M. 29943).

FEMALE (Fig. 106). Length 1.4 mm. Head (Fig. 107D) relatively very short, slightly broader than long. Thorax slightly longer than the head and but little broader, with the lateral margins practically parallel; sternal plate (Fig. 107C) somewhat hatchet-shaped.

Pleural plates (Fig. 107A) strongly developed, present on the second to fourth segments; first pair with the dorsal portion bearing one very long and one minute seta, terminating in a single tapering lobe and with the ventral portion terminating in a broad, free lobe; between the two parts

are a pair of very small setæ; plates of the third segment with a broad, nearly truncate dorsal lobe and a tapering, curved ventral lobe which bears one very long and one shorter seta; plates of the fourth segment consisting of a single long, tapering lobe.

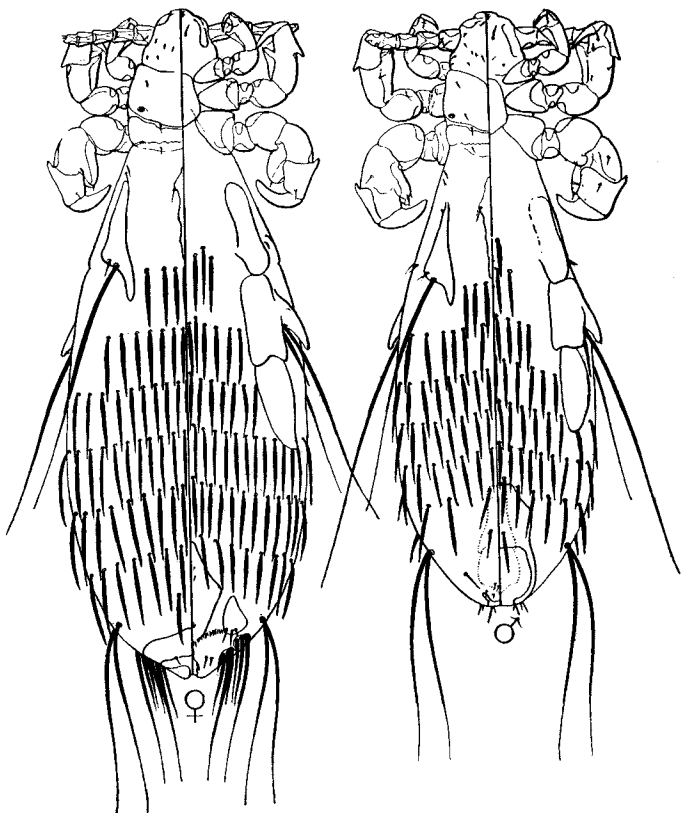


Fig. 106. *Fahrenholzia microcephala* n. sp., male and female.

Abdomen with a narrow, longitudinal, chitinized area on the second tergite and a transverse plate on the ninth tergite; second tergite with six or seven setæ, third to seventh with thirteen to twenty, the eighth with but two. Ventral side with the setæ arranged much as on the dorsum. Genital plate quite large. Margins of the ninth segment with two clusters of setæ, some of which are very long.

MALE (Fig. 106). Length 1.1 mm. In general closely resembling the female. *Genitalia* (Fig. 107B) with the basal plate (*bp*) quite broad, with the apical angles produced and with a slender, median, posterior process; parameres (*par*) with the tips flattened and expanded; pseudopenis (*pp*) a short, straight rod with the posterior end slightly trifoliate.

NOTES.—The unusual character of the pleural plates is sufficient to distinguish this species from the others of the genus.

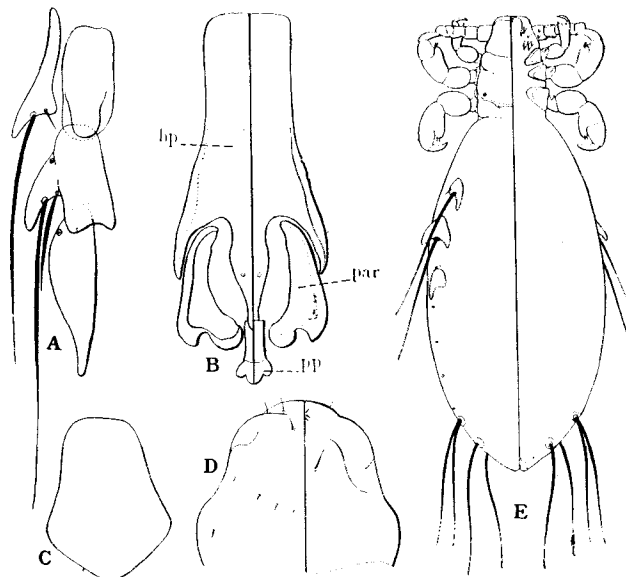


Fig. 107.—*Fahrenholzia microcephala* n. sp.: A, pleural plates; B, genitalia of male; C, sternal plate; D, head; E, immature stage.

3. *Fahrenholzia tribulosa* Ferris.

(Synonymy under subspecies.)

3a. *Fahrenholzia tribulosa tribulosa* Ferris.

FIGS. 108, 109A, 109D, 109E.

1916. *Fahrenholzia tribulosa* Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 151 (part; without description).

1916. *Fahrenholzia tribulosa* Ferris, *Psyche* 23: 102; f. 4, 5 (part).

PREVIOUS RECORDS. Type, a female, and allotype from *Perognathus californicus*, Pleasant Valley, California. Specimens from *Perognathus formosus*, Victorville, California, previously recorded as belonging to this form are now transferred to *F. tribulosa reducta* n. ssp.

SPECIMENS EXAMINED. Only as above.

FEMALE (Fig. 108). Length 1.4–1.5 mm. *Head* a trifle longer than broad, acute anteriorly. *Thorax* about as long as the head and scarcely wider, with the lateral margins nearly parallel; sternal plate (Fig. 109E) roughly circular.

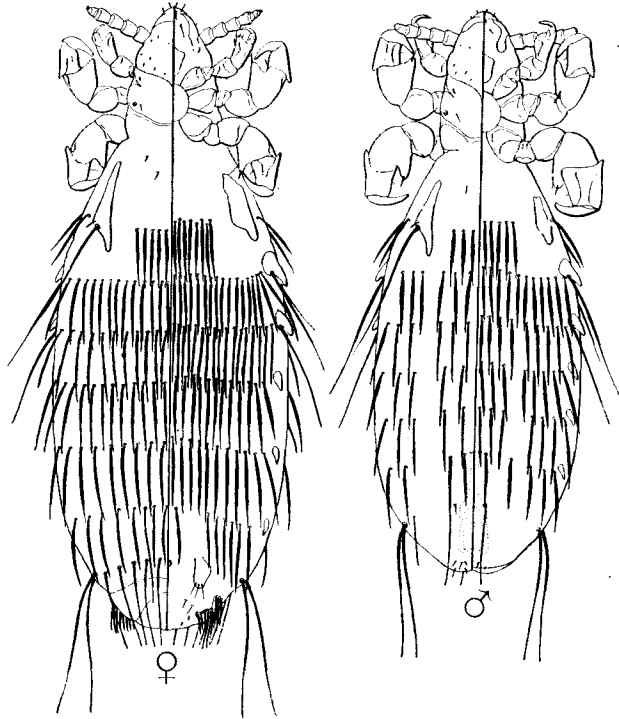


Fig. 108.—*Fahrenholzia tribulosa tribulosa* Ferris, male and female.

Pleural plates (Fig. 109D) present on the second to seventh segments; plates of the second segment with the dorsal portion produced into a curved, tapering lobe and with the ventral portion bearing a small free lobe; between the two portions are two moderately large setae; plates of the third segment consisting of a single tapering lobe bearing a single long and one very short seta; plates of the fourth, fifth, and sixth segments small, consisting of a single tapering lobe.

Abdomen with ten or more setae on the second tergite, with sixteen to

twenty-four on the third to seventh and ten on the eighth. Ventral side with the setae arranged much as on the dorsum. Genital plate not chitinized, or at most weakly so. Margins of the ninth segment with two groups of small setae.

MALE (Fig. 108). Length 1.1 mm. Closely resembling the female but with somewhat fewer setae. *Genitalia* (Fig. 109A) with the posterior third of the basal plate (*bp*) strongly expanded, with the posterior angles strongly produced and with a slender median process posteriorly; parameres (*par*) slightly curved, not flattened; pseudopenis (*pp*) quite large, V-shaped.

NOTES.—From *F. pinnata* and *F. microcephala* this is readily separable by the form of the genitalia and the pleural plates.

Included among the material upon which this species was originally based and in the material now available there are two forms which differ in the character of the pleural plates. The status of these is somewhat doubtful, but for the present I am placing them as subspecies of *F. tribulosa*.

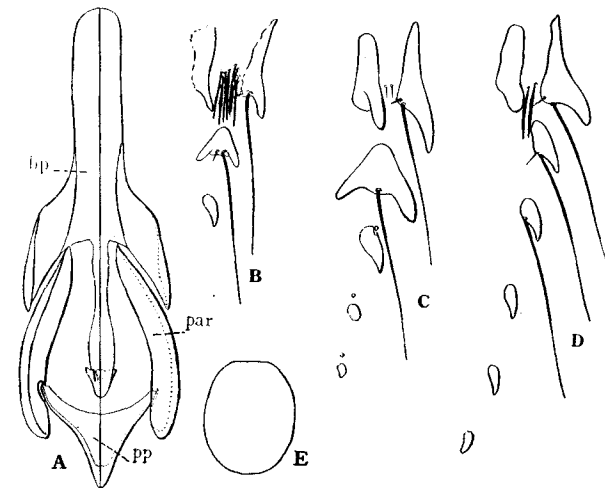


Fig. 109.—*Fahrenholzia tribulosa tribulosa* Ferris: A, genitalia of male; D, pleural plates; E, sternal plate. *F. tribulosa reducta* n. ssp.: B, pleural plates. *S. tribulosa zacatecae* n. ssp.: C, pleural plates.

3b. *Fahrenholzia tribulosa reducta* n. ssp.

FIG. 109B.

1916. *Fahrenholzia tribulosa* Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 151 (part; without description).
1916. *Fahrenholzia tribulosa* Ferris, *Psyche* 23: 102 (part).

PREVIOUS RECORDS. Recorded as *Fahrenholzia tribulosa* Ferris from *Perognathus formosus*, Victorville, California.

SPECIMENS EXAMINED. As above recorded. Holotype a female.

MALE AND FEMALE. Differing from *F. tribulosa tribulosa* only in the character of the pleural plates (Fig. 109B) which are present on the second to fourth segments only. Plates of the second segment with the parts small and slender, tending to be weakly chitinized, the dorsal portion with one very long and one minute seta and with several stout setæ between the two portions; plates of the third segment bilobed but very small, bearing one long and one short seta; plates of the fourth segment consisting of a single small lobe.

3c. *Fahrenholzia tribulosa zacatecæ* n. ssp.

FIG. 109C.

SPECIMENS EXAMINED. From *Perognathus hispidus zacatecæ*, Valparaiso, Zacatecas, Mexico (U. S. N. M. 91875). Holotype a female.

MALE AND FEMALE. Differing from *F. tribulosa tribulosa* and *F. tribulosa reducta* only in the form of the pleural plates. Plates of the second segment as in *tribulosa*; plates of the third segment quite large, bilobed; plates of the fourth, fifth, and sixth segments quite small.

Genus **NEOLINOGNATHUS** Bedford.

1920. Bedford, *Ent. Monthly Mag.* (3) 6: 88.

Anoplura without eyes; with five-segmented antennæ, which are not sexually dimorphic; legs with the tibia produced into a thumb-like process opposing the claw, the anterior pair weak, with slender claw, the middle and posterior pairs much larger, subequal, with the tarsus flattened and with stout claw; sternal plate divided longitudinally; pleural plates lacking; spiracles present only on the thorax and on the eighth abdominal segment; derm of the abdomen membranous, beset with minute points and with some large points which are chitinized, the whole giving the body a scaly appearance; head without post-antennal angles and with the occipital region but little constricted; genitalia of the males of a distinctive type, the parameres apparently lacking, the endomeres fused and much enlarged, the basal plate and pseudopenis very small.

HOSTS. Known only from members of the family *Macroscelidæ*, the "elephant shrews," of the order *Insectivora*.

TYPE OF THE GENUS. *Neolinognathus elephantuli* Bedford. This and *N. prælautus* n. sp. are the only included species.

1. *Neolinognathus elephantuli* Bedford.

FIGS. 110, 111A-C, 111F.

1920. *Neolinognathus elephantuli* Bedford, *Ent. Monthly Mag.* (3) 6: 89-90; f.

PREVIOUS RECORDS. From *Elephantulus rupestris jamesoni*, Anderstepport, Transvaal, South Africa.

SPECIMENS EXAMINED. A male and several females from the type host and locality, received through the kindness of Mr. Bedford and numerous specimens from the following: *Petrodromus tetradactylus*, British Central Africa (U. S. N. M. 141526); *Nasilio brachyrhynchus delameri*, Loita Plains, British East Africa (U. S. N. M. 181461).

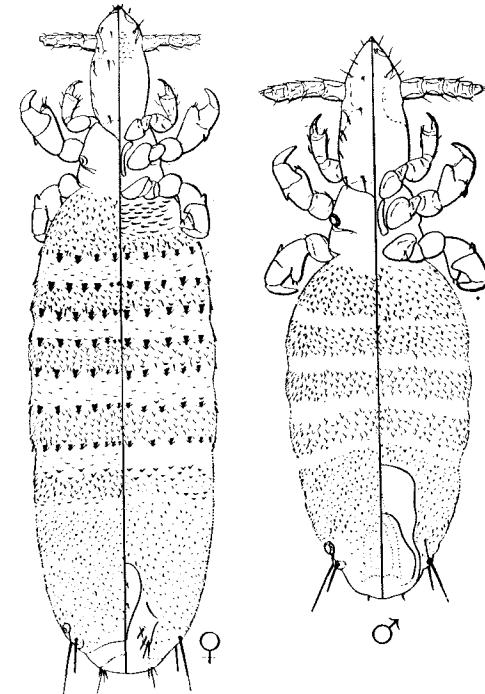


Fig. 110.—*Neolinognathus elephantuli* Bedford, male and female. Female from *Elephantulus rupestris jamesoni*, male from *Petrodromus tetradactylus*.

FEMALE (Fig. 110). Length 1-1.2 mm. Head slender, more than twice as long as wide, acute anteriorly. Thorax slightly wider than the head and scarcely as long, the lateral margins almost parallel; sternal plate (Fig. 111B) divided longitudinally into two irregular, slender plates; middle and anterior legs (Fig. 111C) with a distinct, tooth-like, preapical process on the outer margin of the tibia.

Abdomen elongate and rather slender. Along the posterior margin of the second tergite and sternite and both the anterior and posterior margins of the third to fifth tergites and sternites is a definite, single row of enlarged, chitinized points (Fig. 111F). The remainder of the abdomen is beset with minute, unchitinized points. Ninth segment with the tergite chitinized; eighth with a pair of small setæ at each side. Sternal plate (Fig. 111B) chitinized, elongate oval, acute posteriorly; gonapods small; margins of ninth segment with a few small setæ.

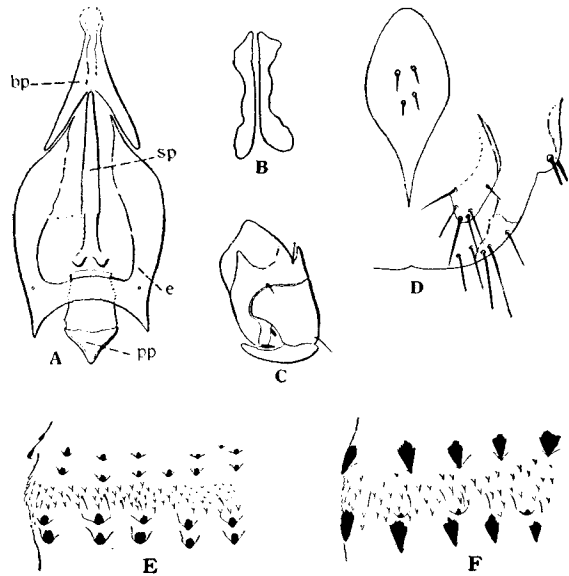


Fig. 111.—*Neolinognathus elephantuli* Bedford: A, genitalia of male; B, sternal plate; C, posterior tibia and tarsus; D, portion of abdomen. *Neolinognathus praelautus* n. sp.: E, portion of abdomen.

MALE (Fig. 110). Length 0.8 mm. In general resembling the female but with the abdomen entirely devoid of the larger, chitinized points. *Genitalia* (Fig. 111A) with the basal plate (*bp*) quite small, of an inverted Y-shape; parameres apparently lacking, replaced by a large ring sclerite which I regard as the fused endomeral pieces (*e*); pseudopenis (*pp*) very small.

NOTES.—The specimens from *Nasilio* differ from the others in the presence of large, chitinized points on the abdomen of the male. Otherwise they appear to be the same as typical examples.

2. *Neolinognathus praelautus* n. sp.

FIGS. 111E, 112.

SPECIMENS EXAMINED. Holotype, a female, and allotype from *Elephantulus pulcher phæus*, Lime Springs, British East Africa (U. S. N. M. 181488). Also from *E. rufescens*, Vor, British East Africa (U. S. N. M. 182612).

FEMALE (Fig. 112). Length 1 mm. Differing from *N. elephantuli* chiefly in the absence of the tooth-like process on the tibiæ of the middle and posterior legs and in having the enlarged, chitinized points of the abdomen smaller, bluntly pointed and arranged in double instead of single rows.

MALE (Fig. 112). Differing from the male of *N. elephantuli* in lacking the tooth-like process on the middle and posterior tibiæ and in having a few of the larger, chitinized points along the posterior margins of the abdominal segments.

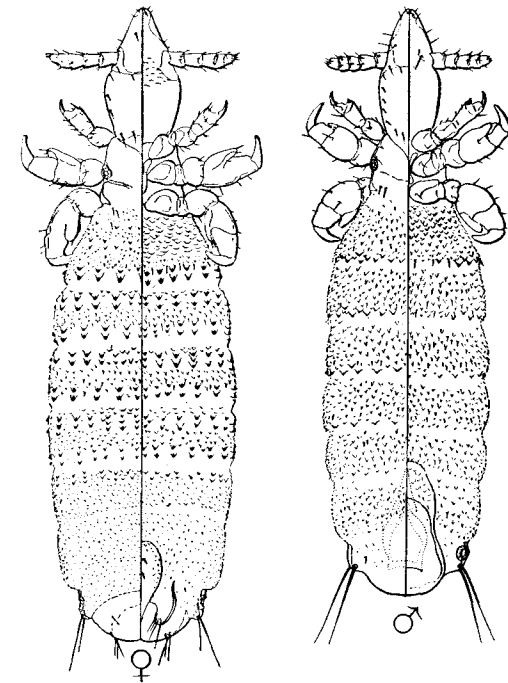


Fig. 112.—*Neolinognathus praelautus* n. sp., male and female.

Genus **SCIPIO** Cummings.

1913. *Scipio* Cummings, *Bull. Ent. Res.* 3: 393.
 1916. *Neumanellus* Fahrenholz, *Archiv f. Naturgeschichte*, Abt. A., 81, 11: 31.
 1916. *Scipio* Ferris, *Annals Durban Museum* 1: 232.
 1916. *Scipio* Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 177.

Anoplura without eyes; with five-segmented antennæ which are not sexually dimorphic; legs with the tarsus produced into a thumb-like process opposing the claw, the first pair small, with weak claw and with a curved claw-like process rising beside the claw, second and third pairs much larger, subequal, with stout claw; pleural plates present on the third to eighth segments; abdomen entirely membranous except for small tergal plates in the male, each segment with not more than one row of setæ; ninth segment without a pair of flattened lobes on the ventral side.

HOSTS. From rodents of the African genus *Thryonomys* of the family *Octodontidae*.

TYPE OF THE GENUS. *Hæmatopinus aulacodi* Neumann. But one other species, *Scipio breviceps* Ferris, is included.

NOTES.—The most distinctive feature of this genus, a character which it shares only with the genus *Hybophthirus*, is that of the presence of the claw-like process on the anterior tarsi. This structure has at times been spoken of as a claw, but it is in all probability merely an enlarged spine, for it is not jointed at the base.

These two genera, *Scipio* and *Hybophthirus*, appear to be quite closely related, and it is only with some hesitation that I am regarding them as distinct. I shall discuss this point further in connection with the description of the latter genus.

1. *Scipio aulacodi* (Neumann).

FIGS. 113, 114A-B, 114E, 114 G.

1911. *Hæmatopinus aulacodi* Neumann, *Archives de Parasitologie* 14: 403-406; f. 5-7.
 1913. *Scipio aulacodi* (Neum.), Cummings, *Bull. Ent. Res.* 3: 393.
 1916. *Scipio aulacodi* (Neum.), Ferris, *Annals Durban Museum* 3: 233; tf. 16, 17B.
 1916. *Neumannellus aulacodi* (Neum.), Fahrenholz, *Archiv f. Naturgeschichte*, Abt. A, 81, 11: 31.
 1919. *Scipio aulacodi* (Neum.), Bedford, *Rept. Div. Vet. Res., Dept. Agric. Un. S. Africa* 6-7: 715.

PREVIOUS RECORDS. Originally described from *Thryonomys* (= *Aulacodus*) *swinderianus*, Dahomey, Africa. Also recorded from the same host, Northeastern Rhodesia (Cummings); *Thryonomys* sp., Mfongosi, Zululand (Ferris); *Thryonomys aulacodus*, Rustenburg District, Transvaal (Bedford).

SPECIMENS EXAMINED. From *Thryonomys* sp., Mfongosi, Zululand.

FEMALE (Fig. 113). Length 2.25 mm. *Head* (Fig. 114G) relatively very large, more than twice as long as wide, acute anteriorly and with the lateral margins of the hind head almost parallel. Antennæ long and slender.

Thorax somewhat shorter than the head, with the posterior angles chitinized and slightly lobed. *Pleural plates* quite small, each with the dorsal

apical angle produced into a small tooth and each bearing a pair of slender setæ, those of the seventh and eighth pairs very long; spiracles small.

Abdomen with tergal and sternal plates undeveloped except for the ninth tergite and the genital plate on the eighth sternite. Dorsal setæ

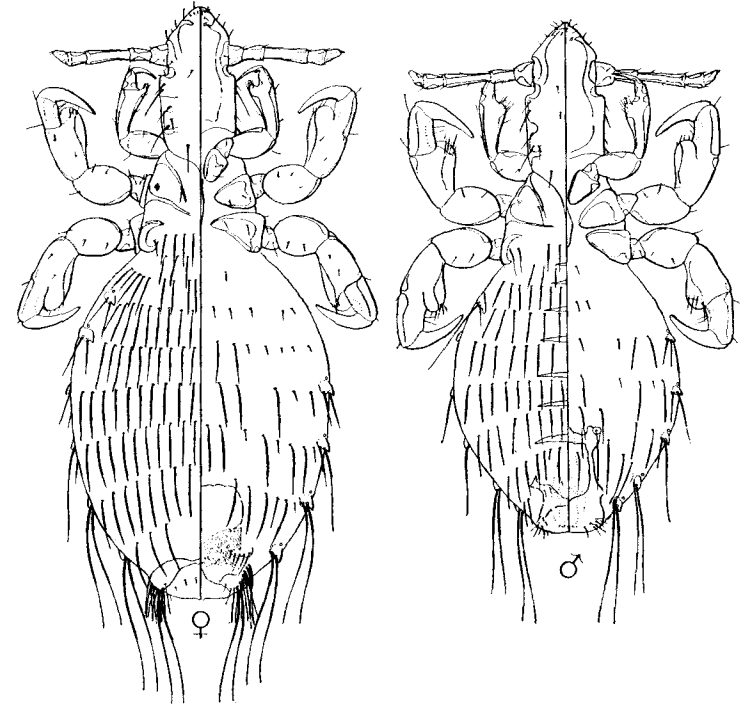


Fig. 113.—*Scipio aulacodi* (Neum.), male and female. From specimens from *Thryonomys* sp., Mfongosi, Zululand.

slender, the posterior margin of the thorax with six or eight, the first tergite with six, the second to seventh tergites with sixteen to twenty, the eighth with six. On the ventral side the setæ on the first four segments tend to be very small and few, and on the remaining segments small setæ are mingled with the larger. *Gonapods* (Fig. 114E) with several slender setæ and the lateral margins of the ninth segment with a fringe of long setæ. The wall of the vagina is chitinized and presents a tessellated appearance, the tessellations (Fig. 114B) more or less regularly polygonal, the interspaces narrow.

MALE (Fig. 113). Length 1.9 mm. In general form resembling the female but with small tergal plates on the abdominal segments. Dorsum of the abdomen with for the most part fourteen to twenty setae in a row; venter with the setae few, in part very small.

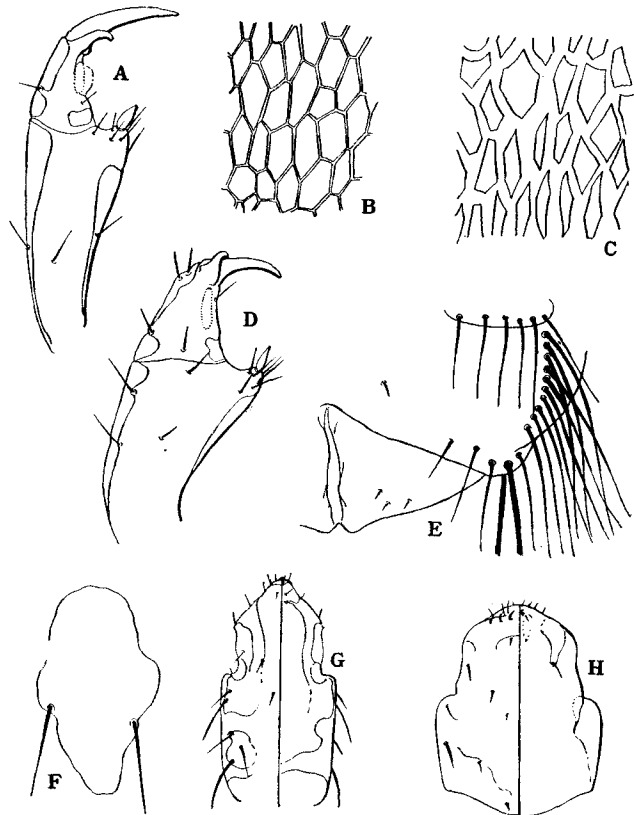


Fig. 114.—*Scipio aulacodi* (Neum.): *A*, anterior tibia and tarsus; *B*, tessellations on wall of vagina; *G*, head. *S. breviceps* Ferris: *C*, tessellations on wall of vagina; *D*, anterior tibia and tarsus; *E*, genital region of female; *F*, sternal plate; *H*, head.

Genitalia (Fig. 116*B*) with the basal plate (*bp*) broad, expanded posteriorly; parameres (*par*) rather short and stout, tapering to the apex, which is somewhat hooked and enclosing a ring-shaped, flattened piece which is perhaps the fused endomeres (*e*); pseudopenis (*pp*) very small.

NOTES.—From the only other species of this genus, *S. breviceps* Ferris, this differs most conspicuously in the form of the head, and in the much smaller pleural plates.

These two species occur together upon the same host species. They represent one of the few cases of the occurrence of species of the same genus upon the same host.

2. *Scipio breviceps* Ferris.

FIGS. 114*C-D*, 114*F*, 114*H*, 115, 116.

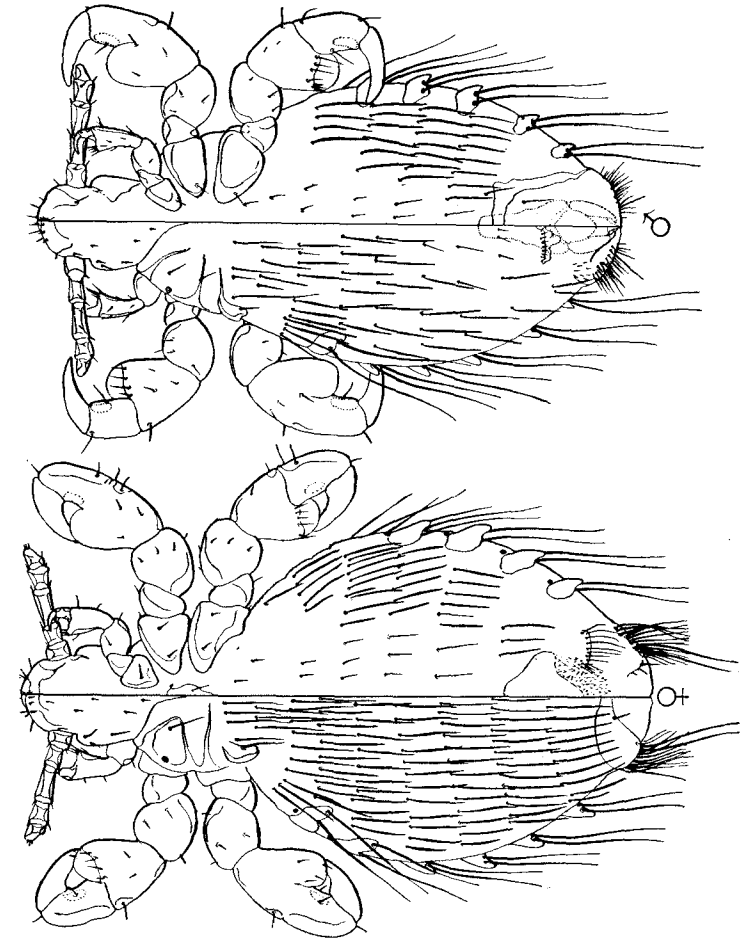


Fig. 115.—*Scipio breviceps* Ferris, male and female.

1916. *Scipio breviceps* Ferris, *Annals Durban Museum* 3: 234; tf. 17A, 18-22.
 1916. *Scipio breviceps* Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 178.
 1919. *Scipio breviceps* Ferris, Bedford, *Rept. Div. Vet. Res., Dept. Agric. Un. S. Africa* 6-7: 715.

PREVIOUS RECORDS. Originally described from *Thryonomys* sp., Mfongosi, Zululand. Also recorded by Bedford from *Thryonomys aulacodus*, Rustenburg District, Transvaal.

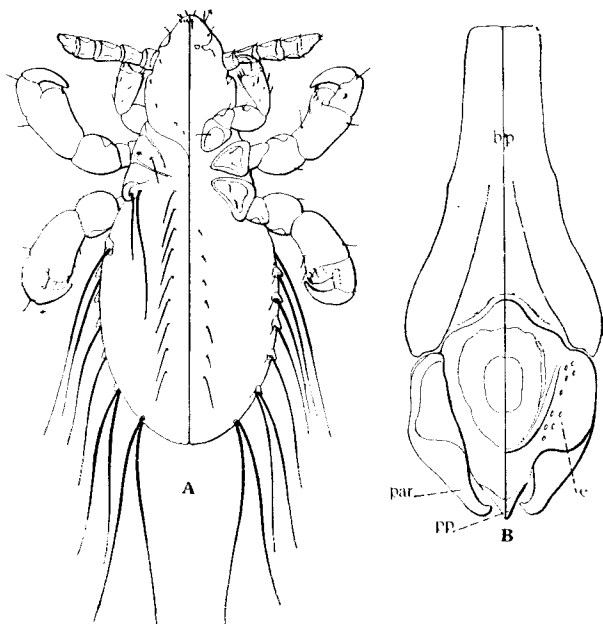


Fig. 116.—*Scipio breviceps* Ferris: A, first (?) stage; B, genitalia of male.

SPECIMENS EXAMINED. The types.

FEMALE (Fig. 115). Length 1.9 mm. *Head* (Fig. 114H) but little longer than broad. *Thorax* about as long as the head; sternal plate (Fig. 114F) irregular in form, bearing a pair of small setae. Pleural plates of the same type as in *S. aulacodi* but larger, each with a pair of slender setae; spiracles small.

Abdomen as in *S. aulacodi*, the tergites with for the most part sixteen to twenty-five quite long setae; sternites with the setae in the median region tending to be very small, those near the margins large. Ventral side of

the ninth segment as in *S. aulacodi*. Wall of the vagina tessellated, the tessellations irregular and with large interspaces (Fig. 114C).

MALE (Fig. 115). Length 1.7 mm. In general resembling the female but with fewer setae. Tergal plates not developed. Genitalia as in *S. aulacodi*.

IMMATURE STAGES. Representatives of a single immature stage (Fig. 116A) are available, this probably being the first. In this stage the claw-like process of the anterior tarsi is lacking. The pleural plates are much as in the adult but very small. The abdomen bears merely a median pair of setae on each segment, dorsally and ventrally.

Genus HYBOPHTHIRUS Enderlein.

1909. Enderlein, *Denks. d. Med.-Naturw. Gesell. zu Jena* 14: 79.
 1913. Cummings, *Bull. Ent. Res.* 4: 44.

Anoplura without eyes; with five-segmented antennae, which are not sexually dimorphic; legs with the tibia produced into a thumb-like process opposing the claw, the anterior pair small and weak, with a curved, claw-like process rising beside the slender claw, anterior and middle pairs large and stout, subequal, with stout claw; thorax with the apical angles produced into distinct lobes; abdomen with not more than one row of setae on each segment, dorsally and ventrally, in both sexes; pleural plates present on the second to eighth segments; ventral side of the ninth segment with a pair of lobe-like processes; head with distinct post-antennal angles.

HOSTS. Known only from the "Aard-Vark" or "Cape ant bear," of the genus *Orycteropus*, the only genus of the order *Tubulidentata*.

TYPE OF THE GENUS. *Hamatopinus notophallus* Neumann.

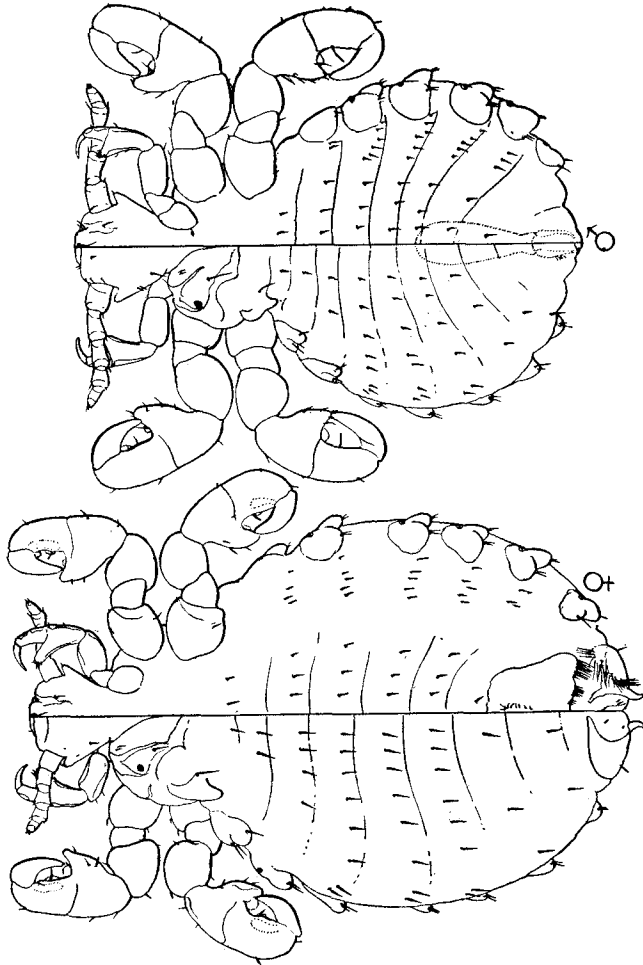
NOTES.—As I have pointed out under the discussion of the genus *Scipio*, I regard these two genera as very closely related. They differ most conspicuously in the matter of size, *H. notophallus* being one of the largest of the Anoplura and reaching a length of 4.5 mm., while neither of the species of *Scipio* attains a length of over 2.5 mm. This is hardly to be regarded as a generic difference, however. Structurally the two genera differ chiefly in the presence of but six pairs of pleural plates in the two species of *Scipio*, in which the plates are lacking on the second segment, while there are seven pairs in *Hybophthirus*. The strongly produced apical lobes of the thorax in *Hybophthirus* are to some extent distinctive, although there is a tendency toward this condition in *Scipio*. The pair of lobe-like processes on the ventral side of the ninth abdominal segment in *Hybophthirus* is perhaps of generic value.

In the original description of this genus Enderlein laid special emphasis upon the presence of the thoracic lobes and the two-segmented condition of the anterior tarsi, while he overlooked the presence on the anterior legs of the claw-like process. The matter of the two-segmented tarsus is not significant, for this condition is evident in a wide range of genera. Nor is the presence of the thoracic lobes significant, for the same condition appears in the genus *Hamatopinus*.

1. *Hybophthirus notophallus* (Neumann).

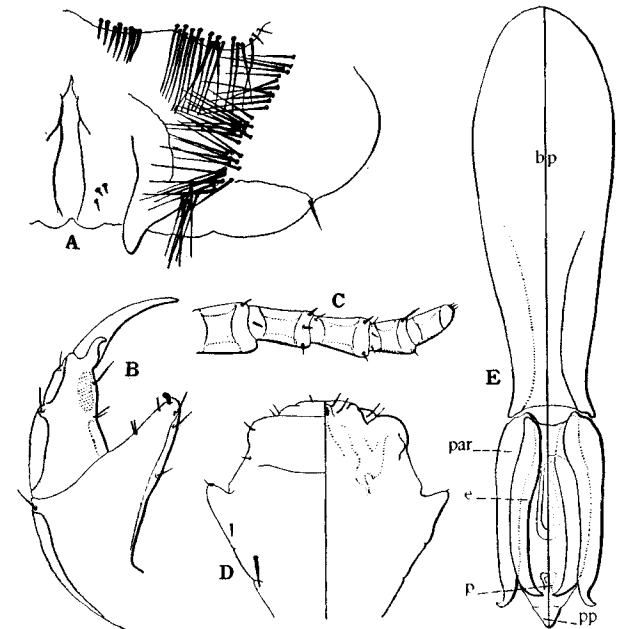
Figs. 117, 118.

1909. *Hematopinus notophallus* Neumann, *Jahrb. des Nassausischen Ver. für Naturkunde in Wiesbaden*, p. 2.
 1909. *Hybophthirus orycteropodi* Enderlein, *Denks. des Med.-Naturw. Gesell. zu Jena* 14: 79-80; pl. 8, f. 1-3.

Fig. 117.—*Hybophthirus notophallus* (Neum.), male and female.

1913. *Hybophthirus notophallus* (Neumann), Cummings, *Bull. Ent. Res.* 4: 44.
 1914. *Hybophthirus notophallus* (Neum.), Waterston, *Annals South African Museum* 10: 278.
 1916. *Hybophthirus notophallus* (Neum.), Ferris, "Cat. Anoplura," *Proc. Cal. Acad. Sci.* (4) 6: 157.
 1916. *Hybophthirus notophallus* (Neum.), Cummings, *Proc. Zool. Soc. London*, pp. 267-9; tf. 7-8.
 1919. *Hybophthirus notophallus* (Neum.), Bedford, *Rept. Div. Vet. Res., Dept. Agric. Un. S. Africa* 6-7: 715.

PREVIOUS RECORDS. Originally described from *Orycteropus afer*, "Gochas, Afrique occidentale allemande." Also recorded from the same species, "Klein-Namaland; Umgebung von Steinkopf" (Enderlein); and in the Zoological Garden at London (Cummings, 1916); from *O. capensis*, without locality (Waterston), and in the Zoological Garden at Pretoria, South Africa (Bedford).

Fig. 118.—*Hybophthirus notophallus* (Neum.): A, genital region of female; B, anterior tibia and tarsus; C, antenna; D, head; E, genitalia of male.

SPECIMENS EXAMINED. Several examples from *Orycteropus capensis*, Zoological Garden, Pretoria, South Africa, received through the kindness of Mr. Bedford.

FEMALE (Fig. 117). Length 4.5 mm. General form very stout. *Head* (Fig. 118D) relatively small, almost truncate in front, but little longer than wide, with the post-antennal angles very acute and with the lateral margins of the hind head almost straight and sharply convergent.

Thorax slightly longer than the head and more than twice as wide, with the lateral margins strongly arcuate, the posterior lateral angles bearing a strong, chitinized, lobe-like process; sternal plate not chitinized. Claw-like process of the anterior legs (Fig. 118B) small but distinct.

Abdomen almost circular. *Pleural plates* quite large, but not overlapping, all of much the same form, each with a rounded, projecting dorsal lobe and each bearing a pair of small setæ. Spiracles small. Seventh and eighth segments without long setæ at the lateral margins. Dorsal and ventral setæ few and small. Ninth segment beneath (Fig. 118A) with two clusters of numerous setæ and with a pair of flat, lobe-like processes; posterior margin of the genital plate with numerous small setæ.

MALE (Fig. 117). Length 3.5 mm. In general appearance closely resembling the female. *Genitalia* (Fig. 118E) with the basal plate (*bp*) quite long, not expanded posteriorly; parameres (*par*) long and nearly straight, enclosing the two endomeral pieces (*e*) and the penis (*p*); pseudo-penis (*pp*) very small.

IMMATURE STAGES. Cummings (1916) has described the first stage. This differs from the adult in the entire absence of pleural plates, and in lacking the post-antennal angles.

NOTES.—Cummings (1913) has pointed out that Neumann's description of this species has priority over that of Enderlein.

