

# Anoplura from Mozambique with descriptions of a new species and nymphal stages\*

BY

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In recent years, the Anoplura fauna of Africa has been subjected to extensive study by JOHNSON (1960; 1962a, b, and c; 1963), BENOIT (1959a, b; 1961a, b; 1962a, b, c; 1965), KUHN and LUDWIG (1965), EMERSON and KIM (1968) and KIM and EMERSON (1968).

The present project, on the Anoplura of Africa, is based for the most part on collections made by personel of the Division of Mammals, Department of Vertebrate Zoology, U. S. National Museum, Smithsonian Institution, namely Drs. H. W. SETZER (HWS), H. J. HERBERT (HJH), A. R. HARDY (ARH), C. G. COETZER (CGC), R. M. DAVIS (RMD), J. C. LINGERBACH (JCL), A. L. MOORE (ALM) and R. C. COLE (RCC).

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The identification of mammals from Mozambique were provided by Dr. H. W. SETZER. Zoological nomenclature of the host animals follows that of ANDERSON and JONES (1967) and ANSELL (1960), except as modified by Dr. H. W. SETZER. Morphological terminologies of the Anoplura are those previously published by KIM (1965; 1966a, b). A complete citation of references and synonymies is given for each species, unless the species were treated in the previous paper (KIM and EMERSON, 1968).

This paper deals with the Anoplura of Mozambique, including 3 families, 9 genera and 32 species: 10 species of *Hoplopleura*, 11 species of *Polyplax*, 2 species of *Scipio*, 5 species of *Linognathus*, and 1 species for each of *Haemodipsus*, *Lemurphthirus*, *Neohaematopinus*, *Prolinognathus*, and *Haematopinus*. One new species *Polyplax acomydis* n. sp. and nymphal stages of 7 species of Hoplopleuridae are described and illustrated, and adult stages of 3 *Hoplopleura* species are also redescribed and illustrated.

## FAMILY HAEMATOPINIDAE

### Genus HAEMATOPINUS LEACH

#### 1. *Haematopinus phacochoeri* ENDERLEIN

*Haematopinus phacochoeri* ENDERLEIN, 1908: 7, fig. 3; FERRIS, 1933: 444, fig. 260, 261; FAHRENHOLZ, 1939: 149, fig. 9a, 9b; FERRIS, 1951: 91; BENOIT, 1959a: 116; BENOIT, 1961a: 232; BENOIT, 1964: 153.

*Haematopinus peristictus* KELLOGG and PAINE (*partim*), 1911: 145, pl. 4, fig. 3-6.

*Haematopinus phacochoeri peristictus* KELLOGG and PAINE, FAHRENHOLZ, 1939: 150.

This species has previously been taken from *Phacochoerus aeliani massaicus*, *P. aethiopicus*, and *P. sundevali* in Africa.

*Specimens examined.* - MOZAMBIQUE: Ex *Phacochoerus aethiopicus*, Mambone, 20°59'S and 35°01' E, 15 November 1964, 2 females.

FAMILY HOPLOPLEURIDAE

Subfamily HOPLOPLEURINAE

Genus HOPLOPLEURA ENDERLEIN

2. *Hoplopleura enormis* KELLOGG and FERRIS. (Figs. 1-6).

*Hoplopleura enormis* KELLOGG and FERRIS, 1915: 155, pl. 16, fig. 44e;  
KELLOGG and FERRIS, 1916: 247; JOHNSON, 1960: 33-34.

*Hoplopleura enormis enormis* (*partim*), FERRIS, 1921: 94, fig. 57,  
58 B-C, 59 B (not records from *Lemniscomys barbarus*); BEDFORD,  
1929: 505; HOPKINS, 1949: 480 (the record from *Lemniscomys gri-  
selda* only).

*Hoplopleura enormis* (*partim*), FERRIS, 1951: 135 (not the records  
from *L. barbarus*); JOHNSON, 1957: 26.

This species was originally described from 2 male and several female specimens collected off *Lemniscomys griselda spinalis* (as *Arvicanthis dorsalis*), Zululand, South Africa. JOHNSON (1957) discussed the status of *Hoplopleura spiculifer* (GERVAIS) with regard to *H. enormis*. Male genitalia of this species has not been described and illustrated. A full description and illustration of *H. enormis* is presented here to be comparable with *H. spiculifer* and other related species.

*Description.* - Nymphal stages are not known. FEMALE. Total body length about 1.41 mm. *Head* (Fig. 1): Postantennal angle slightly produced; AS, 2 pairs of SHS, ACHS, PCHS and VPHS distinct; PDHS long, placed between PMHS and ADHS; 3 distinct MHS present on each side; antennae 5-segmented. *Thorax* wider than head; DPTS small; DPtS and DMtS small; 1 minute accessory seta placed lateral of mesothoracic spiracle; sternal plate (Fig. 4) oval, with short anterior and posterior processes. *Legs* as in other members of the genus. *Abdomen* elongated, with about 17 tergites and 16 sternites and genital plates, about 7 setae present off sternites on each side; tergal plates for the most part with 4 quite stout setae; sternites with 5-8 setae; segment 2 with its sternite extending laterally and articulating with corresponding paratergites, with 2 groups of 2 setae; first sternite of segment 3 extended laterally and articulating with corresponding paratergites, with 2 groups of 2 enlarged setae; paratergites (Fig. 3) with its lateral lobes divided into 3-4 lobules; paratergites of segments 3-6 each with a pair of

minute setae placed on the corner of median emargination; paratergites of segments 7 and 8 each with a pair of long setae; paratergites of segments 3-5 each with 4 elongated lobules and dorsal lobules of paratergites 3 and 4 more than two times longer than other lobules, dorsal lobule of paratergite 3 being the largest; dorsal lobule of paratergite 5 much longer than other lobules; paratergite of segment 6 with 3 lobules; paratergite of segment 7 with only dorsal lobe; paratergite of segment 8 with no lateral lobe. *Genitalia* (Fig. 2): Genital plate large, emarginate laterally, with 5 setae on each side; valvula broad and serrated; gonopods pointed posteriorly, with 3 setae; genital lobe with numerous setae and genital setae spiniform; spermatheca not distinct.

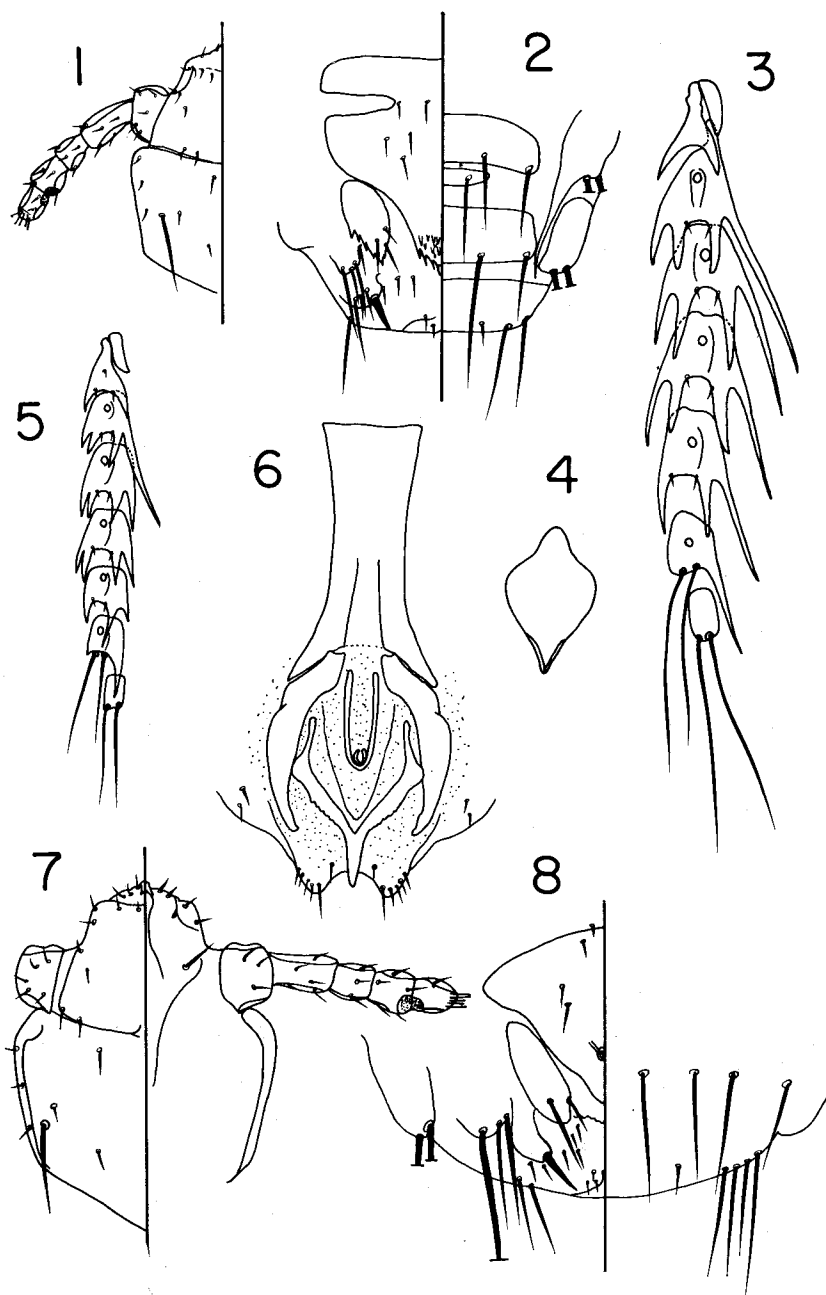
**MALE.** Total body length about 1.03 mm. Head, thorax, legs and abdomen as in female except for usual sexual dimorphism, unless mentioned otherwise. *Abdomen* with 8 tergal and 12 sternal plates; about 4 setae present off sternal plates on each side; tergites with 2-6 setae; paratergites of segments 3-5 each with 4 lobules, each dorsal lobule slightly longer than ventral one; dorsal lobule of abdominal paratergite 3 more than twice as long as other lobules. *Genitalia* (Fig. 6). Basal apodeme relatively short; parameres gradually tapered posteriorly, curved and laterally notched at anterior one-third, and pointed inward; pseudopenis Y-shaped, with its arm laterally produced at anterior one-third; anal area bilobed, each lobe with 5-6 short setae.

*Specimens examined.* - MOZAMBIQUE: Ex *Lemniscomys griselda*, Mague (New) Boroma, Tete District, 21 August 1964, 2 male and 3 female (HJH-318, 319); 16 mi W of Shingweldzi on main road to Punela, Maria, 10 Sept. 1953, 1 male and 1 female (KND 240-249).

### 3. *Hoplopleura intermedia* KELLOGG and FERRIS

This species is one of the most common sucking lice on rodents in Africa, and was treated extensively by JOHNSON (1960) and KIM and EMERSON (1968); adult stages (JOHNSON, 1960) and nymphal stages (KIM and EMERSON, 1968).

*Specimens examined.* - MOZAMBIQUE: Ex *Mastomys natalensis*, Tete District: Vila Vasco da Gama, 13 Sept. 1964, 1 collection (HJH-591); New Bene (Tambue), 17-18 Sept. 1964, 2 collections (HJH-634, 641); 93 km S. Vila Coutinho, 10 October 1964, 1 collection (HJH-810); Vila Caldas Xavier, 16 October 1964, 1 collection (HJH-873); Mecito, 19-20 Oct. 1964, 2 collections (HJH 893, 906); Mague (New) Boroma,



Figs. 1-6. — *Hoplopleura enormis* KELLOGG and FERRIS. - 1. Dorsal view of female head; - 2. Female genitalia and dorsal view of abdominal apex; - 3. Female paratergites; - 4. Female thoracic sternal plate; - 5. Male paratergites; - 6. Male genitalia.

Figs. 7-8. — *Hoplopleura neumanni* FAHRENHOLZ, female. - 7. Head; - 8. Genitalia and dorsal view of abdominal apex.

20 Aug. 1964, 1 collection (HJH-295); Zumbo, 25-30 Aug. 1964, 8 collections (HJH and CGC); 2 km N Vila Gamito, 10 Aug. 1964, 1 collection (HWS-4350); Chiuta, 21 Sept. 1964, 1 collection (HJH-668); Muchena, 25-27 July 1964, 67 collections (CGC, ALM, HJH, JCL, HWS, RMD), 7 Aug. 1964, 1 collection (RMD-185), July 25-Aug. 7 1964, 15 collections, 31 females and 19 males (RMD); Bragança, 2 Oct. 1964, 1 collection (HJH-740); Luangua River, 7 Aug. 1964, 2 collections (CGC-286, 290); 30 mi NW Furancungo, 6-7 Aug. 1964, 9 collections (HJH, JCL, HWS); 14 mi SE Chioco, 16-18 Aug. 1964, 1 collection (HJH-963); Inhambane District: 4 km N Panda, 13-20 April 1964, 5 collections (REC); 3 km NE Inharrime, 29 April 1964, 4 collections (REC); 5 km SE Cozuno, 26 April 1964, 3 collections (REC); Manica and Sofala District: Vila Pery, 3-8 Sept. 1964, 14 collections (ARH, RMD); Vila Gouveia, 21-23 Aug. 1964, 5 collections (JCL, RMD); 3 km SE Vila Machado, 10-14 Sept. 1964, 16 collections (ARH, RMD); 10 km N Beira, 29 Oct. 1964, 3 collections (RMD, ARH); 20 km N Vila Paiva de Andrada, 19-23 Sept. 1964, 19 collections (ARH); 4 km NE Vila Paiva de Andrada, 19-28 Sept. 1964, 4 collections (ARH); 3 km N Vila de Monica, 28 Aug. 1964, 1 collection (RMD-334); Lourenço Marques District: Mahau River, 26°40'S and 32°10'E, 24 Jan. 1964, 1 collection (REC-620); 1 mi NE Boane, 11-13 July 1964, 55 collections (CGC, JCL, RMD, HWS, HJH); Boane, 12 July 1964, 74 females, 58 males, 4 nymphs (HJH-65); 10 km N Boane, 13 July 1964, 4 collections (HWS, RMD); Inhaca Island, 17-19 Jan. 1964, 4 collections (REC, ALM); Moamba, 10 March 1964, 59 females, 25 males (REC-921); Massangena, 1 Feb. 1964, 33 females and 1 male (REC-636); Beira District: Vila Pery, 3-7 Sept. 1964, 19 females and 7 males, 5 collections (RMD); Vila Machada, 10-14 Sept. 1964, 14 females and 1 male, 5 collections (RMD); Vila Manica, 28 Aug. 1964, 29 females and 22 males, 2 collections (RMD-330, 334); Vila Gouveia, 22 Aug. 1964, 2 females, 1 collection (RMD-285); Vila Paiva de Andrada, 21 Sept. 1964, 4 females and 4 males (ARH-623), 24-27 Oct. 1964, 3 females (RMD-667), 25 Sept. 1964, 1 female (RMD-600); ex *Mus triton*, Tete District: Braganca, 3 Oct. 1964, 1 female (HJH-745); ex *Myomys* sp., Maputo Prov: Boane, 12 Jan. 1964, 8 females and 2 males (REC-535); Massangena, 7 Feb. 1964, 3 females and 1 male (REC-697); ex *Aethomys chrysophilus*, Tete District: 2 mi SE Tete, 22 July 1964, 1 collection (JCL-225); Massangena, 5 Feb. 1964, 2 males and 1 female (REC-669); ex *Steatomys* sp., Tete District: Massangena, 6 Feb. 1964, 2 males (REC-679); ex *Dendromus* sp., Brananga, 2 Oct. 1964, 1 male (HJH-740).

4. *Hoplopleura neumanni* FAHRENHOLZ - (Figs. 7-8).

*Hoplopleura neumanni* FAHRENHOLZ, 1919: 26; FERRIS, 1921: 101, fig. 63; HOPKINS, 1949: 477; FERRIS, 1951: 138; JOHNSON, 1960: 35, fig. 45, 48.

*Haematopinus praecitus* NEUMANN (*partim*), 1902: 600 (*lapsus calami praecisus*).

*Haematopinus praecisus* (*partim*), NEUMANN, 1903: 144 (emendation).

*Haematopinus* (*Polyplax*) *praecisus* (*partim*), NEUMANN, 1909: 523, fig. 23; FERRIS, 1916: 178.

This species was originally described from two females taken off « gros rats » (possibly *Tatera*) in Abyssinia (Ethiopia). The female was illustrated by FERRIS (1921) and the male by JOHNSON (1960). However, the head and the female genitalia have not been adequately described and illustrated. For this reason the description and illustration of the female head and genitalia is herewith presented. *H. neumanni* has been collected from *Tatera nigricauda nyama* in Kenya (FERRIS, 1921) and *Tatera robusta swaithlingi* in Tanganyika (JOHNSON, 1960). Nymphal stages are not known.

*Description.* - FEMALE: Total body length about 1.66 mm. *Head* (Fig. 7) anteriorly narrow, with postantennal angle developed; OS, CS, AS, ACHS, and PCHS distinct; 2 SHS placed close to antennae on each side; 2 MHS present; PDHS long, with 1 distinct ADHS; VPHS distinct; antennae 5-segmented, with 2 sensoria on terminal and penultimate segments connected. *Genitalia* (Fig. 8): Genital plate obtriangular, with 4 setae more or less arranged diagonally; valvulae not produced; gonopods elongated, with 2 long setae; genital lobe produced, with 1 genital seta strongly spiniform; anal area rounded posteriorly, with 3-10 minute setae.

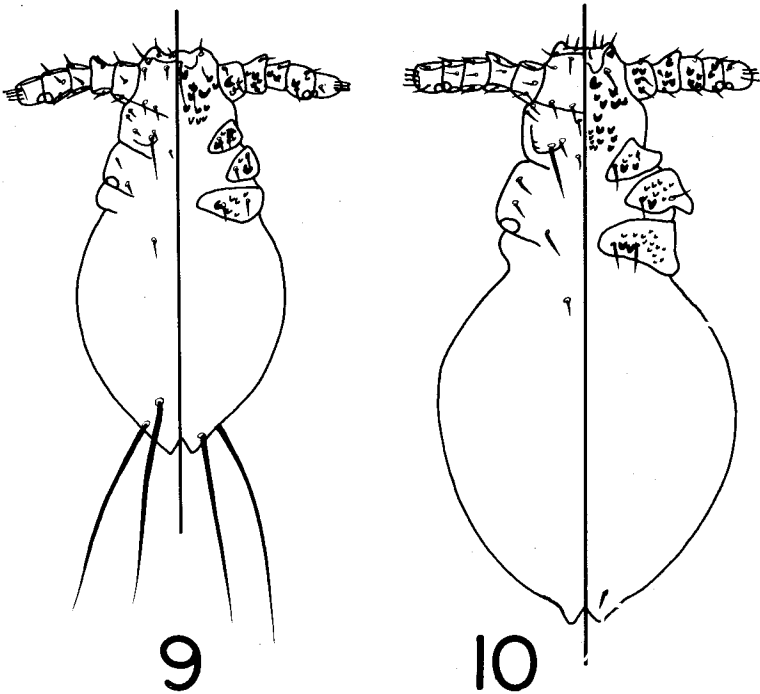
*Specimens examined.* - MOZAMBIQUE: Ex *Tatera leucogaster*, Moamba, Lourenço, Marques District, 10 March 1964, 1 female (REC-940).

5. *Hoplopleura patersoni* JOHNSON - (Figs. 9-10).

*Hoplopleura patersoni* JOHNSON, 1960: 31, fig. 40-44; BENOIT, 1964: 156; EMERSON and KIM, 1968: 510.

This species has been known from *Aethomys chrysophilus* and *Aethomys walambae*. No nymphal stages are previously known. Three nymphal stages are herewith described and illustrated.

*Description.* - NYMPH I (Fig. 9). Total body length 0.49 mm. *Head* longer than thorax, with its ventral surface and antennae covered with variously sized tubercles; postantennal and posterolateral angles slight; OS, CS, AS, and PCHS distinct; ACHS and ADPHS missing; 2 pairs of SHS distinct; 3 MHS present, but PMHS close to PDPHS; PDPHS long, with 1 distinct ADHS; VPHS distinct; antennae 5-segmented. *Thorax* wider than head; DPtS and DPtS mi-



Figs. 9-10. — *Hoplopleura patersoni* JOHNSON. - 9. Nymph 1; - 10. Nymph 2.

nute; DMtS missing; no sternal plate developed; coxal plates with numerous tubercles. *Legs*: Fore legs smallest of three pairs, with distinct tarsus and acuminate claws; middle and hind legs similar in shape, with tibiotarsus enlarged. *Abdomen* with its cuticle covered with microtrichia; no evidence of segmentation; no paratergite developed; anal segment notched; only 1 DCAS minute; 1 pair of MAS on each side.

NYMPH 2 (Fig. 10). Total body length 0.69 mm. Head, thorax, legs and abdomen as in nymph 1, unless mentioned otherwise. *Head*



with ACHS; ventral tubercles larger and more numerous. *Thorax* with DMtS. Abdomen enlarged, with no MAS; 1 AcS present adjacent to anal lobe.

NYPH 3. Total body length 0.89 mm. Same as in nymph 2.

*Specimens examined.* - MOZAMBIQUE: Ex *Aethomys namaquensis*, Tete District: Mague (New) Boroma, 21 Aug. 1964, 1 collection (HJH-315); Fingoe, 10 Sept. 1964, 1 collection (HJH-569); Chiuta, 21 Sept. 1964, 1 female and 1 nymph (HJH-659); ex *Aethomys chrysophilus*, Tete District: Zumbo, 25 Aug. 1964, 1 collection (HJH-385); Fingoe, 10 Sept. 1964, 1 collection (HJH-572); 2 mi SE Tete, 21 July 1964, 1 collection (HJH-85); Vila Coutinho, 6 Oct. 1964, 2 collections (HJH-762, 764); Fingoe, no other data, 13 females, 9 males and 2 nymphs; Changara, 3 Nov. 1964, 2 females (HJH-1009).

#### 6. *Hoplopleura pelomydis* FERRIS

A complete synonymy and description of adult and nymphal stages has been made by KIM and EMERSON (1968).

*Specimens examined.* - MOZAMBIQUE: Ex *Lemniscomys griselda*, Coguno, Inhambane District, 25 April 1964, 1 male (REC-1401).

#### 7. *Hoplopleura rukenyae* FERRIS

A complete description and illustration of adult stage is found in FERRIS (1921) and JOHNSON (1963), and nymphal stages are described by KIM and EMERSON (1968).

*Specimens examined.* - MOZAMBIQUE: Ex *Mus triton*, Tete District: Braganca, 1 Oct. 1964, 2 collections (HJH-732, 724); Zambue, 2 Sept. 1964, 4 collections (HJH-477, 478; CGC-442, 443); Braganca, 3 Oct. 1964, 21 collections (HJH); 93 km S. Vila Coutinho, 7 Oct. 1964, 17 females, 6 males and 1 nymph, 1 collection (HJH-767); 10 km E Furancungo, 5 collections (HWS); 20 km E Furancungo, 1 collection (HWS-4250); 30 mi NW Furancungo, 7 collections (HJH-194, 199; JCL-357; HWS-4291 to 4294); Furancungo, 2-3 Aug. 1964, 4 females and 1 male (CGC-248); Zambue, 3 collections (HJH-476 to 478); Furgoe, 1 collection (HJH-582); Vila Vasco da Gama, 16 collections (HJH-584 to 603, 612 to 615, 624, 625), 13 Sept. 1964, 1 male and 2 nymphs (HJH-600); Luangua River, 7 Aug. 1964, 1 male (CGC-284).

8. *Hoplopleura setzeri* JOHNSON

*Hoplopleura setzeri* JOHNSON, 1960: 15-17, fig. 9, 10, 12, 14, 15, 17; BENOIT, 1961a: 236; KIM and EMERSON, 1968: 25, fig. 14 (nymph 2).

*Specimens examined.* - MOZAMBIQUE: Ex *Grammomys dolichurus*, Tete District: Furancungo, 3 Aug. 1964, 1 collection (JCL-330); 93 km S Vila Coutino, 12 Oct. 1964, 1 collection (HJH-832).

9. *Hoplopleura somereni* WATERSTON

*Hoplopleura somereni* WATERSTON, 1923: 99-101, fig. 1b-d, 2c-d; HOPKINS, 1949: 479; FERRIS, 1951: 143; JOHNSON, 1960: 29; KUHN and LUDWIG, 1965: 238; KIM and EMERSON, 1968: 25-26, fig. 32-36.

The adult stage of this species was redescribed by KIM and EMERSON (1968), but no nymphal stage is yet known.

*Specimens examined.* - MOZAMBIQUE: Ex *Dasymys incomtus*, Vila Vasco da Gama, Tete District, 14 Sept. 1964, 1 collection (HJH-607).

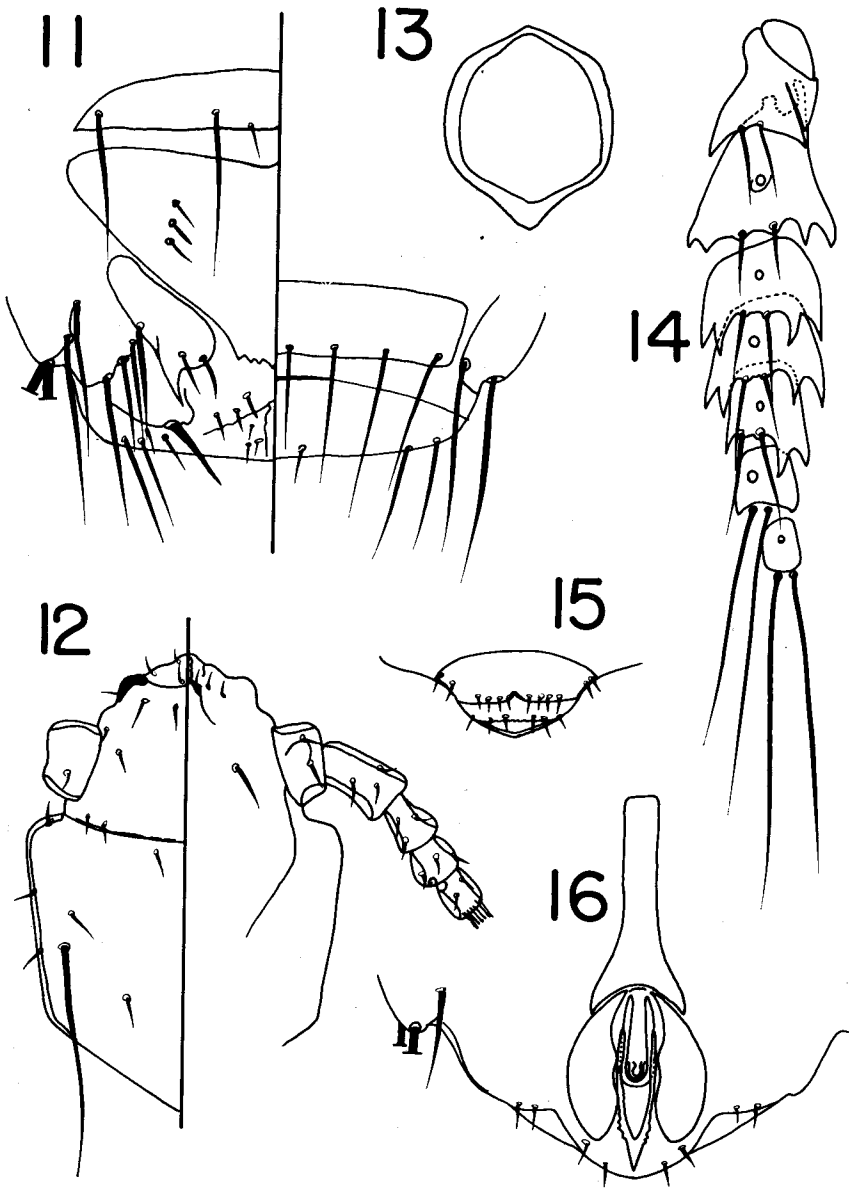
10. *Hoplopleura veprecula* FERRIS - (Figs. 11-16).

*Hoplopleura veprecula* FERRIS, 1921: 105, fig. 64B, 66A, C, F; FERRIS, 1951: 144; PATERSON, 1954: 225; COOREMAN, 1955: 188; BENOIT, 1959: 264; JOHNSON, 1960: 38; BENOIT, 1964: 157, fig. 5, 6.

*Hoplopleura (Ctenopleura) veprecula*, HOPKINS, 1949: 478.

*H. veprecula* FERRIS was described from three female specimens taken off *Tatera böhmi varia* in Kenya, and off *Tatera valida* (BENOIT, 1964). FERRIS' description and illustration was less than adequate, and BENOIT (1964) illustrated the thoracic sternal plate and genitalia of the male without accompanying description. The adult stages are herewith redescribed. Nymphal stages are not known.

*Description.* - MALE. Total body length 1.11 mm. *Head* (Fig. 12) about 0.22 mm long, with its anterior margin bluntly pointed; post-antennal angle distinct; antennae 5-segmented, with its pedicel longer than other segments; AS, OS, CS, ACHS, PCHS, and VPHS distinct; 2 SHS placed close to lateral margin on each side; DPHS long, with 1 anterior ADHS. *Thorax* with small mesothoracic spiracle; sternal plate (Fig. 13) subhexagonal; DPTS minute; ADTS, DPtS and DMtS minute. *Legs* as in other member of the genus. *Abdomen* with 7 tergites and about 13 sternites; each segment with a tergite; segments 2 and 7 each with a sternite; segments 3-5 each with 3 sternites; segment 6 with 2 sternites; sternite of segment 2



Figs. 11-16. — *Hoptopleura veprecula* FERRIS. - 11. Female genitalia and dorsal view of abdominal apex; - 12. Dorsal and ventral view of male head; - 13. Male thoracic sternite; - 14. Male paratergites; - 15. Dorsal view of abdominal apex, male; - 16. Male genitalia.

and first sternal plate of segment 3 extended laterally and articulate with corresponding paratergites; first sternal plate of segment 3 with 2 sets of spiniform setae and 5 middle setae; tergites each with 1-23 setae; paratergites (Fig. 14) short and wide, each with 2 long setae; paratergites of segments 3-5 each with 4 relatively short lobules; paratergite of segment 6 with 3 lobules; paratergite of segments 7 and 8 without lateral lobes; paratergal setae of segments 2 and 3 shorter than paratergites; paratergal setae of other segments much longer than paratergites; anal lobe produced, with numerous short setae. *Genitalia* (Fig. 16) with long basal apodeme; parameres strongly enlarged, and blunt at apex; pseudopenis with its posterior process short.

**FEMALE.** Total body length 1.53 mm. Head, thorax, legs, and abdomen as in the male, unless mentioned otherwise. *Head* length 0.24 mm. *Abdomen* with 15 tergites and 15 sternites; segments 2 and 3 each with 1 tergite; segments 5-7 each with 3 tergites and 3 sternites; segment 4 with 4 tergites and 3 sternites; each tergite with 8-10 setae; each sternite with 12-23 setae. *Genitalia* (Fig. 11): Genital plate obtriangular with 3 setae arranged in longitudinal line on each side; valvula not produced; gonopod paired, each with posterior process and 3 setae; genital lobe distinct, with genital seta spiniform; anal area with numerous minute setae; spermatheca indistinct.

*Specimens examined.* - MOZAMBIQUE: Ex *Dasymys incomptus*, Zambeue, Tete District, 1 Sept. 1964, 2 males and 4 females (CGC-440).

#### Subfamily HYBOPHTHIRINAE

#### Genus **SCIPIO** CUMMINGS

#### 11. **Scipio aulacodi** (NEUMANN)

This species has previously been recorded from *Thryonomys swinderianus*, *T. gregorianus*, and *Choeromys harrisoni* in Kenya, Angola, Northern Rhodesia, Mauritania, Mali, and Congo. BENOIT (1962b, 1964) also recorded this species from *Thryonomys swinderianus* and *Choeromys harrisoni* in the Congo. A full synonymy for this species has been presented by KIM and EMERSON (1968).

*Specimens examined.* - MOZAMBIQUE: Ex *Thryonomys swinderianus*, Muchena, Tete District, 28 July 1964, 1 collection (HWS-4197); 10 km SE Vila Machado, Manica and Sofala District, 14 Sept. 1964, 1 collection (RMD-497).

12. **Scipio breviceps** FERRIS

This species has previously been recorded from *Thryonomys swinderianus* and *Choeromys harrisoni rutschuricus* in South Africa and Congo. BENOIT (1964) also reported this species from *T. swinderianus* in Congo. A full literature citation is given in KIM and EMERSON (1968).

*Specimens examined.* - MOZAMBIQUE: Ex *Thryonomys swinderianus*, Muchena, Tete District, 28 July 1964, 1 collection (HWS-4197).

Subfamily POLYPLACINAE

Genus **HAEMODIPSUS** ENDERLEIN

13. **Haemodipsus ventricosus** (DENNY)

*Haemodipsus ventricosus* DENNY, 1842: 30, pl. 25, fig. 6; GIEBEL, 1874: 47; PIAGET, 1880: 642.

*Haematopinus (Polyplax) ventricosus*, NEUMANN, 1909: 527-528; fig. 27.

*Haematopinus ventricosus (partim)*, OSBORN, 1896: 182.

*Polyplax ventricosus*, EVANS, 1913: 94.

*Haemodipsus ventricosus*, ENDERLEIN, 1904: 143; DALLA TORRE 1908: 15; MJÖBERG, 1910: 165; JOHNSTON and HARRISON, 1913: 107; EWING, 1924: 550; EWING, 1929: 140; FERRIS, 1932: 332-335, fig. 204, 205; FERRIS, 1951: 179, fig. 81, 82; FERRIS, 1954: 93.

*Haemodipsus ventricosus (partim)*, KELLOGG and FERRIS, 1915: 28; FERRIS, 1916: 152.

*Specimens examined.* - MOZAMBIQUE: Ex *Lepus capensis*, 5 km N Mungari, Manica and Sofala Dist., 19 Aug. 1964, 1 collection (JCL-412); Zambue, Tete District, 2 Sept. 1964, 1 collection (HJH-484).

Genus **LEMURPHTHIRUS** BEDFORD

14. **Lemurphthirus stigosus** FERRIS

*Lemurphthirus stigosus* FERRIS, 1954: 92, fig. 1a-f; JOHNSON, 1962: 53-55, fig. 9.

This species was originally described from the female and nymph taken off *Galago (Otolemur) crassicaudatus* in Natal, and description of the male was made by JOHNSON (1962).

*Specimens examined.* - MOZAMBIQUE: Ex *Galago crassicaudatus*, 93 km S Vila Coutinho, Tete District, 10 Oct. 1964, 1 collection (HJH-812); ex *Galago senegalensis*, Massangena, 4 Feb. 1964, 1 female (REC-659).

Genus **NEOHAEMATOPINUS** MJÖBERG

15. **Neohaematopinus suahelicus** FERRIS

*Neohaematopinus suahelicus* FERRIS, 1923: 258, fig. 165B, F, G; HOPKINS, 1949: 458, 459; FERRIS, 1951: 196; JOHNSON, 1960: 46.

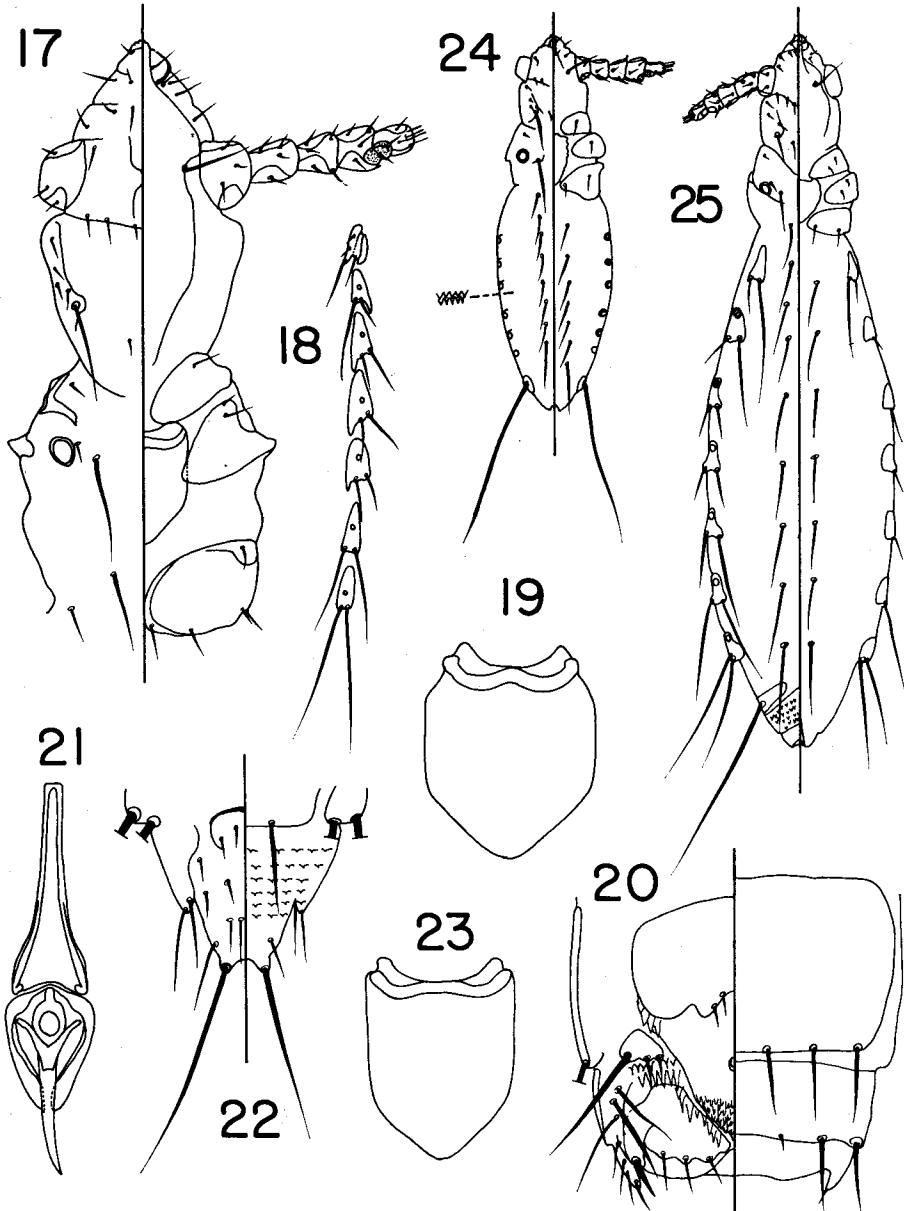
This species has been known from *Paraxerus palliatus suahelicus*, *P. p. ornatus*, *P. ochraceus*, and *Parasciurus animosus* in Kenya (FERRIS, 1923, 1951), and *Paraxerus cepapi aruscensis* in Kenya (JOHNSON, 1960).

*Specimens examined.* - MOZAMBIQUE: Ex *Paraxerus cepapi*, Moamba, 11 March 1964, 11 males and 14 females (REC-950).

Genus **POLYPLAX** ENDERLEIN

16. **Polyplax acomydis** new species - (Figs. 17-25).

*Type-Data.* - Ex *Acomys spinosissimus* PETERS, 1852, MOZAMBIQUE: Holotype female, Vila Gouveia, Beira District, 23 Aug. 1964, J. C. LINGERBACH (JCL-428) and allotype male, Vila Paiva de Andrada, Beira District, 19 Sept. 1964, R. M. DAVIS (RMD-536). Paratypes: 16 males, 27 females, and 14 nymphs; MOZAMBIQUE: Beira District; Vila Paiva de Andrada, 19-25 Sept. 1964, 4 males and 11 females (RMD-582, 584, 571, 532, 592, 547); Vila Gouveia, 24 Aug. 1964, 1 female, 1 nymph 1 and 1 nymph 3 (JCL-439-441); Vila de Manica, 1 Sept. 1964, 4 females, 1 male, and 1 nymph 3 (RMD-367, 368, 369); Tete District; Tete, 22 July 1964, 1 male and 1 female (HWS-4093); Tete, 23 July 1964, 1 male, 2 females and 1 nymph 3 (CGC-68); Macanha River, 5 Sept. 1964, 5 males and 3 females (CGC-461, 465, 468); Macanha River, 7 Sept. 1964, 5 males, 3 females, 3 nymph 1 and 1 nymph 3 (HJH-534, 500, 539); Chiuta, 22 Sept. 1964, 4 females (CGC-533); Sumbo, 27 Aug. 1964, 1 female (CGC-347); Mague, 20 Aug. 1964, 1 female (CGC-347); Massangene, 5 Feb. 1964, 1 male and 2 females (REC-660); 1 Feb. 1964, 2 females (REC-638); Muchena, 28 July 1964, 1 nymph 2 (HJH-158). All type specimens are deposited in the collection of the U.S. National Museum, except 1 male and 1 female paratypes in the University of Minnesota Entomology Collection, St. Paul, Minnesota, and 4



Figs. 17-25. — *Polyplax acomydis* n. sp. - 17-20. Female; - 21-23. Male. - 17. Dorsal and ventral views of head and thorax; - 18. Paratergites; - 19. Thoracic sternal plate; - 20. Female genitalia; - 21. Male genitalia; - 22. Dorsal and ventral views of abdominal apex; - 23. Male thoracic sternal plate; - 24. Nymph 1; - 25. Nymph 2.

males and females in the collection of the Frost Entomological Museum, The Pennsylvania State University, University Park, Pennsylvania.

*Diagnosis.* - *P. acomydis* n. sp. is closely related to *P. dolichura* JOHNSON, *P. meridionalis* JOHNSON, *P. brachyrrhyncha* CUMMINGS, *P. hoogstraali* JOHNSON, and *P. oxyrrhyncha* CUMMINGS, all of which are taken from *Acomys* in Africa, but separable from *P. dolichura*, *P. brachyrrhyncha* and *P. hoogstraali* by having thoracic sternal plate well developed and shield-shaped with its anterior margin concave, and head elongate and anteriorly pointed. This species is further separable from *P. meridionalis* and *P. oxyrrhynchus* by having thoracic sternal plate with anterior sclerite barlike and other difference in genitalic details.

*Description.* - FEMALE. Total body length about 1.94 mm. *Head* (Fig. 17) elongate and pointed anteriorly in front of antennae; postantennal angle distinct; posterolateral angle not developed; AS, CS, OS, 2 SHS, ACHS, PCHS and 3 MHS distinct; DPHS long, with 1 ADHS minute and placed anterolateral to DPHD; VPHS long, reaching the base of second antennal segment; antennae 5-segmented. *Thorax* (Fig. 17) slightly wider than head; sternal plate (Fig. 19) shield-shaped, more or less pentagonal, with its anterior margin concave and a barlike sclerite anteriorly; coxal plates without distinct tubercles; DPtS and DMtS small; DMtS placed anterolateral of DPtS; DPtS long. *Legs*: fore legs smallest of three pairs, with acuminate claws; middle legs larger than fore legs, with stout claws; hind legs enlarged, with large tibiotarsus and blunt claw. *Abdomen* with 12 tergal, 12 sternal, and 7 paratergal plates; segments 2 and 3 each with 1 tergite, segments 4-7 each with 2 tergites; segments 1 and 2 each with 1 sternite; segments 3-7 each with 2 sternites; each tergite usually with 6-8 setae; 4 DLAS and 6 VLAS present; paratergites of segment 2 divided, with 2 apical setae, ventral seta being longer than dorsal one and paratergite; paratergites of segment 3 with only dorsal paratergal lobe and 2 apical setae, ventral seta being twice as long as dorsal one; paratergites of segments 4-6 each with only ventral paratergal lobe and a pair of setae as long as or shorter than paratergites; paratergites of segments 7 and 8 each with no apical lobe and a pair of long setae; spiracles present on paratergites of segments 3-8. *Genitalia* (Fig. 20): Genital plate longer than wide; with 2 setae placed diagonally on each side; gonopods triangular, with 2 small and 1 long setae; genital lobe distinct, with genital seta spiniform; spermatheca small, ring-like.



MÁLE. Total body length 1.36 mm. Head, thorax, legs and abdomen same as in female, unless mentioned otherwise. *Thorax* with sternal plate as in Fig. 23. *Abdomen* (Fig. 22) with 6 tergal and 9 sternal plates; segments 2-7 each with 1 tergal and 1 sternal plate except for segment 3 with 2 sternites; 7 DLAS and 6 VLAS present; anal segment bifurcate, with a pair of long setae and cuticle of dorsal surface scaly. *Genitalia* (Fig. 21): Basal apodeme longer than aedeagus proper and enlarged apically; paramere with lateral margins straight, slightly enlarged and convergent at apex; pseudopenis long, enclosed by parameres, with its apical arm more than twice as long as lateral arms.

NYPH 1 (Fig. 24). Total body length 0.79 mm. *Head* longer than wide, elongate and pointed anteriorly; postantennal angle distinct; OS, CS, AS, 2 SHS, ACHS, PCHS and 3 MHS present on each side; PDPHS long, with ADHS placed anterior to PDPHS; VPHS long, reaching base of second antennal segment. *Thorax* wider than head; mesothoracic spiracle large; DPtS minute; DMtS and ADTS missing; coxal plates with no tubercle; sternal plate developed. *Legs* as in other members of the genus. *Abdomen* with 6 spiracles, 9 DCAS and 7 VCAS; no paratergite developed; only 1 MAS present on each side; cuticle scaly.

NYPH 2 (Fig. 25). Total body length 1.08 mm. Head and thorax same as in Nymph 1, except for size and presence of DMtS. *Abdomen* with 9 DCAS, 7 VCAS, 7 paratergites, 6 spiracles, and 1 MAS on each side; paratergites each with no lateral lobe; paratergal setae paired, borne on lateral angle and much longer than paratergites; anal segment notched at apex; cuticle scaly dorsally and covered with microtrichia on ventral surface.

NYPH 3. Total body length 1.59 mm. Same as in Nymph 2 except for the size and more definite thoracic sternal plate.

*Specimens examined.* - All type specimens. Other material: MOZAMBIQUE: Ex *Crocidura luna*, Vila Paiva de Andrada, Beira District, 22 Sept. 1964, 1 male and 3 females (RMD-565); ex *Mastomys natalensis*, Moamba, Lourenço Marques District, 7 Feb. 1964, 1 male (REC-698); ex *Grammomys dolichurus*, Vila Paiva de Andrada, Beira District, 21 Sept. 1964, 1 nymph, Specimens taken off *Crocidura luna* and *Mastomys natalensis* may be stragglers or contamination.

17. *Polyplax arvicanthis* BEDFORD - (Figs. 26-28).

This species has been recorded from *Rhabdomys pumilio* (JOHNSON, 1960; EMERSON and KIM, 1968) and *Lemniscomys striatus* (KIM and EMERSON, 1968) in Kenya, South Africa, and South West Africa. The adult stage was described and illustrated by BEDFORD (1919) and FERRIS (1923), but no nymphal stage has been known previously. Hence three nymphal stages are herewith described and illustrated.

*Description.* - NYMPH 1 (Fig. 26). Total body length 0.49 mm. *Head* rounded anteriorly; postantennal angle not developed; OS, AS, CS, PCHS and VPHS present; 3 SHS present on each side; a row of 3 MHS convergent; PDPHS long and strong; ADHS minute, placed anteriorly to PDPHS; antennae 5-segmented, with 2 sensoria contiguous. *Thorax* slightly wider than head; no sternal plate developed; DMtS and DPtS long; DPtS missing; coxal plates with no tubercle. *Legs* as in other members of the genus. *Abdomen* with 7 paratergites, 6 spiracles, 9 DCAS, 7 VCAS and 1 MAS on each side; anal segment prolonged; paratergites each with a pair of minute setae.

NYMPH 2 (Fig. 27). Total body length 0.75 mm. Same as in Nymph 1, unless mentioned otherwise. *Head* with 2 ADHS placed immediately anterior to PDPHS. *Thorax* with DPtS. *Abdomen* with 2 long MAS on each side, one being borne on paratergites of segment 8.

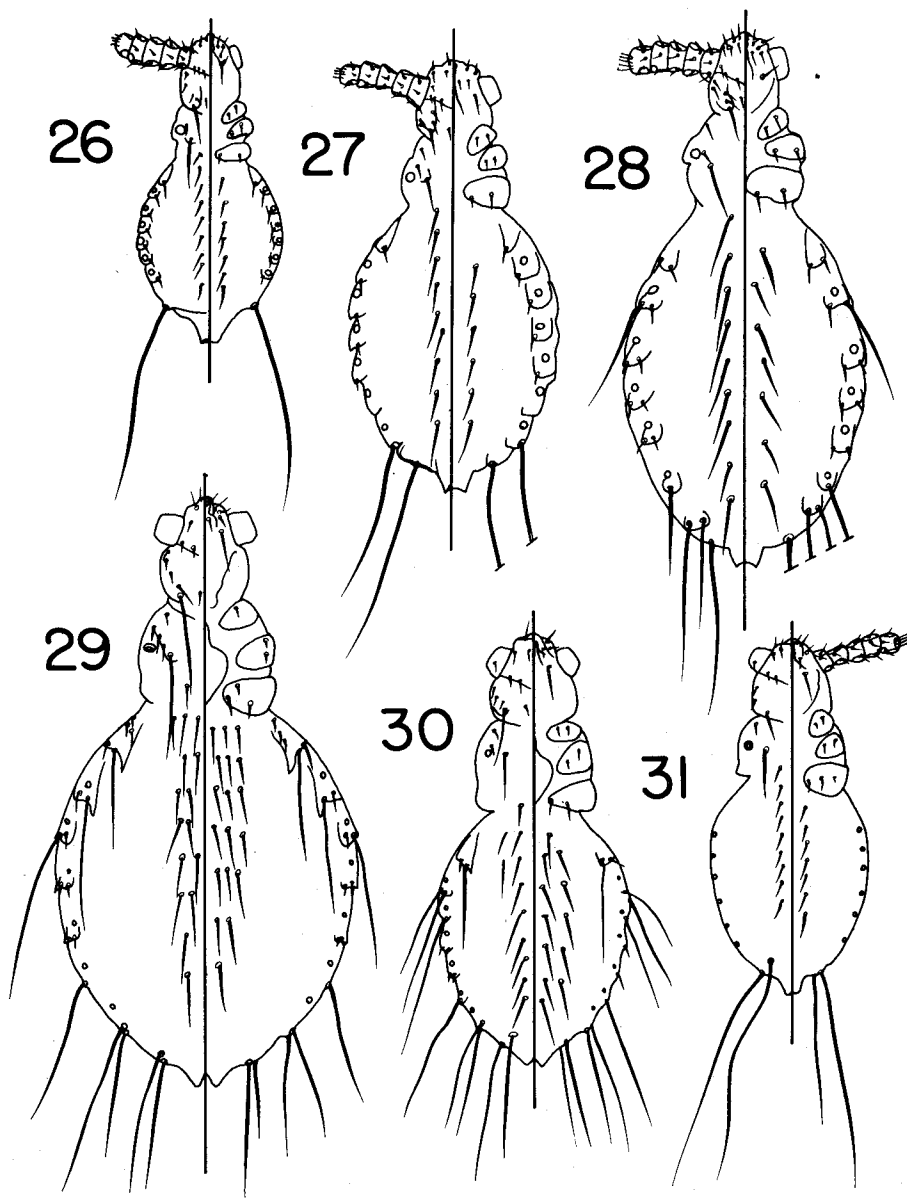
NYMPH 3 (Fig. 28). Total body length 0.87 mm. Same as in Nymph 2, unless mentioned otherwise. *Abdomen* with long 4 MAS on each side; 1 AMAS present on paratergite of segment 7, 2 MMAS on paratergite of segment 8; ventral paratergal setae of segment 3 more than 3 times longer than its paratergites.

*Specimens examined.* - Ex *Lemniscomys striatus*, KENYA: Londioni Camp, Molo, 29 May 1965, 1 nymph 1, 1 nymph 2 and 1 nymph 3 (MEK-166); ex *Myomys* sp., MOZAMBIQUE: Boane, Moputo Prov., 12 Jan. 1964, 1 female (REC-543) (STRAGGLER?). Other specimens of adult and nymphal stages studied were collected from *Rhabdomys pumilio* and *Liotomys* in South Africa.

18. *Polyplax biseriata* FERRIS - (Figs. 29-31).

*Polyplax biseriata* FERRIS, 1923: 199, fig. 125A, 126; HOPKINS, 1949: 477, 478; FERRIS, 1951: 207; PATERSON and THOMPSON, 1953: 200, 203; WERNECK, 1953: 57, fig. 4, 8, 9; BENOIT, 1959: 265; JOHNSON, 1960: 69, fig. 73, 79, 86, 95, 96; BENOIT, 1964: 156.

*Eremophthirus biseriata*, FAHRENHOLZ, 1938: 243; COOREMAN, 1955: 188.



Figs. 26-28. — *Polyplax arvicantis* BEDFORD. - 26. Nymph 1; - 27. Nymph 2; - 28. Nymph 3.

Figs. 29-31. — *Polyplax biseriata* FERRIS. - 29. Nymph 3; - 30. Nymph 2; - 31. Nymph 1.

This species has been known from *Tatera böhmi*, *T. lobengulae* (FERRIS, 1923 and 1951), *T. schinzi*, *T. brantsi*, *T. afra* and *T. liodon* (PATERSON and THOMPSON, 1953; COOREMAN, 1955; BENOIT, 1959, 1964; JOHNSON, 1960). Nymphal stages have not been known previously. Hence, three nymphal stages are herewith described.

*Description.* - NYMPH 1 (Fig. 31). Total body length 0.57 mm. *Head* short, rounded anteriorly; postantennal angle not developed; OS, CS, AS, PDPHS and VPHS present; 2 SHS and 2MHS present; ADHS, ACHS, PCHS absent; antennae 5-segmented; cuticle not tuberculated. *Thorax* with mesothoracic spiracle small; no sternal plate present; DPtS minute; DMtS missing; DPTS long; coxal plates with no peculiar setae or tubercles. *Legs* as in other members of the genus. *Abdomen* with 6 spiracles, 9 DCAS, 7 VCAS, and 2 MAS on each side; anal segment prolonged.

NYMPH 2 (Fig. 30). Total body length 0.72 mm. *Head*, *thorax*, *legs* and *abdomen* as in Nymph 1, unless mentioned otherwise. *Head* with 3 MHS and 1 PCHS; ADHS minute, placed anterior to PDPHS. *Thorax*: Sternal plate distinct, oval, with handle-like anterior process; DMtS present anterior to mesothoracic spiracle. *Abdomen* with 5 paratergites and 6 spiracles; the first paratergites (segment 2) well developed without spiracle; paratergites of segments 3, 4, 5 and 6 poorly developed; paratergites of segments 2, 3, and 4 each with 1 ventral seta minute and 1 dorsal seta long, about 7-10 times as long as ventral seta; paratergites of segments 5 and 6 with 1 pair of minute setae; 5 MAS present on each side, the first being single; 2 DLAS and 5 VLAS in addition to CAS; anal segment not prolonged, but bifurcate.

NYMPH 3 (Fig. 29). Total body length 0.99 mm. Similar to Nymph 2, except for the following characters: *Head* slightly produced anteriorly. *Thorax* with 2 additional setae between DMtS and DPTS. *Abdomen* with paratergites distinctly developed; 9 rows of DCAS, 2, 6, 4, 4, 4, 4, 2 and 2 setae respectively; 7 rows of VCAS, 6, 6, 6, 6, 6, 4 and 2 setae respectively.

*Specimens examined.* - MOZAMBIQUE: Ex *Tatera leucogaster*, Chigubo, 11 Feb. 1964, 7 males, 9 females, 11 nymphs (AIM-53, 54); Massangena, 7 Feb. 1964, 1 female (REC-705), 1 female (AIM-35); 3 Feb. 1964, 3 nymph 2 (AIM-11); Villa Gouvía, Beira District, 21 Aug. 1964, 1 female (JCL-418); Mombane, Inhambane District, 24 March 1964, 3 males, 1 female and 12 nymphs (REC-972, 976); Chimonso, Gaza District, 26 Feb. 1964, 3 males, 4 females and 9 nymphs (REC-896); Ma-

pulanguene, Gaza District, 4-5 March 1964, 2 males, 1 female and 5 nymphs (REC-871, 883); Villa Pavia Andrada, Beira district, 28 Aug. 1964, 1 male (RMD-650); Bragnago, 1 Oct. 1964, 1 female (HJH-737); Muamba, 9 March 1964, 3 males and 3 females (REC-903); 23 March 1964, 1 male and 2 females (REC-976); Massangene, 4 Feb. 1964, 4 males and 1 female (REC-655); ex *Mastomys natalensis*, Villa Gouveia, Beira District, 1 female (JCL-431); Villa Paiva Andrada, Beira District, 25 Sept. 1964, 1 female (RMD-600); Panda, Inhambane District, 20 April 1964, 1 female (REC-1319); ex *Aethomys chrysophilus*, Vila Pery, Beira District, 3 Sept. 1964, 3 females and 8 nymphs (RMD-379); Massangena, 7 Feb. 1964, 1 female and 7 nymphs (REC-692); ex *Mus triton*, Zambue, 1 Sept. 1964, 1 male and 1 female (CGC-441). Collections from *Aethomys*, *Mastomys* and *Mus* may possibly be either contamination or stragglers.

#### 19. *Polyplax cummingsi* FERRIS

A full synonymy, citation, and descriptions of nymphs are found in KIM and EMERSON (1968).

*Specimens examined.* - MOZAMBIQUE: Ex *Dasymys incomptus*, 10 km N Beira, Manica and Sofala District, 26-29 Oct. 1964, 9 females, 1 male and 8 nymphs, 4 collections (RMD-701, 704, 706; ARH-717); Brazanca, Tete District, 2 Oct. 1964, 1 collection (HJH-743); Vila Vasco da Gama, Tete District, 14 Sept. 1964, 1 collection (HJH-607); ex *Aethomys chrysophilus*, Boane, Tete District, 20 July 1964, 9 nymphs; 2 mi NE Tete, Tete District, 21 July 1964, 13 males, 23 females and 48 nymphs (HJH-82, 84, 87); 23 July 1964, 7 nymphs (HWS-4114); Chanzara, Tete District, 1 Nov. 1964, 1 male, 13 females and 26 nymphs (HJH-982, 984); Furancungo, Tete District, 2 Aug. 1964, 5 nymphs (HWS-4246); Mague, 20 Aug. 1964, 1 nymph (HJH-302); ex *Mus triton*, Zambue, 2 Sept. 1964, 1 male and 1 female (HJH-777, 778); Furancungo, Tete District, 2 Aug. 1964, 1 female (HWS-4260). Collections from *Mus* may be stragglers.

#### 20. *Polyplax grammomydis* WERNECK - (Fig. 32).

*Polyplax grammomydis* WERNECK, 1953: 62, fig. 16-18; JOHNSON 1960: 54 (no specimens).

This species is closely allied to *P. spinulosa*, but the adult stage is easily identified by having male pseudopenis stout wedge-shaped and articulated with tips of parameres and female with no setae present

laterally off the abdominal setae. No nymphal stage has been known previously. Hence, the nymph 2 is herewith described and illustrated. Nymphs 1 and 3 are not known.

*Description.* - NYMPH 2 (Fig. 32): Total body length 0.89 mm. *Head* longer than wide, with OS, CS, AS, PDPHS and PCHS; 3 SHS, 2 MHS and 2 ADHS present on each side; 2 ADHS placed anterior to PDPHS on a lobe; VPHS long, reaching beyond base of antennal segment 2; antennae 5-segmented; ventral cuticle scaly. *Thorax* wider than head; DPtS minute; DMtS stout; DPtS strong; coxal plates with few setae; no sternal plate. *Legs* as in other members of *Polyplax*. *Abdomen* with 7 paratergal plates, 6 spiracles, 9 DCAS and 7 VCAS; ventral paratergal lobes pointed; paratergites of segments 2-6 each with a pair of short setae; paratergites of segment 7 with ventral seta large and dorsal seta minute; paratergite of segment 8 with a pair of long setae; segment 9 with 2 setae on each side; anal segment not prolonged, but slightly notched at apex.

*Specimens examined.* - MOZAMBIQUE: Ex *Grammomys dolichurus*, Inhaca Island, 17 Jan. 1964, 1 female and 1 nymph 2 (REC-592).

## 21. *Polyplax jonesi* KELLOGG and FERRIS - (Fig. 33).

*Polyplax jonesi* KELLOGG and FERRIS, 1915: 151, pl. 15, fig. 3-3e; FERRIS, 1923: 216, fig. 138, 139; FERRIS, 1951: 208; PATERSON and THOMPSON, 1953: 200; JOHNSON, 1960: 92; BENOIT 1961a: 233.

This species has been reported from *Saccostomus campestris* in Zululand, South Africa, (KELLOGG and FERRIS, 1915), South West Africa (PATERSON and THOMPSON, 1953) and the Congo (BENOIT, 1961a). JOHNSON (1960) did not see specimens of this species. The adult stage is well described and illustrated (KELLOGG and FERRIS, 1915) but no nymphal stage has been known before. In this study 2 nymphs were available for study. Nymph 3 is herewith described and illustrated. Nymphs 1 and 2 are unknown.

*Description.* - NYMPH 3 (Fig. 33). Total body length 0.80 mm. *Head* about as long as wide; posterolateral angle noticeable; CS, OS, AS, 2 SHS, PCHS and 2 MHS present; PDPHS long and ADHS placed anterior to PDPHS, both on a lobe; VPHS barely reaching base of antennal segment 2; antennae 5-segmented. *Thorax* wider than head; DPtS minute; DMtS distinct; DPtS long; sternal plate developed, oval; coxal plates with several setae. *Legs* as in other members of *Polyplax*. *Abdomen* with 6 paratergites, 6 spiracles, 2 rows of DCAS

and 3 rows of VCAS; paratergites of segments 2-6 with a pair of short setae and pointed lateral lobes; paratergite of segment 7 with a pair of long setae; segments 8 and 9 each with 2 long setae on each side; 5 DLAS present next to paratergites; median DCAS with 8 setae;

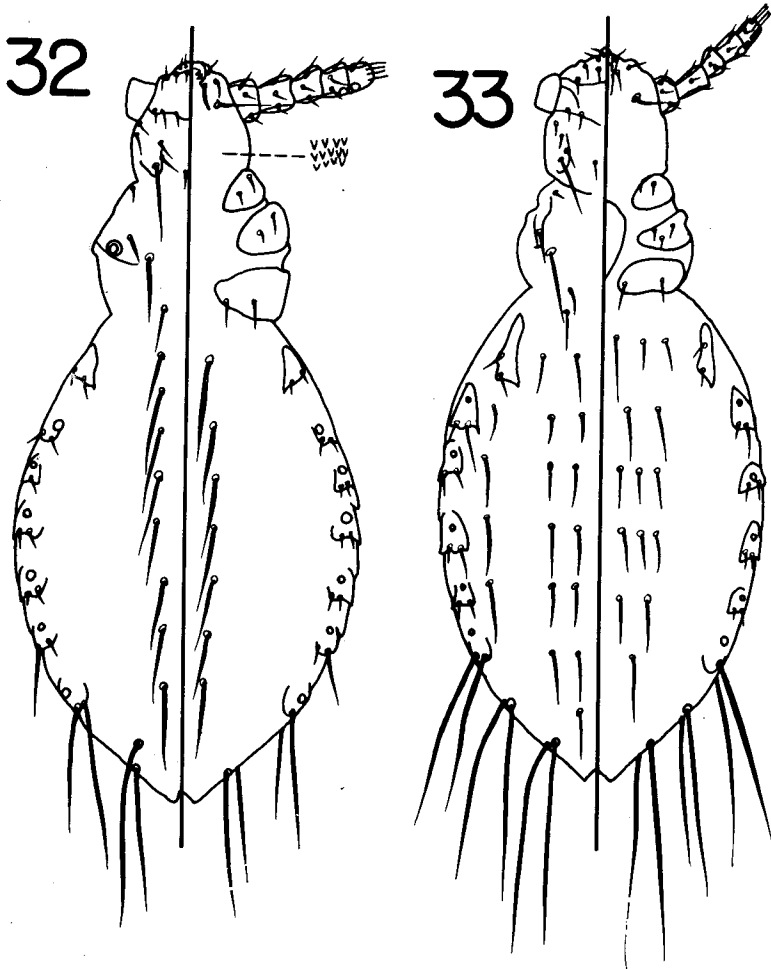


Fig. 32. — *Polyplax grammomydis* WERNECK; Nymph 2.  
Fig. 33. — *Polyplax jonesi* KELLOGG and FERRIS; Nymph 3.

lateral DCAS with 7 setae; sternum with 6 rows of setae, 6, 4, 6, 6, 4, 2 respectively; anal segment not prolonged but notched noticeably.

*Specimens examined.* - MOZAMBIQUE: Ex *Saccostomus campestris*, Chanzara, Tete District, 1 Nov. 1964, 1 collection (HJH-981); Moamba, 10 March 1964, 44 2 N (REC-922); Muchena, Tete District, July 25 1965, 3 collections (HWS-4195, 4147; CGC-101).

22. **Polyplax kaiseri** JOHNSON

*Polyplax kaiseri* JOHNSON, 1960: 93-95, fig. 156-158, 161, 162; BENOIT, 1962a: 478.

This species was described on the basis of large number of specimens collected off *Gerbillus gerbillus* in Egypt (JOHNSON, 1960) and also known from *G. hardwoodi* in Tanganyika (BENOIT, 1962).

*Specimen examined.* - MOZAMBIQUE: Ex *Steatomys* sp., Massangena, 6 Feb. 1964, 2 females and 2 males (REC-679) (STRAGGLERS?).

23. **Polyplax otomydis** CUMMINGS

*Polyplax otomydis* CUMMINGS, 1912: 395, fig. 2; WATERSTON, 1914: 275; KELLOGG and FERRIS, 1915: 150; FERRIS, 1916b: 240, fig. 23 A; BEDFORD, 1919: 715; FERRIS, 1923: 211, fig. 134, 135; BENOIT, 1959b: 266; JOHNSON, 1960: 70-74, fig. 99, 100, 107, 108, 122, 124, 125, 127; BENOIT, 1961a: 233; KIM and EMERSON, 1968: 33.

*Polyplax otomydis* (*partim*), FERRIS, 1951: 208 (*Sinks cummingsi* FERRIS).

*Specimen examined.* - MOZAMBIQUE: Ex *Otomys angoniensis*, Brangango, 14°24' S, 34°20'E, Oct. 1 1964, 14 (HJH-738).

24. **Polyplax paradoxa** JOHNSON - (Figs. 34-35).

*Polyplax paradoxa* JOHNSON, 1960: 72-74, fig. 97, 104, 109, 119.

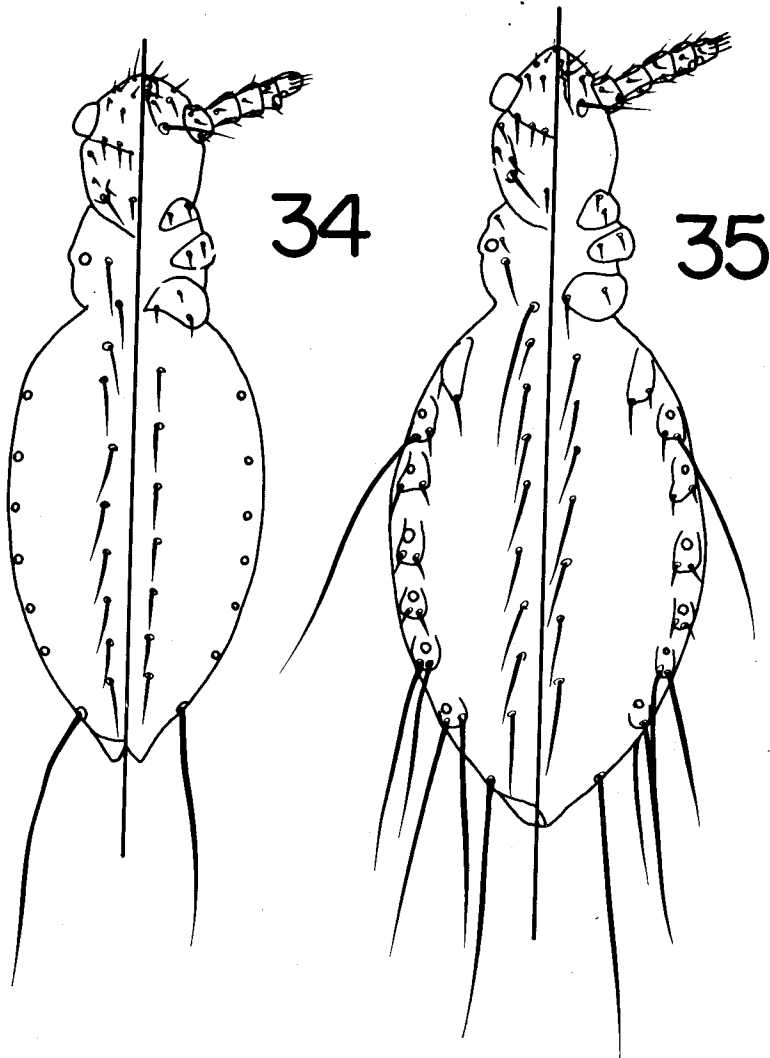
This species was described from female specimens collected off *Meriones* sp., Egypt. No male and nymphal stages have been described previously. Specimens of nymphal stages were available for study. Three nymphal stages are herewith described and illustrated.

*Description.* - NYMPH 1 (Fig. 34). Total body length 0.73 mm. *Head* slightly longer than wide, rounded anteriorly, with OS, CS, AS, ACHS, and PCHS; 2 SHS long and 2 MHS short on each side; PDPHS long and ADHS short on a lobe; VPHS long, almost reaching apex of antennae segment 2; antennae 5-segmented. *Thorax* with no DPtS and DMtS; DPtS long; ADtS missing; coxal plates with no peculiar setae; no sternal plate. *Legs* as in other members of *Polyplax*. *Abdomen* with 6 spiracles, 1 MAS, 9 DCAS, and 7 VCAS on each side; anal segment prolonged and bifurcate at apex.

NYMPH 2 (Fig. 35). Total body length 0.86 mm. *Head* longer than wide, slightly prolonged anteriorly before antennae; OS, CS, AS,



ACHS, PCHS. 2 SHS and 2 MHS present on each side; PDPHS and ADHS on a lobe; VPHS long, reaching base of antennae segment 3; antennae 5-segmented. *Thorax* with DPtS, DMtS and DPTs; coxal plates with several setae; no sternal plate. *Legs* as in other members of *Polyplax*. *Abdomen* with 6 spiracles, 7 paratergites, 9 DCAS and 7 VCAS; paratergites of segments 2 and 4-6 each with a pair of short setae, segment 2 with paratergal seta placed on apex of dorsal lobe;



Figs. 34-35. — *Polyplax paradoxa* JOHNSON. - 34. Nymph 1; - 35. Nymph 2.

segment 3 with ventral paratergal seta more than 5 times longer than paratergite; paratergites of segments 7 and 8 each with a pair of long setae; segment 9 with 1 seta on each side; anal segment not prolonged.

NYPH 3: Total body length 0.99 mm. Same as nymph 2.

*Specimens examined.* - MOZAMBIQUE: Ex *Pelomys fallax*, Beira, Manica and Sofala District, 29 Oct. 1964, 6 females, 1 male and 4 nymphs (RMD-709).

25. ***Polyplax spinulosa*** (BURM.).

*Specimens examined.* - MOZAMBIQUE: Ex *Rattus rattus*, Furancungo, 2 Aug. 1964, 3 females (JCL-322); Inhaca Island, 17 Jan. 1964, 2 males (REC-603).

26. ***Polyplax tatera*** FERRIS - (Figs. 36-38).

*Polyplax taterae* FERRIS, 1923: 198, fig. 124, 125 B, C, D; HOPKINS, 1949: 477; FERRIS, 1951: 214; PATERSON and THOMPSON, 1953: 199, 203; WERNECK, 1953: 58, fig. 7; JOHNSON, 1960: 62, 63.

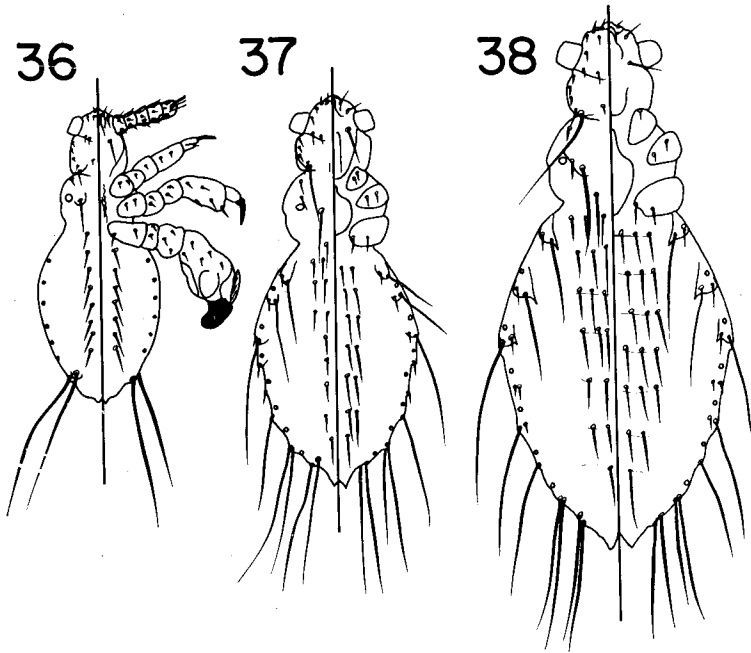
*Eremophthirus taterae*, FAHRENHOLZ, 1938: 243.

*Polyplax taterae mombassae* WERNECK, 1940: 724; HOPKINS, 1949: 477.

This species has been known from *Tatera vicina*, Kenya (FERRIS, 1923, 1951; WERNECK, 1940; PATERSON and THOMPSON, 1953), *T. robusta swaithlingi*, Tanganyika, and *T. robusta nigricauda*, Kenya (JOHNSON, 1960). No nymphal stage has been known previously. A large series of nymphal stages was available for study. The three nymphal stages are herewith described and illustrated.

*Description.* - NYPH 1 (Fig. 36). Total body length 0.51 mm. *Head* about as long as wide; OS, CS, AS, 3 SHS, 2 SH, PDPHS and PCHS present on each side; 1 VPHS long; antennae 5-segmented. *Thorax* wider than head; DPtS and DPTS distinct; DMtS missing; coxal plates with no peculiar setae; mesothoracic spiracle large; slight indication of sternal plate present. *Legs*: fore legs 5-segmented, with claw acuminate; middle legs with tibia and tarsus longer than those in fore legs and claws acuminate; hind legs with tibia and tarsus enlarged and claws large, blunt. *Abdomen* with 6 spiracles, 8 DCAS, 7 VCAS and 2 MAS on each side; no paratergites; anal segment slightly prolonged and bifurcate.

NYMPH 2 (Fig. 37). Total body length 0.73 mm. *Head* with post-antennal and posterolateral angle developed; CS, AS, OS, 2 SHS, 3 MHS, DCHS and VPHS distinct; PDPHS long, with ADHS located anterior to PDPHS; antennae 5-segmented. *Thorax* with DPtS, DMtS and DPTS long; sternal plate oval, with handle-like anterior process; coxal plates with several minute setae. *Legs* as in Nymph 1. *Abdomen* with 2 well developed and 4 poorly developed paratergites; parater-



Figs. 36-38. — *Polyplax laterae* FERRIS. - 36. Nymph 1; - 37. Nymph 2; - 38. Nymph 3.

gite of segments 2, 3 and 4 each with dorsal setae about 5 times longer than paratergites and ventral seta minute; paratergites of segments 5 and 6 each with 1 minute seta; segment 7 with 1 paratergal seta; segments 8 and 9 each with 2 setae; 9 rows of DCAS present, 2, 4, 4, 4, 2, 2, 2, 2 and 2 respectively; 7 rows of VCAS present, 4, 4, 4, 4, 4, 4 and 2 respectively; anal segment prolonged and bifurcate.

NYMPH 3 (Fig. 38). Total body length 1.00 mm. *Head*, thorax, legs and abdomen as in Nymph 2, unless mentioned otherwise. *Head* with PDPHS very long. *Thorax* with 1 ADTS between DPtS and DMtS. *Abdomen* with 3 well developed paratergites, each with dorsal lobe

pointed; only segment 5 with a pair of minute setae; segment 6 with 1 long and 1 short setae; 9 rows of DCAS, 2, 6, 6, 6, 6, 4, 4, 2 and 2 respectively; 7 rows of VCAS, 6, 6, 6, 6, 6, 4 and 2 respectively.

*Specimens examined.* - MOZAMBIQUE: Ex *Tatera leucogaster*, Beira District, 5 km N Mungari, 16-18 Aug. 1964, 7 collections (RMD-231, 260, 261, 263; JCL-400, 402, 405); 4 km NE Vila Paiva de Andrada, 25 Sept. 1964, 5 collections (RMD-650, 651, 654, 597, 596); Inhambane District, Coguno, 23-24 April 1964, 10 collections (REC-1362, 1415, 1377, 1382, 1385, 1354, 1355, 1357, 1381, 1358); 3 km NE Inharrime, 9 collections (REC-1443, 1444, 1445, 1448, 1449, 1452, 1454, 1461, 1462); Janzamo, 14 April 1964, 1 collection (REC-1232); Macoculombane, 12 km W Panda, 20 April 1964, 4 collections (REC-1322, 1323, 1324, 1330); 6 km W Panda, 18 April 1964, 5 collections (REC-1276, 1278, 1279, 1299, 1281); Lourango Marques District, 10 km N Boane, 13 July 1964, 18 females, 16 males and 42 nymphs (CGC-30; HWS-4059, 4060); Inhaca Island, 16-17 Jan. 1964, 4 males, 4 females and 3 nymphs (ALM-4, 61; REC-584); Moamba, 12 March 1964, 1 collection (REC-965); Manica and Sofala District, Mezimbite, 8 km N Dondo, 3 collections (RMD-742, 782, 784); Vila Gouveia, 21-25 Aug. 1964, 6 collections (JCL-419; 418; 429; RMD-283, 282, 326); Vila Pery, 4-6 Sept. 1964, 3 collections (RMD-406, 407, 425); Tete District, Braganca, 1-3 Oct. 1964, 2 collections (HJH-737, 748); Changara, 3 Nov. 1964, 1 collection (HJH-1012); Fingoe, 9-10 Sept. 1964, 3 collections (HJH-568; CGC-494, 486); Magiic, 20-22 Aug. 1964, 10 collections (HJH-325, 328, 323, 337, 326, 330, 332, 338, 331, 306); Mucanha River, 5-7 Sept. 1964, 10 collections (HJH-524, 506, 555, 507, 527, 508, 558, 514, 509, 523); New Bone (Tambue), 17 Sept. 1964, 1 collection (HJH-631); 2 mi NE Tete, 23 July 1964, 2 collections (HWS-4120, 4117) Vila Coutinho, 7 Oct. 1964, 2 collections (HJH-772, 781); 2 km N Vila Gamito, 10 Aug. 1964, 11 males, 8 females and 57 nymphs, (HWS-4349); Zambue, 26 Aug.-3 Sept. 1964, 25 females and 17 nymphs (HJH-482, 491, 464; CGC-398); Zumbo, 25-30 Aug. 1964, 23 collections (HJH-390 to 470); Vila Machado, Manica and Sofala District, 12 Sept. 1964; 1 collection (RMD); Magu, 3-21 Aug. 1964, 4 females and 9 nymphs (HJH-332, 335); Chicoa, 18 Aug. 1964, 1 female (CGC-340); Mucanha River, Sept. 5, 1964, 12 females and 5 nymphs (HJH-504, 505, 513); Chimonso, Gaza District, 21 Feb. 1964, 1 female, 1 male and 5 nymphs (REC-783); 30 km NW Furancungo, 6-7 Aug. 1964, 4 collections (HWS-4274, 4275, 4276, 4295); Luangua River, 6-7 Aug. 1964, 4 collections (CGC-282, 256, 257, 255); ex *Tatera böhmi*, 10 km E Furancungo, 3 Aug. 1964, 5 collections, 21 females, 42 males and 57 nymphs, (JCL-332, 334, 331; HWS-4257, 5258).

FAMILY LINOGNATHIDAE

Genus LINOGNATHUS ENDERLEIN

27. *Linognathus kimi* VAN DER MERWE.

*Linognathus kimi* VAN DER MERWE, 1968: 3-4, fig. 1, 2, 3.

This species was described from a large series of male, female and nymph specimens collected off *Raphicerus sharpei* and *R. melanotis* in Rhodesia and Mozambique.

*Specimens examined.* - MOZAMBIQUE: Ex *Raphicerus melanotis*, Vila Caldas Xavier, Tete District, 15 Oct. 1964, 1 female (paratypes) and 1 nymph (HJH-862); Zumbo, Tete District, 27 Aug. 1964, 1 collection (HJH-415) (paratypes); Mague (New) Boroma, Tete District, 21 Aug. 1964, 1 collection (HJH-312); Tete, Tete District, 21 July 1964, 10 males, 5 females and 5 nymphs (paratypes).

28. *Linognathus limnotragi* CUMMINGS

*Linognathus limnotragi* CUMMINGS, 1913: 36, fig. 1.

*Linognathus limnotragi* FERRIS, 1932: 383, fig. 231A, I, J, 232C, D; FERRIS, 1951: 231; FIEDLER and STAMPA, 1956: 62-63; BENOIT, 1959a: 116.

This species has been collected off *Tragelaphus gratus*, *T. syavaticus* and *T. scriptus* (FERRIS, 1951; BENOIT, 1959a).

*Specimens examined.* - MOZAMBIQUE: Ex *Tragelaphus scriptus*, 8 km SW Chioco, Tete District, 28 Oct. 1964, 1 collection (HJH-966); 93 km N Vila Coutinho, Tete District, 10 Oct. 1964, 1 collection (HJH-800); 2 mi NE Tete, Tete District, 20 July 1964, 1 collection (JCL-211).

29. *Linognathus nesotragi* VAN DER MERWE.

*Linognathus mesotragi* VAN DER MERWE, 1968: 5-6, fig. 4.

This species was described from 2 male and 2 female specimen collected off *Nesotragus moschatus* in Mozambique.

*Specimens examined.* - MOZAMBIQUE: Ex *Nesotragus moschatus*, Changara, Tete District, 2 males and 2 females (type series) (HJH-1030).

30. *Linognathus zumpti* FIELDER and STAMPA.

*Linognathus zumpti* FIEDLER and STAMPA, 1958: 176-77, fig. 5-8.

This species was described on the basis of 3 males and 3 females taken from *Sylvicapra grimmia transvaalursis* and 2 females and 2 males from *Raphicerus campestris capricornis* in North Africa.

*Specimens examined.* - MOZAMBIQUE: Ex *Sylvicapra grimmia*, Vila Crouveia, Manica and Sofala District, 22 Aug. 1964, 1 collection (JGL-426); 14 mi SE Ohicoa, Tete District, 17-25 Aug. 1964, 4 collections (HJH-242, 926, 925, 965); Mague (New) Boroma, Tete District, 20-21 Aug. 1964, 2 collections (HJH-291, 311); Zambue, Tete District, 3 Sept. 1964, 1 collection (CGC-447); Changara, Tete District, 1-4 Nov. 1964, 2 collections (HJH-970, 1020).

31. *Linognathus* sp.

These collections were made from *Redunca arundinum* at Muchena, Tete District, Mozambique, on 28 July 1964 (CGC-166; ALM-81).

One collection was made from *Tragolaphus strepsiceros* at Zambue, Tete District, Mozambique, 3 Sept. 1964 (HJH-494).

Genus **PROLINOGNATHUS** EWING

32. *Prolinognathus* sp. near *leptocephalus* (EHRENBERG).

The genus is poorly understood. The taxonomic status of the members of this genus is in confusion. The last comprehensive work was done on this genus by FAHRENHOLZ (1939). The name used for the specimen examined here may not be valid.

*Specimen examined.* - MOZAMBIQUE: Ex *Procavia capensis*, Braganca, Tete District, 4 Oct. 1964, 1 female (HJH-753).

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ABSTRACT

This paper deals with the Anoplura fauna of Mozambique and includes 3 families, 9 genera and 32 species : 10 species of *Hoplopleura*, 11 species of *Polyplax*, 2 species of *Scipio*, 5 species of *Linognathus*, and 1 species for each of *Haemodipsus*, *Lemurphthirus*, *Neohaematopinus*, *Prolinognathus*, and *Haematopinus*. One new species *Polyplax acomydis* n. sp. and nymphal stages of 7 species of Hoplopleuridae are described and illustrated, and adult stages of 3 *Hoplopleura* species are also redescribed and illustrated.

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**Anoplura from Mozambique with  
descriptions of a new species and nymphal  
stages**

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