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A Review of the Genus *Holomenopon* (Mallophaga: Menoponidae) from the Anseriformes¹

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ABSTRACT

Sixteen species of *Holomenopon* Eichler are recognized and discussed, and 10 species are illustrated. This includes 3 new species: *H. acutae* from *Anas acuta*, *H. clauseni* from *Aix sponsa*, and *H. bucephalae* from *Bucephala albeola*. There are 11 new synonymies: *H. leucoxanthum* (Burmeister) (= *Menopon lunarium* Rudow, *M. albofasciatum* Piaget, *M. nyrocae* Blagove-

shtchensky, *H. concii* Eichler, *H. dendrocygni* Carriker, and *H. hanslöhrli* Eichler); *H. tumidum* (Piaget) (= *M. africanum* Kellogg & Paine); and *H. tadornae* (Gervais) (= *M. extraneum* Piaget, *M. eulasium* Kellogg, *H. museigottingense* Eichler, and *H. boettcheri* Eichler). A neotype is designated for *H. leucoxanthum*. A key to the species is given.

The genus *Holomenopon* Eichler contains 25 specific and subspecific names, all of which are now recognized as valid taxa. These lice are restricted to various species of ducks, swans, and geese of the Order Anseriformes. Since there has been no published work based on a critical examination of the available *Holomenopon* material, I undertook this study to determine the status of the names now in *Holomenopon*, to redescribe the recognizable species, to describe the new species found, and to provide a key for the identification of these species.

I thank Dr. Theresa Clay, British Museum

(Natural History), and Dr. K. C. Emerson, Arlington, Va., for assistance in the preparation of this manuscript; in addition, I thank them as well as Dr. John A. Chemsak, University of California, Berkeley; Dr. Robert C. Dalglish, Union College, Schenectady, N. Y.; Dr. Robert E. Elbel, Dugway, Utah; and Dr. Per Inge Persson, Naturhistoriska Riksmuseet, Stockholm, for the loan of important specimens.

In the following descriptions, numbers applied to certain head setae are those given by Clay (1969). Reference to tergites, pleurites, or sternites pertains to the abdomen. The postspiracular seta and an adjacent mediad seta, even though they may be recessed slightly from the margin of the tergite, are

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included in the marginal tergal setal counts. Quantitation for sternal setae includes those in the brushes. Measurements are given in millimeters. The nomenclature of the host species follows that of Delacour (1954, 1956, 1959).

Genus *Holomenopon* Eichler

Holomenopon Eichler, 1941, Stettiner Entomol. Zeit. 102: 125. Type-species: *Menopon albofasciatum* Piaget (placed as junior synonym of *M. leucoxanthum* Burmeister in this paper).

Head (Fig. 1).—Rounded anteriorly, broadest across temples, and without preocular slit or notch; dorsolateral margin without row of short setae; temples without ventral submarginal patch or rows of setae; no ventral processes. Antenna (Fig. 3) with scape and usually pedicel without distal anterior prolongations; terminal segment undivided, about as long as wide, and concealed beneath head. Occipital setae 21 and 22 long, extending beyond transverse prothoracic thickening; seta 23 lateroanterior to seta 22; alveoli of setae 26 and 27 not closely associated; with 4–5 very long marginal temple setae each side; with 4 mid-dorsal setae, inner much longer than outer; usually a sensillum (Fig. 1: *d*) medioanterior to inner mid-dorsal seta. Subocular setae as in Fig. 11; gula rounded, typically with 4 + 4 setae, less often 3 or 5 on a side; hypopharyngeal sclerites reduced (Fig. 13).

Thorax.—Outer dorsal prothoracic seta longer and stouter than inner; usually 20 marginal pronotal setae (short setae beginning outermost numbering mediad 1, 3, 5, 7, and 9; long setae typically being 2, 4, 6, 8, and 10), less often 18, 19, 21, or 22 setae, because of more or fewer short setae; prosternal plate with deeply serrated margin (Fig. 6), without setae (rarely 1) other than usual 2 short setae each on small sclerite. Oblong postnotum of typical normal shape; mesothorax not as sclerotized ring; with 4 medioanterior mesonotal setae; mesosternum with only 2 setae, spiculate posteriorly (Fig. 7). Metanotum with 2–4 medioanterior setae; 13–25 marginal metanotal setae of varying lengths. Brush on ventral femur III; 4 sensilla on ventral trochanter II–III.

Abdomen.—Tergites I–II with short seta lateral to postspiracular seta; postspiracular setae long to very long on I–VIII; tergites undivided, of approximately equal lengths; tergoventral setae of long setae among shorter setae; spiracles on tergites. Pleurites with anterior setae; without inner posterior prolongation. Usually with distinct brushes laterally on sternites IV–V, less developed on III and VI; sternites usually widely separated from pleurites, often with plate in separating membrane. Female: without anterior tergal setae; sternite VII usually separate from subgenital plate and usually with flat to flatly rounded posterior margin of subgenital plate; anus usually oval, without inner setae; genital chamber either without evident vestiture or with microtrichia. Male: without anterior setae on tergite I; often with anterior tergal setae at least on some of II–VIII, especially posterior segments; subgenital plate with

sternite VIII incorporated into it; genitalia variable, usually symmetrical with well-defined endomeral plate and parameres, tapering basal apodeme, and spiculate genital sac with pair of elongate sclerites.

Holomenopon goliath Clay

Holomenopon goliath Clay, 1961: 45. Type-host: *Anseranas semipalmata* (Latham).

This species was so well described by Clay (1961) and contains such a number of features unique among the known *Holomenopon* that redescription here is unnecessary. Both sexes differ from the other species in having a long medioanterior head seta associated with dorsal sensillum *d*, the pedicel of the antenna with a distal prolongation (Clay 1961: Fig. 2), a longer outer mid-dorsal head seta, the prosternal plate of somewhat different shape (Clay 1961: Fig. 3), lateral setae on sternites IV–V numerous but not forming well-developed brushes, pleurites on each segment anteriorly closer to sternites, and large dimensions. The female has sternite VII fused into the subgenital plate, considerably different shape and chaetotaxy of the subgenital plate (Clay 1961: Fig. 8), and a unique chaetotaxy of the anus. The male possesses an unusual asymmetrical ventral terminalia (Clay 1961: Fig. 5) and asymmetrical genitalia (Clay 1961: Fig. 6, 7).

Material Examined.—1 ♀, 3 ♂, *Anseranas semipalmata*, Australia.

Holomenopon böhmi Eichler

Holomenopon böhmi Eichler, 1954: 151. Type-host: *Coscoroba coscoroba* (Molina).

I have seen no material from the type-host. There is a chance that this is not the correct host, since the species was described from a male that was taken from a bird in a Vienna zoological garden. The description is lacking in detail; however, an illustration of the prosternal plate (Eichler 1954: Fig. 1) clearly shows the louse to be in the correct genus. The other illustration, that of the male genitalia (Eichler 1954: Fig. 2), shows unique parameres each bearing several small setae. If one assumes that these parameres are correctly illustrated, then *H. böhmi* is separable from all other males of *Holomenopon* that I have seen.

leucoxanthum-group

The 11 species placed in this group share the following features:

- (1) Female anus with 4 atypical setae in ventral anal fringe (Fig. 5, 15, 21);
- (2) male genitalia of type exemplified by Fig. 4, 14, 18, 19, and 25, elongate and usually without markedly expanded endomeral plate;
- (3) metasternal plate of type in Fig. 8, with 15–25 setae;
- (4) posterior postmental setae of a long and short seta (Fig. 12);
- (5) metanotum medioanteriorly with only 2 setae;
- (6) male usually with anterior tergal setae at least on VIII.

Holomenopon leucoxanthum (Burmeister),
sensu lato
(Fig. 2-13)

- Menopon leucoxanthum* Burmeister, 1838, Handb. Entomol. 2: 440. Type-host: *Anas crecca* L.
Menopon lunarium Rudow, 1869, Z. Ges. Naturwiss. 34: 402. Type-host: *Platypus nigra* = *Melanitta nigra* (L.).
 NEW SYNONYMY.
Menopon albofasciatum Piaget, 1880, Pediculines: 496. Type-host: *Tadorna vulpanser* (*Anas tadorna*) = *Tadorna tadorna* (L.). NEW SYNONYMY.
Menopon nyrocae Blagoveshtchensky, 1940, Mag. Parasit. Inst. Zool. Acad. Sci. URSS 8: 25. Type-host: *Nyroca ferina* = *Aythya ferina* (L.). NEW SYNONYMY.
Menopon leucoxanthum var. *marecae* Blagoveshtchensky, 1940, Mag. Parasit. Inst. Zool. Acad. Sci. URSS 8: 27. Type-host: *Mareca penelope* = *Anas penelope* L.
Holomenopon concii Eichler, 1943, Mitt. Münch. Entomol. Ges. 33: 237. Type-host: *Sarkidiornis melanotos* (Pennant). NEW SYNONYMY.
Holomenopon dendrocygni Carriker, 1955, Bol. Entomol. Venezol. 11: 33. Type-host: *Dendrocygna viduata* (L.). NEW SYNONYMY.
Holomenopon hanslöhrl Eichler, 1958, Nachr. Naturw. Mus. Aschaffenburg, no. 58: 62. Type-host: *Nyroca ferina* = *Aythya ferina*. NEW SYNONYMY.

FEMALE.—Much as in Fig. 1, but with details of terminalia as in Fig. 5 and 9. (1) Preocular seta 10 as short as or shorter than seta 8 (Fig. 2). (2) Short marginal pronotal setae 3, 5, 7, and 9 of approximately same size. (3) Metanotal marginally with 8 long setae (occasionally 9) crossing following tergite. (4) Marginal tergal setae: I, 21-29; II, 22-32; III-V, 20-38; VI, 16-36; VII, 15-32; VIII, 10-21. (5) Last tergite as in Fig. 9, with 2 very long setae each side with alveoli positioned as shown; seta anterior to these usually shorter and finer than seta immediately posterior to them; with total of 5-8 inner posterior setae. (6) Sternal setae: I, 6-14; II, 24-41; III, 33-71; IV-V, 48-113; VI, 42-71; VII, 38-64; subgenital plate, 37-62. (7) Anus as in Fig. 5; ventral fringe of 22-32 setae, including 4 atypical setae appearing to be composed almost solely of base; dorsal fringe of 22-38 setae, more or less of equal length; thin preanal plate. (8) Lateroposterior corner of genital chamber without conspicuous spiculation. (9) Dimensions: temple width 0.54-0.63, prothorax width 0.41-0.51, metathorax width 0.51-0.60, and total length 1.70-2.11.

MALE.—Abdomen as in Fig. 10. (1) Preocular seta 10 as short as or shorter than seta 8. (2) Marginal tergal setae: I, 21-29; II, 23-31; III, 23-37; IV, 25-40; V-VII, 23-44; VIII, 20-35. (3) Anterior tergal setae: II, 0-3; III, 0-21; IV, 0-49; V, 0-59; VI, 0-82; VII, 3-140; VIII, 35-175; IX, 48-125. (4) Sternal setae: I, 5-10; II, 21-37; III, 26-66; IV-V, 41-111; VI, 32-69; VII, 28-55; VIII, 21-40; subgenital plate, 14-27. (5) Genitalia as in Fig. 4; genital sclerites long (0.10-0.15), slender, typically V-shaped; endomeral plate shaped as shown; basal apodeme slender; width 0.09-0.12. (6) Dimensions: temple width 0.52-0.60, prothorax width 0.39-0.46, metathorax width 0.44-0.54, and total length 1.44-1.87.

The female is distinctive from all other females of

the known species of *Holomenopon* by possession of the 4 atypical setae in the ventral anal fringe (Fig. 5). The male is best distinguished by its type of genitalia and genital sclerites (Fig. 4) in conjunction with the typically large number of anterior tergal setae on the posterior segments.

Kéler (1942) gave an excellent series of illustrations of "*Eidmanniella leucoxantha* (Nitzsch)" based on the Nitzsch material in the Halle collection. Since this material has subsequently been destroyed, this description represents the soundest basis for correct association of material from *Anas crecca* with the name *H. leucoxanthum*. These figures are, with 1 exception, in excellent agreement with the species as just described. Such critical features as female with only 8 long marginal metanotal setae and with fairly even dorsal anal fringe setae and the male genitalia virtually identical to my Fig. 4 support this statement. The only point of real concern is that Kéler (1942) did not show the 4 atypical setae in the ventral anal fringe. He did, however, show 4 large setal bases which are comparable in size and placement to the 4 atypical setae, but these large bases bear short setae. It is my conjecture that, when illustrating the anal fringes, he felt that these 4 setae were broken off and that he inserted short setae in his illustration.

The only other *Holomenopon* of this general type that occurs among various species of *Anas* is *H. setigerum* (Blagoveshtchensky). Whereas this species does have 4 ventral anal fringe setae somewhat comparable to those shown by Kéler (1942: Fig. 18c), the number of long marginal metanotal setae, the lengths of the dorsal anal fringe setae, and the male genitalia are quite different. In addition, Kéler stated that this material was identical with material he had from "*Oidemia nigra* Lin."; the only specimens I have seen from *Melanitta nigra* are those of *H. leucoxanthum* as interpreted here.

I have specimens on loan from Drs. K. C. Emerson and Theresa Clay, labeled by them as *H. leucoxanthum*, that support my interpretation as being consistent with theirs. To avoid further confusion, it is desirable to designate a neotype to stabilize this name for the species with female bearing 4 unique setae in the ventral anal fringe.

The male lectotype and 2 ♀ of *M. albofasciatum* in the British Museum (Natural History) have been determined by Dr. Clay to be conspecific with *H. leucoxanthum*. I have seen no material from *Aythya ferina*, the type-host of both *H. nyrocae* and *H. hanslöhrl*; the descriptive details and female illustration of the former, in conjunction with the host, justify this synonymy; the latter name is based on a male, with no reference to the much earlier name for lice from the same host species, and the few descriptive details that are present indicate *H. hanslöhrl* to be the same as *H. nyrocae* and thereby also a junior synonym of *H. leucoxanthum*.

Material Examined.—Neotype ♀, *Anas crecca crecca*, Chao Chou, Ping-tung Hsien, Formosa, 27 Dec. 1960, R. E. Kuntz, PF 10094; in U. S. National

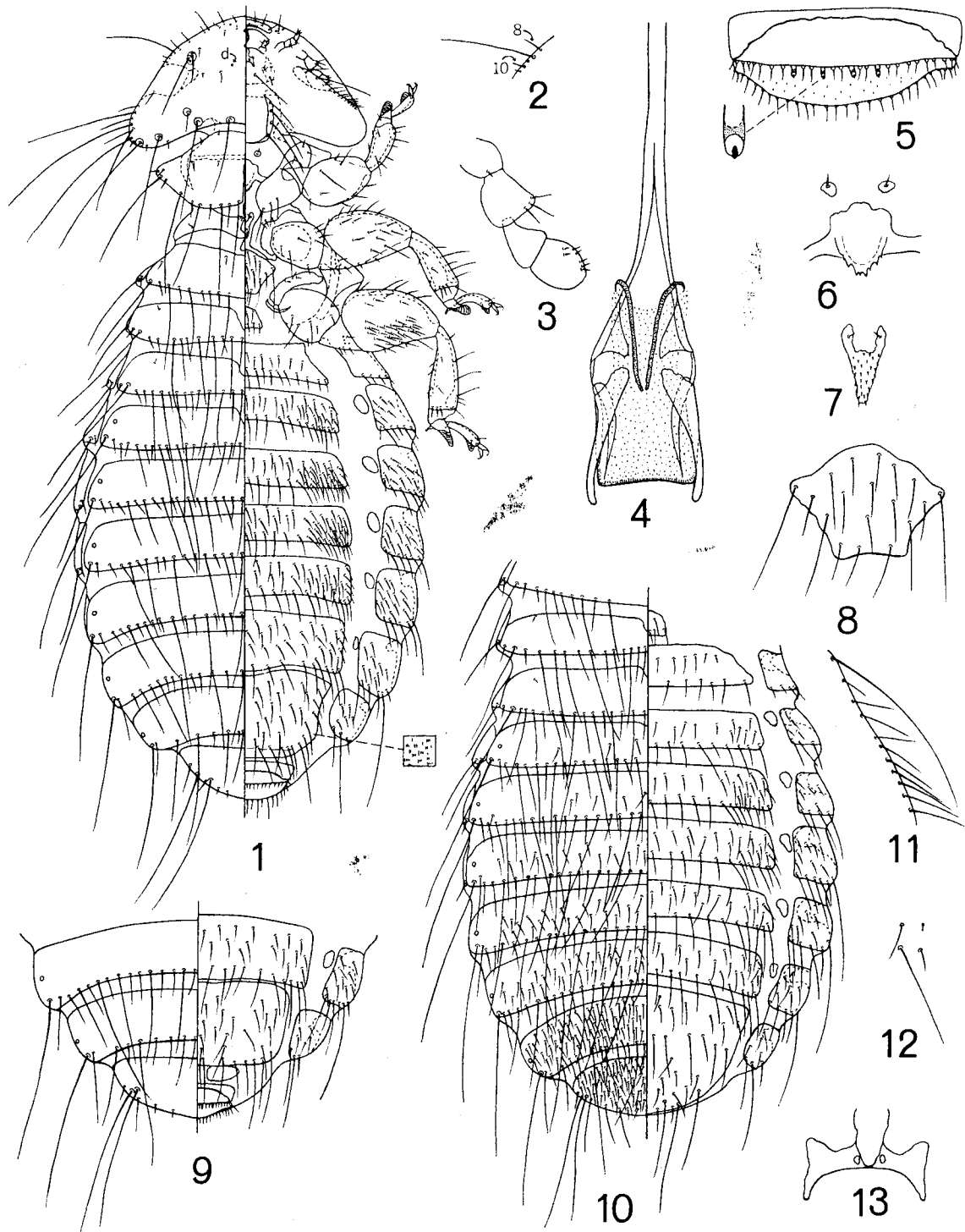


FIG. 1.—*H. setigerum*, ♀.

FIG. 2-13.—*H. leucoxanthum*. 2, Preocular setae; 3, antenna; 4, ♂ genitalia; 5, ♀ anus; 6, prosternal plate; 7, mesosternal plate; 8, metasternal plate; 9, ♀ terminalia; 10, ♂ abdomen; 11, subocular setae; 12, postmental setae; 13, hypopharyngeal sclerites.

Museum collection. Other material: 1 ♂, *Anas americana* Gmelin, U.S.A.; 1 ♀, *A. clypeata* L., U.S.A.; 2 ♀, 4 ♂, *A. cyanoptera* Vieillot, U.S.A.; 12 ♀, 2 ♂, *A. platyrhynchos* L., U.S.A., Formosa; 1 ♀, 1 ♂, *A. strepera* L., U.S.A.; 4 ♀, 4 ♂, *A. superciliosa* Gmelin, Rennell Is., W. Australia; 10 ♀, 7 ♂, *Anser anser* (L.), Formosa, Thailand; 10 ♀, 6 ♂, *Aythya affinis* (Eyton), U.S.A., Canada, Canal Zone; 85 ♀, 64 ♂, *A. americana* (Eyton), U.S.A.; 5 ♀, 6 ♂, *A. australis* Eyton, W. Australia; 1 ♀, 5 ♂, *A. collaris* (Donovan), U.S.A.; 1 ♀, 1 ♂, *A. fuligula* (L.), Switzerland; 2 ♀, *A. marila* (L.), England; 84 ♀, 63 ♂, *A. valisineria* (Wilson), U.S.A.; 4 ♀, 2 ♂, *Branta canadensis* (L.), no locality; 2 ♀, *Clangula hyemalis* (L.), Iceland; 1 ♀, 1 ♂, *Dendrocygna arcuata* (Horsfield), Australia; 1 ♀, 2 ♂, *D. bicolor* (Vieillot), Colombia, Kenya; 2 ♂, *D. eytoni* (Eyton), N. Queensland; 7 ♀, 5 ♂, *D. javanica* (Horsfield), Thailand; 2 ♀, 5 ♂, *D. viduata*, British Guiana; 6 ♀, 1 ♂, *Melanitta nigra*, U.S.A., Sweden, Ross-Shire; 2 ♂, *Netta erythrophthalma* (Wied), So. Africa; 2 ♀, *N. rufina* (Pallas), Rajputana; 4 ♀, 4 ♂, *Oxyura jamaicensis* (Gmelin), U.S.A.; 23 ♀, 22 ♂, *Sarkidiornis melanotos*, Uganda, Port. East Africa; 1 ♂, *Tadorna radjah* (Lesson), Australia; 1 ♀, *Bucephala albeola* (L.), Alaska.

Holomenopon setigerum (Blagoveshtchensky)

(Fig. 1, 14, 15)

Menopon setigerum Blagoveshtchensky, 1948, Mag. Parasit. Inst. Zool. Acad. Sci. URSS 10: 260. Type-host: *Spatula clypeata* = *Anas clypeata* L.

FEMALE.—As in Fig. 1. (1) Preocular seta 10 shorter than seta 8. (2) Pronotal marginal setae 7 and 9 as short as to variably longer than 3 and 5. (3) Metanotum marginally with 10 long setae. (4) Marginal tergal setae: I, 24–30; II, 27–34; III–V, 27–42; VI, 21–33; VII, 18–32; VIII, 12–19. (5) Last tergite with 2 very long setae each side with alveoli well separated; seta anterior to these usually longer and stouter than seta posterior to them; with total of 6 inner posterior setae. (6) Sternal setae: I, 7–12; II, 25–35; III, 34–82; IV–V, 50–125; VI, 40–80; VII, 37–70; subgenital plate, 41–55. (7) Anus as in Fig. 15; ventral fringe of 24–30 setae, including 4 atypical setae as shown, with terminal portion of these setae at least as long as base; dorsal fringe of 18–24 setae, of longer among shorter setae; thick preanal plate. (8) Lateroposterior corner of genital chamber with conspicuous spiculation as in square in Fig. 1, spiculation often extending across posterior vulval margin. (9) Dimensions: temple width 0.58–0.64, prothorax width 0.45–0.50, metathorax width 0.53–0.63, and total length 1.81–2.15.

MALE.—(1) Preocular seta 10 shorter than seta 8. (2) Marginal tergal setae: I, 26–29; II, 28–37; III, 30–47; IV–VI, 33–53; VII, 27–47; VIII, 20–40. (3) Anterior tergal setae: II, 0; III, 0–11; IV, 1–29; V, 1–38; VI, 1–77; VII, 1–111; VIII, 49–180; IX, 104–150. (4) Sternal setae: I, 6–11; II, 25–35; III, 35–66; IV, 61–101; V, 51–90; VI, 39–74; VII, 35–

63; VIII, 27–37; subgenital plate, 22–28. (5) Genitalia as in Fig. 14; genital sclerites short (0.07–0.11), irregularly thickened; endomerall plate sharply defined, with pointed corners; basal apodeme thick; width 0.11–0.13. (6) Dimensions: temple width 0.57–0.63, prothorax width 0.44–0.47, metathorax width 0.52–0.59, and total length 1.51–1.89.

I have found no satisfactory means for separating the female of *H. setigerum* from females of *H. acutae* and *H. bucephalae*, n. spp.; these are characterized as having a ventral anal fringe with the 4 atypical setae as in Fig. 15, 10 long marginal metanotal setae extending across the following tergite, an irregular dorsal anal fringe, and a spiculation on the latero-posterior corners of the genital chamber (Fig. 1). The male genitalia type (Fig. 14) is shared by *H. acutae*, but these 2 species can be separated by the much reduced number of anterior tergal setae for *H. acutae*.

Material Examined.—9 ♀, 4 ♂, *Anas clypeata*, U.S.A.; 1 ♀, *A. crecca*, no locality (probably U.S.A.); 14 ♀, 5 ♂, *A. cyanoptera*, U.S.A.; 2 ♀, *A. discors* L., U.S.A.; 1 ♀, *A. querquedula* L., Nepal; 10 ♀, 3 ♂, *A. smithii* (Hartert), Transvaal; 59 ♀, 26 ♂, *A. strepera*, U.S.A.; 5 ♀, 3 ♂, *Chenonetta jubata* (Latham), Australia; 4 ♀, 1 ♂, *Cairina scutulata* (S. Müller), Thailand.

Holomenopon acutae, n. sp.

Type-host: *Anas acuta* L.

FEMALE.—As for *H. setigerum*.

MALE.—As for *H. setigerum*, except as follows. (2) Marginal tergal setae: I, 19–27; II, 20–28; III, 26–30; IV, 24–28; V, 25–28; VI, 23–28; VII, 22–27; VIII, 18–23. (3) Anterior tergal setae: II–VII, 0; VIII, 16–26; IX, 57–65. (4) Sternal setae: I, 7; II, 23–25; III, 33–39; IV, 53–61; V, 45–52; VI, 43–45; VII, 37–39; VIII, 22–26; subgenital plate, 19–20. (6) Dimensions: temple width 0.57, prothorax width 0.42, metathorax width 0.51–0.52, and total length 1.67–1.74.

The female is apparently inseparable from those of *H. setigerum* and *H. bucephalae*. The male genitalia are similar to those of *H. setigerum* (Fig. 14), but the male of *H. acutae* has markedly fewer anterior tergal setae than *H. setigerum* as well as a tendency for fewer sternal and marginal tergal setae and slightly smaller thoracic dimensions.

Material Examined.—Holotype ♂, *Anas acuta*, Israel, 27 June 1959, Brit. Mus. 1959–541; in British Museum (Natural History) collection. Paratypes: 1 ♀, same data as holotype; 1 ♀, Ogden Bay, Utah, 27 Nov. 1938, B. C. Taylor. Other material: 1 ♀, 1 ♂, *A. capensis* Gmelin, South Africa.

Holomenopon clauseni, n. sp.

(Fig. 19, 20)

Type-host: *Aix sponsa* (L.).

FEMALE.—(1) Preocular seta 10 shorter than seta 8. (2) Marginal pronotal setae 3, 5, 7, and 9 all short, or 9 variably longer. (3) Metanotum mar-

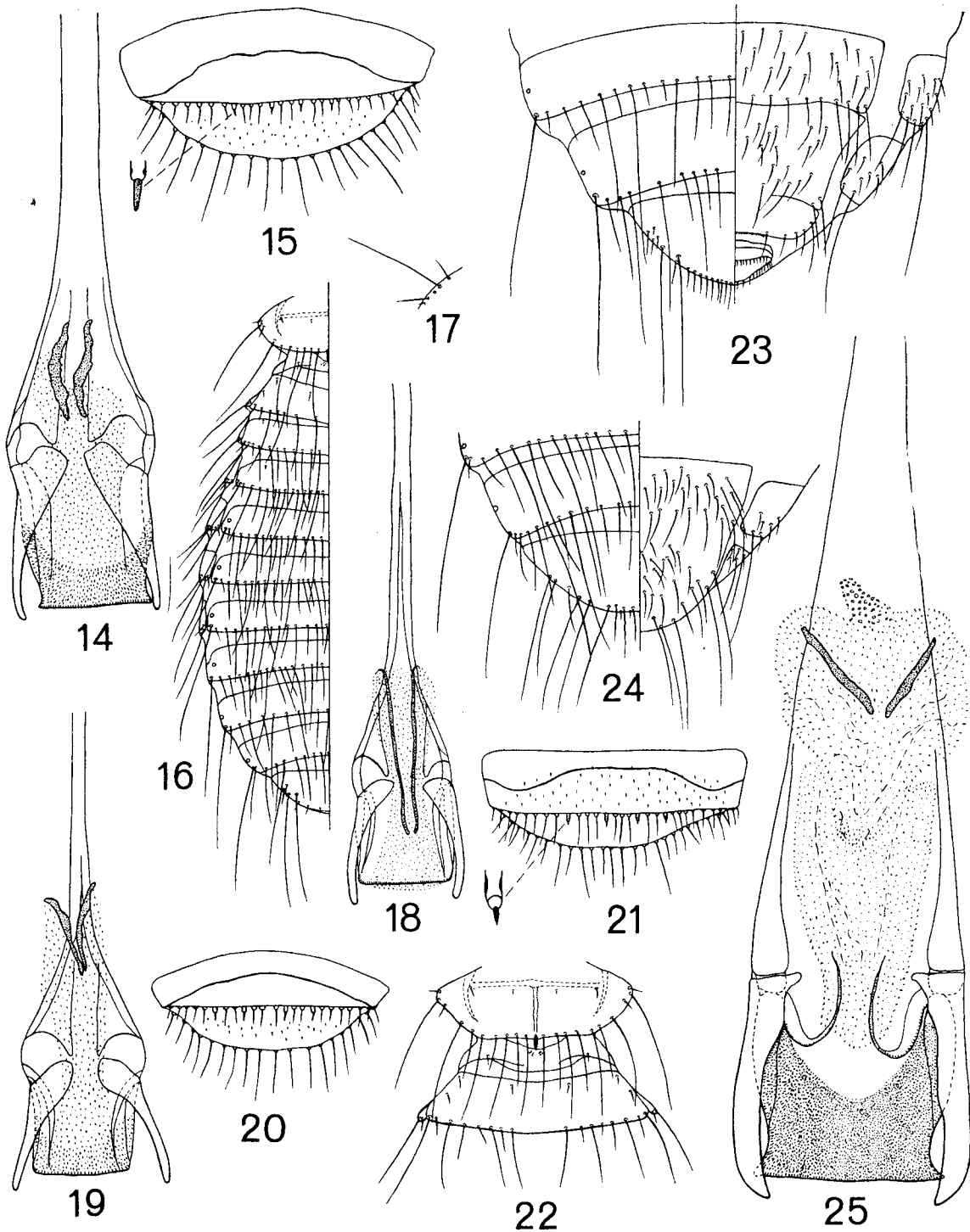


FIG. 14, 15.—*H. setigerum*. 14, ♂ genitalia; 15, ♀ anus.
 FIG. 16.—*H. brevitboracicum*, dorsal ♀ thorax and abdomen.
 FIG. 17, 18.—*H. tadornae*. 17, Preocular setae; 18, ♂ genitalia.
 FIG. 19, 20.—*H. clauseni*. 19, ♂ genitalia; 20, ♀ anus.
 FIG. 21, 22.—*H. tumidum*. 21, ♀ anus; 22, ♀ thorax.
 FIG. 23–25.—*H. cairinae*. 23, ♀ terminalia; 24, ♂ terminalia; 25, ♂ genitalia.

ginally with 8 (rarely 9) long setae. (4) Marginal tergal setae: I, 19-27; II-V, 20-35; VI, 18-31; VII, 14-27; VIII, 10-18. (5) Last tergite often as for *H. setigerum*, but with variable position of alveoli of very long setae. (6) Sternal setae: I, 6-11, II, 21-33; III, 34-54; IV-V, 53-77; VI, 43-66; VII, 34-63; subgenital plate, 46-56. (7) Anus as in Fig. 20; ventral fringe of 21-30 setae, including 4 atypical setae much as shown for *H. setigerum* (Fig. 15), but these usually almost as long as adjacent setae in fringe; dorsal fringe of 18-22 setae, of essentially similar lengths except laterally, but somewhat variable in this. (8) Lateroposterior corner of genital chamber weakly to conspicuously spiculate as for *H. setigerum*. (9) Dimensions: temple width 0.54-0.60, prothorax width 0.41-0.46, metathorax width 0.48-0.58, and total length 1.72-1.98.

MALE.—Essentially as for *H. leucoxanthum* in (1)-(4). (5) Genitalia as in Fig. 19; genital sclerites short (0.08-0.10), slender, somewhat irregular in shape; otherwise close to those of *H. leucoxanthum*. (6) Dimensions: temple width 0.53-0.58, prothorax width 0.40-0.45, metathorax width 0.44-0.51, and total length 1.45-1.76.

The female resembles that of *H. setigerum*, but differs in having only 8 long marginal metanotal setae and in the relative lengths of the setae in the anal fringes. The male is more like *H. leucoxanthum*, but the genital sclerites are typically shorter.

Material Examined.—Holotype ♂, *Aix sponsa*, Onamia, Minn., U.S.A., 9 Oct. 1966, P. Clausen, 66-219; in University of Minnesota collection. Paratypes (from type-host): 11 ♀, 9 ♂, same data as holotype; 129 ♀, 131 ♂, Albany Co., N. Y., 17 Aug. 1964, R. C. Dalglish; 10 ♀, 6 ♂, State College, Miss., E. W. Stafford; 4 ♀, 4 ♂, Winchester, N. H., 22 Sept. 1934, L. R. Nelson; 2 ♀, 2 ♂, Miami, Fla., 24 Oct. 1927; 1 ♀, Wayne Co., Ind., 13 Aug. 1964, W. H. Buskirk; 1 ♀, Jeanerette, La., 14 Aug. 1927, Dikman; 1 ♀, Raleigh, N. C., 26 Nov. 1896, Brasley Bros. Other material: 7 ♀, 3 ♂, *Anas discors*, U.S.A.; 6 ♀, 1 ♂, *Bucephala albeola*, U.S.A.

Holomenopon tumidum (Piaget)

(Fig. 21, 22)

Menopon tumidum Piaget, 1885, Pediculines, Suppl.: 151.

Type-host: *Plectropterus gambensis* (L.).

Menopon africanum Kellogg & Paine, 1911, Bull. Entomol. Res. 2: 149. Type-host: *Plectropterus gambensis* (L.). NEW SYNONYMY.

FEMALE.—(1) Preocular seta 10 same length to somewhat longer than seta 8. (2) Marginal pronotal setae 5, 7, and 9 longer than seta 3 (Fig. 22). (3) Metanotum marginally with 8 (less often 7) long setae (Fig. 22). (4) Marginal tergal setae: I, 22-24; II, 30-34; III-VI, 32-37; VII, 29-34; VIII, 18-20. (5) Last tergite as for *H. leucoxanthum*, but with 8-11 inner posterior setae. (6) Sternal setae: I, 10-12; II, 34-37; III, 52-58; IV-V, 74-106; VI, 63-72; VII, 50-64; subgenital plate, 43-51. (7) Anus as in Fig. 21; ventral fringe of 29-35 setae, including 4 atypical setae with terminal portion dis-

tinctly shorter than base; dorsal fringe of 24-33 setae, of variably irregular lengths; preanal plate as shown.

(8) Lateroposterior corner of genital chamber without conspicuous spiculation. (9) Dimensions: temple width 0.65-0.70, prothorax width 0.49-0.51, metathorax width 0.61-0.64, and total length 2.16-2.28.

MALE.—(1) Preocular setae as for female. (2)-(4) Tergal and sternal setae as for *H. leucoxanthum*. (5) Genitalia as for *H. clauseni*, but with genital sclerites variably shaped from near that of Fig. 19 to being thicker and curved anteriorly. (6) Dimensions: temple width 0.67-0.68, prothorax width 0.47-0.49, metathorax width 0.54-0.55, and total length 1.88-1.97.

Both sexes have a temple width distinctly greater than any of the foregoing members of this group. The female with longer marginal pronotal setae 5, 7, and 9, and with the unique atypical setae in the ventral anal fringe is further separable from other females.

The male lectotype, as well as a male and a female of the type-series of *M. tumidum* in the British Museum (Natural History), has been found by Dr. Clay to be in essential agreement with the description as given for the species. Two females of *M. africanum* also were studied by Dr. Clay and found to be conspecific with *M. tumidum*; I designate here as a lectotype of *M. africanum* the female on slide no. 32 in the British Museum (Natural History) compared by Dr. Clay with my figures and description of *H. tumidum*.

Material Examined.—5 ♀, 4 ♂, *Plectropterus gambensis*, Transvaal, Belgian Congo, Portuguese, East Africa, N. Rhodesia.

Holomenopon brevitboracicum (Piaget)

(Fig. 16)

Menopon brevitboracicum Piaget, 1880, Pediculines: 495. Type-host: *Cygnus nigricollis* = *C. melanocoryphus* (Molina).

FEMALE.—Thorax and abdomen as in Fig. 16. (1) Preocular seta 10 about same length to somewhat longer than seta 8 (Fig. 17). (2) Marginal pronotal setae 7 and 9 distinctly longer than setae 3 and 5 (Fig. 16). (3) Metanotum marginally with 12 (less often 11) long setae. (4) Marginal tergal setae: I, 21-29; II, 26-35; III-V, 26-46; VI, 21-43; VII, 19-39; VIII, 12-26; generally longer marginal tergal setae, lacking series of shorter thicker setae laterally (Fig. 16). (5) Last tergite much as for *H. leucoxanthum* (Fig. 9). (6) Sternal setae: I, 4-8; II, 24-32; III, 38-60; IV, 63-93; V, 56-86; VI, 45-70; VII, 37-58; subgenital plate, 38-53. (7) Anus with ventral fringe as in Fig. 15, with 28-35 setae; dorsal fringe of 27-33 setae, of fairly equal lengths; preanal plate much as in Fig. 15. (8) Lateroposterior corner of genital chamber without conspicuous spiculation. (9) Dimensions: temple width 0.58-0.63, prothorax width 0.44-0.49, metathorax width 0.54-0.60, and total length 1.88-2.15.

MALE.—(1) Preocular setae as for female. (2) Marginal tergal setae: I, 19-26; II, 26-31; III, 29-

34; IV, 30-38; V-VII, 26-39; VIII, 21-26. (3) Anterior tergal setae: II-IV, 0; V-VI, 0-2; VII, 0-10; VIII, 7-54; IX, 62-125; anterior setae on V-VIII, when present, mostly lateral. (4) Sternal setae: I, 5-6; II, 21-28; III, 37-52; IV-V, 46-74; VI, 42-56; VII, 33-45; VIII, 22-34; subgenital plate, 19-24. (5) Genitalia essentially as for *H. clauseni* (Fig. 19). (6) Dimensions: temple width 0.56-0.58, prothorax width 0.42-0.45, metathorax width 0.49-0.54, and total length 1.73-1.91.

The ventral anal fringe type and temple width place the female close to *H. setigerum* and *H. clauseni*; however, it is separated by more dorsal anal fringe setae, by lacking lateroposterior genital chamber spiculation, by a longer preocular seta 10, by having generally longer tergal setae, and by having usually 12 long marginal metanotal setae. The male, by its fewer anterior tergal setae, is most similar to *H. acutae* and *H. bucephalae*; it is separable from the former by the shape of the genital sclerites and from the latter by differences in dimensions and number of marginal tergal setae.

The male lectotype of *M. brevithoracicum* in the British Museum (Natural History) was compared by Dr. Clay with the foregoing description and found to be essentially in agreement with it.

Material Examined.—38 ♀, 27 ♂, *Cygnus melanocoryphus*, Paraguay; 11 ♀, 4 ♂, *Chloephaga picta* (Gmelin), Falkland Is.; 2 ♀, *C. rubidiceps* Sclater, South America.

Holomenopon bucephalae, n.sp.

Type-host: *Bucephala albeola* (L.).

FEMALE.—Apparently inseparable from *H. setigerum* and *H. acutae*.

MALE.—(1) Preocular seta 10 shorter than seta 8. (2) Marginal tergal setae on II-VIII, respectively, 23, 24, 24, 25, 25, 25, and 20. (3) Anterior tergal setae: II-VII, 0; VIII, 11; IX, 55. (4) Sternal setae on I-VIII, respectively, 4, 21, 28, 44, 38, 35, 26, and 19; subgenital plate, 17. (5) Genitalia as for *H. clauseni* (Fig. 19), with somewhat more pointed endomeral plate corners. (6) Dimensions: temple width 0.54, prothorax width 0.40, metathorax width 0.49, and total length 1.62.

The male, with anterior tergal setae only on VIII, is most like *H. brevithoracicum* and *H. acutae*; it is possibly separable from the former by having fewer sternal and marginal tergal setae and a smaller head and thorax width, and from the latter by the shape of the genital sclerites. The female is distinguishable from that of *H. brevithoracicum* by shorter pronotal setae 7 and 9, by fewer dorsal anal fringe setae, by having lateroposterior genital chamber spiculation, and by having generally shorter tergal setae.

Material Examined.—Holotype ♂, *Bucephala albeola*, Charleston, S. C., 1-6-34, G. R. Lunz, Jr., Bish. no. 21251; in the U. S. National Museum collection. Paratype: 1 ♀, same data as holotype. Other material: 2 ♀, *B. clangula*, U.S.A.—tentatively placed as *H. bucephalae* in absence of males.

Holomenopon tadornae (Gervais), sensu lato

(Fig. 17, 18)

Philopterus tadornae Gervais, 1844, In Walckenaer, Hist. Nat. Ins. 3: 323. Type-host: *Anas tadorna* = *Tadorna tadorna* (L.).

Menopon extraneum Piaget, 1880, Pediculines: 506. Type-host: *Cavia cobaya* (error) = some anseriform species. NEW SYNONYMY.

Menopon eulassium Kellogg, 1910, Wiss. Ergebn. Schwed. Zool. Exped. Kilimandjaro 3: 54. Type-host: *Phalacrocorax africanus* (error). NEW SYNONYMY.

Holomenopon museigottingense Eichler, 1954, Beitr. zur Fauna Perus 4: 37. Type-host: *Chloephaga melanoptera* (Eyton). NEW SYNONYMY.

Holomenopon boetticheri Eichler, 1955, Prophylaxe 2: 52. Type-host: *Alopochen aegyptiacus* (L.). NEW SYNONYMY.

FEMALE.—(1), (2), and (4)-(9) As for *H. brevithoracicum*. (3) Metanotum marginally with 8 long setae.

MALE.—As for female in (1). (2)-(4) Essentially as for *H. leucoxanthum*. (5) Genitalia as in Fig. 18; most features as for *H. leucoxanthum*, but with very long genital sclerites (0.16-0.19), slender, subparallel. (6) As for *H. leucoxanthum*.

The combination of the longer preocular seta 10 and marginal pronotal setae 7 and 9, with only 8 long marginal metanotal setae, separates the female from those of the other group species except for *H. transvaalense* (Bedford) and *H. obscurum* (Piaget); the quantitative tergal and anal chaetotaxy is used to separate these. The male is easily separated from all *Holomenopon* except *H. transvaalense* by its characteristic very long slender sclerites associated with the genital sac; quantitative tergal chaetotaxy separates these 2 species.

The male lectotype, in addition to 1 ♂ and 2 ♀ of *M. extraneum*, has been compared by Dr. Clay with the foregoing description and found to be essentially in agreement with it. Dr. Clay had also previously examined the type-specimen of *M. eulassium* and had noted on the slide that it was a junior synonym of *H. tadornae*, sens. lat.; I have been able to obtain the loan of that specimen and agree with Dr. Clay in the synonymy.

Material Examined.—20 ♀, 13 ♂, *Tadorna tadorna*, England, Scotland; 1 ♀, 6 ♂, *T. ferruginea* (Pallas), Rajputana, Siam; 15 ♀, 24 ♂, *Alopochen aegyptiacus*, British East Africa, Belgian Congo, Sudan, Camerouns, Uganda, South Africa, Ethiopia; 2 ♂, *Branta bernicla* (L.), England: 17 ♀, 10 ♂, *Chloephaga melanoptera*, New York Zoo; 1 ♂, holotype of *Menopon eulassium* Kellogg from erroneous host.

Holomenopon transvaalense (Bedford)

Menopon transvaalensis Bedford, 1920, Rep. Vet. Res. S. Afr. 7-8: 716. Type-host: Domestic duck (probably *Anas platyrhynchos* L. or *Cairina moschata* (L.)).

FEMALE.—Close to *H. tadornae* in (1)-(3) and (8). (4) Marginal tergal setae on I-VIII, respectively, 37, 44, 52, 57, 53, 55, 49, and 33. (5) Last tergite with 9 inner posterior setae. (6) Sternal setae on I-VII, respectively, 12, 35, 71, 121, 112, 91, and 73; subgenital plate, 49. (7) Anus with ventral

fringe as in Fig. 15, with 45 setae; dorsal fringe of 40 setae. (9) Dimensions: temple width 0.61, prothorax width 0.45, metathorax width 0.62, and total length 2.28.

MALE.—Essentially as for *H. tadornae* in (1) and (3)-(5). (2) Marginal tergal setae on I-VIII, respectively, 34, 37, 48, 52, 53, 45, and 39. (6) Dimensions: temple width 0.61, prothorax width 0.48, metathorax width 0.55, and total length 1.88.

Both sexes are very similar to *H. tadornae*, even to males having apparently identical genitalia. However, *H. transvaalense* is readily separable by various quantitative features involving many more setae on tergal margins of both sexes as well as on the female anal fringes and sternites.

Material Examined.—1 ♀, 1 ♂, domestic duck, S. Africa—Homotype (from type-lot) of *H. transvaalense*, compared by G. H. E. Hopkins.

Holomenopon obscurum (Piaget)

Menopon obscurum Piaget, 1880, Pediculines: 497. Type-host: *Anas radjah* = *Tadorna radjah* (Lesson).

FEMALE.—(1) Preocular seta 10 approximately same length as seta 8. (2) Marginal pronotal setae 7 and 9 longer than 3 and 5. (3) Metanotum marginally with 8 long setae. (4) Marginal tergal setae: I, 27-32; II, 35-37; III-VI, 38-44; VII, 33-36; VIII, 18-23. (5) Last tergite essentially as in Fig. 9 (*H. leucoxanthum*); 5-6 inner posterior setae. (6) Sternal setae: I, 8-9; II, 29-33; III, 43-53; IV-V, 59-80; VI, 53-63; VII, 43-55; subgenital plate, 41-47. (7) Anus of type in Fig. 15; with 29-30 ventral fringe setae; 29-31 dorsal fringe setae in variably irregular row. (8) Lateroposterior corner of genital chamber without conspicuous spiculation. (9) Dimensions: temple width 0.55-0.59, prothorax width 0.40-0.43, metathorax width 0.56-0.58, and total length 1.82-1.96.

MALE.—(1) Preocular seta 10 as for female. (2) Marginal tergal setae: I, 27-31; II, 31-38; III, 35-46; IV, 40-48; V-VI, 42-51; VII, 36-42; VIII, 27-33. (3) and (4) As for *H. leucoxanthum*. (5) Genitalia similar to those of *H. leucoxanthum* (Fig. 4), with genital sclerites 0.11-0.13 long, vaguely defined but appearing to be slightly thicker than those shown. (6) Dimensions: temple width 0.58-0.60, prothorax width 0.40-0.44, metathorax width 0.52-0.53, and total length 1.70-1.76.

As mentioned earlier, the female is similar to both *H. tadornae* and *H. transvaalense*, and is separable from them only on the basis of quantitative tergal chaetotaxy, being intermediate between the other 2 species. On the other hand, the male has quite different genital sclerites, not having the very long slender sclerites of *H. tadornae* and *H. transvaalense*. It appears to be more like *H. leucoxanthum* or *H. clauseni*, but is separable on the basis of having more tergal setae on most segments.

Before obtaining the material from *Tadorna radjah*, I had concluded that *H. obscurum* was most likely conspecific with *H. tadornae*. However, subsequent study of the male lectotype of *M. obscurum*, with

genital sclerites difficult to discern, and the additional specimens from *T. radjah*, made it evident that the genital sclerites are not of the *H. tadornae* type; it would appear as if *T. radjah* has a species of *Holomenopon* different from that of related hosts.

Material Examined.—3 ♀, 4 ♂ (including ♂ lectotype of *M. obscurum* Piaget), *Tadorna radjah*, Papua (no locality for lectotype).

Holomenopon cairinae Eichler

(Fig. 23-25)

Holomenopon cairinae Eichler, 1943, Mitt. Münch. Entomol. Ges. 33: 236. Type-host: *Cairina moschata* (L.).

FEMALE.—(1) Preocular seta 10 shorter than seta 8. (2) Marginal pronotal setae 3, 5, 7, and 9 all short. (3) Metanotum marginally with 8 long setae. (4) Marginal tergal setae: I, 19-24; II, 22-26; III-VII, 25-34; VIII, 18-25. (5) Last tergite as in Fig. 23, with 2 very long setae on each side having total of 5-8 setae lateroanterior to these and with row of 17-22 stout medium to long inner posterior setae. (6) Sternal setae: I, 8-11; II, 21-31; III, 47-70; IV-V, 73-96; VI, 61-75; VII, 53-62; rather unusual subgenital plate with total of 46-59 setae, but with posterior margin having setae only laterally, with coarse-appearing median portion (Fig. 23). (7) Anus as in Fig. 23, displaced anteriorly from end of body; ventral fringe of 28-33 setae, including 4 atypical setae much as for *H. setigerum* (Fig. 15); dorsal fringe of 23-29 setae, short, hardly reaching end of body. (8) Lateroposterior corner of genital chamber variably spiculate. (9) Dimensions: temple width 0.65-0.69, prothorax width 0.53-0.57, metathorax width 0.59-0.65, and total length 2.14-2.37.

MALE.—(1) Preocular setae as for female. (2) Marginal tergal setae in range for female. (3) Without anterior tergal setae on I-IX, but with irregular row of 20 or so setae around posterior margin of last segment (Fig. 24). (4) Sternal setae: I, 10-15; II, 28-32; III, 61-67; IV, 89-102; V-VI, 73-90; VII, 55-65; VIII, 43-44; subgenital plate, 44-45. (5) Genitalia as in Fig. 25; very large and of unique structure; endomeral plate sharply defined, with pointed corners; thick basal apodeme; width 0.24-0.25. (6) Dimensions: temple width 0.65-0.67, prothorax width 0.50-0.53, metathorax width 0.56-0.59, and total length 2.06-2.13.

This species is highly characteristic in both sexes, easily separated from all other known species of the genus by the chaetotaxy of the female terminalia and by the structure and large size of the male genitalia. This is the only species of the group whose male is without anterior tergal setae on any segment.

Material Examined.—15 ♀, 7 ♂, *Cairina moschata*, Brazil, Ecuador, British Guiana.

clypeilargum-group

The 3 species placed in this group share the following features:

(1) Female anus as in Fig. 29, with numerous atypical pointed setae in ventral fringe;

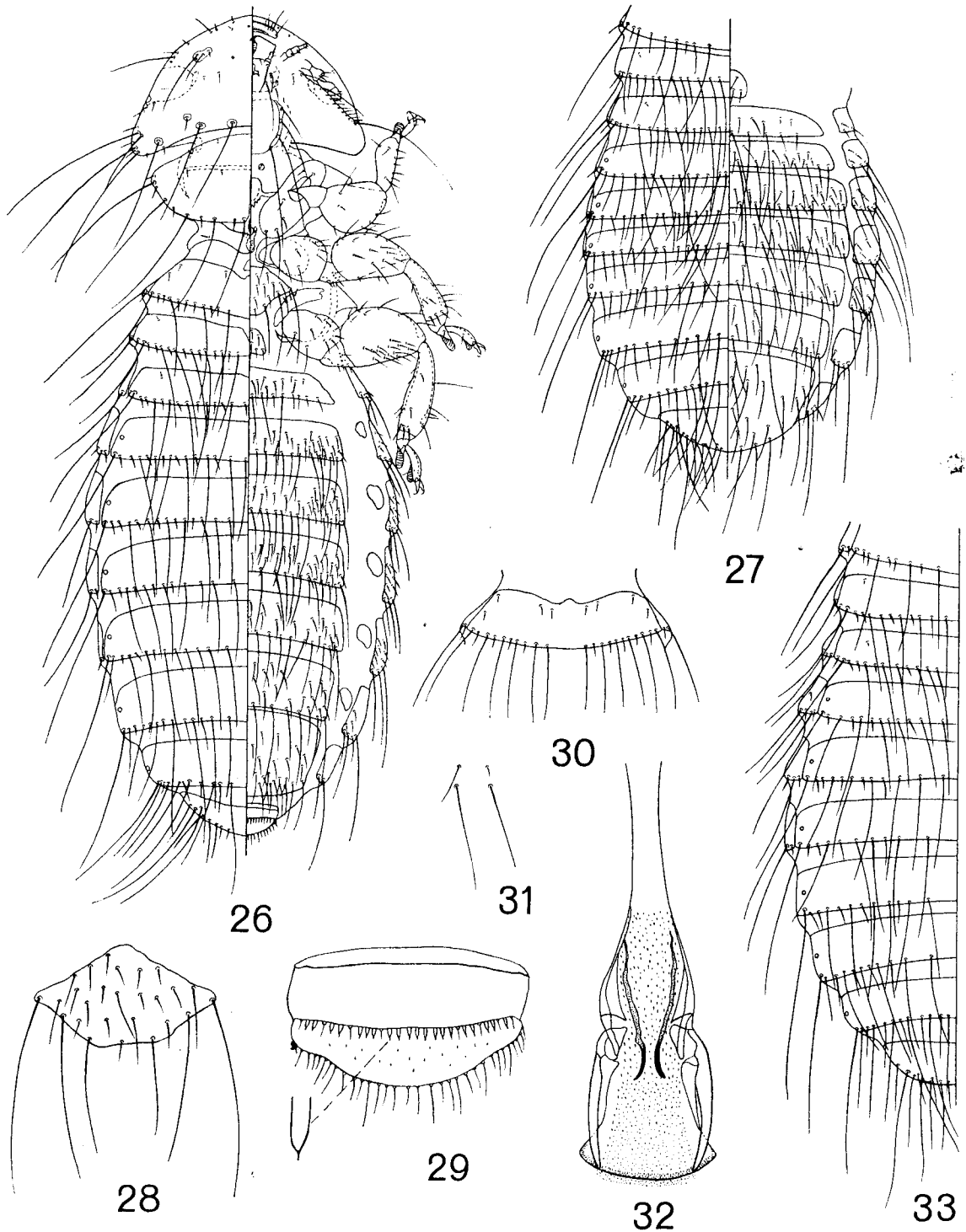


FIG. 26-29.—*H. clypeilargum*. 26, ♀; 27, ♂ abdomen; 28, metasternal plate; 29, ♀ anus.
 FIG. 30, 31.—*H. loomisii*. 30, Metanotum; 31, postmental setae.
 FIG. 32, 33.—*H. maxbeieri*. 32, ♂ genitalia; 33, dorsal ♂ abdomen.

(2) male genitalia as in Fig. 32, short and broad, with distally expanded endomerteral plate;

(3) metasternal plate of type in Fig. 28, with variable number of setae;

(4) posterior postmental setae either of a long and short seta (Fig. 12) or with both setae long (Fig. 31);

(5) metanotum medioanteriorly with 2 or 4 setae;

(6) male without anterior tergal setae on any segments.

Holomenopon clypeilargum Eichler, sensu lato

(Fig. 26-29)

Holomenopon clypeilargum Eichler, 1943, Mitt. Münch. Entomol. Ges. 33: 236. Type-host: *Anas acuta* L.

FEMALE.—As in Fig. 26. (1) Preocular seta 10 minute to absent. (2) Posterior postmental setae of a long and short seta. (3) Metanotum marginally with 8 long setae, medioanteriorly with 2 setae; metasternal plate with 26-35 setae. (4) Marginal tergal setae: I-V, 22-35; VI, 23-30; VII, 19-29; VIII, 17-25. (5) Last tergite as in Fig. 26, with 15-20 or so setae around posterior margin, of varying lengths. (6) Sternal setae: I, 7-12; II, 24-33; III, 46-72; IV-V, 61-92; VI, 45-61; VII, 32-50; subgenital plate, 35-44. (7) Anus with ventral fringe of 28-36 setae; dorsal fringe of 28-38 setae, of irregular lengths; thin preanal plate. (8) Lateroposterior corner of genital chamber without conspicuous spiculation. (9) Dimensions: temple width 0.56-0.62, prothorax width 0.44-0.49, metathorax width 0.49-0.55, and total length 1.94-2.04.

MALE.—Essentially as for female in (1)-(3). (4) Marginal tergal setae: I-VIII, 21-29; lengths as in Fig. 27, with all segments having finer longer setae laterally mediad to postspiracular setae; last tergite with 30-38 mostly long setae distributed around posterior margin. (5) Sternal setae: I, 5-7; II, 10-24; III, 27-42; IV-V, 32-54; VI, 25-33; VII, 15-24; VIII, 10-18; subgenital plate, 15-25. (6) Genitalia (Fig. 32) with pair of slender elongate genital sclerites, each 0.13-0.16 long; width 0.10-0.11. (7) Dimensions: temple width 0.42-0.46, prothorax width 0.36-0.38, metathorax width 0.36-0.43, and total length 1.31-1.47.

The female of *H. clypeilargum* is apparently inseparable from that of *H. maxbeieri* Eichler; the male of *H. clypeilargum*, in being smaller and in having longer finer marginal tergal setae on the anterior segments, differs from that of the closely related *H. maxbeieri*. Both sexes of these 2 species, by having a long and a short posterior postmental setal pattern and by having only 2 medioanterior metanotal setae, differ from *H. loomisii* (Kellogg).

As will be discussed under the following species, series from 11 hosts represented by females only are tentatively included here as being *H. clypeilargum*.

Material Examined.—21 ♀, 3 ♂, *Anas crecca*, U.S.A., Formosa, Sweden; 9 ♀, 4 ♂, *A. clypeata*, U.S.A., England; 7 ♀, 1 ♂, *A. cyanoptera*, U.S.A.; 4 ♀, 2 ♂, *A. flavirostris* Vieillot, Bolivia; 2 ♀, 1 ♂,

A. querquedula, Nepal; 16 ♀, 1 ♂, *A. strepera*, Formosa, England; 1 ♀, 1 ♂, *Aythya valisineria*, U.S.A. Series based only on females: 3 ♀, *Anas acuta*, U.S.A., Marshall Is.; 12 ♀, *A. americana*, U.S.A.; 1 ♀, *A. discors*, U.S.A.; 4 ♀, *A. penelope*, Egypt, England; 2 ♀, *A. rubripes* Brewster, U.S.A.; 1 ♀, *A. undulata* DuBois, Kenya; 1 ♀, *Aythya collaris*, U.S.A.; 1 ♀, *A. marila*, Canada; 1 ♀, *A. novaeseelandiae* (Gmelin), New Zealand; 1 ♀, *Mergus cucullatus* L., U.S.A.; 1 ♀, *M. merganser* L., U.S.A.

Holomenopon maxbeieri Eichler

(Fig. 32, 33)

Holomenopon maxbeieri Eichler, 1954, Monatsh. f. Veterinarmed. 9: 284. Type-host: *Anas platyrhynchos* L.

FEMALE.—Essentially as for *H. clypeilargum* in (1)-(8). (9) Dimensions: temple width 0.58-0.63, prothorax width 0.46-0.53, metathorax width 0.51-0.60, and total length 1.97-2.27.

MALE.—(1)-(3) and (6) As for *H. clypeilargum*. (4) Marginal tergal setae: I-II, 18-25; III, 21-28; IV-VIII, 20-24; lengths as in Fig. 33, with principal feature in short stout setae just mediad to postspiracular setae on tergites I-IV or I-V; last tergite with 16-22 setae across posterior margin. (5) Sternal setae: I, 6-9; II, 19-30; III, 42-49; IV-V, 48-66; VI, 29-38; VII, 21-25; VIII, 13-15; subgenital plate, 17-25. (7) Dimensions: temple width 0.50-0.53, prothorax width 0.40-0.43, metathorax width 0.42-0.49, and total length 1.65-1.75.

Even though the females of *H. clypeilargum* and *H. maxbeieri* are apparently inseparable, with perhaps a tendency for *H. maxbeieri* to be somewhat larger, the differences between the males make it clear that 2 species are involved. The male of *H. maxbeieri* is consistently larger and has the shorter stouter marginal tergal setae on the anterior segments.

The available materials seem to indicate that the mallard has its own species of this group (*H. maxbeieri*) and that most of the remaining species of *Anas*, as well as birds in *Aythya* and possibly elsewhere, have *H. clypeilargum*. I have seen series of lice from 7 other *Anas* and *Aythya* species, all clearly representing *H. clypeilargum* on the basis of the males. It is for this reason that I have arbitrarily listed under *H. clypeilargum* the 11 series represented only by females as being more likely *clypeilargum* than *H. maxbeieri*.

If one is correct in assuming that *H. transvaalense* was taken from either *A. platyrhynchos* or *Cairina moschata*, then I would tend to favor the former as the correct host; *H. transvaalense* is very similar to *H. tadornae*, found on a group of hosts closely related to the mallard; the only louse I have seen from *C. moschata* is *H. cairinae*, a most unique form in both sexes. If this reasoning is correct, then it would make the mallard the possessor of 2 species of *Holomenopon* that are not shared by the other species of *Anas*.

Material Examined.—55 ♀, 28 ♂, *Anas platyrhynchos*, U.S.A., Hungary.

X

Holomenopon loomisii (Kellogg)

(Fig. 30, 31)

Menopon loomisii Kellogg, 1896, Proc. Calif. Acad. Sci. (2) 6: 162. Type-host: *Oidemias deglandi* = *Melanitta fusca* (L.).

FEMALE.—(1), (4), (5), (7), and (8) As for *H. clypeilargum*. (2) Both posterior postmental setae long (Fig. 31). (3) Metanotum marginally with 11–12 long setae, medioanteriorly with 4 setae (Fig. 30); metasternal plate with 18–24 setae. (6) Sternal setae: I, 5–9; II, 20–28; III, 32–50; IV–V, 48–65; VI, 39–50; VII, 35–43; subgenital plate, 33–40. (9) Dimensions: temple width 0.55–0.63, prothorax width 0.46–0.54, metathorax width 0.55–0.59, and total length 1.87–2.19.

MALE.—(1)–(4) As for female, except metasternal plate with 15–17 setae and marginal tergal setae on VIII, 28–34; last tergite with 37–47 setae irregularly across posterior margin. (5) Sternal setae: I, 3–6; II, 15–18; III, 22–39; IV–V, 33–54; VI, 25–33; VII, 20–28; VIII, 11–13; subgenital plate, 11–14. (6) Genitalia essentially as in Fig. 32, but with longer genital sclerites (0.16–0.18) and denser longer spicules around area of sclerites; width 0.14–0.16. (7) Dimensions as for *H. maxbeieri*.

This is the only species of *Holomenopon* I have seen that has both posterior postmental setae long and consistently has 4 short medioanterior metanotal setae. The female is otherwise close to those of the other 2 species of this group; the male has the shorter marginal tergal setae on the anterior segments, as for *H. maxbeieri*, but the genitalia are distinctly larger.

Material Examined.—1 ♀, *Melanitta fusca*, Estonia; 7 ♀, 2 ♂, *Mergus serrator* L., England; 5 ♀, 1 ♂, *Somateria mollissima* (L.), Scotland; 1 ♀, *S. spectabilis* (L.), Lapland.

DISCUSSION

A summary of the distribution of my *Holomenopon* material among the species of Anseriformes is given in Fig. 34; of the approximately 150 species of birds in this order, only the 62 are tabulated from which I am aware of *Holomenopon* having been collected. The values indicate the number of different collections represented by my specimens; the higher this value presumably the lower the chance of this host record being erroneous because of straggling, contamination, or the like. Horizontal lines divide host subfamilies and tribes. The total specimens and geographical distribution involved may be found in the *Material Examined* section for each louse species.

Seven of the 16 *Holomenopon* species are associated with only a single host. Of these, *H. goliath* is the most atypical and stands apart from all other species by several characters; the placement of its host in its own subfamily apart from the other Anseriformes is consistent with the louse features. I have seen no specimen of *H. bohmi*, but this is apparently unique based on features of the male genitalia.

The species of *Holomenopon* found on the greatest number of hosts is *H. leucoxanthum*, being known to date from 31 hosts species ranging from the Dendrocygnini to the Oxyurini. Of the tribes of Anserinae, only the Somateriini, and questionably the Tadornini, do not have reliable records of *H. leucoxanthum*. I seriously doubt whether this species normally occurs on several hosts, such as *Chenonetta*, *Aix*, *Cairina*, or *Plectropterus*; however, its distribution centering in the Dendrocygnini, Anatini, and Aythyini, as well as sporadically elsewhere, would indicate a broad host selection and the certainty that further collecting will expand this host list. Two other species from this *leucoxanthum*-group, *H. setigerum* and *H. acutae*, also are essentially confined to *Anas* species; I have doubts about the placement of the *Chenonetta jubata* and *Cairina scutulata* specimens in *H. setigerum*, but have done so here pending the availability of more material.

Even though the type-host of *H. brevithoracicum* is *Cygnus melanocoryphus*, it would appear to be collected more commonly from *Chloephaga* species. The host distribution of *H. tadornae* is principally in the Tadornini; *H. transvaalense* is morphologically quite close to *H. tadornae* and is questionably included here with *A. platyrhynchos* as its type-host.

Of the 3 species of the *clypeilargum*-group, *H. clypeilargum* has a fairly broad host range among various *Anas* and *Aythya* species, and *H. maxbeieri* from *Anas platyrhynchos* is very close to, but distinct from, *H. clypeilargum*. I seriously question the record of *H. clypeilargum* from *Mergus cucullatus* and *M. merganser*. *H. loomisii*, while clearly a member of the *clypeilargum*-group, is the only *Holomenopon* I have seen from the Somateriini and is unique in its postmental and anterior metanotal setae.

Especially interesting is the number of species of *Holomenopon* associated with a single host species. Aside from *Bucephala albeola*, *Tadorna radjah*, and *T. tadorna*, all instances of more than 1 louse species being from a single host are in *Anas* and *Aythya*. There are 6 species of *Anas* with 3 *Holomenopon* species recorded from each, and 3 species each of *Anas* and *Aythya* with 2 *Holomenopon* species each. Apparently within at least these host genera the occurrence of a *clypeilargum*-group species and 1 or 2 *leucoxanthum*-group species is to be anticipated.

Key to Species of *Holomenopon*

FEMALES

(exclusive of *H. bohmi* Eichler)

1. Long seta adjacent to dorsal head sensillum *d*; temple width over 0.70 *goliath* Clay
Without seta adjacent to dorsal head sensillum *d* (Fig. 1); temple width not over 0.70 2
2. Ventral anal fringe as in Fig. 29; metasternal plate as in Fig. 28 3
Ventral anal fringe as in Fig. 5, 15, 20, or 21; metasternal plate as in Fig. 8 4
3. Metanotum medioanteriorly with total of 4 setae (Fig. 30); both posterior postmental setae long (Fig. 31) *loomisii* (Kellogg)
Metanotum medioanteriorly with total of 2 (rarely 3) setae; posterior postmental setae of a long

Species of Holomenopon		34															
		goliath	böhmi	leucoxanthum	setigerum	acutae	clauseni	tumidum	brevithoracicum	bucephalae	tadornae	transvaalense	obscurum	cairinae	clypeilargum	maxbeieri	loomisii
Species of Host																	
Anseranatinae																	
	Anseranas semipalmata	→ 2															
Anserinae																	
	Dendrocygnini																
	Dendrocygna eytoni			1													
	arcuata			1													
	bicolor			1													
	javanica			1													
	viduata			1													
	Anserini																
	Coscoroba coscoroba	→ X															
	Cygnus melanocoryphus							→ 1									
	Anser anser			2													
	Branta canadensis			1													
	bernicla									1							
Anatinae																	
	Tadornini																
	Chloephaga melanoptera																
	rubidiceps								1	1							
	picta							4									
	Alopochen aegyptiacus																
	Tadorna ferruginea									2							
	radjah			1						2							
	tadorna			X						→ 4		→ 2					
	Anatini																
	Anas platyrhynchos			5							→ 1				→ 9		
	rubripes														2		
	superciliosa			2											1		
	undulata														1		
	flavirostris														1		
	crecca		→ 1		1										1		
	strepera		1		1										1		
	penelope														1		
	americana			1											1		
	acuta					→ 2									→ 2		
	capensis					1									1		
	querquedula					1									1		
	discors					1									1		
	cyanoptera			1		1		1							1		
	smithii					1									3		
	clypeata			1		→ 3									3		
	Somateriini																
	Somateria mollissima																5
	spectabilis																1
	Aythiini																
	Netta rufina			1													
	erythrophthalma			1													
	Aythya valisineria			5													
	ferina			X											1		
	americana			8													
	australis			1													
	collaris			2													
	fuligula			1											1		
	novae-seelandiae														1		
	affinis			9											1		
	marila			1											1		
	Cairinini																
	Chenonetta jubata				3												
	Aix sponsa																
	Sarkidiornis melanotos			3				→ 8									
	Cairina moschata																
	scutulata																
	Plectropterus gambensis				1												
	Mergini																
	Melanitta fusca																
	nigra																
	Clangula hyemalis			3													→ 1
	Bucephala clangula			1													
	albeola			1													
	Mergus cucullatus							1									
	serrator									1							
	merganser																1
	Oxyurini																
	Oxyura jamaicensis			4													
Total number of hosts		1	1	31	9	2	3	1	3	2	5	1	1	1	18	1	4

FIG. 34.—Host distribution of each species of *Holomenopon* indicated by number of collections represented in this study. X = no material seen by author. Arrow = type-host.

- and a short seta (Fig. 12) .. *clypeilargum* Eichler
maxbeieri Eichler
4. Ventral anal fringe containing 4 atypical setae as in Fig. 5, with very little if any portion protruding beyond base *leucoxanthum* (Burmeister)
 Ventral anal fringe containing other types of setae (Fig. 15, 20, or 21), but none as above 5
 5. Over 15 stout inner posterior setae in regular row across end of abdomen (Fig. 23) .. *cairinae* Eichler
 With fewer and finer inner posterior setae (as in Fig. 1 or 9), not forming such a row 6
 6. Temple width 0.65 or more; terminal portion of atypical setae of ventral anal fringe considerably shorter than base (Fig. 21); marginal pronotal setae 5, 7, and 9 subequal, all longer than seta 3 (Fig. 22) *tumidum* (Piaget)
 Temple width less than 0.65; terminal portion of atypical setae of ventral anal fringe as long as or longer than base, near to that of Fig. 15; marginal pronotal setae 3 and 5 subequal and short, setae 7 and 9 variably short to long 7
 7. Preocular seta 10 shorter than seta 8; lateroposterior corner of genital chamber with spiculations; marginal pronotal setae 7 and 9 usually short and about same length as setae 3 and 5. 8
 Preocular seta 10 equal to or longer than seta 8; lateroposterior corner of genital chamber without evident spiculation; marginal pronotal setae 7 and 9 longer than setae 3 and 5 9
 8. With only 8 (rarely 9) long marginal metanotal setae extending across tergite I; dorsal anal fringe setae usually of fairly uniform lengths (Fig. 20) *clauseni*, n. sp.
 Usually with 10 such long marginal metanotal setae; dorsal anal fringe with longer among shorter setae (Fig. 15) *setigerum* (Blagoveshtchensky)
bucephalae, n. sp.
acutae, n. sp.
 9. Metanotum marginally with 10 or more long setae extending across tergite I *brevithoracicum* (Piaget)
 Metanotum marginally with 9 or fewer long setae extending across tergite I 10
 10. More than 48 marginal setae on each of tergites III-VI; ventral anal fringe of over 40 setae *transvaalense* (Bedford)
 Fewer than 48 marginal setae on each of tergites III-VI; ventral anal fringe of fewer than 40 setae 11
 11. Most to all of tergites III-VI with over 37 marginal setae *obscurum* (Piaget)
 Most to all of tergites III-VI with fewer than 37 marginal setae *tadornae* (Gervais)
 5. Metanotum medioanteriorly with total of 4 setae (Fig. 30); both posterior postmental setae long (Fig. 31) *loomisii* (Kellogg)
 Metanotum medioanteriorly with total of 2 (rarely 3) setae; posterior postmental setae of a long and a short seta (Fig. 12) 6
 6. With number of short stout marginal setae at least on tergites I-IV (Fig. 33); temple width over 0.48 *maxbeieri* Eichler
 With shorter setae on tergites I-IV generally not as short and stout (Fig. 27); temple width less than 0.48 *clypeilargum* Eichler
 7. Very long slender genital sclerites (Fig. 18), at least 0.16 long 8
 Genital sclerites shorter, less than 0.16 long, slender to irregularly thickened (Fig. 4, 14, or 19) 9
 8. More than 48 marginal setae on each of tergites IV-VI *transvaalense* (Bedford)
 Fewer than 48 marginal setae on each of tergites IV-VI *tadornae* (Gervais)
 9. Without anterior tergal setae on V-VI, usually none on VII, VIII with not more than 50 or so, sparser medially than laterally 10
 Usually with anterior tergal setae on V-VI, VII with up to over 100, VIII typically with 50-180 distributed evenly across segment 12
 10. Genital sclerites thick, much as in Fig. 14 *acutae*, n. sp.
 Genital sclerites slender, much as in Fig. 19 11
 11. Tergites III-IV each with over 27 marginal setae; temple width over 0.55. *brevithoracicum* (Piaget)
 Tergites III-IV each with fewer than 27 marginal setae; temple width less than 0.55 *bucephalae*, n. sp.
 12. Temple width greater than 0.65 .. *tumidum* (Piaget)
 Temple width less than 0.65 13
 13. Genitalia as in Fig. 14, with short irregularly thickened sclerites (not over 0.11 long); endomerical plate sharply defined with angular corners; thick basal apodeme *setigerum* (Blagoveshtchensky)
 Genitalia as in Fig. 4 or 19 14
 14. Each of tergites IV-VI with 40 or more marginal setae *obscurum* (Piaget)
 Tergites IV-VI usually with fewer than 40 marginal setae 15
 15. Genitalia as in Fig. 4, with genital sclerites usually over 0.10 long *leucoxanthum* (Burmeister)
 Genitalia as in Fig. 19, with genital sclerites usually not over 0.10 long *clauseni*, n. sp.

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MALES

1. Both subgenital plate and genitalia markedly asymmetrical; temple width over 0.75 *goliat* Clay
 Essentially symmetrical subgenital plate and genitalia; temple width less than 0.75 2
2. Parameres of genitalia with number of short setae along surface *bohmi* Eichler
 Parameres without setae on surface 3
3. Genitalia quite large, 0.24-0.25 wide (Fig. 25) *cairinae* Eichler
 Genitalia much smaller, less than 0.17 wide, as in Fig. 4, 14, 18, 19, or 32 4
4. Without anterior tergal setae on VIII; genitalia as in Fig. 32 5
 With anterior tergal setae on VIII; genitalia as in Fig. 4, 14, 18, or 19 7