

## Species of *Colpocephalum* (Mallophaga: Menoponidae) Parasitic upon the Galliformes<sup>1</sup>

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### ABSTRACT

Fourteen species of *Colpocephalum* sen. lat. from gallinaceous birds are recognized and discussed. Ten of these are newly described; they and their type-hosts are *chloropi* (*Tropicoperdix chloropus*), *talegallae* (*Talegalla cuvieri*), *orientalis* (*Arborophila orientalis sumatrana*), *tetraophasis* (*Tetraophasis obscurus*), *freycineti* (*Megapodius freycinet freycinet*), *lathamii* and *allecturae*

(*Alectura lathamii lathamii*), *wilhelmi* and *arfakiani* (*Aepyodius arfakianus*), and *maleonis* (*Macrocephalon maleo*). *C. echinatum* Ewing is synonymized with *C. thoracicum* Kellogg and Paine. *C. parumpilosum* Piaget and *C. hoffmanni* Zavaleta are considered species sedis incertae. A key to the species is given.

This paper is one of a series reviewing the status of the species of the genus *Colpocephalum* Nitzsch, 1818. In spite of the wide distribution and importance to man of the gallinaceous birds, only 8 species of *Colpocephalum* are recognized as parasitic upon members of this order. The present study re-evaluates the status of the described forms and describes 10 species as new to science. The analysis of the group is based on approximately 230 adult specimens of *Colpocephalum* from 14 genera and 19 species of the Galliformes. Keys to the known species from this host group are given to facilitate identification.

The type species for the genus *Colpocephalum* is *C. zebra* Burmeister from the Ciconiiformes. We recognize that at least some of the forms on the gallinaceous birds diverge morphologically from the type species, but we will consider all these lice as *Colpocephalum* sensu lato until a thorough knowledge of the entire complex is obtained.

The members of the *Colpocephalum* found on the gallinaceous birds can be characterized for the most part by the features given in Price and Beer (1963b). Preocular and occipital nodi usually are well developed; in several instances the head carinae are faint or absent, but, except for *C. majesticum*, these are in well-cleared specimens. A shallow preocular notch is present, never a deep slit. Several species show marked elongation of the terminal antennal segment, but the majority do not. There are 4 middorsal head setae. Occipital setae range from

minute to medium length, but all 4 of uniform length on any single specimen. Margin of the pronotum typically with 8 setae on each side—short, long, short, and 5 medium to long setae. Third femur with 3–4 comb rows. In only 2 species do we fail to detect some form of abdominal tergal division with females. Sternite III usually with 2–3 comb rows on each side, but several species may have IV with a single row. Margin of vulva either is rounded or, with 3 species, deeply indented at the midline. Females of all species observed have an internal reticulation associated with the genital chamber.

Males are slightly smaller than females, with the anterior head margin in most cases more flatly rounded, usually with 2–4 spiniform marginal setae and a larger number of minute dorsal setae. Otherwise, head and thorax are as with the female. The abdomen demonstrates pronounced sexual dimorphism in those species whose females have divided abdominal tergites; male tergites are always entire and often have a more abundant and different chaetotaxy than females.

Because of the paucity of specimens in numerous cases and the relative abundance of good qualitative morphological features for identification to species, we have not resorted to presentation of much quantitative data. From our studies of related lice, we have come to appreciate the variation inherent in many setal counts. We believe that such counts for the lice of this study would offer little beyond what can be seen from an illustration. Adequate collections in the future may make a quantitative analysis desirable.

To avoid repetition of dimensions, and to stress our lack of emphasis on them, we present here some

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ranges of size for females (except *C. majesticum*, which is larger) that have a flat to convex vulval margin: preocular width, 0.33–0.38 mm; temple width, 0.50–0.59 mm; head length, 0.30–0.41 mm; prothorax width, 0.33–0.42 mm; metathorax width, 0.52–0.71 mm; total length, 1.46–2.34 mm. The females of the 3 species with vulval margin deeply indented at the midline are significantly smaller: preocular width, 0.23–0.28 mm; temple width, 0.34–0.45 mm; head length, 0.25–0.32 mm; prothorax width, 0.27–0.35 mm; metathorax width, 0.37–0.50 mm; total length, 1.56–1.82 mm. Ranges of male size are only slightly lower than these.

All lice utilized for this study represent specimens mounted on slides. Unless stated specifically to the contrary in the following descriptions, the species may be considered to conform to the preceding generalized discussion. We have followed the nomenclature of Peters (1934) for the hosts throughout this paper.

### *Colpocephalum appendiculatum* Nitzsch

*Colpocephalum appendiculatum* Nitzsch, 1866, *In* Giebel, *Zeitschr. Ges. Naturwiss.* 28: 394. Type-Host: *Argus giganteus* = *Argusianus argus* (L.).

FEMALE.—As in Fig. 1. Anterior margin of head somewhat tapered. Carinae poorly developed, perhaps from over-clearing. Middorsal head setae of similar length, minute. Two very long marginal temple setae. Occipital setae short. Terminal antennal segment over twice as long as wide. Margin of pronotum differs from all other species in having 6 long median setae on each side instead of 5. Metanotum with sparse short anterior and median marginal setae. Abdominal segments I–III longer and broader than remainder. Tergites IV–IX tripartite, with that of III indented on posterior margin; terminal segment (referred to as IX throughout this paper, although it is undoubtedly a composite of at least IX and X) additionally with a small terminal median plate. Tergocentral setae on I longer toward midline, on III–IV moderately long, and on other segments short to minute. Short anterior setae on all segments except IX. Postspiracular setae very long on all but I, IV, and V. Short marginal and anterior setae on sternites II–VII. Three comb rows on III and suggestion of comb on IV. Vulval margin flatly rounded, with fine setae; row of hooked setae laterally; median submarginal cluster of long setae. Distinctive anal rim, oval with fine evenly spaced setae and about 10 heavier inner dorsal setae (Fig. 2). Internal reticulation associated with genital chamber with fine structure as in Fig. 3.

MALE.—Anterior portion of head as in Fig. 4. Pronotum, with same chaetotaxy as female, differs

from all other species. Abdomen (Fig. 5) with postspiracular setae very long on II–VIII. Tergocentral setae moderately short and evenly spaced; tergites I–VIII with single to irregular double row of short anterior setae. Three comb rows on sternite III and at least 1 on IV; *C. talegallae* is the only other species from the Galliformes known to have a comb row on IV. Male genitalia (Fig. 6) with genital sclerite having short lateral points and a long median projection; tip of penis broad, spatulate.

*Material Examined*.—32 ♀, 36 ♂ from *A. argus grayi* (Elliot) from Sarawak and Borneo; 1 ♀ from *Lophura ignita ignita* (Shaw) from Borneo; 3 ♀ from *Rheinardia o. ocellata* (Elliot) from Annam.

### *Colpocephalum majesticum* Harrison

*Colpocephalum majus* Piaget, 1880 (nec p. 519), *Pediculines*: 538. Type-Host: *Megapodium rubripes* var. *Duperreyi* = *Megapodius r. reinwardt* Dumont. *Colpocephalum majesticum* Harrison, 1916, *Parasitology* 9: 51. Nomen novum for *majus* Piaget, 1880, p. 538.

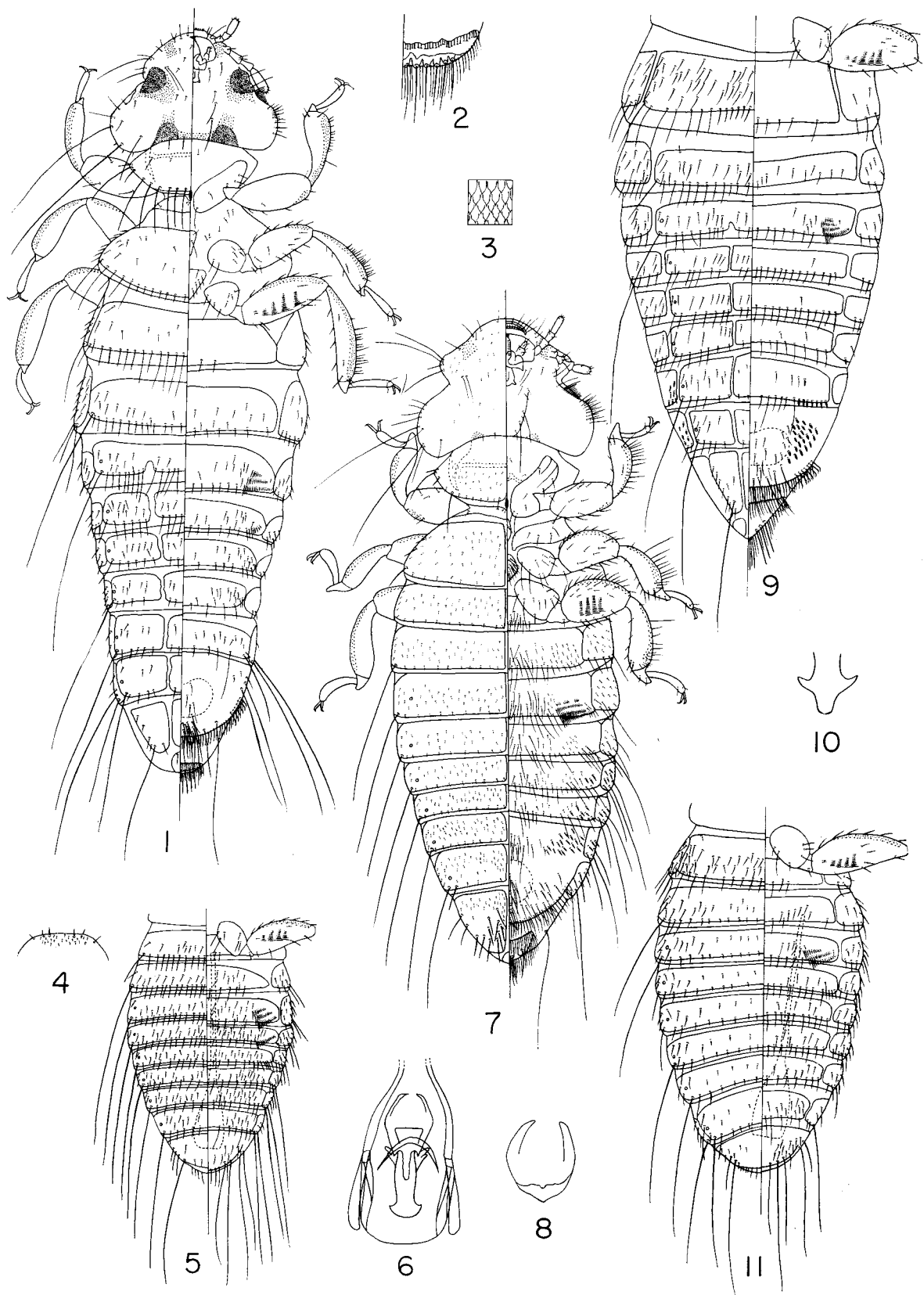
FEMALE.—As in Fig. 7. Distinctively different from all other known gallinaceous *Colpocephalum* in many features. Head differs in shape, in absence of prominent carinae and nodi, and in presence of numerous microsetae dorsally. Occipital setae short, fine. Terminal antennal segment over twice as long as wide. Pronotum dorsally with microsetae, marginally with only 3 long and 2 short setae as well as several minute setae. Metanotum bipartite, with numerous microsetae marginally and anteriorly; metasternal plate with dense cluster of medium setae. Abdominal segments I–VIII of essentially same length; all tergites divided at midline; small median terminal plate on IX. All tergocentral and anterior setae on I–VIII very minute; tergite IX with longer stouter setae as well as microsetae. Postspiracular setae very long on II–VIII; VIII may or may not have stouter longer seta adjacent to the postspiracular seta. Three long comb rows on sternite III with indication of fourth row. Sternites VII–IX fused with spiniform setae laterally on V–VII. Vulval margin rounded, with chaetotaxy as illustrated. Anus oval, fringed with fine medium setae; several longer stouter dorsal inner setae. Internal reticulation associated with genital chamber with fine structure as in Fig. 23.

MALE.—Head and thorax as for female except for 2–3 more long marginal pronotal setae on each side. Abdominal tergites undivided and with chaetotaxy of I–VIII similar to female except for having a stout medium seta adjacent to postspiracular setae on II–VIII (as shown for tergite VIII in Fig. 7). Tergite IX with many anterior microsetae; marginally with several fine short setae, 2 very long setae, and 3

*C. appendiculatum* Nitzsch. FIG. 1.—Female (×58). FIG. 2.—Anus, female. FIG. 3.—Detail of reticulation of genital chamber, female. FIG. 4.—Anterior margin of head, male. FIG. 5.—Abdomen, male (×58). FIG. 6.—Genitalia, male.

*C. majesticum* Harrison. FIG. 7.—Female (×45). FIG. 8.—Genital sclerite, male.

*C. thoracicum* Kellogg and Paine. FIG. 9.—Abdomen, female (×55). FIG. 10.—Distal end of penis. FIG. 11.—Abdomen, male (×57).



medium inner posterior setae on each side. Sternites II-VIII each with over 100 setae. Genital sclerite without prominent posterior projections (Fig. 8); penis barbed, similar to Fig. 13.

*Material Examined.*—1 type ♀ from the Piaget collection "sur une *Megapodium rubripes* var. *Duperreyi*"; 5 ♀, 2 ♂ from *Talegalla jobiensis longicauda* A. B. Meyer from Kaiser-Wilhelmsland; 1 ♀ from *T. cwiieri* Lesson from New Guinea.

### *Colpocephalum thoracicum* Kellogg and Paine

*Colpocephalum thoracicum* Kellogg and Paine, 1914, Rec. Indian Mus. 10: 230. Type-Host: *Pavo muticus* L.

*Colpocephalum echinatum* Ewing, 1930, Proc. Entomol. Soc. Washington 32: 118. Type-Host: *Pavo muticus* L. NEW SYNONYMY.

FEMALE.—Head and thorax close to *C. appendiculatum* (Fig. 1) except for shorter dorsal setae at anterior margin of preocular nodus, only 5 shorter median marginal pronotal setae on each side, and metanotum with patch of longer median anterior and marginal setae. Abdominal segments I-III longer than remainder, with I longest (Fig. 9). Tergites tripartite as for *C. appendiculatum*, but with median terminal plate on IX divided. Tergocentral setae on I shorter toward midline; short anterior setae present on all tergites, especially numerous on I. Postspiracular setae very long only on III, VII, and VIII. Sternites with few anterior setae; marginal short spiniform setae laterally on VII. Vulval margin flatly rounded with continuous row of setae; about 6 lateral hooked setae on each side; anteriorly fused sternites VIII-IX with median fine setae and distinctive lateral patch of spiniform setae found in no other known species with this vulval shape. Anus "V"-shaped, with fine even-length marginal setae except for about 8 longer ones in ventral fringe and 10 heavier marginal setae within the dorsal rim. Details of internal reticulation associated with genital chamber as in Fig. 23.

MALE.—Head and thorax close to *C. appendiculatum*, except as noted above for female. Abdomen (Fig. 11) with median tergocentral and anterior setae on II-VIII minute. Postspiracular setae very long on all segments but I, IV, and V. Genital sclerite as in Fig. 6, but penis with uniquely-shaped large lateral projections (Fig. 10).

This species was described from an immature specimen even though Kellogg and Paine (1914) state: "A single female from *Pavo muticus* (Burma). An extremely small species, but from blotches, etc., certainly an adult." We have immature specimens of *C. tausi* (Ansari) from *Pavo cristatus* which are very similar to the illustration in Kellogg and Paine's description. However, we have been unable to obtain immature material from *P. muticus*. Ewing, ignoring the fact that the specimen described by Kellogg and Paine was not an adult, later described *C. echinatum* from *P. muticus*. Dr. Clay has informed us that she was unable to find the type specimen of *C. thoracicum* among the other Mallophaga described by Kellogg and Paine in the Indian

Museum, Calcutta, and it may be assumed that the type was among other material in the Museum lost in a flood. In view of this fact and our belief that the adults of *C. echinatum* represent the same species as the nymph of *C. thoracicum*, we have placed the former as a synonym of *C. thoracicum*.

*Material Examined.*—1 ♀, 1 ♂ from *P. muticus* from Siam.

### *Colpocephalum tausi* (Ansari)

*Galliferrisia tausi* Ansari, 1951, Proc. Natl. Inst. Sci. India 17: 151. Type-Host: *Pavo cristatus* L.

FEMALE.—Head and thorax differ from *C. appendiculatum* (Fig. 1) in having shorter dorsal setae at anterior margin of preocular nodus, anterior margin of head broadly rounded, preocular and occipital nodi and associated carinae well developed, only 5 shorter median marginal setae on each side of pronotum, and metanotum with a patch of longer median anterior and marginal seta. Abdominal segments I-III longer and wider than remainder (Fig. 12). Abdominal tergites II and IV-IX tripartite. Tergocentral setae long on I, medium to short on II-VIII; row of short to medium anterior setae on tergites I-VIII. Postspiracular setae very long only on III, VII, and VIII. Tergite IX with lateral portions each bearing of row of short marginal setae, 1 long seta, and a comb of 2-5 medium spiniform setae; we have not observed any other species with this comb. Sternites II-VII with medium to short marginal setae and from 2-10 anterior setae; spiniform lateral marginal setae on VII. Vulval margin much like *C. appendiculatum*, but with row of spiniform setae medioanterior to the hooked setae. Anus "V"-shaped and fringed with medium length setae of unequal lengths; 8-10 heavier inner setae dorsally. Reticulation associated with genital chamber similar to Fig. 23.

MALE.—Aside from postspiracular setae being very long on III-VIII, the general abdominal chaetotaxy on I-VIII (Fig. 14) is not greatly different from that of female. Genital sclerite and penis as in Fig. 13. Abdominal chaetotaxy and genitalic structures separate the male from related species.

*Material Examined.*—12 ♀, 17 ♂ from *P. cristatus* from Lucknow and Nepal; 10 ♀, 8 ♂ from the turkey from Formosa, Virgin Islands, and Puerto Rico. Dr. Clay has confirmed that the types of *C. tausi* agree with our description as given above.

### *Colpocephalum chloropi*, new species

Type-Host.—*Tropicoperdix charltonii chloropus* = *T. chloropus* Blyth.

FEMALE.—As in Fig. 22. Occipital and preocular nodi present, but associated carinae weakly developed. Middorsal head setae and occipital setae minute. Terminal antennal segment less than twice as long as wide. Metanotum with minute marginal and anterior setae. Abdomen relatively slender, tapered, with segments I-VIII approximately equal in length. Tergites I-IV entire, V-VIII tripartite, and IX divided. At least median tergocentral setae minute

on all segments; longer anterior setae on I-IV, occasionally on V; minute on VI-VIII; this chaetotaxy separates *C. chloropi* from all other known species. Postspiracular setae very long on II-VI and VIII. Marginal sternal setae minute on I-VI except for several longer setae mediad to combs on III; median marginal setae on VII medium, lateral ones short and spiniform. Vulval margin deeply indented at midline; with row of short, fine setae anterior to marginal ones; no marginal setae in median area; group of medium anterior setae medially and minute with few spiniform setae laterally. Anus "V"-shaped; dorsal fringe of long, fine, even-length setae; ventral fringe of long, fine setae on median portion and only several minute setae laterally; no inner setae. Fine structure of reticulation associated with genital chamber as in Fig. 23.

**MALE.**—Abdominal structure and chaetotaxy as in Fig. 21. Separated from other species by longer anterior and minute tergoventral setae on tergites I-IV. Postspiracular setae very long on II-VIII. Lateral marginal spiniform setae on sternites IV-VIII. Genitalia (Fig. 24) with genital sclerite having well developed lateral points and central point varying from nearly as long as lateral points to almost absent. Penis slender, tapering, without terminal barbs.

**Material Examined.**—13 ♀, 13 ♂ from *T. charltonii chloropus*, Kamphaeng Phet, Khlong Khlung, Ban Hua Thanon, Thailand, 7 April 1953, Deignan and Elbel, coll., RE 2392, RT B-17877. Holotype ♀, allotype ♂, 3 ♀, 3 ♂ paratypes in the United States National Museum (USNM); 5 ♀, 4 ♂ paratypes in the collection of Dr. K. C. Emerson; 4 ♀, 5 ♂ paratypes at the University of Minnesota. Additionally, 1 ♀ from *T. charltonii tonkinensis* Delacour from Annam.

#### *Colpocephalum talegallae*, new species

Type-Host.—*Talegalla cuvieri* Lesson.

**FEMALE.**—Head differs from *C. chloropi* in having inner middorsal setae much longer than outer setae (Fig. 17) and terminal antennal segment over twice as long as wide. Occipital setae of same length as inner middorsal head setae. Metanotum with a number of short anterior and medium marginal setae. Abdominal segments I-VIII of equal length (Fig. 15); tergites divided as for *C. chloropi*. Tergoventral setae rather short on all segments, but shorter on more posterior segments; a few short anterior setae on all tergites. Postspiracular setae long on II-VIII. All marginal sternal setae short except for slightly longer median pair on II-III. Lateral marginal setae spiniform on V-VII; all anterior sternal setae short. Vulval margin deeply concave at midline and expanded laterally; lateral marginal setae hooked; lateroanterior setae spiniform, in elongated patch. Anal rim "V"-shaped, with long median and short lateral setae in both dorsal and ventral fringes; 2 short, fine and 1-2 long inner dorsal setae on each side. Reticulation associated with genital chamber distinctive, with fine structure

pointed in center (upper portion, Fig. 16) and rounded in periphery (lower portion, Fig. 16). Closest to *C. chloropi*, but longer tergoventral setae and details of vulval and anal chaetotaxy readily distinguish females.

**MALE.**—Abdomen oval (Fig. 18). Tergoventral setae short; the only *Colpocephalum* known thus far from the Galliformes having male without anterior tergal setae (except possibly *C. hoffmanni*). Postspiracular setae very long on II-III and VI-VIII, and slightly shorter on IV-V. Sternites with short to medium marginal setae; very few short anterior setae. Three comb rows on sternite III and 1 on IV; only *C. appendiculatum* also has a comb row on IV. Genitalia strongly sclerotized, slightly flared at distal end, but the specimens available do not show detailed structure of the genital sclerite; it appears to have 2 lateral projections and a median process. with a stout unbarbed penis, but this is uncertain.

**Material Examined.**—10 ♀, 1 ♂ from *T. cuvieri* from Dutch New Guinea (from skin) and New Guinea; 4 ♀, 2 ♂ from *T. jobiensis longicaudus* from E. New Guinea and Kaiser-Wilhelmsland; 6 ♀ from *T. fuscirostris* Salvadori from New Guinea. The specimens from *T. cuvieri* have been selected as the type series; holotype female, allotype male, 6 ♀ paratypes in the British Museum (Natural History) (BMNH); 3 ♀ paratypes at the University of Minnesota.

#### *Colpocephalum orientalis*, new species

Type-Host.—*Arborophila orientalis sumatrana* Ogilvie-Grant.

**FEMALE.**—Head and prothorax not discernibly different from *C. chloropi* (Fig. 22). Metanotum with medium anterior and marginal setae. Abdomen (Fig. 25) also close to that of *C. chloropi*. Median tergoventral setae long on I-IV and minute on V-VIII. Postspiracular setae long on II-VIII. Sternal chaetotaxy variable: few minute setae on I-II, long marginal setae on III, setae of mixed lengths on IV, minute setae on V, and lateral spiniform setae on VI-VII. Vulval margin deeply indented, with marginal and submarginal row of short setae; lateral setae straight. Anus "V"-shaped with long median setae on both dorsal and ventral rims and few minute setae laterally in ventral fringe. Reticulation associated with genital chamber with fine structure as in Fig. 23. This species differs from *C. chloropi* in having tergites I-IV with long tergoventral setae and sternite III with long median marginal setae.

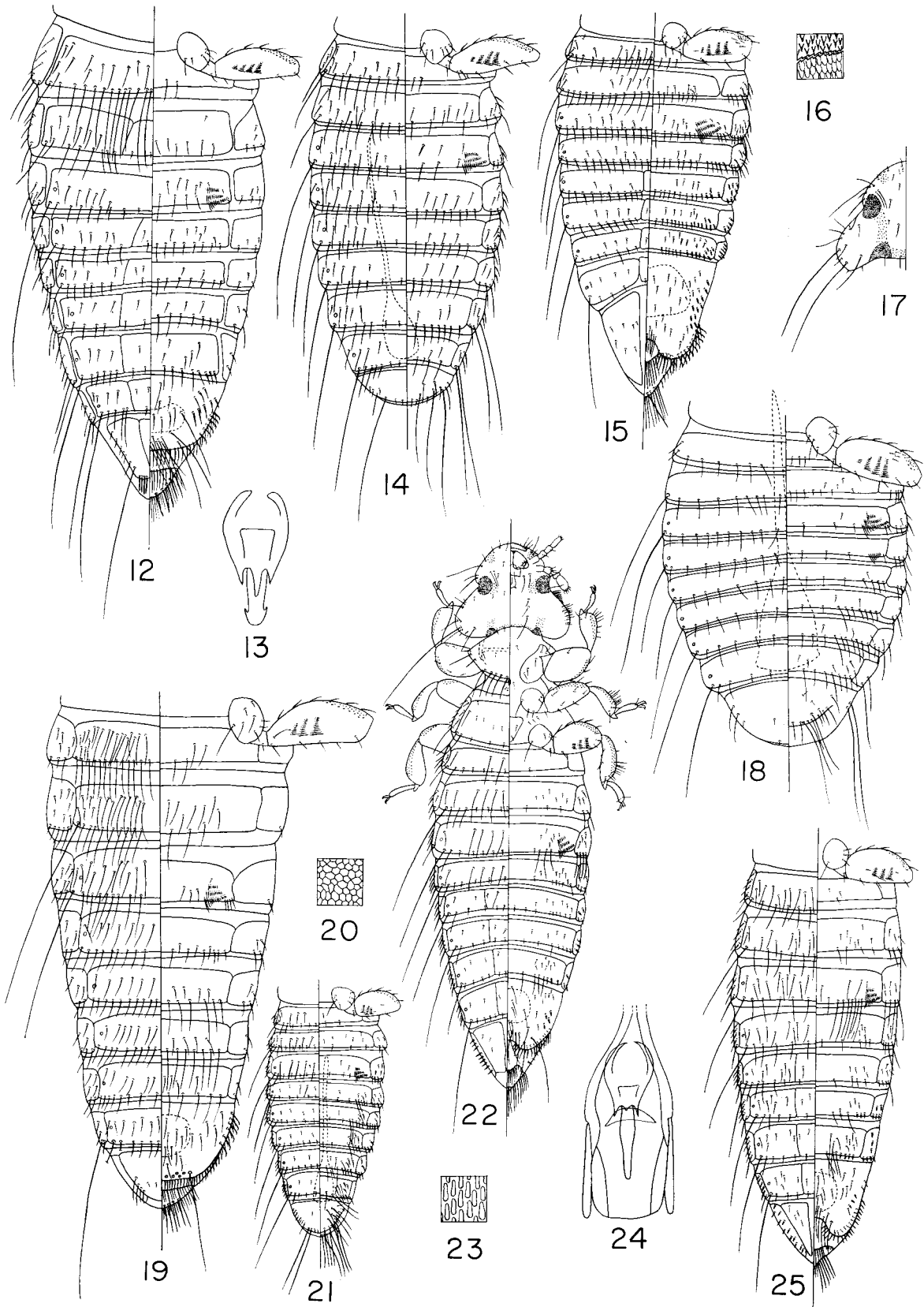
**MALE.**—Unknown.

**Material Examined.**—1 ♀ from *A. orientalis sumatrana* from Sumatra. Holotype in the USNM.

#### *Colpocephalum tetraophasis*, new species

Type-Host.—*Tetraophasis obscurus* (J. Verreaux).

**FEMALE.**—As in Fig. 26. Preocular and occipital nodi moderately developed and associated carinae weak. Long dorsal postocular seta. Inner middorsal head setae much longer than outer. Occipital setae long, almost crossing prothorax. Terminal antennal



segment about twice as long as wide. Outer dorsal pronotal seta long. Metanotum with number of medium anterior and marginal setae. Abdomen oval, segments I-VIII essentially of same length; no discernible division of tergites. Numerous medium to long tergo-central and anterior setae, giving hairy appearance to louse. Postspiracular setae very long on II-III and V-VIII, slightly shorter on IV. Marginal and anterior sternal setae of medium length on all segments. Two comb rows on sternite III. Vulval margin flatly rounded, with mixed short and medium setae; lateral setae hooked; a few anterior setae on fused sternites VIII-XI, but not grouped medioposteriorly. Ventral rim of anus rounded and with setae of varied lengths; dorsal rim indented in "W"-shape, with 4-6 stouter inner setae. Detail of reticulation associated with genital chamber as in Fig. 3. Long postocular and outer dorsal pronotal setae, large number of medium to long tergal and sternal setae, and distinctive anal shape and chaetotaxy characterize this species.

MALE.—Chaetotaxy similar to female, with genital sclerite (Fig. 27) having long lateral and median projections; end of penis expanded, spatulate.

*Material Examined.*—1 ♀, 6 ♂ from *T. obscurus*, Nov., 1921, Yunnan; 2 ♀, 2 ♂ from *Lerwa lerwa* (Hodgson) (from skin) from Szechuan. The specimens from *T. obscurus* were selected for the type series; holotype female, allotype male, 4 paratype ♂ in the BMNH and 1 ♂ paratype at the University of Minnesota.

#### *Colpocephalum freycineti*, new species

Type-Host.—*Megapodius freycinet freycinet* Gaimard.

FEMALE.—Head broadly rounded anteriorly. Preocular nodi well developed, occipital nodi and carinae weak. Middorsal head setae minute. Terminal antennal segment less than twice as long as wide. Median occipital setae moderately long, lateral setae not observed. Margin of pronotum with 8 setae; setae 1 and 3 short and 4 at least twice length of any others; outer dorsal pronotal seta almost reaching to base of marginal seta 4. Metanotum with patch of median setae; marginal setae longer laterally, shorter medially. Unusual in having abdominal tergites not discernibly divided (Fig. 19); only *C. chloropi* also has apparently complete tergites. Tergo-central setae on I-III longer than those on other segments; all tergites with long to medium anterior setae. Postspiracular setae very long on II-III and VIII. Sternites with sparse chaetotaxy. Vulval margin flatly rounded, with row of evenly spaced short setae

and row of hooked setae laterally; a number of medium anterior setae. Anus oval, fringed with short, even-length setae; about 10 heavier inner dorsal anal setae and 5 longer setae in ventral fringe. Detail of reticulation associated with genital chamber as in Fig. 20.

MALE.—Unknown.

*Material Examined.*—1 ♀ from *M. f. freycinet* from Halmahera. Holotype in the USNM.

#### *Colpocephalum lathami*, new species

Type-Host.—*Alectura lathami lathami* J. E. Gray.

FEMALE.—As in Fig. 28. Preocular and occipital nodi and associated carinae well developed. Inner middorsal head setae slightly longer than outer. Medium occipital setae. Terminal antennal segment less than twice as long as wide. Pronotum with 8 marginal setae on each side; 2-3 setae in position of outer dorsal pronotal seta; inner dorsal pronotal seta displaced posteriorly. Metanotum with few anterior setae; marginal setae short. Abdominal segments I-III somewhat longer than others. Abdominal tergites II-VIII tripartite; IX with tergite divided and small median terminal plate. Tergo-central setae on I long; those on other tergites short. Short anterior setae on all tergites. Postspiracular setae very long on II-III and V-VIII. Marginal sternal setae on I and IV-VII short; at least some longer ones on II-III; all anterior setae short. Vulval margin flatly rounded, with medium seta and row of lateral hooked setae; medio-posterior patch of long submarginal setae. Anus (Fig. 29) with ventral fringe of 4-6 long setae among closely-spaced fine setae; dorsal fringe also of fine setae, with 8-10 stout, longer, inner setae. Reticulation associated with genital chamber with fine structure like lower portion of Fig. 16. A number of features separate the female from those of other species, such as pattern of tergal division, the row of long tergo-central setae on I, long marginal sternal setae on II-III, and vulval and anal chaetotaxy.

MALE.—Not known with certainty. A male associated with one of the type females was indistinguishable from males of *C. alecturae*. More material is necessary to determine whether males of these 2 species are similar or whether all males at hand are males of *C. alecturae*.

*Material Examined.*—2 ♀ from *A. l. lathami* from Queensland; 1 ♀ from *Catheturus purpureicollis* = *A. lathami purpureicollis* (Le Souëf) (no data). Holotype and paratype females in the BMNH; paratype female at the University of Minnesota.

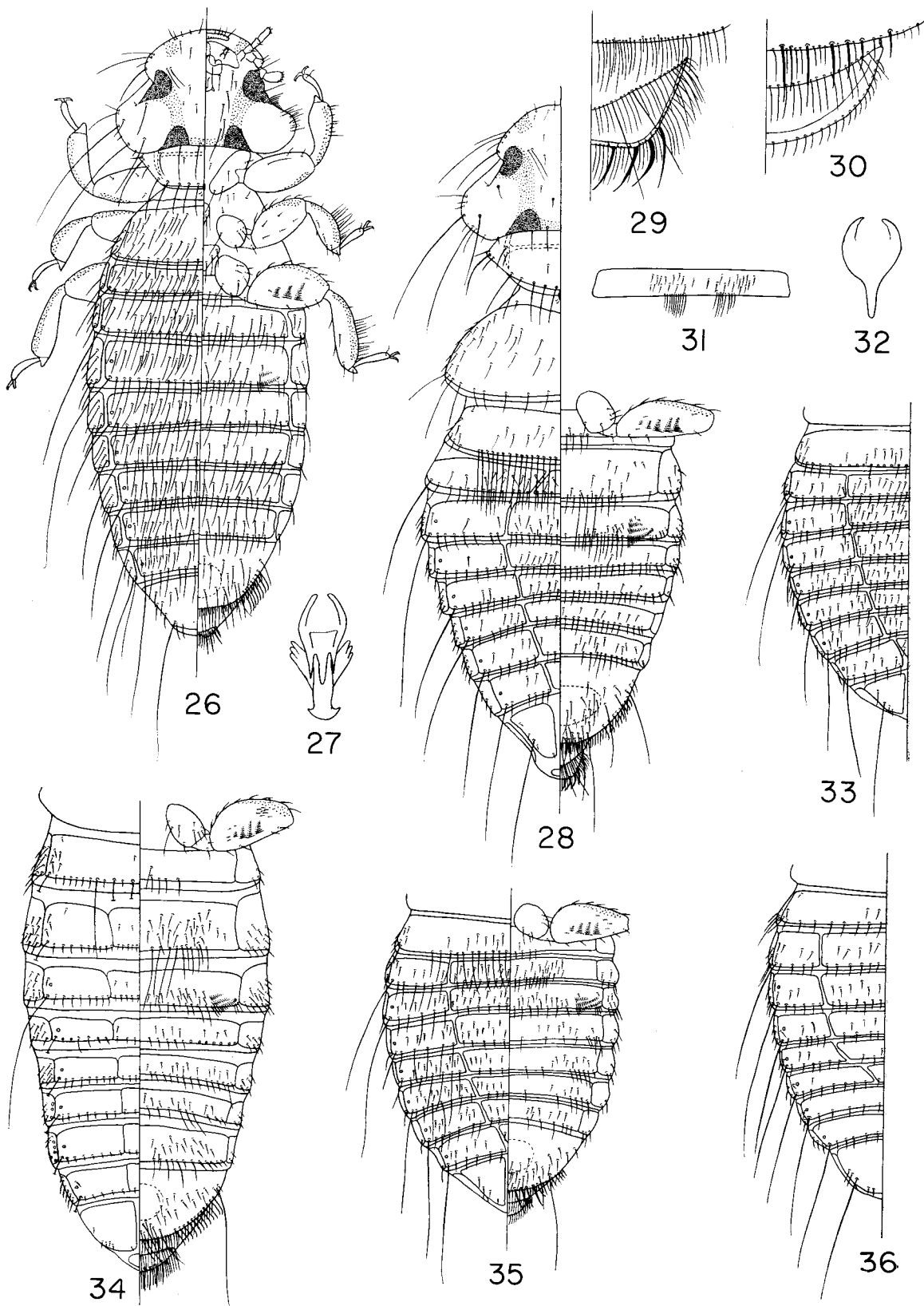
*C. tausi* (Ansari). FIG. 12.—Abdomen, female (×55). FIG. 13.—Genital sclerite and penis. FIG. 14.—Abdomen, male (×57).

*C. talegallae*, n. sp. FIG. 15.—Abdomen, female (×51). FIG. 16.—Detail of reticulation of genital chamber, female. FIG. 17.—Dorsum of head, female. FIG. 18.—Abdomen, male (×86).

*C. freycineti*, n. sp. FIG. 19.—Abdomen, female (×58). FIG. 20.—Detail of reticulation of genital chamber, female.

*C. chloropi*, n. sp. FIG. 21.—Abdomen, male (×54). FIG. 22.—Female (×55). FIG. 23.—Detail of reticulation of genital chamber, female. FIG. 24.—Genitalia, male.

*C. orientalis*, n. sp. FIG. 25.—Abdomen, female (×57).





***Colpocephalum alecturae*, new species**

Type-Host.—*Alectura lathamii lathamii* J. E. Gray.

FEMALE.—Head and thorax similar to those of *C. lathamii* (Fig. 28), except for single or double outer dorsal pronotal setae. Abdominal tergites II-VIII tripartite (Fig. 33); IX with divided tergite and without evidence of median terminal plate. Tergo-central setae mostly broken on I, but evenly spaced across segment and the few median setae present indicate all to be of size similar to those on lateral portions of tergite; short tergo-central setae on other segments. Numerous short anterior setae on all segments. Postspiracular setae long on II-III and VI-VIII. Marginal and anterior setae on sternites mostly short, with tendency for a clumping of setae on II-III (Fig. 31); otherwise, marginal setae evenly spaced across sternites IV-VII. *C. alecturae* is differentiated from *C. arfakiani* and *C. maleonis* by details of tergal and sternal chaetotaxy discussed under each of these species. Vulval margin flatly rounded, with row of even-length short setae and a superimposed row of heavy longer setae (Fig. 30); no hooked setae laterally. Anal rim oval with fine evenly spaced marginal setae; no inner setae (Fig. 30). Reticulation associated with genital chamber like lower portion of Fig. 16. Females of *C. alecturae* are best separable from *C. lathamii* and *C. wilhelmi* by differences in vulval and anal chaetotaxy.

MALE.—Quite close to that of *C. appendiculatum* (Figs. 4-6). Tergal setae seem to be slightly longer and postspiracular setae somewhat shorter, but these differences are nebulous. *C. alecturae* differs from *C. appendiculatum* by having genital sclerite without lateroposterior projections (Fig. 32) and by lacking a comb row on sternite IV.

Material Examined.—4 ♀, 6 ♂ from *A. l. lathamii* from Queensland; 1 ♀, 1 ♂ from *A. l. purpureicollis* (skin—no data). Holotype female, allotype male, 3 ♀ and 4 ♂ paratypes in the BMNH; 1 ♀, 2 ♂ paratypes at the University of Minnesota. Additionally, 1 ♀ from *Megapodius r. reinwardt* (no data).

***Colpocephalum wilhelmi*, new species**

Type-Host.—*Aepyodius arfakianus* (Salvadori).

FEMALE.—Head and thorax as for *C. lathamii* (Fig. 28), except for minute middorsal head setae, occipital setae, inner dorsal pronotal setae, and median marginal and anterior metanotal setae. Abdominal tergites II-VIII tripartite (Fig. 34); terminal segment with divided tergite and a small median posterior plate. Tergo-central setae on I with mixture of long and minute setae; short to minute on other segments. A very few minute anterior setae on

tergites I-IV; no anterior setae on V-IX. Postspiracular setae long on III and broken off other segments. Sternite I with short marginal setae; II with about 8 long, median, marginal setae with shorter setae laterally; III-VI with short marginal setae, shortest medially; VII with setae of variable length. Short anterior setae on all sternites. Vulval margin evenly rounded, almost semicircular; chaetotaxy of vulva and anus much like *C. lathamii* (Fig. 29); shape of anus more oval. Reticulation associated with genital chamber like lower portion of Fig. 16.

MALE.—Unknown.

Material Examined.—1 ♀ from *A. arfakianus* from Kaiser-Wilhelmsland. Holotype in the BMNH.

***Colpocephalum arfakiani*, new species**

Type-Host.—*Aepyodius arfakianus* (Salvadori).

FEMALE.—Head and thorax similar to *C. alecturae* and *C. lathamii* (Fig. 28), with 1-2 outer dorsal pronotal setae. Abdominal tergites (Fig. 35) divided same as with *C. alecturae*. Long median tergo-central setae on I, with gap between them and shorter lateral setae; lateral tergo-central setae on II-VII decidedly longer than those on median plate. Postspiracular setae very long on II-III and VI-VIII. No evidence of very long lateral seta on IX, but it might be broken off the specimens studied. Marginal sternal setae on II-III evenly spaced across segment; those on IV-VII sparse in median area, more abundant laterally. Vulva, anus (Fig. 30), and internal reticulation associated with genital chamber (lower portion, Fig. 16) similar to *C. alecturae*. Close to *C. alecturae*, but separable on the basis of the longer tergo-central setae on I and the lateral gap in the row, the longer lateral tergo-central setae on II-VII, and sternal chaetotaxy.

MALE.—Inseparable from *C. alecturae*.

Material Examined.—5 ♀, 9 ♂ from *A. arfakianus* from Papua, Kaiser-Wilhelmsland and New Guinea. Holotype female, allotype male, 3 ♀, 6 ♂ paratypes in the BMNH, 1 ♀, 2 ♂ paratypes at the University of Minnesota.

***Colpocephalum maleonis*, new species**

Type-Host.—*Macrocephalon maleo* S. Müller.

FEMALE.—Head and thorax close to *C. alecturae*, *C. lathamii*, and *C. arfakiani*. Only abdominal tergites (Fig. 36) II-VI tripartite; VII-IX undivided. Tergo-central setae short and evenly spaced across all segments. Small number of anterior setae on tergites I-VI, none on VII-IX. Postspiracular setae long on II-VIII. Marginal setae on sternites usually

- C. tetraophasis*, n. sp. FIG. 26.—Female (×63). FIG. 27.—Genital sclerite and penis.  
*C. lathamii*, n. sp. FIG. 28.—Female (×58). FIG. 29.—Anus and vulval margin.  
*C. alecturae*, n. sp. FIG. 30.—Anus and vulval margin. FIG. 31.—Sternite II, female. FIG. 32.—Genital sclerite, male. FIG. 33.—Dorsum of abdomen, female (×46).  
*C. wilhelmi*, n. sp. FIG. 34.—Abdomen, female (×56).  
*C. arfakiani*, n. sp. FIG. 35.—Abdomen, female (×51).  
*C. maleonis*, n. sp. FIG. 36.—Dorsum of abdomen, female (×54).

short, arranged much as for *C. arfakiani*. Vulva, anus (Fig. 30), and internal reticulation associated with genital chamber (lower portion, Fig. 16) similar to *C. alecturae* and *C. arfakiani*. This species may be separated from the related species by its pattern of tergal division, the absence of anterior tergal setae on VII-IX and their paucity on other segments, and the very long postspiracular setae on II-VIII.

MALE.—Inseparable from *C. alecturae*.

*Material Examined*.—5 ♀, 1 ♂ from *Megacephalon* (= *Macrocephalon*) *maleo* from Celebes and Zoological Gardens of London. Holotype female, allotype male, and 3 ♀ paratypes in the BMNH; 1 ♀ paratype at the University of Minnesota.

### *Colpocephalum longicorne* Rudow

*Colpocephalum longicorne* Rudow, 1869, Zeitschr. Ges. Naturwiss. 34: 393. Type-Host: *Gallus furcatus* = *Gallus varius* (Shaw).

With reference to this species, Clay and Hopkins (1955) state: "There is not much doubt that Rudow's original description refers to the *Colpocephalum* and not to the *Menopon*. This *Colpocephalum* is unlike the type found on the Galliformes and is probably a straggler from one of the Falconiformes, in which case it will be a matter of great difficulty to identify it. Owing to the original description being almost completely meaningless this name has been treated as a *nomen dubium* for the last 85 years and should not now be revived. Application will, therefore, be made to the International Commission to have the name *Colpocephalum longicorne* Rudow, 1869, placed on the Official Index."

We were able to borrow the single male type specimen of this species from Dr. H. Weidner, Zoologisches Staatsinstitut und Zoologisches Museum of Hamburg, and found that it does not resemble any *Colpocephalum* we have seen from the Falconiformes. Rather, in most respects it shows excellent agreement with a species of *Colpocephalum* from the woodpeckers (Piciformes). Since we anticipate dealing with lice from the Piciformes at a later date, we shall not treat this further here. Our conclusion on this species, however, will be that it is a contaminant from the Piciformes to *G. varius* and that it will fall into synonymy with a previously described species. Therefore, since no action has been taken by the International Commission, there will be no need to act further on this name as suggested above by Clay and Hopkins.

### Species Sedis Incertae

#### *Colpocephalum parumpilosum* Piaget

*Colpocephalum parumpilosum* Piaget, 1880, Pediculines: 536. Type-Host: *Lophophorus resplendens* = *Lophophorus impejanus* (Latham).

No specimens available to us. The following are observations from the description and illustration from Piaget (1880): head nodi and carinae well

developed; orbital sinus very wide and deep; antennae short, last segment cylindrical; abdomen elongated oval, rounded posteriorly, with segments I-VIII of equal length; tergites undivided and without anterior setae; vulva convex with few marginal setae evenly spaced across it; anus oval with fringes of similar setae.

Based upon Piaget's description, the females of this species differ from all other *Colpocephalum* from the Galliformes (except *C. hoffmanni* Zavaleta) in the shape of the abdomen, the absence of anterior tergal setae, the complete abdominal tergites, and the rounded vulval margin with sparse setae. Although a single male was seen by Piaget (1880), it was in such poor shape that he did not attempt its description. We do have a single male presumably from the type host, but without associated females; however, we doubt that this male is of this species and its condition is so poor that we shall not treat it here. Since Piaget's series of females was from the Zoological Garden of Rotterdam and since we have previously noted straggling in his material collected there, there is a strong possibility his series does not represent gallinaceous bird lice. The divergence of his material in a number of features from the typical gallinaceous *Colpocephalum* lends support to this viewpoint. There are now no specimens of *C. parumpilosum* in the Piaget collections of the British Museum (Natural History) or the Rijksmuseum van Natuurlijke Historie, Leiden, and the type can be presumed lost (Clay 1953); therefore, we cannot render any opinion as to the correct placement of this species.

#### *Colpocephalum hoffmanni* Zavaleta

*Colpocephalum hoffmanni* Zavaleta, 1944, An. Inst. Biol. Mexico 15: 199. Type-Host: *Oreophasis derbianus* G. R. Gray.

We have not seen specimens of this species but the drawings and description presented by Zavaleta (1944) show that it is distinct from all other *Colpocephalum* from the Galliformes (except possibly *C. parumpilosum*, whose host data are questionable). The median occipital setae are long and the lateral ones, minute, whereas in the other species from the Galliformes they are of equal length. There are 6 marginal pronotal setae on each side as opposed to 8 or 9 in all other species of this group. It appears to be most closely related to the *Colpocephalum* of owls (Strigiformes) which have similar occipital and marginal pronotal setae (see Price and Beer 1963a). In addition, both lack anterior tergal setae. Zavaleta (1944) shows the setae on the abdomen to be shorter than on those from owls; also all of the postspiracular setae are long whereas those on IV and V are short on the species from owls.

We feel that it is doubtful as to whether this species, which is the only *Colpocephalum* recorded from the Cracidae, is truly associated with the gallinaceous birds.

KEY TO THE SPECIES OF *Colpocephalum* FROM THE GALLIFORMES

## FEMALES

1. All abdominal tergites undivided and lacking anterior setae..... *parumpilosum* Piaget  
At least some abdominal tergites divided or with anterior setae or both..... 2  
..... *hoffmanni* Zavaleta
2. Vulval margin convex or flattened, usually with continuous row of setae..... 3  
Vulval margin deeply indented at midline and without median setae..... 13
3. Comb of 2-5 medium spiniform setae posteriorly on each lateral portion of tergite IX (Fig. 12)..... *tausi* (Ansari) 4  
Without such combs on tergite IX..... 4
4. Patch of spiniform setae on each side of fused sternites VIII-IX (Fig. 9).....  
Without patch of spiniform setae on sides of fused sternites VIII-IX..... 5  
..... *thoracicum* Kellogg and Paine
5. Dorsal anal rim "W"-shaped, with 4-6 stout inner setae; abdominal tergites undivided; postspiracular setae long on II-VIII; long anterior and marginal setae on all abdominal tergites (Fig. 26)..... *tetraophasis*, n. sp.  
Without above combination of characters..... 6
6. Abdominal tergites I-VIII divided at midline (Fig. 7)..... *majesticum* Harrison  
Tergites I-VIII either undivided, or tripartite, or various combinations of these..... 7
7. Abdominal tergites undivided; postspiracular setae short on IV-VII; abdominal chaetotaxy as in Fig. 19..... *freycineti*, n. sp.  
Abdomen with at least some tergites divided; postspiracular setae long at least on VII..... 8
8. With 8-10 heavy inner dorsal anal setae (Figs. 2 or 29)..... 9  
Without heavy inner dorsal anal setae (Fig. 30) 11
9. Median tergoventral setae on I alternating long with minute setae; very few if any anterior setae on most tergites (Fig. 34)..... *wilhelmi*, n. sp.  
Median tergoventral setae on I of essentially same length; all abdominal tergites with anterior setae..... 10
10. Tergite I with over 20 long median tergoventral setae, separated from lateral setae by gap; tergite II tripartite (Fig. 28)..... *lathamii*, n. sp.  
Tergite I without such a row of long tergoventral setae; tergite II undivided (Fig. 1)..... *appendiculatum* Nitzsch
11. Only tergites II-VI tripartite; no anterior setae on tergites VII-VIII (Fig. 36)..... *maleonis*, n. sp.  
Tergites II-VIII tripartite; anterior setae on tergites VII-VIII..... 12
12. Tergite I with tergoventral setae long, separated from lateral ones by gap; lateral tergoventral setae on II-VI much longer than those on median tergal plate; marginal sternal setae on II-III more or less evenly spaced across segment (Fig. 35)..... *arfakiani*, n. sp.  
Tergite I with tergoventral setae evenly spaced across segment, of medium length; lateral tergoventral setae on II-VI not markedly longer than median ones (Fig. 33); marginal sternal setae on II-III grouped as in Fig. 31..... *alecturae*, n. sp.

13. Tergoventral setae minute on all segments; anterior setae long on I-IV (Fig. 22)..... *chloropi*, n. sp.  
Tergoventral setae longer, of about same length as anterior setae..... 14
14. Marginal setae on sternite III long, extending across IV (Fig. 25)..... *orientalis*, n. sp.  
Marginal setae on sternite III short (Fig. 15)..... *talegallae*, n. sp.

## MALES

(Exclusive of *parumpilosum* Piaget, *freycineti* n. sp., *lathamii* n. sp., *wilhelmi* n. sp., and *orientalis* n. sp.)

1. Pronotum, metanotum, and all abdominal tergites with numerous microsetae (as in Fig. 7); sternites II-VIII with many setae, usually over 100 each; genital sclerite without median or lateroposterior projections (Fig. 8)..... *majesticum* Harrison  
Without above combination of characters..... 2
2. Margin of pronotum with 6 setae on each side..... *hoffmanni* Zavaleta  
Margin of pronotum with 8-9 setae on each side... 3
3. Tergites without anterior setae (Fig. 18)..... *talegallae*, n. sp.  
At least some tergites with anterior setae..... 4
4. Genital sclerite without lateroposterior projections (Fig. 32)..... *alecturae*, n. sp.  
*arfakiani*, n. sp.  
*maleonis*, n. sp.  
Genital sclerite with pointed lateroposterior projections..... 5
5. All abdominal tergites with minute tergoventral setae; longer anterior setae only on tergites I-IV (Fig. 21); median process of genital sclerite not longer than lateral processes; penis unbarbed (Fig. 24)..... *chloropi*, n. sp.  
Abdominal tergal chaetotaxy differs from above; median process of genital sclerite longer than lateral ones; penis barbed..... 6
6. One comb row on sternite IV, occasionally suggestion of second row (Fig. 5); genitalia as in Fig. 6..... *appendiculatum* Nitzsch  
No comb row on sternite IV..... 7
7. All tergoventral setae long, of essentially same length; inner middorsal head setae distinctly longer than outer; occipital setae long (Fig. 26); genital sclerite as in Fig. 27..... *tetraophasis*, n. sp.  
Without above combination of characters..... 8
8. Minute tergal setae as in Fig. 11; postspiracular setae long only on II-III and VI-VIII; distal portion of penis as in Fig. 10..... *thoracicum* Kellogg and Paine  
Abdominal tergites with fewer and longer setae (Fig. 14); postspiracular setae long on at least III-VIII; penis as in Fig. 13..... *tausi* (Ansari)

## DISCUSSION

The Galliformes, in which Peters (1934) recognizes approximately 275 species of birds, apparently is not commonly infested by *Colpocephalum*, at least if one judges from the number of described species of these lice and the number of specimens we could obtain by canvassing major Mallophaga collections. Yet, even with the scarcity of material, we found what we believe to be 10 previously undescribed species; this more than doubles the number of species of *Colpocephalum* known from this bird order. Thus, although these lice are rather rarely collected, those

that are show such profound differences between species that this would seem to indicate an extended period of host-parasite association and resultant divergence and speciation.

The family Megapodiidae, which contains only 18 species, or 6.5%, of the gallinaceous birds, is parasitized by 8 species, or half, of the known galliform *Colpocephalum*, 7 of which are newly described in this paper. Assuming that Peters (1934), in listing the Megapodiidae first, considers them to be the most primitive of the Galliformes, then this host-parasite phenomenon might be anticipated. Even more interesting is the fact that *C. arfakiani* and *C. wilhelmi* were taken together in the same collection from *Aepyodius arfakianus* and *C. lathamii* and *C. alecturae* in the same collection from *Alectura lathamii*. This fact would indicate that parasitism of the same individual by 2 possibly closely related species of *Colpocephalum* may occur.

The geographical distribution of the host birds and therefore of the lice is most interesting. With only 2 exceptions, all *Colpocephalum* of Galliformes have been taken in southern continental Asia, the islands of the South Pacific, and Australia. The members of the Megapodiidae are found only on South Pacific islands and Australia; they account for 8 species of *Colpocephalum*. Seven more species of these lice occur on various genera of the Phasianinae (Phasianidae), again with all of these host birds being Asiatic in origin. The unconfirmed and questionable species *C. hoffmanni* from Mexico is the only known record from the Cracidae, a family restricted to the Western Hemisphere. No *Colpocephalum* are known from the Tetraonidae, the Odontophorinae (Phasianidae), the non-Asiatic Phasianinae, the Numididae, or the Opisthocomidae; all these birds are native to the Western Hemisphere, Europe, Africa, or northern Asia. Within the family Meleagrididae, *C. tausi* has been taken from the domestic turkey, but none of these collections is from birds within their native range. This would suggest that this louse has passed to the turkey from the type-host, *Pavo cristatus*, a phasianid native to Asia.

*C. chloropi* and *C. orientalis*, species with females having a deeply indented vulval margin, apparently substantiate the presumed close relationship of *Arborophila* and *Tropicoperdix* (Phasianinae); however, the third louse with this type of vulva, *C. talegallae*, is found on 3 species of *Talegalla* (Megapodiidae) and expresses a relationship on which we can offer no comments. The rather unique species *C. tetraophasis* is from both *Lerwa* and *Tetraophasis* (Phasianinae), 2 genera of birds placed fairly close together by Peters (1934).

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