

here: hind wing clearly widened between nervature and apex (fig. 8).

♂.—Scape and radicle darker than in male of *pegasus*, but structurally the antenna hardly different; arrangement of hairs as in fig. 12. Tergite 1 slightly less transverse and slightly longer medially. Genitalia remarkable in that the "ventral plate" is extremely deeply excised, so that the lateral struts project as two free arms (fig. 14): cardo (not shown in figure) short, transverse, hardly more than one-fifth of the rest of the structure.

INDIA: Namkum, Ranchi, 5 ♀♀, one the type, 1 ♂, bred 24. i. 1938, in company with the two preceding species from eggs of the Lycaenid butterfly, *Tarucus theophrastus* L. on lac hosts (Indian Lac Research Institute).

Telenomus manolus Nixon.

Telenomus manolus Nixon, 1937, Ann. & Mag. Nat. Hist. (10) vol. xx, p. 454.

Originally recorded from Malaya, Kuala Lumpur, where it was bred from lepidopterous eggs on coffee. I have now seen a series from E. SUMATRA: Asahan, 50-60 mm., 1934-36, both sexes bred from eggs of some pest of *Uncaria gambir* Roxb. (*F. Schneider*).

In referring to the male genitalia, in my earlier paper, I expressed a doubt concerning the tooth-like thickening which occurs on each of the apical articulated appendages behind the posterior tooth. I mentioned that it appeared to be free, although I did not show it free in the figure, believing it to be homologous with a similar sclerotization seen in other species of *Telenomus*. On re-examining the preparation from which the drawing was made, and in which the balsam has now become darkened, I find that the thickened process in question is not free. The original figure, p. 457 l. c., shows the "ventral plate" rather too much widened to base and the sides of the basal cylinder slightly too much curved outwardly. Fig. 17 has been drawn from a male belonging to the series I now record from Sumatra, and, embodying the corrections of the mistakes in the earlier figure, gives a more faithful representation of the genitalia of the species.

A. M. N. H. 1162 V. G. 1940

LIII.—Notes on the Mallophaga of Aquatic Birds.—I.
Mallophaga from Divers (Gaviiformes). By GORDON
B. THOMPSON.

THE divers consist of a very small homogeneous group of birds (four species and four subspecies) which are placed between the penguins (Sphenisciformes) and the grebes (Colymbiformes) in the classification of the birds. I understand, however, that the modern view is that they (the divers) have no near relations. They are a primitive group, and although they come near to some other aquatic groups at the base of the avian tree the gaps between them are wider than is the case with groups higher up. It seems that only three species of Mallophaga have been named from them. Having before me specimens from *Gavia a. arctica* (L.) and *Gavia immer* (Brünnich), I have endeavoured to analyze the validity of the three species of parasites known, and am presenting my conclusions below.

The following are the three species of Mallophaga which have been described from divers:—

(1) *Docophorus colymbinus* Denny, 1842.

Type-host*. — *Gavia stellata* Pontoppidan). Red-throated Diver.

(2) *Nirmus frontata* Nitzsch in Giebel, 1866.

Type-hosts.—*Gavia arctica arctica* (Linn.). Black-throated Diver. *Gavia stellata* (Pontoppidan).

(3) *Docophorus gravigiceps* † Kellogg, 1896.

Type-host ‡.—*Gavia arctica pacifica* (Lawrence).

* Fixed by me in my paper on the Denny Coll. (Thompson, 1937, p. 77).

† Owing to the fact that this parasite had not then been regarded as a true parasite of a diver it was omitted from the second part of my type-host list (see Ann. & Mag. Nat. Hist. 1939, ser. 11, vol. iii, p. 242). It was originally described from specimens collected from *Fulica a. americana* Gmelin and *Gavia a. pacifica* (Lawrence). It should be added as no. 62 a, thus:—*Gavia arctica pacifica* Lawrence—*Philopterus gravigiceps* (Kellogg), 1896. On *Urinator pacificus* from California.

‡ See below under "Synonymy of recorded Hosts."

HISTORY OF THE SPECIES.

The first mention * of a parasite from divers was in 1842, when Denny described and figured a species which he called *colymbinus*. A whole figure of a female and a detail of the antenna was given. Denny's specimens were obtained from *Colymbinus septentrionalis* (Red-throated Diver), *C. arcticus* (Black-throated Diver), and *C. glacialis* (Northern Diver). With regard to the specimens from the latter host, Denny considered them to be a variety, but remarked that specimens from the Red-throated Diver were "quite as bright." All that remains of this author's specimens are four females labelled as from "*Colymbinus* sp."

In 1861 the German worker Nitzsch mentioned a parasite "*Nirmus frontatus*" as a *nom. nud.*, the host being *Eudyptes arcticus*. Later, in 1866, Giebel briefly described Nitzsch's specimens under the name "*frontatus*," and gave the hosts as *Eudyptes arcticus* and *E. septentrionalis*. He particularly mentioned the "half-moon shaped signature" (*cf.* figure in Giebel's 'Insecta Epizoa'). In 1874 Giebel redescribed and figured † a female of the species, and gave the hosts as "*Colymbus arcticus* and *C. septentrionalis*." He stated that Nitzsch obtained it in large numbers on a fresh corpse. Giebel also referred to Denny's species, and quoted the latter's Latin diagnosis, but he misspelt the name thus—"columbinus."

The next mention of a diver parasite is to be found in Piaget's Monograph. In 1880 Piaget described and figured females obtained from *C. septentrionalis* which he regarded as being the same as Denny's *colymbinus*. There are two females preserved in Piaget's collection. On a later page this author gave a French interpretation of Giebel's description of "*frontatus*," but he did not have specimens which he regarded as being this species.

Osborn (1896) recorded specimens off *Urinator lumme*, presumably from N. America, as *D. colymbinus* Denny.

* According to Dr. S. Kéler, Nitzsch collected, described, and figured *N. frontatus* in 1826, but this was not published (MISS. Bd. iv. S. 257 u. 317).

† The trabeculae are absent in the figure given by Giebel, but he says this is a mistake.

In the same year Kellogg described a species which he called "*graviceps*" on the basis of specimens obtained from *Fulica americana* and *Urinator pacifica* from California. It is evident now that the diver was the true host of Kellogg's specimens and that those on the coot were stragglers. The same author, in 1899, recorded specimens from *Urinator pacifica* as *D. colymbinus* Denny, and also listed his *D. graviceps* as occurring on the same host. It appears therefore that he regarded the two species as distinct. For the list of the Mallophaga of the world (1908) Kellogg listed all three named species from divers.

Mjöberg (1910) recorded Denny's "*colymbinus*" from *Colymbus arcticus* and *C. septentrionalis*. Evans (1912) recorded Denny's species from the same two hosts and a single specimen from a goosander which must have been a straggler.

Harrison (1916) listed Denny's and Kellogg's species under *Philopterus* and Nitzsch's species under *Degeeriella* in his list of the Mallophaga.

Apart from three records, one for each of the named species, by Kistiakowsky, Bird, Peters, and Gross (see Bibliography for refs.), the diver parasites appear not to have been mentioned otherwise.

SYNONYMY OF RECORDED HOSTS.

<i>Colymbus septentrionalis</i>	=	<i>Gavia stellata</i> (Pontoppidan).
<i>C. arcticus</i>	=	<i>G. a. arctica</i> (Linn.).
<i>C. glacialis</i>	=	<i>G. i. immer</i> (Brünnich).
<i>Eudyptes arcticus</i>	=	<i>G. a. arctica</i> (Linn.).
<i>E. septentrionalis</i>	=	<i>G. stellata</i> (Pontoppidan).
<i>Urinator lumme</i>	=	<i>G. stellata</i> (Pontoppidan).
<i>U. pacifica</i>	=	<i>G. arctica pacifica</i> (Lawrence).

Conclusions as to Synonymy*.

I have had my specimens from *Gavia a. arctica* L. compared with the types of Nitzsch's *frontatus* and Denny's *colymbinus* and Piaget's specimens of *colymbinus* Denny, and it seems that they are all identical. Denny's name, being the oldest, will stand. I have also specimens determined as *graviceps* Kellogg which seem to represent the same species.

* I am indebted to Dr. S. Kéler and Miss T. Clay for their help.

A complete bibliography of the species follows :

BIBLIOGRAPHY.

- Docophorus colymbinus* Denny, 1842, *Anoplur. Brit.* pp. 43, 80, pl. viii, fig. 8.
Nirmus frontatus Nitzsch, 1861, *Zeit. f. ges. Nat.* xviii, p. 319.
N. frontatus Nitzsch in Giebel, 1866, *Zeit. f. ges. Nat.* xxviii, p. 378.
D. colymbinus Denny, Giebel, 1874, *Insecta Epizoa*, p. 119.
N. frontatus Nitzsch, Giebel, 1874, *op. cit.* p. 178, pl. viii, fig. 11.
D. colymbinus Denny, Piaget, 1880, *Les Pédiculines*, pp. 117-118, pl. x, fig. 5.
D. frontatus Giebel, Piaget, 1880, *op. cit.* pp. 203-204.
D. colymbinus Denny, Osborn, 1896, *Bull. Div. Ent. U.S. Dept. Agric.* v. (n. s.) p. 217.
D. grariceps Kellogg, 1896, *Proc. Calif. Acad. Sci.* vi, ser. 2, pp. 82-84, pl. iii, fig. 3.
D. grariceps Kellogg, 1899, *Proc. U.S. Nat. Mus.* xxii, p. 43.
D. colymbinus Denny, Kellogg, 1899, *op. cit.* p. 43.
D. colymbinus Denny, Kellogg, 1908, *Genera Insectorum*, fasc. 66, p. 11.
D. grariceps Kellogg, 1908, *op. cit.* p. 14.
N. frontatus Nitzsch in Giebel, Kellogg, 1908, *op. cit.* p. 24.
D. colymbinus Denny, Mjöberg, 1910, *Ark. Zool.* Bd. 6, no. 13, p. 132.
D. colymbinus Denny, Evans, 1912, *Proc. Roy. Phys. Soc. Edinb.* xviii, p. 290.
Philopterus colymbinus (Denny), Harrison, 1916, *'Parasitology.'* ix, p. 91.
P. grariceps (Kellogg) Harrison, 1916, *op. cit.* p. 96.
Deqgeriella frontata (Nitzsch in Giebel), Harrison, 1916, *op. cit.* p. 113.
Docophorus colymbinus Denny, Kistiakowski, 1926, *Bull. Cl. Sc. Phys. Math., Ac. Scos. Ukraine, Kieff*, Bd. 2, III, 1, p. 135.
Deqgeriella frontata (Nitzsch), Bird, 1935, *Ibis*, p. 847.
P. grariceps (Kellogg), Peters, 1936, *'Bird Banding.'* vii, p. 10.
P. colymbinus (Denny), Gross, 1937, *'Auk.'* liv, p. 41.

Supplementary Note.

When this paper was ready to send to the press I received a copy of Dr. S. Kéler's paper (1939, *Z. Parasitenk.* Bd. 11, p. 49) in which he has erected a new genus for the reception of the diver parasite which I am considering here. I have therefore substituted Kéler's generic name for the one which I was proposing.

CRASPEDONIRMUS Kéler (1939).

Fairly robust forms of moderate size, well pigmented and sclerotized.

Head slightly shorter than long, with lateral margins almost straight, temples broadly rounded, posterior margin almost straight. Main feature of the head is its

division into two parts by a dorsal line running transversely just posterior to the base of the antennæ. Clypeus distinct, goblet-shaped, but there is no clypeal suture. Antennal bands and mandibles strong. Antennæ small, simple. Trabeculæ small.

Prothorax small; meso-metathorax larger, but neither as wide as the head at its widest point.

Abdomen slightly more than one and a half times as long as broad; fourth segment broadest. Transverse bands continuous. Pleurites strongly pigmented and sclerotized, overlapping. Tergites separated from the pleurites by a narrow clear area, almost rectangular, continuous except on first segment. Terminal segments of female bilobed; genital plate distinctive (see fig. 6). A spermatheca is present. Male genitalia small, parameres terminating in a "claw."

Parasitic on Gaviiformes.

Distinguished from the known genera * by the division of the head together with the numerous other distinctive characters of the species.

Genotype.—*Nirmus frontatus* Nitzsch in Giebel = *Docophorus colymbinus* Denny.

Type-host.—*Gavia stellata* (Pontoppidan).

Description † of *Craspedonirmus colymbinus* (Denny).

Specimens examined.—1 ♂ and 3 ♀♀ off the type-host, British Isles; 11 ♀♀, 1 ♂ off *Gavia a. arctica* Linn. from Orkney Is.; and 1 ♀, 1 ♂ off a diver collected in N. American waters.

Female.

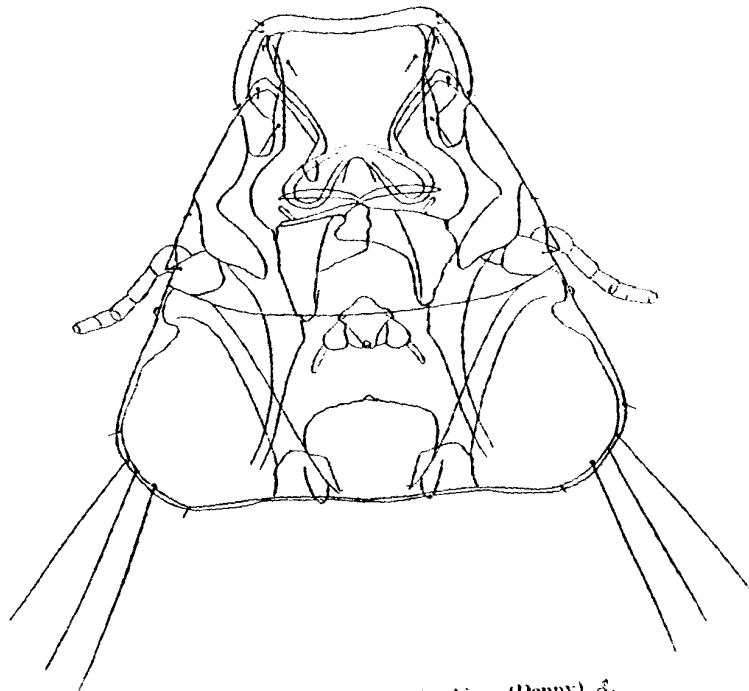
Length, 2.15 mm.; *greatest breadth*, 0.77 mm.

Head: almost as long as broad, with anterior margin straight and the lateral margins straight except for a slight bulge just anterior to the antennæ. Posterior margin slightly convex. Clypeal suture not distinct.

* Dr. Kéler says that this genus reminds one somewhat of *Rallicola*.

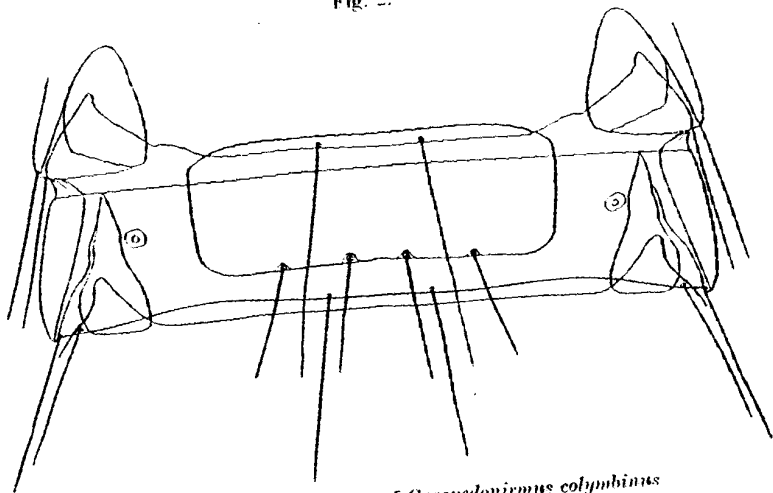
† It should be noted that, owing to the condition of some of the specimens, the whole of this description is based on specimens collected from *Gavia a. arctica* Linn.

Fig. 1.



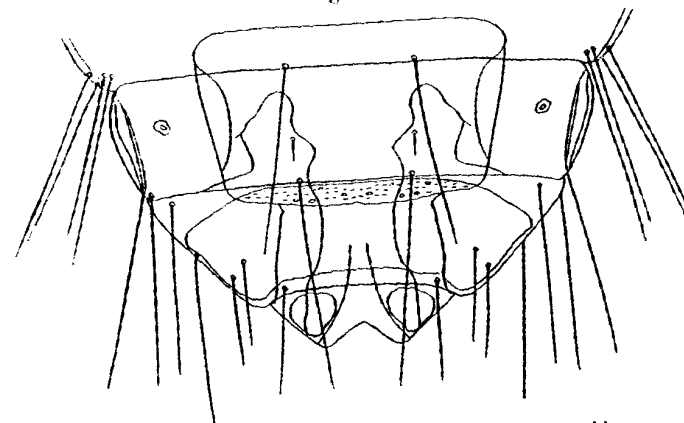
Head of *Craspedonirmus colymbinus* (Denny). ♂.

Fig. 2.



Fourth abdominal segment of *Craspedonirmus colymbinus* (Denny). ♀.

Fig. 3.



Terminal abdominal segments of *Craspedonirmus colymbinus* (Denny). ♀.

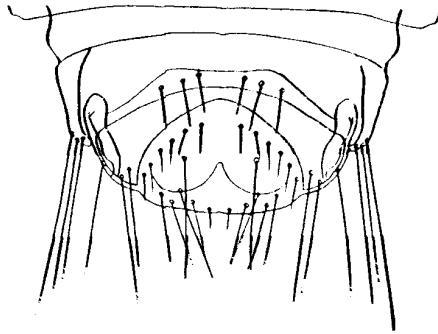
Antennal bands and mandibles strong. The head is divided into two by a dorsal line running transversely from the posterior point of attachment of the antennæ and curving slightly medianly. Temples evenly rounded. Trabeculæ small, about as long as the first segment of the antennæ. Antennæ small, five-segmented, first two segments almost equal in length and together are equal in length to the remaining three segments. For other details of the head see fig. 1.

Thorax small. *Prothorax* narrower than the head at

the temples in the proportion of 5 : 9; almost rectangular; less than half as long as wide; lateral margins heavily sclerotized and pigmented, also two bars running inwards but not meeting medianly posterior to the first coxæ; apparently devoid of setæ. Meso-metathorax rather wider than prothorax; wider than long (7 : 3); wide lateral margins well sclerotized and pigmented; posterior margin produced backward to a blunt point. One fairly long seta at about the middle of the lateral margin and one fairly long and a shorter seta in the posterior lateral angles. Legs short and stout.

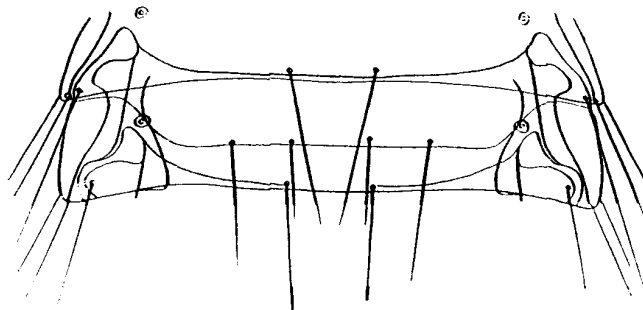
Abdomen: a little more than one and a half times as long as broad. First segment narrow segments becoming

Fig. 4.



Terminal abdominal segments of *Craspedonirmus colymbinus* (Denny), ♂.

Fig. 5.



Fourth abdominal segment of *Craspedonirmus colymbinus* (Denny), ♂.

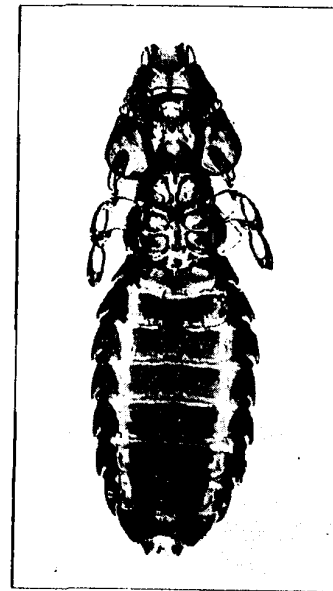
broader to the fourth, then decreasing again. Transverse bands continuous. Pleurites strongly pigmented and

Fig. 6.



♂ genitalia of *Craspedonirmus colymbinus* (Denny).

Fig. 7.



Craspedonirmus colymbinus (Denny), ♀.

sclerotized, overlapping. Tergites separated from pleurites by a narrow clear area, almost rectangular, each bearing two fairly long setae medianly on the posterior margin. Sternites smaller, each bearing four fairly long setae medianly on the posterior margin. Spiracles clearly visible. Terminal segments (see fig. 3). A spermatheca is present.

Male.

Length. 1.96 mm; *greatest breadth.* 0.60 mm.

Smaller, but in all other respects closely resembling the female. For details of the terminal abdominal segments, the abdominal segments, and the genitalia see figs. 4, 5, and 6.

N.B.—It is probable that further research on the Mallophaga of the divers may show that there is more than one species involved. At present, however, it seems that the specimens from the two hosts which I have before me are identical, although I must confess that of the three males I have examined only one is in good condition. The photograph (fig. 7) and figures 1, 2, 3, and 6 were prepared from specimens off *Gavia a. arctica* (Linn.), and figures 4 and 5 were prepared from specimens off *Gavia i. immer* (Brünnich).

LIV.—*Two new Orthoptera from Turkey.* By B. P. UVAROV, D.Sc., British Museum (Natural History).

THE types of the following new species are deposited in the British Museum (Natural History), and paratypes in the Institute of Zoology, Ankara, Turkey.

Tettigoniidæ.

Isophya karabaghi, sp. n. (Fig. 1.)

Differs from all known species by the unusually long ovipositor, while the male is recognizable by the shape of the subgenital plate.

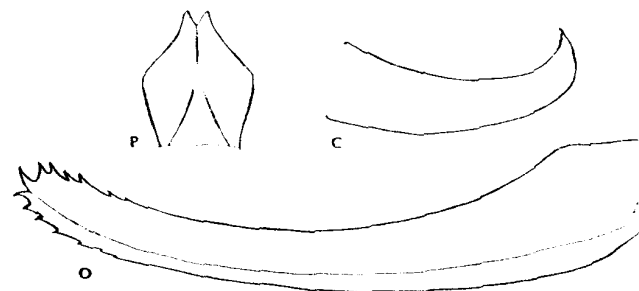
♂ (*type*).—Fastigium of vertex narrow, parallel-sided, with rounded apex, sulcate above.

Pronotum moderately saddle-shaped, short; front margin rounded-truncate; hind margin quite straight, not raised; lateral lobe longer than deep, with the lower margin practically straight and the hind angle very obtuse.

Elytra longer than pronotum, strongly ampliate; inner margin rounded-obtuse angular.

Supra-anal plate more than twice as broad as long; posterior margin shallowly concave; posterior angles broadly rounded. Cercus (fig. 1, c) stout, sparsely hirsute,

Fig. 1.



Isophya karabaghi, sp. n.

P, male subgenital plate; C, male cercus from above; O, female ovipositor.

incurved, with a short apical spinule. Subgenital plate (fig. 1, P) large, elongate, apically narrowed and triangularly excised, with an incomplete median carinula.

Coloration yellowish green, with small reddish-brown dots; legs pale reddish brown; elytra with the costal margin whitish.

♀ (*paratype*).—Elytra very short, strongly transverse, not touching each other on the bases. Subgenital plate rounded-triangular, nearly twice as broad as long. Ovipositor (fig. 1, O) nearly four times the length of pronotum, weakly recurved, strongly dentate at the apex.