The Mallophagan Genus Heterodoxus Le Souëf and Bullen.

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The genus *Heterodoxus* was founded in 1902 by S. A. Le Souef and H. Bullen (†) for a Mallophagous parasite from the kangaroo. The authors say:

"This insect . . . . is interesting on account of its being only the second two-clawed parasite of the family Liotheidae which has been found on a mammal.

" . . . . The insect under consideration . . . closely resembles the sub-genus *Menopon,* but as that sub-genus has been regarded by former writers as being exclusively confined to birds, in order that there may be no confusion we have determined to found a new genus, *Heterodoxus,* for it."

The authors fail to point out characters which would separate, structurally, *Heterodoxus* from certain species of *Menopon,* several of the latter genus having been described from mammals (‡) showing that the belief that two-clawed *Mallophaga* are strictly confined to birds is not founded on fact.

Specimens of *Mallophaga* taken from a dog in Berkeley, Cal., were sent to this laboratory by Professor W. B. Herms, of the University of California. They resemble closely Le Souef & Bullen's *Heterodoxus macropus,* specimens of which, sent to this laboratory by Mr. Le Souef, are at hand. Upon examination of the two lots, characters were at once noted that seem to separate them from all other genera of *Mallophaga.*

I offer the following, therefore, as an account of the structural characters distinguishing this genus, which so far contains but the two species here mentioned.

(†) Le Souef & Bullen: Description of a Mallophagous Parasite from the Kangaroo.—VICTORIAN NATURALIST, Vol. XVIII, No. 10, p. 159, Feb. 6, 1902.

(‡) Kellogg & Paine: Mallophaga from Birds and Mammals.—ENT. NEWS, Vol. XXI, pp. 459-463, 1910.

Genus **Heterodoxus** Le Souef & Bullen.

Resembles certain species of *Menopon* in having the many spines characteristic of mammal-infesting Liotheidae, but dif-

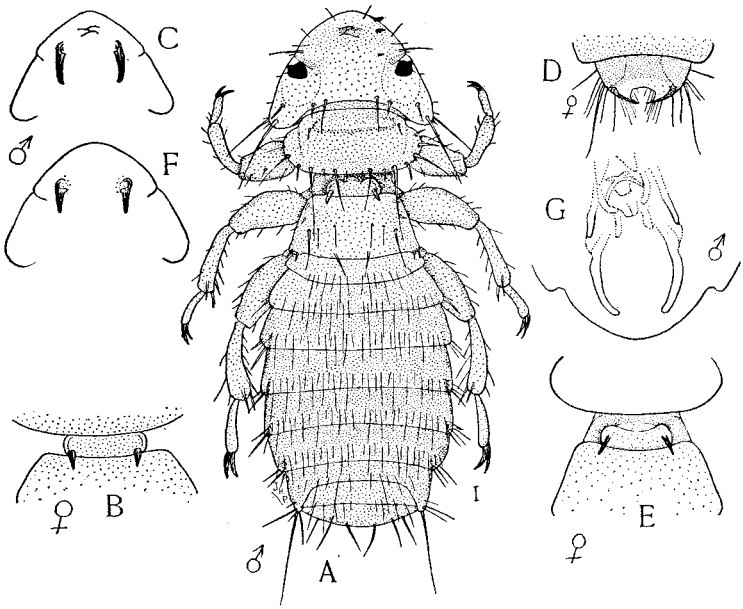

Fig. A. *Heterodoxus armiferus Paine,* ♂.
Fig. B. *Heterodoxus armiferus Paine,* mesothorax of ♀.
Fig. C. *Heterodoxus armiferus Paine,* head of ♂ showing ventral hooks.
Fig. D. *Heterodoxus armiferus Paine,* last segment of ♀.
Fig. E. *Heterodoxus macropus Le Souef & Bullen,* mesothorax of ♀.
Fig. F. *Heterodoxus macropus Le Souef & Bullen,* head of ♂ showing ventral hooks.
Fig. G. *Heterodoxus macropus Le Souef & Bullen,* last segment of ♂ showing genitalia.

fers from this genus and all others in having a distinct mesothorax. Head conical, broader than long, not longer than broad as characterized, on the basis of Le Souef's description,

(‡) V. L. Kellogg: Mallophaga, Genera Insectorum, 66 Fascicule, 1908.

in Kellogg's key to the *Mallophaga;* (‡) front rounded, sides straight, the ocular emarginations being completely filled; ocular fleck prominent; a pair of heavy hook-like spines on the under side. Thorax well developed. Mesothorax a distinct segment, much smaller than the pro- or metathorax. Legs and abdomen well developed. Mammal infesting, probably characteristic of dogs.

Heterodoxus macropus Le Souef & Bullen (Figs. E, F, G).

Four specimens of this species, two males and two females, from a black Wallaby (Victoria) were kindly sent by Mr. Le Souef. The species is well described in the authors' paper before mentioned except for the omission of reference to the mesothorax. This segment is small, consisting of a narrow, short plate on the dorsum with a short heavy spine on each side; sides rounded. (Fig. E.)

DIMENSIONS.

	Length		Width	
	Male	Female	Male	Female
Head	.42	.45	.62	.66
Prothorax	.29	.30	.56	.60
Mesothorax	.13	.14	.20	.22
Prothorax	.29	.30	.56	.60
Abdomen	1.44	1.86	.96	1.06
Total	2.68	3.00		

Dr. G. Enderlein has described a parasite from a South African dog† under the name *Menopon spiniger.* His description and figure, however, both agree so closely with our specimens of *H. macropus* that it is impossible to separate the two species. Owing to priority therefore, *M. spiniger* becomes a synonym. Thus we have both species of the genus *Heterodoxus* occurring on the dog, which animal is probably its characteristic host.

†Enderlein, G., Anopleuren & Mallophagen; Schultze, Forschungsreise in Sudafrika, II; Jenais-Denkschr. XIV, 1909.

Heterodoxus armiferus n. sp. (Figs. A, B, C, D).

Four specimens, one male and three females sent by Professor W. B. Herms, collected from a dog (Berkeley, Cal.). One can scarcely see how two such closely related forms can come from hosts so widely separated, both geographically and systematically unless by some process of "straggling." This species generally resembles *macropus,* but is much smaller and the abdomen of the male is truncate.

Description of male: Head conical, broader than long; clypeus slightly angled on the meson and rounding on the sides; temples straight laterally, rounded narrowly at the posterior angles; occiput concave; ocular emarginations lacking, being completely filled by the large eyes; ocular fleck large, prominent, jet black. Two hook-like spines on under side of head (Fig. C). more developed than in the preceding species (Fig. F); clypeal hairs fine, inconspicuous, except for one long spine just before the eye; eye with one short spine on the surface; temples with two long spines on the angle and several short ones; occiput with short heavy spines and two longer, lighter ones. Thorax well developed; prothorax laterally and posteriorly rounded, with a row of strong spines on those margins; mesothorax small but distinct (Figs. A & B), with sides rounded and a short heavy spine on each side; metathorax trapeziform with posterior margin slightly convex; a number of spines on the margin and surface. Abdomen almost quadrilateral; last segment broad, truncate, slightly rounded; a row of closely set spines across each segment, long and short spines alternating. Last segment of female with forceps-like appendages (Fig. D).

DIMENSIONS.

	Length		Width	
	Male	Female	Male	Female
Head	.38	.40	.56	.58
Prothorax	.22	.22	.49	.51
Mesothorax	.10	.10	.20	.20
Metathorax	.24	.26	.48	.50
Abdomen	.90	1.12	.72	.81
Total	1.76	1.98		

As some of the segments overlap there is a discrepancy between the total length and the sum of the various lengths.

This paper was prepared in the entomological laboratory of Stanford University.