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# ON A COLLECTION OF NEMATODES FROM AUSTRALIAN MARSUPIALS.

By

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(Figures 1-12.)

A small collection of parasitic nematodes belonging to the Australian Museum was submitted to us by the Director, Dr. C. Anderson, for examination, those from marsupials being dealt with here. The host names, Museum registered number, locality and species recorded in this paper are as follows:

*Macropus major* Shaw (W.3212), probably from N.S.W.; *Zoniolaimus bipapillosus* J. & M.; (W.3213) *Pharyngostromgylus macropodis* Yorke and Maplestone.

*Macropus ocydromus* Gould, (W.886), from near Cranbrook, south-western Australia: *Pharyngostromgylus beta* J. & M.; *Cloacina curta* J. & M.; *C. obtusa* J. & M.

*Macropus* sp., probably *major* Shaw, (W.370), from Eidsvold, Queensland: *Dipetalonema roemeri* (Linstow).

*Macropus rufus* Desm., (W.1072), from Mt. Lyndhurst, Northern Flinders Range, South Australia: *Pharyngostromgylus beta* J. & M.

*Macropus rufus* Desm., (G.11181), no locality mentioned: *Zoniolaimus longispicularis* (Wood).

*Macropus fuliginosus* Desm., (W.1064), from Deep Creek, near Kingscote, Kangaroo Island: *Zoniolaimus communis* J. & M.

*Macropus robustus* Gould (W.3214), from Armidale, N.S.W.; *Zoniolaimus longispicularis* (Wood).

*Thylogale eugenii* Desm., (W.1069), from Deep Creek, near Kingscote, Kangaroo Island: *Zoniolaimus eugenii*, n. sp.; *Cloacina petrogale* J. & M.; *Physaloptera* sp.

*Thylogale thetis* Lesson (W.3173), Huonbrook, near Mullumbimby, N.S.W.; *Zoniolaimus uncinatus* J. & M.

*Wallabia irma* Jourdan, (W.887), near Cranbrook, south-western Australia: *Macrostrongylus irma*, n. sp.; *Pharyngostromgylus beta* J. & M.; *Zoniolaimus communis* J. & M.; *Cloacina curta* J. & M.

*Wallabia* sp. "wallaby", (G.11103), without locality: *Dipetalonema* sp.

*Wallabia* sp. "wallaby", (G.11113), without locality: *Contracecum erraticum*, n. sp.

Collections W.886, 887, 1064 and 1072 were made in 1921 by E. Le G. Troughton, Museum Mammalogist, Australian Museum. G.11103, 11113 and 11181 formed part of collections obtained long ago and have no names of localities associated with them. They must have been made about seventy years ago, as the labels are all in the handwriting of G. Krefft, who was Curator of the Australian Museum and

read a paper before the Entomological Society of N. S. Wales in 1871 (published in 1873) on Australian Entozoa. In addition to describing a number of cestodes, mostly from Australian birds and marsupials, he recorded under broad generic names, e.g. *Ascaris*, *Distoma*, etc., the presence of helminths in various animals, chiefly birds and reptiles. The material was stated to have been collected by himself and by Mr. George Masters in the neighbourhood of Sydney and in Queensland. Since all the specimens recorded as obtained by Masters are stated to be from Queensland, presumably Krefft secured the New South Wales material and Masters that from the northern state. Some of it must have come from the Burnett River district of Queensland, e.g. *Ascaris* sp. (which we can safely attribute to *Amblyonema terdentatum* Linstow) from *Ceratodus forsteri*, and perhaps material from *Elseya dentata* (a tortoise) and from "northern wallabies" (*Halmaturus*), Krefft actually naming *Halmaturus mastersi* (now known as *Wallabia bicolor* var. *mastersi*; syn. var. *ingrami* Thomas) from that region, his *Taenia mastersi* probably coming from the same host. *Ascaris* sp. was recorded (Krefft, 1873, 212) from a bandicoot, *Perameles nasuta*, a species formerly common in the Sydney district, which was probably the locality for Krefft's material, his parasite belonging without doubt to our *Physaloptera peramelis* (also from the vicinity of Sydney), but his specimens are no longer available for comparison. Collection G.11113, labelled "Ascaris from Wallaby", but without any other data, contains only a species of *Contraecaecum*, an occurrence so striking as to suggest an error in labelling, as we indicate in a later portion of this paper. Regarding G.11181 from *Macropus rufus*, the host animal must have been taken somewhere on the great inland plains and we are not able to suggest any more definite locality for these particular parasites, though the species, *Zoniolaimus longispicularis*, has been recorded by us from many kangaroos and wallabies from various parts of Australia. An account of several of Krefft's cestodes was published by one of us (T.H.J.) in 1912.

***Contraecaecum erraticum*, n. sp.**

(Figs. 1-2.)

G.11113: "Ascaris from wallaby."

Males about 16-17 mm.; females 15-30 mm. long. A collar region behind the lips, 45 $\mu$  deep. Lips large, each with a pair of laterally-projecting horns; interlabia nearly as long as the main lips; each sublateral lip with one, and the dorsal lip with two large rounded papillae.

In a male 16.5 mm. long the oesophagus was 2.25 mm, the stout conical intestinal caecum 1.65 mm., and the thin, club-shaped oesophageal diverticulum 0.55 mm. long. In the same male the spicules were 3.8 mm. long, i.e. 1:4.3 of body length; but in others they ranged to 1:5.5 of body length. There were twelve pairs of preanal papillae arranged in two linear rows, with the larger papillae more anteriorly situated. Postanally were six pairs of papillae, those of each side being arranged in three groups of two each, one group just posterior to the anus, another near the mid-line behind these and one laterally.

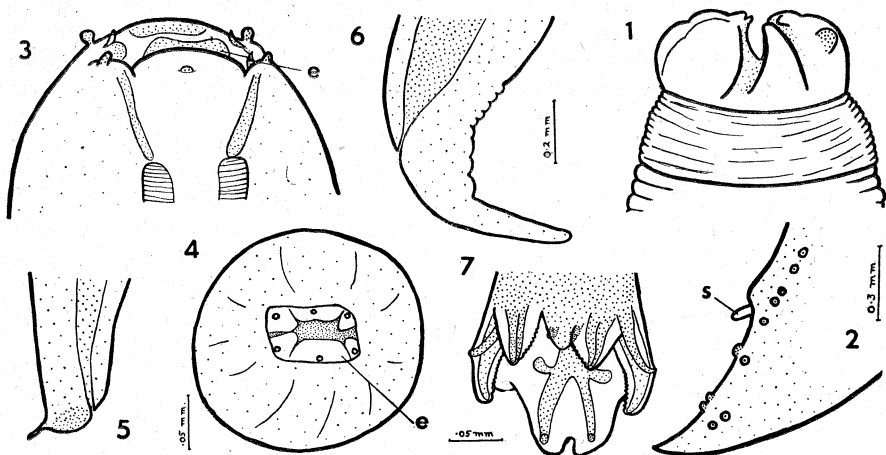
In some females the cuticle just behind the collar formed a ridge. The position of the vulva was 1:3.6 of body length from anterior end. The conical tail was 0.3 mm. long.

The form of the head and the number and arrangement of the postanal papillae suggest *C. microcephalum* (Rud.), but there are fewer preanal papillae and a

shorter oesophageal appendix than in Rudolphi's species; the spicule length given by Cram is not referred to any particular length given for the males.

In general features it also resembles *C. punctatum* Gedoelst, but differs in having fewer preanal papillae, and slightly shorter oesophageal appendix; the ratio of spicule to body length is evidently extremely variable in *C. punctatum*.

The worms are shorter than *C. spiculigerum* (Rud.); the ratio of the lengths of oesophageal and intestinal caeca is different; there are only two pairs of lateral postanal papillae instead of three pairs; and only twelve pairs of preanal papillae instead of 38-56 pairs mentioned by Cram as occurring in *C. spiculigerum*; while the spicules are slightly longer relative to body length than in Rudolphi's species. *C. rodhaini* (Gedoelst), from *Plotus rufus*, is about the same size, but the number



Figs. 1-2.—*Contracaecum erraticum*, n. sp.: 1, head; 2, tail of male. Figs. 3-6.—*Macrostrongylus irma*, n. sp.: 3, lateral view of head; 4, anterior view of head; 5, posterior end of female; 6, variant type of female tail. Fig. 7.—*Pharyngostrongylus beta*: bursa. Figs. 1, 3 and 7 to same scale; figs. 5 and 6. e, element of leaf crown; s, spicule.

of pre- and postanal papillae in the male is greater. *C. tricuspe* (Gedoelst) from *Ardea* sp. and *Plotus melanogaster*, is a shorter species, with relatively longer oesophagus and spicules, many more preanal papillae, and has a more posteriorly situated vulva. *C. pseudodontum* Kreis, from *Phalacrocorax*, agrees very closely with *C. erraticum*, differing in having relatively shorter oesophageal appendix, shorter spicules, and many more preanal and one pair fewer postanal papillae in male, and in the presence of a tooth in the mouth.

In view of the fact that the known hosts for the adult stage of species of *Contracaecum* are fish-eating vertebrates, it seems most probable that a mistake in labelling or a wrong transference of labels has occurred. Krefft's original list (1873, 212-14) contains no mention of "*Ascaris*" from a wallaby, but does include *Ascaris* sp. from *Plotus novae-hollandiae*, a bird from which *Contracaecum spiculigerum* has been reported. Our studies suggest that the latter may be a composite of some closely related species. A search has failed to reveal the presence of

Kreff's material from *Plotus*, unless, as is quite probable, his label "*Ascaris* from Wallaby" should read "*Ascaris* from *Plotus novaehollandiae*".

Kreff's specimens of *Ascaris* sp. (1873, 212) from *Delphinus forsteri* from Port Jackson appear to have been lost, but our species does not resemble the Anisakine nematodes recorded from fish-eating mammals.

***Macropostrongylus irma*, n. sp.**

(Figs. 3-6.)

Part of collection W.887 from the stomach of *Wallabia irma* Jourdan from the vicinity of Cranbrook, south-western Australia. The species is represented by six immature females, some of them poorly preserved. We assign it to *Macropostrongylus* on account of the characters of the head.

Length 14-16 mm. Anterior end rounded; six small circumoral papillae; buccal capsule stout-walled, about 70-80 $\mu$  wide, 50-70 $\mu$  deep; from its anterior border a leaf crown of six elements, each recurved outwardly, the two lateral elements being wider than the four submedian. Six low lips, laterals wider than submedians; lateral papillae much smaller than submedian. Oesophagus 1.65 mm. long, widening towards its posterior end. Nerve ring at 0.85 mm., and excretory pore at 1.1 mm., from the anterior end. A mass of granular tissue just behind the anus. Tail about 0.2 mm. long, with short narrow terminal portion dorsally directed and ending in a point. Vulva not seen.

With these worms were found three females possibly of the same species, but differing somewhat. Two of these, while having a head of the type described above, had the tail longer, more gradually tapering and without the mass of granular tissue posterior to the anus. The third had a tail like the other two, but there was a slight variation in the head region, where a circular constriction just behind the lips gave it a different appearance. These variations may have been due to differences in shrinkage during preservation.

The species differs from others in the characters of the lips and leaf crown, and in the shape of the tail.

***Pharyngostrongylus macropodis* Yorke & Maplestone, 1926.**

From *Macropus major*, locality not stated, probably N.S.W. (W.3213).

***Pharyngostrongylus beta* Johnston & Mawson, 1938.**

(Fig. 7.)

This species was represented in collections W.886 from *Macropus ocydromus* from Cranbrook, Western Australia; W.1072 from *M. rufus* from Mount Lyndhurst, South Australia; and W.887 from *Wallabia irma*, Cranbrook, Western Australia.

The specimens recorded here differ slightly from the type described from Central Australia and from those found in Eastern Australia. They have a slightly longer vestibule and the bristles on the oral papillae are bifid. Such variations do not seem to justify the erection of a new species. The variant has also been identified by us from material collected from *Thylogale flindersi* (Flinders Island, South Australia) and *Petrogale pearsoni* (Pearson Island, South Australia). A better figure of the bursa than that given previously by us (J. & M., 1938b, 265, fig. 6) is included in this report.

**Zoniolaimus communis** Johnston & Mawson, 1939.

The Museum collection contains specimens from *Macropus fuliginosus*, Kangaroo Island (W.1064), and *Wallabia irma*, Cranbrook, Western Australia (W.887). The species was described from Queensland material, its known range being now greatly extended.

**Zoniolaimus eugenii**, n. sp.

(Figs. 8-12.)

From *Thylogale eugenii*, Deep Creek, Kangaroo Island (W.1069).

Stout worms; male about 16-20 mm., females 25-30 mm. long. Head with six lips; two laterals squarish, each with small median papilla near top; four submedians slightly bifid at end, and bearing near base each a small papilla with bristle. The species is characterized by having a pair of accessory lobes arising from the base of each submedian lip. Buccal capsule about 0.09 mm. in diameter, 0.07 mm. deep, with walls about 15 $\mu$  thick, with base 0.13 mm. from top of lips. Oesophagus 2.15 mm. long, and consisting of an anterior narrower portion 0.8 mm. long, widening suddenly to about twice the diameter, but becoming constricted just before joining the intestine. Nerve ring surrounding oesophageal constriction; excretory pore at same level.

*Male*.—Bursa large; ventral lobes not united, dorsal lobe bifurcate and much longer than rest of bursa. Ventral rays stout, parallel, extending nearly to bursal edge; externo-lateral and externo-dorsal arising with laterals and not reaching edge of bursa. Laterals cleft for most of their length; longer than externo-lateral; not quite reaching edge of bursa. Dorsal ray stout, bifurcating at mid-length, each branch giving off a short lateral ray before proceeding nearly to bursal edge. Spicules 2.5 mm. long, 1:6.4 of body length.

*Female*.—Body tapering to a fine point; tail 1.5 mm. long, sometimes dorsally directed. Vulva 0.6 mm. in front of anus; vagina 0.4 mm. long; ovejectors about 0.8 mm.; eggs 0.1 by 0.06 mm.

This species differs from other members of the genus in the presence of paired accessory lobes on the submedian lips.

**Zoniolaimus longispicularis** (Wood) Johnston & Mawson, 1938.

From *Macropus rufus*, locality ?, G.11181, many specimens; from *M. robustus*, Armidale (W.3214). This species is now known to have a wide distribution in the drier parts of Australia.

**Zoniolaimus bipapillosus** J. & M., 1939.

From *Macropus major*, locality not stated, probably N.S.W. (W.3212).

**Zoniolaimus uncinatus** J. & M., 1939.

From *Thylogale thetis*, Huonbrook, near Mullumbimby, N.S.W. (W.3173).

**Cloacina curta** Johnston & Mawson, 1938.

From *Macropus ocydromus* (W.886), and *Wallabia irma* (W.887) from Cranbrook, Western Australia.

*Cloacina obtusa* Johnston & Mawson, 1939.

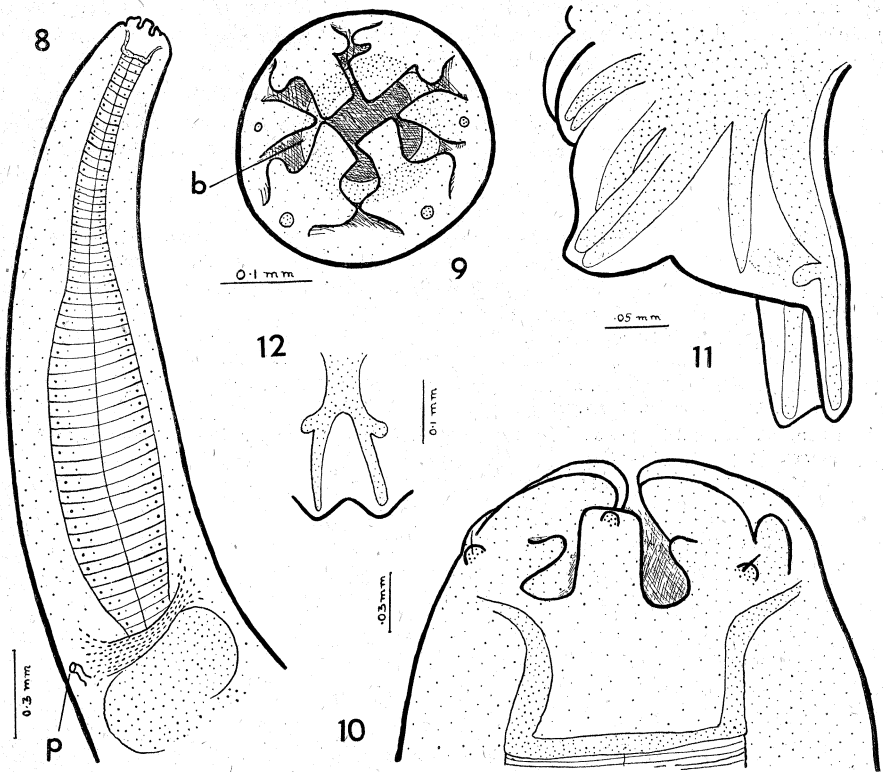
From *Macropus ocydromus*, Cranbrook, Western Australia (W.886).

*Cloacina petrogale* Johnston & Mawson, 1938.

A specimen, probably referable to this species, was found amongst material from *Thylogale eugenii*, Kangaroo Island (W.1069).

*Dipetalonema roemeri* (Linstow).

Many specimens (W.370), forwarded by the late Dr. T. L. Bancroft from Eidsvold, Upper Burnett River, Queensland. The host is not mentioned, but Bancroft had previously recorded the presence of the species (as *Filaria websteri*)



Figs. 8-12.—*Zoniolaimus eugenii*, n. sp.: 8, anterior end; 9, anterior view of head; 10, lateral view of head; 11, bursa; 12, dorsal ray. b, buccal ring; p, excretory pore.

in the kangaroo *Macropus major*, and had sent us specimens from that host as well as from *M. parryi*, both from the vicinity of Eidsvold. The synonymy of *F. websteri* and *D. roemeri* has been discussed by us (J. & M., 1938a, 111).

**Dipetalonema sp.**

From the liver of a wallaby (G.11103), labelled as "cysts of *Ascaris*". The worms are all females. They are 90-100 mm. long, and about 1.3 mm. maximum breadth, and are coiled up very tightly in pockets in the liver. All the specimens are immature and the vulva was not observed. The anterior end is rounded and bears four submedian and two larger (lateral?) papillae, the larger lying slightly behind the submedian. The posterior end of the oesophagus was not seen. The tail is short (0.17 mm.) and its tip is rounded.

As indicated earlier in this report, it is possible that the wallaby may have been *Wallabia bicolor* var. *mastersi* Krefft from the Burnett River, Queensland.

**Physaloptera sp.**

From *Thylogale eugenii*, near Kingscote, Kangaroo Island (W.1069). Specimen 7.4 mm. long; without sex organs. Anus 0.17 mm. from the tip of the bluntly pointed tail. The cervical collar does not cover the lips. Each lip bears a pair of large papillae and has apparently only a median tooth.

The specimen is a larval form whose adult stage is probably to be sought in an eagle or large hawk. Owing to distortion we have not been able to compare the worm with the various known species dealt with by Cram and by Ortlepp.

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