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# THE GALLARD COLLECTION OF PARASITIC NEMATODES IN THE AUSTRALIAN MUSEUM.

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(Figures 1-18.)

During a period of many years, Mr. Luke Gallard, formerly an inspector belonging to the Department of Agriculture, New South Wales, made a collection of parasites, chiefly nematodes, from the fauna of the Gosford and Kenthurst districts where his official duties lay. This collection was placed in the Australian Museum and was recently forwarded to us for identification. Our thanks are due to the Director, Dr. A. B. Walkom, for the opportunity to study it. We also acknowledge assistance from the Commonwealth Research Grant to the University of Adelaide. All material, including types of the new species, is housed in the Museum, the registered numbers being indicated.

The following is a list of the identifications, arranged under their respective hosts:  
PSEUDECHIS PORPHYRIACUS Shaw: *Physaloptera confusa* J. & M., Narara and Gosford.  
*Ophidascaris pyrrius* n. sp., Narara. *Polydelphis* sp., Narara, Gosford.  
PYTHON SPILOTES Lacep.: *Ophidascaris filaria* (Duj.), Tuggerah. *Polydelphis anoura* (Duj.), Tuggerah. *Polydelphis* sp. (? *anoura*), Gosford.  
VARANUS VARIUS Shaw: *Physaloptera* sp., Kenthurst.  
AMPHIBOLURUS BARBATUS Cuv.: *Strongyluris paronai* (Stoss.), Kenthurst. *Physaloptera gallardi* n. sp., Narara.  
TILIQUA SCINCOIDES Shaw: *Pharyngodon australis* n. sp., Narara.  
MENURA NOVAE-HOLLANDIAE Lath.: *Porrocaecum menurae* n. sp., Gosford.  
MACRUPUS UALABATUS Less. & Garn. (= *Wallabia bicolor* Desm.): *Pharyngostrogylus gallardi* n. sp., Ourimbah.

## STRONGYLATA.

### *Pharyngostrogylus gallardi* n. sp. (Figs. 1-4.)

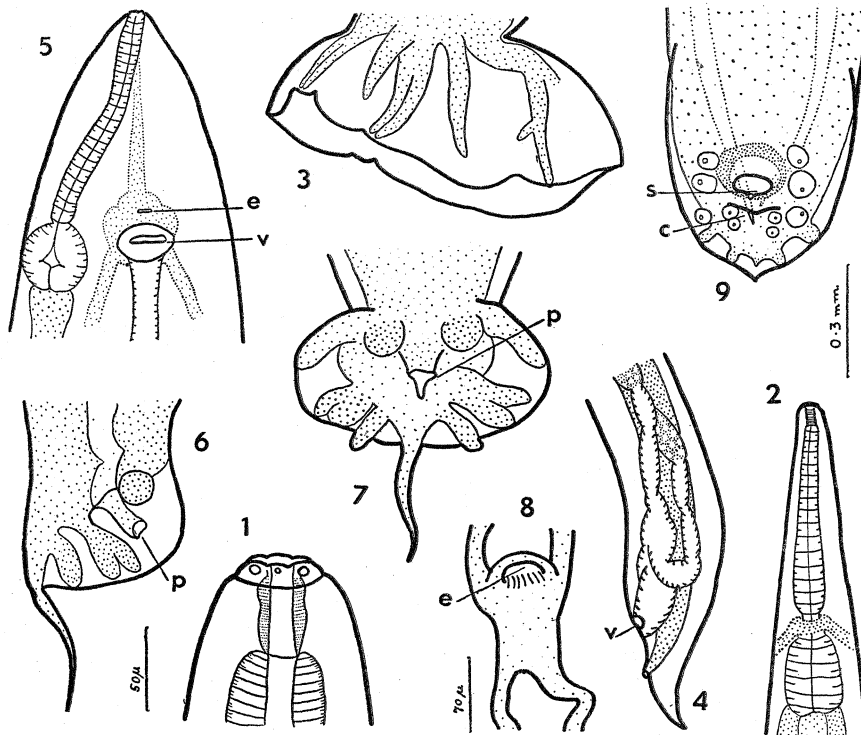
From the oesophagus of a black wallaby, *Macropus ualabatus*, from Ourimbah (W3252). Males and females present. Body filiform, strongly coiled in three to four spirals. Head rounded; six shallow lips, each with low rounded papilla, papillae on lateral lips smaller than those on sub-median. Vestibule  $45\mu$  long,  $13\mu$  internal diameter, walls transversely striated, thicker anteriorly than posteriorly. Oesophagus (in male) .75 mm. long, anterior portion .5 mm. long, widening somewhat towards base, terminated by sudden constriction, and followed by bulb .2 mm. long, .15 mm. wide. Nerve ring at level of oesophageal constriction; excretory pore in region of bulb.

Male: About 9 mm. in length. Spicules about .9 mm. long, with striated alae. Bursa not deeply lobed, inner surface devoid of papillae. Ventral rays equal, almost reaching bursal edge; ventro-laterals short, divergent from other laterals; medio- and postero-laterals of same length, not quite reaching bursal edge; externo-dorsal arising with laterals but divergent from them; dorsal bifurcating at one-third its length, each branch projecting slightly at margin of bursa, and giving off short lateral ray just beyond mid-length.

Female: About 15-18 mm. long. Body tapering posterior to vulva; tail pointed, directed dorsally. Vulva at .35 mm., and anus .23 mm., from tip of tail. Vagina .2 mm. long; ovejectors .35 mm. long. Eggs about  $100\mu$  by  $50\mu$ .

The species most closely resembles *P. parma* J. & M. and *P. theta* J. & M. in the characters of the bursa, i.e. the absence of deep clefts between the lobes and of papillae inside the bursa. It differs from both in the shape of the vestibule walls, from *P. theta* in the coiled habit of the body, and from *P. parma* in the shape of the dorsal ray and of the female tail.

It is perhaps noteworthy that the two species of *Pharyngostrongylus* (*P. parma* and *P. gallardi*) which have been recorded from the gullet of the host animal have each a long thin body coiled in a spiral, whereas other members of the genus, usually taken from the stomach, sometimes from the intestine, are relatively stouter and have a more or less straight body. This new species would be ranged along with *P. theta* in our key to species of the genus (J. & M. 1940, 365), and is most readily separated from it by the shape of the vestibule and by the lengths of the spicules.



Figs. 1-9.—1-4. *Pharyngostrongylus gallardi*; 1. head; 2. anterior end; 3. bursa; 4. posterior end of female. 5-8. *Pharyngodon australis*; 5. anterior end of female; 6. lateral, and 7. ventral, views of male tail; 8. excretory vesicle of male. Fig. 9. *Strongyluris paronai*, male tail. Figs. 1, 6 and 7 to same scale; Figs. 2, 4, 5 and 9; Figs. 3 and 8. c, cloaca; e, excretory pore; p, prolongation of cloacal wall; s, sucker; v, vulva.

#### OXYURATA.

##### *Pharyngodon australis* n. sp. (Figs. 5-8.)

From *Tiliqua scincoides*, Narara (W3279). Males 3-3.2 mm. long; females 8 mm. Three lips, each slightly bilobed. Oesophagus .5 mm. long in male; .75-.77 mm. in female; narrow, with spherical bulb. Nerve ring .23 mm. from head in female. Excretory pore in female in oesophageal region, .5 mm. from head; but far behind it in male, .8 mm. from head.

Male: Excretory vesicle apparently formed from two vessels from posterior and two from anterior end of body. Lateral alae extending to anterior end of the wide caudal alae. Latter supported by two pairs postanal papillae, the anterior pair bifid,

the posterior projecting beyond alae; also a pair of sessile preanal papillae. Spicule absent, but wall of cloaca thickened and projecting as a strong posterior lip. Anus .13 mm. from posterior end. Projecting spike of tail 80–90 $\mu$  long.

Female: Tail narrow, pointed, devoid of spines, exact position of anus not seen. Vulva .55 mm. from head, just behind excretory pore. Excretory vesicle appearing to be formed by union of two vessels from posterior and one from anterior end of body. This discrepancy between male and female excretory systems suggests that the worms belong to different species, but as they were found side by side in the host, and no other parasites were present, this seems unlikely. Probably the nearness of the pore to the anterior end in the female accounts for the presence of only one vessel anterior to the pore. Eggs 125 $\mu$  by 30 $\mu$ .

The species differs from *P. hindlei* Thapar in the number of bursal papillae in the male, and in the position of the excretory pore in the female and in the size of the eggs. Thapar mentioned the presence of a spicule, but Baylis has recorded the species from the type host *Tiliqua scincoides*, in Queensland, in which spicules were absent. The present species differs from *P. tiliquae* Baylis in the size of the body, in the position of the vulva, and the size of the eggs, as well as in the length of the spike of the male tail relative to the width of the caudal alae.

#### ASCARIDATA.

##### *Strongyluris paronai* (Stossich). (Fig. 9.)

From a "frilled lizard", presumably *Amphibolurus barbatus*, from Kenthurst (W3253). Males 14–16 mm. long, .9 mm. wide; females 20–23 mm. long, 1 mm. wide. Lateral alae absent. Oesophagus thin, ending in bulb; anterior part .2 mm. long in male, .32 mm. in female; total length 1.94–2.3 mm. in male, 2.4–2.5 mm. in female. Nerve ring .56 mm. and excretory pore 2.2 mm. from head end in male 16 mm. long.

Male: Tail .15 mm. long with very small terminal spike. Caudal alae narrow, forming an almost circular bursa-like expansion. Sucker .05 mm. in front of cloaca, its aperture rather posteriorly directed, apparently a small papilla on its posterior border. Seven pairs papillae present (fig 9). Spicules more or less equal, about .9 mm. long, ending in fine rounded tips.

Female: Tail .24 mm. long with minute terminal spine. Vulva 7.7 mm. (one-third body length) from posterior end of body. Eggs thick-shelled, 70 $\mu$  by 48 $\mu$ .

The species was described by Stossich (1902) as *Strongylus paronai* from *Amphibolurus muricatus* from Australia, and it was under that name that Johnston (1911) recorded it from *A. barbatus* from Moree, N.S.W., and from *Chlamydosaurus kingii* from Eidsvold, Queensland. Our material differs from Stossich's account in the number of papillae on the male tail. What he described as the cloaca is apparently, from his figure, the sucker, the papillae seen by him on posterior border of the cloaca being comparable with those found on the sucker in other species.

##### *Ophidascaris filaria* Dujardin.

From *Python spilotes*, from Tuggerah (W3251). Male 105 mm. and females to 165 mm. long. No marked enlargement of posterior third as described below for *O. pyrrhus*. Pulp of dorsal lip projecting as stated by Baylis.

The parasite had been reported from the same species of *Python* by Canavan (1931) whose material was taken from a snake which had been three months in the Philadelphia Zoological Gardens, but had originally come from Tasmania. Baylis (1921) had previously reported it from *Python* sp. from Australasia.

##### *Ophidascaris pyrrhus* n. sp. (Figs. 10–11.)

From a black snake, *Pseudechis porphyriacus*, from Narara (W3300). Males 70–80 mm. long, .8 mm. wide; females to 130 mm. long, 2.2 mm. wide. Body much wider in posterior third in both sexes. Interlabia short, about a third length of lips, grooves extending almost to middle of lips; no prolongations of pulp of dorsal lip observed. Oesophagus 3.5–5 mm. long; nerve ring .72 mm. from head in male.

Male: Spicules equal, 4.1-4.8 mm. long, blunt tipped, alate. At least 20 pairs preanal papillae, one median preanal papilla, six pairs postanal, most anterior of latter double-headed and just behind cloaca, remainder in two groups on each side (fig. 11). Tail .15 mm. long, ending in small knob.

Female: Tail rounded, ending in small knob. Vulva about third body length from tail end, just posterior to beginning of swollen part of body. Eggs 58-62 $\mu$  by 75-81 $\mu$ .

We consider the present species distinct from *O. filaria* because of its width in relation to its length, the shape of the pulp of the dorsal lip, the relative length of spicules, and the size and shape of the eggs.

McAlpine (1891) described *Ascaris* sp. from the copper-head snake, *Denisonia superba*, from Victoria, and his brief account, based on a female, suggests an *Ophidascaris*, probably *O. pyrrius*.

#### *Polydelphis anoura* Duj. (Figs. 12-14.)

From *Python spilotes*, Tuggerah (W3299). Males 46 mm. long; female 62 mm. long, 1 mm. wide. Lips slightly wider posteriorly than anteriorly. Dentigerous ridges very fine. Oesophagus 5.68 mm. long in male, .6 mm. in female.

Male: Caudal alae absent. Five pairs postanal papillae, one median preanal papilla, one pair large adanal, and nine or more pairs preanal. Spicules equal, 5.1 mm. long, thin, blunt-tipped, alate. Tail .3 mm. long.

Female: Tail conical, pointed, .4 mm. long. Specimen immature, but on dissection four ovarian tubes seen about middle 10 mm. of body, each widening into small receptaculum seminis before joining its uterus; four uteri running side by side towards anterior end, uniting about 5 mm. behind vulva to form single uterus, latter narrowing to vagina; vulva at about one-third body length from head. No eggs present.

The measurements given for these specimens are similar to those of *P. oculata* Linst. Linstow, however, mentioned only two pairs of postanal papillae. Baylis (1936) pointed out that, apart from its smaller measurements, *P. oculata* bore a close resemblance to *P. anoura*. The present specimens have relatively shorter spicules than *P. anoura*, but since they are young worms, it is suggested that this discrepancy would be less in the adult; we have recorded them as *P. anoura*.

#### *Polydelphis* spp.

(1) Female from *Python spilotes*, Gosford (W3260). 70 mm. long, 1.5 mm. wide. No interlabia. Body strongly coiled so that distinctive features not available. The general appearance suggests an adult female of *P. anoura*.

(2) Specimen of undetermined sex from *Pseudechis porphyriacus*, Narara (W3250). Length 160 mm., width 3 mm. No interlabia. Posterior end very thick, resistant to clearing even when using creosote, but structures are present which may be papillae.

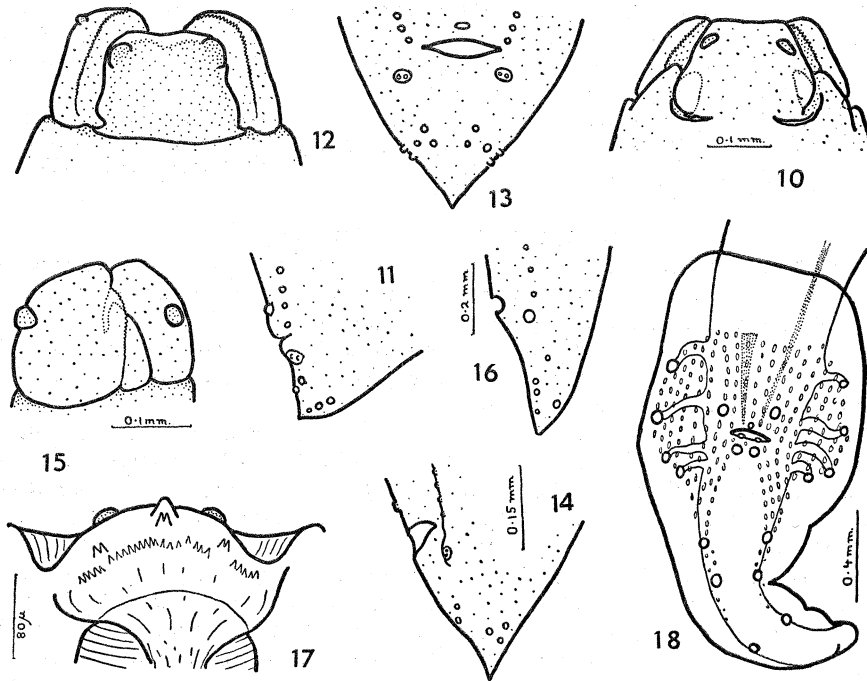
(3) Mutilated female from *Pseudechis porphyriacus*, Gosford (W3298). 86 mm. long, 1 mm. wide.

#### *Porrocaecum menurae* n. sp. (Figs. 15-16.)

From a lyre bird, *Menura novae-hollandiae* (W3287). One male only present, not well cleared. Length 35 mm., width 1 mm. Head as wide as body following. Interlabia nearly as long as lips. Lips provided with lateral flanges, dentigerous ridges present. Oesophagus 2.8 mm. long (excluding ventriculus, .36 mm. in length), .16 mm. wide. Intestinal caecum not observed. Tail .4 mm. long, ending in point. About twelve preanal papillae on each side, the most posterior being almost level with cloaca. Six pairs postanal papillae, one large pair near cloaca, the remaining five on posterior half of tail (fig. 16). Spicules not clearly seen; one (probably the longer) about .7 mm., the other possibly .5 mm.

The species differs from *P. clelandi* J. & M. from Australian thrushes in the width of the head in relation to that of the body, and in the number of postanal papillae. It differs from *P. streperae* J. & M. from Australian *Strepera* spp. in the presence of a

dentigerous ridge on the lips. It most resembles *P. ensicaudatum* Zed. from European *Corvus*, but in view of the lack of information regarding the length of the intestinal caecum and the spicules in our specimens and because of the host relationships we have preferred to assign it to a new species.



Figs. 10-18.—10-11. *Ophidascaris pyrhus*; 10. head of young female; 11. male tail. 12-14. *Polydelphis anoura*; 12. head; 13. ventral, and 14. lateral, views of male tail. 15-16. *Porrocaecum menurae*; 15. head; 16. male tail. 17-18. *Physaloptera gallardi*; 17. inside of a lip; 18. male tail. Figs. 12 and 17 to same scale; Figs. 11, 13 and 14.

#### SPIURATA.

##### *Physaloptera gallardi* n. sp. (Figs. 17-18.)

From intestine of *Amphibolurus barbatus*, Narara (W3257). Males 14-16 mm. long; females to 20 mm. Lips each bearing one median pointed tooth anteriorly, and on inner border three bifid teeth, in dorsal, median, and ventral positions, as well as a row of large denticles, arranged as in fig. 17, these denticles so large as to be seen quite distinctly from outer surface in undissected specimens. Muscular part of oesophagus longer than usual in genus, .56 mm. in length in female; .44 mm. in male; glandular part 2.72 mm. in male. Nerve ring .36 mm., and excretory pore .63 mm. from head end in male. Cervical papillae symmetrically placed, very small, .84 mm. from head in female.

Male: Bursa 2 mm. long, cloaca 1.3 mm. from tip of tail. Alae not quite reaching tip of tail; papillae arranged as in fig. 18. Spicules very unequal; shorter, .5 mm. long, tapering to a point; longer, 2.8 mm., very fine, its tip almost certainly without enlargement.

Female: Tail 1.2 mm. long. Position of vulva not determined owing to density of worm. Eggs  $55\mu$  by  $30\mu$ , flattened on one side.

The species resembles very closely *P. bancrofti* Irwin-Smith, but differs from it in size of denticles on the lips as well as in the size of the worms. The arrangement of caudal papillae resembles that of *P. varani* and *P. paradoxa*, but the species differ in dentition and in the spicule length.

**Physaloptera confusa** J. & M., 1942.

From *Pseudechis porphyriacus*, from Narara (W3247, W3248) and Gosford (W3286). These specimens agree in all respects with the types of the species. Denticles on the inside of the lips were observed in very few cases.

**Physaloptera** sp.

Specimens from *Varanus varius* from Kenthurst (W3249). The material consists of three females, about 15 mm. long. In general form they agree with *P. antarctica* Linst., but the median inner tooth is not bifid. In view of the paucity of the material we prefer not to assign the parasites to any species.

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