

SOME NEW QUEENSLAND ENDOPARASITES.*

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(PLATES IX. & X.)

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Sphærouterina punctata n. sp.

(Pl. IX., figs 1-13.)

FROM the intestine of a "thickhead" or "whistler," *Pachycephala rufiventris* Lath, shot at Caloundra, August, 1914, there were collected numerous pale translucent cestodes reaching about 4 cm in length, and about .65 mm in maximum breadth. The posterior segments readily separated off from the rest of the strobila owing to the presence of very deep constrictions. Each ripe proglottid was seen to contain in its anterior half a dark or brownish rounded egg capsule, this "spotted" appearance suggesting its specific name.

Scolex.—The scolex, whose breadth is .31 mm, bears prominent suckers and rostellum, capable of being withdrawn into a powerful muscular rostellar sac. The rostellum is provided with two series of hooks, those in the anterior circlet being larger than those forming the second row, with which they alternate. There are ten or twelve in each series. The hooks of the first circlet are rather wide and

*The types of the new species described in this paper as well as in a former paper, "Notes on some Entozoa," Proc. Roy. Soc. Queensland, XXIV., 1912, pp. 63-91, have been deposited in the Queensland Museum, Brisbane.

measure .07 mm from the tip of the claw to the dorsal root. Those of the other set are .45 mm long, and have a different shape, the claw being shorter and more strongly curved. They more closely resemble those described from species of *Biuterina* than do the anterior hooks. The dorsal and ventral roots are considerably thickened in both sets.

Strobila —An unsegmented neck is absent. Immediately behind the scolex, proglottids measure nearly .2 mm in width, and though short, are quite distinct. Sexually mature joints are about .13 mm in length and .3 mm in maximum breadth. They gradually become relatively longer, until their dimensions are about .4 mm and .5 mm respectively. Mature segments, found free in the intestine, were about .75 mm long and .7 mm wide, their shape being that of a triangle with the apex removed. The large egg capsule occupies the apical region, unless it has been already extruded. The postero-lateral edges of older segments project freely. The amount of overlapping is small.

Genital pores alternate irregularly and lie marginally just in front of the middle of the proglottid. There is a genital cloaca. Only rarely can a genital papilla be seen.

Calcareous corpuscles of at least two kinds, large and small, are to be found in the cortex. The former, which are rare, are somewhat disc-shaped with radiating depressions on the surface, and may measure as much as .02 mm. The smaller ones are fairly common and possess the usual rounded or elliptical outline. They measure about .007-.008 mm by .005-.004 mm.

The longitudinal musculature is arranged in two concentric series of rather large bundles, the individual bundles, as well as the series, being close to one another. Transverse fibres are to be seen occasionally in sections, their position being internal to the longitudinal series.

The ventral excretory canal is relatively very wide, the small dorsal vessel being directly above it. The latter has a more sinuous course than the former. A

wide transverse vessel connects the ventral canals near the posterior end of each segment. The main longitudinal nerve is situated immediately dorso-laterally to the ventral canal of the corresponding side. The sexducts pass between the excretory vessels and dorsally to the nerve.

Male genitalia :—There are about eight testes each 30-40 μ in diameter, lying behind the ovary and uterus, but above the vitellarium. Occasionally some occur in the medulla between, and laterally from, the excretory canals.

The vas deferens becomes considerably coiled on the pore side of the uterus and paruterine organ. It lies above and close to the vagina, its course being approximately parallel to it. Both of these ducts pass outwards just dorsally to the nerve and ventral vessel, the vas deferens entering the small cirrus sac within whose inner portion it becomes coiled. The cirrus sac is a pyriform structure, 25-30 μ in maximum width and 50-60 μ in length. Its musculature is weak. The organ does not extend inwardly as far as the excretory canals. It contains a small cirrus. The male pore lies at the bottom of a genital cloaca, its position being immediately dorsal or antero-dorsal to the female aperture.

Female organs :—The small bilobed ovary lies in the anterior part of the segment, in front of the testes. It is not median but is situated in an oblique position nearer the pore-bearing edge. The vitellarium is placed posteriorly below the testes.

From the female aperture which lies just below the male pore, the vagina travels inwards below and beside the vas deferens and immediately above the nerve and ventral excretory canal. A small receptaculum seminis may be recognisable. The vagina bends slightly backwards.

The uterus appears near the centre of the segment but rather towards the aporal side, just in front of, and ventrally to the testes, but behind the ovary. It is a simple spherical sac. As it develops the testes and ovary soon disappear. A mass of altered parenchyma makes its appearance antero-ventrally from the uterus, this par-

terine organ developing rapidly. At first it is a short, narrow, longitudinally-placed, more or less median, mass of tissue, becoming tubular. The position of the uterus undergoes alteration, this organ being gradually displaced so as to lie in the posterior part of the proglottid, though occasionally it remains in the middle of the segment as a very large simple sac with numerous ripe eggs within it. The anterior part of the paruterine organ undergoes differentiation to form an expanded rounded capsule, the tubular portion becoming wider and more sinuous. This capsule is sharply marked off from the surrounding tissues, especially laterally and anteriorly. It increases in size and ultimately occupies most of the medulla of the anterior part of the segment. Its dimensions while within the proglottis vary from .22 by .14 mm to .30 by .24 mm. Some which had been extruded from the segment measured .4 by .3 mm.

The capsule consists of an outer coarse layer which stains very deeply with eosin and of an inner zone which retains the hæmatoxylin dye. It is within the latter that the eggs come to lie imbedded. The outer layer does not cover the posterior face of the capsule, the egg-containing tissues being in continuity with the paruterine organ, through which the eggs have travelled from the uterus to the capsule. The peripheral region of the inner zone of the capsule possesses numerous rod-like structures resembling crystalloids, but they do not polarise light. Eggs may occur in this peripheral area. A few fusiform granular bodies were seen in this layer in several capsules.

The paruterine organ has a vacuolate appearance and has what seems to be an axial series of nuclei. The contents of the tube appear to be albuminous.

Ripe eggs are to be found in the capsule and more or less commonly in the uterus.

They measure from .035 by .030 mm to .040 by .035 mm., the contained oncosphere being about .024 mm. in diameter. The embryonal hooklets are .010-.012 mm long, with a long claw whose length is equal to the distance between the dorsal and ventral roots.

Systematic:—The parasite belongs to the Paruterinidæ, but differs from the armed genera, *Biuterina*, *Paruterina* and *Culcitella*. The arrangement of the excretory canals is characteristic in the last named. The uterus is simple in our form whereas it is more or less completely bilobed in *Biuterina* and crescentic or else rather broader than long in *Paruterina*. Besides, the testes are numerous in the last named two genera whereas they are few in the cestode from *Pachycephala*. It appears to resemble *Rhabdometra* in many ways, but the latter has an unarmed scolex.

The new genus for which the name *Sphærouterina* is proposed, may be characterised as follows:—Paruterinidæ; rostellum armed with two rows of hooks; genital pores alternating irregularly; genital ducts passing between the excretory canals and dorsally to the longitudinal nerve; testes few, situated behind the female organs; uterus rounded and simple; paruterine organ terminating in an anteriorly-situated capsule—near *Paruterina* and *Biuterina*. In birds.

Type: *Sphærouterina punctata* Jnstn from *Pachycephala rufiventris* Lath.

Thelastomum alatum n. sp. (Oxyuridæ.)

(Pl. X., figs. 3-7.)

From the intestine of the larva of a Cetonid beetle, *Cacachroa decorticata* MacI, from Cairns, North Queensland, collected by Mr A. A. Girault, and forwarded through the Director of the Queensland Museum, Brisbane.

Female:—Total length 2.9 mm; the tail, i.e., from the anus to the posterior end of the parasite, being .9 mm. (figs. 3, 5.) The female is rather a stout worm whose anterior end is gradually narrowed. The posterior region becomes strongly constricted to form a long, almost straight, sabre-like tail of fairly uniform width except at the end, where it is pointed. The greatest breadth is the region of the vagina (about .20 mm). This organ terminates on a relatively large, backwardly projecting prominence situated in the posterior half of the body, about .6 mm in front of the anus.

The mouth is borne on a small, projecting ring well marked off from the rest of the body. The pharynx, including the gizzard, has a length of .50 mm. Just prior to entering the latter, it narrows somewhat. The pyriform gizzard has a diameter of .09 mm, and is marked off from the rest of the pharynx by a constriction. The intestine is wide and croplike in its anterior portion, with a diameter of .15 mm, soon becoming narrowed to about half this. The nerve ring lies at .2 mm behind the mouth, while the excretory pore is situated in the region of the gizzard at about .4 mm behind the mouth. The short common excretory duct has a somewhat sinuous course.

The ovary can be traced from the dorsal region near the anus, where it may form a loop, forwards almost to the gizzard. Here it turns back almost to the anus in a more ventral position than before. Fertilisation occurs in this region and the duct travels anteriorly as a wide uterus crowded with eggs, commonly arranged in two rows, terminating at the female genital pore, which, as already stated, lies on an eminence. Ripe eggs measure about .08 by .05 mm.

Male:—The male is very small, measuring from .97 to 1.17 mm. in length, the maximum breadth being about .09 mm. (Figs. 4, 6, 7.) The anus projects strongly, and behind it the body is narrowed rapidly to form a short tail .06 mm long, whose anterior half is much broader than the posterior half. The latter terminates in a fine point. The former is arched dorsally and at its junction with the posterior part is a pair of tail papillæ. At each side of the hind portion of body is a prominent ala, which, just in front of the anal region, is somewhat arched and expanded. It becomes narrowed and then again widened to form a rather thin rounded lobe lying above the anus and terminating at the base of the tail. The nerve ring is situated at about .09 mm, and the excretory aperture at about .17 mm from the anterior end. The testis is relatively large. The male spiculum measures .045 mm and is clubshaped and slightly curved, its point being sharp. There appear to be a pair of small papillæ in the neighbourhood of the anus.

Spiroptera megastoma Rud.

From a tumour in the stomach of a horse, Eidsvold, Burnett River, collected by Dr. T. L. Bancroft. This species, though probably not uncommon, is apparently now recorded for the first time as occurring in Queensland.

Agamonema sp.

(Pl. X., figs. 1, 2.)

A small number of white ellipsoid cysts were taken recently from *Hyla cærulea* caught in Brisbane (Oct, 1914). They were lying more or less loosely in the wall of the stomach, just below the peritoneum. Each contained a single nematode, probably a *Spiroptera*, lying in its central area, surrounded by a tough fibrous coat, the "worm area" being about half the diameter of the cyst. The largest cyst measured .9 mm by nearly .7 mm and the smallest .65 by .47 mm.

By teasing out the capsule, the contained worm was liberated. The following account is based upon the largest parasite obtained.

Length 3.10 mm; breadth .010 mm. The body is finely annulate, the rings being, however, scarcely recognisable anteriorly. The anterior end is rounded and only slightly attenuated while the posterior extremity is pointed, there being a short tail, .010 mm, in front of whose end lies the anus. The three lips each bear a small labial papilla, not readily detected. Delicate longitudinal striæ are recognisable on the cuticle of the body.

There is a relatively long tubular pharynx, .43 mm in length, terminating in a slight swollen portion. The anterior end of the intestine is rounded, a deep constriction separating it from the pharynx. The cloaca extends inwards for .075 mm from the anus and is lined by a thick cuticle which is so disposed that it has the appearance of two approximately equal spicules with rounded or clublike inner ends separated from each other, and with sharp outer extremities. It is possible that these may be two male spicules or a single deeply-grooved seta with a bifurcate end.

The nerve ring lies at a distance of .015 mm behind the mouth, and immediately in front of the ring is the excretory aperture.

This larval parasite appears to belong to the Spiropteridæ and is included for the present under the collective generic name, *Agamonema*.

Echinorhynchus hylæ n sp.

(Pl. X., figs. 8, 9.)

A solitary specimen of this species was found recently, encysted just below the peritoneal surface of the liver of a frog, *Hyla cærulea*, caught near Brisbane. The white cylindrical cyst measured 1.4 mm in length and about .5 mm in width.

Though the parasite was in a larval stage, yet enough of its anatomy was recognised to justify naming it. I have compared it with an *Echinorhynch* which was described by me in 1912,* from a *Hyla aurea* caught near Sydney some years ago and am satisfied that the two belong to the same species. They have the same size and general appearance. The characters of the rostellum are described there. In our present specimen this organ is not fully everted but the hooks on its base correspond in shape, size and arrangement with those similarly placed in the case of the former parasite (fig.9).

The rostellar sac with the introverted rostellum measured .9 mm in length. One giant nucleus was distinctly seen, and there appeared to be a second one present. Each lemniscus measured .5 mm, being of about the same length as the introverted proboscis. They were rather shorter than those present in the specimen from *Hyla aurea*. The suspensory ligament and associated organs were considerably coiled and consequently the details of structure were not satisfactorily made out. Sex glands were not recognised, though the vas deferens, vesicula, and the relatively large copulatory bursa were to be seen. The walls of the bursa were thick and much folded internally. The general anatomy is shown in pl. X. fig. 8.

*Proc Roy. Soc. Queensland, XXIV., 1912, pp. 84-85, pl. II. figs. 9, 10.

PLATE, IX.

Sphærouterina punctata n. sp.

- Fig. 1. Eggs.
 Fig. 2. Ripe proglottis, showing capsule; also eggs in uterus.
 Fig. 3. Free segment showing capsule almost extruded.
 Fig. 4. Scolex.
 Fig. 5. Hooks of first series.
 Fig. 6. Hooks of second series.
 Fig. 7. Segment showing genitalia.
 Fig. 8, 9. Segments showing developing paruterine organ.
 Fig. 10. Longit. horiz. sect. of segment.
 Fig. 11. Part of fig. 10, more highly magnified.
 Fig. 12. Trans. sect. segment, showing capsule.
 Fig. 13. Trans. sect. segment, showing genital pore.

PLATE, X.

Agamonema sp. from *Hyla cærulea*.

- Fig. 1. Anterior end.
 Fig. 2. Posterior end.

Thelastomum alatum n. sp.

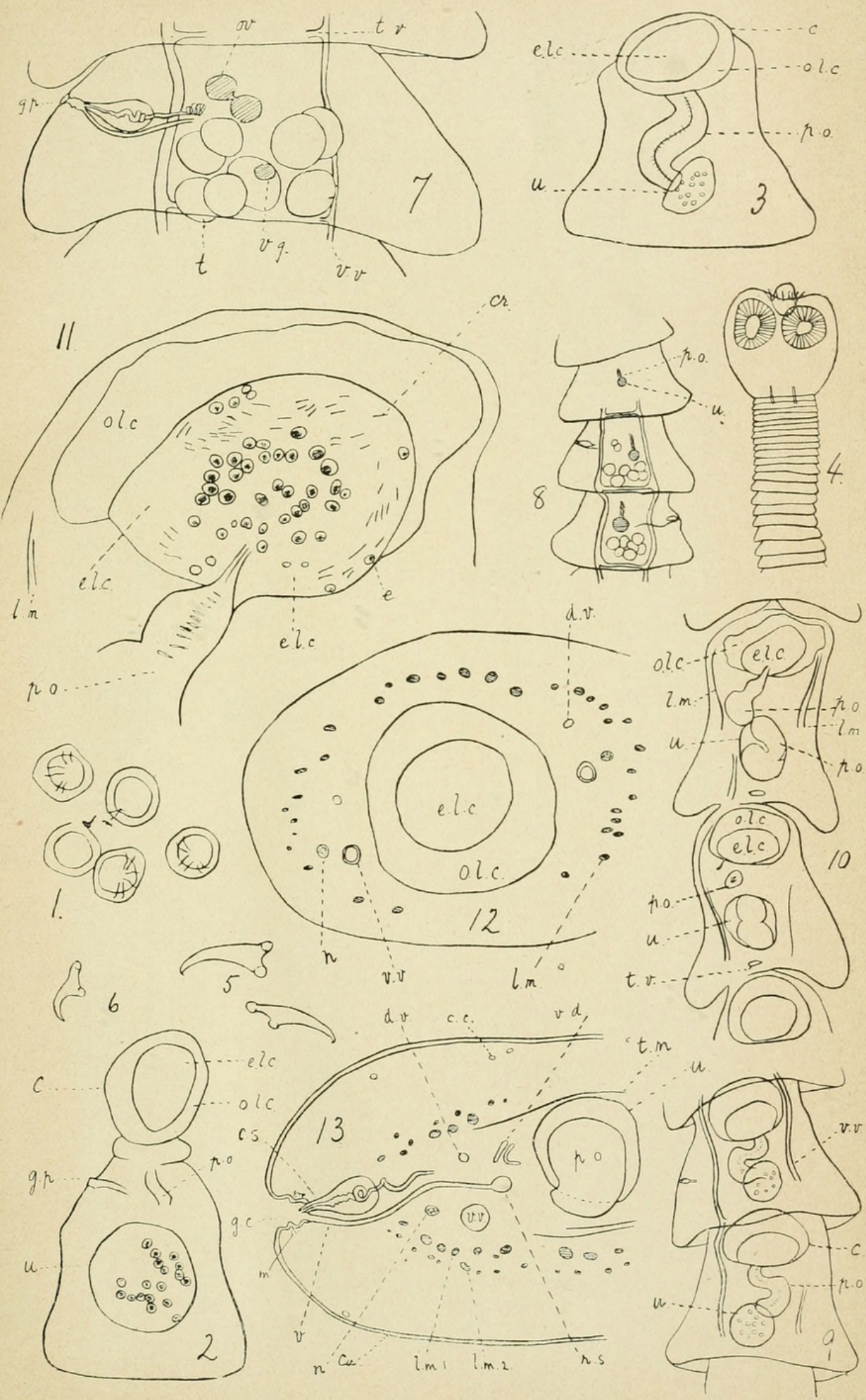
- Fig. 3. Female worm.
 Fig. 4. Male worm—same magnification as fig. 3.
 Fig. 5. Female, anterior end.
 Fig. 6. Male, anterior end, same magnification as fig. 5.
 Fig. 7. Male, posterior end, same magnification as fig. 6.

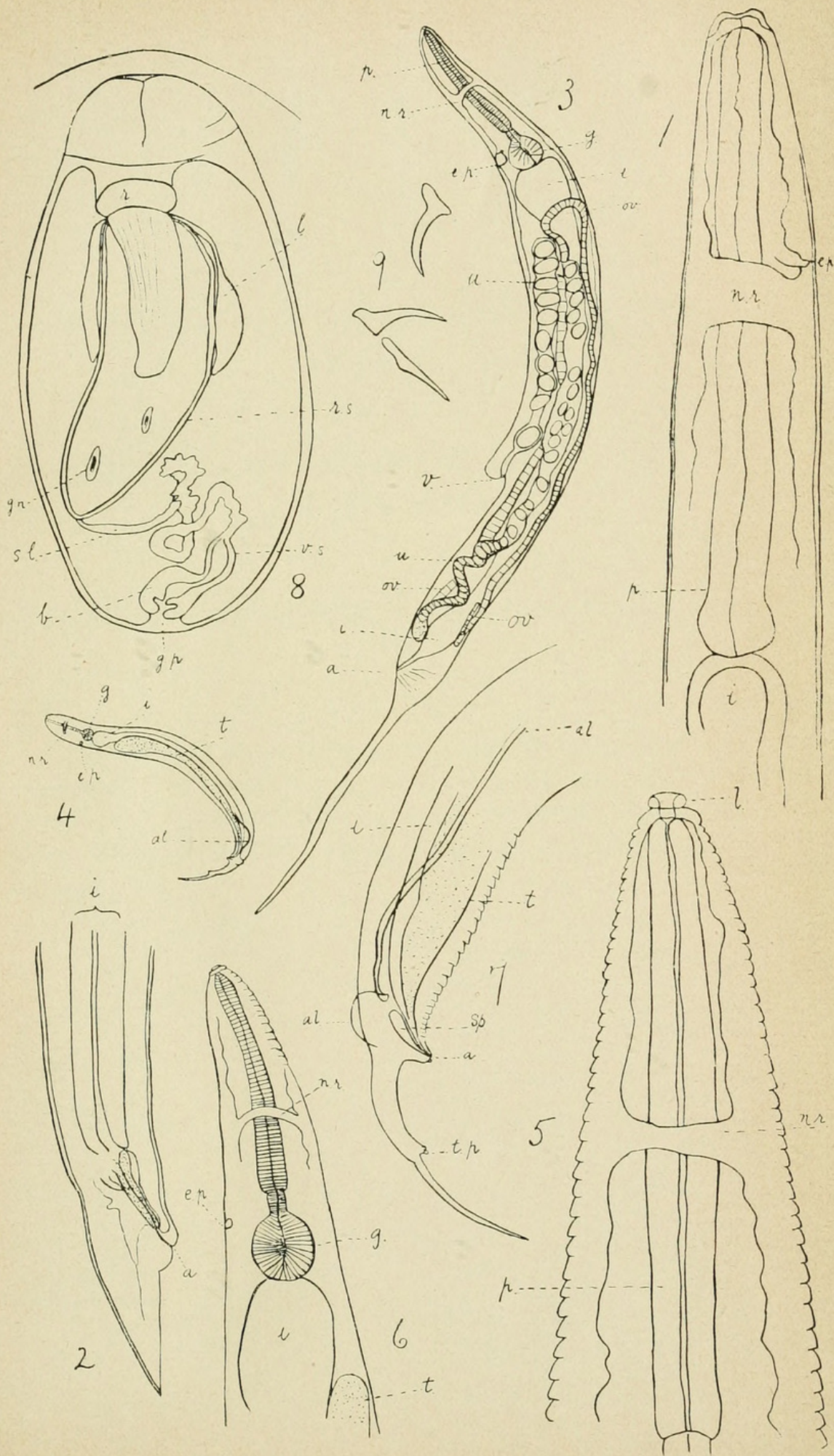
Echinorhynchus hylæ n. sp.

- Fig. 8. Entire specimen.
 Fig. 9. Hooks from base of rostellum—seen from various positions.

REFERENCE TO LETTERING.

a, anus; al., ala; b., bursa; c., capsule; c.c., calcareous corpuscle; cr., ? crystalloids; c.s., cirrus sac; cu., cuticle; d.v., dorsal excretory vessel; e., egg; e.l.c., egg-containing layer of capsule; e.p., excretory pore; g., gizzard; g.n., giant nucleus; g.c., genital cloaca; g.p., genital pore; i., intestine; l., lip; lem., lemniscus; l.m., l.m. 1., l.m. 2., longitudinal muscle bundles; m., muscle; n., nerve; n.r., nerve ring; o.l.c., outer layer of capsule; ov., ovary; p., pharynx; p.s., proboscis sheath; p.o., paruterine organ; r., rostellum; r.s., receptaculum seminis; s., sucker; s.l., suspensory ligament; sp., spicule; t., testis; t.m., transverse muscle; t.p., tail papillæ; t.v., transverse excretory vessel; u., uterus; v., vagina; v.d., vas deferens; v.g., vitelline gland; v.s., vesicula seminalis; v.v., ventral excretory vessel.







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