Helminth Parasites of Antarctic Vertebrates

Part I. Digeneric Trematodes of Marine Fishes

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The trematodes of marine fishes of southern seas have received relatively little attention. Leiper and Atkinson (1914, 1915) reported five species collected near Cape Evans (77° 38' S.) from Trematomus bernacchii, of which about 300 specimens were examined. All five trematodes were named by them as new species. The unsatisfactory generic disposition of four of their species is commented upon in this paper. The fifth species, Allocreadium fouleri, was based on immature specimens which were insufficient for generic allocation. They would not appear to belong in the Genus Allocreadium.

More recently, Szidat (1950) has reported six species from Eleginops maclovinus from Tierra del Fuego. Three of these were identified as new species; the other three were identified only to genus. Johnston (1931, 1934, 1934a, 1937) and Nicoll (1915) have reported a few trematodes from Australia. A number of interesting species have been recorded by Crowcroft (1945-1948) and Manter and Crowcroft (1950) from Tasmania.

Young (1938) listed several trematodes which had been reported from New Zealand although many of these were introduced species. MacFarlane (1939, 1945, 1951, 1952) described several species of Digenea from New Zealand fishes and also made some ecological studies. Manter (1954) reported 66 species of digeneric trematodes from 58 species of New Zealand fishes. Thirty-eight new species and six new genera were named by him. Fyfe (1954, 1954a) described an additional new genus and two new species from New Zealand fishes.

The present paper considers six species of digeneric trematodes collected from four species of fishes in the Antarctic during 1959-1960. All collections of hosts were made at the McMurdo United States International Geophysical Year Station. This station is located at 77° 31' S. Latitude and 166° 38' E. longitude.

Egg measurements are in microns; all other measurements are in millimeters.

PРОСОСТОМАТА

FAMILY LEPOCREADIIDAE

Lepidapedon antarcticus n. sp. (Figures 1 and 2)

DESCRIPTION (based on 30 specimens; measurements on 10): Body flattened, somewhat elongate, spined cuticle; spines minute more dense on forebody, becoming sparse posterior to acetabulum. Length 1.31 to 2.18; greatest width at acetabulum, 0.42 to 0.58. Body broadly rounded at both ends. Oral sucker 0.20 to 0.26 wide; acetabulum 0.20 to 0.28 wide; sucker ratio 1:06 to 1:107, usually 1:100 to 1:104. Forebody 0.42 to 0.66, approximately one-third of body length.

Pharynx 0.12 to 0.32 long by 0.13 to 0.31 wide; prepharynx very short; esophagus short, 0.03 to 0.10 long; distinctly longer than prepharynx.

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*A description of this genus is in preparation by Dr. Hugh H. DeWitt, Stanford University.
Intestinal bifurcation immediately pre-acetabular, always closer to acetabulum than to oral sucker. Ceca relatively broad, terminating near posterior end of body.

Ovary rounded, smooth, immediately pre-testicular, in anterior half of hindbody; ovary 0.13 to 0.18 long by 0.13 to 0.19 wide; seminal receptacle rounded, at posterior margin of ovary, slightly overlapping anterior testis in some specimens; uterus coiled between ovary and acetabulum, metraterm to left of cirrus sac. Vitelline follicles extend continuously from posterior end of body to mid-pharyngeal level, often nearly continuous over esophagus, lateral, dorsal, ventral and posterior to ceca, confluent behind posterior testis; eggs large, 109 to 148 by 43 to 71. Testes rounded, smooth, posterior slightly larger than anterior; anterior testis 0.15 to 0.20 long by 0.18 to 0.26 wide; posterior testis 0.19 to 0.26 long by 0.18 to 0.24 wide; post-testicular space 0.30 to 0.52. Cirrus sac divided by a constricted portion into two parts; posterior portion dorsal to acetabulum, containing slightly coiled seminal vesicle surrounded by large gland cells; constricted portion with a bend above anterior margin of acetabulum, slightly overlapping posterior portion of cirrus sac; anterior portion of cirrus sac club-shaped with cirrus, poorly developed pars prostatica, and few gland cells. Common genital pore slightly sinistral.

Excretory vesicle tubular, terminating at rear margin of posterior testis. The name, \textit{antarcticus}, refers to the geographical location from which the species was collected.

\textbf{Host:} 	extit{Trematomus hanseni} Bouleniger, type host; in 1 of 6 hosts.

\textbf{Location:} Middle Intestine.

\textbf{Type Specimens (Holotype and Paratype):} U. S. National Museum Helminthological Collection Number 59817.


There are eight species of \textit{Lepidapedon} that possess an excretory vesicle extending to the cecal bifurcation; these are: \textit{L. congeri}, \textit{L. epinepheli}, \textit{L. haavoeki}, \textit{L. lericensi}, \textit{L. nicoli}, \textit{L. parepinepheli}, \textit{L. trachinoti}, and \textit{L. truncatum}. \textit{L. antarcticus} differs from all of these species on the basis of the excretory vesicle which extends only to the rear margin of the posterior testis.

The remaining thirteen species possess an excretory vesicle which does not reach as far forward as the acetabulum. \textit{L. antarcticus} keys to \textit{L. genge} in Hanson's (1950) key. It differs from \textit{L. genge} in possessing vitellaria which extend to the mid-pharyngeal level as compared with vitellaria which terminate at the posterior margin of the acetabulum. \textit{L. antarcticus} further differs from \textit{L. genge} in lacking a well-defined prepharynx, possessing a seminal vesicle which barely extends beyond rear margin of acetabulum, sparse spination, broad ceca, and by its somewhat larger eggs. Of the remaining
All projected scales are in millimeters.

Figure 1. *Lepidapedon antarcticum* from *Trematopus hansonii*. Dorsal view.
species with a short excretory vesicle, *L. lutem* appears to be closely related. *L. antarcticus* differs from *L. lutem* in its smaller body dimensions, shorter prepharynx, much larger eggs, larger and more extensive vitelline follicles, and more anteriorly located seminal vesicle.

Hanson (1950) considered *L. coelorhynchi* and *L. gadi* synonyms of *L. elongatum*. She questioned the validity of *L. calli*, *L. garrardi*, and *L. pugetensis*. Accna (1947) reported *calli* and *pugetensis* from Puget Sound but *pugetensis* from *Sebastodes nebulosus* was incompletely and somewhat inaccurately described. *L. calli* from *Porophryx retulus* lacks the bipartite seminal vesicle of other species in *Lepidapton*.

One species, *L. garrardi*, from the Antarctic is very incompletely described. Since the cirrus sac and seminal vesicle were neither described nor figured, its correct genus is uncertain. Hanson (1950) pointed out that the body shape, "delicate" spines, wide ceca, large, rounded testes, and large vitelline follicles suggested *Lepororhynchium* rather than *Lepidapton*. *L. antarcticus* resembles generally the figure of *L. garrardi*. It differs in a number of characters but complete comparison is impossible because of the inadequate description of *L. garrardi*. *L. antarcticus* resembles *L. garrardi* in that it possesses broad ceca, large vitelline follicles, and sparse, minute spination. It differs in the size of its eggs which measure 109 to 148 by 43 to 71 as compared with 100 by 30 for *L. garrardi*. The range in egg size for *L. antarcticus* is quite great but specimens agree within narrow limits for all other characters. *L. antarcticus* is somewhat smaller than *L. garrardi* in nearly all dimensions given.

![Figure 2. *L. antarcticus*, cirrus sac. Dorsal view.](image_url)

![Figure 4. *P. pennelli*, terminal genital organs. Ventral view.](image_url)
FAMILY OPECHELIDAE Ozaki, 1925

Plagioporis pennelli (Leiper and Atkinson, 1914) n. comb., redescription (Fig. 3 and 4)

SYNONYM: Podocotyle pennelli Leiper and Atkinson, 1914.

DESCRIPTION (Based on 30 specimens, measurements on 10): Length 1.12 to 2.07; greatest width at level of acetabulum, 0.31 to 0.49; body tapering at both ends, more broadly rounded at anterior end than at posterior end. Oral sucker 0.11 to 0.17 in transverse diameter, 0.11 to 0.17 long; acetabulum broader than long, 0.26 to 0.44 in transverse diameter, 0.22 to 0.38 long; sucker ratio 1:2.0 to 1:2.75. Forebody 0.27 to 0.35. Short prepharynx, 0.01 to 0.04; pharynx 0.06 to 0.11 long by 0.06 to 0.10 wide; esophagus usually somewhat shorter than pharynx; bifurcation at anterior margin of acetabulum, usually overlaps acetabulum; intestinal cea extend to rear margin of posterior testes or sometimes slightly beyond.

Testes smooth, tandem, sometimes slightly oblique; anterior testis 0.20 to 0.22 long by 0.22 to 0.24 wide; posterior testis 0.22 to 0.24 long by 0.22 to 0.23 wide; testes in contact with each other, anterior testis in contact with ovary; anterior testis just posterior to mid-body. Genital pore opens to left, opposite pharynx. Cirrus sac claviform, extending somewhat diagonally backward, dorsal to acetabulum. Cirrus sac extends backward to mid-acetabular level or slightly beyond. Seminal vesicle simple, claviform, in posterior half of cirrus sac; seminal vesicle usually entirely dorsal to acetabulum. Pars prostatica slightly enlarged, surrounded by large gland cells; weakly developed cirrus, surrounded by a few gland cells. Vitelline follicles large, extending from posterior edge of pharynx to posterior extremity of body; interrupted slightly in some specimens opposite acetabulum; dorsal and lateral to cea; confluent dorsally anterior to acetabulum and above ovary and both testes, usually filling post-testicular space. Ovary post-acetabular, pre-testicular, 0.19 to 0.23 by 0.18 to 0.21. Uterus largely pre-ovarian, extending posteriorly to margin of anterior testis. Eggs 46 to 62 by 24 to 33, usually 55 to 62 by 24 to 26.

Excretory pore terminal; excretory vesicle tubular, extending forward to level of ovary.

HOSTS: Trematomus bernacchii Boulenger, in 8 of 9 hosts; Trematomus hansonii Boulenger, in 2 of 6 hosts; Trematomus centronotus Regan, in 3 of 10 hosts; and in a new species and genus of fish in the Family Zoarcidae, in 2 of 14 hosts.

LOCATION: Upper and lower intestine.


DISCUSSION: Leiper and Atkinson (1914, 1915) listed and later described a new species, Podocotyle pennelli from Trematomus bernacchii from Antarctic waters. According to their description, the cea of their specimens end at the level of the posterior limit of the testes; the ovary is pear-shaped to slightly lobate; the vitellaria range from the level of the genital pore to the posterior extremity; there is an armed cirrus present; and the eggs have a distinct knob-like protrusion at one end. These are characters typical of Plagioporis and for this reason Podocotyle pennelli is transferred to this genus and the new combination becomes Plagioporis pennelli (Leiper and Atkinson, 1914). Although the original description of P. pennelli is incomplete, the figure is somewhat more detailed. The redesription above is based
on 30 specimens which agree with the description and with Figure 19 by Leiper and Atkinson (1915).

Manter (1954) recognizes two subgenera, *Plagioporus* and *Caudotestis*, in *Plagioporus*. Species in *Caudotestis* have intestinal ceca which do not extend beyond the posterior limit of the testes whereas species in *Plagioporus* have ceca which extend beyond the testes. Leiper and Atkinson’s description of *P. pennelli* states that ceca terminate at the end of the posterior testis. Their figure shows ceca which end slightly behind the posterior testis. In my Antarctic specimens, this character is somewhat variable. In some specimens, the ceca end at the rear margin of the posterior testis and in others they end more posteriorly. On the basis of this character, *P. pennelli* should be placed in the Subgenus *Plagioporus*.

Manter (1954) presented a key to the 27 species in the Subgenus *Plagioporus*. Of the species considered in the key, *P. japonicus* Yamaguti, 1938 and *P. isaitshikovii* (Layman, 1930) Price, 1934 seem most closely related to *P. pennelli*. *P. pennelli* differs from *P. japonicus* in possessing somewhat smaller eggs and exhibiting a straight instead of looped seminal vesicle. *P. pennelli* also differs in having a cirrus sac which extends nearly to the posterior margin of the acetabulum instead of one which terminates anterior to the acetabulum. *P. pennelli* differs from *P. isaitshikovii* in its more posterior intestinal bifurcation and continuous vitellaria opposite acetabulum. *P. pennelli* further differs from *P. isaitshikovii* in the extent of the cirrus pouch which extends nearly to the posterior margin of the acetabulum as compared with one which extends anterior to the acetabulum.

**Family Hemichiridae Lühe, 1901**

*Parahemichirus oatesi* (Leiper and Atkinson, 1914) Skrjabin and Guschanskaja, 1954 redescription (Fig. 5 and 6)

**Description** (Based on three specimens): Body small, rounded, with cuticular plications extending from anterior end to slightly beyond end of ovary; body with ecsoma (retracted in all three specimens), approximately one-fourth body length; body 1.69 to 1.90 long by 0.34 at acetabulum; body 0.67 wide at widest point; forebody short, 0.21 to 0.32. Oral sucker globular, 0.13 to 0.16 long by 0.16 wide. Acetabulum in anterior one-fourth of body, nearly round, 0.25 to 0.27 long by 0.30 wide; sucker ratio, 1:1.88.

Prepharynx absent; pharynx globular, 0.08 long by 0.08 wide; esophagus very short or absent; ceca end directly behind vitellaria, may extend slightly into retracted ecsoma.

Genital pore median, ventral, opening beneath middle of oral sucker. Testes rounded, slightly diagonal; anterior testis 0.15 long by 0.18 wide; posterior testis 0.16 long by 0.18 wide. Seminal vesicle undivided, post-acetabular, with thick muscular walls, extending somewhat diagonally in body. Pars prostatica relatively long, post-acetabular, somewhat S-shaped, reflected above antero-dorsal margin of seminal vesicle with numerous, large gland cells. At rear margin of acetabulum, just anterior to pars prostatica, male duct unites with uterus to form a long ductus hemaphroditicus enclosed in a somewhat muscular sac; terminal portion of hemaphroditic duct eversible and functions as a copulatory organ.

Ovary oval, median, 0.14 long by 0.23 wide, immediately post-testicular. Seminal receptacle [was] not observed. Uterine loops pass across body from ovary posterior to ecsoma; uterus then loops forward in several coils in ventral portion of body, passing forward to unit with male duct to form
Figure 3. Plagioporus pennelli from Trematomus hansonii. Ventral view.
ductus hermaphroditicus just dorsal to rear margin of acetabulum. Vitellaria consist of eight well-defined, deeply cleft lobes, apparently forming two glands immediately behind ovary. Eggs 19.2 to 24 by 9.6 to 12.

Excretory vesicle tubular, bifurcating into two excretory arms which unite behind pharynx.

HOSTS: Trematomus benaccltii Boulenger, in 1 of 9 hosts; T. hansonii Boulenger, in 1 of 6 hosts; T. centronotus Regan, in 1 of 10 hosts.

LOCATION: Stomach.


Manter (1940) considered P. parahemius, P. platichthyi, P. atherinae, and P. harenagulae synonyms of P. mersus. Manter (1934) described a species, Hemius sp., which was characterized by an undivided seminal vesicle. His specimen was described as having a thin-walled seminal vesicle in contrast to the typical thick, muscular-walled vesicle of Parahemius. Skrjabin and Guschanskaja (1954) named Manter's specimen, P. dogieli, apparently on the basis of the undivided seminal vesicle. These same authors transferred Hemius oatesi Leiper and Atkinson, 1914, to Parahemius. Although the original description of P. oatesi was incomplete and apparently inaccurate in some cases, it belongs in Parahemius on the basis of its thick-walled, undivided seminal vesicle. With the exception of egg size, my specimens of Parahemius agree with the description and figure of P. oatesi. In the description of this species, the authors state "the eggs are very small as compared with those in the succeeding Hemiusidae. The uterus (ut) is filled with eggs, 0.05 X 0.03 mm., and occupies most of the interstices between the posterior lobule of the yolk-glands and the ventral sucker." The next species of Hemiuridae described in their paper is Aponurus bowersi in which the indicated egg size (.04 mm. by .02 mm) is even smaller than that given for P. oatesi. Because of this inconsistency, and because the range of egg size (.015 to .034 mm. by .008 to .014 mm.) for other species of Parahemius is much lower, the indicated egg size for P. oatesi most likely is an error. My Antarctic specimens of Parahemius have an egg size of 19.2 to 24 by 9.6 to 12, and are assigned to the species, P. oatesi.

P. oatesi differs from all other species in the genus except P. australis and P. lovettiae on the basis of deeply lobed vitellaria. P. oatesi, P. australis, and P. lovettiae are closely related and differ only slightly in a few characters. P. oatesi differs from P. australis on the basis of more deeply lobed vitellaria, somewhat smaller body measurements, less extensive cuticular plications, and slightly larger eggs. It differs from P. lovettiae on the basis of larger body size, larger internal organs, less extensive cuticular plications, and somewhat larger eggs although there is some overlap in measurements.

Genolinea leiperi n. sp. (Figs. 7, 8, and 9)

DESCRIPTION (based on 30 specimens, with measurements on 10): Body
Figure 5. *Parahemiurus oatesi* from *Trematomus bernacchii*. Lateral view.
elongate, muscular, not flattened; cuticle slightly striated; body 1.18 to 1.94 long by .34 to .46 wide at acetabulum. Forebody .28 to .44 or approximately one-fourth of body length. Oral sucker nearly round, subterminal, .11 to .17 long by .12 to .18 wide. Acetabulum nearly round, .20 to .30 by .23 to .32 wide. Sucker ratio 1:1.60 to 1:1.91.

Pharynx .06 to .10 long by .10 to .12 wide; esophagus very short; ceca broad, undulating, ending near posterior end of body.

Genital pore median or slightly sub-median, at posterior margin of pharynx. Testes rounded, usually tandem, sometimes slightly diagonal; anterior testis .15 to .19 long by .14 to .20 wide; posterior testis usually in contact with anterior testis, .13 to .19 long by .20 to .26 wide. Sinus sac with weakly muscular wall, .09 to .15 long by .06 to .08 wide; sinus sac ovoid, containing a distensible hermaphroditic duct with thick-walled basal portion; sinus sac containing numerous small gland cells. Pars prostatica well developed, a narrow curved tube surrounded by a mass of gland cells which

Figure 6. *P. oatesi*, terminal genital organs. Lateral view.

Figure 9. *G. leiperi*, terminal male genital organs. Lateral view.
Figure 7. *Genolinea leipert* from *Trematomus bernacchii*. Ventral view.
occupy a space nearly as large as sinus sac; gland cell mass immediately anterior to acetabulum, sometimes overlapping it slightly. Seminal vesicle external, tubular, with several dilations and lateral coils, extending from prostate cell mass to mid-acetabular level.

Ovary rounded to slightly ovoid, .10 to .19 long by .17 to .23 wide, immediately post-testicular. Seminal receptacle not observed. Uterus with coils extending beyond posterior vitellarium, nearly to end of body, then coiling forward to enter base of sinus sac. Vitellarium consist of two compact lobes, usually tandem, often oblique or lateral to each other, immediately post-ovarian; both vitellaria slightly wider than long; anterior vitellarium .10 to .14 long by .11 to .26 wide; posterior vitellarium .09 to .15 long by .12 to .20 wide; post-vitelline space short. Eggs 31 to 39 long by 12 to 17 wide.

Excretory pore slightly subterminal; crura of excretory vesicle with slight convolutions, uniting dorsal to posterior margin of oral sucker.

HOSTS: *Trematomus bernacchii* Boulenger, type host, in 5 of 9 hosts; *Trematomus centronotus* (in 4 of 10 hosts).

LOCATION: Stomach.

HOLOTYPE AND PARATYPE (Two specimens): U. S. National Museum Helminthological Collection Number 59819.

DISCUSSION: Leiper and Atkinson (1915) described and named a species from the Antarctic as *Aponurus bowersi*. Their specimens cannot belong in the Genus *Aponurus* because the vitellaria consist of two compact, nearly tandem, lobes rather than the seven characteristic of *Aponurus*. The authors failed to describe the seminal vesicle or any of the terminal genital ducts except a “cirrus,” hence the generic disposition of their specimens is uncertain. Their figures indicate that their specimens could be either *Derogenes* or *Genolinae*. Skrjabin and Guschanskaja (1955) transferred *Aponurus bowersi* to *Genolinae*, based on the figure and description in the original paper. The anterior position of the acetabulum and the usually tandem position of the vitellaria would indicate *Genolinae*. The egg size given for *A. bowersi* is 40 by 20 and body size is given as 1. Upper egg size of my specimens of *G. leiperi* is just slightly below the minimal egg measurements of *A. bowersi*. My antarctic specimens of *G. leiperi* are very similar to the published figure of *A. bowersi*. Since the terminal genital ducts and seminal vesicle were not described for this species, the transfer to *Genolinae* would appear to be unjustified. At the present time, the correct allocation of *A. bowersi* remains questionable.

Yamaguti’s (1953) synopsis of the digenetic trematodes lists seven species of *Genolinae*, two of which originally were assigned to other genera. Yamaguti considered *Parasterrilurus* Manter, 1934 a synonym of *Genolinae* and the type and apparently only species of *Parasterrilurus*, *P. amarus* Manter, 1934, became *Genolinae amura* (Manter, 1934). Since *Brachiophalus amarus* Layman, 1930 previously had been transferred to *Genolinae* by Yamaguti (1934), this specific name was preoccupied by Layman’s species. Yamaguti (1953) therefore proposed the new combination *Genolinae argentinae* for Manter’s specimen.

Manter (1954) described a new species, *Genolinae dactylopogri*, from New Zealand waters and also presented a key to the six species which he recognized at the time. He did not include *G. argentinae* and reduced *G. robusta* Lloyd, 1938 to synonymy with *G. laticauda* Manter, 1925. Manter (1955) noted that the genus consisted of seven species, thereby implying his acceptance of the synonymy of *Parasterrilurus* with *Genolinae*.
Figure 8. *G. leiperi* from *Trematomus bernacchii*. Lateral view.
Margolis and Adams (1956) described *G. oncorhynchi* from the salmon, *Oncorhynchus gorbuscha* in British Columbia. Montgomery (1957) reported another species, *G. tanyopa* from *Medialuna californiensis* (Steindachner) and *Hypsepops rubicunda* (Girard) at La Jolla, California. Manter and Pritchard (1960) described *G. ampladena* from *Acanthurus sundivicensis* (Streets). These same authors (Manter and Pritchard, 1960a) described *Genolinea lobata* from the same host.

Skrjabin and Gushanskaia (1955) named Linton's (1940) *Genarcles* sp., *Genolinea lintoni*. These authors are unjustified in making their generic disposition of Linton's specimens of *Genarcles* sp. I have examined Linton's specimens and found them to be in poor condition. They should not be in *Genarcles* as they do not possess united ceca. The seminal vesicle and terminal genital ducts were not seen in these specimens but the transverse testes and vitellaria and distinct preoral lip indicate *Derogenes* rather than *Genolinea*.

*G. lei-peri* is most like *G. laticauda*. It differs from that species by the absence of sphincter muscles of the acetabulum. It also differs in the more posterior position of the seminal vesicle and prostatic complex and in its larger egg size.

*Gonocerca lobata* n. sp. (Figs. 10 and 11)

**Description** (based on six specimens, complete measurements on 1; two specimens immature; three large specimens in poor condition).

Body large, rounded, smooth, short pre-oral lip, .05; cuticular striations evident anteriorly; both ends broadly rounded, tail appendage lacking. Length 3.70 (5.50 and 5.70 in two largest specimens); greatest width immediately pre-acetabular, 1.40 (2.3 and 2.4 in two largest specimens). Oral sucker .47 long by .68 wide; acetabulum large, nearly round, .87 long by .85 wide; acetabulum distinctly pre-equatorial; sucker ratio 1:1.25. Forebody 1.24, approximately one third of body length.

Pharynx .26 long by .19 wide, slightly overlapped by oral sucker; pre-pharynx absent; esophagus short, .029 long. Intestinal bifurcation well anterior to acetabulum, closer to oral sucker than to acetabulum. Ceca swing anteriorly to level of posterior margin of oral sucker; broadened when directed posteriorly, extending to posterior tip of body.

Ovary rounded, smooth, post-acetabular, separated from acetabulum by two loops of uterus; ovary lies in mid-line between vitelline glands, pre-testicular, nearly touching anterior-most testis. Vitellaria compact, deeply and symmetrically four-lobed (in six specimens), lateral to ovary and anterior to testes. Eggs 71 to 86 long by 33 to 39 wide. Muscular metraterm enters genital pore to right of sinus sac. Uterus transversely coiled between ovary and acetabulum; major portion of uterus transversely coiled above acetabulum and forward to level of pharynx. Testes rounded, slightly diagonal, post-ovarian; anterior testis .65 long by .59 wide; posterior testis .78 long by .63 wide; post-testicular space .20. Seminal vesicle transversely placed in body between acetabulum and pharynx; seminal vesicle not enclosed in cirrus sac, closer to pharynx than to acetabulum; seminal vesicle with folded constriction at posterior end, tapering towards anterior end; anterior end sharply reflected where it enters pars prostatica; pars prostatica well developed, surrounded by a number of loose prostate cells; common genital pore medial, ventral to pharynx and immediately behind oral sucker; pars prostatica and prostate gland cells slightly overlapping pharynx.
Figure 10. *Gonocercia lobata* from *Trematomus bernacchii*. Ventral view.
Excretory pore terminal, opening into a bladder lined with columnar epithelium; bladder extends along right side of body, ventral to testes and bifurcates at anterior margin of testes; two excretory arms extend anteriorly beneath intestinal ceca; excretory arms constricted at level halfway between oral sucker and acetabulum, uniting dorsal to oral sucker.

The name lobata is for the distinctive appearance of the vitellaria.

**HOST:** *Trematomus bernacchii* Boulenger, type host, in 2 of 9 specimens; *T. hansoni*, in 1 of 6 hosts.

**LOCATION:** Lower Intestine.

**TYPE SPECIMEN:** Holotype, U. S. National Museum Helminthological Collection Number 59821.

*Gonocerca trematomi* n. sp. (Figs. 12 and 13)

**DESCRIPTION** (based on a single specimen): Body elongate, rounded; forebody flexed ventrally, posterior end broadly rounded; tail appendage lacking; short pre-oral lip. Length 3.8, forebody tapered somewhat anteriorly. Oral sucker .34 long by .35 deep; acetabulum large, post-equatorial, .67 long by .45 deep. Forebody tapered somewhat anteriorly. Oral sucker .34 long by .35 deep; acetabulum large, post-equatorial, .67 long by .45 deep. Forebody 2.0, approximately one-half of body length.

Pharynx rounded, .15 long by .15 deep, slightly overlapped by oral sucker; pre-pharynx absent; intestinal bifurcation well anterior to acetabulum, closer to oral sucker than to acetabulum; ceca extend beyond testis to posterior tip of body.

Ovary rounded, smooth, immediately post-acetabular, anterior margin of ovary in contact with posterior margin of acetabulum; ovary lies in midline between vitelline glands, pre-testicular except for posterior margin which slightly overlaps anterior testis foremargin; ovary .30 long by .44 deep. Vitellaria compact, rounded, smooth; left vitelline gland somewhat more posterior than right, extending back opposite forward portion of anterior testis. Testes large, in tandem, margins overlapping slightly; anterior testis .67 long by .63 deep; posterior testis .68 long by .65 deep; testes extend to posterior end of hindbody; post-testicular space .09. Uterus extends forward from ovary, transversely coiled in body above acetabulum and forward nearly to level of pharynx; muscular metraterm enters genital pore to right of sinus sac. Eggs 45 to 52 long by 24 to 26.4 wide. Seminal vesicle not enclosed in cirrus sac, closer to pharynx than to acetabulum, club-shaped, tapering anteriorly to enter pars prostatica; pars prostatica well developed, surrounded by a mass of loose prostate gland cells; genital pore medial, ventral to pharynx at posterior margin of oral sucker; pars prostatica and prostate gland cells lying partially beneath pharynx.

Excretory pore slightly subterminal, opening into a tubular bladder; excretory arms were not traced throughout their length but apparently unite above the pharynx. The specific name, trematomi, refers to the host genus.

**HOSTS:** *Trematomus bernacchii* Boulenger, type host, in 1 of 9 specimens.

**LOCATION:** Branchial Chamber.

**TYPE SPECIMEN:** Holotype, U. S. National Museum Helminthological Collection Number 59820.

**DISCUSSION:** The type of the genus, *G. phycidis*, was described from *Urophycis chuss* by Manter (1925) from the coast of Maine and later collected (Manter, 1934, 1947) from depths of 139 to 300 fathoms at Tortugas, Florida where it infected *Urophycis regius*, *Merluccius* sp., and *Callopectenus*.
curminatus. It was found to be rather common in New Zealand by Manter (1954), and was recorded there from Coleorhynchus australis Richardson, Macrurus nova-zelandiae (Hector) Merluccius gayi (Guichenot), Parapercis colias (Forster), and Scorpaena cruenta Richardson.

In addition to the two new species from the Antarctic described in this paper, three other species occur in the Genus Gonocerca; these are: G. kobayashii (Layman, 1930) Manter, 1934; G. crassa Manter, 1934; and G. macroformis Wolfgang and Myers, 1954. G. kobayashii was reported from the stomach of Myxoccephalus raninus from Peter the Great Bay. The species is characterized by its lobed vitellaria. G. crassa was reported from 13 different hosts from deep-water fishes at Tortugas, Florida and later was reported from Coleorhynchus sp. from Japan by Yamaguti (1934). Rees (1953) has since reported it from Molva byrkelange from 160 fathoms from Iceland.

G. macroformis was described from the ovary of two other bottom-dwelling forms, the witch and plaice flounders. The occurrence of this species in the ovary is somewhat unusual in that other members of the genus occur in the branchial cavity or upper digestive tract of their hosts. The species exhibits a number of peculiarities, including unusually constructed ceca lined with several cell types, and its peculiar location in the host.

G. lobata is similar to G. kobayashii in the possession of lobed vitellaria. No other members of the genus possess lobed vitellaria. It differs from G. kobayashii in having a generally larger body size, larger eggs, smaller sucker ratio, symmetrical lobation of vitelline glands, and location of the acetabulum anterior to mid-body.

Gonocerca trematomi lacks the lobed vitellaria characteristic of G. lobata and G. kobayashii. In addition, it differs from G. phycidis in larger, more robust body, wider eggs, much longer forebody, more globular seminal vesicle, and smaller sucker ratio. G. trematomi may be distinguished from G. crassa on the basis of its more tandem testes, wider eggs, more anterior genital opening, smaller pre-oral lobe, and uterine coils extending laterally to overlap

Figure 11. G. lobata, terminal genital organs. Ventral view.
Figure 13. G. trematomi, terminal genital organs. Lateral view.
intestinal ceca. *G. trematomi* possesses more tandem testes; more laterally extended uterine coils; thinner, more uniform cecal linings; and much smaller body size than *G. macroformis*.

Wolfgang and Myers (1954) pointed out the structural peculiarities and unusual location within the host of *G. macroformis*, and commented upon its similarities to the gorgoderids which undergo visceral migration in the definitive host. They concluded that it was a true and not an aberrant species on the basis of its occurrence in associated species of bottom dwellers. *G. lobata* was collected only from the extreme lower intestine of the host. The occurrence of both *G. macroformis* and *G. lobata* in somewhat unusual habitats would seem to indicate that this genus of Derogetine hemiurids may be normal inhabitants of the entire digestive tract and associated organs.

Manter (1934) has commented upon the distribution of *G. phycidis* in shallow waters of Maine and in cold waters at depths of 150 to 300 fathoms at Tortugas, Florida. Collection of the genus from Iceland, Japan, New Zealand, and Antarctica further confirms the distinct cold water affinities of the group.

**Summary**

Described are four new species: *Lepidapedon antarcticus*, *Genolinea leiperi*, *Gonocerca lobata*, and *Gonocerca trematomi*.

The following new combination is proposed: *Plagioporus pennelli* (Leiper and Atkinson, 1914) for *Podocotyle pennelli*.

Redescriptions are given of *Plagioporus pennelli* (Leiper and Atkinson, 1914) and *Parahemiarus oatesi* (Leiper and Atkinson, 1914) Skrjabin and Guschanskaja, 1954.

New host records are reported for *Parahemiarus oatesi* and *Plagioporus pennelli*.

**Literature Cited**


Figure 12. *G. trematomi* from *Trematomus bernacchii*. Lateral view.


----- 1951. The life cycle of Stegodexamene anguillae n.g.n. sp. an allogenid trematode from New Zealand. Parasitol. 41: 1-10.


