

This key is designed to help in the identification of the furcocercous cercariae of the Douglas Lake Region of Michigan. This key is made as simple as possible, because of this the key will have faults. Attempts have been made to keep away from much of the fine details such as excretory system, flame cell patterns, and other characteristics that are difficult to determine.

In the use of this key one should study the cercariae well. Cercariae behavior in a container should be noted, the use of vital stains is very important, measurements should be the averages of many, fixed in hot formalin (10%). Oil emersion should be used as much as possible in the determination of the details.

Because of the nature of this key it is impossible to be absolutely positive of the identification, so corresponding to the number by the cercaria is a short description and also a diagram of the cercaria.

The form of this key is such that it would be difficult to give credit to other authors, so that at the end of the key is a list of references that were used in the formation of this key.

KEY TO FAMILIES WITH FORKTAIL CERCARIA

- 1. (a) Cercaria with pharynx and/or caudal bodies usually logifurcate.....2
- (b) Cercaria without pharynx, usually brevifurcate, no caudal body, often with pigmented eyespots, dorsal crest often present.....3
- 2. (a) Cercaria usually with caudal bodies, often with "unpigmented eyespots", penetration glands immediately anterior, or immediately posterior or lateral to ventral sucker (none in oral sucker).....STRIGEIDAE (including DIPLOSTOMATIDAE).
- (b) Pharynx present, pigmented eyespots present, dorsal crest present, brevifurcate, lophocercous.....CLINOSTOMATIDAE.
- (c) Large cercariae, longifurcate, pharynx present, many glands in oral sucker also many glands in forbody.....CYATHOCCTILIDAE.
- (d) Small cercariae, poor swimmers, several glands in oral sucker, about eight pairs of glands grouped about the acetabulum.....BRACHYLAEMIDAE.
- (e) Furcocystocercous cercariae.....AZYGIIDAE.
- 3. (a) Apharyngeal, brevifurcate cercariae with large dorsal finfold, with supporting fin rays, usually with pigmented eyespots.....SANGUINICOLIDAE.
- (b) Emerged cercariae with six pairs of penetration glands, often difficult to see, except under pressure (may appear as one pair). Oculate may or may not have dorsal finfold (if it does, small without supporting spines.) Tail attached ventrally to body, body often flexed ventrally.....SPIRORCHIIDAE.
- (c) Cercariae brevifurcate, 5 or 10 penetration organs often with dorsal-ventral finfold on tail, oculate, will readily penetrate human skin.....SCHISTOSOMATIDAE.

KEY TO MEMBERS OF STRIGEIDAE

- 1. (a) Cercariae without pharynx, containing caudal bodies, tail stem bulbous, cercariae weak swimmers, Planorbula armigera.....C. of Apharyngealstrigea pipientis (1)
- (b) Cercariae with pharynx (may be indistinct).....2
- 2. (a) Cercariae with caudal bodies.....3
- (b) Cercariae without caudal bodies.....16
- 3. (a) Cercariae with six penetration glands.....4

- (b) Cercariae with four or eight penetration glands.....5
- 4. (a) No forward pointing spines in circumoral spineless area, body spines only on oral cap, extending 1/3 of the way back on oral sucker. Five pairs of caudal bodies; Physa gyrina, Physa parkeri, Physa magnalacustraC. physae (2)
- (b) Monostome; packed with parenchyma cells; gut absent or hard to distinguish eye spots with varying shaped pigment granules; course retrorse spines on anterior, diminish in size and number posteriorly, furcae equal to tail stem in living, tail stem cylindrical, width slightly smaller than the width of body; small spines on furcae, and narrow delicate edge (paddle edge) around furcae, Physa gyrina.....C. multicellulata (4)
- (c) Six small indistinct penetration glands back of ventral sucker, 9-10 transverse rows of spines in region between post limits of oral sucker and acetabular level, first 4 or 5 rows complete others only lateral. Ten to twelve forward pointing spines in two irregular rows dorsal to oral sucker; numerous small irregular sized caudal bodies; no unpigmented eyespots; Lymnaea emarginata....C. walloni(3)
- (d) Similar to C. multicellulata but lacks eyespots; when resting body is bent, so that it is hook shaped. No "paddle" edge as in the above, short rhabdocoel gut with distinct pharynx; Helisoma trivolvis.....C. hamata (5)
- (e) Ventral sucker with three to four rows of spines. Penetration glands small and inconspicuous, post acetabular; oral sucker broad in living specimens; Six to eight large hooked spines immediately dorsal to oral opening. No eye spots, anterior 1/2 of body is active and may be curved ventrally Lymnaea emarginataC. higginsii (6)
- 5. (a) Cercariae with eight penetration glands; unpigmented eye spots; 16 pairs of caudal bodies. Row of 30-35 nuclei on each side of tail stem. Helisoma trivolvis, Lymnaea humilis.....C. of Apatomon gracilis, (C. burti) (7)
- (b) Cercariae with four penetration glands.....6
- 6. (a) Cercariae with unpigmented eyespots or "preacetabular bodies".....7
- (b) Cercariae without unpigmented eyespots.....8
- 7. (a) No forward pointing spines in circumoral area; heavy spination in anterior 1/8 of body; 16 caudal bodies, first 6-8 in pairs, last two small and at base of furcae; small penetration glands posterior to sucker. Caeca and pharynx well defined, swims almost constantly; Lymnaea angulata, Lymnaea humilis.....C. longifurea (8)

- (b) Unpigmented eyespots form two large "preacetabular bodies", 12 forward pointing spines, dorsal to oral opening; 6-7 rows of large hooks in oral cap, small scattered spines back to ventral sucker with four irregular rows of spines. Caeca not well developed, form heart shaped structure; swims constantly, Lymnaea emarginata and rarely Lymnaea stagnalis.....C. dohema (9)
8. (a) Caudal bodies numerous, usually 25; oral cap with prominent spines; 10 forward pointing spines dorsal to oral opening, pharynx distinct, caeca well developed with oily appearing substance, hangs in water upside down with tail stem bent "J"; Lymnaea stagnalis, Lymnaea emarginata.....LC. of Diplostomum flexicuadum (D. flexicuada) (10)
- (b) Caudal bodies 10-14 usually 12.....9
9. (a) Penetration glands posterior to acetabulum.....10
- (b) Penetration glands anterior to acetabulum; usually 10 caudal bodies irregularly arranged, spination limited to oral cap., 22 hooks around sucker in one row. Mouth subterminal, narrow caeca extend to posterior edge of acetabulum; Helisoma trivolvis.....C. tenuis (11)
10. (a) Body length averages greater than .185 mm.....11
- (b) Body length averages less than .185mm.....13
11. (a) Tail stem much longer than body, about .050mm longer; constriction behind acetabulum, oral opening terminal, esophagus often dilated, caeca long and conspicuous, extending almost to level of excretory bladder, Lymnaea palustris.....C. elodes (12)
- (b) Tail stem not much longer or about the same as body length.....12
12. (a) Oral opening terminal, prepharynx short, pharynx small, caeca long, distal portions conspicuous, large penetration glands; when cercariae hang free in water the tail stem is bent sharply to the side, 6 pairs of nucleated caudal bodies, constriction behind acetabular region; Lymnaea emarginata.....C. saileri (13)
- (b) Anterior pair of penetration glands tandem, post, pair side by side; broad gland ducts run anteriorly; 6-8 bands of irregular rows of small closely set spines about anterior portion of oral sucker, 9-10 transverse rows of spines in region between oral sucker and middle of ventral sucker. With the first 4-5 rows complete and the others lateral; Lymnaea palustrisC. scudderi (14)
13. (a) Body fairly small, less than .150mm.....14
- (b) Body larger than .150mm.....15

14. (a) Suckers comparatively larger for the body, with the ventral sucker being comparatively larger than the oral sucker; digestive system and penetration glands difficult to see because of density of body, usually at rest but will swim great lengths when agitated, furcae not spread "too far apart" and tail stem bent while resting, 10 forward pointing spines toward opening dorsal; spines in definite rows over body and not found ventrally behind acetabulum. Lymnaea humilis.....C. modicella(15)
- (b) Penetration glands small, pharynx relatively large; caeca narrow and inconspicuous terminating anterior to genital primordia. No forward pointing spines dorsal to oral opening; spines scattered laterally from pharynx to posterior. Small closely set spines on anterior part of body 3-4 irregular rows around acetabulum; Lymnaea caperata.....C. caperata (16)
15. (a) Very common, tail stem bent, similiar to C. flexicuada and C. modicella, similiar morphologically to C. flexicuada except it has six pairs of prominent caudal bodies; Lymnaea emarginata.....C. laruei (17)
- (b) Furcae almost equal in length to tail stem, well developed ventral sucker and pharynx present; 12 irregularly arranged caudal bodies, patches of yellow in front of ventral sucker. Preacetabular region bent slightly ventrally, when resting, a constriction is present behind acetabulum; Lymnaea emarginata and Lymnaea palustris.....C. yogena (18)
16. (a) Cercariae without eyespots... ..17
- (b) Cercariae with eyespots.....19
17. (a) Four penetration glands, posterior to ventral sucker; oral sucker large and subterminal; caeca extending almost to excretory bladder; oral hood with 9-12 rows of spines extending to middle of oral sucker; Gyraulus parvus (exp.).....C. of Strigea elegans (19)
- (b) Penetration glands not as above.....18
18. (a) Four penetrations glands, two anterior and two posterior to the acetabulum; ventral sucker often conspicuously protruded; well developed caeca (difficult to see); 9 forward pointing spines dorsal to oval opening; one irregular row of short spines around acetabulum; Lymnaea palustris..C. of Diplostomum microdenum (C. microdana)(20)
- (b) Four penetration glands anterior and somewhat lateral to the ventral sucker; oral opening ventral in a small spineless area; pharynx large; acetabulum with several irregular rows of various sized flattened spines; four hairlike structures in terminal spineless area; hairlike structures on the tail and body; swims slowly and awkwardly; rests with tail stem partly contracted; Valvata sincera.....C. sincera (21)

19. (a) Cercariae with forward pointing spines in the circumoral spineless area, dorsal to the oral opening.....20
- (b) Cercariae without forward pointing spines in the circumoral spineless area, dorsal to the oral opening.....23
20. (a) Cercariae with 10-12 forward pointing spines.....21
- (b) Cercariae with 16-20 forward pointing spines.....22
21. (a) Ten forward pointing spines in the circumoral spineless area; 4 penetration glands, 2 anterior and 2 posterior to ventral sucker; eyespots unpigmented and very small, at each side of body in front of penetration glands; one row of spines around acetabulum; Lymnaea palustrisC. macrodena (22)
- (b) Twelve forward pointing spines in circumoral spineless area; large cercaria, long periods of rest, short periods of swimming; prominent lateral nuclei on tail; no definite acetabulum, 6 penetration glands; eyespots unpigmented and unprominent; digestive system rudimentary; rests with anterior 1/2 of body bent ventrally; Helisoma trivolvis.....C. of Uvulifer ambloplites(C. besselaie)(23)
22. (a) Tail stem shorter than body; 2 unpigmented eyespots; 4 penetration glands anterior to ventral sucker; body length .198mm, tail stem length .184mm. Ventral sucker with bears several irregular rows of thin elongate spines. Swims constantly, with cercaria distributed equally throughout the water; Physa parkeri, Physa gyrina.....C. douglasi(24)
- (b) Tail stem longer than body length .217mm, tail stem length .238mm. Four penetration glands anterior to ventral sucker; 2 unpigmented eyespots; swims constantly with cercariae concentrated more toward the surface; Lymnaea stagnalis, Lymnaea emarginata.....C. of Cotylurus flabelliformis (25)
23. (a) Body about .101mm in length, tail stem about .165mm in length; large retrorse spines in several rows around oral sucker; mouth slightly subterminal; oral sucker is slightly larger than ventral sucker. Midway between ventral and oral sucker is 2 unpigmented eyespots; Planorbula amigera.....C. of Alaria mustelae (26)
- (b) Body length about .126mm tail length about .177mm; 4 penetration glands anterior and somewhat lateral to ventral sucker; two unpigmented eyespots anterior to penetration glands; well developed ventral sucker; caeca hard to distinguish, extend posterior to ventral sucker a short distance; Helisoma trivolvis and Helisoma companulatum.....C. morrcianaie (27)
- C. chrysenenterica (41);.....omitted from key, see description.
- C. ranae (42).....omitted from key, see description.

FAMILY CLINOSTOMIDAE

There is one genus and possibly two species found in this area. They are very similiar, Clinostomum campanulatum (Rudolphi, 1819) is found in the mouth and buccal cavity of herons, the cercariae penetrate fishes and produce "yellow grubs". Clinostomum attenuatum (Cort 1913) is found in the mouth and buccal cavity of bitterns, the cercariae penetrate frogs. The cercariae are found in Helisoma companulatum and Helisoma antrosa (28).

FAMILY CYATHOCOTILIDAE

Cercariae belonging to this group have been found from Campeloma sp. snails, they have not been adaquately described, they possibly belong to the genus Linstowiella. More work is necessary in this group. (29)

FAMILY BRACHYLAIMIDAE

- 1. (a) Small body .110mm; tail stem short .046mm; furcae short .057mm suckers equal size; poor swimmers, escape in limited numbers. Campeloma sp.....
.....Leucochloridiamorpha constantiae (30)
- (b) Similiar to above except that general size is about twice as large, readily encyst in mantle cavity of Anadonta grandia clams; Campeloma sp.....
.....Ptylinicola Ondatrae (31)*

FAMILY AZYGIIDAE

Several species Azygiida are found in this area, more work is needed on this group. Cercariae of Proterometra dickermani are found sexually mature in Goniobasis livescens from Ocqueoc River, they may also be found in Campeloma sp. from that river. Other members of this family are found in Arnicola, Goniobasis and possibly Campeloma snails. (32)

FAMILY SANGUINICOLIDAE

Several undescribed species of the so called Cercaria cristata type have been found from Campeloma snails. As far can be found, these cercariae have not been described, more work on these cercariae and their life cycle is needed. (33)

*As of August 1963 not published. by D. M. Wootton

FAMILY SPIROCHIIDAE

- 1. (a) Large cercaria, tail stem 3 times the length of body, furcae equal length of body; extends and contracts self, frequently, no dorsal body fin (crest); eyespots dark and prominent; 6 pair of penetration glands in those that emerge naturally, glands exceptionally long and constricted may appear as 2 pair only; Helisoma trivolvisC. of Spirorchis elephantis (34)
- (b) Crest present, (may be difficult to see); rest with head curled around to tail, or in a "U" position; Helisoma companulatum, Helisoma trivolvis.....Spirorchis parvus (35)
- (c) Same as Spirorchis parvus but no crest present (may be the same).....C. wardi(36)

FAMILY SCHISTOSOMATIDAE

- 1. (a) Dorsal-ventral finfold present on tail.....2
- (b) Dorsal-ventral finfold not present on tail; cercariae with stubby appearance, when swimming; rather small (1/2 the size of C. elvae); eyespots and ventral sucker set somewhat posteriorly, penetration gland ducts constricted between eyespots; often attached by ventral sucker to glass and surface film of water, tail very contractile; body, tail, furcae spinose; anterior organ protrusable with long spines Lymnaea reflexa, Lymnaea stagnalis, Lymnaea emarginataSchistosomatum douthitti(37)
- 2. (a) Body length over .290mm (average .307) entire body and tail uniformly spined; ventral sucker protrudes greatly, vigorous swimmer; often attached by ventral sucker, bending the body anterior to the sucker to the side forming a "button hook", Lymnaea stagnalis.....C. of Trichobilharzia elvae(Possibly the same as Trichobilharzia ocellata)(38)
- (b) Body length less than .290mm.....3
- 3. (a) Positive phototactic; float with furcae straight back, and body rigid; sluggish swimmers, similiar to C. Elvae except for size and behavior; Lymnaea emarginata.....C. of Trichobilharzia stagnicolae(C. Stagnicolae)(39)
- (b) Not phototactic, active swimmers; sink to bottom and attach with head organ and ventral sucker, post part of body, tail and furcae stick upwards, forming almost a right angle, all else similiar to C. stagnicolae and C. elvae; Physa parkeri.....C. of Trichobilharzia physellae(C. physellae)(40)

MEASUREMENTS AND BRIEF DESCRIPTIONS (CERCARIA IN SAME ORDER AS KEY)

1. C. of Apharyngealstrigea pipientis

Planorbula amigera. Body .134mm by .057mm; broad contractile tail stem bulging at the middle with large fluid cavity, tail .298mm by .130mm furcae broad flat and contractile .184mm. Ventral sucker .023mm in diameter, behind middle of body, oral sucker .044mm by .031mm. Four pairs of penetration glands grouped variously around ventral sucker. Poor swimmer, caudal bodies present without pharynx.

2. C. physae

Physa parkeri, Physa gyrina, Physa magnacustris. Body .143mm by .036mm, tail stem .222mm by .036mm, furcae .194mm, 5 pairs of caudal bodies. No forward pointing spines in the circumoral spineless area. Body spines limited to oral cap, extending 1/3 of the way down to the oral sucker. Poorly developed pharynx, with short prepharynx. Oral sucker is very long occupying 1/3 of the total body length .049mm by .021mm. Three pairs of penetration glands.

3. C. ^wWalloni

Lymnaea emarginata canadensis. Body .161mm by .043mm; tail stem .237mm by .033mm; furcae .220; oral sucker .039 by .0003mm; ventral sucker diameter .027mm. Pharynx small (10 μ). Enlarged portion of caeca extend to level of genital primordia. Six small indistinct penetration glands back of ventral sucker. 10-12 forward pointing spines in 2 irregular rows dorsal to the oral sucker. Numerous small irregular sized caudal bodies. No unpigmented eyespots.

4. C. multicellulata

Physa gyrina. Monostome, longifurcal. Body packed with parenchyma cells. Eyespots with varyign shaped pigment grandules. Body .165mm by .028mm; tail stem .198mm; furcae .147mm. Anterior organ varies from that of a "prolate spheroid" to a pyriform or dumbell shape. Furcae equal to tail stem in living. Small spines on furcae, and a narrow delicate edge around the furcae. No trace of intestinal track. 3 pairs of penetration glands. 12 caudal bodies. 12 forward pointing spines anterior and dorsal to oral openings.

5. C. hamata

Helisoma trivolvis. Lacks eyespots, otherwise like C. multicellulata, body .179mm by .028mm; tail stem .248mm; furcae .198mm. Caudal glands fill tail stem, No "paddle edge" around furcae. Short rhabdocoel gut with pharynx.

6. C. higginsi

Lymnaea emarginata angulata. Body .206mm. by .40mm, tail stem .339mm by .035mm; furcal length .337mm. Oral hood broad in living specimens, but elongate when fixed. Pharynx small, caeca long. 6 small postacetabular penetration glands. Ventral sucker with 3 to 4 rows of spines. A group of 6-8 large hooked spines immediately dorsal to oral opening. 6-7 pairs of nucleated caudal bodies, no eyespots.

7. C. of Apatomon gracilis (C. burti)

Helisoma trivolvis, Lymnaea humilis. Body .122mm by .070mm, tail stem .165mm. by .057mm; furcae .144mm. No forward pointing spines anteriorly. Unpigmented oval eyespots. Tail stem contractile with 16 pairs of caudal bodies. Row of 30-35 nuclei on each side of tail stem.

8. C. longifurca

Lymnaea angulata, Lymnaea humilis. Body .123mm by .057mm; tail stem .216mm by .039mm; furcae .185mm. Unpigmented eyespots each side of front ventral sucker. No forward pointing spines in the anterior circumoral spineless area. Heavy spination on anterior 1/8 of body. 16 caudal bodies [first 6-8 in pairs, last two small and at the base of the forks. 4 small penetration glands posterior to ventral sucker caeca and pharynx well developed.

9. C. dohema

Lymnaea emarginata, rarely Lymnaea stagnalis. Body .156mm by .041mm; tail stem .179mm by .041mm; furcae .196mm "Preacetabular bodies", 2 large bodies on each side in front of ventral sucker, resemble large unpigmented eyespots. Ventral sucker surrounded by 4 irregular rows of spines. Pharyngeate. Caeca not well developed forming heart shaped structures. 6 penetration glands in two distinct separate groups of 3, posterior to ventral sucker, small. 6 pairs of caudal bodies, 2 at base of each furcae.

10. C. flexicuada (Diplostomum flexicuadum)

Lymnaea emarginata angulata; Lymnaea stagnalis, Body .170mm by .054mm. Tail stem .254mm by .026mm; furcae .226mm. 10 forward pointing spines in the circumoral spineless area. Oral cap with prominent spines followed by 18 rows of spines. About 25 caudal bodies. Pharynx distinct. Caeca well developed, go to posterior extremity, appear to have oily substance within them. Rests with tail stem bent.

11. C. tenuis

Helisoma trivolvis. Body .225mm by .021mm; tail stem .215mm by .021mm; furcae .207mm. 22 hooked spines around sucker in one row. 5 pairs of irregularly arranged caudal bodies. Narrow caeca extending to posterior edge of ventral sucker, each contiguous with two disjoined parts. No eyespots. 4 small penetration glands anterior to acetabulum.

12. C. elodes

Lymnaea palustris. Body .238mm by .039mm; tail stem .288mm by .037mm; furcae .253mm. Oral sucker elongate often pyriform. Oral opening terminal. Caeca long and conspicuous, extending almost to excretory bladder. 4 postacetabular penetration glands. Pharynx small. Ventral sucker with 6-7 irregular rows of spines. 3 groups of spines anteriorly (6-7 spines) (14-18 spines) (6-7 spines), constriction behind acetabulum 10-14 usually 12 caudal bodies.

13. C. saileri

Lymnaea emarginata angulata. Body .208mm by .042mm; tail .235mm by .033mm; furcae .235mm. Oral opening terminal, prepharynx short, pharynx small. Caeca long, distal portion usually conspicuous. 4 large postacetabular penetration glands. Ventral sucker with two or three irregular rows of small hooked spines. 3 groups of spines immediately dorsal to oral sucker and gland duct openings. When cercariae hang free in water tail stem is bent sharply to the side.

14. C. sudderi

Lymnaea palustris. Body .233mm by .035mm tail stem .236mm by .032mm, furcae .223mm. Oral opening terminal, prepharynx short, pharynx small. Caeca very long terminal portion enlarged and conspicuous. Penetration glands behind the acetabulum and ventral to the caeca, the anterior pair tandem, the posterior pair side by side. 10-13 nucleated caudal bodies.

15. C. modicella

Lymnaea humilis. Body .123mm by .057mm; tail stem .185mm by .036mm; furcae .163mm. 12 caudal bodies, no eyespots. Digestive system, penetration glands similar to the C. flexicuada, but difficult to see. Intestinal caeca prominent and reaching to posterior part of the body.

16. C. caperata

Lymnaea caperata. Body .143mm by .038mm; tail stem .123mm by .031mm; furcae .151mm. Oral opening terminal, prepharynx short, pharynx relatively large. Caeca narrow and inconspicuous, terminating anterior to genital

primordia. 4 pairs of small postacetabular penetration glands, ventral to caeca. No unigmented eyespots. 10-14(usually 12) nucliated caudal bodies. 1/4 seen swimming at one time.

17. C. laruei

Lymnaea emarginata angulata, Lymnaea humilis modicella. Body .169mm by .053mm; tail stem .238mm by .042mm; furcae .227mm. 6 pairs of caudal bodies. Digestive system, penetration glands and excretory system are like C. flexicauda.

18. C. yogene

Lymnaea emarginata and Lymnaea palustris. Body .173mm by .041mm; tail stem .236mm by .036mm; furcae .221mm. 4 penetration glands posterior to ventral sucker. Well developed ventral sucker, pharynx and oral sucker. 12 forward pointing spines in the circumoral spineless area. Spend 1/2 of time resting. No eyespots but contain yellow pigment anterior to acetabulum, where eyespots are found in others.

19. C. of Strigea elegans

Gyraulus parvus. Body .135mm by .038mm; one pair of triple and two pairs of single hairs laterally, triple pair at junction of oral sucker and body, one pair of single hairs behind junction of body and oral sucker, and the other at the level of the caeca. Oral sucker large and subterminal .038mm by .029mm. Oral hood with 9-12 rows of spines extending to middle or oral sucker.

20. C. microdena (C. of Diplostomum microdenum)

Lymnaea palustris. Body .154mm by .040mm; tail stem .268mm by .030mm; furcae .233mm; ventral sucker often considerably protruded. Well developed digestive system, often difficult to see. Pharynx present, caeca goes as far posterior as the genital Primordia. 9 forward pointing spines in the circumoral spineless area. 4 penetration glands, postacetabular. One irregular row of short spines around the acetabulum.

21. C. sincera

Valvata sincera. Body .105mm by .044mm; tail stem .068mm by .022mm; furcae .078mm. Tail stem and furcae very contractile. Oral opening ventral in small spineless area. Pharynx large. Intestine saclike. 2 pair small penetration glands lateral and anterior to ventral sucker. The oral opening is capable of expanding greatly.

22. C. macrodena

Lymnaea palustris. Body .203mm by .037mm; tail stem .299mm by .037mm; furcae .277mm. Intestinal caeca and

pharynx well developed. Two very small unpigmented eyespots at sides of body in front of penetration glands. 10 forward pointing spines in circumoral spineless area. 4 penetration glands, coarsely granular, 2 in front and 2 in back of ventral sucker, one row of spines around ventral sucker. No caudal bodies.

23. C. *bessiae*

Helisoma trivolvis. Body .176mm by .037mm; tail stem .255mm by .047mm; furcae .178mm. No caudal bodies. No definite ventral sucker. Pharyngeate, but rest of digestive system not well developed. Penetration glands. Prominent unpigmented eyespots, rest with the anterior part of body bent ventrally. Genital primordia fairly large, with large nuclei.

24. C. *douglasi*

Physa parkeri, Physa gyrina. Body .198mm by .038mm; tail stem .184mm by .032mm; furcae .207mm. 4 small inconspicuous penetration glands anterior to ventral sucker. No caudal bodies. 16-20 forward pointing spines in circumoral spineless area. Constant swimmers. Cercariae found evenly distributed in container. Pharynx present.

25. C. of *Cotylurus flabelliformis*

Lymnaea stagnalis and Lymnaea emarginata angulata. Body .217mm by .039mm; tail stem .238mm by .036mm; furcae .239mm. Similar to C. douglasi. Constant swimmers cercariae found toward surface of water.

26. C. of *Alaria mustelae*

Planorbula amigera (exp.) Body .101mm by .039mm; tail stem .165mm by .031mm; furcae .146mm. Oral sucker .025mm by .021mm. Acetabulum .016mm in diameter. 2 unpigmented eyespots. 2 pair of penetration glands, lateral to ventral sucker mouth slightly subterminal. Ventral sucker with 1 row of spines when expanded and 2 rows when contracted several rows of large retrorse spines around circumoral spineless area.

27. C. *marcianae*

Helisoma trivolvis and Helisoma companulatum. Body .126mm by .049mm; tail stem .177mm by .033mm. No caudal bodies or rows of nuclei in the tail. Unpigmented eyespots present. 2 pairs of penetration glands, somewhat lateral to the central sucker. Pharynx present, caeca difficult to see, extending posterior to ventral sucker a short distance. No forward pointing spines.

28. C. of *Clinostomum*

Helisoma antrosa and Helisoma companulatum. Body

.130mm by .031mm; tail stem .268mm, furcae .088mm. Pigmented, pharyngeal, furcocercous, lophocercous. Anterior tip covered spines. Dorsal median fin-fold, delicate. Crescentic pigmented eyespots. From a redia. 4 pair of penetration glands, found posterior and lateral to pharynx. Primordia of acetabulum present.

29. C. of Cyathocotidae (Linstowiella?)

Campeloma sp. Body large over .400mm, tail stem over .700mm, furcae over .400mm. Swims in rapid jerks. Intestine prominent with tortuous caeca, many glands in penetration organ and in forebody. Tail attached dorsally; tail stem; and furcae spined with delicate hair like processes.

30. C. of Leuchochloridiamorpha constantiae

Campeloma sp. Body .110mm by .047mm; tail stem .046mm by .014mm; furcae .057mm. Oral sucker .038mm; acetabulum .026mm. Poor swimmers. Mouth subterminal, pharynx globular. 3 pair of penetration glands in oral sucker, 8 pairs grouped about acetabulum. Sensory hairs are present on the lateral margins of the anterior 1/2 of the body, and on the dorsal and ventral surfaces of the tail stem and furcae.

31. C. of Ptylinicola ondatrae

Campeloma sp. Same as above, except almost twice as large, with more sensory hairs.

32. C. of Azygiids

Goniobasis, Campeloma, Amnicola. Head encysted in tail, distome well developed, often with eggs (Proterometra dickermani), Very large. Furcae flapper or paddle-like tail stem often with large papillae.

33. C. of Sanguinicolids

Campeloma. Very in size, pigmented eyespots. Large dorsal median fin fold (crest) with supporting rays, behavior of cercariae carries, usually not to active.

34. C. of Spirorchis elephantis (C. elephantis)

Helisoma trivolvis. Body .219mm by .071mm, tail stem .652mm by .045mm; furcae .220mm by .056mm. Head organ .071mm by .033mm. 7 pairs of penetration glands those in dissected snails. 6 pairs in emerged cercariae, these glands are exceptionally long and constricted, appear as if each were 2, with pressure they show true nature. Body distended by large mass of gland cells.

Body and tail are papillose. Eyespots are prominent. No fin fold on dorsal part of body. Apharyngeal.

35. Spirorchis parvus (C. parvus)

Helisoma trivolvis and Helisoma companulatum. Body .214mm by (.07-.079mm); tail stem .551mm by .056mm; Head organ .009mm by .003mm, ventral sucker .031mm by .023mm. Pigmented eyespots. A dorsal median cuticular elevation, forms a crest, no rays. Difficult to see when extended, seems higher when retracted, also it is serrated. Rest with head curled around to tail or in "U" shape. Tail stem attached ventrally. Head organ protrusable.

36. C. wardi

Similar to C. parvus but no dorsal fin.

37. Schistosomatium douthitti (C. douthitti)

Lymnaea reflexa, Lymnaea stagnalis, Lymnaea emarginata. About one 1/2 the size of C. elvae. 8 or 10 penetration glands, Body, tail stem and furcae spines. Anterior organ with larger spines. Tail very contractile, furcae often pulled together in the resting cercariae. Eyespots and ventral sucker set relatively far back. Penetration ducts constricted between eyespots. Often attaches by ventral sucker to glass and surface film. where it goes crawling about using ventral sucker and anterior organ.

38. C. elvae (C. of Trichobilharzia elvae)

Lymnaea stagnalis. Body .307mm by .067mm. Head organ .097mm by .042mm; diameter of ventral sucker .034mm; tail stem x@ .400mm by .045, furcae .254mm by .023mm. 27-32 nuclei in each furcae. Dorsal ventral fin fold on tail. 5 pair of penetration glands. 3 pair post-acetabular, 2 pair circumacetabular. 2 groups of 5 pointed spines on anterior part of body where gland ducts empty. Long exophagus, short caeca. Active swimmer, attaches to glass and will often "hook" anterior body to the side, looks like a "buttonhook". Ventral sucker large and often protruded out.

39. Cercaria stagnicola (C. of Trichobilharzia stagnicola)

Lymnaea emarginata. Body .260mm by .060mm. Head organ .082mm by .039mm. Diameter of ventral sucker .030mm; tail stem .395mm by .040mm; furcae .219mm by .025mm. 27-32 nuclei in each furcae. Similar to C. elvae positive phototactic; floats with body held rigid, furcae straight back; sluggish swimmers.

40. C. physellae

Physa parkeri. Body .265mm by .060mm, head organ .095mm by .039mm; ventral sucker .029mm; tail stem .374mm by .040mm furcae .196mm by .032mm. Similar to C. elvae.

Not phototactic active swimmers; sink to bottom attach so that ventral sucker and head organ are flat against the surface, the body posterior to the ventral sucker and the tail sticks upwards.

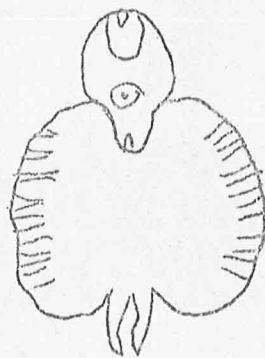
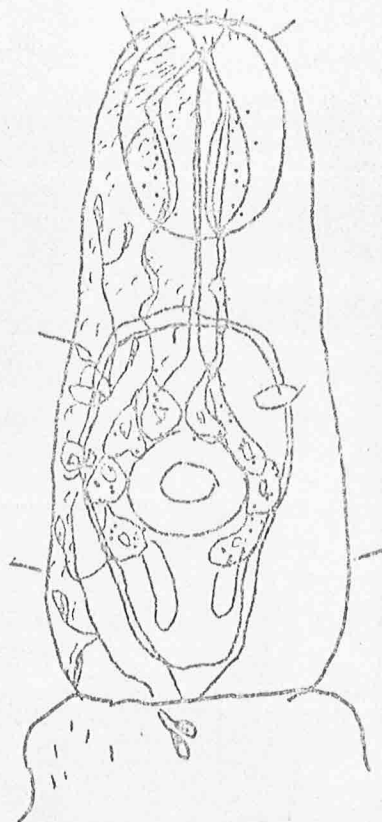
41. C. chrysenderica

Lymnaea megasoma. Body .260mm by .48mm; tail stem .244mm; furcae .248mm. Head gland is lacking. Ventral sucker large, located towards posterior and oral cap of retrorse spines. Usually 6 caudal bodies. The mouth is subterminal; pharynx present. 2 large club shaped caeca, bright yellow in color. 4 penetration glands, post acetabular.

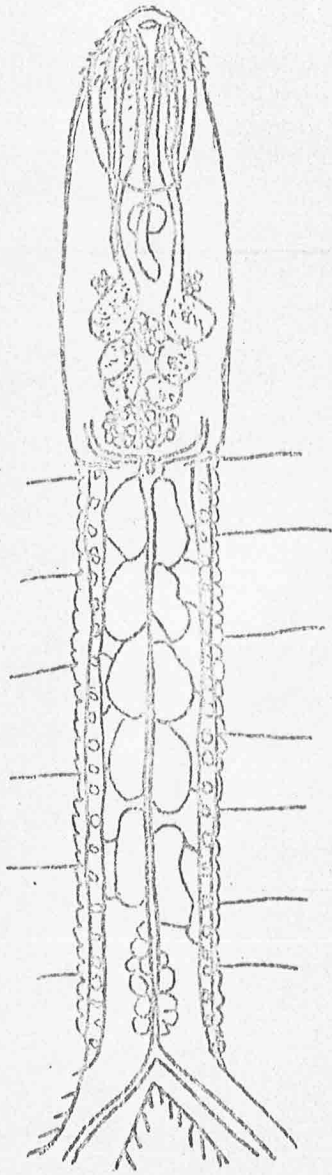
42. C. ranae

Lymnaea emarginata angulata and Lymnaea palustris. Small Strigoid; furcae shorter than tail stem. Body .163mm by .041mm; tail stem .246mm by .038mm; furcae .210mm. Oral sucker .034mm by .038mm; ventral sucker .022mm. Pharynx diameter .013mm. Well developed caeca, constricted in series of succulation, go 1/2 distance from bottom of ventral sucker to posterior end. Two up-pigmented eyespots. No forward pointing spines dorsal to oral opening. Oral cap spines extend 1/2 way down oral sucker. The rest of body and tail stem with small sparsely scattered spines. 1 circle of large spines around the ventral sucker. 4 penetration glands in front of and somewhat lateral to the ventral sucker. No caudal bodies.

Cercaria of Apharyngostrigea pipientis
(1)

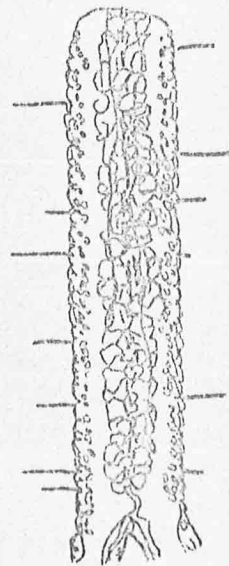


Cercaria physae
(from Cort & Brooks-1928)



(2)

Cercaria wallooni
(from L. Oliver-1941)



(3)



Cercaria hamata

(5)



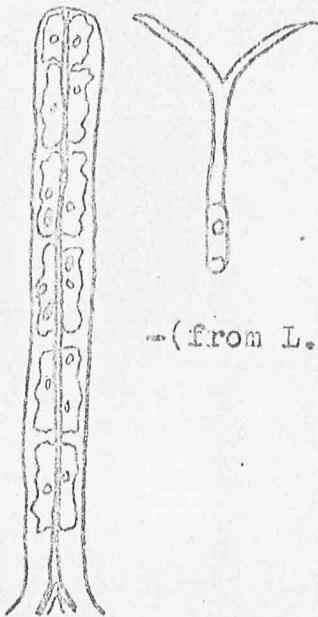
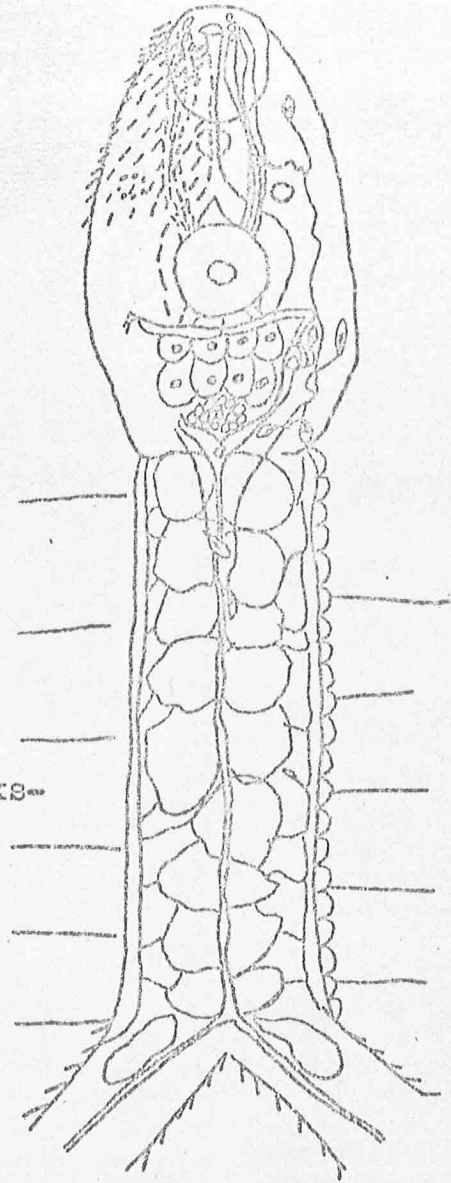
Cercaria multicellulata

(4)

(from Harry M. Miller, Jr.-1923)



(Cort and Brooks-
1928)-



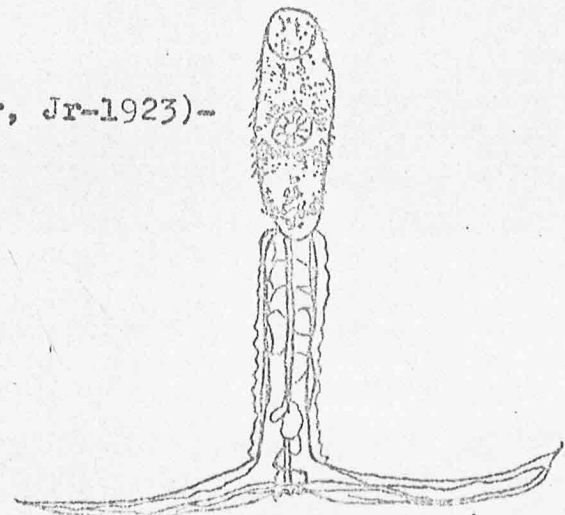
-(from L. Oliver-1942)

(H. M. Miller, Jr-1923)-

Cercaria higginsii

(6)

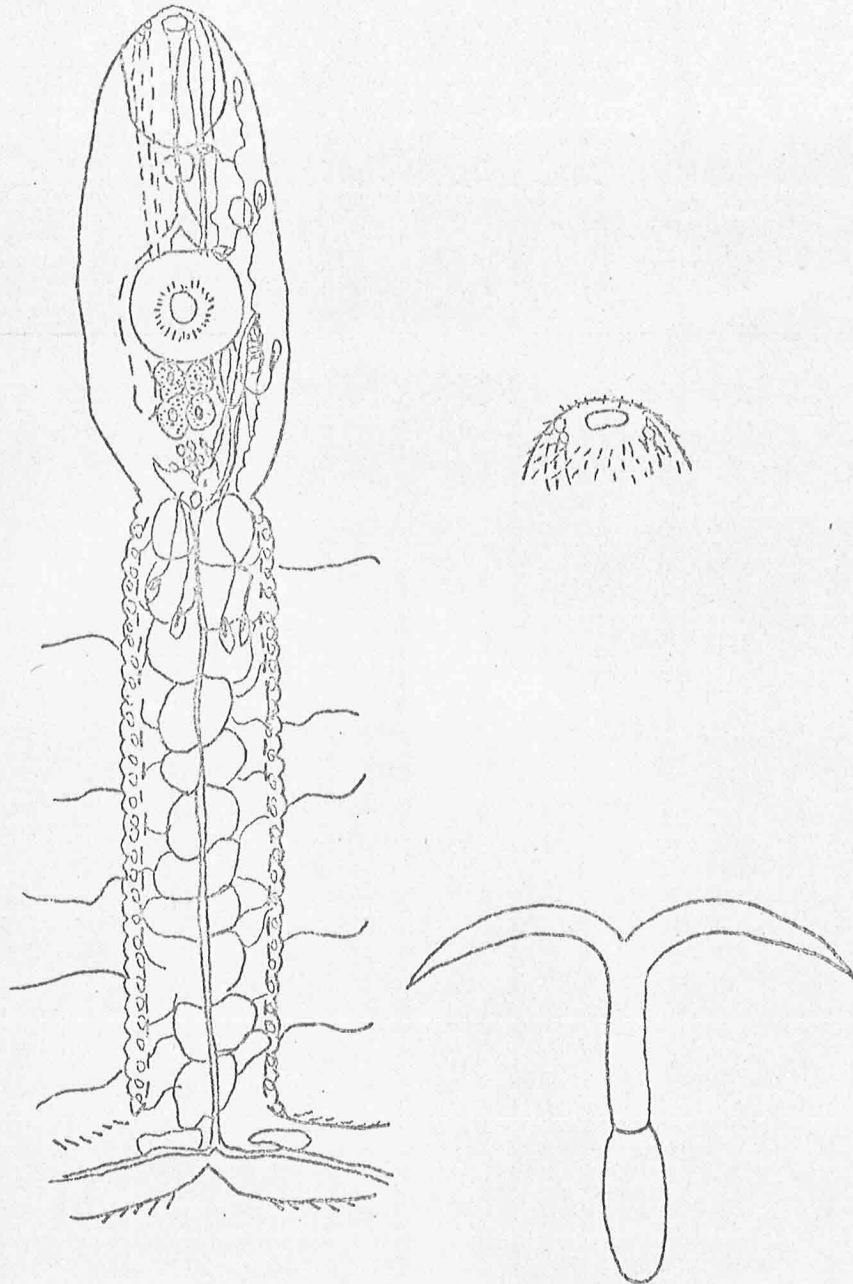
(33)



Cercaria burbi

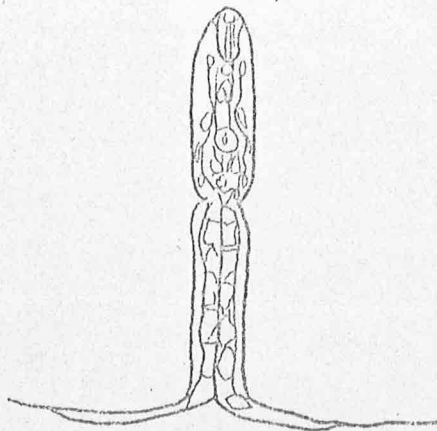
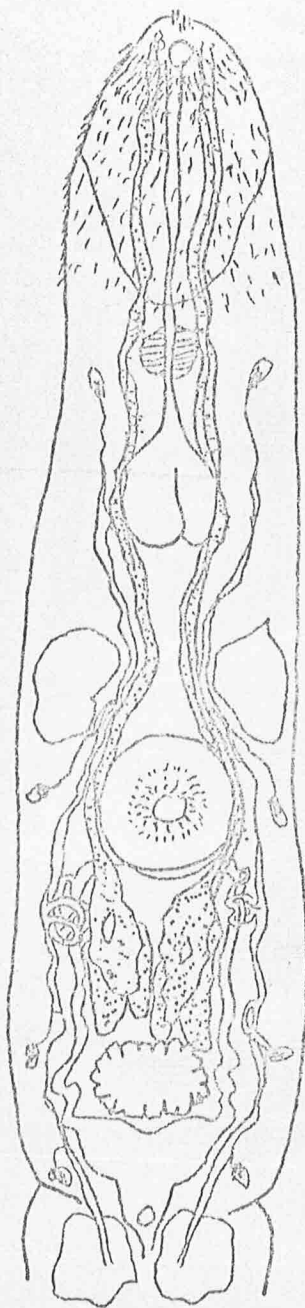
(7)

Cercaria longifurca



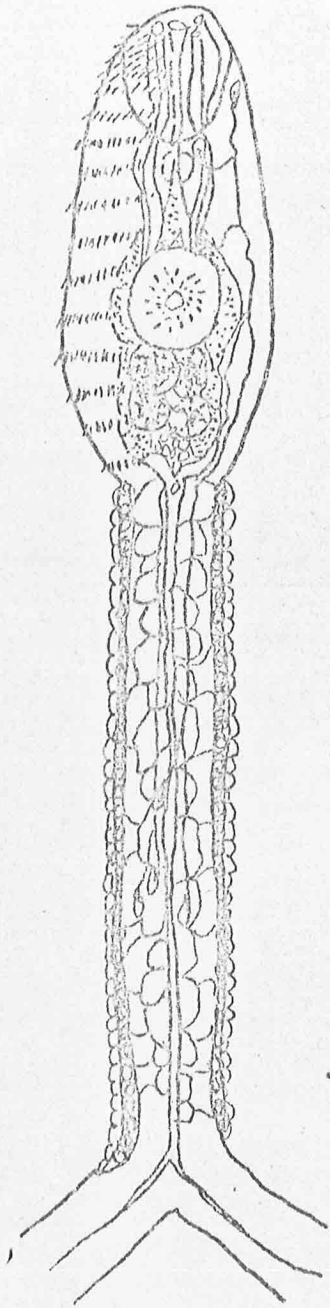
(Cort and Brooks-1928)
(8)

Cercaria doherna



(Cort and Brackett-1937)

(9)

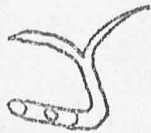


Cercaria tenuis
(11)



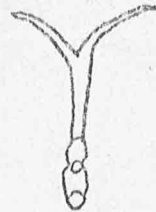
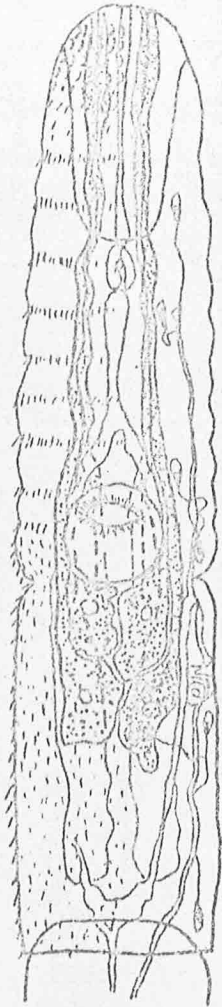
(from H. M. Miller, Jr.-
1923)

-(from S. T. Brooks-1928)

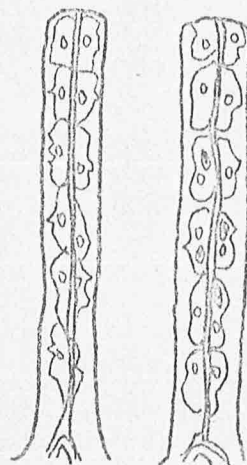
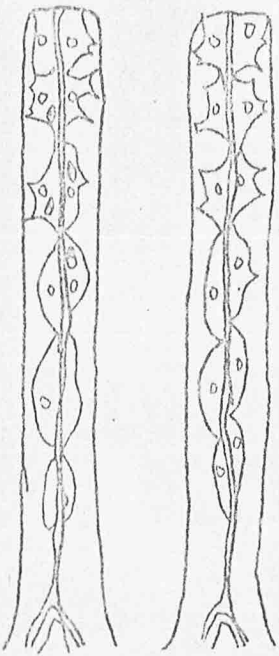


-(from L. Olivier-1942)

Cercaria Diplostomum flexicauda
(10)



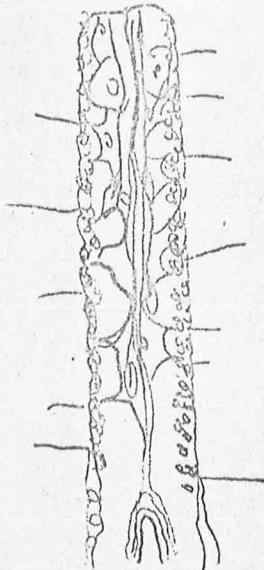
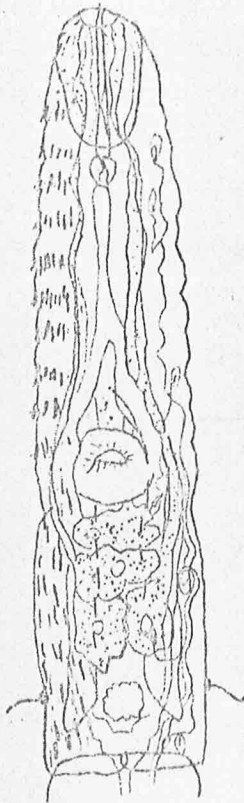
-(from L. Oliver-1942)-



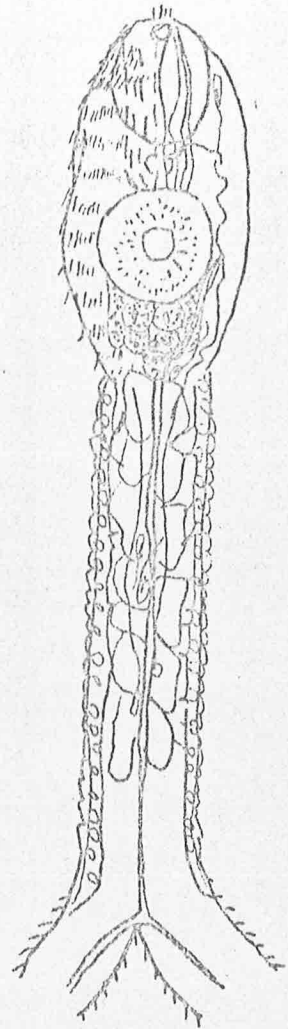
Cercaria elodes
(12)

Cercaria saileri
(13)

Cercaria scudderi
(14)



(from L. Oliver-1941)



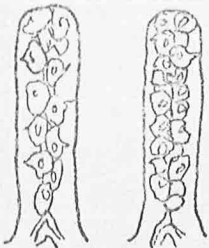
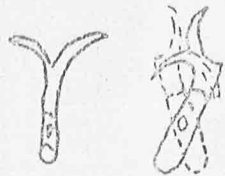
Cercaria modicella
(15)

(from-Cox and Brooks-
1928)

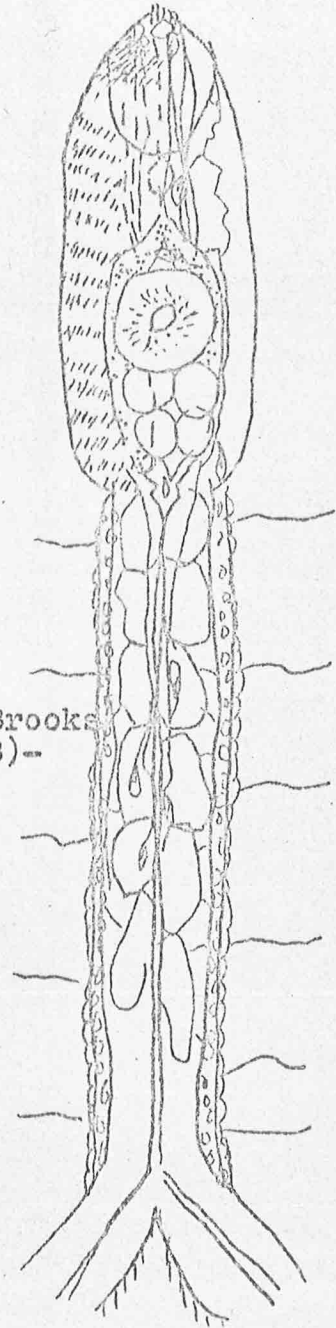
Cercaria caperata
(16)



-(from L. Olivier-1942)

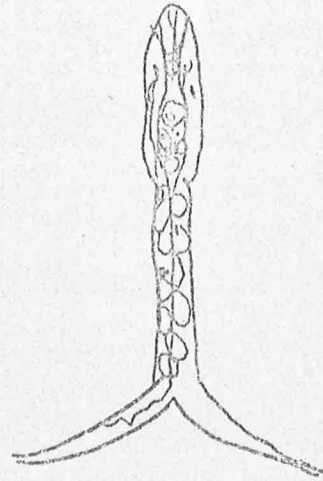
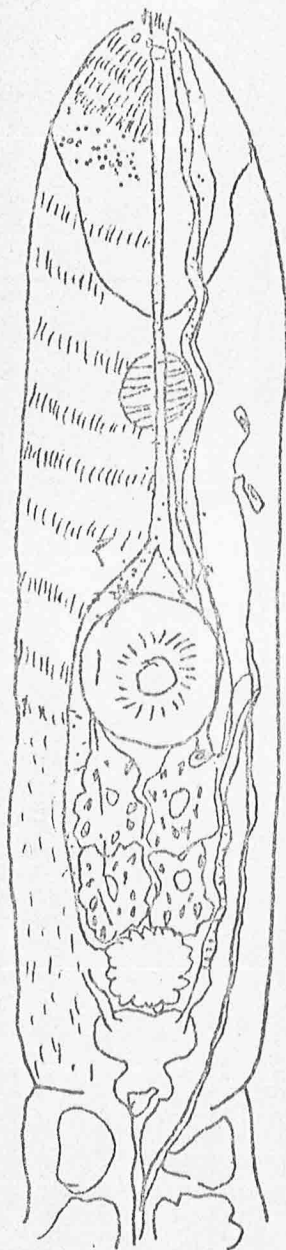


Cercaria laruei
(17)



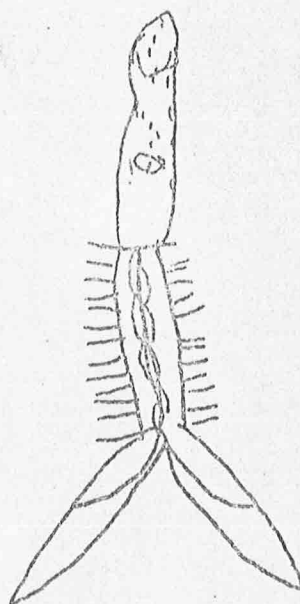
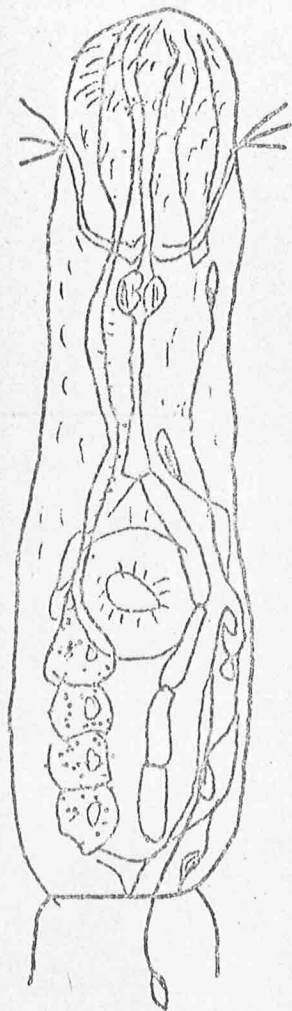
(from Cort and Brooks
1928)-

Cercaria vogena
(18)



-from
(Cort and Brackett-1937)
(40)

Strigea elegans
(19)



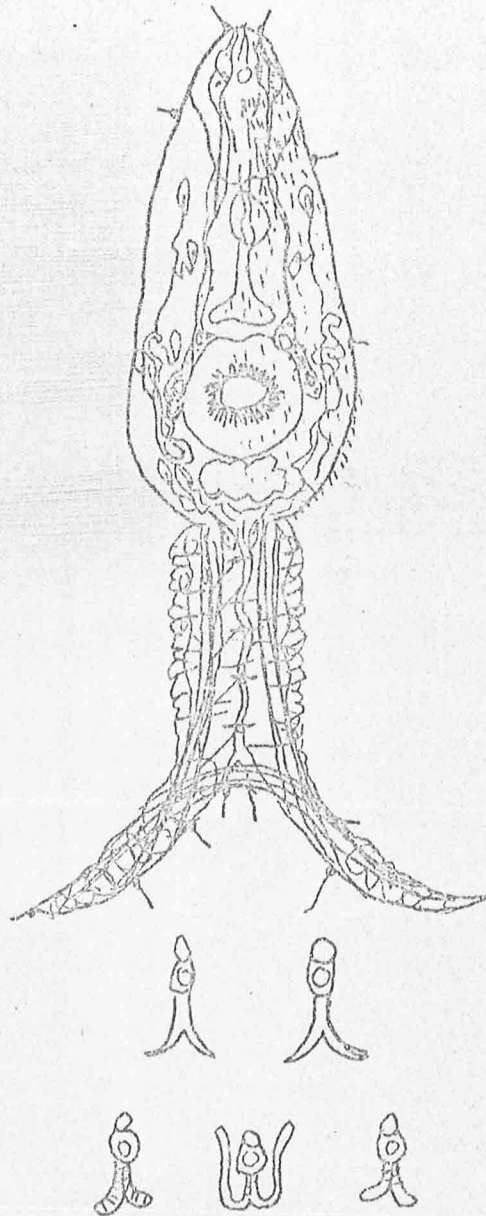
(from-Pearson-1959)

Cercaria micradena
(20)



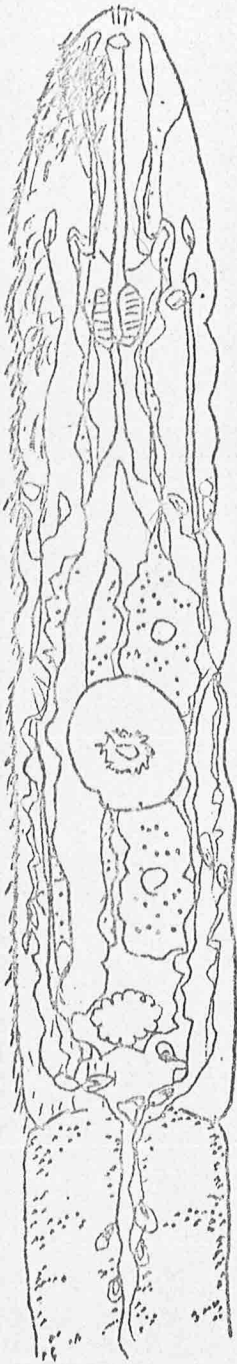
(from-Cort and Brackett-1938)

Cercaria sincera
(21)



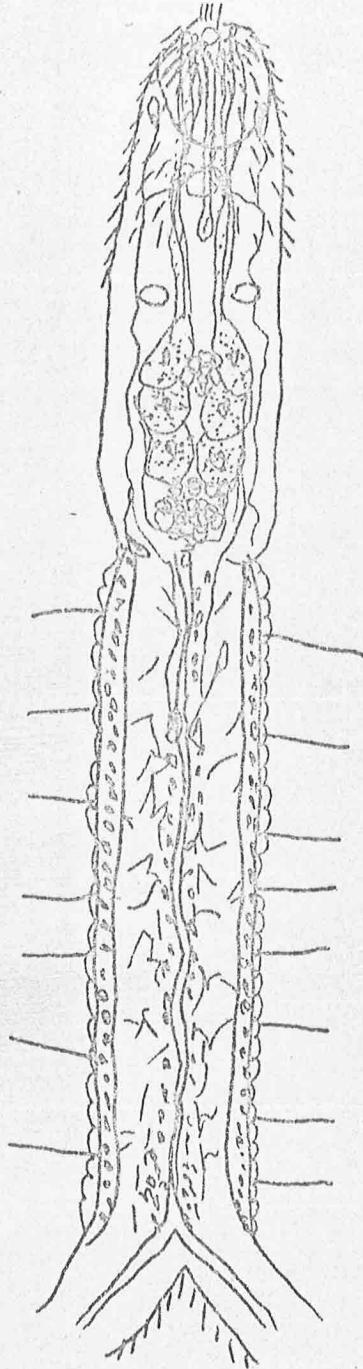
(from L. Oliver-1941)

Cercaria macradena
(22)



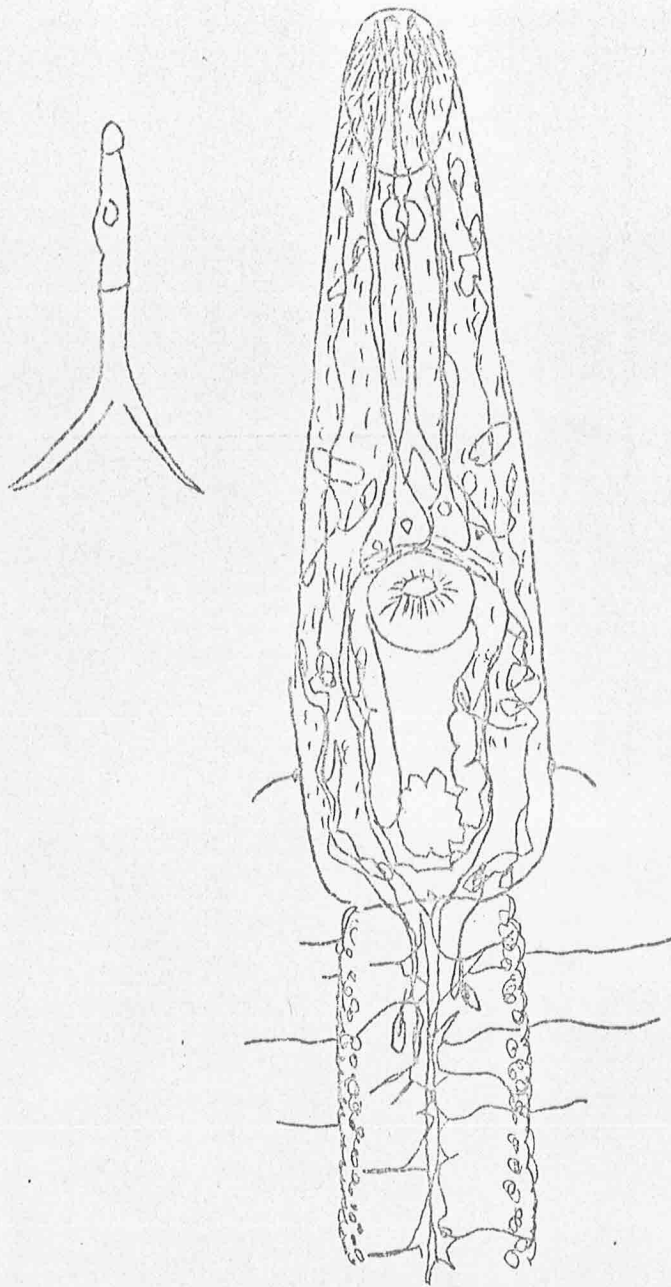
(from-Cort, and Brackett-1938)

Cercaria bessiae
(23)



--from
(Cort and Brooks-1928)

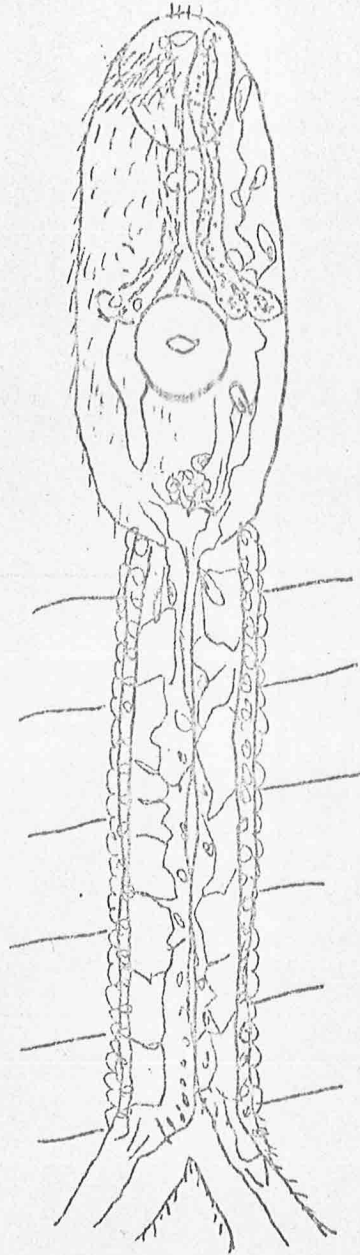
Cercaria douglasi
(24)



(from-Olivier and Cort-1941.)

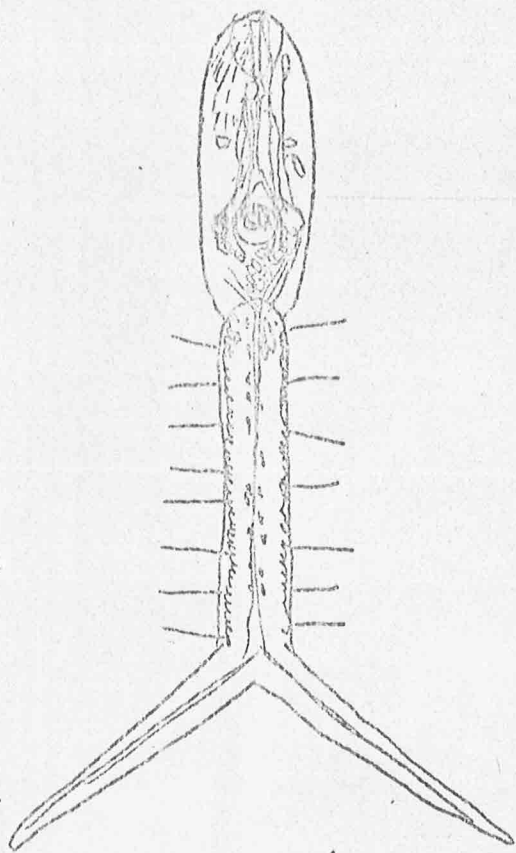
(41)

Cercaria flabelliformis
(25)



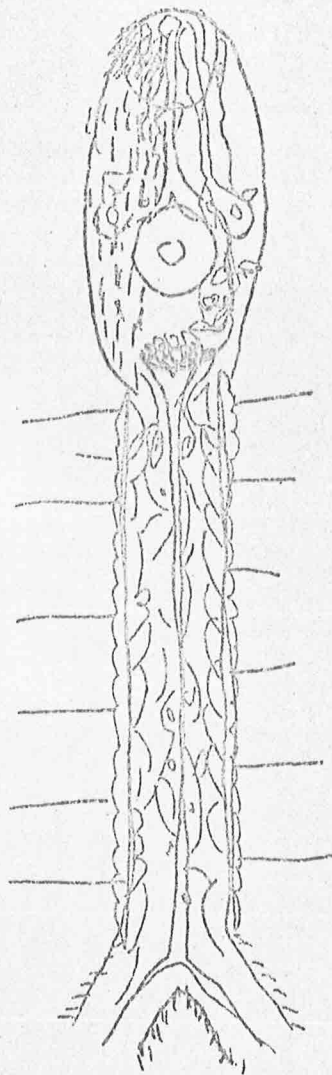
(from Cort and Brooks-1928)
(45)

Cercaria alaria mustelae
(26)

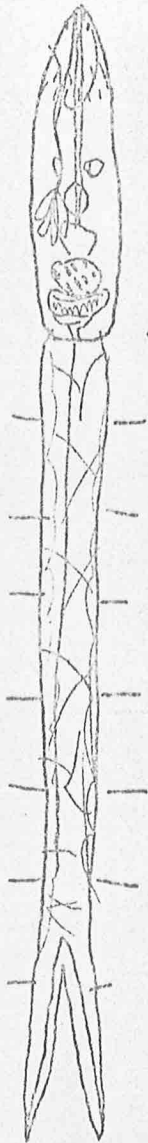


(from-Bosma-1954)

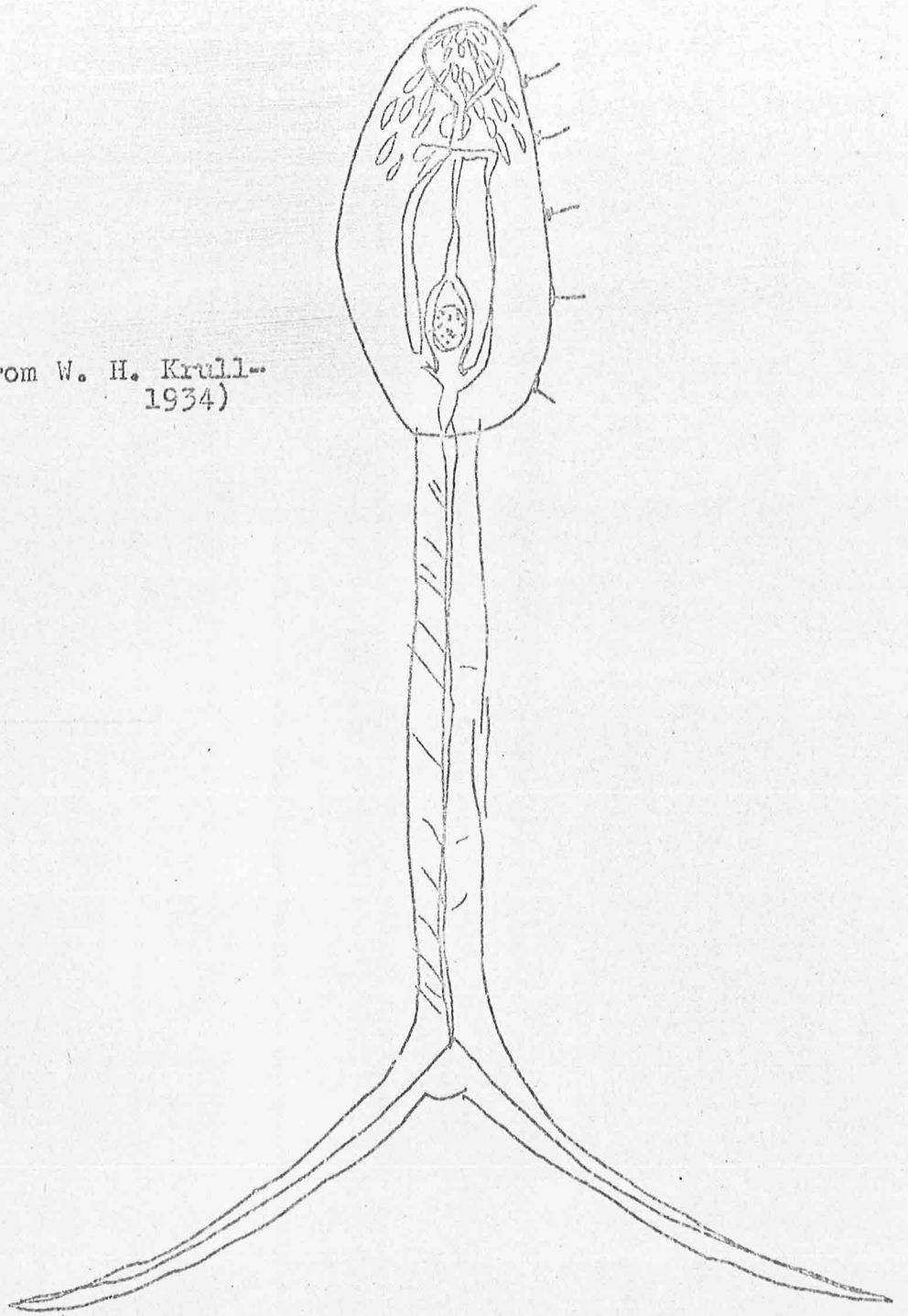
Cercaria marciana
(27)



(from-Cort and Brooks-
1928)

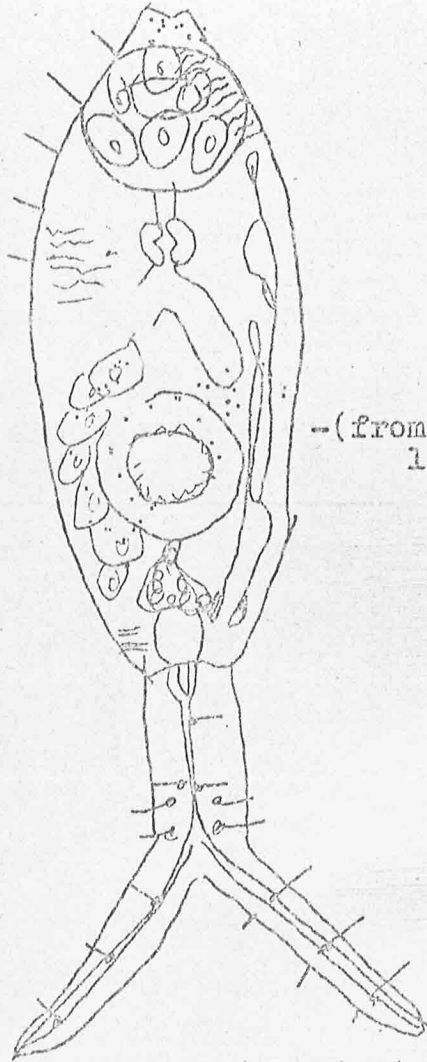


-(from W. H. Krull-
1934)



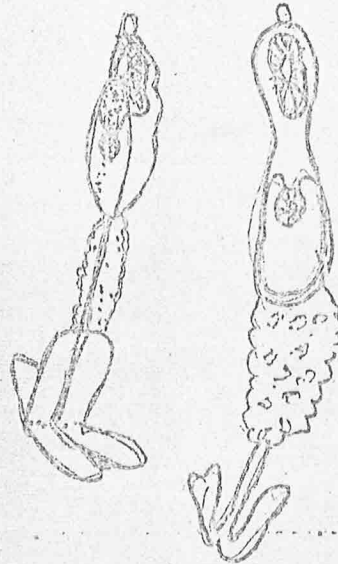
(from Anderson-1944)

C. of Leucochloridiomorpha constantiae
(30)



-(from Allison
1943)

Azygiidae
(roterometra dickermani)
(32)

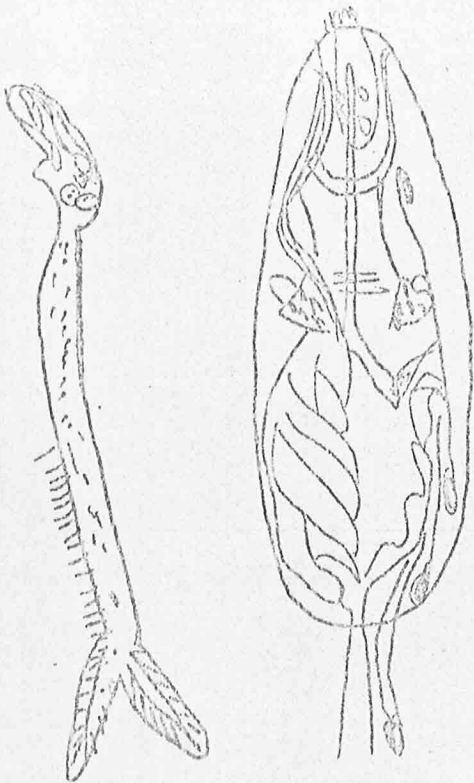


(from Anderson-1962)

C. of Ptylinicola ondatrae
Similar but about twice as large.

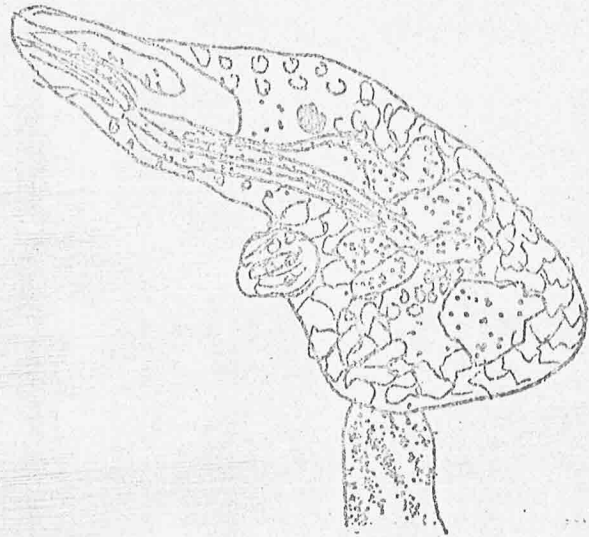
No drawing of Sanguinicolids. (33)

S. elephantis
(34)

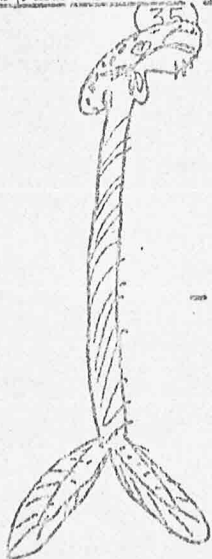


-(from Wall-1941)

Cercaria wardi
(36)



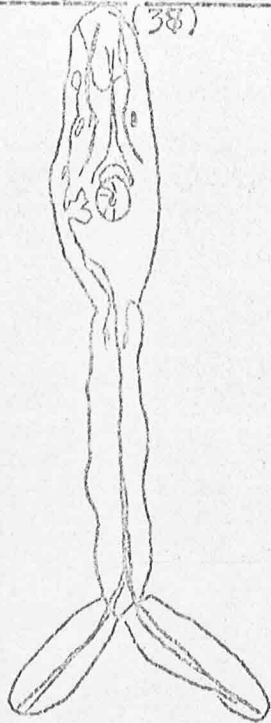
Spirorchis parvis
35



-(from Wall-1941)

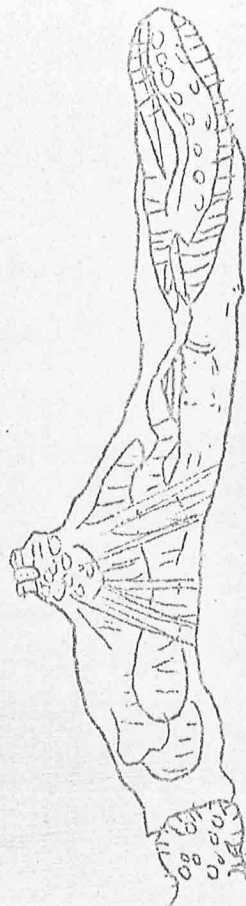
(from H.M. Miller, Jr
1923)

Cercaria douthitti
(38)



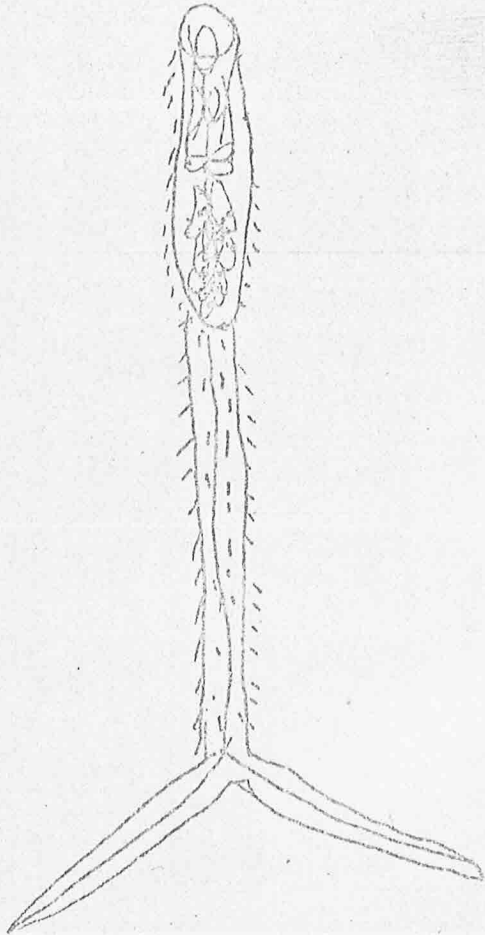
Cort, 1917

Cercaria elvae
(38)

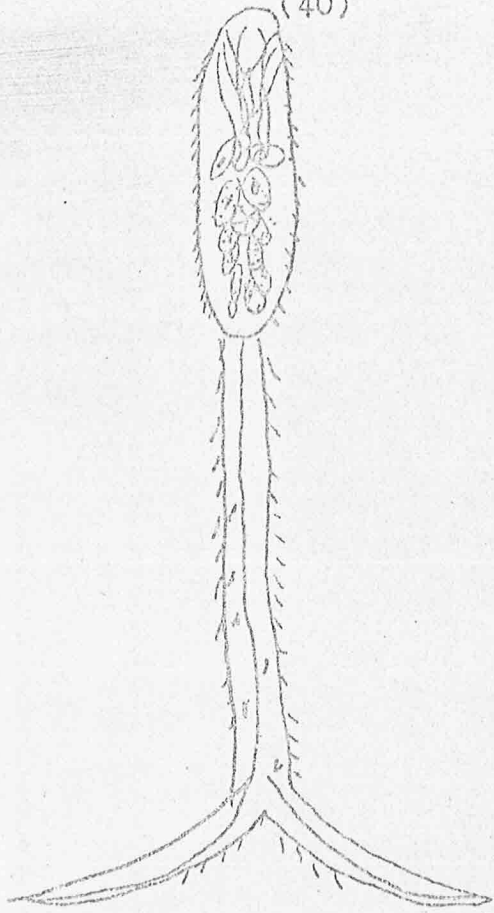


Miller, 1923

Cercaria staninicolae
(39)



Cercaria physellae
(40)



(From Talbot, 1936)

Cercaria Chrysoleuca

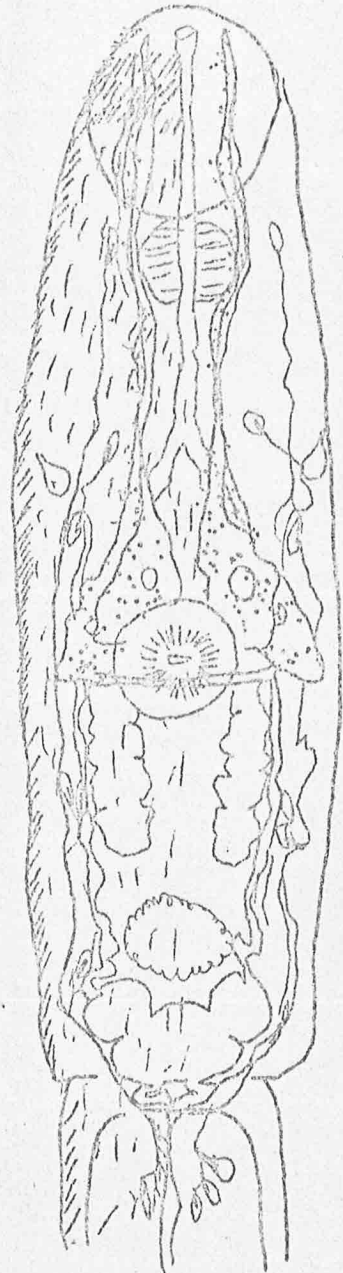
(41)



Miller, 1923

Cercaria ranae

(42)



Cort and Bracket, 1938

(52)

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11. Cort, W. W. and Brackett, Sterling (1938). A new strigeid cercaria which produces bloat disease in tadpoles. J. Parasitol. (C. Ranae)
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