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ON SOME TREMATODES FROM MEGHALAYA

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(With 1 text-figure.)

INTRODUCTION

A faunistic survey of the regions in and around Shillong and Cherrapunjee (Meghalaya) was made by the senior author during the months of January and February 1974 and several helminths were collected from different vertebrates. In all 13 species of trematodes were collected and these belong to 13 genera and 11 families. One of these is a new species while others are known species but show some interesting variations. The present paper deals with the account of trematodes.

SYSTEMATIC ACCOUNT

Family ECHINOSTOMATIDAE Poche, 1926.

Subfamily SINGHIINAE Yamaguti, 1958.

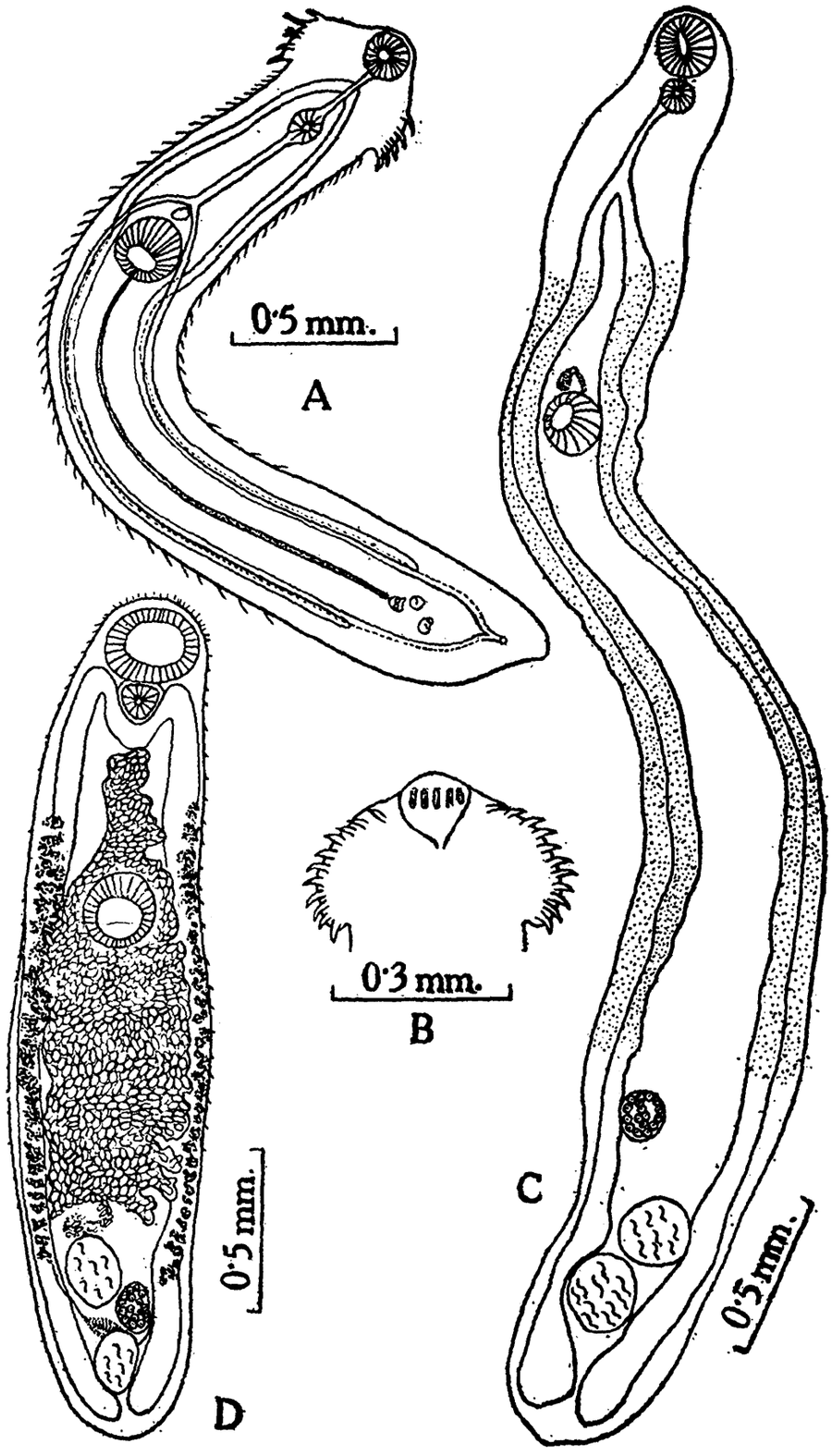
Singhia thapari (Singh, 1953) Yamaguti, 1958.
(Text-fig. 1 A & B)

1953. *Echinostoma thapari* Singh, *Thapar Comm. vol.* : 247.

Material.— 1 ex. (immature); Z.S.I. reg. no. W7233/1; host-fish, *Notopterus chitala*; location-intestine; locality-Shillong fish market; 6. ii. 1974; Coll. *T D. Soota.*

Description.— Body elongated, spatulated, spinose, 2.38×0.38, maximum breadth in acetabular region; cuticular spines extending to anterior two-thirds of body; cephalic collar well-developed bearing a single uninterrupted row of 27 conspicuous spines of variable size; end spines larger; first spine from end measuring 0.072×0.021, second 0.053×0.012, and mid-dorsal 0.048×0.012; oral sucker

All measurements are in millimetres.



Text-fig. 1.—A & B. *Singhia thapari* (Singh); C. *Thaparotrema vittalani* Gupta: D. *Brachylaima shillongensis*, sp. n.

0.09×0.1; prepharynx 1.15; pharynx 0.07; 0.054; oesophagus moderately long, 0.29 in length, intestinal caeca extending almost up to posterior margin of body; acetabulum pre-equatorial, 0.18 in diameter; testes rudimentary, slightly diagonal, small and present in posterior end; anterior testes 0.027×0.036, posterior 0.036×0.045; cirrus pouch small, located just anterior to acetabulum; ovary small, 0.045×0.036 pretesticular, median; vitellaria not much developed; uterus runs as a straight tube and traceable up to acetabulum; eggs absent; 'Y'—shaped excretory system clearly discernible, wide anterior arms run parallel to intestinal caeca, excretory pore terminal.

Remarks.—Singh (1953) obtained fully matured specimens of this species from a fish (*Notopterus chitala*) in Lucknow and described it as a new species under the name *Echinostoma thapari*. Yamaguti (1958) erected the genus *Singhia* for this species and placed it in a new subfamily viz. Singhiinae under Echinostomatidae Poche, 1926. Subsequently, however, no other worker reported this species. The present find is the second record of this fish echinostome. This is the only echinostome recorded in India from fish. Another record of a fish echinostome is from Brazil viz. *Caballerotrema brasiliense* Prudhoe, 1960 from *Arapaima gigas*.

Family OPISTHORCHIIDAE Braun, 1901.

Subfamily OPISTHORCHIINAE Looss, 1899.

Thaparotrema vittalani Gupta, 1955.
(Text-fig. 1, C)

1954. *Thaparotrema vittalani* Dayal & Gupta *Proc. 40th Indian Sci. Congr.* Pt. III : 189.

1955. *Thaparotrema vittalani* Gupta, *Indian J. Helminth.* : **5** (1) 25.

Material.—3 ex. (Juvenile); Z.S.I. reg. nos. W7234-35/1; host—fish, *Rita rita*; location-2; locality-Shillong fish market; 6. ii. 1974; Coll. *T D. Soota.*

Description.— Body long and flattened, 4.18×0.58, maximum breadth in ovarian zone; cuticle spiny, spines dense anteriorly but sparse posteriorly; oral sucker subterminal 0.18×0.15; mouth leads into a short but distinct prepharynx, 0.018 long; pharynx globular, 0.03×0.09; oesophagus 0.216 long, intestinal caeca extend up to posterior end; acetabulum slightly smaller than oral sucker, 0.13×0.15, and 1.12 from anterior end (equal to about 1/3rd of body length); testes in posterior end, oblique in position, contiguous or apart; anterior testis 0.21×0.17, posterior 0.23×0.18; cirrus sac absent; vesicula seminalis faintly discernible, opening just in front of ventral sucker and extending back to acetabulum; ovary dextral and subglobular

0.11×0.09; vitelline follicles extending from preacetabular region to ovarion zone; follicles small and mostly lateral to intestinal caeca but overlapping the latter at places; uterus extending from ootype and forming intercaecal transverse loops up to ventral sucker; a few ova present, 0.034-3.043×0.022—0.024; excretory bladder 'Y'—shaped with terminal excretory pore.

Remarks.— The present species was reported by Dayal and Gupta (1954) in an abstract form as a new genus and species from the gall bladder of a fish (*Rita rita*) from Gauhati, Assam. Later Gupta (1955) defined the genus and described the species in detail. The present material shows variation in the extension of vitellaria, in position of ovary in relation to anterior testis, and in measurements. These are, however considered to be intraspecific variations.

Rai (1971) considered *Thaparotrema* a synonym of *Opisthorchis* Blanchard, 1895, but for the time being the genus *Thaparotrema* is being retained here.

Family LECITHODENDRIIDAE (Lühe, 1901) Odhner, 1910.

Subfamily PLEUROGENINAE Travassos, 1921.

Pleurogenoides pabdai (Pande, 1937) Kaw, 1943.

1937. *Pleurogenes pabdai* Pande, *Proc. Natn. Acad. Sci. India*, 7 (2) : 111.

Material.— 2 ex. (damaged); Z.S.I. reg. nos. W7236-37/1; host-fish, *Ompok* sp.; location-intestine; locality—Shillong fish market; 6. ii. 1974; Coll. *T. D. Soota.*

Description.— Body 0.85×0.06; cuticle spinose; oral sucker 0.13-0.15; acetabulum 0.12-0.13×0.99.— 1.44; testes pre-equatorial, intercaecal, anterior testis 0.16×0.12 and posterior one 0.13×0.11; ovary post-testicular, 0.13×0 12; vitellaria comprising of 16 large follicles; genital pore antero-lateral to ventral sucker on the opposite side of ovary; eggs. 0.026—0.031×0·014.

Remarks.— Pande (1937) described *Pleurogenes pabdai* from a fish *Ompok bimaculatus* (=*Callichrous pabda*) from Lucknow, which Kaw (1943) transferred to the genus *Pleurogenoides* Travassos, 1921. Kakaji (1968) described another species viz. *Pleurogenes attui*, from a fish (*Wallago attu*) but Yamaguti (1971) transferred it to *Pleurogenoides.* The present specimens come close to P. *pabdai* described from the same host but differ in body size, in sizes of suckers and in lesser number of vitelline follicles. But these differences are considered as intraspecific variations and hence the present form has been identified as *P. pabdai.* As detailed description of this species has already been given by Pande (1937) only diagnostic features and measurements are given.

Family BRACHYLAIMIDAE Miller, 1936.

Subfamily BRACHYLAIMINAE Miller, 1936.

Brachylaima (Brachylaima) shillongensis sp. n.
(Text-fig. 1, D)

Material.— 5 ex.; Z.S.I. reg. nos. W7238-39/1; host-a bird, not identified; location-intestine; locality-Moti nagar, Shillong; 19. i. 1974; Coll. *T D. Soota.*

Description.— Body elongated with blunt extremities almost of uniform width throughout, 2.37-2.48×0.51-0.61; cuticle spinose, spines minute, extending up to 3/4 of body length; oral sucker subterminal, 0.18-0.19×0.22—0.24; prepharynx absent; pharynx globular, 0.09—0.1×0.09—0.12; oesophagus absent; intestinal caeca run up to posterior end of body; acetabulum pre-equatorial, 0.16—0.18 in diameter; genital organs in posterior region of body; testes behind one another; anterior testis 0.16—0.19×0 15—0.16. posterior 0.16—0.18×0.14—0.18; cirrus pouch not well defined, located just anterior to anterior testis; genital pore faintly visible anterolateral to anterior testis and on its left side; ovary intertesticular, 0.13—0.14×0.09—0.11; follicular vitellaria extending along the lateral margin of body from a short distance in front of acetabulum to anterior testis or ovary, follicles overlapping intestinal caeca; uterine coils dense and fill up both post-and pre-acetabular intercaecal fields, eventually the uterus opens by side of genital pore; eggs. 0.022—0.024×0.009—0.014.

Remarks,— Yamaguti (1971) has split the genus *Brachylaima* Dujardin, 1843 into two subgenera viz., *Brachylaima* and *Rallitrema.* The present species is referrable to the former subgenus mainly on account of its uterus extending in forebody. Yamaguti (1971) included 28 species under this subgenus, of which only two species. viz. *Brachylaima tisa* Chatterji, 1956, and *B. indicum* Singh, 1962, are known from India.

The present species comes close to *B. Bulvus* (Dujardin, 1843) Blanchard, 1847, and *B. tisa* Chatterji, 1956 in the "relative size" of the suckers, but differs from both in a number of features. It can be easily distinguished from *B. fulvus* by the development and extension of uterine coils (poorly developed in *B. fulvus*) and by the position of gonads which are separate from each other (overlapping in *B. fulvus*). In having cuticular spines, it differs from *B. tisa* in which these are absent, and furthermore the body size and, shape and size of cirrus pouch are different in the present species from those in *B. tisa.* It agrees with *B. indicum* Singh, 1962 in the presence of cuticular spines and

position of gonads, but differs from it in the extension of vitellaria well beyond the acetabulum (in *B. indicum* the vitellaria go as far as the posterior half of the acetabulum) and in the "relative size" of suckers.

Hence the present form is being considered a new species and it is to be designated as *Brachylaima* (*Brachylaima*) *shillongensis*, sp. n.

Family PARAMPHISTOMIDAE Fischoeder, 1901.

Subfamily (i) GASTROTHYLACINAE Stiles and Goldberger, 1901.

1. **Gastrothylax crumenifer** (Creplin, 1847) Otto, 1896.

1847. *Amphistoma crumenifer* Creplin, *Arch. Naturq.*, 13 (1) : 30.

Material.—25 ex.; Z.S.I. reg. no W7240/1; host-goat (*Capra* sp.); location-rumen; locality-Shillong; 3. ii. 1974; Coll. *T D. Soota.*

Remarks.—This species commonly parasitizes goat and other ruminants.

2. **Fischoederius elongatus** (Poirier, 1883) Stiles and Goldberger, 1910.

1883. *Gastrothylax elongatum* poirier, *Bull. Soc. Philom.*, 7 : 73.

Material.—6 ex ; Z.S.I. reg. no. W7242/1; host-goat (*Capra* sp.); location-rumen; locality—Shillong; 3. ii. 1974; Coll. *T. D. Soota.*

Remarks.—This species commonly parasitizes ruminants and is widely distributed in India.

Subfamily (ii) PARAMPHISTOMINAE Fischoeder, 1901.

Orthocoelium scoliocoelium (Fischoeder, 1904) Yamaguti, 1971.

1904. *Paramphistomum scoliocoelium* Fischoeder *Ctbl. Bakt.* 1. Orig., **35** : 599.

Material.—15 ex.; Z.S.I. reg. no. W7241/1; host-goat (*Capra* sp.); location-rumen; locality-Shillong; 3. ii. 1974; Coll. *T D. Soota.*

Remarks.—This species commonly perasitizes goat of Northern India and Bengal. This appears to be the first record from Meghalaya.

Family PLAGIORCHIIDAE Ward; 1917.

Subfamily ASTIOTREMATINAE Baer, 1924.

Astiotrema reniferum (Looss, 1898) Stossich, 1904.

1898. *Astia renifera* Looss, *Zool. Jahrb. Syst.*, **12** : 590.

Material.—4 ex. (2 mature & 2 immature); Z.S.I. reg. no. W7243/1; host-tortoise; location-intestine; locality-Shillong fish market; 1.ii.1974: Coll. *T D. Soota.*

Remarks.—As this species commonly parasitizes different fishes and reptilia and is widely distributed in India, only important measurements are given below. Intraspecific variations in this species have been observed by Yeh and Fotedar (1958), and Basant Kumari *et al.* (1972). In our material we have noticed variations in the distribution of vitellaria which are asymmetrical in some cases, while in other cases extend beyond posterior testis. Further, testes may be smooth or deeply notched.

Body 3.06—3.15×0.5—0.68; oral sucker 0.18—0.21×0.14—0.18; pharynx 0.09—0.1×0.05—0.1; oesophagus 0.32—0.45×0.027—0.03; acetabulum 0.18—0.21—0.18—0.22; anterior testis 0.25—0.32×0.27—0.34, posterior testes 0.29—0.38×0.33—0.36; ovary 0.18—0.2×0.15—0.17; cirrus sac 0.49—0.67×0.16—0.18; eggs 0.024—0.036×0.012—0.014.

Family ISOPARORCHIIDAE (Travassos, 1922) Poche, 1926.

Isoparorchis hypselobagri (Billet, 1898) Ejsmont, 1932.

1898. *Distoma hypselobagri* Billet, *Bull. Sci. France Belgigue*, **28** : 283.

Material.—12 ex.; Z.S.I. reg. no. W7244/1; host-fish, *Wallago attu*; location-air bladder; locality-Shillong fish market; 30. i. 1974; Coll. *T D. Soota.*

Remarks.—This species is widely distributed and has been reported from different fishes. This is, however, first report of its occurrence in Shillong.

Family ALLOCREADIIDAE (Looss, 1902) Stossich, 1903.

Subfamily ALLOCREADIINAE Looss, 1902.

Allocreadium kamalai Gupta, 1956.

1956. *Allocreadium kamalai* Gupta, *Indian J. Helminth.*, **8** (2) : 100.

Material.—1 ex.; Z.S.I. reg. no. W7245/1; host-fish, *Colisa fasciata* ; location-intestines; locality-Cherrapunjee fish market : 10. ii. 1974; Coll. *T. D. Soota.*

Description.—Body with blunt extremities, 4.24×1.44, maximum breadth in ovarian zone; cuticle smooth; subterminal oral sucker 0.21×0.28; prepharynx absent; pharynx 0.12×0.13; oesophagus 0.27×0.1; intestinal caeca run beyond testicular level; acetabulum 0.27—0.3, pre-equatorial, slightly larger than oral sucker and situated a short distance behind oesophageal bifurcation; testes post-equatorial, anterior 0.45×0.4, posterior 0.6×0.45; cirrus pouch pre-acetabular, 0.24×

0.12; genital pore median, a little in front of acetabulum; ovary pretesticular, 0.19×0.23; recepticulum seminis just behind ovary; follicular vitellaria extending laterally from level of oesophageal bifurcation to posterior end, overlapping caeca at places and merging in post-testicular region; uterine coils pretesticular; eggs almost yellowish oval, 0.126—0.144×0.081—0.09.

Remarks.— The present specimen comes close to *A. kamalai* Gupta, 1956, reported from *Oxygaster bacaila* (=*Chela bacaila*) in Lucknow, on account of their oral sucker being slightly smaller than acetabulum and in the extension of vitellaria up to oesophageal bifurcation. But it differs in body size (which is smaller in the present specimen), in the absence of a prepharynx and in respect of positions of cirrus pouch and vesicula seminalis. These variations are considered intraspecific in nature.

The species is being recorded for the first time from a new host and a new locality.

Family OPECOELIDAE Ozaki, 1925.

Subfamily PLAGIOPORINAE Manter, 1947.

Neopodocotyle Indica Dayal, 1950.

1950. *Neopodocotyle indica* Dayal *Indian J. Helminth.*, **2** (1) : 5.

Material.— 2 ex. (one mature & partially damaged and another immature); Z.S.I. reg. no. W7246/1; host—mahseer fish, *Tor tor*; location-intestine; locality— Shillong fish market; 15. ii. 1974; Coll. *T D. Soota.*

Description.— Body elongated with rounded extremities, 3.02× 1 13, maximum breadth just behind acetabulum; cuticle spinose; subterminal oral sucker 0.36×0.32; a short prepharynx present; muscular pharynx 0.21×0.18: oesophagus present; intestinal caeca run up to 0.18 from hinder end; acetabulum 0.4×0.32, situated in anterior third of body; testes tandem, post-equatorial with crenated margin; anterior testis 0.41×0.38, posterior 0.45×0.32; crescent shaped cirrus sac placed lateral to acetabulum, 0.54×0.14; seminal vesicle 0.32×0.09, followed by ductus ejaculatorius; genital pore opening just anterior to acetabulum; ovary pretesticular, pre-equatorial and appears smaller than testes (measurements not taken due to ovary being partially covered with eggs); prominent recepticulum seminis 0.25 ×0.04 just behind acetabulum; vitelline follicles large, lateral to but overlapping caeca, extending from level of acetabulum to posterior end, contiguous in post-testicular field; uterine coils pretesticular, opening by side of genital pore; eggs yellowish oval 0.075—0.092× 0.06—0.07; excretory pore terminal with tubular excretory bladder extending beyond testes.

Discussion.— Dayal (1950) created the genus *Neopodocotyle* for the reception of the species *Neopodocotyle indica* collected from the intestine of the fish, *Ompok bimaculatus* (=*Callichrous bimaculatus*) at Lucknow. Since then three more species have been described viz., *N. lucknowensis* Gupta and Chakrabarti, 1967, redesignated as *Puntiotrema lucknowensis* by Baugh and Chakrabarti, 1970, *N. spinipora* Sircar and Sinha, 1969, and *N. mehrai* Rai, 1971. Apparently Rai (1971) while describing his new species overlooked the paper by Sircar and Sinha (1969). Likewise Sircar and Sinha (1969) seem to have overlooked Gupta and Chakrabarti's (1967) work. The present form resembles closely *N. indica* in all major characters excepting extension of vitellaria and slight variations in relative size of oral sucker and acetabulum. These variations are considered to be intraspecific in nature.

Family DICROCOELIIDAE Odhner, 1910.

Subfamily DICROCOELIINAE Looss, 1809.

Brachydistomum sp.

Material.— 7 ex.; Z.S.I. reg. no. W7247-48/1; host-shrike, *Turdus specious*; location-intestine; locality-Cherrapunjee; 9. ii. 1974; Coll. *T. D. Soota.*

Description.— Body lanceolate, 2.52×0.34, maximum breadth in acetabular region; cuticle smooth; subterminal oral sucker 0.06× 0.12; mouth opening directly into small globular pharynx, 0.04; no prepharynx; oesophagus short, oesophageal bifurcation just in front of acetabulum, intestinal caeca extending almost up to posterior extremity; acetabulum larger than oral sucker, 0.27×0.17 and situated in anterior third of body; testes two, pre-equatorial, pre-ovarian, directly or obliquely tandem; anterior testes 0.11×0.13, posterior 0.12×0.13; cirrus pouch just in front of acetabulum, enclosing seminal vesicle; genital pore located anterior to acetabulum; ovary almost round, just behind posterior testis, 0.091×0.117; shell glands complex just behind ovary; vitelline glands post-ovarian, lateral to caeca and with large follicles on each side extending from behind ovary to a short distance beyond equatorial level; eggs yellowish, 0.36—0.4×0.024—0.026, and distributed in post-ovarian zone; uterus not extending to intratesticular or ovarian space.

Remarks.— Jaiswal (1964) considered the genus *Brachydistomum* as a subgenus of *Lypersomum* Looss, 1899, but Yamaguti (1971) maintains it as a distinct genus to which we agree. The present form comes close to *Brachydistomum microscelis* (Yamaguti, 1933) Travassos, 1944. Because of belated fixation of the material some very important cha-

racters like opening of genital pore, number of vitelline follicles and extension of uterus have become obsolete in our specimens. Though we have no doubt that they belong to the genus *Brachydistomum*, specific identification is not possible.

Family HEMIURIDAE Lühe, 1901.

Subfamily DINURINAE Looss, 1907.

Lecithocladium sp.

Material.— 4 ex.; Z.S.I. reg. no. W7249-50/1; host-fish, *Hilsa ilisha*; location—intestine; locality—Shillong fish market; 4. ii. 1974; Coll. *T. D. Soota.*

Description.—Body cylindrical, tapering posteriorly, length 3·37-3.78 including ecsoma, breadth 0.42—0.54 maximum being near ovarian zone; cuticular spines not discernible; terminal oral sucker 0.13—0.18 ×0.21—0.22; pharynx 0.04—0.06×0.1; oesohhagus absent; intestinal caeca arising immediately behind pharynx, continuing through the entire body including ecsoma and terminating almost at posterior end (in one specimen they are unequal); acetabulum 0.23—0.29×0.23—0.32, and situated a little behind first quarter of body length; testes two, obliquely or directly tandem and placed lateral to vesicula seminalis in the equatorial region of body; anterior testes lying in contact with the posterior end of vesicula seminalis, and is 0.09—0.11×0.09—0.13, posterior testis 0.08—0.11×0.09—0.11; vesicula seminalis elongated, extending behind acetabulum up to testicular level; prostatic duct a long coiled tube opening into ductus hermaphrodicus; genital pore at midlevel of pharynx or just behind it; ovary behind testes, transversely oval in shape, 0.1—0.13×0.15—0.18; vitellaria characteristically convoluted long filliform tubes seven or eight in number and situated in pre and post-ovarian zone overlapping uterine coils.

Remarks.—The present form has similarities with *Lecithocladium sexfasciatum* Gupta and Mehrotra, 1971, and *Lecithocladium harpodontis* Srivastava, 1942, in different features. As specimens collected were already dead, details could not be worked out and hence specific identification was not possible.

SUMMARY

Thirteen species of trematodes from Shillong and Cherrapunjee (Meghalya) belonging to 13 genera and 11 families are dealt with in this paper. One species has been described as new, while remaining are known and show interesting variations.

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