PART II
RAILLIETINA (SKRJABINIA) SKRJABINII N.SP.

(PL. L - LII Figs. 1-6.)

In April, 1966 out of a large number of fowls dissected, a single specimen belonging to the genus Rallietina (Fuhrmann, 1920) and sub-genus Skrjabinia Fuhrm; 1920 was recovered and is described herein as a new species.

Daraineidae
Daraineinae
Genus Rallietina
Sub-genus Skrjabinia

Raillietina (Skrjabinia) Skrjabinii n.sp.

| Host      | Gallus domesticus. |
| Location  | Intestine. |
| Locality  | Gandharbal, Kashmir. |

DESCRIPTION:

The parasite is 6.5 cm. long and broadest in the region of older proglottids.

The scolex is very small and measures 0.375 x 0.303 mm. in size. The rostellum is very well developed, having a breadth of 0.075 mm. The rostellar-sac is 0.17 mm. long. It is provided with a crown of hooks distributed in two irregular rows of 15 hooks in all. The size of the rostellar-hooks varies from 12 to 15 μ. The suckers are unarmed, highly muscular and 0.135 mm. in breadth and 0.25 mm. in length. The scolex is followed by a short neck. The immature region of the worm is 5.26 mm. long. A well defined immature proglottid measures 0.135 x 0.235 mm. in size. The region of the worm which bears
mature genital elements is 18.15 mm. long. A single mature proglottid measures 0.40 x 0.9 mm. A semigravid proglottid measures 1.23-1.275 x 0.975-1.08 mm. and a fully gravid proglottid 2.025 x 1.065 mm. in size. The terminal segments are longer than broad.

There are about 23 to 42 testes, scattered across the proglottid between the longitudinal excretory canals. Each testis is spherical and 30 to 60 µ in diameter. The genital-pores are irregularly alternate, situated at the anterior end of proglottid. A very well developed cirrus-pouch is present, which does not extend beyond the longitudinal excretory canal. The irregularly alternate genital-pores retain their anterior position in the older proglottids as well. The cirrus-sac of a mature proglottid is 0.165 - 0.195 mm. in length. Its proximal end bears a coiled internal vesicula seminalis.

There is a single rosette-like ovary, located anteriorly in the segment and consists of six to eight lobes. It measures 0.105 x 0.12 mm. in diameter. The vitelline-gland is immediately behind the ovary. It is 0.045 - 0.06 mm. in diameter. The oviduct is partially visible, but the vagina is distinctly seen and runs adjacent to the cirrus-pouch. The uterus develops quite early and is seen even when the testes are developing. At first it appears in the form of distorted tubes and ultimately splits into egg-capsules. In the early gravid proglottids, the egg-capsules are restricted to the region between the two longitudinal excretory canals but in the older proglottids, the egg-capsules extend even up to the sides of the proglottids, crossing hugi longitudinal excretory canals. Each egg-capsule measures 30 x 55 µ in size and bears a single onchosphere measures 25 x 48 µ.
DISCUSSION

In having irregularly alternate genital-pores and uterus breaking up into egg-capsules, the present form is assigned to Raillietina. Out of the existing four sub-genra; Raillietina Stiles and Orleman, 1926 (= Ransomia Fuhrmann, 1920); Paroniella, Fuhrmann, 1920; Skrjabinia Fuhrmann, 1920 and Fuhrmannetta Stiles and Orleman, 1926 (= Johnstonia Fuhrmann, 1920); the present form belongs to Skrjabinia in having irregularly alternate genital-pores and one egg in each egg-capsule.

So far only nine species have been described under the sub-genus Skrjabinia; Raillietina (S.) cesticillius (Molin, 1932) from domestic fowl; R. Centroshi (Southwell, 1922) from Centromys rufipennis; R. Ransomia Williams, 1931 from wild turkey; R. Kakia Johri, 1934 from Corvus splendidus; R. Variabilis Leigh, 1941 from wy prairie chicken; R. Darajesi Hughes et Schultze, 1942 in Alectoris graeca; R. Dhuncheta Sharma, 1943 in Euplocamus leoconelanus; R. Circumvallata cadarchensia Joyeux et Baer 1933 from Gallus gallus and R. Bohmi Pfeiffer, 1958 from Gallus domesticus.

Out of the said species the present form is closer to R. (S.) centroshi, R. (S.) cesticillius and R. (S.) ransomia in its general morphology.

From R. (S.) centroshi, the present form is found to be distinct in having only 15 rostellar hooks and unarmed suckers. There are 300 rostellar-hooks and the suckers bear diffused spines in R. (S.) centroshi. Although the position of genital-pore is similar in both, the number of testes is 40 in R. centroshi but in the present form the number varies from 23 x 42. The shape of the ovary is yet another point of difference, being bilobed in centroshi and distinctly 6-8 lobed in the present form. Further differences are recorded in the
in the relative body size and the size of oospher. From
R.(S.)loesticillus, with which the present form resembles
in some general morphological features, differs in the number
of restellar-hooks (400 - 500) and number of tastes (20 - 30)
and the shape of the ovary.

From R.(S.)variabilis and R.(S.)ransomi the present form
is again found to be distinct in the number of restellar
hooks and their size.

In view of these differences, the present form is
regarded here to constitute a new species for which the name
Raillietina (Skriabinia) skriabinii is proposed.
Raillietina (Skriabinia) skriabinii n.sp.

PL. L
Fig. 1 Scolex
2 Mature segment

PL. LI
Fig. 3 Mature segments
4 Early gravid segments

PL. LII
Fig. 5 Gravid segment
6 Egg
RAILLIETINA (SKRJABINIA) INDICA N.SP.

Three fully mature and a few immature worms of the genus Raillietina, sub-genus Skrjabinia were obtained from the common domestic fowl from Pattan (Kashmir).

Davaineidae Fuhrmann, 1907
Davaineinae Braun, 1900

GENUS Raillietina Fuhrmann, 1920
SUB-GENUS Skrjabinia Fuhrmann, 1920

Raillietina (Skrjabinia) indica N.Sp.

Host : Gallus domesticus.
Location : Intestine
Locality : Pattan, Kashmir

DESCRIPTION

The worms are small and flat, showing maximum width in the posterior proglottids. The mature worms measure 2.2 to 3.1 cm. in length and 0.825 mm. in maximum breadth in the region of gravid proglottids. The proglottids are broader than long in every region of the worm.

The immature region of the worm is 1.8 to 2.1 mm. in length. An immature proglottid measures 0.165 x 0.24 mm. in size. The mature region of the worm is 9.3 x 9.8 mm. in length and a fully mature proglottid measures 0.375 x 0.95 - 1.06 mm. in size. A semigravid proglottid measures 0.48 x 0.995 mm. and a gravid proglottid 0.525 x 0.45 mm. in length and 0.165 - 0.825 mm. in breadth.

The genital-pores are marginal situated anteriorly and are irregularly alternate. The scolex is typically a davaineid type. It is somewhat rectangular, with bulging suckers and is
well marked off from the neck, measuring 0.375 mm. in length and 0.305 mm. in breadth, across the sucker region. The rostellum is protrusible and oval in shape bearing at its tip a crown of rostellar hooks arranged in a single row. The number of hooks varies from 30 - 35 and each hook measures 8 - 10 µ in length. The size of the rostellar - sac along with the crown is 0.18 x 0.085 mm. The suckers are fairly large, oval in shape and their margins beset with several rows of minute diffused spines. Each sucker is armed with about 6 - 10 rows of sucker spines and measures 0.21 x 0.225 mm. in length and 0.075 - 0.14 mm. in breadth.

The longitudinal and transverse excretory canals are seem right from anterior to the posterior end. In the terminal segment, the two ventral longitudinal excretory canals join to form a common excretory duct, which opens to the outside at the excretory aperture. The genital-ducts pass in between the longitudinal excretory-ducts.

The testes, 20 - 30 in number, are posterior to ovary and the vitelline-gland along the transverse excretory canal. Each testis is rounded and 0.03 to 0.06 mm. in diameter. The cirrus-pouch is small and pyriform in shape. It never reaches the longitudinal excretory-ducts and is 0.15 - 0.185 mm. in length. The cirrus is small and unarmed. The vas-deferens is thrown into convoluted tubes but pursues a straight course before entering the cirrus-pouch.

A folded ovary is present along the anterior side of the proglottids. In fully mature proglottids, the ovary measures 0.08 - 0.12 mm. in length and 0.135 - 0.15 mm. in breadth. The vitelline-gland is situated just posterior to the ovary. It is transversely elongated and measures 0.045 mm. in length and 0.085 mm. in breadth. The vagina arises just anterior to the
vitelline-gland as a thin tube and opens into the shallow
genital atrium posterior to the opening of the cirrus-pouch.
The vagina runs parallel to the vas deferens.

The uterus develops in the form of minute tubes, which
ultimately break up into egg-capsules. A fully gravid
proglottid bears numerous egg-capsules with a single egg in
each capsule. The egg-capsules extend beyond the excretory-
ducts and measure 30 - 40 μ x 20 - 22 μ in size. An
onchosphere measures 28 - 36 μ x 18 - 20 μ.

**DISCUSSION**

From the above description it is clear that the present
specimens belong to the sub-genus *Skrijabinia* of the genus
Raillietina. The present specimens are found to be different
in following morphological features from *Raillietina* (*Skrijabinia*)
skriabinia n.sp; which is described from the same host:

The scolex of *R.(S.)Skrijabinia* is globular, bearing muscular
suckers and rostelium having only 15 hooks whereas the scolex
of the present form is rectangular, its suckers are beset with
diffused spines in 6 - 10 rows and rostellar crown bears 30 - 35
hooks. Moreover, in the mature proglottids of *R.(S.)skrijabinia*
ovary is rosette-like, testes are 23 - 42 in number, but in the
present form ovary is lobed and 20 to 30 testes are present. So
the present form is decidedly different from *R.(S.)skrijabinia*.

The distinguishing features of the present form are

A well developed scolex with conspicuous armed suckers
bearing 6 - 10 rows of spines, a single row of 30 - 35 rostellar-
hooks, 20 - 30 testes in each segment, a lobed ovary, irregularly
alternate genital-pores and broader than long gravid segments,
each gravid segment containing a large number of egg-capsules
with one egg in each capsule.
From among the remaining species of the sub-genus, the present form is closest R. (S.) cesticillus and R. (S.) iranasi, but from both these species it can be distinguished in the number of rostellar-hooks and their arrangement, both length, size of hooks and the number of testes.

R. (S.) centroni is nearer to the present species in body length, but well marked differences are noted in the number of rows of spines around each sucker, number and arrangement of rostellar-hooks, number of testes and the shape of ovary.

The present form is accordingly considered here to constitute a new species for which the name Saillietina (Sphriapinia) indica is proposed.
Raillietina (Skrijabinia) indica n.sp.

PL. LIII  Fig. 1  Scolex
1
2  Mature segment

PL. LIV  Fig. 3  Arrangement of genital-pores in mature region
3
4  Gravid segment

PL. LV  Fig. 5  Egg

PL. LVI  Photo micrographs
1  Scolex of R.(R.) tetragona
2  Scolex of R.(S.) Skrjabini
3  Scolex of R.(S.) indica
RAILLIETINA (SKRJABINIA) CESTICILLUS (MOLIN, 1858)

Thirty specimens of Raillietina (Skrjabinia) cesticillus were obtained from the intestine of common domestic fowl as a rare infection in October, 1967.

Davaineidae Fuhrmann, 1907
Davaineinae Braun, 1900
Genus: Raillietina Fuhrmann, 1920
Subgenicus: Skrabinia Fuhrmann, 1920

Raillietina (Skrabinia) cesticillus (Molin, 1858)

Host: Gallus domesticus
Location: Intestine
Locality: Harwan, Kashmir.

DESCRIPTION

The cestodes are small 3.675 to 36.75 mm. in length and 1.28 mm. in maximum breadth. The mature forms are 20 - 50 mm. in length. The proglottids are craspedate.

The immature proglottids measure 0.045 - 0.06 x 0.23-0.255 mm. in size. The mature proglottids are comparatively fewer and measure 0.275 - 0.30 mm. in length and 0.615 - 0.645 mm. in breadth. A semigravid proglottid measures 0.27 x 1.26 mm. in size. The gravid proglottids are 1.98-3.1 x 0.975-1.08 mm. in size.

The genital-pores are irregularly alternate and are situated in the anterior third of the margin of proglottid.

The scolex is typically of davalinid type. It is almost triangular and is well marked off from the neck and measures 0.35 mm. in length and 0.355 mm. in breadth. The suckers are inconspicuous and measure 0.06 - 0.075 mm. in diameter. A
broad rostellum is present at the tip of scolex. It measures 0.06 x 0.285 mm. in size and is armed with numerous spiniform hooks, about 400 in number. Each hook is 5 - 10 μ in length.

The testes, 10 - 15 in number, are present just posterior to ovary, bounded on the sides by the longitudinal excretory ducts. They are rounded and 0.015 - 0.045 (0.03) mm. in diameter. The cirrus-pouch is small, pyriform and crosses the poral longitudinal excretory duct. It is 0.075 - 0.09 mm. in length. C-irrus is small and unarmed. The vas deferens arises as a thick convoluted tube. The eyaculatory duct is slightly bulbons at the proximal end.

The ovary is median and formed of two lobes, poral lobe being smaller. In fully mature proglottids, the ovary extends 0.15 mm. across and 0.06 - 0.08 mm. along the length of the proglottid. The vitelline-gland is present posterior to the ovary. It is pendulous and measures 0.075-0.08 x 0.045-0.05 mm. in size. The vagina arises as a thin tube posterior to the cirrus-pouch.

The gravid proglottids are full of egg-capsules, each containing a single egg. It measures 45 - 75 μ and an egg 30 - 45 μ in diameter.

The present form while agreeing in all essential details with Raillietina (Skriabinia) cisticillus (Molin, 1958) Southwell, 1930 from Gallus sonerati, shows slight differences in the shape of ovary, number of testes and in the extent of cirrus-pouch which crosses the longitudinal excretory canal. These differences are regarded as variations of no specific importance and could be included in the specific diagnosis of Raillietina (S.) cisticillus.
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<thead>
<tr>
<th></th>
<th><strong>R. (S.) centren</strong></th>
<th><strong>R. (S.) cesticillus</strong></th>
<th><strong>R. (S.) cesticillus</strong></th>
<th><strong>R. (S.) skrjabini</strong></th>
<th><strong>R. (S.) indica</strong></th>
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<tr>
<td></td>
<td>(Southwell, 1922)</td>
<td>(Molin, 1858)</td>
<td>Author's Collection</td>
<td>N. Sn.</td>
<td>N. Sn.</td>
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<td>Length</td>
<td>2.5 cm.</td>
<td>13 cm.</td>
<td>3.675-36.75 cm.</td>
<td>6.5 cm.</td>
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<td>Breadth (max)</td>
<td>1.5 mm.</td>
<td>3 mm.</td>
<td>1.22 mm.</td>
<td>1.065 mm.</td>
<td>0.825 mm.</td>
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<td>Scolex (diameter)</td>
<td>300 µ</td>
<td>0.355 mm.</td>
<td>0.3 mm.</td>
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<td>Rostellar-sac (length)</td>
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<td>0.06 x 0.280 mm.</td>
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<td>No. of hooks? (their size)</td>
<td>300</td>
<td>400 - 500</td>
<td>About 470</td>
<td>15</td>
<td>30 - 35</td>
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<td></td>
<td>(9 - 11 µ)</td>
<td>7 - 12 µ</td>
<td>5 - 10 µ</td>
<td>12 - 15 µ</td>
<td>8 - 10 µ</td>
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<td>Sucker size</td>
<td>300 µ (D.)</td>
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<td>0.05 - 0.075 mm.</td>
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<td>0.075 - 0.12 µ</td>
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<td>Number Sucker spines</td>
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<td>S. spines (size)</td>
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<td>Testes</td>
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<td>30 - 30 (no measurements)</td>
<td>10 - 15 µ</td>
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<td></td>
<td>-</td>
<td>0.15 x 0.06 - 0.08 mm</td>
<td>Rosette-like</td>
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<td>0.105 - 0.12 mm</td>
<td>0.08 - 0.12 x</td>
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<td></td>
<td>-</td>
<td></td>
<td>0.135 - 0.15 mm</td>
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<td>Vitelline-gland</td>
<td>-</td>
<td>75 - 80 x 45 - 50 µ</td>
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<td>Eggs</td>
<td>35 µ</td>
<td>30 - 45 µ</td>
<td>24 - 48 µ</td>
<td>23 - 35 x 13 - 20 µ</td>
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<td>Gallus domesticus</td>
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<td>Harwan, Kashmir</td>
<td>Ganderbal</td>
<td>Patan,</td>
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<td>Plate</td>
<td>Fig.</td>
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<tr>
<td>LVII</td>
<td>1</td>
<td>Scolex</td>
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<td></td>
<td>2</td>
<td>Mature segment</td>
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<td>LVIII</td>
<td>3</td>
<td>Gravid segment</td>
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**Raillietina (Skribinia) casticillus** 
(Molin, 1858)
CHOANOTAENIA KASHMIRIENSIS N.SP.

A number of cestodes were recovered from the intestine of the domestic fowl, Gallus domesticus brought from Shopyan, Kashmir.

Dilepididae Ralliet et Henry, 1909
Syn.Dilepinidae Fuhrmann, 1907
Dioylidinae (Stiles, 1896).
Genus: Choanotaenia Ralliet, 1896.

Choanotaenia kashmiriensis N.SP.

Host: Gallus domesticus.
Location: Intestine.
Locality: Shopyan, Kashmir.

DESCRIPTION

The cestodes measure 6.3 - 9.45 mm. in length and 1.02 - 1.06 mm. in maximum breadth.

The scolex is muscular and comparatively small. It is 0.3 - 0.36 mm. in length and 0.225 - 0.315 mm. in maximum breadth in the region of suckers. The rostellarium is small and sac-like, measuring 0.23 x 0.065 mm. in size. It is armed with a single crown of 14 rostellar-hooks. The hooks are linear in shape having both blade and handle elongated. Each hook measures 18 - 22 μ in length. The four suckers are spherical or oval with thick muscular walls. Each sucker measures 0.06 - 0.075 mm. in diameter. In some forms, the suckers are elongated and measure 0.18 - 0.2 mm. in length and 0.095 - 0.14 mm. in breadth. The proglottids are craspedote.

Conspicuous ventral longitudinal excretory ducts run from
anterior to the posterior region. The diameter of the duct is variable in different regions of the worm. It is 30 μ in immature, 45 μ in mature and 60 - 75 μ in the gravid region.

The testes, 14 - 90 in number, are present posterior and lateral to ovary. The average number of testes recorded in a mature segment is 15 and are present throughout the length of the worm proglottid and bounded by the longitudinal excretory ducts. They are rounded and measure 30 - 60 μ in diameter. The vas deferens is coiled and the vesicula seminalis is apparently absent. The cirrus-pouch is elongated to pyriform in shape, opening to the exterior at the genital-pore through a sunken genital-atrium. The cirrus-pouch crosses the dorsal longitudinal excretory vessel. Its length varies from 0.15-0.185 mm. The cirrus is armed with minute spines. The genital-pores are irregularly alternate and are present towards the anterior region in mature proglottids and at the middle level in semigravid and gravid proglottids.

The ovary is lobulate and lies in the middle of the proglottid towards the anterior region. It measures 0.9 x 0.18 mm. in size. The vitelline-gland is present posterior to the ovary and its diameter varies from 45 to 60 μ.

The mature region of the worm is followed by proglottids bearing reticulate uterus. In the following proglottids, the uterus breaks into small compartments, which bear eggs in posterior proglottids. A perfect gravid proglottid shows uterus broken into small egg-capsule like compartments bearing onchospheres. In the present form, definite egg-capsules were observed. Eggs measure 60 - 75 μ in diameter and an onchosphere within egg 45 - 60 μ.
Yamaguti, (1959) and Wardle & Mcleod, (1952) place the genus Choanotaenia Ralliet, 1896 in the sub-family Dipylidinae (Stiles, 1896) on account of the following characters:

- Genital-pores irregularly alternate; ovary pre-equatorial;
- Gonocyst vitelline-gland; uterus sac-like and reticular which may break down into egg-capsules each with one egg; cirrus armed.

Southwell, (1930) places this genus in the sub-family Dilenidae Fuhrmann, 1907, because according to him the uterus of Choanotaenia does not at all break into egg-capsules. Ranson, Cohn and Messitt also place this genus in the sub-family Dipylidinae on account of the above said characters. But workers like Crety, Clerc, Joyenx and Baer have kept the genus in the sub-family Dipylidinae as stated by Wardle & Mcleod (1952). They are of the opinion that uterus of Choanotaenia does break down into egg-capsules. They have also pointed out that definite egg-capsules are not usually observed because the gravid proglottids leave the host body without full maturation of the egg-capsules in them. The systematic position of the genus as given by Yamaguti, Wardle and Mcleod, Crety, Clerc, Joyenx and Baer in placing the genus C-choanotaenia in the sub-family Dipylidinae is also followed here.

Matevosyan (1954) revised the family Dilenididae and created a new family C-choanotaeniidae.

Comparing the present form with the known species of the genus, shows marked differences in the characters like the size and shape of strobila, Scolex and rostellum, number of rostellar-hooks and their arrangement, number of testes,
proximal extent of cirrus-pouch and the shape of ovary. The only species which, as far as the writer is aware, has been reported from the domestic fowl is *Choanotaenia infundibuliformis* Goeze, 1782) Railliet, 1896 and recorded from India also by Southwell (1930). The present form having the same host appears to be a closely related species in having similar segmentation of the body and shape of posterior proglottids, in having irregularly alternate genital-pores, long armed cirrus-pouch and lobulate ovary. The present form, however, cannot be assigned to this species in view of the following differences:

(Refer Table III)

1) Distinctly smaller body length and scolex.

2) 14 rostellar-hooks, which are linear and not distinctly curved.

3) 14 - 20 testes in the median field.

4) An elongated armed cirrus-pouch, crossing the poral longitudinal excretory vessel and opening into a sunken genital-atrium.

5) Distinctly reticulate uterus breaking into egg-capsules.

Considering these differences the present form is regarded here a new species of the genus *Choanotaenia* for which name *Choanotaenia kashmiriensis* is proposed.

The species of *Choanotaenia* which have been reported as parasites of Indian birds are:

*Choanotaenia infundibuliformis* (Goeze, 1782) Railliet, 1896; *C.barbara* (Meggitt, 1926) reported by K.P. Singh, 1956 from *Passer domesticus*; *C.pondiana* Inamdar, 1934 from *Passer domesticus*; *C.manimurensis* Patwardhari, 1935 from Snie; *C.lindsay Burt, 1940 also reported by K.P. Singh(1950) from *Lophiuphis malabarica*; *C.magnibarata* Burt, 1940;
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<tr>
<th>Species</th>
<th>Host</th>
<th>Locality</th>
<th>Length</th>
<th>Breadth</th>
<th>Ant. row</th>
<th>Post. row</th>
<th>H. Size.</th>
<th>Suckers</th>
<th>Testes No*</th>
<th>Testes size</th>
<th>Cirrus-pouch (L)</th>
<th>Vi telline-gland</th>
<th>Eggs</th>
<th>Onchospheres</th>
<th>Fins shape</th>
<th>Host¨ Indicator</th>
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<tbody>
<tr>
<td>Choanotaenia gitti</td>
<td>R. P. Mukherjee, 1944</td>
<td>43.68 (29.952 - 57.408)</td>
<td>0.884 (0.728 - 1.049)</td>
<td>0.265 x 0.196 (0.212 - 0.318)</td>
<td>0.053 x 0.042</td>
<td>0.16-0.20 (0.159)</td>
<td>0.032-0.036 x 0.022-0.026 (0.033)</td>
<td>0.03-0.036 x 0.022-0.026 (0.033)</td>
<td>12</td>
<td>0.02-0.03</td>
<td>0.15-0.165</td>
<td>0.05-0.105</td>
<td>0.015-0.017</td>
<td>0.018-0.022</td>
<td>0.40-0.45</td>
<td></td>
</tr>
<tr>
<td>Choanotaenia hvuellecea</td>
<td>K. S. Singh, 1959</td>
<td>Rangoon</td>
<td>6.497 - 7.565 (6.48)</td>
<td>0.37-0.49 (0.33)</td>
<td>0.06 - 0.07</td>
<td>2</td>
<td>0.05-0.06</td>
<td>0.21-0.30</td>
<td>0.15-0.23</td>
<td>0.3-0.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. formis</td>
<td>After Southwell, 1930</td>
<td>36.6-65.6 (36.4)</td>
<td>0.756-0.979 (0.78)</td>
<td>0.194</td>
<td>1</td>
<td>0.05-0.07</td>
<td>0.13-0.35</td>
<td>0.18-0.2</td>
<td>30</td>
<td>0.01-0.02</td>
<td>0.03</td>
<td>0.11</td>
<td>0.015-0.02</td>
<td>0.016-0.018</td>
<td>0.018-0.022</td>
<td>0.40-0.45</td>
</tr>
<tr>
<td>C. sonoti</td>
<td>Rangoon</td>
<td>20-30</td>
<td>0.83-0.97 (0.85)</td>
<td>0.26</td>
<td>2</td>
<td>0.05-0.06</td>
<td>0.13-0.20</td>
<td>0.18-0.2</td>
<td>30</td>
<td>0.01-0.02</td>
<td>0.03</td>
<td>0.11</td>
<td>0.015-0.02</td>
<td>0.016-0.018</td>
<td>0.018-0.022</td>
<td>0.40-0.45</td>
</tr>
<tr>
<td>C. macroura</td>
<td>Rangoon</td>
<td>20-30</td>
<td>0.83-0.97 (0.85)</td>
<td>0.26</td>
<td>2</td>
<td>0.05-0.06</td>
<td>0.13-0.20</td>
<td>0.18-0.2</td>
<td>30</td>
<td>0.01-0.02</td>
<td>0.03</td>
<td>0.11</td>
<td>0.015-0.02</td>
<td>0.016-0.018</td>
<td>0.018-0.022</td>
<td>0.40-0.45</td>
</tr>
<tr>
<td>C. marmoreus</td>
<td>Bengal</td>
<td>20-30</td>
<td>0.83-0.97 (0.85)</td>
<td>0.26</td>
<td>2</td>
<td>0.05-0.06</td>
<td>0.13-0.20</td>
<td>0.18-0.2</td>
<td>30</td>
<td>0.01-0.02</td>
<td>0.03</td>
<td>0.11</td>
<td>0.015-0.02</td>
<td>0.016-0.018</td>
<td>0.018-0.022</td>
<td>0.40-0.45</td>
</tr>
</tbody>
</table>

Note: If not otherwise indicated, measurements are given in microns (µm).
Choanotaenia kashmiriensis n.sp.

<table>
<thead>
<tr>
<th>Plate</th>
<th>Fig.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIX</td>
<td>1</td>
<td>Scolex</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Mature segment</td>
</tr>
<tr>
<td>LX</td>
<td>3</td>
<td>Arrangement of genital-pores in mature region</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Uterus in semigravid region</td>
</tr>
<tr>
<td>LXI</td>
<td>5</td>
<td>Gravid segment</td>
</tr>
<tr>
<td>LXII</td>
<td>6</td>
<td>Cirrus-pouch magnified</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Eggs</td>
</tr>
</tbody>
</table>
Several specimens were collected from the intestine of common domestic fowl in Kashmir. The infection of helminth parasites in fowl was studied almost throughout the year, but the present worms were collected only in May, 1966 and is considered to be a rare infection.

These intestinal-flukes are assigned to the species *E. coecale* Muraschkinzev, 1937 which is a first record from Indian region.

**DESCRIPTION**

The flukes are elongated, flattened, spiny and broadest in the region of the ovary. The length of the body varies from 4.05 - 5.925 mm. and breadth from 0.975 - 1.155 mm. Cuticle is beset with small rose thorn-shaped spines ventrally unto the level of ventral-sucker. Head-collar is comparatively smaller, but is well marked off from the main body. It bears 47 collar-spines, arranged in an uninterrupted row, but along the two sides of the head-collar there are accessory spines as well. The length of the collar spines varies from 0.03 - 0.045 mm. Muscular oral-sucker is rounded, measuring 0.105 - 0.195 mm. in diameter. Mouth opening is sub-terminal and ventral. A small prepharynx is present and the pharynx is fairly muscular, 0.12 - 0.18 x 0.075 - 0.135 mm. in size. It is followed by a short oesophagus, which is 0.255 - 0.3 mm. in length and divides into two intestinal caeca, which run laterally almost to the
posterior end. The length of intestinal caeca varies from 145 - 517.5 mm. The ventral-sucker is located just posterior to the intestinal bifurcation and measures 0.48 - 0.63 mm. in diameter.

Two testes are present in the posterior region of the body, one behind the other. In one specimen, the anterior testis is very small as compared to the bigger pyriform posterior testis (Anterior testis 0.255 x 0.225 mm. and posterior testis 0.675 x 0.33 mm.). In the other specimens, the testes are present almost in the middle of the body and usually bear constriction in the middle. The average size of the anterior testis is 0.3 x 0.39 mm. and posterior testis 0.315 x 0.42 mm. A pyriform cirrus-pouch is present just near the ventral-sucker, partly covered by it and measures 0.33 - 0.375 mm. in length. The internal vesicular seminalis is coiled and the cirrus is muscular, well developed and projecting through the genital-pore. The cirrus is unarmed and the genital-pore is situated just below the intestinal bifurcation.

The ovary is almost spherical and is situated anterior to the anterior testis. It measures 0.21 x 0.21-0.195 x 0.225 mm. in size. The shell-gland measures 0.105 mm. in diameter. Vitellaria consist of many follicles, distributed in the lateral fields, being 117 to 120 mm. away from the anterior end 0.03 x 0.285 mm. from the posterior end. In one specimen, vitelline-follicles meet in the mid area just near the caecal termination.

At the extreme posterior end is a small excretory-pore which leads into a Y-shaped excretory bladder.

The eggs measure 0.045-0.105 x 0.03-0.06 mm. in size.
DISCUSSION

The present form as clear from the above description falls under the genus *Echinostoma* Rudolphi, 1809. The position of gonads, nature and distribution of collar-spines, position of genital-pore and uterus agree with the generic characters. In general morphological features including the number of collar-spines (47), the present form comes nearer to *E. coeca* Muraschkinzer, 1937 to which it is tentatively assigned.

The present form can be compared with the following forms in having same number of collar-spines: *E. corvi* Yamaguti, 1935 from *Corvus corone corone*; *E. sarcinum* Dietz, 1909 from *Pulica atra* and *Grus grus*; *E. travassosi* Skrjabin, 1924 from *Corvus corone*; *E. chloropodis* (Zeder, 1800) from *Gallinula chloropus* and *Oripsomega porzana* and *E. microscopina* Singh, K.S., 1954 from *Anas acuta*.

While the present form resembles *E. corvi* in having 47 collar-spines, it differs in their size. *E. sarcinum* resembles the present form again in the number of collar-spines, but in their size they are larger as compared to the present form. Moreover, the ventral-sucker and cirrus-sac are also widely different. *E. travassosi* has elongated bean-shaped testes as compared to simple constricted testes of the present form. *E. chloropodis* resembles the present form in the number as well as size of collar-spines, but it differs in other characters like the shape and size of testes, ovary and cirrus-pouch. In *E. microscopina*, the collar-spines are much smaller than the present form and further differs in the shape of testes, cirrus-pouch etc.

Considering these points of difference between the
present form and the forms having 47 collar-spines, the present form is tentatively assigned to *E. coecale*, which is described from *Gallus gallus* (Russia) and has all the major morphological features like the shape of testes and cirrus-pouch and size of spines similar to the present form. The collar-spines however number 49 in *E. coecale* and as already stated 47 in the present form. Another variation in the present form is in vitelline-follicles which may meet mesially behind testes.

Yasaguti (1956) has listed 94 species of the genus *Echinostoma* from birds. Bhalerao, 1935 in his monograph on the parasites of domesticated animals in India, has not recorded *Echinostoma* from *Gallus*.

**Host** : *Gallus domesticus*.
**Location** : Intestine
**Locality** : Naseem-Bagh.
PLATES LXIII - LXV

Echinostoma coesaele

PL. LXIII
Fig. 1  Entire specimen
Fig. 2  Head collar.

PL. LXIV
Fig. 3  Entire specimen (Two testes of different shapes)

PL. LXV
1  Photo micrograph of head-collar
2  Photo micrograph of head-collar.
ECHINOSTOMA REVOLUTUM (FRÖHLICH, 1802) LOSSS, 1899.

Five typical specimens of *E. revolutum* were collected from the intestine of common domestic fowl in Kashmir. Their measurements (in mm.) are given below:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>12.33 - 14</td>
</tr>
<tr>
<td>Breadth</td>
<td>1.715 - 1.53</td>
</tr>
<tr>
<td>Diameter O.S.</td>
<td>0.18 - 0.3</td>
</tr>
<tr>
<td>Pharynx</td>
<td>0.24 x 0.12 -</td>
</tr>
<tr>
<td></td>
<td>0.225 x 0.255</td>
</tr>
<tr>
<td>Length oesophagus</td>
<td>0.405 - 0.66</td>
</tr>
<tr>
<td>Length intestinal caeca</td>
<td>10.95 - 11.25</td>
</tr>
<tr>
<td>Diameter V.S.</td>
<td>0.9 - 1.275 x 0.9</td>
</tr>
<tr>
<td>Posterior testis</td>
<td>0.72 x 0.48 -</td>
</tr>
<tr>
<td></td>
<td>1.35 x 0.345</td>
</tr>
<tr>
<td>Anterior testis</td>
<td>0.75 x 0.51 -</td>
</tr>
<tr>
<td></td>
<td>1.215 x 0.345</td>
</tr>
<tr>
<td>Ovary</td>
<td>0.33 x 0.585 -</td>
</tr>
<tr>
<td></td>
<td>0.375 x 0.375</td>
</tr>
<tr>
<td>Egg</td>
<td>0.075 x 0.045 -</td>
</tr>
<tr>
<td></td>
<td>0.075 x 0.03</td>
</tr>
<tr>
<td>Length cirrus-sac</td>
<td>0.525 - 0.528</td>
</tr>
<tr>
<td>Vitellaria away from ant. end</td>
<td>1.92 - 3.105</td>
</tr>
<tr>
<td>Vitellaria away from post. end</td>
<td>0.375 - 0.365</td>
</tr>
<tr>
<td>Length collar-spines</td>
<td>0.03 - 0.09</td>
</tr>
<tr>
<td>Number collar-spines</td>
<td>37</td>
</tr>
<tr>
<td>Abnormal specimen bearing 3 testes</td>
<td></td>
</tr>
<tr>
<td>Measurements of testes (in mm.)</td>
<td></td>
</tr>
<tr>
<td>Testis 1</td>
<td>0.63 x 0.345</td>
</tr>
<tr>
<td>Testis 2</td>
<td>0.75 x 0.315</td>
</tr>
</tbody>
</table>
Testis 3

Host: Gallus domesticus
Location: Intestine
Locality: Naseem-Bagh, Srinagar.
Echinostoma revolutum (Fröhlich 1802)
Looss, 1899.

PL. LXVI  Fig. 1  Entire specimen (Notched testes)

PL. LXVII Fig. 2  Entire specimen (Pyriform testes)

3  Abnormal specimen with 3 testes
Aquaria (Cheilospirura) hamulosa (Diesing, 1861) Railliet, Henry et Sisoff, 1912.

Aquaria (Cheilospirura) hamulosa has been reported from all parts of the world. It is common parasite found in the gizzard of fowl and recorded here for the first time from Kashmir.

Earlier, it has been reported and briefly described from various areas outside India by Tubangui (1926), Gram (1927, 1931) and Li (1934).

The chief characteristic feature of the species is the presence of four cuticular cords which extend from anterior end to the level of longer spicule in male and upto the vulvar position in female. The sub-generic characters being that the cords are not anastomosed and are non-recurrent. The spicules of males are widely unequal.

The present worms although agree with the known description of the species show following variations:-

Of the postanal papillae, three pairs nearer to cloaca and the fourth pair located a short distance behind them are the largest in size. While the description given by
Baytis (1939) shows that out of the postcloacal papillae, three papillae lie near the tip, the diagram reproduced by him after Tubangui shows slightly different arrangement. Starting from the cloaca the fourth post-anal papillae are a short distance behind the anterior three pairs and only two pairs are near the tail tip. In the present specimens, the cuticular rings surrounding cloaca are not conspicuous. Size variations are also recorded as clear from the table.

The said differences being of the nature of individual variations, the present specimens are assigned to *Aevaria* (Cheilospirura) *hamulosa* (Diesing, 1851) Railliet, Henry et Sisoff, 1912.
## TABLE (___)

### Comparative measurements (in mm.)

<table>
<thead>
<tr>
<th>Known measurements</th>
<th>Present measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>L.  8.5-15</td>
</tr>
<tr>
<td></td>
<td>B.  0.24 - 0.36</td>
</tr>
<tr>
<td></td>
<td>L.Ph. 0.18-0.3</td>
</tr>
<tr>
<td></td>
<td>Tail  0.4 - 0.7</td>
</tr>
<tr>
<td></td>
<td>Spl.1 1.12 - 2.35</td>
</tr>
<tr>
<td></td>
<td>Spl.2 0.19 - 0.24</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A-curria (Cheilospirura) hammonia
(Dæsing, 1851) Railliet, Henry et Sisoff, 1912

PL. LXIII Fig. 1 Anterior region
2 Mail tail

PL. LXX Fig. 3 Vulvar - position.
**HETERAKIS GALLINAE (Gmelin, 1790)**

OXYUROIDEA  
Wienland, 1858

Heterakidae  
Ralliet et Henry, 1914

Heterakinae  
Ralliet et Henry, 1912

**Heterakis**  
Dugardin, 1845.

**Heterakis gallinae**  
Gmelin, 1790)

**Syn.**  
(H. papillosa, H. vesicularis)

**Measurements.** - (in mms.)

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Male.</th>
<th>Female.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>7.05 - 8.82</td>
<td>8.775 - 11.775</td>
</tr>
<tr>
<td>Breadth</td>
<td>0.285 - 0.8</td>
<td>0.39 - 0.48</td>
</tr>
<tr>
<td>Length of Pharynx</td>
<td>0.03</td>
<td>0.03 - 0.046</td>
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<tr>
<td>Total length of esophagus</td>
<td>0.93 - 0.975</td>
<td></td>
</tr>
<tr>
<td>Breadth of narrow end</td>
<td>0.075</td>
<td></td>
</tr>
<tr>
<td>Breadth of bulb</td>
<td>0.165</td>
<td></td>
</tr>
<tr>
<td>Nerve-ring away from anterior end.</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Length of spicules.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp. 1</td>
<td>2.175 - 2.25</td>
<td></td>
</tr>
<tr>
<td>Sp. 2</td>
<td>0.525 - 0.705</td>
<td></td>
</tr>
<tr>
<td>Tail length</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>Total length of oesophagus</td>
<td>0.95 - 11.25</td>
<td></td>
</tr>
<tr>
<td>Breadth of narrow end of oesophagus</td>
<td>0.06 - 0.075</td>
<td></td>
</tr>
<tr>
<td>Breadth of bulb</td>
<td>0.195 - 0.24</td>
<td></td>
</tr>
<tr>
<td>Nerve-ring anterior end</td>
<td>0.06 - 0.075</td>
<td></td>
</tr>
<tr>
<td>Vulva anterior end</td>
<td>4.5 - 4.7</td>
<td></td>
</tr>
<tr>
<td>Tail length</td>
<td>0.9 - 0.975</td>
<td></td>
</tr>
<tr>
<td>Egg size.</td>
<td>0.060 - 0.075 x 0.03 - 0.035</td>
<td></td>
</tr>
</tbody>
</table>
PLATES LXX

Heterakis gallinae (Omelin, 1790)

PL. LXX Fig. 1 Anterior region
2 Mail tail
Seven specimens belonging to the genus *Notocotylus* Diesing, 1839 were collected from *Anas platyrhynchos platyrhynchos*, common mallard duck in Kashmir. These specimens are assigned to *N. attenuatus* and are briefly described in view of several variations.

**Notocotylidae**  
*Notocotylinae*  
*Notocotylus*  

*Notocotylus attenuatus* (Rud., 1809) Kossack, 1911.

Elongated oval body measuring $3.25 - 7.2 \times 0.85 \times 1.4$ mm. in size. Out of 3 rows of glands, lateral rows have maximum of 21 glands and the middle row has 17 glands. Lateral rows extend more anteriorly than the middle row and glands in the testicular region are longer in size.

The oral sucker is sub-terminal and spherical. The oesophagus is followed by intestinal bifurcation. The caeca extend to the posterior region of body.

The testes are as usual symmetrical, deeply lobed laterally, elongated and extra caecal, being located laterally in the posterior region of the body. The cirrus sac is elongated and club-shaped. A narrow, reversible cirrus is present. The vesicula seminalis externa is well developed and coiled. The genital-pore is at or immediately in front of behind the intestinal bifurcation. All the three variations in the position of genital-pore were marked in the same material.

The ovary is slightly lobed, median and intercaecal. The shell gland complex lies immediately in front of ovary. The uterus has an average of 17 to 19 transverse coils. The number of uterine coils may vary depending on the maturity of the
worms. Of these coils 10 to 11 are in the vitelline region and the rest anterior to it. The uterine coils are mostly intercaecal and spread between the shell gland and the cirrus sac. The metraterm is almost half as long as the cirrus sac. The vitellaria are follicular and intercaecal except a few follicles which may lie in the intercaecal field. The follicles extend posteriorly to the anterior level of testes and anteriorly to about the middle level of the body length. The eggs are oval. The excretory bladder is short and divided into two lateral branches behind the ovary. The excretory pore is median and located more or less dorsally.

**SYSTEMATIC POSITION**

From the description it is clear that the present specimens belong to the genus *Notoctylus* Diesing, 1859. Davies (1956) differentiates three genera, *Notoctylus*, *Cataetropolis* Odhner, 1905, and *Paramonostomum* Luhe, 1909, in the sub-family *Notoctylinae*, on the basis of presence or absence of ventral glands, their nature and number of rows and relative length of cirrus pouch and metraterm.

Yamaguti (1958) in his key to the genera of *Notoctylinae* from birds, differentiates the genera *Notoctylus*, *Cataetropolis*, *Paramonostomum*, *Notoctylus* Harwood, 1939, *Parapronoecephalum*, Belop Olskaia, 1952 and *Tristriata* Belopoliska, 1953, on the basis of the presence or absence of ventral glands, their nature and number of rows, posterior extent of vitellaria, presence or absence of head collar and position of testes with respect to caeca in hinder region.

Skrjabin (1953) lists five genera in the sub-family *Notoctylinae* namely, *Notoctylus*, *Cataetropolis*, *Tristriata*,
Paramonostomum, Notomonostomum and Quinquenseris Skvorszov, 1934.

Yamasuti (1958), while including Parapronocephalum in his key to the genera of Notocotylinae, also refers this genus to a separate family Pronocephalidae Looss, 1902 and sub-family Pronocephalinae Looss, 1899. This family and sub-family essentially include the genera from reptilian hosts and it is desirable to place the genus Parapronocephalum in the sub-family Notocotylinae, the genera of which are more closely related to it than the genera of Pronocephalinae.

Of the foresaid genera, Notocotylus is characterised in having 3 rows of ventral glands, vitellaria in pre-testicular and lateral field, testes lateral to posterior region of caeca and cirrus sac elongated, claviform and more or less twice the length of metraterm. All these characters are present in the present specimens.

The genera Hindia Lal, 1935, Naviformia Lal, 1935, Kossackia Szidat, 1938 and Hindolana Strand, 1942 are now considered as synonyms of Notocotylus. Lal (1935) differentiated Hindia, Naviformia and Notocotylus mainly on the basis of slight differences in the position of genital-pore. Harwood (1939) rightly states that such minor variations in the position of genital pore does not hold any outstanding position for the creation of new genera. Moreover, the study of present specimens of Notocotylus confirms this fact. The position of genital pore may vary slightly being located at or slightly in front or behind the intestinal bifurcation.

Present specimens of Notocotylus can be conveniently assigned to N. attenuatus. Variation in the number of ventral
glands in the three rows is not considered here of any specific importance. While Herber (1942) gave specific importance to the number of ventral glands, Baylis (1928) rightly found their number variable, depending on the age of the parasite. The cirrus sac in the present specimens is twice the length of the metraterm as is characteristic of *N. attenuatus.*


The present specimens resemble *N. parviovatus,* *N. chionis,* *N. gibbus* and *N. intestinalis* in having more or less the same number of ventral glands, but differ widely from all these species in the relative length of cirrus sac and metraterm and other morphological features.

Comparison of the present form with *N. babai,* *N. indicus* and *N. lucknowensis* is found interesting. All the three species do not show any outstanding specific difference between each other and with the present specimens and are regarded here as synonyms of *N. attenuatus.* Bhalerao (1935) records 17 glands in lateral rows and 15 in the central row of *N. babai.* This difference with *N. attenuatus* is regarded here as mere variation of no specific importance. The only difference to separate the three species is the position of genital pore which is again regarded here as a variation, as clear from the study of the present specimens. The position of genital pore may vary slightly being located at or immediately in front or behind the intestinal bifurcation. Nath and Pande (1962) have rightly
expressed their doubts regarding the validity of some of
the species including N. babai and N. lucknowensis. As regards
N. magniovatus Yamaguti, 1934, Bhalerao (1936) found no
difference when this species was compared with N. attenuatus.
Slight difference in the egg size of the two species is
of no specific importance.

**NOTOCOTYLUS ATTENUATUS** (Rud. 1809) Kossack, 1911


* N. attenuatus Rudolphi, 1809
* Notocotylus triserialis Diesing, 1839.
* N. babai Bhalerao, 1938
* N. indicus Lal, 1935
* N. magniovatus Yamaguti, 1934
* Hindia lucknowensis Lal, 1936

**REVISED SPECIFIC DIAGNOSIS:**

Notocotylidae, Notocotylinae;

Of the characters of the genus. Body elongated oval with narrow
anterior and broad rounded posterior end; cuticle with minute
spines on ventral surface; ventral glands 17-21 in lateral
rows and 17-18 in middle row; oesophagus short; caecae long,
terminate near posterior end; pharynx absent; testes laterally
lobed, located lateral to caecae in posterior region; cirrus sac
long, about two times the length of metraterm; genital pore at
or immediately in front or behind intestinal bifurcation; ovary
intertesticular; shell gland complex in front of ovary;
vitellaria commence at about middle of body and terminate at or
near anterior border of testes; transverse uterine coils between
shell gland and cirrus sac; prominent unicellular gland cells
may be present around metraterm; eggs 11-22 µX6-11 µ.
*Notocotylus attenuatus* (Rudolph, 1809) Kessels, 1911

**PL. LXXI**

*Fig. 1* Entire specimen

**PL. LXXII**

*Fig. 2* Anterior end magnified

*Fig. 3* Entire specimen (Sucker-glands)
Echinostoma revolutum (Fröhlrich, 1802) Looss, 1899.

Four specimens of the genus *Echinostoma* Rudolphi, 1809 were collected from the intestine of mallard ducks. These are tentatively assigned to *E. revolutum* and compared with some of the known species of the genus which are closely allied to it.

Echinostomatidae

Echinostomatinae

Echinostoma

*Echinostoma revolutum* (Fröhlrich, 1802) Looss, 1899.

Host: *Anas platyrhynchos platyrhynchos*.

Location: Intestine

Locality: Ningal, Sopore (Kashmir)

**DESCRIPTION**

The body is elongated oval, measuring 6.435 - 6.75 × 0.87 - 0.975 mm. in size. The maximum width is in the acetabular region beyond which the body becomes gradually narrow. The cuticle is covered with more or less oval shaped spines. The spines are more closely set in anterior fourth of body. The lateral spines are well marked and clearly seen in anterior half of body. The oral sucker is terminal or subterminal, 0.135 - 0.15 mm. in diameter. A reniform collar surrounds the head and bears a double row of spines, varying 25 - 30 in number. The spines may not be of uniform shape and size. In one of the specimens the head spines are both oval and spindle-shaped. Short prepharynx leads into a muscular pharynx, 0.15 - 0.18 × 0.135 - 0.15 mm. in size. The intestinal bifurcation is pre-acetabular. The blind ends of caeca are 0.195 - 0.225 mm. from posterior end. The acetabulum
is very well developed and highly muscular. It is spherical 0.615 - 0.675 mm. in diameter. The sucker ratio is roughly 1:4.

The testes are elongated oval in shape and located one behind the other in second half of the body. Anterior testis is 0.78-0.84 x 0.3-0.36 mm. and posterior testis 0.84-0.96 x 0.27-0.36 mm. in size. In one of the specimens an abnormal condition of only one testis is present. It probably represents two fused testes, being large and measuring 1.08 x 0.375 mm. in size. The cirrus sac is oval and located obliquely behind the intestinal bifurcation on the left side. The genital-pore is located at or immediately behind the intestinal bifurcation, slightly shifted to one side.

The ovary is pretesticular. It is much smaller than the testes measuring 0.21 - 0.27 x 0.21 - 0.3 mm. in size. Shell gland is indistinctly seen behind the ovary. The uterus constitutes a few coils with relatively fewer number of eggs. The eggs measure 26 - 27 x 16 - 17 µ in size. The vitellaria consist of rounded follicles commencing at the level of ventral sucker and extending to the level of blind ends of caeca. The transverse vitelline ducts meet shortly anterior to anterior testis. The excretory bladder is Y-shaped.

**SYSTEMATIC POSITION:**

The general morphology of the present specimens agrees with that of *Echinostoma revolutum* to which these are assigned. The difference in the body size and number of collar spines, although consistent in the four specimens, are for the time considered as variations in *E. revolutum* till further material is available to confirm the present observations.

Present specimens can be compared with the species
E. anseris Yamaguti, 1939, E. chloropodes philippinensis
Tubangui, 1932, E. coalitum Barker and Beaver, 1915,
E. armigerum Barker and Irvine, 1915, E. sovindum Moghe, 1932,
E. chasma Lal, 1939, E. splendens, E. bhattacharyai, E. crecii,
E. minimus and E. longicirrus Verma, 1936. While comparing the
foresaid species with E. revolutum and the present specimens, we
find that the E. anseris, having 37 collar spines, could be
conveniently placed under E. revolutum, E. coalitum and E.
armigerum, having more or less the same number of head spines,
has been rightly considered by Gupta (1962) as synonyms of
E. revolutum. Beaver (1937) found these two species identical
to E. revolutum, while discussing its life history. E. chloropodes
philippinensis, although similar in general morphology,
differs widely in the number of head spines. In case of
E. sovindum and E. chasma, the number of head spines, being
32 and 34 respectively, the number approaches to the number
in E. revolutum, but both the forms differ from this species
and present specimens in other morphological characters like
shape of testes, body size, nature of uterine coils etc. All
the five species of Echinostoma, described by Verma (1936),
namely, E. splendens, E. bhattacharyai, E. crecii, E. longicirrus
and E. minimus, resemble our present specimens in all important
characters. The body shape and size, oral sucker, ventral sucker
testes and eggs are more or less similar. The difference in
the number of head spines with that of present specimens, is
considered here as variation of no specific importance. For
the first four species of Verma, named above, the number of head
spines is 37, 35, 32 and 37 respectively. The number in the
fifth species is not given. While the body size of Verma's
species approaches that of present specimens, the number of
head spines is more or less similar to that of E. revolutum.
Variation in the number of head spines has not to be strictly followed as a specific character, particularly when the difference is not wide. Gupta (1962) states that the number of collar spines is variable, as spines do fall off while fixing and mounting the specimens. It is proposed here to assign present specimens having slightly lesser number of collar spines to E. revolutum and place Verma's five species as synonyms of the same species. We agree with Gupta (1962) in considering E. coaliatum and E. armigerum as synonyms of E. revolutum.

As regards the present specimens of Echinostoma, it is possible that these may have to be referred to a new species under which all other species of Echinostoma with approximately the same number of collar spines and approximately the same body size, will be placed. This can, however, be confirmed only after further material, similar, to present specimens, is available.
PLATE LXXIII - LXXV

Rhinocerosa revoluta (Fröhlich 1802) Looss, 1899

PL. LXXIII  Fig. 1  Entire specimen

PL. LXXIV  Fig. 2  Head-collar

PL. LXXV  Fig. 4  Abnormal specimen with single testes.
RAILLIETINA (RAILLIETINA) PARRYUNCINATA (MEGGITT, 1924).

A few cestodes were obtained from the intestine of a duck, *Anas platyrhynchos platyrhynchos* (Anseriformes). On identification, the worms were found to belong to *Raillietina (R.)* parviuncinata (Meggitt, 1924).

Davaineidae Fuhrmann, 1907
Davaineinae Braun, 1900
Genus: Raillietina Fuhrmann, 1920
Sub-genus: Raillietina Fuhrmann, 1920

*Raillietina (R.) parviuncinata* (Meggitt, 1924)

<table>
<thead>
<tr>
<th>Host</th>
<th><em>Anas platyrhynchos platyrhynchos</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Intestine</td>
</tr>
<tr>
<td>Locality</td>
<td>Sopore, Kashmir</td>
</tr>
</tbody>
</table>

**DESCRIPTION**

The cestodes are small bearing 150 to 200 proglottids.
The total length of worms varies from 2.5 to 5.5 cm, and the maximum breadth of the proglottids is 0.75 - 1.12 mm.

The measurement of various regions of the worms are:

- **Immature region** = 6.9 mm.
- **Immature proglottid** = 0.15 x 0.305 mm.
- **Mature region** = 11.25 mm.
- **Mature proglottid** = 0.73 x 0.975 mm.
- **Gravid proglottid** = 0.525 - 0.527 x 0.75 - 1.12 mm.

Fully gravid segments were not available although several hosts were dissected.
The genital-pores are unilateral and are situated almost in the middle of the proglottid.
The scolex is globular but not well marked off from the neck. It measures 0.255 mm. in length and 0.16 mm. in breadth across the sucker region. A well developed rostellum is present, which bears 100 - 120 hooks. Each hook measures 5 - 8 μ in length. Suckers are small, oval in shape and bear minute diffused spines. Each sucker measures 0.07 - 0.09 mm. in length and 0.045 - 0.06 mm. in breadth.

The testes, 28 - 33 in number, are present in the whole of proglottid but restricted between the two longitudinal excretory ducts. They are rounded and measure 15 to 30 μ in diameter. The vas-deferens converges towards the ovary. A thick cirrus-pouch is present, which does not cross the oral longitudinal excretory vessel. It measures 0.105 - 0.215 mm. in length. It is unarmed and opens into the genital atrium in front of vagina.

The ovary is compact and pendulous and located in the middle of the proglottid. It measures 0.08 - 0.12 mm. in length and 0.085 mm. in breadth. A minute spherical vitelline gland is present just posterior to the ovary and measures 0.045 mm. in diameter.

Each gravid proglottid bears 48 - 50 egg-capsules which measure 0.03 - 0.045 mm. in diameter. An egg-capsule contains 3 to 8 eggs which measure 8 - 15 μ in diameter.

The present form agrees in all important characters with Raillietina (R.) parviuncinata described by Meggitt et Saw (1924) from Anas boschas doestica.

As clear from Table V giving comparative measurements, the present collection shows, variations in number of rostellar-hooks, number and distribution of testes which do not extend beyond the longitudinal excretory vessels and number of eggs in an egg-capsule.
**TABLE**

Comparative measurements of *R. (R.) parvuncincta* Meggit, 1924.

<table>
<thead>
<tr>
<th></th>
<th>After Southwell, 1920</th>
<th>Present collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>11 - 12 cm.</td>
<td>2.5 - 5.5 cm.</td>
</tr>
<tr>
<td>Breadth</td>
<td>200 μ</td>
<td>0.75 - 1.12 mm.</td>
</tr>
<tr>
<td>Scolex</td>
<td>260 - 370 μ (D.)</td>
<td>0.255 x 0.15 mm.</td>
</tr>
<tr>
<td>Suckers</td>
<td>Armed 9 rows of spines</td>
<td>Diffused spines. 0.07-0.09 x 0.045-0.06 mm.</td>
</tr>
<tr>
<td>Rostellum (size)</td>
<td>0.026 - 0.3 mm.</td>
<td>0.045 mm. (D.)</td>
</tr>
<tr>
<td>No. of hooks</td>
<td>150 T-shaped; 7-9 μ</td>
<td>100-120; 5-8 μ</td>
</tr>
<tr>
<td>Testes</td>
<td>24 - 39 (27)</td>
<td>28-33; 15-30 μ (D.)</td>
</tr>
<tr>
<td>Cirrus-sac</td>
<td>580 - 840 μ (L.)</td>
<td>0.105 - 0.215 mm. (L.)</td>
</tr>
<tr>
<td>Ovary</td>
<td>-</td>
<td>0.08-0.12 x 0.085 mm.</td>
</tr>
<tr>
<td>Egg-capsules</td>
<td>50 per segment</td>
<td>48 - 50 per segment</td>
</tr>
<tr>
<td>Eggs</td>
<td>11-13 eggs per capsule</td>
<td>3-8 eggs per capsule; 6 - 15 μ (D.)</td>
</tr>
<tr>
<td>Host</td>
<td>Duck</td>
<td><em>Anas platyrhynchos</em></td>
</tr>
<tr>
<td>Localilty</td>
<td>Rangoon</td>
<td><em>platyrhynchos.</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sopore, Kashmir.</td>
</tr>
</tbody>
</table>
PLATES LXXVI

Rallietina (Rallietina) parvuncinata
(Meggitt, 1924)

PL. LXXVI  Fig. 1  Scolex
2  Mature segments
3  Gravid segments.
DICRANOTAENIA CORONULA KASHMIRIENSIS n.var.

A few cestodes were collected from the intestines of a duck, Anas platyrhynchos platyrhynchos from Sopore, Kashmir.

Hymenolepididae Railliet et Henry, 1909
Hymenolepidinae Perrier, 1897
Dicranotaenia Railliet, 1892

Dicranotaenia coronula var. Kashmiriensis n.var.

Host : Anas platyrhynchos platyrhynchos
Location : Intestine
Locality : Sopore, Kashmir.

DESCRIPTION

The cestodes are 31.75 to 23.625 mm. long and the maximum width is 0.91 to 0.915 mm. The scolex is well marked off from the rest of the strobila. The immature region of the worms is 5.9 - 6.3 mm. in length and its proglottids measure 0.05x0.045 mm in size. The mature region, is 4.5-5.25 mm. in length. A mature proglottid measures 0.03 - 0.045 x 0.42 - 0.48 mm in size. A semigravid proglottid is 0.075 x 0.32 mm. and a gravid proglottid is 0.075 - 0.12x0.72 - 0.915 mm. in size.

The scolex measures 0.285 mm. across the suckers and 0.475 mm. in length. The suckers are 0.09 - 0.105 mm. in diameter. The rostellum is armed with a single crown of 20 hooks which are small and 7 - 9 mm. in length. The rostellar-sac measures 0.105 - 0.27 mm. in length. Distinct longitudinal muscles are seen around and at the base of rostellar-sac.

The testes, 3 in number, are rounded and are in a transverse row. Each testis measures 45 - 60 mm. in diameter. The external seminal vesicle is absent. An rudimentary cirrus-pouch is present.
and measures 30 - 50 μ in length. The genital pores are unilateral.

A median fan-shaped ovary with a distinct vitelline-gland postero ventral to it, is seen in early mature segments. The ovary of this region measures 0.03 x 0.13 mm in size, whereas the ovary of fully mature segments measures 0.03 x 0.04 mm in size. The spherical vitelline-gland is 20 to 30 μ in diameter. The uterus is elongated and saccular in the semigravid proglottids. In gravid segments the eggs are seen all along the segment beyond the excretory vessels also. The eggs measure 18-20 x 20-30 μ in size.

**DISCUSSION**

The present hymenoecephal cestode can be placed under *Micranotaenia* (Bailliet, 1892) in which the rostellum has a variable number of hooks in a single row; suckers unarmed; numerous proglottids; testes three in a triangle or in a transverse row; ovary lobulate and saccular uterus.

It comes nearer to *H. coronula* (Dugardin, 1845) - Bailliet, 1892 which is well known species reported from ducks from different parts of the world including domestic duck from Burma. With this species, the present form resembles in the number of hooks, but differs in having three testes in a transverse row. Short cirrus-sac, comparatively small and feebly lobed ovary and distinctly small body length (120 to 190 mm in *H. coronula* after Southwell (1930) and 21 to 23 mm in the present form.

In view of these differences, the present form is regarded here as a distinct variety under *H. coronula* for which the name *Micranotaenia coronula Kashmiriensis* is proposed.
Dieranotaenia Coronula kashmirensis n. var.

PL. LXXVII Fig. 1 Scôlex
2 Early mature segments

PL. LXXVIII Fig. 3 Mature segments
4 Semigravid segments

PL. LXXIX Fig. 5 Gravid segments
6 Egg
0.2 mm.

0.2 mm.
ARMADOSKRIABINIA LONGICIRRA N.SP.

Several cestode specimens were collected from the intestines of common ducks *Anas platyrhynchos platyrhynchos* in Nishat-Bagh area. The cestodes belong to the genus *Armadoskriabinia* and are described herein as a new species due to several distinct morphological features.

Genus: *Armadoskriabinia*

Hymenolepididae (Railliet et Henry, 1909)
Hymenolepidinae (Parier, 1897)

**Description**

The body is 16.8 x 23.86 mm. in length and 0.675 mm. in maximum width. The style saclex although small is not marked off from the neck. Its four muscular suckers are elongated oval in outline. The rostellar-sac is pyriform and armed with only 6 hooks. The handle and blade of each hook are of equal length. A prominent guard is present, but it is shorter than both the blade and the handle.

The three testes present in each segment develop early, when the female genitalia are not yet developed. At this stage the testes are more or less spherical and arranged transversely in a straight line. In fully mature proglottids, the testes become broader transversely but continue to maintain the same position. The cirrus-pouch runs straight along the anterior margin of the
proglottid in early mature proglottids and in the following segments along the inter-segmental line. In a fully mature region, the cirrus-pouch extends up to the level of median testis and in the segments to follow it reaches up to the aporal excretory vessel. Vesicula seminalis externa is pyriform and shows variable size, but a well-developed cirrus is present. It is spinose and has a bulbous distal end. The genital-pores are unilateral and located near the anterior intersegmental line of each segment.

The ovary is small, spherical and inconspicuous in early segments where it is usually overlapping the aporal testis. In a fully mature region, the ovary maintains the same position but it is lobed. The vitelline-gland is very small and located behind the ovary. The uterus which is not seen here in mature segments forms 2 or 3 sacs which are not lobed and occupy the space between the two excretory canals. The uterus is filled with onchospheres.

**Measurements:**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>16.8 - 23.85 mm</td>
<td></td>
</tr>
<tr>
<td>Max. breadth</td>
<td>0.675 mm</td>
<td></td>
</tr>
<tr>
<td>Scolex</td>
<td>0.165 - 0.226 x 0.105 - 0.15 mm</td>
<td></td>
</tr>
<tr>
<td>Restellum</td>
<td>90 - 150 x 30 - 45 d</td>
<td></td>
</tr>
<tr>
<td>No. Rostellar-hooks</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Suckers</td>
<td>0.07 - 0.08 x 0.045 mm</td>
<td></td>
</tr>
<tr>
<td>Immature proglottid</td>
<td>0.03 - 0.046 x 0.075 - 0.21 mm</td>
<td></td>
</tr>
<tr>
<td>Mature proglottid</td>
<td>0.075 - 0.09 x 0.675 - 1.065 mm</td>
<td></td>
</tr>
<tr>
<td>Gravid proglottid</td>
<td>0.09 - 0.105 x 0.15 - 0.39 mm</td>
<td></td>
</tr>
<tr>
<td>Testis (early segments)</td>
<td>45 - 60 d</td>
<td></td>
</tr>
<tr>
<td>Mature testis</td>
<td>0.075 - 0.12 x 0.135 - 0.195 mm</td>
<td></td>
</tr>
<tr>
<td>Cirrus-pouch (early segments)</td>
<td>0.165 - 0.285 mm</td>
<td></td>
</tr>
<tr>
<td>Cirrus-pouch (Mature segments)</td>
<td>0.45 - 0.82 mm</td>
<td></td>
</tr>
<tr>
<td>Cirrus-pouch (semimature segment)</td>
<td>0.345 - 0.375 mm</td>
<td></td>
</tr>
<tr>
<td>Cirrus-pouch (Gravid segment)</td>
<td>0.27 x 0.3 mm</td>
<td></td>
</tr>
<tr>
<td>Ovary (Semi-mature segment)</td>
<td>0.045 - 0.075 x 0.075 - 0.15 mm</td>
<td></td>
</tr>
<tr>
<td>Ovary (Mature segment)</td>
<td>0.06 - 0.095 x 0.195 - 0.25 mm</td>
<td></td>
</tr>
</tbody>
</table>
The present hymenoloeid cestode is assigned to *Armadoskriabinia* Spassky et Spaskaja, 1954 in having similar shape of rostellar-hooks, number of testes, a well developed muscular cirrus-pouch, external seminal vesicle and in having fewer lobes of uterine-sacs in the gravid segments. The present form however shows several differences also with the said genus. These are:

1. Number of rostellar hooks being 6 instead of 10
2. Disposition of testes, arranged in a transverse row.
3. Two to three uterine-sacs which are not lobed and are restricted between the two excretory ducts.

When compared to the known species of the genus of which five species have been placed under the said genus by Yamaguti, 1959 the present form is found to be distinct in having only 6 rostellar-hooks, in the disposition of testes, shape of uterine-sacs in the gravid segments and the aporal extent of the cirrus-pouch. These differences are also true when the present species is compared with the genotype *A. medici* (Stossich, 1890) Spassky et Spaskaya, 1954, which has also been reported from *Pelicanus* sps. from India.

In view of these differences, the present form is considered here to be a new species for which the name *Armadoskriabinia longicirra* is proposed.

The distinguishing features of the new species are as under:

10) Scolex not marked off from the neck.
11) Rostellum with a single row of six hooks. Each hook with approximately equal handle and blade and a
prominent but short gaurd.

iii) Testes 3 in a transverse row.

iv) Ovary lobed and dorsal to aporal testis.

v) Vitelline-gland posterior to ovary.

vi) Uterus in gravid segments forms two to three sacs which are not lobed and are filled with relatively few number of eggs.

vii) Body length 16 - 24 mm.

**REVISED GENERIC-DIAGNOSIS.**

*Hymenolepidinae:*

Rostellum well developed with 6 to 10 or more hooks, the handle and blade of which are approximately of the same length and with a prominent gaurd shorter than blade; suckers unarmed; inner longitudinal muscle bundles numerous; testes three; one poral and two antiporal, may be in a triangle or in the same straight line; cirrus-pouch muscular, long, may or may not reach the aporal margin; accessory stylet absent; external and internal seminal vesicles distinct; ovarian lobes long, overlapping testes or antiporal testis only; vitelline-gland may be median or posteriorian; uterus begins as a transverse tube and forms two to three lobed sacs which may occupy the whole of the proglottid or remain restricted between the two excretory ducts. Parasites of aquatic birds.
Armado skriabinia longicirra n.sp.

PL. LXX
Fig. 1 Scolex
Fig. 2 Early mature segments

PL. LXXXI
Fig. 3 Mature segments (with vitelline-gland)
4 Fully mature region

PL. LXXXII
Fig. 5 Gravid segments
6 Cirrus-pouch in mature region

PL. LXXXIII
Fig. 7 Cirrus-pouch in gravid region.
Three specimens belonging to the genus Typhlocoelum Stossich, 1902 were collected from the air-passages of brown duck in Kashmir.

According to the key of species of Typhlocoelum given by Fotedar (1964), the present specimens fall under the known species Typhlocoelum sisowi (Skrjabin, 1913) Dubois, 1952, which has not been so far recorded from India. A new variety of the same species has been however, described from Anas acuta by S.P. Jain (1966). The only other species recorded so far from Kashmir from Olatarrhynchos platyrhynchos is Typhlocoelum indicum Fotedar, 1964.

Typhlocoelum sisowi was originally recorded from Anas boschas domestica and later from other species of Anas.

DESCRIPTION

These tracheal flukes are comparatively large, broadly oval in shape being 7.065 - 8.355 x 8.075 - 3.615 mm. in size. The cuticle is smooth having no spines. Oral-sucker is weakly developed and the ventral-sucker is absent. The ventral-sucker is only present in Typhlocoelum symbium Krull, 1940. Lal (1936) has recorded ventral-sucker in Typhlocoelum 3hovellus also.
The sub-terminal oral-sucker measures 0.255 - 0.3 x 0.55-0.6 mm. in size. It leads into the pharynx through a short pre-pharynx. The pharynx is almost spherical in shape and measures 0.21 x 0.27 x 0.195 x 0.27 mm. in size; whereas the prepharynx is 0.15 - 0.165 mm. long. The pharynx is followed by a short oesophagus, which is 0.105 - 0.235 mm. in length. It immediately bifurcates into two intestinal caecae, which unite at the base to form a complete arch. Both the intestinal caeca give out diverticulae along the inner side. Each caecum has 12 to 14 diverticulae. The length of each diverticulum varies from 0.165 - 0.45 mm.

The excretory-bladder is half moon-shaped or somewhat elongated, situated just below the intestinal arch. Small, numerous vitelline-follicles are distributed laterally along the intestinal caecae.

The two testes are obliquely placed in the posterior part of the body. They are spherical in shape. Posterior testis is median and located in front of the intestinal arch. The anterior testis is a little in front towards the left side. The size of the anterior testis is 0.255-0.3 x 0.225 - 0.285 mm. and that of the posterior testis is 0.21 - 0.3 x 0.165 - 0.315 mm. A small cirrus-sac is present. The genital-pore is median and immediately in front of pharynx.

The ovary is somewhat oval in shape and located along the inner border of right caecum. It is 0.21 - 0.36 x 0.255-0.3 mm. in size. A very well developed uterus is present, the uterine coils are not significant, but numerous eggs are present in the intercaecal field. The uterine coils are
only distinct in the anterior and posterior regions. The eggs are broadly oval and measure 0.075 - 0.12 x 0.045-0.06 mm.

Including the present species, there are now four species of Typhlocoelum, recorded so far from India.

Typhlococcolum sisovii (Skrjabin, 1913) Dubois, 1952.

PL. LXXXVII  Fig. 1  Entire specimen
**NOTAULUS ASIATICUS** Skrjabin, 1913.

Ooisthorchidae  
Braun, 1901  
Ooisthorchinae  
Looss, 1899  
Notaulus  
Skrjabin, 1913.

**Host:** Anas Sp. (Brown ducks).  
**Location:** Bile-passages - Liver.  
**Locality:** Kashmir.

*Notaulus asiaticus* was originally described from origin Aygula imperialis and Circus cinereus from U.S.S.R. Morgan (1935) described *Ooisthorchis dendriticus*, which was nearer to the morphology of *Notaulus*, but he preferred to place his species under *Ooisthorchis* and regarded Skrjabin's genus *Notaulus* a synonym of *Ooisthorchis*.

Ganta (1963) rightly considers Notaulus a distinct genus. Skrjabin and Pemrovy (1950) has listed two species *Notaulus asiaticus* and *N. dendriticus* under the genus *Notaulus*.

The present specimens of *Notaulus* agree with the original description of *N. asiaticus* and is accordingly assigned to it.

**MEASUREMENTS** (in mm.)

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>8.49 - 21.735</td>
</tr>
<tr>
<td>Breadth in testicular region.</td>
<td>0.6 - 1.24</td>
</tr>
<tr>
<td>O.I. diameter.</td>
<td>0.06 - 0.12</td>
</tr>
<tr>
<td>Pharynx</td>
<td>0.09 x 0.075 - 0.15</td>
</tr>
<tr>
<td>Oesophagus length</td>
<td>0.315 - 0.425</td>
</tr>
<tr>
<td>V. I. diameter.</td>
<td>0.075 - 0.15</td>
</tr>
</tbody>
</table>
Length of left intestinal caecum = 8.325 - 20.625

Length of right intestinal caecum = 8.325 - 20.64

Ovary = 1.08 - 0.45 x 0.705 - 0.27

Vitellaria away from ant. end. = 2.925 - 7.635

Vitellaria away from post. end. = 2.25 - 5.955

Anterior testis = 1.2 - 2.655 x 0.45 - 1.155

Posterior testis = 1.2 - 2.58 x 0.405 - 1.2

Eyes = 0.422 - 0.024 x 0.015
Plate LXXXV

Notaulus asiaticus Krjabin, 1913

PL. LXXXV  Fig. 1  Entire specimen
Psilochasmus oxyurus (Creplin, 1825) Lühe, 1910.

Psilostomatidae  Odhner, 1913
Psilostominae   Lühe, 1909
Psilochasmus    Lühe, 1909
               (emend. Odhner, 1913)

Psilochasmus oxyurus (Creplin, 1825) Lühe, 1910.

Host: *Anas* sp. (Brown ducks)
Habitat: Intestine
Location: Anchar, Kashmir.

One mature trematode specimen belonging to the genus *Psilochasmus* was collected from the intestine of brown ducks from Anchar, Kashmir. These specimens are assigned to *P. oxyurus* with which they agree in all essential characters. *P. Longicirratus* is regarded as a synonym of *P. oxyurus*.

**DESCRIPTION**

The specimen measures 5.28 mm. in length and 0.975 mm. in maximum width in acetabular region. The oval sucker is 0.3 mm. in diameter and smaller than ventral sucker. The body, having a characteristic shape of the genus, has a terminal operable-caudal spike, measuring 0.36 mm. in length.

The acetabular region is very prominent due to a large muscular ventral sucker which is well raised and located at the level of the posterior border of anterior third of body length. It measures 0.6 x 0.45 mm. in size. The pharynx is 0.195 mm. in diameter and oesophagus which is very well developed and muscular, 0.75 mm. in length and 0.21 mm. in width, being wider than pharynx. The caeca terminate shortly
in front of posterior end.

The two testes are one behind the other, inter-caecal and slightly lobed laterally. The anterior testis measures 0.475 and posterior testis 0.45 mm in length. They are located in second half of the body. The cirrus-pouch is fairly long and encloses a coiled voluminous seminal vesicle in its proximal region. It measures 1.5 mm in length and terminates anteriorly at the genital-pore near the anterior border of acetabulum. Posteriorly it extends to the level of anterior border of ovary.

The ovary is much smaller than testes. It is more or less spherical and measures 0.25 mm. in diameter. The receptaculum seminis is absent. The uterus has a few haocs and contains only a few large eggs measuring 60×45 μ in size. The vitelline follicles extend anteriorly to the level of posterior border of acetabulum and posteriorly to the blind ends of Caeca. The follicles are both lateral and caecal and join mesially behind the posterior testis.
Psilocheasmus longicirratus Skrjabin, 1913 is mainly differentiated from other species of the genus, including the type species \( P. \text{oxyurus} \) in having a longer cirrus-pouch. Measurements of cirrus pouch of \( P. \text{longicirratus} \) recorded by Skrjabin (1913), Tubangui (1932) and Hsi and Chow (1938) is 1.292-1.302 mm., 1.1.3 mm. and 1.6 mm. respectively. In the present specimen, it measures 1.5 mm. in length and still does not cross the ovarian level. Since the relative length of cirrus-pouch and its posterior extent in the present specimen approaches to that recorded in \( P. \text{longicirratus} \) and still retaining all the characteristics of \( P. \text{oxyurus} \), it is proposed to place \( P. \text{longicirratus} \) as a synonym of \( P. \text{oxyurus} \) as has been rightly done by Stunkard (1931) Inamdar, Dharwar and Bhalerao (1944) named their collection of \( \text{Psilocheasmus} \) from \( \text{Nyrome ferina} \) from Indian as \( P. \text{longicirratus} \).

Gusta (1957) described a new species \( P. \text{indicula} \) from \( \text{Casara rufila} \) and recorded \( P. \text{oxyurus} \) from the same host. Jaiswal (1957) described two new species of \( \text{Psilocheasmus} \), \( P. \text{alii} \) from common duck \( \text{Anas crecca} \) and \( P. \text{megacytaulus} \) from field \( \text{Egret, Ardeola gravi} \) of Hyderabad, India.
Psilochamus arvirus
(Creplin, 1825) Lühe, 1910

PL. LXXXVI    Fig. 1    Entire specimen
Twelve thick specimens were recovered from *Anas* sp. (Brown-duck) and were identified as *Drepanidotaenia lanceolata* (Bloch, 1782) Railliet, 1892.

**Hymenolepididae** Railliet et Henry, 1909

**Hymenolepidinae** Perrier, 1897

**Genus: Drepanidotaenia** Railliet, 1892

*Drepanidotaenia lanceolata*

Bloch, 1782) Railliet, 1892

**Host**: *Anas* sp. (Brown-duck)

**Location**: Intestine

**Locality**: Srinagar, Kashmir.

**DESCRIPTION**

The worms measure 6.376 - 30.32 mm. in length and the maximum width is 12 mm.

The scolex is small and more or less spherical, measuring 0.105 mm. in length and 0.075 - 0.09 mm. in breadth in the sucker-region. The rostellar-sac is muscular and measures 30x57 μ in size. The rostellum is armed with 8 hooks. The guard of each hook is short, but the blade is very much curved. Each hook measures 15 - 20 μ in length. The suckers are oval, measuring 30 - 32 x 50 - 60 μ in size and are highly muscular.

The three testes develop early in the strobila when the ovary has not appeared. They are elongated, slightly lobular and present towards the poral side. Fully developed testes measure 0.165 mm. in length and 0.315 mm. in breadth. The cirrus-pouch is slender and elongated, extending up to the median testis. It measures 0.5 - 0.95 mm. in length. The poral end of cirrus-pouch is spinose and the proximal end of cirrus is...
funnel-shaped, bearing spiny bristles. The external seminal vesicle is not distinct. Genital-pores are sunken and unilateral.

The ovary is fan-shaped highly lobular and placed towards the antiporal side. It measures 0.15 - 0.18 mm in length and 0.25 - 0.28 mm in breadth. The vitelline-gland is just posterior to the ovary. It is compact and measures 18 μ in diameter.

When compared with the known description of the species, the present specimens show minor variations in the shape of suckers, size of rostellar-hooks and cirrus-pouch.
### Comparative measurements of *H. lancospata* (Bloch, 1782) Railliet, 1892.

<table>
<thead>
<tr>
<th></th>
<th>After Southwell, 1930</th>
<th>Author's collection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong></td>
<td>13 cm.</td>
<td>6.375 - 30.32 mm.</td>
</tr>
<tr>
<td><strong>Breadth</strong></td>
<td>1.8 cm.</td>
<td>12 mm.</td>
</tr>
<tr>
<td><strong>Scolex</strong></td>
<td>-</td>
<td>0.105 x 0.075 - 0.09 mm.</td>
</tr>
<tr>
<td><strong>Hostellar-sac</strong></td>
<td>-</td>
<td>57 x 30 μL</td>
</tr>
<tr>
<td><strong>R. hooks</strong></td>
<td>8; 30 - 35 μL</td>
<td>8; 15 - 20 μL</td>
</tr>
<tr>
<td><strong>Suckers</strong></td>
<td>-</td>
<td>50 - 60 x 30 μL</td>
</tr>
<tr>
<td><strong>Testis</strong></td>
<td>-</td>
<td>0.165 x 0.315 mm.</td>
</tr>
<tr>
<td><strong>Cirrus-pouch</strong></td>
<td>-</td>
<td>0.5 - 0.95 mm.</td>
</tr>
<tr>
<td><strong>Ovary</strong></td>
<td>-</td>
<td>0.15 - 0.18 x 0.25 - 0.28 mm.</td>
</tr>
<tr>
<td><strong>Vitelline-gland</strong></td>
<td>-</td>
<td>18 μL</td>
</tr>
<tr>
<td><strong>Eggs</strong></td>
<td>50 x 30 μL</td>
<td>-</td>
</tr>
<tr>
<td><strong>Host</strong></td>
<td><em>Chenoparis strata</em></td>
<td><em>Anas sp.</em></td>
</tr>
<tr>
<td><strong>Locality</strong></td>
<td>Bengal</td>
<td>Kashmir.</td>
</tr>
</tbody>
</table>
PLATE VIII

Drepanidotaenia lanceolata
(Bloch, 1782) Weinland, 1858

PL. LXXXIII   Fig. 1 Seolex
              2 Mature segments
              3 Cirrus-pouch
Large number of cestodes with a number of detached gravid proglottids were recovered from the intestine of common house crows, Corvus Splendans caught at Baramulla, Kashmir.

On identification, the worms were found to belong to the sub-genus Paroniella Fuhrmann, 1920 of the genus Raillietina and to the species Raillietina (Paroniella) Corvina (Fuhrmann, 1905) Fuhrmann, 1920.

<table>
<thead>
<tr>
<th>Family</th>
<th>Fuhrmann, 1907</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribe</td>
<td>Braun, 1900</td>
</tr>
<tr>
<td>Genus</td>
<td>Raillietina</td>
</tr>
<tr>
<td>Sub-genus</td>
<td>Paroniella</td>
</tr>
</tbody>
</table>

Raillietina (Paroniella) corvina (Fuhrmann, 1905) Fuhrmann, 1920

Host : Corvus Splendans  
Location : Intestine  
Locality : Baramulla, Kashmir.

DESCRIPTION

The cestodes are long, consisting of a number of proglottids, which are generally quite broad as compared to their length, except some last proglottids which are longer than broad.

The scolecites of the worms were not available, so the description is based on mature and gravid proglottids only.

The worms are 15 - 20 cm. long. The mature segments are broader than long and 0.165 - 0.18 x 1.275 - 1.32 mm. in size. The semigravid are 0.285 - 0.385 mm. long and 1.2 - 1.55 mm. in breadth. Fully gravid proglottids measure 2.89 - 3.55 x 2.25 - 2.4 mm. in size.
The testes are spherical, 27 - 30 in number and located on either sides of the ovary in two groups, but they do not extend beyond the longitudinal excretory canals. Each testis measures 30 - 40 μ in diameter. A coiled vas deferens is present. The cirrus-pouch does not extend beyond the longitudinal excretory vessel. The genital-pores are unilateral, situated in the posterior third of each proglottid.

The ovary is situated in the middle between the two groups of testes and consists of 8 - 10 tubule-like follicles. It measures 0.06 - 0.085 mm. in length and 0.18 - 0.195 mm. in breadth. The vagina is a thin and straight tube, which crosses the longitudinal excretory canal and opens into the genital atrium posterior to the cirrus-pouch. The vitelline-gland which is spherical, lies just posterior to the ovary and measures 0.06 x 0.075 mm. in diameter.

Immediately after the mature segments, the uterus makes its appearance and the ovary gets distorted. Ultimately the uterus breaks up into egg-capsules. A gravid proglottid bears numerous egg-capsules which do not extend beyond the longitudinal excretory ducts. Each egg-capsule bears a single egg. An egg-capsule measures 45 - 50 μ x 30 - 35 μ and the onchosphere 40 - 45 x 25 - 35 μ in diameter.

The specimens of Raillietina from Corvus splendens as described above belong to the sub-genus Paroniella, in having unilateral genital-pores and a single egg in each capsule. In all other features, the worms possess the typical characters of the genus Raillietina.

The species of the sub-genus Paroniella described so far from Corvidae in India are:

R. compacta (Clerk, 1906),
R. corvina (Fuhrmann, 1905) in *Corvus culminatus* and *C. macro rhynchos*.

*R. rehnoldae* (Meggitt, 1926) from *Corvus splendens inselens*.

The form described here resembles *Raillietina Corvina*, as the body size, the number of testes and the shape of the ovary are similar. Slight difference is noted in the position of genital-pore which is more or less at the middle of the segment in *Corvina*, but is near the posterior region in the present form. The present form is accordingly assigned to *R. (2.) Corvina*. 
Variations in characters of *R. (R.) corvina* (Fuhrmann, 1905)

<table>
<thead>
<tr>
<th>Character</th>
<th><em>R. (R.) corvina</em> (Fuhrmann, 1905)</th>
<th>Present collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>12 cm.</td>
<td>15 - 20 cm.</td>
</tr>
<tr>
<td>Breadth</td>
<td>2 - 3 mm.</td>
<td>3.56 mm.</td>
</tr>
<tr>
<td>Rostellar-hooks</td>
<td>80; 16 - 18 μL</td>
<td>-</td>
</tr>
<tr>
<td>Suckers</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No. Spines</td>
<td>5 - 6 rows</td>
<td>9 μL</td>
</tr>
<tr>
<td>Testes</td>
<td>26</td>
<td>27-30; 30-60 μL</td>
</tr>
<tr>
<td>C-irrus Pouch (size)</td>
<td>100 x 40 μL</td>
<td>0.105 - 0.12 mm.</td>
</tr>
<tr>
<td>Ovary</td>
<td>-</td>
<td>0.06-0.095 x 0.18-0.195 mm.</td>
</tr>
<tr>
<td>Vitelline-gland</td>
<td>-</td>
<td>0.06 - 0.075 mm.</td>
</tr>
<tr>
<td>Egg</td>
<td>-</td>
<td>40 - 45 x 25 - 28 μ</td>
</tr>
<tr>
<td>Host</td>
<td><em>Corvus macrorhynchos,</em></td>
<td><em>Corvus splendans.</em></td>
</tr>
<tr>
<td></td>
<td><em>Corvus splendans.</em></td>
<td></td>
</tr>
<tr>
<td>Localilty</td>
<td>Orissa, Calcutta</td>
<td>Baramulla,  Kashmir.</td>
</tr>
</tbody>
</table>
Plates LXXXVIII - LXXXIX

Rhillistina (Paroniella) Corvina (Fuhrmann, 1905)

PL. LXXXVIII
Fig. 1 Mature segments
2 Semigravid segments

PL. LXXXIX
Fig. 3 Gravid segments
4 Eggs
Large number of the spirurid nematodes belonging to the genus *Aquaria* Bremer, 1811 were recovered from underneath the horny lining of the rizard of *Corvus monedula*.

On examination the worms were found to belong to the species *A. anthuris* (Rudolphi, 1819) Railliet, Henry et Sisoff, 1912; recovered for the first time from this area. This species has been however, recorded earlier from a variety of hosts from other parts of India. Mapleton, 1913 described *A. acutata* from Indian tree-pie (*Dendrocitta rufa*) which was however placed as a synonym of *A. anthuris* by Baylis and other workers. *A. anthuris* has been recorded from the red-billed blue magpie (*Urocissa erythrorhynchos occipitalis*) by Baylis and Daubney, 1922 and from the red-billed chough (*Pyrrhocorax pyrrhocorax*) = (*Graculus erentia*) by Mapleton, 1931.

Singh, 1948 gave a revised description of this species recovered from the common house crow (*Corvus splendans*) and jungle-crow (*Corvus macrourhynchos*) from Hyderabad. Slight variations were recorded in the present specimens of *A. anthuris* which are included in the brief description given below.

Railliet, Henry and Sisoff, 1912 divided the genus *Aquaria* into a number of sub-genra. This sub-genre division was followed by Baylis and Daubney (1926), Baylis (1939) and Yorke and Mapleton (1926). Later workers like Singh (1948) Yamaguti (1961) prefer to treat *Aquaria* as a separate genus.
raising other relevant sub-genra to the rank of genera. The
writer would also prefer to follow the same scheme of
classification of this complex genus *Aquaria*.

*Spiruroidea*

*Acariidae* syn.

*Anthuria*

*Cheilospirura*

*Dispharagus*

*Spiropterus*

*Aquaria anthuris* (Rudolphi, 1819)

**DESCRIPTION**

**Male.** The males are very small and comparatively
more slender than females. They measure 6.45 - 9.45 mm. in
length and 0.18 - 0.225 mm. in breadth. The length of male
specimens also is comparatively lesser than the already
described specimens of *A. anthuris*. The cuticular striations
are at a distance of 2 - 4 μ. The pharynx is 0.15 - 0.21 mm.,
but the total length of oesophagus is 1.8 to 2.37 mm. The
cordons extend unto the oesophageal level and end at a
distance of 2.25 - 2.38 mm. from the anterior tip. The male
tail is 0.345 - 0.435 mm. in length. Very well developed
caudal alae are present and their length varies from
0.63 - 0.81 mm. Four pairs of well developed pedunculate
papillae are present and a variable number of six to seven
pairs are present in the postanal region. The spicules are
subequal and alate and measure 0.165 - 0.225 mm. and
0.18 - 0.225 mm. respectively.

**Female.** The females are 12.3 - 14.26 mm. in length with a
diameter of 0.36 - 0.39 mm. The length of these specimens
is comparatively lesser than those which have been already described by Railliet, Henry and Sisoff (1912), Baylis (1939) and Singh (1948). The cuticular striations are at a distance of 2 - 3 μ. The cordons extend up to a length of 5.705 - 7.095 mm. from the anterior end. The length of pharynx varies from 0.195 - 0.27 mm. and total length of oesophagus is 2.25 - 3.15 mm. A short tail is present in females having a length of 0.255 - 0.345 mm. Papillae are absent in the case of females. The vulvar opening is almost at the middle of the body of the worm. It is at a distance of 5.7 - 7.2 mm. from the anterior end. The uterii are full of thick shelled eggs. The eggs measure 35 - 46 x 25 - 27 μ.

Various species of *Aemusla* recorded so far from Indian sub-continent are:

1) *A. anthuris* (Rudolphi, 1819), Syn. *A nebraskensis*, Williams, 1929, in *Coracias garrula*, *Oriolus salbula* Europe. Also in *Corvus*, *Urocissa*, *Pyrrhocorax*, *Dendrocitta*, *Pica*; Europe, Canada, U.S.A., India (Hyderabad) and Kashmir and Japan.


iii) *A. conica* Maplestone, 1931 in *Copyschus saularis*; Calcutta Zoo. Assigned by Baylis (1939) to sub-genra *Acusala*.

iv) *A. hyderabandensis* Singh, 1948, in *Accipitor nipus*; India.


vi) *A. lata* Maplestone, 1931, in *Pallulus roulelroule*; India.

vii) *A. scutata* Maplestone, 1931 in *Dendrocitta rufa*; India.

viii) *A. tigrinini* Zersteka, 1926 in *Passer domesticus*.

*Z. montanus*; Russia, India.
**PLATE 3 XC - XCI**

*Acuaria anthuris* (Rud., 1819)
Railliet et Henry Sisoff, 1912

**PL. XC**

*Fig. 1* Anterior region

**PL. XCI**

*Fig. 2* Ventral view
mail tail

*Fig. 3* Lateral view
mail tail.
RAILLIETINA (PARONIELLA) HIMALAYANA N.SP.

Out of the two birds Corvus monedula in shot in the J&K University Campus, Srinagar, one revealed the infection of a single cestode, recovered from its intestine. Study of the parasite belonging to the genus Raillietina and sub-genus Paroniella, revealed several morphological features which distinguish it with the existing species of the genus. It is considered here to constitute a new species.

Davaineidae Fuhrmann, 1907
Davaineinae Braun, 1900
Genus: Raillietina Fuhrmann, 1920
Sub-genus: Paroniella Fuhrmann, 1920

Raillietina (Paroniella) himalaya N.Sp.

Host: Corvus monedula
Location: Intestine
Locality: University Campus, Srinagar.

DESCRIPTION

The cestode is a large one, having a length of 11.6 cm. and a maximum breadth of 0.81 - 1.085 mm. The posterolateral prolongations are significant in the immature proglottids, but they are less marked in the posterior proglottids. The segmentation is however indistinct, although proglottids are craspedote. Proglottids are broad in immature and mature region of the worm but are longer than broad in the posterior region.

The scolex is not marked off from the neck and is armed with a double crown of rostellar-hooks. It measures 0.3 mm. in length and 0.24 mm. in breadth. The four suckers are large, muscular and are diagonally placed. They measure 0.075 - 0.09 mm. in diameter. The rostellum is well marked elongated, measuring
0.075 mm. in breadth and 0.27 mm. in length. It is armed with a double crown of 20 hooks at its tip. The hooks of the inner crown measure 15 - 20 μ and that of the outer crown 22 - 25 μ in length.

The immature proglottids are very few in number and measure 0.09 - 0.31 mm. in length and 0.21 to 0.57 mm. in breadth. The immature region of the worm is 8.7 mm. in length and the mature region 9.75 mm. A fully mature proglottid measures 0.42 - 0.45 mm. in length and 0.84 - 1.15 mm. in breadth. A fully gravid proglottid measures 1.425 mm. in breadth and 2.7 mm. in length.

The longitudinal excretory ducts are quite narrow. These are joined by a narrow transverse excretory duct in each segment. The ventral longitudinal excretory duct measures 15 μ in immature region, 25 - 30 μ in mature proglottids and 45 μ in gravid proglottids in diameter.

The testes 40 to 50 in number are scattered in the whole of the proglottid. They are closely aggregated and are present posterior to the ovary, bounded by the longitudinal excretory ducts. The testes in fully mature proglottids measure 30 - 55 μ in diameter. Cirrus-pouch is present near the anterior third of the segment, but it is indistinctly seen in all segments. The genital-atries have unilateral arrangement. The cirrus-pouch is elongated pyriform but does not extend beyond the poral longitudinal excretory duct. It measures 0.09 - 0.1 mm. in length. The cirrus is small and slender. Fine hair-like processes were found in the genital-atrium of semigravid proglottids.

The ovary is small with compact tubular lobes. It is present at the anterior most part of the proglottid towards the poral side. It measures 0.09 mm. in length and 0.12 mm. in breadth.
The vitelline-gland could not be located. Neither the receptaculum seminis nor the vagina have been clearly traced. The uterus develops rapidly and when fully developed, it occupies whole of the proglottid. It soon breaks into egg-capsules, each containing a single onchospheres. An egg-capsule measures 0.03 – 0.045 mm. across and the onchospheres within are 28 – 30 μ in diameter.

DISCUSSION

Several species of the genus Raillietina have been described from the birds of the family Corvidae from different parts of the world.

In India, Raillietina (R.) manilatens 

Southwell, 1930 from Macav; Raillietina (S.) Nakia Johri, 1934 in Corvus splendens; Raillietina (P.) compacts (Clerc; 1906) from Corvus; Raillietina (P.) Corvina (Fuhrmann, 1905) in Corvus sps.; Raillietina (P.) reynoldsae Meggitt, 1926 in Corvus splendens insolae.

Comparing the present form with the above species belonging to the sub-genus Paronlella, it is found to differ from Raillietina (P.) compacts in having lesser number of rostellar hooks and from Raillietina (P.) Corvina in the number of rostellar hooks and from Raillietina (P.) Corvina in the number of rostellar hooks, shape of ovary and number of testes (ovary is fan-shaped and number of testes is 26; 80 rostellar-hooks in R. (P.) Corvina). In Raillietina (P.) reynoldsae, the number of testes is nearer to the present form i.e. 39. But differs in all other major specific characters. Such differences are also noted when the present form is compared with the remaining species of the sub-genus.

The distinguishing features of the present form are:

Broad suck scolex with well developed suckers; double crown of 20 rostellar-hooks; scolex continued insensibly into
neck; 40 - 50 testes in each segment, small lobulate but fairly compact ovary near the anterior margin of each proglottid; genital-pores unilateral; cirrus-sac nearer to anterior margin; numerous egg-capsules extending beyond the excretory tubes and each containing a single egg.

In view of the said differences with the known species of the sub-genus and considering the above said distinguishing features of the present form, it is regarded here to constitute a new species, for which the name *Raillietina (Paroniella) himalayana* is proposed.
Raillietina(Paromielia) himalayana n.sp.

PL. XCII
Fig. 1 Scolex

PL. XCIll
Fig. 2 Early mature segments
Fig. 3 Mature segments

PL. XCV
Fig. 4 Gravid segments
5 Egg
RAILLIETINA (RAILLIETINA) NAGPURENSIS (MOGHE, 1925)

Four specimens belonging to the genus Raillietina were recovered from domestic pigeons, *Columbia livia domestica* in Srinagar. Their study revealed that they belong to *Raillietina (R.) nagpurenensis* (Moghe, 1925) which were described from the same host.

A brief description of the species is given as under:

**Davaineidae**
- Fuhrmann, 1907

**Davaineinae**
- Braun, 1900

**Genus**
- Raillietina

**Subgenus**
- Raillietina

**Raillietina (R.) nagpurenensis** (Moghe, 1925)
- **Host**: *Columbia livia domestica*
- **Location**: Intestine
- **Locality**: Baramulla, Kashmir.

**DESCRIPTION**

The cestodes are 11 - 15 mm. in length and 1.23 - 1.51 mm. in maximum breadth in the region of semigravid proglottids. The measurements of various regions of the worms are:

- **Immature region** = 6.3 mm.
- **Immature proglottid** = 0.12 - 0.15 x 0.405 - 0.45 mm.
- **Mature region** = 14.55 mm.
- **Mature proglottid** = 0.3 - 0.45 x 0.99 - 1.42 mm.
- **Semigravid proglottid** = 0.45 x 1.51 mm.
- **Gravid proglottid** = 0.9 - 1.05 x 1.17 - 1.45 mm.

The scolex is small, but not well marked off from the strobilar region. It measures 0.25 - 0.27 mm. in length and 0.16 - 0.18 mm. in breadth in the sucker region. A well developed rostellum is present and bears a single crown of
180 - 200 hooks. The rostellum measures 0.045 mm. in length and 0.025 mm. in width and each rostellar-hook 8 - 10 μ in length. The suckers are large and oval, measuring 0.135x0.075-0.09 mm. Each sucker is armed with about 10 - 12 rows of spines and a spine measures 3 - 5 μ in length.

The two ventral longitudinal excretory ducts are joined by a transverse excretory vessel in each segment.

The testes 26 to 29 in number are situated in lateral and posterior field of the proximal proglottid around the ovary. Maximum number of testes is present on the aporal side of the proglottid. They are rounded and measure 0.03 x 0.045 mm. in diameter. Vas-deferens shows compact coils before entering the cirrus-pouch. The cirrus-pouch is elongated and pyriform. It measures 0.09 to 0.105 mm. in length. A small armed cirrus is present.

The ovary is large and lobulate bearing 10 - 14 lobes. It measures 0.12 - 0.135 mm. in length and 0.15 - 0.165 mm. in maximum breadth. Vitelline-gland is immediately posterior to the ovary and is slightly elongated. It measures 45 to 60 μ in diameter. The genital-pore is situated laterally in the middle of the proglottid. Semi-gravid segments bear a reticulate uterus. The gravid segments bear 54 - 62 egg-capsules per proglottid and each capsule contains 2 - 8 eggs. The egg-capsule measures 0.06 - 0.135 mm. in length and 0.05-0.08 mm. in width and an egg 15 - 30 μ.
The species reported so far from the pigeons of the Indian region are:

- *Raillietina ceylonica* (Baezynska, 1914) from *Columba livia lenconata*.
- *Raillietina nagoureensis* Moghe, 1925 in domestic pigeons.
- *Raillietina perplexa* Johri, 1933 in *Columba intermedia*.
- *Raillietina ak polychalix* (Kotlan, 1921) *Columba livia*.
- *Raillietina spiralis* (Bacz-ynska, 1914) in *columba* sps. New Delhi. Also reported by K.P. Singh, 1969 from India from the same host.
- *Raillietina torquata* (Meggitt, 1924) from pigeons.
- *Raillietina Volzi* (Fuhrmann, 1905) in *Columba livia*.
Comparative measurements *R.* (*R.*) *nagpurensis* Moghe, 1925.

<table>
<thead>
<tr>
<th></th>
<th>After Southwell, 1930</th>
<th>Present collection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong></td>
<td>25 - 27 cm.</td>
<td>11 - 15 cm.</td>
</tr>
<tr>
<td><strong>Breadth</strong></td>
<td>1.3 mm.</td>
<td>1.23 - 1.51 mm.</td>
</tr>
<tr>
<td><strong>Scolex</strong></td>
<td>340 - 380 μm (3)</td>
<td>0.25 - 0.27 x 0.16 - 0.18 mm.</td>
</tr>
<tr>
<td><strong>Suckers</strong></td>
<td>Armed single row. 17 μm</td>
<td>Armed; 10 - 12 rows spines; 3 - 5 μ; 0.135 x 0.075 - 0.08 mm.</td>
</tr>
<tr>
<td><strong>Rostellum</strong></td>
<td>-</td>
<td>0.045 x 0.025 mm.</td>
</tr>
<tr>
<td><strong>R. hooks.</strong></td>
<td>220; 17 μ and 19 μ</td>
<td>180 - 200; 8 - 10 μ</td>
</tr>
<tr>
<td><strong>Testes</strong></td>
<td>19 - 22</td>
<td>26 - 29; 30 - 45 μ (D)</td>
</tr>
<tr>
<td><strong>Citrus-sac</strong></td>
<td>90 x 30 μ</td>
<td>0.09 - 0.105 mm. (L.)</td>
</tr>
<tr>
<td><strong>Ovary</strong></td>
<td>645 μ (B.)</td>
<td>0.11 - 0.135 x 0.15 - 0.165 mm.</td>
</tr>
<tr>
<td><strong>Eggs Capsules</strong></td>
<td>50 - 94 per segment 50 x 43 μ</td>
<td>54 - 62 per segment; 0.06 - 0.135 x 0.05 - 0.08 mm.</td>
</tr>
<tr>
<td><strong>Eggs</strong></td>
<td>3 - 8 eggs per capsule 17 x 14 μ</td>
<td>2 - 8 eggs per capsule; 15 x 30 μ</td>
</tr>
<tr>
<td><strong>Host</strong></td>
<td>Domestic pigeon</td>
<td>Columba livia domestica</td>
</tr>
<tr>
<td><strong>Locality</strong></td>
<td>Nagpur</td>
<td>Baramulla, Kashmir.</td>
</tr>
</tbody>
</table>
Raillietina (*Raillietina*) nagourensis (Moghe, 1925)

**PL. XCV**

- **Fig. 1** Scoler
- **2** Mature segments

**PL. XCVI**

- **Fig. 3** Gravid segment
- **4** Egg-capsules
RAILLIETINA (RAILLIETINA) sps.

Fragments of cestodes were collected from the intestines of common chakore, Alectoris graeca. Most of the specimens were immature and in the mature specimens, scoleces were not available. The description is based on mature and gravid proglottids only.

Davaineidae Fuhrmann, 1907
Davaineinae Braun, 1900
Genus: Raillietina Fuhrmann, 1920
Sub-genus: Raillietina Fuhrmann, 1920

Raillietina (Raillietina) sps.

Host : Alectoris graeca
Location : Intestine.
Locality : Gulmarg.

Measurements

Length (without scolex) = 25 - 28 cms.
Max. breadth in semigravid region = 1.22 mm.
Mature proglottid = 0.32 - 0.45 x 1.11 - 1.2 mm.
Semigravid proglottid = 0.63 - 0.74 x 1.02 - 1.08 mm.
Gravid proglottid = 1.02 x 0.955 mm.
Testes = 15 - 30 µ (Diameter)
Length of cirrus-pouch = 0.105 - 0.12 mm.
Ovary = 0.085 - 0.15 x 0.03 - 0.065 mm.
Vitelline-gland = 80 - 45 µ (Diameter)
Egg-capsule = 0.12 - 0.25 x 0.08 - 0.15 mm.
Egg = 15 - 30 µ (Diameter).

The proglottids are all broader than long except a few terminal ones. In each segment, the testes numbering 48 - 50 are distributed throughout its width between the excretory vessels. The cirrus-pouch is well developed and reaches the poral
longitudinal excretory vessel. The genital-pores are unilateral and located in the anterior region of each segment. The cirrus is coiled and slender.

The ovary is small, compact and more or less pyriform and located nearer the oral side. The vitelline-gland located posterior to ovary, is spherical in shape. The vesicula seminalis is conspicuous. The uterus is seen as areticolum in the semigravid proglottids. It breaks up into egg-capsules in the following segments. 37 - 40 egg-capsules are present in each gravid segment. Each capsule contains 3 - 8 eggs.

As clear from the above description, the present form belongs to the genus and sub-genus Raillietina. As far as the writer is aware, the species of Raillietina recorded so far from Alectoris graeca in India are Raillietina (R.) graeca Thomas et Evans, 1938; R.(S.) davaisei Hughes et Schultz, 1942 and R.(P.) Broeckl (Modeer, 1790) Fuhrmann, 1920.

While the differences with the last two species are obvious in view of the sub-genric differences i.e.; in the number of eggs in an egg-capsule and the position of genital-pore. The present form is found to be distinct from Raillietina (R.) graeca, in the number of testes, body measurements, cirrus-pouch, shape of ovary and number of egg-capsules in each segment.

Similar differences are noted when compared to the known description of other species of the sub-genus. In view of the absence of the scolex, the present form is not assigned to any species and is tentatively named as Raillietina(R.) sp.
PLATES XCVII

Raillietina (Raillietina) sc.

PL. XCVII Fig. 1 Mature segment
2 Gravid segment
RAILLIETINA (P. SARONIELLA) STURNI N.SP.

Two specimens of cestodes belonging to the genus Rallietina and sub-genus Paroniella were recovered from a bird, Sturnus sp., shot in the University Campus. The specimens are regarded here to constitute a new species.

Davaineidae Fuhrmann, 1907
Davaineinae Braun, 1900
Genus: Rallietina Fuhrmann, 1920

RAILLIETINA (P. SARONIELLA) STURNI N.SP.

Host: Sturnus
Location: Intestine
Locality: University Campus, Srinagar.

DESCRIPTION

The cestodes are small consisting of very few immature and mature proglottids. Gravid segments are also very few and some were recovered separately from the intestine. The measurements of the various regions of the worms are:

<table>
<thead>
<tr>
<th>Region</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>10.45 - 14.45 mm.</td>
</tr>
<tr>
<td>Max. breadth</td>
<td>0.105 - 0.24 mm.</td>
</tr>
<tr>
<td>Immature region</td>
<td>4.5 - 5 mm.</td>
</tr>
<tr>
<td>Proglottid</td>
<td>0.03 x 0.105 mm.</td>
</tr>
<tr>
<td>Mature region</td>
<td>5.7 - 6 mm.</td>
</tr>
<tr>
<td>Mature proglottid</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>0.165-0.18x0.405-0.45 mm.</td>
</tr>
<tr>
<td>ii)</td>
<td>0.13-0.2 x 0.705-0.72 mm.</td>
</tr>
<tr>
<td>iii)</td>
<td>0.15-0.18 x 0.45-0.48 mm.</td>
</tr>
<tr>
<td>Semigravid proglottid</td>
<td>0.21 x 0.75 mm.</td>
</tr>
<tr>
<td>Gravid proglottid</td>
<td>0.84 - 0.9 x 0.65-0.84 mm.</td>
</tr>
</tbody>
</table>

The scolex is very small and well marked off from the neck. It measures 0.155 mm. in length and 0.145 mm. in breadth.
across the suckers. A well developed rostellum is present, bearing a pyriform rostellar-sac, measuring 0.095 mm. in length and 0.065 mm. in breadth. It is armed with a single row of rostellar-hooks, 8 - 10 in number. All the hooks are of the same shape and possess long blades. The length of rostellar hooks varies from 15 - 18 μ. The suckers are rounded, shallow but muscular and measure 0.06 mm. in diameter.

The longitudinal excretory duct measures 15 μ in immature, 45 μ in mature, 60 μ in semigravid and 30 μ in gravid proglottids. A well defined excretory bladder along with an excretory-pore was found in the terminal gravid proglottid.

The testes are spherical and aggregated in clumps, located in the posterior part of the proglottid behind the ovary. They lie quite close to each other. In some segments it appears like a single mass. Their number varies from 28 - 28, in each segment. Each testis measures 15 - 60 μ in diameter. A barrel-shaped, elongated cirrus-pouch extends beyond the poral longitudinal excretory duct. In a mature proglottid, cirrus-pouch measures 0.105 - 0.135 mm. in length. The genital-pores are unilateral, present in the anterior part of each ut proglottid. The ovary is located in the middle of the ut proglottid. Its shape is variable in different proglottids. It is spherical in some, oval in few and irregularly lobed in other proglottids. It measures 0.15 x 0.12 x 0.045 - 0.09 mm. in size. The vitelline-gland is oval in shape and present just posterior to the ovary. It measures 15 - 45 μ mm. across. The vagina is a thin and straight tube running adjacent to the cirrus-pouch and opening into the genital-core. The uterus breaks into uterine-capsules. A fully gravid proglottid is found full
of egg-capsules, but the capsules do not extend beyond the longitudinal excretory-ducts. Each egg-capsule measures 35 - 40 μ and an onchosphere 30 - 40 μ in diameter. Only one egg is present in each capsule.

**DISCUSSION**

From the above description, it is clear that the present specimen belong to the sub-genus *Paroniella* of the genus *Raillietina*. The distinguishing features of the species are:

- Small triangular scolex with muscular suckers; a single row of 8 - 10 rostellar-hooks; 25 - 28 testes in each segment and aggregated in a mass; ovary highly variable—spherical, oval or irregularly lobed; unilateral genital-pores; cirrus-pouch barrel-shaped, crosses poral longitudinal excretory duct; numerous egg-capsules in each proglottid, not extending beyond the longitudinal excretory ducts and each egg-capsule containing a single onchosphere.

From *Raillietina (Paroniella) himalayana* n.sp. described here from *Corvus splendens*, the present form *shows wide differences in the shape of scolex, number of rostellar-hooks being 18 - 20 in *R.* (*P.*) himalayana and 8 - 10 in the present form also differs from *R.* (*P.*) himalayana in the number of testes, shape and position of ovary, shape of cirrus-pouch and onchospheres not extending beyond the longitudinal excretory ducts.

From among the known species of the sub-genus *Paroniella*, the present form is nearer to *Raillietina (Paroniella) compacta* but differs from it in having a lesser number of rostellar-hooks. *R.* (*P.*) *reynoldsa*, is yet another species which again differs in several important specific characters. The present form is also closer to *Raillietina (Paroniella) Corvina* in having a
lesser number of testes, being 26 in R. (P.) Corvina and 28 in the present form, but differs in the number of rostellar-hooks, shape of ovary and cirrus-pouch and in having testes characteristically aggregated in groups.

Considering the important differences with the existing species of the sub-genus Paroniella, the present form is regarded to constitute a new species for which the name Raillietina (Paroniella) sturni is proposed.
Raillietina (Parodiella) sturni n.sp.

PL. XC VIII  
Fig. 1 Scolex
2 Early mature segments

PL. XCI X  
Fig. 3 Mature segment magnified
4 Mature segments.

PL. C  
Fig. 5 Gravid segment.
6 Eggs

Photomicrographs

PL. XI  
1 Scolex of R. (P.) himalayana
2 Scolex of R. (P) sturni
3 Scolex of R. (R.) nagpurensis.
Dilepis sps.

A few complete specimens and several broken segments of a cestode belonging to the genus Dilepis were recovered from the intestine of a bird, Sturnus. No definite specific name is proposed for the specimens in view of the limited material which was left for some time in the host intestine before collection.

Dilepididae Railliet et Henry, 1909
Emended Lineicome, 1939.
Dilepidinae Fuhrmann, 1907
Dilepis Weinland, 1858

**Dilepis sps.**

**Host** : Sturnus
**Location** : Intestine
**Locality** : Gulab Bagh, Srinagar.

**DESCRIPTION**

The cestodes are small and show well marked segmentation. The worms are 9 to 11.25 mm. in length and 1.83 in maximum breadth. The immature proglottids measure 0.075 x 0.525 mm. in size. The mature proglottids measure 0.165 - 0.225 x 0.675 - 1.095 mm. in size. The semi-gravid proglottids measure 0.15-0.225 x 1.35-1.83 mm. and gravid proglottids 0.235-0.255 x 1.2-1.5 mm. in size.

The scolex is broadly triangular, 0.48 mm. in length and 0.495 mm. in breadth across the suckers. The segmentation starts immediately behind the scolex. The diameter of suckers varies from 0.165 - 0.18 mm. and are highly muscular. The restellar-sac is 0.42 mm. in length and 0.18 mm. in breadth. A double
A crown of 24 - 25 rostellar hooks is present. The hooks of outer crown are 0.12 mm. in length and those of inner crown are 0.065 mm. in length.

The testes, 20 - 25 mm in number, are present around the ovary. Each testis measures 15 - 30 μ in diameter. The cirrus-pouch is elongated and crosses the poral longitudinal excretory-duct. It is 0.125 - 0.27 mm. in length. The genital-pores are unilateral. A median fan-shaped ovary is present, it measures 0.105 - 0.12 x 0.15 - 0.18 mm. in size. The vitelline-gland is just posterior to the ovary and is 30 μ in diameter. The gravid proglottids are full of eggs in a very compact uterus. The eggs are 30 - 45 μ in size.

As is clear from the above description, the present worms have all the chief characteristics of the genus Dilepis i.e.; arrangement of rostellar-hooks and genital-pores, disposition of gonads and eggs in uterus. It is accordingly assigned to this genus.

No specific name is proposed, nor assigned to any known species. This is possible only when sufficient material is available for detailed study.
Dilepis sp.

Fig. 1. Stages

2. Mature segment
One hymenolepid specimen belonging to the genus Mayhevia Yamaguti, 1956, was recovered from the intestine of Acrodothères tristitiatrix, common Myna in Kashmir. The specimen is considered here to belong to a new species of the genus.

Hymenolepididae Ballest et Henry, 1909
Hymenolepidinae Perrier, 1897

Mayhevia himalayai n.sp.
Host: Acrodothères tristitiatrix
Location: Intestine
Locality: Lolab, Kashmir.

DESCRIPTION

The specimen measures 14.05 mm. in length and 0.325 mm. in maximum breadth. The external segmentation of the worm is well marked and there are about 130 segments which are more or less all broader than long except last few segments. The posterior segments do not appear to be fully gravid, although numerous eggs are seen spread out in these segments. The posterior most segment with an excretory-pore is intact in the worm.

The immature region of the worm measures 3.15 mm. in length and each proglottid in this region has an average size of 0.03 x 0.075 mm. Mature region is 3.45 mm. long. Its segments are 0.045 x 0.15 mm. in size. In semi-gravid and posterior segments, the measurements recorded are 0.12 - 0.17 x 0.15 - 0.25 mm.
The scolex is peculiar in having a definite demarcation between it and the following neck. It is not only relatively broad, but very much elongated. It measures 0.15 mm. in width and nearly 0.35 mm. in length. The rostellum is well differentiated and armed with a single crown of 25 hooks. It is 0.05 x 0.04 mm. in size. The hooks as usual have a short handle, a long blade and a small gaurd. Each hook measures 8 - 10 μ in length. The four suckers are more or less oval with thick muscular walls and each measures 0.05 x 0.075 mm. in size.

The longitudinal excretory canals are well developed. Segmental transverse excretory ducts are narrow and feebly developed.

The testes, 3 in number, are located dorsal to the ovary and near the posterior margin of the proglottid. Two testes are anoral and one oral. They measure 30 to 50 μ in diameter. The cirrus-sacs is elongated and pyriform, but it never extends beyond the oral longitudinal excretory duct. It measures 0.03 to 0.045 mm. in length. The genital-pores are unilateral.

The ovary is more or less compact and measures 0.02 to 0.025 mm. in diameter. The vitelline-glands posterior to ovary and is 15 to 20 μ in size. A thin vaginal-tube runs along the vas-deferens and opens at the genital-pore below the male genital opening.

In the semigravid proglottids, the uterus extends beyond the longitudinal excretory ducts. Gravid proglottids are full of eggs which are 8 x 10 μ in size.
SYSTEMATIC POSITION

Genus Hymenolepis.

- Weinland, 1858 was till recently a very complicated genus comprising more than 500 sps. In spite of the valuable work contributed by Spasski and Spaskaja (1956) and Yamaguti (1956, 1959), further studies may be found essential to regroup the existing genera under the sub-family Hymenolepidinae. In the present form testes are three in number which although disposed in a triangle in each segment are very close to each other, the ovary is apparently compact and not lobed, the cirrus-pouch does not extend beyond the excretory vessel, the external seminal-vesicle is apparently absent and the rostellum bears a single row of 25 hooks. Following the classification of Hymenolepidinae from birds by Yamaguti (1959) the present form comes nearer to the genus Mayhewia to which it is tentatively assigned. The points of difference with the genus are in the shape of ovary, the extent of cirrus-pouch and in the absence of external seminal-vesicle, which could be added to the generic-diagnosis.

DISCUSSION

So far five hymenolepid sps. with three testes are known from Acridotheres, namely H. acridotherioides (Parona, 1830) Fuhrmann, 1920; L. carinipitosa (Coeze, 1782) Southwell, 1930; H. ellisoni Surt, 1944, H. planiestici (Mayhew, 1925) Fuhrmann, 1932 and H. warra Singh, K.S., 1952, but from all these species, the present form which is also from Acridotheres, is found to be distinct in having larger number of rostellar-hooks and in the shape of the hooks. The differences are also noted in the shape and size of scolex and the suckers, the extent of cirrus-
pouch and the size of strobila. From H. Makundi Singh, 1952 described from A. nas. sps., having larger number of rostellar hooks (90), the present form is again found to be distinct in the shape of ovary and the disposition of the three testes and size of scolex. Other species in which the rostellar-hooks are nearer or equal to the present form are: H. coronula (Dujardin, 1845) Cotin, 1901 (20); H. forcata (Stieda, 1860) Southwell, 1920 (25); H. medic (Stossich, 1890) Fuhrmann, 1906 (20) and H. simplex Fuhrmann, 1906 (20). But from all these species the present form differs in one or the other morphological features like the relative size of scolex, strobila, the shape of cirrus-pouch, shape of ovary and the size of eggs.

In view of these differences, the present form is regarded a new species for which the name Mayhewia himalavai is proposed.
Mehewia himalaya n.sp.

PL. CIII
Fig. 1 Scolex
2 Mature segments

PL. CIV
Fig. 3 Gravid segment
4 Terminal gravid segment
  (candal excretory-pore)
The first report of *Aviculariella collaricephala* infection in a kingfisher *Alcedo attis* was reported by Oschmarin (1959) from Vietnam and U.S.S.R. Infection of the same species is recorded here for the first time from Indian region.

Four female worms were collected underneath the horny lining of the gizzard of *Alcedo attis*, common Kingfisher in Kashmir. Male worms were not obtained. The infection of these worms is very rare. The specimens are very close to *Aviculariella collaricephala* (Oschmarin, 1959) Oschmarin, 1963 in all important characters except for the body length, size of eggs and presence of three papillae at the tip of female tail.

Various species of the genus *Aviculariella* Wehr, 1931 have been recorded from all parts of the world. These are: *Aviculariella aloyana* Wehr, 1931 from Cervle aloyana esurina; *A. brevis* (Maplestone, 1931) Skrjabin, Sobolev et Ivaschkin, 1965 from Halcyon swynnensia and Cervle halcyon and *A. collaricephala* (Oschmarin, 1959) Oschmarin, 1963 from *Alcedo attis*.

According to Yamaguti, 1961, the only species of the genus *Aviculariella* reported from Indian region is *A. aloyana* Wehr, 1931, Syn. of *Husuniella brevis* Maplestone, 1931. In the absence of male it is rather difficult to compare the present form with the existing three species of the genus, but in view of the close similarity with the female of *Aviculariella collaricephala*, these worms are assigned to the same species.

*Acuarioidae* Sobolev, 1949

*Acuariidae* Seurat, 1913
Aviculariella collarcicephala (Oschmarin, 1959) Oschmarin, 1963

**DESCRIPTION—FOUR FEMALES**

The worms are slender, delicate and very much elongated. The two terminal ends are pointed, maximum width being in the region between vulva and anus. The whole of middle region is filled with eggs in various stages of development. The cuticle has characteristic transverse striations.

The anterior end bears a well defined buccal capsule which is short, narrow and triangular. Two conical lips are present laterally on either side of the anterior end. The cords are confined to cephalic region and are non-recurrent. They are serrated on the inner borders. Cephalic cuticle is slightly inflated behind the cords. Vulva is in the posterior region of the body, just in front of anus. Ovjector runs backwards and forwards to join the uterus. Both the uteri are filled with embryonated eggs. Three papillae are present at the terminal end of female tail, one median and two lateral.

**Measurements.— (average in mm.)**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>21.37</td>
</tr>
<tr>
<td>Width in vulvar region</td>
<td>0.137 - 0.16</td>
</tr>
<tr>
<td>Length of Mus.pharynx</td>
<td>0.19</td>
</tr>
<tr>
<td>Vulva Length of Gl.pharynx</td>
<td>3.46</td>
</tr>
<tr>
<td>Vulva away from post.end.</td>
<td>0.58</td>
</tr>
</tbody>
</table>
Cuticular striations 0.002
Length of cuticular collar 0.052 - 0.08
Tail length 0.145 - 0.23
Eggs 0.05 x 0.08

Specific diagnosis of the females of A. Collaricapsa:
of the characters of the genus.—

S. streptocarinae, non-recurrent cuticular cords, restricted to the head region; triangular with slightly serrated inner border; no lateral flanges; with two large simple lateral lips; buccal-capsule short; vulva near anus; definite cuticular groove behind cords; ovjector runs backwards and turns forwards to join the uterus; egg embryonated.
Three male specimens belonging to the nematode genus *Aquaria* Bremser, 1811 were collected from the gizzard of *Phylloscopus affinis* kashmiriensis, common crowned Willow-Warbler, in Kashmir. The worms, found under the gizzard lining of the bird, reveal several morphological features which distinguish them from the known species of the genus and are described herein as a new species.

*Spiruroidea* Diesing, 1861  
*Aquariidae* Seurat, 1913  
*Aquaria* Bremser, 1811  
*Aquaria phylloscopi* n.sp.

The body of the worms is of uniform width except at the ends where they are slightly attenuated. The cuticle is thick and striated, the striations being 2-3 μ apart. The cuticular cords are distinct and extend beyond the level of oesophagus, occupying nearly anterior 1/4 of total body length. The head-end bears 2 pairs of papillae. The mouth leads into a narrow cylindrical pharynx. The oesophagus is differentiated into anterior short muscular and posterior long glandular portions. The length -ratio between oesophagus and body is 1:4. The caudal also are broadest in the region of spicules and get conspicuously narrowed in the post-cloacal region, thus giving a characteristic shape to the caudal region as a whole. The width of caudal also in the pre-cloacal region ranges from 0.15 to 0.27 mm. and immediately behind cloaca from 0.09 to 0.1 mm. The number and distribution of caudal papillae is again characteristic, there are 10 pairs of pedunculate papillae which are distributed as : 3 pairs pre-cloacal, 1 pair cloacal and 6 pairs post-cloacal. Of the latter, posterior 4
pairs are nearer to each other when compared to the two anterior pairs. The spicules are slightly subequal, broad and of uniform diameter. Their distal ends are distinctly notched. No alae are seen in the spicules.

MEASUREMENTS (in mm.)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>8.265</td>
<td>8.175</td>
<td>7.815</td>
</tr>
<tr>
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<td>0.105</td>
<td>0.12</td>
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<td>Pharynx length</td>
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<td>Muscular Oesophagus</td>
<td>0.26</td>
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<td>0.22</td>
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<td>Glandular Oesophagus</td>
<td>1.14</td>
<td>1.12</td>
<td>1.1</td>
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<tr>
<td>Tail length</td>
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<td>Lt. Spicule</td>
<td>0.21</td>
<td>0.19</td>
<td>0.18</td>
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DISCUSSION:

Baylis and Daubney (1926) divided the genus *Aquaria* into 6 sub-genera and this classification was followed by Baylis (1939) also. The sub-genera were raised on the basis of the characters like the nature of cordon, their posterior extend and the length ratio of two spicules.

Yamaguti (1961) and Skrjabin et al (1965) consider the genera *Spirostera* Rudolphi, 1819, *Anthuris* Rudolphi, 1819, *Dispharagus* Dujardin, 1846 and *Cheilospirura* Diesing, 1861 as synonyms of *Aquaria*. A revision of the family Aquariidae and the genus *Aquaria* is found essential to clarify the validity of some of the genera. In this connection it may be pointed out here that the genus *Cheilospirura* deserves the status of a distinct subgenus under *Aquaria* in view of the presence of distinctly unequal spicules.

The present form agrees in all essential features with the genus and the subgenus *Aquaria* in having non-recurrent and
non-anastomosing cordons and slightly subequal spicules. Its distinguishing features are:

Broad caudal alae in the region of spicules; slightly subequal spicules with notched distal ends; 10 pairs of pedunculate caudal papillae of which 3 are pre-cloacal, one cloacal and 6 post-cloacal.

Comparing the present form with the existing species of the genus, it is found to be nearer to Aquaria anthuris (Rudolphi 1819), A.cordata (Mueller, 1897), A.ornata (Gendre, 1912) Railliet, Henry and Sisoff, 1912) A.skriabini (Ozerskaya, 1926) Singh, 1948, A.kunzli, Singh, 1948, A.alii Rasheed, 1960 and A.Sinchi Rasheed, 1960.

In A.anthuris there are 11 pairs of caudal papillae of which 4 are pre-cloacal, 3 cloacal and 4 post-cloacal, but in the present form there are 10 pairs of which 3 are pre-cloacal, 1 cloacal and 6 post-cloacal. Moreover, the caudal alae in the present form are much broader and the spicules are non-alate and distinctly notched at their distal ends.

In A.cordata the number of papillae is 11 - 4 pre-cloacal, 1 cloacal and 6 post-cloacal. Its cordons are relatively short and the caudal alae are not distinctly broad. Similarly in A.ornata the arrangement of papillae is again different, there being 4 pre-cloacal and 6 post-cloacal. Its spicules are not notched and the caudal alae are not distinctly broad.

A.skriabini has 11 pairs of caudal papillae - 4 pre-cloacal, 1 cloacal and 6 post-cloacal. Its left spicule is of uniform width and has a pointed tip but its right spicule is broad in anterior half and distal tip is notched. A.kunzli bears 12 pairs of papillae of which 4 are pre-cloacal, 1 cloacal and 7 post-cloacal. While the two spicules are equal, right
one is thinner than the left one. Difference with the present form are obvious. *A. alii* and *A. singhi* also show similar differences when compared to the present form. With the remaining species of the genus the present form shows much wider differences. It is, therefore, considered here to constitute a new species for which the name *Acuaria phylloscopei* is proposed.

**Host** : *Phylloscopus reguloides*  
*Kashmiriensis*, common crowned Willow-Warbler.

**Location** : Gizzard.

**Locality** : Srinagar, Kashmir - India.
**PLATE CVIII - CIX**

*Aquaaria phyllocoele* n.sp.

<table>
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<tr>
<th>PL. CVIII</th>
<th>Fig. 1</th>
<th>Anterior end</th>
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<td></td>
<td>2</td>
<td>Anterior end magnified</td>
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<table>
<thead>
<tr>
<th>PL. CIX</th>
<th>Fig. 3</th>
<th>Male tail</th>
</tr>
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</table>
CONTRACAEUM CONTRACAEUM DENTILABIUM N.SP.

Two male specimens belonging to the nematode genus
Contracaecum Railliet et Henry, 1912 were recovered from the
stomach of Milvus migrans, common kite in Kashmir.

Heterocheilidae
Filocapsulariinae
Genus : Contracaecum
Sub-genus : Contracaecum

Contracaecum (C.) dentilabium n.sp.

DESCRIPTION

Material : 2 male worms.

The worms are elongated fairly thick and measure 23.1 and
27.615 mm. in length and 0.495 mm. and 0.645 mm. in maximum
breadth. The cuticle is aspinose with striations at
intervals of 6 to 7 μ. The anterior end is provided with
three well developed lips. The two lateroventral lips are
provided with a tooth each on their inner sides in the
median plane. Besides these lips, interlabia are also present.
The buccal-capsule is present and measures 0.075 x 0.015 mm.
in size. The oesophagus is not well differentiated into
muscular and glandular regions. The total length of
oesophagus including buccal-capsule is 3.7 mm. and 3.9 mm.
The nerve-ring is situated in the anterior one third of the
oesophagus being 1.15 mm. from anterior end. The junction
of the oesophagus and intestine is marked by the presence
of a reduced ventriculus, which gives off a solid posterior
appendix. A well developed intestinal caecum is present and
runs anteriorly. The ventriculus measures 0.22 x 0.14 mm and the oesophageal appendix 0.63 x 0.15 mm in size in one of the specimens. The length of intestinal caecum in the two specimens is 2.5 mm and 2.8 mm and 0.23 mm and 0.25 mm in max. width. The spicules are long, alate and subequal. The left spicule is longer than the right one and measures 6.225 mm and 6.18 mm and the right spicule is 5.865 mm and 5.805 mm in the two specimens. Candal alae and gubernaculum are absent. The tail is short and pointed, measuring 0.195 mm and 0.21 mm in the two worms. The male tail is provided with a number of papillae out of which 5 pairs are postcloacal and very well developed and each bears a small peduncle; two pairs are cloacal which are larger than postcloacal papillae. There are 18 pairs of precloacal papillae, out of which 6 pairs immediately anterior to cloaca are more distinct and slightly pedunculate. The remaining 12 pairs are indistinct and become gradually sessile anteriorly.

**SYSTEMATIC POSITION**

Genus *Contracaecum* Railliet et Henry, 1912 is characterized by the presence of three lips; well developed interlabia; oesophageal ventriculus, solid posterior appendix and intestinal caecum; absence of candal alae in male; presence of numerous precloacal papillae; varying number of cloacal and postcloacal papillae; long equal or sub-equal and alate spicules; absence of gubernaculum and the position of vulva in female in the anterior region of the body.

Yorke and Maplestone (1926) place *Contracaecum* under the order Ascaroidea Railliet and Henry, 1915, Family
Heterocheilidae Railliet & Henry, 1915 and sub-family Anisakinae Railliet & Henry, 1912. On account of the absence of cuticular spines or any other raised structures, absence of teeth in lips, presence of interlabia and absence of cervical collar.

Yamaguti (1961) places genus Contracaecum under the order Ascaridae Chitwood et Chitwood, 1937; Family Heterocheilidae Railliet and Henry, 1915 and Sub-family Filoocapsularinae Railliet and Henry, 1915 on account of the absence of cuticular spines or other raised structures. Yamaguti, further differentiates Contracaecum from the other four genera under Filoocapsularinae; namely,

- **Ampulicaecum** Baylis, 1922
- **Heterophylhum** Spaul, 1927
- **Porrocaecum** Railliet et Henry, 1912
- **Balanisakis** Maplestone, 1922

On the basis of the presence of postoesophageal ventriculus, ventricular appendix and interlabia Yamaguti further recognizes two sub-genra of Mosgovoy, 1951 under Contracaecum, namely,

- **Contracaecum** and **Ornitocaecum** on the basis of the absence and presence of gubernaculum respectively. On the other hand, Skrjabin, Schikhobalova & Mosgovoy, 1951 divided Contracaecum into three sub-genra:
  - **Contracaecum**
  - **Ornitocaecum** and **Erschovicaecum** on the basis of the characters like absence of gubernaculum in Contracaecum; presence of gubernaculum in Ornitocaecum and the absence of gubernaculum and the presence of spoon-shaped groove on the lip in Erschovicaecum.

Keeping these characters in view, the present two
male worms belong to the sub-genus *Contracaecum* of the genus *Contracaecum*.

**DISCUSSION**

The present form has the following distinguishing features:

- Two lateroventral lips with a tooth on their inner side, third lip around the mouth slightly smaller than the other two lips; male canal end with five pairs of slightly pedunculate postcloacal papillae, two pairs of large cloacal (anal) papillae, six pairs of distinct and pedunculate precloacal papillae followed by about twelve pairs of indistinct and sessile papillae anterior to them; spicules long, sub-equal and alate. In having a tooth in each of the lateroventral lips and the said number and position of male canal papillae the present form can be distinguished from all the known species of the genus *Contracaecum*. From the two species *Contracaecum (C.) milvi* Yamaguti, 1935 and *C. (C.) milviensis* Karokhin, 1937 recorded from kite of the genus *Milvus*; the present form from *Milvus migrans* can be again differentiated in the number and position of male canal papillae and the relative length of spicules and in having a tooth in each of the lateroventral lips.

The present form also shows wide differences from the following six known species of *Contracaecum* from Indian birds, namely:

- *C. (C.) accipitriris* Inglis, 1954 in Sarcogyps calvus; India.
- *C. (C.) engonatum* Baylis et Daubney, 1922 in Ciconia nigra; India.
C. rosarium (Conna, 1912) in Nycticorax spx.; West Africa, India.
C. tricusis (Gedoeist, 1916) in Ardea, Arbinga in Belgian Congo. Also in Plotus; Australia, Java, Calcutta.

In view of the said differences, the present form cannot be accommodated under the known species of the genus and is regarded here a new species of the genus and sub-genus Contracaecum for which the name Contracaecum (Contracaecum) dentilabium is proposed.
Contracaecum (Contracaecum) dentilabium n.sp.

PL. CX  Fig. 1  Anterior end

PL. CXI  Fig. 2  Middle region (showing intestinal-caecum, ventriculus and oesophageal-appendix)

PL. CXII  Fig. 3  Male tail

PL. CXIII  Fig. 4  Male tail magnified

Photomicrographs

PL. CXIV  1  Anterior end
          2  Male tail
<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>B.B.</td>
<td>Basal-plate</td>
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<tr>
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<td>Basement membrane</td>
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<td>C.J.</td>
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<td>D.V.M.</td>
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<td>External seminal vesicle</td>
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SUMMARY

This thesis deals with the helminth parasites of some avian hosts in Kashmir.

Part I deals with some histomorphological studies of *Raillietina (Raillietina) tetragona* (Molin, 1858) davenportid cestode parasite of poultry in Kashmir. Histology of the body wall, musculature of scolex and strobila and some details of excretory and reproductive systems of the cestode have been worked out here for the first time. Variations in general morphology including body size, number of testes, rostellar hooks and eggs in egg-capsules are also recorded. In scolex the longitudinal excretory vessels divide into a number of peripheral vessels which in turn form a ring-vessel. Calcareous corpuscles are recorded in parenchyma. In parenchyma musculature, the longitudinal muscles tend to form two layers of which the outer layer is formed of scattered fibres and inner one are arranged in groups. The dorsoventral fibres are poorly developed. Only two types of myoblasts are recorded. The genital-ducts have been studied in detail. In gravid region, each egg-capsule contains 3 - 10 eggs.

Part II deals with the taxonomic studies of 29 helminth parasites out of which 16 are cestodes, 6 trematodes and 7 nematodes. These are recorded from 12 avian hosts - *Gallus domesticus*, *Anas platyrhynchos platyrhynchos*, *Anas sp.*, *Corvus splendens*, *Corvus monedula*, *Miumba livia*, *Alectoris graeca*, *sturnus sp.*, *Acridothres tristis tristis*, *Alcedo atthis*, *Phylloscopus sp.*, and *Milvus migrans lineatus*. 
Raillietina (Skriabinia) skriabini n.sp; Raillietina (Skriabinia) indica n.sp; Raillietina (Skriabinia) cesticillus (Molin, 1852), Choanotaenia kashmiriensis n.sp; Echinostoma coecale Muraschkinzev, 1937, Echinostoma revolutum (Fröhlich, 1802) Looss, 1899, Heterakis gallinae (Omelin, 1790) and Acuaria hamulosa (Diesing, 1851) Railliet, Henry et Sisoff, 1912 are recorded from common domestic fowl, Gallus domesticus.

Raillietina (S.) skriabini, described as a new species, has 15 rostellar hooks, highly muscular suckers, 23-42 testes, 6-8 lobed and rostellate-like ovary, irregularly alternate genital-pores and one egg in each egg-capsule.

Raillietina (S.) indica n.sp; is a small cestode with genital pores irregularly alternate and located near anterior margin of each segment. Its scolex is more or less rectangular and has 30 - 35 rostellar-hooks. Suckers have 6 - 10 rows of minute spines, testes are 20 - 30 in number and cirrus-pouch is pyriform and does not cross poral longitudinal excretory vessel. The vitelline gland is transversely elongated and each egg-capsule has one egg.

In Choanotaenia kashmiriensis n.sp; scolex has 14 rostellar-hooks in one row, testes 14 - 20 in number, cirrus-pouch elongated and crosses poral longitudinal excretory vessel, cirrus armed with spines, at genital-atrium sunken, genital-pore alternate, ovary lobed and uterus reticulate.

Raillietina (S.) cesticillus (Molin, 1852) is briefly described and variations recorded.

Echinostoma coecale Muraschkinzev, 1937 is recorded for the first time from Indian region.

In an abnormal specimen of Echinostoma revolutum (Frohlich, 1802) Looss, 1899 from Gallus, 3 testes are recorded.
Aquaria (C.)hamulosa (Diesing, 1851) Railliet, Henry et Sisoff, 1912 is briefly described and variations recorded.

H. gallinae (Omelin, 1790) is also briefly described.

Dicranotaenia coromula kashmirensis n.var., the scoles is distinctly marked off from the neck. Rostellum is armed with single crown of 20 hooks, 3 testes are arranged in a transverse row and ovary is fan-shaped and median. The uterus is elongated and saccular.

Armadoskrijabinia longicirra n.sp; is found to be distinct from the known species of the genus in having a single crown of 6 rostellar hooks, ovary lobed and dorsal to aporal testis and uterus in gravid segment formed of 2 to 3 sacs which are not further lobed. Three testes are in a transverse row. Internal and external seminal vesicles are present and cirrus-pouch is very much elongated.

Raillietina (E.) parviuncinata Notocotylus attenuatus and Echinozoon revolutum collected from the mallard duck are briefly described and on the basis of their variations, taxonomic position of various allied species is discussed and regarded as synonyms of E. revolutum and N. attenuatus. (Abstract of joint paper appended).

Typhlocoelum sisowi (Skrjabin, 1913) Dubois, 1952; Notanlus asiaticus Skrjabin, 1913; Pallechasmus oxyirus (Creolin, 1825) Lühe, 1910 and Drapanidotaenia lanceolata (Bloch, 1782) Weinland, 1858 are recorded from Anas sp. brown-ducks.

T. sisowi is recorded for the first time from Indian region and from a new host.

From Corvus splendans, Raillietina (Paroniella)corvina (Fuhrmann, 1905) and a nematode Aquaria anthuris (Rudolfi, 1819)
Railliet, Henry et Sidoff, 1912 are briefly described and compared with the known description of the respective species.

From *Corvus monedula* a new species *Raillietina* (Paroniella) *himalayana* is described. The scolex is armed with a double crown of 20 rostellar-hooks. The testes number 40 - 50. Cirrus-pouch is near anterior third of each segment and does not cross poral longitudinal excretory vessel, genital atrium bears hair-like processes, unilateral genital-pores, small ovary with compact tubular lobes and located near anterior margin of each proglottid and single egg in each egg-capule.

*Raillietina* (*Raillietina*) *nepalensis* (Moghe,1925) is recorded from *Columbia livia* and *Raillietina* (*Raillietina*) sp. from *Alectoris graeca*. The latter species probably constitutes a new species and is doubtfully referred for the time to *Raillietina* (*Raillietina*) sp., on the basis of several morphological features except those of scolex which was not available. It has 40 - 50 testes, unilateral genital-pores, small ovary near poral-side, 37 - 40 egg-capules with 3 - 8 eggs in each.

From *Sturnus* sp., *Raillietina* (Paroniella) *sturni* n.sp. is described. It is found to be distinct from the known species under the sub-genus *Paroniella* in having a single crown of 8-10 rostellar-hooks, 25 - 28 testes in each segment, ovary with a highly variable shape and barrel-shaped cirrus-pouch. From the same host a doubtful species under the genus *Dilepis* Weinland, 1858 is briefly described. It has a double crown of 24-26 rostellar-hooks, 20 - 25 testes, cirrus-pouch crosses the poral longitudinal excretory vessel. Unilateral genital-pore and a median fan-shaped ovary and compact uterus with numerous eggs.

A new species hymenolepid Cestode, *Mayhewia himalvai* is described from *Acridotheres tristis tristis*. The scolex has no
definite demarcation from the neck. Rostellum has a single crown of 25 hooks. Of the three testes, two are aporal and one oral. Genital-pores are unilateral and cirrus-pouch does not cross the excretory vessel. Further, the ovary is compact and uterus extends beyond excretory vessel in gravid segment. From the same host a new species of Diplostriana Railliet and Henry, 1909, *Diplostriana bickleyi*, was jointly described and published in 1965. (Reprint appended).

From *Aedodoattis, Aviculariella Collaricaphala* (Oschmarin, 1959) Oschmarin, 1963 is recorded for the first time in India.

From a common warbler, *Aquaria phyllocephali* n.sp. is described. A joint paper on this species was submitted at the Science Congress in 1967 session at Varanasi (Abstract appended). The cuticular cordons occupy anterior one fourth of body length. Length ratio of oesophagus and body length is 1:4. Of the ten pairs of candal papillae, 3 are precloacal, 1 cloacal and 6 post cloacal. The spicules are slightly subequal, distinctly notched and non-alate.

In *Contracaecum (Contracaecum) dentilabium* n.sp; from *Milvus migrans linaetus*, two latero-ventral lips at anterior end are provided with a tooth each on their inner side in the median plane and interlabia are also present. Spicules are long, alate and subequal. In male tail 5 pairs of well developed pedunculate papillae are post-cloacal, 2 pairs of large cloacal papillae which are longer than former papillae and 18 pairs of precloacal papillae of which 6 immediately anterior to cloaca are most distinct and slightly pedunculate. These characters distinguish the new form from all known species of the genus.