RECORDS

of the

INDIAN MUSEUM

(A JOURNAL OF INDIAN ZOOLOGY)

Vol. XIX, Part I.

MARCH, 1920.

Calcutta:

PUBLISHED BY THE DIRECTOR, ZOOLOGICAL SURVEY OF INDIA.
PRINTED AT THE BAPTIST MISSION PRESS.

1920.

Price Two Rupees.

RECORDS

of the

INDIAN MUSEUM

(A JOURNAL OF INDIAN ZOOLOGY)

Vol. XIX, 1920.

EDITED BY

THE DIRECTOR,
ZOOLOGICAL SURVEY OF INDIA.

Calcutta:
PUBLISHED BY THE DIRECTOR, ZOOLOGICAL SURVEY OF INDIA.
PRINTED AT THE BAPTIST MISSION PRESS.

1921.

CONTENTS.

LIST OF PLATES.

LIST OF AUTHORS.

INDEX.

—◇—

[*N.B.*—An asterisk (*) preceding a line denotes a new variety or subspecies; a dagger (†) indicates a new species; a double dagger (‡) a new genus; a double asterisk (**) a new subfamily; synonyms are printed in italics.]

A

B

C

L

M

N

O

P

R

S

I. A REVISION OF THE INDIAN SPECIES OF THE GENUS *PHYLLOBOTHRIUM*

By T. SOUTHWELL, *A.R.C.S., F.Z.S, Director of Fisheries, Bengal,* and B. PRASHAD, *D.Sc.*

(With Plate I.)

During recent years large numbers of Cestoda have been collected in India and Ceylon. Except in a few instances the descriptions of such of these parasites as have been described have been based almost exclusively on external characters, and such characters are often insufficient to identify the parasite. The variability of form assumed by all cestodes during the process of preservation, and the differences due to age and between the mature and immature worms, makes identification by means of external characters alone very difficult. Further, descriptions of parasites which do not include an account of the anatomy cannot be regarded as satisfactory.

The genus *Phyllobothrium* was first defined by Van Beneden in the year 1849. Unfortunately, we have been unable to obtain a copy of the original memoir. In 1850 he published a description of the two species *P. thridax* and *P. lactuca,* while in 1858 he described the species *P. auricula.* A description of two more species, *P. brassica* and *P. fallax,* followed in 1871.

In 1850 the same author (1) defines the characters of the genus *Phyllobothrium* as follows:—

"The four bothridia are sessile; their concavities face externally. They are very mobile and have their edges frilled and puckered like the leaves of a lettuce."

In 1888 Zschokke (14) published a very careful account of the anatomy of *P. thridax* and *P. dohrni* (*Orygmatobothrium dohrni*). An excellent description of *P. vagans,* Haswell, was given by Haswell (8); and quite recently Yoshida (13) has given a further account of the anatomy of *P. lactuca,* Van Ben. Linton (5) described two species *P. foliatum* and *P. thysanocephalum,* and also added some notes on Leidy's species *P loliginis,* but he eventually found it necessary to establish the genus *Thysanocephalum* for his *P. thysanoceaphalum* and changed the name of this species to *Thysanocephalum crispum,* though according to the accepted rules of zoological nomenclature it should be known as *T thysanocephalum.*

Shipley and Hornell (11) described three new species, viz.—*P. blakei, P. minutum* and *P. pammicrum,* from external characters alone, giving no account of their anatomy. Shipley had also

described previously a species *P. dipsadormorphi* from a snake (10). The genus *Phyllobothrium* usually infests fish-hosts, but the following four species have been described from other animals or without identification of the host.

1. *P. dipsadormorphi* from the "Malagea" snake—*Dipsadormorphus irregularis.*
2. *P. delphini* from the Dolphin—*Delphinus tursio.*
3. *P. inchoatum* from the whale—*Mesoplodon sowerbiensis.*
4. ? *P. crispatissima* and *P. variabile.* Hosts unknown.

The total number of species recorded up till now is 20.

Our collection comprises five species only (viz. *P. blakei, P. pammicrum P. foliatum, P. lactuca, P. compacta*), and represents all the known Indian species except *P. minutum.*

A point worthy of note in connection with the general anatomy of the genus is the presence of supplemental discs on the bothridia in some of the species and their absence in the others. Until the anatomy of the genera closely allied to *Phyllobothrium* has been more fully worked out, it is impossible to discuss the exact relationships of the genus, though it is probable that an elucidation of the anatomy of species belonging to the closely allied genera may necessitate a new grouping of the species.

Pyllobothrium lactuca, Van Beneden.

(Plate I, fig. 1.)

Five specimens from the spiral valve of *Galeocerdo tigrinis*, Müll. and Henle, Ceylon Pearl Banks, December 1910.

Van Beneden's account (1) of the anatomy of this species is somewhat meagre. A further account has recently been given by Yoshida (15) which also is incomplete. Johnstone (4) suggests that Van Beneden's figure of this species was drawn from a specimen in which the bothridia had undergone extreme contraction, the head as a result having assumed a spherical appearance and consequently presenting very little indication of the true shape of the bothridia. Johnstone's figure of the head of *P. lactuca* consequently differs somewhat from Van Beneden's figure of the same species.

The worm was recorded from the Ceylon Pearl Banks by Shipley and Hornell (11), who obtained it from the intestine of *Trygon walga.* These authors state that their specimens resemble Van Beneden's figure except that the four bothridia are more distinct. The voluminous head of *P. lactuca* naturally presents different appearances according to the condition of preservation. Our specimens resemble the figure given by Van Beneden in having the head compact and somewhat rounded in shape, though the four bothridia are quite separate.

The specimens, which were preserved in spirit, measure 12 cms., 15 cms., 16 cms., 17·5 cms., and 24 cms., respectively. No measurements of the living worms were taken, but very considerable

contraction was noticed on transferring them to spirit. The greatest breadth of the preserved specimens varies from 3 to 4 mm., and the breadth of the head from 3·5 mm. to 5 mm. In the living condition it was noticed that the worms are capable of very great elongation. The great mobility of the bothridia, noted by Van Beneden, was also observed in the living specimens.

Free proglottides were found in great abundance in the spiral valve of *Galeocerdo tigrinis*. They varied in shape and degree of maturity. The anterior extremity of the mature proglottid is very much reduced, and the sides curve back from it to the broad and ruffled posterior margin.

We have nothing to add to the already existing accounts of the external characters of the worm but certain anatomical features call for remark, as they do not seem to have been noticed before. The reproductive system as seen in a fully mature and detached proglottid is first described, further on the structures as seen in a proglottid still attached to the body of the worm are also considered.

Male organs. The testes (T) consist of numerous rounded structures occurring from near the anterior pointed portion of the proglottid to behind the genital opening. They occupy the central field and are situated at a much deeper level than the vitteline glands which lie external to them. Each testes is about ·05 mm. in diameter and is much smaller than is shown by Van Beneden; moreover the number of testes in each proglottid is much larger than is shown in his figure. From each of the testes leads a fine duct, and the ducts from the various testes unite together to form a single median vas deferens (v.d). This duct is a very much coiled, elongated, tubular structure, which continues to the cirrus sac; the terminal portion forms the ejaculatory duct and the outer end of the tube is continuous with the outer extremity of the cirrus sac. At the time of protrusion the ejaculatory duct is a double tube, the outer tube being the everted part of the cirrus sac (c), while the inner tube is the terminal portion of the vas deferens. This evertible portion—the penis (P) or the cirrus—is unarmed.

Female organs:—The ovaries (ov.) consist of two large lobes, lying one on each side of the centre line, near the posterior end of the segment; they are connected with each other by a median isthmus. Each of the lateral halves is double, as has been described by Haswell for *P. vagans*. The margins of the ovaries are very much crenated. The oviduct (o.d) begins ventral to the isthmus in a pouch-like structure which is known as the "swallowing apparatus." We have not been able to see in our preparations of *P. lactuca* the "plug" described by Haswell, and it appears that this structure is absent in *P. lactuca*. From the "swallowing apparatus" the oviduct runs backwards, ventrally to the shell gland (S.G.) and the receptaculum seminis (R.S), and then curves upwards and to the dorsal surface, it is then continued forwards dorsally to the vagina and the isthmus of the ovary to end blindly. In its course it

receives, just before curving upwards, the fertilising duct from the receptaculum seminis. The vitteline duct opens into it a little further on. The distal portion of the oviduct (which has been designated the ootype (P.U), or primary uterus, opens into the secondary uterus (S.U) by a longitudinal slit on the ventral surface of the secondary uterus. The secondary uterus is a large elliptical chamber, extending from close to the isthmus of the ovary to very near the anterior end of the proglottid. It has no external aperture and the dehiscence of the proglottid probably takes place in the same manner as has been described by Haswell for *P. vagans*. The shell-gland (S.G) is a compact structure surrounding that portion of the oviduct which is situated a little in front of the opening of the vitteline duct into the oviduct. As seen in sections, the shell-gland appears to be connected with the oviduct by minute tubules, through which the secretion is poured into the duct. The vagina (Va) opens immediately in front of the male opening by a fairly broad aperture into the shallow genital pit, which is situated nearer the posterior than the anterior extremity. Its terminal portion is swollen to form a barrel-shaped structure, which probably serves for the storage of spermatozoa until they can find their way to the bag-like receptaculum seminis at the end of the sinuous vaginal duct; from the barrel-shaped dilatation a thin tube leads backwards and upwards. A little above the origin of the main vas deferens this tube curves backwards and is continued, dorsal to the secondary uterus; eventually below the isthmus of the ovary it is dilated to form the vesicula seminalis. From the bay-like receptaculum seminis the fertilising duct leads to the oviduct, as has already been described.

The vitteline glands (V) are situated laterally throughout the length of the proglottid. They are ovoidal structures 4 mm. in diameter. A fine duct leads from each glandular unit, these tubules then unite into two ducts, one on either side, and the pair further unite to form a median duct, which opens into the oviduct a little below the shell-gland.

In the last attached segment the whole of the anatomy was made out in two cases. The secondary uterus is, however, in segments still attached, only a tubular structure without any eggs. In other details they resemble the free proglottides. In the more anterior segments all the structures are not developed and cannot be seen.

Phyllobothrium foliatum, Linton.

(Plate I, figs. 2, 3.)

Four specimens from *Rhynchobatus djeddensis* (Forsk.), Ceylon Pearl Banks, February 3rd, 1911.

Linton (5) described the species in 1890. His specimens were obtained from *Trygon centura* caught at Woods Hole, Mass., in 1887. He subsequently recorded the species from *Carcharinus obscurus* at Beaufort, North Carolina, July 11th, 1902. The spe-

cies has not been recorded since. His description is somewhat incomplete and his figures are not quite clear. We, therefore, figure the essential features of the anatomy of the worm again.

Three of our specimens, which were preserved in spirit, measure 5 cms. in length and the fourth measures 6 cms. The breadth of the posterior segments is 2 mm. and the length 3 cms.

All the four specimens have four supplemental discs in each case. These suckers appear to be formed by the fusion of a portion of the edge of the bothridium, and, in a casual examination, the frilled edge may occasionally be mistaken for a sucker, but in the specimens before us there are distinct suckers in each case. Linton (5) states that his *P. foliatum* has the bothridia pedicelled, in marginal pairs, a feature which would require a modification of the generic characters for including this peculiarity. In our specimens the bothridial pedicel is very short, and the bothridia may be described as practically sessile. No observations are available regarding these structures in the living specimens.

The anatomical details of a ripe proglottid of this species are exactly similar to those given for *P. lactuca* except that the vitteline glands in *P. foliatum* are confined to the lateral fields lying external to the excretory tube. Linton described the cirrus of *P. foliatum* as being echinate. In none of our worms was the cirrus protruded, but we were able to ascertain that no spines occur on the cirrus in these specimens. This character, therefore, appears to be variable in *P. foliatum*, although usually it is a constant feature in other species.

Phyllobothrium pammicrum Shipley & Hornell.

(Plate I, fig. 4.)

Over a dozen immature specimens from *Urogymnus asperrimus*, Ceylon Pearl Banks, February 16th, 1911.

Thirteen specimens from *Hypolophus sephen*, main area of Chilka Lake, December 1911.

Shipley and Hornell described this species from the intestine of *Carcharias melanopterus* caught at Dutch Bay, Ceylon, in 1905. They had only two specimens. In the original description only the external anatomy was dealt with.

One of us (14) recorded the occurrence of the same species in the intestine of *Hypolophus sephen*, whence 13 specimens were obtained. At the same time a short account of the anatomy was also given. We have, besides, specimens from the intestine of *Urogymnus asperrimus* from the coast of Ceylon.

The length of the various specimens varies from 4 to 5 mm., the maximum breadth up to 3 mm., and the last segment is nearly 1 mm. long.

The head, which we figure, bears four sessile bothridia which have slightly thickened and crisped edges. There are no accessory suckers, and the neck is short.

There are a large number of testes of a fair size disposed on either side of the longitudinal axis of the proglottid. The cirrus-

sac, though provided with a stout musculature, is not very conspicuous. The cirrus has no spiny armature. The vitelline glands are, as in *P. lactuca*, distributed on either side of the testes. The position and structure of the ovary, shell-gland, and the other female generative organs is the same as in *P. lactuca*.

Phyllobothrium blakei, Shipley & Hornell.

(Plate I, fig. 5.)

Thirteen specimens from the intestine of *Trygon kuhli* trawled from Periya Paar.

Shipley and Hornell described this species in 1906 from about half a dozen specimens (half the number of which were without heads) from the intestine of *Trygon kuhli*.

The head, which we figure, bears four frilled sessile bothridia without accessory suckers. There is no neck. The proglottides do not show any overlapping at the posterior margins. The last segment is about three times as long as broad.

The disposition and arrangement of the reproductive organs is the same as in the other species of the genus. The secondary uterus is comparatively large for the size of the proglottid, and the cirrus-sac is well developed; the cirrus, however, is not echinate.

Phyllobothrium compacta, sp. nov.

(Plate I, figs. 6, 7.)

In our collections we found five specimens of a *Phyllobothrium* which cannot be assigned to any of the previously described species. We have named it *P. compacta* in view of the compact appearance of the head. The specimens were obtained from the intestine of *Trygon kuhli* trawled from Anaivilundun Paar, Ceylon (4—5 fathoms deep) on the 19th February, 1911.

The largest specimen measures 51 mm. but the others do not exceed 40 mm. The greatest width is 4 mm., and this point lies about the middle of the worm; the proglottides decrease in width posteriorly. The head has a very compact appearance owing to the sessile nature of the large and well-developed bothridia. The edges of the bothridia are slightly crumpled and there are no accessory suckers.

The specimens unfortunately are not fully mature but the anatomy as far it can be made out resembles that of *P. lactuca*.

The species may be characterised as :—Length about 51 mm., greatest breadth 4 mm., gradually decreasing to a little more than 2 mm. posteriorly. Head with four compact and sessile bothridia, without accessory suckers; neck long. There is only a slight overlapping of the proglottides. Reproductive pores lateral on alternate sides.

Habitat. Intestine of *Trygon kuhli*. November 19th, 1911.

Type-specimen in the collection of the Zoological Survey of India, Number ZEV $\frac{7255}{7}$.

LITERATURE.

1. Beneden, P. J. Van — Recherches sur la fauna littorale de Belgique les vers Cestoides, etc. *Mem. Acad. Roy. Sci. Belgique.*, XXV, Brussels, 1850.
2. ,, — *Memoire sur les vers intestinaux*, Paris 1858.
3. Braun, M. — In Bronn's Klassen und Ordnungen des Theirreichs. IV *Vermes.* Abt. I, b, *Cestodes*, 1890-1900.
4. Johnstone, J — 14th, 15th and 18th Annual Reports, Lancashire Sea Fisheries Laboratory. *Trans. Liverpool Biol. Soc.*, 1906-1910.
5. Linton, E. — Notes on Entozoa of Marine fishes of New England, with descriptions of several new species. *Ann. Rep. Com. of Fish & Fisheries*, 1886, Washington, 1889.
6. ,, — As above. Part II. *Annual Report*, 1887.
7. ,, — Parasites of the fishes of the Woods Hole Region. *Bull. U.S. Comm. Fish* and *Fisheries* for 1899. Washington, 1901.
8. Linstow, O. Von — *Compendium der Helminthologie*, Nachtrag., 1878-1889. Hannover, 1889.
9. Haswell, W.A. — On a Cestode from Cestracion. *Quart. Journ. Micros. Sci.* XLVI, 1903.
10. Shipley, A. — In Willey's *Zoological Results*, Part V, 1900.
11. Shipley, A. & Hornell, J — Herdman's Ceylon Pearl Oyster Reports. Vols. II, III, & V *Proc. Roy. Soc.*, London, 1904, 1905 & 1906.
12. Southwell, T. — Description of nine new species of Cestode parasites, including two new genera, from marine fishes of Ceylon. *Ceylon Marine Biological Reports*, Pt. V Colombo, 1911.
13. ,, — A short account of our present knowledge of the Cestode fauna of India and Ceylon. *Journ. Asiat. Soc. Bengal*, Vol. XX, No. 5.
14. ,, — Notes from the Bengal Fisheries Laboratory, Indian Museum, No. 3.—On Helminths from fish and aquatic birds in the Chilka Lake. *Rec. Ind. Mus.*, Vol. XI, 1915.
15. Yoshida, S. — Some Cestodes from Japanese Selachians, including five new species.

Parasitology, Vol. 9, No. 4. Cambridge, 1917.

16. Zschokke, F. *Recherches sur les structure anatomique et histologique des Cestodes.* Geneve, 1888.

EXPLANATION OF PLATE I.

FIG. 1.—*Phyllobothrium lactuca*, van Ben., a mature free proglottid showing the anatomy.

„ 2.—*P. foliatum*, Linton, surface view of the head.

„ 3.—*P. foliatum*, a mature proglottid showing the anatomy.

„ 4.—*P. pammicrum*, Shipley and Hornell, surface view of the head.

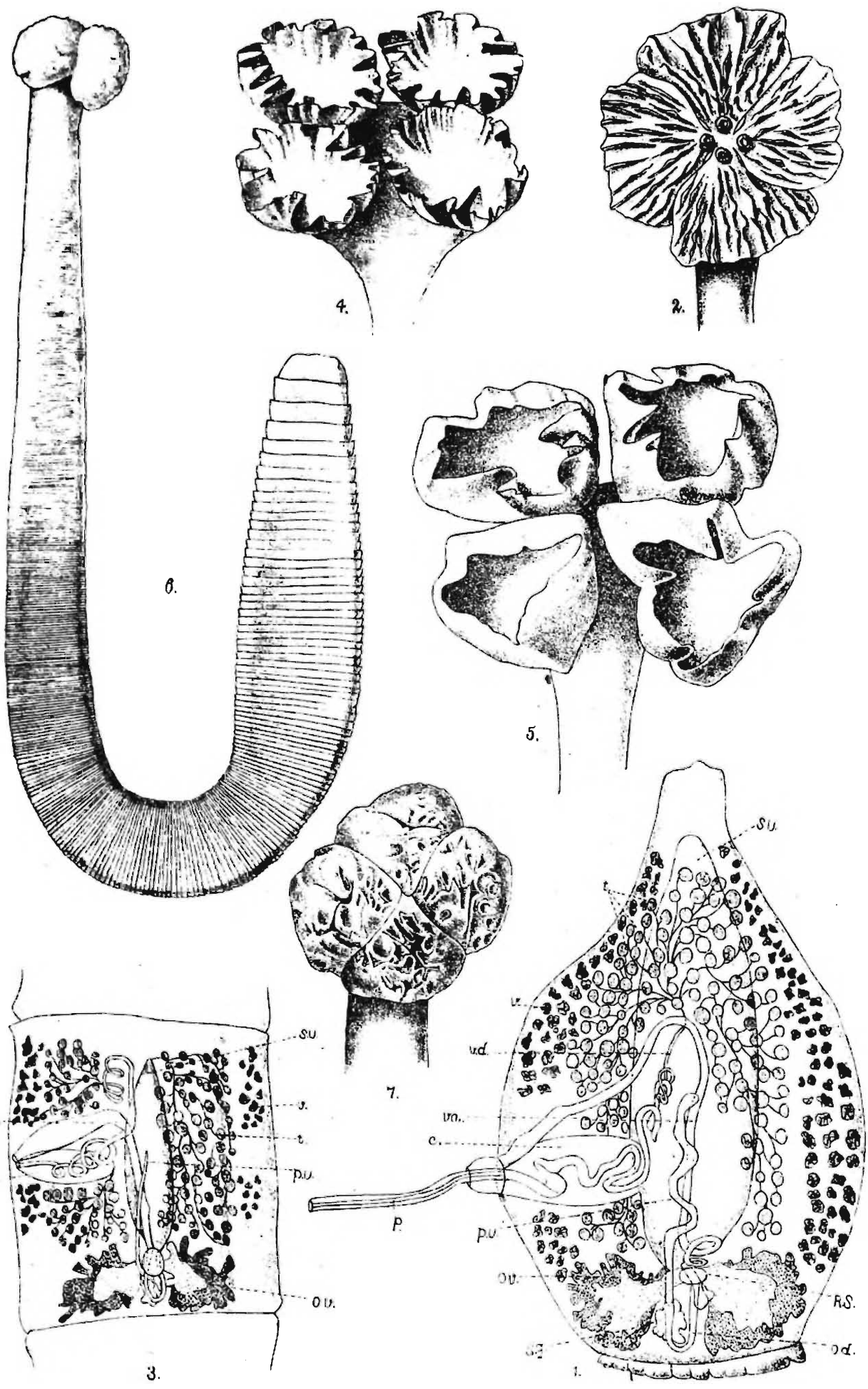
„ 5.—*P. blakei*, Shipley and Hornell, surface view of the head.

„ 6.—*P. compacta*, sp. nov., entire worm.

„ 7.—*P. compacta*, surface view of the head.

REFERENCE LETTERING.

C.=Cirrus-sac. O.D.=Oviduct. Ov.=Ovary. P.=Penis. P.U. =Primary uterus. R.S.=Receptaculum seminis. S.G.=Shell-gland. S.U.=Secondary uterus. T.=Testis. V.=Vitelline glands. Va.=Vagina. V.d.=Vas deferens.



D. Bagchi *del et lith.*

PHYLLOBOTHRIUM

II. NOTES ON THE GENUS *CHLORITIS*, BECK, WITH THE DESCRIPTION OF THE ANIMAL OF A NEW GENUS (*BURMOCHLORITIS*)

By LT.-COLONEL H. H. GODWIN-AUSTEN, F.R.S.

(With Plate IV).

In preparing contributions to the Zoological Results of the Abor Expedition my attention has been called to genera of the Helicidae, and I have come across in my collection of spirit specimens several species of much interest as regards the classification of the Land Mollusca. In this paper I take the genus *Chloritis* and species appertaining to it, and here I must not miss the opportunity of mentioning the work of Henry A. Pilsbry, who has done so much towards our knowledge of very many families and offer him my thanks for the assistance his work has been to me.

The genus *Chloritis* was created in 1837 by Beck; in 1847 Gray took as the type of it *Helix ungulina*, Linn., and is followed in "Die Heliceen," pp. 161 and 162 (1860). This shell figured in Pilsbry's Manual of Conchology, plate 29, figs. 1, 2 and 3 is a very distinctive one in form. Apparently the animal has never been examined, and it would appear that the widening of the group to contain forms with a convex spire, unless supported by anatomical characters, was a retrograde step.

Pilsbry with very little material in spirit to deal with, did his best with the genus, and states that only two species of the typical group of *Chloritis* have been investigated anatomically, viz. *C. dinodeomorpha*, Tap. Can. and *C. leei*, Cox, the last by C. Hedley. The figures of the generative organs reproduced on pl. 28, fig. 10 and pl. 32, fig. 42, respectively, differ very much one from the other, so much so that the two species can hardly fall into the same genus.

Pilsbry very truly has said (p. 122) with regard to conflicting opinion as to generic value in this widely distributed group of the Helicidae: "Controversy respecting the generic position of certain species known by the shells alone is idle, for the anatomy only can give a true answer to our questioning."

Burmochloritis kengtungensis, n. gen., n. sp.

Locality.—Hills north of Kengtung State, S. Shan States (Col. R. G. Woodthorpe, R.E.); four specimens were obtained.

Shell deeply umbilicated, conoid; sculpture, hair scars visible on 3rd whorl arranged in oblique lines; surface under high power

rather rough, the first three whorls finely and transversely striate, becoming regularly ribbed on the two last, this ribbing is indistinct on basal side. Colour deep ochraceous, with a narrow ruddy brown band, just above the periphery. Spire moderately conoid, apex blunt. Suture impressed. Whorls 5½, rounded on the periphery. Aperture semilunate. Peristome white, sinuate above, near upper inner angle, thickened and reflected, a callous on the parietal wall, columellar margin oblique.

Sizes.—Major diameter 32·0 ; alt. axis 16 mm.

I at first took this species to be *C. theobaldi* of Gude, originally described and figured in Pro. Malac. Soc. 1914, p. 55, also in Fauna British India, 1914, p. 177, but on my recently comparing it with the type specimen in the British Museum, although a close ally, it differs in several characters, being much larger, differently sculptured, and having the peristome sinuate. It comes from the eastern side of the Shan States.

Colonel R. G. Woodthorpe made a very fine collection of land mollusca on the Siam boundary when he was laying it down, and among the species preserved in spirit this is one and I am able to describe the animal.

Foot extremely long, extending to a very fine point : right dorsal lobe small, the left inconspicuous in two small lobes (fig. 1) ; visceral sac closely mottled with black. The generative organs (figs. 2 and 3) are complicated, the penis elongate and much coiled from the generative aperture to the retractor muscle which is close to a very sharp bend (*p*) at the end of the sheath, epiphallus (*ep*) very long and an extremely long flagellum (*f*). The vas deferens is also of great length. The spermatheca rises from the free oviduct, has one sharp bend, and towards the albumen gland its duct is imbedded in the oviduct, terminating in a globose sac as dotted in the figure ; this was seen in course of dissection but got broken off. The free oviduct opens into an ample atrium (*a*) with strongly plicate internal walls (fig. 4).

Close above the atrium and opening into it there is an oblong somewhat flattened sac (fig. 6) with leathery walls, the distal end produced into a short cylindrical tube, which is retractile. On cutting this open upon the dotted line (in fig. 6) a cylindrical dart was disclosed, having a spiral structure, but soft and leathery, not as usually calcareous ; along the side of this dart sac (fig. 7) there are numerous strong muscles (*m*), many of which have their attachment on the side of the body wall. The radula (fig. 9) differs from all described by Pilsbry in this group, the teeth are all plain straight sided from the central to margin, the laterals becoming narrower and longer and but slightly curved ; the marginals are very minute unicuspid, only the very last bicuspid. The radula is unusually long, having as many as 146 rows. Stoliczka describes that of *Trachia delibrata* to be very long with 125 rows.

The formula is 47. 9. 1. 9. 47 or 56. 1. 56.

The jaw (fig. 8) is very solid, well arched, with some 9 strong broad ribs.

The shell of this species (*Burmochloritis kengtungensis*) I have now described in detail comes very close to *Chloritis theobaldi*, Gude [1] and to *Anserina*, Theobald,[2] all three from the same country, the Shan States, east of the Irrawady River.

The most remarkable distinctive character in *B. kengtungensis* is the presence of a dart sac, and next the form of the teeth of the radula. With regard to the first, in the description of the genus *Chloritis* by Pilsbry (*Man. Conch.*, p. 117) we find " Genital system characterized by the lack of dart sack or other accessory organ on the female side " ; with regard to the second,—Basal cusps are present on the lateral teeth (pl. 28, fig. 4).

I have already referred to the two species of which the anatomy is known, viz. *dinodeomorpha* and *leei*. Fig. 42 on plate 32 of the last-named is very interesting in connection with the anatomy of *B. kengtungensis*. On the female side a large sac is depicted much in the same position as the dart sac of the Shan States specimen ; it may possibly be a dart sac, it is not alluded to in the description but I have not seen Mr. Hedley's original one and figures. The penis with the very long flagellum is wonderfully alike in the two species. Pilsbry places *C. leei*, Cox, in the group of *C. eustoma*, Pfr. I must here note the section *Sulcobasis* of Taparoni Canefri, with the type *sulcosa*, Pfr. (pl. 29, figs. 9, 10, shell). This in shape is not unlike that of *B. kengtungensis* and he has described another species *beatricis* and shows the central and inner lateral teeth to lack side cusps.

The characters of this Shan species differ so distinctly from those hitherto accepted for *Chloritis* I consider there are sufficient grounds for the creation of a new genus which I name *Burmochloritis*, in which I place *theobaldi* and *anserina* ; should *leei* of Australia possess a dart it may possibly be included.

---

[1] *Faun. Brit. Ind., Moll.* II, p. 177, fig. 81.
[2] *Ibid.*, p. 175.

EXPLANATION OF PLATE IV.

Burmochloritis kengtungensis, n. gen., n. sp.

FIG. 1.—Mantle zone, with right and left dorsal lobes (*rdl and ldl*) × 3.

„ 2.—Part of the generative organs, free oviduct point where severed; × 3.

„ 3.—The ovotestis (*ot*) and hermaphrodite duct; × 3.

„ 4.—The dart sac viewed from the side and atrium (*a*) opened out; × 3.

„ 5.—Do., dorsal surface showing position of dart, inside dotted line; × 3.

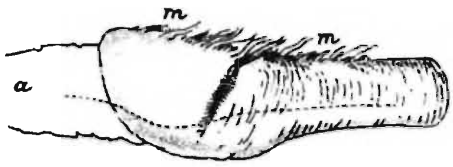
„ 6.—Do., dorsal surface and side, showing retractor muscle attachments (*m*), dotted line where cut open; × 3.

„ 7.—Do., interior exposed, showing the retractile dart; × 3.

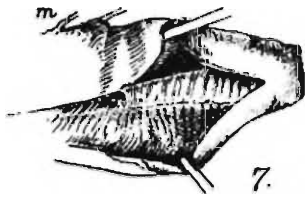
„ 8.—Jaw; × 30.

„ 9.—Teeth of radula at different parts of the row; × 245.

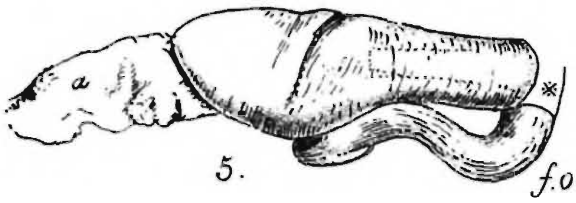
ep. epiphallus; *gen. ep.* generative aperture, position of; *ov.* oviduct; *f. ov.* free oviduct; *p.* penis; *rmp.* retractor muscle penis; *vd.* vas deferens.



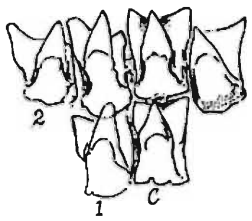
6.



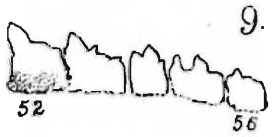
7.

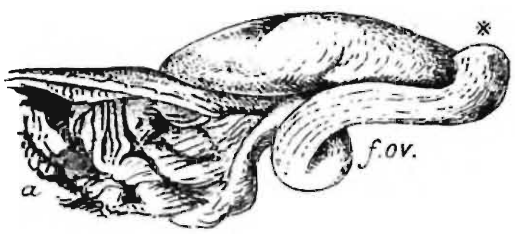


5.

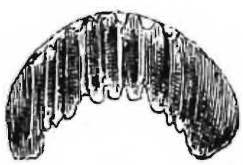


9.



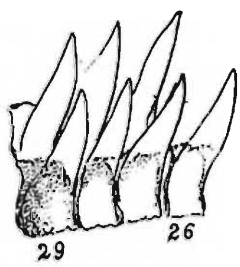


4.

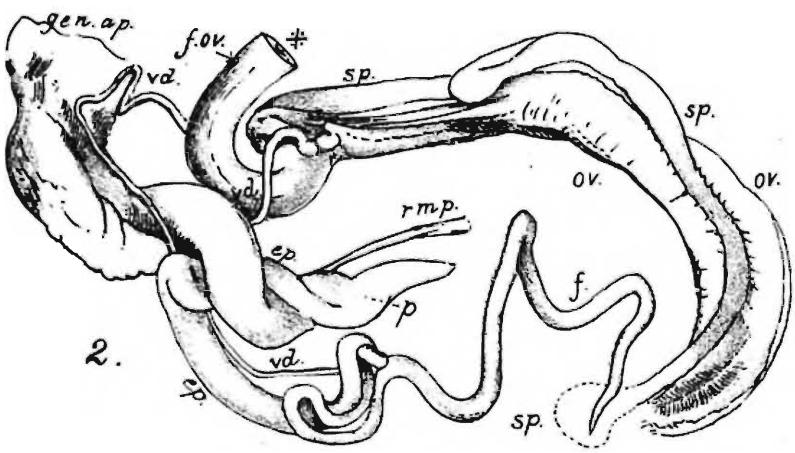


8

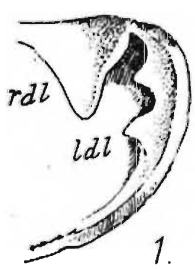
3.



9.



2.



1.

H H. Godwin-Austen *del* A. Chowdhary *lith*

Burmochloritis kengtungensis, G.-A.

III ON THE PROPER NAME OF THE RED JUNGLE FOWL FROM PENINSULAR INDIA

By HERBERT C. ROBINSON and C. BODEN KLOSS.

Examination of a large series of Red Jungle Fowl from East Java has raised an interesting point in connection with the proper names of the various races of Red Jungle Fowl which extend from Western India to Cochin-China, Hainan and the Philippines in the East and to Java in the South, reappearing in the higher islands of the Pacific, where possibly it owes its introduction to man.

For those who use the 12th edition of Linnaeus, the first name available is *Phasianus gallus* Linnaeus, Syst. Nat. 1, 1766, p. 270; after specifying several varieties (α, β, γ, etc.) Linnaeus proceeds to quote a locality as *Habitat* in India Orientale; Pouli candor, etc. We consider that this paragraph refers to the species as a whole and not to the variety *Gallus pusillus* which immediately precedes it. The type locality of *Gallus gallus* may therefore be taken as the island of Pulau Condor off the southernmost mouth of the Mekong, and Cochin-China birds may therefore be assumed to be typical. Linnaeus certainly had access to specimens from this island which were contained in the Mus. Carlsonianum at Gothenburg, as is evidenced by the description of *Larus polo-condor* by Sparrman hitherto known as *Sterna dougalli*. However, many people refuse to accept "gallus" as a specific name as it was applied to the domestic bird in the *Fauna Svecica*. The Pulau Condor bird was also probably a domestic fowl as we have recently received a collection from the island, which does not include it. Should this objection be upheld, the next binomial name is *Tetrao ferrugineus* Gmelin, Syst. Nat. 1, pt. 2, 1788, p. 761, *vide* Hartert (*Nov. Zool.* IX, 1902, p. 218).

This name is founded jointly on the "Grande Caille de la Chine", Sonnerat, Voy. Ind. Orient., ii, 1782, p. 171, and on Latham's "Hackled Partridge," Gen. Syn. Av., ii, 1783, p. 766, pl. 66, which latter gives an excellent figure of the female from a bird in the Leverian Museum, probably now in Vienna, said to come from the Cape of Good Hope. If Sonnerat's bird did not actually come from China it must have come from the Philippines or from some place east of the head of the Bay of Bengal. He visited no area in Peninsular India whence the Red Jungle Fowl is known to occur.

It is evident, therefore, that whether the specific names *gallus* or *ferrugineus* be used, they must both be applied to the Eastern and not to the Western race, if utilised for wild birds.

The next name applied is *Gallus bankiva*, Temm., Pig. et Gall., ii, 1813, pl. 87; this is obviously founded on Javan birds; "bengkiwo" being the Javanese (East Java) name for the species, *vide* Horsf., Trans. Linn. Soc. XIII, 1821, p. 185.

So much for the synonymy.

We have examined a series of birds—indubitably wild—shot on the slopes of the Idjen Volcano, Banjoewangi, E. Java, at a height of 5,700 feet, at a distance of more than ten miles from any human habitation. Both the males and the females of this series are distinguishable at a glance from any continental birds we have examined by the dark colour of the neck hackles in the male and by their truncate terminations in both sexes. In the female also the black central areas of the neck hackles are much wider than in the continental birds and the lateral edgings much paler; the heads of the males are also much darker.

We have no hesitation in considering that these specimens are typical of *Gallus bankiva* and in restricting the subspecies to the island of Java. Young males and females, and males in eclipse plumage present exactly the same relative differences as the full-plumaged birds.

The birds inhabiting N. E. Sumatra, on the other hand, are quite indistinguishable from those from Annam, Cochin-China, E., S.W., S.E., and Peninsular Siam and the Malay Peninsula.

From the large number of specimens we have examined in the flesh we do not believe that there is any consistent character to be found in the colour of the lappets. Our large series from S.W and Peninsular Siam, which we are certain are truly wild birds, has them mostly "red" or "pinkish red," while one is whitish pink and another white; the Annamese birds were bluish white, East Siam red and S.E. Siam pink or red, and birds from Koh Mesan, a little island off the coast of S.E. Siam, bluish white. Mr. Siemund, who has shot very large numbers in the neighbourhood of Kuala Lumpur and Taiping, states that the lappets are usually bluish white. The whole of our series have the posterior portion of the neck hackles rich straw yellow and strongly acuminate, showing no signs of the rounded feathers typical of the Javanese birds.

The races will therefore stand as:—

1. **Gallus ferrugineus ferrugineus** (Gm.).

Gallus bankiva bankiva, Stuart Baker (part.), *Journ. Nat. Hist. Soc., Bombay*, XXV, 1917, p. 18 *et seq.*

Sumatra, Malay Peninsula to Hainan, Westward to Burma.

2. **Gallus ferrugineus murghi**, subsp. nov., postea p. 15.

Gallus bankiva ferrugineus, Stuart Baker, *op. cit.*, p. 3.

Peninsular India, North and East to Assam.

3. **Gallus ferrugineus bankiva** (Temm.).

Gallus bankiva bankiva, Stuart Baker (part.), *op. cit.*, p. 18.

Java, Lombok.

It is obviously impossible to accept Mr. Stuart Baker's nomenclature as he uses as a parent name one which is 25 years later in date than his later subspecies.

Accepting Mr. Baker's views on the distinctness of the Eastern and Western races in regard to the paler hackles possessed by the latter, and in view of the facts which we have here drawn attention to, we consider that the Western bird has no name.

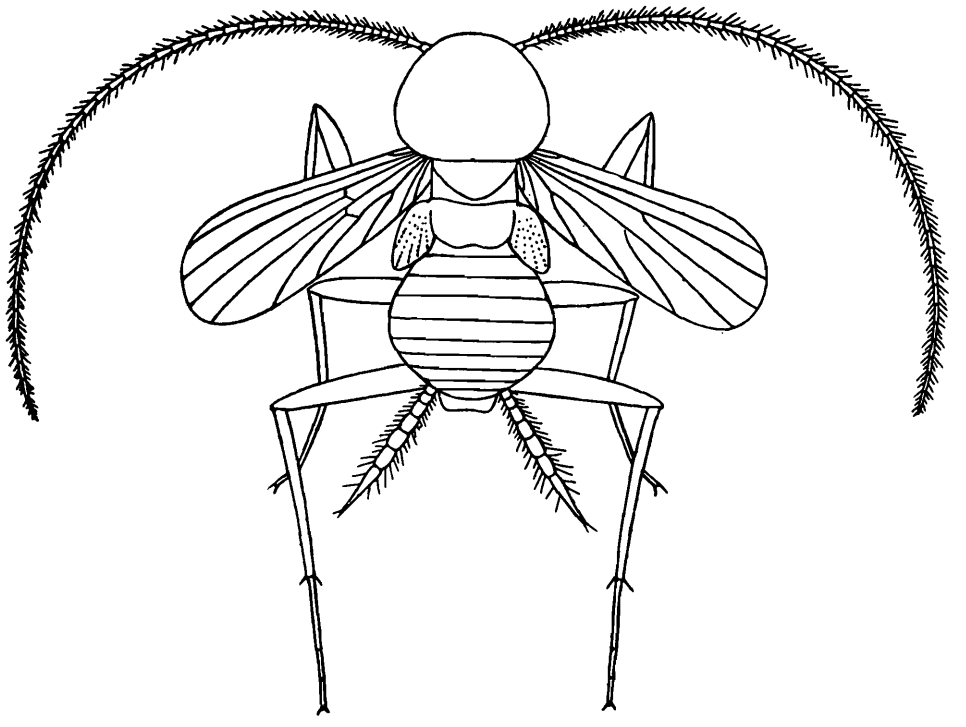
We therefore name it *Gallus ferrugineus murghi*, subsp. nov.

Type: Adult male (Zool. Survey of India, No. 18921) from Chirala, Gya District, Bihar (Museum Collector).

IV THE FEMALE OF THE COCKROACH *ALLUAUDELLA*

By F. H. GRAVELY, D.Sc., *Asst. Superintendent, Zoological Survey of India* (now *Superintendent, Government Museum, Madras*).

The genera *Alluaudella* and *Cardax* contain minute cockroaches of such unusual form that Shelford remarked when describing the latter: "It is difficult to discover the affinities of a genus so aberrant as this. .it cannot be regarded as closely related to any known genus."[1] Only two species of *Alluaudella* and one of *Cardax* are known, and these from male specimens only. The discovery



Alluaudella himalayensis ♀ × 15.

of a female is therefore of considerable interest. It was found by Mr. L. C. Hartless in his bungalow at Pashok, *ca.* 3,500 ft., in the Darjiling District of the Eastern Himalayas. Its tegmina are small and its wings vestigial, so that it is obviously incapable of flight; but the tegmina presumably function as a protection to the body, for they are sufficiently developed to show that the venation

[1] *Ann. Mag. Nat. Hist.* (8) I, p. 162 (1908).

is practically identical with that of the male of *Alluaudella himalayensis*, which was described [1] from a single specimen collected at Kurseong, 4,700 ft., in the same district by Dr. Annandale in June 1910.

The total length is 2·5 mm., but the abdomen has evidently shrunk greatly in drying, as it does not now extend much beyond the ends of the hind coxae.

The general colour is dull yellowish, distinctly paler than that of the browner male. The head is scarcely exposed by the pronotum and appears larger than in the male on account of the much smaller and rather narrow eyes. There are no ocelli. The large basal joint of each antenna is succeeded, as in the male, by two joints each about twice as long as broad, these are succeeded by a number of joints which are broader than long. Distally the joints become gradually longer and thinner, those of at least two thirds of the antenna being fully twice as long as broad.[2]

The pronotum is somewhat more rounded than in the male and is not pubescent, though there are a few spiny hairs on the margin.

The tegmina are short, probably too short to cover the abdomen in fresh specimens. Their venation is identical with that of the male. A comparison of the two tegmina shows that the venation varies slightly as in the male. The wings are very much reduced, but show indications of similar venation. The styles are much stouter than in the male.

---

[1] *Rec. Ind. Mus.* V, pp. 309-311, pl. xx (1910).

[2] The antennae of the male resemble those of the female. They are about as long as the wings, not shorter as shown in the figure (*Rec. Ind. Mus.* V, 1910, pl. xx, fig. 5 A). Their second joint is as long as the third, not shorter as shown (*loc. cit.* fig. 5 B). The antennae of *Cardax* as shown on the same plate are also too short.

V A NEW *CHLAMYS* FROM DARJILING

By S. MAULIK, *Professor of Zoology in the University of Calcutta.*

Family CHRYSOMELIDAE.

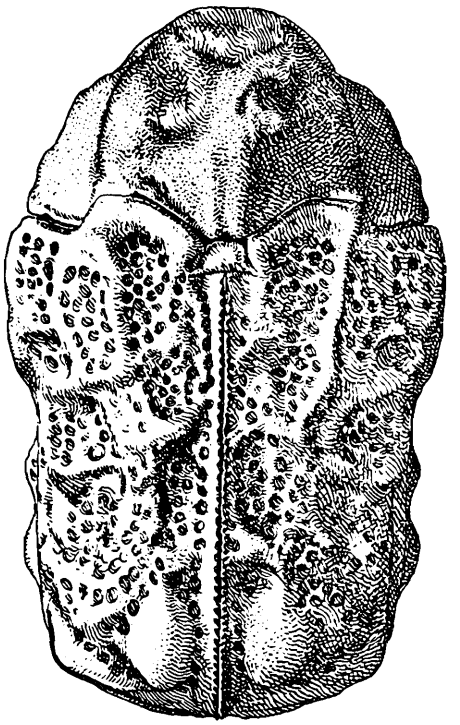
Division *CAMPTOSOMATA*.

Subfamily CHLAMYDINAE.

Genus **Chlamys**, Knoch.

Chlamys pashokensis, sp. n.

Body subquadrate, broadest at the base of the elytra, narrowed anteriorly and more or less parallel posteriorly; dark reddish-brown, with the eyes, the mandibles, some area on the elevated surface of the pronotum, the posterior edge of the prothorax and

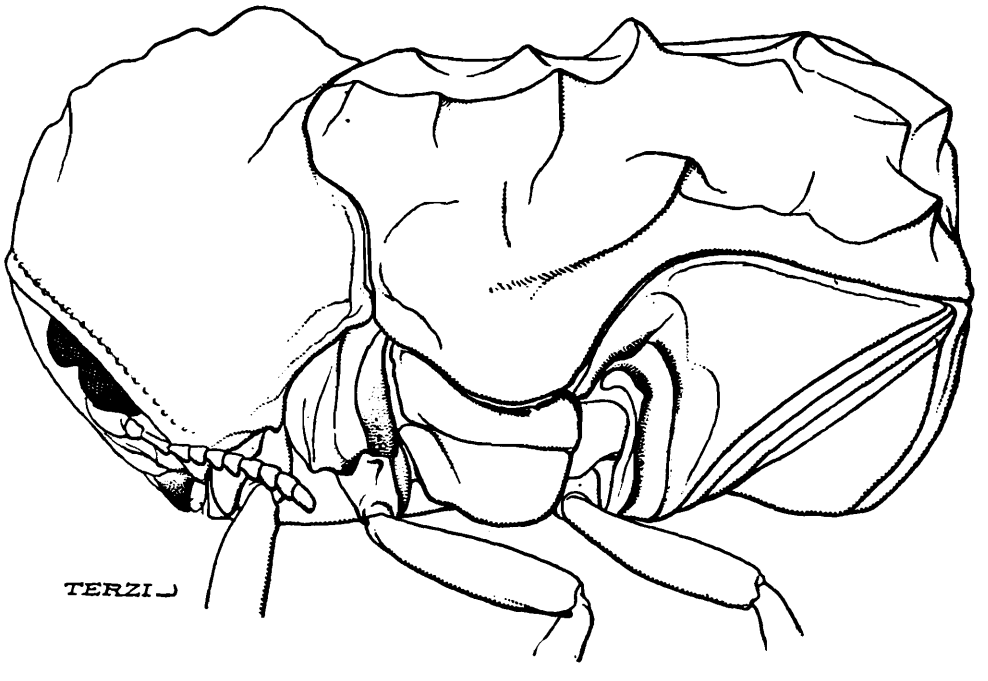


TEXT-FIG. 1.—Upper side of *Chlamys pashokensis*, sp. n.

the anterior edge of the elytra, the depressed areas on the elytra, edges of the episterna and those of the excavations in which the posterior femora are inserted, black or piceous; the antennae, a large area on each side of the prothorax, a tubercle on the protho-

rax in the middle of the base, two tubercles on the posterior edge of the elytra, a large lateral area of the first abdominal segment and the pygidium beneath, light brown. The insect is completely covered with coarse and shallow punctures, in some parts the punctures are shallower, in some they are deeper.

Head deeply inserted in the prothorax, viewed from the underside flat and closely punctate. There is a lighter triangular area on the interantennal space, and a black longitudinal streak in the middle branching to a certain extent on the interocular space. The eyes are deeply and triangularly notched on the inner margin. The first joint of the antennae is the thickest and longest, the second small and rounded, the third elongate, the fourth transverse but smaller than the following joints which are all transversely expanded. When the antennae are extended forwards the lateral expansions of the eight apical joints are on the outer side, in repose



TEXT-FIG. 2.—Side view of *Chlamys pashokensis*, sp. n.

they lie in deep channels, the lateral expansions being on the inner side. *Prothorax* bisinuate on either side at the base which is as broad as that of the elytra; broadest at base, narrowed in front, the anterior margin circular, lateral margin oblique and straight. The pronotum is elevated in the middle, the boundary of this elevated surface being marked by black. It has four small tubercles surrounded by black, a lighter and larger tubercle behind, channelled in the middle. The rest of the pronotal surface is uneven having elevations and depressions. *Scutellum* trapezoidal, about twice as broad as long, the two apical outer angles produced posteriorly, the surface rough. *Elytra* broadest at the base, constricted in the middle, coarsely and deeply punctate; suture serrate throughout; humeral callus raised into a tubercle. On each elytron the basal area along the anterior margin is raised, from the middle of which runs obliquely an indistinct costa on the outer

side of which there are four or five irregularly disposed small and large tubercles all of which are not well defined; on the inner side there are four tubercles; on the posterior edge there are two large light brown tubercles.

On each side of the oblique costa in the middle of the elytron the surface is deeply depressed. Pygidium finely punctate with an indistinct cross in the raised middle portion; areas along the sides depressed; a small area near the elytral edge black.

Length 5 mm., breadth $3\frac{1}{2}$ mm.

Pashok, alt. 2,500 ft., Darjiling District, 26-v—14-vi-1916 (*F. H. Gravely*).

VI DESCRIPTION OF A NEW SPECIES OF THE GENUS *PSEUDOPHAEA* (= *EUPHAEA*, SELYS) FROM WESTERN INDIA WITH SOME REMARKS ON THE SECTION *DISPAR* OF THE GENUS

By F. F. LAIDLAW, *M.A.*

Pseudophaea fraseri, sp. n.

1 ♂ Talewadi, near Castle Rock, N. Kanara Dist., Oct. 3-10, 1916. S. Kemp. $\frac{4300}{H\,1}$

5 ♂♂ (One of these is the type ♂) Castle Rock, N. Kanara Dist., Oct. 1916. S. Kemp. $\frac{4374}{H\,1}$

1 ♀ (Allotype) Castle Rock, N. Kanara Dist., Oct. 1916. S. Kemp. $\frac{4350}{H\,1}$

♂ *Wings* relatively long and narrow, the hinder-wing markedly shorter than the fore-wing, and with its apex very regularly rounded. That of fore wing by comparison more pointed (see text-fig.). Length of fore-wing 35 mm., greatest breadth 6·5 mm. at a point just mid-way between pterostigma and nodus.

Length of hinder-wing 32 mm., greatest breadth 6·5 mm. attained at level of proximal end of pterostigma, which is about 4 mm. long on both wings. Both pairs of wings have a yellowish tinge, deepest at the base of the hinder pair; most marked in the type ♂ which is apparently the most mature of the specimens.

The apical third or thereabouts of the hinder wing is opaque, brownish-black, with rather a violet reflex. The inner margin of the opaque area runs transversely straight across the wing at right angles to the long axis of the wing. The transition from the opaque to the transparent is almost abrupt, in the type there is a shading off of colour over a width of about 1 mm. The opaque area of the type is about 10 mm. long. In another specimen it is about 8·5 mm., and in this individual the total length of the hinder-wing is 31 mm.

Pterostigma 4 mm., nodal indicator $\frac{18}{16}|\frac{33}{26}$.

Head: Upper and posterior surfaces black, except the base of the labrum, genae and bases of the mandibles which are bluish-white. Labial structures white tipped with black.

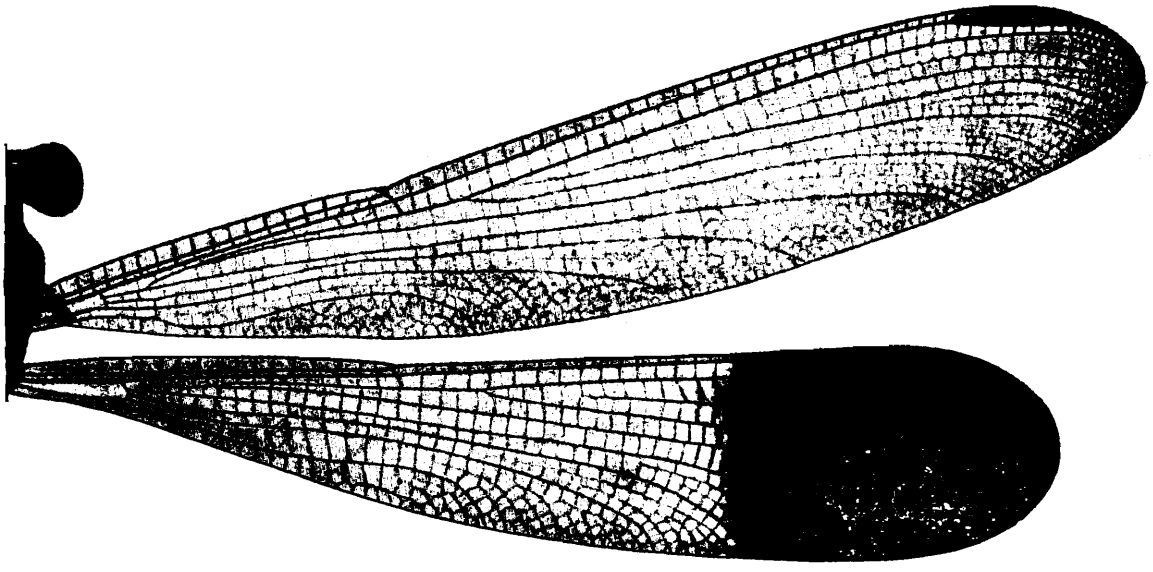
Prothorax: Black with a pair of transversely oval, bluish-white spots on either side of the pronotum.

Synthorax: Mesepisterna and dorsal surface generally rich velvety black. On either side of the mid-dorsal carina is a bluish-

white line, shaped like a long thin wedge, its base resting rather obliquely on the anterior margin of the synthorax. In addition there are traces of a second line of the same colour close in front of the humeral suture, most readily distinguished at its upper end. The mesepimeron, bordered with black along the humeral suture, is brown-orange in colour with a large oblong-oval island of black enclosed. The mesepisternum and metepimeron are also brown-orange, the suture between them marked with black at its upper end.

Ventral surface reddish-brown.

Abdomen: The first six segments are reddish-brown, the last four black. The anterior segments are darker above than on the ventral side, they deepen also in colour distally, 2, 3, 4 have a very fine longitudinal line of yellowish-green dorsally. The anterior



Wings of *Pseudophaea fraseri* sp. n. ♂ (type).

half of 7 is a very dark brown shading into black. The mid-dorsal carina of 10 is raised apically to form a small tubercle which projects beyond the distal margin of the segment. Length of abdomen 38 mm.

Legs: Anterior pair black, the two posterior pairs reddish-brown with black articulations, cilia and tarsi.

Anal appendages: Upper pair stout, about as long as the 10th segment of abdomen, divaricate with slight inward curve, in profile digitiform, superior pair about one-quarter the length of upper pair, closely approximated and parallel, distant from the upper pair, slightly curved upwards. Both pairs black.

♀ (Allotype). *Wings* unfortunately much frayed, so that it is impossible to give exact measurements. The length of the fore-wing is about 34 mm., and of the hinder-wing about 31 mm., the latter does not show the specialization in shape found in the male,

ERRATUM.

P. 25, line 12 from bottom, *for* Major F. C. Fraser, R.A.M.C. *read* Major F. C. Fraser, I.M.S.

its greatest breadth, a little over 6 mm., appears to be mid-way between the nodus and pterostigma.

The wings are colourless, and the length of the pterostigma is 4 mm.

Head more extensively marked with bluish-white than is that of the male. The coloured area of the upper lip is broader, the mark on the genae ascends to the level of the anterior ocellus, and there is a bluish-white spot in the centre of the post-clypeus, and a small square mark on either side of the ocelli of the same colour.

Prothorax: As in the male, but the coloured spots a trifle smaller relatively than in that sex.

Synthorax: Mesepisterna and dorsal surface black, on either side of the mid-dorsal carina is a bluish-white line narrower than that seen in the male, a little widened anteriorly. Just in front of the humeral suture is a second line rather of a yellow hue, this anteriorly almost meets the more median line.

The mesepisternum is dull yellow, bordered with black along the humeral suture, the yellow colour enclosing a large oblong-oval island of black. The first and second lateral sutures are marked with black along their whole length; the rest of the side and the ventral surface of the synthorax is dull yellow in colour.

Abdomen: Shining black above and at the sides, ventrally dull yellowish brown. Segments 1-4 have a very fine, yellow line marking the dorsal, longitudinal carina; the line is present but barely perceptible on segment 5, and reappears on segments 8, 9.

Laterally segments 1 and 2 have a broad, pale-yellow band; a similar band occurs on segments 3-6, not quite reaching the distal border of the segment, but widened at the base of each to form an incomplete pale ring. On segment 7 the band is diminished, extending only one-half the length of the segment, and the basal widening is less marked. On segment 8 the band is reduced to a small postero-lateral spot, and on 9 to antero-lateral and postero-lateral spots.

Legs: Black, excepting the coxae and anterior surfaces of the femora which are yellow.

Anal appendages equal in length to segment 10, acute-conical.

This fine new species, which I have much pleasure in dedicating to Major F. C. Fraser, R.A.M.C., belongs to a small section of the genus *Pesudophaea*, which may be called the section *dispar*, after its first described species, named by Rambur.

One other species referable to the section has been described. This is *Pseudophaea impar*, Selys, from Malacca, with the race *inaequipar*, Selys, described by its author as a distinct species from Borneo. Krüger has reported *Pseudophaea impar* from Soekaranda, Sumatra (*Stett. Entomol. Zeit.* 1898, p. 78), but I do not know whether it differs to any extent from the Peninsular form or not.

Pseudophaea fraseri and *Pseudophaea dispar* are much more nearly related to each other than either of them is to *Pseudophaea*

impar. I have examples of the males of all the four forms before me For the females I have seen only the allotype of *P. fraseri*, Selys description and wing-figure of *P. dispar* (*Mon. Calopt.*, p. 168, pl. v, fig. 3) and the same writer's very brief description of the female of *P. impar* (*Bull. Acad. Belg.* (2) VII, p. 441 (1859).

I have been able to compare the males with those of a number of other species of the genus in my own collection. Of females, which are rare in collections, I have seen only two specimens of *P. brunnea*, Selys, from Burma, and a figure of the wing of *P formosa*, Selys, given by Dr. Ris (Supplementa Entomol. 1, p. 53, fig 5). On the evidence before me I can say that whilst the males of the genus show very remarkable differences in colouring and wing shape as between species and species the females are all (so far as I know) very much alike. For example, the males of *P. fraseri*, *P. formosa*, and *P. brunnea* are so different in appearance that at first sight one would think them to belong to three different genera, whilst the females require a tolerably careful scrutiny for their separation.

Hence in defining the section *dispar* it is obvious that the male characters must be entirely relied on, and especially those of the hinder-wing.

When de Selys in his "Monographie des Caloptérygines" characterized the group *dispar* of his genus *Euphaea* he was not acquainted with either of the other species here included. So that I am able to offer a fuller definition of the group or section, at the same time removing from it his *E. decorata*, which as Ris (*loc. cit.*) has noted falls into a distinct group, *decorata-compar-formosa*.

I suggest then the following amended definition for the section *dispar* of the genus *Pesudophaea*.

> The section comprises species of *Pesudophaea* in which the fore-wing of the male is entirely hyaline (save that mature specimens may have the apical margin outlined with brown beyond the pterostigma).
>
> Hinder-wing gradually increasing in breadth almost to the level of the basal end of the pterostigma; its apex very regularly rounded.
>
> Its greatest breadth bears the proportion to its greatest length of between 1 : 4 and 1 : 5.
>
> Its apical part rather abruptly opaque, brown or black; the opacity covers from one-quarter to three-sevenths of the wing length and its inner margin lies transversely at right angles to the long axis of the wing. There is no metallic green or blue colouring on the wing.

The regular curving of the apex of the hinder-wing exists only in the males. Its character is well shown in the accompanying text-figure for which I am indebted to Messrs. H. and F. E. Campion.

The apex of the fore-wing is of the shape more usually seen and differs but little from that of allied genera such as *Bayadera* or *Anisopleura*.

The males of the section may be differentiated as follows:—

A. Large species, hinder-wing exceeding 30 mm. in length; its length bearing the ratio to its greatest breadth of about 5 : 1.

a. Length of hind-wing nearly 40 mm. Synthoracic colour pattern similar to that of female. No longitudinal dorsal mark on segments 2-3 of abdomen ... ... *P. dispar*, Ramb. Nilgiri Hills.

b. Length of hinder-wing about 32 mm. Synthoracic colour pattern shows specialization when compared with that of the female. A light longitudinal line on segments 2-3 of abdomen. *P. fraseri*, n. sp. W. Coast of India.

B. Smaller form. Hinder-wing less than 25 mm. in length. Its length bearing the ratio 4 : 1 to its greatest breadth. Colour pattern of synthorax specialized[1]; black above, blue at the sides ... ... *P. impar*, Selys.

α. Apical mark of hinder-wing about three-sevenths of wing-length ... ... Sub-sp. *impar*, Selys, Malacca.

β. Apical mark of hinder-wing about two-fifths of wing-length ... ... Sub-sp. *inaequipar*, Selys, Borneo.

Measurements of hinder-wings of species belonging to the section.

	Base of hinder-wing to nodus.	Nodus to apex.	Greatest breadth.
P. dispar, Ramb. ...	17·5 mm.	... 22·5 mm.	... 8 mm.
P. fraseri, n. sp. ...	12 mm.	... 20 mm.	... 6·5 mm.
P. impar, Selys ...	10 mm.	... 14 mm.	... 6 mm.

[1] The colour pattern of the synthorax of the females of the two species I have examined is, as will have been inferred, very much alike. It resembles also that found in *Bayadera*. I regard this pattern as probably primitive for the genus.

MISCELLANEA

FISH.

Note on a supposed new Indian genus.

Jordan has recently created a new genus *Raimas*[1] with *Cyprinus bola*, Hamilton, as its type to take the place of *Bola*, Günther.[2] He thinks *Bola* to be "preoccupied by Hamilton." It does not, however, appear that Hamilton Buchanan ever used the name *Bola* (or *Bhola*) in a generic sense. He mentions *Bola* (deriving the name, as he says, from the local name of a fish called in Bengal *Bhola*) only in two places,[3] and in both he uses it as a specific name under his subgenus *Barilius*,[4] which is generally recognised as a valid genus. Günther founded the genus *Bola* with Hamilton Buchanan's *Cyprinus goha* as its type, and borrowed the generic name from the specific apellation *C. bola*, Hamilton. In the genus *Bola*, Günther, there are two distinct species, viz. *B. bola* (H.B.) and *B. goha* (H.B.), though both Günther and Day[5] regarded them as synonymous. The *Cyprinus bola* of Hamilton Buchanan was from "the Brahmaputra," it grows to "five or six inches in length" and "is of little value," whereas Hamilton's *Cyprinus goha* is a "trout" to English residents and was obtained "from the Kosi, Yamuna, and Son rivers; grows to about the size of a herring and is fine-flavoured delicate fish." Furthermore, the *Bhola* of Bengal is not the *Rajamas* of the Assamese, from which local name, by the way, Jordan christens his newly-proposed genus. M'Clelland[6] and Cuvier and Valenciennes[7] recognised the two species as distinct. There are two coloured figures of natural size in the volume of MS Drawings by Hamilton Buchanan in the library of the Asiatic Society of Bengal, representing these two species. The name *C. Goha* appears in Hamilton Buchanan's own handwriting on the back of Plate cxxvi, while the name *Cyprinus Bhola* in the same handwriting is written on the back of Plate cxxxi, the latter much the smaller figure of the two. In absence of the types, these drawings have to be adopted as the *protographs* of these two species, and as the genus *Bola*, Günther, is not preoccupied, the names of the species should be respectively: *Bola goha* (H.B.) and *Bola bola* (H.B.).

B. L. CHAUDHURI.

---

1 Jordan, *Proc. Acad. Nat. Sci. Philadelphia*, LXX, p. 344.
2 Günther, *Cat. Fish. Brit. Mus.*, VII, p. 263.
3 Hamilton Buchanan, *Acc. Fish. Ganges*, pp. 275 and 385.
4 ,, ,, ,, ,, pp. 266 and 384.
5 Day, *Fish. India*, p. 594.
6 M'Clelland, *Asiat. Research.*, XIX, pp. 297 and 298, pl. xlvii, fig. 1, and pl. xlviii, fig. 5*β*.
7 Cuvier and Valenciennes, *Hist. Nat. Poiss.*, XVI, pp. 423 and 424.