

XVI NEW AND INTERESTING PEDUNCULATE CIRRIPEDES FROM INDIAN SEAS

By N. ANNANDALE, *D.Sc., F.A.S.B., Superintendent of the Indian Museum.*

(Plates xxxiii-xxxiv.)

For some years past the main biological work of the 'Investigator' has been carried out in comparatively shallow water, and the Surgeon-Naturalists (Capts. R. B. Seymour Sewell and T. L. Bomford) have devoted considerable attention to the littoral and sub-littoral fauna. The result has been, so far as the Cirripedia Pedunculata are concerned, to add several new and interesting species to the fauna of the Bay of Bengal. I propose here to describe or notice these, together with a species of which specimens have been obtained by Mr. J. Hornell off the coast of Baluchistan.

Family SCALPELLIDAE.

Scalpellinae, Pilsbry, *U.S. Nat. Mus. Bull.* 60; p. 4 (1907).
Pollicipedidae Annandale, *Mem. Ind. Mus.* II, p. 63 (1909).

Of this family four species have now to be added to the Indian fauna, one belonging to the genus *Lithotrya* and three to the subgenus *Smilium* of the genus *Scalpellum*.

Genus *Scalpellum*, Leach.

Subgenus *Smilium* Gray.

Annandale, *Rec. Ind. Mus.* V, p. 145 (1910).

The species of this subgenus often inhabit shallower water than those of *Scalpellum* (s.s). It is, therefore, not surprising that the exploration of the coast of Burma should have resulted in the discovery of forms not hitherto known from these seas, for most of the biological work of the 'Investigator' has been carried out hitherto in much deeper water. The three species here noted have all been found already elsewhere in the Oriental Region.

Scalpellum (*Smilium*) *kampeni*, Annandale.

Rec. Ind. Mus. III, p. 267, figs. 1-4 (1909); *Vid. Med. naturhist. Foren. Köbenhavn*, 1910, p. 82.

This species was originally discovered by Dr. P. van Kampen in 13-16 fathoms off the coast of Sumatra. It has since been found off Singapore and in the Gulf of Siam (by Dr. Th. Mortensen)

at depths of from 15–30 fathoms. Several specimens were obtained by Capt. Sewell off the coast of Burma in comparatively shallow water. Precise details as to their *provenance* are not at present forthcoming.

Scalpellum (Smilium) rostratum, Darwin.

Darwin, *Mon. Cirr. Lepadidae*, p. 259, pl. iv, fig. 7 (1851).

Hoek, *Siboga-Exp.*, Mon. XXXIa, p. 65, pl. v, fig. 13 (1907).

Sewell, *Fourn. As. Soc. Bengal (n.s.)* IX, p. 329 (1913).

Originally described from the Phillipines (20 fathoms), this species was taken at several places in the Malay Archipelago by the 'Siboga' in depths of from $8\frac{1}{2}$ to $61\frac{1}{2}$ fathoms. A young specimen was obtained by Capt. Sewell off the coast of Burma in 50 fathoms ('Investigator' sta. 395: lat. $13^{\circ} 29' N.$, long. $97^{\circ} 30' E.$).

Scalpellum (Smilium) sinense, Annandale.

(Pls. xxxiii, xxxiv, fig. 1.)

Ved. Med. naturhist. Foren. Köbenhavn, 1910, p. 211, pl. iii, fig. 3.

This species was first reported from the China Sea. Capt. Bomford obtained three specimens on the spines of a sea-urchin of the family Cidaridae (together with the types of *Heteralepas reticulata*, described below) in 60 fathoms in the Mergui Archipelago (sta. 534: lat. $12^{\circ} 4' N.$, long. $96^{\circ} 44' E.$). These specimens, which were taken in April, have no males attached, although one is ovigerous.

The proportions of the valves and the shape of the terga vary somewhat, the external membrane is much denser in some individuals than in others, and the form of the mandible is extraordinarily variable. In the specimen from China first dissected there were five main teeth (including the inner angle) with a small subsidiary tooth between the first two; in one Burmese example there are six subequal teeth, but in another there are seven teeth, the fourth of which has, however, almost the nature of a subsidiary tooth. The following appear to be specific characters:—the appendage as a whole is never very strongly curved, the first main tooth is never either much larger than or widely separated from the second; all the teeth (except the small subsidiary ones) are of moderate size, subequal and about equidistant; the inner angle forms a blunt tooth not much larger than the others and clothed with short spines or hairs.

The eggs are broadly oval in outline, 0.4 mm. long by 0.29 mm. broad. They are present only in comparatively small numbers, each lamella containing about 100. That is to say, each barnacle produces about 200 eggs at a time.

Genus Lithotrya, G. B. Sowerby.

The species of this genus are usually found boring in coral-reefs, among the shells of molluscs or in soft limestone.

The Indian species are still imperfectly known, having been recorded only from outlying groups of islands such as the Maldives and the Nicobars.

Lithotrya (Conchotrya) valentiana (Gray).

Darwin, *Mon. Cirr. Lepadidae*, p. 371, pl. viii, fig. 5 (1851).

Gruvel, *Mon. Cirh.*, p. 104, fig. 113 (1905).

Mr. Hornell took two specimens of this species in cavities in limestone rocks on the shore of Churnah I. off the coast of Baluchistan and has kindly presented them to the Indian Museum. The original specimens were embedded in an oyster-shell from the Red Sea, and others have since been found in a similar position at Zanzibar.

L. valentiana is distinguished from all others of the genus by the absence of lateral valves. The rostrum is rudimentary and the scuta, terga and carina lock together in an unusually intricate manner. These characters are perhaps sufficient to justify the retention of Gray's name *Conchotrya* as that of a subgenus of which this species would be the type and, so far as is known, the sole representative. The peduncle is normal in shape. It is covered with minute chitinous tubercles and bears a transverse suboval calcareous plate on its posterior surface at or near the base.

Family LEPADIDAE.

Subfamily *Oxynaspidinae*.

***Oxynaspis indica*, Annandale.**

Oxynaspis celata subsp. *indica*, Annandale, *Mem. Ind. Mus.* II, p. 69, pl. vii, fig. 10 (1909).

I think it best on the whole to recognize the Indian *Oxynaspis* as a distinct species, although it is closely allied to the one from the Atlantic described by Darwin as *O. celata*. It has a narrower capitulum than that form and neither the shape of the valves nor the structure of the appendages is quite the same.

I was wrong (*loc. cit.*, 1909) in differing from Darwin as to the nature of the spiny covering of the shell in this genus. In a young specimen recently examined the antipatharian has produced a flat, spiny growth over the valves, and from this growth normal branches are actually given off at the tip of each tergum of the cirripede, reaching a length of several millimetres. There can, therefore, be no doubt that the external covering of the barnacle is produced, not by the animal itself, but by the organism to which it is attached—as Darwin originally stated.

O. indica occurs on both sides of the Bay of Bengal at depths of from 15 to 20 fathoms. I have recently found two small specimens on an antipatharian from 'Investigator' station 464 (S. of Ceylon: lat. 5° 56' N., long. 75° 45' E.: 52-68 faths.).

Subfamily *Lepadinae*.Genus *Alepas* (Rang), Pilsbry.

Alepas, Pilsbry, *U.S. Nat. Mus. Bull.* 60, p. 103 (1907); Annandale, *Mem. Ind. Mus.* II, p. 64¹(1909).

Pelagic *Lepadinae* with translucent or transparent tissues, without calcareous valves or with a pair of scuta only, without a muscular lining to the capitulum, without anal appendages or with uniarticulate anal appendages, with straight or nearly straight cirri of not more than about 14 joints to each ramus, with (in one species) 5 lateral filaments on each side. The joints of the cirri bear circles of hair distally; the mandibles are well developed, with five or six teeth; the maxillae often have the cutting edge scalariform.

The synonymy of the genus thus redefined is discussed by Pilsbry in the paper cited. I have adopted his views on the subject because they seem to be consistent and to tend to simplicity in the classification of the *Lepadidae*, but it is of course true that the identification of the species described by Quoy and Gaimard and by Rang on the one hand and by Lesson on the other must remain in doubt.

In my own paper to which reference is made I proposed to recognize *Alepas* provisionally as the eponymous genus of a subfamily of somewhat degenerate *Lepadidae* characterized by their transparent tissues and simplified valves and appendages. It is clear, however, from an examination of the species described below that I was mistaken in my views as to the relationships of the genus, which must be placed near *Conchoderma*. Indeed, the characters whereon the two genera are separated (the thickness of the capitulum, the length of the cirri, the spinulation of these appendages, and apparent differences in the form of the mouth-parts, which are unknown in some species of *Alepas*) are hardly of generic importance unless considered together. Whether some of the other genera (*Chaetolepas*, *Microlepas*, etc.) placed by me in 1909 in the "*Alepadinae*" should be separated from the *Lepadinae* is doubtful, but *Anelasma* appears to be very distinct. I have not seen examples of any of these genera.

The different species of *Alepas* have in nearly all cases been found on the umbrella of pelagic medusae. The genus evidently occurs in all warm and tropical seas, but individuals appear to be extremely rare. Specimens identified by Gruvel as *A. parasita*, Sander-Rang, have been taken in the southern part of the Indian Ocean ¹.

Alepas investigatoris, sp. nov.

(Pls. xxxiii, xxxiv, fig. 2.)

The whole animal is white and translucent, except that the cement-glands have a yellowish tinge, which is also present in the

¹ *Bull. Soc. zool. France*, 1907, p. 163.

ova. The scuta are white and opaque.¹ The outline of the capitulum and peduncle is graceful and as a rule markedly sinuous; the relative proportions of the two regions differs considerably in different individuals and probably the peduncle is contractile as well as capable of being twisted and curved in various directions.

The posterior outline of the capitulum is strongly arched, the anterior outline markedly sinuous, strongly convex down the edge of the orifice and almost straight and vertical below it. The apex of the capitulum as seen from the side is slightly produced but not pointed. The whole capitulum is somewhat compressed. As seen from above it is distinctly emarginate in front, a median notch separating its anterior border into two almost rectangular lobes. The sides in this view are sinuous, but roughly parallel; the posterior border broadly rounded. The margins of the orifice are retroverted and a little thickened, but not fringed. The orifice is patent.

The peduncle is slender and cylindrical, a little swollen at the base, a little longer than, as long as, or a little shorter than the capitulum.

The scutum is well calcified, Y-shaped but with the relative lengths of the three arms variable.

The cirri are straight and of moderate length. Those of the first pair are not widely separated from the others, which they resemble in general form though they are considerably shorter than the second pair; each ramus has 8 joints, but the anterior ramus is distinctly shorter than the posterior one. The two basal joints of each are devoid of terminal hairs, but all the other joints bear a complete circle thereof, and also a fringe descending from it for some little distance down the posterior face. The second cirrus has 9 joints in each ramus, a complete circle of hairs at the tip of each joint and an incomplete (distal) marginal fringe in front. The rami of the remaining cirri have from 11 to 14 joints, some of those at the base being sometimes imperfectly differentiated. The terminal circles of hairs are sometimes interrupted on the posterior cirri, but the incomplete marginal fringe is always present at any rate on the last 8 to 10 joints. The sixth cirrus is slightly the longest. In all the cirri the rami are much longer than the undivided basal part of the appendage.

There are no anal appendages, but the position of each is indicated by an indistinct papilla.

There are 5 lateral filaments on each side, situated as follows:—two at the base of the first one at the base of the third, one at the base of the fourth and one at the base of the fifth cirrus. Each filament is a delicate tapering flattened structure, quite transparent and easily overlooked though of considerable relative size; the first pair are larger than the others, which diminish in size from before backwards.

¹ In some specimens preserved in formalin the calcareous matter has apparently been dissolved out.

The mouth-parts are prominent, but the labrum is not markedly bullate. It is quite smooth. The mandibles have six sharply pointed teeth; the outermost is separated by a considerable gap from the second, towards which it does not converge; the two inner teeth are close together. The inner edge of the first four teeth is pectinate. The whole appendage is minutely pubescent and there is a short fringe of minute hairs on the inner margin within the innermost tooth. The maxilla bears a single stout yellow spine at the outer extremity of its cutting edge but, almost concealed by it, there are two smaller spines on each side; the edge is strongly sinuous with four distinct depressions; it is clothed with soft flattened hairs of various lengths. The inner maxilla is broad and stout, clothed with short soft hairs.

The penis is moderately long and stout, smooth and tapering. It is clothed with fine hairs.

The eggs are remarkably small and numerous. They are invisible individually to the naked eye but form a fairly stout yellowish lamella that appears smooth and homogeneous until examined with a strong lens. They are broadly oval in outline.

Dimensions of largest specimen.

| | |
|----------------------|--------|
| Length of capitulum | 30 mm. |
| Breadth of capitulum | 30 ,, |
| Length of peduncle | 38 ,, |
| Breadth of peduncle | 10 ,, |

Habitat.—Morrison Bay, Mergui Archipelago; on Rhizostomous medusa.

Type.—No. 8711/10, *Crust., Ind. Mus.*

A. investigatoris is closely related to *A. pellucida* (Aurivillius) and *A. pacifica*, Pilsbry, but is apparently distinguished from both by the emargination of the capitulum above, by having five lateral filaments on each side and by its longer cirri, as well as by other characters more likely to be variable.

Two specimens, one large and one small, were found together on the edge of the umbrella of a medusa by Capt. Sewell, while another medusa of about a foot in diameter was surrounded in the same region by a number of individuals of different sizes. None were found on other specimens of the coelenterate examined at the time.

Genus *Heteralepas*, Pilsbry.

Heteralepas (Paralepas) reticulata, sp. nov.

(Pls. xxxiii, xxxiv, fig. 3.)

The capitulum and peduncle are (in spirit) of an opaque slightly yellowish tint, due to the muscular layer, which is covered externally by a thick transparent, tough, quasi-cartilaginous integument. The whole animal is very small.

The capitulum is almost globular; there is no carinal crest, but the posterior part and the sides are covered with a reticula-

tion of deep grooves and in the centre of each mesh there is a projecting tubercle; below the aperture the surface is smooth or marked with irregular (mostly transverse) grooves. No scuta can be distinguished but the outline of a pair of irregular areas is sometimes indicated on the smooth anterior part of the capitulum, in the position they would occupy. The aperture is less than a third as long as the capitulum and can be almost completely closed so as to appear merely as a narrow vertical slit with horizontal grooves extending outwards from it when open it is subtriangular and surrounded by a distinct fringe: it can evidently also be protruded so as to be almost tubular.

The peduncle is cylindrical. It is rather shorter than the capitulum, but at the base is often produced in front in the form of a tapering flattened process that lies in one of the grooves on the sea-urchin's spine and sometimes is as long or nearly as long as the peduncle.

The cirri are short and feebly curved, but the rami are relatively long as compared with the undivided basal portion. The first cirrus is widely separated from the second and differs considerably in outline from all the others. Its anterior ramus is much the shorter and more slender of the two (although each has 8 joints) and is nearly cylindrical in form. The posterior ramus tapers to a point, and is considerably swollen at the base. In both rami the apical part of each joint bears a more or less incomplete circle of very stout bristles; on the basal joint of the posterior ramus the circle is widely interrupted posteriorly. On the anterior ramus the circle is so deep that it occupies a half or even two-thirds of some of the joints. The other cirri are similarly armed, but the circles of bristles, which are complete on the anterior cirri and laterally interrupted on the posterior ones, are not so deep.

The anal appendages are long and slender, having 7 or 8 joints, the tip of each of which is surrounded by a sparse circle of long but very fine hairs. The distal part of the appendages is much attenuated.

The penis is slender and smooth, much contorted in the preserved specimen and clothed with fine hairs.

The mouth-parts are very prominent. The labrum is not bullate; it bears a semicircle of minute, blunt chitinous teeth. The mandible has four teeth, of which the outermost is the largest. It is rather widely separated from the second tooth, towards which it is slightly curved. The remaining three teeth are straight, subequal and equidistant; the second and third are sharply pointed; their inner margin bears several short stout spines that give it a pectinate appearance. The innermost tooth is minutely bifid or trifid and bears on its inner edge several irregular projections and a fringe of fine hairs similar to those that cover the greater part of the body of the appendage. The cutting edge of the maxilla is definitely scalariform, with four distinct steps; it bears numerous stout bristles. The second

maxilla is slender; it is armed with hairs of varying size, some of them moderately stout and long.

Dimensions of a large specimen.

| | |
|-----------------------|--------|
| Length of capitulum | 5 mm. |
| Breadth of capitulum | 3.5 ,, |
| Length of peduncle | 3 ,, |
| Thickness of peduncle | 2 ,, |

Habitat.—Mergui Archipelago: 60 fathoms ('Investigator' sta. 534): on spines of Cidarid sea-urchin, with *Scalpellum sinense*.

Types.—No. 8713/10 *Crust.*, *Ind. Mus.*

The external appearance of this species is very characteristic and will at once distinguish it from any other of the genus.



EXPLANATION OF PLATE XXXIII.

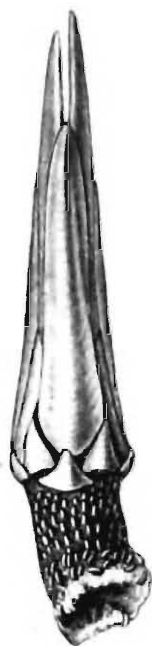
FIGS. 1, 1a, 1b.—Shell and peduncle of *Scalpellum* (*Smilium*) *sinense*, Annand. from Burma ($\times 5$).

The tip of the left tergum was broken in the specimen figured.

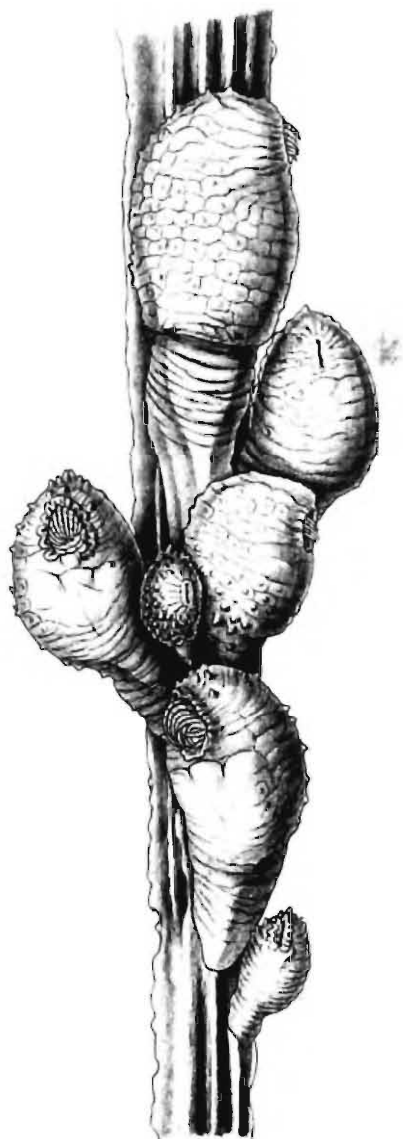
„ 2.—*Alepas investigatoris*, sp. nov., from Burma (nat. size).

„ 3.—*Heteralepas* (*Paralepas*) *reticulata*, sp. nov., on spine of Cidarid sea-urchin from Burma ($\times 5$).

„ 3a.—The orifice of one of the same specimens further enlarged ($\times 16$).



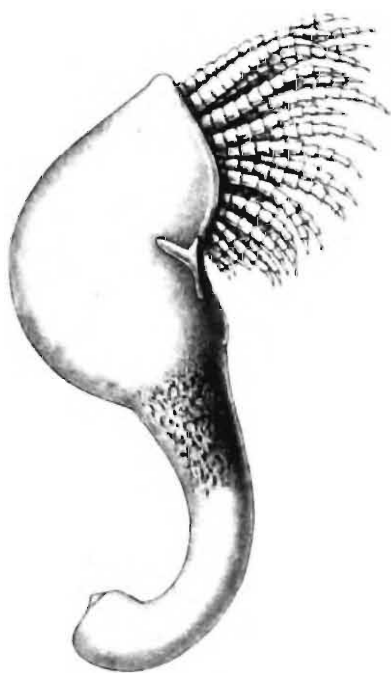
1b.



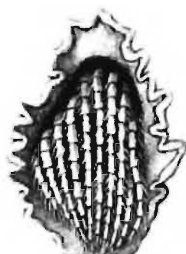
3.



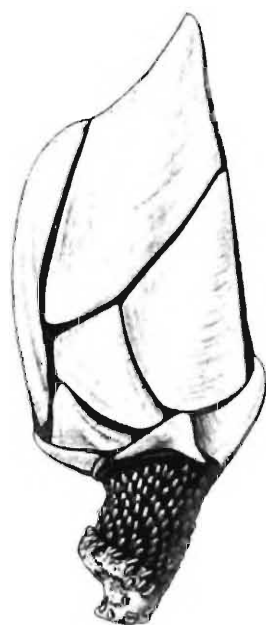
1a.



2.



3a.



1.

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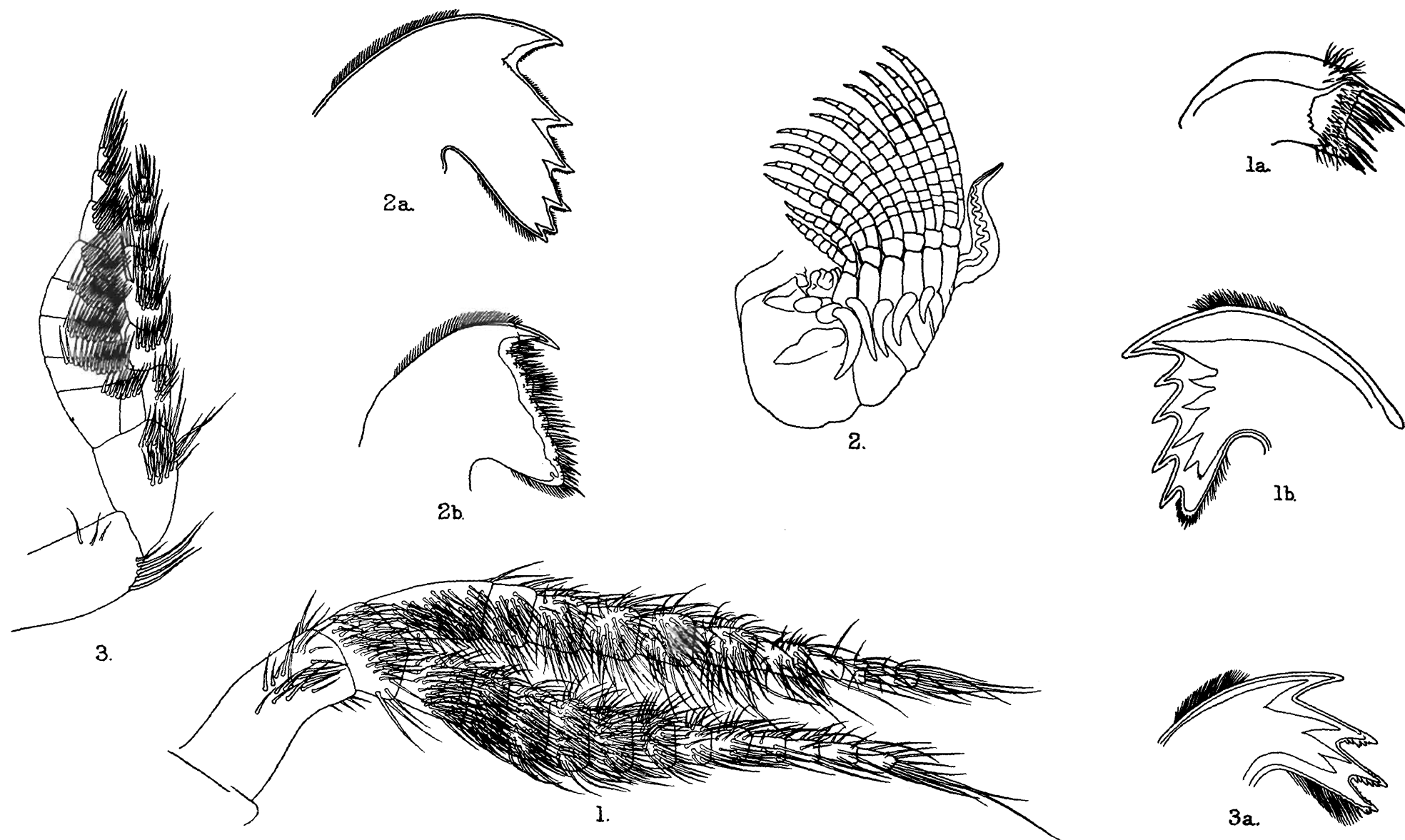
Bemrose, Collo, Derby.

Fig. 1. *Scalpellum sinense*. Fig 2. *Alepas investigatoris*.

Fig. 3. *Heteralepas reticulata*.

EXPLANATION OF PLATE XXXIV.

- FIG. 1.—First cirrus of *Scalpellum (Smilium) sinense*, Annand.
($\times ca.$ 13).
- ,, 1a.—Maxilla of same species ($\times ca.$ 27½).
- ,, 1b.—Mandible of same species ($\times ca.$ 27½).
- ,, 2.—Animal of *Alepa investigatoris*, sp. nov. ($\times 1\frac{1}{3}$).
The hairs and bristles on the appendages, etc., are not shown.
- ,, 2a.—Mandible of same species ($\times ca.$ 6).
- ,, 2b.—Maxilla of same species ($\times ca.$ 6).
- ,, 3.—First cirrus of *Heteralepas (Paralepas) reticulata*, sp.
nov. ($\times ca.$ 32).
- ,, 3a.—Mandible of same species ($\times ca.$ 44).



S. C. Mondul del.

Bemrose, Collie, Derby.

Fig. 1. *Scalpellum sinense*.

Fig. 2. *Alepas investigatoris*.

Fig. 3. *Heteralepas reticulata*.

XVII MORE NOTES ON INDIAN DERMAPTERA.

By MALCOLM BURR, *D.Sc., F.E.S., etc.*

Since the publication of my half volume on the Dermaptera in the Fauna of British India Series, material has accumulated with considerable rapidity. This has led to the following papers on Indian Dermaptera :—

- BORELLI, A. (1911¹). Diagnosi preventive di Dermatteri nuovi della regione indiana. (Boll. Mus. Torino. No. 640, vol. xxvi, pp. 1-4, 1912).
- „ (1912⁸). Dermapteres nouveaux ou peu connus du Museum de Paris. (Bull. Mus. Hist. Nat. Paris, vol. xviii, pp. 221-240, 1912).
- BURR, M. (1911¹⁶). Contribution to our knowledge of Indian Earwigs (J. Asiat. Soc., Bengal, vol. vii, No. 11, pp. 771-800, December 1911).
- „ (1913⁴). Zoological Results of the Abor Expedition, 1911-12. X. Dermaptera. Rec. Ind. Mus., viii, pp. 135-147).
- „ (1913⁵). Indian Dermaptera collected by Dr. A. D. Imms. (J. Proc. Asiat. Soc., Bengal (N.S.), ix, No. 5, pp. 183-187, 1913).

Since the appearance of the above papers, I have received still further material, a list of which is incorporated in the following pages. For these I am indebted as follows:—

- (i) to Father Astruc, S.J., for material collected at Shembaganur, and the Pulney Hills in the Madura District, Madras.
- (ii) A small collection from Southern India kindly sent me by my old friend Mr. T. B. Fletcher, F.E.S., now Imperial Entomologist at Pusa.
- (iii) A small collection made at Jaunsar and in the Central Provinces, by Dr. A. D. Imms, late Forest Entomologist to the Government of India.
- (iv) Various material in the Indian Museum, submitted to me by my old friend Dr. N. Annandale.
- (v) The private collection of His Excellency Lord Carmichael, Governor of Bengal, also sent me by the Indian Museum. This collection will ultimately be distributed to different museums in India, Great Britain and Australia.

The material referred to is to be assumed to be in the Indian Museum, unless stated otherwise; specimens from Dr. Imms and

Mr. Fletcher are indicated by the respective initials (A. D. I., and T. B. F.). Dr. Inms's specimens have been returned to Dehra Dun, and Mr. Fletcher's are incorporated in my own collection, thanks to his generosity.

The numbers refer to the official numbering of the Indian Museum.

PROTODERMAPTERA.

Family PYGIDICRANIDAE.

Subfamily *DIPLATYINAE*.

Genus *Diplatys*, Serv.

1. *Diplatys gladiator*, Burr.

Chota Nagpur, Purulia, Manbhum District, 10-ii-12, No. 9529/19 ♀ : pass between Chaibassa and Chakardharpur (nymph). 2-4-iii-13, No. 9539/19.

Bengal, Calcutta, June 11, ♂, No. 9511/19: Calcutta in house, Jan. 12, ♀, No. 9506/19, Calcutta, 1 ♀, 20-ii, No. 498/20.

S. India, Coimbatore, on wet rock, ix-12 (P.S. coll.).

Hitherto only recorded from neighbourhood of Calcutta.

2. *Diplatys falcatus*, Burr.

W. Himalayas, Almora, Kumaon, 6500 ft., vii-11, (♂ ♂ ♂ ♂) Nos. 9555/19, 9556/19 (a fragment), 9557/19, 9558/19, 9577/19, (♀), 9580/19, larva, 9574/19 : Mussoorie, 7000 ft. 20-iv-05. ♂ ♂, (♀) No. 518/20. (Brunetti). No. 519/20 has the forceps long, straight, contiguous, and not dilated.

Also two fragments (Nos. 9565/19 and 9566/19) from same locality, probably referable here.

3. *Diplatys lefroyi*, Burr.

S. India, Coimbatore, 2-xii-12. ♂ (T. B. F.).

4. *Diplatys rufescens*, Kirby.

W. Himalayas, Almora, Kumaon, 6500 ft., 18-vii-11, ♂ ♂, 9554/19, 9562/19, 9570/19, 9576/19, 9579/19.

S. India, Coimbatore, ♂ (K. S. P.).

5. *Diplatys annandalei*, Burr.?

Chota Nagpur, pass between Chaibassa and Chakardharpur, 2-4-iii-13. No. 9591/19.

I think this specimen must be referred to this species. Hitherto only known from Siam.

6. *Diplatys liberatus*, Burr.

S. India, Puthir, S. Canara, 29-i-13 (Y. R.), ♂

7. *Diplatys bormansi*, Burr. ?

Bombay, Satara District, Bamnoli to Akalpa, Ratnagiri District. 27-x-12. 2 ♀ No. S.P.A./341-342, Medha, Yenna Valley, 2300 ft., 23-iv-12. S.P.A./172, a fragment, same locality, S.P.A./175. Helvak, Koyna Valley, 2000 ft., iv-12. S.P.A./198, a fragment.

It is possible that where sufficient material has been examined, and especially, the genital armature observed, that several species of this difficult genus will require to be fused. To dissect out the genitalia, and the ninth sternite of the male, which offers such valuable specific characters in this genus, but is often difficult to observe, specimens in alcohol are necessary. I am inclined to think that there are dimorphic forms of the males in several instances.

Subfamily *PYGIDICRANINAE*.Genus *Kalocrania*, Zacher.1. *Kalocrania eximia*, Dohrn.

Assam, Sonapur, ♂, No. 9586/19 (L. W. Middelton).

E. Bengal, ♀, No. 9540/19 (H. Stapleton).

Upper Burma: Northern Shan Hills, ♂ (J. C. Brown). A defective small specimen, with the tips of the forceps broken off, No. 535/20.

2. *Kalocrania picta*, Guer.

Bengal, Calcutta, rains, 2 ♂, No. 9587/19 (Gravely).

3. *Kalocrania valida*, Dohrn.

S. India, Ootacamund, 20-31-xii-12 and 27-x-12, at 7500 ft. (T. B. F.), 2 ♀ The elytra is unusually short.

Genus *Dicrana*, Burr.1. *Dicrana kallipyga*, Dohrn.

S. India, Ootacamund, 12-14-i-13 (T. B. F.), 4 ♂, 3 ♀, 3 I.

id., 7500 ft. 27-x-12. ♂ (T. B. F.). Shevaroy's, Hopeville Estate, 4000 ft., 16-x-12, (T. B. F.), larva. Mysore, Bababudin Hills, xi-12, 4000-5000 ft. (T. B. F.), Maddur, 3000 ft., 23-vii-12, ♀ (T. B. F.).

Bombay, Satara District, Taloshi, Koyna Valley, 2000 ft., ♀, S.P.A./180, Helvak, Koyna Valley, 2000 ft., iv-12, S.P.A./197.

2. *Dicrana dravidia*, sp. n.

Fusco-nigra, fulvo-variegata: forcipis brachia ♂ basi ipso contigua, tum fortiter arcuata, apice bimucronata, attingentia.

| | |
|----------------|--------|
| | ♂ |
| Long. corporis | 19 mm. |
| ,, forcipis | 3.5 |

Small: greyish black, varied with tawny: antennae greyish: head smooth, black, marbled with tawny: pronotum as broad as the head, longer than broad, parallel-sided, posterior border straight, all angles rounded, black, with a median tawny band and narrow tawny edging: scutellum tawny: elytra black, with a broad, oblique broad pale tawny band: legs tawny, marbled with black: abdomen greyish and black, densely clothed with a golden pubescence: last tergite ample, smooth: ninth sternite broadly rounded, entire; forceps stout and depressed, trigonal, stout and broad at the base and subcontiguous at the base itself, arcuate to enclose a lozenge-shaped area, the points meeting and bimucronate: inner margin crenulate near the base.

S. India: Madura District: Shembaganur, 1 ♂ (Father Astruc, *c.m.*).

The forceps readily distinguish them from other Oriental species: in appearance it recalls the African *D. frontalis* and *D. separata*.

Family LABIDURIDAE.

Subfamily ALLOSTETHINAE.

Genus *Gonolabidura*, Zacher.1. *Gonolabidura minor*, sp. n.

Statura minore: *G. piligeri* vicina: differt statura multo minore, sculptura abdominis crebriori, segmento ultimo dorsali lateribus carinatis.

| | |
|----------------|--------|
| | ♂ |
| Long. corporis | 11 mm. |
| ,, forcipis | 1.5 |

Small: colour red-brown: antennae greyish, basal 2 segments yellow and apical ones whitish; about 15 segments; 3rd. cylindrical, about twice as long as broad; 2nd. much shorter, obconical, the rest gradually lengthening, form pear-shaped to long ovate. Head smooth, shining, sutures faint: pronotum transverse, rectangular: meso- and metanota larvae: sternum typical: legs yellow: abdomen chocolate brown, hairy, densely but very finely punctulate: sides of 7-9th segments convex and finely rugulose: last dorsal segment ample, smooth, with a keel along each side corresponding to the lateral ridge of the forceps: penultimate ventral segment rounded: metaparameres lanceolate,

acuminate: forceps with branches subremote, trigonal, tapering, unarmed, gently arcuate.

S. India: Anamalai Hills, 4000 ft., 23-i-12. ♂, nymph, (T. B. Fletcher, *c.m.*).

This is a diminutive relation of *G. piligera*: it differs in its much smaller size, more densely, but equally finely, punctulate abdomen, and laterally keeled last dorsal segment. I took it at first for a larva of that species, but the apical segments of the parameres are protruding: these are typically narrow and pointed. I hesitated to extract them, preferring to wait for more material, as there is no doubt as to the position of the species, and I did not wish to damage the only adult male available, which is dry.

Subfamily *PSALINAE*.

Genus *Homoeolabis*, Borelli.

1. *Homoeolabis maindroni*, Bor.

S. India: Coimbatore, 21-vi-12. Under a log, ♀ (Y R.). Coorg, on coffee estate, 3400 ft., 4-iv-12, Bangalore.

Genus *Euborellia*, Burr.

1. *Euborellia stali*, Dohrn.

S. India, Bangalore, under flower pots, 3300 ft., 28-i-12, many specimens; Coimbatore, many specimens: *id.*, at light. 30-ix-12 (T. B. F.): *id.*, 22-v-12 (Y R), ♂.

Bombay (town), Elphinstone College Compound, 4-viii-11, under stone, No. 1545/19.

2. *Euborellia penicillata*, Bor.

S. India, Ootacamund, 12-14-i-13: many specimens. (T. B. F.).
id., 27-x-12. 2500 ft. ♂ (T. B. F.).

3. *Euborellia moesta*, Gene, vel species vicina.

Bombay, Satara District, Mahableshwar; 4200 ft., 13-16-iv 12. S.P.A./161, 167, 168. ♂♂: S.P.A./166, 169 larvae.

4. *Euborellia*, sp.

E. Himalayas, La-ai River, Kalem Valley, Mishmi Country. 31-x-12. ♀ No. 7701/19.

5. *Euborellia greeni*, Burr.

Mysore: Bababudin Hills, 4500-5000 ft.

Madras: Shevaroy Hills, Hopeville Estate, 4000 ft., 16-x-12. 2♂: Vallakadai Peak, 4500 ft., 18-x-12. Kadiar Rocks, 4000 ft., 15-x-12. Yercaud, 4500 ft., 20-x-12.

All the above specimens were taken by Mr. T. Bainbrigge Fletcher in October, at an elevation between 4000 and 5000 ft., under logs and in dead leaves.

It somewhat resembles *E. penicillata*, but it is a little bigger, more clumsily built, and lacks the tuft of hairs in the ninth sternite of the male: the colour is much less rich, and the sculpture of the head much more marked.

These South Indian specimens differ from the original Singalese examples, taken by Mr. Green, in more dull-coloured legs, which do not contrast so strikingly with the black body.

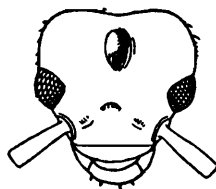
The species is already known from Southern India, as there is one from the Nilgiris in the British Museum.

Travancore:—Top Station, 6000 ft. (Andrews).

This is a very small pair, the male being only 10 mm. long: the forceps are decidedly arcuate apicad, but it agrees in other respects with the specimens from the Shevaroyes.

6. *Euborellia sisera*, sp. n.

Caput rufum, occiput profunde excavato: pronotum rufum, subquadratum: elytra ad suturam attingentia, scutello



brevi et lato: pedes fulvi: abdomen ♂ segmentis lateribus 6-9 carinulatis, acuminatis ac rugulosis: segmentum penultimum ventrale ♂ rotundatum: forcipis brachia ♂ subremota, triquetre, irregularita arcuata et asymmetrica.

| | |
|----------------|-----------|
| | ♂ |
| Long. corporis | 18.20 mm. |
| „ forcipis | 3 |

Antennae red-brown with 18 segments, the 3 basal segments yellow and some paler before the apex, 3rd, cylindrical and elongate; 4th, half; the 5th, nearly as long as 3rd; all subcylindrical. Head deep red or reddish black, smooth and tumid, the suture faint: the middle of the occipital region occupied, from the base of the head to the transverse suture, by a deep, regular, longitudinal cavity. Pronotum subrectangular, slightly concealed by the rudimentary elytra, which meet for the greater part of the sutural length, exposing only a very short scutellum, which is almost as broad as the mesonotum. Metanotum larval. Prosteronum elongate and parallel-sided constricted before the base: mesonotum rounded and metanotum truncate posteriorly: all sternum yellow. Legs orange yellow; tarsi long, the first and third segments about equal, the second minute. Abdomen black, very

finely punctulate: sides of 6-9th segments in the ♂ acuminate, finely keeled and rugulose. Last dorsal segment ♂ ample, smooth, transverse, with a median sulculus, truncate posteriorly, with a rugulose keel down each side: penultimate ventral segment ♂ rounded. Forceps with the branches ♂ not contiguous, trigonal and tapering, rather elongate and irregularly arcuate, asymmetrical.

S. *India*, Anamalai Hills, 4000-4200 ft., 22-23-i-12, under dead logs., 2 ♂ (T. B. Fletcher: type in *c.m.*).

I am indebted to Mr. T. Bainbrigge Fletcher for this peculiar species: it is chiefly remarkable for the curious cavity in the top of the head: at first I took this to be a pathological feature, but it is identical in both the male specimens available: under the lens it has every appearance of being structural. It would be most interesting to investigate its functions: possibly it is a scent-gland.

In all other respects it appears to be a typical *Euborellia*: the structure of the elytra is as in *E. greeni*, but the forceps are quite distinctive. It most nearly approaches the large black variety of *E. greeni* recorded by me from Ceylon, which is very probably a good species.

Genus *Anisolabis*, Fieber.

1. *Anisolabis annulipes*, Luc.

Simla Hills, Dharampur, 5100 ft., 15-v-13, ♂ (Phaku Ram). Darjiling District, Singla, 1500 ft.: No. C.C./373 (Lord Carmichael's collection).

Satara District, Medha, Yenna Valley, 2300 ft., 24-x-12: ♀ with young. S.P.A./174 and 384.

Coimbatore, ♀ on a mass of eggs under a stone in house. 23-vi-12 (Y R.).

Possibly some of these are anelytrate varieties of *E. stali*.

2. *Anisolabis maritima*, Bon. ?

Nilgiris, Coonoor, xi-12; ♀ No. 9592/19.

3. *Anisolabis*? sp. n.

Satara District, Mahableshwar, 4200 ft., 13-16-iv-12 (♂, ♀ and nymph). S.P.A./162-4.

Genus *Psalis*, Serv.

1. *Psalis dohrni*, Kirby.

Elphinstone College Compound, Bombay, 4-viii-11. Under stones. No. 1545/19 ♂ ♀ Vela, Koyna Valley, 2100 ft. (♂). S.P.A./181.

2. *Psalis lefroyi*, Burr. ?

Bangalore, 17-vii-12. ♀ (T. B. F.).

3. *Psalis femoralis*, Dohrn.

Upper Burma, Northern Shan Hills, ♂: No. 534/20.

Subfamily *LABIDURINAE*.Genus *Nala*, Zacher.1. *Nala lividipes*, Duf.

Purulia, Manbhum District, Chota Nagpur, 10-ii-12; 2 ♀
Nos. 9527-8/19, ♂ 9530/19, ♀ 9538/19, ♂ 9537/19, ♀ 9536/19.
Collectorganj, Cawnpore District, U.P. (♂ ♂, ♀) 9541-3/19. 1
Anwarganj, Cawnpore District, U.P.; ♂ 9544/19; between
Amausi and Harauni, near Lucknow, U.P., ♀ ♀ ♂ 9549-51/19.
Hamirpur Road, U.P. 16-17-x-11. ♀. 9553/19.
Satara District, Moleshwar, 3200 ft., iv-12. ♀ S.P.A./202.
Calcutta, rains. 7787/20. ♂ (Gravelly).
Calcutta, in Museum cabinets. ♂. No. 497/20.
Kurseong, 13-16-vii-07. ♀ No. 507/20.
Darjiling District, Singla, 1500 ft.; C.C./373 (Lord Carmi-
chael's coll.).
Coimbatore, at light, many specimens: (Y R. and T. B. F.).
Mysore, at light. 14-xi-12. (T. B. F.).
Bellary at Yemmaganur. 20-24-xii-12: ♂ (Y R.).

2. *Nala nepalensis*, Burr.

Darjiling District, Singla; 3 ♂, 3 ♀, 3 larvae. C.C./372.
(Lord Carmichael's collection).
Dharampur, 5100 ft., 15-v-13 (♂) No. 528/20 (Phaku Ram).

Genus *Labidura*, Leach.1. *Labidura riparia*, Pallas.

Simla Hills, Matiana, 8000 ft., larva; 532/20.
Satara District, Kudali Valley, Kudal, 2300 ft., iv-13;
S.P.A./392-4.
Balighai near Puri, Orissa, 16-20-viii-11 (♂) 9588/19.
Japog Reservoir, 6-i-08, Jodhpur, Rajputana; 9595/19, larva.
Bellary at Yemmaganur, 18-24-xii-12; ♂ ♀ (Y R.).
Between Amausi and Harauni, near Lucknow, U.P. (♂ ♂)
and ♀; 9546-8/19.
Kanauj, U.P. 18-xii, larva, 9552/19.
The following specimens of a small, dark red form:—Limba-
dia to Sason, Kathiawar; 5-xi-12 (♀) S.P.A./324: Sason, Kathia-
war (♂ ♀) S.P.A./325-6; also ♀ ♀ and 1, S.P.A./333-5.

Labidura riparia Pallas var. **inermis**, Br.

- Sasan, Kathiawar, ♀ S.P.A./336.
 Beyt, Dwarka, Kathiawar, 15-x-12. ♂ S.P.A./337.
 Medha, Satara District, 25-x-12. ♀ S.P.A./338.
 Khed, Ratnagiri District, 31-xi-12 (larvae). S.P.A./339-40.
 Purulia, Manbhum District, Chota Nagpur, 10-ii-12. Nos.
 9513-9517/19, 9519-9524/19, 9531-2/19.
 Calcutta, ♀, ♂ Nos. 495-6/20.

2. Labidura bengalensis, Dohrn.

- Purulia, Manbhum District, Chota Nagpur, 10-ii-12 (♂, 3 ♀)
 9515-6/19, 9518/19, 9525/19.

Genus **Forcipula**, Bol.**1. Forcipula trispinosa**, Dohrn.

- Purulia, Manbhum District, Chota Nagpur, 10-ii-12 (♀)
 9514/19.
 Sasan, Kathiawar, 5-xii-12 (♀) S.P.A./328.
id., ♂, of race *minor*, S.P.A./329.
 Simla Hills, Dharampur, 6-8-v-07 (♂) (N. A.) 520-1/20,
 522-4/20.
id., 5100 ft., 1-v-13 (♂, ♀) (Phaku Ram) 525-
 7/20.
 Satara District, Kudali Valley, Kudal, 2300 ft., iv-13. ♀
 S.P.A./395-6.
 Darjiling District. 1-3000 ft., vi-12 (♂ ♀) C.C. 376 7.
 Calcutta, Museum Compound, 25-ii-13. 9593/19.
 Kotwan, Mirzapore District, U.P., 29-xii-12, "below rocks in
 bed of stream." 2 ♀ No. 9594/19.
 Base of hills, Chakardharpur, Singbhoom District, Chota
 Nagpur, 1-4-iii-13 (race *minor* ♂) 9590/19.

2. Forcipula pugnax, Kirby.

- Darjiling District, 1-3000 ft. v-vi-12. 3 ♂, 9 ♀ C.C./371.
 Sasan, Kathiawar, 5-xii-12. S.P.A./327.
 Darjiling District, Singla, 1500 ft. C.C./372 (two brachyp-
 terous ♀ ♀, probably referable here).

3. Forcipula quadrispinosa, Dohrn.

- Medha, Yenna Valley, Satara District. 2300 ft., 13-iv-12 (♂)
 S.P.A./170.
 Kumberli, Vashishti Valley, Ratnagiri District. 300 ft. ♀
 S.P.A./203.
 Sasan, Kathiawar. 5-xii-12. ♂, ♀ ♀ S.P.A./330-2.
 I consider that the number of abdominal spines, armature and
 curvature of the forceps are untrustworthy as specific characters,

and if we rely entirely upon one, say the spines, we shall find various types of forceps, and *vice versa*. Probably the three species should be fused into one.

Subfamily *PARISOLABINAE*.

Genus *Pseudisolabis*, Burr.

1. *Pseudisolabis burri*, Bor.

Simla Hills, Matiana, 8000 ft. (♀) 531/20.
Hitherto only recorded from Kashmir.

Family *APACHYIDAE*.

Genus *Apachyus*, Serv.

1. *Apachyus feae*, Borm.

E. Himalayas, La-ai River, Kalem Valley, Mishmi Country,
31-x-12. No. 7700/19. Larva.

EUDERMAPTERA.

Family *LABIIDAE*.

Subfamily *SPONGIPHORINAE*.

Genus *Irdex*, Burr.

1. *Irdex nitidipennis*, Borm.

Anamalais, 5500 ft., 21-i-12. (T. B. F.).
Mysore, Bababudin, xi-12. 4500-5000 ft. (T. B. F.).

Genus *Spongovostox*, Burr.

1. *Spongovostox semiflavus*, Borm.

Nilgiri Hills, Karkur Gât, 1500 ft. v-11 (Andrews), ♂
9582/19.

Subfamily *LABIINAE*.

Genus *Labia*, Leach.

1. *Labia curvicauda*, Motsch.

Tamarasseri, Travancore, 19-i-13. On a coconut palm
(Y R. coll.).

2. *Labia pilicornis*, Motsch.

Calcutta, ♀, 499/20 (or *minor*, L. ?).

Genus *Prolabia*, Burr.

1. *Prolabia arachidis*, Yers.

Trivandrum, "in bed mats, associated with *Cimex*" 9596/19.
Bombay, Girgaon, "in bamboo basket" 1542/19.

This species seems to have a preference for artificial conditions, whence the facility with which it has become cosmopolitan.

Genus *Chaetospania*, Karsch.

1. *Chaetospania thoracica*, Dohrn.

Tamarasseri, Travancore, 19-i-13. On a coconut palm.
(Y R.) ♂.

Family CHELISOCHIDAE.

Genus *Chelisoches*, Scudd.

1. *Chelisoches morio*, Fabr.

Tamarasseri, Malabar, 19-ii-13. "On a coconut palm."
(Y R.)
Puthir, "in toddy", 25-i-13. ♀ (Y R.).

Genus *Proreus*, Burr.

1. *Proreus simulans*, Stål.

Balighai, near Puri, Orissa. 16-20-viii-11 (♀) 7788/20.
Calcutta, Eden Gardens, at light. 17-x-11. 3 ♂, 5 ♀ Nos.
9501-5/19, 9507/19, 9509-10/19.

2. *Proreus melanocephalus*, Dohrn.

Calcutta, Eden Gardens, at light, 31-x-12 (♂) 9508/19.
Calcutta, in house. 9-vi-12 (♂) 9512/19.

3. *Proreus cunctator*, Burr.

Darjiling District, Singla, 1500 ft. (♂) C.C./373.
Recorded from the Assam-Bhutan frontier.

Genus *Lamprophorus*, Burr.

1. *Lamprophorus kervillei*, Burr.

Darjiling District, Singla, 1500 ft. C.C./373. ♀
Hitherto recorded only from Java and North-East Assam.

Family FORFICULIDAE.

Subfamily ANECHURINAE.

Genus *Anechura*, Scudd.

1. *Anechura zubovskii*, Sem.

Simla Hills, Theog, 800 ft., 27-iv-07 (♀) 533/20.

Genus *Allodahlia*, Verh.1. *Allodahlia scabriuscula*, Serv.

Pussumbing, Darjiling, 4700 ft., xii-06: Dr. H. H. Mann
(♀ ♀) 504 5/20.

2. *Allodahlia ahrimanes*, Burr.

Pussumbing, Darjiling, 4700 ft., xii-06: Dr. H. H. Mann
(♂) 506/20.

Subfamily *FORFICULINAE*.Genus *Hypurgus*, Burr.1. *Hypurgus fulvus*, Burr.

Upper Burma, Northern Shan Hills (♂) 536/20.

Genus *Elaunon*, Burr.1. *Elaunon bipartitus*, Kirby.

Coimbatore, 30-ix-12, at light: macrolabious ♂ (T. B. F.).
Shevaroy, Kadiar Rocks, 4600 ft., 15-x 12 (T. B. F.).
Bangalore, 3000 ft. 1-xii-12. Macrolabious ♂ (Anstead).
Kumaon, Almora, 6500 ft. 18-vii-11. Macrolabious ♂ ♂,
9560-1/19, 9568/19, 9571-2/19.
id., ♀ ♀ ♀ 9563-4/19, 9567/19, and 9569/19.
id., cyclolabious ♂. 9573/19.

Genus *Forficula*, L.1. *Forficula beelzebub*, Burr.

Darjiling, 7000 ft., 17-ix-05 (♂) 508/20: Brunetti.
W Himalayas, Mussoorie. 7000 ft. 20-vi-05 (♂ ♂, ♀)
515-6-7/20 (Brunetti).
Darjiling District, Senchal, 8000 ft., v-03 (♂, ♀ ♀) C.C./375.
Lord Carmichael's coll.
Darjiling District, 1-3000 ft., vi-12 (♂) C.C./378.

2. *Forficula ornata*, Borm.

Chutri Gouri, Nepal Terai, 27-iv-07 (♂) 509/20.

3. *Forficula greeni*, Burr.

Calcutta, at light, 9-x-12 (♀) 9535/19

4. *Forficula* ? sp.

N Bengal, Siliguri, 18-20-vii-08—♀ only. 500/20, 502/20, 503/20.

Body except abdomen absolutely smooth, with a rich, glistening green metallic oily lustre: general colour black: abdomen deep chestnut to black, and finely punctulate: last tergite weakly crested at the exterior angles: branches of forceps depressed, straight, stout, and tapering.

The rich, smooth, brilliant, lustre of the head, pronotum elytra and wings render this a very distinctive species, but I refrain from naming it, as without the male it is impossible definitely to decide its exact generic position.

5. *Forficula* ? sp.

Nymph only. Lucknow. 510-513/20.

do. Bijnor District, Rampore Chaka, U.P., 514/20.

6. *Forficula* ? sp.

Darjiling District, Senchal. 8000 ft. v-13. ♀ only. (Lord Carmichael's collection). C.C./375.

7. *Forficula gravelyi*, sp. n.

Fusco-castanea: pronotum pentagonale: forcipis bracchia ♂ per duas partes diplanata ac dilatata, hac parte rectangulo terminata.

| | |
|----------------|----------|
| | ♂ |
| Long. corporis | 10.5 mm. |
| „ forcipis | 6 |

Build moderately strong: general colour deep chestnut, abdomen black: antennae rather thick, black: fourth segment nearly as long as the third: head rather depressed, smooth, sutures faint: pronotum smooth, pentagonal, convex posteriorly: elytra deep brown, smooth, broad, not very long, truncate: wings protruding slightly, dark brown. Legs brown: abdomen jet black, pliciform tubercles very distinct, dorsal surface finely and densely punctulate: last tergite rectangular, transverse, punctate, not crested: pygidium minute, obtuse. Forceps with the branches robust, strongly depressed and dilated through two-thirds their length, this part ending with a right angle, but no tooth: tip gently arcuate.

Poona: Khed District, among rubbish in house: No. 1544/19.

This species very closely resembles the African *F. rodziankoi*, Sem., differing from the dark macropterous forms of that variable species almost solely in the shape of the pronotum, which is almost pentagonal, being obtusely rounded posteriorly with straight and parallel sides.

Subfamily *OPISTHOCOSMIINAE*.Genus *Eparchus*, Burr.1. *Eparchus insignis*, Haan.

Mysore, Bababudin Hills, 4500-5000 ft., xi-12 (T. B. F.).

Yercaud. "Under log; when exposed, ♀ moved eggs in mouth." ♂, ♀: 20-x-12, 4500 ft., and in dead leaves.

Fairlands Estate, 3500 ft. Sidapur, Coorg. "Under log: ♀ with eggs." 17-xi-12. (T. B. F.).

Shevaroy's, Hopeville Estate, 4000 ft., 16-x-12 (♂, ♀) (T. B. F.).

Darjiling District, Singla, 1500 ft. C.C./374. ♀ and larva.

Genus *Timomenus*, Burr.1. *Timomenus lugens*, Borm.

Darjiling District, Singla, 1500 ft. ♂ C.C./373.



XVIII. DESCRIPTION OF A NEW SPECIES
OF *HIPPOCAMPUS*

By GEORG DUNCKER (*Hamburg*).

Hippocampus brachyrhynchus, n sp.

Ann. 11+(33-37), Ann. subd. 2(-3)+1, D. 17-19, A. 4, P. 13-15, B. i. 6-8.

Annuli with blunt spines, nearly uniform, except on ann. vii t. and ann. iv, vii, xi and xiv c., where they are dorsally a little enlarged. Crista abdom. prominent, in males with a black cutaneous fringe (dewlap). No cutaneous appendages, except simple papillae on the breeding-pouch, more closely arranged in its posterior half. Coronet scarcely developed. Rostrum very short, $\frac{1}{2}$ - $\frac{3}{4}$ in postorbital length of head, up to $1\frac{1}{2}$ times in orbital diameter. Total length up to 70 mm.

Uniformly dark coloured; light radiating stripes from the eye.

Ind. Mus. No. 8508, 5 ♂, 4 ♀ Chilka Lake, Rambha Bay, Ganjam distr., Madras (*Chilka Survey*).

Ind. Mus. No. 14299, 1 ♂. Mekran Coast, Baluchistan (*F. W. Townsend*).

Types in the Indian Museum, Calcutta.

XIX MOLLUSCA FROM THE CHILKA
LAKE ON THE EAST COAST OF INDIA

By H. B. PRESTON, F.Z.S.

[The shells here described were collected, unless it is otherwise stated, by Mr. Kemp and myself in 1913. The types of the new species (except that of *Nassa denegabilis*) are in the collection of the Indian Museum.—N. A.]

Class GASTROPODA.

Order PROSOBRANCHIA.

Family TEREBRIDAE.

Terebra rambhaënsis, sp. n.

(Figs. 5, 5a, p. 298).

Shell small, subulate, shining, pale reddish brown ornamented with a whitish spiral band; remaining whorls 7, flat, regularly increasing, sculptured with coarse, rounded, rather closely-set, very slightly oblique costulae which bulge considerably in their subsutural and lower parts; suture impressed; base of shell without plication and smooth but for growth striae; columella margin obliquely descending, callously thickened and inwardly bulging above; labrum simple; aperture broadly inversely auriform.

Alt. 4, diam. maj. 1.25 mm.

Hab.—Rambha Bay, south end of Lake Chilka, Ganjam District, Madras.

Family NASSIDAE.

Nassa sistroidea, G. and H. Nevill.

J Asi. Soc. Bengal, vol. xliii, pt. 2, pl. i, fig. 6.
Channel between Satpara and Manikpatna.

Nassa labecula, A. Ads.

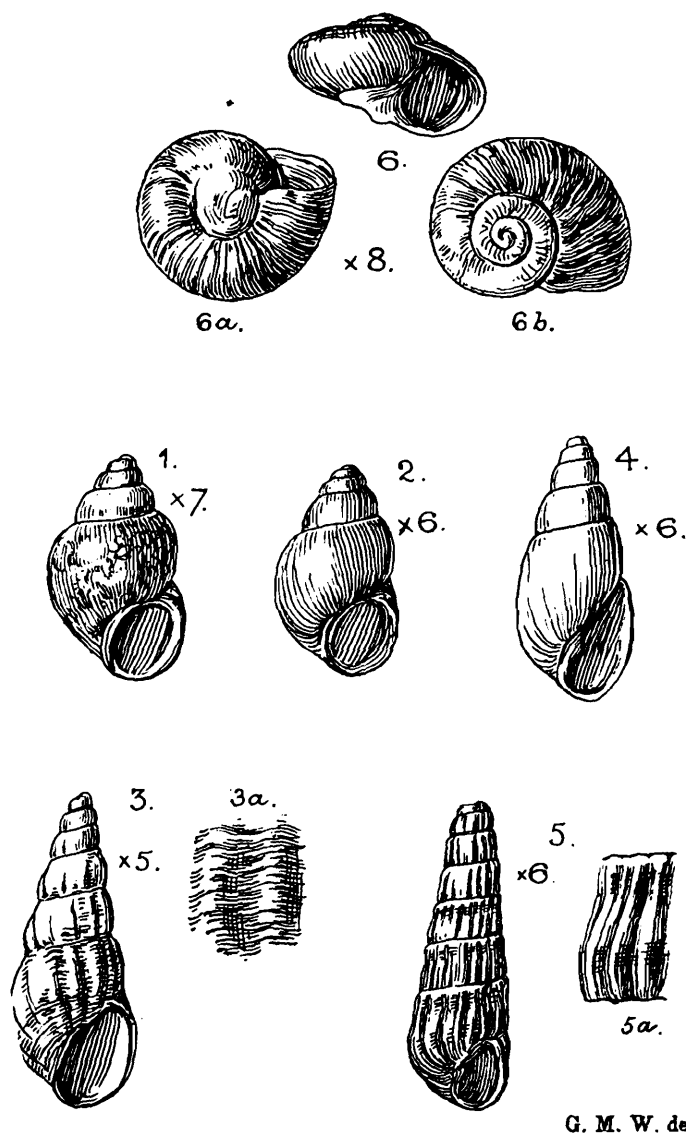
Proc. Zool. Soc., London, 1851, p. 98.
Channel between Satpara and Manikpatna.

Nassa denegabilis, sp. n.

(Fig 9, p. 301).

Shell fusiform, pale greenish yellow painted with a subsutural and broad basal band of pinkish red; whorls 7, regularly increas-

ing, sculptured with coarse, transverse, rounded costae which become obsolete on the base of the shell, which is also sculptured with fine, wavy, revolving lirae; suture impressed, broadly, margined below; columella margin whitish, tinged with flesh colour, excavated, porcellanous, diffused above into a well-defined, restricted parietal callus, which is thickened into a tubercle near its junction with the upper margin of the labrum above; labrum



G. M. W. del.

FIG. 1. *Stenothyra chilkaënsis*.
 " 2. " *orissaënsis*.
 " 3. *Litiopa (Alaba) kempi*.

FIG. 4. *Odostomia chilkaënsis*.
 " 5. *Terebra rambhaënsis*.
 " 6. *Tinostoma variegata*.

coarsely varicosely thickened behind, acute, very slightly outwardly reflexed, having five denticles within; aperture obliquely ovate; canal short, broad, a little recurved; interior of shell pure white.

Alt. 11, diam. maj. 5, diam. mim. 4 mm.

Aperture: alt. 4, diam. 1.5 mm.

Hab.—Lake Chilka, "along marine side of Lake Estuary."
 (G. Nevill).

The type specimen is in the British Museum.

Specimens were also taken by Dr. Annandale at the following localities:—Manikpatna in 4 feet of water; channel between Satpara and Manikpatna; Breakfast Isd., Ganjam District (young and adult); Satpara, close in shore; between Barnakuda and Nalbano Isd., in 10 feet; Barkul, among weeds at the edge of the lake.

Nassa orissaënsis, sp. n.

(Figs. 10, 10a, p. 301).

Shell fusiform, rather thin, pale brown, painted on the last whorl with a rather broad, subperipheral chestnut band; whorls 5, shouldered above, the first very small, the second proportionately large, the remainder regularly increasing, sculptured with coarse, transverse costulae crossed by fine, spiral lirae, thus presenting a somewhat cancellate appearance; suture impressed; columella margin vertically descending, angled above and oblique at the base, spreading above into a well defined, whitish, parietal callus which reaches to the upper margin of the labrum; labrum erect, varicosely thickened behind, crenellated, especially above, by the terminations of the spiral lirae; aperture oval; canal very broad, short.

Alt. 6.25, diam. maj. 3.25, diam. min. 3 mm.

Aperture: alt. 2.75, diam. 1 mm.

Hab.—Lake Chilka, Orissa, on a muddy bottom at a depth of from 6 to 8 feet, about three miles off Balugaon (Type); about two miles off Balugaon, on a muddy bottom at between 6 to 8 feet; Manikpatna, in 4 feet; Rambha Bay, south end of Lake Chilka, in the Ganjam District; Satpara, close in shore; between Barnakuda and Nalbano Isd., in 10 feet; off east end of Nalbano Isd., in from 4 to 6 feet.

Family MURICIDAE.

Thais carinifera, Lam.

Lamarck, Animaux sans Vertèbres, vol. vii, 1822, p. 241.

Breakfast Isd., "inhabited by a hermit crab (*Clibanarius padavensis*, de Man.); off Samal Isd., Ganjam District, Madras.

Family CERITHIIDAE.

Potamides (Tympanotonos) fluviatilis, Pot. and Mich.

Cat. Moll. de Douai, p. 363, pl. xxxi, figs. 19–20.

Off eastern end of Nalbano Isd., Orissa, in 4–6 feet; Manikpatna, in 4 feet; channel between Satpara and Manikpatna; off Satpara.

Family LITIOPIIDAE.

Litiopa (Alaba) kempii, sp. n.

(Figs. 3, 3a, p. 298).

Shell fusiform, imperforate, in dead condition white, but bearing traces of having been covered with a reddish brown periostracum; remaining whorls 6, sculptured with coarse, transverse costulae and, on the lower half, with indistinct spiral lirae while, in addition, microscopic, confluent striae are also visible; suture impressed; base of shell finely spirally lirate; columella margin obliquely descending; labrum acute; aperture ovate.

Alt. 5.25, diam. maj. 2.25 mm.

Aperture: alt. 1.5, diam. .75 mm.

Hab.—Rambha Bay, south end of Lake Chilka, Ganjam District, Madras.

Family VIVIPARIDAE.

Vivipara bengalensis, Lk.

Anim. s. Vert. (ed. Desh.), vol. viii, p. 513, 1838: Reeve, Con. Icon. *Paludina*, pl. II, fig. 5, vol. xiv, 1864.

About half a mile east of Nalbano Isd., Orissa, in from 10 to 12 feet of water, a single young specimen (an empty shell).

Family HYDROBIIDAE.

Stenothyra minima, Sow.

Ann. Mag. Bot. Hist. (Charlesworth's series), vol. i, London (1837), p. 217, fig. 22b (as *Nematura*).

On a muddy bottom in from 6 to 8 feet of water, about two miles off Balugaon, Orissa.

Stenothyra, chilkaënsis, sp. n.

(Fig. 1, p. 298).

Shell minutely rimate, ovate, yellowish brown; whorls 5, the first very small, the second large in proportion, the last also large, convex, without sculpture; suture well impressed; perforation reduced to a very narrow chink; labrum continuous; aperture oblique, ovate.

Alt. 2.75, diam. maj. 2 (nearly), diam. min. 1.5 mm.

Hab.—Barkul, Lake Chilka, Orissa, among weeds at the edge of the lake.

Stenothyra orissaënsis, sp. n.

(Fig. 2, p. 298).

Shell small, narrowly perforate, ovately turbinate, pale greenish yellow; whorls 5, regularly increasing, smooth, but for

growth markings, the last convex and rapidly descending in front; labrum continuous, slightly erect; aperture strangulate, oblique, oval.

Alt. 2.25, diam. maj., 1.5 mm.

Hab.—Off Satpara, Lake Chilka, Orissa, at a depth of from 4 to 6 feet, close in shore (Type); dead specimens were also taken at Manikpatna at a depth of 4 feet.

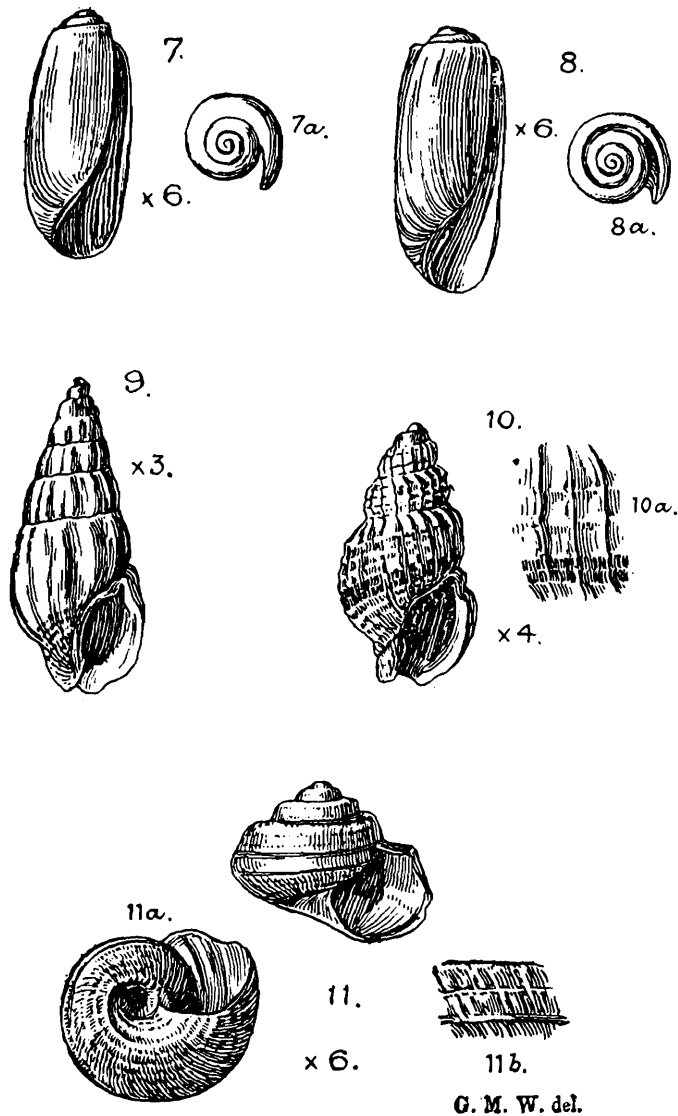


FIG. 7. *Tornatina estriata.*

FIG. 9. *Nassa denegabilis.*

" 8. " *soror.*

" 10. *Nassa orissaensis.*

FIG. 11. *Solariella satparaensis.*

Family PYRAMIDELLIDAE.

Odostomia chilkaensis, sp. n.

(Fig. 4, p. 298).

Shell elongately ovate, opaque, in somewhat eroded condition white, without trace of sculpture; whorls 6, shouldered above, the first three small, regularly increasing, the last three propor-

tionately very long; suture well impressed; columella margin thickened into a very oblique plait which enters the shell above; labrum simple; aperture obliquely, slightly curvedly and elongately subtriangular.

Alt. 3, diam. maj. 1.5 mm.

Aperture: alt. 1, diam. .25 mm.

Hab.—Manikpatna, Lake Chilka, Orissa, at a depth of 4 feet.

Family CYCLOSTREMATIDAE.

Tinostoma variegata, sp. n.

(Figs 6, 6a, 6b, p. 298).

Shell depressedly turbinate, polished, shining, pale greyish white shading to pale yellowish brown and painted with irregular, zigzag, radiate, transverse bands of dark ashen-grey which are more pronounced in the subsutural region; whorls 4, the first three regularly increasing, the last large, the earlier whorls smooth, the last two bearing radiate growth plications; suture impressed, narrowly margined below with white; base of shell very moderately convex, conspicuously painted with rather closely-set, radiate, whitish bands and presenting a slightly microscopic, granular appearance; umbilical region overlaid by a coarse, convex, greyish callus which becomes again overlaid and thickened by a broadly outwardly extending, nacreous callus round the base of the columella; columella margin callously thickened, vertically descending then angled and very obliquely descending below, spreading above into an interiorly situate, thick, nacreous, parietal callus; labrum simple; aperture roundly subovate.

Alt. .75, diam. maj. 2, diam. min. 1.5 mm.

Hab.—Manikpatna, Lake Chilka, Orissa, at a depth of 4 feet.

Family TROCHIDAE.

Solariella satparaënsis, sp. n.

(Figs. 11, 11a, 11b, p. 301).

Shell small, turbinate, polished, shining, whitish ornamented with blackish brown blotches and spiral rows of the same colour; whorls 5, regularly and rather rapidly increasing, narrowly planulate above, sloping below, spirally lirata, the uppermost and, on the last whorl, the peripheral lirations being considerably coarser than the remainder, the interstices finely, closely, transversely striate; suture impressed, very narrowly submargined below; base of shell moderately convex, also sculptured with revolving lirae, but without trace of transverse striation except in the actual umbilical cavity; umbilicus shouldered and wide at the margin, rapidly narrowing, funnel shaped, deep, also spirally lirata and very noticeably, closely, transversely striate; columella margin curvedly excavated above, obliquely descending below; labrum acute,

waved and angled above by the terminations of the spiral lirae; aperture subquadrate.

Alt. 2, diam. maj. 3, diam. min. 2.5 mm.

Aperture: alt. 1 diam. 1 mm.

Hab.—Satpara, Lake Chilka, Orissa, at a depth of from 4 to 6 feet, close in shore.

Class **OPISTHOBRANCHIA.**

Family **BULLIDAE.**

Bulla (Haminea) crocata, Pease.

Proc. Zool. Soc., London, 1860, p. 19.

Satpara, Orissa, found dead on shore.

Family **TORNATINIDAE.**

Tornatina estriata, sp. n.

(Figs. 7, 7a, p. 301).

Shell ovately cylindrical with moderately exerted spire, white, semitransparent; whorls 4, smooth polished, without sculpture, showing only indistinct growth markings; suture narrowly channelled, the channel overhung by the upper portion of the whorl below: columella margin descending obliquely, scarcely curved, somewhat twisted above where it enters the shell; labrum acute, very slightly constricted and bent inwards over the aperture in the median part, a little dilated below, obtusely angled above, aperture straight and somewhat narrow above, commencing to widen in the median region and considerably open below.

Alt. 3.75, diam. maj. 1.5 mm.

Hab.—Lake Chilka, Orissa, on muddy bottom at a depth of from 6 to 8 feet, about two miles off Balugaon (Type); Manikpatna, Orissa in 4 feet.

Tornatina soror, sp. n.

(Figs. 8, 8a, p. 301).

Shell differing from *T. estriata*, Preston, in its larger size and less ovately cylindrical form which, in the present species, is more shouldered above and slightly tapering towards the base; the columella margin does not descend as obliquely as in that species, but bulges somewhat inwardly above, is excavated and curved in the median region and descends slightly obliquely below in the opposite direction to that in *T. estriata*.

Alt. 4.75, diam. maj. 2 mm.

Hab.—Manikpatna, Lake Chilka, Orissa, at a depth of 4 feet.

Class LAMELLIBRANCHIA.

Sub-Order MYTILACEA.

Family MYTILIDAE.

Modiola undulata (Dkr.).

Proc. Zool. Soc., London, 1856, p. 363.

Between Barnakuda and Nalbano Isd., in 10 feet.

var. **crassicostata**, var. n.

(Fig. 15, p. 305).

Shell differing from the typical form in being anteriorly and posteriorly coarsely costate.

Long. 5.75, lat. 12.5 mm.

Hab.—Off Samal Island, Lake Chilka Ganjam District, Madras (Type); Breakfast Isd., Ganjam District, on rocks.

Modiola emarginata, Bens.

Reeve, Con. Icon. *Modiola* sp. 60, pl. x, fig. 73, vol. x, 1858.

Lake Chilka (*ex. coll.* W. T. Blanford).

Sub-Order ARCACEA.

Family ARCIDAE.

Arca granosa, Lin.

Linnæus, Syst. Nat., p. 1142.

On shore near Rambha, Ganjam District, Madras; off Samal Isd., in from 8 to 15 feet (a single valve).

Sub-Order CONCHACEA.

Family VENERIDAE.

Meroë chilkaënsis, sp. n.

(Figs. 13, 13a, p. 305).

Shell ovate, concentrically striate and transversely, finely costulate; umbone small; dorsal margin anteriorly gently arched, posteriorly sloping; ventral margin rounded; anterior side steeply sloping above, acuminate rounded below; posterior side angled above, roundly sloping below; right valve bearing three cardinal teeth of which the anterior is nearly vertical and moderately fine, the median-oblique and coarse and the posterior very oblique, fine and elongate, and a fine anterior oblique lateral tooth.

Long. 16.5, lat. 25.25 mm.

Hab.—On shore at Satpara, Lake Chilka. Probably in a sub-fossil state.

Four valves (all right) only, were collected.

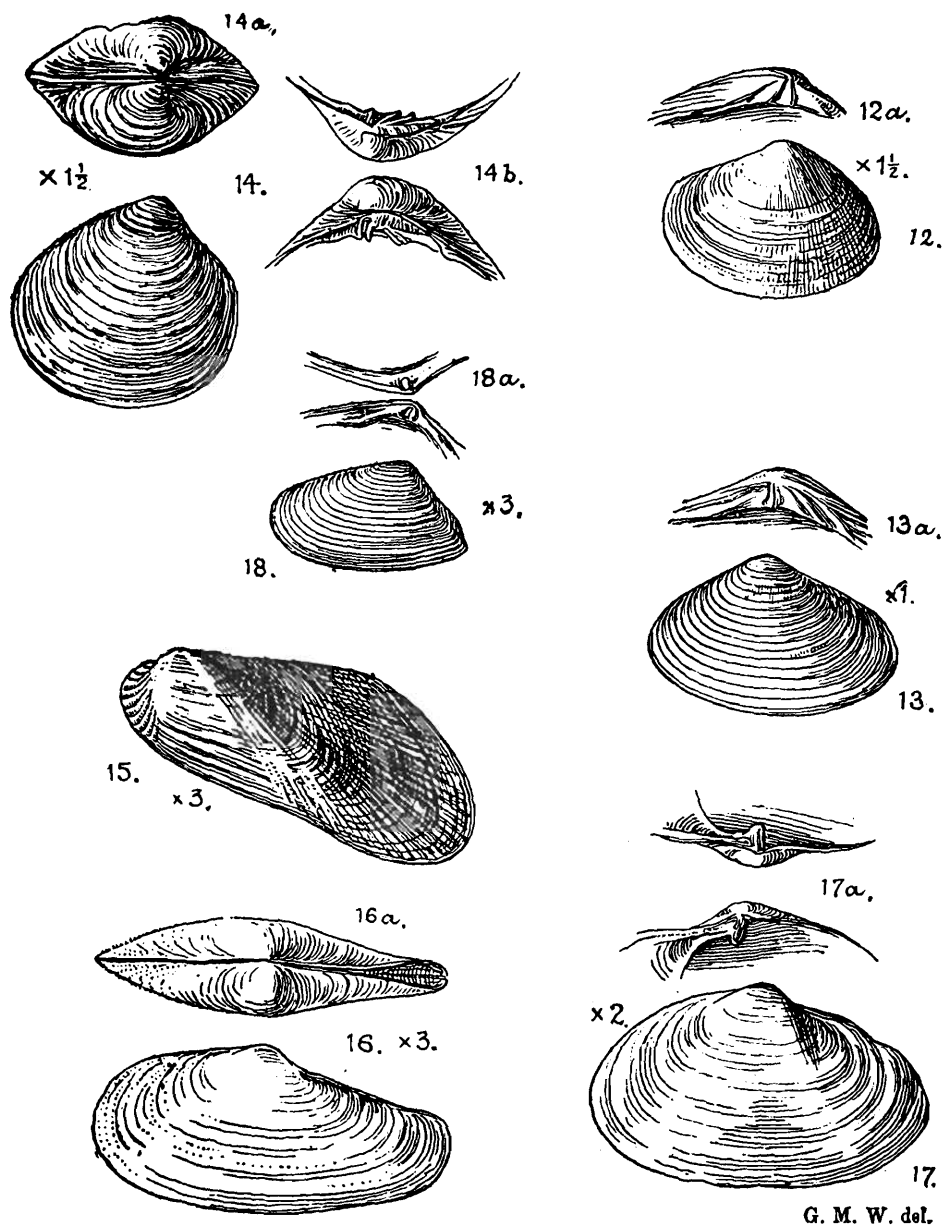


FIG. 12. *Meroë satparaënsis.*

FIG. 15. *Modiola undulata* var. *crassicostrata.*

FIG. 13. „ *chilkaënsis.*
 „ 14. *Clementia annandalei.*

„ 16. *Lyonsia samalinsulæ.*
 „ 17. *Anatina granulosa.*

FIG. 18. *Tellina confusa.*

***Meroë satparaënsis*, sp. n.**

(Figs. 12, 12a, p. 305).

Shell ovately cuneiform, regularly and closely concentrically grooved and sculptured with closely-set, fine, wavy, transverse

striae; umbone moderately large, hardly prominent, showing traces of purplish colouring; dorsal margin anteriorly, steeply sloping, posteriorly gently so; ventral margin gently rounded; anterior side abruptly sloping above, sharply rounded below; posterior side produced, rounded; left valve bearing two, scarcely divergent, almost vertical, cardinal teeth, a very oblique and a little projecting, posterior, cardinal tooth, and a broad, oblique, grooved, anterior lateral; inner margin of shell crenulate.

Long. 16.5, lat. 22.25 mm.

Hab.—On shore at Satpara, Lake Chilka, Orissa. Probably in a subfossil state.

The author has only been able to examine a single valve (the left) of this interesting species.

Clementia annandalei, sp. n.

(Figs. 14, 14a-b, p. 305).

Shell slightly inequilateral, convex, roundly ovate, thin, white, marked with rather fine, concentric striae and coarse, flattened ridges; umbones small, not prominent, curved in an anterior direction; dorsal margin arched; ventral margin rounded; anterior side rounded; posterior side a very little produced, obtusely rounded; right valve bearing three cardinal teeth of which, the anterior is small and very slightly curved, the median short thick and cuneiform and the posterior about double the length of the median tooth, very oblique and also thickened; the left valve also bearing three cardinals of which, the anterior is short and somewhat erect, the median very oblique and running at an acute angle to the anterior, while the posterior is fine and also very oblique running again at an acute angle to the median.

Long. 16.5, lat. 17.5 mm.

Hab.—Lake Chilka, Orissa, about three miles off Balugaon, from muddy bottom at a depth of from 6 to 8 feet (Type); smaller examples were also taken on the same bottom and at the same depth at about two miles from the same locality; between Barnakuda and Nalbano Isd., in 10 feet; off Samal Isd., Ganjam District, Madras; about half a mile east of Nalbano Isd., Orissa, in from 10 to 12 feet. Port Canning, Gangetic delta (*Coll. Ind. Mus.*).

Family CYRENIDAE.

Corbicula (Velorita) satparaënsis, sp. n.

(Figs. 22, 22a, p. 308).

Shell moderately large, very solid, cardiiform, both valves bearing traces of radiate transverse costulae; umbones large, prominent; dorsal margin strongly arched; ventral margin gently

rounded; anterior side sloping above, rounded below; posterior side somewhat abruptly descending, a little produced below; hinge plates massive; right valve bearing an obsolete anterior, an almost vertical median and a very oblique, posterior, cardinal tooth and an oblique, slightly curved, finely striated lateral; left valve bearing a rather large and nodule-like anterior, a coarse, erect, triangular, almost vertical median and an oblique, posterior tooth which is also erect and coarse and a broad, striate lateral.

Long. 46.5, lat. 48.5 mm.

Hab.—On shore at Satpara, Orissa, probably in a subfossil state (Type); on shore near Rambha, Ganjam District, Madras.

Family UNGULINIDAE.

Diplodonta (Felania) annandalei, sp. n.

(Figs. 20, 20a-b, p. 308).

Shell somewhat squarely ovate, not very convex, covered with a thin, very pale straw-coloured periostracum, finely concentrically striate; umbones small, but rather prominent; dorsal margin both anteriorly and posteriorly sloping; ventral margin gently rounded; anterior side sharply rounded above; posterior side little produced, the margin rather abruptly descending in a gentle curve; right valve bearing a rather oblique, broad, short, anterior cardinal and an oblique, slightly curved, narrowly and deeply bifid posterior, cardinal tooth; left valve bearing a slightly curved, broadly bifid anterior and a very oblique, elongated, posterior, cardinal tooth; pallial line simple.

Long. 6, lat. 7 mm.

Hab.—Between Barnakuda and Nalbano Isd., Lake Chilka, at a depth of 10 feet.

Diplodonta (Felania) chilkaënsis, sp. n.

(Figs. 21, 21a-b, p. 308).

Shell orbicular, covered with a yellowish brown periostracum, both valves closely, concentrically striate; umbones not prominent; dorsal margin a little excavated anteriorly, gently sloping posteriorly; ventral margin rounded; anterior side rather abruptly descending; posterior side rounded; both valves bearing two cardinal teeth of which the posterior is massive and bifid in the right valve, while the anterior has the same characters in the left; interior of shell pinkish.

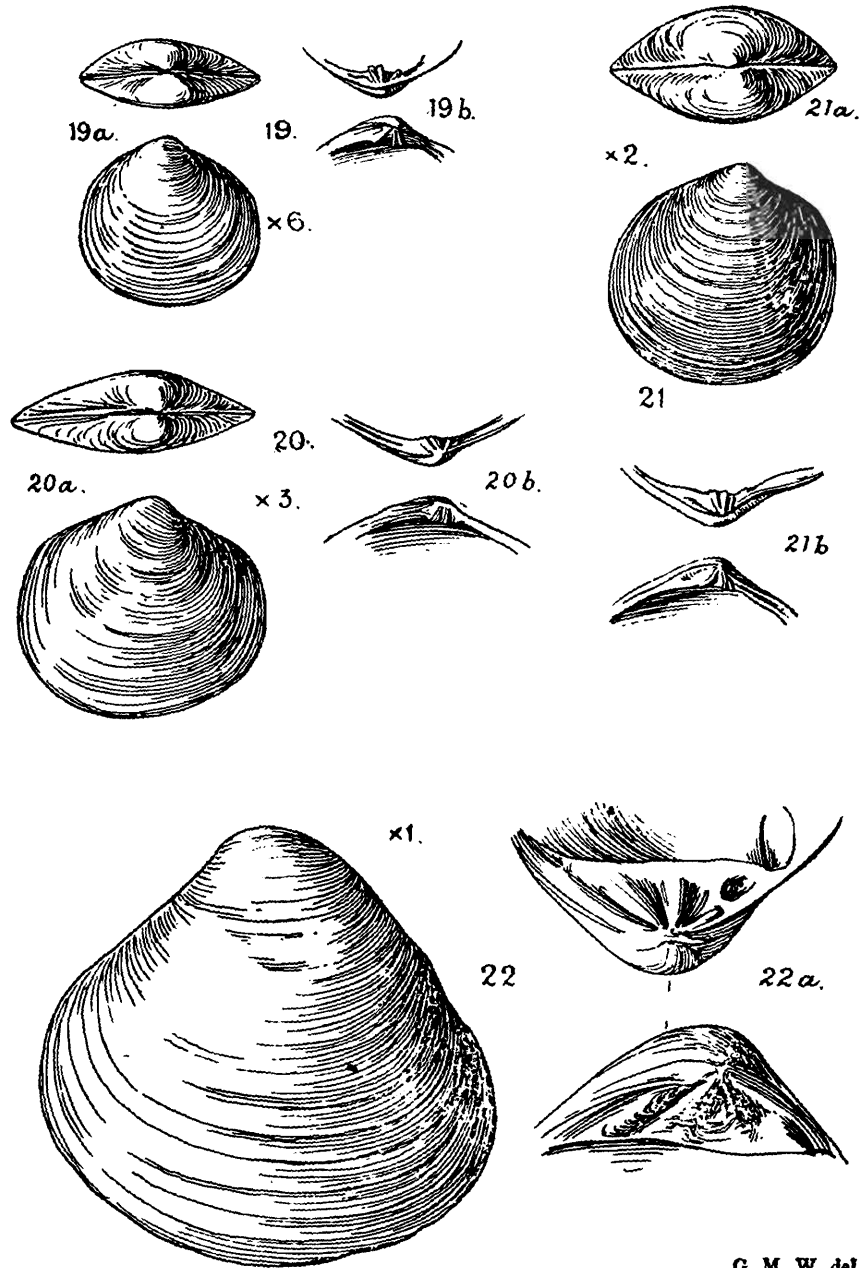
Long. 12, lat. 12.5 mm.

Hab.—Lake Chilka (Type) (*ex coll.* Raban); Manikpatna, in 4 feet.

Diplodonta (Felania) ovalis, sp. n

(Figs. 19, 19a-b, p. 308).

Shell small, ovate, very inequilateral, both valves irregularly, concentrically striate; umbones small, a little prominent; dorsal



G. M. W. del.

FIG. 19. *Diplodonta (Felania) ovalis*.
 " 20. " " *annandalei*.
 " 21. " " *chilkaënsis*.
 " 22. *Corbicula (Velorita) satparaënsis*.

margin anteriorly rounded, posteriorly sloping and very slightly arched; ventral margin rounded; anterior side abruptly descending, almost straight in the median part; posterior side produced, rounded: cardinal teeth in right valve consisting of a bifid, narrow, V-shaped posterior and a very oblique, somewhat club-shaped, anterior tooth in front of which is also situate a marginal

projection which is almost contracted into two unequal, inwardly projecting portions; cardinal teeth in left valve consisting of a narrow, V-shaped, bifid *anterior* and a very oblique, but *straight posterior* tooth, while the marginal projection is quite lacking; palleal line simple; interior of shell suffused with pinkish red.

Long. 3, lat. 3.5 (nearly) mm.

Hab.—Manikpatna, Orissa, at a depth of 4 feet.

Family SOLENIDAE.

Solen truncatus, Wood.

Sowerby, *Genera of Shells*; Reeve, *Con. Icon.*, *Solen*, pl. i, fig. 1, vol. xix, 1874.

From muddy bottom in 6 to 8 feet, about two miles off Balugaon, Orissa; Rambha Bay, south end of Lake Chilka, Ganjam District; between Barnakuda and Nalbano Isd., in 10 feet; off Samal Island, Ganjam District, in from 8 to 15 feet, all very young, but in various stages of growth.

Sub-Order ADESMACEA.

Family PHOLADIDAE.

Martesia striata, Lin., var.

Linnaeus, *Syst. Nat.*; Reeve, *Con. Icon.*, *Pholas*, pl. viii, figs. 32a, b, c, vol. xviii, 1873.

Lake Chilka (*ex coll.* Raban).

Sub-Order TELLINACEA.

Family TELLINIDAE.

Tellina confusa, sp. n.

(Figs. 18, 18a, p. 305).

Shell small, cuneiform, whitish, polished, shining, both valves sculptured with fine, regular, concentric striae; umbones small, posteriorly situate; dorsal margin anteriorly sloping, posteriorly very oblique; ventral margin scarcely rounded; anterior side produced, obtusely rounded; posterior side truncately rostrate.

Long. 4.25, lat. 6.75 mm.

Hab.—Lake Chilka (*Coll. Ind. Mus.*).

The species has been confounded in the Indian Museum with *T. aequistriata*, Sow.¹ of which the original locality is unknown; as, however, the figures of that species are clearly of a much broader and more ovate form, the author considers himself fully justified in describing the present shell as new.

¹ Reeve, *Con. Icon. Tellina*, pl. xlv, figs. 265a, b, vol. xvii, 1870.

Family SCROBICULARIIDAE.

Theora opalina, Hinds.

Proc. Zool. Soc., London, 1843, p. 78, as *Neoera*.

About two miles off Balugaon, Orissa, on muddy bottom in from 6 to 8 feet; off Satpara, Orissa, in from 4 to 6 feet; off Samal Isd., Ganjam District, Madras, in from 8 to 10 feet; between Barnakuda and Nalbano Isd., Lake Chilka, in 10 feet (Dr. N Annandale). Port Canning, Gangetic Delta (W T. Blanford).

Sub-Order ANATINACEA.

Family LYONSIIDAE.

Lyonsia samalinsulæ, sp. n.

(Figs. 16, 16a, p. 305).

Shell small, thin, elongately ovate, posteriorly gaping, whitish tinged, especially anteriorly, with reddish orange; umbones of moderate size, not prominent, obliquely angled in a transverse direction; both valves of a somewhat coarsely granular texture and marked with coarse, concentric plications especially on the left valve; dorsal margin very slightly sloping anteriorly, more rapidly sloping and membranaceous posteriorly; ventral margin very gently curved; anterior side abruptly rounded; posterior side produced, roundedly acuminate, with membranaceous margin.

Long. 6.25, lat. 12.75 mm.

Hab.—Off Samal Isd., Ganjam District, Madras, in from 8 to 15 feet (Type); between Barnakuda and Nalbano Isd., in 10 feet; Manikpatna, Orissa, in 4 feet, young specimens only taken at this locality.

Family ANATINIDAE.

Anatina granulosa, sp. n.

(Figs. 17, 17a, p. 305).

Shell rather small, a little gaping posteriorly, thin, whitish, with the exception of the umbonal region where considerable erosion has taken place and the extreme posterior side, granular in texture and marked with fine radiate striae, posterior portion coarsely, concentrically laminiferous; umbones rather small, flattened; dorsal margin sloping posteriorly; ventral margin very gently rounded; anterior side sloping above, rounded below; posterior side very bluntly rostrate; projecting hinge plate in valve bearing two small, fine teeth; palleal sinus very broad.

Long. 11, lat. 18.75 mm.

Hab.—Lake Chilka (*Coll. Ind. Mus.*).

XX DESCRIPTION D'UN NOUVEAU
DRYINIDE DES INDES

Par J J KIEFFER (*Bitsch*).

Mesodryinus indicus, n. sp.

♀ Entièrement jaune rougeâtre et brillant. Tête un peu transversale, presque lisse, à peine découpée en arc au bord postérieur. Vertex faiblement convexe. Yeux glabres, distants du bord occipital du tiers de leur longueur. Palpes maxillaires longs, atteignant le bord postérieur de la tête, offrant quatre articles après la flexion; palpes labiaux courts, avec deux articles après la flexion. Antennes grêles, à peine grossies distalement, atteignant l'extrémité du thorax, c'est-à-dire, la moitié du corps, 2^e article un peu plus court que le 1^{er}, 3^e deux fois aussi long que les deux premiers réunis ou que le 4^e, le 9^e encore deux fois aussi long que gros. Pronotum faiblement convexe, allongé, plus mince que le mesonotum, celui-ci transversale, plus court que le pronotum, avec deux sillons parapsidaux faiblement marqués, ce qui distingue cette espèce de tous ses congénères. Les côtés du pronotum n'atteignent pas les écailles. Metanotum un peu plus court que le scutellum. Segment médian allongé, graduellement déclive en arrière, faiblement réticulé; le reste du thorax est finement chagriné. Ailes hyalines et sans tache, stigma pâle, étroit et très long, partie proximale du radius égale au tiers de la partie distale, basale un peu oblique, peu distante du stigma. Aux pattes antérieures, la hanche est grossie et longue, le trochanter pétiolé, en massue, de moitié aussi long que le fémur, tarse et pince comme d'ordinaire dans ce genre, branche externe de la pince avec 7 spinules alignées et espacées, et une dent avant l'extrémité; branche interne atteignant la base du 3^e article, arqué au bout, ayant une rangée de lamelles obtuses, alternant avec des soies, cette rangée est interrompue à l'endroit de la courbure. Abdomen lisse. L. 5 mm.

Obtenu par M. T. Bainbrige Fletcher, Imperial Entomologist, à Pusa, de nymphes de *Phromnia marginella*, de la famille des Fulgorides; 5 exemplaires.

Loc. :—Pusa, Bihar.

XXI QUELQUES NOUVEAUX CHIRONOMIDES DES INDES.

Par J J KIEFFER (*Bitsch*).

Dibezzia spinigera, n. sp.

♀ D'un roux marron; balanciers, hanches et pattes d'un roux clair, extrémité antérieure de l'abdomen et tout le dessous de l'abdomen roux sombre. Face proéminente en bosse. Bouche pointue, aussi longue que la tête. Yeux séparés au vertex par une ligne. Palpes de 4 articles grêles, dont le 2^e est cylindrique, non grossi. Antennes de 14 articles, dont le 2^e est plus long que le 3^e, 3-9 subcylindriques, à peine plus gros au milieu, ayant dans leur moitié basale des soies non en verticilles et 4 fois aussi longues que l'article, et vers l'extrémité une soie plus courte, 10^e article conformé comme la 9^e, mais 2 fois aussi long, 10-12 graduellement allongés, 13^e et 14^e un peu plus courts que le 12^e, leurs soies un peu plus courtes que celles des articles 2-9. Ailes finement ponctuées, hyalines, avec 3 bandes transversales sombres, dont la proximale est d'un brun noir, située à égale distance de la base alaire et de la nervure transversale, la 2^e est d'un brun clair et s'étend de la transversale jusqu'à l'extrémité du radius, 3^e non percurrente comme les 2 autres, d'un brun clair, occupant le quart distal du cubitus et s'arrêtant à la discoïdale; l'unique cellule radiale est peu distinctement rétrécie au $\frac{1}{5}$ proximal, son extrémité aussi éloignée de la pointe alaire que le rameau inférieur de la discoïdale, la discoïdale se bifurque peu avant la transversale, cubitus 5 fois aussi long que la radius. Thorax glabre, lisse, brillant, ayant au milieu de son bord antérieur une petite spinule très distincte et horizontale. Fémurs et tibias antérieurs raccourcis mais non grossis, le fémur pas plus long que la hauteur de la tête, à 3 spinules dans sa moitié distale, tarse un peu plus long que le tibia, métatarse égalant les 3 articles suivants réunis, 4^e article pas plus long que gros, le 5^e égalant le 3^e et le 4^e réunis, crochets inégaux, le grand aussi long que l'article, plus de 2 fois aussi long que le petit; aux 4 tarses antérieurs le 4^e article est semblable, muni de chaque côté de son extrémité, d'un appendice assombri, bilobé et densément poilu, le lobe inférieur est armé d'une grosse soie brune, les 3 articles précédents ont à l'extrémité, sur le dessous, 2 grosses soies brunes ou spinules, métatarse de toutes les pattes avec 2 rangées de soies bulbeuses. Pattes intermédiaires conformées comme les antérieures, sauf que les fémurs et les

tibias sont allongés, le tarse aussi long que le tibia, celui-ci sans peigne. Pattes postérieures encore plus longues que les intermédiaires, leur fémur grossi subitement mais faiblement dans un peu moins de leur moitié distale, inerme comme les intermédiaires, aussi long que le tibia, celui-ci à peigne double, tarse 2 fois aussi long que le tibia, métatarse d'un tiers plus, long que le 2^e article, celui-ci double du 3^e qui est un peu plus long que le 4^e, égal au 5^e, crochets inégaux et simples, le grand très long, 4-5 fois aussi long que le petit, dépassant un peu l'article tarsal, qui est 12-15 fois aussi long que gros. Abdomen à peine incurvé, sans longs poils, à peine pubescent : pétiole cylindrique, 3 fois aussi long que gros, égalant la tête et le thorax réunis, son second article plus long que le 1^{er}, les 5 tergites suivants plus de 2 fois aussi larges que le pétiole, transversaux, à peine convexes dorsalement, fortement convexes ventralement.—L. 5 mm.

Bihar : Purneah, 5-viii-1907.

Chironomus perileucus, n. sp.


♂ ♀ D'un roux ferrugineux ou roux jaune; mesonotum, scutellum et balanciers verts ou jaunes, 3 bandes du mesonotum ferrugineuses, mates et raccourcies; antennes du ♂ brunâtres sauf le scape, dernier article antennaire de la ♀ brun noir; abdomen d'un vert clair, avec le bord postérieur des segments d'un blanc prumineux, 2 derniers segments et pince d'un roux brunâtre, parfois l'abdomen ets jaune (♂) ou rouge (♀); fémurs et tibias verts ou jaunes, tarsi blancs, extrémité des 3 premiers articles noire, 4^e et 5^e articles d'un brun noir. Lobes frontaux distincts. Antennes du ♂ de 12 articles, panache gris, articles 3-11 très transversaux, to 12^e 2½ fois aussi long que 2-11 réunis. Antennes de la ♀ de 6 articles, dont le 2^e est subcylindrique, avec 2 verticilles de poils et 2 appendices sensoriels, 3-5 ellipsoïdaux, à col un peu plus court que le noeud et à 2 appendices sensoriels inégaux, 6^e de moitié plus long que le 5^e, hérissé de soies 3-4 fois aussi longues que sa grosseur. Ailes d'un blanc de lait, nervures antérieures jaunes, les autres pâles, base du cubitus et transversale noires et ceintes de noir, auxiliaire dépassant à peine la transversale, qui est oblique, radius dépassant le milieu du cubitus, qui est arqué et plus éloigné de la pointe alaire que la discoïdale, bifurcation de la posticale distale de la transversale. Pattes antérieures pubescentes, métatarse chez la ♀ 2 fois aussi long que le tibia, 2^e article égal au tibia, à peine plus long que le 3^e, 4^e de moitié plus long que le 3^e (♂ ♀), plus de 2 fois aussi long que le 5^e, celui-ci 10 fois aussi long que gros, pulvilles larges. Articles terminaux de la pince convexes, longuement poilus dorsalement, moitié distale subitement amincie en lame de couteau, glabre, avec 5 ou 6 soies rigides et alignées au tiers distal du côté médian; grands appendices larges et atteignant le milieu des articles terminaux. L. 4.5 5 mm.

Calcutta, obtenu d'éclosion à l'Indian Museum, 10-16 juillet.

Chironomus lamprothorax var. conjungens, n. var.

♂ ♀ Le ♂ est d'un roux ferrugineux, mesonotum plus clair, à bandes ferrugineuses, brillantes et raccourcies, metanotum d'un brun noir, flagellum brun, palpes brun-noir, pattes d'un blanc jaunâtre, aux antérieures l'extrémité du fémur, le tibia sauf un large anneau avant l'extrémité et le tarse sont d'un brun noir, comme les 2 ou 3 derniers articles des 4 tarses postérieurs, balanciers jaunâtres, abdomen vert ou jaune, moitié postérieure et pince d'un jaune brunâtre. La ♀ est d'un jaune roussâtre, 6^e article antennaire ou les 5 derniers d'un brun sombre, les 3 bandes du mesonotum et le metanotum d'un noir brillant, abdomen entièrement d'un roux carné sombre, balanciers jaunâtres, pattes colorées comme chez le ♂. Antennes du ♂ de 12 articles, panache gris, articles 3-11 très transversaux, 12^e 2½ fois aussi long que les 10 précédents réunis. Antennes de la ♀ comme chez le type, sauf que le dernier article est au moins 2 fois aussi long que l'avant dernier. Radius dépassant le milieu du cubitus, celui-ci faiblement arqué, aussi distant de la pointe alaire que la discoïdale, bifurcation de la posticale très distale de la transversale. Comme chez le type, les pattes antérieures sont pubescentes, leur métatarse de moitié plus long que le tibia, le 4^e article d'un tiers plus long que le 3^e, pulvilles larges, dépassant le milieu des crochets. Appendices terminaux de la pince obtus et d'égale largeur, sans longs poils, un peu plus longs que les basaux; appendice supérieur petit, n'atteignant pas l'extrémité de l'article basal, glabre, filiforme dans sa moitié basale, un peu arqué et renflé en ellipse dans la moitié, sauf le bout distal qui est rétréci, la partie ellipsoïdale porte, au côté médian, 7 ou 8 longues soies alignées et très rapprochées; appendice inférieur très large, plus large que l'article terminal, dont il atteint le tiers distal, un peu moins large dans sa moitié basale.—L. ♂ 4 mm., ♀ 2, 6 mm.

Calcutta, obtenu d'éclosion à l'Indian Museum, 25-viii-1910.



MISCELLANEA

FISHES.

NOTE ON *Trygon kuhlii*.—A large gravid female measuring 34.5 cm.¹ across the disk was captured off the Madras coast on the 15th of January, 1914. It lived in the Marine Aquarium, Madras, till the 13th of March.

In the aquarium it was habitually sluggish, lying buried in sand with only the eyes, the spiracles and a portion of the tail visible above the surface. The large spiracle, which except when fully opened is a narrow slit, extends from near the anterior level of the eye to a point about one-third of its own length behind that organ. The upper margin of the spiracle, *i.e.* the one nearest the eye, forms behind that organ a projecting fold. Both the eye and this fold are employed in closing the spiracular aperture when sand and other foreign bodies drop from above or when the water is agitated. This curious arrangement serves both for the protection of the eye and for the exclusion of foreign objects from the spiracle. Normally the spiracles are kept wide open for purposes of respiration, causing a prominent erection of the eyes considerably above the surface of the head. This gives the ray a most grotesque appearance.

The colour of the dorsal surface of the disk is chocolate brown during life with a few scattered blue ocelli, but changes after death, becoming slate-coloured² in preserved specimens.

Like other species of *Trygon*, *T. kuhlii* is viviparous. On the 12th of March the above specimen gave birth to two young, both of which were males. Immediately after birth the young died and the mother died on the following day.

Description of the Young.

The young differ in size as will be seen from measurements given below :—

| | Specimen A ♂. | Specimen B ♂. |
|------------------------|---------------|---------------|
| Maximum length | 133 mm. | 115 mm. |
| Maximum width of disk | 60 mm. | 47 mm. |
| Length of pectoral fin | 22½ mm. | 18 mm. |
| Length of ventral fin | 8 mm. | 6 mm. |
| Length of tail . | 83 mm. | 72 mm. |
| Umbilical chord | 10 mm. | |

¹ The measurement was taken from "point to point"; if measured with a tape across the back it is 35.5 cm. The usual size appears to be about 32 cm. See *Mem. Ind. Mus.*, Vol. II, No. 1, page 34.

² *Op. cit.*, vol. II, part 1, page 35.

The last leaves the body in the mid-ventral line immediately posterior to the gills.

Colour—In spirit the dorsal surface is brown and the under surface whitish. The edge of the disk all round is darker than the back. The blue ocelli are absent. The ocular portion of the disk is dark brown crossed by two light bands connecting the anterior and posterior edges of the orbit respectively.

NOTE ON THE BREEDING OF *Chiloscyllium griseum*, Müll. and Henle.—*Chiloscyllium griseum*, Müll. and Henle. (= *C. indicum* (Gmel.) of the "Fauna") is one of the commonest dog-fishes on the Madras coast. In January, 1913, one of the tanks in the Marine Aquarium at Madras contained eight adult specimens captured at different times. As the period of "gestation" is



Egg-capsule of *Chiloscyllium griseum*, $\times \frac{1}{5}$.

probably very long in dog-fish, there is little doubt that the fish in question must have been impregnated before entering the aquarium. Every night from January 27th to 30th a pair of egg-capsules were laid, and a single one on the night of February 1st. It could not be ascertained whether all the eggs were laid by a single individual or not.

Description of egg.—The horny capsule is of the usual quadrangular shape. The shorter or terminal sides of the quadrangle are contracted and irregularly folded so as to bring the angles towards the middle line. The contraction is greater at one end than at the other, consequently the angles actually meet in the former case, while they do not do so in the latter. The four angles are not prolonged into the usual filaments for attachment, their function being relegated to extremely numerous and slender silky threads which fringe the edges of the capsule. In

one of the lateral margins the threads are particularly numerous and extend to a great length, in some cases to about 180 mm., notwithstanding the fact that they are closely matted and twisted together.

Of the 9 eggs the measurements of the largest and of the smallest egg-capsule are as follows :—

| | Largest egg-capsule. | Smallest egg-capsule. |
|--------------------------|-------------------------|--------------------------|
| Maximum length | 78 mm. | 70 mm. |
| Maximum breadth | 36 mm. | 32 mm. |
| Maximum thickness | 21 mm. | 18 mm. |
| Length of matted threads | 180 mm. | |

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REPTILES.

THREE RARE HIMALAYAN LIZARDS.—Thanks to the generosity of Col. Tytler, R.E., and Major F. Wall, I.M.S., the Indian Museum has recently received specimens of three rare lizards from the Western Himalayas. They are *Alsophylax himalayensis*, Annandale, *Gymnodactylus lawderanus*, Stoliczka and *Acanthosaura major* (Jerdon).

Alsophylax himalayensis.

Annandale, *Rec. Ind. Mus.* IX, p. 305, pl. xv, fig. 1, (1913).

This lizard was recently described by myself from a single female specimen taken in the Simla Hills at an altitude of about 5000 ft. Major Wall has still more recently sent us a male from Almorah, taken at about the same altitude. It is rather darker and greyer than the female and has the markings on the dorsal surface denser. The tail is more distinctly swollen and there is a prominent tubercle on its ventral surface at each side a little behind the vent. There is, however, no trace of praeanal pores—a feature that seems to differentiate the lizard from the male of any other species in the genus, from the general facies of which *A. himalayensis* is, indeed, somewhat divergent.

Gymnodactylus lawderanus.

Col. Tytler has just sent us a specimen of this rare gecko which he took in July at Konsanie in Kumaon at an altitude of 6000 ft. So far as published records go, this is only the second specimen known, but Major Wall informs me that he has recently presented one or more to the British Museum. Col. Tytler's specimen is unfortunately mutilated, but it retains the basal part of the tail, which was deformed in the type. In his key to the Indian species of the genus in the "Fauna" (p. 60) Dr. Boulenger, relying on the original description and figures, includes *G. lawderanus* among those species which do not possess a lateral fold, and states

that the tail is without tubercles. The type, which is in the Indian Museum, though generally in good condition so far as the body is concerned, is somewhat shrivelled and it is difficult to see whether the fold is altogether absent. In the fresh specimen it is clearly present. The tail, moreover, is partly surrounded by rings of small nail-like tubercles interrupted on the dorsal and ventral surfaces. Otherwise this specimen agrees with the type. The species is not related in any close degree to any other, but, despite its cylindrical tail, evidently comes nearest to *G. stoliczkai*, with which it was placed provisionally in my recent revision of the Indian representatives of the genus (*Rec. Ind. Mus.* IX, p. 316). The flattened tail of *G. stoliczkai* must, therefore, be regarded as no more than a specific character.

Acanthosaura major.

Boulenger, *Cat. Liz. Brit. Mus.*, I, p. 306, pl. xxiii, fig. 3. (1885).

The typical form of this species, which Dr. Boulenger has figured from the type, is a very different-looking lizard from the one I described some years ago (*Rec. Ind. Mus.*, I, p. 152; 1907) under the name *Acanthosaura kumaonensis*, but the difference lies solely in the smaller size, slighter build and rather longer tail of the latter. With both a male and a female of *A. major* before me—the female obtained at Tolpani in Garhwal by Col. Tytler (9000 ft.), the male by myself outside the town of Simla (*ca.* 8000 ft.)—I can find no structural difference between the two forms, except that the crest is higher in the typical male. This form reaches a length of nearly 25 cm., whereas adult males of the race or subspecies *kumaonensis*, as it may be called, are not longer than 18 cm., the females being rather shorter. The typical form is found in the Simla Hill States and Garhwal, probably at altitudes above 6000 ft., whereas the race *kumaonensis* occurs a little to the eastwards in Kumaon and in Garhwal at slightly lower altitudes. Probably the two races merge gradually the one into the other. The difference between them is similar in many respects to that between the Peninsular race (subsp. *gigas*, Blyth)¹ and the typical northern and eastern race of *Calotes versicolor*.

N. ANNANDALE.

¹ Recent investigations show that this larger race, in which the secondary sexual characters of the male are very strongly developed, occupies the whole of Peninsular India south of the Indo-Gangetic plain and also Ceylon. To the north-west its range extends far beyond the Peninsular Area into Baluchistan. The typical form of the species occupies the foot-hills of the Himalayas, the Gangetic plain, Assam, Burma, Siam, the northern part of the Malay Peninsula, etc. Only adults of the two races can be distinguished satisfactorily.