FAUNA OF THE CHILKA LAKE

THE POLYZOA OF THE LAKE AND OF BRACKISH WATER IN THE GANGETIC DELTA.

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(With 3 text-figures.)

CONTENTS.

POLYZOA.

By N. ANNANDALE.

Eight species of Polyzoa have been found in brackish water on the coasts of India, but of these only three occur, so far as we know, in the Chilka Lake. A fourth was abundant some years ago in small pools of brackish water near its inner shore, but has now disappeared and has not been taken in the lake itself.

A list of the eight species will be found in the Table of Contents on the opposite page. One half of these species are apparently endemic in estuarine tracts, maritime swamps and lagoons in India, while the other half are cosmopolitan or at any rate very widely distributed. The two series may be tabulated thus:—

ENDEMIC INDIAN SPECIES.	WIDELY DISTRIBUTED SPECIES.
Membranipora bengalensis,	*Membranipora hippopus*,
Victorella bengalensis,	*Bowerbankia caudata*,
Loxosomatoides colonialis,	*Alcyonidium mytili*,
Loxosomatoides laevis.	*Barentsia discreta*.

With one exception the genera are cosmopolitan. The exception is *Loxosomatoides*, which is only known from estuarine tracts and lagoons on the east coast of India. The two species of this genus, as well as the two other endemic forms in the list, have been found only in water of slight or variable salinity, while all the cosmopolitan species are known to occur in the sea. *Loxosomatoides* is closely related to the North American freshwater genus *Urnatella*.

The species found in the Chilka Lake are *Loxosomatoides laevis*, *Membranipora hippopus* and *Alcyonidium mytili*, while the one that formerly occurred in pools in the vicinity was *Bowerbankia caudata*. The first three of these are abundant or at least fairly common in both divisions of the lake, among the permanent inhabitants of which they must all be included. *L. laevis* also occurs in lagoons near Madras and is closely related to the Gangetic *L. colonialis*. The absence of *Victorella* and of *M. bengalensis* is rather strange, for both forms occur almost certainly at Bombay, while the Ctenostome has also been found at Madras. Both are very abundant where they do occur, and neither could well escape the notice of a collector accustomed to look for it. Possibly their absence is due to lack of suitable food.

The only important biological fact I have to add to our knowledge of these brackish-water Polyzoa is that *Loxosomatoides* produces resting buds. The structure of these buds is discussed on p. 130.

In addition to the indigenous Polyzoa of the lake we found within its boundaries specimens of two other species a marine Cheilostome and a freshwater Phylactolae-

matous form. As the presence of both in the region to be considered was evidently adventitious, they may be dismissed here in a few words.

The marine species was *Membranipora tuberculata*, Bosc, a form common in the Atlantic and already recorded from Indian seas by Miss Thornely[1]. A number of young colonies were observed on a stick that had been washed in at the sea-mouth opposite Arakhuda. The species lives attached to floating objects, especially algae[2]; Miss Thornely's specimens, though taken over deep water, were on a floating *Fucus* and evidently came from near the surface.

The Phylactolaematous form I recently described under the name *Plumatella punctata* var. *longigemmis*[3]. It grows luxuriantly in a pond of practically fresh water on Barkuda Island, and in September we found its statoblasts in large numbers on the surface of the main area, on to which they had probably been blown by the wind. We could obtain no evidence that they germinated in the lake and the species can hardly be included in the fauna thereof.

GEOGRAPHICAL LIST OF CHILKA SPECIES.

m.a.=main area: o.ch.=outer channel: sp. gr.=specific gravity of water in the lake.

	CHILKA LAKE.		FURTHER DISTRIBUTION.	sp. gr.
	m.a.	*o.ch.*		
ECTOPROCTA.				
Cheilostomata.				
Membranipora hippopus	x	x	Cosmopolitan (*marine and estuarine*).	1·000—1·0275
Ctenostomata.				
Bowerbankia caudata *			European seas.	—
Alcyoniaium mytili	x	x	Cosmopolitan (*marine*).	1·006—1·0275
ENTOPROCTA.				
Loxosomatoides laevis	x	x	Madras backwaters (*brackish water*).	1·000—1·0275

* Occurred formerly in pools near shore of main area, not found in lake.

ECTOPROCTA.

CHEILOSTOMATA.

Genus **MEMBRANIPORA**, De Blainville.

1909. *Membranipora*, Levinsen, *Morph. Syst. Studies Cheilost. Polyzoa*, p. 144 (Copenhagen).

Both the species of Cheilostomata to be discussed belong to the genus *Membranipora* as restricted by Levinsen, having the armature of the lateral wall

[1] *Rec. Ind. Mus.* I, p. 185, fig. 3 (1909).

[2] Norman, *Journ. Linn. Soc.* (*Zool.*) XXX, p. 287 (1909).

[3] *Rec. Ind. Mus.* XI, pp. 168, 169, fig. 2 (p. 166), pl. iii, fig. 2 (1915).

of the zooecium completely covered by a membranous upper or dorsal wall. They are readily distinguished by the following characters:-

M bengalensis forms a slightly foliaceous colony with a faint silvery lustre and is by no means hyaline. The lip of the zooecium bears a pair of very long and slender bifid spines.

M hippopus forms an entirely flat colony that is transparent and hyaline; unless the polypides are gorged with food or forming brown bodies, all that is usually visible to the naked eye is a delicate network produced by the armature of the lateral walls of the zooecia; the lip bears no spines.

Membranipora bengalensis, Stoliczka.

1869. *Membranipora bengalensis*, Stoliczka, *Journ. As. Soc. Bengal* XXXVIII (2), p 55, pl. xii.

1907. *Membranipora bengalensis*, Thornely, *Rec. Ind. Mus.* I, p. 186, fig. 4.

1911. *Membranipora bengalensis*, Annandale, *Faun. Brit. Ind., Freshw. Sponges*, etc., p. 175, fig. 33.

This species has not been found in the Chilka Lake, but is abundant in pools of brackish water in the Gangetic delta, within the limits of which it also occurs in the Salt Lakes near Calcutta. It has also been taken in creeks near Bombay, but Miss Thornely's record from Mergui is due to the misreading of an almost illegible label.

Membranipora hippopus, Levinsen.

1854. *Membranipora lacroixii*, Busk, *B. M. Cat. Polyzoa* II, p. 60, pl. lxix, pl. civ, fig. 1.

1880. *Membranipora lacroixii*, Hincks, *Brit. Marine Polyzoa*, p. 129, pl. xvii, figs. 5-8.

1909. *Membranipora hippopus*, Levinsen, *Morph. Syst. Studies Cheilost. Polyzoa*, pp. 144, 146.

1911. *Membranipora lacroixii*, Annandale, *Faun. Brit. Ind., Freshw. Sponges*, etc., pp. 23, 175.

There has been considerable confusion about this species, but Levinsen has given good cause for considering it distinct from the one described by Audouin as *Flustra lacroixii*.

The armature of the lateral wall of the zooecium is very slight, consisting of two parallel calcified bands of no great depth, one situated at the base of the wall and the other superficial. The area between them remains membranous. Both margins may be either smooth, irregular or minutely denticulate; when denticulate they have a beaded appearance. In the numerous specimens I have examined I have failed to find a single ovicell, but in one a "tower-cell" was present. The small triangular abortive zooecia figured by Hincks (*op. cit.*, pl. xxii, fig. 6) occur rarely in Indian examples. The polypides have 12 very long and delicate tentacles.

The animal is extremely shy and in captivity never extends its tentacles for more than a few minutes at a time. If a healthy colony be observed in favourable conditions the different individuals will be seen to protrude and retract the lophophore frequently, but not either rhythmically or in unison.

Larvae of the Cyphonautes type were taken in our tow-nets at Rambha in January, but were very minute and did not provide any definite specific characters.

M hippopus is in the broadest sense a cosmopolitan species and seems to be equally at home in brackish and in salt water. It has been found in the Cochin backwaters and in the estuaries of the Ganges, in pools of brackish water, in lagoons and on the open coast of Orissa; off the British coasts it occurs both in brackish ditches, in the littoral zone and in deep water. It is abundant all over the Chilka Lake and flourishes at all seasons, in fresh, brackish and salt water; on the leaves of *Halophila*, the stems of *Potamogeton*, on reeds, on rocks and stones, on the shells (living and dead) of *Purpura* and in the deserted burrows of *Teredo* in a wooden post. On rocks it is frequently overwhelmed by the rapid growth of sponges, but often succeeds for a period in preserving for itself a bare space in the midst of *Laxosuberites lacustris*, which is a very thin encrusting form.

CTENOSTOMATA.

Division *PALUDICELLINA*.

Family VICTORELLIDAE.

Genus **VICTORELLA**, Kent.

1911. *Victorella*, Annandale, *Faun. Brit. Ind., Freshw. Sponges*, etc., p. 194.

1911. *Victorella, id., Rec. Ind. Mus.* VI, p. 195.

It is perhaps best, as suggested in my volume in the *Fauna of British India*, to regard this genus as representing a family distinguished from the Paludicellidae by the fact that there is only a single funiculus which is not connected with the gonads. Braem[1] has recently shown that in *Paludicella* (as well as in *Victorella* and occasionally in *Pottsiella*) secondary buds may be produced in addition to the three primary ones characteristic of the division, and *Pottsiella*, though it resembles *Victorella* in external characters, agrees with *Paludicella* in internal anatomy. The separation of the two families must, therefore, depend on the structure and position of the gonads and funicular strands, and the Victorellidae must for the present be accepted as generically monotypic.

As I have pointed out in the paper cited (1911), the so-called species of *Victorella* are very closely allied and should perhaps be regarded as local races, varieties or phases of a single species. The form common in the Gangetic delta appears to be indistinguishable from one described from Central Asia and is also very doubtfully distinct from an African form found in Tanganyika and in the Egyptian salt lake Birket-el-Qurun.

[1] *Archiv f. Hydrobiol. und Planktonkunde* IX, 1913-14. Unfortunately the copy of this paper in my possession has been mislaid, and I am unable to refer to the page.

Victorella bengalensis, Annandale.

1907. ? *Victorella symbiotica*, Rousselet, *Proc. Zool. Soc. London* I, p. 255, pl. xv, figs. 7-8.

1908. *Victorella bengalensis*, Annandale, *Rec. Ind. Mus.* II, p. 12, fig. 1.

1911. *Victorella continentalis*, Braem, *Trav. Soc. Nat. St. Pétersb.* XLII, p. 30, figs. 18-21.

1911. *Victorella bengalensis*, Annandale, *Faun. Brit. Ind., Freshw. Sponges*, etc., pp. 191-198, fig. 37.

1911. *Victorella bengalensis*, *id.*, *Rec. Ind. Mus.* VI, p. 197, pl. xii, figs. 3, 7, 8.

I cannot find any definite difference between this species and the form from Issyk-kul in Central Asia described by Braem as *Victorella continentalis*. The latter, however, seems to have been founded on young colonies just developing from resting buds. The features in which *V bengalensis* differs from Rousselet's *V symbiotica* are also of problematical value, perhaps depending rather on the direct influence of environment than on anything inherent in the organism. In *V bengalensis*, to use the name provisionally, this influence is powerful in determining the method of growth, and four distinct phases may be noted. First, there are young colonies developing from resting buds on objects the surface of which provides abundance of space. In these the zooecia are short and almost entirely recumbent, closely resembling those of *Paludicella* in shape. Older colonies vary in accordance with the nature of the object to which they are attached. The phase most commonly found resembles a thick fur in which the hairs are represented by upright zooecia, and grows on the stems and roots of grasses and water-plants and occasionally on the shells of Gastropod molluscs. When the colony, attached to supports of the kind, is being overwhelmed by mud owing to the deposition of silt in tidal creeks, the stolons of the secondary buds become greatly elongated and by their entanglement produce a spongy mass; the individual zooecia in this phase of the species are almost entirely vertical and often of considerable height. The simplest adult phase is that found on the stems of the hydroid *Bimeria fluminalis*. In it the colony is much more diffuse than in the two others, and the zooecia, though mainly upright, are more definitely swollen at the base. This phase often approaches very close to the European *V pavida*, which is commonly found on the stems of *Cordylophora lacustris*, a hydroid that resembles *B. fluminalis* in ecology and manner of growth.

I was surprised not to find this Polyzoon in the Chilka Lake ; it is common in the tidal area of the Gangetic delta and has been taken at Madras and also probably at Bombay. In the Gangetic delta it usually affects brackish water, but has been observed with *Plumatella* in a pond of fresh water near a tidal canal. At Madras it was found on the carapace of a freshwater prawn. The food is perhaps restricted to diatoms of a kind that were not observed in the lake, but on this point further information is desirable.

Division *VESICULARINA.*

Family VESICULARIDAE.

Genus **BOWERBANKIA**, Fane.

Bowerbankia caudata, Hincks.

1880. *Bowerbankia caudata*, Hincks, *Brit. Marine Polyzoa*, p. 521, pl. lxxv, figs. 7-8.

1880. *Bowerbankia gracillima*, *id.*, *ibid.*, p. 525, pl. lxxv, fig. 6.

1907. *Bowerbankia caudata*, Thornely, *Rec. Ind. Mus.* I, p. 196.

1908. *Bowerbankia caudata* race *bengalensis*, Annandale, *Rec. Ind. Mus.* II, p. 13.

1911. *Bowerbankia caudata* subsp. *bengalensis*, *id.*, *Faun. Brit. Ind.*, *Freshw. Sponges*, etc., p. 189.

In the form I have named *bengalensis* the zooecia show every gradation between those of *B. caudata* and those of *B. gracillima* as figured by Hincks, and sometimes even surpass the latter in their elongation and relative slenderness. They also vary in colour, sometimes being quite hyaline and sometimes having a rather opaque brownish tinge. Generally speaking, the zooecia of young or poorly developed colonies and of the younger parts of more luxuriant ones are short, relatively stout, colourless and transparent, while those of more opulent colonies are longer and relatively more slender; it is only some zooecia that become darkened. I have found none in which the "tails" formed branching radicles, but occasionally they are forked. The racial name *bengalensis* can hardly be maintained in view of the variability of the form to which it was applied.

Waters[1] has pointed out that at present it is hardly possible to identify some of the supposed species of *Bowerbankia* and that the "tailed" condition of the zooecia is by no means confined to Hincks's *caudata*. The Indian form, however, is constant in its method of growth, except in so far as it is indicated above, and never produces upright or hanging branches. The gizzard (*i.e.* the part bearing horny teeth) is about 0·058 mm. in transverse diameter when expanded, the length in this condition being considerably less than the breadth, *viz.* about 0·046 mm. According to Waters (*op. cit.*, p. 242) the diameter of the organ is about 0·1 in *B. imbricata* "in an ordinary non-inflated condition." The anatomy of the polypide agrees closely with that of a specimen from the Irish Sea (Port Erin) lent me by Mr. F. H. Gravely, in particular in the structure of the gizzard. The figure of this organ reproduced on pl. xii, vol. VI of the *Records of the Indian Museum* (1911) for comparison with those of *Victorella* and *Hislopia* was drawn from Mr. Gravely's English specimen.

B. caudata, to judge from the few references[2] in literature to it, seems to be a scarce species in European waters. In India I have seen it only in the neighbour-

[1] *Journ. Linn. Soc.* (*Zool.*) XXXI, p. 241 (1910).

[2] For references see Waters, *op. cit.*, pp. 248, 249. Most of the works he cites are unfortunately not available in Calcutta.

hood of Port Canning in the Gangetic delta (where it is abundant with *Victorella bengalensis* in pools of brackish water) and at Rambha on the Chilka Lake. We did not find it in the lake itself, but in March, 1909, it was growing luxuriantly on water-plants of the genus *Nais* in pools of slightly brackish water near the shore. These pools have now become quite fresh, probably owing to the action of floods, and the Polyzoon has disappeared from them. *Bowerbankia caudata*, though it shares with other members of its genus the capacity of living in brackish water is essentially a marine species and can only have reached the pools *viâ* the lake, in which its apparent non-occurrence is therefore somewhat remarkable.

Division *ALCYONELLEA*.

Family ALCYONIDIIDAE.

Genus **ALCYONIDIUM**, Lamouroux.

Alcyonidium mytili, Dalyell.

1880. *Alcyonidium mytili*, Hincks, *Brit. Marine Polyzoa*, p. 498, pl. lxx, figs. 2, 3.

1905. *Alcyonidium mytili*, Thornely in Herdman's *Ceylon Pearl Fisheries* IV, p. 127.

Specimens from the Chilka Lake agree well with Hincks's figures. The polypides have as a rule 12 to 14 tentacles; Hincks says 15 to 18.

We found the species fairly common on shells of *Potamides* (*Tympanotonos*) *fluviatilis* at Satpara both in the fresh- and the salt-water season, and on those of *Purpura* (*Thais*) *carinifera* near the south end of the lake at all times of the year. So far as we could see it was always attached to shells that contained either hermit-crabs or their own proper inhabitants. Mr. T. Southwell recently captured at Diamond Harbour in the Hughli estuary a sea-snake (*Enhydrina valakadien*) to the skin of which numerous small circular colonies of this Polyzoon were attached. It would seem, therefore, that in the conditions prevalent in the Chilka Lake and in Indian estuaries it is advantageous for the organism to be attached to animals possessing the power of progression; but in Europe *A. mytili* has been found—as its name indicates—associated with sedentary molluscs, and also on algae, stones, etc.

The species is cosmopolitan.

ENTOPROCTA.

Family URNATELLIDAE.

1856. Urnatellidae, Allman, *Mon. Freshwater Polyzoa*, p. 117.

The family may be defined as follows:—

Deciduous colonial Entoprocta of fresh or brackish water that produce resting buds either by segmentation of the stalk or by the degeneration of a capitulum; that have a vertical or sloping lophophore with a well-developed web-like sphincter at its base, distinct tentacular retractors, a well-defined cloaca and a distinct water-vascular system.

Only two genera can at present be assigned to this family, namely *Urnatella*, Leidy, from fresh water in North America and *Loxosomatoides*, Annandale, from brackish water in India.

Genus **LOXOSOMATOIDES**, Annandale.

1908. *Loxosomatoides*, Annandale, *Rec. Ind. Mus.* II, p. 14.

Since this genus was described I have been able to compare specimens of *Urnatella* with the types. The relationship between the two genera is evidently very close and is shown even in the minute structure of the lophophore and tentacles and in the position of the different parts of the alimentary canal. I have not been able to detect any trace of a brood-pouch in *Loxosomatoides* and there is a distinct cloaca, most readily seen when the rectum is in a retracted condition. Spaces occur in the lophophore that are clearly homologous with the water-vascular system of *Urnatella*[1], and tentacular retractors are conspicuously present.

Urnatella, therefore, differs from *Loxosomatoides* mainly in the segmented stalk of its polyps and in not possessing either an elongate stolon or a chitinous capitular shield.

Nothing is known of the embryology of either genus, but the asexual method of reproduction is similar, though not identical, in the two. In *Urnatella* the stalks of the polyps segment to form resting buds, while in *Loxosomatoides* buds are formed by the degeneration of capitula. It is not yet certain whether any capitulum may degenerate for this purpose, or only certain capitula do so, and I have no information as to the stage in the development of the capitulum at which degeneration commences; but it is noteworthy that in one instance a stalk was observed which bore three resting buds, arranged in a linear series one in front of the other at its extremity. It is perhaps legitimate in any case to regard the capitulum in *Urnatella* as the homologue of a single segment of the stalk, or rather to conceive of the segment as a degenerate capitulum.

The species of *Loxosomatoides* that occurs in the Chilka Lake and the lagoons of Madras is not identical with the one described from the Gangetic delta, but the two are closely related. They may easily be distinguished one from the other by the complete absence from the capitular shield of the Peninsular species (*L. laevis*) of the spines that always occur on that of *L. colonialis*, and by the much more regular ornamentation of the shield in the former species. The normal method of growth is also different, for whereas the polyps in *L. laevis* are borne singly at considerable intervals on stalks that arise from one side of a slender rhizome which branches sparingly, in *L. colonialis*, though the unilateral arrangement also obtains, the polyps are arranged in groups and the rhizome from which their stalks arise is somewhat flattened and irregular and branches rather less sparingly. These characters are liable to be obscured if growth is congested or inhibited, but they never disappear altogether.

[1] Davenport, *Bull. Mus. Comp. Zool. Harvard* XXIV, pp. 1-44, pls. i-vi (1893).

Loxosomatoides colonialis, Annandale.

1908. *Loxosomatoides colonialis*, Annandale, *Rec. Ind. Mus.* II, pp. 14-19, figs. 2-7.

Except for what has been said under the generic heading, I have nothing to add to my original account of the species.

L. colonialis has been found as yet only in pools of brackish water at Port Canning in the Gangetic delta.

Loxosomatoides laevis, sp. nov.

In general structure this species closely resembles the preceding one, from which it differs mainly in the ornamentation of its capitular shield. The differences, however, appear to be quite constant, and I have seen no intermediate forms, though the number of examples examined in the field and in the laboratory has been large.

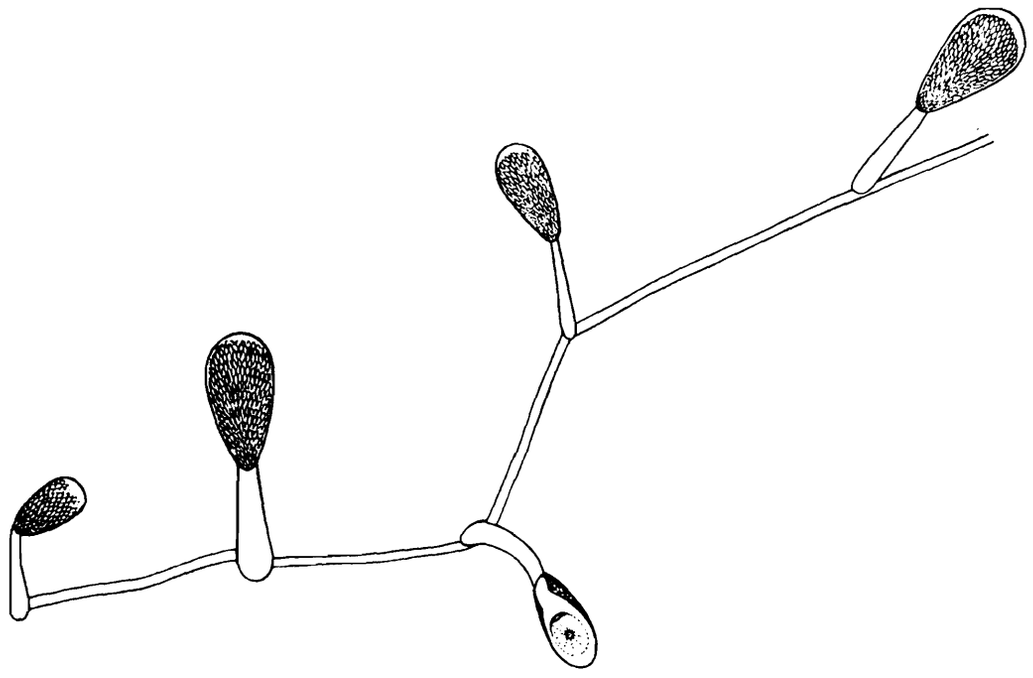

FIG. 1.—*Loxosomatoides laevis*, sp. nov.
Part of type specimen. One of the polyps has been turned back to show the oral surface.

The polyps (fig. 1) arise singly and at considerable intervals from a creeping rhizome that branches very sparingly or not at all. It grows mainly in one direction and follows the inequalities of the surface to which it is attached; the upper surface is convex, the lower surface flattened; its calibre is small and its surface smooth; it is never splayed out at the margins; the thin cuticle that covers it is usually colourless, but may be more or less tinged with brown.

The polyps all face in the same direction, away from the side of the rhizome to which the stalks of all of them are attached. The stalks are more or less swollen at the base and taper gradually; there is no specialized basal region. In normal

circumstances the stalk is very little if at all longer than the capitulum, but if the colony is overwhelmed by mud it may become greatly elongated; its cuticle is almost smooth and may be either colourless or have a distinct brownish tinge. The capitulum is rather narrowly ovoid, the blunter end being uppermost; in the opposite plane it is strongly compressed. When the lophophore is retracted, its direction is almost vertical, but when the tentacles are extended it slopes outwards and downwards in the same way as that of *L. colonialis* and *U. gracilis*. The normal number of tentacles appears to be 14.

The relative size of the capitulum shield varies considerably, but as a rule it does not completely cover the aboral surface, leaving bare a rim of variable width at the upper end. At the sides its margins are clear-cut; below the oral area they bend inwards towards the middle of the oral surface and are then obliquely truncated. There are never any spines on the shield; its ornamentation consists of numerous minute, closely compacted oval depressions arranged regularly in transverse rows. Those of the upper rows are a little larger than those nearer the narrowed basal

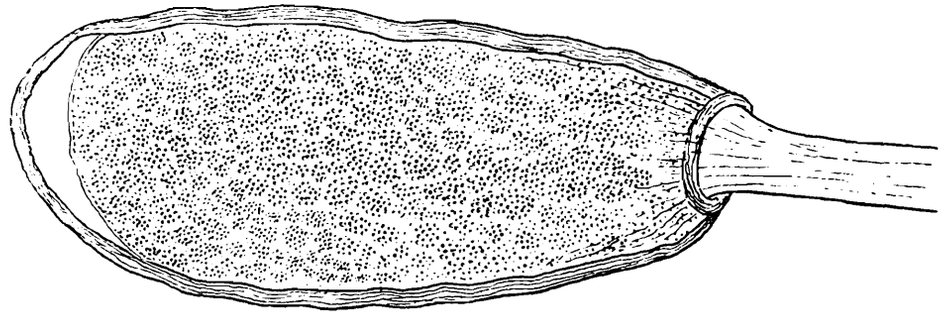

FIG. 2.—*Loxosomatoides laevis*, sp. nov.
Resting bud as seen from above in optical section, × 250.

extremity. The oral surface is completely devoid of spines or other armature and is always colourless. In life, as in spirit, the contrast between it and the shield, which is of a yellowish shade, is usually striking.

The length of the capitulum in the largest polyps is usually about 0·47 mm., the greatest breadth about 0·35 mm., and the thickness considerably less.

The most interesting fact ascertained with reference to the biology of this species was that of the production of resting buds. Seen from above these buds (fig. 2) closely resemble capitula lying, oral surface downwards, on the object to which the colony is attached. They are usually, however, rather narrower than ordinary capitula and their stalks, instead of standing upright or bending over in a semi-recumbent position, lie flat and adhere throughout their length. The upper surface of the bud is covered by a shield closely resembling that of a capitulum and ornamented in the same manner. At the broader end this shield is somewhat thinner and of a paler yellow. At the other extremity the bud bears a stout circular annulus of horny substance through which the stalk enters, the direction of this ring being at right angles to the surface on which it rests. The stalk, except in being

horizontal and adherent, resembles that of ordinary capitula. The lower surface of the bud is covered by a thin horny membrane that adheres to the object of attachment. The inner structure is very simple, consisting of a mass of circular cells filled with granular matter and contained in a delicate external epithelial membrane. Muscle-fibres can be seen making their way from the stalk into the proximal part of the cellular mass. There is a space at the broader end of the capsule. The granuliferous cells are not packed closely but are separated by spaces that appear to be void of connecting substance. The length of the bud is about 0·27 and the breadth 0·15. It is thus smaller than the largest polyps.

I have found these buds on one occasion only, in the Ennur backwater in October, 1913. They take the place of ordinary polyps in the colony, but I cannot say whether they are produced by the degeneration of an ordinary active capitulum or by direct development. In the colonies in which they occurred I noticed that many

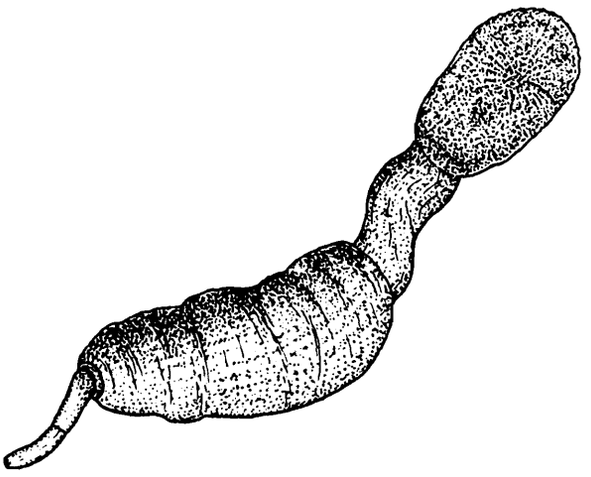

FIG. 3.—*Loxosomatoides laevis*, sp. nov.
Resting bud giving rise to a new colony, × 100.

normal polyps were lying prone on the surface of the oyster-shells to which they were attached, but this attitude is often adopted in normal circumstances, the shield being invariably uppermost. Among my specimens is one illustrating the origin of a young colony from a resting bud. It was in the substance of a thin encrusting Myxospongid sponge. This specimen is shown in fig. 3. The capsule of the bud has already degenerated somewhat, but traces of the characteristic ornamentation can still be detected under a high power. From the broader end a stalk bearing a young polyp has already emerged, while through the annulus at the other extremity a young stolon has made its way and is already producing at its tip the stalk of a polyp. It is evident that the original stalk of the bud had degenerated and disappeared; that this occurs commonly is substantiated by other specimens.

The polyps of *L. laevis* are very shy and I found it difficult to induce them to expand in captivity. When the lophophore was retracted they usually remained with the lower part of the stalk vertical and the upper part bent over in such a way

that the capitular shield was horizontal or had its broader end depressed. Sometimes, however, they lay quite prone as already indicated. The colonies were usually found either on stones or on oyster-shells, in both cases on protected surfaces, but they did not seem to avoid light so much as to seek protection from falling silt. In one instance we found a small colony on the stem of a water-plant. Its polyps did not differ from those of others. On stones the species was almost invariably associated with *Laxosuberites lacustris*, at the base of which its rhizome adhered, sending up the polyps through the substance of the sponge.

Though actually found in the Chilka Lake at three localities only, the species is evidently distributed widely in both divisions of the lake-system. The three localities were Barkuda Island and Gopkuda Bay in the main area and the oyster-beds of Manikpatna in the outer channel At the first and the last of these places it was abundant, but at Gopkuda Bay only one specimen was taken. The organism is so minute and inconspicuous that it very readily escapes observation, and it was probably owing to the fact that at Barkuda we were able (living in a bungalow close to the lake and having every facility for microscopic work) to make a very thorough investigation of the stones of the little landing-stage, that we found it in such abundance there. Oyster-shells also are naturally much more easily transferred to headquarters and examined in the field than stray pieces of rock. Apart from the Chilka Lake, the species has as yet been discovered only on the oyster-beds of the Ennur backwater a few miles up the coast from Madras. At Barkuda Id. the species was taken in an active condition at all times of the year, in water of specific gravity varying from 1·010 to 1·006; at Manikpatna we found it in March and September and at Ennur in November and January. It is thus clear that *L. laevis* can live in water of a specific gravity of at least 1·0265 and can survive, at any rate for a limited period, in pure fresh water.

The type (registered No. ZEV 6211/7) is preserved in the Indian Museum.

Family Pedicellinidae.

Genus **BARENTSIA**, Hincks.

1880. *Barentsia*, Hincks, *Ann. Mag. Nat. Hist.* (5) VI, p. 285.
1886. *Cercopodaria*, Busk, *Rep. Zool. 'Challenger'* XVII (2), p. 41.

Barentsia discreta (Busk).

1886. *Cercopodaria discreta*, Busk, *Rep. Zool. 'Challenger'* XVII (2), p. 44, pl. x, figs. 6-12.
1905. *Cercopodaria discreta*, Thornely in Herdman's *Ceylon Pearl Fisheries* IV, p. 128.
1912. *Barentsia discreta*, Annandale, *Rec. Ind. Mus.* VII, p. 205.

In my note of 1912 I recorded the occurrence of a dwarfed form of this species in the Mutlah estuary at Port Canning in the Gangetic delta, the water containing

a saline residue of about 25·46 *per mille*, that is to say being almost as salt as that of the Bay of Bengal.

B. discreta was originally described from a depth of over 100 fathoms in the South Atlantic and was found subsequently by Professor Herdman in comparatively shallow water off Ceylon.