

XX.—THREE INDIAN PHYLACTOLÆMATA

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Plumatella bombayensis, sp. nov.

Allied to *P. tanganyikæ*, Rousselet.

Zoëcia short, stout, with thick walls, closely adherent to and even embedded in solid objects, densely pigmented throughout, with a strong keel and furrow on their proximal half, almost triangular in cross-section in this half, but oval in the distal half; their free extremity truncated, often oblique, sometimes trumpet-shaped; the walls of the zoëcium irregularly annulated towards the distal end, and often constricted a short distance below the tip, the base of some zoëcia irregularly inflated. The polypide with a small lophophore, which bears about thirty

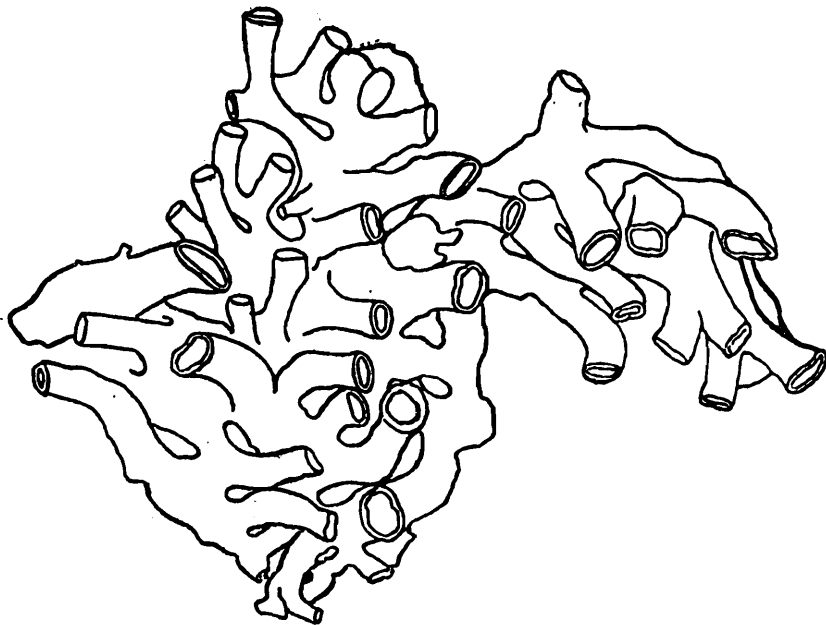


FIG. 1.—Part of a colony of *P. bombayensis*, $\times 16$.

tentacles; base of the stomach rounded. Free statoblasts few, elongate, often irregular in outline; the swim-ring well developed and broad; the central capsule profusely and regularly tuberculate. Fixed statoblasts broadly oval, surrounded by a chitinous ring which is often produced irregularly at several or many points and is devoid of reticulate markings.

Habitat.—On lower surface of stones in a lake and pond at Igatpuri, Western Ghats, Bombay Presidency. November, 1907; N. Annandale *leg.* Often covering a considerable area; many of

the zoaria dead and decomposed, in some only fixed statoblasts remaining.

I am by no means sure that this form is more than a local race of Mr. C. Rousselet's *P. tanganyikæ*, of which, by the kindness of Mr. R. Kirkpatrick, I have been able to examine one of the types. I have, however, submitted a specimen of the Bombay form to Mr. Rousselet, who considers it quite distinct, suggesting that it may be related to Allman's *P. fruticosa*, on account of a similarity in the measurements of the statoblasts he himself has examined. But what I call *P. fruticosa* is a slender species with more or less free colonies, a faintly tinted cuticle, and a rounded distal extremity to the zoëcia; and in my diagnosis of this form I follow Allman's figures (*Mon. Freshwater Polyzoa*, pl. vi). My new species possesses none of these characters and differs from *P. tanganyikæ* only in the following points: (1) its darker colour; (2) its strong keel, which gives its basal half almost a triangular outline in cross-section; and (3) its possession of free statoblasts. It resembles the African species in characters perhaps more important, *viz.*, in its annulate and truncated zoëcia and its habit of partially embedding its colonies in the substance to which it adheres.

The truncate appearance of the zoëcia is naturally most distinct when the polypides are contracted. In this condition the zoëcia apparently resemble those of *P. philippinensis*, Kraepelin, between which and the African form *P. bombayensis* is evidently in some respects intermediate. When the polypides are expanded it is seen that there is a much sharper division between the zoëcium proper and what Allman calls the tentacular sheath than there is in most species of the genus, in which, as a rule, the chitinized cuticle fades away gradually at the distal extremity of the zoëcium, giving place to a soft membrane. In *P. bombayensis* and *P. tanganyikæ*, however, and apparently in *P. philippinensis* also, the walls of the zoëcium are unusually stout and terminate abruptly, the tentacular sheath and the parts immediately adjacent to them being extremely delicate and collapsing completely when the polypide is drawn into the aperture.¹ In *P. emarginata*, which resembles these forms to some extent in the thickness of the walls of the zoëcia, although the zoëcia themselves have a much smaller diameter, the aperture is as a rule more or less lateral, not terminal, and is approached by a distinct triangular patch of rather stout but almost transparent membrane situated on the upper surface of the zoëcium, the tip of which is rounded even when the polypide is fully contracted.

As I find that the statoblasts of the Indian forms of *Plumatella* do not afford, in their exact actual or proportional measurements, any safe specific criterion, I have purposely omitted to give measurements of those of *P. bombayensis*; but I may say that, in the few specimens I have examined, the breadth equals about two-thirds

¹ Probably *P. aplinii*, MacGillivray, from Australia (*Trans. Roy. Soc. Victoria*, v, p. 203, 1860) also belongs to this group, but the description is very incomplete.

of the length, and that the central capsule is about three-fourths as broad as long. The statoblast has thus neither the attenuated outline of that of *P. philippinensis* nor the broadly oval form of that of the typical *P. repens*. The form might, therefore, so far as the proportions of the statoblasts are concerned, fall into either of Kraepelin's two species *P. polymorpha* and *P. princeps*, which represent respectively the group related, as regards this character, to *P. repens* and that related to *P. emarginata* in the same way.

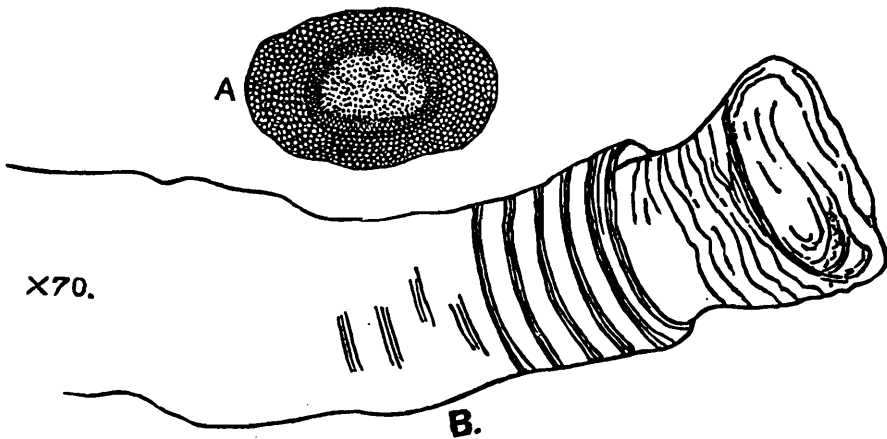


FIG. 2.—*P. bombayensis*: statoblast (A) and distal part of a zoecium (B), both $\times 70$.

Lophopus carteri (Hyatt).

Zoaria consisting of small, mound-shaped, colourless masses of gelatinous consistency, which have the power of progression without any specialization of the base and are capable of coalescing by means of their gelatinous investment to form compound colonies of a temporary nature. Zoecia tubular, upright, rather short; their walls consisting of an inner cellular layer and an outer gelatinous one devoid of cells in the living organism. Stomach yellow, rounded, but not broadly, at the base; lophophore bearing about sixty tentacles, which are distinctly webbed at their point of origin. Statoblasts (fig. 3) large, somewhat variable in size and proportions, but averaging about 0.85 mm. by 0.56 mm., truncately oval in outline, curved longitudinally, with a wide swim-ring and an almost circular capsule, which is relatively small; the statoblast bearing at each end a series of straight processes, each of which is armed with a row of minute, blunt hooks on either side.

This form only differs from my *L. himalayanus* in the larger number of tentacles borne by its lophophore, and in the more perfect development of the processes on the statoblasts. In *L. himalayanus* these are sometimes reduced to minute rudiments (fig. 4) in statoblasts proved by their dark colour and by the fact that they are found floating free in large numbers, to be

mature. The arrangement of the zoëcia in these two forms agrees more closely with that found in *L. crystallinus* than with that found in *L. lendenfeldi*, which is further distinguished by the comparatively small size of its statoblast. By the kindness of Mr. R. Kirkpatrick

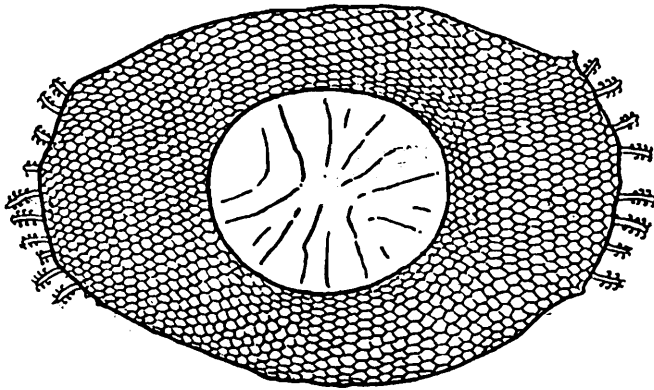


FIG. 3.—*L. carteri*: statoblast from Igatpuri Lake, W. Ghats, $\times 70$.

I have lately been able to examine a specimen of this Australian form, regarding which I am therefore in a position to express a more definite opinion than I was when I wrote my former note on the Himalayan form (*Rec. Ind. Mus.*, i, p. 145), in which I stated that the two were probably identical specifically. Even in *L. lendenfeldi*, judging from an examination of this specimen, cells are probably absent from the gelatinous investment in the living organism, although in specimens preserved in spirit those of the inner layer are apt to be forced out of their natural position. This is certainly the case in the two Indian forms and in *L. crystallinus*, in all of which this artificial phenomenon occurs. The cells

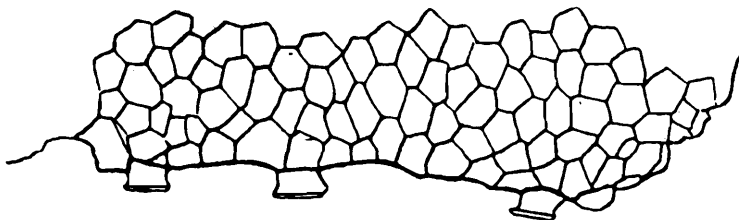


FIG. 4.—*L. himalayanus*: extremity of statoblast, $\times 240$.

of the inner layer, however, are distinctly larger in the Indian and Australian forms than they are in *L. crystallinus*, and are apparently more easily displaced. In *Plumatella punctata* not only have these cells all the characters of its genus, but the stiffer consistency of the cuticle, swollen though it is, prevents them from being forced into it artificially.

As regards the generic position of *L. carteri*, I have already stated (*Rec. Ind. Mus.*, i, p. 147) that I see no reason to separate it from the genus to which Carter assigned it. It must be confessed,

however, that, in order to include it, the definition of this genus must be modified, and that it is very difficult to draw an exact line between *Lophopus* and *Pectinatella*, if the younger stages of the colonies of the latter are to be taken into account, and if the Indian forms are to be placed in the former. Moreover, the Japanese forms (*Pectinatella gelatinosa* and *P. davenporti*) do not altogether agree with the only other fully described species of their genus, viz., *P. magnifica* of N. America and the continent of Europe. Unfortunately I have not yet been able to obtain a copy of the full account of *P. davenporti*, which is published by the Japanese Zoological Society, and am therefore forced to rely on the summary thereof published by Oka, the author of the species, in the *Zool. Anzeiger*, vol. xxxi, No. 23, May, 1907. Mr. Rousselet has, however, drawn my attention to the close similarity between the statoblasts of this form and those of *L. carteri*.

Further, there is a certain biological resemblance between *L. carteri* and the species of *Pectinatella*. Oka (*Journ. Coll. Sci. Tokyo*, iv, 1891) has described *P. gelatinosa* as forming gigantic compound colonies by the coalescence of numerous small zoaria, each of which arises from a single statoblast; and a somewhat similar phenomenon occurs in *P. magnifica*. I found large numbers of small zoaria of *L. carteri*, grouped together but quite distinct from one another, on the under surface of stones in the lake at Igatpuri in November last. They were apparently adult zoaria and most of them bore mature statoblasts. When they were detached from their support, however, and placed in a bottle of water, several of them coalesced so as to become, to the naked eye, a single colony, although a microscopic investigation revealed the fact that it was only the gelatinous investment that had taken part in the coalescence. Such compound colonies did not appear to be permanent, nor did I see any in natural conditions. Moreover, they showed no tendency to secrete a common basal membrane, as the components of the large colonies of *Pectinatella* do.

On the leaves of a tree whose branches dipped into the water of a lake at Kawkareik in the interior of the Amherst district of Tenasserim I found, in March last, a number of similar zoaria, quite independent of one another. They differed from those taken in the Bombay Presidency in autumn in the following characters: (1) their cœnœcium had a decided yellow tinge; (2) their polypides were larger; and (3) they bore no statoblasts. It is just possible that these were young colonies of the form described below, on the evidence of a statoblast from the same lake, as *Pectinatella burmanica*; but their zoœcia were upright and the histological similarity between them and zoaria of *L. carteri* was so close that I think they must have represented this species. If they belonged to the same species as the statoblast found in their vicinity, it would, in my opinion, be impossible any longer to separate the two genera; but this is a point on which it is not yet possible for me to express a definite opinion.

Pectinatella burmanica, sp. nov.

Animal unknown. Statoblast dark brown in colour, very large, almost circular, measuring 1.56×1.75 mm., curved longitudinally; the central capsule relatively small, measuring 0.458×0.63 mm. Circumference armed with numerous minute hooked processes with a very short stem and often irregular or abortive in form.

Habitat.—Lake at Kawkareik, interior of Amherst district, Tenasserim. March, 1908; N. Annandale *leg.*

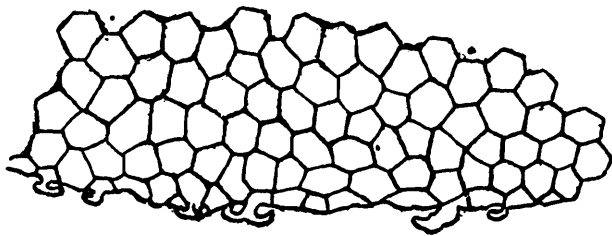


FIG. 5.—*Pect. burmanica*: part of periphery of statoblast, $\times 240$.

This statoblast was found attached to the protective tube of the Oligochaete worm *Aulophorus tongkinensis*, a most industrious collector of gemmules and statoblasts, whose tubes, so common in Indian ponds and lakes, generally afford some indication of the sponges and polyzoa to be found in the locality in which they are taken. Together with the specimen figured were statoblasts of a species of *Plumatella* and of two genera of sponges, all fastened to the tube of a single worm. So far as it is possible to say without examining the animal, *Pectinatella burmanica* is related to *P. gelatinosa*, Oka, from Japan, whence I have received some mounted statoblasts from Mr. C. Rousselet. The statoblasts of the latter form are, however, subrectangular in outline and their processes are more numerous and much more constant in form. As regards its shape, the statoblast of the new species somewhat resembles that of *Lophopus jheringi*, Meissner, but the latter is considerably smaller (0.8×1.0 mm.) and apparently lacks processes of all sorts. As regards the distorted and often degenerate nature of the hooked processes *P. burmanica* resembles *Lophopus himalayanus*, but in the latter form the processes are often more complex and, when they occur, are invariably confined to the extremities of the statoblast; the latter being a feature which may serve to distinguish *L. carteri* as well as *L. himalayanus* (if these two are specifically distinct from one another) from all species of the genus *Pectinatella*.