XV FAUNA SYMBIOTICA INDICA

No. 3.—POLYZOA ASSOCIATED WITH CERTAIN GANGETIC TORTOISES.

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(Plate XIII.)

It was noticed that peculiar lichenoid patches were present on the carapaces of a number of tortoises captured in the Ganges near Rajmahal in March, 1912, by Mr. B. L. Chaudhuri and brought alive to Calcutta At first sight the patches were taken for algae, but a close examination showed that they were formed of one or both of two species of polyzoa, namely *Hislopia lacustris* and an undescribed form of *Plumatella* closely allied to *P. tanganyikae.* The tortoises in the collection belonged both to the Testudinidae and the Trionychidae, the former being represented by three species of *Kachuga* (*K. dhongoka, K. lineata* and *K. smithii*) and one of *Hardella* (*H. thurgii*), while the Trionychidae comprised *Trionyx gangeticus* and *T hurum.* The polyzoa were not found on either species of *Trionyx* or on *K. smithii* (a small species), but one or both occurred on most of the larger specimens of Testudinidae. Probably the skin of the mud-turtles is too soft and slimy for their proper attachment or growth.

The tortoises had been out of the water for at least twenty-four hours before they were examined and the polypides of the polyzoa had perished, but fortunately the zooecia remained in sufficiently good condition for an investigation of the general structure and specific characters.

HISLOPIA LACUSTRIS, Carter.

Annandale, *Faun. Brit. Ind.*—Freshwater Sponges, etc., pp. 190, 200—205, figs. 35A, 38 and 39.

The zoaria on the tortoises' shells each cover an area of several square inches and are of luxurious growth, almost every zooecium producing its full complement of three buds and the whole colony being closely compacted, without, however the zooecia overlapping. The individual zooecia are small, measuring on an average slightly over 1 mm. in length and being very variable in breadth ; they are as a rule irregularly polygonal in outline and have the proximal end narrower than the distal. The orifice is circular or subcircular and as a rule lacks spines, although it

has a well-marked chitinous border. The zooecia are too closely fitted together for a flat membrane to intervene, but their chitinous margins are well developed.

Most of the zoaria in the collection had been overgrown by the Phylactolaematous species next to be described. They were only found on the carapace of *Hardella thurgii* in this instance, but *Hislopia lacustris* commonly occurs on the shells of molluscs of the genus *Vivipara* as well as on the leaves of *Vallisneria spiralis*, on logs, stones and other inanimate fixed or floating objects. Major Walton discovered the polyzoon *Stolella indica* growing over large zoaria in the United Provinces and the bases of the type-specimens of the sponge *Corvospongilla burmanica* from Pegu contained the remains of zooecia. The species is widely distributed in the tropical parts of eastern Asia.

PLUMATELLA (AFRINDELLA) TESTUDINICOLA, sp. nov.

Zoaria forming quite flat, oval or circular lichenoid patches with undulating or sinuous borders and in some instances as much as 10 cm. in diameter; consisting of zooecia laying parallel and closely adjacent in one plane and radiating in branches from a common centre.

Zooecia entirely recumbent, narrow, elongate, with the orifice opening almost vertically; the proximal part a little flattened, without dorsal keel or furrow, the ectocyst densely covered with minute sand-grains, translucent brownish, indistinctly annulated, paler on the distal than on the proximal part.

Polypide not observed.

Statoblasts.—Only fixed statoblasts are apparently developed. They occur in great profusion, entirely filling many dead zooecia and arranged in moniliform series. As the dorsal wall of the zooecium decays they are left adhering with its ventral wall to the host's carapace and reproduce the pattern of the zooecium, often almost completely. They are, as a rule, broadly oval, measuring about 0·52 × 0·35 mm., but sometimes they are circular and occasionally kidney-shaped. The surface is polished and without a trace of reticulation and the capsule is surrounded by a stout chitinous ring separated from it by a deep peripheral groove; the colour is black or very dark brown.

Localities and hosts.—R. Ganges near Rajmahal, on carapace of *Hardella thurgii*, *Kachuga dhongoka* and *K. lineata*: staloblasts also observed on young specimens of *K. dhongoka* from Allahabad and Fatteghar.

The structure of the zooecium closely resembles that of the zooecia of some forms of *Plumatella tanganyikae*, which I have recently adopted as the type-species of the new subgenus *Afrindella* (Rec. Ind. Mus., vii, p. 140) and I have little doubt that I am right in referring the new species to that subgenus. It is unfortunate, however, that the polypides of the type-specimens are not in a fit state for examination. The statoblasts somewhat

resemble those of *Fredericella*, to which belong the only species hitherto described in which all of these bodies are devoid of a ring of air-cells. The fixed statoblasts of *Plumatella*, however, always resemble those of *Fredericella*, and that to a different extent in different species. It is probable in the present instance that the production of fixed statoblasts only is an adaptation correlated with the peculiar method of life adopted by the polyzoon. As the tortoises to which it is attached leave the water for purposes of oviposition, if not for other purposes also, it is perhaps necessary that the *Plumatella* should not altogether lose their services as beasts of burden at any period in its life-cycle, solid objects to which it can affix itself being few and far between in the mud of the Ganges.

In its general appearance *P. testudinicola* bears a remarkable but of course quite superficial resemblance to certain Cheilostomes and Ctenostomes that encrust flat surfaces. The method of budding is, however, completely different, for the closely compacted parallel branches of the zoarium are produced by linear budding or by the production in the first instance of two divergent buds at the tip of a parent zooecium. Except at and near the centre (which is the oldest part of the zoarium) there is no organic connection between the different branches, which, at any rate near the periphery, merely lie alongside one another. In the older parts of the colony it is clear that the production of divergent buds in the position indicated has been frequent but that they, or rather the branches produced from them by linear budding, have become closely pressed together and therefore parallel, not apparently having the power of raising themselves from the basis to which they adhere. Thus the method of budding differs from that of such forms as *Membranipora* and *Hislopia* in that lateral buds are never produced, while there is no single zooecium from which the branches radiate outwards as in *Flustrella* and many other encrusting forms. Indeed, it seems probable that each apparent colony is not really a single zoarium but rather the result of budding on the part of a group of statoblasts or embryos from each of which branches have been produced in one or in two directions. In *Plumatella tanganyikae*, although compact flat zoaria are often found, it is always possible to see that their branching is fundamentally bilateral and probably arises from the fact that the two first polypides produced from a single statoblast or embryo have diverged from one another before fixation was completed. In *P. testudinicola*, on the other hand, each colony appears to have arisen from a group of separate but closely adjacent individuals, the branches of which have been forced to diverge by mutual pressure. It is, however, difficult to be quite sure of this without studying young growing zoaria, which I have not seen, as the central part of old zoaria is always in a more or less decayed condition.

My specimens of the new species were taken in March, and it is evident that the vegetative phase of their life-cycle was practi-

cally complete, statoblasts being produced in large numbers. *P. testudinicola,* like so many other Indian representatives of the Phylactolaemata, would appear, therefore, to be essentially a cold-weather form. On *Hardella thurgii* the zoaria grew over those of *Hislopia lacustris* and the zooecia were much less regular in their arrangement than when they were alone. The smooth shell of *Kachuga lineata* seemed, on the other hand, to encourage the production of the regularity and parallel growth so characteristic of the branches of the species.