MISCELLANEA

TUNICATA.

SOME SALPS TAKEN BY R.I.M.S.S. "INVESTIGATOR" IN THE BAY OF BENGAL AND ANDAMAN SEA.—Hitherto, the Salpidae of Indian seas have not received much attention, but of late years owing to a more systematic use of the tow-net, and the introduction of a mid-water net on board the "Investigator," a foundation has been laid for future work.

The following remarks are merely intended to record the presence of certain species in the Andaman Sea and Bay of Bengal. The species were all obtained during the months from October to April that comprise the survey seasons of successive years: the data are quite insufficient to give any idea of the distribution or relative abundance of each species.

1. *Cyclosalpa bakeri*, Ritter, 1905.

Of this I have only found one specimen of the solitary generation, obtained in a surface tow-net near Preparis North Channel (15°25′N., 93°45′E.) on 16th November, 1909.

This is a small example measuring only 5·4 mm. It agrees very closely with Ritter's description (Publ. Univ. Calif., vol. 2) having muscle C and all the body muscles [1] interrupted dorsally. But the "lateral organs" number only four on each side, there being none between muscles 1 and 2. Muscle 6 also does not seem to be continued into a longitudinal band near the mid-dorsal line. In all other characters, such as the ventral inclination of the anterior end, the structure of the brain, hypophysis and viscera, the arrangement of the muscles at the branchial and atrial orifices, it exactly agrees with Ritter's description. It is evidently quite a young specimen, still possessing placenta and elaeoblast.

2. *Salpa fusiformis*, Cuvier.

A few examples of the aggregate generation, all of the typical variety, were obtained at the same locality as the previous specimen.

3. *Salpa cylindrica*, Cuvier.

Both the solitary and aggregate generations are extremely common in the neighbourhood of the Mergui Archipelago. They

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[1] In the lettering and numbering of the particular muscles I have followed the designations given by Dr. Ihle in *Das Tierreich*, May, 1912

were also obtained in the northern part of the Andaman Sea in 1897-98. The shape of the test of the solitary form has been noted by W. K. Brooks ("The Genus Salpa": Mem. Biol. Lab. John Hopkins Univ.) but the dorso-lateral keel does not seem to be prolonged posteriorly to the same extent as he indicates.

The firm part of the test ends abruptly posteriorly and is here of a triangular sectional form, the angles being formed by the two dorso-lateral and the mid-ventral keel. On either side there are on the test two other ridges, one above the dorso-lateral keel, and one between the dorso-lateral and the ventral keel. These ridges terminate posteriorly a little in front of the posterior termination of the firm part of the test.

In the aggregate generation, the ventral ends of muscle X, on the under side of the atrial aperture, come into contact one with another and then, diverging, pass forwards a short distance in the ventral wall of the atrial siphon.

4. *Salpa hexagona*, Q. and G.

One very fine example of the solitary generation was obtained in a mid-water net at station 393 (7°21′6″ N., 85°7′15″ E.) This measures 73 mm. from branchial to atrial apertures, the posterior processes of the test adding another 13 mm. to the length.

No specimens of the aggregate generation have been met with.

5. *Salpa confoederata*, Forskål.

Numerous specimens, both of the solitary and the aggregate generations, were obtained near Preparis North Channel (15°25′ N., 93°45′ E.) on 16th November, 1909.

6. *Salpa multitentaculata*, Q. and G.

A few of the aggregate generation were obtained in a mid-water net at station 461 (10°15′ N., 90°15′ E.) on 19th April, 1912. Except for their contained embryos none of the solitary generation have been found.

7. *Salpa democratica*, Forskål.

These have been found in the northern part of the Andaman Sea and at numerous stations among the Islands of the Mergui Archipelago. The individuals are much smaller than some specimens from Plymouth, England, that are in the Indian Museum, the largest specimen of the solitary form that I have measured being only 11 mm. long. The posterior processes of the test are also relatively shorter than in those from English waters. During the last survey season, spent in the Mergui Archipelago, the only species I obtained were *S. democratica* and *S. cylindrica*. These generally occurred together, but opposite the town of Mergui, in the Tenasserim R., only the former was obtained.

8. *Salpa zonaria* (Pallas).

Both generations have been found in the northern part of the Andaman Sea and the solitary generation was found at station 393, in a mid-water net.

The German deep-sea expedition on the "Valdivia" visited neighbouring waters, passing from Sumatra to the Nicobar Is., and thence to Ceylon in February, 1899. In this region they did not find *C. bakeri*, *S. cylindrica*, *S. confoederata* or *S. multitentaculata*. On the other hand, they obtained *C. pinnata*, *C. affinis*, *C. floridana*, *S. fusiformis aspera*, and *S. amboinensis*.

It appears therefore that much work remains to be done, both in studying the forms that inhabit Indian waters, and in noticing the seasonal occurrence of particular species many of which have an almost world-wide distribution.

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INSECTS.

ADAPTATION IN THE HABITS OF A TABANID FLY.—In Miss Ricardo's description of the Tabanid *Haematopota litoralis* from Puri in Orissa (*Ann. Mag. Nat. Hist.* (8), ii, p. 546, 1910) it is stated that the species is common on cactus hedges in the daytime. The case is one of considerable interest from a biological point of view and I have only waited for the publication of the description to give the facts in full. In August, 1910, I found both sexes of the fly abundant on a hedge of Prickly Pear (*Opuntia elatior*, Mill.) running parallel to and some hundred yards distant from the sea. In the heat of the day they sat quietly at the base of the bunches of thorns scattered over the flattened and laterally expanded stems of this cactus, and were easily captured by inserting a small glass tube over them, except when, as was often the case, the position of the thorns rendered this manœuvre impossible. Like other Indian species of the genus, *H. litoralis* is as a rule matutinal and crepuscular in habits, only becoming active in the morning and evening. The other species with which I am acquainted rest on rocks, walls or the bark of trees, on which their mottled wings render them extremely inconspicuous. *H. litoralis* is by no means inconspicuous on the green cactus stems, for its colouration is not markedly different from that of its all es. Its peculiar habits, moreover, expose it to another danger than those which might arise, were it not protected by the thorns, from being conspicuous; for in the high winds that often prevail on the east coast of India flies making their way on the wing to the protection of the thorns are liable to be impaled upon them. This often occurs. Doubtless, however, the advantage gained from the adoption of the habit is greater than its inherent risk, for it would be very difficult for any enemy, except of course a microscopic one, to attack the fly at the base of the thorns. The most interesting feature of the case lies in the fact that the habit must have been adopted recently, for *Opuntia elatior* was only