XXVI A NOTE ON THE MARINE INVERTEBRATE FAUNA OF CHANDIPORE, ORISSA.

By F. H. GRAVELY, *D.Sc., Assistant Superintendent, Zoological Survey of India.*

With

NOTES ON ECHIUROIDS

By B. PRASHAD, *D.Sc., Officiating Director of Fisheries, Bengal, Bihar and Orissa.*

The following notes are based on visits to Chandipore in or about May of the years 1915, 1916, 1917 and 1919. I have to thank Dr. N. Annandale and Mr. S. W Kemp for many of the identifications.

Chandipore is situated on the Orissa coast, about ten miles from Balasore. A stretch of jungle interspersed with muddy pools and creeks of brackish water, where Calling Crabs (*Gelasimus*) of various colours abound, is separated from the shore by a narrow belt of sand-dunes. The shore slopes very gradually, and a mile or more of wet sand or mud is uncovered at low tide. The Burhabalang River empties itself into the sea two or three miles to the north-east, and a smaller stream at a somewhat greater distance to the south-west. The nature of the shore between tide-marks varies considerably in different places and there are patches of sparse low grass or sedge towards the latter estuary, where the ground is particularly muddy. The fauna includes estuarine species, such as *Bimeria fluminalis* and *Meretrix meretrix* as well as species which are essentially marine; but the greater part probably belongs to the latter category.

At the mouth of the Burhabalang River the open sea has evidently encroached on an old mangrove swamp, and the tide comes up over banks of stiff clay, where roots and stumps of bushes are still to be seen, and Calling Crabs and other species characteristic of the jungle swamps behind the sandhills are still abundant. This clay was examined in 1917 and 1919 only. Where the mangrove roots had been washed away and the fauna was more of a marine type the following invertebrates were found:—

COELENTERATA.

Burrowing Actinians. A few small specimens.

LAMELLIBRANCHIATA.

Solen sp. Very minute; siphons normal, *i.e.* not as in the Chilka Lake species (*Mem. Ind. Mus.*, pp. 354-355, fig. 5). Few specimens found.

Fragile burrowing Lamellibranch with very long siphons. Abundant.

GEPHYREA.

Thalassema branchiorhychus, Annandale and Kemp. Abundant in 1917. One doubtful specimen (without proboscis) found in 1919.

Thalassema microrhynchus, Prashad. With very small proboscis. One specimen only of this interesting new species found in 1919.

CRUSTACEA.

Isopod (? *Sphaeroma*) living in burrows and rolling into a ball like a woodlouse when disturbed. Common in 1919.

Upogebia sp. One specimen only (1919).

Alphaeus sp. The snapping of its claws could be heard in all directions as one's weight pressed on its burrows.

The invertebrates found between tide-marks on the shore generally were as follows:—

COELENERATA.

Clavactinia gallensis, Thornely (*Report on the Pearl Oyster Fisheries of the Gulf of Manaar*, II, pp. 110-111, pl. i, fig. 3). Abundant on *Nassa* and other shells, both living and inhabited by hermit crabs.

Clavactinia sp. Much denser and more luxuriant than the former, and of a deeper pink colour, but possibly the same species. Found only on the exposed ends of Chaetopterid tubes in 1919.

Bimeria fluminalis, Annandale. (*Mem. Ind. Mus.*, V, pp. 111-114, text-fig. 10, pl. ix, figs. 3-3*a*). On post driven into sand between tide-marks. This species has not hitherto been found in the open sea.

Obelia spinulosa, Bale—(see Annandale, *Mem. Ind. Mus.*, V, p. 106, fig. 9.) On exposed ends of Chaetopterid tubes.

Cavernularia sp. Common every year except 1919, when no specimens were seen.

Virgularia sp. Apparently fairly common, especially in 1919, near low-tide mark. Occasionally specimens are found lying on the sand when they can readily be collected; more often they are embedded in mud or sand to within an inch or two of the top. When touched or disturbed by pressure they shoot down out of sight and out of reach with extraordinary rapidity.

Actinians are sometimes found attached to shells inhabited by hermit crabs. One species attaches itself to Chaetopterid tubes below the surface of the ground, rising up to spread its tentacles at the surface. The largest form (? *Cerianthus* sp.), common every year, except 1919 when none were found, lives with its elongate column deeply embedded in the sand, and its tentacles expanded, usually at the bottom of a slight depression in the ground.

POLYCHAETA.

Syllidae. Small worms, some of them strobilizing, found among *Obelia* on Chaetopterid tubes.

Polynoidae. Sometimes found in large shells inhabited by hermit crabs.

Spionidae. Small worms living among debris at base of *Obelia* on Chaetopterid tubes.

Chaetopteridae (? n. gen.). A small Chaetopterid with a single pair of tentacles, 7 short chaetigerous segments (including the specialized fourth segment), 2 longer ones, 2 very long ones and then a number of short ones, forms slender and strongly anulated hyaline tubes (diameter about 1 mm.) in the sand near low-tide mark. About 60 mm. of the tube project above the ground and are often covered with hydroids on which small nudibranchs feed and among which small Syllids and Spionids live. Actinians sometimes attach themselves to these tubes below the surface of the ground, stretching up to spread their tentacles in the water.

Other worm tubes, including tubes of *Pectinaria* washed up by the tide, are common.

MOLLUSCA.

Nassa. A large species is the commonest gastropod between tide-marks. Its shell is often covered with *Clavactinia gallensis* which is found on living individuals as well as on shells inhabited by hermit crabs.

Nudibranchs, probably minute Aeolids, were found eating and laying eggs among hydroids on Chaetopterid tubes. A larger nudibranch without cerata was washed up by the tide in considerable numbers in 1916.

Lamellibranch shells washed up by the tide are both varied and numerous. *Meretrix meretrix* is sometimes found alive on the surface of the ground between tide-marks.

ECHINODERMATA.

Small Echinoid shells are sometimes washed up by the tide, and were specially abundant in 1919, when a few living specimens were found between tide-marks. Their tube-feet were very small, and appeared to be useless for walking, this function having been taken over by the somewhat long purplish spines.

CRUSTACEA.

Ocypoda macrocera, Milne-Edwards (see Alcock, *Journ. Asiat. Soc. Bengal*, LXIX, II, p. 347) is by far the most striking crab on the beach on account of its bright red colour, large numbers and considerable size.

Scopimera investigatoris, Alcock (see Kemp, *Rec. Ind. Mus.*, XVI, pp. 316, 317) burrows in the sand at about high tide-mark, arranging its moderately large pellets beside a broad and very definite straight pathway from its hole.

Dotilla intermedia, de Man (see Kemp, *Rec. Ind. Mus.*, XVI, pp. 331–333, fig. 10) occurs to some extent with *Scopimera* but also extends a great deal further out. Where it burrows in sand that is not too wet it brings up pellets, somewhat smaller than those of *Scopimera*, and arranges them in concentric arcs which may be completed to form either a spiral or a series of concentric circles, with less definite paths across them from the burrow to the outside. When burrowing in wet mud it builds a sort of rampart round its hole, which often closes over it as a small dome. Two forms of male occur at Chandipore in this species (see Kemp, *loc. cit.*, pp. 331–333, fig. 10).

Macrophthalmus transversus, Latreille (see Kemp, *Rec. Ind. Mus.*, XVI, p. 386) lives further out towards low water than does *Dotilla*. It is usually common, but was very scarce in 1916. Its burrows are markedly oblique, not vertical as are those of *Ocypoda*, *Scopimera* and *Dotilla*.

ARACHNIDA.

Limulus molluccanus, Latreille (see Pocock, *Ann. Mag. Nat. Hist.*, 7, IX, pp. 260-266, pl. v-vi; and Annandale, *Rec. Ind. Mus*, III, pp. 294-295), is moderately abundant.

INSECTA.

Cicindela biramosa, Fabricius, is very abundant.

Cicindela quadrilineata, Fabricius, is sometimes to be found where the ground is muddy. In 1919 it was comparatively abundant on muddy sand at the mouth of the Burhabalang River. Both species are common seashore insects, living near high-tide mark, but I am not aware that they have been found so closely associated before. In Annandale and Horn's Annotated List of Indian Museum Cicindelinae (Calcutta, 1909) *C. biramosa* is recorded from various places from N. Canara on the Malabar coast to Java, and *C. quadrilineata* from Burma and Bengal to south of Madras; and the known range of the latter species is extended in the "Fauna of British India" to Sind and Baluchistan. More recent observations both by Dr. Annandale and myself suggest that *C. biramosa* is the common seashore species of the east and south-west coasts of the Indian Peninsula, that *C. quadrilineata* holds this position on the

northern parts of the west coast. Mr. Kemp found both on the coast of Portuguese India.

NOTES ON ECHIUROIDS FROM CHANDIPORE, ORISSA.

By B. PRASHAD, *D.Sc.*

In May 1919, Dr. F. H. Gravely obtained two specimens of Echiuroids from the mud-flats at Chandipore on the coast of the Bay of Bengal. The two specimens belong to the genus *Thalassema*, Gaertner, and are referable to two distinct species. One of the specimens is without the proboscis and so it is impossible to assign it to its species with any great certainty, but it bears in general shape and anatomy a very close resemblance to *T branchiorhynchus*, Annandale and Kemp,[1] which was collected previously by Dr. Gravely at the same locality in fairly large numbers. The other specimen cannot be assigned to any previously known species and is described as a new one. This species is very important from a biological point of view, and affords an interesting example of the occurrence under essentially similar biological conditions of animals with exactly opposite types of apparently adaptive characters.

Thalassema branchiorhynchus, Annandale and Kemp.

1915. *Thalassema branchiorhynchus*, Annandale and Kemp, *Mem. Ind. Mus.*, V, p. 61, figs, 2, 3.
1919. *Thalassema branchiorhynchus*, Prashad, *Mem. As. Soc. Bengal*, VI, p. 324.

I assign the specimen without the proboscis to this species with some hesitation, because the most characteristic feature of the species—the proboscis—is absent. In the position of the proboscis a semicircular scar is to be seen, and from this it appears that the proboscis must have been cast off long ago, for the scar is quite healed up, and there is no trace of the openings of the vascular sinuses.

The specimen is preserved in an expanded condition, and is an elongated sickle-shaped organism much more pointed at the posterior than at the anterior end. The length is 31 mm. and the maximum breadth only 5 mm. The arrangement of the integumentary papillae is very similar to that described for the type-specimen. The general anatomy also is identical.

Thalassema microrhynchus, sp. nov.

There is a single specimen of this species from the same locality as the preceding one. Preserved in an expanded condition,

---

[1] *Mem. Ind. Mus.*, V, p. 61 (1915).