

NEO X Sys. Ges

tree-rat of India, called *Mus rufescens* by Blyth* and Jerdon,† but greyer and less rufous than that species generally is. The skull is undistinguishable from that of Calcutta specimens. The dried skin measures about 5½ inches from nose to insertion of tail, tail (vertebræ preserved) 6 inches. The colour is greyish brown above, darker on the back owing to the prevalence of longer black-tipped hairs, white below, the edge of the white colour being distinct and well marked.

This rat is found in most parts of India, and *M. robustulus*,‡ of Burma appears to be only a variety. It also abounds in the Nicobar islands where it does much damage in the cocoa-nut trees.§ It is naturally surprising to find this rat in the upper Indus valley together with Central Asiatic types like *Cricetus* and *Lagomys*. Of course I do not mean to say that this long-tailed Indian tree-rat is true *Mus rufescens* of Gray, but the determination of the names of Indian rats and mice can only be attempted after a careful comparison of specimens.

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X.—A Description of some new Species of Hydroid Zoophytes from the Indian Coasts and Seas.—By SURGEON J. ARMSTRONG, Marine Survey Department.

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(With Plates IX, X, XI, XII.)

With the exception of a single species all the following hydroids are calyptoblastic. The one exception is *Endendrium ramosum*, which is a typical gymnoblastic zoophyte, and is especially remarkable in having the gonophores borne not upon a true blastostyle but upon atrophied hydranths from which the tentacles have disappeared.

LAFOËA ELONGATA, (nov. spec.)

(Plate IX.)

Zoophyte.—Plant-like, gregarious, dark-brown.

Trophosome.—Stems erect, simple, straight or slightly curved, 1 to 2½ inches high, pinnate, with 3 or 4 transverse annular markings immediately above the origin of each pinna, and rooted by a creeping tubular

* J. A. S. B., 1863, XXXII, p. 340.

† Mammals of India, p. 199.

‡ Blyth, J. A. S. B., XXVIII, p. 294; XXXII, p. 342; see also J. A. S. B., 1878, XLVII, pt. 2, p. 165.

§ Stray Feathers, IV, p. 433.

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stolon. The pinnae are alternate, and each carries on its upper surface a monoserial row of hydrothecae, they are transversely annulated, both at their origins from the stem and immediately above the origin of each calycele. The hydrothecae are free, elongated and tubular, annulated at their origins, and with the margin of the mouth even.

Gonosome.—Unknown.

Habitat.—Rocks between high and low water at Pigeon Island, and Konkan Coast on the west coast of India, and at Diamond Island off the Pegu Coast in Burmah.

This very interesting form is certainly a campanularian, while its long tubular hydrothecae would indicate *Lafocia* as its proper genus, a genus, however, not very well defined. I have lately had several opportunities of examining this zoophyte in a living condition; the polypites are supported on long attenuated peduncles, and have both disc and tentacles completely extruded from the hydrothecae, into the cavities of which they are only partially retractile. Although apparently tolerably extended in its distribution, it is very far from being abundant anywhere. It seems to thrive best in those localities most exposed to heavy seas and the influence of the South West Monsoon. This species and another belonging to the genus *Thimaria* are the only representatives of the Hydroid family I have met with during two seasons spent upon the coast of the Ratnágiri and Alibág Collectorates.

HALICORNARIA SETOSA (nov. spec.)

(Plate X.)

Zoophyte.—Stiff, erect, solitary, and of a dark-brown colour.

Trophosome.—Stem bipinnate, more or less irregularly and numerously branched, varying in height from one to five inches, rooted by an entangled mass of short fibrous filaments, and carrying closely set primary pinnae. The main stem is made up of a fasciculus of three tubes, from the central one of which an alternate series of hydrotheca-bearing pinnae arises, but the stems of the secondary pinnae, which are formed of a fasciculus of two tubes, are destitute of hydrothecae, but carry along their entire length an alternate series of ultimate hydrotheca-bearing pinnae. The ultimate pinnae are thus borne not only on the primary pinnae but also on the stem; they are closely set, alternate, of nearly equal length, and divided by joints into a series of internodes, each of which gives origin to a calycele with its nematophores. The hydrothecae are deep, flask-shaped, deeply concave in front below the lip, and correspondingly convex behind; the aperture is wide, and has the margin provided with two large lateral teeth, and two smaller ones posteriorly. The

nematophores are three in number, two lateral, which are short, blunt, divergent, and projecting slightly beyond the margin of the hydrotheca; and one mesial, which is remarkable as being provided with a lateral as well as terminal orifice, it is adnate to the base and lower third of the calycle, being free only at its extremity which projects horizontally outwards from the hydrotheca.

Gonosome.—Consists of a number of lozenge-shaped bodies filled with dark granular matter, and pointed at their free extremities; they arise on each side of the primary pinnæ in the intervals between the ultimate pinnæ.

Habitat.—Off Cape Negrais in 80 fathoms. At Cheduba Island in from 8 to 10 fathoms; off the Terrible Islands in 25 fathoms, and off Cape Comorin in 40 fathoms.

This beautiful species is closely allied to *Halicornaria bipinnata* of Allman. It has a very wide distribution, being found at intervals all along the Arrakan and Pegu Coasts, as well as off the South Coast of India. On several specimens which I examined I found the main stem provided with two parallel rows of pellucid dots, the nature of which I have hitherto been unable to determine; they are, however, most probably the optical expression of cauline nematophores. It is also remarkable in having the mesial hydrothecal nematophore provided with a lateral orifice as in *H. saccaria* (Linn. Soc. Journ., Vol. XII.) This species appears to afford a favourite anchoring ground for a small bivalve belonging to the genus "*Vexillum*;" most of the specimens dredged up by me were covered with this species firmly adherent by their byssi and in different stages of development.

HALICORNARIA PLUMOSA (nov. spec.)

(Plate XI.)

Zoophyte.—Feathery, gregarious.

Trophosome.—Stems one to two inches in height, fasciated towards the base, of a dark brown colour, straight or gently curved, minutely pinnate and rooted by a creeping filiform stolon. The pinnæ arise alternately by jointed processes from the anterior surface of the stem; they are divided by more or less complete joints into a series of short internodes, each of which carries a calycle with its nematophores. The hydrothecæ are unilateral and borne on the upper surface of the pinnæ and sessile; they are cup-shaped and have a large and patulous orifice, the margin of which is deeply denticulated, and is especially characterized by the possession of a single long mesial tooth immediately behind and projecting above the anterior nematophore. The intrathecal ridge passes backwards

from the anterior nematophore across the lower fifth of the calycle and is prolonged into the wall of the pinna. The nematophores are only developed in connection with the hydrothecæ, they are three in number, two lateral and one mesial or anterior; the lateral are short, tubular, free and projecting; the mesial is long, adnate throughout its entire length, except at its immediate extremity, where it is free and slightly projecting.

Gonosome.—The gonothecæ arise singly from the posterior aspect of the stem near its base, they are bell-shaped and have a circular even and somewhat everted margin; the older ones present a more or less annulated or ribbed appearance.

Habitat.—In 35 to 40 fathoms off Cape Comorin, south coast of India, and in from 10 to 15 fathoms off Cheduba Island, coast of Arrakan.

DESMOSCYPHUS HUMILIS (nov. spec.)

(Plate IX.)

Trophosome.—Stems gregarious, not exceeding a quarter of an inch in height, straight, simple, erect, divided by joints into a series of short internodes, each of which carries a pair of calyces, and rooted by a creeping stolon. The hydrothecæ are biserial, opposite, urceolate, the upper half free and tubular, the lower half adnate and sacciform; the aperture is directed upwards and outwards, and has the margin marked by several deep denticulations.

Gonosome.—The gonothecæ are broadly tubular or slightly pyriform and with a simple margin; they are opposite, and arise by short pedicles on each side in the intervals between the calyces with which they consequently alternate.

Habitat.—Saint George's Island on the west coast of India, attached to sea-weed between high and low water marks. This species is evidently referrible to the genus *Desmoscyphus* of Allman. (Linn. Soc. Journal, Vol. XII.) Although many gonangia possess clearly defined peduncles, yet at first sight some often appear to be sessile. This difference, however, is only apparent, for a closer examination shows that they are all pedunculated.

SEPTULARELLA RIGOSA (nov. spec.)

(Plate X.)

Trophosome.—Stems slender, arising at short intervals from a creeping filiform stolon, unbranched, zig-zag, and divided by constrictions immediately above each calycle into a series of rather lengthened internodes each of which supports only one hydrotheca. The hydrothecæ are biserial and alternate, they are broadly tubular, but wider at the base

where alone they are adnate, being narrower at the orifice, which is square, and has the margin produced into four nearly equidistant teeth, they are all more or less deeply annulated or spirally ribbed.

Gonosome.—Unknown.

Habitat.—Off Cape Comorin in 40 fathoms, and off the Arrakan Coast in from 10 to 15 fathoms.

This hydroid bears a very close resemblance to *S. tenella* of Alders, but differs from it in the stem not being twisted at the joints and in the spiral ribbing of the hydrothecæ.

THIMARIA COMPRESSA (nov. spec.)

(Plate XII.)

Trophosome.—Stems sparingly clustered, about an inch and a half in height, unfasciated, erect, more or less decidedly zig-zag, rooted by a creeping tubular stolon, and giving origin to a limited number of pinnae. The pinnae are alternate, few in number, and arise at regular intervals from the main stem, of which they are for a short part of the commencement of their course mere diverticula, being identical with it in structure, destitute of hydrothecæ, and with two annular constrictions marking the origin of each. The terminal nine-tenths of its length is made up of an aggregation of closely packed subalternate hydrothecæ, which are continued to its termination. Very often, however, the pinna is composed of a linear series of two or sometimes of three of the simple forms above described. The lower half of the hydrotheca is broadly tubular and adnate, the upper half is narrower, free, and projecting horizontally outwards, the aperture is oblique with the lower margin prolonged into a sharp tooth.

Gonosome.—Unknown.

Habitat.—Extremely abundant on the rocks between high and low water at Diamond Island, as well as amongst the laterite rocks on the Konkan Coast. I have also dredged it in 40 fathoms of water off Cape Comorin.

ANTENNELLA ALLMANI (nov. spec.)

(Plate XII.)

Trophosome.—Stems sparingly clustered, very slender, gently curved from base to apex, rooted by a slender filiform stolon, and attaining a height of about half an inch; they are divided by long, oblique partitions into a series of internodes, each of which carries an hydrotheca and four nematophores. The hydrothecæ are campanulate with large patulous orifices and perfectly even slightly everted margins. The nematophores are four in number on each segment of the stem, two lateral, one inferior and one superior. The lateral nematophores are quite free, long, narrow, and trumpet-shaped with a circular aperture and everted margin, from which they gradually taper down to extremely fine points, which are at-

tached, one on each side, to lateral processes of the stem, by a joint which allows the slightest motion of the water to communicate free vibratory oscillations to the nematophore. The inferior nematophore is free, tubular, much shorter than the lateral, and arising from a tumescent prominence on the stem, slightly below the base of the calycle, is directed upwards towards its anterior aspect. The superior nematophore is somewhat smaller, but in form and direction corresponds precisely with the inferior, it arises on a level with the upper margin of the calycle from the stem, which is here quite even and presents no enlargement similar to that which marks the origin of the lower nematophore.

Gonosome.—Unknown.

Habitat.—Off Cape Comorin in 50 fathoms, and off the coast of Cheduba Island in 8 to 10 fathoms.

ENDENDRIUM RAMOSUM (nov. spec.)

(Plate XII.)

Trophosome.—Tree-like, stem much and irregularly branched, attaining a height of $3\frac{1}{2}$ or 4 inches, fascicular and rooted by an entangled mass of short fibrous filaments, the branchlets are more or less dichotomously arranged and are all annulated at their origins.

Gonosome.—Gonophores consisting of clusters of spherical bodies, filled with a granular substance. They appear not to be borne on true blastostyles, but on the bodies of atrophied hydranths from which the tentacles have disappeared.

Habitat.—In 40 fathoms off Cape Comorin, and very sparingly, in from 10 to 70 fathoms, along the coast of Arrakan.

XI.—Notes on the Formation of the Country passed through by the 2nd Column Tal Chotiali Field Force during its march from Kala Abdul-lah Khan in the Khójak Pass to Lugári Bárkhán. Spring of 1879.—By LIEUT. R. C. TEMPLE, 1st Ghoorkas.

(With Map—Plate XIII.)

General Features.—There are one or two features general to the country passed through upon which it would be as well to remark before proceeding to note in detail the formations met with during the various marches.

The Glacis.—The most remarkable feature to be observed all over Southern Afghanistan is the peculiar gradual slope, or *glacis*, leading up