

When viewed in conjunction with the external characters of the animal and the form of the shell, they will eventually serve to give an accurate idea of the relations of the genus with the rest of the family.

I have four other Moulmein shells living—*Pupina artata*, B., *Helix Achatina*, Gray, *Helix pylaïca*, B., and *Rhaphaulus Chrysalis*, Pfr. The three former creep about briskly, and have allowed their form to be ascertained. The retiring habits of *Rhaphaulus*, which shelters itself under leaves, and obstinately refuses to expose itself while under observation, withdrawing quickly into its shell when uncovered, have hitherto prevented me from making a description of it. *Helix Achatina* and *pylaïca* differ widely in their animals. Specimens of the former having produced, on the 23rd and 26th inst., a single young shell with several whorls, and measuring 6 millimetres in diameter, I am disposed to set the species down as ovoviviparous, no previous deposit of an ovum having been observed on either occasion. The young ones are as agile and fearless as their parents.

The rapidity of our steam-communication with tropical climates, and the knowledge that even land-shells provided with opercula, and to all appearance empty, may be reanimated, ought to stimulate our collectors, in the West as well as in the East, to transmit freshly-taken specimens to Europe for examination. In 1853, specimens of *Cyclophorus Indicus*, Desh., from Bombay, reached me in a living state, after a voyage of four months round the Cape; and one of the specimens of *Otopoma clausum*, which I examined a year ago, is still living, although in a torpid condition. The arrival of *Camptonyx* from Kattiwár is also a case worthy of remembrance.

Since writing the above, *Rhaphaulus Chrysalis* has moved about sufficiently to allow its main points to be ascertained.

Cheltenham, June 29th, 1859.

IX.—Notes on the Animals of *Rhaphaulus Chrysalis*, *Pupina artata*, *Otopoma clausum*, *Helix Achatina*, and *H. pylaïca*.
By W. H. BENSON, Esq.

IN the account of *Hybocystis gravis*, mention was made of several other Tenasserim species of Mollusca found alive among the shells procured for me by Captains Sankey and Haughton at Moulmein. A few notes on their external characters will prove acceptable to conchologists.

Rhaphaulus Chrysalis, Pfr.

Foot oblong, rounded anteriorly, narrowed posteriorly, and rounded at the extremity; muzzle short, declivous, rounded at the front, not emarginate nor lobed; tentacula somewhat short, slightly ringed, pointed at the summits and then slightly tumid, colour a pale cinnabar-red; eyes small, jet-black, situated on tubercles, which are on the head, and joined to the outer base of the tentacula. The foot is greyish white, the sole pale, the muzzle a pale reddish buff-colour.

The operculum, which is carried centrally on the hinder part of the foot, about midway between the shell and the tail, is capable of being withdrawn beyond the internal opening of the sutural tube, although ordinarily closing the aperture.

There is no organ to be seen corresponding with the internal sutural tube, the animal in this respect exhibiting a similarity to that of *Pterocyclos*, which, as described by me in 1836, possesses no soft parts calculated to fill the anomalous portions of the shell near the aperture.

Operculum very thin, horny, concave externally, consisting of $6\frac{1}{2}$ concave volutions with a varnished surface.

For the single living specimen of this shell I am indebted to Capt. R. H. Sankey, by whom it was taken in January. It remained closed in its shell until the 27th of June, when it began to yield slowly to the means employed to revive it, finally moving about and creeping freely under an inverted glass.

Pupina artata, B.

Foot oblong, the sole being somewhat truncate in front and slightly angled at each side anteriorly, hinder extremity narrowed and pointed; muzzle declivous, entire; tentacula short, subulate, and swollen all round at the base; eyes black and prominent, situated on the hinder and external part of the basal swelling.

The operculum is rather thick, horny, rounded at the thickened edge, and consists of $4\frac{1}{2}$ –5 concave whorls divided by a raised edge. The inner surface has the umbonal region a little elevated.

In my first description of the shell I stated that the operculum was calcareous, with few whorls. Dr. Pfeiffer, who had the specimen before him, made no alteration in the description, but observed that my characters were abnormal. The paucity of whorls was intended to be comparative with reference to the allied genus *Megalomastoma*. On taking out the operculum of that specimen, its substance appears evidently to be horny; but neither in this species, nor in the Khasia *P. imbricifera*, which

has a still thicker horny operculum, with a very prominent umbo internally, can it be said to answer Pfeiffer's generic description of "membranaceous."

The animal was easily revived in two specimens with the operculum received from Capt. Haughton, and began at once to move about freely and fearlessly. No organ corresponding with the slits at the upper or lower part of the aperture can be detected.

Otopoma clausum, Sow.

A description of the animal, with its singular double sole, has been given in the paper on *Hybocystis*. The operculum is normal. It may be observed that, unlike *Hybocystis*, *Pupina*, and *Rhaphaulus*, the eyes are situated on the side of the tentacula, as it were on the upper end of a short pedicle, soldered to and forming one with the tentaculum, much in the same manner as in the genus *Paludina*.

It is also worthy of remark that, by holding *Rhaphaulus Chrysalis* and *Otopoma clausum* for a few minutes in the hand, and thereby imparting warmth to the animals, they were induced to come out and exhibit themselves. The latter shell had been shut up for a year, and had left Kattiwár eighteen months previously. During several days it had scarcely ventured to do more than raise the operculum, so as to expose a portion of the foot. *Rhaphaulus* was so timid, that on being stirred, or even examined through a lens, it shut itself up, but came out boldly when held for a short time between the fingers, and, on being set down, commenced creeping about. The absence of sufficient warmth has apparently much to do with the shyness observable in some cases.

Helix Achatina, Gray.

Five specimens, taken near Moulmein by Capt. R. H. Sankey, in January, were found to be living.

The sole is oblong, rounded at each end, and pallid. The head, neck, and tentacula are blackish; the upper pair of tentacula long and slender towards the ocular points, the lower ones very short. There is no mucous pore near the hinder extremity.

The animal, as remarked in a previous paper, is probably ovoviviparous, two young and active specimens, with $3\frac{1}{2}$ whorls, having been produced, one of them four, the other seven days after the parents had been revived.

Helix pylaica, B.

Three living specimens, taken by Capt. Sankey, were examined. The foot is long and narrow (20 millimetres by 2); the upper

tentacula long, and blackish like the back of the neck; the lower tentacula short.

There is a raised, tubercular, mucous? pore above and near the extremity of the foot, not lengthened and overhanging as in *Nanina*? (*Macrochlamys*, B., 1832) *vitrinoides*. A black excrementitious-looking matter is generally found in the orifice of the pore. The animal is active, and not easily alarmed. The narrow form of the foot bears the necessary relation to the curious linear aperture of the shell. Have the North American forms of *Tridopsis* the mucous pore and a similarly narrow foot?

It will be interesting to know, also, whether the Cingalese forms associated with *Helix Achatina* under *Ophiogyræ*, Pfr., such as *H. Rivolii*, &c., are ovoviviparous.

Cheltenham, July 4th, 1859.

X.—*Descriptions of four new Species of Humming-birds from Mexico.* By JOHN GOULD, Esq., F.R.S. &c.

To the Editors of the Annals and Magazine of Natural History.

20 Broad Street, Golden Square, W.,
July 13, 1859.

GENTLEMEN,

I send you herewith, for insertion in the next Number of your Magazine, descriptions of four new species of Mexican Humming-birds, for the first of which I am indebted to the researches of M. Rafael Montes d'Oca, and for the three others to M. Adolphe Boucar, through the kindness of M. Sallé.

I am, Gentlemen,

Your very obedient Servant,

JOHN GOULD.

Amazilia Ocai.

Crown, sides of the head, throat, and breast glittering grass-green, with a few of the white bases of the feathers showing on the centre of the throat; back of the neck and upper part of the back deep green; upper and under wing-coverts, flanks, lower part of the back, upper tail-coverts and tail greenish bronze; under surface of the base of outer tail-feathers reddish buff; wings purplish brown; base of the secondaries reddish buff; abdomen pale brown; under tail-coverts light bronze margined with white; bill black, lighter beneath; feet brown.

Total length 4 inches; bill $\frac{7}{8}$; wing $2\frac{1}{4}$; tail $1\frac{3}{8}$.

Habitat. Xalapa, in Southern Mexico.

Remark. This species cannot be confounded with any other



Benson, W. H. 1859. "IX.—Notes on the animals of *Rhaphaulus Chrysalis*, *Pupina artata*, *Otopoma clausum*, *Helix Achatina*, and *H. pylaïca*." *The Annals and magazine of natural history; zoology, botany, and geology* 4, 93–96.

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