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### XIV.—On the marine vivarium

C.S. Harris Esq.

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I have procured the *B. mirabilis* in a living state, parasitic on *Cellularia avicularia*—one of Mr. Bean's original habitats for it—in tide-pools on the Devonshire coast.

#### LAOMEDEA LACERATA (mihi).

This species (the perfect state of Dr. Johnston's *Campanularia lacerata*), which I first described in the 'Annals' for August 1852, has occurred to me again on the coast of Devon. It has a special liking for *Bowerbankia imbricata*, about the dense tufts of which I have found it in considerable plenty at Exmouth, and I have also dredged it in Slapton Bay, on *Campanularia verticillata*.

#### CAMPANULARIA INTEGRAL,—the VESICLE.

We have no description or figure, I believe, of the *Vesicle* of this species, though it may perhaps be known to collectors. I have only once met with it,—on specimens of the zoophyte found at Filey on the Yorkshire coast, which spread profusely over one of the red sea-weeds,—a favourite habitat with the various kinds of *Campanularia*. The vesicle of *C. integra* resembles in general character that of its ally the *C. volubilis*, but has its own distinctive peculiarities. It is more truly pedicellate, elongate, spirally twisted; the wrinkles are not so numerous nor so closely set, and are sharply carinated. The vesicle is abruptly attenuated below, and wants altogether the regular ovate form which belongs to that of the *volubilis*.

I am glad to be able to add a drawing of the *C. integra* and its vesicle, from the accurate pencil of Mr. Tuffen West. Plate III.

#### EXPLANATION OF PLATES II. AND III.

##### PLATE II.

*Sertularia alata*, natural size, and portions magnified.

##### PLATE III.

*Halia prætenuis*, a few cells magnified.

*Campanularia integra*, with its vesicles, magnified.

XIV.—On the *Marine Vivarium*. By C. S. HARRIS, Esq.

To the Editors of the *Annals of Natural History*.

GENTLEMEN,

THE accompanying letter was sent to me a short time since by my friend C. S. Harris, Esq., of Budleigh Salterton, Devon, whose experience has been equal to that of either Mr. Warington

or Mr. Gosse, but scarcely with the same result; unless, as I may infer from the following paragraph in Mr. Gosse's last communication to the 'Annals'—"Some of the original animals still remain in a healthy condition, such as *Actiniæ* and *Serpulæ*, though others have died off in the course of the summer, and have been replaced by more"—Mr. Harris changed the water, Mr. Gosse the animals.

My own experience is limited to this summer, and certainly through the hot weather we could not keep animals alive, except some common *Actiniæ*, which shut themselves up into balls: unless the water was changed every few days, it became brown. But since the weather has become colder, I have kept many animals, including *Aplysia*, *Actiniæ* (several species), *Paguri*, *Dorides*, Mollusca, and one large Starfish (*Uraster glacialis*), for four months, when an accident broke the case, of which we have three mounted in the garden of the Athenæum here:—the object of which, in this proximity to the sea, is more to have a reservoir to observe oceanic products, than to prove the capability of maintaining a perpetual and healthy equilibrium between the animal and vegetable kingdoms; though the latter will not be neglected.

The fact observed by Mr. Warrington, of the power of the *Limnæus* to move from one place to another by means of a mucous suspending cord, I have observed also to be the case with *Bulla aperta*, in the vivarium of my friend Mr. Smyth; but the power of secreting the mucus, which is exuded from the external surface of the animal, is limited in its continuance; to prove the fact, we raised it three times to a glass shelf in the vivarium; the last time, not being able to secrete the ladder, it fell head over heels, and therefore lost the power of choosing its place below, as it could do when it came down by the cord.

I am, Gentlemen, yours obediently,

C. SPENCE BATE,

*Hon. Sec. to Plymouth Institution and Devon  
and Cornwall Nat. Hist. Society.*

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17 Clarence Place, Penzance, Dec. 17, 1854.

MY DEAR SIR,

In answer to your request, I have only to say, I did not keep a vivarium with any view to its being of service to the cause of science; not having, at the time I commenced some five years ago, any idea that others were doing the same with a higher view than mere amusement: this I now very much regret; however, such experience as I have had shall be detailed as briefly as possible, and if of any service to you, I shall feel gratified by your using

it. At first I put into the tank (a long glass case, length  $2\frac{1}{2}$  ft., depth 18 inches, width 12 in.; the bottom of 3-inch mahogany, with a gutta-percha tap to draw off the water) all the curious objects that presented themselves in my dredging, and for some time derived much pleasure in watching them; but I soon found that crowding was not only injurious to the various tribes, but that it caused the water to become foul.

The *Actinia dianthus*, *A. parasitica*, *A. crassicornis*, I have found the longest lived; *dianthus* I have  $3\frac{1}{2}$  years old, and some 2 years old, born in the tank: this species I have never yet found take any food I offered, therefore I suppose it derives its nourishment from animalculæ; it is the best for keeping and the most beautiful, standing up some 6 to 9 inches; the others I occasionally fed with a portion of mussel, previously washed, to destroy the milky substance that would foul the water. With these live very well the small Hermit Crabs and Swimmers (crabs), also the Rock Blennies; the latter I have had tame enough to come to the surface and feed from the hand; I kept them five months, when they were destroyed by my crowding in too many things, with the desire to show a friend. I have found it advisable to clean all the *Actinæ* previous to placing them in the tank, by keeping them in a tub of salt water, and taking off the dirt and slime with a soft brush; they will then throw out a quantity of milky liquor, which, if in the vivarium, would foul it. As a rule, I clean everything and keep it apart for a few hours to get purged, fish excepted. All the *Pectens* are amusing, and tolerably long-lived. The Goby is a long liver also. The *Sertulariæ* are beautiful objects. *Tubularia gracilis*, *T. indivisa*, *Lucernaria auricula*, *L. campanulata*, are all beautiful, and when near the glass and viewed with a lens, highly interesting; they do not foul the water if taken out when dead. All the above have been in one tank, the water of which in winter was changed once in two or three weeks, in summer twice a week. Growing on pieces of rock were *Iridea edulis*, *Enteromorpha erecta*, and *E. intestinalis*; these all kept well. I was much troubled with a green weed, which during the summer months covered everything, and could only be kept down by a thorough cleaning every week; but in one experiment I made with some water left a whole summer in a globe, this green weed (I think an *Enteromorpha*) kept the water perfectly sweet: this globe was placed out of the influence of the sun, but open to the rain. Another beautiful object, but which, unless the water is frequently changed, continues in beauty but a few days, is the *Alcyonium digitatum*; nothing can be more beautiful when fully distended. I have kept them eight to ten days by frequent changes of water, as they are apt to turn it milky, which is certain destruction to all in the tank; they are very abun-

dant, and make a fine show among a group of common *Actiniæ*.

I never found that the green plague could be kept down by the introduction of the common Winkle, or other Mollusca. It is, however, highly interesting to see the latter deposit their spawn; and moreover the *Trochi* and others are very beautiful. One very interesting fact I witnessed several times: the *Gonoderus* (I know not the specific name) deposit its spawn, in the form of a mass that I can compare to nothing better than a shirt frill, and always quite at the edge of the water. I had two in the vivarium: when one, which I suppose to be the female, had deposited its spawn, the other took its place close by, as if to guard it. I removed them several times to the opposite end, but they could be seen as constantly returning to the same spot: as they chose such an unsafe place, I had no opportunity of seeing the result of their labours come into life.

The *Actinia dianthus* will appear sometimes covered with a thread-like mucilage, which in a few days shows small joints or knobs; these begin to wave or float about and attach themselves to the glass, or shells and rock, and in a day or two, if examined with a lens, will be found to be the young *Actiniæ*; therefore with common care you need not be without this lovely variety, which in fact gives no trouble.

It is only within the past two years that I have heard of attempts to keep sea water pure by means of certain sea-weeds; but I must confess that all the vivaria I have seen since, where the attempt has been made, have been anything but pleasant sights to look upon,—not in the least resembling the clear rock-pools one delights to pry into on a bright summer's day. Whether such a desirable thing will ever be accomplished, is a question far from being solved; I have made two or three attempts, at the suggestion of others, but without success. In warm weather up rose that plague, the little green weed, and soon hid everything from sight; thus destroying the use of the vivarium as an object of study or delight, though by it the water might be kept pure,—but how far animal life also, I know not. I certainly think, as a public sight, instructive and entertaining, the vivarium is best kept in order by manual labour, changing the water, cleaning the animals, rocks and shells, and removing instantly all that perish. An hour or so in early morning is all that is required, with the introduction of a few new or fresh objects from time to time; and by occasionally changing the masses of rock,—from which change you would get much proper food for your animals,—all would be kept in a healthy condition. In large tanks larger rock-fish may be admitted; but, I think, as a rule, all that have a tendency to foul the water should be kept apart, among which are

those animals that require much feeding ; though none require much, if the water is properly changed and a spare tub of water kept for cleansing purposes.

A very beautiful vivarium might be made, having on rocks and shells as many varieties of zoophytes as could be procured, the only large objects to be the *A. dianthus*, which requires no feeding, and is found of such beautiful colours ; the *Deleseria* and other striking Algæ might be introduced with effect, and I will vouch for its attraction.

Were I nearer to you, I should have much pleasure in being at your meetings. I have written to a friend dredging in Scotland to send home all the small Crustacea, among which you may possibly find something.

Yours very sincerely,

C. S. HARRIS.

## PROCEEDINGS OF LEARNED SOCIETIES.

### ZOOLOGICAL SOCIETY.

January 11, 1853.—Dr. J. E. Gray, V.P., in the Chair.

ON A NEW SPECIES OF SALAMANDER FROM CALIFORNIA.

By J. E. GRAY, PH.D., F.R.S., V.P.Z.S.

Mr. Henry Gurney most kindly sent to the Zoological Society for exhibition some Reptiles, from Monterey in California, with the desire that the specimens should afterwards be placed in the British Museum. Among the rest was a very fine and large specimen of a Triton, which has much the external appearance of the large white-spotted *Ambystoma Carolinæ* of the eastern part of the United States of America. On more minute examination and comparison, it proved to be quite distinct ; and as I do not find any description of it in any of the American papers on these animals, I have sent a comparative description of the two species.

#### 1. AMBYOSTOMA CAROLINÆ, Gray, Cat. Amph. B. M. 35.

Brown ; small spot over orbit, large spot on each side the occiput, on each leg near the joint, and a series down each side of the back and tail, white ; palatine teeth in a short, nearly straight line, between and not reaching to the internal nostrils, and with a separate small group of teeth behind each internal nostril.

#### 2. AMBYOSTOMA CALIFORNIENSE.

Black ; sides of lips, lower part of neck, body and tail, and limbs, with large white spots ; palatine teeth in an elongated angular transverse line, bent forwards in the middle and extending to the outer edge of the hinder part of the internal nostril.

*Hab.* California, Monterey, in a well (*Gurney*).

A smaller white spot on each side of the back, not symmetrical ; the one on the right side being much in front of the other.

*Ambystoma punctulatum*, Gray, Cat. Amph. B. M. 37, has the