ON THE *EUPLECTELLA ASPERGILLUM*, Owen; OR "VENUS'S FLOWER BASKET,"

A SPECIES OF SPONGE BELONGING TO THE ALCYONOID FAMILY;

AND

A NOTICE OF THE *HYALONEMA* OR "GLASS ROPE" SPONGE.

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Sponges assume a great variety of forms, some are cylindrical and cup-shaped, others are flattened, spherical, and finger shaped, varying in size from small specks to gigantic dimensions, the latter exemplified in the so-called "Neptune's Cup," (*Thalassema Neptuni*) a specimen of which is in the Museum of the Society. Some of the sponges display a great variety of rich colours, from bright scarlet and mauve, to pale yellow and rose, but the beautiful and delicate tints change when exposed to the air to a dull brownish hue. Sponges are formed of a soft glairy substance termed sarcode, which envelopes a skeleton composed of silicious, calcareous, or horny material. The first exemplified by the *Euplectella*, *Hyalonema*, *Holtenia*, *Rossella*, &c., &c.; the second by the genus Grantia, and the last by the common sponge (*Spongia communis*) forming an elastic substance extensively employed for domestic purposes.

The most delicate and beautiful of the silicious sponges are those composed of threads or filaments of almost pure silex, beautifully interlaced and terminating at the base in delicate threads of exquisite fineness like spun silk, as seen in the *Euplectella aspergillum* of Owen, popularly named "Venus's Flower Basket," resembling in its form a bouquet holder of spun glass; others form hollow cups, from which beards of long, flossy filaments are pendent, consisting of silex resembling spun glass, as in *Holtenia*, *Rossella*, &c. Another remarkable silicious sponge, is the Hyalonema, known as the "Glass Coral," or "Rope Glass;" this sponge or rather a portion of it, I had an opportunity of examining in the Museum of the Royal Society at Hobart Town, and also some specimens in the possession of Mr. James Macfarlane, of that city, who brought them from Japan, and presented the examples in the Society's Museum. The portions of the *Hyalonema* I examined consisted of a rod of twisted fibres varying in thickness, and about six or seven inches in length, encased in a brownish leathery coating, the surface of which was studded with a species of parasitical Zoophyte; the lower

portion was frayed out, so that the glass threads were separated from one another. It was evidently not perfect, and a question had arisen where specimens were first seen brought from Japan, whether it was a natural production or a misdirected industry of those ingenious people. It appears that Ehrenberg took this view, when he examined the *Hyalonema*, recognising the silicious strands as the spicules of a sponge quite independent of the Zoophyte with which they were encrusted. After an examination of the specimens, the conclusion I arrived at, and the opinion I gave, was, that the Zoophyte was imperfect. On my return to Sydney, I found on reference to Professor Wyville Thompson's recent work on the "Depths of the Sea," that the conclusion I arrived at was correct, and that perfect specimens of this remarkable sponge had been obtained, not from Japan, but at first from the coast of Portugal and subsequently from the coast of Scotland. The species obtained from the coast of Portugal was discovered by Professor Barboza de Bocage, and is named *Hyalonema lusitanicum* (of which an engraving is given from which I send a copy) it is closely related to the glass rope sponges of Japan, which have so long perplexed naturalists to determine their position in the animal series, and their relation to their constant companion the parasitic Palythoa, a genus of Zoophytes. Respecting the capture of *Hyalonema* on the coast of Scotland, Wyville Thompson says :—Off the Butt of Lewis, north of the Hebrides, or western islands of Scotland, "we met in water of 450 to 500 fathoms, on two occasions, with full grown specimens of a species of the remarkable genus *Hyalonema*, with the coils in the larger examples upwards of forty centimetres in length. *Hyalonema* is certainly a very striking object, and although our specimens belong apparently to the same species, *H. lusitanicum*, of Professor Barboza de Bocage, from the coast of Portugal, it is one of the most interesting additions made to the British Fauna during our cruise." He further describes this curious sponge as follows :—"A bundle of from 200 to 300 threads of transparent silica, glistening with a silky lustre, like the most brilliant spun glass, each thread from 30 to 40 centimetres long, in the middle the thickness of a knitting needle, and gradually tapering towards either end to a fine point; the whole bundle coiled like a strand of rope into a lengthened spiral, the threads of the middle and upper portions remaining compactly coiled by a permanent twist of the individual threads; the lower part of the coil, which, when the sponge is living, is imbedded in the mud, frayed out so that the glossy threads stand separate from one another, like the bristles of a glittering brush; the

upper portion of the coil, close and compact, is imbedded perpendicularly in a conical or cylindrical sponge; and usually part of the sponge-substance, is covered with a brownish leathery coating, whose surface is studded with the polyps of an alcyonarian zoophyte. Such is the general effect of a complete specimen of *Hyalonema*." In the same work he says "*Hyalonema* was also common; but we got few perfect specimens with the sponge and glass rope in connection. The conical sponge heads were very numerous; they seemed to have been torn off by the edge of the dredge, the rope remaining in the mud, and the ropes were frequently brought up without the sponge. Almost all the ropes were encrusted with the constant 'commensal' of *Hyalonema*, *Polythoa fatua*. Very young examples of *Hyalonema*, with the whisp from 5 mm. to 20 mm. long, had usually no *Palythoa* on them; but when they had attained above the latter dimensions in almost every case one could see the first Polyp of the *Palythoa* making its appearance as a small bud, and its pink-encrusting cœnosarc spreading round it." When the Challenger was in the South Atlantic it has been mentioned that the trawl was put down in 1,375 fathoms, and on the following day in 1,600 fathoms, between Prince Edward's Islands and the Crozets, the number of species taken in these two hauls was very large, and many of them belonged to especially interesting genera, while many were new to science. There occurred with others the well-known genera *Euplectella* and *Hyalonema*, showing the wide range of those beautiful sponges. It has only been during the last few years that specimens of the beautiful silicious frames or skeletons of the sponge belonging to the Alcyonoid family named *Euplectella* has been discovered in greater numbers, and have been brought from the Philippine Islands to New South Wales by the ships arriving from those islands with cargoes of sugar. The Euplectella is of a most singular and beautiful texture, exciting admiration by the clear transparency of its exquisite lace like work, and the delicacy with which the threads are apparently interwoven, forming a construction of delicate network not to be equalled by any human fabric. They assume for the most part the form of a cornucopia, and are attached, when partly buried in the mud, to the sand, coral rock, or other objects, even to the mud itself by a bundle of terminal fibres or threads having a silky or silvery lustre, situated at the smaller and narrower end or base of the sponge. In the living state this silicious or flinty skeleton is enveloped by a delicate gelatinous organic tissue of a pale brown colour. This beautiful sponge can now be seen in our public museums, and also in many private collections, and as I have been able to send

two specimens for your Museum, some account of them may be interesting to the members of the Society. This elegant generic form of reticulate alcyonoid sponge was first described by Professor Owen, in 1841, from a specimen brought from the Philippine Islands by Mr. Hugh Cuming, and published in the Transactions of the Zoological Society of London (vol. 3, 1849.) In a letter to Professor Owen, Mr. Cuming relates how it was obtained, as follows:—"The *Euplectella* brought home by me from the Philippines, was taken by a fisherman, in ten fathoms, rocky ground, off the Island of Bohol, one of the Southern Islands of the Philippine Group. The fisherman was employed in catching a species of cod which abounds in those islands, and finding, after some time, the fish did not take his bait, he drew up his line, when to his surprise he found the specimen of Euplectella attached to his hook, near the orifice, and fearing to injure it by disentangling the hook from such a fragile substance, he cut out that portion to which the hook was attached. On his arrival on shore, at St. Nicholas de Zebu, he made a present of it to the Governor of the town. On my arrival a few days after, I was introduced to the Governor, who, upon knowing the object of my visit to the island, presented me with it, as the greatest curiosity he had to offer me, as he had never seen the like before. On my showing it to the Bishop of that city, and the principal inhabitants, they confirmed the opinion of its rarity expressed by the Governor." This beautiful and singular marine production forms part of a member of the lowest class of organised bodies, being the skeleton of a species of sponge, belonging to the cylindrical or reticulate, or alcyonoid family. "If," says Professor Owen, "the basal aperture of the cone were open, the resemblance to some of the known reticulate alcyonoid sponges would be very close, especially to that called *Alcyonellam gelatinosum* by Blainville, its closure by the reticulate convex frilled cap, in the present instance establishes the generic distinction; and, in the exquisite beauty and regularity of the texture of the walls of the cone, this species surpasses any of the allied productions that I have yet seen, or found described. I propose, therefore, to name it *Euplectella aspergillum*," the generic name being derived from Eu, well; and Plecto, to weave. The specific name given by Professor Owen, is simply a translation of the popular name by which it is known among the fishermen at the Philippine Islands, who call it "Regadera," which means "Watering Pot," from the resemblance of the reticulated cap at the upper end to the spout of a watering pot; but Dr. J. E. Gray has given to it, a very pretty and appropriate popular name of "Venus's Flower Basket." *Euplectella* is an excellent generic name, being

indicative of the exquisite regularity and complexity of the interweaving of its component threads, resembling the most delicate spun glass, and of a silvery lustre. The specimens brought to Sydney, New South Wales, varied in size from eight to fifteen inches in length, and of a proportionate diameter. An account was published in the annals of Natural History (vol. 3, 4th series, 1869) of the method adopted to capture the *Euplectella*. It was as follows :—" The only place where the Regaderas are to be found is about three miles from the shore, in front of the small village of Palisay, which is about five or six miles south of the town of Zebu, Island of Zebu, Philippine Islands. The mode of catching them is very ingenious, and is as follows :—When the tide is about its full, the natives go out in very small canoes to the bed in which they are found, which is about a mile in circumference, and from 130 to 135 fathoms deep. The native, when he considers he has come to about the extremity of the bed, then lets drop his fishing tackle, composed of a piece of iron of the shape of a T, to the two extremities of which are attached two flexible pieces of bamboo, armed with hooks. This sinks to the bottom, and the native sits perfectly still in his tiny canoe, which is then gradually drifted by the tide or current over the ground on which the Regaderas are found; so soon as he feels that his trawling apparatus has caught something, he begins to haul his line gently in, and generally finds two or three impaled on the hooks. When taken out of the water the Regaderas are dirty and yellow, but after being put into fresh water, or exposed to the rain, and dried in the sun, they become perfectly white. The bottom of the sea where the Regaderas are found, is composed of soft mud and sand. The extended fibres or root of the Regadera is embedded in this, and the top or broad part always looks, as the natives say, to the setting sun. In the Regadera, when fished up, are generally found from one to three small animals of the crab species, of about the size of very small shrimps. The hooks, of course, often catch Regaderas without bringing them up, and many that have been recovered show signs of having a new piece of netting put over the part torn by the hook. It is said that the first Regadera discovered in Zebu was sold for fifty dollars, and that a Dr. Caloo, who took it to Manilla, was then offered two hundred dollars for it; for some time after that they continued to be worth sixteen dollars each. It was only in 1865 they became abundant, through the present bed of them being discovered." The Regaderas' usual form is that of a cornucopia, although some have been occasionally seen nearly straight, but those are comparatively rare. The inclination of the growth is outward. When first caught they are covered

with a yellowish brown gelatinous tissue veiling the beautiful texture of the crystal framework.

The first specimen obtained by Mr. Hugh Cuming was sold in London for thirty pounds, others afterwards realised from ten to fifteen pounds; but fresh discoveries having lately been made, they have become more plentiful, and the prices have been very materially reduced. In nearly the whole of the specimens I examined, there were different species of crabs and other crustacea, imprisoned in the crystal frame without any opening to admit a possibility of escape, as secure as if in a corked or sealed bottle, the mystery of their entrance has puzzled learned naturalists, as the apples in the dumplings did George the Third, or as the liqueurs in the sugar plums have also mystified many wise heads. A question arises, how they got in? This can only be satisfactorily explained, either by their having effected an entrance previous to the completion in growth of the skeleton of the sponge, or what is still more probable, when a rent has occurred accidentally in the delicate net work, an entrance was effected before the injury had been repaired, and which, when completed, render their escape impossible, for that this sponge has the power of secreting silicious matter for the reparation of any injury it may sustain, can be proved by the examination of specimens in which repairs of injuries have been made; for the restoring power of the sponges displays remarkable activity of their vital power as shown by the rapidity and strength with which injuries are repaired, for according to experiments made by Mr. Bowerbank, injuries that had been sustained by some sponges were repaired in less than twenty-four hours. By some naturalists it was supposed that the crabs were the architects of this fairly-like structure, but they might have reflected, that although crabs have the power of secreting calcareous, they cannot produce a silicious or flinty matter, but as this class of sponges is known to be capable of creating this silicious material, we may readily be convinced that this elaborate and exquisitely delicate lace tracery is their work. In 1857 Professor Owen and Dr. Arthur Farre, published in the 22nd vol. of the Linnean Transactions, an account of another beautiful species of Euplectella, under the name of *Euplectella cucumer*, or Cucumber Euplectella, from the peculiarity of its form, which when first seen in the engraving, might readily, and has been mistaken for the representation of that singular vegetable production the Cactus, and it certainly bears a close resemblance to the form of some of the species. It is stated in the description to have been given to Captain Etheridge, R. N., by the King of the Seychelle Islands, but as no monarch resides at that group, it is most probable a mistake

for the ruler of the Comoro Islands, which are situated between the East Coast of Africa, and the North point of Madagascar, or for the Sultan of the Island of Zanzibar. Professor Owen says that "To the question put by almost every one to whom the *Euplectella* is shown, as to how the threads could have been so regularly, yet intricately interwoven, I have sometimes replied, that there has been no such thing as interweaving in the case; that no thread, as such, was ever laid across another in the construction of the Euplectella, that the analogy of human textile fabrics does not apply to this beautiful natural object. In artificial lace work, the several stages of a complex result must be taken in the succession indicated by painful and exact calculation; in organic lace work, different stages are done at once. Thus it is that the Divine works surpass those of man's utmost ingenuity. The threads of the *Euplectella* were not first spun, and then interwoven, but were formed as interwoven, the two processes going on simultaneously or 'pari passu.' Just as in the cancelleous texture of bone, the plates of bone are not first formed, and then fitted to one another, as in building a house of cards; but the forming and the fitting go on together in the course of molecular growth. I presume also that in the beautiful object which we call the *Euplectella* we have but its skeleton, and that in the living state the exquisite structure of the flinty framework may be veiled by the delicate gelatinous enveloping organic tissue." This beautiful sponge will now be still more plentiful as it has recently been discovered on the coast of Portugal, for in a letter in the *Daily News* from that journal's special correspondent on board the "Challenger," he says, "on the evening of 4th of March, 1873, Professor Wyville Thompson gave a popular lecture on the objects of the expedition, and after giving an account of the very satisfactory results which they had already obtained, the Professor described some of the most interesting objects brought up by the dredge. One of the most interesting of these objects was a beautiful specimen of the Philippine Island Sponge (*Euplectella aspergillum*) obtained off the coast of Portugal at a depth of 2,000 fathoms. This is the first specimen of this species of sponge ever found in any waters but those of the Philippine Islands, and it was always believed to be indigenous to them."

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