ORIGINAL COMMUNICATIONS.

Description *of a* New Form *of* Naked-eyed Medusa (*Thaumantias achroa*), *with Histological Details*. By T. Spencer Cobbold, M.D., F.L.S., Lecturer on Botany at St. Mary's Hospital Medical School, London.

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On the 13th of August, 1856, after filling a marine aquarium, containing about three gallons of water, I detected a small naked-eyed Medusa swimming vigorously near the surface. This minute creature was immediately made the subject of careful study, and it turned out to be a species of Thaumantias new to Britain (fig. 1, Pl. I). So far as I can ascertain, it has not been described by any author abroad; I have therefore thought it worthy of a separate notice. The water containing the Medusa had been procured four days previously from the shore near Leith, and had been kept in an earthen vessel hermetically closed. The animal was only preserved alive until the 16th of the same month, in consequence of injuries sustained during a prolonged and often-repeated microscopic examination.

Referring to the various organs in detail, I allude in the first place to the *umbrella*. The form and general aspect of this structure resembles that of the more typical species, being hemispherical, transparent, colourless, smooth, slightly elongated vertically when in a state of rest, the transverse diameter measuring rather more than the third of an inch, and becoming much increased during contraction, the length of the disc, at the same time, being proportionately lessened. To remark particularly on such admeasurements may appear trifling, but it is useful as an aid to diagnosis, because the animal bears a very marked resemblance to *Thaumantias punctata* and *T. Thomsoni*. These, however, present a more depressed umbrella. Again, it is similar, at first sight, to *T. convexa*; but this species has the umbrella more cylindrical, and there are other distinguishing characters, which will be alluded to presently. The circumferential portion of the umbrella is fringed by twenty-four tentacula of extreme delicacy and unusual length; also, by eight ocelli, a circular gastro-vascular canal, and a well-defined shelf-like veil directed inwards. These parts will be considered separately. Under

a quarter-inch objective, the external convex surface of the umbrella presented a few well-defined and sparsely scattered cellules, which were rather irregularly disposed beneath the transparent, and, in such situations, slightly elevated, epidermis (fig. 2). No other indications of structure were noticed.

The *tentacula*, while relaxed and motionless, are fully three times the length of the disc—a peculiarity serving to distinguish this Medusa from all other British species, their peculiar arrangement ($5 \times 4 + 4$) also constituting a satisfactory mark of identification. During the gentle agitation of the water it frequently happened that the tentacula stretched beyond this length, the trailing filaments assuming an almost invisible tenuity, but when violent contraction occurred, the threads suddenly acquired the form of minute tubercles, bordering the circumferential margin of the umbrella. A gradual unfolding usually commenced immediately after the contraction—the exciting agent being removed—the extension invariably originating at the base of the filament, and proceeding uniformly downwards to the extremity, until each succeeding portion was unfurled. Incompletely extended, the tentacles always appear clavate at the tip. Amplified 50 diameters, they exhibit a finely granular and ringed appearance, analogous to that of the prehensile labiate organs of *hydroida* (fig. 3); with an ordinary pocket-lens indications of knotting may be seen at the extremity of the cirrhi. To the naked eye the tentacular bulbs appear colourless and homogeneous, but under a magnification of 300 diameters, the sub-epidermic tissues display numerous closely packed fusiform cells, identical with those described as lying beneath the cuticle of the umbrella (fig. 9). They refracted light very strongly, but the existence of nuclei could not be demonstrated. At the bulb the cells are irregularly disposed; a little further down they begin to assume symptoms of grouping, co-ordinate with which bulgings appear at the margin of the thread. Lower still, the fusiform particles acquire an incompletely linear arrangement, speedily merging into a definite series of rings or knots, placed at regular intervals. While the cirrhus is relaxed the cell-groups are separated by a transparent interspace, which is much constricted, but exceeds in length the parenchymatous knot. Near the extremity of the thread the cells are more cogently developed, and being placed at a right angle to the axis of the filament, appear to stand out from the investing epidermis (fig. 4). At the upper part the tentacula exhibit lateral lines in their interior, denoting the presence of a central canal, the markings becoming more conspicuous near the bulb (fig. 9). This last-named structure, viewed by

transmitted light, appears more opaque than the filament, in consequence of its greater thickness, and the abundance of those highly refracting fusiform particles already described. The limiting membrane of an otolitic vesicle was discernible, but there were apparently no vibratory movements within the cavity.

The *ocelli*, eight in number (2 × 4), are placed round the circular margin of the disc, at intervals, between every third tentacle—an arrangement somewhat peculiar. The unassisted eye failed to detect their presence; a very slight enlargement, however, rendered them visible. Magnified 60 diameters, each ocellus was seen to consist of a transparent vesicle containing a round nucleus at the base, and in addition, five bright yellow, highly refracting globules (fig. 8). The latter, larger than the nucleus, varied in size respectively, the difference being uniform and gradational. Under a quarter-inch lens these variations in size were more obvious, the bulk of the central and superior globule being paramount. The wall of the sac was now seen to be double, the ocellus being supported by a cellular thickening of the lining membrane of the circular gastro-vascular canal (fig. 10). When under examination, the nucleus broke up, and many of the tissues, elsewhere, disintegrated, while the animal was still living in an enfeebled condition.

The *marginal vessel* is about the width of the filamentary tentacle, and to the unassisted eye its walls appear transparent and homogeneous. Two kinds of corpuscles, large and small, are contain-d within the canal; of these we shall speak more particularly when referring to the circulation.

The *shelf-like veil* is directed inwards at a right angle to the axis of the disc, and, though broad and conspicuous, offers no structural indications.

The *sub-umbrella* is placed rather higher than midway between the marginal ring and the convex surface of the disc. The depth of the concavity lessened during contraction, but not uniformly so, it being observed that the upper part remained unaffected, to the extent of a third of its area, from the summit downwards, the circular limit of this rigid portion forming, as it were, a *point d'appui* for the development of contractile action throughout the remainder of the membrane. No muscular tissue, properly so called, could be detected.

The proboscidiform *peduncle* has all the features common to the genus. It is about the twentieth part of an inch in length, quadrangular, and provided with four simple or slightly fimbriated triangular lips (fig. 5). The contained stomachal cavity was thrown into various shapes during the

lateral and twisting contractile movements of the peduncle, but viewed from above, while empty and in a state of rest, the walls were symmetrically disposed in the form of a cross (fig. 7). With the help of a pocket-lens the lips presented a finely granular or ground-glass-like appearance, which was due to the abundance of those minute fusiform cellules forming, as we have seen, the general parenchyma of the body.

The functionally combined respiratory and nutritive system of vessels, or *gastro-vascular canals*, are five in number—four radiating and one circumferential—as in other gymnophthalmatous genera; their walls are transparent, well defined, and rigid. The smaller kind of the contained corpuscles are rather less in diameter than human blood-globules; while the larger, apparently mother-cells, are nearly three times greater, possessing nuclei of variable size, but frequently identical in character with the lesser globules. All are transparent and colourless, with the limiting membrane sharply marked (figs. 9, 10, 11). When the circulation was active, the corpuscles moved in a moderately rapid and regular manner, their course in the radiating vessels being continuous from one half of the hemisphere to the other. In other words—two vessels carried the particles from the marginal canal, convergingly, to the central point of intercommunication, on the one hand, and two conveyed the same elements from the centre, divergingly, on the other (fig. 7). The behaviour of the corpuscles led me to conjecture the presence of cilia within the canals, though they were not structurally demonstrated. In regard to the presumed continuity of the vessels with the stomach in this genus, at the summit of the umbrella, let it suffice me to add, that I could discover no opening or any interposed channel of communication. The enlarged central vascular space formed at the crossing of the radiating canals, was the only indication of a supra-stomachal cavity; through this space the corpuscles rolled on uninterruptedly (fig. 11).

The *reproductive glands*—four in number, elongated or semiclavate—are placed on the inferior surface of the sub-umbrella, a short way distant from the margin, and in the course of the radiating canals. Their border to the naked eye was smooth, but under a half-inch objective the surface looked undulating, an appearance due to the bulging of the ovarian cells lying immediately beneath. Each gland was subdivided by one of the radiating vessels traversing its long axis (fig. 6). The subjacent ova at the surface severally displayed an outer cell-wall with its included transparent albumen, a second membrane surrounding the molecular yolk, and a third constituting the germinal spot, within which were three or four

rounded particles, beautifully distinct (fig. 12). Deeper in the organ were similar cells, smaller in size and imperfectly developed, evidently destined to supply the place of those ripe for expulsion. The connecting tissue between and among these ova displayed many of the ordinary parenchymatous cellules within its substance.

To facilitate identification, I subjoin in conclusion a few particulars gathered from Professor Forbes's monograph, in which *Thaumantias inconspicua, T. punctata,* and *T. Thomsoni* differ from this species. The first has the disc wider and more flattened, also, purplish-coloured glands and twenty tentacles. The second has thirty-two tentacula, is a larger species, with the umbrella more depressed. The third has but sixteen tentacula, the bulbs and reproductive glands containing a yellow pigment. There is no other British species for which it can be readily mistaken. The great length of the tentacula forms a distinctive peculiarity. I have designated this Medusa, *Thaumantias achroa* (ἄχροος, colourless).

On the Minute Structure *of* Involuntary Muscular Fibre. By Joseph Lister, Esq., F.R.C.S. Eng. and Edin., Assistant-Surgeon to the Royal Infirmary, Edinburgh. Communicated by Dr. Christison.

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It has been long known that contractile tissue presents itself in the human body in two forms, one composed of fibres of considerable magnitude, and therefore readily visible under a low magnifying power, and marked very characteristically with transverse lines at short intervals, the other consisting of fibres much more minute, of exceedingly soft and delicate aspect, and destitute of transverse striæ. The former variety constitutes the muscles of the limbs, and of all parts whose movements are under the dominion of the will; while the latter forms the contractile element of organs, such as the intestines, which are placed beyond the control of volition. There are, however, some exceptions to this general rule, the