ART. 35. Any member or fellow who shall pay the sum of fifty dollars to the Association, at any one time, shall become a Life Member, and as such shall be exempt from all further assessments, and shall be entitled to the Proceedings of the Association. All money thus received shall be invested as a permanent fund, the income of which shall be used only to assist in original research unless otherwise directed by unanimous vote of the Standing Committee.

ART. 36. All admission fees and assessments must be paid to the Permanent Secretary, who shall give proper receipts for the same.

ART. 27. All members and fellows must forward to the Permanent Secretary, as early as possible, and when practicable before the convening of the Association, full titles of all the papers which they propose to present during the meeting, with a statement of the time that each will occupy in delivery, and also such abstracts of their contents as will give a general idea of their nature; and no title shall be referred by the Standing Committee to the Sectional Committee until an abstract of the paper or the paper itself has been received.

(Blank forms for giving the titles and abstracts of papers will be furnished by the Permanent Secretary on application. The Standing Committee particularly request, in order to facilitate the arrangement of the programme, that the titles and abstracts should be forwarded so as to reach the Permanent Secretary before August ninth. At the Saratoga meeting the *Permanent Secretary* was instructed *not to enter*, on the list of papers to be presented, any titles of papers until an abstract of the paper, or the paper itself, was received.)

Notice of errors in the printed list of Members of the Association, of change of address, and information respecting the decease of Members, should be sent to the Permanent Secretary in order that due notice may be taken of the same in the next volume of "Proceedings." It is particularly requested that the Permanent Secretary be notified at once of any errors in the names and addresses that will be given in the list in the Saratoga volume, as a revised edition of the list will be printed for circulation at the Boston meeting.

The Saratoga volume (vol. 28) will soon be distributed by mail to every member who has paid the assessment for the Saratoga meeting.

The volumes of the Proceedings of the Association (28 in number) can be obtained from the Permanent Secretary, at the price of $1.50 a volume; or any member wishing for ten or more volumes, in order to complete a set, may obtain them at $1.00 a volume. The volumes may be had bound in cloth for the extra price of fifty cents each, or in one-half Turkey morocco for the extra price of $1.00 each. Uniform cloth covers for the volumes will be furnished by mail at thirty cents each, or by express or at the meetings for twenty-five cents each. Copies of Volumes 2 and 26 will be received in exchange for other volumes or will be purchased at $1.00 each.

The Memoir on Fossil Butterflies, by Mr. S. H. Scudder, published by the donation of Mrs. Elizabeth Thompson, 4to, 1875, will be furnished at $2.00 a copy. The Transactions of the Association of Geologists and Naturalists, 1 vol. 8vo, 1843, bound in cloth, can be obtained at $3.00 a copy.

It will save much time and confusion at the meeting if members will send their assessments *in advance* to the Permanent Secretary, in return for which a Member's ticket, bearing a receipt for the Boston meeting will be forwarded. Members not intending to be present at Boston, are particularly requested to send their assessment in advance, and to those who specially request the same a copy of the Boston Daily Programme will be mailed.

The address of the PERMANENT SECRETARY, F. W. Putnam, Esq., will be *Salem*, Mass., *until August 1st;* after that time, and until the meeting has adjourned, his office will be at the MASSACHUSETTS INSTITUTE OF TECHNOLOGY, *Boston, Mass.*

ON "LIMNOCODIUM VICTORIA," A HYDROID MEDUSA OF FRESH WATER.

A short time since I received from Mr. Sowerby, Secretary of the Royal Botanical Society, a letter informing me of the occurrence of certain Medusoid organizations in the warm-water tank devoted to the cultivation of the *Victoria regia* in the Gardens of the Society. The letter contained a request that I should examine the animals with a view to their determination; Mr. Sowerby accompanied it with rough sketches, and offered to place specimens at my disposal.

The discovery of true freshwater Medusæ was so startling a fact that I lost no time in calling on Mr. Sowerby, with whom I visited the tank, and carried away such specimens as were needed for examination.

The water in the tank had then a temperature of 86° F., and was literally swarming with little Medusæ, the largest of which measured nearly half an inch in transverse diameter. They were very energetic in their movements, swimming with the characteristic systole and diastole of their umbrella, and apparently in the very conditions which contribute most completely to their well being.

As it now became evident that the Medusa belonged to a generic form hitherto undescribed, I prepared for the Linnean Society a paper containing the results of my examination, and assigning to the new Medusa the name of *Limnocodium victoria* (λίμνη, a pond, and κώδων, a bell). This was received and recorded by the secretaries on June 14, and read at the next meeting, on the 17th.[1]

The umbrella varies much in form with its state of contraction, passing from a somewhat conical shape with depressed summit through figures more or less hemispherical to that of a shallow cup or even of a nearly flat disk. Its outer surface is covered by an epithelium composed of flattened hexagonal cells with distinct and brilliant nucleus. The manubrium is large; it commences with a quadrate base, and when extended projects beyond the margin of the umbrella. The mouth is destitute of tentacles, but is divided into four lips, which are everted and plicated. The endoderm of the manubrium is thrown into four strongly-marked longitudinal plicated ridges.

The radial canals are four in number, they originate each in an angle of the quadrate base of the manubrium, and open distally into a wide circular canal. Each radial canal is accompanied by longitudinal muscular fibres, which spread out on each side at the junction of the radial with the circular canal.

The velum is of moderate width, and the extreme margin of the umbrella is thickened and festooned, and loaded with brownish-yellow pigment cells.

The attachment of the tentacles is peculiar. Instead of being free continuations of the umbrella margin, they are given off from the outer surface of the umbrella at points a little above the margin. From each of these points, however, a ridge may be traced centrifugally as far as the thickened umbrella margin; this is caused by the proximate portion of the tentacle being here adnate to the outer surface of the umbrella. It holds exactly the position of the "mantelspangen" or *peronia*, so well developed in the whole of the Narcomedusæ of Haeckel, and occurring also in some genera of his Trachomedusæ. Its structure, however, differs from that of the true *peronia*, which are merely lines of thread cells marking the path travelled over by the tentacle as the insertion of this moved in the course of metamorphosis from the margin of the umbrella to a point at

[1] Some facts in addition to those contained in my original paper are included in the present communication.

some distance above it, while in Limnocodium the ridges are direct continuations of the tentacles whose structure they retain. They become narrower as they approach the margin.

The number of the tentacles is very large in adult specimens. The four tentacles which correspond to the directions of the four radial canals, or the perradial tentacles, are the longest and thickest. The quadrant which intervenes between every two of these carries, at nearly the same height above the margin, about thirteen shorter and thinner tentacles, while between every two of these three to five much smaller tentacles are given off from points nearer to the margin, and at two or three levels, but without any absolute regularity; indeed, in the older examples all regularity, except in the primary or perradial tentacles, seems lost, and the law of their sequence ceases to be apparent.

I could find no indication of a cavity in the tentacles; but they do not present the peculiar cylindrical chord-like endodermal axis formed by a series of large, clear, thick-walled cells which is so characteristic of the solid tentacles in the Trachomedusæ and Narcomedusæ. From the solid tentacles of these orders they differ also in their great extensibility, the four perradial tentacles admitting of extension in the form of long, greatly-attenuated filaments to many times the height of the vertical axis of the umbrella, even when this height is at its maximum; and being again capable of assuming by contraction the form of short thick clubs. Indeed, instead of presenting the comparatively rigid and imperfectly contractile character which prevails among the Trachomedusæ and the Narcomedusæ, they possess as great a power of extension and contraction as may be found in the tentacles of many Leptomedusæ (Thaumantidæ, &c.) These four perradiate tentacles contract independently of the others, and seem to form a different system. All the tentacles are armed along their length with minute thread cells, which are set in close, somewhat spirally arranged warts.

The lithocysts or marginal vesicles are, in adult specimens, about 128 in number. They are situated near the umbrellar margin of the velum, between the bases of the tentacles, and are grouped somewhat irregularly, so that their number has no close relation with that of the tentacles. They consist of a highly refringent spherical body, on which may be usually seen one or more small nucleus-like corpuscles, the whole surrounded by a delicate transparent and structureless capsule. This capsule is very remarkable, for instead of presenting the usual spherical form, it is of enlongated piriform shape. In its larger end is lodged the spherical refringent body, and it thence becomes attenuated, forming a long tubular tail-like extension which is continued into the velum, in which it runs transversely towards its free margin, and there, after usually becoming more or less convoluted, terminates in a blind extremity.

The marginal nerve-ring can be traced running round the whole margin of the umbrella, and in close relation with the otolitic cells. Ocelli are not present.

The generative sacs are borne on the radiating canals, into which they open at a short distance beyond the exit of these from the base of the manubrium. They are of an oval form, and from their point of attachment to the radial canal hang down free into the cavity of the umbrella. Some of the specimens examined contained nearly mature ova, which, under compression, were forced from the sac through the radial canal into the cavity of the stomach.

While some of the characters described above point to an affinity with both the Trachomedusæ and Narcomedusæ, this affinity ceases to show itself in the very important morphological element afforded by the marginal bodies. In both Trachomedusæ and Narcomedusæ the marginal bodies belong to the tentacular system; they are metamorphosed tentacles, and their otolite cells are endodermal, while in the Leptomedusæ, the only other order of craspedotal Medusæ in which marginal vesicles occur, these bodies are genetically derived from the velum. Now in Limnocodium the marginal vesicles seem to be as truly velar as in the Leptomedusæ. They occur on the lower or abumbral side of the velum, close to its insertion into the umbrella, and the tubular extension of their capsule runs along this side to the free margin of the velum, while the delicate epithelium of the abumbral side passes over them as in the Leptomedusæ. It is true that this point cannot be regarded as settled until an opportunity of tracing the development is afforded; but in very young specimens which I examined I found nothing opposed to the view that the marginal vesicles were derived, like those of the Leptomedusæ, from the velum.

Important points still remain to be cleared up regarding the development of Limnocodium and the determination of the question whether the Medusa be derived from the egg directly or only through the intervention of a hydranlid trophosome. I have arranged, with Mr. Sowerby, some methods of observation by which I hope to obtain data for determination of these points.

If this be the case Limnocodium will hold a position intermediate between the Leptomedusæ and the Trachomedusæ; but as the greatest systematic importance must be attached to the structure and origin of the marginal vesicles, its affinity with the Leptomedusæ must be regarded as the closer of the two. GEO. J. ALLMAN.

THE ELECTRIC LAMPS OF M. TCHIKOLEFF.

M. Tchikoleff, the head of the electric lighting department of the Russian artillery, has addressed to *La Lumière Electrique* a communication, of which the following is a translation, in which he claims that the application of derived currents which has been successfully adopted with the lamps of MM. Lontin and Siemens, was employed by him as far back as the year 1871.

"Having experimented for a lengthened period with the Foucault and Serrin regulator lamps, which were considered to be the best at the period when I took up the question, I was able to observe in them the following defects:

1. Several lamps, arranged in series or in multiple arc in a circuit, would not continue to work.

2. These lamps could be worked only by very powerful currents, whereas with a lamp regulated by hand the voltaic arc could be obtained with weaker currents, giving of course a less intense light.

3. They worked with regularity only when the current was constant, or varied within very restricted limits.

I traced the cause of these defects to the fact that the working of the regulating mechanism was based upon a kind of equilibrium between the attractive force of an electro-magnet and the counteracting force of a spring. Such a system does not regulate the distance between the charcoal points, but only the general force of the current in the circuit. Now under these circumstances it is possible that, when two or more lamps are placed in series in a circuit, one of them may have its carbons in contact, whilst the carbons of the other lamp or lamps are at a greater or less distance apart, without the equilibrium between the electro-magnets and the counteracting springs being disturbed.

Now it was to obviate this defect that I endeavored to devise an arrangement which, whilst allowing each lamp placed in a circuit to be independent of the general intensity of the current and its variations, would enable it to maintain constant the resistance of its own voltaic arc, and this arrangement appeared to me obtainable by applying to the regulator lamps the principle of the *differential action of derived currents*.

It was in 1869 that I made the first experiment on the foregoing arrangement with a regulator lamp of M. Foucault, the counteracting spring of which I replaced by a supplementary electro-magnet traversed by a very weak derivation of the current, parallel to the voltaic arc. This electro-magnet was wound with a wire of high resistance, and the current producing the voltaic arc passed through the other electro-magnet. The armatures of these electro-magnets were placed at the two extremities of a rocking-lever, carrying at its centre of oscillation an arm which controlled the mechanism for increasing or diminishing the distance between the carbons; and the rocking-lever was in equilibrium when the voltaic arc possessed its normal resistance.