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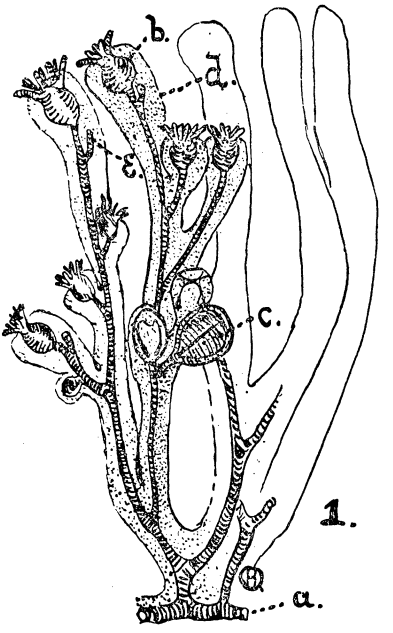
PERIGONIMUS JONESII; A HYDROID SUPPOSED TO BE NEW, FROM COLD SPRING HARBOR LONG ISLAND.

By Henry Leslie Osborn and Charles W. Hargitt.

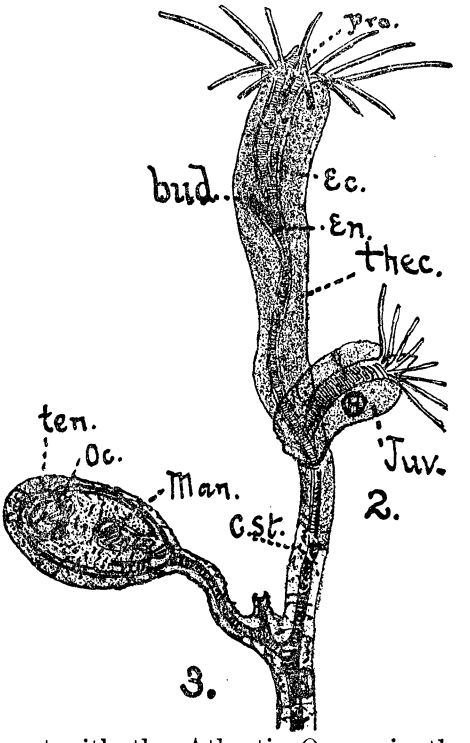
The authors of this article, while engaged in seaside studies at Cold Spring Harbor, at the Laboratory of The Brooklyn Institute, found a certain hydroid which is the subject of this



article. A careful survey of the accessible literature of the subject has failed to demonstrate that it has been previously described, though its very common occurrence together with the ease of its capture render it remarkable that it should have escaped the hands of the collector heretofore. It is a very interesting species on account of the very primitive state of development of the integument, if we may so call the theca or skeleton, and hence of interest to the biologist, for whose sake,

rather than merely for the sake of its faunal interest, these notes are written.

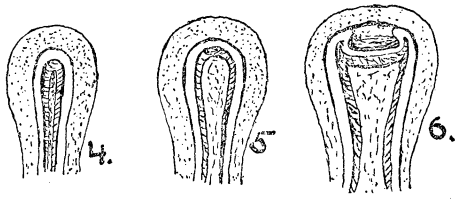
The species occurs very commonly as a flesh-tinted scum on the abdomen or on the tips of the joints of the walking legs (pereiopods) of the Channel Crab *Libinia emarginata.* This crab lives abundantly a very lazy life in the deeper waters near the mouth of Oyster Bay and in the bays and sounds gener-



ally that connect with the Atlantic Ocean in the latitude of Long Island. If specimens of the crab be placed immediately upon capture in an aquarium, the hydroid, if present, can be seen as a fleshy fuzzy mass in the midst of the rather abundant hairy material that covers the creature on the ventral surface quite generally. The hydroid is thus a messmate of the crab, but there is no proof that I know of that the latter is in any way affected by the presence of this lowly companion. There is a disease of a certain fish caused by the presence of a parasitic hydroid described by Fewkes as *Hydrichthys mirus*

[Bull. Mus. Comp. Zool., Vol. XIII, p. 224]. In this case however, it was not certain that the parasite did any damage to the fish. It is not impossible that a hydroid could get into such a relation to the soft tissues of a crab at the joints as to be a harmful resident there, but we know of no proof that such is true of *Perigonimus jonesii*.

An examination of the colony with the low power shows that it is a very much branched mass of stalks arising from stolons that ramify on the surfaces offered by the shelly outer covering of the host. The colony is, unlike most of the other species of this genus, very closely and luxuriantly branched, and the two kinds of persons are both carried on the same stalk. The stalks are terminated with one oldest zooid and below it are the younger ones and the gonozooids. The hydriform persons or hydrozoids are, as shown in figure 2, only slightly differentiated into a body separate from the stem and in this respect it is of the more primitive hydroid form. The tentacles are not numerically constant but are about sixteen in number. They tend, when fully expanded, to assume an alternately reflexed position. They are confined to a single row at the base of the

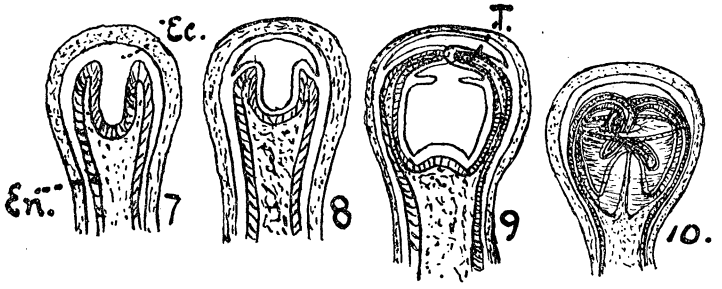


proboscis. This is also a primitive character. The stem just at the base of the body proper of the hydrozooid bears a little bud not sufficiently developed to project beyond the outline of the cuticle. The interesting thing about this hydroid to the biologist is the very primitive condition of the external skeleton. This is a gelatinous investment that covers the stem and the body in every part. It is so soft and flexible that it follows all the movements of the body and stem without any apparent resistance. This cuticle reaches upon the body to the level of the tentacles to which it is fastened, as is shown by the fact that it is moved about with them as the animal waves them to and fro, and it is retracted with them as the proboscis is drawn

down to the slight extent that is possible to the animal. The covering is of the most delicate texture but strong enough to hold firmly together in all the movements of its possessor. In the older parts the cuticle is somewhat more opaque and is more or less stuck up with dirt and such things.

The gonozoids are budded in clusters from the sides of the stem near its centre, they have an investment of cuticle which eutirely covers them, and the bell develops to its time of release but not to its maturity in this case, and can then be seen to break off from the parent stock and swim away for itself. The stages in the development of the bell are as usual in this order. They are as follows. It appears as a minute bud on one side of the stalk, and not for some time can it be seen whether it is to give rise to a medusa or to a polyp. An enlargement into a somewhat spherical head usually indicates the medusoid character of the bud. This process is quite gradual as may be seen from the figs. 4, 5 and 6, all of which, while somewhat diagrammatic, were sketched directly from living or preserved and mounted specimens. As has been said, they follow the general course of development common to the order. *Cf.* Lang, Comp. Anat., p. 105, *et seq.*

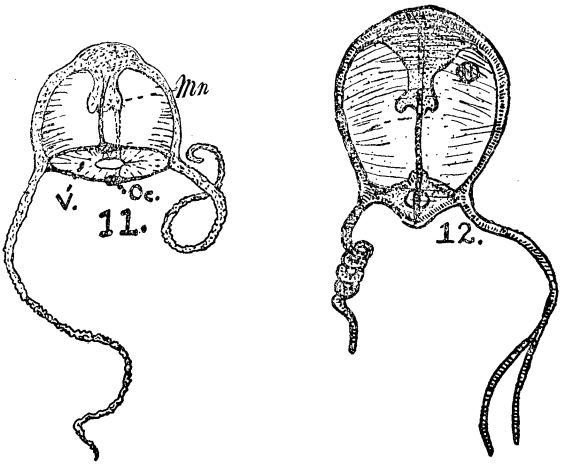
The first differential change that occurs is a thickening of the peripheral ectoderm at the extremity of the bud, with an accompanying invagination extending to the entoderm; fig. 4. This continues as shown in figs. 7 and 8. In this process



there occurs what may be designated as a cleavage of the ectoderm of the outer margin of the bud, and which extends for some distance around the bell, fig. 8. The outer portion constitutes the outer ectodermal envelopes of the medusa, and is ruptured and finally atrophies at, or immediately before, the

final separation of the medusa. The inner layer of the ectoderm continues to invaginate, making the ectodermal lining of the bell, and giving rise to the tentacles and velum. *Cf.* figs. 9 and 10.

From a glance at figs. 11 and 12, it will be seen that the



tentacles are relatively very long, but in mature specimens they are much longer than represented. Their disposition during the period of development is quite interesting. It is measurably indicated in fig. 9. They are from the first turned inward and soon enter the interior of the bell, being nicely folded and filling the entire cavity. This habit is not abandoned immediately on the separation of the medusa. In many cases under observation the medusa, when suddenly disturbed, would at once contract the tentacles, and, seeking the mouth of the bell, dispose them within, and at the same time assume an almost spherical form and thus remain for some time or till the disturbance ceased.

The development of the radial and circumferential gastric canals proceeded, *pari passu*, with the growth of the medusa. This was very easily demonstrated by the active circulation which was observed extending to the very tips of the tentacles and over the middle of the bell to unite with the circumferential canal at the optic spots. No special histological investiga-

tions were made, but it seemed highly probable that the canals arose after the manner described by Lang, (*op. cit.* p. 73.)

The development of the manubrium calls for no special account. Its origin is illustrated in fig. 9, it is also shown in fig. 3.

The origin of the mouth is simply through the rupturing of the terminal walls of the manubrium, and was observed in several cases, and seems to be after the method common throughout the order so far as known.

There is not the least difficulty in obtaining the young medusa or in keeping them alive in aquaria for a considerable period of time. We had them as long as fifteen days and examined them constantly, but we did not succeed in rearing them to maturity. At the time of their liberation from the hydroid stock the reproductive organs had not yet made their appearance.[1] Perhaps a later study of this creature will disclose a way in which this important link in the life history can be discovered. Until this important fact, the definitive form of the medusa, is supplied, the generic affinity of the species must remain in uncertainty. There are indications enough, however, to justify its provisional assignment to the genus Perigonimus of Sars. Not only are the structure of the hydroid stage and the structure of the young medusa, in favor of this, but this species shares with nearly all of the remaining members of the genus the habit of commensalism. Thus *P. repens* is found on the shells of the hermit crab, *P. minutus* lives on the shells of Turritella, *P. vestitus* is attached to the shell of Buccinum, and *P. repens* is reported from the shells of Libinia in the British Islands. The form we are now considering, while it is generically related at least in the hydroid and early medusoid stage to the Genus Perigonimus, is not, so far as we have been able to learn, specifically related to any described species. We have, therefore proposed to give it the name *Perigonimus jonesii*, to commemorate the founder and constant friend of the Cold Spring Biological Laboratory, Dr. Jones. The great luxuriance

[1] In one instance, figured in No. 12, one of the tentacles was bifid. It was distinctly double from the point of its origin and was plainly a monstrous character rarely found. Each portion of the tentacle was moved independently but both tended to be retracted together on stimulation.

of the branching, together with the origin of the medusæ from the stalks bearing the hydroid members, and the presence of several medusæ originating at a common point of attachment to the parent stem are the specific characters that have required the erection of this new species.

For convenience the species of the genus are summarized here.

P. repens, tentacles all erect, about 18–20, medusæ and hydroids simple, arising separately from a creeping hydrorhiza, young medusa bi-tentaculate.

P. minutus, tentacles 7, medusæ arising from the simple or very sparingly branched hydroid persons, on shells of Turritella.

P. vestitus, tentacles 8, alternately reflexed, medusæ arising either from the hydrorhiza or from the hydroid person, not in clusters; hydroids not branched, young medusa bi-tentaculate, On shells of Buccinum.

P. palliatus, tentacles, 8 alternately reflexed, thick gelatinous coat as far as the bases of the tentacles, gonophores arising from the hydrorhiza. On shells of the hermit crab.

P. jonesii, tentacles 16, alternately reflexed, thick gelatinous coat as far as the bases of the tentacles; medusæ and hydroids on the same stalks, hydroids luxuriantly branched and mudusæ clustered, young medusæ bi-tentaculate. On shells of Libinia.

To the morphologist a form like the one just described has peculiar interest because of the many primitive characters which are united in it. It is not improbable that the higher calyculate Campanularian Hydroids may have been descended from athecate ancestors that were more or less closely like the genus Perigonimus. This is a very lowly form of the tubularians, having only a single row of tentacles, the mode of reproduction is very simple, and the medusa is of a most simple character. Still while Perigonomus is treated among the naked hydroids, it has a covering. This covering is such a one as such an animal as the naked hydroids might have in their earlier stages of the acquisition of a strong skeleton. It is not a highly differentiated product, but a delicate, hardly compacted slime not very unlike the mucous secretions that all

animals are so commonly throwing off from their bodies. If the semi-fluid coat of this sort were stiffened only a little, we should arrive at the more compact chitinous cuticle of the calyculate forms. The case of Perigonimus thus furnishes a suggestion of the probable history of the chitinous cuticle of the hydroids; at first a thin envelope, later a stiffened cover forming a greater protection to the body and providing for freedom of motion by the development of joints at stated intervals. The facts of ontogeny are in favor of such a view of the history of the cuticle, for we know that the cuticle arises as an excretion thrown off from the ectoderm and hardened on exposure to the water. And the differences between the gelatinous and the chitinous cuticle, are such differences in the chemical or metabolic functions of cells as could conceivably easily come within the range of operation of natural selection. It is of great interest then to find so primitive an animal with so primitive a mode of skeleton building, and whether the creature is really a primitive one or its primitive characters are only secondarily acquired it is one the entire life history of which would be full of interest.

EXPLANATION OF THE FIGURES.

Fig. 1.—View of general mode of branching and situation of medusæ. *a* hydrorhiza; *b.* hydroid person; *c.* medusa bud; *d.* the gelatinous cov. *e.* a young hydroid bud.

Fig. 2.—Enlarged view of the terminal zooid showing the body, "ec," "en;" and the covering "thec;" the proboscis, "pro;" and a younger zooid, "juv."

Fig. 3.—View of a single one of the medusæ in position. *c. st,* the stem of the colony; *man.* the manubrium inside the bell; *oc,* the eye-spot at the location of a tentacle; *ten,* a tentacle.

Figs. 4, 5, 6, 7, 8, 9, 10, different successive stages in the growth of the medusa.

Fig. 11, a medusa just freed from the colony; *mn.* manubrium, *oc,* ocellus; *v.* velum.

Fig. 12, view of an exceptional specimen showing bifurcated tentacle.

Hamline, Minnesota, July 19th., 1893.