THE POLYPARIUM AMBULANS.

Dr. Korotneff, of Moscow, has just described an animal from the Philippine Sea which is causing zoologists some little trouble. The *Polyparium ambulans*—that is the name Dr. Korotneff gives the new organism—was taken by the co-director of the Franco-Russian station of Villefranche in the strait that separates the Mindanao and Billiton islands.

"When I took this animal from the trawl, it appeared to me," says he, "under the form of a glairy ball of a yellowish-gray, and of the size of a European chestnut, marked with spiral convolutions and covered with small tubercles. I isolated the body in a glass, and soon saw the convolutions unwinding, the ball changing into a sort of band of a certain thickness, each of the tubercles exhibiting a mouth-like orifice, and the entire body, to my great astonishment, beginning to climb up the sides of the glass."

In Fig. 1 the animal is represented climbing up the branches of a gorgon of the same locality. It will be seen from this figure that the surface of the *Polyparium* that is turned inwardly when rolled up is very different from the other. It is upon this surface that it moves when climbing. It somewhat recalls the ventral disk of a snail, or, better, of a climbing holothurian, and may be considered as a ventral surface. This ventral surface is marked with two longitudinal furrows that divide it into three parallel bands, one median and the two others lateral, and each being about half the width of the median. The two lateral bands are not exactly alike, so that the animal is not perfectly symmetrical. The median band is provided with transverse series of

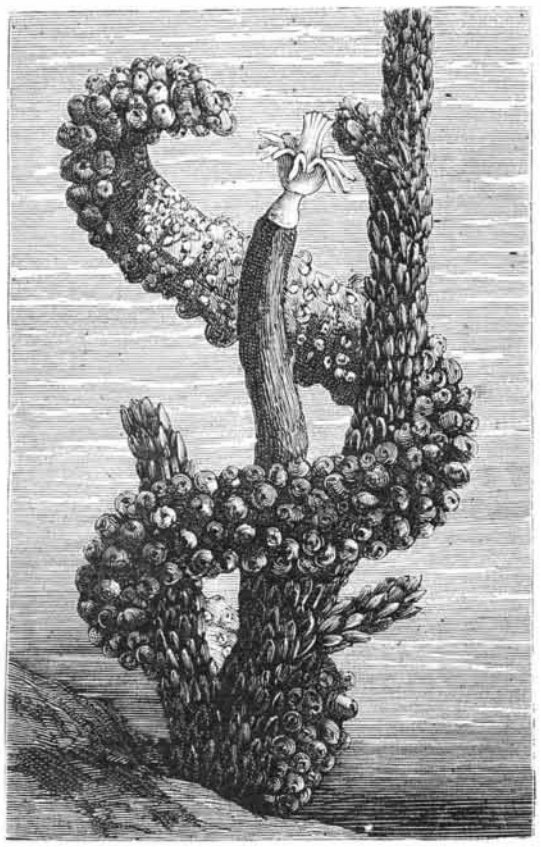

Fig. 1.—THE POLYPARIUM AMBULANS.
(TWICE NATURAL SIZE.)

suckers, each of which is placed exactly opposite one of the nearly spherical tubercles which carry the orifices of the dorsal side. This correspondence of the dorsal tubercles, *t*, and ventral suckers, *v*, is clearly seen in Fig. 2, No. 1, which represents a vertical and longitudinal section of a small portion of the *Polyparium*. In this section we remark that the band that constitutes the body of this singular organism is hollow, and that its cavity is divided into successive chambers, *l*, by transverse partitions, *c*, arranged like those that separate from each other the segments of the body of an annelid worm. But here there is an important difference. In an annelid worm the partitions that succeed one another separate chambers that resemble each other, and their two surfaces are nearly alike. Here the partitions have dissimilar surfaces, and are grouped in pairs, so as to turn their like faces toward each other and thus limit transverse chambers (Fig. 2, No. 1, *l*), that are separated from each other by empty spaces, *e*. In the chambers, *l*, the hollow tubercles open at *p*, the cavity communicating with the exterior through the intermedium of the dorsal orifices already mentioned.

Taking merely the general form of the body into account, and the regular repetition of the transverse partitions, the *Polyparium* might be considered a worm; but, if it were a worm, a digestive tube ought to pass through the partitions, and open externally in a single orifice. But that is not the case here. The digestive tube is totally wanting. It is the wall of the chambers that has to digest the food materials, and the latter can be introduced into the chambers themselves only through the intermedium of the orifices of the dorsal tubercles. Consequently these orifices must really be considered as so many mouths.

Now, in the entire animal kingdom, the sponges and polyps are the only animals in which the walls of the body perform the digestive functions, the body being thus only a sort of stomach. Despite its vermiform appearance, then, the *Polyparium* must be placed near these animals. On another hand, one well defined character distinguishes the polyps from the sponges, and that is the presence in the external layer of thin integuments of innumerable capsules filled with a venomous liquid, which a spirally wound thread, capable of untwisting at the least contact, causes to penetrate the bodies of animals exposing themselves to such contact. This is the cause of the burning sensation that the large sea anemones and medusas produce when they are touched. The wall of the *Polyparium's* body is stuffed with such stinging capsules, and the animal is, therefore, a polyp, and the structure of its body walls, minutely studied by Korotneff, assigns it a place very near the sea anemones or actinias. Here begin the difficulties.

For elementary teaching, naturalists have had the habit of selecting in the animal kingdom a certain number of types representing, for them, the fundamental forms that animals can assume. These types are, in a manner, stereotyped in their mind, and they include in them all aberrant forms, without occupying themselves about the manner in which the types themselves have been constituted. The sea anemones or actinias are just one of such types, and they serve as a starting point to explain the structure of the polyps that make up the large and important class of corallia. Dr. Korotneff then endeavored to find out how the organization of the *Polyparium* could be connected with that of the actinias, the tissues of which are here reproduced in microscopical structure. The task was not easy. A few words will suffice to explain the difficulty. In the first place, the aspect of the actinias is very different from that of the *Polyparium*. An actinia is like a stemless flower whose animate petals are arranged in numerous concentric series around a central orifice, which is the mouth. The petals of these movable flowers are called tentacles. Fig. 2 (Nos. 2 and 3) represents transverse sections through the body of two of these actinias, an *Alcyon* and a *Ceriantha*. In this figure the central ellipse, *g*, is a section of a tube open, below which succeeds the mouth, and which some consider as a stomach and others as an œsophagus. The radiating cells, *l*, comprised between the central circle and the external one, *c*, which represents the wall of the body, each forms a continuation of the tentacle. As the œsophagal tube has in general a length much less than that of the body, the partitions that separate these cells soon become free from the internal side, and the cells all open in the central cavity of the polyp's body. The same partition is common to two consecutive cells.

All this agrees but little with the organization of the *Polyparium*. Here there is no œsophagus. The cells do not communicate with a central cavity, and are, on the contrary, entirely separate from each other. Moreover, the transverse partitions, whose arrangement is so strange, are not common to two consecutive cells, but each cell has its own walls, separated by an empty space from the walls of the two contiguous cells. The difficulty may be diminished by remarking with Dr. Korotneff that the cells of sea anemones are arranged symmetrically on each side of two odd cells, as clearly shown in Fig. 2, Nos. 2 and 3, *i l*. If the œsophagal tube disappeared, and the partitions were elongated to the center of the polyp, they would necessarily meet in pairs and become united, and constitute an organism that would not be without some analogy with the *Polyparium*.

We know, on another hand, corallia, such as the meandrinas and dendrogyras, in which the cells are arranged on each side of long, sinuous galleries, on the median line of which are found numerous mouths. Dr. Korotneff thinks that the *Polyparium* is the equivalent of one of these galleries—a *Meandrina* without tentacles and with numerous mouths arranged in a large number of transverse series, instead of being arranged in a single longitudinal series. To this interpretation Mr. Ehlers opposes another. To him the tubercles of the *Polyparium* are so many tentacles provided with a mouth, and, in fact, the tentacles of some of the actinias of our coasts are perforated at the summit, and, according to Hertwig, in a certain number of deep sea actinias each tentacle is provided with a well developed mouth at the apex. The tentacle may even be abortive and the mouth alone remain, and this doubtless brings us near to the *Polyparium*.

While to Dr. Korotneff the *Polyparium* is a coralloid with numerous mouths and without tentacles, to Ehlers, on the contrary, the animal is a coralloid with perforated tentacles, but no mouth. Mr. Ehlers even asks if the animal is not a single large fragment of a deep sea actinia mutilated by a fish. The arrangement, however, of the transverse cells separated from each other by an empty space removes all foundation from such a supposition. It does not, any more than does Korotneff's theory, explain why each cell has its own walls separated from the walls of the contiguous cells, nor why several orifices correspond to the same transverse chamber. Messrs. Ehlers and Korotneff both accept the coralloid as an ideal type to which the *Polyparium* must be likened, without asking what the former itself may be.

We have already shown that the coralloid polyp is but an assemblage of simpler polyps closely united and forming an association in which the associates have divided up the roles. The central polyp alone has preserved a mouth, and it swallows and digests for its associates, which in general have no mouth, but capture the prey that the central polyp digests. They thus descend to the rank of tentacles. We have seen that it is not always thus, and that in a long series extending from the *Bunodes* to the *Liponema* each tentacle-polyp can preserve its own mouth. But this is not the only mode of association shown by these polyps. Nothing obliges them to arrange themselves in concentric circles around a central individual, and nothing obliges them to unite so exactly that their walls are confounded. In the majority of forms intermediate between the hydroid and coralloid polyps, such union does not take place, all the polyps living distinct. It is nearly so with the *Polyparium*. Here the polyps are arranged in transverse rows—an arrangement doubtless favored by the movements that determine locomotion. Each row dwells completely distinct from its neighbors, but the polyps of the same row are closely united, the walls separating them have disappeared, as have the internal walls of the cells of the coralloids, and all together no longer form anything but one and the same transverse chamber.

The close correspondence of the suckers of the ventral surface and the tubercles of the dorsal prove that it is really thus. The polyps have in this way formed an association exactly comparable to that remarkable association of bryozoa called *Cristalella*. On the whole, the tubercles are comparable to the tentacles of the corallia, as Ehlers says, and their orifices are indeed mouths, as Korotneff will have it; but the *Polyparium*, an association of hydroid polyps, like the coralloid polyp, has not presented the same mode of division of the physiological work that the latter has.—*La Nature.*

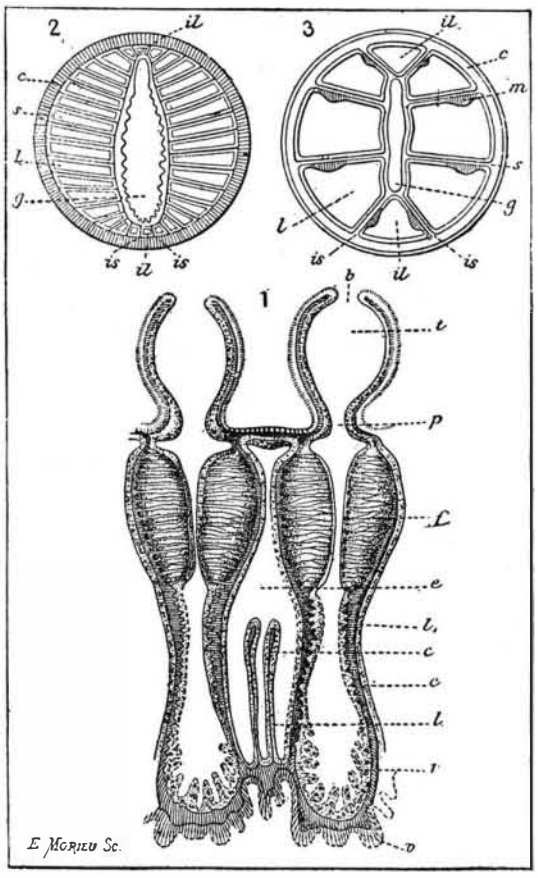

Fig. 2.

No. 1, vertical section through two cells of the polyparium: *b*, mouth; *c*, partitions; *e*, space between two cells; *l*, cavity of the transverse cells; *f*, thick transverse bands; *p*, pharynx; *t*, cavity of the tubercles; *r*, entodermic folds; *v*, sucker. No. 2, transverse section through the upper region of a sea anemone. No. 3, section through the upper region of an alcyonium: *c*, body wall; *l*, lateral cells, even and symmetrical; *i l*, odd cells; *si s*, partitions; *g*, stomachal tube.

New Army Rifles.

President Carnot, before his late journey to Upper Savoy, officially inspected the military school of St. Cyr, and the pupils, according to his request, were directed to test the rapidity of fire between the modified Gras and the regulation Lebel rifles. In the space of 30 seconds the competitors provided with the new pattern firearm had discharged 150 cartridges more than the Gras section, both the parties numbering 50 barrels each. With the magazines in action for continued fire, it was found that the Lebel could deliver double the number of shots to the Gras for an equal lapse of time. The whole of the German army is now armed with the magazine rifle, and commentators have observed that the advent of some marked advance in war equipment in the German army has always been followed by war.