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Les jeunes Physalies

Note supplémentaire sur le développement postembryonnaire de la Physalie[1)]

par

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Avec 3 figures dans la texte

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Il est sans fondement de supposer que la Physalie, comme la Velella ou la Portita, vive pendant son premier stade de larve à une grande profondeur dans la mer ; toujours est il que ce stade de développement est resté inconnu jusqu'à présent. Mais il semble qu'une véritable planule vient se former chez cet animal Cystonectide, comme chez les Auronectides et les Physonectides dont il se rapproche très étroitement. Cette planule à venir est évidemment bipolaire, s'allongeant sur un axe. Bientôt à un des pôles de la larve, l'ectoderme s'épaissit en un nodule qui donnera naissance à la glande gazogène, et à la plus grande étendue ce pôle s'effrondre pour donner naissance à une pneumatocyste. L'autre pôle, continuant à s'allonger et ouvrant une bouche à son extrémité, devient le gatrozoïde primaire. Il va sans dire que le filament pêcheur viendra se développer à la partie basale de ce dernier. Il est à croire que la larve nagean d'abord au moyen de cils excessivement fins prend ici une forme du plancton nommée " Siphonula " (HAECKEL, 1888).

La larve siphonule représentée par HAECKEL (1888, pl. XXVI, fig. 2) offre cependant une forme assez éloignée de la réalité. En somme, l'imagination ingénieuse de l'auteur aurait donné à la larve un pneumatocyste plus gros qu'il ne lui fallait et remplacé le gastrozoïde primaire par celui de l'animal adulte. À ce point de vue, il

1) Mem. Coll. Sci. Kyoto Imp. Univ., Ser. B., Vol. VIII (1932) No. 1 (Art. 1)

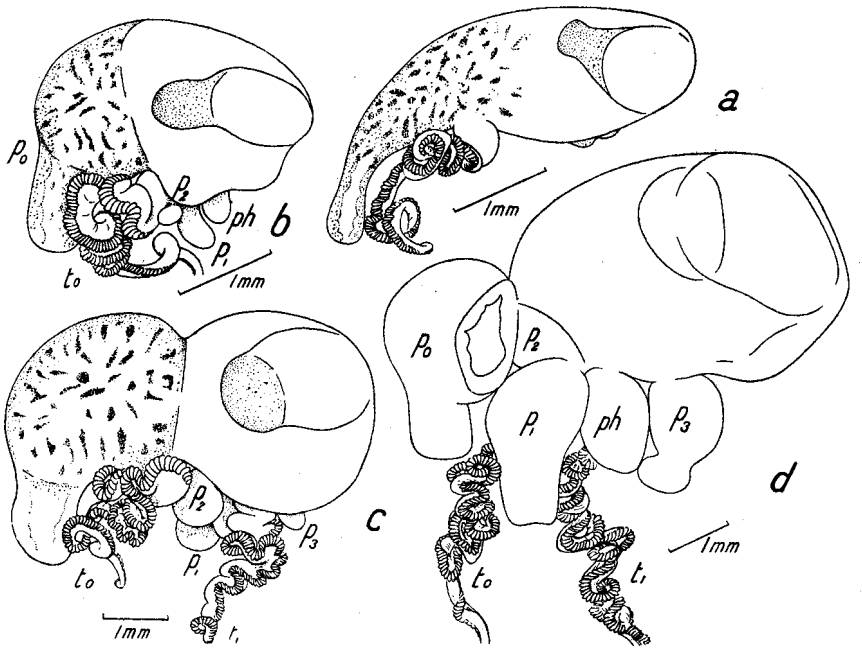

Fig. 1. Quatre stade primaires du développement postembryonnaire de la Physalie Pacifique :— p_0, gastrozoïde primaire ; p_1—p_3, gastrozoïdes secondaires ; *ph*, phylloméride ; t_0, tentacule primaire ; t_1, tentacule secondaire (ceci se développe au tentacule principal).

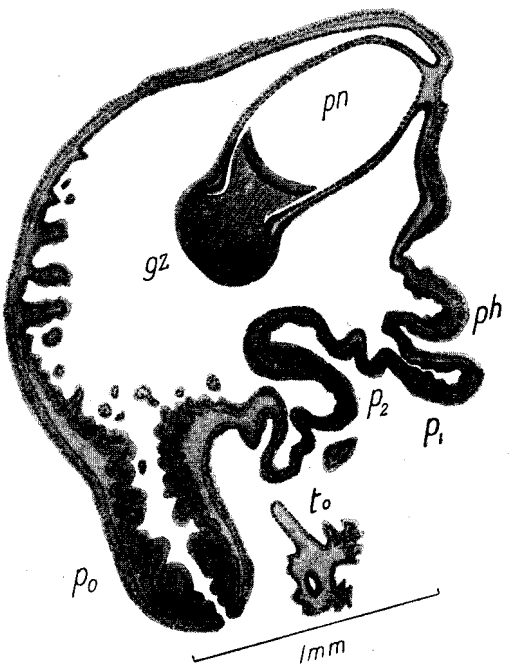

Fig. 2. Coupe médio-longitudinale du spécimen dessiné à la fig. 1. *b*.

paraît que la forme de la Physalie la plus jeune, décrite par HUXLEY (1859, pl. X, fig. 1) correspond mieux à la réalité.

La plus jeune siphonule que nous avons trouvée dans le plancton au Laboratoire Maritime de Seto au printemps dernier, avait une longueur de 4 mm environ, et comme la fig. 1 *a* le montre, elle présentait une sorte de tige recourbée d'un côté et pourvue à son extrémité obtuse d'un pneumatocyste. Ce dernier mesure à peine un millimètre de diamètre et on y voit une glande gazogène relativement grande qui est liée à son extrémité. La larve se recourbe vers le bas un peu au-dessous du milieu de son corps et à partir de là va en s'effilant dans la partie du gastrozoïde, qui pourvu d'un filament pêcheur déjà très développé. D'ailleurs, sur le spécimen que nous avons observé, le développement d'un polype se laissait prévoir à la face inférieure du flotteur.

Au point de vue de l'évolution postembryonnaire, il y a une assez grande différence entre cette jeune Physalie et celle qui a été décrite dernièrement comme siphonule de HAECKEL au deuxième stade (OKADA, 1932, fig. 1, p. 3). Nous en avons pu rencontrer encore dans le plancton observé le printemps dernier un assez grand nombre de types intermédiaires. Ce sont ces types que l'on trouvera à la fig. 1 *b*, *c* et *d*. Par leur comparaison est mis en évidence l'ordre de stade évolutif d'un seul polype (fig. 1 *a*) à plusieurs, les polypes apparaissant l'un après l'autre à la face inférieure du flotteur qui, dans l'intervalle, se développe de plus en plus.

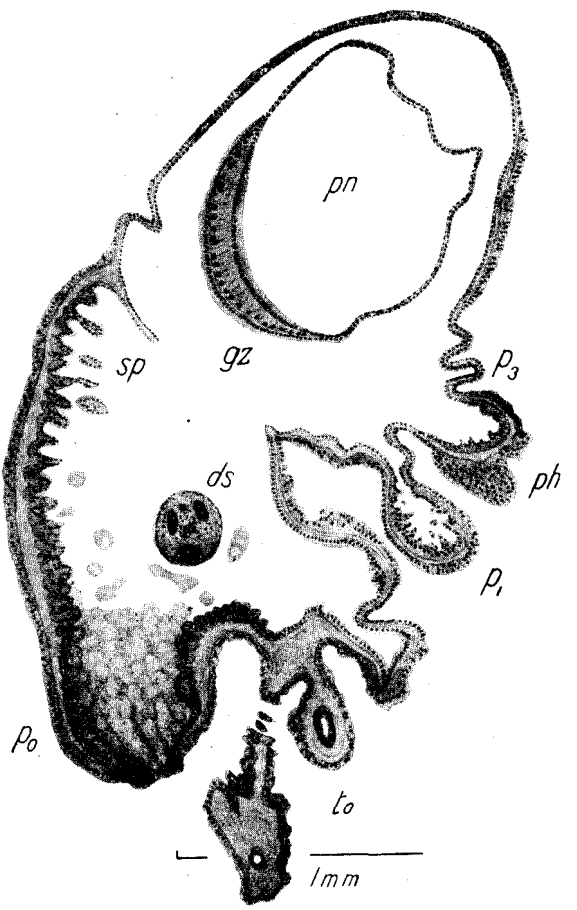

Fig. 3. Coupe médio-longitudinale de la jeune Physalie indiquée par la fig. 1 *c*:— *ds*, larve de distome; *gz*, glande gazogène; *pn*, cavité pneumatique; d'ailleurs, même notation que dans la primaire figure.

Dans une très jeune Physalie, l'intérieur du flotteur c.-à-d. la cavité péripneumatique et l'intérieur du gastrozoïde primaire communiquent directement l'un avec l'autre, comme il est indiqué par HAECKEL (*l. c.*, p. 340) ; la séparation de ces deux cavités est un phénomène qui se manifeste relativement tard, à l'époque où la siphonule est à son deuxième stade. La fig. 2 donne une coupe médio-longitudinale de la larve indiquée à la fig. 1 *b* ; à ce stade, nous ne trouvons aucune limite pouvant séparer la cavité du gastrozoïde et celle du flotteur, sauf un bon développement de la première en villi hépatiques. La fig. 3 présente également une coupe médio-longitudinale du spécimen de la fig. 1 *c*. On y voit qu'un septum (*sp*) fait nettement son apparition sur le côté dorsal du gastrozoïde primaire. Disons ici en passant, que c'est après ce stade qu'apparaissent les larves du distome (*ds*) dans la cavité du gastrozoïde ; il semble qu'il y ait un certain rapport entre la formation du septum et l'achèvement de la bouche qui termine ce dernier.

Enfin la structure d'une jeune Physalie réste d'une grande symétrie jusqu'à ce que le quatrième gastrozoïde secondaire se soit formé au-dessous du flotteur, tandis qu'elle ne l'est à partir de la formation du cinquième polype généralement à gauche et du deuxième tentacule en conformité avec le côté droit (cf. la description précédente de la larve au stade V, *l. c.*, p. 8).

Okada (1935)

Young *Physalia*s
Supplementary note on the postembryonic development of *Physalia*[1]

Yo. K. OKADA

There is no basis to assume that *Physalia*, like *Velella* and *Porpita*, spends its first stages of larval life in the depths of the ocean; but this stage of development has remained unknown up to the present. But it seems that a true planula is formed in the cystonectid animal, as in the auronectids and physonectids, which they closely approach. This planula is obviously bipolar, lying along an axis. Soon, at one end of the larva, the ectoderm thickens into a lump which will give rise to the gas gland, and the largest part of that pole collapses to give rise to the pneumatophore. The other pole continues to extend and a mouth opens at its end, which becomes the primary gastrozooid. It goes without saying that the tentacle will develop at the base of the latter. It is probable first swims using very fine cilia and one comes to find the type of plankton called "Siphonula" (Haeckel, 1888)

The larval siphonula shown by Haeckel (1888, P. XXVI, fig. 2), however, shows a form quite different from reality. In summary, the ingenious imagination of the author would give to the larva a pneumatophore so large that it would be necessary the primary gastrozooid with that of the adult animal. From this point of view, it appears that the shape of the youngest *Physalia* described by Huxley (1859, Pl. X, fig. 1) corresponds more to reality.

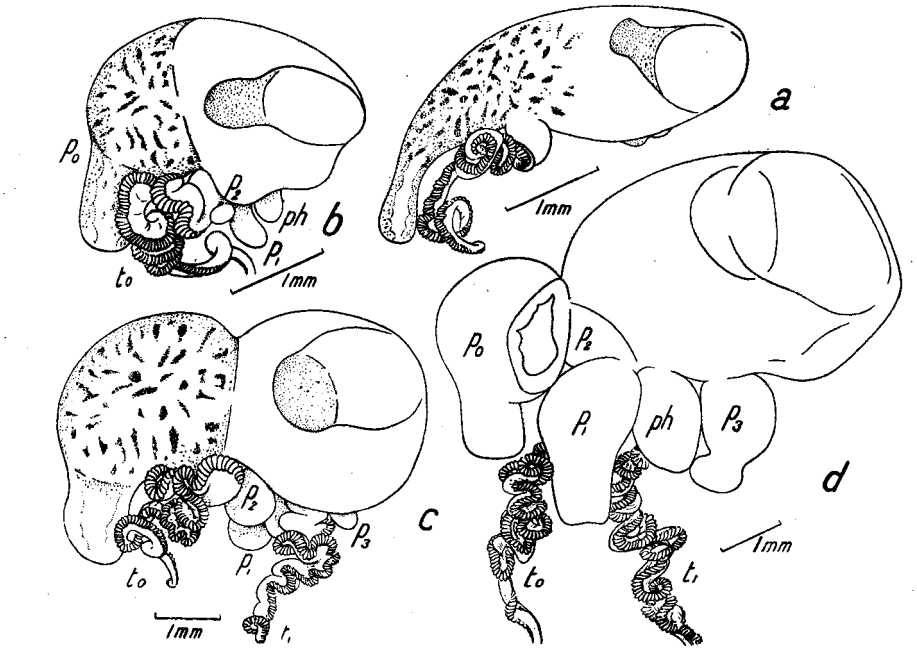

Fig. 1.
Four primary stages of postembryonic development of the Pacific *Physalia* – pa, primary gastrozooid; p1-p3 secondary gastrozooids; ph, ampulla; t_0, primary tentacle; t_1, secondary tentacle (this develops into the main tentacle)

The youngest siphonula that we have found in the plankton at the Seto Marine Laboratory during the spring had a length of approximately 4mm and, as is shown in Fig.

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1, it was like a rod curved on one side and with a pneumatophore at its obtuse end. The latter measured only 1mm in diameter and had a relatively large gas gland that lay at its end. The larva curves down a little below the middle part of its body and from there tapers down into the gastrozooid, which is provided with an already quite well developed tentacle. Moreover, on the specimen we looked at, the development of a polyp is foreshadowed on the underside of the float.

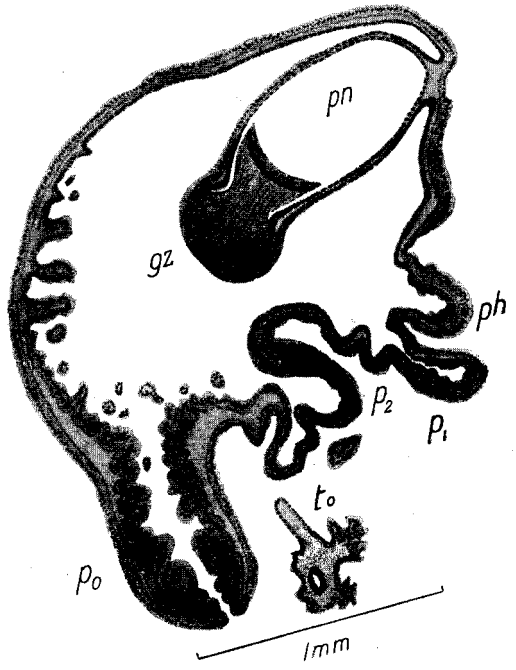

Fig. 2.
Median longitudinal section of specimen drawn in Fig. 1b.

In terms of postembryonic development there is a quite large difference between this young *Physalia* and that which has been recently described as the second stage of the siphonula of Haeckel (Okada, 1932, fig. 1, p. 3). We have again encountered in the spring plankton a large number of intermediate stages. These are forms that can be seen in Fig. 1b, c, d. Their comparison is shown in the order of evolutionary stages from a single polyp *(Fig. 1a) to several, the polyps appearing one after the other on the lower side of the float that, in the meantime, grows more and more.

In the very young *Physalia*, the inside of the float, i.e. the pericystic cavity, and the inside of the primary gastrozooid are in direct communication, as indicated by Haeckel (l.c. p. 340); the separation of these two cavities is a phenomenon that manifests itself relatively late, at the time when the siphonula is in its second stage. Fig. 2 shows a median longitudinal section of the larva illustrated in Fig. 1b; at this stage one finds nothing separating the cavity of the gastrozooid and that of the float, except for a good development of hepatic villi in the former. Fig. 3 is also a median longitudinal section of the specimen shown in Fig. 1c. It shows that a septum (sp) has clearly appeared on the dorsal side of the primary gastrozooid. It can be said in passing that after this stage larval distomes (ds) appear in the cavity of the gastrozooid; and it appears that there is some relationship between the development of the septum and the completion of the mouth which terminates the latter.

Finally the structure of a young *Physalia* remains greatly symmetrical as up until the fourth secondary gastrozooid is formed below the float, while it is from the formation

of the fifth polyp generally to the left and of the second tentacle in conformity with the right side (cf. the previous description of the larva at Stage V, l.c. p.8)

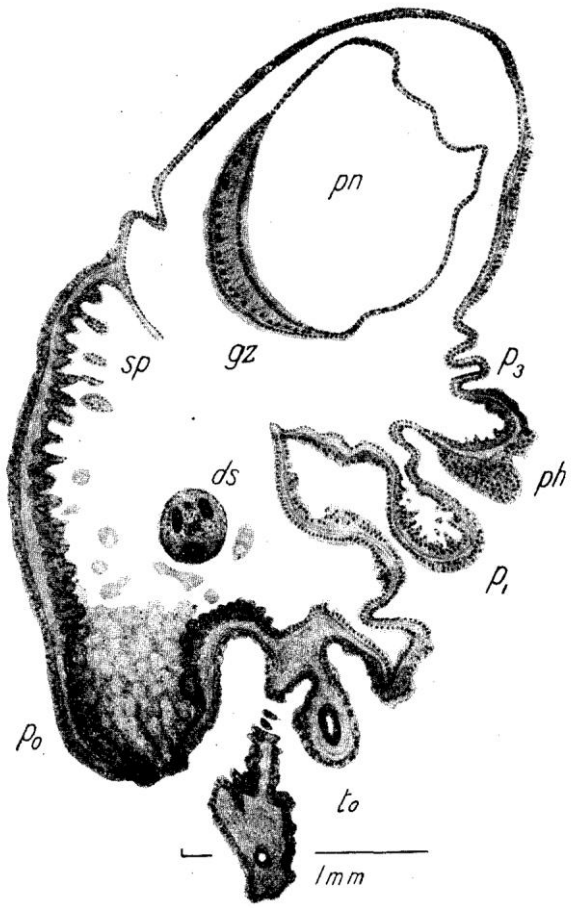

Fig. 3.
Median longitudinal section of the young *Physalia* shown in Fig. 1c: ds, distome larva; gz, gas gland; pn, pneumatophore; otherwise the same notation as in the first figure.

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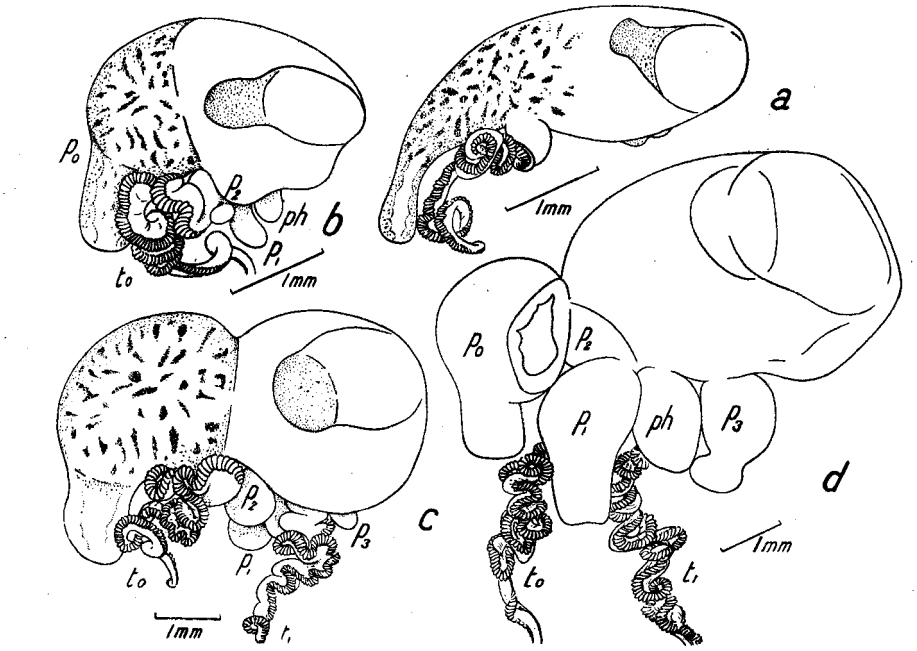

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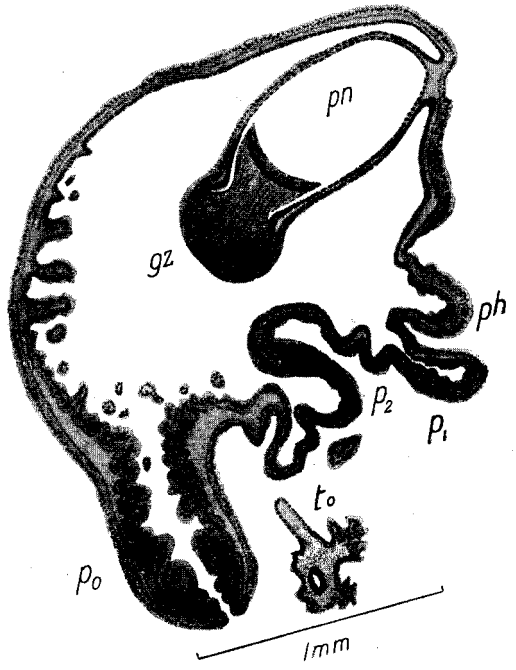

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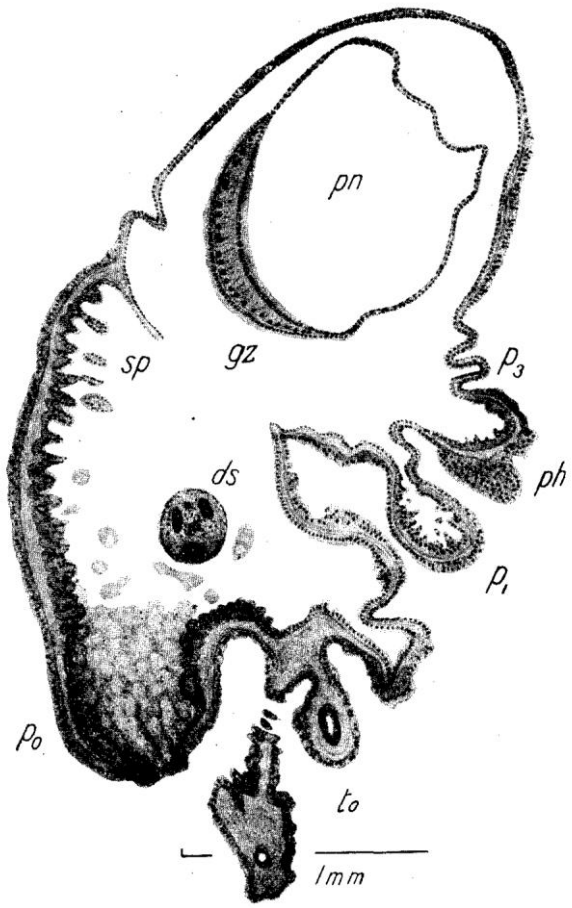

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