Or io non volli altro che rilevare come dalle mie ricerche (incomplete o meno) risultasse un concetto semplice sull' origine dei nervi cerebrali (II, III, V, VIII, X) e sulla struttura del cervello dei teleostei, concetto che trovavasi in armonia colle idee di Gerlach sull' origine dei nervi spinali; e che l'origine del nervo ottico non faceva eccezione (come avrebbe fatto, se i reperti di Fritsch fossero stati veri) al tipo generale di origine delle radici sensitive dei nervi del midollo spinale ed allungato. Sostengo ancora queste idee che le ricerche fatte nelle varie classi di vertebrati ed anche in invertebrati sempre più confermano.

Aggiunge Fritsch che i miei reperti istologici, se anche fossero veri, non dimostrerebbero nulla per le omologie. Che non dimostrassero tutto, consento, che non dimostrassero nulla no: se non altro dimostrano che le omologie di Fritsch, fondate sulla natura istologica, e sui rapporti del tetto ottico sono false. Anch' io ho detto che per le omologie speciali mancano »sufficienti dati comparativi e embriologici«. La quistione delle omologie è molto ma molto complessa; e prima di tutto bisognerà bene intendersi sul significato delle parole.

Intanto debbo constatare che, dopo la pubblicazione del lavoro di Fritsch, le ricerche di varii naturalisti, fatte da punti di vista diversi, hanno condotto a ritener false le idee fondamentali di lui.

7. Note from Chesapeake Zoological Laboratory. Development of Tubularia cristata.

By H. W. Conn in Beaufort.

The development of Tubularian Hydroids has been a subject of some dispute. The latest paper on the subject, that of Ciamician (Zeitschr. f. wiss. Zool. 32. Bd.) describes an irregular segmentation resulting in an epibolic gastrula. This result so out of accord with the development of other hydroids has been much questioned and denied. With the abundant opportunity afforded me here at Beaufort I have made a careful study of the Tubularian embryo, and find that its development agrees completely with other Hydroids.

The species worked upon is *Tubularia cristata*, which would of course present only specific differences from the species used by Ciamician. I find that Ciamician's figures are only partially correct: that moreover they are superficial, and that he puts a wrong interpretation upon them. He studied the egg alive, by keeping the separate medusae or clusters of them in a chop of water, under observation. This method as he admits is open to great difficulties and chances for error. The medusa is completely filled by the eggs; two, three, four, or even more

of them being crowded into a comparatively small space. The eggs are thus very much distorted and never assume a spherical form. Assuming as they do a great variety of shapes, it is difficult to get a view of them which shows correctly what is taking place. This is particularly true of the earliest stages. To add to this difficulty the spadix is continually undergoing movements, which constantly changes the view. To avoid the sources of error thus incurred, I removed the egg completely from the medusa and examined it by itself. Further I have hardened the eggs in osmic acid and studied them by sections. Both methods show conclusively that there is no approach to an epibolic gastrula. The segmentation is not perfectly regular and very frequently presents appearances which resemble an epibolic gastrula. Further study however shows that this resemblance is only superficial, being due to slight irregularities and to difficulties of observation. The segmentation proceeds in a perfectly normal way and a typical morula is reached. The morula is never spherical but is somewhat disk-shaped owing to the pressure of the medusa wall. As the segmentation goes on the cells become less and less distinct, until finally a stage is reached in which all traces of segmentation have externally dissapeared. The embryo lies now quite freely in the medusa cavity, entirely free from the spadix. It is this which Allman has considered the Tubularian egg. The stages of segmentation escaped his notice entirely. It is really as we see the egg in quite an advanced stage of development. The embryo is now transformed into an actinula, essentially as Ciamician describes.

Sections at various stages confirm the above results. No traces of a differentiation into two layers is seen until the segmentation is quite far advanced. The ectoderm makes its appearance quite slowly and sections show it to be a true determinate ectoderm. The endoderm appears somewhat later. After the ectoderm has become perfectly distinct, a layer of cells, very indistinct at first but becoming more and more definite, is seen just within the ectoderm. This endoderm absorbes the food mass within and soon forms a layer, one row of cells thick. At the bases of the tentacles however it is several rows thick. Just before the actinula becomes free two layers are perfectly definite and enclose a distinct central cavity.

The segmentation and formation of the germinal layers as above given, coincides completely with Coelenterates in general. *Tubularia*, which has been considered somewhat of an anomaly in hydroid development, presents thus no noteworthy differences from the rest of the Hydroids.

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