REPORT

ON THE SCIENTIFIC RESULTS

OF THE

"MICHAEL SARS" NORTH ATLANTIC DEEP-SEA EXPEDITION 1910

CARRIED OUT UNDER THE AUSPICES OF THE NORWEGIAN GOVERNMENT AND THE SUPERINTENDENCE OF

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CTENOPHORA

FROM THE

"MICHAEL SARS" NORTH ATLANTIC DEEP-SEA EXPEDITION 1910

BY

DR. TH. MORTENSEN

WITH 1 PLATE AND 4 FIGURES IN THE TEXT

The material of Ctenophora collected by the "Michael Sars" Expedition is not very large, but upon the whole in a fairly good condition. The specimens are preserved in formaline, which has the great advantage of keeping them nearly as transparent as the living specimens.

The species found are only five, viz. *Pleurobrachia pileus* (O. Fr. Müller), *Mertensia ovum* (Fabr.), *Beroë cucumis* Fabr., *Beroë Forskåli* M. Edw. and a new deep-sea Ctenophore, which is described here under the name of *Aulacoctena acuminata* Mrtsn. That these five species represent all the Ctenophores met with by the expedition, is rather improbable. It can scarcely be doubted that also some Lobate Ctenophores have been taken, but as these can only be preserved when treated separately and with the utmost care, it could not be expected that specimens should be found in the preserved materail, it being nearly impossible on such an expedition to find the time necessarry for the proper treatment of these difficult objects.

While the four firstnamed species afford little interest beyond the distribution, the deep-sea form is of unusual interest. Hitherto only two deep-sea Ctenophores have been found. The German Deep-sea Expedition, by which deep-sea Ctenophores were for the first time observed, found in the Atlantic and Indian Ocean a form apparently allied to *Mertensia.* The same form was also taken by the German South Polar Expedition, one specimen off Kerguelen, another off the Cap Verde Islands, and was described by Dr. F. Moser[1]) under the name of *Mertensia Chuni.* Also a deep-sea Cydippid was taken by the German deep-sea Expedition; it is still known only from the short notice given by Chun[2]). The new form discovered by the "Michael Sars" is thus only the third deep-sea Ctenophore made known, and from that reason alone may attract attention. The study of its anatomy has considerably increased its importance. While in general it agrees with the morphology of the Ctenophores as hitherto known, especially from the surface forms, it affords several new and important features, which necessitate the establishment not only of a new genus for it, but also of a new family, to which the *„Mertensia“ Chuni* evidently likewise belongs.

It would be very interesting to learn the anatomical structure of the deep-sea Cydippid from the German Deep-sea Expedition, in order to see, whether this form perhaps also belongs to the same family. That it is stated to be a "Cydippe", evidently, means nothing more definitely beyond the fact that it is a tentaculate Ctenophore of the order Cydippidea. This concerns the question, whether all deep-sea Ctenophores belong to the same family or whether deep-sea forms have developed within several of the larger groups of the Ctenophores. It is, of course, impossible to say anything more definitely at present about this very interesting problem, so long as the whole number of deep-sea forms known amounts to no more than three, of which only two have been studied. But the fact that these two forms, though so very different looking, appear to be nearly related, is already suggestive, and it is certainly not inappropriate to call attention to the problem already now.

That there will prove to exist still more deep-sea Ctenophores, can scarcely be doubted. It is noticeable, it is true, that only these few forms have been found in all the many deep-sea tow-nettings hitherto carried out, and this is certainly not suggestive of the existence of a great number of different forms of deep-sea Ctenophores. But the fact that only so few specimens of these forms have been found counterbalances this evidence. It is beyond doubt that these forms must exist in vast numbers somewhere — this is simply necessary for the existence of the species. But when we have in all found only 6 specimens of one form *("Mertensia" Chuni),* 3 of another (the new form from the "Michael Sars") and one specimen of the third (the Cydippid of the German Deep-sea Expedition), this fact evidently means that there still remains much to be discovered in regard to the occurrence of these forms — and there are then ample possibilities for the existence of other, hitherto undiscovered forms among them. Even with regard to the occurence of the surface

[1]) F. Moser: Die Ctenophoren der deutschen Südpolar-Expedition. Deutsche Südpolar Exp. 1901—1903. Bd. XI. Zoologie III 1909, p. 126, Taf. XX Fig. 1—4.

[2]) C. Chun: Aus den Tiefen des Weltmeeres. II Aufl. 1905. p. 545,

Ctenophores there are still many unsolved problems; it is then not to be wondered at that this also holds good for the deep-sea forms.

The new form discovered by the "Michael Sars" was taken on Station 64 (34° 44′ N., 47° 52′ W. 2000 m. wire; $^{24}/_{6}$ 1910), in young fish trawl, 2 specimens, one large and one small; station 81 (48° 2′ N. 39° 55′ W., 1500 m. wire; $^{17}/_{7}$ 1910), in $^{3}/_{4}$ m. net, fragments of a large specimen. The small specimen was sacrificed for sections, which, however, proved very poor and of little use. The animai being very little transparent, it was necessary, in order to study the anatomical structure, to make dissections. For that purpose the fragments from Stat. 81 proved very useful, so that the large specimen from Stat. 64 could be spared to some degree.

The photographs (Pl. I, figs. 1—4) were made by Docent R. H. Stamm. I beg herewith to express my thanks for his kind assistance.

I shall describe this form under the name of

Aulacoctena acuminata n. g., n. sp.

The large specimen measures 45 mm. in length, 21 mm. in breadth. It is distinctly compressed after the sagittal axis, measuring only 16 mm. in thickness.

The outline of the body (Pl. I, fig. 1) is ovate, narrowing slightly towards the oral end. The aboral end is produced into a long, slender process, measuring — as is seen from the figure of the small specimen (Pl. I, fig. 3) — about $^{1}/_{5}$ of the total length. (In the large specimen this apical prolongation was partly lost, and this was also the case in the broken specimen). Along each side of the body, between the subtentacular costae, there is a very deep furrow (Pl. I, fig. 2), in the bottom of which lies the tentacular apparatus. The furrow continues from the oral end nearly to the tip of the apical prolongation. The mouth edge forms two rounded lobes, in the transversal plane; the corners are, however, not so deep as would appear from fig. 2, the furrow being here somewhat split up at the lower end. Also between the other costae the body may be somewhat depressed, but this is evidently due to the preservation.

The costae are nearly equal in length, the subtentacular ones being only slightly longer than the others; they cease at about $^{1}/_{4}$ of the body length from the oral end—judging from the furrows in which they are retractet; the combs could not be discerned so far down. On the aboral prolongation the costae continue nearly to the tip.

The aboral prolongation is deeply invaginated on the top, being thus a hollow tube. The bottom is slightly widened and elevated in the middle, and here lies the apical organ. (Pl. I, fig. 5). The costae continue as ciliated ridges down along the inside of the tube to the apical organ. (I have been unable to discern with certainty more than 4 of them, but that all 8 costae continue to the apical organ in the same way can scarcely be doubted). Of the structure of the apical organ I can give no information. The polar fields continue some way up the inside of the tube—how far, could not be ascertained, the tip being broken; but in any case, it will be nearly to the upper edge. Close to the apical organ, in the bottom of the invagination, lie the two excretory pores, in the typical oblique position, not in the median sagittal line.

The gastrovascular system. (Pl. I, fig. 5 textfig. 1—3). From the rather small, flattened infundibulum proceeds a short, spacious infundibular canal. The excretory canals are very short; whether they are simple or divided in the usual way, could not be settled; but the fact that the pores lie distinctly to the side would seem to indicate that they are divided, the one branch forming a blind ampulla. The adradial vessels issue separately, not from a common interradial vessel (see the diagram, textfig. 3, compared with fig. 4, the diagram of a typical tentaculate Ctenophore). The subsagittal adradial vessels issue directly from the infundibulum, very close to the median line. They proceed downwards, close to the pharyngeal wall, for nearly half the length of the pharynx, giving off sligthly branching, but not anastomosing, proliferations along their inner and abradial, but not along the adradial side. About halfway down a branch passes outwards to the meridional vessel, while the adradial vessel continues downwards, ending blindly (texfig. 1). The subtransversal adradial vessels issue distally, over the tentacle basis. They give off each one long branch, which passes downwards as a simple canal, parallel to the tentacle sheat, ending blindly. In the broken specimen only one of the adradial subtransversal vessels gave off this branch (textfig. 1 and 2).

The meridional vessels continue aborally from the entrance of the adradial vessel nearly to the tip of the apical prolongation. In their whole length the meridian vessels give off numerous proliferations to both sides. These are white and, as they lie close to the surface, very conspicuous, forming one of the most prominent features of the animal. They issue not regularly alternating or opposite and are alternatingly — but not regularly — shorter or longer, the longer ones being often more or less branched. They do not form anastomoses, but may cover one another more or less, as they are so numerous and large that there is not room for them all in the same plane. Those issuing from the subtentacular vessels along the lateral furrows are especially conspicuous and beautifully arranged (Pl. I, fig. 8). None of the proliferations pass through the jelly to the pharyngeal wall, as is the case in *Beroë*, where there is otherwise a similar arrangement of proliferations from the meridional vessels.

The pharyngeal vessels issue close to the tentacular basis. They proliferate like the pharyngeal part of the subsagittal adradial vessels; in the lower part the proliferations are longer, nearly meeting in the sagittal middle line of the pharyngeal wall, but they do not form anastomoses. At the oral edge the pharyngeal and meridional vessels end blindy. (Pl. I, fig. 6).

The pharynx is very large. In the upper half its lumen is nearly obliterated on account of very strongly developed, sagittal folds, which do not correspond to the usual pharyngeal folds of Ctenophores. They are arranged in four longitudinal bands, following the four subsagittal adradial vessels, from which proliferations pass in among the folds. The true pharyngeal folds follow the pharyngeal vessels, from which likewise proliferations pass into them; they are much less developed, but are double as usual. (Textfig. 2). The lower half of the pharynx is more spacious. (Pl. I, figs. 5—6). The whole of the pharynx is compressed in the sagittal plane, as typical in Ctenophores, but this feature is obliterated in the upper part on account of the strong development of the sagittal folds, except at the uppermost end. Here the walls are closely appressed, so as to get almost the appearance of a narrow vessel, as seen from the outside (textfig. 1). The walls are here strongly ciliated, this part evidently corresponding to the ciliated pouch of the typical Ctenophores. The oesophagus is not long, but distinct, compressed in the sagittal plane as usual. On the inner lips and the outbending wall (the outer wall of the diaphragm) there appears to be a powerful ciliation.

The histological structure of the gastrovascular canals I have not been able to see in a satisfactory way. In the proliferations there are two lateral thickenings, the outer an inner side being thin; in the meridional vessels there appears to be only one thickening, on the outer side, the whole inner side being thin-walled. Rosettes could not be discerned.

In the meridional vessels and even in the proliferations from these, far down in the body, I have found, in the broken specimen, some large Copepods. This is, however, scarcely a definite proof that this Ctenophore, contrary to the custom of all the rest of them, digests its food not in the pharynx, but in the gastrovascular system. It may perhaps be due to the Copepods having themselves penetrated into the cavities of the digestive system during the capture in the hoof, after the specimen was broken. They do not show signs of having been under the digestive action of the Ctenophore. The strong development of folds in the pharynx would also seem to afford evidence for the absorption of the food in the pharynx after the usual Ctenophoran fashion.

The arrangement of the gonads could, unfortunately not be made out. Probably they will be found to have their place in the proliferations of the meridional vessels, in the same way as in *Beroë;* but even in sections I could see nothing which could be definitely recognized as gonads.

The tentacular apparatus (Pl. I, figs. 5, 7, 9). The tentacular basis is rather short slightly widened at the lover end. It is not longitudinally divided, but appears in sections to be built as usual, the tentacular vessels with their ectodermal covering of colloblast-forming cells occupying the sides, the root of the tentacle occupying the middle part of the basis. It affords the unique feature that the colloblast-layer sends a prolongation into each of the subtransverse adradial vessels, continuing nearly to the point, where it opens into the meridional vessel. This is probably simply a fold of the colloblast-layer of the tentacular basis, but I have been unable to find out, how this peculiar arrangement—an ectodermal prolongation lying within an entodermal tube—has arisen. These two processes from the tentacular basis, very conspicuous on account of their yellow colour, give the puzzling impression, that there are two lateral tentacles to each tentacular basis: indeed, I thought so myself at first, before I had yet studied the anatomy of the animal more closely.

The tentacle is, so far as I have been able to ascertain, unbranched, but ends in a peculiar large knob. (Pl. I. fig. 9). This reminds one somewhat of the peculiar appendages on the tentacles of *Hormiphora;* but it is certain that the knob here occupies the end of the tentacle, and I have found only one such knob on each tentacle. Its shape is somewhat different, now with a constriction at the point, now without such constriction; this is doubtles due to muscular contraction. It appears to be completely covered with colloblasts, though these have been lost in places in the preserved specimens.

The tentacular sheath is directed downwards (Pl. I, figs. 5, 6) and opens at the oral edge, where the lateral furrow ends.

The colloblasts (Pl. I, figs. 10—11) are comparatively large and beautiful objects. The spiral filament is very strongly developed, but there is no central filament to be seen. The grains of the cupule show a definite arrangement in small rosettes.

The jelly is very tough and resistent, nearly as cartilage. It is full of muscles, arranged rather regularly. In tranverse sections the muscles are seen to go from one rib to the other, while others go between the outer and

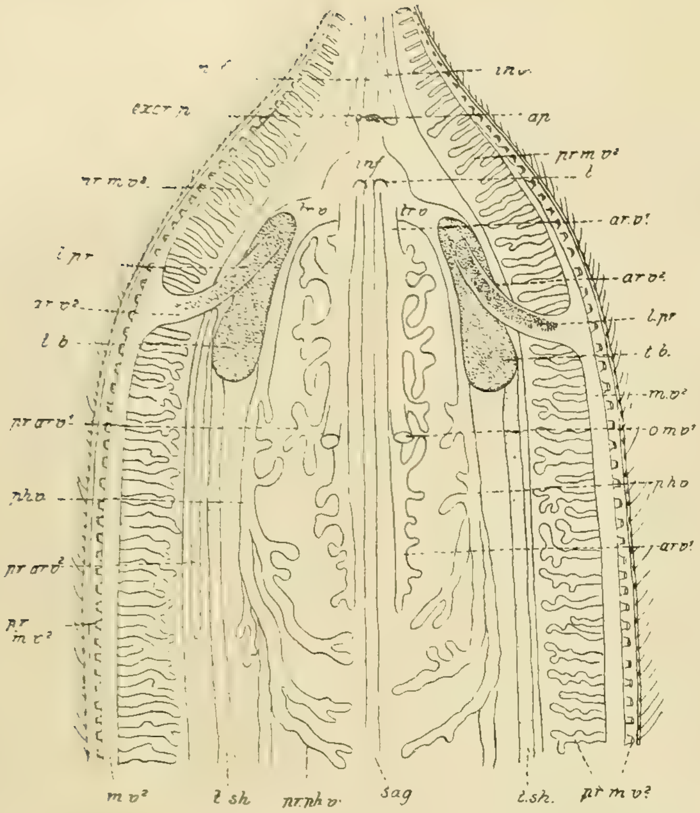

Fig. 1. Gastrovascular system of *Aulacoctena acuminata*; slightly diagrammatic. $^3/_1$. ap. apical organ, ar v.[1] subsagittal adradial vessel; ar. v.[2] subtransversal adradial vessel; excr p. excretory pore; inf. infundibulum; inv. apical invagination; l. inner lips of oesophagus; l. pr. lateral process from tentacle basis; m v.[2] subtransversal meridional vessel; o. m. v.[1] opening of the adradial vessel into the subsagittal meridional vessel. p f. polar field; ph. v. pharyngeal vessel; pr. ar. v.[1] proliferations from subsagittal adradial vessels; pr. ar. v.[2] proliferation from subtransversal adradial vessel; pr m. v.[2] proliferations from the subtransversal meridional vessels; those of the side turning towards the spectator have been cut near the basis, while those of the other side, lying in the side wall of the lateral furrow are complete; pr. ph. v. proliferations from the pharyngeal vessels; sag. the narrow, sagittal edge of the pharynx; t. b tentacular basis, t. sh. tentacle sheath; tr. v. transverse vessel.

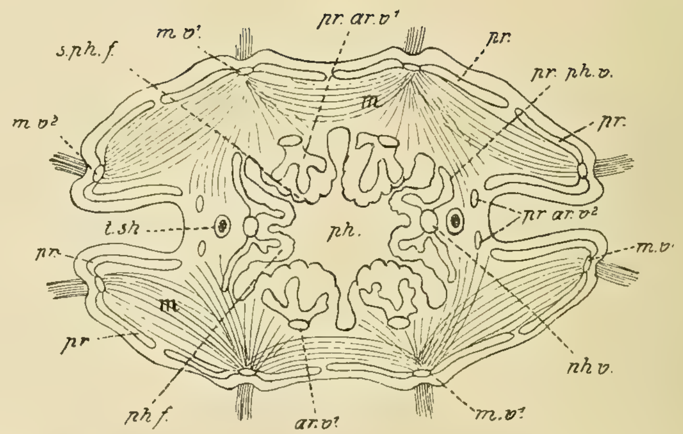

Fig. 2 Transverse section of *Aulacoctena acuminata;* slightly diagrammatic. $^{3.5}/_1$. ar. v.[1] subsagittal adradial vessel; m. muscle fibres; m. v.[1] subsagittal meridional vessel; m. v.[2] subtransversal meridional vessel, ph. pharynx; ph. f. pharyngeal folds; ph. v. pharyngeal vessel; pr. proliferations from meridional vessels; pr. ar. v.[1] proliferations from subsagittal adradial vessels; pr. ar. v.[2] proliferations from subtransversal adradial vessels; pr. ph. v. proliferations from pharyngeal vessel; s. ph. f. sagittal pharyngeal folds; t. sh. tentacle sheath.

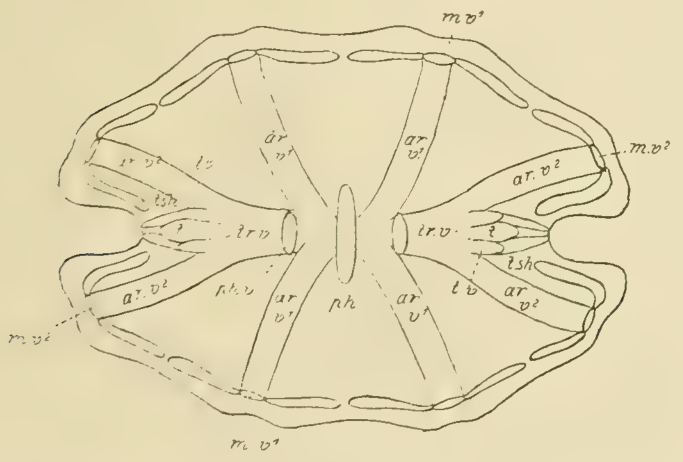

Fig. 3.

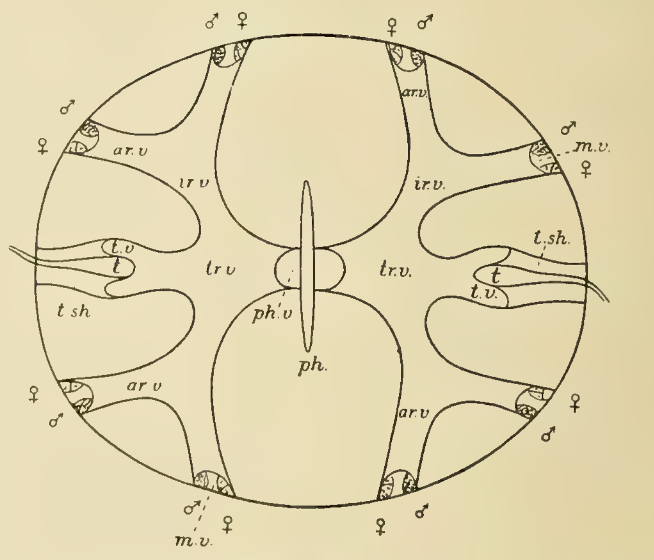

Fig. 4.

Fig. 3—4. Diagrams of the gastrovascular system of *Aulacoctena* (3) and of a typical tentaculate Ctenophore (4). ar. v. adradial vessels, [1] subsagittal, [2] subtransversal; ir. v. interradial vessel (not found in *Aulacoctena);* m. v. meridional vessel, [1] subsagittal, [2] subtransversal; ph. pharynx; ph. v. pharyngeal vessel; t. tentacle; tr. v. transverse vessel; t. sh. tentacle sheath; t v tentacular vessel.

inner wall of the body (textfig. 2); also longitudinal muscles are distinct, especially in the aboral part. All these crossing fibres form together a close, somewhat regular meshwork. The muscle cells show some very peculiar protoplasmic swellings (Pl. I, fig. 12), looking almost like a ganglionic chain of an Arthropod. Several of these swellings may be found on the same thread, in irregular distances. Branching of the muscle cells has not been observed, but very probably will be found at their ends. They are all rather much folded, nearly spirally; this is evidently the result of contraction on preservation. Amoeboid cells are very scarce in the jelly.

Granular cells are exceedingly numerous in the sagittal folds of the pharynx, while the true pharyngeal folds contain such cells only in very small numbers.

The colour is now yellowish, semitransparent; originally it was more red, the colour being bound to the folds of the pharynx.

The nearest relative of this very interesting Ctenophore is evidently, the *"Mertensia" Chuni*, for which I have established ("Ingolf" Ctenophora, p. 36) the genus *Bathyctena*. Like *Aulacoctena* it has proliferations from the meridional and pharyngeal vessels, a feature otherwise not known among tentaculate Ctenophores. The pharyngeal walls are strongly folded in *Bathyctena*; but i does not appear from Dr. Moser's description, whether these folds are arranged in the same way as in *Aulacoctena*. Through the kindness of Professor Vanhöffen I have had opportunity to see the two specimens of *Bathyctena* from the German South Polar Expedition. The condition of these specimens does not permit any further preparation, but I observed in the pharynx of the larger specimen a pair of whitish lobes ending, where the widening of the pharynx begins. These lobes, which are not indicated in the figure (Taf. XX, 3) given by Dr. Moser, I am inclined to regard as corresponding to the sagittal pharyngeal folds of *Aulacoctena*. There seems also to be an indication, that they are separated in the middle line. In the smaller specimen these lobes could not be observed. Whether the development of folds in the pharynx is mainly the same in both forms or not, I think that the character of the proliferating meridional and pharyngeal vessels is important enough to justify the establishment of a separate family for these two forms. I shall give here diagnoses of this family and the two genera belonging to it.

Bathyctenidæ n. fam.

Tentaculate Ctenophores, compressed after the sagittal plane. Proliferations from the meridional and the pharyngeal vessels. The pharynx walls strongly folded. Tentacle sheath opening orally. Jelly very tough. Deep-sea forms.

1. ***Bathyctena*** Mrtsn.

Body rounded; no lateral furrow. Apical organ not sunken. Pharynx in the lower part strongly widened in the transversal plane.[1]) No lateral processes from the tentacular basis.

Only species known: *B. chuni* (Moser).

2. ***Aulacoctena*** Mrtsn.

Body ovate, with a deep lateral furrow and an apical prolongation, deeply invaginated; the apical organ lies in the bottom of the invagination. The pharynx not widened in the transversal plane in the lower part. The upper part of the pharynx with strongly developed sagittal folds. The subsagittal adradial vessels issue directly from the infundibulum, the subtransversal issue distally, at the sides of the tentacle basis. Proliferations also from the adradial vessels. Tentacle basis with lateral processes. Tentacles simple, with a terminal knob.

Only species known: *A. acuminata* Mrtsn.

It still remains to consider the question, to which group of the other Ctenophores the Bathyctenidæ are related. The sagittal compression decidedly suggests the Mertensiids as their nearest relations, as is also expressed in the fact that *Bathyctena* was originally refered to the genus *Mertensia*. The proliferations of the meridional and pharyngeal vessels certainly recall the Beroids, but the fact that the deep-sea forms are tentaculate at once shows that this is merely an analogous development, the proliferations having developed independently in both Beroids and Bathyctenids. It is worth recalling that Mertens[2]) states to have observed in *Mertensia ovum* „baumartig verzweigte Gefässe" proceeding from the upper part of the subtransversal meridional vessels towards the inner part of the gastrovascular system. If this proves to be correct, it will, evidently, mean another connecting point between the Mertensiids and the Bathyctenids.

With the Pleurobrachiidæ and the Cestidæ the deep-sea forms show no nearer relation; with the Lobatæ and the Platyctenidæ they have the large oral lobes in common.

Our present knowledge evidently leads to the conclusion that the Bathyctenids are derived from the Mertensiids, along the same line as the Lobatæ and the Platyctenidæ.

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[1]) This diagnosis is, of course, not complete; but in the present state of our knowledge it seems not warranted to extend it and give any definite statement about the arrangement of the gastrovascular system.

[2]) H. Mertens: Beobachtungen und Untersuchungen über die beroëartigen Acalephen. Mem. Acad. Imp. St. Petersbourg. Ser. 6, Vol. 2. 1833. (See also; Ingolf-Ctenophora, p. 63).

The Ctenophores from the surface waters collected by the "Michael Sars" are the following;

1. *Mertensia ovum* (Fabr.).

Station 76. (47° 11′ N, 47° 6′ W., 9/7 1910; 1 m. net, 50—0 m.—2 specimens.

One of these specimens is comparatively well preserved, it is, indeed, the best preserved specimen I ever saw of this form. The meridional vessels are distinct (in all other specimens, which I have examined, they are quite indiscernable); they are strongly folded, so that I thought at first to see here the proliferations observed by MERTENS. There can, however, be no doubt that the folds are simply due to the contraction on preservation. The locality is in the Labrador Stream.

2. *Pleurobrachia pileus* (O. Fr. Müll.).

Station 71. (43° 18′ N., 51° 17′ W. 30/6 1910).
1. Surface; 1 m. net, 11 specimens.
3. 100 m. wire; 1 m. net, 4 specimens.
8. 300 — young fish trawl; 8 specimens.

— 72. (44° 35′ N., 51° 15′ W. 1/7 1910).
3. 30—0 m., 1 m. net, 16 specimens.

— 97. (56° 15′ N., 8° 28′ W. 4/8 1910).
3. 50 m. wire; young fish trawl; 1 specimen.

— 102. (60° 57′ N., 4° 38′ W. 9/8—10/8 1910).
22. 1 m. net; surface; 1 specimen.
3/4 — 200 m. wire; 2 specimens.

The specimens are upon the whole very well preserved, so that there can scarcely be any doubt of the determination. The species *Pleurobrachia brunnea* recently described by A. G. MAYER[1]) from the coast of New Jersey appears not to be among them; to be sure, it will probably always be very difficult to discern the most prominent of the specific characters of this species, viz. the terminal knob of the tentacles, in preserved specimens; but the shape and colour of the specimens does not suit to *Pl. brunnea.* The captures of the "Michael Sars" of *Pl. pileus* do not appear to me to warrant any conclusion regarding its bathymetrical distribution.

3. *Beroë cucumis* Fabricius

Station 10. (45° 26′ N., 9° 20′ W. 19/4—21/4 1910).
300 m. wire; yong fish trawl, 2 fine, medium sized specimens.
6. 1 m. silknet; 100 m. wire out; 3 small specimens.
7. 1 m. silknet; 200 m. wire: 2 small, badly preserved specimens.

— 42. (28° 2′ N., 14° 17′ W. 23/5—24/5 1910).
Young fish trawl; 900 m. wire; 2 very badly preserved small specimens. (The identification not beyond doubt).

— 49. (29° 6′ N., 25° 2′ W. 1/6 1910).
24. 1 m. silknet; 270 m. wire out; 1 small, badly preserved specimen.

Station 53. (34° 59′ N., 33° 1′ W. 8/6—9/6 1910).
32. Young fish trawl; 600 m. wire; 1 small. poorly preserved specimen.
42. Young fish trawl; 1600 m. wire; 1 medium sized specimen.
45. Bottom net; 2100 m. wire; 1 small specimen.
54. Young fish trawl; 1600 m. wire. Fragment of a large specimen.

— 56. (56° 53′ N., 29° 47′ W. 10/6—11/6 1910).
2. Silknet; surface; 1 large specimen.
Young fish trawl; 300 m. wire; 1 large specimen.

— 63. (36° 5′ N., 43° 58′ W. 22/6 1910).
16. 3 m. silknet; 4500—1500 m. wire; 1 small specimen.
22. 3 m. silknet; 1356—450 m. wire; 1 large specimen.

— 64. (34° 44′ N., 47° 52′ W. 24/6 1910).
34. Young fish trawl; 2000 m. wire; 2 medium sized specimens.
50. Young fish trawl; 2000 m. wire; 1 small, badly preserved specimen.
? 3 m. net; 3000 m. wire; 1 large, badly preserved specimen.

— 71. (43° 18′ N., 51° 17′ W. 30/6 1910).
1. 1 m. net; surface; several small specimens.
3. 1 m. net; 100 m. wire; 1 medium sized specimen.

— 76. (47° 11′ N., 47° 6′ W. 9/7 1910).
1 m. net; 50—0 m.; 1 medium sized specimen.

— 80. (47° 34′ N., 43° 11′ W. 11/7 1910).
18. 3 m. net; 3000, 2500, 2000 m. wire; 1 large specimen.

— 81 (48° 2′ N., 39° 55′ W. 12/7 1910).
16. 1 m. net; surface; 1 medium sized specimen.
27. 3/4 m. silknet; 2500 m. wire; 1 small, badly preserved specimen; the determination not quite certain.
33. 3 m. net; 3000 m. wire; 1 medium sized specimen.

— 82. (48° 24′ N., 36° 53′ W. 13/7 1910).
13. 3/4 m. net; 1500 m. wire; 1 small specimen. (The determination not quite certain).
38. Young fish trawl; 2000 m. wire; 1 small, badly preserved specimen.

— 84. (48° 4′ N., 32° 25′ W. 15/7 1910).
21 a. Young fish trawl; 2000 m. wire; 1 large specimen.
37 Young fish trawl; 3000 m. wire; 1 small specimen.

— 87. (46° 48′ N., 27° 46′ W. 17/7 1910).
11 a. Young fish trawl; 2000 m. wire; 1 large specimen.

— 88. (45° 26′ N., 25° 45′ W. 18/7 1910).
17. 3/4 m. net; 1500 m. wire; 1 medium sized specimen.

90. (46° 58′ N., 19° 6′ W. 21/7 1910).
23. 3/4 m. net; 1500 m. wire; 1 medium sized specimen.

— 92. (48° 29′ N., 13° 55′ W. 24/7 1910).
41. Young fish trawl; 1000 m. wire. 1 medium sized specimen.

— 98. (56° 33′ N., 9° 30′ W. 5/8 1910).
31. 3 m. net; 1500 m. wire; 1 large and 1 small specimen.
35. 1 m. silk net; surface; 1 medium sized specimen.

— 101. (57° 41′ N., 11° 48′ W. 7/8 1910).
20. Young fish trawl; 2000 m. wire; 1 small specimen.

— 102. (60° 57′ N., 4° 38′ W. 9/8 1910).
3. 3 m. net; 1500 m. wire; 5 medium sized specimens.
5. Young fish trawl; 1000 m. wire; 2 small, badly preserved specimens.
6. 3/4 m. silk net; 1400 m. wire; 1 small, 1 medium sized specimen.
36. 1 m. net; 100 m. wire. 1 small specimen.

[1]) A. G. MAYER: Ctenophores of the Atlantic Coast of North America. Publ. Carnegie Inst. Washington, No. 162. 1912.

The rather considerable number of catches of this species shows that it is found all over the Atlantic—a result which is, however, by no means surprising, in view of the fact that it has a cosmopolitan distribution. That the species was not taken in the open Atlantic by the Plankton-Expedition may probably be due to the apparatus used by that Expedition.

Concerning the bathymetrical distribution the catches of the "Michael Sars" do not give any reliable results. The number of specimens taken is not nearly large enough to warant conclusions from the differential catches. When there is f. i. one specimen in the surface haul and 2 specimens in the haul with 1500 m. wire, there is not at all sufficient evidence that the two latter have not been taken also at the surface.

4. ***Beroë Forskåli*** M. Edw.

Station 88. (45° 26′ N., 25° 45′ W. 18/7 1910.)
41. 1 m. net; 200 m. wire; 1 large specimen.

The specimen is in a rather fragmentary condition, but otherwise so well preserved, that the determination is beyound doubt.

In the "Ingolf" Ctenophora (p. 92) I expressed my conviction that this species would prove to occur also in the Atlantic, not only in the Mediterranean and the Indo-Pacific Oceans, from which it was hitherto alone recorded. That my suggestion was correct, is definitely proved herewith, while the two Atlantic localities given in the work quoted could not put the matter beyond doubt, being founded on old, poorly preserved specimens, which could not be identified with full certainty. Otherwise the species is now seen to be abundant also in the West India Sea and along the U. S. Atlantic coast, as far North as Chesapeake Bay. I conclude this from A. G. Mayer's statement of *Beroë ovata* in his "Ctenophores of the Atlantic Coast of North America" (p. 51). It is evident that the species which he designates as *Beroë ovata* is the same as *Beroë Forskåli*. When A. G. Mayer thus maintains *Beroë ovata* as distinct from *B. cucumis*, while I, in my contemporaneously with his work published "Ingolf" Ctenophora, maintain that *B. ovata* cannot be distinguished from *B. cucumis*, these two statements are realy not contradictory, because the *B. ovata* of A. G. Mayer is quite a different species from that called by that name by Chun and other workers, viz. *B. Forskåli*, which nobody would think of confounding with *B. cucumis*.

Explanation of the Plate I.

Aulacoctena acuminata Mrtsn.

Figs. 1—4 photographs by Docent R. H. STAMM; figs. 5—12 drawn by the author.

Fig. 1. Large specimen, seen from the sagittal side. $^{1\cdot5}/_1$.

" 2. The same specimen, seen from the tentacular side. A thin glass tube has been laid into the lateral furrow, in order to make it more distinctly seen in the photograph. The glass tube is seen in the upper half. The oral slit is a little widened. $^{1\cdot5}/_1$.

" 3. Small specimen, seen from the sagittal side. $^{1\cdot5}/_1$.

" 4. Fragment of a large specimen upper part, opened so as to show the folds of the pharynx; the lateral processes from the tentacular bases are seen, also the apical invagination, in the slightly widened bottom of which lies the apical organ. Along the sides are seen the proliferations from the subtransversal meridional vessels along the wall of the lateral furrow. $^{1\cdot5}/_1$.

" 5. The same fragment as fig. 4, somewhat more dissected. The upper part of the pharynx is filled out by the large sagittal folds; below these some proliferations from the pharyngeal vessels are seen in the pharyngeal wall. Between the openings of the subsagittal adradial vessels (o. adr. v.) is seen the oesophagus with the thickened inner lips. ap. apical organ; inf. infundibulum; inv. apical invagination; l. pr. lateral process from the tentacle basis; ph. v. pharyngeal vessel; pr. proliferations from the subtransversal meridional vessels; s. w. side wall of the body: t. b. tentacle basis; t. sh. tentacle sheath. $^{3}/_1$.

" 6. Lower end of the pharynx. ph. v. pharyngeal vessel, pr. proliferations from the subtransversal vessels; s. t. v. subtransverse meridional vessel; s. w. side wall of the body; t. sh. tentacular sheath. $^{3}/_1$.

" 7. Tentacular basis, seen from the outside. adr. v. adradial vessel; l. pr. lateral process from the tentacle basis; o. tr. v. opening of the transverse vessel; ph.v. pharyngeal vessel; pr. ar. proliferation from the adradial vessel; t. sh. tentacular sheath. $^{10}/_1$.

" 8. Proliferations from subtransverse meridional vessel, along the wall of the lateral furrow. $^{6}/_1$.

" 9. Terminal knob of the tentacle. $^{17}/_1$.

" 10—11. Colloblasts. $^{730}/_1$.

" 12. Muscle fibre with protoplasmic swellings. $^{730}/_1$.

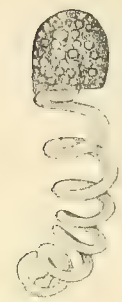
3.

10.

1.

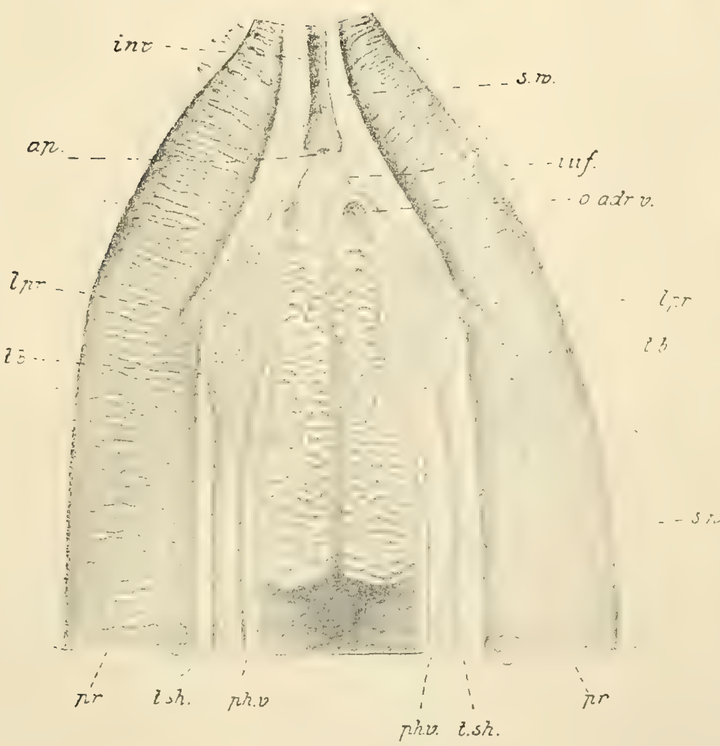
12.

4.



11.

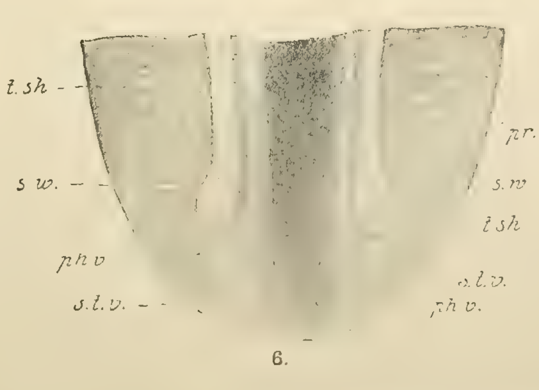
2.



5.

8.

7.



6.

9.

Fig. 1—4 R. H. Stamm phot., 5—12 Th. Mortensen del.