FROM

TRANSACTIONS

OF THE

NEW ZEALAND INSTITUTE

VOLUME XXXIX, 1906.

NEW ZEALAND CTENOPHORES.

By W. B. BENHAM, D.Sc.

WELLINGTON
JOHN MACKAY, GOVERNMENT PRINTING OFFICE.
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Art. XIII.—*New Zealand Ctenophores.*

By W. B. Benham, D.Sc.

[*Read before the Otago Institute, 14th August,* 1906.]

Plate VII.

Hitherto the only member of that group of "melon-jelly-fish" that has been attributed to our seas is a pleurobrachid, named *Cydippe dimidiata,* Lesson.* This was obtained in the Tasman Sea—or, as it was termed, "the channel between New Zealand and New South Wales"—in 1770, by Banks and Solander, during Captain Cook's first voyage. It was originally named by them "*Beroe biloba,*" but by Lesson† was placed in his genus *Eschscholthia* and described by him as *E. dimidiata.* It had been figured previously by Eschscholtz‡; and Chun, presumably judging from this figure, identifies it as a member of the genus *Cydippe.*§ It has not been studied further, and nothing more is known of it than the short account given by Lesson. I think that it may well be removed from our list.

During the last few years I have collected or received a few specimens of ctenophores which belong to two genera—*Beroe,* Browne, 1756; and *Euplokamis,* Chun, 1880—for each of which I propose, though with considerable diffidence, owing to lack of recent literature, a new specific name, though I recognise that these may be found superfluous.

Beroe shakespeari, n. sp.

I received a number of individuals, well preserved in formalin, from Mr. R. Shakespear, the Curator of Little Barrier Island, to whom my thanks are given for his kindness and thoughtfulness in presenting them to me.

The specimens, some of which have a faint roseate hue, are subglobular, but slightly compressed in the transverse or infundibular plane, so that the "sagittal" diameter is rather greater than the "transverse."

The fifteen individuals vary from 27 mm. to 62 mm. in height, and from 20 mm. to 50 mm. in diameter across the base, being

* Lesson, Ann. Sci. Nat. (Zool.). 1836, ser. 2, vol. v, p. 254.

† Lesson, Hist. Nat. Zoophytes, Acalephes, 1843, p. 102.

‡ Eschscholtz, Syst. der Acalephen, 1829, pl. ii, fig. 2.

§ Chun, Fauna u. Flora des Golfes v. Neapel. Ctenophoren, p. 287 (1880).

rather greater than this near the equator. One or two have a more oval form, the diameter being proportionally smaller, but in the majority the vertical and horizontal diameters are approximately equal.

The mouth does not occupy the whole of the base—*i.e.*, it is not relatively so large as in the two well-known Mediterranean species, *B. ovata* and *B. forskalii*. In the present species the oral moiety of the body is somewhat contracted, sloping downwards and inwards, so as to be nearly horizontal around the mouth.

The costæ, even in the largest individuals, do not extend down to the margin of the mouth. This I supposed at first to be related to the immaturity of the specimens, but I find that the largest ones contain fully developed spermatozoa in the meridional canals and young ova, so presumably they are practically full-grown, or at any rate adult. These gonads are limited to the meridional canals, and extend down to their lowest limits. The costæ taper off to a fine point orally, about two-thirds of the total height of the body. The eight costæ are not absolutely equidistant; the pair at each end of the sagittal plane run at first parallel with each other and are closer together than are the other costæ; they then diverge rather suddenly, so that at the equator the distance separating the pair of subsagittal costæ is only slightly less than that between other pairs. Thus, in the largest specimen, the distance between the pair of subtransverse costæ at the equator is 12 mm., and between the subsagittals 10 mm. But at their origin these distances are 4 mm. and 1·5 mm. respectively.

The subcostal or meridional canals give off, right and left, branched cœca, which do not anastomose but terminate in slight dilatations; and to some extent those of one canal interdigitate with those of a neighbouring canal—as in *B. ovata*. The two stomodæal canals also give origin to a few fine outgrowths which take a horizontal direction on the wall of the stomodæum and branch slightly; these open into a series of inwardly directed branches from the meridional canals. These canals and branches are readily seen in the specimens, and I injected them in one large individual in order to confirm the observation. The four meridional and the stomodæal canal of each side open into a semicircular marginal canal at the edge of the mouth; but the two marginal canals do not meet at the ends of the sagittal plane. This fact is also in agreement with Chun's observations.

I have obtained specimens of this species of *Beroe* from the following localities: (*a.*) Little Barrier Island (Shakespear); 1906. (*b.*) Off D'Urville Island, off the north coast of the

South Island (G. M. Thomson); 1900. (*c.*) Tauranga, on the east coast of the North Island (which is without date, and was collected during my predecessor's time).

The lot (*a*) include forms varying in size from 27 mm. to 62 mm. in length; the largest I take to be adults. The lots (*b*) and (*c*) are quite young, attaining a length of 9 mm., 6 mm., and even less. They exhibit a series of stages of growth corresponding to some of those figured and described by Agassiz* for *B. roseola*, on pp. 36, 37.

The youngest of my specimens has costæ extending only a short way down the body (*cf.* fig. 52 of Agassiz); the meridional canals are relatively wide, have no branches, and open below into a semicircular canal (*cf.* figs. 57 and 58 of Agassiz); but in the former figure no marginal canal has appeared, while in the latter there are already indications of cœca which are absent in my specimens.

In the lot (*a*), even in the smallest, the meridional canals are provided with branched cœca, though the branches in the smaller individuals (20–25 mm. in length) are not so much ramified as in the older. (This measurement was taken after transference from formol to alcohol, in which the specimens shrink somewhat—losing about 20 per cent. of their former size). In all of them the costæ extend more than half-way down.

Remarks. — The question arises, Is a new specific name required for this form? Chun (p. 306) has pointed out in his memoir the immense amount of synonymy—both generic and specific—that occurs in the family Beroidæ, and comes to the conclusion that, at any rate in the Northern Hemisphere, not more than three species exist—namely, *Beroe ovata*, *B. forskalii*, and *B. cucumis*. But he acknowledges that the forms that have been gathered in the Pacific Ocean, and figured by older authors, are insufficiently described to enable him to decide as to their validity or otherwise.

More recently, a species *B. australis* has been described by Agassiz and Mayer† from Fiji, which, however, is quite distinct from the present form, and appears nearly related to *B. forskalii*.

But from each of the three species from the Northern Hemisphere the present one differs in the following points: From *B. forskalii* in form and sundry details which serve to distin-

* Agassiz, N. American Acalephæ, Ill. Catal. Mus. Harvard, 1865.

† Agassiz and Mayer, "The Acalephs of Fiji," Bull. Mus. Harvard, 32, 1899, p. 177.

guish this from *B. ovata*. From *B. cucumis* (= *B. roseola*, Agass.) in the presence of network of canals on the wall of the stomodæum—just that feature which most distinctly separates the North Atlantic form from *B. ovata*.

We are reduced, then, to a comparison of our New Zealand species with *B. ovata*, which, though it descends into the tropical and even the southern regions of the Atlantic, does not appear to have been met with eastward of Africa. From *B. ovata* our species differs in its more globular form, for even in the individuals in which the horizontal diameter is least in relation to the vertical (*e.g.*, 60 mm. × 40 mm.) the proportions are very different from those of *B. ovata*, in which the length is more than twice the breadth; secondly, the approximation of the upper ends of the subsagittal costæ; thirdly, in the cessation of the costæ before the lower margin is reached (which may possibly be due to the specimens being not yet fully grown); fourthly, in the fact that the mouth is not at the widest part—that the lower margin of the bell is directed inwards, so that the mouth is smaller, relatively, than in *B. ovata*. It may be that in life the mouth of our species is capable of a certain amount of mobility and distension.

Reference should perhaps be made to Agassiz's* "*Idyiopsis clarkii*" from South Carolina, which in its more rounded form (see fig. 63, p. 39, *loc. cit.*) certainly resembles our species. Agassiz emphasizes the short vertical axis, the compressed body, the prominent costæ, and depressed intercostal regions as distinctive of the genus, which later authors include in *Beroe*. But though there is a certain degree of resemblance, it is not probable that the same species would occur in the Atlantic and the Pacific. In "*Idyiopsis clarkii*" the polar area is, from Agassiz's figure, much more compact than in the present species.

The only Pacific species, besides *B. australis*, is *Beroe macrostoma*, Peron,† which was obtained south of New Guinea during the voyage of the "Coquille." Its shape is, however, like that of *B. ovata*, but Chun states that it is insufficiently described for identification. At any rate it is quite unlike our New Zealand species.

Euplokamis australis, n. sp.

The body is cylindrical, though slightly narrower at the aboral pole; the mouth is situated on a short and probably mobile tube, considerably narrower than the body.

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* Agassiz, Illust. Cat. Harvard Mus., 1865, p. 39.

† Peron, Voy. de la Coquille, Zool., p. 105, pl. xv, 2.

The characteristic features upon which this genus was founded are (1) the great extent of the costæ and the large size of the costal plates; (2) the tentacles issue from the tentacular sheath very high up the sides.

The present species differs from *E. stationis*, described by Chun, p. 283, in a few very evident characters. The "tentacle-base" is about one-third the length of the body, and extends considerably below the level of the "infundibulum"; the tentacillæ or accessory filaments do not roll up into spirals, and I am unable to detect the transversely striated muscle within them which Chun describes for *E. stationis*.

Localities.—(*a.*) A single individual: off the north coast of the South Island, near Farewell Spit (G. M. Thomson). (*b.*) Several young ones: Otago Harbour (Cottrell).*

The largest individual is 20 mm. in length, with a greatest diameter of 12 mm. rather below the equator, while near the aboral pole its diameter is 8 mm.

The specimen preserved in formalin exhibited the internal anatomy well (see Plate VII, fig. 1). The gonads are present, but the gametes not fully developed. The long "infundibular canal," large "infundibulum," the radiating canals from it, are all shown. Those from Otago Harbour are young ones, and in them the enormous breadth of the costæ and the great size of the individual costal plates can be seen.

These young ones measure, on an average, 5 mm. × 3 mm. The costæ almost touch one another, and each is made up of 12 plates. In these young ones the aperture of the tentacle-sac is much nearer the apex, and the length of the tentacle-base is about half the length of the animal, and its lower end reaches nearly to the lower end of the costa: this is perhaps due to unequal contraction of the parts: these had been fixed in corrosive sublimate and preserved in alcohol, which causes the jelly to shrink to a much greater extent than does formalin.

Remarks.—A comparison of the figures and description of *E. stationis* with those of our species makes it evident that there are considerable differences between them. But since the publication of Chun's monograph on the Mediterranean ctenophores two other species belonging to this genus have been described. *E. cucumis*, Mertens, has been redescribed by Vanhoffen,† to whose account, however, I have not access. It was obtained near Unalaschka, in the Behring Sea. The short account given by Mertens is referred to by Chun (footnote, p. 284), where it is

* I have also a specimen, 9 mm. in length, from Port Jackson.
† Vanhoffen, "Ctenophoren," in Nordische Plankton, 1903.

stated that the tentacle-base is situated in the neighbourhood of the stomodæum. *E. californiensis* has been described by Torrey,* whose account of it I have been unable to obtain. It was captured off San Diego, on the coast of California. It is possible that our New Zealand species is identical with it.

In addition, there is an earlier species, *E. elongata*, of Quoy and Gaimard,† which was placed by them in the genus *Beroe*, then by Lesson (*loc. cit.*, p. 103) in the genus *Janira* (as *J. quoyi*), but has been by Chun recognised as a *Euplokamis*, who resuscitated the original specific name.

This species was taken in the Atlantic, off the coast of Africa; in it the tentacle-base is more than half the length of the body.

From this species, also, mine is evidently quite distinct.

EXPLANATION OF PLATE VII.

(Figs. 1–4 refer to *Beroe shakespeari*; figs. 5–7 refer to *Euplokamis australis*.)

Fig. 1. *Beroe shakespeari*, natural size of preserved specimen: *a*, canals containing gonads; *b*, costæ; *c*, mouth. The apex is retracted.

Fig. 2. The same, view of apical pole (natural size), showing the compression of the animal, and the apical approximation of the subsagittal costæ (*d*).

Fig. 3. A younger individual (natural size).

Fig. 4. A very young specimen (enlarged), showing short costæ, wide canals, without the cæcal outgrowths.

Fig. 5. *Euplokamis australis*, adult individual (× 2½), showing, by transparency, the internal anatomy. The tentacles are partially retracted.

Fig. 6. A young specimen (× 4). The costæ are wide; the tentacles, almost fully protruded, issue much nearer the apex than in the adult.

Fig. 7. A portion of a young one bisected to show the great length of the tentacle-sac at this stage as compared with adult (perhaps due to differences of preservation). *b*, the tentacle-base.

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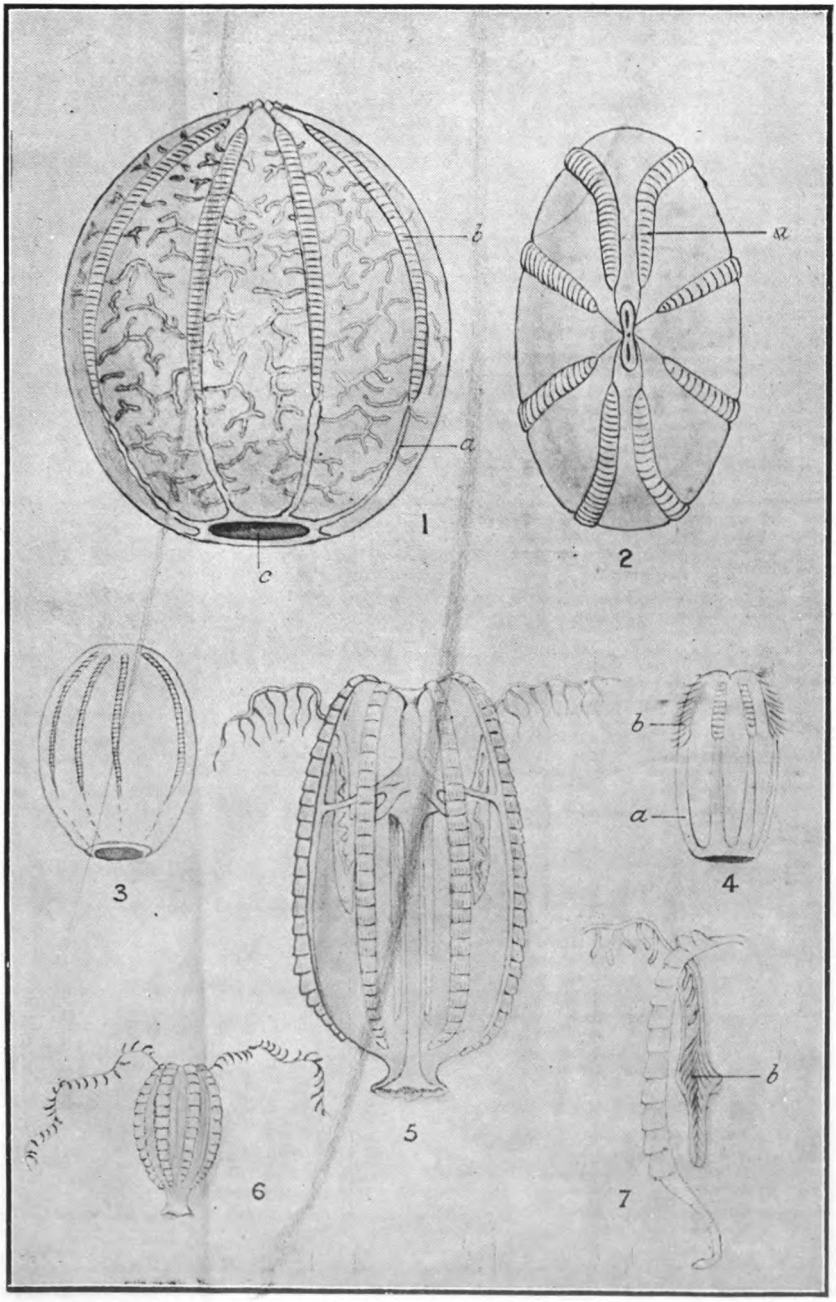
* Torrey, Univ. California Publications, 1904, vol. ii, p. 46.

† Quoy and Gaimard, "Voy. Astrolabe," iv, p. 37, pl. vi, Mollusques; and Atlas, pl. 90, figs. 9–14.



NEW ZEALAND CTENOPHORES.—Benham.