

## The Cœlenterate Plankton of the Northumbrian Coast during the Year 1924.

By

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With 1 Figure in the Text.

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THE following is a report on the Cœlenterate plankton taken off the Northumbrian Coast in 1924 during cruises of the *Evadne* of the Dove Marine Laboratory, Cullercoats, Northumberland. The work has been carried out under the supervision of Professor A. D. Peacock to whom I am indebted for much helpful advice. I must thank Professor A. Meek of Armstrong College, Newcastle-upon-Tyne, for so kindly providing the material, and Miss M. Yeats for the use of her notes on the 1924 surface medusæ. Mr. P. L. Kramp of Copenhagen was so good as to check my identifications of certain specimens hitherto unnoted from Northumberland, and for this service I express my obligation. Dr. Allen, Director of the Plymouth Marine Biological Laboratory, and Capt. Totton of the British Museum, have also been kind enough to assist in questions of nomenclature. My own work consisted of the investigation of middle and bottom water samples and Miss Yeats' results on surface samples have also been incorporated here to make the yearly report complete.

*Technique.* This was the same as that employed by Peacock (see *Dove Marine Laboratory Report*, 1923) and need not be enlarged on here, but a short note on the method of staining may be added. A most useful stain for the medusæ as preserved in the collection\* is Picro-Nigrosine, 1 part saturated alcohol solution (70%) stain to 3 parts 70% alcohol. The medusæ are immersed for a short time until they assume a pale green colour. They are then quickly transferred to a differentiating solution of 1 part formic acid and 4 parts 70% alcohol, and left for half an hour. The gelatinous umbrella takes on a bright blue colour and the gonads and manubrium a bright yellow, which colours are intensified on dehydration. This method is particularly useful in examining the oral tentacles of such small specimens as *Lizzia blondina* Forbes. Results were better when a strong solution of Picro-Nigrosine (as above) was used for a short time than when a weaker stain was used for a longer period.

\* Fixed in 5% formalin and preserved in 70% alcohol.

The count in each case was absolute for the sample received, for it was found by experiments on estimates made from only a portion of a sample that the enumeration errors were sometimes very large.

The nomenclature employed is that recommended by Mr. E. T. Browne for adoption in the proposed revised list of the Plymouth Fauna.

*Notes on the Catches.* The most striking feature of the catches is the very great variety of medusæ taken, 22 species in all, of which 17 are confined to middle and bottom waters. In addition to those previously listed for Northumbrian waters there are recorded 9 other species, viz. *Purena (Sarsia) gemmifera* (Forbes), *Sarsia prolifera* Forbes, *Hybocodon prolifer* L. Agassiz, *Lizzia blondina* Forbes, *Rathkea octopunctata* (M. Sars), *Leuckartiara octona* (Fleming), *Mitrocoma (Mitrocomella) fulva* (Browne), *Eutonina indicans* (Romanes), and *Æquorea forskalea* Peron et Lesueur.

The numbers of *Obelia* and *Aglantha* are rather small compared with those of former years, but on the other hand this want is balanced by the sudden invasion of the plankton by *Lizzia blondina*, which is found in large numbers at all depths during August and September. While *Hybocodon* is confined to the April catches, *Euphysa*, *Bougainvillia* and *Phialidium* are well represented throughout the whole range.

All the hauls were made in daylight.

*Notes on the Species taken.*

(For details regarding station, depth and numbers, reference should be made to Table I and Fig. 1. The figures in Table I have been arrived at by calculation and express the numbers for the whole catch.)

## ANTHOMEDUSÆ.

### SARSIIDÆ.

This family, contrary to previous years' experience with similar collections, is well represented. There are at least three different species and, moreover, they illustrate succession in seasonal occurrence. *S. tubulosa* has been found from April to the end of July, then its place is taken by *Purena gemmifera* and *S. prolifera* which continue to be present until the end of October when the catches ceased. The two last-named are listed in this series of Coelenterate plankton for the first time.

#### *Sarsia tubulosa* (M. Sars).

The largest specimen measures about 10 mm. high in the preserved state. The basal bulbs are large and each has a prominent light brown ocellus such as is figured by Kramp (1926, Pt. 10, Pl. I, Fig. 5). The specimens from Stations 2M, 6B and 10M measure 3, 8, and 9 mm. respectively, from which we may conclude, in agreement with Kramp, that

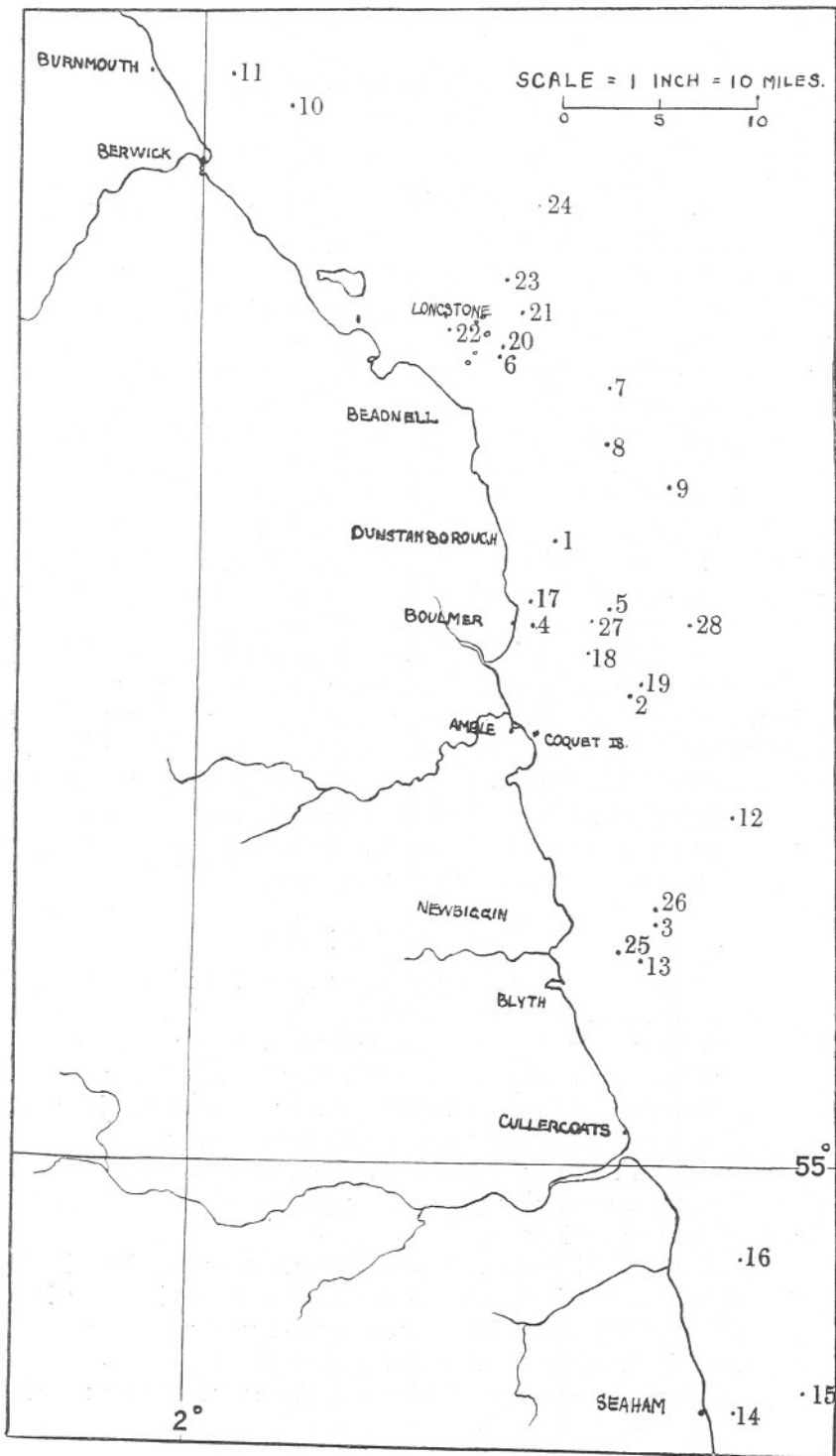


FIG. 1.

specimens liberated in April do not reach their maximum size until the end of July. Both *Sarsia tubulosa* (M. Sars) and *S. tubulosa* var. *mirabilis* L. Aggassiz are listed in the 1922 plankton taken in water samples from the Coquet, but Kramp, who has made a very careful examination of the whole *tubulosa*-group (*sensu* Hartlaub), asserts that even in the living specimens he can find no specific differences distinguishing these two. Even if two distinct varieties do exist, I have been unable to determine to which our specimens would belong and have merely designated them *S. tubulosa*.

A few specimens taken are very small, about 1 mm. high, and are sexually immature. The manubrium is without an apical chamber and in some cases is short and slightly swollen above the mouth. In no specimen does the manubrium, even when fully extended, hang below the level of the bell. The tentacles are longer than the bell and are provided with incomplete nematocyst rings. Owing to the state of preservation the ocelli which would furnish a distinguishing character cannot be detected. In general appearance, however, the specimens agree very well with the *Sarsia eximia* figured by Hartlaub in *Nordisches Plankton*. On the other hand they might quite well be very young *S. tubulosa*, for in the latter the manubrium is quite undifferentiated in the young stage. If this is so, then the specimens taken in April would represent the spring brood, from which the large *S. tubulosa* recorded for July have been derived. This possibility is borne out by Kramp's assertion that this species requires  $1\frac{1}{2}$ -2 months to develop and attain its full size. Moreover, the fact that no large *Sarsia eximia* have been taken seems further to indicate that the specimens in question are young *S. tubulosa*.

#### *Sarsia prolifera* Forbes.

In all 71 specimens of this rather rare medusa have been found in the samples examined. All were taken by middle and bottom nets in September and October, with the exception of two which were taken as early as April off Newbiggin. The largest catch was taken on 17th October but all are small, none attaining a height of more than 1.5 mm. Most of the specimens bear buds of various sizes at the bases of the tentacles, and, as those taken in April differ in no way from those taken in September and October, it seems that the species propagates by gemmation during the greater part of the year.

The species, which seems to be confined to the coast of Britain, has been taken by Garstang at Plymouth as early as March and by Mayer at Mousehole as late as November. Those found by the latter author were sexually mature, and, since none of our specimens bears gonads, it seems reasonable to conclude that sexual reproduction is confined to the winter months.

*Purena (Sarsia) gemmifera* (Forbes).

This species of *Sarsia*, which likewise has not hitherto been recorded for these waters, is rather restricted in distribution, appearing only at three stations, one off Cresswell and two in the vicinity of the Boulmer Buoy. The bell varies in height from .4 to 1.75 mm. and the manubrium when extended may measure as much as 10 mm. The buds in the manubrium do not seem to be developed in any constant order, for in some the oldest primary bud is nearest the proximal end of the manubrium and in others it is second or third in the series. In one specimen the buds in order of size are 2nd, 3rd, 1st, and 4th from the proximal end. Chun, however, has demonstrated his law of succession of buds for this species, and the condition of the above may be explained by the fact that some of these may be secondary or tertiary buds, which first appear on the pedicels of the primary buds and continue to develop after the latter are set free. But, on the other hand, the specimens are so small that I think it unlikely that any primary buds have already been freed. Further, I have not observed any secondary bud developing on the pedicel of a primary one, and therefore I conclude that the law of succession does not hold for this species.

The larger buds also have young buds on the manubrium, but it seems that the primary buds are not set free until they have attained a height of about .4 mm. This conclusion is based on the fact that none of the medusa buds measures more than .4 mm. and no free medusæ have been taken in the plankton measuring less than this.

*Dipurena (Slabberia) halterata* (Forbes).

Only two specimens were obtained by a bottom net off the Boulmer Buoy in September, one having the manubrium missing. One specimen is about 6 mm. high and has two rings of nematocysts above the terminal bulb of the tentacles, while the other specimen is somewhat higher and the tentacles have three distinct rings of nematocysts above the terminal bulb, the proximal being the smallest and being succeeded by three or four very narrow rings which gradually give place to scattered nematocyst cells.

*Euphysa aurata* (Forbes).

From the tables it appears as if this medusa has its greatest distribution in bottom waters and gradually shades off in numbers to the surface layers. The largest catches were taken off Burnmouth in July and off Souter in August. The medusæ vary in size up to 2.5 mm. although some are very much shrunken and contracted. There are from 6 to 26 rings of nematocysts in the tentacles, but the majority have about 15. Mayer, in his synopsis of the characters of *Steenstrupia aurata*, states

that there are no definite rings of nematocysts, but Hartlaub, 1907 (p. 83, Fig. 78), gives drawings of tentacles of what he calls *Corymorpha aurata* and *C. nutans*, in which he shows that the former has fewer but broader rings than the latter. (It should be noted that later, p. 87, Fig. 82, Hartlaub uses the name *C. sarsi* for the latter species). Moreover, the specimens, which according to Mayer would be more like *nutans* (Mayer's *Steenstrupia rubra*), from the nature of the tentacle, lack the distinct axial canal which is so characteristic of that species. In some the gelatinous apical projection is fairly well formed, but this character is very variable.

*Steenstrupia (Corymorpha) nutans* (M. Sars).

A single specimen, characterised by being larger than the specimens of *Euphysa aurata*, and showing an apical canal and a distinct "shoulder" in the radial canal was classified as *S. nutans*.

*Hybocodon prolifer* L. Agassiz.

This species has only been recorded from two stations—off Dunstanburgh and the River Coquet. All the specimens which are mentioned show marked asymmetry in the shape of the bell, which varies in height from .5 to 1.5 mm.

Some have developed two tentacles, but none has three. The large tentacle has about 50 closely-set nematocyst rings, and the lateral tentacle, when present, has about 12. A well-formed lateral bulb may be present on either side of the main bulb, and, as all three bulbs may have secondary buds in some, the cluster is so large as to fill completely the mouth of the bell. The manubrium, which is pear-shaped, can be extended just beyond the edge of the bell, and in many of the specimens it is curved to one side. The mouth is simple and is surrounded by a fairly well-defined rim which according to Kramp bears numerous nematocysts, but these I have been unable to find.

*Podocoryne areolata* Alder.

This medusa has a rather restricted seasonal distribution, being found only during July and August. The specimens vary in size from .5-5 mm. and the larger ones have 32 tentacles. Pigment is prominent in the basal bulb and also between the folds of the gonad.

*Bougainvillia britannica* Forbes.

This species has a regular occurrence throughout the season, but on the whole the numbers taken are fairly small. It is entirely absent from surface layers and the best catch (87) is from a bottom net. The specimens vary in height from 1-8 mm., and, although the evidence is not convincing, yet it is suggestive that the specimens attain their maximum size in July.

*Lizzia blondina* Forbes.

This is the first record of this species in the Plankton Reports for the North-East Coast, and it is present in such large numbers that it forms the principal part of the medusa plankton catch from August to September. A noteworthy feature is that the medusa has its greatest vertical distribution in surface waters and shows a gradual decrease in numbers towards the deeper water. Further, the hauls taken during its maximum period at stations near the coast, viz. 14, 16, 17 and 22, show a marked decrease in number. It would seem therefore that the medusæ when liberated are carried further out to sea and there find conditions more suitable for a sexual reproduction, by which large swarms can be quickly produced.

The individuals are small, less than 1 mm. in diameter. The bell in the preserved specimens is flattened on top and there are eight tentacle bulbs, the four perradial being in some cases bigger than the interradial and each bearing two tentacles. The manubrium is short and bears several buds on its sides, while the mouth has four simple oral tentacles each ending in a single knob of nematocysts. The distinct oral arms and the grouping of the tentacles show that the medusa belongs to Forbes' genus *Lizzia*. Kramp, following Haeckel, distinguishes three stages in the development of *L. blondina*—*Dysmorphosa minima*, with only eight tentacles, *L. claparedei* with twelve (two on each perradial bulb), and the fully developed *L. blondina* with three tentacles on the perradial and one on each interradial bulb. Our specimens would belong to the two first-named species only, for none has the full number of tentacles and none has gonads. It seems then that the medusa does not become sexually mature till after October, during which month it shows a marked decrease in numbers, possibly owing to the slowing down of the process of gemmation.

Miss Yeats found a small percentage of another medusa, *Willsia stellata* Forbes, but the numbers of these were not determined exactly.

*Rathkea octopunctata* (M. Sars) (= *Rathkea blumenbachii* Hartlaub).

Only two specimens have been found, one taken by a bottom net and the other by a middle net off Burnmouth in July. They are readily distinguished from *Lizzia blondina* by the light brown pigmentation of the tentacle bulb which carries three tentacles. The manubrium, moreover, has four short stout lips each of which bears two sessile knobs of nematocysts. Just above the base of the lip on either side there is, in addition, another nematocyst cluster. Although the specimens measure only 1 mm. in height, they compare very closely with Hartlaub's drawings in *Nordisches Plankton*.

*Leuckartiara octona* (Fleming).

This rather striking medusa has a very restricted seasonal occurrence, being found only from August till October, the largest catches being taken by middle and bottom nets. The largest specimen from the Longstone on 11th September measures  $10 \times 10$  mm. The radial canals are broad and slightly notched and each of the 20 tentacles has an outwardly projecting spur on the adaxial side of the comparatively large basal bulb. The possession of tentacular spurs and a large prominent apical projection immediately points to the specimens belonging to *Leuckartiara octona* (Hartlaub, 1914, p. 285). Kramp has made several observations on number and order of development of tentacles in this species, and on the whole these apply fairly closely to our specimens. The smallest, taken in August off Souter, measures only 1 mm. in height, and has four well-developed tentacles and four interradial rudiments. Judging by its small size we may conclude that it cannot have been carried any great distance, and the hydroid, *Perigonimus repens*, must therefore live somewhere in the neighbourhood.

## LEPTOMEDUSÆ.

*Mitrocoma* (*Mitrocomella*) *fulva* (Browne)

(=*Mitrocoma polydiademata* Romanes.)

This species, listed for this area for the first time, occurs in middle and bottom waters during July. The largest specimen measures 12 mm. in diameter and about 8 mm. in height, and has 42 tentacles with 3 or 4 cirri between adjacent pairs. Lithocysts are present, but I cannot be certain of the number of concretions in each. The manubrium is small and produced at the corners into a slightly recurved lip, a feature which does not seem to have been mentioned elsewhere. In the female the gonad occupies the lower three-quarters of the radial canal and ends within 1 mm. of the edge. A smaller specimen, 7 mm. by 4 mm., has 21 tentacles (5, 5, 5 and 6) and in it the gonad (male) stretches from the circular vessel to the middle of the radial canal. The gonad is relatively larger and more compact than in the female, in which the ova extend in a thin sinuous band on either side of the canal. From an examination of the specimens the males would appear to come to maturity while much smaller than the females.

One specimen, taken off the Coquet (Station 12M.), is peculiar in that two adjacent radial canals, carrying gonads, have swung round and fused about the middle of their course. The common canal formed splits again near the circular canal and gives off a short side branch.



*Cosmetira pilosella* (Forbes).

This species was taken in very small numbers and was restricted in distribution. The largest specimen, taken off the Longstone in September, measures 13 mm. in diameter, but is sexually spent.

*Tiaropsis multicirrata* (M. Sars).

In April ten small specimens were taken, the bell in each case measuring about 1.5 mm. in diameter and slightly more in height. There are 32 tentacles with smaller ones developing between them, and eight prominent adradial lithocysts. The mouth is quadrangular with four small lips. No gonads have yet developed.

In July twelve large specimens were taken off Seaham. These vary in diameter from 8–12 mm. and the tentacles vary in number from 176 to 236. According to Bigelow (1913), whose largest specimen measured 22 mm. in diameter, the final number is about 250. In my largest specimens (12 mm.), which are almost sexually mature, the bell margin is closely crowded with tentacles and seems to carry its maximum number, but the actual size of these specimens cannot be determined accurately owing to their preserved state. They differ from the smaller ones in having the bell relatively flatter, the manubrium much more frilled and the gonads well developed and in some cases mature. The collection shows eight females and four males. A prominent feature is the presence of granules of intense black pigment which are scattered along the dorsal wall of the ovary. This pigment is also present at the base of each tentacle, but is only seen clearly in mounted specimens with a fairly high power of the microscope, when the concretions in the marginal vesicles can also be seen to advantage. Owing to preservation these concretions are much broken up and look very like pigment granules. In the male the black pigment is not so conspicuous on the gonad.

The species has been confused with *Eutonina indicans* (Romanes) by Johansen and Levinsen (1903), and indeed the two species are very much alike in the preserved state. As both species were found in the same sample a certain amount of difficulty was experienced at first in distinguishing the two sorts. Mr. Kramp has kindly corroborated these identifications. The peduncle of *Eutonina*, however, although much contracted, is quite distinctive, as are also the black ocelli in the lithocysts of *Tiaropsis*.

*Obelia* sp.

This medusa occurs in very small numbers compared with those of previous records. Miss Robson has recorded five species of *Obelia* hydroids for the North-East coast (*Dove Marine Report*, 1914), and since there are five medusa-producing hydroids of this genus we should expect to find

five species of medusæ. The work of Browne (1905, p. 70) in rearing different *Obelia* species shows, however, that their medusæ are practically indistinguishable so that, in view of his findings, it does not seem possible to give the specific names of the specimens handled.

*Phialidium hemisphæricum* (Gronovius).

The numbers of this medusa, present at all stations and at all depths, compare favourably with those of former years. The largest catch was obtained off the Longstone by a bottom net early in September. The specimens range in size up to 12 mm. in diameter and show great variation in form, especially in the number and shape of the tentacle bulbs. Although these differences may be due to the preservative, yet I believe with Kramp that possibly different varieties exist.

One freak specimen has two manubria separated by a distance equal to their own width.

*Saphenia gracilis* (Forbes and Goodsir).

Although by no means abundant in the collection, this rather rare medusa is present in larger numbers than in previous records. It increases both in number and size from early September to October when the mature specimens are to be found.

*Eutonina indicans* (Romanes) (= *Eutonina socialis*, Hartlaub).

In all, 33 specimens of this medusa were taken in middle and bottom waters in July and August. They are conspicuous on account of their large size and prominent gelatinous peduncle which bears a much-frilled manubrium. In Hartlaub's figure (1897) this frilled condition is not indicated to the extent shown in my specimens. Kramp has found this species in more northern waters and has made very careful measurements; with his observations the Northumbrian specimens are in accord.

In the older specimens dark pigment can be detected on the tentacle bulbs, along the dorsal surface of the gonads and along the dorsal surface of the grooves in the floor of the stomach. So far I have been unable to find any reference to this in the literature dealing with this species.

*Tima bairdii* (Johnston).

Only four specimens were taken in July off the Longstone. All measure more than 20 mm. and one shows traces of a developing gonad.

*Æquorea forskalea* Péron et Lesueur.

One badly mutilated specimen was taken in July by a bottom net off Seaham. It measures about 12 mm. in diameter and has 16 radial canals. This appears to be the first record of the species for Northumbrian waters.

## TRACHYMEDUSÆ.

*Aglantha rosea* (Forbes).

Compared with the catches of previous years, the numbers recorded for this species are very small. It was entirely absent during July, August and October, and only 25 specimens were obtained during September.

These medusæ do not belong to Kramp's larger form *A. digitale* forma *typica*, but rather to the variety *rosea* for reasons given in a previous Report (Peacock, 1923).

## SCYPHOMEDUSÆ.

*Aurelia* sp.

A single ephyra was captured by a bottom net in April.

## CTENOPHORA.

*Beroë* and *Pleurobrachia* are well represented from July to October. *Beroë* is the more numerous for the early part of July, then as it decreases in numbers *Pleurobrachia* shows a gradual increase. Both are found at all depths.

## ACTINOZOA.

## FAM. CEREANTHIDEA.

*Arachnactis bournei* Fowl. (?)

Large numbers of *Arachnactis* larvæ were taken in April by middle and bottom nets off the Coquet and Newbiggin. They are comparable with the figures of the species given by Carlgren (*Nordisches Plankton*, XI).

*Arachnactis albida* Sars.

A single specimen of *A. albida* was taken in July. It differs from the former species in the arrangement and length of the tentacles.

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TABLE I.

ANTHOMEDUSÆ	Species.	Month. Station. Depth.*	April.			July.										August.			September.					October.										
			1 13	2 28½	3 27	4 19	5 31	6 22	7 34	8 45	9 40	10 33	11 33	12 39	13 34	14 12	15 28	16 25	17 18	18 26	19 39	20 22	21 38½	22 11	23 41	24 35½	25 24	26 29	27 27½	28 37½				
Sarsia	eximia	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
		M	2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sarsia	tubulosa	B	5	-	7	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sarsia	prolifera	M	-	2	-	-	-	-	-	2	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		B	-	-	-	-	-	4	-	2	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sarsia	gemmifera	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	
Dipurena	halterata	B	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	7	-	-	12	52	9	4	-	-			
		S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	43	5	2	-	-			
Euphysa	aurata	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-	-	-	-	-	2	-	-	-	-		
Hybocodon	prolifer	S	-	-	-	-	59	-	-	2	-	-	-	-	-	-	-	43	-	2	9	-	2	-	65	25	-	-	-	-	-	-		
		M	5	-	-	20	2	12	66	81	56	66	43	5	-	9	57	57	4	4	-	8	-	12	11	4	7	9	14	-	-	-		
Podocoryne	areolata	B	7	2	-	7	26	40	95	221	122	499	437	55	24	46	167	549	-	10	6	4	-	6	35	4	2	10	27	-	-	-	-	
		S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bougainvillia	britannica	M	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		B	12	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lizzia	blondina	S	-	-	-	3	11	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		M	-	-	2	4	-	2	7	7	5	10	22	-	-	70	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rathke	octopunctata	B	-	-	-	6	-	11	2	3	5	-	27	36	2	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		S	-	-	2	3	-	7	9	14	7	-	7	-	-	9	6	-	-	-	4	-	-	2	4	-	-	-	-	-	-	-	-	-
Leuckartiaria	octona	M	-	-	2	-	-	-	-	-	-	-	-	-	4	1,431	102	68	968	759	164	13	59	493	3,676	6	16	-	-	-	-	-	-	-
		B	-	-	-	-	6	-	-	-	-	-	-	-	4	235	40	18	666	1,172	73	2	36	117	376	18	6	-	-	-	-	-	-	-
Leuckartiaria	octona	S	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	2	-	-	17	-	-	2	-	-
Leuckartiaria	octona	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	4	2	7	-	-	-	-	-	-
		S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	-

\* Depth of sea bottom in fathoms.

TABLE I.—*continued.*

		April.		July.											August.				September.					October.							
Species.	Month.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28		
	Station.	31	28½	27	19	31	22	34	45	40	33	33	39	34	12	28	25	18	26	39	22	38½	11	41	35½	24	29	27½	37½		
	Depth.*																														
LEPTOMEDUSÆ	Mitrocoma	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	fulva	M	-	-	-	-	-	-	7	11	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		B	-	-	-	-	6	2	-	2	-	3	-	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Cosmetira	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pilosella	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	-	-	-	-	-	2	-	
		B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	-	2	4	-	-	-	4	-	-	-	-	-	-
	Tiaropsis	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	multicirrata	M	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		B	-	7	3	-	-	-	-	-	-	-	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Obelia sp.	S	-	-	-	5	-	-	2	-	17	2	22	18	-	20	-	-	-	-	11	2	-	-	-	-	-	-	-	-	-
		M	14	-	16	-	20	-	14	2	2	-	-	33	-	-	2	2	-	-	-	4	-	-	3	2	-	-	-	-	-
		B	-	5	2	-	6	-	2	6	11	-	-	12	-	3	-	-	-	-	-	-	-	-	4	-	2	2	4	-	-
	Phialidium	S	-	-	-	5	55	-	-	-	2	15	2	28	-	4	17	-	-	-	4	18	-	18	-	4	-	-	-	-	
hemisphaericum	M	-	-	-	40	3	23	51	23	59	40	54	13	72	20	89	10	-	-	2	14	-	5	64	21	32	5	22	58		
	B	-	3	2	7	87	4	43	155	15	35	23	33	136	119	18	38	46	16	11	5	2	4	119	469	21	30	7	46		
Saphenia	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
gracilis	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	8	-	2	7	9	10	-	25	12		
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	4	-	4	9	6	5	13		
Eutonina	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
indicans	M	-	-	-	-	-	-	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	B	-	-	-	3	-	-	4	4	-	-	33	-	2	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tima	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
bairdii	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	B	-	-	-	-	-	-	4†	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
TRACHY-MEDUSÆ	Aglantha	S	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	rosea	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2	-	6	-	-	-	-	
		B	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	

\* Depth of sea bottom in fathoms,

† Absolute no.