

Notes on *Cyanea* Caught in the Ring-trawl in the Plymouth Area during the Years 1925 to 1930.

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DURING the researches on the vertical distribution of plankton and on the seasonal abundance of young fish, a record was kept of all *Cyanea lamarcki* Péron and Lesueur* occurring in the catches of the 2-metre stramin ring-trawl. This was primarily for correlation with the abundance of such fish as the young whiting, *Gadus merlangus*, which at certain stages in their development shelter under the umbrella of the medusa. Since it is only with the larger *Cyanea* that this association of the young whiting exists it was necessary to keep a record of the sizes of the *Cyanea* occurring in the catches. These were only rough measurements and denote the diameter of the flattened disc of the medusa usually to the nearest half-inch.

Records of the sizes of *Cyanea* species occurring in other latitudes have been published from time to time, but the writer can find no record of the sizes occurring at Plymouth and it seemed desirable to publish these observations.

In Table III at the end of this paper are given all the numbers and measurements of *Cyanea* caught in the ring-trawl. All the data for the hauls in question have been given in previously published papers in this journal dealing with the vertical distribution of plankton or the abundance of young fish. It is only necessary to state here that on all dates in the years 1925 and 1926 the numbers given are the total numbers taken in five or usually six ten-minute hauls, each haul being taken at a different depth. From 1927 onwards the collections on each day were half-hour oblique hauls.

A study of these records shows that *Cyanea* was only taken in the months of April, May, June, and July. Not a single specimen was caught in any other month in the year. In Table I are summarised the results for all years showing the numbers at the different sizes occurring in the months April to July.

* The validity of *Cyanea lamarcki* as a distinct species seems still to be in doubt (*vide* Bigelow, 1, p. 357, and Krumbach, 6, p. 24), but I have here followed the nomenclature of the Plymouth Fauna List. In my previous publications I have followed Mayer (7, p. 596) in regarding *lamarcki* as a variety of *C. capillata*. Vanhöffen (8, p. 53) regarded *C. lamarcki* as a distinct species.

TABLE I.

	Diameter of disc in inches.												
	<2"	2"	2½"	3"	3½"	4"	4½"	5"	5½"	6"	6½"	7"	7½"
April	118	3	-	2	-	-	-	-	-	-	-	-	-
May	45	6	6	7	-	4	-	-	-	-	-	-	-
June	21	11	8	8	1	12	1	2	1	1	-	-	1
July	4	1	1	2	2	3	-	5	-	2	1	-	-

It shows that *Cyanea* of a very small size, many of about half an inch diameter or less, appear in comparatively large numbers in April, the largest taken in that month being only 3 inches in diameter. The numbers of small medusæ of under two inches get steadily lower until in July only 4 were taken during the five years in which collections were made in that month. At the same time the numbers of large specimens increase. It appears that 5 to 6 inches in diameter is the usual limit of size reached, one only of 7½ inches having been taken.

In Table II are given the average catches per half-hour oblique haul for each of the months April, May, June, and July for the years 1925 to 1930. (These figures have been calculated as in Journ. Mar. Biol. Assoc., N.S., Vol. XVI, No. 3, p. 707.)

TABLE II.

	1925	1926	1927	1928	1929	1930
April	0.0	11.3	0.0	0.0	2.3	1.6
May	0.6	4.1	2.0	—	9.8	1.3
June	0.4	1.3	1.7	—	10.7	1.3
July	0.8	0.0	0.8	—	1.4	1.0

This shows that in 1926 and 1929 the *Cyanea* were distinctly more abundant than in the other years.

The size of these blue *Cyanea* is generally given as from 200–300 mm. diameter (Vanhöffen, 8, p. 53). Haeckel (5, p. 530) gives 100–200 mm., and rarely 300 mm. These measurements are slightly higher than those given in Table I, for while 200 mm. is 7.9 inches, 300 mm. is 11.8 inches. It is possible that these larger sizes occur here but are not caught in the ring-trawl; at any rate, they cannot be very common.

Miss Delap (2, p. 21) reared *Cyanea lamarcki* in an aquarium. Her first ephyrae were liberated by March 12th, and by April 15th the largest was 10 mm. in diameter. The latter would correspond to about the size at which they first appeared in April in the ring-trawl catches. Under aquarium conditions the largest size she succeeded in rearing the *Cyanea* to was only 80 mm. (3.2 inches) by June 10th. In 1901 M. and C. Delap record in Valencia Harbour "A good many seen in June from two to five inches in diameter" (3, p. 15), and for 1902 they say, "A considerable number seen on May 8th, from ¾-inch to double that size, all young stages" (4, p. 13).

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TABLE III.

NUMBERS AND SIZES OF CYANEA TAKEN IN THE 2-METRE STRAMIN RING-TRAWL COLLECTIONS AT PLYMOUTH FROM 1925 TO 1930.

1925.		1927 (cont.)	
April	2nd, 8th, 22nd, 29th: none.	August	4th, 8th, 19th, 26th, 31st: none.
May	19th (i.) 1 ("small").	Sept.	6th, 15th, 19th: none.
	19th (ii.) 1 (" ").	Oct.	4th, 13th, 18th, 24th: none.
June	4th (i.) —	Nov.	1st; Dec. 15th, 21st: none.
	4th (ii.) —	1928.	
	17th (i.) $\frac{1}{2}$ ", 1: 2", 1.	Jan.	9th, 16th, 26th, 30th: none.
	17th (ii.) —	Feb.	2nd, 20th, 27th: none.
	17th (iii.) 3", 1.	March	5th, 21st, 30th: none.
	18th (i.) 2", 1: 4", 1.	April	4th, 11th, 12th, 23rd: none.
	18th (ii.) $1\frac{1}{2}$ ", 1.	1929.	
	18th (iii.) —	April	10th —
	18th (iv.) 3", 1: 4", 1.		19th $\frac{3}{4}$ ", 3: 2", 1: 3", 1.
	19th (i.) —		23rd $\frac{3}{4}$ ", 2: 1", 1: $1\frac{1}{2}$ ", 1.
	19th (ii.) $2\frac{1}{2}$ ", 1.		29th —
July	1st (i.) $\frac{3}{4}$ ", 1: $1\frac{1}{2}$ ", 1: 3", 1:	May	6th $\frac{1}{2}$ ", 5: 1", 1: 2", 1.
	$3\frac{1}{2}$ ", 1.		13th 2", 6: $\frac{3}{4}$ ", 3: 1", 5: $1\frac{1}{4}$ ",
	1st (ii.) $1\frac{1}{2}$ ", 1.		2: 2", 4: $2\frac{1}{2}$ ", 1: $2\frac{3}{4}$ ", 1.
	16th —		23rd —
	29th $1\frac{1}{2}$ ", 1.		27th 1", 2: $1\frac{1}{2}$ ", 1: 2", 1:
August	6th —	June	6th $\frac{3}{4}$ ", 1: 1", 4: $1\frac{1}{2}$ ", 6:
1926.			2", 4: $2\frac{1}{2}$ ", 3: 3", 3:
April	9th $\frac{1}{2}$ "- $1\frac{1}{2}$ ", 12: $\frac{3}{8}$ "- $1\frac{1}{4}$ ", 6:		4", 2.
	under 1", 6.		11th 1", 1: $1\frac{1}{2}$ ", 1: 2", 2:
	13th (i.) $\frac{1}{4}$ "- $\frac{3}{4}$ ", 5: $\frac{1}{4}$ "- $\frac{1}{2}$ ", 7: 1"-		$2\frac{1}{2}$ ", 2: 3", 2.
	$1\frac{1}{4}$ ", 2: $1-1\frac{3}{4}$ ", 4: 3", 1.		25th $1\frac{1}{2}$ ", 1.
	13th (ii.) $\frac{1}{2}$ ", 25: $\frac{1}{2}$ "- $1\frac{1}{2}$ ", 20: 1",	July	3rd 4", 1: 5", 2: 6", 1.
	1: 2", 1.		9th —
	22nd $\frac{1}{4}$ ", 1: $\frac{1}{2}$ ", 2: $\frac{1}{3}$ ", 1: 1"-		18th $2\frac{1}{2}$ ", 1: 3", 1: 5", 1.
	$1\frac{3}{4}$ ", 3: 1"-2", 4.		23rd —
	26th $\frac{1}{2}$ ", 2: $\frac{3}{4}$ ", 1: $1\frac{3}{4}$ ", 1:		30th —
	2", 1.	August	9th, 15th, 22nd, 26th: none.
May	6th $\frac{1}{2}$ ", 1: 1", 2: $1\frac{1}{2}$ ", 1:	Sept.	4th, 6th, 10th, 17th, 24th: none.
	3", 1: 4", 1.	Oct.	3rd, 10th, 16th: none.
	19th <1", 3: $\frac{1}{2}$ ", 4: 1", 1:	1930.	
	3", 1.	Feb.	2nd, 12th, 19th, 26th: none.
June	3rd (i.) —	March	5th, 12th, 19th, 27th: none.
	3rd (ii.) —	April	2nd —
	3rd (iii.) $1\frac{3}{4}$ ", 1: 2", 1: $2\frac{1}{2}$ ", 1:		11th $\frac{1}{2}$ ", 1.
	$4\frac{1}{2}$ ", 1: 6", 1.		16th —
	4th $\frac{1}{2}$ ", 1: 2", 1: 3", 1: 4",		24th $\frac{1}{2}$ ", 5: $\frac{3}{4}$ ", 1.
	4: 5", 2: $5\frac{1}{2}$ ", 1: $7\frac{1}{2}$ ", 1.		29th $\frac{1}{2}$ ", 1.
	25th —	May	7th $\frac{3}{4}$ ", 1: 1", 1.
	30th —		15th $\frac{1}{2}$ ", 1.
July	6th, 13th, 15th, 26th: none.		22nd $\frac{1}{2}$ ", 1.
August	4th: Sept. 22nd: none.	June	10th —
1927.			19th $3\frac{1}{2}$ ", 1: 4", 2.
April	4th, 5th, 20th, 26th: none.		26th $2\frac{1}{4}$ ", 1.
May	2nd —	July	4th —
	9th $1\frac{1}{2}$ ", 2: 3", 1: 4", 2.		9th —
	16th $2\frac{1}{2}$ ", 1: 3", 2.		14th —
	25th —		23rd 5", 1: 6", 1.
June	2nd 1", 2: $1\frac{1}{2}$ ", 1: 4", 1.		29th $3\frac{1}{2}$ ", 1: 5", 1: $6\frac{1}{2}$ ", 1.
	9th —	August	8th, 14th, 21st, 28th: none.
	29th 2", 1: 4", 1.		
July	8th 4", 1.		
	12th 2", 1.		
	21st —		
	26th 4", 1.		