

# Copepods from Georges Bank identified by Clarke & Bumpus on R/V Atlantis in the Georges Bank from 1939-1941 (CBGB project)

Website: <https://www.bco-dmo.org/dataset/3324>

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## Project

» [Clarke-Bumpus Georges Bank](#) (CBGB)

## Program

» [Historical Datasets](#) (Historical)

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## Dataset Description

"These [copepod species and abundance] data are the results of a survey to a specific area of the ocean where the studies were repeated at intervals and in this way the seasonal growth and cycle and production of the area were studied on a quantitative basis." George Clarke, 1974 interview. "Clark and his colleagues (Pierce and Bumpus) made eleven cruises between 1939 and 1941, towing the sampler, measuring water conditions and studying the zooplankton's growth and movements." (Woods Hole Currents, Volume 5 no. 1, 1996, p.9)

## Methods & Sampling

Samples of plankton and hydrographic data for the present study were obtained from the research vessel, "Atlantis", during eleven cruises to Georges Bank from September 1939 to June 1941 (Table I). On each cruise a net-work of 21 to 52 stations was occupied over the Bank. In all cruises (except that of January, 1940) the stations were ordinarily placed at 15-mile intervals on five or six parallel sections, about 25 miles apart, running SE and NW across the Bank and into the immediately adjacent waters. The location of the stations is indicated in the charts showing the distribution of *Sagitta* (Figs. 5 and 6). The stations covered the region from South Channel on the southwest to the eastern tip of Georges Bank and from the deep basin of the Gulf of Maine on

the northwest to the edge of the continental shelf on the southeast.

Standard hydrographic observations for salinity and temperature were made at every station and Secchi disc measurements of transparency were carried out during daylight stations. Studies of certain chemical characteristics of the water and of the phytoplankton population were undertaken by collaborating investigators (Sears, 1941; and Riley, 1941 and 1942).

The zooplankton was collected at each station by means of two or more hauls with Plankton Samplers (Clarke and Bumpus, 1940) and one haul with a stramin net. Sagittae (Chaetognath) were taken in adequate numbers in both types of equipment and the two sets of hauls served as a check on one another.

The opening of the Plankton Sampler, which is 12.7 cm. in diameter, is provided with a shutter, and each instrument contains a meter which records the amount of water filtered by the net. In the present case, the instruments were equipped with No. 2 silk nets (22 strands/cm.) and "oblique" hauls 1 were made at a speed of about 2 knots for periods of 25 to 40 minutes. Ordinarily between 10 and 20 cubic meters of water were filtered during each tow, but the action of the tide or of clogging was such that values as low as 5 m<sup>3</sup> and higher than 30 m<sup>3</sup> were recorded. This variation makes clear the need for measuring the amount of water which actually passes through the net. The Samplers were arranged vertically so as to divide the total depth of water into two or three strata and, when feasible, were attached to the same cable. The uppermost instrument sampled the "Shallow" Stratum, extending from a depth of 25 m. to the surface. The lower limit of this stratum corresponded roughly with the position of the thermocline in those areas where it existed. At stations where the water was less than 75 m. deep, the "Second-depth" Stratum extended from the bottom to 25 m. In water deeper than 75 m., however, the remaining distance to the bottom (or to a maximum depth of 200 m.) was divided into two equal parts and these comprised the "Second-depth" and the "Deep" Strata respectively. The vertical distribution of the sagittae could therefore be studied on the basis of these strata:

<b>Stratum</b>	<b>Water less than 75 m</b>	<b>Water more than 75 m</b>
"Shallow"	0 m to 25 m	0 m. to 25 m
"Second-depth"	25 m to bottom	25 m to half distance to bottom (or to half distance to 200 m)
"Deep"	-	Remaining distance to bottom (or to 200 m)

The stramin net (Diameter: 1.5 m., Mesh: 6 strands/cm.) was equipped with rollers at the lower edge of its frame in order that it could be safely lowered until it touched the bottom. One "oblique" haul was made from the bottom (or from a depth of 200 m.) to the surface at each station. When proper allowance was made for the difference in the sizes of the apertures of the stramin net and the Plankton Samplers, a good agreement was found between the numbers of sagittae taken by the former and the sum of the catches of the latter at each station.

#### References:

- CLARKE, G. L., AND D. F. BUMPUS, 1940. The Plankton Sampler-an instrument for quantitative plankton investigations. Linnological Society of America, Special Pub., (No. 5): 1-8.
- RILEY, GORDON A., 1941. Plankton studies. IV. Georges Bank. Bull. BingharH Oceanographic Coll., VII: Art. 4, 1-73.
- RILEY, GORDON A., 1942. The relationship of vertical turbulence and spring diatom flowerings. Sears Found. Jour. Mar. Res., 5: 67-87.
- SEARS, MARY, 1941. Notes on the phytoplankton on Georges Bank in 1940. Sears Found. Jour. Mar. Res., 4: 247-257.

(from: George L. Clarke, E. Lowe Pierce, Dean F. Bumpus. 1943. "The Distribution and Reproduction of *Sagitta elegans* on Georges Bank in Relation to the Hydrographical Conditions". Biological Bulletin, Vol. 85, No. 3, pp. 201-226

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Stable URL: <http://www.jstor.org/stable/1538223>)

## Data Processing Description

The species listed here are only those that were found, not all the species that were looked for, i.e., these are the non-zero data.

## Data Files

File
<b>clarke-bumpus_copes_join.csv</b> (Comma Separated Values (.csv), 815.26 KB) MD5:2e53cc595c133fe36653ad420f8a6b10
Primary data file for dataset ID 3324

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## Parameters

Parameter	Description	Units
cruiseid	cruise identification: 2 letter ship code + sequential number of cruise	alphanumeric
year	year of sampling	YYYY
station	station identification number	integer
month_local	month of year	integer: 1-12
day_local	day of month: local time	integer: 1-31
lat_avg	average latitude position in decimal degrees (west is negative)	decimal degrees
lon_avg	average longitude position in decimal degrees (south is negative)	decimal degrees
tow_depth_top	upper depth of the tow	meters
tow_depth_bottom	lower depth of the tow	meters
pcent_of_sample	percent of the sample that was examined	number: 0-100
top_adj	adjusted upper depth of tow	meters
bottom_adj	adjusted lower depth of tow	meters
depth_interval	thickness of water layer sampled	meters
time_start	time at start of tow	HH:MM

time_end	time at end of tow	HH:MM
vol_filt	volume filtered by the net	cubic meters
disp_vol_tot	total displacement volume of the sample	milliliters
species	genus and species name of an organism	text
count	number of individuals found in the (sub)-sample	integer
comments	free text comments	text

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## Instruments

<b>Dataset-specific Instrument Name</b>	Clarke-Bumpus Sampler
<b>Generic Instrument Name</b>	Clarke-Bumpus Sampler
<b>Dataset-specific Description</b>	"The beauty of the Clarke-Bumpus Sampler was that it allowed for the collection of vertically-stratified discrete depth samples...It was unique in its time." (From Woods Hole Currents, Volume 1 no. 5, 1996, p.9.
<b>Generic Instrument Description</b>	"Clarke and Bumpus designed a small two-messenger zooplankton collection system that could be deployed as multiple units on the wire and had a positive means of opening and closing the mouth of the net. A frame attached at the top and bottom to the towing wire supported a cylindrical tube 12.7 cm in diameter and 16 cm long, to which a net was attached. In the mouth of the tube was a flat plate (like a stove pipe damper plate), which closed off the cylinder when the net was deployed. When the first messenger released a spring-loaded latch, the plate was rotated 90 degrees, opening the net; a second messenger rotated it another 90 degrees to close the net. A flowmeter at the back of the cylinder recorded flow through the net." (Wiebe and Benfield, 2003) The instruments were equipped with No. 2 silk nets (22 strands/cm.) and "oblique" hauls were made at a speed of about 2 knots for periods of 25 to 40 minutes. References: CLARKE, G. L., AND D. F. BUMPUS, 1940. The Plankton Sampler-an instrument for quantitative plankton investigations. Linnological Society of America, Special Pub., (No. 5): 1-8. Wiebe, Peter H. and Mark C. Benfield, 2003. From the Hensen net toward four-dimensional biological oceanography. Progress in Oceanography, 56, pp. 7-136.

<b>Dataset-specific Instrument Name</b>	Stramin net
<b>Generic Instrument Name</b>	Stramin net
<b>Generic Instrument Description</b>	A Stramin net is specifically designed to sample plankton near the bottom and one such, designed by F.S. Russell in 1928, the 'stramin' net (Diameter: 1.5 m., Mesh: 6 strands/cm.) was equipped with rollers at the lower edge of its frame in order that it could be safely lowered until it touched the bottom. One "oblique" haul was made from the bottom (or from a depth of 200 m.) to the surface at each station. "It was mounted in an Agassiz trawl frame so that it was centered inside the trawl net, which was also fixed to the frame and cleared the bottom by approximately 17.8 cm. No provisions were made to prevent contamination of the collection during the lowering of the net to the sea floor or the hauling back to the surface."(Wiebe and Benfield, 2003) References: Wiebe, Peter H. and Mark C. Benfield, 2003. From the Hensen net toward four-dimensional biological oceanography. Progress in Oceanography, 56, pp. 7-136.

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## Deployments

### AT89

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58042">https://www.bco-dmo.org/deployment/58042</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1939-09-06
<b>End Date</b>	1939-09-16
<b>Description</b>	<b>Methods &amp; Sampling</b> zooplankton collection on Georges Bank

### AT100

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58049">https://www.bco-dmo.org/deployment/58049</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1940-06-19
<b>End Date</b>	1940-06-27

### AT112

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58050">https://www.bco-dmo.org/deployment/58050</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1941-03-21
<b>End Date</b>	1941-04-02

### AT93

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58044">https://www.bco-dmo.org/deployment/58044</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1940-01-04
<b>End Date</b>	1940-01-11

#### AT95

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58045">https://www.bco-dmo.org/deployment/58045</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1940-03-21
<b>End Date</b>	1940-04-02

#### AT96

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58046">https://www.bco-dmo.org/deployment/58046</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1940-04-17
<b>End Date</b>	1940-04-27

#### AT98

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58048">https://www.bco-dmo.org/deployment/58048</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1940-06-01
<b>End Date</b>	1940-06-08

#### AT113

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58051">https://www.bco-dmo.org/deployment/58051</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1941-04-15
<b>End Date</b>	1941-04-23

#### AT97

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58047">https://www.bco-dmo.org/deployment/58047</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1940-05-09
<b>End Date</b>	1940-05-16

#### AT114

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58052">https://www.bco-dmo.org/deployment/58052</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1941-05-07
<b>End Date</b>	1941-05-14

#### **AT116**

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58053">https://www.bco-dmo.org/deployment/58053</a>
<b>Platform</b>	R/V Atlantis (ketch)
<b>Start Date</b>	1941-05-28
<b>End Date</b>	1941-06-04

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## **Project Information**

### **Clarke-Bumpus Georges Bank (CBGB)**

**Coverage:** Georges Bank

plankton tows on Georges Bank taken from 1939-1941 by George L. Clarke and Dean F. Bumpus

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## **Program Information**

### **Historical Datasets (Historical)**

**Coverage:** global

This 'program' consists of data sets that are not part of a recognized program and are of historical interest, usually collected before 1980.

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