PILCHARD EGGS AND LARVAE AND OTHER FISH LARVAE, PACIFIC COAST - 1951

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PILCHARD EGGS AND LARVAE AND OTHER FISH LARVAE, PACIFIC COAST, 1951

This report contains the results of quantitative sampling of pilchard (Sardinops caerulea) eggs and larvae off the west coast of California and Baja California during 1951. (The area surveyed is shown in figure 1.) Although the collections were designed primarily to yield information on the distribution and abundance of pilchard eggs and larvae, a not unexpected byproduct was information on a number of other fish of present or potential commercial importance. We are including records of the larvae of five of these: northern anchovy (Engraulis mordax), jack mackerel (Trachurus symmetricus), hake (Merluccius productus), Pacific mackerel (Pneumatophorus diego) and rockfish (Sebastodes spp.).

In the tables, pilchard eggs are enumerated by age (in days) since spawning; pilchard and anchovy larvae by size categories; and for the remaining species a tabulation is given of the numbers taken.

The haul data for the 1951 collections have already been presented in the report on "Zooplankton Volumes off the Pacific Coast, 1951" (Special Scientific Report: Fisheries No. 73, May 1952). However, a record of the standardized haul factors was not included, and they are presented as Table I in this report.

The investigation of the extent and amount of pilchard spawning, and of the survival of pilchard larvae in relation to oceanographic conditions constitutes one of the major lines of research being pursued by the South Pacific Fishery Investigations of the U. S. Fish and Wildlife Service under the California Cooperative Sardine Research Program. This program is sponsored by the Marine Research Committee and is being carried out in conjunction with the Scripps Institution of Oceanography of the University of California, the Bureau of Marine Fisheries of the California Department of Fish and Game, the California Academy of Sciences and the Hopkins Marine Station of Stanford University. It is a pleasure to acknowledge the wholehearted cooperation of the above agencies.

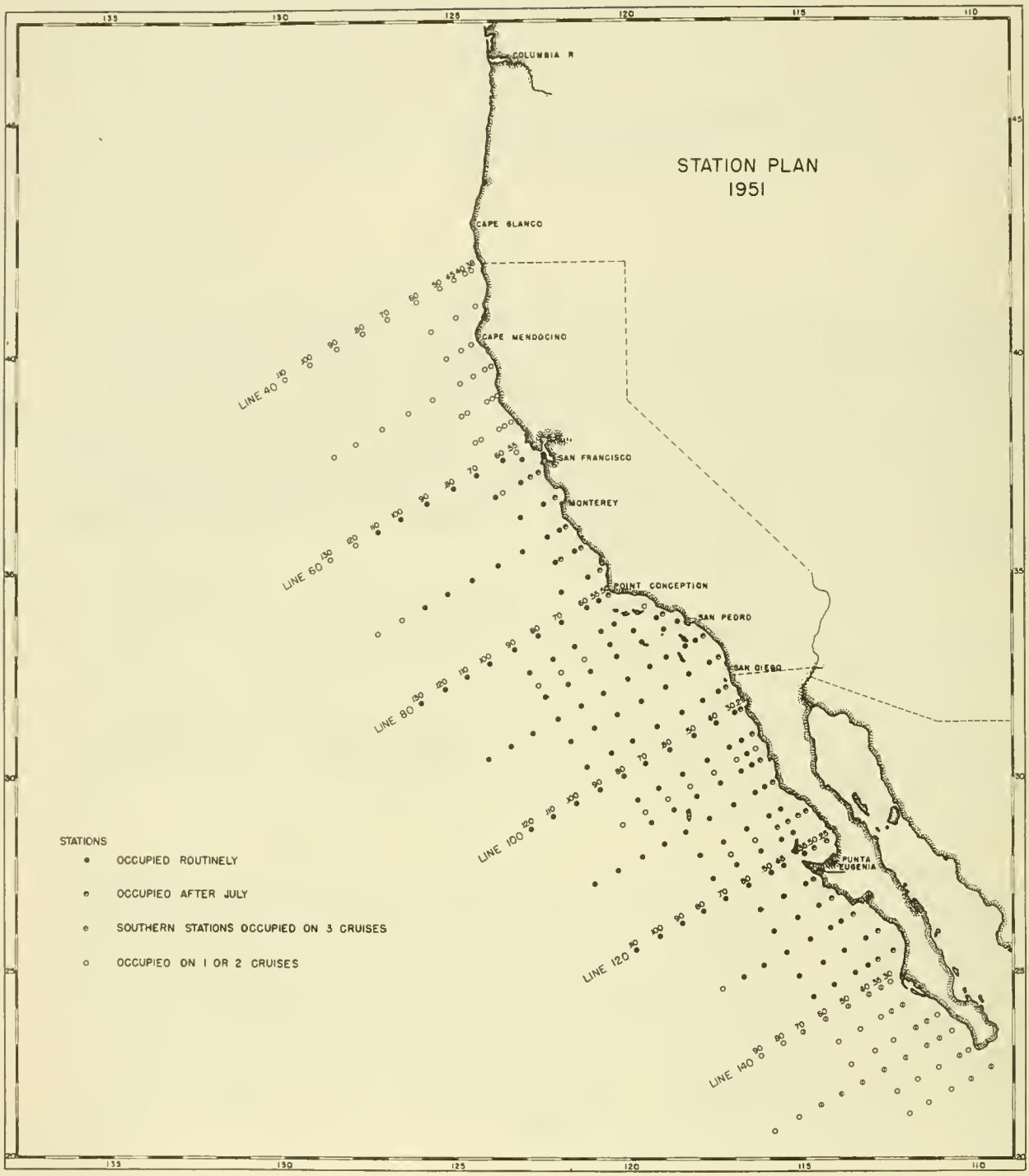

Figure 1. Station plan, showing location of all stations occupied on survey cruises of the California Cooperative Sardine Research Program during 1951

AREA COVERED

The area surveyed during 1951 is shown in figure 1. The month by month coverage, by area, is summarized in text table 1. There were 12 survey cruises made during 1951. The average number of stations occupied per cruise was 120, but as few as 65 and as many as 170 stations were occupied on a cruise.

Intensity of coverage in different parts of the survey area varied with need. The area off northern California (Lines 40-57) was surveyed on only two cruises made in July and August. The coverage off central California was much more thorough, stations having been occupied on Lines 60-77 during every month except February and March. The area between Pt. Conception and Pt. Abreojos (Lines 80-137) was surveyed monthly during 1951, although the coverage was abbreviated in December. The area off southern Baja California was surveyed three times: during March (Cruise 23), June (Cruise 26) and September (Cruise 29).

Six vessels participated in one or more cruises. These were the CREST, HORIZON and PAOLINA T. of the Scripps Institution of Oceanography, the N. B. SCOFIELD and YELLOWFIN of the California Department of Fish and Game, and the BLACK DOUGLAS of the U. S. Fish and Wildlife Service. Two to four vessels were used on each of the monthly cruises. A tabulation of the vessels employed on each cruise during 1951 is given in text table 2.

Text table 2. Research vessels participating in the collection of material during 1951.

Month	Cruise No.	No. vessels used	BLACK DOUGLAS	CREST	HORIZON	N.B. SCOFIELD	PAOLINA T.	YELLOWFIN
January	21	3		X	X	X		
February	22	2	X	X				
March	23	3	X	X	X			
April	24	3	X	X	X			
May	25	3	X	X	X			
June	26	4	X	X	X			X
July	27	3	X	X			X	
August	28	3	X	X			X	
September	29	3	X	X			X	
October	30	3	X	X			X	
November	31	2	X	X				
December	32	2			X			X
Total	(12)	34	10	11	6	1	4	2

METHODS OF SAMPLING

The nets used in the collection of fish eggs and larvae were constructed of No. 30xxx grit gauze, a heavy duty grade of silk bolting cloth. The openings between meshes in this material are approximately 0.65 mm. when new, shrinking to approximately 0.50 mm. after use. The nets were conical in shape, 1.0 meter in diameter at the mouth and approximately 5 meters in length. A current meter was placed in the center of the mouth of each net to register the flow of water into the net during a haul.

The nets were hauled obliquely from approximately 140 meters in depth to the surface (200 meters of wire out at greatest depth), except at shallow stations. The hauls were made at a vessel speed of about $1\frac{1}{2}$ to 2 knots. The hauls differed from those made in previous years in one respect: the depth of the stratum sampled was approximately doubled. Previously the hauls had averaged about 70 meters in depth (net lowered on 100 meters of wire).

MEASUREMENT OF VOLUME OF WATER STRAINED DURING PLANKTON HAULS

An Atlas type current meter was suspended in the mouth of each net. This instrument consists of a rotator and revolution counter housed in an open cylinder. The water entering the net during a haul actuates the freely running rotator, which is geared to the revolution counter. A reading of the counter was made before commencing a plankton haul, and again on the completion of the haul.

Current meters were calibrated before and after each cruise on which they were employed. During calibration trials, each current meter was hauled over a measured distance at a range of speeds. Performance graphs were constructed in which the independent variable was the speed of towing (revolutions per second), the dependent variable the length of the column of water in meters that was needed to effect one revolution of the current meter at any given towing speed. Since performance tests were made before and after each cruise, the graph applicable to a given cruise was based on two calibration trials. In text table 3, current meter performance data are given for the current meters used during 1951.

The consistency in the performance of Atlas type current meters can be judged from this table. Current meter No. 88, which was used on eleven cruises during 1951, was quite consistent in performance throughout the year. Current meter No. 82, used on six cruises, gradually became more free-running with continued use.

The volume of water strained during a haul was determined from the formulation:

$$V = R \cdot a \cdot p$$

in which

a - the cross-sectional area of the mouth of the net in square meters

p - length of the column of water in meters needed to effect one revolution of the current meter at the average speed at which the haul was taken (determined from the appropriate calibration graph)

R - total number of revolutions registered by the current meter during a haul

V - total volume of water strained in cubic meters during a haul

VERTICAL DISTRIBUTION OF SARDINE EGGS AND LARVAE

The distribution of plankton organisms in the ocean can be considered to be four dimensional, if the time component is included as one of the dimensions. Of these, the vertical component is the easiest to deal with, as often it can be completely encompassed. Sampling of both the time and horizontal distributions, however, are necessarily spotty.

Fortunately, most fish eggs and larvae occur in the euphotic zone, usually in the upper 100 meters of depth. It has been shown that most sardine eggs and larvae occur above 40 meters in depth, and all above 100 meters. Hence, our routine hauls, which sample a depth stratum of approximately 140 meters, should effectively encompass the depth distribution of sardine eggs and larvae.

VARIATION IN DEPTH OF PLANKTON HAULS

Because of unavoidable variations in speed of towing, hauls differed in the depth of the stratum sampled. At a higher speed than usual, the net went less deep and spent more time in each unit of depth traversed. For hauls taken at a slower vessel speed than usual, the reverse was true.

Most of the vessels used for taking plankton hauls could not be slowed down sufficiently when the sea was fairly calm. At such times, the engine had to be started and stopped frequently in order to approximate the desired towing speed. More uniform hauling was possible when a moderate sea was running (wind 4 or 5 on the Beaufort scale). The shallowness of the water at some stations did not permit making hauls of the "usual" depth.

We have verified, by use of the depth-flow unit of an Isaacs high speed sampler, that the depth of a plankton net at any instant during a haul can be approximated by multiplying the amount of towing wire out by the cosine of the angle of stray of the towing wire from the vertical (Ahlstrom 1952, p. 4). The angle of stray of the towing wire is measured continuously during a haul by means of an inclinometer suspended from the boom and riding freely on the wire. As uniform an angle as possible is maintained during a haul, preferably a 45 degree angle. The angle of stray is recorded at half-minute intervals during a haul.

To derive the average depth of a haul, D, the cosine of the average angle of stray is multiplied by the length (in meters) of the towing cable released in taking the haul. The cosine of the average angle of stray is considered to be more representative of the haul as a whole than the cosine of the angle of stray at greatest depth.

STANDARDIZATION OF HAULS

The "standard haul" that we employ adjusts the number of eggs or larvae in a haul to the number in 10 cubic meters of water strained per unit of depth fished by the net. If the vertical distribution has been encompassed, as it has been for sardine eggs and larvae, this value is equivalent to the number under ten square meters of sea surface. The standardization factor for each haul (S. Factor) was derived from the formulation:

$$S = \frac{10\ D}{V} \text{ or } \frac{10\ D}{R \cdot a \cdot p}$$

in which

S - standardized haul factor

D - the average depth of a haul

The other symbols retain the same meaning as in the earlier formulation.

Text table 3. Current meter performance data for two selected speeds (Cruises 21-32)

Current meter	Cruise on which used	Meters/rev at 2.0 rev/sec (1	Meters/rev at 3.5 rev/sec (1
No. 31	B-26 (2	0.233	0.224
No. 32	C-24	0.306	0.305
	H-25	0.318	0.315
	Y-26	0.327	0.317
	P-27	0.328	0.312
	Y-32	0.319	0.312
No. 81	S-21	0.292	0.285
	C-25	0.298	0.289
	P-28	0.295	0.290
	P-29	0.292	0.290
	C-31*(Jewels replaced)	0.278	0.269
No. 82	C-21	0.320	0.307
	C-22	0.316	0.306
	C-23	0.311	0.302
	C-27	0.307	0.297
	C-28	0.303	0.292
	C-29	0.293	0.286
No. 87	H-23	0.358	0.351
	H-24	0.360	0.360
	H-26	0.356	0.355
	P-27	0.344	0.338
No. 88	H-21	0.305	0.303
	B-22	0.314	0.311
	B-23	0.316	0.311
	B-24	0.312	0.306
	B-25	0.309	0.305
	C-26	0.304	0.303
	B-27	0.306	0.300
	B-28	0.309	0.299
	B-29	0.309	0.301
	B-30	0.302	0.295
	B-31	0.302	0.292
No. 96	C-29	0.382	0.375
	P-30	0.388	0.376
No. 97	C-30	0.381	0.374
	H-32	0.383	0.381
No. 98	H-32	0.356	0.351

1) Each entry is based on the average of two calibrations, one made before, the other after the cruise indicated. The average rev/sec registered by the current meters during most hauls lie within the range of 2.0 to 3.5 rev/sec

2) B - BLACK DOUGLAS, C - CREST, H - HORIZON, P - PAOLINA T., S - N.B.SCOFIELD, Y - YELLOWFIN

SEPARATION OF FISH EGGS & LARVAE FROM PLANKTON SAMPLES

Usually the entire plankton sample was examined for fish eggs and larvae. The examination was made under a low power binocular microscope. Of the 1437 plankton samples collected on survey cruises during 1951, 1262 samples, or 87.8%, were sorted in entirety. Of the samples that were fractioned into aliquot portions, 148 were divided into 2 portions, 22 were divided into 4 aliquots, 4 into 8 aliquots and only 1 sample into 16 portions. One aliquot portion was sorted of each of the fractioned samples. Text table 4 summarizes the above information by cruise for 1951.

Text table 4. Laboratory examination of the 1951 plankton samples.

	Percent examined					
	6.25	12.5	25	50	100	No. samples examined
Cruise 21				8	116	124
Cruise 22				8	90	98
Cruise 23				12	124	136
Cruise 24		1	6	20	111	138
Cruise 25			3	14	110	127
Cruise 26	1	3	9	36	121	170
Cruise 27			3	15	91	109
Cruise 28				11	118	129
Cruise 29			1	4	132	137
Cruise 30				7	109	116
Cruise 31				10	79	89
Cruise 32				3	61	64
Total	1	4	22	148	1262	1437

GUIDE TO TABLES

A record of haul data for 1951 has already been presented in Special Scientific Report: Fisheries No. 73 (May 1952).

Table I. Standardized haul factors. The factors adjust each haul to the comparable standard of 10 cubic meters of water strained per meter of depth fished (see text).

Table II. Record of Pilchard Eggs, 1951.

Number of normal eggs: Number of normally developing pilchard eggs.

Total number of eggs: Includes all pilchard eggs taken in a sample, whether normal or abnormal. Pilchard eggs were classified as abnormal when the embryos were stunted and misshapen in appearance. It is not known whether such abnormalities are caused by a diseased condition of the eggs or by mechanical injury during collection.

The letters A through D are used to designate age categories of eggs:

A: Eggs spawned within 24 hours of collection
B: Eggs spawned within 24.1 to 48 hours of collection
C: Eggs spawned within 48.1 to 72 hours of collection
D: Eggs spawned within 72.1 to 96 hours of collection
Unclass: Unclassified eggs - deteriorating eggs that could not be classified with certainty.

Average n^1: Average number of eggs spawned per day. Because of incomplete age categories, resulting from hauls having been taken while spawning or hatching was actively taking place, not all age categories were used in determining n^1, but only those followed by an asterisk.

Table III. Record of Pilchard Larvae, 1951.

Midpoint of size classes: The larvae are grouped into size classes which have the following midpoints and ranges:

Midpoint (in mm.)	Range (in mm.)	Midpoint (in mm.)	Range (in mm.)
3.25	2.26-4.25	12.75	12.26-13.25
4.75	4.26-5.25	13.75	13.26-14.25
5.75	5.26-6.25	14.75	14.26-15.25
6.75	6.26-7.25	15.75	15.26-16.25
7.75	7.26-8.25	17.25	16.26-18.25
8.75	8.26-9.25	19.25	18.26-20.25
9.75	9.26-10.25	21.25	20.26-22.25
10.75	10.26-11.25	23.25	22.26-24.25
11.75	11.26-12.25		

Table IV. Record of Anchovy Larvae, 1951.

Same as above except for the first category. The size class with midpoint of 3.0 mm. contains larvae from 1.76 to 4.25 mm. in length.

Table V. Record of the Larvae of Jack Mackerel (Trachurus symmetricus), 1951.

The standardized number of larvae are listed by station for all cruises on which they were taken during 1951. A dash indicates that the station was not occupied.

Table VI. Record of the Larvae of Hake (Merluccius productus), 1951.

The comments under Table V are applicable here as well.

Table VII. Record of the Larvae of Pacific Mackerel (Pneumatophorus diego), 1951.

The comments under Table V are applicable here as well.

Table VIII. Record of the Larvae of Rockfish (Sebastodes spp.), 1951

The comments under Table V are applicable here as well.

Table I

Record of Standardized Haul Factors for Oblique Hauls made with Plankton Nets during Cruises 21-32 in 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
40.38	-	-	-	-	-	-	-	1.49	-	-	-	-
40.40	-	-	-	-	-	-	-	2.67	-	-	-	-
40.45	-	-	-	-	-	-	1.65	-	-	-	-	-
40.50	-	-	-	-	-	-	1.87	2.31	-	-	-	-
40.60	-	-	-	-	-	-	2.30	2.50	-	-	-	-
40.70	-	-	-	-	-	-	NQ	2.95	-	-	-	-
40.80	-	-	-	-	-	-	1.65	2.14	-	-	-	-
40.90	-	-	-	-	-	-	1.60	-	-	-	-	-
40.100	-	-	-	-	-	-	1.60	-	-	-	-	-
40.110	-	-	-	-	-	-	1.40	-	-	-	-	-
43.42	-	-	-	-	-	-	-	1.35	-	-	-	-
43.50	-	-	-	-	-	-	NQ	2.27	-	-	-	-
43.60	-	-	-	-	-	-	1.92	2.43	-	-	-	-
47.50	-	-	-	-	-	-	-	2.40	-	-	-	-
47.55	-	-	-	-	-	-	1.58	-	-	-	-	-
47.60	-	-	-	-	-	-	1.42	2.44	-	-	-	-
50.47	-	-	-	-	-	-	-	1.39	-	-	-	-
50.50	-	-	-	-	-	-	-	2.56	-	-	-	-
50.55	-	-	-	-	-	-	1.47	-	-	-	-	-
50.60	-	-	-	-	-	-	1.61	2.54	-	-	-	-
50.70	-	-	-	-	-	-	1.36	3.18	-	-	-	-
50.80	-	-	-	-	-	-	2.23	2.01	-	-	-	-
50.90	-	-	-	-	-	-	2.40	-	-	-	-	-
50.100	-	-	-	-	-	-	1.58	-	-	-	-	-
50.110	-	-	-	-	-	-	1.46	-	-	-	-	-
53.52	-	-	-	-	-	-	-	1.50	-	-	-	-
53.54	-	-	-	-	-	-	2.10	-	-	-	-	-
53.55	-	-	-	-	-	-	-	2.78	-	-	-	-
53.64	-	-	-	-	-	-	(1.40)	-	-	-	-	-
53.65	-	-	-	-	-	-	-	2.16	-	-	-	-
57.51	-	-	-	-	-	-	-	1.51	-	-	-	-
57.54	-	-	-	-	-	-	1.68	-	-	-	-	-
57.55	-	-	-	-	-	-	-	2.20	-	-	-	-
57.64	-	-	-	-	-	-	1.99	-	-	-	-	-
57.65	-	-	-	-	-	-	-	2.60	-	-	-	-
60.55	-	-	-	-	-	-	-	1.48	-	-	1.90	-
60.60	1.83	-	-	2.06	1.81	1.87	1.60	2.33	3.26	2.51	2.52	-
60.70	-	-	-	2.26	1.86	1.70	1.65	1.90	3.91	2.18	3.22	-
60.80	-	-	-	2.18	1.84	2.17	1.75	2.63	3.06	2.75	2.92	-
60.90	-	-	-	1.81	1.82	1.77	1.73	2.98	3.19	-	3.23	-
60.100	-	-	-	1.73	1.80	1.73	1.58	-	-	-	3.27	-
60.110	-	-	-	1.86	1.86	1.76	1.54	-	-	-	-	-
60.120	-	-	-	-	-	1.78	1.50	-	-	-	-	-
60.130	-	-	-	-	-	1.97	-	-	-	-	-	-

Table I (cont'd)

Record of Standardized Haul Factors for Oblique Hauls made with Plankton Nets during Cruises 21-32 in 1951

	Cruise and Month											
Sta.	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
61.55	2.81	-	-	1.45	1.72	1.62	1.64	-	-	-	-	-
63.52	-	-	-	-	-	-	-	1.90	-	-	1.46	1.32
63.55	-	-	-	-	-	-	-	3.10	-	-	3.45	1.95
63.57	1.70	-	-	1.95	1.61	1.62	2.09	-	-	-	-	-
63.65	-	-	-	-	-	-	-	2.76	-	-	-	-
63.67	2.13	-	-	1.85	-	1.70	1.88	-	-	-	-	-
67.50	-	-	-	-	-	-	-	1.52	-	-	1.40	1.42
67.55	.94	-	-	1.98	1.57	1.78	1.81	2.29	-	-	3.22	4.48
67.65	1.48	-	-	1.71	1.70	1.85	1.84	2.68	-	-	2.83	2.44
70.51	-	-	-	-	-	-	-	2.40	-	-	2.74	3.21
70.55	1.62	-	-	2.35	1.65	1.90	1.61	-	-	-	-	-
70.60	1.76	-	-	2.24	1.69	1.59	1.65	2.40	2.76	2.40	2.64	3.82
70.70	1.39	-	-	1.82	1.78	2.03	1.69	2.50	3.22	2.80	3.18	2.51
70.80	2.32	-	-	1.95	1.60	1.82	1.73	2.52	2.28	2.64	3.35	2.58
70.90	1.83	-	-	1.76	1.76	1.81	1.51	-	3.27	2.48	-	-
70.100	-	-	-	1.82	1.77	1.93	1.68	-	-	-	-	-
70.110	-	-	-	1.84	1.69	1.80	1.63	-	-	-	-	-
70.120	-	-	-	-	-	1.87	1.59	-	-	-	-	-
70.130	-	-	-	-	-	1.74	-	-	-	-	-	-
73.50	-	-	-	-	-	-	-	1.66	-	-	1.76	1.25
73.51	1.87	-	-	2.34	1.98	1.37	1.56	-	-	-	-	-
73.60	-	-	-	-	-	-	-	2.64	2.77	2.68	3.23	2.25
73.61	1.44	-	-	1.79	1.76	1.79	(1.75)	-	-	-	-	-
77.50	-	-	-	-	-	-	-	1.39	1.62	2.20	1.67	1.69
77.55	1.84	-	-	1.86	1.95	1.80	1.90	2.36	2.86	2.37	3.06	2.12
77.65	1.69	-	-	1.74	1.81	2.00	2.26	2.84	2.93	2.76	3.03	3.39
80.51	-	-	-	-	-	-	-	1.74	1.56	1.56	2.89	.99
80.55	2.04	1.80	2.18	1.80	1.78	1.67	NQ	2.87	2.53	1.86	2.76	-
80.60	1.62	1.87	2.28	1.69	-	1.48	NQ	2.98	2.71	2.30	3.51	2.48
80.70	1.73	1.55	2.05	1.69	-	1.65	1.92	2.91	2.52	1.99	3.16	2.83
80.80	1.53	1.76	1.64	1.64	-	1.81	1.73	3.01	2.76	1.75	3.46	2.56
80.90	1.66	1.80	1.19	1.96	-	1.74	1.66	-	3.16	2.18	3.32	2.49
80.100	-	1.83	1.40	1.63	-	1.61	1.69	-	2.75	2.27	3.34	-
80.110	-	1.91	1.83	1.89	-	1.61	1.73	-	-	-	-	-
80.120	-	1.68	1.97	1.76	-	-	-	-	-	-	-	-
80.130	-	1.83	1.63	1.81	-	-	-	-	-	-	-	-
83.43	-	-	-	-	-	-	-	-	-	-	3.63	2.24
83.55	-	1.79	-	1.57	1.65	2.83	-	-	3.42	1.95	-	-
83.60	(1.71)	1.64	-	1.48	1.82	-	-	-	-	2.18	-	-
83.70	1.70	-	-	1.71	2.07	2.13	-	-	-	-	-	-
83.80	1.45	-	-	1.90	-	1.89	-	-	-	-	-	-
83.90	1.62	-	-	1.59	-	2.02	-	-	-	-	-	-
85.38	-	-	-	-	-	-	-	2.60	1.77	1.14	1.19	2.18
85.40	-	-	1.99	-	-	-	1.58	3.15	2.88	2.26	2.86	1.55

Table I (cont'd)
Record of Standardized Haul Factors for Oblique Hauls made with Plankton Nets during Cruises 21-32 in 1951

	Cruise and Month											
Sta.	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
85.50	-	-	1.67	-	-	-	-	2.79	3.66	2.02	2.49	3.07
85.60	-	-	-	-	-	-	-	2.49	-	2.00	3.18	-
85.70	-	-	2.01	-	-	-	-	2.68	-	-	-	-
85.80	-	-	2.51	-	-	-	-	2.28	-	-	-	-
85.90	-	-	2.38	-	-	-	-	-	-	-	-	-
87.35	1.65	1.76	-	1.66	1.87	1.76	-	2.51	-	-	-	-
87.40	1.91	1.94	-	2.12	1.76	1.74	-	-	-	-	-	-
87.50	-	-	-	2.65	1.35	1.76	-	-	-	-	-	-
87.60	2.08	-	-	1.90	1.59	1.86	-	-	-	-	-	-
87.70	1.90	-	-	1.76	1.71	(2.21)	-	-	-	-	-	-
87.80	1.25	-	-	1.78	1.93	2.12	-	-	-	-	-	-
87.90	1.92	-	-	1.98	1.90	2.51	-	-	-	-	-	-
90.28	-	-	-	-	-	-	-	2.56	2.73	1.51	2.88	-
90.30	1.98	1.77	1.67	1.46	2.13	1.89	1.84	2.25	2.43	2.03	2.82	-
90.37	2.05	1.83	1.59	1.21	1.82	1.76	1.65	1.79	2.85	3.24	2.94	1.98
90.45	1.98	1.74	2.66	1.25	1.97	1.67	NQ	2.63	2.52	2.39	3.06	1.59
90.53	1.82	1.67	1.78	1.23	2.01	1.61	2.05	2.01	2.41	2.26	3.01	1.70
90.60	1.83	1.80	1.60	1.39	1.96	1.59	1.75	2.91	2.73	1.96	3.07	1.94
90.70	1.93	1.72	3.02	1.37	1.75	1.66	2.38	2.72	2.52	1.86	3.09	-
90.80	1.80	1.68	2.04	1.16	2.09	1.82	1.98	2.93	-	-	-	-
90.90	1.77	1.86	2.07	1.32	1.79	1.95	1.74	2.84	-	-	-	-
90.100	1.87	1.75	1.84	1.37	2.20	1.73	1.70	2.75	-	-	-	-
90.110	2.01	1.72	1.65	1.49	1.96	1.81	1.78	-	-	-	-	-
90.120	1.97	1.90	1.90	1.60	1.75	-	-	-	-	-	-	-
93.27	-	-	-	-	-	-	-	1.35	1.34	2.53	1.14	1.44
93.30	1.84	1.81	1.60	1.53	2.07	1.75	1.78	2.53	2.28	2.58	2.60	2.44
93.40	2.01	1.75	1.80	1.41	2.51	(1.87)	2.01	2.52	2.94	2.37	-	2.43
93.50	1.84	1.71	1.78	1.83	2.26	(1.69)	2.09	2.62	2.52	3.06	2.16	2.63
93.60	2.09	1.77	1.97	1.77	1.73	(1.51)	-	2.61	-	-	-	-
93.70	1.59	1.72	2.01	1.80	1.99	1.01	-	1.82	-	-	-	-
93.80	1.97	1.90	2.33	1.58	1.74	2.00	2.17	2.40	-	-	-	-
93.90	1.88	1.98	1.91	1.81	2.11	2.00	1.90	-	-	-	-	-
97.30	-	-	-	-	-	-	-	1.02	1.39	.99	1.22	1.46
97.32	1.77	1.72	1.80	1.42	2.04	1.48	1.75	2.18	2.74	2.65	2.66	NQ
97.40	1.83	1.62	1.80	1.89	2.00	1.44	1.92	3.20	2.14	2.75	2.33	3.00
97.50	1.87	1.74	1.61	1.60	2.22	1.84	1.83	2.52	2.74	2.68	2.75	2.19
97.60	1.91	1.78	1.66	1.80	1.90	1.16	1.63	2.63	-	-	-	-
97.70	1.88	1.54	2.65	1.69	1.87	1.90	1.98	2.62	-	-	-	-
97.80	1.76	1.58	2.46	1.60	1.65	1.82	1.80	2.85	-	-	-	-
97.90	1.85	1.89	1.65	1.76	1.80	1.62	2.02	-	-	-	-	-
100.29	-	-	-	-	-	-	-	1.69	1.18	1.20	1.37	2.52
100.30	1.57	1.90	1.62	1.70	1.74	2.12	-	1.80	2.40	2.22	2.35	2.22
100.40	1.93	1.93	1.59	1.74	1.81	1.91	1.94	2.48	2.24	2.32	2.55	2.77
100.50	1.86	1.95	1.58	1.86	2.10	1.86	1.79	1.98	2.58	2.48	2.43	2.83

Table I (cont'd)

Record of Standardized Haul Factors for Oblique Hauls made with Plankton Nets during Cruises 21-32 in 1951

	Cruise and Month											
Sta.	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
100.60	1.86	1.93	1.65	1.60	2.28	1.68	2.72	2.73	2.62	2.19	2.72	2.79
100.70	1.91	1.77	1.59	1.52	1.86	1.80	2.58	1.84	2.61	2.69	-	2.56
100.80	1.90	1.86	1.72	1.49	1.62	1.84	1.90	-	2.62	2.72	2.85	-
100.90	1.82	1.59	1.57	1.54	1.67	1.86	2.40	-	2.59	2.10	-	-
100.100	1.88	-	1.67	1.61	1.80	-	2.27	-	-	-	-	-
100.110	1.90	-	-	1.50	1.94	-	-	-	-	-	-	-
100.120	1.90	-	-	1.50	2.01	-	-	-	-	-	-	-
103.30	-	-	-	-	-	-	-	-	1.00	1.61	1.51	1.35
103.35	-	-	2.43	2.06	2.03	1.61	-	-	2.37	2.67	2.18	1.04
103.40	2.07	-	2.79	1.74	1.90	2.33	-	-	2.43	2.60	2.53	2.62
103.50	1.74	-	2.81	1.87	1.96	1.68	-	-	-	-	-	-
103.60	1.82	-	3.36	2.22	2.12	1.72	-	-	-	-	-	-
103.70	1.70	-	2.77	1.69	2.01	1.84	-	-	-	-	-	-
103.80	1.76	-	3.17	1.83	1.93	-	-	-	-	-	-	-
105.32	-	-	-	-	-	-	-	1.73	-	-	-	-
105.35	1.66	1.62	-	-	-	-	-	2.54	-	-	-	-
105.40	-	1.78	-	-	-	-	-	2.67	-	-	-	-
105.50	-	1.61	-	-	-	-	-	2.87	-	-	-	-
105.60	-	1.68	-	-	-	-	-	2.36	-	-	-	-
105.70	-	1.96	-	-	-	-	-	-	-	-	-	-
105.80	-	1.68	-	-	-	-	-	-	-	-	-	-
105.90	-	1.74	-	-	-	-	-	-	-	-	-	-
107.32	-	-	-	-	-	-	-	-	2.76	3.01	2.48	2.38
107.35	-	-	2.66	1.60	1.97	1.82	-	-	2.72	2.67	2.72	2.58
107.40	1.87	-	2.47	1.81	1.66	1.86	-	-	2.65	2.57	2.70	2.64
107.50	2.00	-	2.87	2.06	1.81	1.65	-	-	-	-	-	-
107.60	1.66	-	2.70	2.15	1.80	1.75	-	-	-	-	-	-
107.70	1.73	-	2.57	2.01	1.72	2.16	-	-	-	-	-	-
107.80	1.77	-	2.52	1.64	2.28	1.98	-	-	-	-	-	-
110.33	-	-	-	-	-	-	-	1.47	1.71	1.47	1.42	1.65
110.35	1.61	2.00	2.56	1.98	1.30	1.80	-	2.77	2.71	2.86	2.63	2.57
110.40	1.69	1.97	2.60	1.80	1.31	1.59	-	2.63	2.80	2.12	2.82	2.25
110.50	1.66	1.70	2.38	1.74	1.95	1.46	-	2.60	2.48	2.97	2.58	2.86
110.60	1.58	1.72	2.59	1.78	1.95	2.56	-	2.68	2.65	2.77	2.50	2.78
110.70	2.09	2.01	2.49	2.12	1.69	2.16	-	-	-	-	-	-
110.80	2.07	1.87	2.47	1.96	2.01	1.70	1.86	-	-	-	-	-
110.90	1.20	1.80	2.34	1.80	1.40	2.04	1.82	-	-	-	-	-
110.100	1.80	1.72	2.34	1.82	1.85	1.50	-	-	-	-	-	-
110.110	1.48	-	2.43	2.16	1.91	1.71	-	-	-	-	-	-
113.35	1.47	1.54	2.74	2.44	2.11	1.66	-	-	-	-	-	-
113.40	1.77	1.74	2.71	1.86	1.88	1.90	-	-	-	-	-	-
113.50	1.48	(1.87)	2.46	1.85	1.72	2.27	-	-	-	-	-	-
113.60	1.95	1.79	2.64	2.09	1.88	1.98	-	-	-	-	-	-
113.70	1.56	1.89	2.56	2.39	1.60	1.84	-	-	-	-	-	-

Table I (cont'd)
Record of Standardized Haul Factors for Oblique Hauls made with Plankton Nets during Cruises 21-32 in 1951

	Cruise and Month											
Sta.	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
115.27	-	-	-	-	-	-	-	1.26	1.55	1.57	1.33	3.86
115.30	-	-	-	-	-	-	-	1.88	1.39	1.41	1.49	1.46
115.35	-	-	-	-	-	-	-	3.15	2.71	2.86	2.64	2.94
115.40	-	-	-	-	-	-	-	3.02	2.26	2.86	2.73	2.55
115.50	-	-	-	-	-	-	-	2.49	-	-	-	-
115.60	-	-	-	-	-	-	-	2.90	-	-	-	-
117.35	1.18	1.88	2.49	1.76	1.44	1.88	-	-	-	-	-	-
117.40	1.07	1.88	2.57	1.62	1.72	1.67	-	-	-	-	-	-
117.50	1.97	1.99	2.60	1.86	1.95	1.88	-	-	-	-	-	-
117.60	1.17	1.91	2.64	2.18	1.58	2.37	-	-	-	-	-	-
117.70	1.62	(1.32)	2.63	2.15	1.51	2.06	-	-	-	-	-	-
120.25	-	-	-	-	-	-	-	2.04	1.89	2.18	1.53	1.67
120.30	-	-	-	-	-	-	-	2.77	1.90	1.62	1.68	1.65
120.35	1.85	(1.75)	1.52	2.36	2.49	1.67	.98	2.42	1.64	1.63	1.59	1.72
120.45	2.16	1.95	3.04	2.12	1.68	1.90	1.96	2.46	3.03	2.77	3.02	3.15
120.50	1.60	1.88	2.60	1.84	1.88	1.68	1.67	2.82	-	2.84	2.82	3.10
120.60	1.74	2.07	2.75	2.03	1.82	1.76	2.06	2.79	2.77	2.76	2.66	2.17
120.70	2.24	2.05	2.60	1.70	1.89	2.97	1.99	2.80	2.81	2.62	2.94	2.54
120.80	1.99	1.64	2.70	1.97	2.06	2.17	1.68	2.51	3.21	2.68	2.74	-
120.90	1.75	1.95	2.68	1.88	1.87	2.43	1.77	2.65	2.77	3.04	2.78	-
120.100	1.88	2.17	2.48	1.88	1.62	1.99	-	-	-	-	-	-
120.110	2.08	-	2.50	1.60	1.97	1.75	-	-	-	-	-	-
123.37	-	-	-	-	-	-	-	.80	2.36	1.30	1.48	2.16
123.40	1.73	1.86	2.53	(1.73)	1.96	1.49	1.96	2.61	3.21	2.71	2.53	1.33
123.50	1.46	1.77	2.71	1.92	1.29	1.63	1.83	3.30	-	2.55	-	-
123.60	1.48	1.82	2.60	1.69	1.92	1.95	1.57	2.42	-	-	-	-
127.34	-	-	-	-	-	-	-	1.64	1.60	1.44	1.40	-
127.40	1.66	1.67	2.44	2.02	1.69	1.71	1.93	3.08	3.55	2.68	2.84	-
127.50	1.65	1.79	2.61	2.34	1.79	1.72	1.76	2.43	-	2.74	-	-
127.60	2.18	1.69	2.58	1.83	1.63	1.40	1.65	2.43	-	-	-	-
130.30	-	-	-	-	-	-	-	1.40	1.97	2.01	1.55	-
130.35	1.82	1.82	2.37	1.43	1.84	1.55	1.55	2.76	NQ	3.36	2.60	-
130.40	1.87	1.81	1.95	1.74	1.61	1.82	1.83	2.85	3.32	3.14	2.87	-
130.50	1.77	1.78	2.10	1.92	1.74	1.44	1.78	2.35	3.23	2.54	2.63	-
130.60	1.47	1.73	1.98	2.49	1.70	1.75	1.74	2.51	3.17	2.76	2.78	-
130.70	1.55	1.66	2.22	1.72	1.68	1.67	-	-	2.81	3.14	-	-
130.80	2.10	1.73	1.94	1.85	1.75	1.89	-	-	-	-	-	-
130.90	-	-	-	-	-	1.78	-	-	-	-	-	-
133.25	-	-	-	-	-	-	-	2.45	1.48	1.74	1.60	-
133.30	1.80	1.66	3.11	1.62	1.73	1.63	2.07	3.13	2.57	2.79	2.76	-
133.40	1.65	1.83	2.15	1.77	1.90	2.05	1.82	4.70	-	-	-	-
133.50	1.42	1.81	1.80	2.04	1.80	1.99	1.91	2.51	-	-	-	-
133.60	1.56	1.59	1.77	1.90	1.87	1.88	-	-	-	-	-	-

Table I (cont'd)

Record of Standardized Haul Factors for Oblique Hauls made with Plankton Nets during Cruises 21-32 in 1951

	Cruise and Month											
Sta.	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
137.23	-	-	-	-	-	-	-	1.67	1.28	2.39	2.07	-
137.30	-	-	-	-	-	-	-	2.14	2.72	3.06	2.80	-
137.35	1.83	1.67	2.04	1.78	1.83	1.98	1.28	-	-	-	-	-
137.40	1.63	1.62	1.74	1.73	1.86	2.14	1.63	2.26	-	-	-	-
137.50	1.70	1.70	2.20	1.78	1.86	2.02	1.76	2.30	-	-	-	-
137.60	2.07	1.74	1.93	1.86	1.76	1.72	-	-	-	-	-	-
140.30	-	-	-	-	-	-	-	-	1.92	-	-	-
140.35	-	-	1.85	-	-	1.85	-	-	2.64	-	-	-
140.40	-	-	2.07	-	-	1.88	-	-	2.36	-	-	-
140.50	-	-	2.02	-	-	1.76	-	-	2.90	-	-	-
140.60	-	-	1.90	-	-	1.89	-	-	2.77	-	-	-
140.70	-	-	1.93	-	-	1.87	-	-	2.56	-	-	-
140.80	-	-	2.18	-	-	1.86	-	-	-	-	-	-
140.90	-	-	-	-	-	1.91	-	-	-	-	-	-
143.30	-	-	1.66	-	-	1.90	-	-	3.46	-	-	-
143.35	-	-	1.74	-	-	1.91	-	-	2.78	-	-	-
143.40	-	-	1.90	-	-	2.04	-	-	-	-	-	-
143.50	-	-	2.23	-	-	2.18	-	-	-	-	-	-
143.60	-	-	-	-	-	1.99	-	-	-	-	-	-
147.20	-	-	1.58	-	-	-	-	-	2.49	-	-	-
147.25	-	-	1.96	-	-	2.07	-	-	1.48	-	-	-
147.30	-	-	1.43	-	-	1.99	-	-	2.70	-	-	-
147.40	-	-	1.92	-	-	1.94	-	-	-	-	-	-
147.50	-	-	-	-	-	1.85	-	-	-	-	-	-
147.60	-	-	-	-	-	2.10	-	-	-	-	-	-
150.19	-	-	-	-	-	-	-	-	2.58	-	-	-
150.25	-	-	1.39	-	-	2.41	-	-	2.50	-	-	-
150.30	-	-	2.02	-	-	3.05	-	-	2.40	-	-	-
150.40	-	-	1.71	-	-	1.93	-	-	2.75	-	-	-
150.50	-	-	1.88	-	-	2.04	-	-	2.57	-	-	-
150.60	-	-	1.81	-	-	1.81	-	-	2.83	-	-	-
150.70	-	-	1.93	-	-	1.78	-	-	2.50	-	-	-
150.80	-	-	1.82	-	-	1.95	-	-	2.91	-	-	-
150.90	-	-	-	-	-	1.88	-	-	2.73	-	-	-
150.100	-	-	-	-	-	-	-	-	2.54	-	-	-
153.16	-	-	-	-	-	-	-	-	2.48	-	-	-
153.20	-	-	2.09	-	-	2.20	-	-	2.72	-	-	-
153.30	-	-	2.01	-	-	2.19	-	-	-	-	-	-
153.40	-	-	1.58	-	-	2.05	-	-	-	-	-	-
153.50	-	-	1.84	-	-	1.93	-	-	-	-	-	-
157.10	-	-	1.54	-	-	2.21	-	-	1.25	-	-	-
157.20	-	-	1.47	-	-	1.96	-	-	2.59	-	-	-
157.30	-	-	1.86	-	-	2.06	-	-	-	-	-	-
157.40	-	-	1.65	-	-	1.94	-	-	-	-	-	-
157.50	-	-	1.84	-	-	2.10	-	-	-	-	-	-

Table II
Record of Pilchard Eggs, 1951

Station	Number of Normal Eggs A	B	C	D	Total Number of Eggs A	B	C	D	Uncl.	n	Ave. n^1
Cruise 21:											
120.35	11	20	9		54	35*	28			117	35
120.45	9	0			17*	0*				17	9
123.40	14	704	998		81*	1254*	1457		36	2828	676
127.40	0	2			0*	12*				12	6
130.35	0	16	4		0	18*	11		2	31	19
Total	34	742	1011		152	1319	1496		38	3005	745
Cruise 22:											
93.40	0	0	0	9	0	0*	0*	30	2	32	0
117.35	0	0	8		0*	0*	8			8	0
120.35	28	131			138*	486*			100	724	362
120.45	27	39			1022*	335*			5873	7230	3615
123.40		154	134		0	262*	283*		214	759	379
123.50	140	497	356		230	735*	623*		156	1744	746
Total	195	821	498	9	1390	1818	914	30	6345	10497	5102
Cruise 23:											
80.70	0	2	0		0*	2*				2	1
90.60	2	0	6		3*	3*	14*			20	7
100.30	0	0	2	0	0*	0*	2*	2*		4	1
103.40	0	6	0		0*	6*	6*			12	4
107.40	0	0	0	0	0*	0*	0*	5	2	7	0
113.35	0	0	6	230	0	0*	126*	438*	16	580	194
113.50	0	0	5		0*	0*	10*			10	3
117.40	0	3	0		0*	3*	0*			3	1
117.50	60	289	0		315*	595*	588*		343	1841	614
120.35	0	2	2		0	2*	2*	0*		4	1
120.45	7697	6864	693		8390*	7436*	717*		821	17364	5788
120.50	400	429	8		868*	551*	8			1427	710
120.60	0	11	11		0*	16*	11		3	30	9
123.40	4104	19825	8698		5819*	21292*	11562		1113	39786	13945
123.50	0	3	0		0*	22*	3		14	39	17
127.50	0	16	73		0	18*	78			96	18
130.35	19	0			43*	0*				43	21
133.30	0	0	0		0	0*	3			3	0
Total	12282	27450	9504	230	15438	29946	13130	445	2312	61271	21334

Table II (cont'd)
Record of Pilchard Eggs, 1951

Station	Number of Normal Eggs A	B	C	D	Total Number of Eggs A	B	C	D	Uncl.	n	Ave. n'
Cruise 24:											
87.60	0	0	0		0*	8*	0*		2	10	3
87.70	0	2	0		0*	2*	0*			2	1
87.80	0	0	2		0*	0*	4*		2	6	2
90.37	0	1	0		0*	5*	0*			5	2
90.53	0	0	5	0	0	0*	5*	0*		5	2
93.50	0	0	2	22	4*	0*	7*	33		44	4
97.32	0	11	11		0	18*	11*		21	50	25
97.50	19	0	0		248*	0*	0*		130	378	126
97.60	0	2	0		0*	4*	0*			4	1
100.40	7	0	0		10*	0*	0*			10	3
103.35	2	27	2		2*	35*	6		2	45	19
103.40	0	4	0			4*	0*			4	2
110.70	2	0			2*	0*				2	1
113.40	0	26	952		0*	35*	1551			1586	18
113.50	0	7	70		0	24*	577*			601	301
113.70	5	0			22*	0*				22	11
117.40	0	6			0*	6*				6	3
117.60	0	0	4		0	0*	37			37	0
120.45	240	153	47		655*	402*	91*		431	1579	526
120.50	528	604	416		845	992*	765*		764	3366	1136
120.60	0	0			0*	2*				2	1
120.70	0	0			3*	0*				3	2
123.40	0	1291	1803	40	0	1775*	2991*	57*	806	5629	1876
127.40	2	101	832	1327	2	123*	1030*	2091	30	3276	582
130.35	0	177	177		0*	267*	276*		56	599	200
130.40	7	2	2		12*	2*	3*		4	21	7
Total	812	2414	4325	1389	1805	3704	7354	2181	2248	17292	4854

Table II (cont'd)
Record of Pilchard Eggs, 1951

Station	Number of Normal Eggs A	B	C	D	Total Number of Eggs A	B	C	D	Uncl.	n	Ave. n^1
Cruise 25:											
80.55	0	0	0	4	0*	0*	0*	4		4	0
90.53	0	8	0	16	0*	14*	2*	26	8	50	6
90.60	14	53	1225	8	16*	53*	1552*	12		1633	540
93.40	3	53	0		3*	462*	0*		113	578	192
97.32	0	2	6		0*	8*	14*		2	24	8
97.50	4	0	24		13	18*	60*	2	2	95	40
100.30	0	6	0		0	6*	0*			6	3
100.40	0	0	2		0	0*	2*			2	1
100.50	6	82	57		8*	118*	233			359	63
103.35	0	12	6		0*	71*	16			87	36
103.40	0	2	6		0*	11*	11			22	6
107.40	0	0	0		0*	0*	3*			3	1
110.35	0	3	4		0*	10*	4*		5	19	6
110.40	7	46	7		7*	63*	8		1	79	35
113.35	0	4	0	8	0*	4*	0*	8*		12	3
117.40	0	7	0		0*	7*	0*		7	14	5
117.60	0	5	0		0	5*	0*			5	2
117.70	0	3			0*	4*				4	2
120.35	0	403	269		0	515*	339*		20	874	437
120.45	158	113	1104		200*	118*	1257*			1575	525
120.50	0	100	267		0*	165*	744			909	83
123.40	2916	2693	1170	69	5098*	3618*	1323*	69		10108	3343
127.40	154	431	1575		291*	495*	3733*		39	4558	1517
130.35	0	0	0	6	0	0*	0*	6*		6	2
Total	3262	4026	5722	111	5636	5765	9301	127	197	21026	6856

Table II (cont'd)
Record of Pilchard Eggs, 1951

Station	Number of Normal Eggs A	B	C	D	Total Number of Eggs A	B	C	D	Uncl.	n	Ave. n'
Cruise 26:											
67.55	0	0	0	4	0*	0*	0*	4		4	0
80.55	0	0	25	2	0*	0*	67*	2*		69	17
87.35	0	7	4		0	39*	4			43	39
87.60	0	11	249		4*	30*	312*		9	355	118
90.30	2	93	115		2	113*	157*		6	278	138
90.37	19	30			35*	34*				69	34
90.45	0	0			13*	0*				13	7
97.32	34	13			50*	15*			7	72	36
97.40	0	1	14		0*	1*	36*			37	12
97.50	0	0	2		0*	0*	4			4	0
97.60	0	648	0	0	0	1303*	0*	0*	51	1354	451
100.40	0	0	0		0	0*	2*			2	1
103.35	8	169	113		8	296*	161*		24	489	240
103.40	2	14	65		2	133*	70*		19	224	111
117.35	0	0	2		0*	0*	2*			2	1
117.40	0	2	0		0*	2*	0*			2	1
120.35	0	0	10		0	10*	20*			30	15
143.40	0	4			0	4*				4	4
153.20	0	0	4		0	0*	9			9	0
Total	65	992	603	6	114	1980	844	6	116	3060	1225
Cruise 27:											
90.30	4	0			34*	5*				39	19
90.37	0	10	0		0	13*	2			15	13
90.53	0	0	0		0*	0*	2*			2	1
120.35	127	1211	29		246*	1278*	36*		10	1570	524
120.45	0	4			0*	4*			4	8	4
133.30	0	89	0		0	228*	10*		39	277	139
Total	131	1314	29		280	1528	50		53	1911	700

Table II (cont'd)
Record of Pilchard Eggs, 1951

Station	Number of Normal Eggs A	B	C	D	Total Number of Eggs A	B	C	D	Uncl.	n	Ave. n'
Cruise 28:											
97.30	0	26	0	0	0	26*	0*	0*		26	9
120.25	2	43			31	96*			6	133	96
120.30	626	226			1058	520*			89	1667	549
120.35	0	0	0		0	0*	5			5	0
123.40	5	0			21*	0*			5	26	13
130.30	165				210*				3	213	213
Total	798	295			1320	642	5		103	2070	880
Cruise 29:											
120.25	49	28			49*	28*				77	39
123.37	0	7			0	12*				12	12
Total	49	35			49	40				89	51
Cruise 30:											
115.27	0	0			0*	2*				2	1
115.35	3203	303			4090*	366*				4456	2228
120.25	4	150			4	190*				194	190
Total	3207	453			4094	558				4652	2419
Cruise 31:											
120.25	113	314			167	379*				546	379
120.30	0	685			0*	702*				702	351
Total	113	999			167	1081				1248	730
Cruise 32:											
120.25	5				33	3*				36	3
120.30	172	0			275*	0*				275	138
120.35	9				10*					10	10
123.37	0	4			0	9*				9	9
Total	186	4			318	12				330	160

Table III
Record of Pilchard Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 21:																			
120.35	11.0																		11.0
123.40	44.9	20.7	5.2																70.8
Total	55.9	20.7	5.2																81.8
Cruise 22:																			
93.40	3.5	3.6																	7.1
100.40				1.9															1.9
117.50					4.0			2.0	4.0										10.0
120.35	54.2					1.8													56.0
123.40		1.9	1.9			1.9													5.7
123.50	185.9	26.5	8.8																221.2
130.35												1.8							1.8
137.40																1.6			1.6
Total	243.6	32.0	10.7	1.9	4.0	3.7		2.0	4.0			1.8				1.6			305.3
Cruise 23:																			
90.30														1.5					1.5
90.37					1.6														1.6
93.40		1.8																	1.8
97.40		1.8																	1.8
100.30		1.6																	1.6
113.35	11.0																		11.0
113.60										5.3									5.3
117.50		2.6																	2.6
120.45	54.7	133.7	145.9	24.3	42.5	12.2	18.2	6.1											437.6
120.50	10.4	59.8	20.8	5.2	2.6	5.2			2.6										106.6
123.40	177.1	45.5	15.2				5.1												242.9
127.50	5.2			2.6	5.2	2.6													15.6
130.35	7.1	30.8																	37.9
133.30	6.2																		6.2
137.35						2.0		2.0											4.0
150.30											2.0								2.0
Total	271.7	277.6	181.9	32.1	51.9	22.0	23.3	8.1	2.6	5.3	2.0			1.5					880.0

Table III (cont'd)
Record of Pilchard Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 24:																			
87.60			1.9																1.9
87.80	1.8	24.9	21.4		7.1	7.2	3.6	1.8				1.8							69.6
90.53		2.5	7.4	2.5	22.1	14.8	7.4	4.9							2.5				64.1
90.70		1.4										1.4							2.8
93.30					1.5														1.5
93.40				1.4	2.8	1.4													5.6
93.60			1.8																1.8
97.40			1.9	1.9		1.9		1.9											7.6
97.60		5.4	3.6																9.0
100.50	29.7	37.2																	66.9
103.50		1.9	1.9									1.9							5.7
103.60													2.2						2.2
103.70								1.7											1.7
103.80									1.8	1.8									3.6
110.70		8.5								4.2									12.7
113.40	266.0	1.9																	267.9
113.50	16.7																		16.7
117.40		1.6			3.2														4.8
117.60	39.2	39.2					2.2												80.6
120.45	3.1	12.5	3.1	3.1	3.1														24.9
120.50	27.6	31.3	3.7				5.5				1.8								69.9
120.70		11.9	3.4	5.1	5.1														25.5
123.40	27.6	34.6		1.7	1.7				3.5										69.1
123.50		7.7	5.8	1.9								1.9							17.3
123.60				1.7															1.7
127.40	375.8	28.2	2.0		2.0					2.0	2.0								412.0
130.35	70.0	278.9	98.7	14.3	2.8	4.3				2.8	1.4								473.2
130.40										1.7									1.7
133.30		1.6	8.1	24.3	14.6														48.6
137.35						1.8	3.6	1.8	7.1										14.3
Total	857.5	531.2	164.7	57.9	66.0	31.4	22.3	12.1	12.4	12.5	5.2	7.0	2.2		2.5				1784.9

Table III (cont'd)
Record of Pilchard Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 25:																			
87.90											1.9								1.9
90.53	2.0		2.0	4.0		4.0													12.0
90.60	13.7	23.6	3.9																41.2
97.50	88.8	111.0		11.1	4.4	6.6	11.1	4.4			2.2	2.2	2.2	2.2					246.2
97.60	5.7	28.5																	34.2
100.30	1.7	1.7		1.7				3.5	1.7	1.7			1.7	1.7	1.7				17.1
100.40			1.8	3.6	10.8	1.8	1.8												19.8
100.60	20.6	38.7	20.5	18.3					2.3										100.4
100.70									1.9										1.9
103.35	26.4																		26.4
103.40	81.7	1.9			1.9														85.5
110.35														1.3					1.3
110.40		1.3																	1.3
113.60														1.9	1.9				3.8
113.70									3.2						3.2				6.4
117.60		15.8		1.6															17.4
120.35	2.5	19.9	24.9	12.5	7.5	7.5	5.0		2.5		2.5								84.8
120.45	99.1	280.6	45.4	20.2	5.1	3.4	3.4	8.4	1.7	1.7	1.7								470.7
120.50	3.8	47.0	9.4	3.8	5.7	5.7	5.6		1.9										82.9
123.40	37.2	41.2	9.8		2.0														90.2
123.50			1.3																1.3
127.40	123.4	206.2	104.8	148.7	120.0	49.0	50.7	27.0	15.2	1.7									846.7
127.50				3.6					1.8										5.4
130.35		38.7	119.6	90.2	108.6	95.6	46.0	25.7	3.6	7.4	1.8	3.6	1.8	9.2					551.8
130.40			4.8	8.0	9.6	8.0	8.0	1.6	1.6	4.8	4.8	4.8							56.0
130.50		3.5		1.7	3.5		3.4												12.1
133.30		1.7	1.7	1.7	3.5	6.9	10.4	13.8	5.2	5.2	5.2	6.9							62.2
133.40					11.4	19.0	57.0	83.6	96.9	81.7	81.7	39.9	41.8	32.3	3.8	1.9			551.0
137.35					1.8					5.5	5.5	7.3	1.8						21.9
137.40										1.9	1.9	3.8		5.6					13.2
137.50								1.9		3.7	7.4								13.0
Total	506.6	861.3	349.9	330.7	295.8	207.5	202.4	169.9	139.5	115.3	116.6	68.5	49.3	54.2	10.6	1.9			3480.0

Table III (cont'd)
Record of Pilchard Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 26:																			
70.120																		1.9*	1.9
83.55											2.8								2.8
83.70											4.3			4.3					8.6
83.80														3.8					3.8
90.30	33.9	13.2		1.9															49.0
90.37		3.5			1.8														5.3
93.50															1.7	1.7			3.4
97.32	4.5	3.0																	7.5
97.40	15.9	1.4																	17.3
97.50		16.6	23.9	5.5	3.7		1.8					1.8			1.8	1.8			56.9
97.60									1.2										1.2
100.30	4.2	17.0																	21.2
100.50	3.7																		3.7
103.35	1.6	1.6	1.6																4.8
103.40		2.3	4.6												2.3		2.3		11.5
110.80									1.7	1.7				1.7		1.7			6.8
113.60			4.0	4.0	29.7	37.6	33.7	31.7	39.6	17.8	15.8	19.8	11.9	11.9	2.0			5.9	265.4
120.45					1.9														1.9
120.90						2.4			2.4										4.8
123.40	1.5	41.7	93.9	82.0	104.3	92.4	44.7	40.2	55.1	64.1	43.3	37.2	17.8	35.8	3.0			13.4	770.4
123.50			3.2	13.1	42.4	18.0	30.9	35.8	37.5	21.2	22.8	13.1						29.3	267.3
127.40		3.4	12.0	6.8	8.5	8.6	1.7	3.4										5.1	49.5
127.50				3.5	1.7	3.4	1.7												10.3
130.50						1.4	1.4	2.9	2.8	7.2	11.5	1.4							28.6
133.30																1.6			1.6
133.50								6.0	6.0	6.0				6.0	4.0	23.9	12.0	6.0*	69.9
133.60							1.9		1.9										3.8
137.35							2.0												2.0
140.40																	1.9		1.9
143.30														3.8					3.8
143.40		4.1	20.4	28.6															53.1
147.30							2.0												2.0
147.40												3.9							3.9
150.25					2.4		2.4	4.8	2.4	4.8	7.2		2.4						26.4
153.20	4.4	4.4		4.4															13.2
Total	69.7	112.2	163.6	149.8	196.4	163.8	124.2	124.8	150.6	122.8	107.7	77.2	32.1	67.3	14.8	30.7	16.2	53.7	1785.5
																		7.9*	

* - 27.25 mm. group

Table III (cont'd)
Record of Pilchard Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 27:																			
80.55						(2.0)													2.0
90.37	3.3	4.9	3.3	3.2	3.2	1.6													19.5
90.45											1.9								1.9
120.35	26.5	19.6	3.6	1.0	2.0	1.0													53.1
120.60					2.1														2.1
130.35				1.6															1.6
130.50							1.8												1.8
133.30	8.2																		8.2
Total	38.0	24.5	6.3	5.8	7.3	4.6	1.8				1.9								90.2
Cruise 28:																			
115.27	1.3	1.3				1.3													3.9
115.30			1.9																1.9
120.25	2.0																		2.0
120.30	55.4	49.9	5.5			16.6		5.5	5.5										138.4
120.35	2.4	41.1	113.8	145.2	150.0	125.9	92.0	36.3	4.8	7.2	2.4								721.1
127.34	55.7	73.8	46.0	13.1	1.6			1.6											191.8
127.50		2.4	12.2	2.4															17.0
130.30	159.6	8.4	15.4	7.0	4.2														194.6
130.50														2.4					2.4
130.60						2.5													2.5
133.25			2.4																2.4
137.30									2.1										2.1
Total	276.4	176.9	197.2	167.7	155.8	146.3	92.0	43.4	12.4	7.2	2.4			2.4					1280.1

Table III (cont'd)
Record of Pilchard Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 29:																			
115.27			1.6																1.6
115.30			1.4	1.4															2.8
115.35								2.7											2.7
120.25	7.6	1.9	3.8	1.9	3.8	1.9													20.9
120.30	7.6	3.8	1.9		1.9	1.9													17.1
120.35			1.6	3.3	1.6	1.6	1.6	1.6		3.3			1.6	1.6					17.8
123.37	7.1			7.1															14.2
123.40			3.2											3.2					6.4
140.30	3.8	3.8	3.8																11.4
Total	26.1	9.5	17.3	13.7	7.3	5.4	1.6	4.3		3.3			1.6	4.8					94.9
Cruise 30:																			
115.35							14.3	11.5	17.2	5.7		2.9							51.6
120.25	2.2	8.8	19.7	10.9	4.4						2.2					8.8	6.6		63.6
120.30				8.1	8.1	1.6			1.6										19.4
123.37	1.3	2.6																	3.9
Total	3.5	11.4	19.7	19.0	12.5	1.6	14.3	11.5	18.8	5.7	2.2	2.9				8.8	6.6		138.5
Cruise 31:																			
115.27						1.3													1.3
120.25	22.9	160.7	114.7	30.6	41.3	39.8	19.8	1.5	3.0		1.5								435.8
120.30	47.1	8.4	3.4	11.8	8.4	8.4	6.8	1.7											96.0
120.35		8.0	6.4	1.6											1.6				17.6
123.37	40.0	57.7	41.4	23.6	8.8			3.0	1.5	1.5									177.5
Total	110.0	234.8	165.9	67.6	58.5	49.5	26.6	6.2	4.5	1.5	1.5				1.6				728.2
Cruise 32:																			
115.27									3.9										3.9
115.30									4.4	1.5	4.4								10.3
115.35		2.9			2.9														5.8
120.30	3.3																		3.3
120.35	227.0	29.3	15.5																271.8
120.45									9.4			12.6	3.2	3.2					28.4
120.60							2.2												2.2
123.37	13.0					2.2													15.2
123.40	15.9	21.2	14.6	11.9	8.0	2.6		1.3											75.5
Total	259.2	53.4	30.1	11.9	10.9	4.8	2.2	1.3	17.7	1.5	4.4	12.6	3.2	3.2					416.4

Table IV
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 21:																			
73.51					1.9		1.9												3.8
80.55				2.0															2.0
83.60					5.2	1.7	1.7		1.7	3.4									13.7
87.35		9.9	28.0	54.4	41.3	21.4	14.8												169.8
87.40			3.8	26.7	43.9	28.7	28.7			1.9									133.7
87.60						2.1		2.1											4.2
90.30	15.9	2.0			4.0	2.0													23.9
90.37	6.0	4.1	2.0	12.2	14.4	12.4	4.1												55.2
90.45											2.0								2.0
90.53										3.6									3.6
90.60										1.8									1.8
93.30	3.7	5.5	11.1	1.8	1.8														23.9
97.32			5.3		3.5	5.3	19.4	24.7	17.7	7.0	1.8								84.7
100.30	89.5	28.2	15.7	4.7	6.3	1.6													146.0
100.40	1.9																		1.9
113.35			2.9		1.5														4.4
117.35			2.4			5.9	1.2	5.9	1.2										16.6
117.40	14.0	13.9	7.5	18.2	11.8	2.2	2.2	2.2											72.0
117.50			3.9		4.0														7.9
117.70					1.6	1.6				1.6									4.8
120.35	25.8	79.6	81.4	64.7	24.0	24.0	9.3	1.8											310.6
120.45	19.5	4.4																	23.9
120.80									2.0										2.0
123.40	8.7	3.4	1.7	1.7	1.7	1.7				1.7									20.6
123.50	2.9																	1.5	4.4
127.40	18.3	6.7	5.0		1.7														31.7
130.35	20.1	63.7	58.2	5.5	3.6	1.8													152.9
130.40	1.9		3.7	3.7															9.3
133.30		1.8	3.6		9.0	10.8	16.2	3.6	3.6										48.6
137.35	1.8	1.8	11.0	12.9	7.3		5.5	1.8											42.1
137.40											1.6								1.6
137.50														1.7					1.7
137.60										2.1	2.1								4.2
Total	230.0	225.0	247.2	208.5	188.5	123.2	105.0	42.1	26.2	23.1	7.5			1.7				1.5	1429.5

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 22:																			
80.55								5.2											5.2
87.35	1.8	1.8	5.3			1.8	1.8				1.8	1.8							16.1
87.40				3.9		3.9		3.9	3.9										15.6
90.30					1.8	3.6		5.3	5.3	12.4	12.4	14.2							55.0
90.45							1.7			5.2	1.7	1.7							10.3
90.60								1.8		1.8									3.6
93.30							1.8		3.6	1.8		1.8							9.0
93.40								1.8											1.8
100.30						1.9													1.9
105.40							1.8				1.8								3.6
105.50							1.6												1.6
117.35	71.4	7.5	15.1	7.6	5.7	3.8	3.8		1.9										116.8
117.40		1.9	11.3	24.5	18.8	24.5	13.1	5.6	3.8										103.5
117.50				4.0	6.0	10.0			2.0			2.0							24.0
120.35	40.2	17.6	33.2	29.8	10.5	3.5													134.8
120.50	9.4				1.9	3.8													15.1
120.60	22.7	24.8	10.3	12.4	2.1	12.5													84.8
123.40	100.4	174.8	243.7	133.9	59.5	33.5	27.9	27.9	9.3	9.3	3.8								824.0
123.50		7.0	7.0	17.7	3.5	7.1	1.8	3.5	1.8										49.4
123.60	1.8	1.8					3.6												7.2
127.40	3.4	3.3	5.0	26.7	26.7	10.0	5.0		1.7										81.8
127.50			9.0	7.2	7.2	1.8				1.8	1.8								28.8
130.35			14.5	25.5	10.9	3.6	3.6		1.8										59.9
130.40	3.6	21.7	72.4	48.9	19.9	10.8	3.6	1.8	1.8										184.5
133.30	343.7	23.2	14.9	1.7	3.3	1.7													388.5
133.40	1.8			9.2	1.8	1.8	7.4												22.0
133.50							1.8												1.8
137.35	40.1	38.4	26.8		1.7				1.7										108.7
137.40	1.6	53.5	94.0	106.9	72.9	29.2	14.6	1.6	3.2	3.2			1.6	1.6					383.9
137.50				3.4	1.7	3.4		1.7	1.7										11.9
Total	641.9	377.3	562.5	463.3	255.9	172.2	94.9	60.1	43.5	35.5	23.3	21.5	1.6	1.6					2755.1

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 23:																			
90.30		1.5	1.5	1.5		4.5	4.5	4.5	1.5		1.5								21.0
90.37				3.2															3.2
90.45											2.7						2.7		5.4
93.30				1.6		1.6		1.6			3.2	3.2							11.2
100.30	61.5	3.2																	64.7
107.35				2.7															2.7
107.70				5.1															5.1
110.35				2.6															2.6
110.70	2.5		2.5	2.5															7.5
113.35	16.5																		16.5
113.60		5.3	5.3	10.6															21.2
113.70	12.8	89.6	122.9	89.6	30.8	2.6	5.2												353.5
117.35	22.4		5.0																27.4
117.40	151.6	5.2		2.6		2.6	2.6												164.6
117.50	18.2																	2.6	20.8
117.60	5.2							2.6						2.6					10.4
117.70		23.7	23.7	39.5	7.9	5.2	2.6	2.6	2.6	2.6		2.6						2.6	115.6
120.35	1.5		3.0	9.1	12.2	24.3	18.3	15.2	1.5	4.5									89.6
120.45	121.5	54.7	146.0	127.7	109.4	30.4	24.3	12.2	1 .2										638.4
120.50	10.4	36.4	18.2	5.2	13.0	5.2													88.4
120.60	24.8	74.3	30.2	19.3		2.8	2.8												154.2
123.40	5.1	5.1				5.1	5.1												20.4
123.50	18.9				2.7														21.6
123.60	2.6		7.8																10.4
127.40					2.4														2.4
130.35	7.2		2.4																9.6
130.40	2.0																		2.0
133.30	2136.6	196.4	491.4	49.7	18.7	9.3			3.1										4105.2
133.40	4.3																		4.3
133.50	5.4																		5.4
133.60	1.8																		1.8
137.35	171.3	563.0	520.2	177.5	32.6		4.1	4.1				4.1							1476.9
137.40	33.0	27.9	31.3	8.7	7.0	1.7	1.7							1.7				3.5	116.5
137.50		8.8	37.4	35.2	30.8	39.6	44.0	26.4	26.4	13.2	4.4	4.4	2.2	2.2					275.0
137.60		3.9	1.9		1.9	13.5	7.8	1.9										5.8	36.7
140.35	9.2	48.2	25.8	7.4															90.6
143.30				1.7															1.7
147.20													1.6						1.6
150.50	1.9																		1.9
Total	2848.2	2347.2	1476.5	603.0	269.4	148.4	123.0	71.1	47.3	20.3	11.8	14.3	3.8	6.5			2.7	14.5	8008.0

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 24:																			
70.70					7.2	3.6													10.8
83.55				3.1		6.3	6.3	3.1											18.8
83.60			4.0	4.0	7.9	27.7													43.6
87.35	6.6	9.9	20.0		3.3														39.8
87.40		2.1	12.7	10.6	10.6	4.2	2.1												42.3
87.50							2.6	2.6	2.6		2.6								10.4
87.60					7.6	3.8	3.8											3.8	19.0
87.90								47.5											47.5
90.30	3.0	14.6	13.1	16.0	7.3	4.4		1.5											59.9
90.37	8.5																		8.5
93.30				1.5										1.5					3.0
93.40	1.4																		1.4
97.32	34.1	2.8	2.8		2.8	2.8													45.3
97.40	60.5	35.9	26.4	26.4	22.7	18.9	17.0	13.3		3.8		3.8		1.9					230.6
97.50	1.6																		1.6
100.30	6.8		3.4		1.7														11.9
100.50	3.7			11.1															14.8
100.110	24.0																		24.0
103.40									1.7										1.7
103.50							1.9		1.9		5.6	1.9	1.9	1.9					15.1
103.60	2.2		4.4				2.2												8.8
103.70		16.8	28.8	5.1															50.7
103.80		1.8	9.2	1.8															12.8
110.70	2.1	6.3	6.4	10.6	14.8	25.4	12.7	10.6	8.4	2.1	2.1	2.1						2.1	105.7
110.90	19.8																		19.8
110.100	3.6																		3.6
113.40	1.9																		1.9
113.70		2.4																	2.4

Table IV (cont'd
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 24 (cont'd):																			
117.35	22.8	3.6	1.8	5.3															33.5
117.40	87.5	34.0	16.2	9.8	1.6	8.1	3.2	8.1											168.5
117.50		1.9			1.9	1.9	1.9		1.9	1.9				1.9	1.9				15.2
117.60	4.4	15.2	17.4	19.6	8.8	10.9	4.4		2.2									6.5	89.4
120.35	75.5	16.5	23.6	4.8	7.1	2.4													129.9
120.45	18.7		12.5	6.2	3.1	6.2													46.7
120.50	51.5		1.8		1.8	1.8													56.9
120.60	125.8	24.4	14.3		4.1	22.3	6.1	10.1											207.1
120.70	17.0		1.7		3.4	5.1	3.4		1.7										32.3
120.80	72.8	7.9	2.0																82.7
120.90					1.9														1.9
123.40			1.7	15.6	6.9	1.7	1.7		5.2										32.8
123.50	19.2	40.4	99.9	61.5	26.9														247.9
123.60	49.0	3.4	5.1	1.7	3.4														62.6
127.40	4.0		6.0	18.2	24.3	2.0													54.5
127.50	7.0																		7.0
127.60	1.8																		1.8
130.35		1.4	4.3	5.7	1.4		7.1												19.9
130.40		1.7			1.7	1.7		1.7											6.8
130.50	1.9	5.7	9.6	5.7															22.9
133.30	175.0	1.6	4.9	13.0	4.9	6.4	8.1	4.8	3.2	3.2									225.1
133.40	1.8																		1.8
133.60				1.9															1.9
137.35	3.6	7.1	12.5	1.8			1.8												26.8
137.40	10.4																		10.4
Total	929.5	257.4	366.5	261.0	189.1	167.6	86.3	103.3	28.8	11.0	10.3	7.8	1.9	7.2	1.9			12.4	2442.0

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	Dis.	Total
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25		
Cruise 25:																			
87.40					3.6	1.8			1.8	1.8		1.8	1.8	5.3		1.4	1.8		19.7
87.50																			1.4
90.30						2.1													2.1
90.37								1.8	1.8										3.6
90.45	9.8			5.9							2.0			2.0					27.6
90.53				2.0		2.0	2.0	3.9											2.0
93.40	2.5																		2.5
93.50									5.3										5.3
97.40	272.0	6.0																	278.0
97.32							2.0												2.0
97.50		2.2	2.2	2.2															6.6
100.30	1.7		1.7						1.7		1.7		1.7		1.7				10.2
103.60						2.1		2.1					2.1						6.3
107.35								9.8	5.9	2.0	4.0								21.7
107.80								2.3				2.3							4.6
110.35							2.6	7.8	7.8	2.6				1.3					22.1
110.60													2.0						2.0
113.35	12.6	25.3	52.7	8.4															99.0
113.50		1.7										1.7							3.4
113.70							1.6	3.2	1.6										6.4
117.35	10.1	2.9																	13.0
117.40	3.4						1.7	1.7											6.8

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 25 (cont'd):																			
117.50							1.0	1.0											2.0
117.60				1.6	1.6	1.6	3.2												8.0
117.70	1.5																		1.5
120.35	7.5	19.9	64.8	69.7	146.9	134.4	22.4	7.5	2.5	2.5									478.1
120.45			3.4	1.7	1.7	1.7	1.7	1.7											11.9
120.50			5.7																5.7
120.60	25.5			1.8				1.8	1.8										30.9
120.70				3.8	1.9	3.8	7.6	5.7	3.8										26.6
123.40				2.0	3.9														5.9
123.50	64.5	18.1	2.6		1.3														86.5
123.60	1.9	25.0	3.8		1.9		3.8			1.9	1.9								40.2
127.40		1.7	5.1	3.4	6.8	3.4	8.5	13.6											42.5
127.50		3.6	3.6																7.2
130.35			7.3		5.5	3.6	3.6	3.6	1.8										25.4
130.40	3.2	1.6		4.8	1.6	3.2			3.2	1.6	1.6			1.6					22.4
130.50		3.5						1.7											5.2
133.30				3.4	10.4	8.6	15.5	15.6	13.9	3.4	5.2	1.7	1.7						79.4
133.40		5.7	11.4	74.1	98.8	53.2	38.0	17.1	11.4	7.6	1.9								319.2
133.50	5.4	3.6	3.6																12.6
137.40						1.9	1.9												3.8
137.50			7.4						1.9										9.3
Total	421.6	120.8	175.3	184.8	285.9	223.4	117.1	101.9	66.2	23.4	18.3	7.5	9.3	10.2	1.7	1.4	1.8		1770.6

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 26:																			
60.60	3.7			3.7															7.4
63.67				3.4															3.4
67.55	3.6																		3.6
67.65	3.7		3.7				3.7												11.1
70.100	23.2	46.3	19.3	19.3															108.1
87.35	235.9	112.6	468.2	911.7	387.2	49.3	35.2	24.7	7.0	3.5									2235.3
87.40	7.0		20.9	7.0						7.0									41.9
90.30	35.9	13.3	5.7	15.2	3.8	1.9	1.9												77.7
93.30		1.8		1.8	1.8														5.4
97.50		1.8				1.8	5.5	1.8	1.8	1.8									14.5
97.60									1.2										1.2
100.30	29.7		4.2		8.4	12.7										2.1			57.1
103.50						3.4													3.4
110.60				2.6		2.6	7.7		2.6										15.5
110.70			4.3	4.4	4.3	6.5	6.5	2.2											28.2
110.80					1.7	17.0	8.5	1.7	3.4	1.7	1.7	1.7	3.4	1.7					42.5
113.35					1.7														1.7
113.60	2.0	7.9	63.3	83.1	4.0	2.0		2.0	2.0	4.0								4.0	174.3
117.35	3.8																		3.8
117.50			1.9																1.9
117.60					1.2					1.2									2.4
120.35		13.3	10.0	3.3			3.3				3.3								33.2
120.45				1.9				1.9											3.8
120.90						2.4													2.4
123.40	1.5			1.5	4.5	4.5	13.4	7.5	9.0	1.5	1.5								44.9
123.50					1.6	4.9	9.8	1.6											17.9
127.40				3.4	5.1														8.5
127.50			1.7	3.4															5.1
130.50					1.4	7.2	8.7	5.8	2.8	1.4	4.3								31.6
130.60									1.8										1.8
133.30		3.2	1.6																4.8
133.50				6.0	10.0	17.9	12.0	8.0	8.0	12.0	17.9	12.0	2.0	6.0					111.8
133.60							1.9		1.9										3.8
140.35													7.4						7.4
140.40											1.9								1.9
143.30				15.2	11.4	15.2						3.8							45.6
143.35				3.8	7.6														11.4
147.50						3.7												3.7	7.4
Total	350.0	200.2	604.8	1090.7	455.7	153.0	118.1	57.2	41.5	34.1	30.6	17.5	12.8	7.7		2.1		7.7	3183.7

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 27:																			
40.60									9.2										9.2
57.64										4.0									4.0
60.60								1.6	1.6										3.2
60.70		3.3	6.6	16.5	16.5	16.5	3.3												62.7
60.80				3.5															3.5
60.90			1.7							1.7									3.4
63.57	2.1																		2.1
70.55	1.6																		1.6
70.90					9.1	3.0	6.0	3.0											21.1
70.100									1.7										1.7
85.40	49.0	28.5	39.5	34.8	18.9	17.4	20.6	6.4	1.6	1.6									218.3
90.30	2.1	2.1		6.3	2.1														12.6
90.37	8.1	1.6	8.2	3.3	4.9	3.2	4.9	6.6	4.9										45.7
90.45									5.6										5.6
90.60					1.8														1.8
93.30	3.6		1.8	12.4	3.6			5.4	3.6	1.8	5.4								37.6
120.35		2.0	2.0		2.0			1.0											7.0
120.50				1.7	3.4														5.1
120.60			4.1	2.1	4.2	6.2	8.3	4.2	2.1										31.2
123.40				2.0	11.7		3.9		3.9	5.9	2.0	2.0	2.0	2.0					35.4
127.50			1.8	12.4	26.4	44.0	42.3	17.6	5.3	1.8	1.8								153.4
127.60									1.7										1.7
130.35		1.6			1.6	1.6	1.6	1.6											8.0
130.50								1.8											1.8
130.60	1.7	1.7		1.7															5.1
133.30	2.1	2.1																	4.2
137.35			1.3																1.3
Total	70.3	42.9	67.0	96.7	106.2	91.9	90.9	49.2	41.2	16.8	9.2	2.0	2.0	2.0					688.3

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 28:																			
43.42	2.7																		2.7
53.55						2.8													2.8
53.65										4.3									4.3
57.51																	1.5*		1.5
60.60							4.7		7.0				2.3						14.0
63.55						3.1													3.1
67.50	12.2	6.1	1.5	1.5	1.5	1.5	4.5	1.5	3.0	1.5	1.5	1.5		1.5				1.5	40.8
70.60		2.4																	2.4
77.55						4.7		2.4		2.4									9.5
77.65				2.8	2.8			2.8											8.4
80.55				11.5		2.9			20.1	8.6	2.9	2.9	5.8						54.7
80.60									3.0		3.0								6.0
85.38			2.6	7.8	5.2	2.6	5.2		7.8	5.2									36.4
85.40	6.3		3.2																9.5
85.70							2.7												2.7
87.35	20.1	12.5	2.5	2.5	5.0		2.5											2.5	47.6
90.28	59.0			5.1															64.1
90.60										2.9									2.9
93.27	1.4																		1.4
97.30	26.6	6.1	13.3	22.4	3.0	5.1													76.5
97.32	17.5	13.1	13.0	4.4	6.5													4.4	58.9
100.29		1.7	3.4	3.4	1.7														10.2
100.30	3.6	3.6	5.4	10.8	1.8		1.8												27.0
105.32				1.7										1.7					3.4
105.35	2.5	2.5	2.5	20.3	15.2	20.4	2.5	2.5	2.5	2.5									73.4
105.40					2.7														2.7
115.27	5.0		1.3	1.3	1.3														8.9
115.30	18.9	7.5	18.8	7.5	1.9	1.9													56.5
115.35			3.2																3.2
115.60										2.9									2.9
120.25	4.0	2.0	6.1	8.2	4.0		2.0												26.3
120.30		27.7	155.2	393.3	277.0	160.6	88.7	11.1	11.0										1124.6
120.35		19.3	41.2	75.0	53.2	9.7													198.4
123.37					1.6			4.8	6.4	11.2	14.4	3.2	3.2			1.6			46.4
123.40										5.2									5.2
127.34	37.8	27.9	13.1	1.6															80.4
130.60									2.5										2.5
133.40								4.7	9.4										14.1
137.23						3.3			3.3										6.6
Total	217.6	132.4	286.3	581.1	384.4	218.6	114.6	29.8	76.0	46.7	21.8	7.6	11.3	3.2		1.6	1.5	8.4	2142.9

* - Length unknown

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 29:																			
77.50							1.6												1.6
80.51	1.6		1.6	3.1	1.6														7.9
85.38	3.6		3.5														1.8*		8.9
90.28	166.6			2.7			5.5			2.7	2.7								180.2
90.30				4.9															4.9
93.27	2.6	6.7	9.3	6.7	4.0		1.3	1.3	1.3	1.3									34.5
97.30		2.8																	2.8
100.30					2.4		2.4												4.8
107.32			2.8																2.8
110.33	1.7							8.6	3.4			1.7							15.4
115.27	3.2	3.2																	6.4
115.30	11.2	1.4	1.4		1.4	2.8		1.4											19.6
115.35	16.3		13.5		2.7	2.7												2.7	37.9
120.25	3.8	1.9	30.2	24.5	18.9	9.5	1.9	3.8											94.5
120.30		1.9	9.5	11.4	24.7	7.6	3.8	1.9											60.8
120.35	1.6		6.6	9.8	4.9	11.5	4.9	8.2	6.5	3.3	1.6			1.6					60.5
123.37			2.4	4.8	2.4		2.4												12.0
123.40					3.2														3.2
137.23										5.1									5.1
140.30	19.2	11.5	3.8	3.8															38.3
140.35			2.6																2.6
F&G Sta.																			
459								4.9											4.9
480					2.1														2.1
509	1.6	3.3																	4.9
517		2.0																	2.0
527	23.2	6.6	6.6																36.4
529									4.3										4.3
Total	256.2	41.3	93.8	71.7	68.3	34.1	23.8	30.1	15.5	12.4	4.3	1.7		1.6			1.8	2.7	659.3

* - Length unknown

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 30:																			
77.50		8.8	2.2	11.0	2.2		4.4	2.2											30.8
77.55		2.4																	2.4
80.51	10.9			1.6				1.6											14.1
85.38	1.1				1.1														2.2
85.40	4.6	2.3		2.3															9.2
90.28	25.7	48.3	46.8	46.8	36.2	18.2	12.0	13.6	15.1	6.0	4.5	3.0						15.1	291.3
90.30	2.0	2.0	2.0	2.0	2.0	2.0	2.0	4.1	6.1	2.0		6.1	2.0					6.1	40.4
90.37			3.2	9.7	3.2														16.1
90.45			2.4																2.4
93.27	7.6	5.1	10.2	7.6									2.5						33.0
93.30	23.2																		23.2
97.30	20.9	34.7	37.6	12.9	1.0	2.0	5.0											4.0	118.1
100.29		1.2	1.2	1.2	1.2		2.4												7.2
107.32	9.0		3.0	12.0		27.0	9.0	3.0	3.0										66.0
107.35				2.7	2.7														5.4
110.33		4.4	2.9	8.8	3.0	1.5	3.0												23.6
110.35	2.9	5.8	8.6	2.9	2.9	2.9													26.0
110.40		2.1		2.1	2.1	2.1	8.4												16.8
115.27	7.8	1.6	3.1	1.6	1.6	1.6	1.6												18.9
115.30	4.2	1.4			1.4														7.0
115.40					2.9														2.9
120.25				2.2		2.2													4.4
120.30	1.6								1.6										3.2
F&G Sta.																			
503													3.0	3.0	3.0				9.0
517								1.7											1.7
519								2.4											2.4
527													2.9						2.9
529							2.2			2.2	2.2			2.2					8.8
Total	121.5	120.1	123.2	127.4	63.5	59.5	50.0	28.6	25.8	10.2	6.7	9.1	10.4	5.2	3.0			25.2	789.4

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																	
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 31:																			
60.60																2.5			2.5
67.50							1.4												1.4
67.55												3.2							3.2
77.50					1.7				3.3	1.7									6.7
77.55					3.1														3.1
80.51				2.9		2.9	5.8												11.6
80.55								2.8											2.8
83.43	69.0	108.9	108.9	156.1	108.9	79.8	32.7	7.3		3.6								98.0	773.2
85.38	3.6	8.4	15.5	11.9	17.8	6.0	1.2											2.4	66.8
85.40	28.5	51.5	31.5	25.7	5.8	5.8												20.0	168.8
90.28	40.4	118.1	103.7	123.9	112.4	25.9	34.6	11.5	43.2	17.3	14.4	11.6	14.4	5.8	8.7	2.9		60.5	749.3
90.30	2.8	14.1	8.4	11.2	2.8	2.8			2.8	2.8								8.5	56.2
90.37		2.9	8.8	2.9	5.9	5.9	11.7												38.1
93.27	11.4	8.0	9.1	10.2	18.3	3.4	6.9	2.3	3.4	2.3				1.1				1.1	77.5
97.30	525.8																		525.8
100.29	2.8	2.7	1.4															1.4	8.3
103.35					2.2			2.2	2.2										6.6
107.32						2.5			2.5						2.5				7.5
107.35		2.7	5.4	2.7	2.7	19.0													32.5
107.40	5.4																		5.4
110.33	11.4	88.1	142.0	227.2	178.9	161.9	88.0	76.7	36.9	17.1	2.8							54.0	1085.0
110.35	13.2						2.6		2.6										18.4
115.27		22.6	41.3	12.0	1.3	2.7	2.7	1.3	2.6	1.3								8.0	95.8
120.25					1.5														1.5
123.37	40.0	45.9	44.4	5.9	4.5	1.5			1.5									3.0	146.7
123.40				5.0															5.0
127.34		1.4																	1.4
Total	754.3	475.3	520.4	597.6	467.8	320.1	187.6	104.1	101.0	46.1	17.2	14.8	14.4	6.9	11.2	5.4		256.9	3901.1

Table IV (cont'd)
Record of Anchovy Larvae, 1951

Station	Midpoint of Size Class (in mm.)																		
	3.0	4.75	5.75	6.75	7.75	8.75	9.75	10.75	11.75	12.75	13.75	14.75	15.75	17.25	19.25	21.25	23.25	Dis.	Total
Cruise 32:																			
63.55								2.9											2.9
70.51																	6.4*		6.4
77.55																	8.5*		8.5
80.51			2.0	5.0	15.8	8.9	3.0	2.0	2.0					1.0				3.0	42.7
83.43	2.2		6.7	6.7	4.5	2.2	11.2	2.2		2.2								2.2	40.1
85.38	178.7	28.3	41.4	28.3	8.8	13.1	4.4											58.9	361.9
93.30				2.4			2.4	2.4		2.4									9.6
93.40							2.4	2.4											4.8
97.30	13.1	1.5	4.4	4.4	1.5	3.0	5.8	8.8	11.7	8.7	8.8	1.5	1.5						74.7
100.29		2.5		12.6		15.1	10.0		5.0	2.5			2.5					2.5	52.7
100.30	2.2	4.4	11.1	15.6	15.5	17.8	22.2	13.4	4.4	4.4	2.2							4.4	117.6
100.40																	27.7*		27.7
100.50						2.8													2.8
103.30	13.6	1.4	1.4	1.4	6.7	4.0	5.4	9.4	5.4	4.0	1.4	1.4	5.4	1.4					62.3
107.32	2.4		2.4									2.4							7.2
107.35								1.6	1.6		1.6	1.6							6.4
110.33	13.2	10.0					1.6		1.6									1.6	28.0
110.35	23.2	5.1	2.6			2.6												2.6	36.1
115.27	15.5	23.2	169.8	154.4	158.3	69.4	38.6	34.7	38.6			3.9						11.6	718.0
115.30	17.6	14.6	5.9	16.1	8.8	2.9	10.3	2.9	4.4	3.0	1.5							14.6	102.6
115.35	5.8	2.9																	8.7
115.40							7.6	5.1	2.6	2.6									17.9
120.35	5.1																		5.1
120.45				3.2	3.2														6.4
123.37	2.2		2.2				4.3												8.7
123.40	6.6			1.3	6.7	2.7	1.3											4.0	22.6
Total	301.4	93.9	249.9	251.4	229.8	144.5	130.5	87.8	77.3	29.8	15.5	10.8	9.4	2.4				105.4	1782.4
																		42.6	

* - Length unknown

Table V

Record of the Larvae of Jack Mackerel (Trachurus symmetricus), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
40.70	-	-	-	-	-	-		6	-	-	-	-
40.80	-	-	-	-	-	-		2	-	-	-	-
60.60		-	-			4						-
60.80	-	-	-				4					-
60.90	-	-	-			2	7			-		-
60.100	-	-	-			10		-	-	-		-
60.110	-	-	-	22				-	-	-	-	-
60.130	-	-	-	-	-	6	-	-	-	-	-	-
63.67		-	-		-	7		-	-	-	-	-
67.55		-	-	4		46			-	-		
67.65		-	-			30			-	-		
70.60		-	-	9		41						
70.70		-	-			49	2					
70.80		-	-			440	4					
70.90		-	-	5		452	6	-			-	-
70.100	-	-	-		5	15		-	-	-	-	-
70.110	-	-	-	2		34		-	-	-	-	-
70.120	-	-	-	-	-	17		-	-	-	-	-
70.130	-	-	-	-	-	21	-	-	-	-	-	-
73.51		-	-				9	-	-	-	-	-
73.61		-	-	93		25		-	-	-	-	-
77.55		-	-	19		58	13					
77.65		-	-	14		4						
80.55			6	13		15						-
80.60		2	223	8	-	12	(4)					
80.70		45	379	3	-	50						
80.80			202	20	-	18	2					
80.90		2	169	6	-		2	-				
80.100	-	4	3	13	-	2	2	-				-
80.110	-	8	62	17	-	19		-	-	-	-	-
80.120	-		16	49	-	-	-	-	-	-	-	-
80.130	-		24	63	-	-	-	-	-	-	-	-
83.55	-		-	9		170	-	-			-	-
83.60			-	32		24	-	-	-		-	-
83.70		-	-	14		1039	-	-	-	-	-	-
83.80		-	-	25	-	102	-	-	-	-	-	-
83.90		-	-	51	-	12	-	-	-	-	-	-
85.40	-	-		-	-	-	2					
85.70	-	-	4	-	-	-	-	3	-	-	-	-
85.80	-	-	216	-	-	-	-	7	-	-	-	-
85.90	-	-	110	-	-	-	-	-	-	-	-	-
87.60		-	-	697	3	32	-	-	-	-	-	-
87.70		-	-	949	5	2	-	-	-	-	-	-
87.80		-	-	1020	6	4	-	-	-	-	-	-
87.90		-	-	1473	2	5	-	-	-	-	-	-

Table V (cont'd)

Record of the Larvae of Jack Mackerel (Trachurus symmetricus), 1951

	Cruise and Month											
	21	22	23	24	25	26	27	28	29	30	31	32
Sta.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
90.30										2		-
90.37			13	2		7	5	2				
90.45				15			2					
90.53				184	56		10					
90.60			37	17	169	10						
90.70			72	256				3				-
90.80		2	4	43	4	16	2	26	-	-	-	-
90.90			217	8	22				-	-	-	
90.100			270	42	24	28		6	-	-	-	-
90.110			25	34	6	7	2	-	-	-	-	-
90.120			11	32	51	-	-	-	-	-	-	-
93.27	-	-	-	-	-	-	-	1				
93.30							2	2				
93.40			43	13	5	8	10	2			-	
93.50				4			6	5			4	
93.60			28	42	12	82	-	8	-	-	-	-
93.70		3	22	130	2	162	-		-	-	-	-
93.80			107	417	57	84			-	-	-	-
93.90			38	130	32	30	4	-	-	-	-	-
97.32				1		3	2	4				NQ
97.40		122	14	2		1	4				5	
97.50		80	35	13	9	31		2				
97.60		5	78	218	13	14	3	3	-	-	-	-
97.70			196	103	2	11	5		-	-	-	-
97.80		2	74	120	50	11	2		-	-	-	-
97.90		2	10	42	47	11	2	-	-	-	-	-
100.30			5	3	7		-					
100.40				45	40	2	8				3	
100.50			2	126	124			2				
100.60			2	26	857	12	5	3				
100.70			97	140	4	4			3		-	
100.80			215	78	5	28	21	-				-
100.90			3	48	2	2		-			-	-
100.100		-		3	13	-	25	-	-	-	-	-
100.110		-	-	6	2	-	-	-	-	-	-	-
100.120		-	-		6	-	-	-	-	-	-	-
103.35	-	-		33	55	2	-	-				
103.40		-	11	33	59	5	-	-				
103.50		-	62	32		3	-	-	-	-	-	-
103.60		-	44	20	2	40	-	-	-	-	-	-
103.70		-	100	22	18	11	-	-	-	-	-	-
103.80		-	843	24	19	-	-	-	-	-	-	-
105.50	-		-	-	-	-	-	12	-	-	-	-
107.35	-	-		11		15	-	-				
107.40		-	7	67	2	19	-	-		3		
107.50		-	12	2	5	2	-	-	-	-	-	-

Table V (cont'd)
Record of the Larvae of Jack Mackerel (Trachurus symmetricus), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
107.60	2	-	11		2		-	-	-	-	-	-
107.70		-	18	30	2	2	-	-	-	-	-	-
107.80		-	484	177	34	6	-	-	-	-	-	-
110.35						2	-					
110.40				2	1	2	-	3				
110.50			43	2	4		-					
110.60			10	5	4	5	-					
110.70			5	6	3		-	-	-	-	-	-
110.80			10	204	4	8	6	-	-	-	-	-
110.90			2	117	11		7	-	-	-	-	-
110.100				4	4	2	-	-	-	-	-	-
110.110		-	2		8		-	-	-	-	-	-
113.35			27			2	-	-	-	-	-	-
113.40					2		-	-	-	-	-	-
113.50			42	2			-	-	-	-	-	-
113.60				42	4	14	-	-	-	-	-	-
113.70				10	8		-	-	-	-	-	-
117.50			65			2	-	-	-	-	-	-
117.60				4	6	4	-	-	-	-	-	-
117.70			10	2		4	-	-	-	-	-	-
120.45						2						
120.50						2			-			
120.60			14	14	4	2						
120.70			26	20	4	3	2					
120.80			11	8	2	2	10					-
120.90			3				2					-
120.100			12				-	-	-	-	-	-
120.110		-	5				-	-	-	-	-	-
123.40						7						
123.50				8		3			-		-	-
123.60				10					-	-	-	-
127.40						3						-
127.50					2	2			-		-	-
127.60				2	2	10			-	-	-	-
130.35					2							-
130.50					2							-
130.60			2									-
130.70			2				-	-			-	-
133.50				6					-	-	-	-
137.35							1	-	-	-	-	-
137.50				2					-	-	-	-
137.60			2				-	-	-	-	-	-
Totals	2	277	4917	7894	1917	3517	205	104	3	5	12	0

Table VI

Record of the Larvae of Hake (Merluccius productus), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
61.55		-	-	3				-	-	-	-	-
60.70	-	-	-	4								-
60.80	-	-	-	9								-
60.90	-	-	-	14	2					-		-
60.100	-	-	-	21				-	-	-		-
60.110	-	-	-	6				-	-	-	-	-
63.57	5	-	-					-	-	-	-	-
63.67	72	-	-	7	-			-	-	-	-	-
67.65		-	-	137					-	-		
70.55		-	-	14				-	-	-	-	-
70.60		-	-	4	5							
70.70	3	-	-	11		4						
70.80	44	-	-	31								
70.90		-	-	53				-			-	-
70.100	-	-	-	91				-	-	-	-	-
73.51		-	-	5				-	-	-	-	-
73.61		-	-	64	2			-	-	-	-	-
77.55		-	-	201		4	4					
77.65		-	-	35	2							
80.55			294	104	14	3					3	-
80.60		4	1145	66	-							
80.70		5	1240	37	-							
80.80		435	343	212	-							
80.90		13	536	8	-			-				
80.100	-		119	127	-			-				-
80.110	-	55	716	47	-			-	-	-	-	-
80.120	-		2	144	-	-	-	-	-	-	-	-
80.130	-		124	1292	-	-	-	-	-	-	-	-
83.43	-	-	-	-	-	-	-	-	-	-		4
83.55	-		-	273			-	-			-	-
83.60			-	420		2	-	-	-		-	-
83.70		-	-	263	4	8	-	-	-	-	-	-
83.80		-	-	209	-		-	-	-	-	-	-
83.90		-	-	369	-		-	-	-	-	-	-
85.38	-	-	-	-	-	-	-					22
85.40	-	-		-	-	-						3
85.50	-	-	2	-	-	-	-					
85.70	-	-	20	-	-	-	-		-	-	-	-
85.80	-	-	20	-	-	-	-		-	-	-	-
85.90	-	-	126	-	-	-	-	-	-	-	-	-

Table VI (cont'd)
Record of the Larvae of Hake (Merluccius productus), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
87.40	2		-	17			-	-	-	-	-	-
87.50	-	-	-		7		-	-	-	-	-	-
87.60		-	-	578			-	-	-	-	-	-
87.70		-	-	174	9		-	-	-	-	-	-
87.80		-	-	247	15		-	-	-	-	-	-
87.90		-	-	222	53		-	-	-	-	-	-
90.30	6		2									-
90.37	4		8									
90.45		2		31	6							
90.53				396	12							
90.60			6	90	2					4		
90.70			36	160	2							-
90.80			33	139					-	-	-	-
90.90			197	206					-	-	-	-
90.100			2						-	-	-	-
93.30			11	9								
93.40			221	240							-	
93.50			25	35	5	7						
93.60			22	294		3	-		-	-	-	-
93.70			4	351	10	6	-		-	-	-	-
93.80			191	169		4			-	-	-	-
93.90			13	11				-	-	-	-	-
97.30	-	-	-	-	-	-	-			3		
97.32	2		5	37		2						NQ
97.40	2	1628	1892	21		3						
97.50		235	89	34	7							
97.60		2	85	187	19	8			-	-	-	-
97.70			209	34	4				-	-	-	-
97.80			644	11					-	-	-	-
97.90			5	18				-	-	-	-	-
100.30			11	2		4	-					
100.40		6	27	1576	11							
100.50		4	54	536	2							
100.60		1058	264	38	57							
100.70			9424	103							-	
100.80			580	10				-				-
100.90			19	3				-			-	-
100.100		-		3		-		-	-	-	-	-
103.35	-	-	61	126	22		-	-				
103.40		-	296	129	11		-	-				

Table VI (cont'd)

Record of the Larvae of Hake (Merluccius productus), 1951

Sta.	Cruise and Month											
	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
103.50		-	2692	4	2	3	-	-	-	-	-	-
103.60		-	1522	153	2		-	-	-	-	-.	-
103.70	2	-	266	5			-	-	-	-	-	-
103.80		-	13608	71		-	-	-	-	-	-	-
105.50	-	13	-	-	-	-	-		-	-	-	-
105.60	-	44	-	-	-	-	-		-	-	-	-
105.70	-	8	-	-	-	-	-	-	-	-	-	-
105.80	-	729	-	-	-	-	-	-	-	-	-	-
105.90	-	19	-	-	-	-	-	-	-	-	-	-
107.35	-	-	130	107	6		-	-				
107.40		-	1729	288	13		-	-				
107.50		-	3	6	18		-	-	-	-	-	-
107.60		-		6	2		-	-	-	-	-	-
107.70		-	21	304			-	-	-	-	-	-
107.80		-	426	992			-	-	-	-	-	-
110.33	-	-	-	-	-	-	-				14	
110.35			3	2	14		-			3		
110.40		34	8	4	1		-					
110.50			262	4	6		-					
110.60			5		2		-					
110.70			8	6	2	26	-	-	-	-	-	-
110.80				124	4	7		-	-	-	-	-
110.90				31				-	-	-	-	-
110.100				4			-	-	-	-	-	-
113.35			247	2	6		-	-	-	-	-	-
113.40				6			-	-	-	-	-	-
113.50				17			-	-	-	-	-	-
113.60				31	2	14	-	-	-	-	-	-
113.70			20	5		6	-	-	-	-	-	-
115.30	-	-	-	-	-	-	-	2	6			26
115.35	-	-	-	-	-	-	-		8			9
117.35		242	102	14			-	-	-	-	-	-
117.40		54	154	154	2	2	-	-	-	-	-	-
117.50			34	19			-	-	-	-	-	-
117.60			3	39	5		-	-	-	-	-	-
117.70			5		2	2	-	-	-	-	-	-
120.35	31	105	32		60	20						
120.45		8	55	44	35							
120.50		4	13	4	4		5		-			
120.60			11	4	4		4					

Table VI (cont'd)

Record of the Larvae of Hake (Merluccius productus), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
120.70				58								
123.40		331	5	24	10							
123.50		103	3	8					-		-	-
123.60		4		3					-	-	-	-
127.40		2	10	91	39	7						-
127.50						5	2		-		-	-
130.35		2	5	114	4	2	2					-
130.40		24	4	24		2						-
130.50				2	2							-
133.30	34	17	68	37	7	2						-
133.40	7	38	17	9	30				-	-	-	-
133.50	8	31				8			-	-	-	-
133.60		3	12		2		-	-	-	-	-	-
137.35		109	341	73	6			-	-	-	-	-
137.40		1370	141		9				-	-	-	-
137.50		10	262						-	-	-	-
137.60			12				-	-	-	-	-	-
140.35	-	-	31	-	-		-	-		-	-	-
140.40	-	-	10	-	-		-	-		-	-	-
140.50	-	-	4	-	-		-	-		-	-	-
143.30	-	-	7	-	-		-	-		-	-	-
143.35	-	-	9	-	-	4	-	-		-	-	-
143.40	-	-	4	-	-		-	-	-	-	-	-
143.50	-	-	11	-	-		-	-	-	-	-	-
147.20	-	-	3	-	-	-	-	-		-	-	-
147.25	-	-	33	-	-		-	-		-	-	-
147.30	-	-	29	-	-		-	-		-	-	-
147.40	-	-	12	-	-		-	-	-	-	-	-
150.40	-	-	2	-	-		-	-		-	-	-
150.70	-	-	29	-	-	4	-	-		-	-	-
150.80	-	-		-	-	2	-	-		-	-	-
157.10	-	-	2	-	-		-	-		-	-	-
Totals	222.	6751	41548	13411	584	174	17	2	14	10	17	64

Table VII

Record of the Larvae of Pacific Mackerel (Pneumatophorus diego), 1951

	Cruise and Month											
Sta.	21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
85.40	-	-		-	-	-	2	3				
87.70		-	-	4			-	-	-	-	-	-
87.80		-	-	2			-	-	-	-	-	-
90.37							5					
93.30							2					
93.60				2					-	-	-	-
93.80			5						-	-	-	-
97.50					7	20						
97.60				7					-	-	-	-
100.30					2		-					
100.40					5							
100.50					29							
100.60				26	32							
100.70				2								
107.80		-		2			-	-	-	-	-	-
110.35						2	-					
113.60						2	-	-	-	-	-	-
115.27	-	-	-	-	-	-	-	1				
115.30	-	-	-	-	-	-	-	4				
115.35	-	-	-	-	-	-	-		3			
117.60						1	-	-	-	-	-	-
120.25	-	-	-	-	-	-	-				31	
120.30	-	-	-	-	-	-	-	55	2		27	
120.35					22		5	65				9
120.45					2							
120.50					4				-			
123.37	-	-	-	-	-	-					31	
123.40		2		2		13						
127.34	-	-	-	-	-	-	-	243	2		-	-
127.40						7					-	-
127.50								5	-		-	-
130.30	-	-	-	-	-	-	-	74			-	-
130.35				32							-	-
130.40					3						-	-
130.50					2						-	-
133.30			37	11	2						-	-
133.40				20	66			5	-	-	-	-
137.23	-	-	-	-	-	-	-		72		-	-
137.35		2	6	4				-	-	-	-	-
137.40			10		30				-	-	-	-
137.50					2				-	-	-	-
143.30	-	-		-	-		-	-	4	-	-	-
143.40	-	-		-	-	24	-	-	-	-	-	-
147.30	-	-		-	-	4	-	-		-	-	-
Totals	0	4	58	114	204	77	14	455	83	0	89	9

Table VIII

Record of the Larvae of Rockfish (Sebastodes spp.), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
40.45	-	-	-	-	-	-	2	-	-	-	-	-
40.50	-	-	-	-	-	-	8	18	-	-	-	-
40.60	-	-	-	-	-	-	101		-	-	-	-
40.70	-	-	-	-	-	-	(4)	6	-	-	-	-
43.42	-	-	-	-	-	-	-	3	-	-	-	-
43.50	-	-	-	-	-	-	(5)	4	-	-	-	-
43.60	-	-	-	-	-	-	27	12	-	-	-	-
47.50	-	-	-	-	-	-	-	12	-	-	-	-
47.55	-	-	-	-	-	-	28	-	-	-	-	-
47.60	-	-	-	-	-	-	54	5	-	-	-	-
50.50	-	-	-	-	-	-	-	5	-	-	-	-
50.60	-	-	-	-	-	-	14	10	-	-	-	-
50.70	-	-	-	-	-	-	14	10	-	-	-	-
50.80	-	-	-	-	-	-	18		-	-	-	-
50.90	-	-	-	-	-	-	14	-	-	-	-	-
53.54	-	-	-	-	-	-	46	-	-	-	-	-
53.55	-	-	-	-	-	-	-	3	-	-	-	-
53.64	-	-	-	-	-	-	11	-	-	-	-	-
53.65	-	-	-	-	-	-	-	9	-	-	-	-
57.54	-	-	-	-	-	-	7	-	-	-	-	-
57.55	-	-	-	-	-	-	-	9	-	-	-	-
57.64	-	-	-	-	-	-	44	-	-	-	-	-
57.65	-	-	-	-	-	-	-	10	-	-	-	-
60.55	-	-	-	-	-	-	-	78	-	-		-
61.55	222	-	-	22		26	49	-	-	-	-	-
60.60	46	-	-	16		15	16	58	3		2	-
60.70	-	-	-	9	2	14	46	10		4	13	-
60.80	-	-	-	13		17		3	18		3	-
60.90	-	-	-	14	7		4	3		-		-
60.100	-	-	-	2	7		2	-	-	-		-
60.110	-	-	-	7				-	-	-	-	-
60.120	-	-	-	-	-	2		-	-	-	-	-
63.52	-	-	-	-	-	-	-		-	-	2	3
63.55	-	-	-	-	-	-	-	12	-	-	24	38
63.57		-	-	296	3	687	15	-	-	-	-	-
63.65	-	-	-	-	-	-	-	3	-	-	-	-
63.67		-	-	7	-		45	-	-	-	-	-
67.50	-	-	-	-	-	-	-	15	-	-	7	
67.55	38	-	-			14		30	-	-	29	
67.65		-	-	14			2		-	-	11	

Table VIII (cont'd)
Record of the Larvae of Rockfish (Sebastodes spp.), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
70.51	-	-	-	-	-	-	-	5	-	-	63	38
70.55	162	-	-	28			124	-	-	-	-	-
70.60	53	-	-		10			48			5	
70.70	25	-	-	4	7		12	2			6	
70.80	5	-	-	8		4	4					
70.90		-	-	18	5	4	6	-			-	-
70.100	-	-	-	15	2	4	5	-	-	-	-	-
70.110	-	-	-		5			-	-	-	-	-
73.50	-	-	-	-	-	-	-		-	-	2	4
73.51	148	-	-	52	14	52	22	-	-	-	-	-
73.60	-	-	-	-	-	-	-	13				
73.61	24	-	-	43	2	2	30	-	-	-	-	-
77.50	-	-	-	-	-	-	-	4	18	18		8
77.55	6	-	-	182	8	11	23	12	6	17	3	
77.65	25	-	-	21	2	36	4	23			6	7
80.51	-	-	-	-	-	-	-	2	6	11	84	29
80.55	16	62	17	5	18	3	4	12	15	9	6	-
80.60	65	11		10	-	6				2		
80.70				15	-	7	7			2		
80.80					-	18						
80.90	2	2			-			-				
80.100	-		7		-			-				-
80.110	-	2		6	-			-	-	-	-	-
80.120	-			4	-	-	-	-	-	-	-	-
80.130	-		6	2	-	-	-	-	-	-	-	-
83.43	-	-	-	-	-	-	-	-	-	-	29	72
83.55	-	54	-	75	41	8	-	-	3	2	-	-
83.60	458	59	-	143	4	20	-	-	-	2	-	-
83.70		-	-	3	83	17	-	-	-	-	-	-
83.80		-	-	17	-	8	-	-	-	-	-	-
83.90		-	-	3	-		-	-	-	-	-	-
85.38	-	-	-	-	-	-	-	52		9	2	30
85.40	-	-	34	-	-	-	11		3	11	17	16
85.50	-	-	236	-	-	-	-	6				
85.70	-	-	30	-	-	-	-	5	-	-	-	-
87.35	134	48	-	13	19		-	13	-	-	-	-
87.40	80	237	-	78	44	21	-	-	-	-	-	-
87.50	-	-	-	739	76	28	-	-	-	-	-	-
87.60	6	-	-	437	2	6	-	-	-	-	-	-
87.70		-	-	11			-	-	-	-	-	-

Table VIII (cont'd)
Record of the Larvae of Rockfish (Sebastodes spp.), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
87.80		-	-	5		2	-	-	-	-	-	-
87.90		-	-	63	8	8	-	-	-	-	-	-
90.28	-	-	-	-	-	-	-	90	14	3	216	-
90.30	32	20	244	137	11	13			15		25	-
90.37	78	40	100	25	13	5	3			3	3	2
90.45	71	50	3	55	43	13	4	10	5		6	3
90.53	167	22	27	25	183	2	6	4	2	2		58
90.60	7	5	5		39	16	9	3				
90.70	37	17	6	19			2	8	2			-
90.80		5	8	9	2	2			-	-	-	-
90.90		2		10					-	-	-	-
90.100						4			-	-	-	-
90.110					16			-	-	-	-	-
93.27	-	-	-	-	-	-	-	9	15	13	3	9
93.30	57	74	43	60	6	5	7		5	16		7
93.40	40	357	43	110	20	142	4		3		-	54
93.50		2	36	238	148	17	10			15	11	3
93.60		25	2	14	7	36	-		-	-	-	-
93.70				31	6	12	-		-	-	-	-
93.80				27		4			-	-	-	-
97.30	-	-	-	-	-	-	-	19	3	5	5	22
97.32	142	65	4	54	10	19	23	17			5	NQ
97.40	115	3	112	34	64	20	8		2		28	21
97.50	11	4	2	29	24	6	2				3	2
97.60		5		281	4	28	3		-	-	-	-
97.70							2		-	-	-	-
97.80		2							-	-	-	-
100.29	-	-	-	-	-	-	-	2			4	8
100.30	34	57	96	264	44	68	-	2	2	22	24	9
100.40	6	25	10	278	80		2					
100.50	4		2	149	13			4				
100.60		4	2	3	201	7						
100.70				5					3		-	
103.30	-	-	-	-	-	-	-	-	1		3	9
103.35	-	-	12	18	45	18	-	-				3
103.40	12	-		17	23	2	-	-				
103.50	5	-		4	2	34	-	-	-	-	-	-
103.60	4	-			23		-	-	-	-	-	-
103.70		-	6				-	-	-	-	-	-
103.80		-	9			-	-	-	-	-	-	-

Table VIII (cont'd)
Record of the Larvae of Rockfish (Sebastodes spp.), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
105.32	-	-	-	-	-	-	-	2	-	-	-	-
105.35	2	19	-	-	-	-	-		-	-	-	-
105.50	-	3	-	-	-	-	-		-	-	-	-
105.60	-	2	-	-	-	-	-	2	-	-	-	-
105.70	-	4	-	-	-	-	-	-	-	-	-	-
105.80	-	10	-	-	-	-	-	-	-	-	-	-
107.32	-	-	-	-	-	-	-	-		3	5	43
107.35	-	-	37	6	2	2	-	-				
107.40		-		9	15		-	-				
107.50		-	3		100	8	-	-	-	-	-	-
107.60	10	-		2	11		-	-	-	-	-	-
107.70		-	13				-	-	-	-	-	-
107.80		-	2	2	5		-	-	-	-	-	-
110.33	-	-	-	-	-	-	-			7	28	5
110.35	2		5	4	10	4	-	6				
110.40			36	4	4	2	-			2		
110.50	2		2		8	2	-					
110.60						3	-					
110.70	44		8			11	-	-	-	-	-	-
110.80					4	12		-	-	-	-	-
110.90						2	4	-	-	-	-	-
113.35	57	11	11	66	167	5	-	-	-	-	-	-
113.40				9	4	2	-	-	-	-	-	-
113.50			2				-	-	-	-	-	-
113.60						10	-	-	-	-	-	-
113.70		2	5	5	2	7	-	-	-	-	-	-
115.27	-	-	-	-	-	-	-		2			
115.30	-	-	-	-	-	-	-		1	1	2	2
115.40	-	-	-	-	-	-	-			3		
117.35	107	100	110	7	36	34	-	-	-	-	-	-
117.40	41	109	193	507	46	10	-	-	-	-	-	-
117.50		6	8	6	3		-	-	-	-	-	-
117.60				13	5		-	-	-	-	-	-
117.70			3		2	6	-	-	-	-	-	-
120.25	-	-	-	-	-	-	-					2
120.30	-	-	-	-	-	-	-		4			
120.35	13	7	12	21	17	13	3	5			2	
120.45		8	24	59	18	4		2	3			
120.50			5	4	4		2	8	-			3
120.60							21	25				

Table VIII (cont'd)
Record of the Larvae of Rockfish (Sebastodes spp.), 1951

Sta.	Cruise and Month 21 Jan.	22 Feb.	23 Mar.	24 Apr.	25 May	26 June	27 July	28 Aug.	29 Sept.	30 Oct.	31 Nov.	32 Dec.
120.70				2				162				
120.80								5	13			-
120.90								3	3			-
123.37	-	-	-	-	-	-	-		2			
123.40	5	24	5	52	69							
123.50		2		4					-		-	-
127.40				28	113	2		3				-
127.50				2		5			-		-	-
130.35			5	223	169	5	3					-
130.40			2	4	3	6				3		-
130.50							4					-
130.60								10				-
133.25	-	-	-	-	-	-	-	2				-
133.30	16	7	53	37	9	8						-
133.40					6				-	-	-	-
133.50						22			-	-	-	-
137.23	-	-	-	-	-	-	-			2		-
137.30	-	-	-	-	-	-	-	2				-
137.35	2		8	5		4	1	-	-	-	-	-
137.40			5		7		2		-	-	-	-
137.50			7		2				-	-	-	-
140.35	-	-	9	-	-		-	-	3	-	-	-
140.40	-	-		-	-	4	-	-		-	-	-
143.30	-	-	5	-	-		-	-		-	-	-
143.35	-	-	5	-	-		-	-		-	-	-
143.40	-	-	4	-	-		-	-	-	-	-	-
150.19	-	-	-	-	-	-	-	-	3	-	-	-
157.10	-	-		-	-		-	-	2	-	-	-
Totals	2638	1573	1689	5377	2237	1706	953	930	180	187	687	510

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