

# data report

## PHYSICAL AND CHEMICAL DATA

CCOFI Cruise 5607  
6-25 July 1956

CCOFI Cruise 5608  
7-19 August 1956

CCOFI Cruise 5609  
5-17 September 1956

CCOFI Cruise 5610  
27 September - 5 October 1956

CCOFI Cruise 5611  
30 October - 5 November 1956

SIO Reference 60-35  
27 April 1960

UNIVERSITY OF CALIFORNIA  
SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

CCOFI CRUISE 5607

6-25 July 1956

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CCOFI CRUISE 5609

5-17 September 1956

CCOFI CRUISE 5610

27 September - 5 October 1956

CCOFI CRUISE 5611

30 October - 5 November 1956


Sponsored by

Marine Research Committee

SIO Reference 60-35

27 April 1960

Approved for distribution:



Roger Revelle, Director



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## INTRODUCTION

The data presented in this report were collected on the eighty-sixth, eighty-seventh, eighty-eighth, eighty-ninth and ninetieth consecutive cruises of the California Cooperative Oceanic Fisheries Investigations program. The R/V Black Douglas of the U. S. Fish and Wildlife Service participated in all five cruises; the R/V Paolina-T of the Scripps Institution participated in Cruise 5607; the R/V Orca of the Scripps Institution participated in Cruises 5607, 5610 and 5611.

The data are tabulated at observed depths; the interpolated and computed values tabulated at standard depths and are accompanied by charts of horizontal distribution. The presentation of data in this report does not constitute publication; however, the data contained in this report have been carefully edited and no modifications should be necessary before final publication.

## STANDARD PROCEDURES

To indicate degree of accuracy, temperatures are recorded in tenths of a degree when obtained by bucket thermometer, thermograph, or bathythermograph, while temperatures from reversing thermometers are recorded in hundredths of a degree. Extrapolated values and values interpolated between remote observations are entered within parentheses. A hyphen is used to indicate a missing observed value. The time is the time of messenger release. When more than one cast was made on a station, messenger times and wire angles are given in the order of increasing depth. A line is left blank between the observed data of each cast.

## FOOTNOTES

Footnotes which appear frequently are "loose bottle cap" and "possible evaporation." To avoid any confusion as to their meaning the following explanation is included.

Laboratory personnel, before titrating the salinity samples, note any possible imperfections in the sealing of the bottles as follows:

Loose bottle cap:

The cap is definitely loose so that it could be moved with very little applied pressure. The salinity values obtained from these samples may be usable depending on time and/or conditions of storage.



Possible evaporation:     Either the cap was sealed with less than usual pressure, the bottle edge chipped, the rubber washer cracked, or the bale broke on opening, etc.

Use of the above values in interpolation depends upon consistency with other values of salinity and other properties, and these footnotes are supplemented with "falls on property curve" or "does not fall on property curve," depending upon whether the property curve was drawn through the value or not.

In addition to footnotes, three special notations are used without footnotes because their meaning is always the same.

To indicate a premature or a delayed reversal of the water-sampling device which results in certain depth and property errors, the following notation is used.

p: pretrip or posttrip

Values which are not drawn through because they seem to be in error without apparent reason are indicated by one of the following notations.

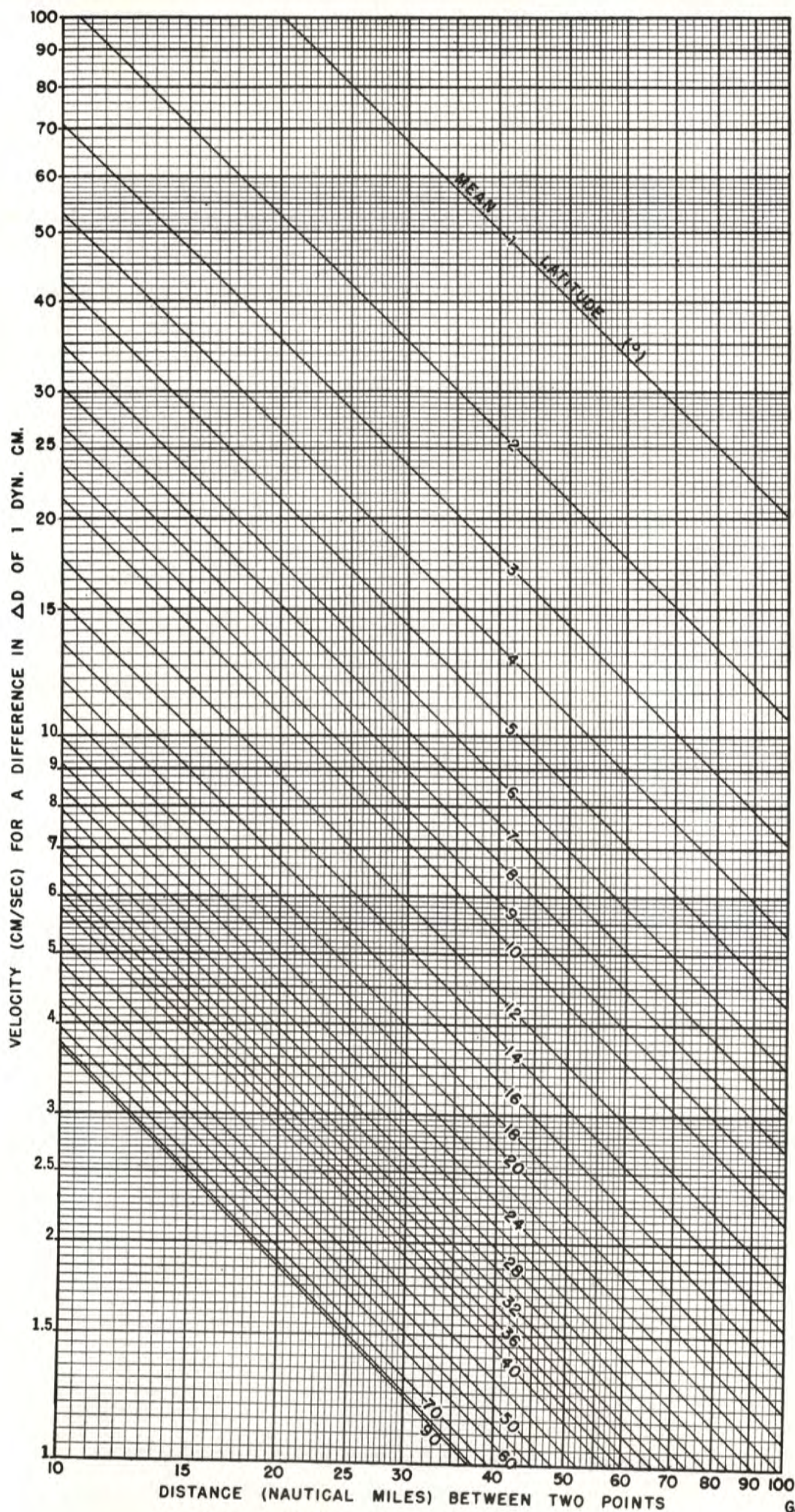
r: rejected value (value seems to be definitely wrong),

u: uncertain value (value may be correct; occasionally it can influence the drawing of the property curve).

#### FORMAT

These data are typed in the format of the University of California Press publication, Oceanic Observations of the Pacific. So that these pages can be used as copy for the 1956 volume, the first page of the Cruise 5607 data is numbered 193; 5608, 204; 5609, 209; 5610, 214; 5611, 217.





VELOCITY OF GEOSTROPHIC FLOW



FIGURES

1. CCOFI Cruise 5608, station positions
2. Horizontal distribution of temperature at 10 meters
3. Horizontal distribution of salinity at 10 meters

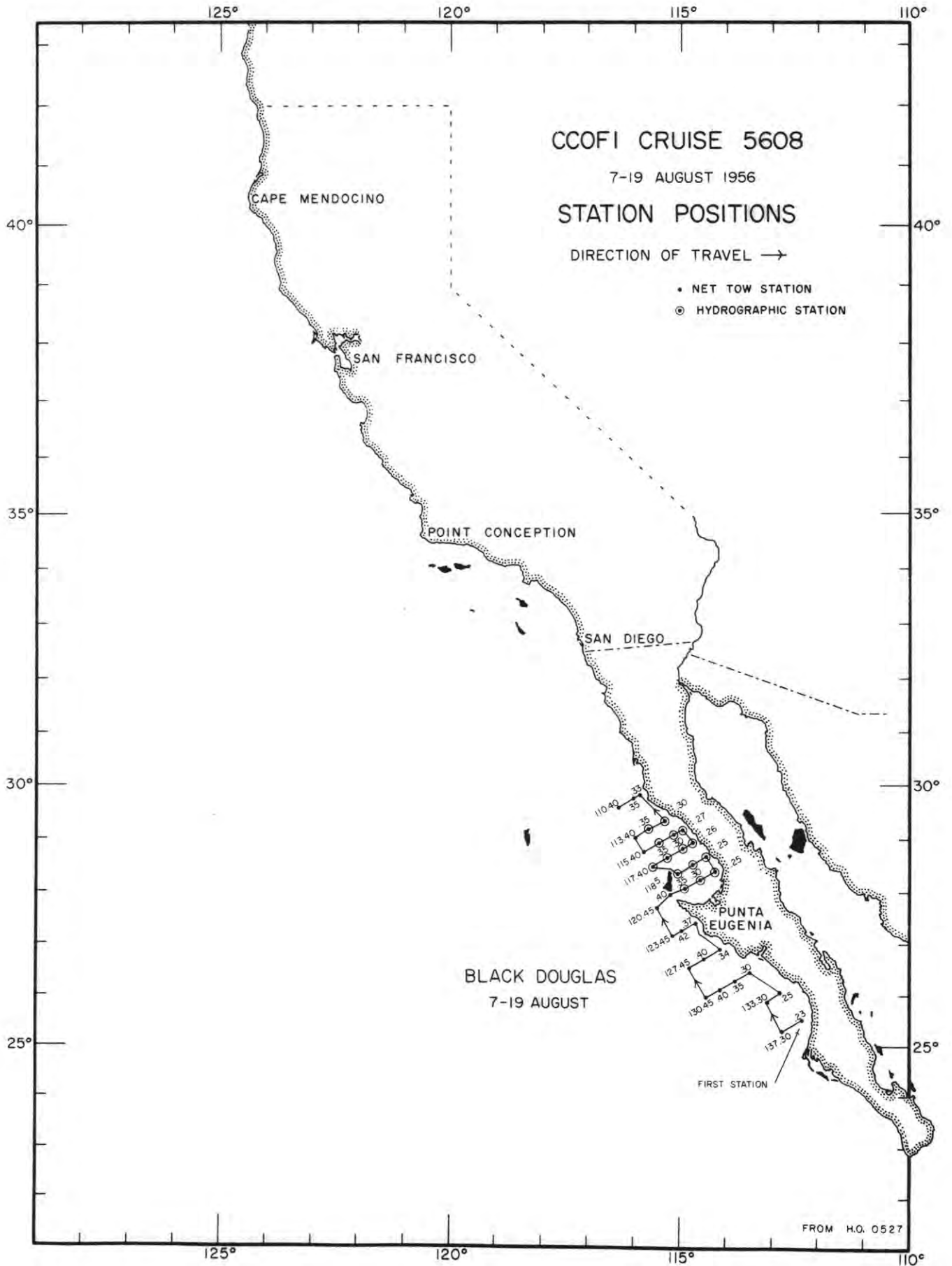


FIGURE 1



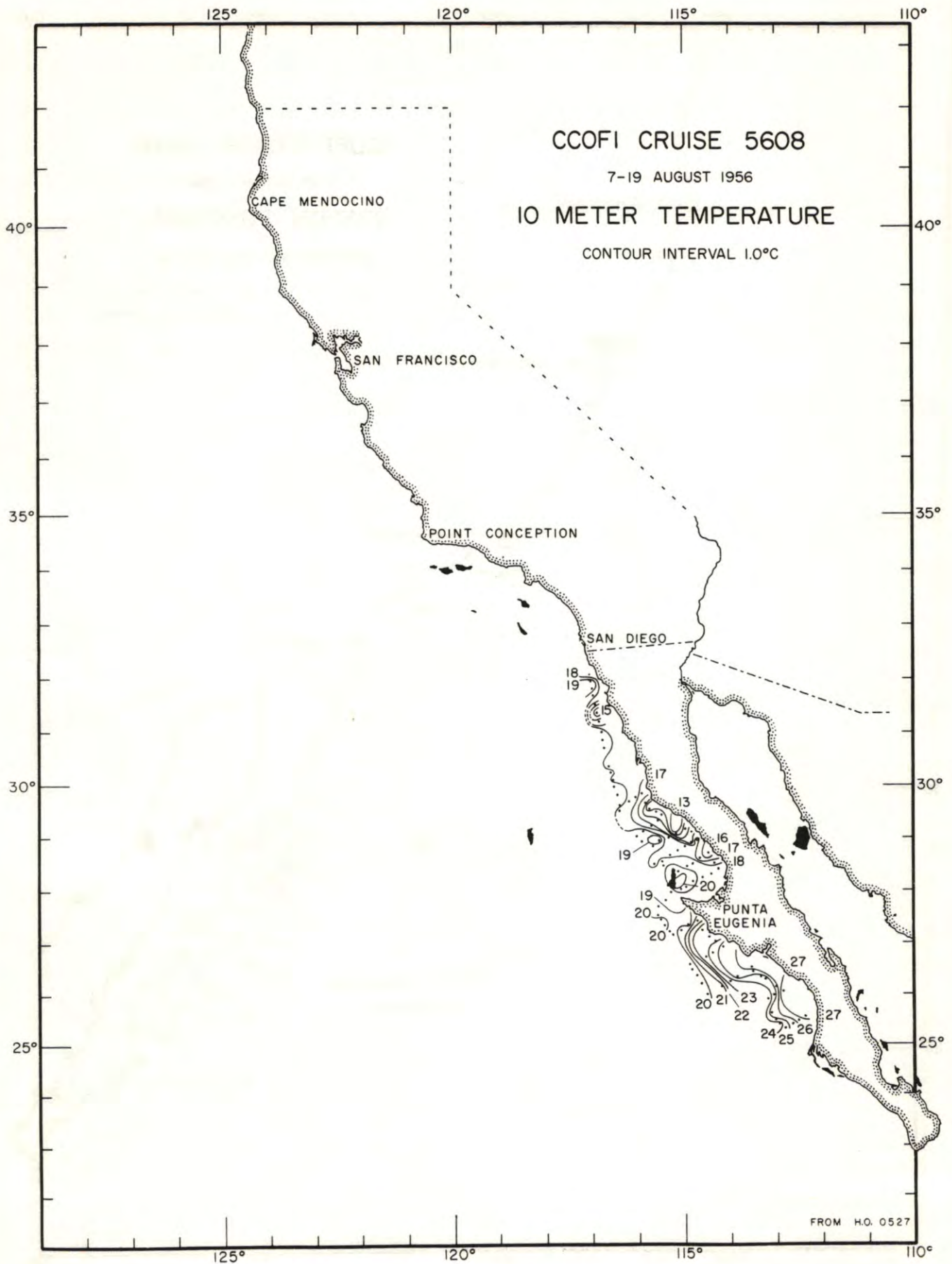


FIGURE 2

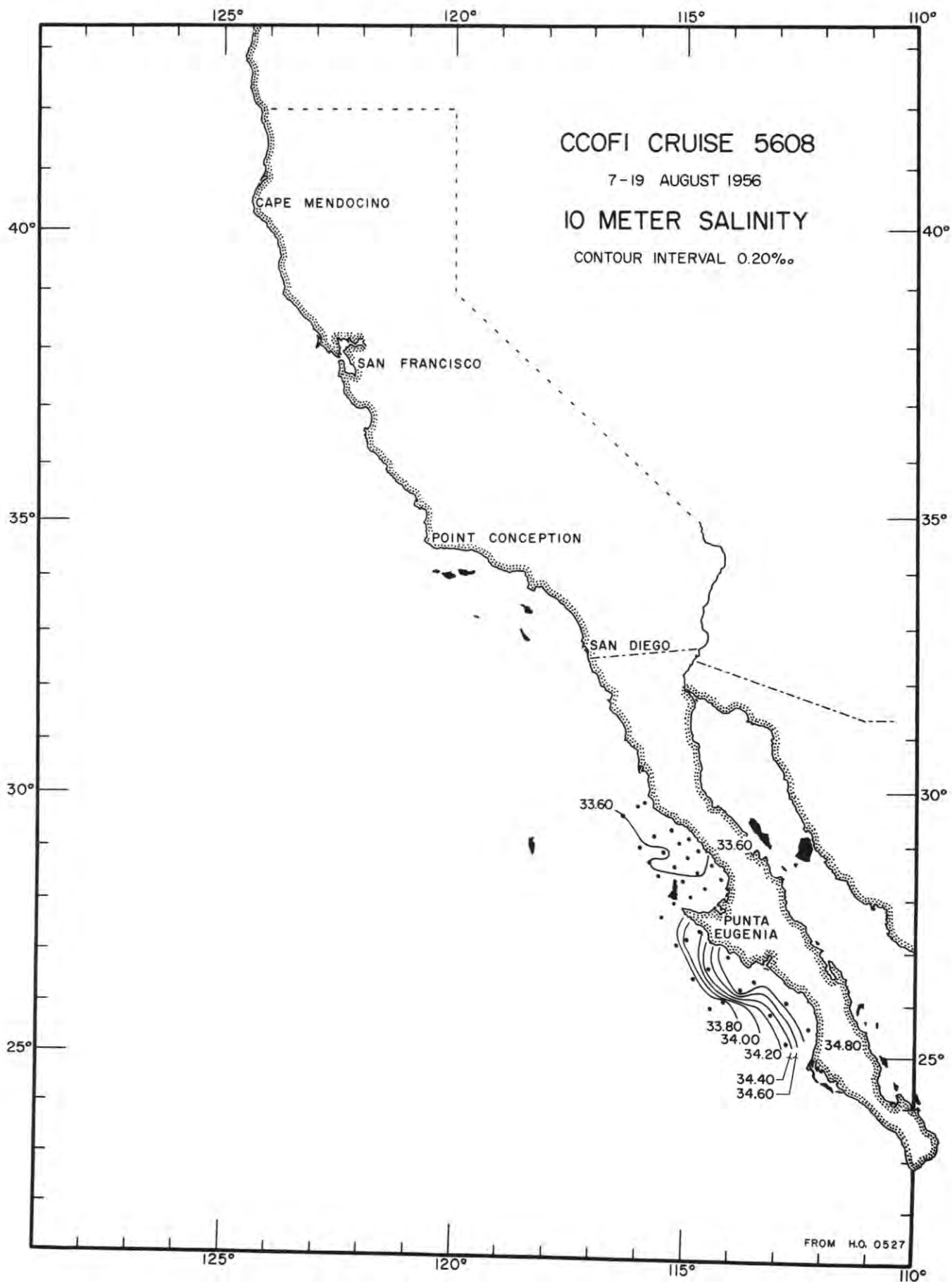


FIGURE 3



PERSONNEL  
Cruise 5608

SHIP'S CAPTAIN

Forster, Charles W., R/V Black Douglas

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

R/V Black Douglas

MacGregor, John S., Marine Fishery Biologist, U. S. Fish and Wildlife  
Service

Taft, Bruce A., Statistician, U. S. Fish and Wildlife Service

SIO

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OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	$\delta T_3$	Z	T	S	O <sub>2</sub>	$\sigma_t$	$\delta T_3$	$\Delta D$
m	°C	‰	ml/L	$10^{-5} \text{ cm}^3/\text{g}$	m	°C	‰	ml/L	g/L	$10^{-5} \text{ cm}^3/\text{g}$	dyn. m

113.30 BLACK DOUGLAS; August 17, 1956; 2250 GCT; 29°22.5'N, 115°17.5'W; sounding, 32 fm; wind, 340°, force 3; weather, partly cloudy; sea, moderate; wire angle, 05°.

0	17.03	33.54		353	0	17.03	33.54		24.41	353	
10	(14.0)a	33.50		(291)	10	(14.0)	33.50		(25.06)	(291)	
30	(12.0)	33.44		(258)	20	(12.7)	33.46		(25.28)	(270)	
50	11.56	33.56		241	30	(12.0)	33.44		(25.41)	(258)	
					50	11.56	33.56		25.59	241	

113.35 BLACK DOUGLAS; August 17, 1956; 1958 GCT; 29°13'N, 115°40'W; sounding, 800 fm; wind, 320°, force 3; weather, overcast; sea, moderate; wire angle, 02°.

0	18.09	33.55		376	0	18.09	33.55		24.17	376	
10	(18.0)	33.53		(378)	10	(18.0)	33.53		(24.15)	(378)	
30	(15.6)	33.51		(319)	20	(17.8)	33.53		(24.22)	(371)	
50	(12.6)	33.30b)		(280)	30	(15.6)	33.51		(24.73)	(323)	
75	(11.6)	33.31		(260)	50	(12.6)	33.30		(25.18)	(280)	
100	10.98	33.56		232	75	(11.6)	33.31		(25.39)	(260)	
					100	10.98	33.56		25.69	232	

115.27 BLACK DOUGLAS; August 17, 1956; 0649 GCT; 29°11'N, 114°55'W; sounding, 43 fm; wind, 280°, force 3; weather, overcast; sea, moderate; wire angle, 08°.

0	17.29	33.55b)		358	0	17.26	33.55		24.36	358	
10	(14.5)	33.55		(298)	10	(14.5)	33.55		(25.00)	(298)	
30	(11.9)	33.47		(254)	20	(12.6)	33.49		(25.33)	(266)	
50	11.29	33.61		234	30	(11.9)	33.47		(25.45)	(254)	
					50	11.29	33.61		25.66	234	

115.30 BLACK DOUGLAS; August 17, 1956; 0820 GCT; 29°05'N, 115°08'W; sounding, 52 fm; wind, 280°, force 3; weather, overcast; sea, moderate; wire angle, 00°.

0	17.77	33.58		367	0	17.77	33.58		24.26	367	
10	(13.0)	33.55		(268)	10	(13.0)	33.55		(25.30)	(268)	
30	(11.2)	33.51		(240)	20	(11.6)	33.51		25.54	245	
50	(10.6)	33.57		(225)	30	(11.2)	33.51		(25.60)	(240)	
75	10.56	33.82b)		206	50	(10.6)	33.57		(25.76)	(225)	
					75	10.56	33.82		25.96	205	

115.35 BLACK DOUGLAS; August 17, 1956; 1125 GCT; 28°55'N, 115°22.5'W; sounding, 580 fm; wind, 320°, force 4; weather, overcast; sea, rough; wire angle, 09°.

0	18.81	33.62		389	0	18.81	33.62		24.03	389	
10	(18.4)	33.62		(380)	10	(18.4)	33.62		(24.12)	(380)	
30	(16.1)	33.57		(330)	20	(18.0)	33.62		(24.22)	(370)	
49	(13.6)	33.51		(282)	30	(16.1)	33.57		(24.65)	(330)	
74	(12.5)	33.44		(269)	50	(13.5)	33.50		(25.16)	(282)	
99	11.68	33.58		242	75	(12.5)	33.44		(25.31)	(268)	
					100	(11.6)	(33.59)		(25.58)	(242)	

- a) The hydrographic casts on this cruise were made with four, five or six Nansen bottles, only two of which contained reversing thermometers. The temperature values for the remaining bottles were obtained from bathythermogram readings although the traces were very wide and much below the usual standards.
- b) Loose bottle cap; value falls on property curve.



OBSERVED					INTERPOLATED				COMPUTED		
Z	T	S	O <sub>2</sub>	$\delta T_3$	Z	T	S	O <sub>2</sub>	$\sigma_t$	$\delta T_3$	$\Delta D$
m	°C	‰	ml/L	$10^{-5}$ cm/g	m	°C	‰	ml/L	g/L	$10^{-5}$ cm/g	dyn. m

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BLACK DOUGLAS; August 17, 1956; 0423 GCT; 28°56'N, 114°41'W; sounding, 40 fm; wind, 320°, force 2; weather, overcast; sea, moderate; wire angle, 00°.

117.26

0	17.65	33.55		366	0	17.65	33.55		24.27	366	
10	(17.4)a	33.55		(360)	10	(17.4)	33.55		(24.33)	(360)	
30	(13.8)	33.48		(290)	20	(15.4)	33.52		(24.77)	(319)	
50	11.71	33.49		250	30	(13.8)	33.48		(25.08)	(289)	
					50	11.71	33.49		25.49	250	

BLACK DOUGLAS; August 17, 1956; 0233 GCT; 28°48'N, 114°56.5'W; sounding, 55 fm; wind, 320°, force 3; weather, overcast; sea, moderate; wire angle, 05°.

117.30

0	18.49	33.61		382	0	18.49	33.61		24.11	382	
10	(18.4)	33.58		(382)	10	(18.4)	33.58		(24.11)	(382)	
30	(11.6)	33.71		(232)	20	(12.4)	33.71		(25.54)	(246)	
50	(10.6)	33.57		(225)	30	(11.6)	33.71		(25.69)	(231)	
75	(10.5)	33.91		(198)	50	(10.6)	33.57		(25.76)	(225)	
100	10.44	33.90		198	75	(10.5)	33.91		(26.04)	(198)	
					100	10.44	33.90		26.04	198	

BLACK DOUGLAS; August 16, 1956; 2346 GCT; 28°38'N, 115°16'W; sounding, 120 fm; wind, 280°, force 3; weather, overcast; sea, very rough; wire angle, 03°.

117.35

0	18.21	33.58		378	0	18.21	33.58		24.15	378	
10	(18.1)	33.58		(374)	10	(18.1)	33.58		(24.19)	(374)	
30	(14.0)	33.55		(288)	20	(17.8)	33.58		(24.26)	(367)	
50	(12.4)	33.42		(267)	30	(14.0)	33.55		(25.10)	(288)	
75	(12.2)	33.55		(254)	50	(12.4)	33.42		(25.32)	(267)	
100	11.64	33.75		230	75	(12.2)	33.55		(25.45)	(254)	
					100	11.64	33.75		25.71	230	

BLACK DOUGLAS; August 16, 1956; 2035 GCT; 28°28'N, 115°35.5'W; sounding, 560 fm; wind, 330°, force 2; weather, overcast; sea, rough; wire angle, 06°.

117.40

0	19.36	33.65		399	0	19.36	33.65		23.92	399	
10	(16.0)	33.61		(326)	10	(16.0)	33.61		(24.70)	(326)	
30	(12.7)	33.46b)		(270)	20	(12.8)	33.46		(25.27)	(271)	
50	(11.4)	33.49		(245)	30	(12.7)	33.46		(25.28)	(270)	
75	(11.3)	33.68		(230)	50	(11.4)	33.49		(25.55)	(245)	
100	11.24	33.93		210	75	(11.3)	33.68		(25.71)	(230)	
					100	11.24	33.93		25.92	210	

BLACK DOUGLAS; August 16, 1956; 1030 GCT; 28°40.5'N, 114°25.5'W; sounding, 45 fm; wind, 300°, force 3; weather, overcast; sea, slight; wire angle, 05°.

118<sup>5</sup>.25

0	18.28	33.62		376	0	18.28	33.62		24.17	376	
10	(15.6)	33.62		(316)	10	(15.6)	33.62		(24.80)	(316)	
30	(12.1)	33.42		(262)	20	(13.2)	33.48		(25.20)	(278)	
50	(11.4)	33.37		(253)	30	(12.1)	33.42		(25.37)	(262)	
75	11.14	33.78		218	50	(11.4)	33.37		(25.46)	(253)	
					75	11.14	33.78		25.82	218	

a) See footnote, page 204.

b) Loose bottle cap; value falls on property curve.

SIO CCOFI 5608	OBSERVED				INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O <sub>2</sub> ml/L	$\delta T_3$ 10 <sup>-5</sup> cm <sup>3</sup> /g	Z m	T °C	S ‰	O <sub>2</sub> ml/L	$\sigma_t$ g/L	$\delta T_3$ 10 <sup>-5</sup> cm <sup>3</sup> /g

118<sup>5</sup>.30 BLACK DOUGLAS; August 16, 1956; 1328 GCT; 28°30.5'N, 114°45.5'W; sounding, 62 fm; wind, 300°, force 3; weather, overcast; sea, moderate; wire angle, 10°.

0	18.18	33.60		375	0	18.18	33.60		24.17	375	
9	(18.1)a)	33.59		(374)	10	(18.1)	33.59		(24.20)	(373)	
30	(13.3)	33.51		(279)	20	(17.5)	33.59		(24.33)	(360)	
48	(12.0)	33.37		(264)	30	(13.3)	33.51		(25.18)	(279)	
73	(11.4)	33.49		(244)	50	(11.9)	33.38		(25.37)	(262)	
101	10.91	33.76		216	75	(11.3)	33.52		(25.59)	(241)	
					100	10.92	33.75		25.85	217	

118<sup>5</sup>.35 BLACK DOUGLAS; August 16, 1956; 1646 GCT; 28°20.5'N, 115°05'W; sounding, 64 fm; wind, 330°, force 3; weather, overcast; sea, moderate; wire angle, 00°.

0	20.42	33.78		417	0	20.42	33.78		23.74	417	
10	(19.6)	33.74		(399)	10	(19.6)	33.74		(23.92)	(399)	
30	(14.0)	33.62		(283)	20	(16.8)	33.67		(24.57)	(338)	
50	(12.6)	33.49		(266)	30	(14.0)	33.62		(25.15)	(283)	
75	(12.0)	33.53		(251)	50	(12.6)	33.49		(25.32)	(266)	
100	11.57	33.68		233	75	(12.0)	33.53		(25.48)	(251)	
					100	11.57	33.68		25.68	233	

120.25 BLACK DOUGLAS; August 16, 1956; 0709 GCT; 28°23'N, 114°14.5'W; sounding, 27 fm; wind, 320°, force 2; weather, overcast; sea, moderate; wire angle, 00°.

0	18.93	33.65		390	0	18.93	33.65		24.02	390	
10	(18.9)	33.62		(391)	10	(18.9)	33.62		(24.01)	(391)	
30	(13.4)	33.52		(280)	20	(13.6)	33.52		(25.15)	(282)	
50	13.34	-		-	30	(13.4)	33.52		(25.17)	(280)	
					50	13.34					

120.30 BLACK DOUGLAS; August 16, 1956; 0435 GCT; 28°13'N, 114°34'W; sounding, 53 fm; wind, 320°, force 2; weather, cloudy; sea, moderate; wire angle, 05°.

0	19.42	33.68		399	0	19.42	33.68		23.92	399	
10	(19.3)	33.67b)		(395)	10	(19.3)	33.67		(23.96)	(395)	
30	(15.0)	33.64		(302)	20	(18.2)	33.66		(24.22)	(371)	
50	(12.0)	33.53		(253)	30	(15.0)	33.64		(24.95)	(302)	
75	11.84	33.69		238	50	(12.0)	33.53		(25.47)	(253)	
					75	11.84	33.69		25.62	238	

120.35 BLACK DOUGLAS; August 16, 1956; 0120 GCT; 28°03'N, 114°54'W; sounding, 47 fm; wind, 360°, force 3; weather, clear; sea, moderate; wire angle, 12°.

0	19.82	33.66		410	0	19.82	33.66		23.80	410	
10	(19.6)	33.66		(405)	10	(19.6)	33.66		(23.86)	(405)	
29	(19.0)	33.66		(392)	20	(19.3)	33.66		(23.94)	(398)	
49	(11.7)	33.67		(236)	30	(19.0)	33.66		(24.02)	(390)	

a) See footnote, page 204.

b) Loose bottle cap; value falls on property curve.



Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
110.33-B	VIII-18	0445	29°50.5'	115°52.0'	58	320°	3	partly cloudy	moderate	16.57	33.48
110.35-B	18	0650	29°46.5'	116°00.0'	700	320°	3	partly cloudy	moderate	17.10	33.52
110.40-B	18	0825	29°36.5'	116°19.5'	1370	260°	2	cloudy	slight	18.65	33.60
113.40-B	17	1715	29°02.0'	115°58.5'	1020	320°	3	overcast	moderate	18.99	33.65
115.40-B	17	1415	28°45.0'	115°47.0'	750	320°	4	overcast	rough	18.63	33.60
120.40-B	15	2250	27°56.5'	115°14.0'	22	280°	5	partly cloudy	rough	18.72	33.70
120.45-B	15	1950	27°40.0'	115°31.0'	1200	330°	4	cloudy	very rough	19.62	33.68
123.37-B	15	0900	27°24.0'	114°39.5'	40	230°	3	clear	slight	21.14	34.18
123.42-B	15	1140	27°14.0'	114°59.5'	900	300°	5	clear	rough	20.41	34.05
123.45-B	15	1320	27°08.0'	115°11.0'	2250	340°	6	partly cloudy	rough	19.98	33.77
127.34-B	15	0240	26°55.5'	114°06.0'	44	300°	4	clear	rough	25.01	34.90
127.40-B	14	2250	26°43.0'	114°29.0'	1800	280°	5	partly cloudy	very rough	23.12a)	34.49
127.45-B	14	2010	26°34.0'	114°48.0'	2000	330°	4	partly cloudy	rough	19.84	33.73
130.30-B	14	0700	26°29.0'	113°29.0'	42	350°	3	clear	rough	26.06	34.86
130.35-B	14	0935	26°19.0'	113°48.5'	180	290°	4	clear	moderate	25.50	34.82
130.40-B	14	1215	26°09.0'	114°07.5'	1200	300°	4	clear	moderate	20.90	33.78
130.45-B	14	1450	25°59.0'	114°25.5'	-	-	-	missing	missing	19.97	33.69

a) Mean value of 23.05 and 23.18°C.

TEMPERATURE AND SALINITY AT 10 METERS (NET-TOW STATIONS)

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Station	Date	Time GCT	Latitude North	Longitude West	Sounding (fm)	Wind		Weather	Sea	10 Meters	
						Dir	Force			T	S
133.25-B	VIII-14	0050	26°04.5'	112°48.0'	45	290°	3	partly cloudy	moderate	27.14	34.92
133.30-B	13	2210	25°54.5'	113°07.5'	108	270°	4	clear	moderate	23.58	34.38
137.23-B	13	0400	25°34.0'	112°18.5'	40	260°	4	clear	moderate	27.48	34.96
137.30-B	13	0805	25°20.0'	112°45.5'	200	310°	3	clear	moderate	24.40	34.29

TEMPERATURE AND SALINITY AT 10 METERS (NET-TOW STATIONS)



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Mr. D. L. Alverson, Chief  
North Pacific Fisheries Exploration and  
Gear Research  
Bureau of Commercial Fisheries  
2725 Montlake Boulevard  
Seattle 2, Washington

Mr. William Anderson  
Bureau of Commercial Fisheries  
Brunswick, Georgia

Mr. William E. Batzler  
Code 2232  
U. S. Navy Electronics Laboratory  
San Diego 52, California

British Joint Services  
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Code 2233  
U. S. Navy Electronics Laboratory  
San Diego 52, California

Mr. Thomas S. Austin  
Bureau of Commercial Fisheries  
Biological Laboratory  
P. O. Box 3830  
Honolulu 12, Hawaii

Dr. Rolf Bolin  
Hopkins Marine Station  
Pacific Grove, California

Librarian  
Bureau of Commercial Fisheries  
Biological Laboratory  
P. O. Box 3830  
Honolulu 12, Hawaii

Dr. Wayne V. Burt  
Assoc. Prof. of Oceanography  
School of Science  
Oregon State College  
Corvallis, Oregon

Mr. Luis R. A. Capurro  
Associate Director  
IGY World Data Center  
Oceanographic Archive  
A. and M. College of Texas  
College Station, Texas

Mr. Harold B. Clemens, Jr.  
Marine Resources Operations  
California State Fisheries Laboratory  
Terminal Island, California



Chief, Division of Fisheries  
Commonwealth Scientific and Industrial  
Research Organization  
P. O. Box 21  
Crunulla, N. S. W., Australia

Mr. R. S. Croker, Director  
California Department of Fish and Game  
Marine Fisheries Laboratory Branch  
772 Capitol Avenue  
Sacramento 14, California

Deutsches Hydrographisches Institut  
Bernhard-Nocht-Str. 78  
Hamburg 4, Germany

Chief  
Division of Biological Research  
Bureau of Commercial Fisheries  
U. S. Department of the Interior  
Washington 25, D. C.

Dr. S. A. El Wardani  
Sciences  
San Jose State College  
San Jose, California

Dr. Richard H. Fleming  
University of Washington  
Oceanographic Laboratories  
Seattle 5, Washington

Prof. James A. Gast  
Division of Natural Resources  
Humboldt State College  
Arcata, California

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Secretario General  
Universidad de Baja California  
Mexicali, B. C.  
México

Dr. G. M. Cresswell  
Department of Earth Sciences  
Stanford Research Institute  
Menlo Park, California

Herrn Professor Dr. A. Defant  
Sternwartestrasse 38  
Innsbruck  
Austria

Dirección General de Pesca é  
Industrias Conexas  
Estación de Biología Marina  
Casa del Marina  
Mazatlán, Sinaloa, México

Mr. Robert L. Eberhardt  
Technology - ASW and Ocean Systems  
Lockheed Aircraft Corporation  
California Division  
Burbank, California

Director of Research  
Fish Commission of Oregon  
Route 1, Box 31A  
Clackamas, Oregon

Dr. Paul M. Fye  
Woods Hole Oceanographic Institution  
Woods Hole, Massachusetts

Dr. Robert H. Gibbs, Jr.  
Department of Biology  
Boston University  
Boston 15, Massachusetts

Mr. C. G. Gunnerson  
Department of Water Resources  
Division of Resources Planning  
P. O. Box 388  
Sacramento 2, California



Hancock Library of Biology and  
Oceanography  
Allan Hancock Foundation  
University of Southern California  
Los Angeles 7, California

Mr. John Hawk  
c/o Seafarers' International Union of  
North America  
450 Harrison Street  
San Francisco 5, California

Mr. T. Hirano  
Tokai Regional Fisheries Research  
Laboratory  
Tsukishima  
Tokyo, Japan

Icthyological Laboratory  
U. S. Fish and Wildlife Service  
U. S. National Museum  
Washington 25, D. C.

Director  
Instituto de Geofísica  
Torre de Ciencias, 3er piso  
Universidad Nacional Autónoma de México  
Villa Obregón, D. F., México

Mr. Alphonse Kemmerich  
Executive Director  
Pacific Marine Fisheries Commission  
741 State Office Building  
1400 S. W. Fifth Avenue  
Portland 1, Oregon

Dr. E. Koto  
Institute of Fisheries  
Hokkaido University  
Hakodate, Japan

Dr. John Lyman  
National Science Foundation  
Washington 25, D. C.

Dr. William J. Hargis, Jr., Director  
Virginia Fisheries Laboratory  
Gloucester Point, Virginia

Dr. Robert W. Hiatt  
University of Hawaii  
Honolulu 12, Hawaii

Mr. Charles J. Hoeppe  
U. S. Department of Commerce  
Coast and Geodetic Survey  
417 South Hill Street, Room 535  
Los Angeles 13, California

Director (2)  
IGY, WDC-A, Oceanography  
Texas A. and M. College  
College Station, Texas

Japan Meteorological Agency  
Oceanographical Section  
Tokyo, Japan

Dr. H. Kitamura  
Oceanographic Section  
Kobe Marine Observatory  
Kobe, Japan

Dr. E. C. LaFond  
Code 2250  
U. S. Navy Electronics Laboratory  
San Diego 52, California

Mr. Joseph Mardesich  
1513 West Fifteenth Street  
San Pedro, California

Mr. John C. Marr  
Bureau of Commercial Fisheries  
Biological Laboratory  
P. O. Box 3830  
Honolulu 12, Hawaii

Dr. Hugh J. McLellan  
Department of Oceanography  
Texas A. and M. College  
College Station, Texas

Dr. R. C. Miller, Director  
California Academy of Science  
Golden Gate Park  
San Francisco 18, California

Mr. John V. Morris  
French Sardine Company  
582 Tuna Street  
Terminal Island, California

Mr. A. W. H. Needler, Director  
Pacific Biological Station  
Nanaimo, B. C.  
Canada

Dr. Robert M. Norris  
Department of Physical Sciences  
University of California  
Santa Barbara Campus  
Goleta, California

Chief of Naval Research  
Office of Naval Research  
Geophysics Branch, Code 416  
Washington 25, D. C.

Dr. E. L. Pickard  
Institute of Oceanography  
University of British Columbia  
Vancouver, B. C.  
Canada

Mr. Jotaro Masuzuwa  
Japan Meteorological Agency  
Oceanographical Section  
Tokyo, Japan

Mr. Arthur H. Mendonca  
c/o R. E. Booth Company, Inc.  
280 Battery Street  
San Francisco 11, California

Librarian  
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and Food  
Fisheries Laboratory  
Lowestoft, Suffolk, England

National Marine Consultants, Inc.  
1500 Chapala Street  
Santa Barbara, California  
Attn: Dr. Richard Kent

Mr. Kenneth S. Norris  
University of California  
Department of Zoology  
Los Angeles 24, California

Director  
Norwegian Polar Institute  
Observatoriegat 1  
Oslo, Norway

Dr. Yngve H. Olsen  
Journal of Marine Research  
Yale University  
New Haven, Connecticut

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Deutscher Wetterdienst Seewetteramt  
Hamburg, Germany



Dr. D. W. Pritchard, Director  
Chesapeake Bay Institute  
The Johns Hopkins University  
121 Maryland Hall  
Baltimore 18, Maryland

Pusan Fisheries College  
Pusan  
Korea

Dr. Gordon A. Riley  
Bingham Oceanographic Foundation  
Yale University  
New Haven, Connecticut

Dr. O. E. Sette, Chief  
Bureau of Commercial Fisheries  
Biological Laboratory  
450-B Jordan Hall  
Stanford, California

Mr. D. Shoji  
Japanese Hydrographic Office  
Tsukiji  
Tokyo, Japan

Mr. W. E. Stewart  
c/o California State Chamber of Commerce  
350 Bush Street  
San Francisco 4, California

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Stanford, California

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Annelida Section  
British Museum (Natural History)  
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Wormley  
Near Godalming  
Surrey, England

Mr. John Radovich  
California Department of Fish and Game  
California State Fisheries Laboratory  
Terminal Island, California

Mr. Don T. Saxby  
California Division  
California Packing Corporation  
2600 Seventh Street  
Berkeley 10, California

Mr. W. T. Shannon, Director  
California Department of Fish and Game  
926 J Street  
Sacramento 14, California

Dr. Reimer Simonsen  
Institut für Meereskunde  
Hohenbergstrasse 2  
Kiel, Germany

Prof. Henry M. Stommel  
Harvard University  
Pierce Hall  
Cambridge 38, Massachusetts

Dr. Y. Takenouti  
Oceanographical Section  
Japan Meteorological Agency  
Chuo-ku  
Tokyo, Japan

Department of Oceanography  
Texas A. and M. College  
College Station, Texas

Mr. A. J. Thomson, Official Secretary  
New South Wales Government Offices  
56, Strand  
London, W. C. 2, England

Dr. M. Uda  
Tokyo University of Fisheries  
Minato-ku  
Tokyo, Japan

U. S. Hydrographic Office (2)  
Navy Department  
Washington 25, D. C.  
Attn: Dr. Boyd E. Olson  
Division of Oceanography

University of California, Berkeley  
Department of Zoology  
Berkeley 4, California

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Oceanographic Laboratories  
Friday Harbor, Washington

Director  
University of Washington  
School of Fisheries  
Seattle 4, Washington

Mr. Richard C. Vetter  
Secretary to the Committee on  
Oceanography  
National Academy of Sciences  
2101 Constitution Avenue  
Washington 25, D. C.

Dr. R. B. Tibby  
Hancock Foundation  
University of Southern California  
University Park  
Los Angeles 7, California

U. S. Fish and Wildlife Service  
Marine Game Fish Research  
c/o University of California  
Department of Zoology  
Los Angeles 24, California

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Publications Office  
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2200 University Avenue  
Berkeley 4, California

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University of Miami  
Marine Laboratory  
Coral Gables, Florida

Librarian (2)  
University of Washington  
Oceanographic Laboratories  
Seattle 5, Washington

Mr. Gilbert C. Van Camp, Sr.  
772 Tuna Street  
Terminal Island, California

Dr. Boyd W. Walker  
University of California  
Department of Zoology  
Los Angeles 24, California



Director  
Washington Biological Laboratory  
Bureau of Commercial Fisheries  
U. S. Fish and Wildlife Service  
Washington 25, D. C.

Dr. Warren S. Wooster  
Office of Oceanography  
UNESCO  
Place de Fontenoy  
Paris 7<sup>e</sup>, France

Inter-American Tropical Tuna Commission  
(c/o Scripps Institution of Oceanography)

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Scripps Institution of Oceanography

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Dr. M. Pat Wennekens  
Oceanic Research Division  
(Code 508)  
Naval Ordnance Test Station  
China Lake, California

Dr. Kozo Yoshida  
Geophysical Institute  
Tokyo University  
Bunkyo-ku  
Tokyo, Japan

U. S. Bureau of Commercial Fisheries  
(c/o Scripps Institution of Oceanography)

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