4979

Diag. Cht. No. 5530-4 & 5402-2

Form 504
Ed. June, 1928

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
R.S. Patton, *Director*

State: California

DESCRIPTIVE REPORT

~~*Topographic*~~
Hydrographic } *Sheet No.* 8 4979

LOCALITY

Approaches to San Francisco Bay

Golden Gate to Pt. Reyes

1929.

CHIEF OF PARTY

O.W. Swainson

U. S. GOVERNMENT PRINTING OFFICE: 1925

4979

Form 537
11—5812

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 4979

HYDROGRAPHIC TITLE SHEET

The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field No. 8

REGISTER NO. 4979

State California.

General locality ~~Northern California Coast.~~ Approaches to San Francisco Bay

Locality Golden Gate to Pt Reyes ~~Head.~~

Scale 1:40,000 Date of survey June 20 - Sept. 26, 1929

Vessel PIONEER & MIANUS.

Chief of Party O. W. Swainson.

Surveyed by O. W. Swainson.

Protracted by R. A. Gilmore.

Soundings penciled by R. A. Gilmore.

Soundings in fathoms ~~feet~~

Plane of reference Mean Lower Low Water.

Subdivision of wire dragged areas by

Inked by J. FLEMING Oct - 1930

Verified by J. F.

Instructions dated April 9, 1929

Remarks:

GPO

D E S C R I P T I V E R E P O R T

TO ACCOMPANY HYDROGRAPHIC SHEET NO. 8 4979

SHIP HYDROGRAPHY COAST OF CALIFORNIA

GULF OF THE FARALLONES

1929

U.S.C. & G.S.S. PIONEER

O. W. SWAINSON COMMANDING

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SHEET NO. 8.

The work on this sheet was done by the party on the ship PIONEER in accordance with instructions dated April 9, 1929.

The scale of the sheet is 1:40,000. The sheet extends from the inshore hydrography at Pt. Reyes southward to latitude 37° 42' N. which is just south of the San Francisco Lightship, and westward to a junction with sheets 7 and 10.

Visual fix control was used for the entire sheet. Some difficulty was encountered in fixing the positions on the outer portion of the sheet due to 'jumping' of the line when the fix was changed from shore signals to the Farallon Islands. This is thought to be due mainly to the great distance of the signals.

Some conspicuous hills and natural objects were cut in by sextant angles for hydrographic signals. These proved of great assistance.

Another source of difficulty was the scarcity of sufficient visibility to see the signals.

SALINITY AND TEMPERATURES

A special report is written on the salinities and temperatures taken.

JUNCTION WITH OTHER SHEETS

From the junction with the inshore hydrography it appears that the theoretical correction for the fathometer under 18 fathoms is in error. Fathometer soundings between 18 and 15 seemed to be about 1/2 fathom too small, 15 to 14 was one too small, in less depths 1 1/2 to 2 fathoms. This discrepancy is partially due to swell of the sea and

a tendency of the hand leadsman to read too deep, and of the fathometer reader too small in order to be on the safe side.

The following is a list of soundings at sheet junctions that appear to be doubtful.

The list of soundings actually rejected is contained in Page 2 of Cartographers report - H-4979.

Soundings from position 15A to 16 A Retained
" " " 13A - four 19 fms. Retained
" " " 18E - 18, 17, 17. Retained
" " " 48H - 18, 20, 20. see list of rejections cartographers report P. #2
" " " 63H - 64H
" " " 65H - 66H
" " " 73H - 74H
" " " 75H - 76H
" " " 80H - 82H
" " " 83H - 85H

SEE NOTE IN BLUE

Fathometer reading 1 fm. too small around 20 fm. as evidenced by comparison on P. 34 Vol. 3. By direction of Chiefs of F.R. and F.W sections and as recommended by C. of Party in D.R., One fms. has been added to all soundings less than 21 fms on H-Day.

" " " 96H - 19, 19.
" " " 99H - 100H
" " " 111M - 112M Retained
" " " 9R - 15, 15, 16. See Cartographers Report Page 2
" " " 46R - 14, 14. Retained
" " " 48R - 49R Retained
" " " 63S - 11, 12. Retained
" " " 65S - 66S Retained
" " " 85S - 13, 14, 14. Retained
" " " 104S - 14, 14, 13. Retained
" " " 124S - 14, 14, 14, Retained
" " " 137S - 14, 14. Retained
" " " 139S - 14, 14. Retained
" " " 12U - 14U.
" " " 40U - 15, 16.
" " " 42U - 15, 16.

see Cartographers report
See note at Pos. 36 which shows Fathometer not working well.

" " " ~~13V - 15V~~
" " " ~~38V - 39V~~
" " " 164T - 166T see cartographers report Page #2
" " " 69V - 70V " " " "
" " " 164D - 166D " " " "
" " " 94U - 95U " " " "
" " " 71V - 72V retained
" " " 88V - 89V see Page 2 - Cartographers report
" " " 90V - 91V Retained
" " " 107V - 111V See Cartographers report
" " " 124V - 128V retain
" " " 142V - 145V retained
" " " 158V - 161V retained
" " " 1X - 5X See Cartographers report (list on Page 3)
" " " 78K - 32
" " " 63K - 31

Related to H-5013 (Retained)

above 2 dgs. should be rejected o w S

STATISTICS - HYDROGRAPHIC

SHEET NO. VIII.

Date	Day Letter	Sndg. Vol.	Bomb Pos.	Visual Pos.	Statute Miles	F. R.	Lead Line	Boat
June 20	A	1		23	11.6	146		PIONEER
21	B	1		86	63.6	595		"
July 11	C	1		71	32.0	285		"
12	D	1 & 2		170	122.4	703		"
15	E	2		79	41.5	432		"
16	F	2		93	53.0	420		"
19	G	2 & 3		64	52.5	439		"
23	H	3		112	80.0	620		"
24	J	3		67	52.0	338		"
25	K	3		126	106.0	433		"
Aug. 2	L	4		16	5.0	78		"
Sept. 6	M	4		16	5.0	51		"
24	N	4		31	15.0	117		"
25	P	4	10	94	55.1	334		"
26	Q	4	1	63	10.5	220		"
Oct. 9	R	4 & 5		142	81.0	619		"
10	S	5		175	105.8	968		"
11	T	5 & 6	12	156	94.0	888		"
21	U	6		102	55.0	603		"
22	V	6 & 7		180	103.0	810	42	"
29	W	7	2	108	75.5	717		"
30	X	7	7	168	107.0	920		"
Sept. 23	a	8		72	12.4		243	MIANUS
26	b	8		22	4.0		71	"
Totals			32	2128	1342.9	10736	356	

SOUNDING CORRECTIONS

The tables in the hydrographic manual for reducing the fathometer and sonic soundings could not be used by themselves. They do not take into account the difference in base line between the oscillator and microphones from that for which the fathometer was built, nor do they apply the index correction of the machine.

Detailed graphs were drawn and a final simple table arrived at with which soundings could be readily corrected. The description of the derivation of the table is as follows:-

CORRECTIONS TO FATHOMETER SOUNDINGS.

For the purpose of correcting fathometer soundings for temperature, salinity of water, length of hydrophone and oscillator base, etc., the following curves have been constructed and tables computed. The various factors have been combined into one correction curve for application, algebraically, as one correction to soundings under 100 fathoms. For soundings above 100 fathoms, a separate table has been compiled. Separate reducers for slope of bottom and tide will have to be applied.

Graph No. 1 is obtained by plotting as ordinates the values of the water temperatures taken at various times during the season and the depths as abscissae. From this curve table "A" is derived. The average temperatures of this table were obtained by scaling from the curve temperatures at each two fathom point and taking means of these values for desired depths. These means give the average temperature of the water through which the sound wave passes. These means are plotted on graph No. 2 to show the mean temperature of the water through which the sound wave passes for given depths.

Before plotting graphs 1 and 2 a study of temperatures was made to see if there was a very great variation due to locality and season of the year. Finally, the means of all temperatures for the season were used, because the variation was small. This can be seen by inspection of graph No. 3 and table "C". Graph No. 3 shows the variation of temperatures for different months at the surface, ten, twenty, and 30 fathoms, and table "C" shows the variation for latitude at a depth of ten fathoms.

Graph No. 4 is a representation of factors, by which fathometer

soundings must be multiplied to get corrections to the observed depths for temperature and salinity. These factors are obtained from table 4b, page 159 of the Hydrographic Manual for a dial speed of 246 r.p.m. and an assumed velocity of 820 fathoms per second. The average field value of 34.0 for salinity was used. On graph No. 4 are indicated the limiting temperatures to which factors to the nearest 0.001 are applicable. These limiting temperatures are indicated on graph No. 2 and the applicable factors shown by appropriate brackets. From this graph table "B" is then derived, showing temperatures and salinity factors to the nearest 0.001, in terms of depth, i.e., factors by which observed soundings must be multiplied to obtain corrections.

Graphs Nos. 5 and 6 represent the corrections in fathoms to be applied to the observed soundings because of the fact that the oscillator and hydrophones are quite a distance apart. When the oscillator sends out a sound wave it travels to the bottom and is reflected back to the hydrophone over the opposite sides of an isosceles triangle, with the distance between the oscillator and hydrophone as its base, and the true depth of water as its altitude. This triangle must therefore be computed for the lengths of its sides from which the corrections may be obtained. The fathometer on the Pioneer has its dial graduated so as to correct automatically the readings for a base line of twenty-four feet between the oscillator and hydrophone. Additional base line corrections must be applied, however, because hydrophone No. 1 is 93 feet from the oscillator and Nos. 2 and 3 are 69.4 feet from the oscillator. In table No. 5 column one shows the true depth below the water surface, column two the depth that would be measured by the fathometer for a base of 93 feet between oscillator and hydrophone if the dial had equal graduations; column 3 gives the dial corrections for a 24 foot base; and column 4, which is the difference of 2 and 3

gives the corrected fathometer depth. Column 5 gives the total base line corrections and is obtained by subtracting column 1 from column 4.

The draught scale on the fathometer was set at 16 feet during the entire season with the exception of October 21st to 28th, when something apparently caused it to slip back some.

To make the factors of table "B" usable as decrements and also to combine such decrements with corrections for base line, table "D" is drawn up. Table "D" is derived from graphs Nos. 5 and 6 for sonic hydrophone No. 1 and magazine hydrophones Nos. 2 and 3 respectively, and from table "B"; the corrections here being combined into single quantities in terms of fathoms, to be algebraically applied to observed soundings.

The values from the total column of table "D" are then graphically represented on graph No. 7 for the respective hydrophones. From this graph table "E" is derived, giving corrections to the nearest tenth of a fathom with the limiting depths to which applicable.

The values of table "E" are used in tables "F" and "G", the fathometer soundings being here corrected for temperature, salinity and base line, and compared with the vertical casts. From this an average value of differences between the corrected fathometer soundings and vertical casts is obtained for the hydrophones. These differences, which can be called Index Correction, represent an average value by which all hydrophone soundings must be corrected, and this average value combined with the values of column two of table "E" gives the values of column four of table "E", which values are to be used for the reduction of soundings in the Sounding Records.

For depths above 100 fathoms table "H" has been prepared in a

manner similar to that on page 119 of the Hydrographic Manual. It differs from the latter, however, by the application of the Index Corrections for the hydrophone. These Index Corrections were obtained from tables "F" and "G".

TABLE C.

Temperatures

Depth 10 Fathoms.

Latitude 37 - (20 to 30)

October	24	13.5
	25	12.2
November	4	11.5
	5	11.4
	8	11.8
October	23	14.0
		74.4

Mean - 12.40.

Latitude 37 - (30 to 40)

August	14	10.5
	15	11.0
	16	12.2
	20	12.0
September	18	13.0
	20	12.0
October	3	11.7
		82.4

Mean - 11.77

Latitude 37 - (40 to 50)

August	2	16.0
	5	11.0
	9	11.5
	20	12.0
	27	12.5
	28	10.5
September	4	14.1
	5	13.9
	17	12.7
	30	12.8
October	2	10.9
	24	11.5
		149.4

Mean - 12.45

Latitude 37 - (50 +)

August	8	11.0
	10	12.0
	22	10.0
	23	11.0
	29	12.0
	30	11.0
September	24	11.0
	"	12.0
	25	10.9
		100.9

Mean - 11.21.

TABULATION OF COMPARISONS
OF
PATHOMETER READINGS
WITH
VERTICAL CASTS

SHEET #7. TABLE 1.

Date	Day	Depth Vert. Cast	Depth Hyd. #1	Depth Hyd. #2	Depth Hyd. #3
Aug. 1	D	28.5	26.5		
1	D	27.5	26.0		
Sept. 27	K	39.0	37.5		
Oct. 4	L	20.0	19.5	20.0	
4	L	29.4	28.5		
4	L	30.0	28.5		
4	L	30.5	29.0		
4	L	30.5	29.5		
4	L	30.5	29.0		
4	L	30.0	28.5		
15	M	33.4	31.5	32.5	
31	N	31.6	30.8		
SHEET #8					
June 20	A	21.0	19.0	21.0	21.0
21	B	20.7	22.0	20.0	20.5
21	B	21.5	21.5	22.5	23.0
21	B	31.4	31.5		
July 11	C	42.9	39.5	42.5	
11	C	32.0	28.5	31.5	
12	D	19.6		19.5	19.0
12	D	21.4	19.0	21.0	21.0
15	E	16.0	15.6	16.2	
16	F	31.5	29.0	32.5	
16	F	31.5	29.0	32.0	
19	G	27.5	27.0		
19	G	28.0	26.5	28.8	
19	G	32.9	31.2	34.0	
23	H	22.7	21.0	22.5	
24	J	31.0	29.0	31.0	
25	K	27.0	25.7	28.5	
25	K	25.6	24.5	27.0	
Oct. 9	R	16.8	16.2		
10	S	21.6	20.9		
10	S	20.7	19.9		
10	S	14.0	15.0	14.5	
11	T	15.9	14.9	16.0	
11	T	30.0	29.0	30.0	
21	U	14.3	15.0		
21	U	26.5	26.5		
22	V	20.0	20.5		
22	V	14.9	16.5		
22	V	14.3	15.5		

TABULATION OF COMPARISONS CONTINUED

SHEET #8. Date		Day	Depth V.C.	Depth Hyd. #1	Depth Hyd. #2.	Depth Hyd #3.
Oct.	22	V	25.0	25.5		
	29	W	21.9	21.0		
	30	X	12.5	12.5	12.5	
	30	X	15.1	14.5		
	SHEET NO. 10.					
July	17	D	53.6	50.5	54.5	
	18	E	40.1	39.5	41.5	
	23	G	46.5	45.0	46.0	
	24	H	48.1	46.0	48.0	
	24	H	46.5	44.5	46.0	
	25	J	43.0	41.0	42.5	
	31	K	42.5	41.0	42.8	
	31	K	42.2		42.5	
Aug.	5	L	33.8	31.0		
	5	L	33.8	31.0		
	6	M	41.0	39.5		
	7	N	51.5	50.0		
	8	O	53.4	51.2		
	9	Q	77.0	77.0		
	9	Q	48.4	47.0	49.0	
	14	R	58.7	57.0		
	15	S	49.3	47.1		
	16	T	59.0	57.0		
	20	U	33.1	31.0		
	20	U	52.6	50.0		
	21	V	52.0	50.0	51.5	52.5
	22	W	58.5	57.0		
	22	W	34.6	33.0		
	23	X	40.6	38.9		
	27	Y	58.9	57.0		
	28	Z	85.6	84.5		
	28	Z	54.9	53.5		
	29	AA	53.4	52.0		
	29	AA	52.0	49.5		
	29	AA	51.5	49.0		
	30	BB	49.8	48.5		
Sept.	4	CC	67.3	65.5		
	5	DD	62.9	61.0	60.5	
	17	EE	38.3	36.0		
	18	FF	31.0	28.5		
	20	GH	29.5	27.9	29.5	
	20	HH	27.6	26.5	28.0	
	23	JJ	32.7	31.5	32.5	
	24	KK	42.1	40.3		
	24	KK	51.2	48.5		
	24	KK	49.0	49.2		
	25	LL	50.7	49.0		
	30	MM	48.4	46.3		
	30	MM	55.0	52.3	55.5	
Oct.	2	NN	35.5	32.5	34.0	
	14	PP	29.1	28.5		

TABULATION OF COMPARISONS CONTINUED

	Date	Day	Depth Vert. Cast	Depth Hyd. #1	
Oct.	1	A	210	210	White Light (Johnson)
	1	A		205	White Light (Nelson)
	1	A		215	White Light (Hoell)
	25	C	38.5	36.0	
Nov.	1	D	36.5	36.5	
	4	E	36.9	33.8	
	4	E	34.5	33.2	
	5	F	37.6	36.2	
	8	G	37.2	36.0	
	18	H	33.1	32.5	
	18	H	32.0	30.5	
	19	J	42.2	40.5	
	20	K	46.2	45.0	
	21	L	51.6	51.5	

FATHOMETER INDEX CORRECTION - TABLE 'F' .

HYDROPHONE NO. 1.

Date		Sounding	Corr.	Corr. Sndg.	Vert. Cast	Index Corr.
June	20	19.0	-1.5	17.5	21.0	3.5
	21	22.0	1.3	20.7	20.7	0.0
	21	21.5	1.3	20.2	21.5	1.3
	21	31.5	0.9	30.6	31.4	0.8
July	11	39.5	0.8	38.7	42.9	4.2
	11	28.5	1.0	27.5	32.0	4.5
	12	19.0	1.3	17.7	21.4	3.7
	15	15.6	1.9	13.7	16.0	2.3
	15	29.0	0.9	28.1	31.5	3.4
	16	29.0	0.9	28.1	31.5	3.4
	17	50.5	0.6	49.9	53.6	3.7
18	18	39.5	0.8	38.7	40.1	1.4
19	19	27.0	1.1	25.9	27.5	1.6
	19	26.5	1.0	25.5	28.0	2.5
	19	31.2	0.9	29.3	32.9	3.6
	23	21.0	1.3	20.7	22.7	2.0
	23	45.0	0.7	44.3	46.3	2.0
	24	46.0	0.8	45.2	48.1	2.9
	24	44.5	0.7	43.8	46.5	2.7
	24	29.0	0.9	28.1	31.0	2.9
	25	25.7	1.1	24.6	27.0	2.4
	25	24.5	1.1	23.4	25.6	2.2
	25	41.0	0.7	40.3	43.0	2.7
	31	41.0	0.7	40.3	42.5	2.2
Aug.	1	26.5	1.0	25.5	28.5	3.0
	1	26.0	1.1	24.9	27.5	2.6
	5	31.0	0.9	30.1	33.8	3.7
	5	31.0	0.9	30.1	33.8	3.7
	6	39.5	0.7	38.8	41.0	2.2
	7	50.0	0.6	49.4	51.5	2.1
	8	51.2	0.6	50.6	53.4	2.8
	9	77.0	0.6	76.4	77.0	0.6
	9	47.0	0.7	46.3	48.4	2.1
	14	57.0	0.6	56.4	58.7	2.3
	15	47.1	0.7	46.4	49.3	2.9
	16	57.0	0.6	56.4	59.0	2.6
	20	31.0	0.9	30.1	33.1	3.0
	20	50.0	0.6	49.4	52.6	3.2
	21	50.0	0.6	49.4	52.0	2.6
	22	37.0	0.8	36.2	38.5	2.3
	22	33.0	0.9	32.1	34.6	2.5
	23	38.9	0.8	38.1	40.6	2.5
	27	57.0	0.6	56.4	58.9	2.5
	28	84.5	0.6	83.9	85.6	1.7
	28	53.5	0.6	52.9	54.9	2.0
	29	52.0	0.6	51.4	53.4	2.0
	29	49.5	0.6	48.9	52.0	3.1
	29	49.0	0.6	48.4	51.5	3.1
	30	48.5	0.7	47.8	49.8	2.0

(CONTINUATION)

FATHOMETER INDEX CORRECTION - TABLE 'F'.

HYDROPHONE NO. 1.

Date	Sounding	Corr.	Corr. Sndg	Vert. East	Index Corr.	
Sept. 4	65.5	0.6	64.9	67.3	2.4	
5	61.0	0.6	60.4	62.9	2.5	
17	36.0	0.8	35.2	38.3	3.1	
18	28.5	0.9	27.6	31.0	3.4	
20	27.9	1.0	26.9	29.5	2.6	
20	26.5	1.1	25.4	27.6	2.2	
23	31.5	0.9	30.6	32.7	2.1	
24	40.3	0.7	39.6	42.1	2.5	
24	48.5	0.6	47.9	51.2	3.3	
24	49.2	0.7	48.5	49.0	0.5	
25	49.0	0.6	48.4	50.7	2.3	
27	37.5	0.8	36.7	39.0	2.3	
30	46.3	0.7	45.6	48.4	2.8	
30	52.3	0.6	51.7	55.0	3.3	
Oct. 1	21.0	1.3	19.7	21.0	1.3	
2	32.5	0.9	31.6	35.5	3.9	
4	19.5	1.5	18.0	20.0	2.0	
4	28.5	1.0	27.5	29.4	1.9	
4	28.5	1.0	27.5	30.0	2.5	
4	29.0	1.0	28.0	30.5	2.5	
4	29.5	1.0	28.5	30.5	2.0	
4	29.0	1.0	28.0	30.5	2.5	
4	28.5	1.0	27.5	30.0	2.5	
9	16.2	1.8	14.4	16.8	2.4	
10	20.9	1.3	19.6	21.6	2.0	
10	19.9	1.5	18.4	20.7	2.3	
10	15.0	2.2	12.8	14.0	1.2	
11	14.9	1.9	13.0	15.9	2.9	
11	29.0	1.0	28.0	30.0	2.0	
14	28.5	1.0	27.5	29.1	1.6	
15	31.5	0.9	30.6	33.4	2.8	
21	15.0	2.2	12.8	14.3	1.5)	
21	26.5	1.1	25.4	26.5	1.1)	Not added-
22	20.5	1.5	19.0	20.0	1.0)	draft scale
22	16.5	2.0	14.5	14.9	0.4)	slipped.
22	15.5	2.0	13.5	14.3	0.8)	
22	25.5	1.1	24.4	26.0	0.6)	
24	21.5	1.3	20.2	22.4	2.2	
25	36.8	0.8	36.0	38.5	2.5*	(Draft scale chan
29	21.0	1.3	19.7	21.9	2.2	(back to 13 feet.
30	12.5	2.6	9.9	12.5	2.6	
30	31.8	0.9	30.9	32.4	1.5	
31	30.8	0.9	29.9	31.6	1.7	
Nov. 1	36.5	0.8	35.7	36.5	1.2	
4	36.8	0.8	36.0	38.9	1.9	
4	33.2	0.9	32.3	34.5	2.2	
5	36.2	0.8	35.4	37.6	2.2	
8	36.0	0.8	35.2	37.2	2.0	

(CONTINUATION)

FATHOMETER INDEX CORRECTION - TABLE 'F'.

HYDROPHONE NO. 1.

	Date	Sounding	Corr.	Corr. Sndg.	Vert. Cast	Index Correction.
Nov.	18	32.5	0.9	31.6	33.1	1.5
	18	30.5	0.9	29 .6	32.0	2.4
	19	40.5	0.7	39.8	42.2	2.4
	20	45.0	0.7	44.3	46.2	1.9
	21	51.5	0.6	49.9	51.6	1.7
					MEAN - -	2.42

TABLE 'G' - HYDROPHONE NO. 2.

June	20	21.0	0.7	20.3	21.0	0.7
	21	20.0	0.7	19,3	20.7	1.4
	21	22.5	0.7	21.8	21.5	0.3
July	11	42.5	0.4	42.1	42.9	0.8
	11	31.5	0.5	31 .0	32.0	1.0
	12	19.5	0.8	18.7	19.6	0.9
	12	21.0	0.7	20.3	21.4	1.1
	15	16.2	0.9	15.3	16.0	0.7
	16	32.5	0.5	32.0	31.5	0.5
	16	32.0	0.5	31.5	31.5	0.0
	17	54.5	0.4	54.1	53.6	0.5
	18	41.5	0.5	41.0	40.1	0.9
	19	28.8	0.6	28.2	28.0	0.2
	19	34.0	0.5	33.5	32.9	0.6
	23	22.5	0.7	21.8	22.7	0.9
	24	31.0	0.5	30.5	31.0	0.5
	23	46.0	0.4	45.6	46.3	0.7
	24	48.0	0.4	47.6	48.1	0.5
	24	46.0	0.4	45.6	46.5	0.9
	25	42.5	0.4	42.1	43.0	0.9
	25	28.5	0.6	27.9	27.0	0.9
	25	27.0	0.6	26.4	25.6	0.8
	31	42.8	0.5	42.3	42.5	0.2
	31	42.5	0.5	42.0	42.2	0.2
Aug.	9	49.0	0.4	48.6	48.4	0.2
	21	51.5	0.4	51.1	52.0	0.9
Sept.	5	60.5	0.4	60.1	62.9	2.8
	20	29.5	0.5	29.0	29.5	0.5
	20	28.0	0.6	27.4	27.6	0.2
	23	32.3	0.5	31.8	32.7	0.9
	30	55.5	0.4	55.1	55.0	0.1
Oct.	2	34.0	0.5	33.5	35.5	2.0
	4	20.0	0.8	19.2	20.0	0.8
	10	14.5	1.0	13 .5	14.0	0.5
	11	16.0	0.9	15.1	15.9	0.8
	11	30.0	0.5	29.5	30.0	0.5
	15	32.5	0.5	32.0	33.1	0.4
	30	13.0	1.1	11.9	12.5	0.6
					MEAN - -	.47

TABLE H. FATHOMETER CORRECTIONS FOR DEPTHS OVER 100 FATHOMS

Depth in Fms.	Temp.	Vel. per Second	Adiabatic correction per sec.	Corr. vel. per second	Mn. vel. per sec.	Depth range	Factor	Factor x depth	I. C. Hyd. # 1	Corr. Hyd. #1. Fms.	I. C. Hyds. 2 & 3	Corr. Hyd. 2 & 3. Fms.
100	9.94	813	+ 1	814	814							
300	5.41	807	+ 1	808	811	200-400	-.011	-3.3	+2.4	-0.9	+0.5	-2.8
500	4.00	807	+ 1	808	810	400-600	-.012	-6.0	+2.4	-3.6	+0.5	-5.5
700	3.47*	810	+ 1	811	810	600-800	-.012	-8.4	+2.4	-6.0	+0.5	-7.9
900	3.22*	815	+ 1	814	811	800-1000	-.011	-9.9	+2.4	-7.5	+0.5	-9.4
1100	3.02*	816	+ 1	817	812	1000-1200	-.010	-11.0	+2.4	-8.6	+0.5	-10.5
1300	2.84*	818	+ 1	819	815	1200-1400	-.008	-10.4	+2.4	-8.0	+0.5	-9.9
1500	2.67*	822	+ 2	824	814	1400-1600	-.007	-10.5	+2.4	-8.0	+0.5	-10.0
1700	2.5	824	+ 2	826	816	1600-1850	-.005	-8.5	+2.4	-6.1	+0.5	-8.0

*From graph No. 7. 8

Salinity - 34.0. Velocity 820.

Salinity 34.0 SONIC FACTORS. Velocity 800.

Depth in Fms.	Temp. °C	Vel. per second	Adiabatic corr. per second.	Corrected vel. per second.	Mean vel. per sec.	Depth range	Factor	Correction.
100	9.94	813	+ 1	814	814	50-200	+0.017	+ 13.8
300	5.41	807	+ 1	808	811	200-400	+0.014	+ 4.2
500	4.00	807	+ 1	808	810	400-600	+0.012	+ 9.0
700	3.47*	810	+ 1	811	810	600-800	+0.012	+ 9.4
900	3.22*	813	+ 1	814	811	800-1000	+0.014	+ 12.6
1100	3.02*	816	+ 1	817	812	1000-1200	+0.015	+ 16.5
1300	2.84*	818	+ 1	819	813	1200-1400	+0.016	+ 20.8
1500	2.67*	822	+ 2	824	814	1400-1600	+0.017	+ 25.5
1700	2.5	824	+ 2	826	816	1600-1850	+0.020	+ 34.0
2000	2.26*	829	+ 2	831	817	1850-2100	+0.021	+ 42.0

* From graph No. 7. 8

Respectfully submitted,

O.W. Swainson

O.W. Swainson

H.& G. Engr., Chief of Party

ecm

April 17, 1930.

Division of Hydrography and Topography:

Division of Charts:

Tide Reducers are approved in
volumes of sounding records for
4979
HYDROGRAPHIC SHEET
California (Vicinity of Point Reyes)
Locality:
O. W. Swanson, in 1929
Chief of Party:
Plane of reference is mean lower low water, reading
Point Reyes
ft. on tide staff at
ft. below B. M.

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.

Paul C. Whitney

Chief, Division of Tides and Currents.

Field Records Section (Charts)

HYDROGRAPHIC SHEET No. H. 4979

The following statistics will be submitted with the cartographer's report on the sheet:

Number of positions on sheet	2128
Number of positions checked	434
Number of positions revised	8
Number of soundings recorded	11092
Number of soundings revised	43
Number of signals erroneously plotted or transferred	None

Date: Oct. 7 - 1930

Cartographer: J. Fleming

Field Records Section

Report on H. 4979 - Surveyed in 1929

Chief of Party O.W.S. - Surveyed by O.W.S.

Protracted by - R. A. Gilmore - Sounding By. R. A. G.

Verified and inked by J. Fleming

---

(1) The Records conform to the requirements of General Instructions

(2) The plan and character of the development fulfill the requirements of G. I.

(3) The plan and extent of the development satisfy the specific instructions

(4) Sounding line crossings are satisfactory except between 160-162-D
Lat 37° 51' 00
Long 122-43 where differences of 2-fms are noted.

(5) The 20-fm depth curve only, can be completely drawn

(6) The field plotting was 'Very Good' — The only departure from G. I. was in the plotting of fractional parts of fms between 7 and 10-fms The correct values for 1 ft - 2 ft and 4 ft were not plotted

Junctions

Junction with H 4974 was Good but is improved by the addition of 1-fm for soundings below 21-fms on H day. (See authority Page 2 this report)

The overlap is incomplete S. E. of Pt. Reyes

Junction with H. 4975 is "Good" — There were a number of 2-fms differences which indicated that in some cases the fathometer was not working well while in most cases it was evident that the correction factor was inadequate

Some of the differences were adjusted by the application of a correction based upon the following Authority:—

"By direction of Chiefs of Field Records and Field Work Sections and as recommended by Chief of Party in the Descriptive Report One Fathom has been added to all soundings less than 21-fms on H-day."

The above correction failed to reconcile the differences noted at Pos 46-49-H where a basin-like depression would be indicated by the fathometer A condition entirely disproved by the lead line soundings on the larger scale H. 4975. — These Fathometer soundings were rejected

The following is a list of all fathometer soundings rejected and the positions identifying them:—

(1) The Two soundings preceding Pos. 46-H to the Two soundings following Pos. 49-H inclusive.

(2) The Two soundings at Pos. 9-R

(3) Entire line of soundings 14-U to 28-U - (Blank strip running S.W from Bolinas Bay) the soundings on this line were consistently 3-fms deeper than the soundings on adjacent lines By drawing depth curves for each fathom difference it was shown that such a condition is extremely unlikely and certainly does not exist in this area of flat bottom.

(4) 12-fms on 95-U
11 " " 89-V
12 " " 70-V
11 & 12 " " 71-C

(5) From the first 10-fm sounding following Pos. 167-T to end of line

(6) 165-D To end of line also 11-fms on Pos. 163-D

(7) 107-108-V (Sounding on 107-V excepted)

(8) 1-X To 3-X also 3-soundings at Pos. 4-X

All rejections are indicated by asterisks in Blue in sounding records

NOTE. The above list supersedes the list given on Page #2 of D.R.

Comparison with previous surveys

H.2988 (year 1909) shows a sharp Eastward movement of the 10-fm curve Lat. 37°47.30" Long. 122 38.0 This survey failed to disclose it, altho it must be recognized as a less detailed survey.
The area covered by the overlap is quite small and comparison is limited
A letter attached to the tracing accompanying H.2988 says that the work is doubtful owing to the use of two lead lines - one corrected and one uncorrected which were used ~~alternately~~ on Port and Stbd.
The positions controlling the soundings and depth curve at the point in question were checked and the soundings verified. (H-2988)
H-4979 shows 9¾ or 58 ft. where on H.2988 the values are 63 to 70 ft.

Comparison with 4173 shows that an apparent shoaling tendency has developed in Lat. 37°47.0 Long 122°38.4 since that survey (1921).
The differences noted amount to approx. 10-ft. and are observed in the vicinity of the 7 fm and 7½ fm Fathometer soundings on H-4979
Note that the close development in Latitude 37-48.0 is by Lead Line.

Comparison with H.2504 failed to bring out differences of any magnitude, except a confirmation of the differences given in the preceding paragraph and at the point given.

Notes on Verification.

The Light Ship is shown to be about 730-M - N.E. of the position indicated on the chart, but still North of the Main Ship Channel
The Fathometer flashed 10-fm between 13-1K-B. Lat 37°54 Long 123.00 (rejected).

The work is considered 'excellent'

Respectfully submitted
J.S. Fleming

Oct. 30 - 1930
app. A.M. Sobieralski Inspected Oct. 1930 E.S.[illegible]

(Add the following paragraph)

The fathometer soundings of this sheet overlaps the leadline soundings of H. 4975 in depths of 11 to 19 fathoms, and are almost uniformly 1 fathom deeper than shown on H. 4975. As it is possible that the leadline soundings are somewhat excessive, the minimum depths shown be used in charting

E.O.E.

Curve No. 1

Actual Temperatures at given Depths

Depths in Fathoms

13.34 11.92 10.99 10.29 9.97 9.30 8.78

Curve No. 2

Average Temperature passed through by Sound for Given Depths

Depths in Fathoms

12.43 11.88 11.45 11.09 10.80 10.57 10.37 10.21 10.06 9.94

+0.001 +0.000 -0.001 -0.002 -0.003 -0.004

Table "B"

Depths	Factors
5 - 13	+ 0.001
14 - 22	± 0.000
23 - 34	- 0.001
35 - 52	- 0.002
53 - 76	- 0.003
76 - 100	- 0.004

Table "A"

Depth	Average Temperature
10	12.43
20	11.88
30	11.45
40	11.09
50	10.80
60	10.57
70	10.37
80	10.21
90	10.06
100	9.94

J.C.S.H.

Monthly Variations of Water Temperatures

No. 3

Degrees – Centigrade

14
13
12
11
10

$\frac{263.3}{17} = 13.90$

$\frac{242}{1} = 13.68$

$\frac{255.9}{19} = 13.44$

$\frac{154.8}{12} = 12.90$ Surface

$\frac{150.4}{12} = 12.53$

$\frac{112.4}{9} = 12.39$

$\frac{73.6}{6} = 12.27$

$\frac{69.8}{6} = 11.62$ Depth – 10 Fms.

$\frac{66.9}{6} = 11.15$ Depth – 20 Fms. (Not Many Observations)

$\frac{132.2}{12} = 11.02$

$\frac{32.6}{3} = 10.87$

$\frac{64.6}{6} = 10.76$

$\frac{85.1}{8} = 10.64$ Depth – 30 Fms.

$\frac{41.3}{4}$ 10.3

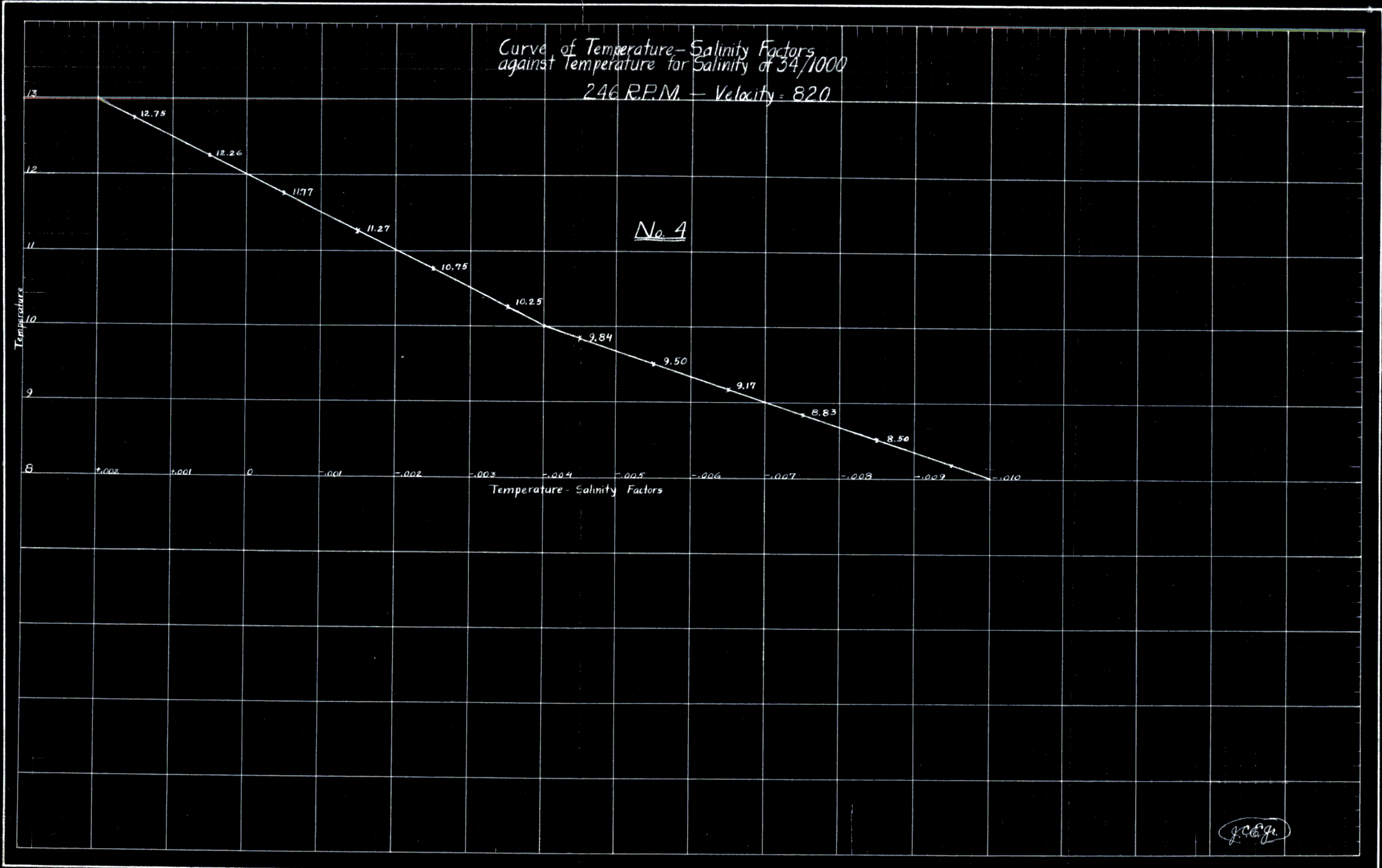
12 = 11.55

11 = 11

9 9.67

June 3 6 9 12 18 21 24 27 | July 3 6 9 12 18 21 24 27 | August 3 6 9 12 1 24 27 | September 3 6 9 12 18 21 24 27 | October 3 6 9 12 18 21 24 27 | November 3 6 9 12 18 21 24 27

J.C.E. Jr

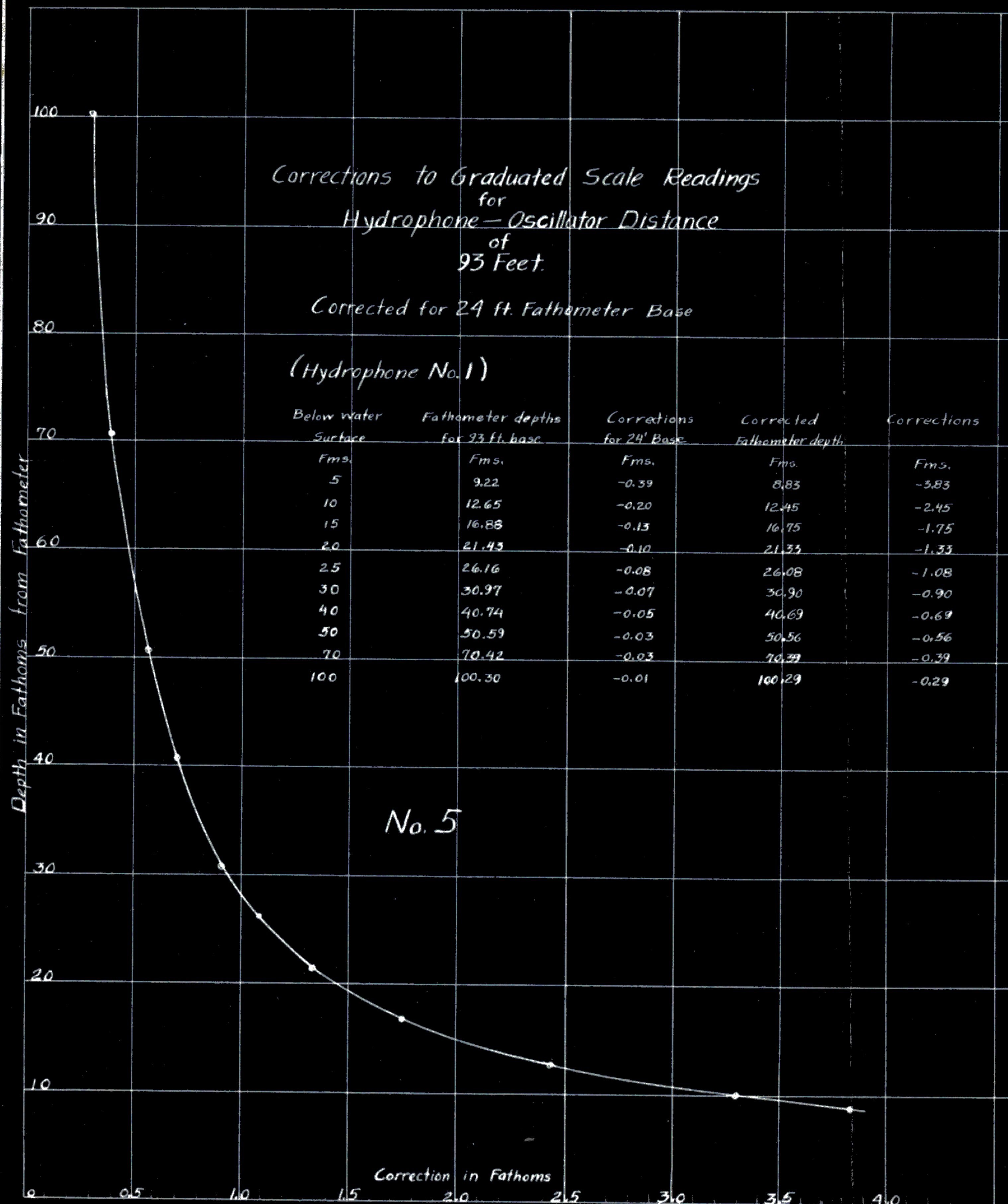

Curve of Temperature-Salinity Factors
against Temperature for Salinity of 34/1000
246 R.P.M. — Velocity = 820
No. 4
Temperature
13
12
11
10
9
8
12.75
12.26
11.77
11.27
10.75
10.25
9.84
9.50
9.17
8.83
8.50
+.002
+.001
0
-.001
-.002
-.003
-.004
-.005
-.006
-.007
-.008
-.009
-.010
Temperature - Salinity Factors

Corrections to Graduated Scale Readings for Hydrophone – Oscillator Distance of 93 Feet.

Corrected for 24 ft. Fathometer Base

(Hydrophone No. 1)

Below water Surface	Fathometer depths for 93 ft. base	Corrections for 24' Base	Corrected Fathometer depth	Corrections
Fms.	Fms.	Fms.	Fms.	Fms.
5	9.22	-0.39	8.83	-3.83
10	12.65	-0.20	12.45	-2.45
15	16.88	-0.13	16.75	-1.75
20	21.43	-0.10	21.33	-1.33
25	26.16	-0.08	26.08	-1.08
30	30.97	-0.07	30.90	-0.90
40	40.74	-0.05	40.69	-0.69
50	50.59	-0.03	50.56	-0.56
70	70.42	-0.03	70.39	-0.39
100	100.30	-0.01	100.29	-0.29



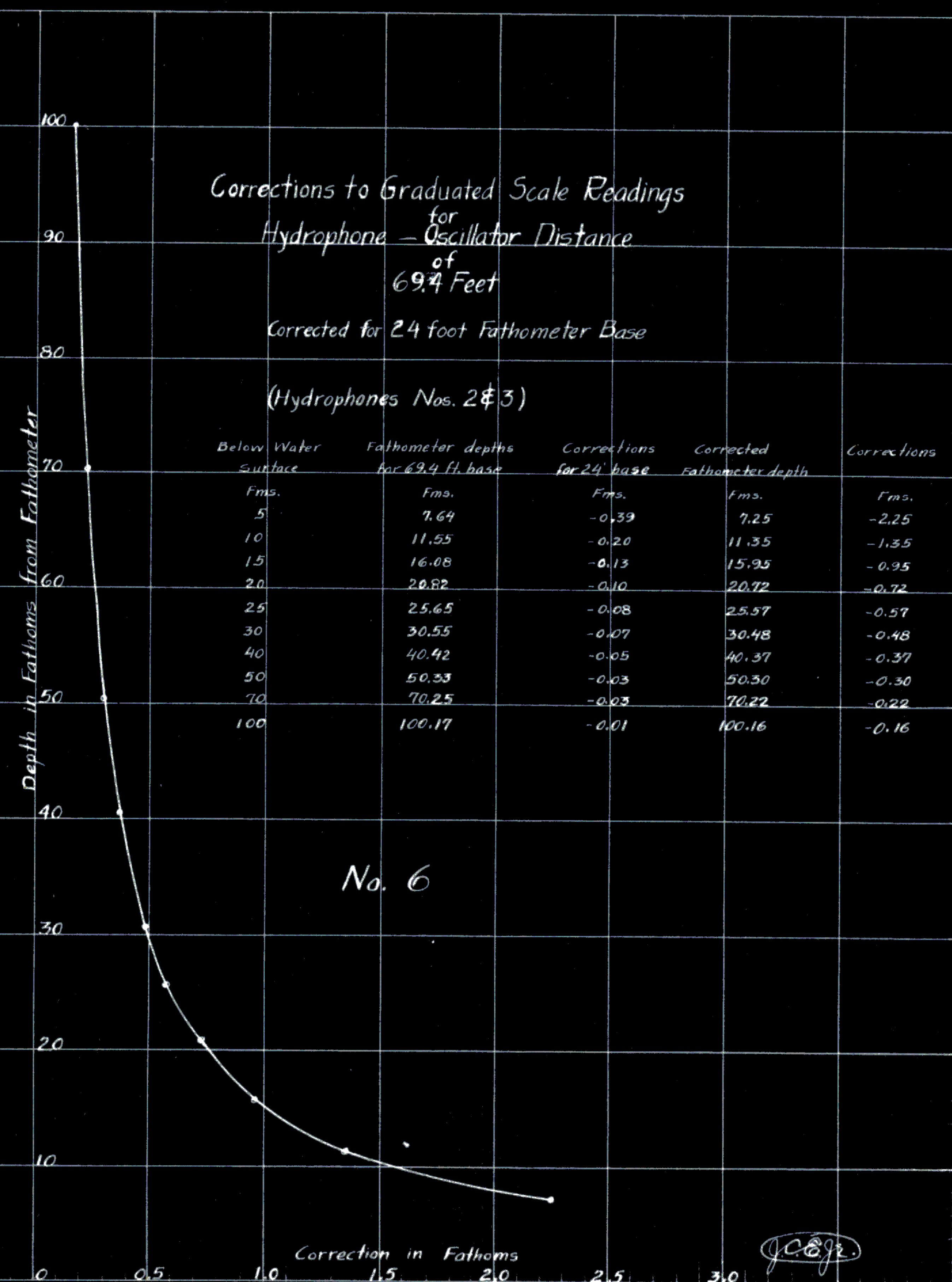
No. 5

Corrections to Graduated Scale Readings for Hydrophone – Oscillator Distance of 69.4 Feet

Corrected for 24 foot Fathometer Base

(Hydrophones Nos. 2 & 3)

Below Water Surface	Fathometer depths for 69.4 ft. base	Corrections for 24' base	Corrected Fathometer depth	Corrections
Fms.	Fms.	Fms.	Fms.	Fms.
5	7.64	-0.39	7.25	-2.25
10	11.55	-0.20	11.35	-1.35
15	16.08	-0.13	15.95	-0.95
20	20.82	-0.10	20.72	-0.72
25	25.65	-0.08	25.57	-0.57
30	30.55	-0.07	30.48	-0.48
40	40.42	-0.05	40.37	-0.37
50	50.33	-0.03	50.30	-0.30
70	70.25	-0.03	70.22	-0.22
100	100.17	-0.01	100.16	-0.16



No. 6

J.C.E.Jr.

Final Table of Corrections "E"

No. 1 Hydrophone (sonic)				Nos. 2 & 3 Hydrophones (fathometer)			
Depth	Correction	I.C.	Hyd. Red.	Depth	Correction	I.C.	Hyd. Red.
10.0	-3.3	+2.4	-0.9	10.0 - 10.5	-1.5	+0.5	-1.0
10.5	3.1		-0.7	11.0 - 11.5	1.3		-0.8
11.0	3.0		-0.6	12.0 - 12.5	1.2		-0.7
11.5	2.9		-0.5	13.0 - 13.5	1.1		-0.6
12.0	2.7		-0.3	14.0 - 14.5	1.0		-0.5
12.5	2.6		-0.2	15.0 - 15.5	1.0		-0.5
13.0	2.5		-0.1	16.0 - 16.5	0.9		-0.4
13.5	2.4		±0.0	17.0 - 18.0	0.9		-0.4
14.0	2.2		+0.2	19.0 - 20.0	0.8		-0.3
14.5-15.5	2.0		+0.4	21.0 - 23.0	0.7		-0.2
15.5-16.0	1.9		+0.5	24.0 - 28.0	0.6		-0.1
16.5-17.0	1.8		+0.6	29.0 - 35.0	0.5		±0.0
17.5-18.0	1.6		+0.8	36.0 - 78.0	0.4		+0.1
18.5-19.0	1.5		+0.9	79.0 - 100.0	0.5		±0.0
19.5-20.5	1.5		+0.9				
21.0-22.0	1.3		+1.1				
23.0-24.0	1.2		+1.2				
25.0-27.0	1.1		+1.3				
28.0-30.0	1.0		+1.4				
31.0-35.0	0.9		+1.5				
36.0-40.0	0.8		+1.6				
41.0-50.0	0.7		+1.7				
51.0-90.0	0.6		+1.8				
91.0-100.0	0.7		+1.7				

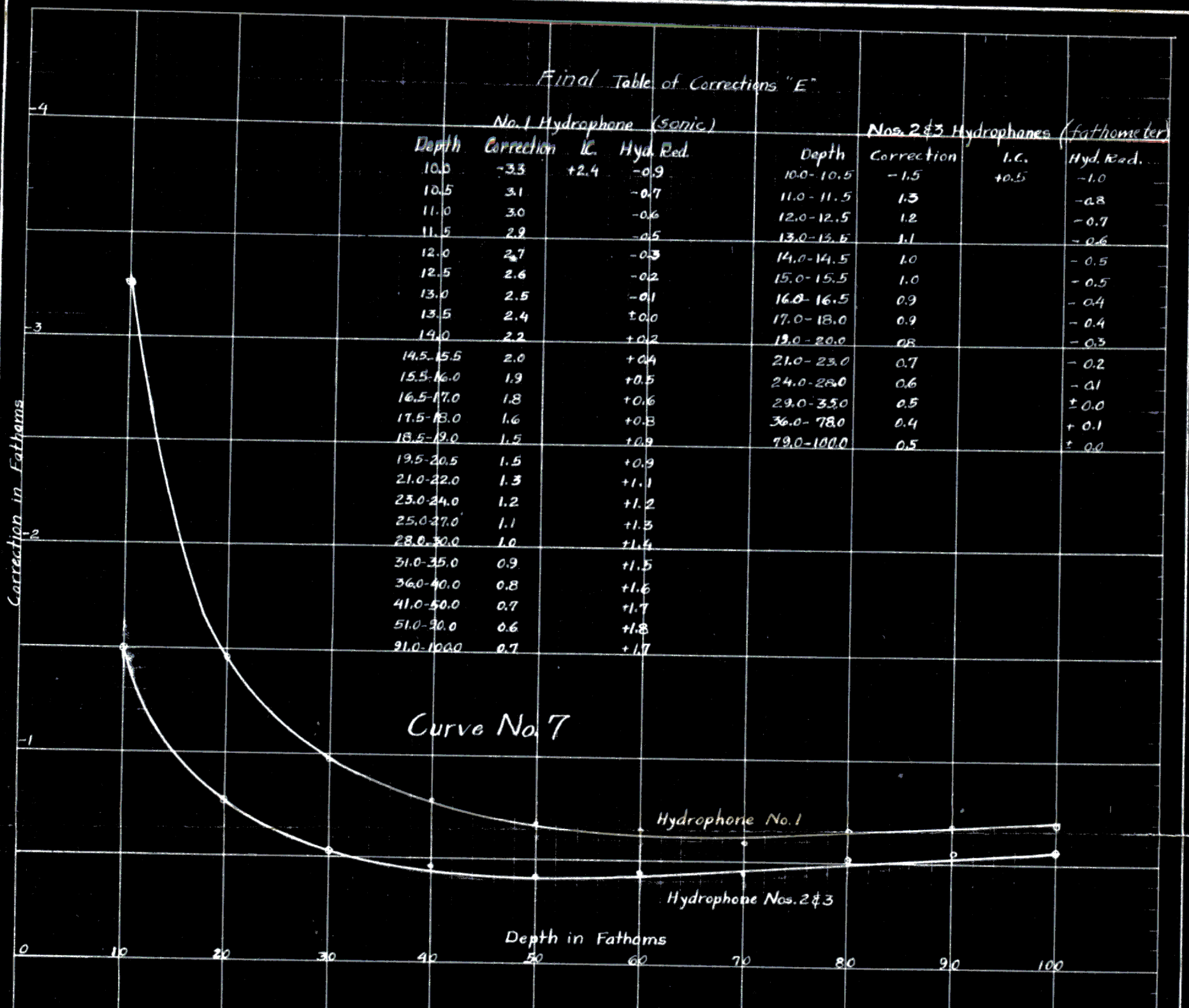


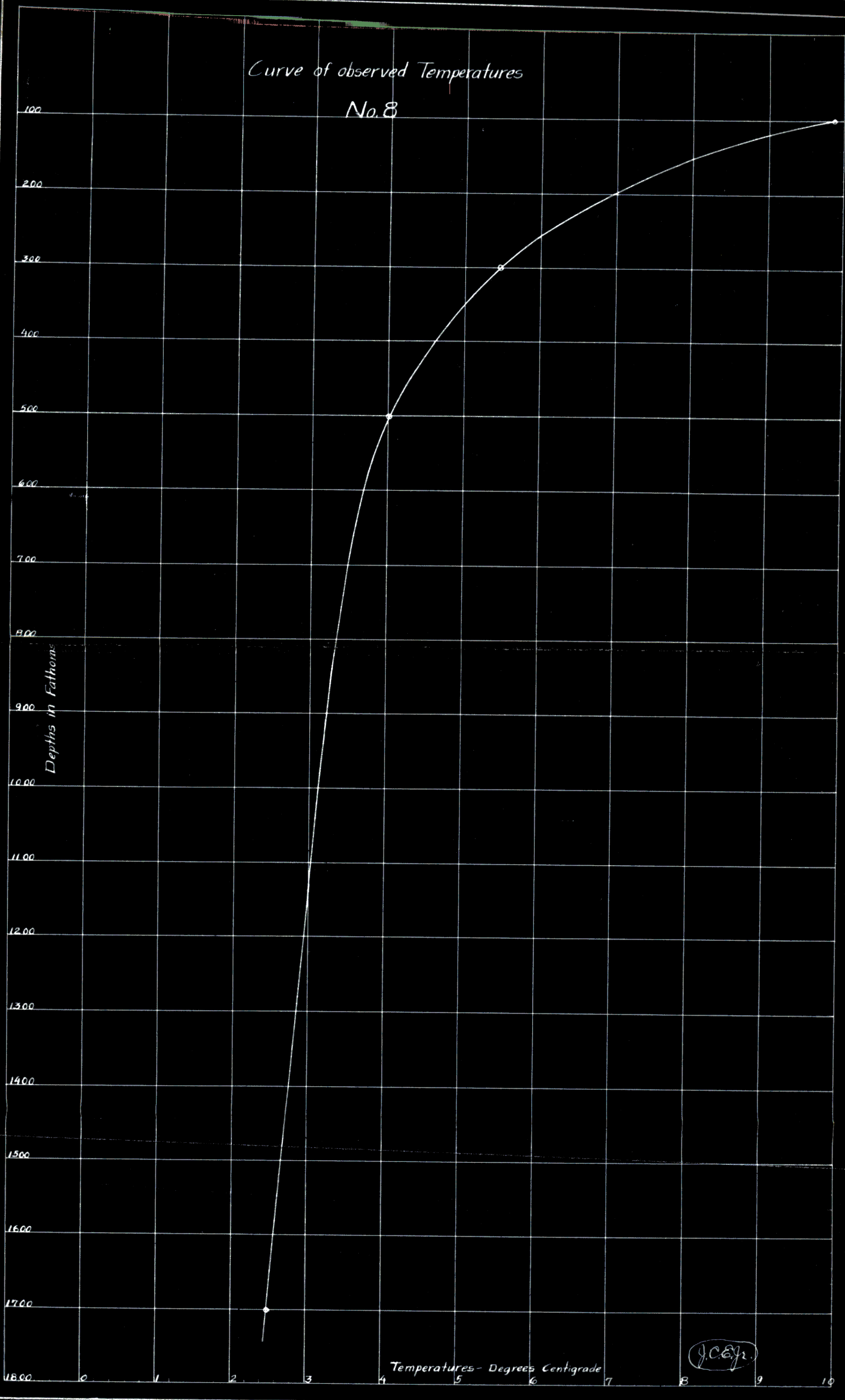
Table D

Depth Fms.	Hydrophone No. 1 Distance Correction from Graph 5	Temperature Correction from table B	Total Correction	Depth Fms.	Hydrophone Nos. 2 & 3 Distance Correction from Graph 5	Temperature Correction from table B	Total Correction
10	-3.29	+0.01	-3.28	10	-1.54	+0.01	-1.53
20	1.44	±0.00	1.44	20	0.76	±0.00	0.76
30	0.94	-.03	0.97	30	0.49	-0.03	0.52
40	0.71	-.08	0.79	40	0.38	-0.08	0.46
50	0.57	-.10	0.67	50	0.31	-0.10	0.41
60	0.47	-.18	0.65	60	0.26	-0.18	0.44
70	0.39	-.21	0.60	70	0.23	-0.21	0.44
80	0.34	-.32	0.66	80	0.20	-0.32	0.52
90	0.31	-.36	0.67	90	0.17	-0.36	0.53
100	0.30	-.40	0.70	100	0.17	-0.40	0.57

J.C.G.

Curve of observed Temperatures

No. 8



Applied to extension of Cht. 5599 7-15-41 K. R.
Some pdgs re-selected for Reconstruction 5532 Mar. 1956 L. a. m.
applied to ch. 5598 10/26/56 [illegible]
Appd 5601 11/21/63 C R Wittman
Comp appd 5072 New chart after V&R part direct part thru [illegible] 5532, 5598, 5599 [illegible] 4-17-64