

# 4300

NOV 7 - 1923

Diag. Chf. No. 1244

# 4300

FORM 504	
DEPARTMENT OF COMMERCE	
U. S. COAST AND GEODETIC SURVEY	
State: FLORIDA	
11-5613	
DESCRIPTIVE REPORT.	
Hydrog	Sheet No. 4300 c
LOCALITY:	
East Coast, Off. Shore	
Off. Matanzas Inlet	
1923	
CHIEF OF PARTY:	
R.E. Luce, A.M. Sobieralski	

DESCRIPTIVE REPORT

to accompany

HYDROGRAPHIC SHEET 'C'

East Coast of Florida

Lat. 29°-46' to Lat. 29°-35'.

Scale 1-100,000.

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U.S.C. & G.S. STR. LYDONIA

Jan.-Apr. 1923

R. F. Luce & A. M. Sobieralski

Chief of Party.

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\* \* \* \*  
\* \* \* \*  
\* \*  
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Instructions dated Nov. 7, 1922.

DESCRIPTIVE REPORT

Sheet C

E. COAST OF FLORIDA

Scale 1-100,000

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This sheet shows the off-shore work done by the Str. LYDONIA off the East Coast of Florida during the season from Jan. to April 1923.

The signals plotted on this sheet are all floating signals, and the positions are obtained from Sheet # A, 1-40,000.

The work was done in accordance with the instructions for precise dead reckoning, and the usual method of plotting the work was followed. The course steered is shown by a dotted red line, the course adjusted for current, leeway and transfer is shown by a full red line. The error of closure is then adjusted proportionally to the actual distance run, and the final adjusted course shown by a black line.

The current diagrams are shown on the sheet on a scale of 1-50,000, that is, double the scale of the sheet.

Current observations were taken in the usual method, by anchoring the ship with a short scope and using a current pole from the stern. In depths over 30 fathoms, a whaleboat was anchored, using a concrete anchor and stranded wire of high tensile strength. A buoy was attached to the anchor, and the ship's departure was taken from this buoy. There is little difficulty in measuring currents of about 0.35 knots, but a current weaker than this is liable to be in error both as to amount and direction due to the swinging of the ship, especially if the wind is opposed to the current. This introduces an element of uncertainty into the adjustments for current.

The currents were found to be generally rotary, until the influence of the Gulf Stream is felt. Under normal conditions, the strength of the Gulf Stream is encountered beyond the 30 fathoms curve. A current velocity of 2.5 knots was measured on "F" day, (April 21). There was a noticeable tide rip on the edge of the Stream on this day, with a marked change in the strength of the current. A marked difference in the surface temperature was also observed. In other words, on this day the edge of the

Gulf Stream was a line visible to the eye on account of the tide rips, and marked by a change in current velocity from 0.54 knots to 2.27 knots, and a change in the surface temperature from 69<sup>o</sup>.1 F to 77<sup>o</sup>.5 F.

The weakest point in this method of determining positions is the log. Other errors are eliminated or at least compensated, in the final adjustment, but errors due to the log, or at least the log factor, can neither be detected nor eliminated by the error of closure; for, even if an entirely erroneous log factor is used, the line would still close. Astronomical observations are, perhaps, the only check, and as astronomical observations do not give particularly reliable results, on account of the variations due to poor horizon, poor observing etc., there is a large element of uncertainty about the log.

To illustrate the uncertainty due to the log, details of two log tests are given. It will be seen that the log factor for Log. No. 80 changed considerably, while Log No. 173 remained constant. There was no accident to the log, but the bearings were getting worn. On the other hand, in both tests log No. 80 gave more uniform results than log No. 173.

The change in the log factor was first noticed on "C" day, by astronomical observations and by the depth curves--that is, using the old log factor, the depth curves did not agree with adjoining lines. The log factors determined in Feb. are therefore used for A. and B. days, while the log factors determined in April are used for the following days.

Deviations determined in January are used for A AND B days, while the deviations determined in June are used for the following days. The reason for using the latter values is that errors due to the use of the earlier values were noticed at this time. If the earlier values are used in plotting the log test in April, it will be seen that the courses do not agree with the fixed positions.

#### PLANE OF REFERENCE.

The plane of reference is mean low water, determined from observations at St. Augustine and Matanzas Inlet. It is assumed that high and low water in the area covered by this sheet occurs one hour earlier than at the tide stations. Where the Matanzas Inlet tide station is used for reducers, the range is increased 1/3.

January 11, 1923.

## LOG RATING.

## OFF CRESCENT BEACH, FLA.

Pos. of	X. (Gus 37 <sup>0</sup> -00'	Pos. of	Z. (Gus 80 <sup>0</sup> - 07'
	(Cres		(Cres
	(Cor 62 -39		(Cor 40 - 06

CURRENT OBSERVATIONS.

TIME	VELOCITY OF		DIRECTION OF		MEAN Vel.	MEAN Dir.
	X	Z	X	Z		
10.30	0.36	0.19	350 <sup>0</sup>	355 <sup>0</sup>	0.28	352 <sup>0</sup>
11.00	0.26	0.22	345	360	0.24	352
11.30	0.33	0.18	350	350	0.26	350
12.00	0.37	0.17	348	355	0.27	352
12.30	0.39	0.23	348	350	0.31	349
1.00	0.38	0.24	350	345	0.31	348
1.30	0.34	0.30	348	345	0.32	346
2.00	0.36	0.28	345	345	0.32	345
2.30	0.34	0.27	348	350	0.30	349

January 11, 1923.

SCOUNDING SPEED -- 58 R. P. M.

Log Test course 3.118 Nautical Miles S.

Course  $164\frac{10}{2}$  (true)

		LOG NUMBER 80				LOG NUMBER 173			
B	ELAPSED TIME	LOG READS	LOG Dist.	CURRENT	LOG DIST (+) (-)	LOG READS	LOG Dist.	CURRENT	LOG DIST (-) (+)
		49.03				5.36			
Y	0-30-00	<del>49.03</del>				6.86	1.50		
Y	10-46-27	50.52	1.49			8.22	<u>1.36</u>		
Z	11-02-10	51.88	<u>1.36</u>				<u>2.86</u>	40.139	2.999
			2.85	+0.139	2.989				
Z	11-11-58	52.51				8.88			
Y	11-30-02	54.01	1.50			10.41	1.53		
X	11-49-50	55.61	<u>1.60</u>			12.06	<u>1.65</u>		
			3.10	-0.164	2.936		<u>3.18</u>	-0.164	3.016
X	11-56-52	56.01				12.49			
Y	12-13-40	57.43	1.42			13.93	1.44		
Z	12-29-32	58.80	<u>1.37</u>			15.29	<u>1.36</u>		
			2.79	+0.158	2.948		<u>2.80</u>	+0.158	2.958
Z	12-38-46	59.33				15.88			
Y	12-56-45	60.84	1.51			17.43	1.55		
X	1-15-31	62.51	<u>1.67</u>			19.10	<u>1.67</u>		
			3.18	-0.190	2.990		<u>3.22</u>	-0.190	3.030

\*\*\*\*\*

Log No. 80.  
 Sounding Speed (58 R.P.M.)  
 Log. Dist. ± Current.  
 1. 2.989  
 2. 2.936  
 3. 2.948  
 4. 2.990  
~~11.663~~  
 2.96675

Log No. 173.  
 Sounding Speed (58 R.P.M.)  
 Log. Dist. ± Current.  
 1. 2.999  
 2. 3.016  
 3. 2.958  
 4. 3.030  
12.013  
 3.00075

Log Factor X Log Dist  
 = True Dist

Log Factor =	$\frac{\text{True Dist}}{\text{Log Dist}}$	*****	Log Factor =	$\frac{\text{True Dist}}{\text{Log Dist}}$
	$= \frac{3.118}{2.96675}$			$= \frac{3.118}{3.00075}$
Log Factor =	1.051		Log Factor =	1.040

FULL SPEED - 100 R.P.M.

Log Test course 3.118 Nautical Miles S.

Course 164 $\frac{1}{2}$ <sup>o</sup> True

LOG	NUMBER	80				LOG	173			
Time Lap	Lapsed Time	Log	Log Dist.	Current	Log Dist + Current	Log	Log Dist	Current	Log Dist + Current	
X 1-21-17		63.20				19.78				
Y 1-30-47	0-09-30	64.73	1.53			21.35	1.55			
Z 1-39-52	0-18-35	66.13	<u>1.40</u>			22.81	<u>1.48</u>			
			2.93	+ 0.099	3.029		3.03	+ 0.099	3.129	
Z 1-45-46		66.94				23.60				
Y 1-55/27	0-10-41	68.50	1.56			25.17	1.57			
X 2-05-12	0-19-26	70.11	<u>1.61</u>			26.87	<u>1.70</u>			
			3.17	- 0.104	3.066		3.27	-00.104	3.166	
X 2-09-40		70.73				27.51				
Y 2-18-28	0-08-48	72.23	1.50			29.08	1.57			
Z 2-26-57	0-17-17	73.64	<u>1.41</u>			30.57	<u>1.49</u>			
			2.91	+ 0.067	2.997		3.06	+ 0.067	3.147	
Z 2-32-00		74.31				31.23				
Y 2-41-59	0-09-59	75.83	1.52			32.81	1.58			
X 2-52-10	0-20-10	77.51	<u>1.68</u>			34.45	<u>1.64</u>			
			3.20	- 0.101	3.099		3.22	- 0.101	3.119	

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Log Number 80.

Sounding Speed (100 R.P.M.)

1. 3.029  
 2. 3.066  
 3. 2.997  
 4. 3.019  
12.191  
 3.04775

Log Number 173.

Sounding Speed (100 R.P.M.)

1. 3.129  
 2. 3.166  
 3. 3.147  
 4. 3.119  
12.561  
 3.14025

LOG FACTOR X LOG DIST = TRUE NAUTICAL MILES

$$\frac{3.118}{3.04775} = F 1.0235$$

$$\frac{3.118}{3.14025} = F 0.993$$

April 6, 1923.

LOG RATING.

OFF CRESCENT BEACH, FLA.

Pos. of  $\odot$  S. (Gus 31°- 28' (Cres (Cor 79°- 31' Pos. of  $\odot$  N. (100°- 04' ( 40°- 06

CURRENT OBSERVATIONS.

TIME	VELOCITY.		DIRECTION.		MEAN.		
	S.	N.	S.	N.	Vel.	Dir.	
11:00	.66	---	340°	---	(.54)	(330)	(Estimated.)
11:30	.67	.295	330	320½	.48	325	
12:00	.57	.295	318	312½	.43	315	
12:30	.56	.175	320	310	.37	315	
1:00	.48	.13	310	312½	.30	311	
1:30	.45	.27	305	310	.36	307	
2:00	.45	.30	298	302	.38	300	
2:30	.47	.37	295	290	.42	292	
3:00	.40	.45	298	290	.42	294	
3:30	.41	.39	295	300	.40	297	
4:00	.45	---	295	---	(.40)	(295)	(Estimated.)
4:30	.47	---	300	---	(.40)	(295)	(Estimated.)

HALF SPEED -- 55 R. P. M.

South (Course 160°-20' true)

Rps	Time	LOG NUMBER 80				LOG NUMBER 173				TRUE DIST.			
		Log Read.	Log Dist	Cur- rent	Correct- ed Log Dist	Log Read.	Log Dist	Cur- rent	Correct- ed Log Dist	Meters	Miles	Log Factor	
1	4:12:50	16.92	<del>16.92</del>	<del>0.66</del>	<del>-.048</del>	55.15	<del>55.15</del>	<del>0.72</del>	<del>-.048</del>	<del>1260</del>	<del>.682</del>	<del>1.114</del>	<del>1.015</del>
2	22:50	17.58	0.66	-.048	.612	55.87	.72	-.048	.672	1260	.682	1.114	1.015
3	32:50	18.29	0.71	-.048	.662	56.62	.75	-.048	.702	1380	.747	1.128	1.064
4	42:50	18.97	0.68	-.048	.632	57.34	.72	-.048	.672	1328	.719	1.137	1.070
5	52:50	19.72	0.75	-.048	.702	58.15	.81	-.048	.762	1408	.762	1.085	1.000
					2.608					2.808	2.910	1.116	1.037

CURRENT 0.40 KNOTS 295° = 0.29 KNOTS 340°20' (true)

North (Course 345° true)

1	3:06:40	14.02	52.09										
2	16:40	14.70	0.68	+0.045	.725	52.80	.71	+0.045	.755	1492	808	1.114	1.070
3	26:40	15.39	0.69	+0.045	.735	53.52	.72	+0.045	.765	1502	813	1.106	1.063
4	36:40	16.06	0.67	+0.045	.715	54.24	.72	+0.045	.765	1504	814	1.139	1.064
5	46:40	16.75	0.69	+0.045	.735	54.99	.75	+0.045	.795	1510	817	1.112	1.028
					2.910					3.080	3.252	1.118	1.056

CURRENT 0.40 KNOTS 297° true = 0.27 KNOTS 344°-06' (true)

MEAN VALUE, HALF SPEED, LOG FACTOR ( 1.117 Log # 80.  
1.046 Log #173.

FULL SPEED 100 R.P.M.

(Course 344°-06' true)

1	10:46:05	97.50	34.71										
2	52:45	98.40	0.90	+0.058	.958	35.72	1.01	+0.058	1.068	1884	1.020	1.065	0.955
3	59:15	99.30	0.90	+0.056	.956	36.70	0.98	+0.056	1.036	1892	1.024	1.071	0.989
4	11:05:55	100.22	0.92	+0.058	.978	37.69	.99	+0.058	1.046	1940	1.050	1.074	1.002
					2.892					3.152	3.094	1.070	0.982

CURRENT 0.54 KNOTS 330° = 0.52 KNOTS 344°-06' (true)

(Course 160°-20' true)

1	1:55:35	7.65	45.32										
2	2:08:05	8.53	0.93	-.030	.900	46.35	1.03	-.030	1.000	1788	.968	1.076	.968
3	08:45	9.55	0.97	-.031	.939	47.35	1.00	-.031	.969	1806	.978	1.042	1.009
4	15:25	10.52	0.97	-.031	.939	48.34	.99	-.031	.952	1850	1.001	1.067	1.044
					2.778					2.928	2.947	1.062	1.007

CURRENT 0.38 KNOTS 300° true = 0.28 KNOTS 340°-20'

MEAN FACTOR ( 1.066 Log # 80.  
0.994 Log #173.



TRANSFER.

Course  $40^{\circ} - 14'$  (true)      Wind: N.22 E. 10 mi. per hr.

	Transfer in Meters	Angle between ship's head when stopped. Wind course.
L <sup>1</sup> to L <sup>2</sup>	65	$75^{\circ}$
L <sup>2</sup> to L <sup>3</sup>	0	34
L <sup>3</sup> to L <sup>4</sup>	5	43
L <sup>4</sup> to L <sup>5</sup>	40	55
L <sup>5</sup> to L <sup>6</sup>	40	51
L <sup>6</sup> to L <sup>7</sup>	5	45

TOTAL TRANSFER      155 meters.

Observations to determine transfer are very unsatisfactory. Transfer varies with the angle through which the ship swings, the speed, and the force of the wind. From observations and a study of the ship's turning circle, the following rule was adopted.

Ship's Head      'Transfer  
(Angle through' (Applied to rt. or left of course  
which ship      ' depending on which way ship swings,  
swings).      ' generally to right).

---

0- $40^{\circ}$	0
40-50	.01 per sounding.
50-60	.02    "    "
60-70	.03    "    "

The ship's head is recorded after every sounding. It is assumed that the ship starts at full speed with rudder hard over, and that the wind does not exceed 20 miles per hour. In case any of these conditions does not exist, the transfer is best estimated from the wake.

This rule is much simpler than it appears for it is only in exceptional cases that the ship's head fall off more than  $40^{\circ}$  when sounding in depths up to 100 fathoms. In the above observations, a course was purposely selected which would give the maximum swing, that is, with the wind a point or two on port bow.

This rule would probably not work in rough weather, but ~~ix~~ it is difficult to get satisfactory results for any of the observations--log readings, compass heading or current observations--under such conditions.

LEEWAY.

The following observations were made with the ship drifting with wind abeam, while current observations were being made from a small boat near-by.

March 1. Wind: S.W. Force: 22 mis. per hr.

Ship drifting from 8<sup>h</sup> 32<sup>m</sup> 40<sup>s</sup> to 9<sup>h</sup> 30<sup>m</sup>, then proceeded to starting point, Course 179<sup>o</sup>-20' (true), at sounding speed, distance by log 1.16 mis, or, multiplying by log factor 1.116, a corrected distance of 1.295 mis, arriving at ( 9:46, so that the elapsed time was 1<sup>h</sup> 13<sup>m</sup> 30<sup>s</sup> or 1.222 hrs. Current observed at the time was 1.04 knots 330<sup>o</sup> true. From the diagram on accompanying sketch, it will be seen that the ship drifted a total distance of 0.514 mis. or 0.42 mis. per hr. These observations were taken near the 100 fathom curve and not in the position shown on the sketch.

*no sketch  
to accompany  
this report  
JW*

April 6 Wind: N. 20 E. Force: 18 mis. per hr.

At 10:04	ship's position	Gus 30 <sup>o</sup> - 19'
		Cres
		Cor 74 - 21
10:19	" "	Gus 30-- 55
		Cres
		Cor 76 - 43
10:34	" "	Gus 31 - 21
		Cres
		Cor 79 - 31

Total drift with wind abeam	- - - - -	0.257 mis.
Current	- - - - -	0.66 knots 340 <sup>o</sup>
Leeway	- - - - -	0.195 mis.
Leeway per hr.	- - - - -	0.39 mis.

From the above observations and a study of the leeway on the lines run to standardize the logs, a value of 0.40 knots for a 20 miles breeze abeam was adopted. If wind is at any other point, only the component at right angles to the course is used.

I believe that leeway does not vary directly with the force of the wind-- that a breeze under 10 mis. does not affect the ship's course, while a breeze of 30 mis. per hr. would set the ship further off her course than the above rule would give. However, as we have no observations to determine this, leeway is applied proportional to the force of the wind.

HYDROGRAPHY.

Statistics Sheet 5

<u>Date, 1923.</u>	<u>Letter</u>	<u>Volumes</u>	<u>Positions</u>	<u>Soundings</u>	<u>Miles Statute</u>	<u>Vessel</u>
Jan. 30	A	1	35	263	36.0	Lydonia
Feb. 9	B	1	32	247	42.0	"
Mar. 2 & 3	C	1	24	313	65.5	"
Mar. 21	D	1 & 2	14	318	41.8	"
Mar. 28	E	2	14	321	38.9	"
April 21 & 22	F	2	30	376	69.0	"
<b>TOTAL</b>			149	1838	293.2	

COPY TO FIELD RECORDS

Nov. 17, 1923.

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in  
2 volumes of sounding records for

HYDROGRAPHIC SHEET 4500

Locality: **East Coast, Florida - Off Matanzas Inlet**

Chief of Party: **A. H. Sebiorski, in 1923**

Plane of reference is **mean low water, reading**

**6.5** ft. on ~~tide staff~~ **auto-gauge** at **St. Augustine.**

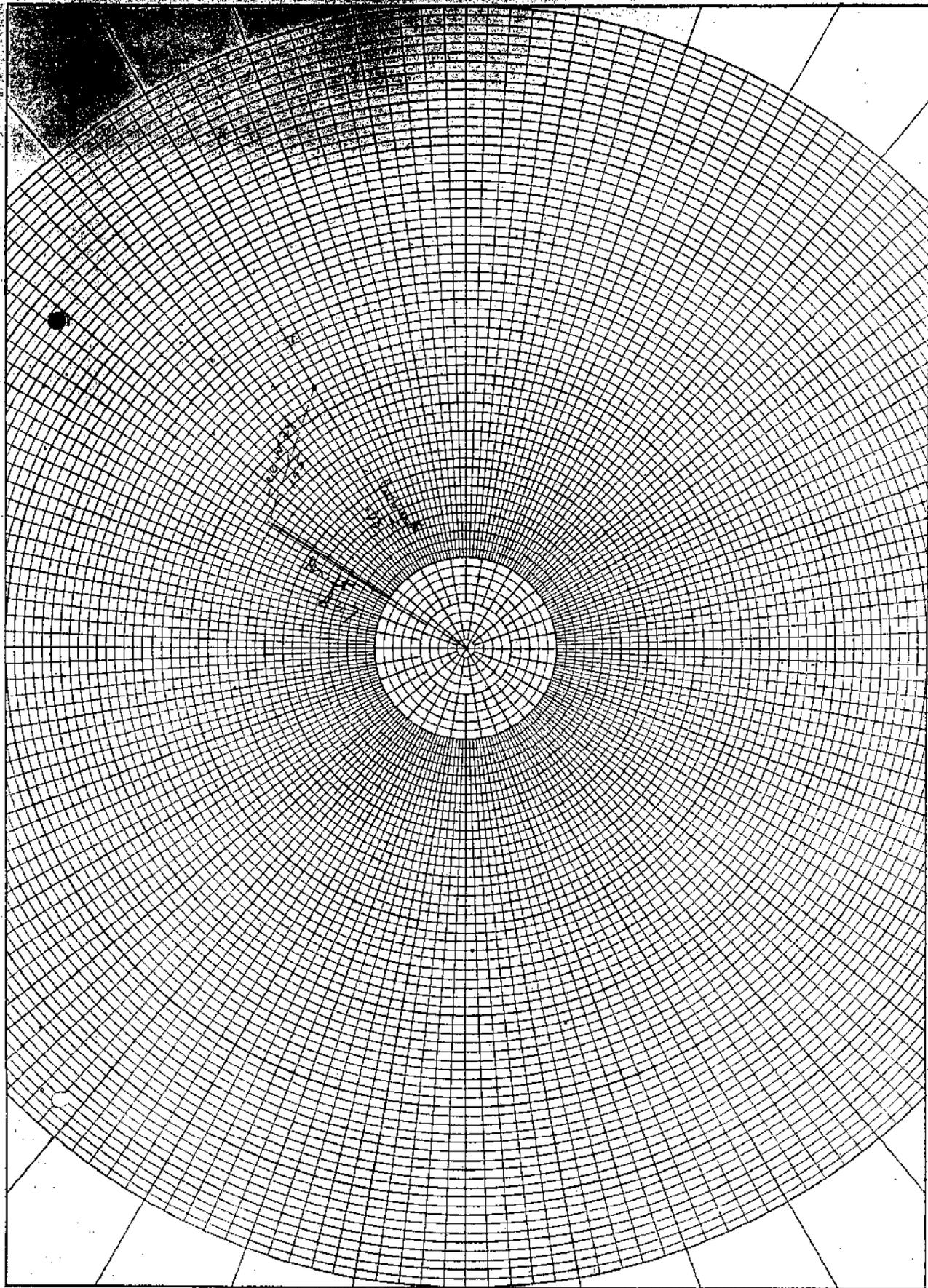
**1.4** " " **tide staff** " **Matanzas Inlet**

For reduction of soundings, 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 on "Office" column.
8. Location of tide gauge not given at beginning of each 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.



Chief, Division of Tides and Currents.

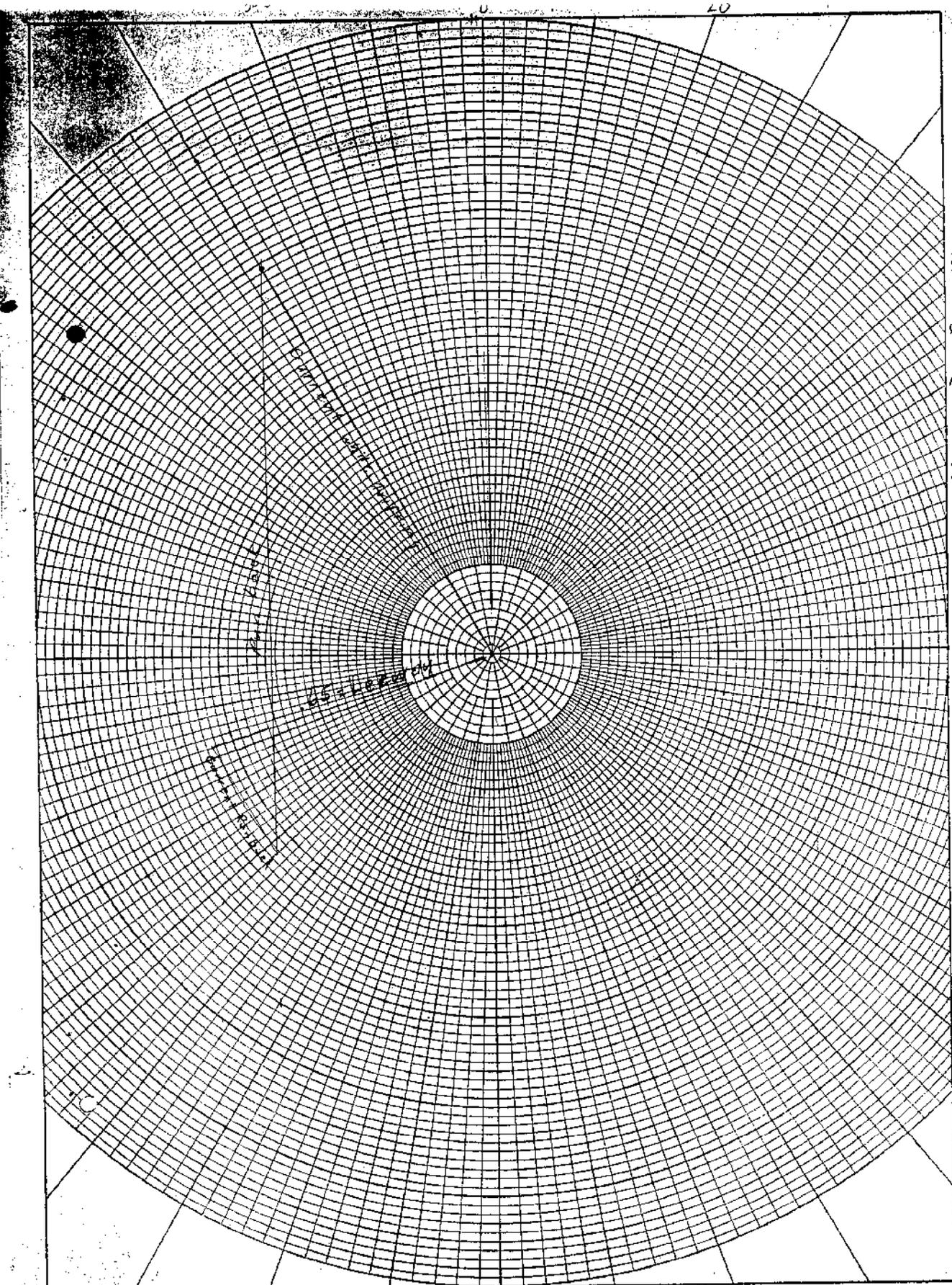


Test of  
April 6th

Survey:  
.31 Amt

Plotted in Field Record Section





Leeway  
 1.295 mi  
 179° 20'

Drifting  
 .95 hrs

Run back  
 .267 hrs

Current  
 Run  
 Drifting back  
 .99 .29

Run back  
 1.295 mi  
 179° 20'

Leeway for  
 run = .65  
 miles  
 or  
 Leeway =  
 .532 knots

Report on Verifying and Inking H. 4300 P. D. R.\*

The verification of this sheet was restricted to checking the intermediate log distances between positions. Due to the fact that the abstract could not be found in the office the plotting of the lines could not be verified.

The field work, in handling the various factors and corrections incident to P. D. R.\* sounding, was excellently done as is shown in the descriptive report.

The following facts, which are not mentioned or at most but briefly touched in the Instructions for P. D. R. Sp. Publication # 73, were brought out in the various tests.

1. The log factor is a variable factor at succeeding times due to wear and perhaps other causes.
2. Transfer may be to right or left depending on the heading of the vessel with respect to the course just before getting underway, and the amount of transfer varies for different arcs thru which the ship swings to get on course.

The plotting of the sheet was excellent and time intervals were carefully observed.

Frank M. Albert,  
Draftsman, Section of Field Records.

\* P. D. R. = Precise Dead Reckoning.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

WASHINGTON

April 25, 1924.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4300

Off Mantanzas Inlet, Fla.

Surveyed in 1923

Instructions dated Nov. 4, 1922 and Feb. 26, 1923.

Chief of Party, A. M. Sobieralski and R. F. Luce.

Surveyed by party of Steamer LYDONIA

Protracted by A. M. Sobieralski.

Soundings plotted by E. H. Bernstein.

Verified and inked by F. M. Albert.

1. The records conform to the requirements of the General Instructions. The descriptive report is unusually comprehensive and contains valuable data relative to dead reckoning correction factors. The dead reckoning abstract could not be found when the sheet was inked, and apparently was not received in the office.
2. The plan and character of development conform to the requirements of the General Instructions.
3. The plan and extent of development satisfy the specific instructions.
4. The sounding line crossings are satisfactory.
5. The information is sufficient for drawing the usual depth curves.
6. The field plotting was completed to the extent prescribed by General Instructions and none of it had to be done over in the office.
7. The junctions with H. 4299 on the west and H. 3965 on the north are satisfactory.
8. No further surveying is required within the area covered by the sheet.
9. The character and scope of the surveying and field drafting are excellent.
10. Reviewed by E. P. Ellis, April, 1924.

*RCX?*

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

The finished Hydrographic Sheet is to be accompanied by the following title sheet, filled in as completely as possible, when the sheet is forwarded to the Office.

U. S. Coast and Geodetic Survey.

Register No. 4300 "C"

State . . . FLORIDA, . . . . .

General locality . East Coast, Off Shore. . . . . .  
Off Matanzas Inlet

Locality . . Lat. 29° 46' to Lat. 29° 35' . . . . .

Chief of party . . R. F. Luce and A. M. Sobieralski . . . . .

Surveyed by . . . R. F. Luce and A. M. Sobieralski . . . . .

Date of survey . . Jan.-April, 1923. . . . . .

Scale . . . . . 1-100,000. . . . . .

Soundings in . . . Fest, . . . . .

Plane of reference . Mean Low Water. . . . . .

Protracted by A.M.S. . . . Soundings in pencil by E.H.B. Bernstein

Inked by . . . . . Verified by . . . . .

Records accompanying sheet (check those forwarded):

Des. report, ..... Tide books, ..... Marigrams, ..... Boat sheets,

...2... Sounding books, ..... Wire-drag books, ..... Photographs.

Data from other sources affecting sheet . . . . .

- 3** Current Records.
- 9** Sheets Form 612 "Precise dead Reckoning"
- 1** Vol. "angles" containing record of Log Test.

Remarks: