3769

3769

Diag. Cht. No 1242 -2

Department of Commerce and Labor
COAST AND GEODETIC SURVEY

_____ Superintendent.

State: Georgia and Florida

DESCRIPTIVE REPORT.

Sheet No. **3769**

LOCALITY:

From St. Simons

Lighthouse

to

St. Johns River

1915

CHIEF OF PARTY:

R. F. Luce

11—4645

DESCRIPTIVE REPORT TO ACCOMPANY SHEET No. Field B.

LOCATION   Offshore Georgia and Florida, from St. Simons Lighthouse to St. Johns River.

AREA   The work on this sheet covers an area bounded on the inshore side by a line of buoys about 13 miles offshore and extending to the 100 fathom contour. The most northerly line lies in Latitude 31 17' (approximately) and extends eastward from Longitude 80 08' to the 100 fathom curve. The most southerly line begins at Buoy M in Latitude 30 21' and Longitude 81 12' and extends eastward to 100 fathoms.

The area covered is approximately 60 miles in E and W direction and 57 miles in N and S direction. The total area is approximately 3100 square miles.

SURVEY METHODS

SOUNDINGS The lines are spaced in general 4 miles apart and run in east and west direction, normal to depth contours. The soundings were taken with a hand lead to a depth of about 12 or 13 fathoms, at which depth change was made to the trolley. Soundings were taken at intervals varying from 1 minute to 5 minutes depending upon the depth of the water and time required to get a vertical sounding. The vessel was run at a speed of 4-1/2 to 5 knots per hour until such a depth was reached that a

vertical sounding could not be obtained. This occurred
at about 25 fathoms. From that point to about 40 fath-
oms it was found expedient to run at full speed 2, 3, or
4 minutes, drift for 2 minutes, and full speed again at
instant of taking sounding. Between 40 and 100 fathoms
soundings were taken every 1 mile by log with the Sigsbee
machine aft, the vessel running at full speed between
soundings and coming to a dead stop for the sounding. In
this way soundings were spaced from 150 meters apart at a
depth of 12 fathoms to 1 mile at a depth of over 40 fath-
oms.

CURRENTS. On each line to a depth of 25 fathoms the ship
was anchored at intervals of two hours to obtain current
observataions, a current pole being used for that purpose.
At a depth greater than 25 fathoms, anchoring the ship be-
ing impracticable, a buoy was anchored at 100 fathoms and
observations taken from a boat steadied at the buoy. Current
observations were also carried on at 30 minute intervals
when the ship was anchored for the night. In nearly all
cases the direction of the current was found to rotate
clockwise in accordance with the change in tide. Wind
had some influence upon the direction and amount of the
currents.

WIND. The general direction of the wind was southwest throughout the work. The wind velocities were obtained from anemometer readings taken with the ship at anchor, and the amount of leeway due to the wind and sea was applied at each anchorage to determine the course to be steered during the succeeding two-hourly period.

DETERMINATION OF POSITION. Each line was started from a sextant angle fix or a departure from a buoy and was run in to another similar fix. Courses were laid out for the two-hourly periods with the assumed allowance for observed current and leeway. Quite a number of sights upon the sun planets and stars were taken but the results from them were in general of little value in locating the lines since the liability of error of line of position was too great to give more than a rough check upon the ship's location.

Excepting the most northerly line, tha from buoy A, the error which was due to strong and inaccurately determine Gulf Stream Currents, the average error of closure through-out the work was quite small considering the impossibility of determining the effect of the Gulf Stream.

THE GULF STREAM. The impracticability of anchoring the vessel in depths greater than 25 fathoms made any method of allowing for currents beyond that line nothing more than

an arbitrary assumption. Currents observed at 100
fathoms showed no consistency in the action of the
Gulf Stream. Whether the Gulf Stream took effect grad-
ually or along a distinct line could not be determined,
and in two cases there apparently was no effect at all.
Taking surface water temperatures at intervals while under-
way was tried for a while but they gave little help in de-
termining the point of contact because it was found that
changes in temperature did not necessarily indicate a
change in current direction. All of which made arbitrary
methods of dealing with that part of each line the only
feasible way. Accordingly each line was plotted using it
as a unit and having no relation to any other line. In
the final adjustments of the lines greater weight was
thrown to that part beyond 25 fathoms, believing that the
probability of error there was greater than in that part be-
tween 12 and 25 fathoms.

LOG TESTS. The logs were tested by running at various
speeds over a known distance in both directions to elimin-
ate as far as possible effects of wind, sea, and current.
Tests were carried on under favorable weather conditions
and in localities little affected by current. The correct-
ions as found were applied to the log readings before plot-
ting, a mean of tests being used.

SWINGING SHIP. All the compasses were compared by swinging ship at intervals in the field season. The Sun was used for comparison. Curves were constructed for each compass and the values used were taken from the curves.

Values for variation were taken from the recent charts of that locality.

PLOTTING THE LINES. In plotting the lines on the fair sheet it was found best to plot all current observations of one line using one initial and to pass a curve through the points: A mean of the current for the distance between current stations was applied to the course and log distance in plotting each two-hourly period of the line.

Respectfully submitted,

R. F. Luce.

Assistant, C. & G. Survey,

Commanding.

Log Test
Off Shore Sheet B.

Luce 1915

~~Jill with~~
~~description~~
~~went for~~
~~the sheet.~~

SHELF MARK:

LOG FACTORS IN PER-CENT.
At about 60 R.P.M.   True dist. = $\dfrac{Log}{factor}$

Log No.	Mar. 3 test	Apr. 30 test	June 26 test.
119	108.5 (reject)	104	104.5
117	103.5	105.2	105.8
19	106	106	

Log Factors at diff. speeds in per-cent
True dist. = $\dfrac{Log}{factor}$

Speed (approx.)	Log # 117	Log # 119	Log # 19
5.1	104.5	104	107.3
6.6	104.1	—	106.7
7.9	105.7	—	105.9

Offshore sheet plotted using following Log factors:
Means.

SPEED	# 117	# 119	# 19
about 5.1	104.8	104.2	106.4
" 6.6	104.0	—	106.5
" 7.8	105.2	—	105.7

Log #19 was used to May 4
" #117 " " from May 4 to May 18
" #119 " " remainder of work.

CURRENT CURVE
LOG TEST OF JUNE 26

--- Recomputed
— 1st Computation
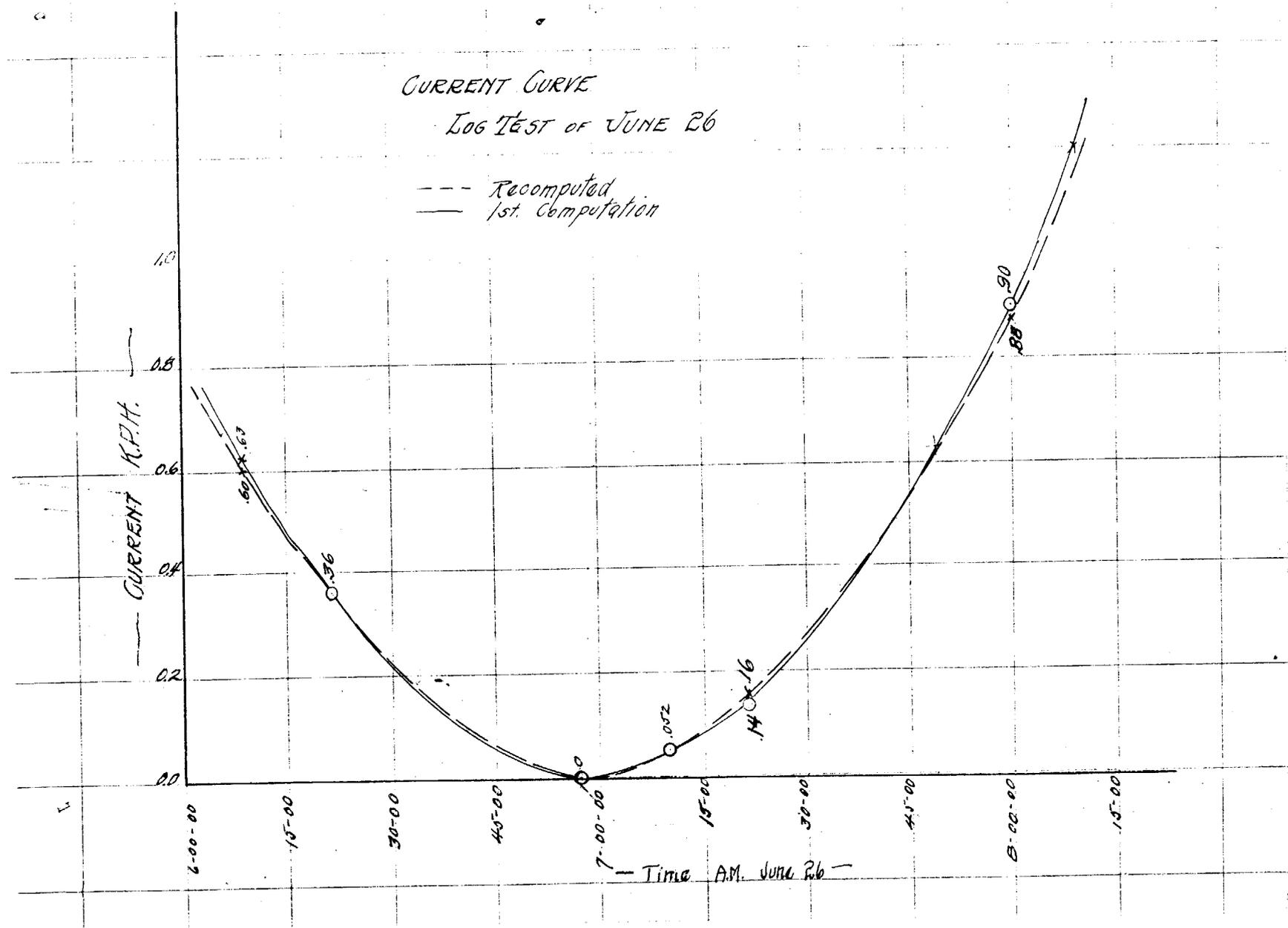
June 26 1925

Assuming #119 = 102% current constant for 1 complete trip.

Solving for current.

(#5 + #6)

$$\#5 \quad \frac{1.23}{1.02} = 1.205$$

$$1.205 - 1.00 = .205 \text{ current.}$$

$$\#6 \quad \frac{87}{1.02} = .853$$

$$1.00 - .853 = .147 \text{ current}$$

13	50
9	41

$$2\overline{)22 \quad 91}$$

11   46   av. time.

.205
.147

$$2\overline{).352}$$

.176   av. current.

$$\frac{.176}{11.76} \times 60 = .90 \text{ KPH value of current.}$$

(#3 + #4) By computations of april test.

at 60.2 RPM. speed 5.1
t 55.4 " " 4.47

Interpolating: at 61.2 " " 5.22

#3 therefore assumed correct + no current

#4 Interpolating : 59.4 RPM. speed 5.00

∴ current .14 K.P.H.

#1 + 2

#1 $\frac{.94}{1.02}$ = .923

1.00 - .923 = .077 current.

#2 $\frac{1.09}{1.02}$ = 1.068

1.068 - 1.00 = .068 current.

.077
.068
2).145
.07 2 av, current.

10   18
13   36
2)23   54
11   57 av. time.

$\frac{.072}{11.95}$ x 60 = .36 K.P.H. current.

DEPARTMENT OF COMMERCE

(handwritten calculations, upside-down)

No. 204
Ed. 5-11-14—300,000

June 26   V H D S.

	Current	Effective	#119	Effec. adj.	#119
#1	.63	.11	1.05	.11	
#2	.18	.041	1.05		
#3	.0	0	1.01		
#4	.14	.03	1.02		
#5	.63	.14	1.09		
#6	1.16	.19	1.06		

adjusted			#119	#119
1	.63	.11	1.05	1.06
2	.20	.045	1.045	1.055
3	.02	.004	1.006	1.044
4	.16	.031	1.021	1.021
5	.63	.14	1.09	1.13
6	1.16	.19	1.06	1.04
			C 6272	6635
			1.045	6.058

DEPARTMENT OF COMMERCE

June 26 A.D.G.

```
  62.4
  61.2
  63.5
 _____
3/187.1
  62.4  mean R.P.M.   Cruise 11°
```

```
 582
 59.4
```

Time Elapsed	M.P.H.	#119	#117	R.P.M.		
					6 04	15
1	10'-18	5.82	.94	.95	62.4	14	33
						6 26	20
2	3'-36	4.41	1.09	1.10	58.2	39	56
						6 51	51
3	11-29	5.22	1.01	1.04	61.2	7 03	20
						7 16	00
4	11-41	5.14	.99	.99	59.4	27	41
						7 42	10
5	3-50	4.34	1.23	1.27	63.5	56	00
						8 06	31
6	9-41	6.38	.87	.85	64.2	16	12

Dist	#119	%	#117	%	R.P.M.	Speed
1 mi.	1.02	102%	1.035	103.3%	61.5	5.22

DEPARTMENT OF COMMERCE

Recompute   June 26 L.D.G.

Assuming 119 = 1.046%

#5 +6)   #5- $\frac{1.23}{1046}$ = 1.175

1.175 - 1.00 = .175

#6 $\frac{.87}{1.046}$ = .831

1.00 - .831 = .169

$\begin{array}{r} .175 \\ .169 \\ \hline 2\,)\overline{.344} \\ \hline .172 \end{array}$ av time 11.76

$\frac{.172}{11.76}$ × 60 = .88 K.P.H. current.

#3 + 4) Current assumed going through #3, N thru #4.

#3 $\frac{1.01}{1.046}$ = .966

1.00 - .966 = .034

#4 $\frac{.99}{1.046}$ = .947 $\begin{array}{r} .033 \\ .034 \text{ subtract} \\ \hline 2\,)\overline{.019} \\ \hline .00\end{array}$

1.00 - .947 = .053

11:35 = 11.6 av. time

$\frac{.01}{11.6}$ × 60 = .052

#1 & 2   #1

$$\frac{94}{1.046} = .90$$

$$1.00 - 90 = .10$$

#2 $$\frac{109}{1.046} = 1.042$$

$$1.042 - 1.00 = .042$$

av. time = 11.95

$$\begin{array}{r} .10 \\ .042 \\ \hline 2\overline{)142} \\ .071 \text{ av. err.} \end{array}$$

$$\frac{.071}{11.95} \div 60 = .36 \text{ K.P.H}$$

DEPARTMENT OF COMMERCE

anchor | picked up.

$U - V$ = 1801.5 | 1827.5

$V - W$ = 1946.0 | 1939.5

$U \cdot W$ = 3747.5 | 3767.0

1 meter = 3.28 feet.

1 nautical mile 1853.25 meters,

log 1827.5 = 3.26186 ✓

= 3.26794 ✓

" 1853.25 = 9.99392 ✓

log dist = 0.9861 ✓

$U - V$ = 3.28769 ✓

" 1939.5 = 3.26794 ✓

log 1853.25 = 0.01975 ✓

log dist = 1.0465 ✓

$V - W.$

$U - V$ = 0.986 miles ✓ nautical

$V - W$ = 1.0465 " ✓

= 2.0325

```
    5.82              5.24
    5.22              6.12
    4.34              6.35
  3)15.38          3)18.71
    5.13              6.24


    .95              .94
   1.04             1.01
   1.27             1.23
  3)326          3)3/8
    1.09             1 06


   4.41             5.82
   5.14             5.94
   6.38             6.42
  3)15.93        3)18/8
    5.31             6.06


             1.09          1.10
              .99           .99
              .87           .85
            3)2.95       3)294
              98            98
```

April 30th 1915.

CAE.

Department of Commerce and Labor

Buoys	No.	R.P.M.	Course	Time	#19	#119	#117
W-U	1	59.2	186½	25'05"	2.15	2.14	2.13
	3	59.6	—	25'45"	2.19	2.16	2.14
Mean	—	59.4	—	25'25"	2.17	2.15	2.135
U-W	2	60.7	9½°	22'35"	2.15	2.09	2.16
	4	61.4	—	22'20"	2.13	2.07	2.13
Mean	—	61.0	—	22'27"	2.14	2.08	2.145
Mean	—	60.2	—	23'56"	2.155	2.115	2.14
W-U	5	55.0	186½°	29'10"	2.24	2.24	2.20
		50.8					
	7	51.1	—	34'50"	2.27	2.33	2.30
		52.9			+ 0.131	+ 0.131	+ 0.131
Mean	5-7	53.0	—	32'00"	2.255	2.285	2.250
U-W	6	57.1	9½°	22'50"	2.08	2.01	2.06
	8	58.5	—	22'20"	2.00	2.03	2.06
		9			+ 0.092	+ 0.092	+ 0.092
Mean	6-8	57.7	—	22'35"	2.04	2.02	2.06
Mean	5-7	Current counting	32'00"	2.124	2.154	2.119
"	6-8	"	"	22'35"	2.132	2.117	2.152
Mean		55.4 54.8	—	27'18"	2.128	2.133	2.136

101
918
920

102
99

6040) 341
5748) 672

3940
3764
1760

9900
9188
720
714
60

102
970
205
147
58

2.255
2.04

32
22 35
54'35"   .215

52.9
57.9
08

53.
57.7
2) 110 7
55.3

152
119
33

119
135

Department of Commerce and Labor

Buoys.	Trip dist.	#19	%	#119	%	#117	%
U-W	2.033	2.155	106 %	2.115	104 %	2.140	105.2 %
60 R.P.M.	gives	5.1	Knots per hour.		Time of above	23'58"
U-W	2.033	2.128	104.8 %	2.133	105 %	2.136	105.1 %
55.4 54.8 R.P.M.	gives	4.47	knots per hour		Time of above	27'18"

27
6
1620
18
1638

29
6
13 0
56
1436

0

0

3.600 / 4.15
3.320
2800 .87
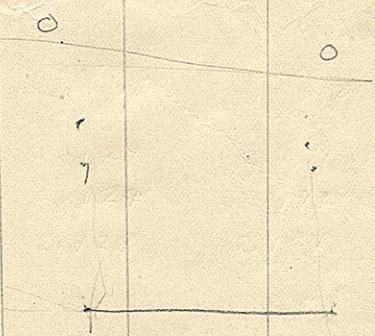
DEPARTMENT OF COMMERCE

Buoys.	1st meas.	2nd meas.	mean.	Corrected mean.
X - Y	1856	1857	1856.5	1856.7
Y - Z	1984	1984	1984.0	1984.2
Sum.	3840	3841	3840.5	3840.9
X - Z	3839	3843	3841	3840.8

1 nautical mile   1853.25 meters.

$$\log 1856.7 = 3.26874 \checkmark$$
$$\text{''} \quad 1853.25 = 3.26794 \checkmark$$
$$\text{''} \quad dist = 0.00080 \checkmark$$
$$\text{''} \quad X\text{-}Y \quad dist = 1.0018 \quad miles.$$

$$\log. 1984.2 = 3.29758 \checkmark$$
$$\text{''} \quad 1853.25 = 3.26794 \checkmark$$
$$\text{''} \quad dist = 0.02964 \checkmark$$
$$\text{''} \quad = 1.0706 \quad miles.$$
$$Y\text{-}Z \quad \text{''} = 2.0724 \quad miles$$
$$X\text{-}Z \quad \text{''}$$

14-05

16 08

1488

1229

9
9
8
91

2185
92

218
34
43
138
34

22
42

125
638
63

43
34

42

34

1341

41.0
52
65
32

137

26
32

R.P.M.	Knots.hr.	Time	Buoys	Inv. dist.	#119	%	#119	%	#117	%
60.7	5.10	24' 21"	X - Z	2.0722	2.242	108.5	2.212	106.8	2.145	103.5
76.9	6.56	18' 54"	X - Z	2.0722	2.268	109.5	2.205	106.5	2.155	104.0
91.8	7.82	15' 52"	X - Z	2.0722	2.255	108.8	2.190	105.7	2.180	105.2

March 3, 1915?

Department of Commerce and Labor

Buoys.	No.	R.P.M.	Course	Time.	#117	#119	#119
Z - X	1	59.6	206°	22' 43"	2.06	2.11	2.17
	3	63.8	—	21' 34"	2.08	2.13	2.18
		4			+ 0.081	+ 0.081	+ 0.081
Mean	1-3	61.7	206°	22' 09"	2.070	2.12	2.185
X - Z	2	54.3	26°	29' 16"	2.23	2.34	2.32
	4	64.8	—	23' 49"	2.24	2.30	2.35
					− 0.097	− 0.097	− 0.097
Mean	2-4	59.6	26°	26' 33"	2.235	2.320	2.835
	1-3				2.151	2.201	2.246
	2-4				2.138	2.223	2.238
Mean	1-3 2-4	60.7	—	24' 21"	2.145	2.212	2.242
Z - X	5	77.8	206°	17' 49"	2.10	2.12	2.20
	7	77.8	—	17' 49"	2.14	2.14	2.22
Mean	5-7	77.8	—	17' 49"	2.12	2.13	2.21
X - Z	6	77.2	26°	19' 45"	2.20	2.29	2.34
	8	74.6	—	20' 12"	2.18	2.27	2.31
Mean	6-8	75.9	—	19' 58"	2.19	2.28	2.325
Mean.	5-7 6-8	76.9	—	18' 54"	2.155	2.205	2.268
Z - X	9	89.9	206°	15' 50"	2.17	2.16	2.25
	11	97.0	—	15' 21"	2.21	2.17	2.26
Mean	9-11	93.5	—	15' 36"	2.19	2.165	2.255
X - Z	10	87.2	26°	16' 08"	2.17	2.21	2.26
	12	93.0	—	16' 09"	2.17	2.22	2.25
Mean	10-12	90.1	—	16' 08"	2.17	2.215	2.255
Mean	9-11 10-12	91.8	—	15' 52"	2.18	2.190	2.255

Statistics to accompany Hydrographic Sheet No. 3769

Date, 1915	Letter	Vol.	Positions	Soundings	Statute Miles	Vessel
March 23	A		38	374	41.0	Bache
" 24	B		157	246	116.7	"
" 25	C		83	895	101.8	"
" 26	D		84	310	94.7	"
" 27	E		20	226	34.9	"
April 8	F		11	103	10.5	"
" 19	G		49	443	52.3	"
" 20	H		100	324	86.9	"
" 21	J		18	188	18.5	"
May 3	K		21	203	22.2	"
" 4	L		92	336	74.1	"
" 18	M		32	274	33.7	"
" 19	N		50	328	59.5	"
" 25	P		27	240	29.5	"
" 26	Q		63	507	61.5	"
June 3	R		31	230	29.5	"
" 4	S		106	480	78.4	"
" 5	T		10	100	11.2	"
" 10	U		28	222	32.4	"
" 11	V		103	522	92.8	"
Totals			1123	6551	1082.1	

Statistics to accompany Hydrographic Sheet No. 3769

Date, 1915		Letter	Vol.	Positions	Soundings	Statute Miles	Vessel
March	23	A		38	374	41.0	Bache
"	24	B		157	246	116.7	"
"	25	C		83	895	101.8	"
"	26	D		84	310	94.7	"
"	27	E		20	226	34.9	"
April	8	F		11	103	10.5	"
"	19	G		49	443	52.3	"
"	20	H		100	324	86.9	"
"	21	J		18	188	18.5	"
May	3	K		21	203	22.2	"
"	4	L		92	336	74.1	"
"	18	M		32	274	33.7	"
"	19	N		50	328	59.5	"
"	25	P		27	240	29.5	"
"	26	Q		63	507	61.5	"
June	3	R		31	230	29.5	"
"	4	S		106	480	78.4	"
"	5	T		10	100	11.8	"
"	10	U		28	222n	32.4	"
"	11	V		103	522	92.8	"
Totals				1123	6551	1082.1	

CHARTS (H)

Off Coast of Georgia, by Assistant Luce

in 1915.

TIDES.

	St. Simon Light. ft.	Fernandina. ft.
Mean low water, or plane of reference on staff	3.3	2.9
Lowest tide observed " "	1.0	0.1
Highest " " " "	11.9	16.7
Mean range of tide	6.4	6.0

Allowance was made for difference in time of tides at

gauges and at place of sounding.

Hyd. Sheet No. 3769

The work on this sheet is done entirely by dead reckoning, and consists of lines run in an east and west direction and spaced about four miles apart.

Starting from a sextant angle fix or a departure from a buoy, the compass course, corrected for variation and deviation, was plotted and the corrected log distance laid off. The corrections for current and wind were then applied. This method was followed out to the end of the line and back again until a fixed point was reached, when the closure was made and the error distributed in the usual manner on some of the lines. On other lines, which extended far enough out to encounter the gulf stream, in the final adjustment the closing error was thrown to that part of the line beyond twenty five fathoms. (Explained more fully in Descriptive Report)

The closing error on most of these lines was remarkably small. Current readings were taken every two hours and without these current corrections, such results could not have been attained.

Accepting the methods as correct, the mechanical plotting of every line was tested and found to be carefully and accurately done, although errors were found in two lines which were taken out and entirely replotted.

Such portions of these lines as fall within the limits of the inshore sheet (Hyd. 3770), were plotted on it. Owing to the difference in scale, the soundings are not identical on these lines common to both sheets, but are shown more fully on Hyd 3770.

The curves drawn from these combined soundings on the inshore sheet were reduced and shown on this sheet.

All the information useful in plotting the dead reckoning work was entered in a separate volume and was found to be indispencable in plotting work of this character. A standard blank form should be compiled and printed for the use of parties doing similar work.

R. L. Johnston

Soundings shown in feet.

Protracted & plotted by field party
Plotting tested & soundings plotted & inked by R.L.J.