

4523

4523

Form 504

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

11-5613

State: N. S. Car.

DESCRIPTIVE REPORT.

Hyd. Sheet No. 4523

LOCALITY:

Atlantic Coast - C. Fear

Long Bay - Offshore

1925

CHIEF OF PARTY:

F. G. Engle

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APR 18 1926  
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~~Division of Hydrography and Topography:~~

Division of Charts:

Tide reducers are approved in  
7 volumes of sounding records for

HYDROGRAPHIC SHEET NO. 4523

Locality: N. Carolina

Chief of Party: F. G. Engle in 1925

Plane of reference is M L W  
5.1 ft. on tide staff at Fort Caswell

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 in "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.

*G. Wade*

Chief, Division of Tides and Currents.

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SHEET No. \_\_\_\_\_

SCALE 1:100,000

OFFSHORE PRECISE DEAD RECKONING HYDROGRAPHY TO 100 FATHOM CURVE

WEST AND SOUTH OF FRYING PAN SHOALS, NORTH CAROLINA.

"U.S.C. & G.S.S. LYDONIA"  
F. G. Engle, H. & G. Engineer,  
Commanding.

INSTRUCTIONS DATED APRIL 21, 1924, MAY 9, 1925.

This sheet covers precise dead reckoning Hydrography westward of work done in 1924. The area extends south of fixed position work on buoys in 1924 & 5 to the 100 fathom curve from Long.  $77^{\circ}45'$  to Long.  $78^{\circ}25'$ . In addition a line out and back to the position of the 100 fathom curve as shown on chart 1110 was run over the 1924 work south of Frying Pan Shoals whistle buoy to verify the position of the 100 fathom curve, in accordance with supplemental instructions dated August 6.

CONTROL:

The inshore ends of the lines were fixed by angles and bearings on buoys and lightship, and the lines were run by precise dead reckoning methods. These consisted of anchoring for currents every two hours, comparisons between steering and standard compasses by observation of azimuth, log and counter readings every 15 minutes and application of leeway and transfer corrections. Three log tests and three ship swings were made during the progress of the work. When possible sun and star sights were taken. The position of buoys were transferred from the 1:40,000 sheets and the position of the lightship determined by cuts from Cape Fear light and "Whis" and a P.D.R. run in one direction between "Whis" and the lightship, currents being observed at each end of the run. The agreement is good and checks the position of the lightship as determined in 1924.

In general, on the long lines on which stops were made for vertical casts, sounding was done only on the outward run and the inward run was made at full speed. This was to eliminate the possible errors due to the uncertain quantity of log loss when stopping. Log loss was estimated to be 0.05 mile at each stop and the leeway was estimated by the commanding officer for each course. The actual direction and velocity was also estimated as it is thought this estimation is all that is required for the estimation of leeway. Leeway was considered as normal to the course in accordance with seafaring practice. Lines were spaced 2 miles apart from the limits of the

Inshore Hydrography to the 15 fathom curve and 4 miles apart from the 15 to the 100 fathom curve.

The log factor varied .03 between the tests of July 15 and August 31 a rather large and unexplained change. The change was checked in the Test of October 6. The values of the second test were applied to the lines from September 2. A comparison between the log and counter readings was made on a separate form, in which the log and counter differences for each 15 minutes interval were entered. The corrected log differences were then entered and an actual counter factor was determined by the total log and counter differences for the two hour run between anchorages this factor was applied to the 15 minute counter differences to obtain distance by counter for comparison with corrected log differences. In several cases slight log losses were thus detected. The actual counter factor naturally varied for the different runs due to wind direction and strength. This computation serves also as a record for spacing the soundings.

The ship was swung for deviations on July 16 prior to commencing work and again on August 20 and August 31 by azimuth circle on the standard compass. Simultaneous comparisons were made between the steering and standard compass each time to obtain the deviations of the former.

The swings have a satisfactory probable error but the deviations of each compass varied from one swing to another to a large degree as shown in the following table for North and South headings (the mean directions of sounding lines)

	Standard		Steering	
	N.	S.	N.	S.
July 16	- 1.0	-0.9	-0.8	-3.3
August 20	- 2.6	-1.7	-3.6	-7.2
August 31	- 1.0	-0.7	-2.1	-4.0

The best compromise and the one which appeared to give the best agreement between the compasses judging from the 15 minute simultaneous readings taken on all lines is to use the standard compass deviations of July 16 until August 26 except on South course on July 31 when the mean of some good azimuths appear better, the standard deviation of August 31 swing from August 26 to September 1 and from September 2 the standard deviations from observed azimuths. For the steering compass use the deviations of July 16 to August 20 and the deviations of August 31, from August 20 on, ignoring in both cases the swing of August 20. The courses on the smooth sheet were plotted using the mean of the two compasses except on July 30 when the large closures indicated a preference for the steering compass.

The compasses of the Lydenia are not well placed for accurate results. The steering compass is in a small wheelhouse and within 8 feet of ventilators and 15 feet from funnel. The standard compass is on the boat deck directly over the wardroom settee and is about 15 feet from the hull. If the house on the Forward boat deck and the pilot house overhead were extended farther forward the standard could be placed on top of the pilot house and could be considerably greater distance from traffic and steel.

The adjustment of lines on the smooth sheet for closing error was made after plotting sights and due weight was given the sights in making the adjustment.

#### METHODS:

From the inshore ends of the lines to about 22 fathoms a trolley apparatus was used. From 22 to seventy fathoms the depths were obtained by tubes and stops made at intervals of 10 soundings for vertical casts. Graphs were constructed for correcting the tube soundings from the comparisons with the tube and wire depths at these stops. Over 70 fathoms all soundings were vertical casts and were taken at intervals of six minutes.

From A to D day inclusive, the trolley method used consisted in attaching the end of a sounding wire to the lead and hauling it up by an electric sounding machine forward, the leadsman being aft and handling the usual phosphor bronze center leadline attached to the lead. When the word to sound was given the man at the forward machine released the brake allowing the lead to descend to the bottom, the leadsman reading the line when the leadline was vertical under the chair and the lead on bottom. This method was used because it was apparently found favor with the Bureau and was used on the previous seasons' work of the Lydenia and some of the crew were experienced with it. The method however was troublesome due to the wire jumping the reel and the accuracy appeared questionable since there was some uncertainty as to the lead being on the bottom or being suspended by the pull of the forward machine. Furthermore it appeared that errors of one to four feet on the side of greater depth were caused by curvature of line since for a part of the descent the lead dragged a part of the line down horizontally or nearly so.

As soon as possible a different method was rigged. It consisted of the usual trolley cable and traveller using the after leadstand and an electric hauling reel aft. The traveller was hauled forward and aft by means of hauling wires led through suitable fairleads

at the inner and outer ends of the trolley booms to a reel mounted at the rail and turned by hand. One of the hauling wires was attached to the tripping hook and the lead was released with the traveller at any position along the cable by jerking the hauling wire. An important improvement on the usual trolley rig was added in the shape of a fairlead attached to the side of the traveller over which the leadline was placed before hauling forward and over which it payed out after release. As soon as the lead was released the traveller was hauled aft at a speed equal to the speed of the ship through the water, thus keeping the line vertical as the lead descended. Before the traveller reached the position of the leadstand the leadsman threw the line off the fairlead and read the depth by feeling the bottom as in ordinary hand work. All trolley work on this sheet from D day on was done in this way and the depths are considered very accurate. From E day on the new Fathometer sounding device was operated and a record made of its indications. The fathometer, bridge and recorder sounding clocks were frequently compared with the standard time piece the bridge watch which was frequently compared with the chronometer. In this way the soundings of the fathometer and the other soundings are fixed on the lines. The fathometer was tended by Lieut. (j.g.) Alfred Ogram, who did excellent work with the device. The fathometer during the time covered by the sheet was not giving very strong signals and at full speed in rough weather the strays were very troublesome, and in every thirty fathoms the record by the machine was very faint. Voltage variation affected the depth by this machine in a large degree.

TABLE OF STATISTICS

Date	1925	Letter	Volume	Position	Sounding	Miles Statute	Veswel Lydonia
July	16	A	1	10	227	17.7	Lydonia
July	17	A	1	10	313	33.8	"
July	23	C	1	16	421	51.3	"
July	24	D	1	14	256	40.0	"
July	30	E	2	26	216	37.6	"
July	31	F	2	26	219	40.4	"
August	5	G	2	5	138	22.3	"
August	6	H	2	17	117	27.4	"
August	7	J	2	8	227	37.1	"
August	7	J	3	7	45	15.6	"
August	14	L	3	35	29	42.1	"
August	27	M	4	14	137	23.9	"
September	2	N	3	12	248	40.0	"
September	3	P	3	13	169	34.4	"
September	4	Q	3	17	188	29.6	"
September	4	Q	4	57	168	53.5	"
September	14	S	4	5	159	25.2	"
September	15	T	4	33	76	17.2	"
October	7	U	4	13	224	42.2	"
October	8	V	5	6	119	18.9	"
November	22	W	5	13	254	37.0	"
Totals				<u>357</u>	<u>3980</u>	<u>687.2</u>	

DEPARTMENT OF COMMERCE

U. S. COAST AND GEODETIC SURVEY

AND REFER TO No. 11-DRM

WASHINGTON

January 3, 1928.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4523

Vicinity of Long Bay, South Carolina (Offshore)

Surveyed in 1925

Instructions dated April 21, 1924; May 9, 1925 (LYDONIA)

Chief of Party, F. G. Engle.

Surveyed by F. G. E.

Protracted by H. G. Warwick.

Soundings plotted by V. M. Gibbons.

Verified and inked by H. R. Edmonston, J. D. Torrey.

1. The records conform to the requirements of the General Instructions with the exception that in many cases in entering the lead line comparisons the entry for true length by standard was omitted. This omission raised a doubt whenever the unit for leadline correction was omitted. For example, with an entry of 9 (presumably fathoms) in the M column and -0.2 in the L-M column, it is uncertain whether this means -0.2 fathoms or feet. In one case (M day) this entry denoted 0 fathoms, 2 feet. However, since the records show that in practically all cases the original entries included merely the M and the L-M columns, it is assumed that the L column was entered subsequent to the field comparison and that the L-M column was misinterpreted by the party making the entry. It was therefore concluded that the entry -0.2 on M day was not 0 fathoms 2 feet but 0.2 feet. This is also based on a number of comparisons throughout the records where the unit of measurement was clearly indicated in the table of comparisons.

It is recommended that in all leadline comparisons the columns M and L should be filled in while making the actual comparison and the L-M column left as an office (field) procedure. This will afford a check on the correction should any question arise in the future and it will also lessen the possibility of slipping up on the + or - signs.

2. The plan and character of development conform to the General Instructions.
3. The plan and extent of development satisfy the specific instructions. Where the spacing of lines does not appear close enough on this sheet it is usually taken care of by an adjoining contemporary survey except in the vicinity of latitude 33° 00', longitude 77° 45' where a split line should be run as the spacing here is about 7 1/2 miles instead of the required four.
4. The information is sufficient for drawing the usual depth curves except the 100 fathom curve in the vicinity mentioned in paragraph 3.
5. The usual field plotting was done by the field party. The field adjustments of all the lines were accepted as plotted, so that no check was given to the ship's positions. The soundings were, however, checked for depth and location. The size of the soundings as plotted by the field party was much too large.
6. The junction with H. 4617 is satisfactory.

The junction with H. 4437 is not satisfactory. Where the present survey joins the east-west system of lines on H. 4437 the differences on crossings vary from 2 to 12 feet with the present survey being always the shoaler. As this was the same condition found on H. 4437 between the east-west system of lines and the diagonal system (see review, H. 4437, paragraph 3), it was evident that the soundings on the east-west lines on H. 4437 were too deep. This is further borne out by the fact that one of the lines on the present survey that overlaps the diagonal lines (hand lead) on H. 4437 agrees well with the soundings on that sheet. The cause of the discrepancy seems to be in the particular method of sounding used on the east-west lines on H. 4437 (the forward electric machine for hauling in the line, and the leadsman aft reading the depth). In such cases unless the line was truly vertical, the sounding obtained would be deeper than the true depth. This apparently is what actually happened. (See descriptive report, H. 4523, page 3, paragraph 4.) After consultation with the Chiefs of Field Records and Field Work it was decided to apply a 6 foot correction to the soundings on the east-west system of lines on H.4437 with the exception of the lines on Frying Pan Shoal, these having been taken with the hand lead. This correction was arrived at by taking the mean of all the differences between the two systems of lines wherever the two crossed. The resulting soundings, while not

representing the true depth in all cases, will approximate the truth close enough for charting purposes. It is for this reason that no change was made in the soundings themselves on the sheet (H. 4437), but the correction can be applied by the compiler to the soundings selected for the charts. This is covered by an appropriate note on the sheet.

The junction with H. 4468 is adequate considering the very weak control for H. 4468 (see review of this sheet). The line from 19 to 20 A (H. 4468) in longitude  $77^{\circ} 44'$  is considerably deeper than the line 11-12 D on H. 4523. It appears as though the line may be out of position. It is recommended that in charting this work that portion of the line that does not agree with the soundings on H. 4523 should be omitted.

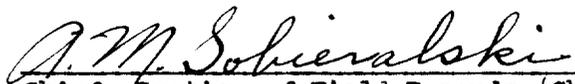
The junctions with the inshore sheets H. 4488 and H. 4323 are generally good. The 10 fathom curves on these sheets are approximately one to two miles further inshore than that on H. 4523. This error, however, is more apparent than real, the difference being due to the plotting of the sheet in fathoms instead of feet. The sounding records were referred to for obtaining the actual depths in feet on H. 4523 and a rough comparison was made with H. 4323 and H. 4488. Generally there was an agreement within 1 or 2 feet. The actual ten fathom curve on H. 4523 agreed well with the ten fathom curve on the inshore sheets. Since a portion of this sheet falls within the limits of chart 1236 (soundings in feet) the following recommendation is made for the application of this sheet to the charts:

- a. Use all the data on the inshore sheets H. 4488 and H. 4323 as far offshore as they extend. This will for the most part take in the 10 fathom curve as shown on H. 4523.
- b. Between the limits of the inshore sheets and the 10 fathom curve as plotted on H. 4523, two feet should be added to all the soundings on H. 4523 after they are converted to feet before they are applied to the 80,000 scale chart. This will take care of the area in latitude  $33^{\circ} 35'$ , between longitudes  $78^{\circ} 00'$  and  $78^{\circ} 10'$ , the 10 fathom area in latitude  $33^{\circ} 34'$ , longitude  $78^{\circ} 20'$ , and the 10 fathom areas in latitudes  $33^{\circ} 34'$  to  $33^{\circ} 35'$ , longitudes  $78^{\circ} 25'$  to  $78^{\circ} 30'$ .
- c. Beyond the limits of the inshore sheets the usual method of converting fathoms to feet should be followed in applying the soundings from H. 4523 to the 80,000 scale chart.

The junction with H. 4615 will be taken up in the review of that sheet.

7. Attention is called to the fact that the 20 fathom tube sounding between positions 1 and 11 T (vol. 4, page 39) was omitted from the sheet upon recommendation of the Chief of Field Work. The sounding falls between 30 fathom soundings, but the fathometer failed to disclose any such depths and it was therefore assumed that the tubes did not reach bottom.
8. No additional work is necessary except as mentioned in paragraph 3 above.
9. Character and scope of field operations - very good.  
Field drafting - good.
10. Reviewed by A. L. Shalowitz, November, 1927.

Approved:

  
\_\_\_\_\_  
Chief, Section of Field Records (Charts)

  
\_\_\_\_\_  
Chief, Section of Field Work (H. & T.)

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. 4523

State <sup>N. and S.</sup> ~~North~~ Carolina

General locality Atlantic Coast - C. Fear

Locality Long Bay - Offshore  
~~Off Frying Pan Shoals~~

Chief of party F. G. Engle H. & G. Eng'r.

Surveyed by F. G. Engle H. & G. Eng'r.

Date of survey July 16, 1925 to November 22, 1925

Scale 1/100,000

Soundings in Fathoms

Plane of reference M. L. W. Fort Caswell Tide Gauge

Protracted by H. C. W. <sup>arwick</sup> Soundings in pencil by V. M. G.

Inked by H. R. Edmonston . . Verified by H. R. Edmonston - J. D. Torrey  
J. D. Torrey

Records accompanying sheet (check those forwarded):

Des. report,  Tide books,  Marigrams, 1 Boat sheets,

5 Sounding books,  Wire-drag books,  Photographs.

Data from other sources affecting sheet 2 **Fathometer sounding books,**  
**1 Envelope of Fort Caswell tides and tide reducing curves,**  
**1 Envelope of P. D. R. computations, 1 Envelope of Log and**  
**Counter comparisons, 2 Envelopes of Ship Swings, 1 Envelope**  
**of Current Diagrams and Tube comparisons, 1 Envelope of**  
**Sights on P. D. R., 6 Record of Current Observation books,**  
**2 Horizontal Angle books, 1 Book of Log Tests, 1 Log of P. D. R.**  
**runs and positions.**