

5274

U. S. COAST & GEODETIC SURVEY
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Ed. June, 1928

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

State: MASSACHUSETTS

DESCRIPTIVE REPORT

~~Topographic~~ } Sheet No. 5A 5274
Hydrographic }

LOCALITY

Georges Bank

SW. of Georges Bank

East of Nantucket Shoals

1932

CHIEF OF PARTY

L.O. Colbert

5274

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

UN 19 1932

REG. NO.

5274

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. 5 A

REGISTER NO. **5274**

State MASSACHUSETTS

General locality GEORGES BANK

Locality Southeast of Nantucket Shoals Lightship
Aug. 9 and Sept. 7,

Scale 1:100,000 Date of survey to Sept. 21, 1932

Vessel HYDROGRAPHER, OCEANOGRAPHER

Chief of Party W. E. PARKER, L. O. Colbert

Surveyed by W. E. PARKER, L. O. Colbert

Plotted
~~Constructed~~ by E. B. BROWN, R. H. Tryon, Jr.

Soundings penciled by E. B. BROWN, R. H. Tryon, Jr.

Soundings in fathoms feet

Plane of reference MEAN LOW WATER

Subdivision of wire dragged areas by NONE

Inked by B.G. Jones & W.H. Bamford

Verified by " " " " " "

Instructions dated MAY 16, 26, 1932

Remarks:

RWW 9/15/92

Prot A C. Klahre Jr
Crawled J.C. Conrath

DESCRIPTIVE REPORT
TO ACCOMPANY SHEET NO. 5A (OCEANOGRAPHER AREA)

DATE OF INSTRUCTIONS:-

Instructions of May 16, 1932, Project H.T. 107.

LIMITS AND SCALE:-

This sheet was surveyed on a scale of 1:100,000 and covers that portion of Georges Bank enclosed by Latitudes 39° -- $45'$, 40° -- $58'$ and Longitudes 68° -- $45'$, 69° -- $40'$.

The sheet is joined by Sheet No. 6 on the north side, by Sheet No. 3 on the northeast side, and by Sheet No. 5 on the east side.

SURVEY METHODS:-

The area on this sheet was surveyed by standard R.A.R. methods, using the Survey Ships LYDONIA and GILBERT as floating hydrophone stations.

REDUCTION OF SOUNDINGS:-

The predicted tides for Cultivator Shoal furnished by the Washington Office, were used in reducing soundings taken westward to the 69th meridian up to and including position No. 164C.

The remainder of the soundings were reduced by means of a tide curve based on the predicted tides for Newport, R.I. with the time three hours and forty minutes later and the mean range one half as large.

At the point of change in method, there is a difference of three feet in the reducers which makes a difference of one fathom in the plotted soundings for that point. *See also the attached report from Division of Tides and Par. 4 of Verifiers report.*

The fathometer correction was obtained from a graph drawn with fathometer comparisons plotted against time. The graphs were drawn for each period during which the fathometer was in continuous operation.

POSITION PLOTTING:-

Positions were plotted from bomb arcs, log distances corrected by log factor and compass courses. The greatest weight was given the bomb arcs unless they appeared to be in considerable error, in which case, either one or both arcs were rejected and the position plotted by dead reckoning.

There is an area about eight miles wide (in Latitude) between Buoys SW and SO in which the bomb arcs failed to meet. No adjustment was made for this discrepancy which came in the middle of the lines, as it was thought that the control was sufficient on the ends of the lines.

In general, the bearings taken did not agree with the bomb arcs and were, in most cases, rejected.

CROSSINGS:-

The crossings on this sheet are good, being in general, two fathoms or less.

Special mention is made of the following:-

1. The HYDROGRAPHER line 18G to 22G appears from the OCEANOGRAPHER'S soundings to have been plotted too far to the northward. It is recommended that the line either be moved about one and one half miles southward or rejected.
2. OCEANOGRAPHER'S 47E to 50E is one to two fathoms shoaler than HYDROGRAPHER'S line 1D to 3D which it adjoins.
3. HYDROGRAPHER'S line 41F to End Line is consistently one to two fathoms shoaler than the OCEANOGRAPHER'S lines which it crosses. As this line is well controlled, no explanation can be offered for the discrepancy unless it be the difference in the two fathometers.
4. OCEANOGRAPHER'S 6G to 9G is two to five fathoms deeper than the turn near HYDROGRAPHER'S 3C. This discrepancy is probably due to the OCEANOGRAPHER'S type 312 fathometer which was sometimes erratic.

Respectfully submitted:

Raymond H. Tryon Jr.

R.H. Tryon, Aid, C&GS.
Ship OCEANOGRAPHER.

Approved and forwarded:

H.A. Seran

H.A. Seran, Comdr., C&GS.,
Commanding Ship OCEANOGRAPHER.

STATISTICS

SHEET NO. 5A

OCEANOGRAPHER

<u>Day</u>	<u>No. Positions</u>	<u>No. Soundings</u>	<u>Statute Miles</u>
A	37	412	78.4
B	66	641	118.5
C	164	1559	326.0
D	104	1108	261.0
E	96	1049	197.6
F	138	1222	286.4
G	97	916	167.0
Totals	702	6907	1435.9

DESCRIPTIVE REPORT TO ACCOMPANY

HYDROGRAPHIC SHEET No. 5-A

VICINITY: SOUTHWEST OF GEORGES BANK

PROJECT No. HT-107

U. S. COAST AND GEODETIC SURVEY SHIP

"HYDROGRAPHER"

W. E. PARKER,

Chief of Party.

DATE OF INSTRUCTIONS:

May 16, 1932.

SURVEY METHODS:

The signals used on this sheet were located by a scheme of (R A R and sun azimuth) triangulation. The original base was determined by a series of astronomic fixes combined with a series of R A R distances. The scheme was adjusted to shore triangulation on Cape Cod.

The positions were obtained by standard R A R methods using two floating hydrophone stations. In several instances distances were obtained from only one station. In this case the line was plotted by dead reckoning and adjusted between two fixed positions, using one arc and the dead reckoning for the final fix. When distances from either station appeared to the plotter to be in considerable error they were rejected. In all cases, before rejecting a distance, the plotting was carefully checked and the chronograph tape was reviewed. In some cases it was discovered that the return signal was surrounded by

interference caused by either water noises or radio noises. Where there is interference, it is often times impossible to obtain a correct distance. The following are cases where other methods than straight R A R plotting were used:

September 7, 1932, A day. Positions 8 to 15 were plotted by dead reckoning and adjusted for closure also to the arcs from 2NS.

September 14, 1932 B Day. There are apparently two errors in the record book at the beginning of B day. These errors, which are explained in the record book, consist of a bearing on the buoy and a course. The plotter kept a rough sheet on which all hydrographic data were kept and from which the correct course and bearings were obtained. ?

September 15, 1932 C day. On position 4 the arc from the Gilbert was not used - the position was determined by a course and log distance that would be in agreement with positions 5, 6, and 7 - also by course and distance from position 3 - these two methods checked a position on the arc from (the Lydonia at) SO.

Positions 10 to 17 inclusive were plotted by dead reckoning and adjusted to arcs from (the Gilbert at) buoy SW - the adjustment was made between fixes, positions 8 and position 18 - arc from SW position 17 was rejected - it was assumed by the plotter that the ship did not start turning on position 11 but at 02:45:25 or one minute and 25 seconds after the position - this allowed 1 minute and 20 seconds

for the turn which is about a mean time required to make a 90° turn - in this way the arcs on positions 10, 12, and 13 were in agreement with each other - also other data (as courses, log runs, and time) between these positions were in agreement.

Position 28-C: The approximate arc from SO could not be used - it was apparently about 300 m. too long.

Position 29-C: The arc from SO was rejected, it was improbable that any stage of currents could have caused the ship to be in position of this arc - there was no arc from SW on this position. The SO arc was approximately 400 m. in error.

Positions 45 to 55 were plotted and adjusted between positions 44 and 56 by dead reckoning and adjusted to the bomb arcs. Arc 53 (from SW) was rejected - this arc was questioned in the record book by the chronograph officer. All other arcs were used.

Arc 54 was entered in the Sounding Record as being from SO; However this arc was used in plogging from buoy SW, and was O.K.

Positions 71, 72 and End Line: There is a very large jump between position 72 and End Line (which was determined by a bearing and range finder distance to buoy SW). However there are several solutions that the plotter may offer but he cannot be certain until the Oceanographer's soundings are plotted. 1st: The arcs

from SO on positions 71 and 72 are too short by an average of 450 meters (approximate). The distances from SO on these positions are very long in comparison with the distances from SW and the fixes are not strong - therefore it is possible that these fixes may be in error even though they are in agreement with each other. If the above is the case, positions 71 and 72 could be plotted by dead reckoning and adjusted between position and End Line holding the arcs from SW as a fix - this adjustment would place the positions in positions as follows: Position 71 bearing 187.4° - 618 meters from the position 71 as plotted at present - position 72 bears 188.4° - 1000 meters from the plotted position. 2nd: There may have been an error of 100° in taking the bearing for position End Line - if that could be possible the position End Line would be in agreement with the bomb fixes positions 71 and 72 - Position End Line would in that case bear 50° distance 1774 meters from the plotted position. These positions are now plotted from the data taken for each individual fix, disregarding the course steered between position 72 and position End Line. When the soundings are plotted on the sheet the error (if any) may be easily determined. The plotter believes that a sudden change in current could not have caused such an error (which is 10° approximate in direction and 0.35 mile in distance.

After Sdgs. by oceanographer were plotted This line was plotted as a D.R. Line between Pos. 70 and E.L. Arcs from SW. were held and Arcs from SO rejected B.G.J.

September 19, 1932 D Day: Position 22 - There is

some question in the mind of the plotter concerning arc SW on this position. The plotter checked all data on this position and can find no error. This position, seems to be too far to the northwestward to be in good agreement with other data.

Positions 26, 27, 28 and 29: The plotter believes that all arcs from SO on these positions are in error - The arc on 26 is too long and arcs on 27, 28 and 29 are too short. The line was plotted by dead reckoning and positions 25 and 30 seemed to be correct also arcs from SW on position 26 and 29 - There would be a very large jump in the line if arcs from SW were used on positions 26, 27, 28 and 29.

Positions 34 to 50: There were several poor bomb arcs between 34 and 50 - This line was plotted by dead reckoning between positions 34 and 50 and adjusted to as many arcs as possible, rejecting those arcs that varied too far from the closed line. The following arcs were rejected: SW and SO position 35 - SW position 38 - two probable values of SO position 41 - a questionable value SO position 42 - a questionable value SW and value SW position 45 - SO position 46 - SW position 49.

Positions 45 and 47 were in fairly good agreement to establish the beginning of the line. Positions 48 and 50 were in good agreement to establish end.

Position 64 - Reject both bomb arcs - Plotting for-

ward from position 63 and back from 65 a position for 64 is established - There was interference on the tape which probably obliterated the true bomb returns.

September 20, 1932 E day: Position 4 - Reject both arcs - the arcs can in no way be coordinated with the adjoining fixes using course, log run, or time on course - The tape for this bomb looks OK so the plotter can offer no explanation for its being in error.

Position 7 - Reject arc SO (Lydonia). This arc is too short - possibly some water noise tripped the key a little before the bomb signal came in - there is no way to tell where the true signal came in in this case.

Position 11 - Reject arc SO (Lydonia) - arc too long - no explanation.

Position 10 and 12 are in agreement and do not check arc SO (Lydonia).

Position 14 to 20 - There was a considerable amount of noise between these bombs and it was very hard to get a true fix. The following arcs were rejected: Position 15 SW - 16 all arcs - 17 SW (Longer arc). There is a jump in this line but this may be due to irregular currents

Positions 55 to 64 - This part of the line was plotted by dead reckoning and adjusted to single arcs - positions 55 and 64 were intersections of two arcs and were used as fixes to determine intermediate positions - The fix on 62 was poor and was rejected - this line crosses a well fixed line in two places and may be adjusted farther

by soundings.

September 21, 1932, F Day: Positions 2 to 21. This line was fixed by cross arcs on positions 9, 10, 15, 16, 18, 19 and single arcs on other positions. The beginning of the line was back plotted by course and log factor established by positions 9 and 10 and was adjusted to the single arcs from SW. The end of the line was fixed by plotting forward from positions 18 and 19 and adjusting to arcs from SO.

August 9, 1932, G Day: This day is a continuation of H day Sheet 5 and is recorded in Volume 3, Sheet 5, pages 65 to 70 - The positions are numbered from 18 to 28 inclusive in accordance with H day Sheet 5.

One of the control stations (Station Gil) does not fall on Sheet 5-A. Therefore positions 18 to 20, inclusive, were plotted on Sheet 5 and transferred to Sheet 5-A. Positions 21 to 28 inclusive, were plotted on the aluminum sheet (on which the survey buoys were plotted). The positions were then transferred to Sheet 5-A;

Reject arcs from S (Lydonia) on positions 18 and 19 - Interference was very bad on these two bombs from the Lydonia and it was practically impossible to get a correct value for the distances.

Soundings below 120 fathoms were taken with fathometer using the fast red light method with the striker. Soundings between 120 fathoms and 160 fathoms (approximate) were taken with the fatho-

meter using slow red light method with the striker. Soundings above 160 fathoms (approximate) were taken with the fathometer using the slow red light method with the oscillator. The fathometer was compared with vertical cast soundings at various depths * and an index error determined for the various methods of each day.

The crossings on this sheet are generally good.

DISCREPANCIES:

The soundings between 130 fathoms and 147 fathoms are questionable between positions 32 B and 33 B. These soundings were taken with the fathometer using slow red light method with the oscillator. It was later discovered that soundings below 150 fathoms taken by this method are not reliable. The soundings in question cross the soundings between positions 42 B and 43 B. The latter soundings were taken with the fathometer using fast red light with the striker and are good soundings. The positions are well controlled on both lines. It is recommended that the former soundings be rejected.

The crossings of soundings between 50E and 52E with soundings between 61D and 62D also with soundings between 24D and 25D are poor. It appears that either the soundings between 50E and 52E are too low or the positions of the soundings are too far to the south. However, all lines concerned are well controlled. The slope of the bottom is very steep and the discrepancies could be caused by small errors in the velocity of sound used in computing the bomb distances.

The crossing of soundings between 54E and 55E with those in vicinity of Position 70E is not good. The soundings between 54E and 55E seem to be too high. The soundings between 55E and 56E seem to be too high as evidenced by a crossing with soundings between 39D and 40D. These soundings are all deep and on a sloping bottom. The positions in question are well controlled.

The crossing of soundings between 18B and 19B with those in vicinity of 84E is poor. The soundings on the B day line seem to be too high. The control on both lines is good.

The crossing of soundings between 72C and the end of the line with soundings 98E and 99E is not very good. Soundings on the C line seem to be too deep by about 1 fathom. There is some question in the mind of the plotter as to the position of the soundings from position 70C to the end of the line. The fixes on 71C and 72C are very weak. This line crosses the Oceanographer's work and a better determination as to the cause of this discrepancy can be made when all of the soundings are on the sheet.

* This Line 71C
To End of day has
been replotted - see
note on Page 69
Sdg. Vol 5. B.G.f.

COMPARISON WITH PREVIOUS SURVEYS:

A submarine gorge was discovered at Lat. $40^{\circ} 05'$ Long. $69^{\circ} 04'$ (approximate) that was not discovered on previous surveys. This gorge represents a dip in the 100 fathom curve (approximate) six miles in length and 1.7 mile (approximate) in average width. This gorge was well developed with longitudinal and cross lines.

There is another dip in the 100 fathom curve 6 miles

approximate to the eastward of the gorge described above. The latter dip is only two miles approximate in length and five miles in width. The 100 fathom curve is very smooth on the old chart of this area.

Respectfully submitted,

Edward B. Brown, Jr.

Edward B. Brown, Jr., Aid,
Coast and Geodetic Survey
Ship "HYDROGRAPHER".

Examined and approved
J. G. Parker
Chief of Party

STATISTICS FOR SHEET, FIELD NO. 5-A

Day	Date 1932	No. of Positions	No. of Soundings	No. of Statute Miles of Sound- ing line.
A	Sept. 7	20	365	69.6
B	Sept. 14	45	584	113.3
C	Sept. 15	72	1030	200.6
D	Sept. 19	73	923	214.2
E	Sept. 20	105	1372	268.7
F	Sept. 21	49	614	65.7
G	Aug. 9	11	132	45.1
Total		375	5020	977.2

Division of Hydrography and Topography:

July 22, 1933.

Division of Charts:

Tide Reducers are approved in
7 volumes of sounding records for

HYDROGRAPHIC SHEET 5274

Locality Southeast of Nantucket Shoals Lightship

Chief of Party: L. O. Colbert and W. E. Parker in 1932

Plane of reference is mean low water, reading

* 3.3 ft. on tide staff at Commonwealth Pier No. 5, Boston, Mass.
18.2 ft. below B. M. 7

* Allowance made for time and range of tide at working grounds some 30 or 40 miles southeast of Nantucket Lightship. However, the tide reducers entered and checked by the field party of the "Hydrographer" in volumes 5, 6 and 7 and by the field party of the "Oceanographer" in volume 1 and that part of "C" day (Sept. 14, 1932) in volume 2, were for the tide at Cultivator Shoal, Georges Bank, some 80 miles to the eastward of the actual working grounds, by applying to the tide curve for Boston a time allowance of approximately minus (-) one hour and a range factor of approximately one-half.

(other side this sheet)

Condition of records satisfactory except as noted below:

Paul Whitney

Chief, Division of Tides and Currents

Report on sheet No. 5274 - Georges Bank

Chief of Party: W.E. Parker, Ship Hydrographer

L.O. Colbert, Ship Oceanographer

Surveyed by: W.E. Parker and L.O. Colbert

Positions Plotted by: E.B. Brown and R.H. Tyson

Soundings Plotted by E.B. Brown and R.H. Tyson

Verified and inked by: B.G. Jones and W.H. Bamford

Section of work inside 50 fm curve
verified and inked by B.G. Jones
section outside the 50 fm curve
verified and inked by B.G. Jones and
W.H. Bamford.

I The Survey methods, Records, and Smooth Plotting conform to the general instructions. The smooth sheet was neatly and carefully plotted.

II The temperature observations, computation of R.A.R. velocities, T_m corrections, and as on, are contained in 5 cahiers of survey data filed in the Library as Misc. Data, Georges Bank 1932, D 536.

III Tide Reducers - Refer to Page 1 of the
 Base Report and to the attached report from
 the Division of Tides and Currents.

Reducers from the predicted tides
 of Cullivator Shoal were used for all the
 sdgs. by the Oceanographer up to Pos. 164 c.
 From Pos. 164 c to the end of the Oceanographers
 work (which includes all sdgs. by Oceanographer
 west of the 69th meridian) the tide reducers
 were taken from the predicted tides of Newport, R. I.
 All sdgs. by the Hydrographer on this wheel
 were reduced from the predicted tide
 curves for Cullivator Shoal. Therefore in
 the area west of the 69th meridian at
 certain stages of the tide the reducers
 for the same time of the day as used by
 the two whips differ by about $\frac{1}{2}$ fm.

No correction has been made for
 this discrepancy as the difference is
 not large enough to materially affect
 the depths on this wheel. In some cases,
 however, this condition does account
 for differences of 1 fm. at the crossings.

IV Position Control Refer to Par. headed "Position Plotting" on Page 2 of the Descriptive Report:

The fact that the distances arcs for positions on or near the line between Buoys "80" and "8W" fail to meet over nearly the whole length of the line, a distance of about 40 miles, apparently indicates some error in the length of the line itself or in the velocities used for the position control.

The cause of this discrepancy was not established in the field and has not been investigated closely in detail while verifying the sheet. However, the distances by which the arcs for several positions on this line fail to meet do not indicate that the intersections north and south of the line are likely to ~~usually~~ be in error to any considerable extent.

This condition may be partly caused by errors in the Hydrophone positions and possibly by variations in the bottom velocities along the bombed lines. The latter is indicated to some extent by the changing bottom velocities determined at Buoy "80":

See next page -

IV continued - Bottom velocities computed from observations at buoy "80" during the survey operations.

Sept 14 (in 37 fms)	- 1506.7 meters/sec
	1505.8
Sept 15 (in 37 fms)	1505.2
(in 37 fms)	1501.9
Sept 19 (in 38 fms)	1497.6
(in 37 fms)	1498.3
Sept 20 (in 37 fms)	1499.0
(in 37 fms)	1498.6
Sept 21 (in 37 fms)	1505.9
	1506.5
	1507.1

II Crossings: The crossings are good except for a number of 2 fm. crossings along the 50 fm. curve and North of the 50 fm. curve. These 2 fm. differences occur where the lines of the 2 whips cross

The fathometer corrections to soundings in this area were obtained directly from the V.C. comparisons recorded in the sounding volumes.

1. Hydrographer's line 18 to 281^S (blue) - See Desc. Report Page 7 - From Pos. 18 to 219 this line shows 2 to 4 fms. greater depths than the oceanographer's lines which it crosses. The plotting and transfer of these positions have been checked. The arcs from one of the swings on Pos. 18 and 19 did not come in correctly due to interference and the line plots North of the course entered from Pos. 18. However, portions 17 and 18 H on H 5273 from which this line depths appear to be correct and there is not enough evidence to warrant replotting these positions on both sheets. This difference at the crossings may also be due to some variation in the index correction of one or both of the fathometers. These ridges from

positions 18 to 21 G have therefore been omitted. The crossings along the remainder of this line 21 G to 28 G are satisfactory except between positions 24 to 25 G (blue). These edgys. agree with the edgys between Pos. 44 to 45 F (blue) but differ by 2 fms with the oceanographers line 65 to 66 F. all positions here are well controlled and the difference seems more likely to be due to a change in the index correction to one of the fathometers.

2. Lat. $40^{\circ}07'$, long $69^{\circ}25'$ to $69^{\circ}35'$ - refer to Par. ^{3 and} 4, Page 2, Desc. Report - from long. $69^{\circ}25'$ west to the limit of the whet the oceanographers work (red) joining the Hydrographers work (blue) along the 50 fm. curve whous generally 2 fms. greater depths.

This section of the 50 fm curve as controlled by the soundings from both whips is obviously incorrect. Drawing a separate curve for each whips work there are two curves which differ by as much as $2\frac{1}{2}$ miles.

There is no indication here that these differences are caused by the plotting of the lines

The fathometer corrections have been

checked and are correct as taken from the V.C. comparisons. The V.C. comparisons used to correct these edgs were made in 38 to 40 fms so that no appreciable error is due to a difference in the actual velocity values between the depth of comparisons and the depths at these crossings.

The oceanographers edgs in this area, F and G days were made with the oscillator 7m with a V.C. comparison at the end of G day. The Hydrographers soundings were made with the oscillator ^{impact} 7m. with V.C. comparisons at or near the beginning and end of the days work.

The more probable cause for these differences is a variation of the index error of one or both fathometers between the times when V.C. comparisons were taken.

There are more edgs. from the ~~oceanog~~ Hydrographers work here and the 50 fm. curve has been plotted on these edgs. all edgs. of the oceanographers above 50 fms and falling inside this curve have been omitted.

The change in index error of the fathometers seems to be a more probable explanation also of the ^{24m} 7 crossings along line 41 to 48 F (blue)*;

* see page 2 of same report

and of the 2 fm. differences between along
 Oceanographer line 5 (red) where it
 runs between and crosses the Hydrographer
 lines North of the 50 fm. curve.

3. Lat 40°-13', Long 69°15' - Hydrographer
 line 1 to 3 is blue. shows ~~to~~ 1 fm. more
 water than the Oceanographer line which it
 crosses. 50 fm. curve has been drawn
 thru the Oceanographer edgs. and the 51 fm
 edgs of the Hydrographer above the curve omitted.
 The actual difference here is only about 3 feet.

4. Lat 40°-18', Long 68°-56' Hydrographer
 line 70 D to 71 D shows 1 fm. more water
 than the Oceanographer line which it crosses. ✓
 The 50 fm. curve has been drawn on the
 Oceanographer edgs. and ^{the} edgs. of the
 Hydrographer omitted between Pos. 70 and 71 D.

5. Lat 40°-18', Long 68°-56' - Hydrographer
 line 55 to 56 ^(blue) shows 1 to 2 fms more water
 than Oceanographer line 2 to 50 (red). Both
 ships using impact fathometer. No error in
 positions indicated. Fathometer corrections checked.
 Difference possibly due to variations in index
 cor. to one or both fathometers. 50 fm curve is

drawn on the Oceanographer sds. and the sds. of the Hydrographer above 50 fms omitted inside of this curve.

Hydrographers work south of the 50 fm. curve:

See Page 7^{and 8} of Desc. Report for type of f.m. used at various depths.

For computation of the f.m. corrections see refer to "Fathometer comparisons and Table of Corrections", and "Analysis of Serial Temp. and Velocity corrections" filed in the cabinet of Misc. Data, Hydrographer, Groves Bank, 1932.

A few minor corrections to crossings in this area have been made as follows:

1. Lat $39^{\circ}-53'$; Long. $69^{\circ}-36'$ Line 17 to 24 B.
~~Line 17~~ Between positions 18 and 20 B this line crossed Pos. 84 E plotting a 597 fm. sdy. on a 467 fm. sdy. Line 17 to 23 B as first plotted was considerably off course. ✓
 The line has been replotted on course and the arcs from Bury "SW". On replotting the line on course it was necessary to reject arcs from "80" on positions 21 and 22 B.

The arc from "80" was not plotted by the field party on Pos. 20 B, presumably because it threw the line too far to the westward and the arcs from "80" on portions 21 and 22 have been rejected in the office for the same reason.

2. Lat. $39^{\circ}-57'$, long. $69^{\circ}-31'$ - see Page 8 of the Desc. Report. Between Pos. 32 and 33 B. rdgs from 147 fms. to 131 fms inclusive have been omitted on the sheet in conformance with the note on page 30 edg. Vol 5 which questions these rdgs.

3. Lat. $39^{\circ}-54'$, long $69^{\circ}-10'$ - Between Pos. 56 and 57c. the 427 and 532 fms. rdgs. falling between 662 and 632 fm rdgs. have been omitted as strays in accordance with the note on Page 62 of Edg. Vol. 5.

4. Lat. ~~40~~³⁹ $^{\circ}-57'$, long $69^{\circ}-00'$ line 58 to 57 E has been bent slightly eastward and replotted from Pos. 58 to 59 E
~~65 to 69~~

VI Junction with other surveys. The junctions with sheets #5271, #5273, and #5275 are not shown as those sheets have not been verified ✓

VII The 50 fm. curve as shown on this sheet is generally from 4 to 4 miles north of its charted position ✓

Irregularities including the submarine gorge found by this survey are not ~~at~~ on the present charts ✓

No detailed comparison has been made with the old survey.

The least depths found on this sheet are the 21 fm. edg. in lat. $40^{\circ}39'$, long. $69^{\circ}21'$; and in lat. $40^{\circ}40'$ and long. $69^{\circ}15'$.

North of lat. $40^{\circ}40'$ the bottom becomes more irregular and there are a number of small elevations shown on the lines by changes in depths of 3 to 8 fathoms.

The 500 fathom curve was inked in brown at Capt. Colbert's direction. Soundings south of latitude $40^{\circ}10'$ (approx) were inked & verified by W.H. Bamford.

Respectfully submitted

B.G. Jones

Sept. 8. 1933 W.H. Bamford.

to improve the crossings with lines 39 to ✓
40 D and 8 to 9 E.

5. Lat. $40^{\circ}-05'$ long. $69^{\circ}-02'$ - Line
50 to 51 E has been replotted and bent ✓
slightly Northward to improve the crossing
with line 61 to 62 D. No slope corrections
have been applied to the edge. on this line
50 to 51 E where it crosses the gorge.

AND REFER TO No. 80-DRM

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
WASHINGTON

SECTION OF FIELD RECORDS

Report on Hydrographic Survey No. 5274

Georges Bank, Massachusetts

Surveyed in 1932
Instructions dated May 16, 1932

Chief of Party, W. E. Parker and L. O. Colbert

Surveyed by W. E. P. and L. O. C.

Protracted and soundings plotted by E. B. Brown and R. H. Tyson.

Verified and inked by B. G. Jones and W. H. Bamford

1. Records - The records conform to the requirements of the Hydrographic Manual.
2. Specific instructions - The work is in conformity with the specific instructions both as to extent and development.
3. Crossings - In general the sounding line crossings are good. There are a number of cases, however, where the HYDROGRAPHER's work crossed or overlapped the OCEANOGRAPHER's work that showed differences of as much as 2 fathoms at the crossings. It was impossible to reconcile these differences, which for the most part showed the OCEANOGRAPHER's work deeper than the HYDROGRAPHER's. Due to the fact that there are a large number of crossings between the two vessels' work where the agreement is perfect, the differences must be attributed to some erratic variation in either of the vessels' fathometers that was not reflected in the comparisons made. The suggestion of the verifier that the discrepancies may be due to a variation in the index correction of one or both of the fathometers seems a reasonable one.
4. Depth curves - With the exception of a portion of the 1000 fathom curve at the southwest corner of the sheet, the usual depth curves could be completely drawn. The 500 fathom curve has been added to the sheet for a better delineation of the submarine valleys.

Most of the work of the OCEANOGRAPHER and HYDROGRAPHER joined in the vicinity of the 50 fathom curve. The differences of 1 and 2 fathoms between the two vessels' work, mentioned in paragraph 3 above, had the effect of showing a very illogical 50 fathom curve or two 50 fathom curves separated in places by as much as 2 1/2 miles. To eliminate this improbable condition certain arbitrary rejections were made on one or the other vessel's work wherever a conflict existed. A smooth 50 fathom curve was thus obtained. (For details regarding

these rejections and omissions, see verifier's report.)

5. Junctions with surveys - The junctions with the contemporary sheets on the north and east will be considered in the review of these sheets.

There are no contemporary sheets to the west and south of this sheet.

6. Comparison with old surveys - No critical depths being involved within the limits of this survey, it was not considered necessary to make comparisons with the old surveys. The new survey is in sufficient detail to satisfy all scale requirements for charts to be published in this vicinity and within its limits should supersede all previous surveys of this area.

It is to be noted that the present charts show no indication of the two submarine valleys developed by this survey.

The charted 22 fathom sounding in lat. 40° 49'.5, long. 69° 09'.5 is from H. 2654 (survey of 1903). It falls in depths of 30 fathoms on the present survey. The entire line on which this sounding is located appears considerably shoaler than the present survey. Being a long dead reckoning line, adjusted for uncertain and varying currents, it is quite possible that the entire line is misplaced. The 22 fathoms should not be retained on the charts.

7. Bomb arcs and sound velocities - It was noticed that bombs fired when the vessel was on range with the two hydrophones "SO" and "SW" always resulted in a failure of the distance arcs to meet. The average discrepancy amounted to about 350 meters which would correspond to an error of 8 meters per second in the adopted sound velocity for a distance of 40 miles between hydrophone stations.

It is the opinion of the writer that the discrepancies may be due to either or both of the following causes:

(1) A failure to use a sound velocity that represented actual conditions at the time of bombing instead of a mean value for the day. It is noticed that variations of as much as 7.5 m.p.s. in the theoretical bottom velocities occurred within a period of 24 hours. (See Analysis and Selection of Velocities for R.A.R. Control, Miscellaneous Data, HYDROGRAPHER, Georges Bank, 1932.)

(2) Errors in relating the magnetophones to the buoy anchors. This is regarded by those in a position to know to be one of the largest sources of error in R.A.R. work when floating magnetophones are used. It is conceivable that this may be the principal cause of the discrepancies noted. The positions of the magnetophones being determined from current and other observations made at the actual time of bombing, are entirely independent of the original bombing for locating buoys.

In connection with the discrepancies noted, it should be emphasized that they are not of sufficient magnitude to cause any serious misplacement of the bomb positions above and below the range SO - SW.

8. Future experiments in Sound Transmission - This sheet suggests a possible method of further augmenting our rapidly accumulating sound transmission data. If two hydrophones could be established between two islands or between an island and the mainland, and both hydrophones accurately located by triangulation, then bombs fired by a vessel when on range between the two hydrophones, would furnish data for determining the path of the sound wave, wholly irrespective of the actual position of the bomb along the line. The computed distance between the two hydrophones, corrected for distance to bottom, divided by the sum of the elapsed time to each hydrophone would give the experimental velocity. A comparison could then be made with the theoretical bottom velocity. Or the theoretical bottom velocity could be computed for the section of line from bomb to each hydrophone and the distance determined. If the sum of the two distances does not agree closely with the computed distance between hydrophones then it would be obvious that a wrong theory of sound transmission had been adopted.

9. Additional work - When work is extended to the westward additional lines should be run at the southwestern end of this sheet to develop the 1000 fathom curve and the submarine valley more fully. A zigzag line across the valley would definitely fix the location of the depth curves.

At the northwestern end of the sheet, the 21 fathom sounding in lat. 40° 46', long. 69° 15' should be examined.

10. Reviewed by A. L. Shalowitz, October 1933.

Examined and approved:

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