

# 8521

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8521

<b>Form 504</b> U. S. DEPARTMENT OF COMMERCE COAST AND GEODETIC SURVEY	
<b>DESCRIPTIVE REPORT</b>	
Type of Survey	Ship <b>EXPLORER</b> <b>DEEP-SEA TRACKLINE, 1960</b>
Field No. <b>EX-1960</b>	Office No. <b>H-8521</b>
<b>LOCALITY</b>	
State	<b>Oceanographic Expedition</b>
General locality	<b>Seattle, Wash. to</b>
Locality	<b>Norfolk, Va. via</b> <b>Panama Canal</b>
<u>19 60</u>	
<b>CHIEF OF PARTY</b> <b>Edmund L. Jones</b>	
<b>LIBRARY &amp; ARCHIVES</b>	
DATE	<b>JUN 17 1960</b>

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

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.

Project 08700  
REGISTER No. ....

Field No. EXPLORER Trackline, 1960

~~Special~~ Oceanographic Expedition

~~General Locality~~ Seattle, Washington, to Norfolk, Virginia,  
via Panama Canal

~~Locality~~ 1° Long. = 4 inches on HO 3000

Scale Series Plotting Sheets Date of survey 4 Feb.--18 April 1960

Original-- 4 Dec. 1959

Instructions dated Suppl.--- 5 Jan. 1960

Director's Letter-- 25 March 1960

Vessel USC&GS SHIP EXPLORER

Chief of party Edmund L. Jones

W.F. Deane, H.D. Reed, W.K. Jeffers,

Surveyed by G. DeGroot, M.T. Egan

Soundings taken by ~~athometer~~, graphic recorder, ~~hand lead~~ 808, EDO and PDR

Fathograms scaled by Personnel aboard Ship EXPLORER

Fathograms checked by Norfolk Processing Office

Protracted by L.V.E & D.R.E.

Soundings penciled by " "

Soundings in fathoms ~~XXXXXXXXXXXXXXXXXXXX~~ Uncorrected for Tides, based on  
a velocity of sound of 800 fms./sec.

REMARKS: Trackline hydrographic survey  
controlled by Sextant, Radar,  
Loran, and astronomic fixes.

CONTENTS  
Trackline Hydrographic Survey  
Seattle, Washington, to Norfolk, Virginia, via Panama  
(Project 08700)

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DESCRIPTIVE REPORT  
to Accompany  
DEEP-SEA TRACKLINE, 1960  
Seattle, Washington, to Norfolk, Virginia, via Panama

4 February - 18 April 1960

USC&GS Ship EXPLORER

Scale: 1" Long. = 4 inches  
(On H.O. 3000 Series  
Plotting Sheets)

Edmund L. Jones, Comdg.

Project 0870C

A. PROJECT:

The deep-sea trackline was accomplished under Original Instructions for Project 08700, dated 4 December 1959; supplemental Instructions dated 5 January 1960; and Director's Letter dated 25 March 1960, subject: (a) Magnetic Surveys off Cape Hatteras and (b) Terminus of Oceanographic Cruise.

B. SURVEY LIMITS AND DATES:

The trackline began 5.3 miles WNW of Cape Flattery, latitude  $48^{\circ}24'.8N$ , Longitude  $124^{\circ}51'.3W$ , following as closely as possible the track prescribed in the instructions. (Refer to Index of Sheets at the beginning of this report).

The trackline terminated 50.0 miles north of Cape Hatteras at Latitude  $35^{\circ}59'.6$ , Longitude  $75^{\circ}31'.1$ .

Breaks in the trackline occurred whenever the Ship stopped to make observations at oceanographic, deep-sea camera, or dredging stations. Hydrography was suspended between Pos. 122A at 1700, 8 Feb., and Pos. 123A at 1300, 9 Feb, along the Oregon-California coast due to rough sea conditions.

A 1:100,000 scale hydrographic sheet was made for doing reconnaissance around the Swan Island area in the West Indies, between Latitude  $16^{\circ}39'$  and  $17^{\circ}35'$ , and Longitude  $83^{\circ}00'$  and  $84^{\circ}15'$ . Field Number EX-100-1-60 was assigned to this boat sheet. It is suggested that the portion of the trackline (Pos. 558A on 11 March through Pos. 837A on 19 March) be plotted on this 1:100,000 scale smooth sheet. (H-8515)

During the period (0400 of 9 April), (Pos. No. 1122) and (2312 of 11 April), (Pos. No. 1131), trackline hydrography was suspended in the area 15 miles east of Fowey Rocks Lt. at Lat.  $25^{\circ}35.5'N$ , Long.  $79^{\circ}49.5'W$ , while the Ship was involved with current survey observations.

Clocks were advanced one hour at following positions:

(On Pos. 303).....22 Feb. (2330--120th Merid.)  
to 23 Feb. (0030--105th Merid.)  
(Betw. Pos. 370 & 371....25 Feb. (2300--105th Merid.)  
to 26 Feb. (0000--90th Merid.)  
(Betw. Pos. 492 & 493)...1 Mar. (2330--90th Merid.)  
to 2 Mar. (0030--75th Merid.)

C. VESSEL AND EQUIPMENT

The entire line was sounded by the Ship EXPLORER using 808 Fathometer, No. 57-20; PDR Fathometer, No. 134; and EDO Fathometer No. 4, (Model No. 185).

EDO Loran Receiver No. 267-70 was used for loran control.

The gyrocompass was used at all times while the survey was in progress. Bearings on charted objects were taken when proceeding in and out of port, and sun azimuths were observed while on the working grounds to check the operations of the gyrocompass. The error was found to be negligible during most of the time. On a few occasions when the error was in excess of one degree, appropriate notes were made in the Dead Reckoning Abstract.

D. TIDE AND CURRENT STATIONS

In accordance with original instructions, no tidal corrections were applied.

E. SMOOTH SHEETS

The plotting of the smooth sheets on H.O. 3000 Series Plotting Sheets was started by personnel aboard the Ship EXPLORER. The trackline was completed on Smooth Plots 1,2,4,5,6, and 7 with the exception of sounding at the time all hydrographic records were transferred to the Norfolk District Office. *Smooth plot completed in Washington Office*

It is recommended that the following limits on the next page be used in making up the smooth sheets: (Also refer to Index Of Sheets of this report).

*soundings shown only on sheets covering San Diego to Norfolk*

E. SMOOTH SHEETS: (Continued)

Plotting Sheet No.	H.O. Plotting Chart No.	Limits of Sheet			
		Latitude		Longitude	
		From	To	From	To
1	3000-9	45°N	50°N	122°W	132°W
2	-8	40	46	122	132
3	-7	35	41	118	128
4	-6	29	36	114	124
5	-5	23	30	110	120
6	-4	17	24	110	120
7	-3	10	18	104	114
8	-3	10	18	95	105
9	-3	10	18	86	96
10	-2	3	11	82	92
11	-2	3	11	73	83
12	-3	10	18	77	87
13	-4	17	24	80	90
14	-5	23	30	77	87
15	3000-6	29	36	71	81

The following C&GS and HO nautical charts were used in plotting visual, loran, and radar fixes, and are included as part of the records:

Seattle to Panama:	C&GS 6102	HO 5760
	" 5022	" 1006
	" 5021	" 1007
	" 5020	" 1018
	" 5101	" 1019

Panama to Norfolk:	HO 5000	C&GS 1113
	" 5004	" 1003
	" 5002	" 1112
	" 5011A	" 1350
	" 0945	" 1111
	" 394	" 1110
	" 966	" 1001
	C&GS 1002	" 1000
	" 1007	" 1109

F. CONTROL STATIONS:

The trackline from Seattle to San Diego was controlled mainly by loran fixes. Visual and radar fixes were obtained at the beginning and end of the line and in the vicinity of Pt. Arena, Farallon Islands and Santa Catalina and San Clemente Islands. Astronomic observations were prevented by overcast skies and adverse weather conditions until the Ship reached the vicinity of Santa Catalina Island. From this point on, astronomic control was also used.

On the leg between San Diego to Panama and Panama to Yucatan Channel (West of Cuba), astronomic control was used throughout the trackline, as there was no loran coverage in this area. Visual and radar fixes were obtained at the beginning and end of line and at other times whenever charted objects were within range. Loran control was not reliable until the ship reached Yucatan Channel.

From Yucatan Channel to Key West, Fla., and also on the return leg to Yucatan Channel and back to Key West, loran control was used, supplemented by astronomic, visual, and radar fixes.

*Loran used with caution in smooth here plotting as many were obviously wild. JFE*

On the last leg of the trackline, Key West to Washington, D.C., loran control was used throughout, supplemented by visual and radar control along the Florida Keys and at the end of the line north of Cape Hatteras. Astronomic observations were made during the first evening on this leg. Loran coverage was exceptionally good along the Atlantic Coast from Miami to Norfolk.

During the entire trip, 265 astronomic observations were made and used in controlling the trackline.

H. SOUNDINGS

The PDR fathometer was used to measure depths over practically the entire trackline. The 808 fathometer was used occasionally when sounding over shoal areas. The Edo fathometer was only used in checking the scale of the PDR.

I. CONTROL OF HYDROGRAPHY

As stated in paragraph (F) of this report, visual, radar, loran, and astronomic fixes were used for control of the trackline from Seattle, Washington, to vicinity of Norfolk, Virginia.

At the time this report was written, smooth sheet plotting had just begun by personnel on board the Ship EXPLORER. It is estimated that smooth plotting will only be 20 to 25% completed before all hydrographic records are transferred to the Norfolk District Office.

*smooth plotting completed in Wash. Office*

I. CONTROL OF HYDROGRAPHY (Continued)

It is recommended that when smooth plotting is resumed, ~~that~~ pertinent information be added to this paragraph.

<u>Position Nos.</u>	<u>Charted Objects used in Visual or Radar Fixes</u>
1 - 6	Cape Flattery Lt. to Destruction Is. Lt.
130 - 134	Pt. Cabrille Lt. to Pt. Arena Lt.
137 - 140	Pt. Reyes Lt. to Farallon Is. Lt.
170 - 175	San Nicolas Is., Santa Catalina Is. Santa Barbara Is., and San Clemente Is.
179 - 180	Pt. Loma Lt.— Cornado Is., in vicinity of San Diego
181 - 185	N. & S. Coronado Is., Vicinity of San Diego
209 - 210	San Benitos Is., Cerros Is.
476 - 489	Montuosa Is., Jicaron Is., Coiba Is., Pt. Mariato, Pt. Mala.
494 - 497	Isle. Bona, in Vicinity of Panama.
498 - 506	Vicinity Colon, Panama Canal Zone Margarita Is. Lt., E. Breakwater Lt. Toro Pt. Lt., Lorenzo Castle.
525 - 537	Courtown Cays, St. Andrews Is. Old Providence Is., Catalina Is.
579 - 581	Swan Island, E & W Tangents and radio tower.
739	Aero Beacon, Swan Island.
763 - 777	Aero Beacon, Swan Island and Tangent to Island
838 -	NW end of Swan Island.
900 - 904	Marquesas Key Lt., Sand Key Lt., vicinity of Key West, Fla.

I. CONTROL OF HYDROGRAPHY: (Continued)

<u>Position Nos.</u>	<u>Charted Objects Used in Visual or Radar Fixes</u>
905 -	Sand Key Lt.; Water Tank, Key West.
915 - 920	Sand Key Lt., Cosgrove Shoal Lt.
974 - 978	West End of Cuba, Cabo San Antonio Lt.
1031 - 1041	Cabo San Antonio Lt., Cayos Lena.
1082 - 1102	Cosgrove Lt., Sand Key Lt., Vicinity of Key West, Fla.
1103 - 1110	Sand Key Lt., Tank— Key West. Amer. Shoal Lt., Maryland Shoal Lt.
1117 - 1146	Alligator Sh. Lt., Molasses Reef Lt., Carysfort Reef Lt., Mosquito Rk. Lt. Tavernier Key Lt., The Elbow Pt. Lt. Pacific Reef Lt., Fowey Rocks Lt. Biscayne Key Tangent, Hillsboro Inlet Lt., TV and Radio Towers— Miami, Jupiter Inlet Lt.
1339 - 1343	Oregon Inlet Lt., Currituck Beach Lt.

L. COMPARISON WITH PRIOR SURVEYS:

When the EXPLORER was at the Key West Naval Base during the period (22-28) March 1960, the Navy requested that an investigation be made of a 25 fathom reported shoal at Lat.  $24^{\circ}20'.0$  N, Long.  $82^{\circ}13'.2$  W. (Refer to copy of two Navy letters attached to this report). Hydrographic Survey H-8011 (Field No. HY-8152) shows 115 fathoms in this area.

On the trackline from Key West to Yucatan Channel and return, an investigation was made in the area of this reported shoal with no indication of shoaling. Refer to Positions 917A to 920A on 30 March and Positions 1082A through 1101A on 4 April. This field investigation was plotted on a tracing superimposed over a copy of Hydrographic Survey, H-8011 (HY-8152). This tracing is filed with the Dead Reckoning Abstract: "Key West to Yucatan Channel and Return." *Reported shoal disproved by Ad. Vt. 1960 on H-8011 by Ship Hydrographer.* No other comparisons were made with prior surveys at the time the trackline was run. After the smooth plot is completed, it is recommended that comparisons be made with prior surveys and that pertinent notes be added to this paragraph.

*Trackline adjusted to bathymetry in areas covered by modern, basic surveys off Florida Keys. Elsewhere, only a general comparison with charts was considered warranted. ME*

M. COMPARISON WITH CHARTS:

In general, the depths obtained on the trackline agreed very well with those shown on the charts. ✓

An uncharted bank with least depth of 15 fathoms was discovered in the Caribbean Sea on 11 March, 1960, while enroute to Swan Island, at Lat. 16°53' N, Long. 83°15' W., approx. 87 miles north-east of Honduras, in surrounding depths of 300-900 fathoms. Refer to letter (Ser. 078, File 703.3) dated 19 May, 1960, a copy of which is included with this report.

*not with the copy!*

N. DANGERS AND SHOALS:

*W. Robinson*

No dangers were found. Shoals and developments are discussed in Paragraphs (L) and (M).

T. BY-PRODUCT INFORMATION:

The following statistical report includes observations made while the Ship EXPLORER was on the oceanographic expedition from Seattle, Washington, to Washington, D.C., 2 February to 21 April 1960.

Oceanographic Stations Occupied. . . . .	50
Bathythermograph Observations	684
Oxygen Analysis. . . . .	750
Phosphate Analysis	198
Nitrite Analysis. . . . .	54
Salinity Samples Bottled	754
Suspended Sediment Samples Bottled. . . . .	11
Bottom Sediment Cores	47
Cores for USPHS Radioactivity Studies. . . . .	8
Deep-Sea Camera Stations	9
Current Drift Bottles Released. . . . .	4,706
Sound-Velocity Meter Lowerings	34
Biological Net Lowerings. . . . .	58
Biological Dredge Hauls	15
Geological Dredge Hauls. . . . .	7
Magnetometer Towed (Nautical Miles)	7,662
Weather Balloons Released. . . . .	59
Synoptic Weather Reports	162
Current Observations, Meter, Hours. . . . .	7

The above tabulation does not include data acquired while the Ship EXPLORER was at Swan Island, West Indies, (12-19) March.

U. OCEANOGRAPHIC SURVEYS:

On the trackline from Seattle, Washington, to Norfolk, Virginia, the following oceanographic and weather observations were made while the Ship was underway:

- Bathythermograph Observations  
(Occasionally the Ship had to reduce speed during rough weather in order to lower the bathythermograph. Appropriate notes were made in the Dead Reckoning Abstract).
- Current Drift Bottle Releases.
- Biological Net Tows.
- Magnetometer Instrument Towing.
- Weather Balloon Releases
- Synoptic Weather Reports.

Trackline hydrography had to be suspended while the Ship stopped to make the following oceanographic observations: (See next page)

U. OCEANOGRAPHIC SURVEYS; (Continued)

Nansen Cast, (For Temperature, salinity, oxygen, phosphate, and nitrate analysis.)

Bottom Cores

Deep-Sea Camera Casts.

Sound-Velocity Meter Lowerings

Biological Dredge Hauls.

Geological Dredge Hauls.

Current Observations (Gulf Stream, 15 miles E. of Fowey Rocks Lt)

(Refer to paragraph (T) for the number of oceanographic observations made).

Appropriate notes were made in the Dead Reckoning Abstract whenever the trackline was broken in order to make the above oceanographic observations.

Z. TABULATION OF APPLICABLE DATA:

*Records filed with A-8515*

1. Sounding Volumes. . . . . 13 Volumes
2. Trackline Smooth Sheets (HO 3000 Series) . . 15 Sheets
3. Trackline Boat Sheets (HO 3000 Series). . . 14 Sheets
4. Dead Reckoning Abstracts . . . . . 151 Sheets
5. Astronomic Sight Computations. . . . . 265 Sheets
6. Loran Positions Computations . . . . . 190 Sheets
7. Fathograms, SOG, and PDR. . . . .
8. Various C&GS and HO Charts used in Plotting-28 sheets

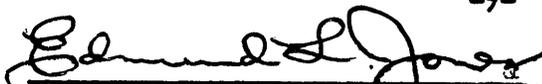
All of the above items (1-8) were transferred to the Norfolk District Office on 31 May 1960.

All oceanographic data acquired on the trackline from Seattle, Washington, to Norfolk, Virginia, ~~was~~ transferred to the Washington Office (20-26) April, when the EXPLORER was in Washington, D.C. An itemized list of oceanographic data appears under Paragraph (T) of this Report.

  
Raymond M. Stone  
CDR, USC&GS

Approved & Forwarded:

-9-

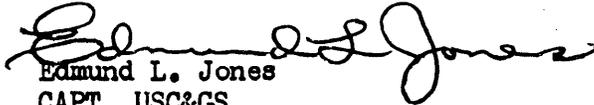
  
Edmund L. Jones, CAPT, C&GS  
Comdg., Ship EXPLORER

APPROVAL SHEET  
Seattle, Washington, to Norfolk, Virginia, via Panama  
Ship EXPLORER

All hydrography accomplished on this trackline was under my immediate supervision.

The sounding volumes, descriptive report, and sheets 1, 2, 4, 5, 6, and 7 of the smooth plot have been examined and are approved.

On 31 May, all hydrographic records were transferred to Norfolk District Office for the completion of the smooth plot.

  
Edmund L. Jones  
CAPT, USC&GS  
Commanding Ship EXPLORER

*Smooth plotting was completed in the  
Washington office. No review is to  
be written.*

*RH Caston 4/10/61*

SHIP EXPLORER  
108 West Olney Road  
Norfolk 10, Virginia

SER. 001  
File 908.1  
KLJ/Law

25 May 1960

To: The Director  
U.S. Coast & Geodetic Survey  
Department of Commerce Bldg.  
Washington 25, D.C.

Subject: Request for Registry Number - Hydrographic Survey - Swan Island

It is requested that this vessel be furnished registry numbers for the following hydrographic sheets:

- (1) Field No. KL-100-1-60 *Given H-8515*
- (2) Field No. KL-10-1-60 *" H-8516*

Item (1) pertains to a 1:100,000 scale hydrographic sheet used in making a ship reconnaissance survey around Swan Island, West Indies.

Item (2) pertains to a 1:10,000 scale hydrographic sheet used in launch hydrography in vicinity of Swan Island.

The limits of Sheet (KL-100-1-60) are: Lat.  $16^{\circ} 39'$  to  $17^{\circ} 35'$   
Long.  $83^{\circ} 00'$  to  $84^{\circ} 15'$

The limits of Sheet (KL-10-1-60) are: Lat.  $17^{\circ} 22'$  to  $17^{\circ} 27'$   
Long.  $83^{\circ} 52'$  to  $83^{\circ} 59'$

HERMUD L. JONES  
CAPTAIN, USCGC  
Commanding Officer

USC&GS SHIP EXPLORER  
102 West Olney Road  
Norfolk 10, Virginia

Ser. 078  
File 703.3  
wbm

19 May 1960

TO: Chief, Coastal Surveys Division  
U.S. Coast and Geodetic Survey  
Department of Commerce Bldg.  
Washington 25, D.C.

Subject: Uncharted Bank in Carribbean.

This is in connection with the telephone call yesterday from  
CDR Woodcock.

The least depth on the bank in question was re-scaled from the  
radio reported depth on 20 March and is 15 fathoms. This depth was found  
on 11 March 1960 while approaching Swan Islands at Latitude 16°53'N, Long-  
itude 83°15'W. The bank is about 87 miles northeast of Honduras and is in  
surrounding depths of 300-900 fathoms. It is about 5 x 8 miles in size  
and elongated in an east and west direction. The center of the bank as  
scaled from the boat sheet is at Latitude 16°55'N, Longitude 83°17'W.

Magnetometer observations indicate an igneous rock outcropping.  
A core taken at the crest of the bank gave a four inch sample of dead coral.  
The recommended name in the radio dispatch was EXPLORER BANK.

About ten hours was spent on the ship development of this shoal.  
The 15 fms depth is at position 559A at 2152, 11 March 1960.

The positions given above are boat sheet positions controlled  
by star fixes. The least depth given is uncorrected.

Edmund L. Jones  
CAPT, USC&GS  
Commanding, Ship EXPLORER

~~KA~~  
Stone

U. S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY  
WASHINGTON 25, D. C.

OFFICE OF THE DIRECTOR  
Special Send back to:  
CO

March 25, 1960

To: CAPT E. L. Jones *ELJ*  
U. S. C. & G. S. S. EXPLORER  
c/o Branch Post Office  
U. S. Naval Station  
Key West, Florida

Subject: (a) Magnetic surveys off Cape Hatteras  
(b) Terminus of oceanographic cruise

Reference: Letter from Dr. Harris B. Stewart dated 20 March 1960

In accordance with reference (a) you are authorized and directed to make magnetic surveys, etc. off Cape Hatteras as requested. The time devoted to these surveys should not exceed 72 hours, unless unexpected targets of opportunity should make it propitious to expand these surveys moderately.

Under subject (b) terminus of oceanographic cruise: it is planned that you will proceed to Washington, D. C. directly after entering Chesapeake Bay and before berthing in Norfolk, Virginia, your home port. It is planned to invite the various Congressional Committees concerned with oceanography, Departmental and officials of the Bureau, and other interested personnel to be on hand to greet the Ship upon her arrival here. This will afford a measure of recognition which the accomplishments of the EXPLORER merit.

It is realized that after three months at sea the ship will probably not look as good as you would desire, but I think everyone will understand that she has been at sea for an extended period which must inevitably leave its mark. I would appreciate you, Dr. Stewart, the Executive Officer, CDR Stone, and others preparing detailed exhibits of specimens to give our visitors a good insight into the operations just concluded.

I know the next question that comes to mind is the length of your stay in Washington before proceeding to Norfolk. I assure you that your stay will be as brief as possible with the objectives we have in mind. Also, it will give you an opportunity to unload any specimens or equipment destined for Washington.

CAPT E. L. Jones

March 25, 1960

By this time, you should have received both prints of the negatives originally forwarded by you and those I brought to Washington. Also, 18 rolls of color kodachrome film were forwarded to you for official use. I anticipate that 12 will be utilized by Mr. Hale and 6 by you in obtaining coverage of the balance of the cruise.

Instructions have gone out to the HYDROGRAPHER for detailed surveys and cores of the four areas around Key West.

In closing, let me state that I haven't enjoyed myself so much for years as I did during my stay on the EXPLORER. It was really like getting back home, and I want to express to you and to the officers and crew my sincerest and deepest appreciation for a wonderful time. Best wishes for a most successful continuation of your cruise.

Sincerely,

*15/ H. Aronold Ruo*

Director

P.S. If you have any more special envelopes available I would appreciate another 25, stamped and postmarked, and with yours and Dr. Stewart's signatures. Send me the bill.

Code 002  
DEC 15 1959

From: Commander, U. S. Naval Base, Key West, Florida  
To: Director, U. S. Coast and Geodetic Survey, Washington 25, D. C.  
Via: (1) Commandant, SIXTH Naval District  
(2) Hydrographer of the Navy

Subj: Survey of Underwater Formation in Key West OPAREA 5-A; request for

Ref: (a) Chart H.O. 3342-0A

Encl: (1) Sketch of Underwater Formation as visualized on basis of Sonar  
U.O.L. and fathometer data

1. On 3 December 1959, USS C.K. BRONSON (DD-665), operating in the Key West area, made sonar contact at position  $24^{\circ} 20' 2''$  N,  $02^{\circ} 13' 9''$  W. Sonar layer depth at the time and place was about 295 feet. Over a five-hour period, other destroyer types, two ASW helicopters with sonar, and two aircraft with UOL (underwater Object Locator) gear picked up the same contact.

2. On the basis of combined sonar, fathometer, and UOL observations, evaluated by experienced ASW officers on the spot, it is the belief of Commander Naval Base Key West that the contact was in all probability a ridge of sea bottom, orientated NW-SE and approximately 150 yards in length. Fathometer readings indicated the object to be at depths of 150 to 180 feet. Enclosure (1) shows information observed. Charted depth is about 673 feet at contact's position.

25-30 fms

3. It is requested that the area in the vicinity of this contact be surveyed as soon as practicable. Since its position is within established submarine operating areas, existence of this ridge would constitute a navigational hazard to submarines at normal submerged operating depths.

112 1/2 fm

4. Key West based units have been alerted to the existence of this possible hazard.

L. H. JUSTIN

Copy to:  
CINCLANTFLT  
COMNADEFORLANT  
COMSUBLANT  
COMSUSSECON FOUR  
COMSUSRON TWELVE  
COMSUSDIV 601

30 Mar 60

EX passed over reported 25 fm  
shoal with no indication

0052 pos. Cosgrove Shoal Lt bears 014° T  
depth 114 fms

See H-8011 ~~Adm~~ WK (1960)  
Reported shoal disproved 15-  
by this additional WK of ship Hydrographer  
Bronson report neither confirmed nor disproved  
by EX. f/E



U. S. NAVY HYDROGRAPHIC OFFICE  
WASHINGTON 25, D. C.

Code 1100-mf  
Serial 371

From: Hydrographer  
To: ~~Commander~~, Naval Base, Key West

Subj: Survey of Underwater Formation in Key West OPAREA 5-A;  
request for

Ref: (a) COMNAVBASE KEY WEST ltr Code 002 of 15 Dec 1959

1. Reference (a) has been forwarded to Director, Coast & Geodetic Survey with request that we be informed of any survey action he may plan.
2. The action report submitted by ~~Commander~~, Reserve Destroyer Squadron FOUR has been noted with interest. It is gratifying to note the high team work and tenacity displayed by this group of ships when, having detected this elusive shoal they maintained contact and contained it despite its evasive and tricky maneuvers.

  
H. G. MUNSON

*Copy furnished by ComNavBase, KWF*

STATISTICS  
 Deep-Sea Trackline, 1960  
 Ship EXPLORER  
 Seattle, Wash. to Norfolk, Va., via Panama  
 Project 08700

Period	Volume Number	Number of Positions	Stat. Miles of Sounding Line
1960			
4 Feb. - 6 Feb.	I	67	382
6 " - 8 "	II	54	445
8 " - 11 "	III	47	624
11 " - 12 "	IV	12	131
TOTAL - (Seattle to San Diego) - - -		180	1,582
17 Feb. - 23 Feb.	V	130	1,445
23 " - 29 "	VI	137	1,572
29 " - 2 Mar.	VII	50	661
TOTAL - (San Diego to Panama) - - -		317	3,678
9 Mar. - 11 Mar.	VIII	60	585
11 " - 16 "	VIII	101 *	237 *
16 " - 19 "	IX	179 *	319 *
19 " - 21 "	IX	37	324
21 " - 22 "	X	30	356
TOTAL - (Panama to Key West) - - -		407	1,821
29 Mar. - 3 Apr.	X	110	878
3 Apr. - 4 Apr.	XI	88	570
TOTAL - (Key West to Yucatan Channel and return) - - -		198	1,448
8 Apr. - 13 Apr.	XI	85	648
13 " - 17 "	XII	154	1,283
17 " - - -	XIII	2	6
TOTAL - (Key West to Norfolk) - - -		241	1,937
TOTAL - (SEATTLE to NORFOLK) - - -		1,343 Pos.	10,466 Stat. Miles

Total Number of Temp. and Sal. Observations - - - 50  
 made along trackline.  
 (Refer to Index Chart at beginning of this report).

\* In Volumes VIII and IX, these amounts represent the number of positions and statute miles of reconnaissance hydrography within the limits of Sheet EX-100-1-60, vicinity of Swan Island, West Indies.

Day Letter "A" was used throughout the trackline.

The position numbers on the smooth sheets are to be indicated with purple ink.

TRACKLINE VELOCITY CORRECTIONS  
Ship EXPLORER— 1960  
Seattle, Washington, to Norfolk, Virginia, via Panama

Paragraph eleven of Original Instructions, dated 4 December 1959, states that velocity corrections will be computed and applied by the Washington Office. \*

A total of fifty oceanographic stations were occupied during the expedition from Seattle to Norfolk. Temperature and salinity observations were made at standard depths at each of these stations. All temperature data and salinity water samples were transferred to the Washington Office during the week (20-26) April 1960.

\* Velocity corr'ns omitted --- uncorrected depths penciled on smooth sheets, San Diego to Norfolk, per Capt. M. G. Ricketts, Chief, Naut. Ch. Div. No soundings shown from Seattle to San Diego.

ME

ENS *Morgan*

DEEP SEA TRACK LINE  
"A" Day 1960

POSITIONS

- (a) Numbers to run consecutively throughout the lines.
- (b) Day letter: "A"
- (c) Color: Purple. (~~Blue pencil will be used on the fathogram and in the volumes.~~)
- (d) Frequency:
  1. Obtain a position at least once each hour on the hour.
  2. At the beginning and end of the lines obtain positions each 30 minutes or oftener to establish positive control.
  3. Record a position at each major change of course. Make minor change of course on the hour only.
  4. Across seamounts and when soundings change rapidly obtain positions on the hour and the half-hour.
  5. Sea mount development work positions should be obtained often enough to provide data for plotting dead reckoning and be consistent with 1-4 above. Further information for development work will be furnished.

POSITION DATA

- (a) Minimum recorded data will consist of time and revolution counter and will be required at change of course, change of fathometer or change of fathometer scale.
- (b) Record the best available data at each hourly or half-hourly fix, such as: sextant angles, bearings, loran lines, radar distances and bearings, or astronomic sights.
- (c) Record three or more loran lines of position if available at each fix. THE ACTUAL TIME OF LORAN READING MUST BE RECORDED. Compute loran line on the forms and plot on the DR chart.
- (d) Maintain a dead reckoning abstract on the form provided. All data necessary to plot the line must be recorded on the abstract.
- (e) Plot all positions on the 3000 series plotting sheets. Once each watch and at each major change of course plot your position.
- (f) Astronomic sights will be obtained by the navigating officer of officer on watch when conditions permit. Such sights should not be assigned position numbers but will be referred to the previous fix.

47  
 66  
 02  
 22  
 09  
 64  
 74  
 416  
 724  
 44

360

SOUNDINGS

- (a) Operate and record the 808 fathometer to its maximum depth (190 fms.)
- (b) Operate 808 and EDO precision recorder together between 101 fms and maximum depth of 808 (190 fms), and record simultaneous soundings when changing from one fathometer to another. Make simultaneous fix marks on both when change is made and record the time of change.
- (c) Operate and record the EDO precision depth recorder for soundings beyond the range of the 808.
- (d) Read and record soundings as follows:
  - 0 to 51 fms to 0.2 fms.
  - 51 to 101 fms to 0.5 fms.
  - 101 to 190 fms to 1.0 fms.
  - \* 190 to 1200 fms to 2.0 fms.
  - Over 1200 fms to 5.0 fms.
  - Steep slopes to 5.0 fms
- (e) Sounding Interval as follows for all fathometers:
 

<del>Rapidly changing bottom</del>	<del>1 minute</del>
Under 100 fms.	2 minutes
Over 100 fms.	6 minutes
- (f) Read and record depth and time on sea mounts and in valleys.
- (g) Start the NMC fathometer once each day preferably during the 0800 to 1200 watch and check operation and sounding

LORAN LINES OF POSITION

- (a) Loran lines will be read and recorded at the beginning of the track line even though the line is firmly fixed by other methods.
- (b) Loran observations should be made when the observer has a good match of waves rather than recording a poor observation at the bell. RECORD THE ACTUAL TIME OF OBSERVATION IN ALL CASES.
- (c) When position depends entirely on loran; Observe three or four pairs if possible. Select pairs that have a favorable angle of intersection and small errors. The observer should evaluate the reading.

E - Excellent	-- 1 microsecond	VG - Very good	-- 2 microseconds
G - Good	-- 3 microseconds	F - Fair	-- 5 Microseconds
P - Poor	-- 10 10 microseconds		

LORAN LINES OF POSITION (Cont'd.)

(d) Loran sky waves are stronger at night and may be usable at distances up to 1400 nautical miles. Only the first sky wave is usable.

Loran ground waves are stronger during daylight. Use ground waves whenever possible. Never match a ground wave and a sky wave. Ground waves may be usable at distances up to 800 nautical miles during daylight and 600 nautical miles during darkness.

(e) Make certain that loran lines of position form a point or bracket so that ships position can be plotted.

MISCELLANEOUS

Bathythermograph observations will be taken on one hour intervals. These should be made on the half-hour to avoid conflict at the change of watch.

Release 10 drift bottles every 2 hours.

Check compasses in accordance with standing orders and observe and compute a sun azimuth for gyre as per standing orders of oftener if necessary.

25	36
5 11.6	21 183.75
10	15
12	35
15	30
0	29

(H-8521)

Notes on EXPLORER track line plotting:

1. Log was not functioning during most of the voyage; revolution counter was inoperative or erratic at times. (Both are needed, one to confirm the other, for best development of log-run factors in dead reckoning. Recommend overhauling both log and revolution counter before oceanographic expeditions.)
2. Dead reckoning abstracts were not complete. Very few notes were given relating to wind, sea, currents, etc. - what few there were were incomplete, i.e. wind velocity without direction. Any information having any remote bearing on the ship's behavior would be welcome to the smooth plotter trying to derive the most probable track on long dead reckoning runs.

3. Recommend that the following articles be furnished to all officers concerned prior to oceanographic work:

"Star Sight Positions", Adams, K.T.  
(Field Engineers Bulletin 2, Dec. 1930)

"Notes on Star Observations", Cowie, G.D.  
(Field Engineers Bulletin 2, Dec. 1930)

"Review of Astronomical Work and a Study of Errors, Georges Bank, 1930",  
Hubbard, L.S. (Field Engineers Bulletin 3, June 1931)

"Lines of Position - Summer Bisectrix", Raynor,  
L.P. (Field Engineers Bulletin 1, June 1930)

4. Field plotting was difficult to follow at times - particularly in Yucatan Straits and vicinity of Florida Keys where more than 1 day's work fell in an area - because position numbers were entirely

omitted on the field plotting (Time was used instead, but dates were not clear in the areas mentioned - position numbers would seem easier to use, as well as much more useful to the smooth plotter).

5. Suggest use of marker buoy, where depth permits, on any development such as Arrowsmith Bank or Explorer Tablemount. The development could then be made relatively correct within itself, even tho its absolute position might have to remain uncertain.
6. Every possible source of information relating to movement during breaks in trackline (such as at oceanographic-station stops) should be considered and included in the records.

No written review is  
to be made for this trackline

WE  
10/60

Ed Carstens 4/10/61

Hydrographic Surveys (Chart Division)

HYDROGRAPHIC SURVEY NO. 8521 Trackline

Records accompanying survey: Smooth sheets 15 HO. PLOT-  
 TING SHEETS  
 boat sheets .....; sounding vols. 13...; wire drag vols. ....;  
 Descriptive Reports 1...; graphic recorder envelopes 17...;  
 special reports, etc. Cahiers; 1-Dead Reckoning Abstracts,.....  
 1-Astronomic Sights, 1-Loran Work Sheets and 1-Instructions and  
 Misc. Data.

The following statistics will be submitted with the cartog-  
 rapher's report on the sheet:

Number of positions on sheet .....  
 Number of positions checked .....  
 Number of positions revised .....  
 Number of soundings revised  
 (refers to depth only) .....  
 Number of soundings erroneously spaced .....  
 Number of signals erroneously plotted  
 or transferred .....  
 Topographic details Time .....  
 Junctions Time .....  
 Verification of soundings from  
 graphic record Time .....  
 Special adjustments Time .....

Verification by <sup>DR Engle</sup> L.V. EVANS..... Total time ..... Date 10/60

Reviewed by <sup>to be</sup> No review written <sup>written</sup> P.H.C..... Time ..... Date .....

NORFOLK PROCESSING OFFICES NOTES  
ON  
CHECK SCANNING OF TRACKLINE FATHOGRAMS  
BY  
SHIP EXPLORER

This Office has completed the check scanning of the following positions:

181 thru 274A \*  
498 thru 1102A

Very few phase changes were marked on the fathograms by the Field Party and it will be noted that all phase changes marked in red pencil, both on the fathograms and in the records, were entered by this Office. In cases where the phase was indeterminate, soundings were read at the same scale used by the Field Party.

Exceptions to the above occurred from 42 minutes after position 210A to the EDO check at position 250A, where there are three instances when corrections of 400 fathoms were made to Field readings. These three instances occurred at position 212A, at 32 minutes after 232A, and at 30 minutes after 236A. All three changes concur with Field notes in the volumes which question the phase being recorded at the time.

Norfolk, Va.  
18 May 1960



Hugh L. Proffitt  
Cartographer.

Pos. 275-497 : field scanning spot-checked,  
fathograms examined for important  
features, No sdgs. shown from  
Pos. 1 - Pos. 180. WE

CANADA

# GULF OF ST. LAWRENCE TO STRAIT OF JUAN DE FUCA

INCLUDING GULF OF MEXICO, CARIBBEAN SEA AND PANAMA CANAL

SOUNDINGS IN FATHOMS HEIGHTS IN FEET

For Symbols and Abbreviations, see Chart No. 1

WINDS AND CURRENTS

See Chart No. 1

WEATHER OBSERVATIONS

See Chart No. 1

*Trackline and Smooth Sheet Index*

UNITED STATES

## PROJECT 08700 USCGS EXPLORER 1960

DEPTH	TEMPERATURE	SALINITY	DENSITY	WIND	WAVE	CURRENT	WEATHER	SEA	SWELL	SEA STATE	WIND DIRECTION	WAVE PERIOD	WAVE DIRECTION	WAVE HEIGHT	WAVE PERIOD	WAVE DIRECTION	WAVE HEIGHT
0																	
10																	
20																	
30																	
40																	
50																	
60																	
70																	
80																	
90																	
100																	

CAPE FLATTERY TO STATION 1

1. BT lowering every hour
2. Release 10 drift bottles every 2 hrs.
3. Weather observations by USCG

OCEANOGRAPHIC STATIONS 1 TO 11

1. Surface water sample at each station
2. BT lowering at each station and every hour between stations
3. 10 drift bottles released at each station
4. 10 drift bottles released at each station
5. Weather observations by USCG

STATION 11 TO SAN DIEGO

1. BT lowering every hour
2. Release 10 drift bottles every 2 hrs.
3. Weather observations by USCG

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SAN DIEGO TO PANAMA

1. Trackline hydrography
2. Oceanographic stations every 300 miles
3. BT lowering at oceanographic stations and every hour between stations
4. 10 drift bottles released at oceanographic stations and every 2 hrs. between stations
5. 10 drift bottles released at each oceanographic station and every 2 hrs. between stations
6. Velocity meter lowering at oceanographic stations
7. Deep sea camera profile
8. Two microtiter sets (except between camera stations), reseter for sampling every 3 hours
9. Two sediment cores in Panama Harbor for F&S
10. Weather observations by USCG

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