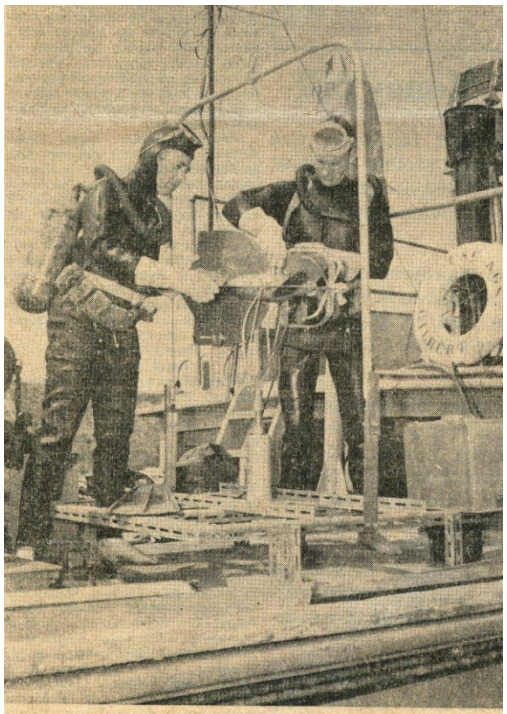
H. B. Stewart, Jr.
Expedition Diary
New York Harbor Circulatory Survey
February 1958
AND
Winyah Bay Current Survey
March 1958



DR. H. B. STEWART, (left) and his assistant are shown making final adjustments on the experimental meter and platform which was placed in Winyah Bay Tuesday. The two men supervised the placement by diving operations. The divers used Navy frogmen suits.

(Times Photo by Fleming)

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Oceanic and Atmospheric Research
Atlantic Oceanographic and Meteorological
Laboratory Miami, FL

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Maria Bello & Ashley Jefferson (Editors)

ABSTRACT

Harris B. Stewart, who eventually became the first director of the NOAA Atlantic Oceanographic and Meteorological Laboratory in Miami, FL, joined the February 1958 New York Harbor Circulatory Survey and the March 1958 Winyah Bay Current Survey in South Carolina. At this time Dr. Stewart was the Chief Hydrographer for the U.S. Coast and Geodetic Survey in Washington, D.C. The main goal of both expeditions was to monitor water currents. Dr. Stewart's papers were donated to NOAA by his family upon his passing in 2000. This is an example of one of his field diaries. The field diary written for New York Harbor and Winyah Bay contains descriptions of the day-to-day ship activities.

INTRODUCTION

Dr. Harris B. Stewart, first director of the NOAA Atlantic Oceanographic and Meteorological Laboratory in Miami, FL, joined the Coast and Geodetic Survey in 1957 as their Chief Hydrographer. In 1958, Dr. Stewart after conducting surveys in the New York Harbor accompanied other scientists to install a platform on which to mount the prototype Roberts Radio-current meter and observe its operation at Winyah Bay in South Carolina.

DIARY AND TRANSCRIPTION

The Stewart family donated the papers of Dr. Stewart to NOAA's Atlantic Oceanographic and Meteorological Laboratory upon his passing on April 25, 2000. Among the Stewart material were 13 field diaries written over several decades, most during the time of great ocean exploration. The diaries will be transcribed and published as a series.

The New York Harbor and Winyah Bay field diary is a bound notebook with a green cover, and measures 5 by 8 inches. Entries were made in ink and pencil, and include sketches of equipment and maps. Loose material, including newspaper clippings, notes, and letters were found inside the diary. The diary was transcribed by hand. The diary and ancillary material were scanned and the graphics filed, in JPG format.

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New York Harbor Circulatory Survey - February 1958
Winyah Bay Current Survey - March 1958

10 February, 1958

Mark Goodheart and I left my apartment for the Marmer at the Staten Island Quarantine Station. Biltmore – Freeway - Tunnel; RT 40 (not I where they split just North of Tunnel) through Wilmington over bridge to the NJ Turnpike. Leave it at exit 11. At exit, take Route 9 - left limb of the V at exit gate. Then take 2nd right-sign labeled outerbridge crossing. Follow signs to and across bridge (over Arthur Kill) onto Staten Island. Turn right just past toll gate onto Paige Street (Ave.? Blvd.?) and follow 2nd to the stop light (Hylan Blvd). Turn left and follow it all around the island-ins and outs, but still Hylan. One block before it dead ends in the Narrows, turn right (at light) onto Bay Street. Approx. two blocks & Quarantine Sta. is on left behind big fence.

Checked ICTI for numbers and found none. We have Temp. Unit #2, Conductivity Unit #2, a freq. meter, ca. 200 ft. of cable, and 1 sensor head. Called Imbrie at Columbia whom I had asked last eve. to check the ice under G. W. Bridge for ice flows. He said there was some but not much. Called Bear N. Y. Park Police and they said there was lots and some was moving. Coast Guard says Albany is 100% frozen, Turkey Neck 95%, Poughkeepsie 90%. A slight thaw or a freshet would really fix it for us. Hale in the Photogrametry Div. of C & GS in Washington is due here when we get in tomorrow from ICTI run. I hope to set up a ciné Kodak movie camera when we have a good view of the river ice. By taking a single frame every 8-10 secs and then projecting them at 24 frames/sec should give a good picture of the overall current pattern & changes in it with time – IF - the ice is good. It's pretty cold here on the ship. 17º today and due to get to 10º tonight. Photo in tonight's paper showed a fishing boat really covered with ice and showed the throughway bridge really jammed with ice. Cmdr. Weber says that last week in the Lower Bay they had 27 knot winds & that water coming over the bow froze on everything - it was pretty miserable operating.

Nomograph that I had asked CBI for was here, so I took a look to see what sort of limits we might expect. At constant salinity, the conductivity increases 4 units (4 milimohs/cm) per 5 ºC temp. At constant temp., conductivity increases 3 units per 4‰ salinity (2‰ Cl). So, actually, conductivity reads almost salinity $\pm$ 5‰.

Mark worked with Thompson on the lights.

Called Butch and will call him Wednesday morning if we are out photographing somewhere.

Called Capt. Crosby. Passed on ICTI listings for Palanchor, gave Hale the word to come on up and we will just hope the ice movement is sufficient.

Tuesday, 11 Feb' 58

Underway from Quarantine Sta. 0755. ICTI has been or is warming up since 0700. They say voltage jumps from 118-122.

DLP Must ICTI be calibrated before each lowering? Why not each day? Values the same. Got station 14 first - then 15. Had to do a good deal of maneuvering to avoid shipping. Station # 16 at mouth of Kill Van Kull was a real stinker - only 40 feet but we had to lay to and wait, then move while eight ships went by our station. Finally, snuck in took, it, and snuck out again. A buoy in here will have a pretty short life expectancy.

0945 of for Sta. # 17.

DLP When ICTI head is out of the water it does not record air temp. but stays at 46.855 - comes back to trot each time. Voltage and cycles OK. Air below zero (0 ºC)! Salinity and temperature from a ship as big as the Marmer are pretty difficult. The possibility should be investigated of using a smaller - Coast Guard? - boat.

On the ICTI – Temp. when in air goes to zero and then past it to 96.85º when it stops, it doesn't appear to reach equilibrium, but stops quite suddenly. On second thought, it is, in fact, recording the outside Temp. Dials go to zero then below it and jam at 96.85º -, it won't go any lower than – 3.15 ºC, so it really is ok after all. Does having it against the lower peg (i.e. 3.15 ºC) do any harm?.

Add 1 external conductivity calibration box to the list of CBI gear.

In A.M., did Sta # 14 and 15 in Narrows; #16 in Arthur Kill; 17, 18, and 19 across and south of Gov. Island; 20, 21, 22 across Governor's Island; # 23 off tip of Manhattan; and 26 and 27 off Pier 64. Twelve station. We left Sta.# 26 at 1345, went up to look over Pier 80 where we may berth tomorrow night.

12, Feb

1128 + 1 h 45 m = 1213 slack pre flood

1348 + 1 h 45 m = 1533 max flood

0845 – ice took 26 secs to pass measured span

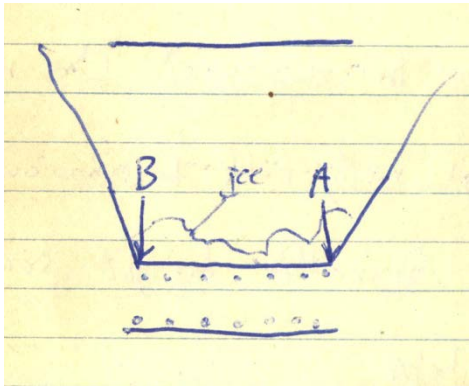
Left the Marmer at 0620 after breakfast, drove Bay St.→ Forest Avenue → to Bayonne Bri. to exit 13 of the N J Turnpike at G. W. Bridge, we checked with the Port Authority Police. I had called a Mr. Tate of Port Authority who had arranged things. Police – esp. Lt. Frend - were most cooperative. They drove out with us while we unloaded gear and Lt. Frend took our car back. We were set up by 0830 - we being Byron Hale – C & GS photog and me - and took the first frame at 0834. He had rigged up a solonoid operating on 4 volts from a 12-volt battery hooked up with a rubber band return to the single frame tripper of a ciné Kodak special through a chronometer that clicks every 10 seconds. Clock was set up on a tripod and

is on bottom of each frame. There is lots of good ice on the river & it is moving right along. Somewhat cloudy – broken - with occasional sun coming through. We are set up under the tower, north side, New York end. It is pretty cold, but with long johns, Hussie boots, and hooded coat, it is bearable. The elevator is at this level and the cops sent some men out to melt the ice that had frozen the door shut. I'm now inside and though really cold, I am out of the wind - Byron Hale brought some rum, so that helps.

Started exposure at frame 5.6.

At 0930, changed to f 6.3 as light gets strong. Clouds now less broken and haze seems to have increased and overall light intensity is greater down stream.

0930 – Ice speed 48 seconds downstream. This is measured by timing ice as lined up between two bridge abatements.



4600 frames @ 6 frames/nuts = 666 minutes 666 minutes = 11.1 hours or more than we need.

Lt. Frend & Officer Novas

Add Sgt. Bellman (letter written 24 February) to the list.

1125 – Ice by at 54 downstream – God, its cold!

1200 – Officer - took me to a delicatessen for sandwiches & coffee.

1335 – Tide has changed & cables are moving up river. The solonoid has frozen & we are tripping it by hand every 10 seconds – it is damn cold!!!!!. Byron is as cold as I am – no heat. I can hardly hold the pen, but I think we are getting good results.

1355 – Changed speed to f 7.7, still working by hand at about 10 min. shifts. Overcast and snowing but not too hard – still pretty cold!! I am absolutely frozen stiff. Lunch, one of the Port Authority police took me to a delicatessen, cost $3.00 for sandwiches & coffee. The solonoid still frozen, couldn't reach Butch

1415 – Ice moving upstream 2 mts 05 seconds to pass the range - even colder! - We are both pretty uncomfortable - moderate snow, 100% overcast.

1500 – Ice going upstream, past range @ 1 m 27 secs. Snowing, still tripping by hand - still damn cold - rum (sob) gone!

1515 – Ice still moving up - still cold!

1525 – Ice by 1 minute 12 secs. Openings changed to 6.3 at ??? hrs. 4.4 @ 1620, and 2.5 @ 1630. That is as wide open as she will go. Snow has stopped and wind has died down. It is still cold but bearable.

Add Officer Raposki to the list. He took me to lunch – so to speak.

1636 – Knocked it off – too dark 33 ft. left – 67 ft. taken new, 3 nts at 24 ft./sec. – Officer Touhey

Executive Director - P. A

Austin J. Tobin

Got back to the Marmer at Pier 26 to find that Thompson – radioman – had been taken off with a heart attack.

Thurs. 13th

Cmd Store off to see Harbor Master about conditions on East River. Them we had to way for a try to come move the RR barge that was wedged across. The slip now – jammed with ice. Once out, we went up river to apt. about ½ mile below G. W. Bridge. We were breaking ice the last ½ mile and lowered the ICTI through a hole chopped in the ice. Capt. Weber called it off for the day and the Ship stopped briefly at Pier 26 for me to hop off and collect. the car. I got back to the Marmer at Quarantine about 1500 – blowing hard and cold, ca. 14º!. In A.M. I helped mark a bit below with the meters –putting on a short connector between vel. and dir. posts so that they would use the same line, and other would act as a ground.

1600 – Set up ICTI with Survey for the 24-hr run. It is rigged off the stern. I plan surface obs. every ¼ hour – with bottom obs. every ½ hour from now till tomorrow eve. Warm-up motors now turned on.

1700 – started 24-hr operation. The Narrows @ Ft. Wadsworth on Sandy Hook.

HW	LW	H_gT
$+0^h02^m$	$+0^h12^m$	-0.3 hw 0.0 lw

Corrected tides at Fort Wadsworth.

13th	~~1555~~	~~3.3 Hw~~
	~~2223~~	~~-0.1 Lw~~
14th	~~0429~~	~~4.2 Hw~~
	~~1103~~	~~-0.2 Lw~~
	1659	3.4 Hw
	2318	-0.2 Lw

Corrected currents - The Narrows - Midstream.

13th	1514 fld.		
	~~1742 Slh~~		
	~~2103 zb~~		
14th	~~0036 slh~~		
	~~0344 fld~~		
	~~0630 Slh~~		~~1618 sfl~~
	~~0944 zb~~	~~1841 Slh~~	
	~~1325 Slh~~		

Calibrated ICTI.

Time	Surface	Bottom + 1	Temperature
1705	20.32	----	0.76
1708	----	20.96	0.79
1715	20.44	----	0.76
1730	20.46	----	0.74
1732	----	20.99	0.77
1745	20.42	----	0.68
1800	20.40	----	0.62
1802	----	21.25	0.83
1815	20.39	----	0.60
1830	20.45	----	0.59
1832	----	21.60	0.86
1845	20.48	----	0.60
1900	20.51	----	0.59
1902	----	20.52	0.59
1915	20.31	----	0.53
1930	20.54	----	0.57
1932	----	20.95	0.71
1945	20.48	----	0.57
2000	20.29	----	0.51
2002	----	20.40	0.57
2015	20.38	----	0.54
2030	20.41	----	0.54
2032	----	20.53 (?able)	0.59
2045	20.40	----	0.51
2100	20.48	----	0.56

Time	Surface	Bottom + 1	Temperature
2103	----	20.70	0.63
2115	20.51	----	0.55
2130	19.95	----	0.44
2132	----	20.05	0.47
2145	19.84	----	0.42
2202	19.79	----	0.40
2200	----	19.96	0.45
2215	19.65	----	0.35
2230	18.86	----	0.24
2232	----	18.91	0.26
2245	18.77	----	0.21
2300	18.88	----	0.25
2302	----	19.03	0.27
2315	18.25	----	0.26
2330	17.81	----	0.25
2332	----	18.05	0.26
2345	17.36	----	0.17
2400	17.55	----	0.21
0002	----	17.64	0.24
0015	17.22	----	0.14
0030	17.18	----	0.13
0032	----	17.24	0.14
0045	16.67	----	0.01
0100	16.28	----	-0.06
0102	----	17.02	0.08

Calibrations

	Conductivity				Temperature	
Time	High	Low	High-Low	Zero	Position 1	Position 2
			February 13			
1700	50.83	25.15	16.86	00.12	10.96	22.41
2245	50.74	25.10	16.79	00.00	10.97	22.42
			February 14			
0310	50.78	25.11	16.80	00.00	10.97	22.42
0810	50.77	25.12	16.81	00.00	10.96	22.42
2110	50.76	25.12	16.80	00.00	10.96	22.42

Time	Surface	Bottom + 1	Temperature
0105	16.20	----	-0.07
0110	16.19	----	-0.08
0115	16.35	----	-0.07
0120	16.35	----	-0.04
0125	16.40	----	-0.03
0130	16.38	----	-0.05
0132	----	19.12	0.52
0135	16.32	----	-0.08

Time	Surface	Bottom + 1	Temperature
0140	17.27	----	+0.09
0145	16.36	----	-0.06
0150	16.55	----	-0.05
0155	16.68	----	-0.04
0200	16.78	----	-0.03
0202	----	19.24	0.52
0205	16.36	----	-0.05
0210	16.65	----	-0.07
0212	16.05 to 17.10		-0.07 to 0.02
0215	16.82	----	-0.03
0220	17.44	----	+0.06
0225	17.42	----	+0.04
0230	17.22	----	0.00
0232	----	19.92	0.49
0245	----	20.08	0.51
0248	17.30	----	.00
0300	17.49	----	0.04
0302	----	19.92	0.43
0315	17.76	----	0.02
0330	18.44	----	0.15
0334	----	19.66	0.37
0345	18.55	----	0.10
0400	19.00	----	0.18
0402	----	19.84	0.36
0415	19.42	----	0.26
0430	19.38	----	0.25
0432	----	19.62	0.31
0445	19.38	----	0.22
0500	19.31	----	0.20
0502	----	20.08	0.41
0515	19.10	----	0.07
0530	19.46	----	0.18
0532	----	20.60	0.38
0545	19.26	----	0.03
0600	19.40	----	0.18
0602	----	19.44	0.32
0605	19.76	----	0.23
0610	19.55	----	0.19
0615	19.76	----	0.21
0630	19.66	----	0.15
0632	----	21.74	0.62
0640	----	21.79	0.62
0645	20.16	----	0.31
0650	20.18	----	0.31
0700	20.00	----	0.22
0702	----	22.28	0.75
0715	20.12	----	0.23
0730	20.42	----	0.30

Time	Surface	Bottom + 1	Temperature
0732	----	21.81	0.56
0740	20.22	----	0.18
0745	20.12	----	0.14
0750	20.38	----	0.30
0755	20.46	----	0.20
0800	20.34	----	0.20
0802	----	20.82	0.43
0815	20.46	----	0.38
0820	20.32	----	0.38
0825	20.15	----	0.36
0830	20.02	----	0.37
0832	----	20.76	0.45
0837	----	20.59	0.44
0840	----	20.36	0.41
0844	----	20.45	0.43
0846	20.06	----	0.32
0850	20.09	----	0.35
0855	20.14	----	0.34
0900	20.15	----	0.33
0902	----	20.47	0.42
0905	----	21.31	0.42
0911	----	20.96	0.57
0914	----	20.88	.52
0916	20.32	----	0.38
0922	20.28	----	0.38
0925	20.32	----	0.38
0930	20.36	----	0.39
0932	----	20.56	0.45
0935	----	20.60	0.47
0940	----	20.45	0.43
0946	20.36	----	0.45
0950	20.36	----	0.45
0955	20.36		0.45
1000	20.36	----	0.48
1002	----	20.51	0.45
1005	----	20.45	0.49
1010	----	20.44	0.45
1014	----	20.48	0.49
1016	20.40	----	0.51
1020	20.40	----	0.51
1025	20.45	----	0.52
1030	20.44	----	0.51
1032	----	20.43	0.48
1040	----	20.45	0.54
1044	----	20.00	0.42
1046	19.88	----	0.40
1050	20.22	----	0.49
1100	19.60	----	0.30

Time	Surface	Bottom + 1	Temperature
1102	----	19.65	0.30
1105	----	20.07	0.47
1110	----	19.65	0.32
1114	----	19.92	0.14
1116	19.14	----	0.24
1120	18.88	----	0.20
1125	18.83	----	0.18
1130	18.50	----	0.10
1132	----	18.54	0.10
1135	----	18.56	0.12
1140	----	18.78	0.17
1144	----	18.78	0.17
1146	18.69	----	0.16
1150	18.63	----	0.15
1155	18.62	----	0.16
1200	18.12	----	0.18
1202	----	18.69	0.18
1207	----	17.55	0.12
1210	----	17.42	0.11
1214	----	17.30	0.13
1216	17.18	----	0.14
1220	17.18	----	0.14
1225	17.08	----	0.15
1230	17.22	----	0.15
1232	----	17.18	0.16
1235	----	17.07	0.16
1240	----	17.06	0.17
1244	----	17.07	0.17
1253	16.85	----	0.17
1255	16.85	----	0.17
1259	16.86	----	0.18
1301	----	17.08	0.17
1305	----	17.08	0.17
1310	----	17.06	0.17
1315	----	17.10	0.17
1316	16.95	----	0.23
1320	16.92	----	0.19
1325	16.91	----	0.21
1330	16.92	----	0.23
1332	----	16.99	0.18
1335	----	17.00	0.18
1340	----	17.07	0.19
1344	----	17.04	0.20
1346	16.97	----	0.24
1350	16.95	----	0.24
1355	16.92	----	0.23
1400	16.96	----	0.20
1402	----	17.05	0.23

Time	Surface	Bottom + 1	Temperature
1405	----	17.06	0.22
1410	----	17.03	0.24
1415	----	17.34	0.23
1417	16.91	----	0.30
1420	16.95	----	0.30
1428	16.92	----	0.33
1430	16.93	----	0.33
1432	----	18.90	0.40
1435	----	18.85	0.40
1440	----	19.06	0.43
1444	----	19.72	0.54
1446	16.88	----	0.32
1450	16.86	----	0.33
1455	17.35	---	0.32
1500	17.08	----	0.34
1502	----	20.08	0.63
1505	----	20.32	0.66
1510	----	19.84	0.60
1514	----	19.70	0.61
1516	17.40	----	0.39
1520	17.25	----	0.39
1525	17.36	----	0.41
1530	17.25	----	0.41
1532	----	19.94	0.62
1538	----	19.82	0.61
1540	----	19.99	0.64
1544	----	19.79	0.61
1546	17.49	----	0.42
1550	17.82	----	0.42
1555	18.02	----	0.44
1600	17.90	----	0.43
1602	----	19.53	0.56
1605	----	19.29	0.54
1610	----	19.22	0.51
1615	----	19.35	0.52
1617	18.27	----	0.46
1620	18.32	----	0.46
1625	18.15	----	0.45
1630	18.26	----	0.44 1/2
1632	----	19.24	0.50
1635	----	19.29	0.52 1/2
1640	----	19.26	0.52
1644	----	19.30	0.53
1646	18.66	----	0.47
1650	18.55	----	0.46
1655	18.57	----	0.45
1700	18.70	----	0.50
			250 obs’

Time	Surface	Bottom + 1	Temperature
1702	----	19.25	0.51
1705	----	19.21	0.51
1710	----	19.28	0.52
1714	----	19.31	0.52
1716	18.55	----	0.49
1720	18.54	----	0.46
1725	18.87	----	0.49
1730	18.75	----	0.48
1732	----	19.20	0.48
1735	----	19.26	0.46 ½
1740	----	19.25	0.48
1744	----	19.25	0.47
1746	18.86	----	0.47 ½
1750	18.88	----	0.47
1755	18.72	----	0.37
1756	18.90	----	0.46
1800	18.99	----	0.43
1802	----	19.84	0.58
1805	----	20.72	0.77
1810	----	21.22	0.82
1815	----	21.46	0.87
1817	19.13	----	0.49
1820	19.11	----	0.48 ½
1825	19.04	----	0.47
1830	19.04	----	0.45
1832	----	21.65	0.92
1835	----	21.94	0.99
1840	----	22.5	01.01
1844	----	21.48	0.85
1849	----	21.16	0.80
1850	19.16	----	0.45
1855	19.26	----	0.42
1900	19.21	----	0.40 ½
1902	----	20.53	0.69
1905	----	20.72	0.73
1910	----	20.48	0.67
1914	----	20.49	0.68
1916	19.23	----	0.38
1920	19.42	----	0.42
1925	19.26	----	0.36
1930	19.29	----	0.36
1932	----	21.38	0.80
1935	----	21.32	0.88
1940	----	21.39	0.89
1944	----	21.08	0.81
1946	19.52	----	0.45
1950	19.38	----	0.41
1955	19.60	----	0.47

Time	Surface	Bottom + 1	Temperature
2000	19.72	----	0.50
2002	----	20.73	0.71
2005	----	20.22	0.61
2010	----	20.70	0.69
2014	----	20.85	0.75
2016	19.24	----	0.39
2020	19.30	----	0.41
2025	19.39	----	0.42
2030	19.37	----	0.44
2032	----	20.90	0.74
2035	----	20.79	0.75
2040	----	20.84	0.78 ½
2044	----	21.18	0.86
2047	----	20.69	0.74
2049	----	20.99	0.83
2051	----	20.59	0.71
2055	----	20.73	0.76
2100	----	20.12	0.62
2113	----	19.66	0.50
2118	19.57	----	0.18
2119	19.30	----	0.30
2121	19.61	----	0.49
2126	19.50	----	00.40

Notes on the 28-hour Series:

Surface meter rigged so that top of cage was 4 – 6" below the surface. Line fired with a loop so it could be hooked over a pad-eye each time it was brought back up to the surface.

Bottom meter position at 1 foot above the bottom was determined every second lowering to compensate for the tide.

Over the 28 hours, 321 observations were made – an average of 11½ obs. per hour or one every 6 minutes or so.

Mark- Circuit Diagram for recorder?

I went back and forth between the lab topside, down the ladder & out the fantail to raise or lower the sensing head 260 times, – no wonder I feel lame as well as tired.

On the ICTI forms were entered the readings every 15 minutes. In this book are recorded in addition the numerous in-between – every five minutes over much of the series.

Calibrations of the equipment were run at 1700 and 2245 on the 13th and at 0310, 0510, and 2110 on the 14th. Enough diff. to justify calibration before each one.

A running plot was maintained throughout the series – I was a busy little tyke – and some interesting features were revealed. ~~An ebbing tide, the water is packy well mixed~~ This plot is of surface and bottom water temperature only – as no nomograph for converting conductivity to salinity was available. This must be done later and should be even more revealing.

Note from the temperature plot that the water column on an ebbing current is pretty well mixed, i.e. nearly isothermal with depth, whereas on a flooding tide the bottom water is considerably warmer. I believe this reflects the up-harbor movement of seawater along the bottom on the flood. River water (surface) is damm cold – ice cubes in it – and is colder than the ~~underliying mixed bottom water~~ ocean water brought in along the bottom.

The pattern on both floods during the cycle was really quite similar. Salinity values during this cycle should be interesting - possibly T-S diagrams can be made for the mixed and the unmixed waters. During the day Mark Goodheart worked on getting the buoys ready with Boats (Bob Savage) and some of the men – he really worked hard too & left at 1600 to go see Capt. Finnegan. Byron Hale took ice pictures yesterday while we were in the thick of it & took shots today around the ship leaving about 1300 to go back to Washington.

Saturday

I slept through breakfast – up by 0800 and back at it. We delayed shoving off until 0900, so we would get in to the East River just after ebb strength. 0955 we made station # 24 just south of the Brooklyn Bridge. There is a good deal of ice in the river – chunks up to table size in large clumps.

1030. Made station # 25. Started just under the Williamsburg and drifted ca. 100 yards south during the 3 minutes the lowering took. Passed up the west side of Blackwells Island and into Hell Gate moving slowly west of Miy Rock, making station #32 just west of the southern tip of Wards Island. By lowering the antennas, we were able to go beneath Triborough Bridge between Manhattan and Randalls I. On slowly, blowing for the Willis Ave. Survey Bridge. Under that and tied up between it and the too low Harlem Bridge right near where Sta# 35 will be.

Currents all through this area are pretty tricky. Down along Blackwells Island and the lower East River these big railroad barges go through with the tide and they really travel, with the tugs trying to guide them, but they must make 8-12 knots through there. I don't think buoy longevity will be much in there. We might put out a dummy buoy with no instruments in it or meters for a week before we expect to occupy the station. This would give them time to get used to missing it and we could see how it survives. This, I think, is a good idea, but Weber is pretty pessimistic about the whole East River Area – a bit too so I think.

1240 Tied up at City Balk head at the foot of Lincoln Ave. in the lower Harlem River. Snow predicted for tonight.

1310 Underway - Made Sta# 35 in Harlem River. Made Sta. #30 and 31 in Hell Gate – off Gracie Mansion and on up East River. Sta. #34 moved east, as it was right in front of the warm water and discharge from a Big Power Plant on L.I. Temps wre over 1^0 above normal. ot #33 as plotted.

Got #37 between Brothers Island and #36 on N side of E River. Another power plant here, and srf. temp were 0.18 as – 0.10 elsewhere. This should be moved too.

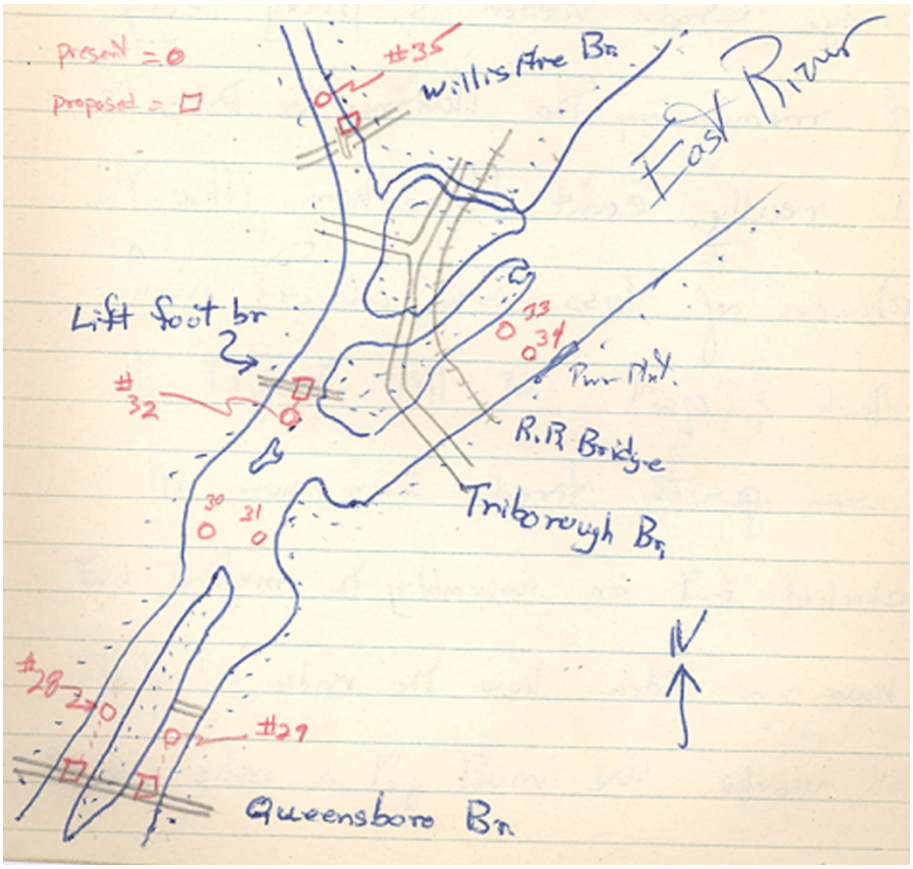
On to #39 @ 1508. This is the easternmost station of the survey. Heading back we were going to get the 2 stations on either side of Blackwells Island, but it was snowing and hard visibility was pretty poor. On the way back I worked up in the forward locker with Mark on the meters. Have been putting a jumper between the vel & dir contacts & grounding the other lead. Meter #88 is pretty rough – we worked on it but it is still rough. One of the magnets is shorter than the others, and makes the rotation uneven. That one will go back to D.C. with Mark.

To NYC that evening & met Butch at Liuchow's for dinner. Ran into Torny Woodruff & Scotty McCube. I dropped Butch at Grand Central & then at Eddie Condon's in a real blizzard. Met Jane McAuliff at the Hill & we went to Hibernians Annual Ball. Back here – still blizzing – at 0300.

Sunday 16 Feb. –

Tied up at Quarantine Station all day. It is still snowing & blowing hard from the north. The doors freeze shut, all the windows in the lab have a thick coating of frost. There is a gunwhole – high drift at the peak of the bow, and the starboard passage is up to the door frames in snow. It was a rough night last night. The mooring was really bucking in high wind & waves. Boats was out on and off putting chafing gear – Things were rolling in the galley and no one got much sleep. The lines are all covered with ice and Mark & I spent the day down in the "instrument lab" – The 6'x 5' foot hole forward of the sleeping hold – getting meters ready for use. Meter put in nice, after section and bellows removed, additional enamel wire (scraped at contact) added to longer lead, innards unpacked, mounting screws removed and slipped into the innards, and innards put in case – release after magnet holder and tighten it down, release forward one – after insertion – and tighten. Short length of covered wire out to fit between vel and dir. contacts, tinned and attached, short lead attached with it. Extra length on longer lead fixed to from screw. Each step checked on ohmmeter to be sure contacts are well made. Plug removed from meter, attached to 2 conductor cable cut yesterday. Bellows put on –hand tight – the drain plug tightened, the filler plug is removed and unit filled with oil – a Esso ariation instrument oil Plug put back, meter taken out and tarred each way to collect bubbles at top. Put back in vice and oil added to top. Bellows pulled out a bit, extra oil added, and filler plug is replaced, bellows released, so oil is actually under a bit of pressure. Rest of meter added, cables put on, and meter returned to box. I took about 2 hrs per meter. We now have 7 done and I now know how to do the rest, and will get them in the next couple of days.

We must check the feasibility of making some of the East River stations from the bridges, lowering the meter for each obs., rather than trying to keep a bouy in those busy lanes.



Stations 28 & 29 would be moved south to the Queensboro Bridge, #32 north to the Wards Island footbridge and #35 south to the Willis Ave swing bridge. Cmdr. Weber is pretty leery of manuvering The Marmer in there & I really can't blame him. Also the chances of loss are almost nul. Mark & I quit at 1100 tonight. He was pretty tired. I am now all checked out on assembling the meters, but have no idea how the radio end of it all works. We must get a radio man – a good radio man – but soon, or all will grind to a halt. Highways are all either closed tight or barely open. Baltimore has 19 inches of snow.

Monday 17 Feb. '58

Cloudy & cold 10-15° Mar temp predicted 6° temp at 0730. It is bitterly cold with wind at 26 mph out of the west. We are some what protected from the full wind here, but snow is drifted high aboard.

Capt. Weber called the ship @ 0800. He heard a radio report that Wash. D.C. has 13 inches & federal workers have the day off. Our truck was to have loaded for Charleston today, but probably won't now. Mark is still aboard – just plain snowed in. Capt. Weber couldn't get his car out to come down. Cap. Crosby called about noon – wondering where Mark was. We worked on the meters in the AM – he left about noon & I went back to it until 5 or so. I did 2 meters complete with cable and plugs and cut 2 25 – foot lengths, and put plugs on both ends. Cmdr. Stone got the radio shack in shape. We hope to put a meter over in a day or so.

Meter # 88 went back to D.C. with Mark – as did 2 leaking expansion chambers.

Dinner with Mary Lee Shrady-Morris & Dave – 8 W 16° - 22D – a nice evening.

Spent nearly an hour digging out the car & the truck. Washington has had 13 inches – Baltimore 19 – a real storm and more is predicted.

Tuesday Feb 18

Woke up to 4° F temp. This AM. Clear, cold and – for the first time in several days – sunny.

Cmdr. Stone kept at it up in the radio shack & I disappeared in to the "instrument shop". Yesterday afternoon I rigged meters 102 and 98. This A.M. I did #94 & 98 and put in the two cables I did yesterday. In the PM I finished up #93 and 74. It took about 2 hours per meter to do it right – & do it right I did. I worked along slowly and as thoroughly as possible. We now have 11 all set with the cables attached, two all set except for the cables which will be out when we know the station they will be used at, and two for which Mark took parts back to D.C. to be fixed: #88 and #95. One meter box had no screws in it; the ones that attach the innards to the case – forward end. I pirated these from #95, but we will need them when the other pars come up. Combed the ship but found non the right size.

Web. 19 Feb.

Cutter Keys for buoys yokes? For meter hangers? Screws for innards to case?

Trying to get a meter rigged from the pier to test all the gear. I ran ohmmeter tests on the meters below & #? Gave a bum pattern. It is al though one of the velocity contacts was not hitting. I have tagged it & will drain it and check the mechanism if there is time. Tagged meters #93 and #74 saying they were already to go except for cables. Tagged #95 saying Mark and I should add the ground and jumper before it is filled – then expansion chamber is in D.C.

Put yoke on #100 (a 75-footer) – no cable pins, so I safely wired it. Boat has the cable rigged for it & the 30 lb weight ready.

MG//

Need coax cable to run from xmetter to buoy deck plate for antenna

Fixed jumpers for #95 & #88 and attached them to tags attached to the housings.

Attached ground to meter #95 case & noted it on tag.

Capt. Weber called D.C.& switched to 703 when he was through talking with Bupers. Mark was out but I left a message with Mrs. Payne that,

1) meters filled with oil,

2) No cotter pins for buoy hangers: we can get them here or he can send some up.

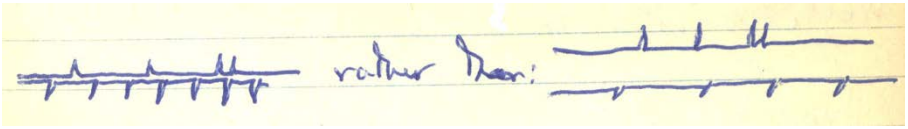
3) Need spare screws that hold innards to the case.

4) Need coax cable for running from x metter to plug plate on buoy.

Bupers says they have a radio man (also named Thompson) who will be checked out down there & sent along.

MG

If pen arm on recorder – i.e. the arm hooked to the chronograph – were ½ - ¾ inch longer Ww could get tracers both at the center of the tape



Second pips too long  , but that probably is in the chronometer at contact and will be checked.

We rigged meter #100 over the side of the pier, but currents inside the pier were too slow to record. Buffers on the outside of the pier fouled it up.

We added a section of 808 cable from a booring strut in the buoy to the water as a ground connected antenna leads to the xmitter, but lead to the xmitter and metter cable – by passing sequence switch, as the connecter from the sequenc Sw [switc] to xmitter was to short to reach on the new board setup.

Checked the crystal in the xmitter, put in the proper band box, put new batts in the recorder and she works. Had meter outside for a while, but wind too irregular and I was leery of the wind anyway, so we have it inside, & she works pretty well.

Thurs. Feb. 20th

Set up meter #100 again in the lab. Since there are few blades to the impeller, and it rotates 5 times per revolution of the big gear, then there are 20 blades going

Send up special paper for making running plot of currents

Get ICTI monograph for our set

by turn of big gear i.e. every complete contact series. Thus velocity pips should come through at 0, 5, and 10 blades with the direction pip in there somewhere. Since each "blade" equals 18°, the direction can be established.

Test runs:

Meter Pointed	Pips at (in blades)	Dir	Current
E(M)	0, 5, 10, 12	215°	125°+
Steeple (007°M)	0, 5, 10, 11	198°	121°+
City (036°M)	0, 5, 10	180° (audible)	144°+
Bow(340°M)	0, 5, 6, 10	108°	128°+
	(10 on this once came in only about half the time)!		
West (M)	0, 3, 5, 10	054°	144°+

5/662
[mean 132°]

Brought up Ensign Benning's hand compass, to check the radio shack in hopes the monsterous error was really in the shack and not in the meter. The place is just loaded with magnetic fields, so I feel OK about the meter, but am a hair worried about that missing 3rd velocity signal. It seems to happen only when pointed towards the bow.

<u>*Stations</u>

#2 is in middle of cable area. Suggestion is to eliminate #2 and move #1 over to the 28 ft. mark on elbow

#6 at junction of 2 cable areas & shool water. Want it moved to junction of Terminal and Raritan Bay Reach.

#16 is highly questionable – its chances of survival are very slim. It could be moved out to Rolling Reef area near 20B chart 285 – or at Boyorre Br. but that is no high!

#22 E.of Gor. I. Heavy traffic in there – would survive better nearer bell buoy (chart 745.

#24 and 25 have poor chances

#28 & 29 don't have a chance – Queensboro Br. Has 133 ft clearance – possible.

#32 (55 ft to br.) - as before. #35 (25 ft. to br.) too

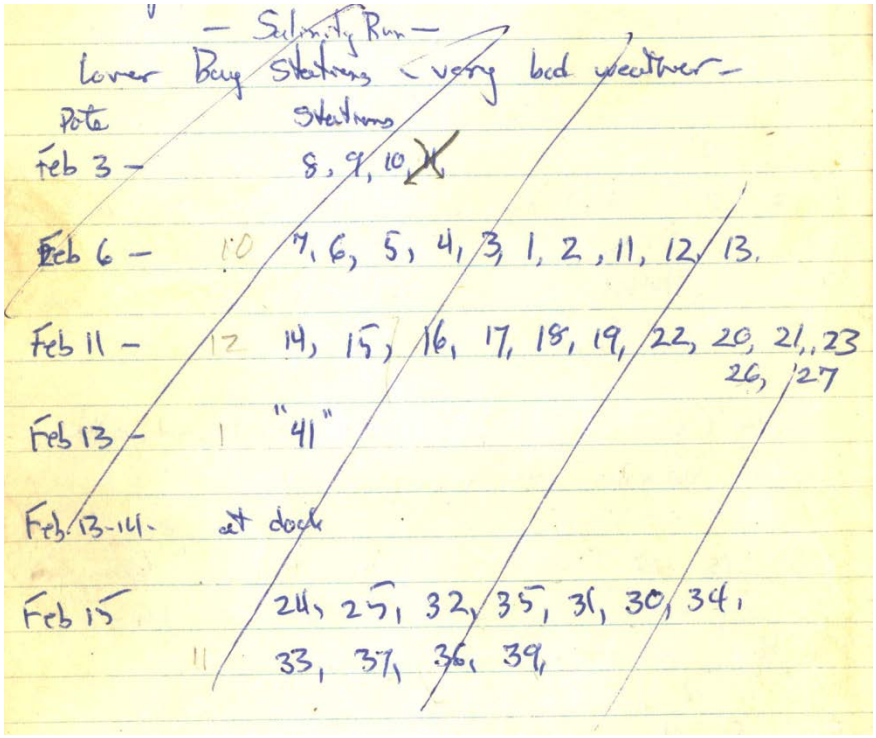
#34 - (& 33 in tow) should be moved to avoid warm water outflow.

#37 is in main channel again! By moving it east a bit – it is a hair wider and could be missed.

#42 Spuyter Dyvil – too narrow to get Marmer in Dock man said no go. There is not enough space. This can be put outside in the river, or can be assigned to the RR bridge.

Possibly pree meters from the bridges –

Salinity is due again in two weeks and not yet finished



Lover Bay Stations (very bad weather). (Reconstructed)

Feb 3 -	8,9,10,11
Feb 6 -	7,6,5,4,3,1,2,11,12,13
Feb11 -	14,15,16,17,18,19,22,20,21,23,26,27
Feb13 -	"41"
Feb13-14 -	At dock
Feb15 -	24,25,32,35,31,30,34,33,37,36,39

Feb 3rd was bad weather, winds to 30 knots with ice over everything. Had to anchor to take the stations and winch kept icing over (only 4 stations).

6th was OK but cold & windy. I arrived the 10th & the 11th was a good day (12 sta.) even so we left the working area what +

Thought was a bit early – The 12th was on the bridge (Geo. Wash.) all day taking pictures – Weber said the lower bay was pretty well fogged in. They did get to pier 26, though, where Tompson was taken off.

The 13th the ice was bad & we took on station through the ice. The 14th the boys had a day off & I ran the 28th station. The 15th we got in 11 stations, but again had to leave early, as it was snowing pretty hard.

The 16th was Sunday – the 17th – 20th we have been tied up as we can't get the up- river stations because of ice and can't plant buoys w/ no radio man. Have put the time to good use in getting the meters and buoys ready to go – big job too.

John P. Coates wants insulation board ½ - 1" thick – 6" x 12-18" bakelite or some such.

Winyah Bay Survey

Talk with E.A. Shultz in C of E office, Charleston telephone permish from CG for recorder on light #22 (sic.)

Last dredged ca '56 at turn. In Sampit Rvv. dredging finished in April 57.

Bottom mtl. has shoaled from mtl probably pretty fluffy. Called to Miami Coast Guard and checked the 22 and 25 light OK. 5 piling creosute. Told them meter recorder 20 to 25 lbs. (?). Said we might put 1x6" a cross between pilings, Advise C.G. at Georgetown when it is installed and Lt. Cdr. De Bergh in Charleston and that permission has been granted by the Miami office

Cmdr. Burk in Miami has given permish for installation on light #25 and that we are to advise people in Georgetown who service it.

Met Mr. J.W. Blair, Asst. Chief Engneer. Advised Charleston C.G. (Lt. Cmdr. De Bergh) of all of this by telephone. Described installation.

8 lb pb w/ 6" shoe penetrated only 1 ft.

Sand Wave lower bay C13 – C14 area 60-75' at base. 4-6' high 5/400ft.

Have Gilbert take run over them start at can buoy 13 to buoy 15. In this area note on fathogram reads "Bottom firm all the way" all the way out from opp. front range at far – end eastern channel. Depth Now dihing discharge and spilling. so fluff not getting.

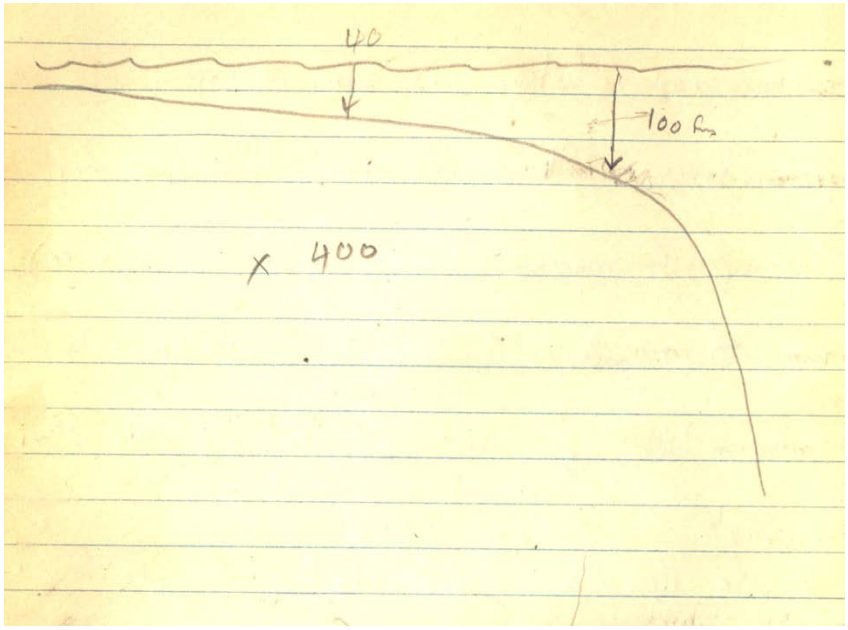
April ’57 notation on fathogram at buoy 25 is “firm”, depth 21 ft.

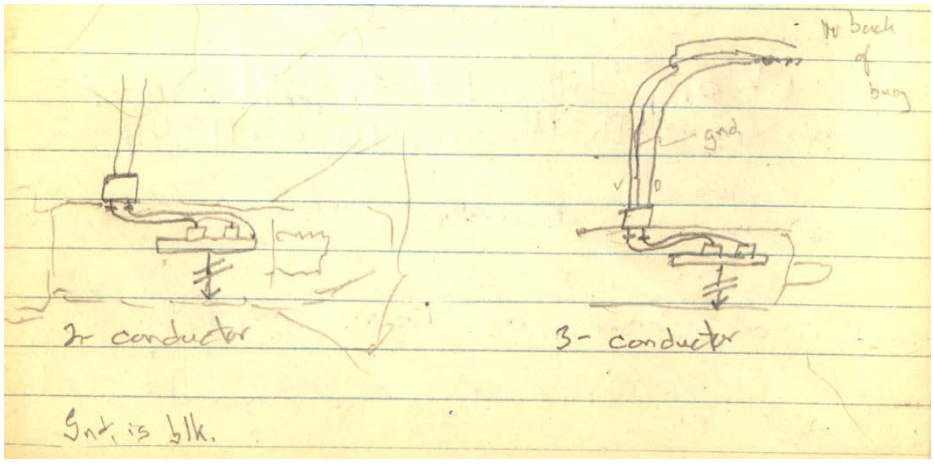
Some deep draft ships have to come through partly loaded or at high tide so meters had best be at edge. C of E people will put out one & anchor near our station for locations & my will move between 2 sta. taking velocities at each : on hr. and ½ hr. Taking 6 measurements vertically (price) and $ samples. (srf. 00m/w, ¼ & ½, m|w → btm, and last one 1-2 ft. above ftm.

$ sample to Marietta C of E lab. Samples over a 14 hr. cycle.

Drop Shultz a line (call) as to schedule (did it) for next week, so he can meet the ship. Shultz RA-3-5341 – ext.19

Home is 17A Pleasnt TU-4-4344





Friday 14 Mar. 1958

Tired, tired, tired! Just back at the hotel from the USC & GSS Gilbert at 2305 after getting there at 0730 this AM almost 16 hrs. worked today. Wednesday I talked to Shultz at the C of E office in Charleston. Then bused up to Georgetown, getting here about 7 PM. Found the ship and got caught up. Buoys just not working.

Thurs the 13th rigged 3 meters and put them in, but meters 2 and 3 shorted out. On deck they were OK, but not in water, steady beep meant short. Off to warehouse, where Mark, I, J.D. Lewis, John Hernandes (radio) & Slim, worked form 4 hrs. on recableing and rewiring all 5 buoys. Back at the ship it still happened. Finally decided it was because the rigging made a loose ground on the deck, but once in the water with all shackles and hangers tight, it was a good ground. They turned some plug in the buoy, got good signals from each. In water (sta. #3) no short, but totally unintelligible signals. Seq. switched OK, but signals unreadable. John figuard grounds were wrong, & that we were receiving from all three at once. It was 1800 by then.

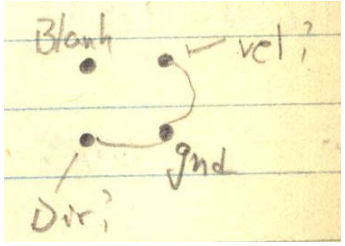
Friday AM – off in the skiff (Mark & John) to correct this at Sta. #1 & Ssta. #3 while I stayed aboard to run the rigging of 3 meters for station #2. We planted that where the Sampret [Sampit] River joins Winyah Bay, & all these were keying by 1300. Have been making readings on 9 meters every ½ hrs. since. It has been a dammed busy day. Mark went to Lions Club at 1930, back about 2245. We stayed at it all the time. All is going OK now, but it is a lot of work. There are only 5-8 minutes per hr. when chronograph isn't going. Tapes come faster than we can scale them. Have had 6 people on it all PM. Tentative schedule is to work all hands over the weekend. Then to knock off Wed – Sat and Sunday to plant # 4, 5, & 6 and my bottom meter. Mark called Capt. C., & New York is having lots of trouble – broke 8 meters. There was some breakage before I came – the plastic – but only 1 today when Ens. Garnett let one fall over. They have to be lowered in on a line, or they will break. Will be a long grind, but I think we will make out OK. Water is cold (42°) & very muddy – but will try to get the bottom mount on when I can. In the meantime, there is more than enough to do.

Saturday 15 March

At shop 0730. Worked a way on tapes & chronograph. To town to check out of the hotel & called Ed Shultz. Unrated and setup bottom mount. Shop did not drill out center post, so I will have to rig up some sort of coil arrangement – perhaps using telephone company wire-coiler – so meter can turn.

~~Mark – cable for mark?~~

Mark and I went over the recorder. Batteries are marked + & – and leads are marked. Connect Butts. Line meter plug up. 1st connect line to meter and watch to see plugs & lines are OK. Direction & vel. Come up separate lines make velocity the inner mark on the tape. Would be best if we could also set up xmtr with antenna, so we could monitor the thing from the ship. Wind check, set time witch at 15 mts., int – cont switch to continuos to give steady V, D, & 10 sec



time all the time and expanded scale for 1 minute every 15 minutes. Batteries to be put in box transmitter too. Cover whole with a tarp. Should – wth full roll – go at least four days.

Mark left ca. 1800 to head back to D.C. I was up until ca. 2300 trying to get the running plots started. Did Sta #3 and started Sta #1 meter #1.

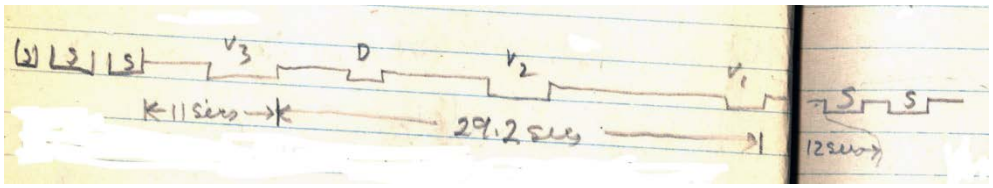
Sunday 16 March

In AM finished all running plots to date. Sta. 2 has lots of gaps of unread tapes, so I started on them. Times must be gotten when ships tie up & leave The Int. Paper Co. dock, as then must deflect currents into station #1. (Got them)

Tapes at station 2 meter #1 are real stinkers, as the V_2 and contact doesn't always hit. This is meter 193-17 and I will try to fix it – i.e. adjust the contacts – when we pull it next.

At 1055 during the 1100 obs, 16 March, on Station 2, meter 1. It hit and did not hit on the same tape, so this particular trouble shows up nicely. Actually either V_3 or D also misses occasionally

Lowest velocity available to date is 0.1 knots. This I got on 2330 obs 14 March Sta. #2 meter #1.

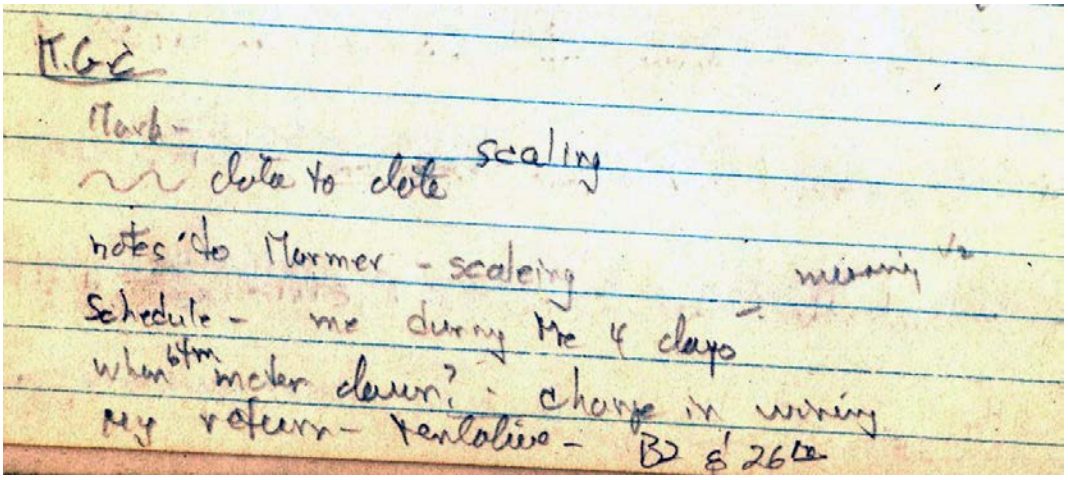


No full internal, had to multiply V1 – V3 by 2 to get full contact interval.

Necessity for pole obs.?

A Mr. Mitchum in Georgetown asked to be remembered to Hanson, C and GS D.C.

K.G.C



Ship times in & out of Dock

Monday 17th March 58

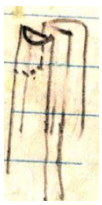
Wrote long letter to Capt. Cosby in AM detailing the operations since Mark Insert figure in here left on Saturday to town with Ens. Mills for film & socks. Worked on Sta #2 tapes that are still unread. Talked long on the "why" of all this to the men running tapes. Ran some of those Bernarr from Charleston paper aboard and talked long with him & Capt. Schoene. Brought all running plots up to the 1830 obs. got a good tape this evening and ran off a duplicate to send to 2 etther. It had V_2 missing on alternate sets, and V_3 out on the others – gave a weird pattern indeed.

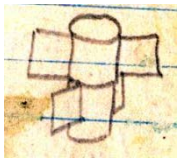
Looks now as though the buoys will come aboard Tuesday afternoon or Wednesday. Although March (Ens. W.M. Lee) says the Capt. said something about planting set #2 on Wednesday, shutting off the xmitters and just leaving them on station until Monday. I'm not a bit enthusiastic about this, even though it would mean I could set up and test the bottom mount here on the duck Thurs., Fri., Sat., and Sun. while all the others were off. I'll wait and see what happens. Charlie Kears (sp?) came aboard today (radio) but Mac (Yueman) left on emergency leave, so net gain is zero.

Tuesday

Tape scaling again then EA Shults & EE LaRoche of C and E Charleston came aboard. I went over all the plots with them & we talked through lunch and till about 1400. Went with them to the C and E boat. Winyah. She is using a price meter with obs at srt., MLW, ½ MLW, 2/3 mlw & 1ft above bottom for 14 hrs.at each station. They are also taking suspended sediment smpls with a milk bottle device w/ a line to pull plug at depth.

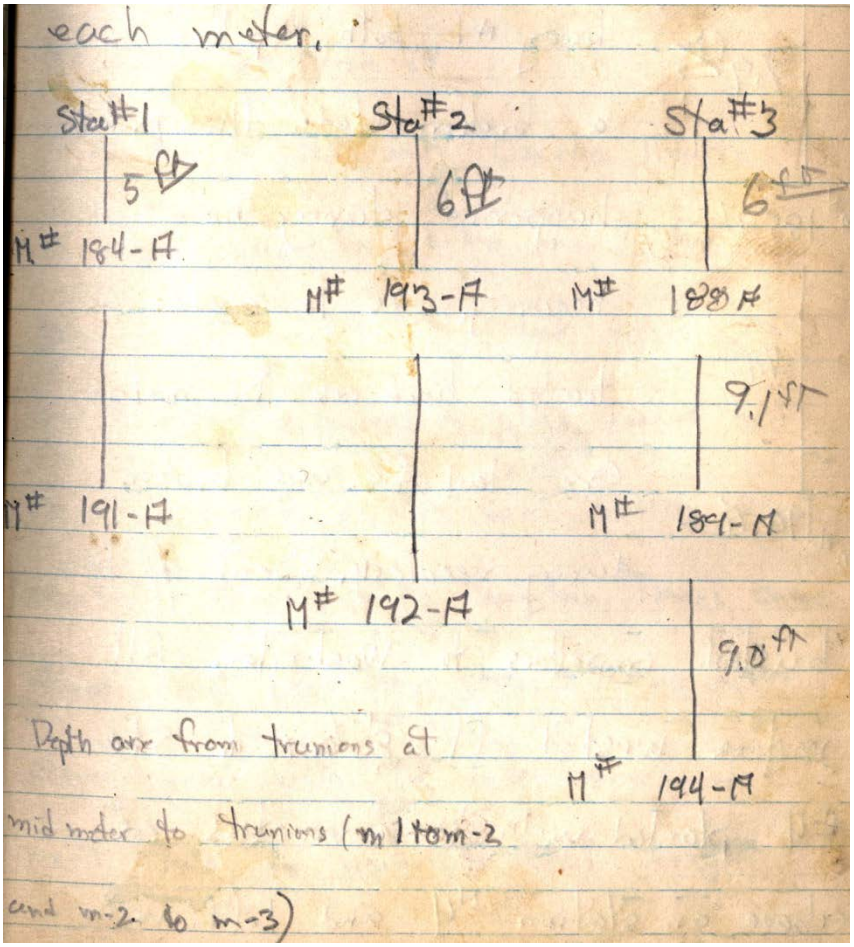
Their price meter has a slotted rod gadget that fits over the wire.





Wing. slots on the top are separated & used to join successive rods together to indicate – roughly – the direction. Eve. Finished all of station 2, brought all

plots up to date & barely started checking. It will be a long job. Engnrs [Engineers] blinked to us about 1930 that they were through, but we ran on until 2030, to give 104 –1061/2 hrs. on each meter.



Depth are form truniens at mid meter to trunions (m1 tom-2 and m-2 to m-3

To date: 5 broken fins & five broken impellors to date. On recovery of buoy #1, both impellors had a broken blade. This probably happened during the actual recovery. As the anchor cable trailed back in to the meters. One tail fin was broken during recovery. Sent off tow busted impellors to Washington. All meters washed off & boxed. Sta. #4 planted with three meters as above on station #4 and left with [73] the sequence switch on A-3 so I can run off an hour or so sometime during the next four days!

Thursday 20 March, '58

Worked in A.M. with Charlie Kearse in rigging up the bottom mount. We assembled it on the after deck, rigged the 250 ft. with the necessary plugs, hooked her to the recorder,& after some fussing, she worked. Fleming of the Georgetown Times came aboard about noon for photos of us in diving gear with the bottom mount. I went into the water to test weight belt, water temperature and visibility. They were too heavy, awful cold, and nil respectively.

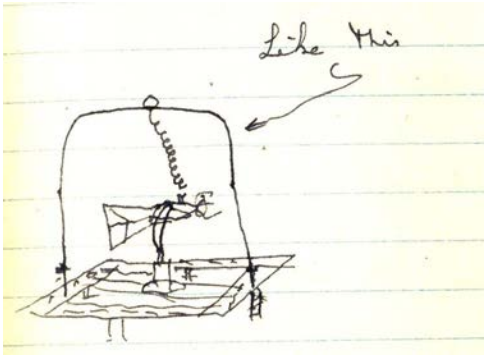
Into Georgetown in the afternoon trying – in rain – to locate a wire holder–coiler such as used on telephones, but more available. Got Ford to cut & thread some ½" pipe for holding cable on the bottom mount. Kearse rewired chronograph so we can run her slower. To warehouse for meter for bottom mount.

From 1645 to 2245 ran meter #3 on station #2 to see how she varied by checking 2 minutes every 15. Curves very nice- as is a plot at contact interval vs. times. Station becomes too bad for buoy reception at 2250, so we knocked it off. Have been living like matadors – steaks, french fries, milk, salad and peas for dinner tonight. Must write Capt. Crosby in the A.M. If tomorrow is like today, will check Kearse out on the aqua lung. He is eager &d I will be glad to have another man along on Tuesday.

Friday, 21 March, 1958

Wrote a 2-page letter to Capt. Crosby &d went in to town to collect mail and to get the pipe that Ford was cutting & threading for the bottom mount. Saw Fleming at the paper & he had a good shot of us & the bottom mount. Tried to get the truck washed off. Caustic soda (?) from the pulp mill will ruin the finish, but the automatic washer at the mill is out, & it would take too long in town.

Kearse had finished box for the recorder, and I fussed trying to get a rig for that blasted bottom mount, so the cable won't get wound up and stop the swiveling action of the meter. The ideal way would be to hare bale up & suspend the cable from that, but it would be 5 ft. high, and wouldn't have a chance of survival in a 25 foot channel.



Kearse left about noon to get the gear & look for a recoiler in Charleston. I started at 1353 taking one-minute observations of meter #3 on station #4. There was to much static for the chronograph, so I used the stepwatch, taking the secs. (to the nearest 0.2) from V1 to V1 for the number of revolutions taking between 25 and 45 seconds – more at lower speeds. There were very few missed droning the 7 hours and 7 minutes of obs. Missed only 12 out of 427 and they were all at slack water where it was all pretty confusing. I found that when it gets too confusing, you don't really have to sort out the V1, V2, V3, & D prps. Just write down the seconds when they come (0(V1), 9(D), 16(V2), 33(V3), 67(V1) etc) and figure it out later. Knocked off the series at 2100 and took on tape to verify my final reading. Static was so bad, I marked with a check those pips that were meter – caused, & the rest are static. Worked away here checking my math & converting the C. I's to velocity & finally knocked off about midnight.

Saturday, 22 March, 1958

Worked the whole blasted day on the data from that 7-hr. every-minute series. Plotted the data first the way it would look had we done it during a regular series – i.e. one reading every ½ hour. Then did it @ one every 12 minutes, and then on every 6 minutes. These showed that our observation do give a valid curve. Then plotted all 430 or so vs. times. Variations up to 0.3 knots in a period of three to four minutes are common but deviations from a mean are about 1-2 tenth of a knot. A 0.6 tick is seen at 1532, some 25 meters after I noted a big freighter left the I.P. Co. dock for the sea. It would take just about that time for her to get to station #4.

I next plotted contact intervals vs. times for the whole 7 hours. This was done since the velocity is rounded off to the nearest tenth of a knot,& minor variations – less than 0.1 knots – would show up in variations in the C. I when they would not in the velocity. Since I had no log paper, I had to change scale three times (1.5 knots corers 0.32 seconds range in C.I's whereas 0.5 knots covers 2.9 seconds). Even so, I discovered that the irregularities noted in the velocity plot are not meter errors, step watch errors, or my errors, but are real. The currents do not increase or decrease at a constant rate. They do not even stay constant (only 7 times during the whole 7 hours was the same contact interval recorded on tow consecutive minutes). What's more the current appears to move in surges with a regular periodicity of about 10 to 12 minutes with a "wave height" of about 0.25 knots. To smooth out the ups and downs, I have started to compute three - minutes running means for every minute. This is a somewhat tedious job for 430 or so observations but by 1230 am – allowing time for a movie this evening – I am up to 1615, some 140 computations. Couldn't stand it and have plotted these up. Peaks occur at 13, 11, 9, 16, 12, 8, 9, 17, 13, 10, 7, and 9 minutes from 1357 to 1615 from a mean period of 11 minutes. Went to see Witness for the Prosecution in Georgetown. It's Great!

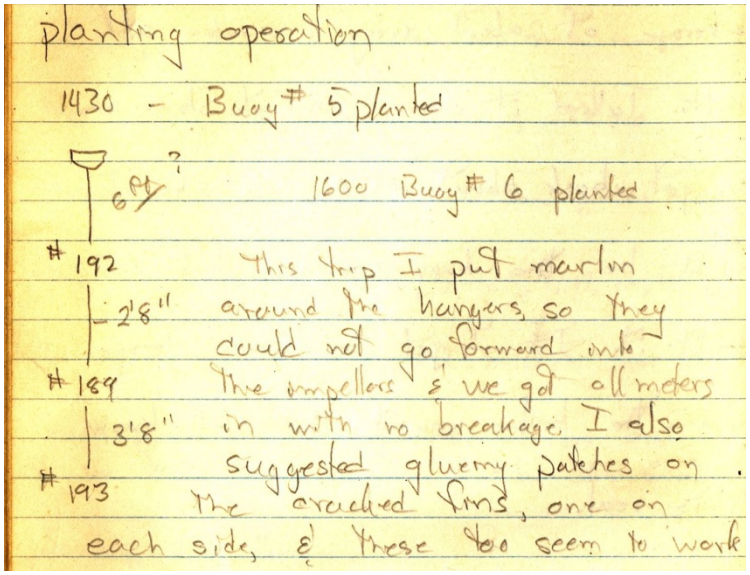
Sunday, 23 March –

I got breakfast for Dick & Madge et moi and we three went off to church in Georgetown and lunch at the Prince George Hotel. Back here I wrote Maggie, K, M & D, Sis, Butch and B.D. Zetler. Then back to the running means again & the plotting. Finally finished these about 2330. The average of about every 11 minutes still holds. Talked it over with Capt. Shoene when he got back about 1030. He thinks it might be the buoy swinging, but I doubt it. If I get the same thing form the bottom mount, then we'll know it is real.

Monday, 24 March, '58

Kearse got some telephone cord re-coiler in Charleston &d I put it on the meter – end of the 3-conductor cable. Drilled holes in recorder box for the meter & transmitter leads to get in to the recorder. Planned the planting operation

1430 – Buoy #5 planted


planting operation
1430 – Buoy # 5 planted
6 ft ?
1600 Buoy # 6 planted
192
2'8"
This trip I put marlin around the hangers so they could not go forward into
189
3'8"
the impellors & we got all meters in with no breakage. I also suggested gluing patches on
193
the cracked fins, one on each side, & these too seem to work

1600 – Buoy #6 planted This trip I put marlin around the hangers so they could not go forward in to the impellors & we get all meters in with no breakage. I also suggested gluing patches on the cracked fins, one on each side, and these too seem to work.

It was raining like mad and a high wind was blowing, so we did not attempt to putdown the bottom mount. Still have to put new batteries in to & fix sequence switch on #4 before we start to record. The 100 hours will start in the mornings. Thus the 100 hrs. will be through Saturday noon, and I will hope to head home that evening.

Is Esmestan still with C and GS? If so let E.E. LaRoche know.

LaRoche &d Hogan came aboard about 9 PM and we talked much longer tan I really wanted to.

Tables

Frasier Pt. Slk. Wt. +1.25 on Charleston.

Slk. at Charleston 11:14 +1.25 1239

Plots

Slk Friday 21 Mar from plot = 1800

From tables = 1545 = 2 hrs. 1330 for Fraguin Pt.15m on Charleston

- Why the difference? -

Worked on G.F. Jerdan's ms. on Florida & wrote him on my suggestions. Quit about midnight – again

Tuesday, 25 March, 1958

Yesterday's rain had stopped during the night &d today dawned overcast cool, & quite windy. Spent the morning getting the bottom mount ready to go. Boats (Albert Lite) & I stretched out the tyrexr cable (3-conductor, neopreme covered type s50 300 volt cable) and the 3/16 oms steel cable. Stretched I tall out on the dock & taped them together every 508 feet for the full 250 feet. Charlie Kearse and John Hernandez worked to get the batteries and transmitter hooked up, while I got the meter down & mounted on the frame, hooked up & tested the cable & meters. Left the I_Pdo pier ca. 1100 for beacon #25 anchored the Gilbert channel ward of the beacon. Put the two boxes – one containing the recorder & batteries, the other with the batteries & transmitter. Hooked everything up there – left John & Charlie there & came back to the Gilbert. We had coiled the cable in a big box & now put his in the skiff. Lowered the mount over the side & held it at the surface while the skiff played out the line. It just reached, but there was no slack. Had Preston Johnson use the skiff as a tug, & push the bow over until the cable reached. I had suited up & dropped in. First I undid the marline that was holding her level and used that to secure the tyrex to the bale. Gave the signal to lower away & hung on to the top as she went down to the bottom in 271/2 feet. I have never been in blacker water. I couldn't see my hand in front of my face – literally. Even with my light blue gloves. I unhooked the lowering hook & eased the bale down in the direction of beacon #25. I then worked by feel back along the bale to be sure the meter was free of cable & could swivel – keeping low so my tanks didn't hit the meter. By feel I could tell all was clear. Back along the bale to the cables & out along the cables towards where I thought the beacon was. Kept tension on the line & came up a right on course for beacon #25. Back to the ship – chow – & off with Hernandez & Kearse to finish up the gear on the beacon. Beacon is 5 –piles with a light & 2 board platform. Both boxes were secured with line & tied- in nails on the platform. Darn little working space. We turned on Xmtr. checked it with the wave meter, turned on recorder, marked the tape– 1318 start – secured the box tops, put tops over all, clamped the antenna to one of the uprights, secured 31/16 cable, took a picture and left. Meanwhile, back at the ship, they were getting a good healthy signal from it, so all seems to be going well.

Will have to check – either audibly or by going down again – to see if the lead-in cable is tangling.

Now receiving from stations #5,6, & 7. All three were put in with no breakage. We did not have enough meters (i.e. enough fins) to put 3 meters on Sta. #6, so she is running with no mid-meters. Now (1500) there is some trouble with meter #1 on buoy #6. Checked in the skiff, & meter is OK, so it must be bum contacts. Will have to pull it & put on a new meter. #2 impellors &3 fins came today, so now we can add the other meter.

Ship went by bottom mount headed out at 1522.Took a reading @1509 & all was well. Another listen in @1645 gave a steady signal – current still running out fast, so it is not on contact, at slack. We had a reading at 1509, some 21/2 hrs. after the current had changed so at least we did not drag the anchor through it.

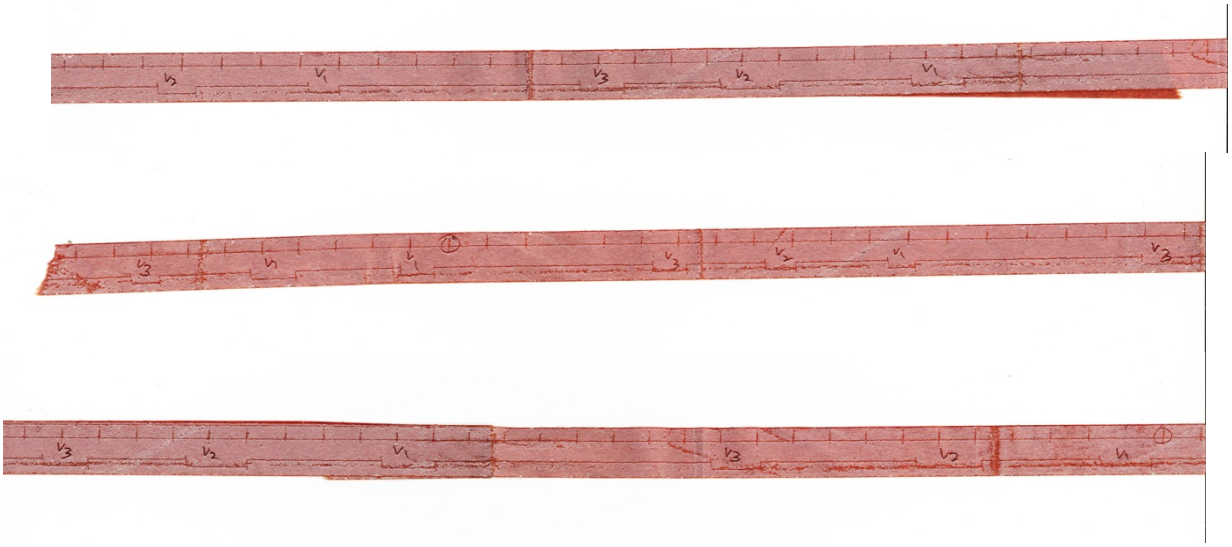
At 1700 we get underway to put the new meters on station #6. Meter #1 doesn't make her V contacts, & no meter was put on #2.

1850 Hernandez & I just back from beacon #25. Recorder still running with times still ticking, but velocity stylus is making continuous contact. No direction pips, intermittent or continuous. If the velocity were shorted, then since velocity & dir[direction] are separate we would still get direction pips. Since we were getting no direction pips, then there was no short. Thus, it appears that something has caused the impellor to stop on contact. I will come back early in the morning & see. We cut off the xmtr [transmitter] to save batteries, but left the recorder on. This in case something is caught loosely in the impeller & might move on when the current stops ebbing & starts to flood. In the morning I will first check the recorder to be sure that it isn't now working OK. Then will go down at beacon #25 and follow the lines to the bottom mount. All will have to be done by feel anyway. Have never seen such inking blackness anywhere.

It took just one hour to pull , check, replace, & replant buoy #6. We first checked meter #1 & found a busted wire in the plug at the meter. So the contacts we were getting were – white lead – only direction re-wired the plug, & replaced it. Then added the new meter to the middle position & replanted it. All three now working well – still no breakage.

1930 Back at the dock, but reception is so bad, we will have to get underway & anchor down on the channel somewhere in order to pick up our signals. Anchored near sta. #5.

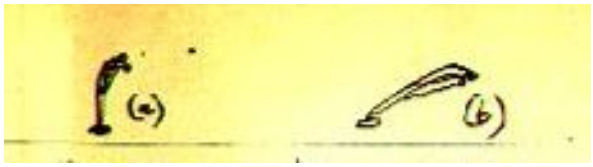
August 2014 -
Scientists speculate that these were used for measuring water temperatures



Wednesday, 26 March, 1958

Right after breakfast, I suited up & Hernandez & I went in the skiff off to beacon #25. We climbed up & took the top off the recorder box. No time tics, & no direction tics, & the velocity was still on. When we disconnected the meter cable, we began to get good time tics, so evidently the steady drain from the velocity contact had lowered the batteries. Anyway, it was not the xmeter [transmitter] or the recorder but the meter that is fouling it up. It was cold, overcast, & windy up on the beacon, and I was cold before I ever got into the water.

I tanked up in the skiff & rolled over to go down cables to the meter. Taking with me my little brown marker buoy & ca. 25 feel of line. Once on the bottom, I closed my eyes to see if it could be any blacker – there was absolutely no difference, eyes open or closed. Moved my light – colored gloved right up to my faceplate, & there was still no difference. Moved out hand over hand along the cable. It was at one p1 – est. 90-120 feet from the beacon – hung up on a piece of wood sticking out of the bottom. I freed it & had to make an almost 90° change in course, so that is where some of out slack had gone. Followed on to where the cables are attached to the bail. Felt along the bail to the hinge & then reached inward to grasp the upright. Followed it up to where the cable is attached & the cable was not twisted up. Following on up along the hanger, it felt



as though the hanger instead of the being like (a) above, felt as thought it has been bent forward (b). It was really pretty hard to tell by feel, though. The impellor seemed to have all its blades, and the fins felt all there, but the angle was all wrong. I came back up – total time in water 15-20 minutes. We came on back to the Gilbert, & I stepped in to the shower & filled the suit with hot water. A couple of minutes of that, a cup of hot coffee, & a cigarette, & all was OK. We'll have to pull the meter up and check it. Current now is running pretty fast, but slack water is shortly after noon, & we will try to get her up & see what the trouble is.

Disconnected cables from beacon #25 picked up all cable in to skiff, took box of cable from skiff to Gilbert & lifted the bottom mount with the 3/16. She was in fact bent over as shown above. Bent in the up current direction. Also some bits of white string(?) were jammed on around the impeller bearings, making her turn hard. Cleared out the string, strengthened the bail, checked the lines with the meter on, got 3 v's [velocities] & a D [direction] ok, & lowered her to the bottom. Put the box in the skiff, off to #25, hooked everything up again. No beeps, but it was at slack water. Bottom meter at Sta. #25 was still too, so hooked her up, turned on xmitter [transmitter], hooked the meter to recorder, closed up the boxes, put tarps back, nailed cable box to the beacon & came back. Shultz, Charles Bee & La Roche were all here. We talked of currents & tides. By 1400 bottom meter on sta.#5 was off slack water & still no beeps on 3331 – bottom mount. I am now suited up again (1430). We will try 3331m again when they are through with this series. If still no beep, I will go down & do what I can on the bottom. It was raining all the time we were on the beacon & it's still cold & rainy. Damn miserable diving weather!

1730 Back aboard. There was a fair current running – (1.2 knots on bottom meter of sta. #5). I had to work up – current along the lines from beacon #25. At the meter – still black as midnight, the current was pretty strong & had to fold one leg around the bail and drape myself around the hinge par of the upright in order to stay there. The swivel just is not efficient. I could turn the meter 90° to the current & it would not come back of its own accord. I was also tipped forward. I cut the line I had put on to keep her from tipping back & was going to try to put it aft to keep her from tipping forward, but in the dark & cold with gloves, it got away from me. The hanger felt bent, so I straightened it up. Impellor seemed to be turning well, though, I came up & by swimming 90° to the current. I was able to grab the shift as I sailed by. Back at the Gilbert, they said they had gotten no pip at all. Over skiff to beacon #25 to cut off the recorder, only to find the recorder working like a charm, with seconds, directions, & velocities coming through nicely (V1 V2 D V3). So even though the xmitter [transmitter] isn't working now, - 1600 – at least the recorder & bottom mount are, when last seen. I fear, though, that once the current has slacked and then turned, it won't swivel back but will tip forward & probably bend again. If so, we will know in the morning & will try either the other bearings or try to re-right it with the bail secured in the upright position & the meter suspended somehow below it. We'll get this thing working if it kills me

– and it may yet. Stepped right in to a hot shower once I was on board and stripped down under torrents of hot water – it helped.

Evening wrote long letter to Capt. Crosby & patched up my rubber suit. That weldwood used to patch the meter fins works well on my suit too.

Thursday, 27 March '58

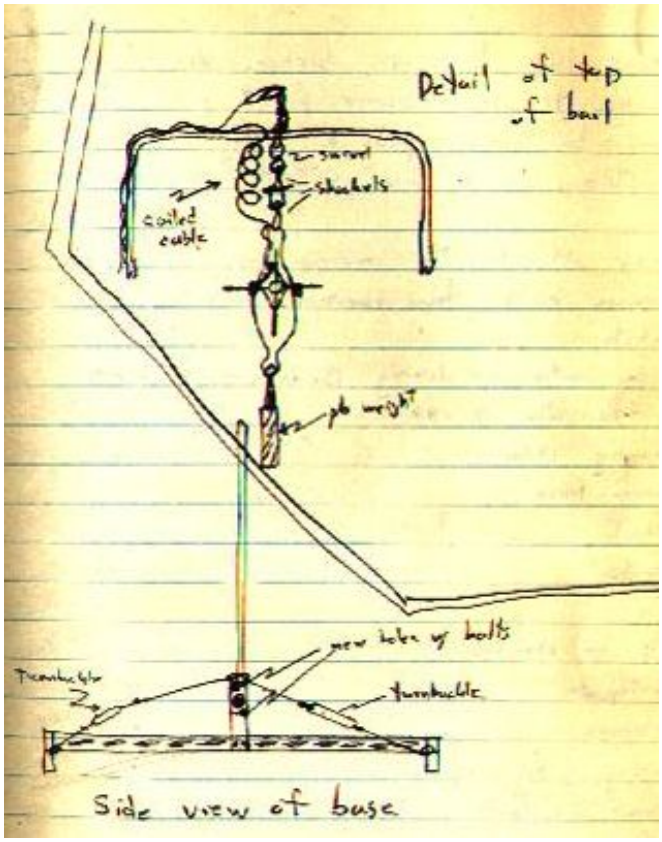
0815 Off for beacon #25. Tide was low again, so I shimmied up to the steps & climbed up. Uncovered recorder box, & there was no time tic at all. The clock was stopped at 0517 (1717?) but I was getting an occasional direction pip, but no time pips. Had Johnson skiff back to the ship for a new clock battery. Put it in & it still didn't start. I put the winding key in the slots & applied a slight backward pressure. Whether it was battery or the nudge, I don't know, but she started. I wanted to see what sort of a record we had, so I removed the take-up reel, took off the tape & re-attached the XXX end to the take-up reel. When I left, seconds were ticking and an occasional D [direction] was coming through.

Back at the ship, I looked over the roll. D marks were pretty regular but V's [velocities] were occasional only. Some 15 or so feet back there was nothing. I think she was OK while the current is ebbing – it was just about at slack before flood when I was there – but she doesn't swivel around to meet the flood direction. Back to the beacon w/ [with] Hernandez, we cut off recorder, pulled plugs, put cable box in the skiff & pulled up cable & the mount, moved to the Gilbert, handed up the box, hooked on the hoisting line & brought her on deck. I first checked with the ohmmeter & we are getting 3 v's [velocities] and a D [direction] at the plug at the end of the Tyrex. Meter itself is thus OK as is the cable to the recorder. When we unhooked the lines from the recorder, we were not getting any time tics at all. By the time we had the meter check on deck, the ship was again en route to the I.P. Co. dock – with the recorder still on beacon #25. I feel that the bottom mount is just not swiveling in the current, & it now appears that there is something wrong with the time tic part of the recorder. If I can get the skiff – she needs more gas – I will scoot back and will bring the recorder back for a complete check before we try again. Will try a better rig for suspending it too!

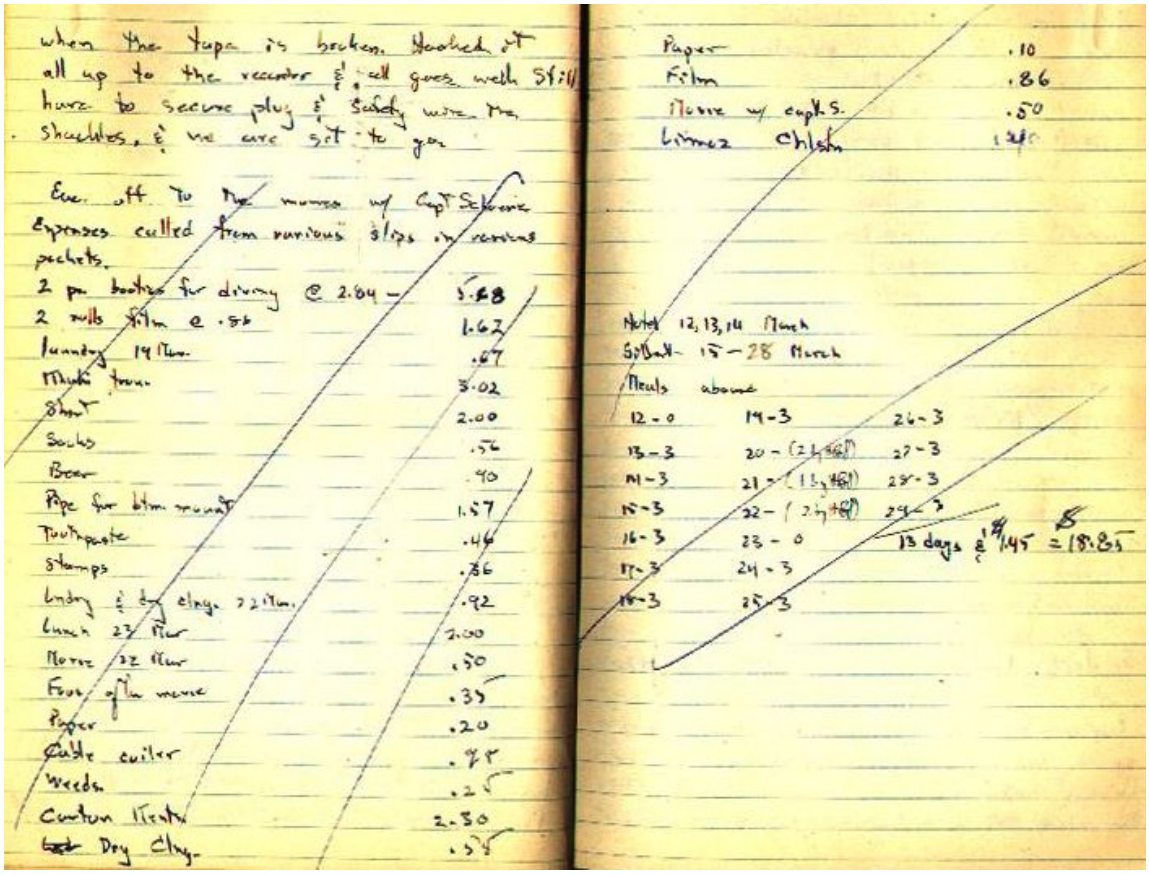
1130 Back at the dock. I think that if the mount is not absolutely flat, that the meter doesn't swivel freely, but tends to hang & vassilate in the downward direction. Capt. Schoene & I have taken off the hanger – little water in the stand, so bearings are apparently tight – and the meter. By suspending a double hanger from the top by a shackle & swivel and by putting extra bolts & guy wires on the upright bule, we can make it secure. I will work on this this afternoon, straighten out the cable, collect and chuck the recorder from beacon #25, and have her all set up to put in at the slack water in the morning. If it works, we will get at least 24 hours of record from it, 24 hours of good record.

After chow I worked till Johnson had picked up some gas, & then he & I out boarded from the I.P. Co. docks down to beacon #25 to recover the recorder. Back aboard we went over her pretty completely & found that even though we were getting V1 V2 V3 keying of XXXX there was no direction. We had a good D [direction] impulse at the end of the cable though we found a bad 50>> relay & replaced it. All appears to be well with the recorder now.

It's for the mount. I had Steve drill two more holes in the hinge plate & then butt them tight. Boats then put cable & turn buckle braces on the uprights for extra strength. I suspended the meter in the regular hanger from a chain of shackles and a turnbuckle. Tyrex was placed on a telephone cable recoiler, marlined to the top of the bail and down along the sides to the base. 3/16 steal cable was secured to the top & taped lightly to the upright so it



would break away with a jerk on it, so meter could be recurred san diver if necessary. At the base, the 3/16 was so taped that it held a 12 ft. coil of the cable, a coil that would be freed when the tape is broken. Hashed it all up to the recorder & all goes well. Still have to secure plug & safety wire the shackles, & we are set to go.



	Slack	Water	Interval	Charleston s/h per flood	Sta. #5 m-3 s/h per ebb
	0539				
25	11.2 e	12.4	+ 1.2		1.2
	17.7 f	20.5	+ 2.8	2.8	
	23.9 e	01.5	+1.6		1.6
	06.4 f	09.0	+2.6	2.6	
26	12.0 e	13.6	+1.6		1.6
	18.5 f	20.4	+1.9	1.9	
	00.8 e	02.5	+1.7		1.7
27	07.3 f	10.0	+2.7	2.7	
	12.9 e	14.7	+1.8		1.8

	19.4 f	21.5	+2.1	2.1	
	01.8 e	03.5	+1.7	S 12.1	- 1.7
28	08.3 f	((10.7))		P. 5	S 9.6
				m 2.4	D 6
					M 1.6

Slack before flood at the bottom meter comes 2.4 hours after slack at Charleston

Slack before egg comes 1.6 hours afterwards.

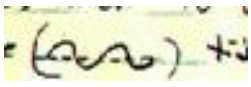
So slack this morning is at 10.7 on 1045

Recoiled the cables in to the boat box. Changed to a freer – swiveling swivel, safely wound the shackles, tested- again – the recorder, wound & set the clock, put a holding line on to keep one meter from banging and she is all set to go. 0950 leave I.P. Co. dock from beacon #25.

1200 Back at the Gilbert from Beacon #25 we tied the Gilbert w/ a long line to beacon #25. Put the recorder in the skiff & Mudge (Ens. W.M. Lee) and I took her over & mounted it on the beacon. Back to the Gilbert & lowered the meter with two recoverable lines, orienting the bale 90° to the current. Put cable box in the skiff & over the 200 ft. to the beacon. Plugged in the meter cable, pushed start button & nothing happened. I died right there. Once the wave of panic had left, I snooped & found the read lead from the battery had broke & and times. Hernandez came over to see why the transmitter wasn't working, one hole where a plug in the harness fits on was too big for a good contact. I suggested stuffing wire in to the hole & she now is working well. She started recording at 1101 am. I marked the 1115, 1130, & 1145 speed-ups on her. About 1135 the time tics stopped. Turned out to be too much tension on the pen. I adjusted that to a lighter line and all was ok. We may have her licked at last. I sure hope so.

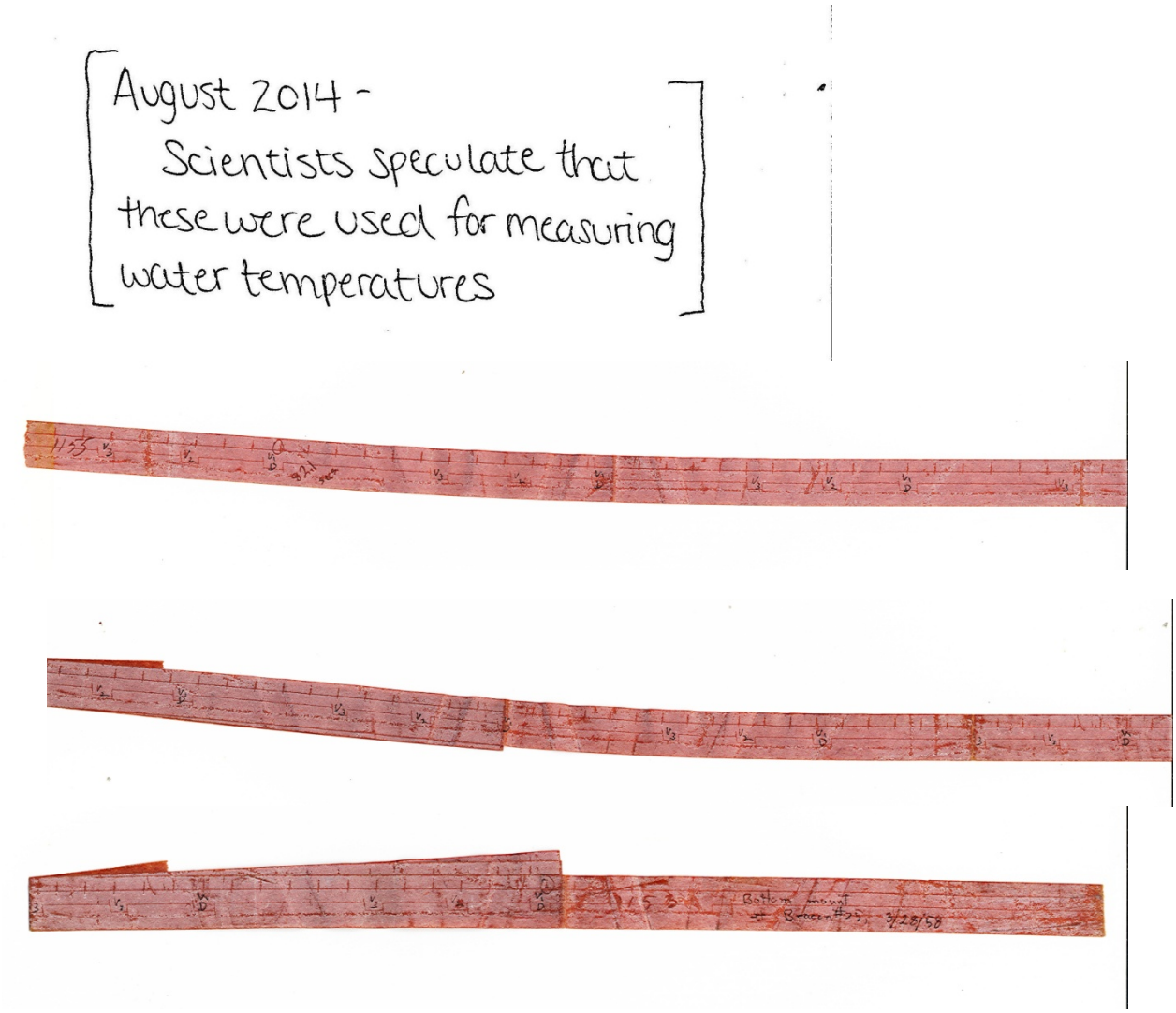
Tape from the recorder @ 1135 is attached 7 revolutions in 82.1 seconds = 11.7 sec. = 0.6 knots & direction is 360°. At the same time, sta. #5 bottom meter had 0.5(1130) to 0.6(1200) so they jibe pretty well.

From 0800 25 March to 1000 28 March are 3 complete



(tidal) days. By counting the squares encompassed within the flood part & the ebb part of each curve, dividing by the number of squares on the abscissa, I got a mean velocity for that period. I then multiplied this value by the time between the two slacks to get the tidal excursions. Adding the flood excursions (26.15 naut. miles) and the Ebb excursions (19.66 naut. miles), there is a net flood excursion over the three days of 6.49 nautical miles. 6.49 naut. miles is 6.49 x 6080 = 39,460 ft. in 294 hours = 134 ft./hr. = 2.2 ft./min

1512 Tuned to 331 ke's & she is still beeping, V1 V2 V3 D. Contact interval is 39 sec. or 0.2 knots. Direction ca. 190°, so she has turned & is lined up OK. Bottom mount is meter #183



Beeps still coming in @ 1940. Six revolutions in 41.8 sec. = 6.97 contacts int. or 1.1 knots. Direction 180° sta. #5 on the bottom had 1.6 @ 1930 and 0.4 at sta. #6 bottom meter. At 2144 four revolutions in 51.2 seconds or a 12.8 contact interval = 0.6 knots.

Saturday 29 March

0706 Tape from the bottom mount shows 19 revolutions in 137 seconds, 7.2 CI = 10 knots at 198°. Bottom meter at #4 is 2.1 at 180°& at #5 is 1.6 at 180° & sta. #6 #3, velocity is 0.4 D ? cable.

At the bottom meter at station #6 the ebb excursion decreases steadily as it leaves the time of spring tides. Excursion in nautical miles.

Date	25	26	27	28	29
Ebb Ex.:	4.62	4.10 & 3.68	3.06 & 2.52	1.68 & 1.65	

Flood excursion shows no such regularity.

1045 Under way for station beacon #25. I went in the skiff with Hernandez to the beacon & climbed up. Opened recorder to find that tape had slipped back from the writing slate & was not visible through the window. Still marking ok, though. In putting her back we broke the tape. Used same masking tape to patch it up. To do this we had to remove batteries to get at the take-up reel; & in putting batteries back, we disconnected – inadvertently – one of the battery wires. So – naturally – one of the battery wires. So – naturally - we got no time tics or anything else. Once the panic had subsided, we found the hitch, wound the clock, checked everything & closed her back up. I was suited up, with my tanks & weight belt in the skiff, so I tanked up, rolled over & down the cables to 1) check to see tyrex & 3/16 cables were not fouled, so meter could be recovered san diver, 2) to see if tyrex had become wound around swivel, between bail & meter as the current reversed, 3) to get a bottom sample for the C of E, and 4) to attach the little brown buoy to the top of the bail by the nylon line.

It was just as cold & as dark as I had recalled from the last time. The tyrex & 3/16 cables were both snagged and tangled under one of the mount legs. The mud was so soft, I could force my arm in up to the elbow. I got them free & checking showed the quick – release for the 3/16 was still in place. Felt my way up to the top of the bail & down the shackles, and there were no twists in the tyrex around the chain of shackles. Evidently she swings back & forth between flood & ebb & not all the way around. Back to the bottom to get the mud sample for the engineers in the labeled jar. Took little – brown – buoy out of my britches & felt back up to the top of the bail and secured running end there & let her bob to the surface.

Back along cables to the beacon & up. I kept slight tension on the cables en route, so any slack will move at the beacon & not in to the meter. Picked up the 9-thread recovery line & went back down the cables. I attached one end to the eye at the top of the bail & up with the other end to the buy, & secured it to it. There are now two ways of recovering the mount; either by the 3/16 & the release mechanism or by the buoy 9-thread. Swam back to the skiff & on to the Gilbert.

Recovered buoy #4. Top impellor lost 2 blades when buoy anchor cable ran back in to it. Others ok, but meter #4 had strands of some fibrous material wrapped around forward impellor bearing causing her to turn harder than normal. Velocities on this meter may be

slower than the current..
Note: should be made in the book. (done,HBS)

Recovered buoys 5& 6 with no incident. It is easier to mount and dismount the meters if we use 2 half hangers. 1304 &1455 tapes taken on the buttom mount & she is still going.

Although I will leave this evening, the bottom mount will stay down Sun, Mon, and Tuesday to give at least four days of record.

Craytens Charter Service Georgetown S.C.

August 2014 -
Scientists speculate that these were used for measuring water temperatures

Appendix: Harris B. Stewart handwritten diary pages

Wingah Bay. Current Survey -- Mar '58

New York Harbor Circulatory Survey - Feb '58

H. B. Stewart, Jr.
Tides & Currents Division
Coast & Geodetic Survey
Washington 25, DC

Access Gilbert in Georgetown SC 26626

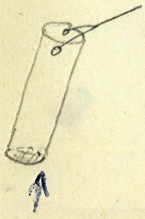
50174

Manufactured by
U. S. Government Printing Office

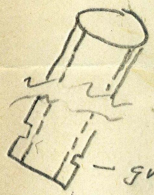
Code 2236
U. S. Navy Electronics Lab
San Diego 52, Calif.
7 Aug 1959

Dear Stew:

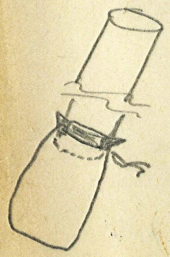
Enclosed is what we have on the rock dredge. Also included is the material for making up the chain bag and the inside netting. We also used to place small pipe dredges on the bottom of the bag to catch the fines; this was simply a large diameter gas pipe with wire at one end (mesh) and a small wire yoke at the top end.



heavy wire mesh, welded to pipe, or

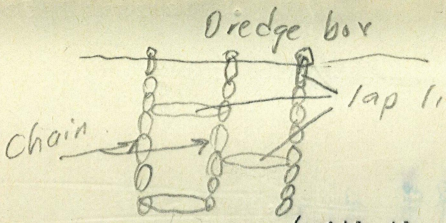


– groove with the bag



or a canvas bag

The chain bag is made up by deciding how long you want the bag to be and cutting the correct number of lengths of chain, attaching them at one end to the holes around the lower edge of the steel box. The lap links are used for this purpose. After the chains are attached, then they are secured together in a sort of mesh by connecting adjacent chains with lap links.



6 foot lengths of chain.

(with the chains)

After the lap links have made up an open-ended bag, the lower end of the chain bag is drawn together with BT or other steel wire. The shrimp netting is then used to make up an interior bag to fit inside the chain bag; it is secured at the top through the holes around the lower edge of the steel box. It is a good idea to tie it down to the bottom end of the chain so that it doesn't come out during lowering.

In the past, wire has been used to secure the chains to the steel box, and wire clips have secured the chains together to make a bag, but the lap links are better, and what we have used for the last few made.

I don't have any data on how much this will cost, it has been several years since we made up the last batch of dredges.

If I can help out, further, let me know.

We are looking forward to seeing you and the new wife in New York. We should have about nine people from the Lab and scores from Scripps; not all of us from the Lab, however, will be on Govt orders--details not settled yet. As ever, Ed

The bottom dredge is designed to enable personnel aboard ship to obtain samples of the ocean bottom including specimens of the organisms living in the sediments.

When ready to be lowered the two buckets are supported and held in an open position by the lowering chains. The two lowering chains are joined by a ring which hangs from the hook of the release mechanism. The weight of the dredge hanging from this hook keeps it in the latched or lowering position. When the dredge reaches the bottom its weight will no longer hold the hook in the latched position and the weight of the lifting chains will swing the hook down, releasing the lowering chains.

At the start of the retrieving action the lifting chains cause a scissor-like action by the lifting arms. This causes the buckets to bite in and entrap a sample of the bottom.

The two buckets should meet and form a good seal to prevent loss of the solid matter inside. An access is provided on one bucket to make it possible for a core to be taken before the sample is disturbed by dumping the material from the dredge.

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10 February, 1957

Mark Goodheart & I left my apt. for the Harmon, at Staten Island Quarantine Station. Outerbridge Freeway - Tunnel - RT 40 (not I believe they split just North of Tunnel) through Wilmington over bridge to NJ Turnpike. Leave it at exit 11. At exit take route 9 - left limb of the V at exit gate. Then take 2nd right - sign labeled outerbridge crossing. Follow signs to & across bridge (over Arthur Kill) onto Staten Island. Turn right just past toll gate onto Paige St. (Ave? Blvd?) & follow to 2nd stop light (Hylan Blvd). Turn left & follow it all around the island - ins

10 February, 1957

North Goodheart & I left my apt. & the Mormon, at Staten Island Quarantine Station. Atmos freezing - Tunnel - RT 40 (not I think they split just North of Tunnel) through Belmar to over bridge to NJ Turnpike. Leave it at exit 11. At exit take route 9 - left limb of the V at exit gate. Then take 2nd right - sign labeled outerbridge crossing. Follow signs to & across bridge (over Raritan R.!!) onto Staten Island. Turn right just past toll gate onto Paige St. (Hwy? Blvd?) & follow to 2nd stop light (Hylan Blvd). Turn left & follow it all around the island - ins

and outs, but still Hylan. One block before it dead ends in the Narrows, turn right (at light) onto Bay Street. Approx two blocks & Quarantine Sta is on left behind big fence.

Checked ICTI for numbers & found none we have Temp. Unit #2, Conductivity Unit #2, a Freq. meter, ca. 200 ft. of cable, & 1 sensor head. Called Imbrie at Columbia whom I had asked last eve. to check the ice under G.W. Bridge for ice flows. He said there was some but not much. Called Bear Mt Park Police, & they said there was lots & some was moving. Coast Guard says Albany is 100% frozen, Turkey Neck 95%, Poughkeepsie 90%. A slight thaw or a freshet would really ~~fix~~ fix it for us. Hale in photogrametry Div of C&GS in Wash is due here when we get in tomorrow from ICTI run. I hope to set up a ciné Kodak movie camera where we have a good view of the river ice. By taking a single frame every 8-10 secs & then projecting them at 24 frms/sec should give a good picture of the overall current pattern & changes in it with time — IF the ice is good. It's pretty cold here on the ship- 17° today & due to get to 10°

tonight. Photo in tonights paper showed a fishing boat really covered with ice, & showed the Thruway bridge really jammed with ice. Cmdr. Weber says that last week in the Lower Bay they had 27 knot winds & that water coming over the bow froze on everything - it was pretty miserable operating.

Nomograph that I had asked CBI for was here was here, so I took a look to see what sort of limits we might expect. At constant salinity, the conductivity increases 4 units (4 milimohs/cm) per 5°C temp. At constant temp., conductivity increases 3 units per 4‰ Salinity (2‰ Cl). So, actually, conductivity reads almost ~~the~~ salinity ± 5‰.

Mark worked with Thompson on the lights.

Called Butch & will call him Wednesday morning if we are out photographing sometime

Called Capt. Crosby. Passed on ICI I listings for Palmchor, gave Hale the word to come on up & we will just hope the ice movement is sufficient

Tuesday, 11 Feb '58

Underway from Quarantine Stn 0755. ICTI has been on & warming up since 0700. They say voltage jumps from 118-122

DLP Must ICTI be calibrated before each lowering? Why not each day? Values the same 1st station in first - then 15. Had to do a good deal of maneuvering to avoid shipping. Station # 16 at mouth of Till Van Trull was a real stinker - only 40 feet but we had to lay to & wait, then move while 8 ships went by our station. Finally snuck in, took it, and snuck out again. A buoy in here will have a pretty short life expectancy.

0945 off for Sta #17

DLP When ICTI head is out of the water it does not record air temp. but stays at 98.855 - comes back to that each time voltage & cycles cut - ~~22?~~ Air below zero! (0°C)

Salinity & temp from a ship as big as the Harmer are pretty difficult. The possibility should be investigated of using a smaller - Coast Guard? - boat. ~~would~~ need

On the ICTI - Temp when in air goes to zero and then post it to 96.85° when it stops, it doesn't appear to reach equilibrium, but stops quite suddenly. On second thought, it

is in fact recording. The outside Temp. Dials go to zero then below it & jam at 96.85- it won't go any lower than -3.15°C - so it really is OK after all. Does having it against the lower peg (i.e. -3.15°C) do any harm?

Add 1 external conductivity calibration box to the list of CBL gear.

In H.Y. did Sta # 14, & 15 in Narrows, #16 in Arthur Kill, 17, 18, & 19 across South of Gov. Island, 20, 21, 22, across Gov. Island #23 off Tip of Manhatten & 26 & 27 off Pier 64 Twelve stations. We left Sta # 26 at 1345, went up to look over Pier 80 where we may berth tomorrow night

12 Feb,

1128 + 1h 45m = 12 13 slack pre flood
1348 + 1h 45m = 15 33 max flood

0345 - Ice took 26 secs to pass measured span

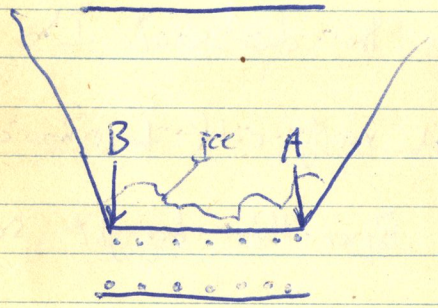
Left the Mariner at 0620 after breakfast drove Bay St. → Forest Ave → Bayonne Br. to exit 13 of N J Turnpike, at G.W. Bridge, we checked with the Port Authority police I had called a Mr. Tate of Port Authority who had arranged things. Police - esp Lt. Friend - were most cooperative. They drove out with us while we unloaded gear & Lt. Friend

back our car back. We were set up by 0530 - me, Barry Byron Hale - Cé Les photog & me - and took the first frame at 0534 He had rigged up a solenoid operating on 6 volts from a 12 volt battery hooked up with a rubber band return to the single frame tripper of a Ciné Kodak Special through a chronometer that clicks every 10 secs. Click was set up on a tripod & is on bottom of each frame. There is lots of good ice in the moon & it is moving right along. Somewhat cloudy - broken - with occasional sun coming through. We are set up under the tower, north side, New York end. It is pretty cold, but with long johns Hussre boots, & hooded coat, it is bearable. The elevator is at this level, & the cops sent some men out to melt the ice that had frozen the door shut. I'm now inside, & though really cold I am out of the wind - Byron Hale brought some rum, so that helps

Started exposure at f 5.6 at 0930 changed to f 6.3 as light gets strong. Clouds now less broken and haze seems to have increased,

and overall light intensity is greater

0930– Ice speed 45 seconds downstream. This is measured by timing ice as lined up between two bridge abutments.



4000 frames @ 6 frames/min = 666 minutes

666 minutes = 11.1 hours or more than we need

Lt Friend & Officers– Navas

letter written 24 Feb

All Sgt. Bellman to the list.

1125– Ice 2y at 54 secs downstream – God, it's cold

1200– Officers – took me to a delicatessen for sandwiches & coffee

1335– Tide has changed & eddies are moving up river. The second hole has frozen & we are tripping it by hand every 10 secs – it is damn cold!!!!!

Ryan is as cold as I am – no heat – I can barely hold the pen, but I think we are

getting good results

1355 Changed speed to f 2.7

Still working by hand at about 10 minute shifts. Overcast & snowing but not too hard - still pretty cold // I am absolutely frozen stiff. Lunch, one of the P.A. police took me to a delicatessen - cost $3.00. Sandwiches & coffee. The second still frozen. Couldn't reach Butch on Freq.

1415 Ice moving upstream 2 mts 07 secs to pass the range - even colder! - Vane are both pretty uncomfortable - moderate snow - 100% overcast.

1500 Ice going upstream past range @ 1m 27 secs. Snowing still tripping by hand - still damn cold - rum (sts) gone

1515 Ice still moving up - still cold!

1525 - Ice by 1 minute 12 secs

Openings changed to 6.3 or ??? hrs, 4.4 @ 1620, and 2.15 @ 1630. That is as wide open as she will go. Snow has stopped & wind has died down. It is still cold but bearable.

Asst officer Rapaski to the 1st. He took me to lunch - so to speak

1636 Knocked off - the Chiefs 33 left - 6 left taken away 3 mts at 24 ft/sec - officer Tackney -

Exec. Director - Pitt
Austin & Tupin

Got back to the Hammer @ Pier 26 to find that Thompson-Radioman- had been taken off with a heart attack.

Thurs 13th

~~Wed 12th~~ Cmdr Stone off to see Harbor Master about conditions on East River. Then we had to wait for a tug to come move the RR barge that was wedged across the slip- now jammed with ice. Once out, we went up river to apl. about ½ mile below Geo. Wash. Bridge. We were breaking ice the last ½ mile, & lowered the ICT through a hole chopped in the ice. Cpl. Weber called it off for the day & the Ship stopped briefly at Pier 26 for me to hop off & collect the cas. - got back to the Hammer at Quarantine about 1500- blowing hard & cold- ca. 14°!

In Pitt I helped mark a bit below with the meters- Putting on a short connector between rel. & dir. posts so that they would use the same line, & other would act as a ground.

1600- Set up ICT with Surveye for the 24-hr. run. It is rigged off the stern. Plan surface obs.

every ¼ hr. with bottom obs every ½ hour from now 'till termination ops.

Warm-up motors now turned on.

1700 Started 24-hr. operation ~~Don't copy all this~~

	Hw	Lw	Hgt
The Narrows @ Ft. Wadsworth	+0h02m	+0h12m	-0.3 hw, -0.0 Lw
on Sandy Hook.			

Corrected Tides @ Ft. Wadsworth

~~13th~~

~~1553~~ ~~4555~~ ~~3.3 Hw~~

~~2223 -0.1 Lw~~

~~14th~~ ~~0429 4.2 Hw~~

~~1103 -0.2 Lw~~

1659 3.4 Hw

2318 -0.2 Lw

13th Corrected Currents - The Narrows - Mid stream

1514 fld.

~~1742 slk~~

~~2103 ebb~~

14th ~~0036 slk~~

~~0314 fld~~

~~0630 slk~~ ~~1618 fld~~

~~0944 ebb~~ ~~1841 ebb~~

~~1325 slk~~

Zone - Skip all this

Calibrated ICTI.

Time	Srf.	Bottom+1	Temp.
1705	20.32	—	00.76
1708	—	~~20.96~~ ~~00.79~~	00.79
1715	20.44	—	00.76
1730	20.46	—	00.74
1732	~~20.99~~	20.99	00.77
1745	20.42	—	00.68
1800	20.46	—	00.62
1802	—	21.25	.83
1815	20.39	—	.60
1830	20.45	—	.59+
1832	—	2160	.86
1845	20.48	—	.60
1900	20.51	—	.59
1902	—	20.52	.59
1915	20.31	—	.53
1930	20.54	—	.57
1932	—	20.95	.71
1945	20.48	—	.57
2000	20.29	—	.51
2002	—	20.40	.57
2015	20.38	—	.54
2030	20.41	—	.54
2032	—	20.53 (?abt)	.59

Time	S.f.	Bottom +1	Temp
2045	20.40	—	.51
2100	20.48	—	.56
2102	—	20.70	.63
2115	20.51	—	.55
2130	19.95	—	.44
2132	—	20.05	.47
2145	19.84	—	.42
2202	19.79	—	.40
2200	—	19.96	.45
2215	19.65	—	.35
2230	18.86	—	.24
2232	—	18.91	.26
2245	18.77	—	.21
2300	18.88	—	.25
2302	—	19.03	.27
2315	18.25	—	.26
2330	17.81	—	.25
2332	—	18.05	.26
2345	17.36	—	.17+
2400	17.55	~~00.2~~	.21
0002	—	17.64	.24
0015	17.22	—	.14
0030	17.18	—	.13
0032	—	17.24	.14
0045	16.67	—	.01
0100	16.28	—	-.06
0102	—	17.02	.08

— Calibrations —

	— Conductivity —				Temp.	
Time	Hi	lo	Hi-lo	Zero	Posit 1	2
13 Feb						
1700	50.83	25.15	16.86	00.12	10.96	22.41
2245	50.74	25.10	16.79	00.00	10.97	22.42
14 Feb						
0310	50.78	25.11	16.80	00.00	10.97	22.42
0810	50.77	25.12	16.81	00.00	10.96½	22.42
2110	50.76	25.12	16.80	00.00	10.96	22.42

Time	Surf.	Bottom	Temp
0105	~~16.20~~	—	-0.07
0110	16.19	—	-0.08
0115	16.35	—	-0.087
0120	16.35	—	-0.04
0125	16.40	—	-0.03
0130	16.38	—	-0.05
0132	—	19.12	0.52
0135	16.32	—	-0.08+
0140	17.27	—	+0.09 climbing like mad
0145	16.36	—	-0.06 settled down
0150	16.65	—	-0.08 vassilating
0155	16.68	—	-0.04
0200	16.78	—	-0.03
0202	~~19.20~~	19.24	00.52
0205	16.36	—	~~-0.07~~ -0.05 vassil.
0210	16.65	—	-0.07
(0212	16.85 to 17.10 really jumpy		-0.07 to +0.02)
0215	16.82	—	-0.03 - fairly stable
0220	17.44	—	+0.06
0225	17.42	—	+0.04
0230	17.22	—	0.00
0232	—	19.92	0.49
0245	—	20.08	0.51
0248	17.30	—	0.00
0300	17.49	—	0.04
0302	~~19.92~~	19.92	0.43

Time	Surf.	Btm.	Temp.
0315	17.76	—	00.02
0330	18.44	—	00.15
0334	—	19.66	00.37
~~0345~~	18.55	—	00.10
0400	19.00	—	00.18
0402	~~19.84~~	19.84	00.36
0415	1942	—	00.26
0430	19.38	—	00.25
0432	—	19.62	00.31
0445	19.38	—	00.22
0500	19.31	—	00.20
0502	—	20.08	00.41
0515	~~20.40~~ 19.10	—	00.07
0530	19.46	—	00.18
0532	—	20.60	00.38
0545	19.26 ~~20.03~~	—	00.03
0600	19.40	—	00.18
0602	~~19.44~~	19.44	00.32
0605	19.76	—	00.23 checks
0610	19.55	—	00.19
0615	19.76	—	00.21
0630	19.66		00.15
0632	—	21.74	00.62 checked
0640	~~21.79~~	~~21.79~~	00.62
0645	20.16	—	00.31
0650	20.18		00.31

Time	Srf.	Bottom+1	Temp
0700	20.00	—	00.22
0702	—	22.28	~~22.28~~ 00.75
0715	20.12	—	00.23
0730	20.42	—	00.30
0732	—	21.81	00.56
0740	20.22	—	00.18
0745	20.12	—	00.14
0750	20.38	—	00.30
0755	20.46	—	00.28
0800	20.34	—	00.20
0802	~~20.82~~	20.82	00.43
0815	20.46	—	00.38
0820	20.32	—	00.38
0825	20.15	—	00.36
0830	20.02	—	00.37
0832	—	20.76	00.45
0837	—	20.59	00.44
0840	—	20.36	00.41
0844	—	20.45	00.43
0846	20.06	—	00.32
0850	20.09	—	00.35
0855	20.14	—	00.34
0900	20.15	—	00.33
0902	—	20.47	00.42
0905	—	21.31	00.42
0911	—	20.96	00.~~57~~ 57

Time	Srf.	Btm+1	Temp	
0914	—	20.88	00.52	
0916	20.32	—	00.38	
0922	20.28	—	00.38	
0925	20.32	—	00.38	
0930	20.36	—	00.39	
0932	—	20.56	00.45	
0935	—	20.60	00.47	
0940	—	20.45	00.43	1st time surface warmer than bottom
0944	—	20.40	00.42	
0946	20.36	—	00.45	
0950	20.36	—	00.45	
0955	20.36	—	00.48	
1000	20.36	—	00.48	
1002	—	20.51	00.45	
1005	—	20.45	00.49	143 readings
1010	—	20.44	00.45	
1014	—	20.48	00.49	
1016	20.40	—	00.51	
1020	20.40	—	00.51	
1025	20.45	—	00.52	
1030	20.44	—	00.51	
1032	~~20~~	20.43	00.48	
1040	—	20.45	00.54	
1044	—	20.00	00.42	
1046	19.88	—	00.40	
1050	20.22	—	00.~~48~~ 49	

Time	Srf.	Btm +1 ft	Cond.
1100	00.30	—	19.60
1102	—	00.30	19.65
1105	—	00.47	20.07
1110	—	00.32	19.65

oops! I'm getting sleepy

Time	Srf.	Btm +1 ft	Temp.
1100	19.60	—	00.30
1102	—	19.65	00.30
1105	—	20.07	00.47
1110	—	19.65	00.32
1114	—	~~—~~ 19.92	00.14
1116	19.14	—	00.24
1120	18.88	—	00.20
1125	18.83	—	00.18
1130	18.50	—	00.10
1132	—	18.54	00.10
1135	—	18.56	00.12
1140	—	18.78	00.17
1144	—	18.78	00.17
1146	18.69	—	00.16
1150	18.63	—	00.15
1155	18.62	—	00.16
1200	18.12	—	00.18
1202	—	18.69	00.18
1207	—	17.55	00.12
1210	—	17.42	00.11
1214	—	17.30	00.13
1216	17.18	—	00.14

Time	Srf.	Btm +1 ft	Temp.	
1220	17.18	—	00.14	Ice drifting by
1225	17.08	—	00.15	
1230	17.72	—	00.15	
1232	—	17.18	00.16	180 readings
1235	—	17.07	00.16	
1240	—	17.06	00.17	replacement while I ate!
1244	—	17.07	00.17	
1246	—	—	—	
1253	16.85	—	00.17	
1255	16.85	—	00.17	
1259	16.86	—	00.18	
1301	—	17.08	00.17	
1305	—	17.08	00.17	
1310	—	17.06	00.17	
1315	—	17.10	00.17	
1316	16.95	—	00.23	
1320	16.92	—	00.19	
1325	16.91	—	00.21+	
1330	16.92	—	00.23	
1332	—	16.99	00.18	
1335	—	17.00	00.18½	
1340	—	17.07	00.19	
1344	—	17.04	00.20	
1346	16.97	—	00.24	
1350	16.95	—	00.24	
1355	16.92	—	00.23	

Time	Surf.	Bottom +1 ft	Temp
1400	16.96	—	00.26
1402	—	17.05	00.23
1405	—	17.06	00.22
1410	—	17.03	00.24
1415	—	17.34	00.23
1417	16.91	—	00.30
1420	16.95	—	00.30
1428	16.92	—	00.33
1430	16.93	—	00.33
1432	—	18.90	00.40
1435	—	18.85	00.40
1440	—	19.06 (19.06)	00.43
1444	—	19.72	00.54
1446	16.88	—	00.32
1450	16.86	—	00.33
1455	17.35 (17.35)	—	00.37
1500	17.08	—	00.34
1502	~~20.08~~	20.08	00.63
1505	—	20.32	00.66
1510	—	19.84	00.60
1514	—	19.70	00.61
1516	17.40	~~17.44~~	00.39
1520	17.25	—	00.39
1525	17.36	—	00.41

110 E 14th St

Time	Surf.	Btm +1	Temp	
1530	17.25	—	00.41	
1532	—	19.94	00.62	
1538	—	19.82	00.61	
1540	—	19.99	00.64½	
1544	—	19.79	0061	
1546	17.49	—	00.42	
1550	17.82	—	00.43	
1555	18.02	—	0044	233 lbs.
1600	17.90	—	00.43	
1602	—	19.53	00.56	
1605	—	19.29	00.54	
1610	—	19.22	00.51	
1615	—	19.35	00.52	
1617	1827	—	00.46	
1620	18.32	—	00.46	
1625	18.15	—	00.45	
1630	18.26	—	00.44½	
1632	—	19.24	00.50	
1635	—	19.29	00.52½	
1640	—	19.26	00.52	
1644	—	19.30	00.53	
1646	18.66	—	00.47	
1650	18.55	—	00.46	
1655	18.57	—	00.45	
1700	18.70	—	00.50	250 lbs.

Time	Conductivity Surface	Conductivity Bottom	Temp. ~~Conductivity~~
1702	—	19.25	00.51
1705	—	19.21	00.51
1710	—	19.28	00.52
1714	—	19.31	00.52 pull up after 1714 obs
1716	18.55	—	00.49
1720	18.54	—	00.46
1725	18.87	—	00.49
1730	18.75	—	00.48
1732	—	19.20	00.48
1735	—	19.26	00.46½
1740	—	19.25	00.48
1744	—	19.25	00.47
1746	18.86	—	00.47½
1750	18.88	—	00.47
1755	18.72	—	00.37 ← Omit
~~1800~~ 1756	18.90	—	00.46 ← more representative
1800	18.99	—	00.43
1802	—	19.84	00.58
1805	—	20.72	00.70
1810	—	21.22	00.82
1815	—	21.46	00.87
1817	19.13	—	00.~~00~~.49
1820	19.11	—	00.48½
1825	19.04	—	00.47

Time	Srf.	Btm+1M	Temp
1830	19.04	—	00.45
1832	—	21.65	00.~~93~~ 92
1835	—	21.94 ???	00.99
1840	—	22.5??	01.01
1844	—	21.48	00.85
1849	—	~~44~~ 21.16	00.80
1850	19.16	—	00.45
1855	19.26	—	00.42
1900	19.21	—	00.40½
1902	—	20.53	00.69
1905	—	20.72	00.73
1910	—	20.48	00.67
1914	—	20.49	00.68
1916	19.23	—	00.38
1920	19.42	—	00.42
1925	19.26	—	00.36 290
1930	19.29	—	00.36
1932	—	21.36	00.80
1935	—	21.32	00.88
1940	—	21.39	00.89
1944	—	21.08	00.81
1946	19.52	—	00.45
1950	19.38	—	00.41
1955	19.60	—	00.47
2000	19.72	—	00.50 (.50)

Time	Srf.	Bottom + 1 ft	Temp.
2002	—	20.73	00.71
2005	—	20.22	00.61
2010	—	20.70	00.69
2014	19.34	20.8~~5~~	00.~~75~~
2016	~~00.39~~	—	00.39
2020	19.30	—	00.41
2025	19.39	—	00.42
2030	19.37	—	00.44
2032	—	20.90	00.~~74~~
2035	—	20.79	00.75
2040	—	20.84	00.78½
2044	—	21.18	00.~~86~~
2047	—	20.69	00.74
2049	—	20.99	00.83
2051	—	20.59	00.71
2055	—	20.73	00.76
2100		2012	0062

2113	—	19.66	00.50
2118	19.57	~~19.~~	00.48
2119	19.30	—	00.30
2121	19.61	—	00.49

(range of .24–.45)

Time	Srf	Bttm	Temp
2126	19.50	—	00.40

LOT

Notes on the 28-hour series:

Surface meter rigged so that top of cage was 4-6" below the surface. Line fixed with a loop, so it could be hooked over a pad-eye each time it was brought back up to the surface.

Bottom meter position at 1 foot above the bottom was redetermined every second lowering to compensate for the tide.

Over the 28 hours, 321 observations were made – an average of 11½ obs per hour or one every 6 minutes or so

Mark- Circuit Diagram for recorder?

I went back & forth between the lab topside, down the ladder & out to the fantail to raise or lower the sensing head 260 times, – no wonder I feel lame as well as tired.

On the ICTI forms were entered the

readings every 15 minutes. In this book are recorded in addition the numerous in-between - every five minutes over much of the series.

Calibrations of the equipment were run at 1700 and 2245 on the 13th and at 0310, 0510, and 2110 on the 14th Enough diff to justify calibration before each one.

A running plot was maintained throughout the series - It was a busy little tyke - and some interesting features were revealed. ~~During ebbing tide, the water is pretty well mixed~~ This plot is of surface and bottom water temperature only - as no nomograph for converting conductivity to salinity was available. This must be done later and should be even more revealing.

Note from the temperature plot that the water column on an ebbing current is pretty well mixed, ie nearly isothermal with depth, whereas on a flooding tide the bottom water is considerably warmer. I believe this reflects the up-harbor movement of seawater along the bottom on the flood. River water (surface) is damn cold - ice cakes n't - and is colder than the ~~underlying mixed bottom water~~ ocean water brought in along the bottom.

The pattern on both floods during the cycle was really quite similar. Salinity values during this cycle should be interesting - possibly T-S diagrams can be made for the mixed and the unmixed waters.

During the day Mark Goodheart worked on ~~Saturday~~ getting the buoys ready with Boats (Bob Savage) & some of the men - he really worked hard too & left ca. 1600 to go see Capt. Finnegan. Byron Hale took ice pictures yesterday while we were in the thick of it & took shots today around the ships leaving about 1300 to go back to Washington.

~~Saturday~~

I slept through breakfast - up by 0800 and back at it - we delayed shoving off until ca. 0900, so we would get into the East River just after ebb strength. 0955 we

made station #24 just south of the Brooklyn Bridge. There is a good deal of ice in the river - chunks up to table size in large clumps.

1030. Made station #25, Started just under the Williamsburg and drifted ~~[illegible]~~ ca. 100 yds south during the 3 minutes the lowering took. Passed up the west side of Blackwells Island & into Hell Gate moving slowly west of Mill Rock, making station #32 just west of the southern tip of Wards Island. By lowering the antenna, we were able to go beneath Triborough Bridge between Manhattan & Randalls I. On slowly, ~~[illegible]~~ blowing for the Willis ~~[illegible]~~ Ave Swing Bridge. Under that and tied up between it and the too low Harlem Bridge right near where Sta # 35 will be.

Currents all through this area are pretty tricky. Down along Blackwells Island & the lower East River these big railroad barges go through with the tide, & they really travel, with the tugs trying to guide them, but they must make 8-12 knots through there. I don't think buoy longevity will be much in there. We might put out a dummy buoy with no instruments on it or meters for a week before we expect to occupy the station. This would give them time to get used to missing it, & we could see how it survives. This, I think, is a good idea, but Weber is pretty pessimistic about the whole East River Area, - a bit too so, I think.

1240 Tied up at City Bulkhead at the foot of Lincoln Ave in the lower Harlem River. Snow predicted for tonight.

* Made Sta #35 in Harlem River

1310 Under way - Made Sta # 30 & 31 in Hell Gate - off Gracie Mansion & on up East River. Sta #34 moved east ~~west~~, as it was right in front of the warm water discharge from a Big Power Plant and the temps were over 1° above normal.

Set # 33 as plotted.

Set # 37 between Brother Island & ~~#~~ 36 on N side of E River. Another power plant here, and sfc temp were 0.18 vs -0.10 elsewhere. This should be moved too.

On to #39 @ 1508 This is the easternmost station of the Survey

Heading back we were going to get the 2 stations on either side of Blackwells Island, but it was snowing hard & visibility was pretty poor. On the way back I worked up in the forward locker with Mark on the meters, Have been putting a jumper between the Vel & Dir contacts & grounding the other lead. Meter #666 is pretty rough - we worked on it, but it is still rough. one of the magnets is shorter than the others, & makes the rotation uneven. Will one will go back to DC with Mark.

To NK Thurs evening & met Butch at Luchows for Dinner. Ran into Tommy Woodruff & Scotty McCabe. I dropped Butch at Grand Central & them at Astor Condens in a real blizzard Met Jane McHuliff at the HH & we went to the Hibernians Annual Ball. Back here - still blizzing - at 0300.

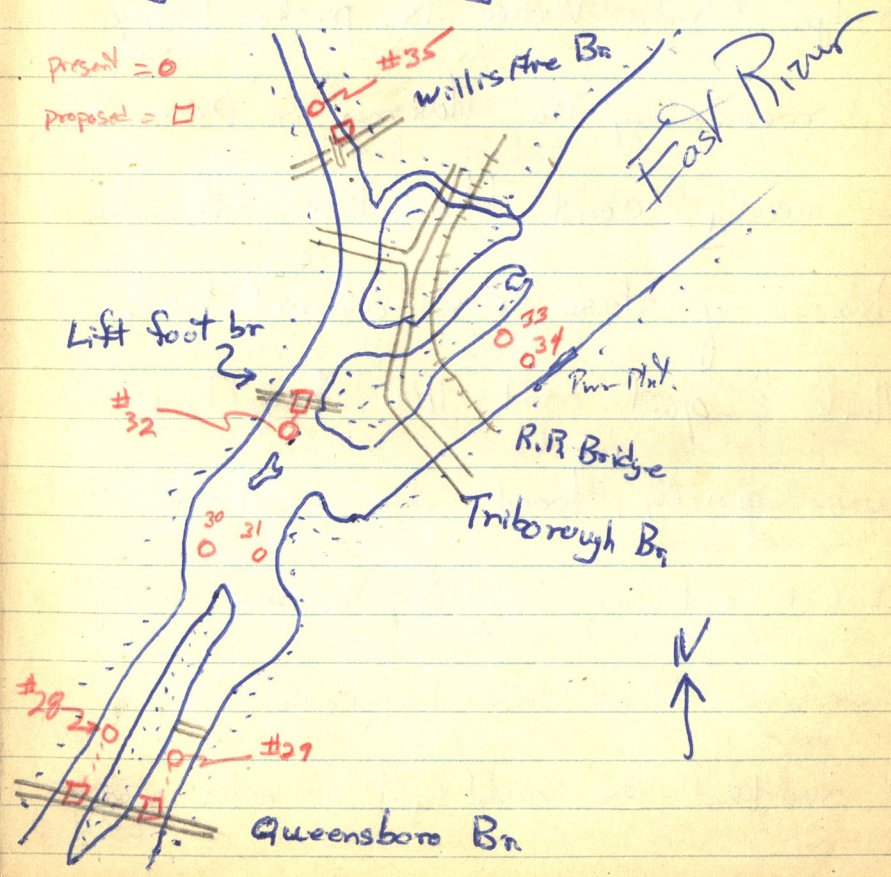
Sunday 16 Feb. -

Tied up at Quarantine Station all day. It is still snowing & blowing hard from the north. The doors freeze shut, all the windows in the lab have a thick coating of frost. There is a genuine 6-8 high drift at the pier

of the bow, and the starboard passage is up to the door frames in snow. It was a rough night last night. The Hannah was really bucking in high wind & waves. Boots was out on and off pulling on chafing gear - things were rolling in the galley & no one got much sleep. The lines are all covered with ice, and Mark & I spent the day down in the "instrument lab" - the 6'x5' foot hole forward of the sleeping hold - getting meters ready for use. Meter pulled in vice, after section and bellows removed, additional enamel wire (scraped at contacts) added to longer lead, innards unpacked, mounting screws removed & slipped into the innards, & innards put in case - release after magnet holder & tighten it down, release forward one - after insertion - and tighten. Short length of covered wire cut to fit between vel & dir. contacts, tinned and attached, short lead attached with it, extra length on longer lead fixed to from screw. Each step checked on ohmeter to be sure contacts are well made. Plug removed from meter, attached to 2-conductor cable cut yesterday. Bellows put on - hand tight - the to drain plug tightened, the filler plug is removed & unit filled with oil - a

Esso ~~mobil~~ aviation instrument oil. Plug put back, meter taken out & turned each way to collect bubbles at top. Put back in vice & oil added to top. Bellows pulled out a bit, extra oil added, and filler plug is replaced; bellows released, so oil is actually under a bit of pressure. Rest of meter added, cobbs put on, & meter returned to box. I took about 2 hrs per meter. We now have 7 done, & I now know how to do the rest, & will get them in the next couple of days.

We must check the feasibility of making some of the East River stations from the bridges, lowering the meter for each obs., rather than trying to keep a buoy in those busy lanes.



Stations 28 & 29 would be moved south to the Queensboro Bridge, #32 north to the Wards Island footbridge and #35 South to the Willis Ave swing bridge. Cmdr. Weber is pretty leery of maneuvering the Harmer in there, & I really can't blame him. Also the chances of loss are almost nil. Mark & I quit at 1100 tonight. He was pretty tired. I am now all checked out on assembling the meters, but have no idea how the radio end of it all works. We must get a radio man — a good radio man - but soon, or all will grind to a halt. Highways are all either closed tight, or barely open. Baltimore has 19 inches of snow

Monday, 17 Feb '58

Cloudy & cold 10-15° Mar temps predicted 60° Temp at 0730. It is bitterly cold with wind at 26 mph out of the west. We are somewhat protected from the full wind here, but snow is drifted high aboard.

Capt. Weber called the ship @ 0800. He heard a radio rpt. that Wash D.C. has 13 inches & federal workers have the day off. Our truck was to have loaded for Charleston today, but probably won't now. Mark is still aboard — just plain snowed in. Capt. Weber couldn't get his car out to come down.

Capt. Crosby called about noon - wondering where Mark was. We worked on the meters in the HH - he left about noon, & I went back to it until about 5 or so. I did 2 meters

complete with cable & plugs and cut 2 25-foot lengths, and put plugs on both ends. Cmdr. Stone got the radio shack in shape. We hope to put a meter over in a day or so.

Meter #88 went back to DC with Mark as did 2 leaking expansion chambers.

Dinner with Marylee Shrady-Norris & Dave - 8 W 16th - 22D - a nice evening.

Spent nearly an hour digging out the gear & the truck. Washington has had 13 inches - Baltimore 19 - a real storm & more is predicted.

Tuesday Feb 18

Woke up to 4° F temp this AM. Clear, cold, and - for the first time in several days - sunny.

Cmdr. Stone kept at it up in the radio shack, & I disappeared into the "instrument shop" Yesterday afternoon I rigged meters 102 & 98.

Pungino (Pun-gee-no) Coffee + rum + twist

This AM, I did #94 & 98 and put in the two cables I did yesterday. In the PM I finished up #93 & 74. It took about 2 hours per meter to do it right - & do it right I did. I worked along slowly and as thoroughly as possible. We now have 11 all set with the cables attached, two all set except for the cables, which will be cut when we know the station they will be used at, and two for which Mark took parts back to DC to be fixed: #88 and #95. One meter box had no screws in it. The ones that attach the innards to the case - forward end. I pirated three from #95, but we will need them when the other parts come up. Combed the ship but found none the right size.

Wed 19th Feb

Color keys for buoys yokes? For meter hangers? Screws for innards to case?

Trying to get a meter rigged from the pier to test all the gear. I ran ohmeter tests on the meters below & #? give a burn pattern. It is as though one of the velocity contacts was not hitting. I have

tagged it & will drain it & check the mechanism if there is time. Tagged meters #93 & #74 saying they were already to go except for cotter pins. Tagged #95 saying Mark or I should add the ground & jumper before it is filled- the expansion chamber is in D.C.

Put yoke on #100 (a 75-footer) - no cotter pins, so I safety wired it. Boats has the cable rigged for it, & the 30 lb weight ready.

MG

Need coax cbl. to run from xmitter to buoy deck plate for antenna

Fixed jumpers for #95 & #88 and attached them to tags ~~mounted~~ attached to the housings.

Attached ~~lead~~ ground to meter #95 case & noted it on tag.

Capt. Weber called D.C. & switched to 703 when he was through talking with Bupers. Mark was out but I left a message with Mrs. Payne that 1) 13 meters filled with oil,

2) No cotter pins for buoy hangers: we can get them here or he can send some up.

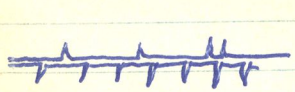
3) need spare screws that hold innards to the case.

4) need coax cable for running from xmitter to plug plate on buoy.

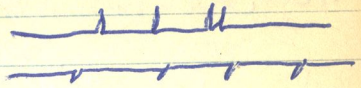
Bupers says they have a roving man (also named Thompson) who will be checked out down there & sent along.

MG

If pen arm on recorder - i.e. the arm hooked to the chronograph - were 1/2 - 3/4 inch longer, we could get traces both at the center of the tape —



rather than:



Second pips too long  , but that probably is in the chronometer & contact & will be checked.

We rigged meter #100 over the side of

the pier, but currents inside the pier were too slow to record. Battels on the outside of the pier fouled it up.

We added a section of 808 cable from a bearing stud in the buoy to the water as a ground. Connected antena leads to the xmitter, batt. leads to xmitter, & meter cable - by passing sequence switch, as the connector from the Seq. Sw. to xmitter was to short to reach on the new board set up.

Checked the crystal in the xmitter, put in the proper band box, put new batts in the recorder & she works. Had meter outside for a while, but wind too irregular & I was leery of the wind anyway, so we have it inside, & she works pretty well.

Thurs. Feb. 20th

Set up meter #100 again in the lab. Since there are four blades to the impeller, and it rotates 5 times per revolution of the big gear, then there are 20 blades going

Send up special paper for making running plot of currents

Get ICTI nomograph for our set

by every turn of big gear, i.e. every complete contact series. Thus velocity pips should come through at 0, 5, and 10 blades with the ~~velocity~~ direction pip in there somewhere. Since each "blade" equals 18°, the direction can be established.

Test runs:

Meter Pointed -	Pips at (in Blades) -	Dir -	error
E (M)	0, 5, 10, 12 -	215° -	125°+
Steple (077°M)	0, 5, 10, 11 -	198° -	121°+
city (036°M)	0, 5, 10 -	180° (and Be) -	144°+
Bow (340°M)	0, 5, 6, 10 -	108° -	128°+
(10 on this one came in only about half the time!)			
West (M)	0, 3, 5, 10 -	054° -	144°+

5 | 662

mean 132°

Brought up Ensign Benning's hand compass, to check the radio shack in hopes the monstrous error was really in the shack & not in the meter. The place is just loaded with magnetic fields, so I feel OK about the meter, but am a hair worried about that moving 3rd velocity signal. It seems to happen only when pointed towards the bows.

Stations

#2 is in middle of cable area. Suggestion is to eliminate #2 & move #1 over to the 28 ft mark to elbow (25 ft)

#6 at junction of 2 cable areas & should work. Would it be moved to junction of Terminal & Raritan Bay Reach

#16 is highly questionable - its chances of survival are very slim. It could be moved out to Rollins Reef area near (20B) chart 295 - or at Bayonne Br. but that is too high!

#22 E of Gov I. Heavy traffic - there would survive better nearer bell buoy (chart 745).

#24 & 25 have poor chances

#28 & 29 don't have a chance - Queensboro Br has 133 ft clearance - possible.

#32 - 55 ft to br - as before, 35 feet. 25 ft to br

#34 - (& 33 in tow) should be moved to avoid warm water outflow

#37 is in main channel again! By moving it east a bit - it is a hair wider & could be missed.

#42 Spuyten Duyvil - too narrow to get Hammer in. Dock man said no go: there is not enough space. This can be put outside in the river, or can be assigned to the RR bridge.

Possibly price meters from the bridges —

Salinity run due again in two weeks & not yet finished –

– Salinity Run –

Lower Bay Stations – very bad weather –

Date		Stations
Feb 3 –		8, 9, 10, ~~11~~
Feb 6 –	10	7, 6, 5, 4, 3, 1, 2, 11, 12, 13.
Feb 11 –	12	14, 15, 16, 17, 18, 19, 22, 20, 21, 23, 26, 27
Feb 13 –	1	"41"
Feb 13-14 –		at dock
Feb 15		24, 25, 32, 35, 31, 30, 34,
	11	33, 37, 36, 39,

Feb 3rd was bad weather, winds to 30knots with ice over everything. Had to anchor to take the stations & were kept icing over. (only 4 Sta.)

6th was all bad cold & windy

I arrived the 10th & the 11th was a good day (12 Sta.) even so we left the working area what + thought was a bit early – The 12th I was on the bridge (Geo. Wash) all day taking pictures – Weber said the lower bay was pretty well fogged in. They did get to pier 26, though, where Tompson was taken off.

The 13th the ice was bad & we took one station through the ice. The 14th the boys had a day off & I ran the 25 hr. station. The 15th we got in 11 stations, but again had to leave early, as it was snowing pretty hard.

The 16th was Sunday – The 17th – 20th we have been tied up, as we can't get the up river stations because of ice. & can't plant buoys w/ no tachometers. Have put the time to good use in getting the 4 meters & buoys ready to go. – a big job too.

John P. Coates wants insulation board ½–1" thick – 6" x 12-48". bakalite or some such.

Salinity run due again in two weeks & not yet finished -

— Salinity Run —

Lower Bay Stations - very bad weather -

Date	Stations
Feb 3 -	8, 9, 10 X
Feb 6 -	10 7, 6, 5, 4, 3 1, 2, 11, 12, 13
Feb 11 -	14, 15, 16, 17, 18, 19, 22, 20, 21, 23, 26, 27
Feb 13 -	1 "41"
Feb 13-14 -	at dock
Feb 15	28, 29, 32, 35, 31, 30, 34,
	33, 37, 36, 38

Feb 3rd was bad weather, winds & seas over everything. Had to anchor to take the stations & water kept icing over. (only 4 stns)

CP was off but cold & windy
I arrived the 10th & the 11th was a good day (DSE) even so we left the working area what +

thought was a bit early - The 12th I was on the bridge (Geo watch) all day taking pictures - Weber said the lower bay was pretty well fogged in. They did get to pier 26, though, where Simpson was taken off

The 13th The ice was bad & we took one station through the ice. The 14th the boys had a day off & I ran the 25-hr. station. The 15th we got in 11 stations. but again had to leave early, as it was snowing quite hard.

The 16th was Sunday - The 17th - 20th we have been tied up as we can't get the up river stations because of ice. & can't start boys up as no radio-men. Have put the lines to good use in getting the 4 meters & buoys ready to go. - a big job too.

John P. Coates wants insulation board ½ - 1" thick - 6" x 12'-8" - Celotex or some such.

Winyah Bay Survey

Talk with E.H. Shultz in C of E office, Charleston
Telephone permish from CG for recorder on
light #22 (sic.)
Last dredged ca '56 at turn. In Sampit Rm
dredging finished in April '57
Bottom mtl. has shoaled from
mtl probably pretty fluffy. Called to Miami
Coast Guard & checked the 22 no. 25
light O.T. 5 piling creosote, Yold Rum
meter recorder 20 to 25 lbs. (?).
Said we might put 1x6" across between
pilings, Advise C.G. of Sctown when it
is installed & Lt. Cdr De Bogh in charleston and that permission
has been granted by the Miami office

Cindr. ~~Burk~~ Burke in Miami has
given permish for installation on
light #25 & that we are to
advise people in Georgetown who
service it.

Met Mr J.W. Blair, Asst. Chief Engrs.
Advised Charleston C.G. (Lt. Cmdr. De Bogh)
of all of this by telephone. Described
installation.

8 lb pb w/ 6" shoe penetrated only 1 ft.

Sand Waves Lower Bay C 13 - C 14
area 60-75' of base, 4-6' high & 400 ft.
Have Gilbert take run over them Start at

can buoy 13 to buoy 15. In this area note on fathogram reads "Bottom firm all the way" ~~Starts~~ all the way out from opp frontrange at lwr-end eastern channel. Depth

Now diking the discharge & spillway. so fluff not getting

April '57 notation on fathogram at buoy 25 is "firm", depth 21 ft

Some deep draft ships have to come through partly loaded or at high tide so metes had best be at edge.

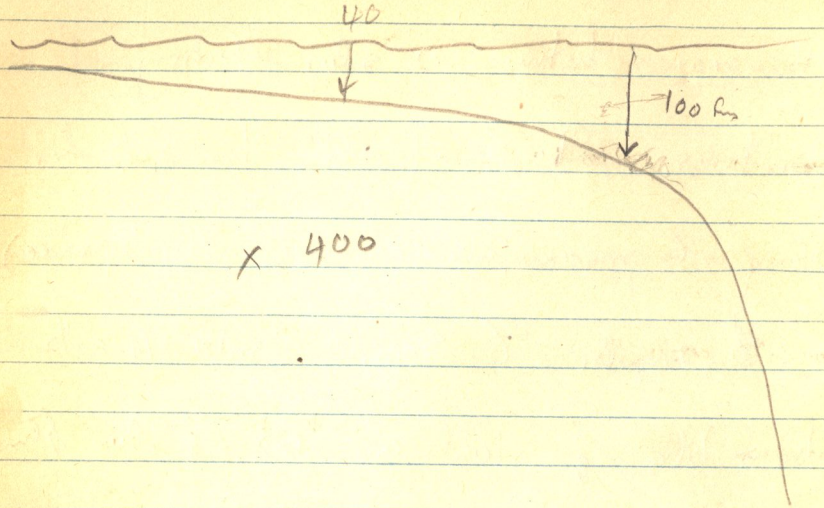
C&GE people will put out can & anchor near our stations for locations. & buy

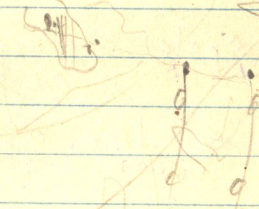
~~Shultz~~

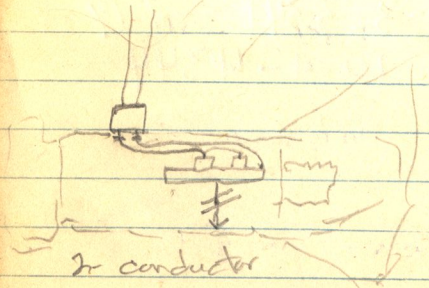
will more between 2 stns. taking velocities at each: on hre & 1/2 hr. taking 6 measurements vertically (price) & 3 smpls. - (surf, 20% mlw, 1/4 & 1/2 mlw → btm, & last one 1-2 ft above btm

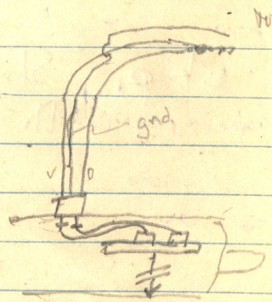
3 smpls to Marietta C&GE lab. Smpls over a 14-hr cycle

* Doop Shultz a line as to schedule for next week, so he can meet the ships. Shultz - RA-3-5341 - ext. 19 Home is Mt Pleasant TU-4-4344









Sat is blk.

12 Mar

D.C. Bus to Statler	.20
Limosine " to airport	1.20

Christa

Bags to car	.25
Limosine to town	1.40
Call to Shultz C of E	.10
Dinner	2.05

Georgetown

Weeds	.80
Cab to Ship	.65

Friday 14 Mar 1958

Tired, tired, Tired! Just back at the hotel from the USC&GSS Gilbert at 2305 after getting there at 0730 this AM almost 16 hrs. eweth today, Wednesday I talked to Shultz at the C of E office in Charleston, Then bused up to Georgetown,

getting her aboard 7P.M Found the ship & got caught up. Buoys just not working.

Thurs the 13th we Rigged 3 meters & put them in, but Meters 2 & 3 shorted out On deck. They were off, but not in water, steady beep meant short, off to warehouse, where Mark, I, J.D. Lewis, John Hernandes (Radio), & Slim worked for 4 hrs on recabling & re-wiring all 5 buoys. Back at the ship it still happened. Finaly decided it was because the rigging made a loose ground on the deck, but once in the water with all shackels & hangers tight, it was a good ground. They turned some plug on the buoy, got good signals from each. In water (sta #3) no short, but totally unintelligable signals. Seq. Switched off, but signals unreadable. John figured grounds were wrong; & that we were receiving from all three at once. It was 1600 by then.

Friday AM - off in the skiff (Mark & John) to correct two of sta #1 & sta #3 while I stayed aboard to run the rigging of 3 meters

for station #2, we planted that where the Sampit River joins Umpah Bay, & all three were keying by 1300 Have been making readings on 9 meters every ½ hr since. It has been a damned busy day. Mark went to Lions club @ 1930, back about 2245. We stayed at it all the time. All is going off now, but it is a lot of work. There are only 5-8 minutes per hr. when chronograph isn't going. Tapes come faster than we can code them, Have had 6 people on it all PM. Tentative schedule is to work all

hands over the weekend. Then to knock off Wed-Sat. & Sunday to plant # 4, 5, & 6 & my bottom meter. Mark called Capt. C., & new york is having lots of trouble- broke 8 meters. There was some breakage before I came - the plastic - but only 1 today when Ens. Garnett let one fall over. They have to be lowered in on a line, or they will break. Will be a long grind, but I think we will make out OK. Water is cold (42°) & very

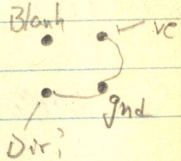
very muddy - but will try to get the bottom mount on when I can. In the meantime, there is more than enough to do.

Saturday - 15 March -

At ship by 0730. Worked away on tapes & chronograph. To town to check out of the hotel & called Ed Shultz. Uncrated & set up bottom mount. Shop did not drill out centerpost, so I will have to rig up some sort of coil arrangement - perhaps using telephone company wire-coiler - so meter can turn.

~~Mark - cable for mount~~

Mark & I went over the recorder. Batteries are marked + & - & leads are marked. Connect Batts. Line meter plug up. 1st connect line to meter & watch to see plugs & lines are OK. Direction & vel. come up separate lines



make velocity the inner mark on the tape. Would be best if we could also set up xmtr with antena, so we could monitor the thing from the ship. Wind clock. Set time switch at 15 mts, int-cont. switch to continuous to give steady V, D, & 10 sec tone. all

The time and expanded scale for 1 minute every 15 minutes. Batteries to be put in box. Transmitter too. Cover whole with a tarp. Should - with full roll - go at least four days.

Mark left ca. 1800 to head back to D.C. I was up until ca. 2300 trying to get the running plots started. Did Sta #3 and started Sta #1 meter #1.

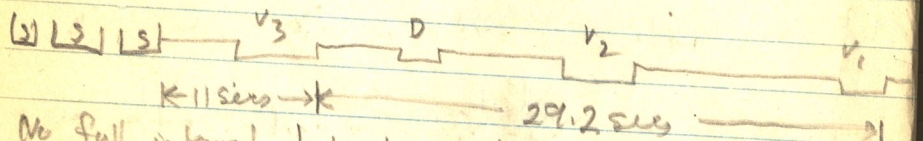
Sunday 16 March

In AM finished all running plots to date. Sta 2 has lots of gaps of unread tapes, so I started on them.

Times must be gotten when ships tie up & leave the Int. Paper Co. docks as they must deflect currents into station #1. Gotten

Tapes at station 2 meter #1 are real stinkers, as the V_2 & contact doesn't always hit. This is meter 193-17 and I will try to fix it - i.e. adjust the contacts - when we pull it next. ~~At~~ At 1055 during the 1100 obs, 16 March, on station 2, meter 1. It hit & did not hit on the same tape, so this particular trouble shows up nicely. Actually either V_3 or D also misses occasionally.

Lowest velocity available to date is 0.14 kts, This I got on 2330 obs 14 March Sta #2 meter #1



No full interval, had to multiply $V_1 - V_3$ by 2 to get full contact interval.

Necessity for pole obs?

Mr. Mitchum in Georgetown asked to be remembered to Hanson, C & GS D.C.

T.G.C.

Mark - scaling
~~ date to date
notes to Mariner - scaling missing
Schedule - me during the 4 days
when 6th meter down? change in wiring
My return - tentative - 3rd & 26th

Ship Times in & out of Dock

Monday 17th Mar 58

Wrote long letter to Capt. Crosby in AM detailing the operations since Mark left on Saturday. To town with ens. Mills for film & seals, worked on Sta # 2 tapes that are still unread. Talked long on the "why" of all this to the men running tapes. Ran some of those. Bernarr from Charleston paper aboard & talked long with him & Capt. Schoene. Brought all running plots up to the 1830 obs, got a good tape this evening & ran off a duplicate to send to Zetthen. It had V_2 missing on alternate sets, and V_3 out

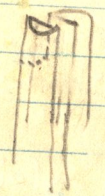
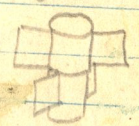
on the others - gave a weird pattern indeed.

Looks now as though the buoys will come aboard Tuesday afternoon or Wednesday. Although Munch (Ens. W. M. Lee) says the Capt. said something about planting set #2 on Wednesday, shutting off the xmitters & just leaving them on station until Monday. I'm not a bit enthusiastic about this, even though it would mean I could set up & test the bottom mount here on the dock Thurs, Fri, Sat, & Sun while all the others were off. I'll wait & see what happens. Charlie Tears (sp?) came aboard today (Radio) ~~&~~ but Mac. (Yeoman) left on emergency leave, so net gain is zero.

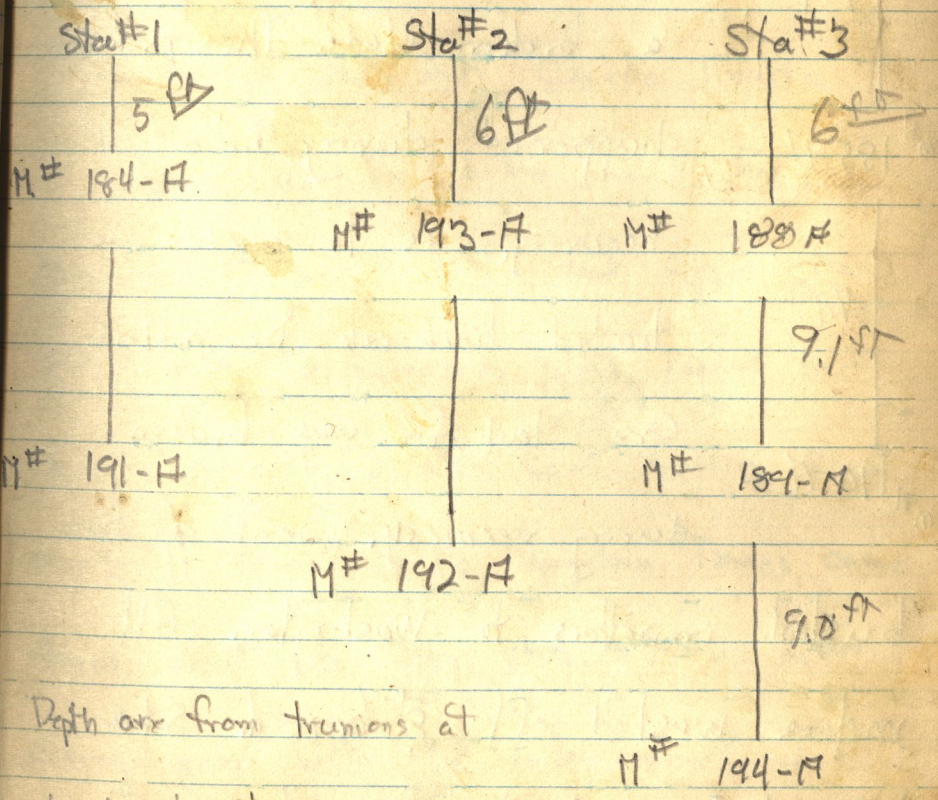
Tuesday

Tape sealing again then & A Shultz & EE LaRoche of C&GE, Charleston came aboard. I went over all the plots with them & we talked through lunch & 'til about 1400. Went with them to the C&GE boat, Wingah, She is using a Price meter with abs at surf, MLW, ½ MLW ⅔ MLW & 1 ft above bottom

for 14 hrs. at each station. They are also taking suspended sediment smpls with a mith bottle device w/ a line to pull plug at depth.

Their price meter has a slotted rod gadget that fits over the wire  wing slots  on the top are separated & used to join successive rods together to indicate - roughly - the direction.

Sun. Finished all of Station 2, brought all plots up to date & barely started checking. It will be a long job. Engnrs. blinked to us about 1930 that they were through, but we ran on until 2030. To give 104 - 106½ hrs on each meter.



Depth are from trunions at mid rder to trunions (m 1 from-2 and m-2 to m-3)

Sta #4 — To date: 5 broken fins
6 ft — & five broken impellors to
m# 188-17 — date. On recovery of
7.9 ft? — buoy #1, both impellors had
a broken blade. This probably
m# 185 17- — happened during the actual
7.9 ft — recovery, as the anchor cable
trailed back into the meters.
One tail fin was broken
m# 190 A- — during recovery. Sent off two
busted impellors to Washington. All
meters washed off & bored. Sta
#4 planted with three meters as
above on station #4 and left with
the sequence switch on A-3 so I
can run off an hour or so sometime
during the next four days.

Thursday 20 March, 58

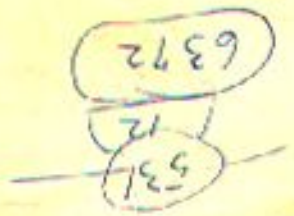
Worked in A.M. with Charlie Pearse
in rigging up the bottom mount. We
assembled it on the after deck, rigged the
250 ft. with the necessary plugs, hooked her
to the recorder, & after some fussing, she
worked. Fleming of the Georgetown Times came
aboard about noon for photos of us in
dirty gear with the bottom mount. I
went into the water to test weight

At constant ‰, conductivity increases 4 units/5°C

At Constant temp, conductivity increases 3 units/4‰(sal) or 2‰(cl).

Salinity here should be on 2 to 35 ‰

Chlorinity range 1-19‰ (so conductivity - 0 to 15‰)



belt, water temp. and visibility. Mag were too heavy, awful cold, and nil respectively

Into Georgetown in the afternoon trying — in vain — to locate a wire holder-cutter such as used on telephones, but none available. Got Ford to cut & thread some ½" pipe for holding cable on the bottom mount. Pearse rewired chronograph so we can run her slower. To warehouse for meter & bottom mount.

From 1645 to 2245 run meter #3 on station #2 to see how she varied by checking 2 minutes every 15. Curves very nice — as is a plot of contact interval vs. time. Status became too bad for buoy reception at 2250, so we knocked it off. Have been living like maharajahs — steaks, french fries, milk, salad and peas for dinner tonight. Must write Capt. Crosby on the M.M. If tomorrow is like today, will check Pearse out on the aqua-lung. He is eager, & I will be glad to have another man along on Tuesday.

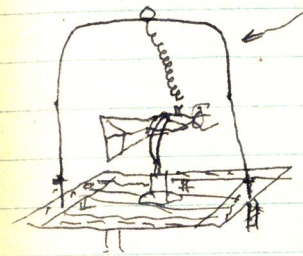
Friday, 21 March, 1958

Wrote a 2-page letter to Capt. Crosby & went into town to collect mail & to get the pipe that Ford was cutting & threading for

the bottom mount. Saw Fleming of the paper, & he had a good shot at us & the bottom mount. Tried to get the muck washed off. Caustic soda (?) from the pulp mill will ruin the finish, but the automatic washer at the mill is out, & it would take too long in town.

Kearse had finished box for the recorder, & I fussed trying to get a rig for that blasted bottom mount, so the cable won't get wound up & stop the swiveling action of the meter. The ideal way would be to have bale up & suspend the cable from that, but it would be 5 ft high, & wouldn't have a chance of survival in a 25 foot channel.

Like this



Kearse left about noon to get gear & look for a recoiler in Charleston. I started at 1353 taking one-minute observations of meter #3 on station #4. There was too much static for the chronograph, so I used the stopwatch, taking the secs. (to the nearest 0.2) from V_1 to V_1 for the number of revolutions taking between 25 and 45 seconds - more at

lower speeds. There were very few missed during the 7 hours and 7 minutes of obs. Missed only 12 out of 427, and they were all at slack water where it was all pretty confusing. I found that when it gets too confusing, you don't really have to sort out the V_1, V_2, V_3, & D pips. Just write down the seconds when they come (0, 9, 16, 33, 67 etc) V_1 D V_2 V_3 H and figure it out later. Knocked off the series at 2100 and took one tape to verify my final reading. Static was so bad, I marked with a check those pips that were meter-caused, & the rest are static. Worked away here checking my math & converting the c. I's to velocity & finally knocked off about midnight.

Saturday, 22 March, 1958

Worked the whole blasted day on the data from that 7-hr every-minute series. Plotted the data first the way it would look had we done it during a regular series - i.e. one reading every ½ hour. Then did it @ one every 12 minutes, and then one every 6 minutes. These showed that our observations do give a valid curve. Then plotted all 430 or so vs. time. Variations up to 0.3 knots in a period of three to four minutes are common but deviations from a mean are

about 1-2 tenths of a knot. A 0.6 kick is seen at 1532, some 25 minutes after I noted a big freighter left the I.P.Co. dock for the sea. It would take just about that time for her to get to station #4.

I next plotted contact intervals vs. time for the whole 7 hours. This was done since the velocity is rounded off to the nearest tenth of a knot, & minor variations - less than 0.1 kts - would show up ~~there~~ in variations on the C.I when they would not in the velocity. Since I had no log paper, I had to change scale three times (1.5 knots covers a 0.32 second range on C.I's whereas 0.5 knots covers 2.9 seconds). Even so, I discovered that the irregularities noted in the velocity plot are not meter errors, stopwatch errors, or my errors, but are real. The currents do not increase or decrease at a constant rate, they do not even stay constant (only 7 times during the whole 7 hours was the same contact interval recorded ~~on~~ on two consecutive minutes). What's more the current appears to move in surges with a regular periodicity of about 10 to 12 minutes with a "wave height" of about 0.25 knots. To smooth out the ups & downs, I have started to compute three-minute running means for every minute. This is a somewhat tedious job for 430 or so observations,

but by 1230 AM – allowing time for a movie this evening – I am up to 1615, some 140 computations. Couldn't stand it and have plotted these up. Peaks occur at 13, 11, 9, 16, 12, 8, 9, 17, 13, 10, 7, and 9 minutes from 1357 to 1815 for a mean period of 11 ~~seconds~~ minutes. Went to see Witness for the Prosecution in Geetown. It's Great!

Sunday, 23 March –

I got breakfast for Dick & Madge et moi and we three went off to church in Geetown & lunch at the Prince George Hotel. Back here I wrote Maggie, Π, M&D, Sis, Butch, & B.D. Zeller. Then back to the running means again & the plotting. Finally finished these about 2330. The

12⟌78 12⟌134

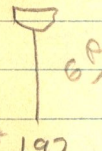
average of about every 11 minutes still holds. Talked it over with Capt. Sheene when he got back about 10:30. He thinks it might be the buoy swinging, but I doubt it. If I get the same thing from the bottom mount, then well know it is real.

Monday, 24 March, '58

Hearse got some telephone cord re-coiler in Charleston, & I put it on the meter-end of the 3-conductor cable. Drilled holes in recorder box for the meter & Xmtr leads to get in to the recorder. Planned the

planting operation

1430 - Buoy # 5 planted



1600 Buoy # 6 planted

This trip I put marlin around the hangers, so they could not go forward into the impellers & we got all meters in with no breakage. I also suggested gluemy patches on the cracked fins, one on each side, & these too seem to work.

It was ramming like mad & a high wind was blowing, so we did not attempt to put down the bottom mount. Still have to put new batteries into & fix sequence switch on # 4 before we start to record. The 100 hrs will start in the morning. Thus the 100 hrs will be through Saturday noon, and I will hope to head home that evening.

Is Edmeston still with Cdls? If so let E.E. LaRoche know.

LaRoche & Hogan came aboard about 9 PM & we talked much longer than I really wanted to.

Tides

Fraser Pt. Slk wtr + 1.25 on Charlstn
Slk at Charlstn 11:14 + 1:25 (1239)

Plots.

Slk Friday 21 Mar from plot = 1800
From tides = 1545 = 2 hr 15 min Charlstn
— Why the difference? — → 1330 for Fraser Pt.

Worked on G.F. Jordan's ms. on Florida & wrote him on my suggestions. Quit about midnight — again

tops over all, clamped the antenna to one of the uprights, secured 3 1/16" cable, took a picture & left. Meanwhile, back at the ship, they were getting a good healthy signal from it. So all seems to be going well.

Will have to check - either audibly or by going down again - to see if the lead-in cable is tangled.

Now receivers from Stations # 5, 6, & 7. All three were put in with no breakage. We did not have enough meters (i.e. enough tens) to put 3 meters on Sta #6, so she is running with no mid-meter. Now (1500) there is some trouble with meter #1 on buoy #6. Checked in the shack, & meter is off, so it must be burn contacts. Will have to pull it & put on a new meter. 3 impellers & 3 tens came today, so now we can add the other meter.

Ship went by bottom mount headed out at 1522. Took a reading @ 1509 & all was well. Another listen-in @ 1645 gave a steady signal - current still running out fast, so if it is not on contact, at slack we had a reading of 1509, some 2½ hrs after the current had changed, so at least we did not drag the anchor through it.

At this we got underway & put two new meters on station #6 (Meter #1 doesn't make how V contacts, & no meter was put on #2

1850 Hernandez & I just back from beacon #25. Recorder still running with timer still ticking, but velocity stylus is making continuous contact. No direction pips, intermittent or continuous. If the velocity were shorted, then since Vel. & Dir. are separate we would still get direction pips. Since we were getting no direction pips, then there was no short. Thus, it appears that something has caused the impeller to stop on contact. I will come back early in the morning & see. We cut off the timer to save batteries, but left the recorder on. This in case something is caught loosely in the impeller & might move on when the current stops ebbing & starts to flood. In the morning I will first check the recorder to be sure that it isn't now working OK. Then will go down at beacon #25 and follow the lines to the bottom mount. All will have to be

done by feel anyway. Have never seen such inky blackness anywhere.

It took just one hour to pull, check, replace & replant buoy #6. We first checked meter #4 & found a busted wire in the plug at the meter. So the contacts we were getting were — white load — only direction. Re-wired the plug, & replaced it. Then added the new meter to the middle position & replanted it. All three now working well — still no breakage.

1830 Back at the dock, but reception is so bad, we will have to get underway & anchor down in the channel somewhere in order to pick up our signals. Anchored near stn #5.

Wednesday, 26 March, 1958

Right after breakfast, I suited up & Hernandez & I went in the skiff off to beacon #25. We climbed up & took the top off the recorder box. No time ties, & no direction ties, & the velocity was still on, when we disconnected the meter cable, we began to get good time ties, so evidently the steady drain from the velocity contact had lowered the batteries. Anyway, it was not the limit or the recorder but the meter that is fouling it up. It was cold, overcast, & windy up on the beacon, & I was cold before I ever got into the water.

I tanked up in the skiff & rolled over to go down the cables to the meter, taking with me my little brown marker buoy & ca. 25 feet of line. Once on the bottom, I closed my eyes to see if it could be any blacker — there was absolutely no difference, eyes open or closed. Moved my light-colored gloves right up to my faceplate, & there was still no difference. Moved out hand over hand along the cable. It was at one pt. - est. 90-120 feet from the beacon - hung up on a piece of wood sticking out of the bottom. I freed it & had to make an almost 90° change in course, so that is where some of our slack had gone. Followed on to where the cables are attached to the bail. Felt along the bail to the hinge & then reached inward to grasp the upright. Followed it up to where the cable is attached & the cable was not twisted up. Following on up along the hangers, it felt

as though the hanger rested at-barny like (a) above. Felt as though it had been bent forward. (B). It was really pretty hard to tell by feel, though. The impeller seemed to have all its blades, & the fins felt all there, but the angle was all wrong. I came back up- total time in water 15-20 mts. We came on back to the Gilbert, & I stepped into the shower & filled the suit with hot water. A couple of minutes of that, a cup of hot coffee, & a cigarette, & all was OK. We'll have to pull the meter up & check it. Current now is running pretty fast, but slack water is shortly after noon, & we will try to get her up & see what the trouble is.

Disconnected cables from beacon #25, packed up all cable into skiff, took loop of cable from skiff to Gilbert & lifted the bottom mount with the 7/16". She was in fact bent over as shown above. Bent in the up current direction. Also some bits of white string(?) were jammed in around the impeller bearings, making her turn hard. Cleared out the stringy stuff,

the bail, checked the lines with the meters on, got 3 v's & a D out, & lowered them to the bottom. Put the box in the skiff, off to #25, hooked everything up again. No beeps, but it was at slack water. Meter at Sta #5 was still no, so we hooked her up, turned on xmitter, hooked meter to recorder, closed up the boxes, put loops back, waited cable box & the beacon & came back. Skolb, Charles Berg & Lu Ruche were all here. We talked of currents & tides. By 1400 bottom meter on sta #5 was off slack water & still no beeps on 3331 bottom mount. I am now suited up again (1430). We will try 3331 again when they are through with the sonics. If still no beep, I will go down & do what I can on the bottom. It was raining all the time we were on the beacon & is still cold & raing. Damn miserable dirty weather!

1730 Back aboard. There was a fair current running (1.2 kts on bottom meter of Sta #5). I had to work up-current along the lines from beacon #25. At the meter still black as midnight, the current was pretty strong & had to fold one leg around

the bail and drape myself around the large part of the upright in order to stay there. The swivel just is not efficient. I could turn the meter 90° to the current & it would not come back of its own accord. It was also tipped forward. I cut the line ~~we~~ I had put on to keep her from tipping back & was going to try to put it off, to keep her from tipping forward, but in the dark & cold with gloves, it got away from me. The hanger ~~appears~~ felt bent, so I straightened it up. Impeller seemed to be turning well, though. I came up & by swimming 90° to the current, I was able to grab the shift as I sailed by. Back at the Gilbert, they said they had gotten no pips at all. Over with shift to Beacon #25 to cut off the recorder, only to find the recorder working like a charm, with seconds, directions, & velocities coming through nicely (V, V_3 D V_3). So even though the knife isn't working now - 1600 - at least the recorder & batteries were, when last seen. I fear, though, that once the current has slacked & then turned, it will swivel back but will tip forward & probably bend again. If so, we will know in the morning & will try either the other bearings or try to rewire it with the bail secured on the upright position & the meter suspended somehow below it. We'll get this thing working if it kills me — and it may yet. Stepped right into a hot shower once I was aboard & stepped down under torrents of hot water - it helped.

Evening: wrote long letter to Capt. Crosby & patched up my rubber suit. Duct tape would used to patch the meter tires works well on my suit too.

Thursday, 27 March '58

0815 off for beacon #25. Tide was low again, so I swam up to the steps & climbed up. Unscrewed recorder box, & there was no tone-tec at all. The clock was stopped at 0517 (1717?) but I was getting an occasional direction pip, but no tone pips. Had Schnoor shift back to the ship for a new clock battery. Put it in & it still didn't start. I put the winding key on the slots & applied a slight backward pressure. Whether it was battery or the nudge, I don't know, but she started. I wanted to see what sort of a record we had, so I removed the take-up reel, took off the

tape & re-attached the loom end to the take-up reel. When I left, seconds were ticking & an occasional D was coming through.

~~Back out~~ Back at the ship. I looked over the roll. D marks were pretty regular but V's were occasional only. Some 15 or so feet back there was nothing. I think she was off while the current is ebbing - it was just about at slack before flood when I was there - but she doesn't swivel around to meet the flood direction. Back to the ~~base~~ beacon w/ Hernandez, we cut off recorder, pulled plugs, put cable box in the shift & pulled up cable & the mount, secured to the Gilbert, handed up the box, hooked on the hoisting line & brought her on deck. I first checked with the ohmeter & we are getting 3 V's & a D at the plug at the end of the Tyrex. Meter itself is shut off as is the cable to the recorder. When we unhooked the lines from the recorder, we were not getting any time ticks at all. By the time we had the meter checked on deck, the ship was again en route to the

D.P.Co. dock - with the recorder still on beacon #25. I feel that the bottom mount is just not swiveling in the current, & it now appears that there is something wrong with the frame for part of the recorder. If I can get the shift - she needs more gas - I will scoot back, & will bring the recorder back for a complete check before we try again. Will try a better rig for suspending it too!

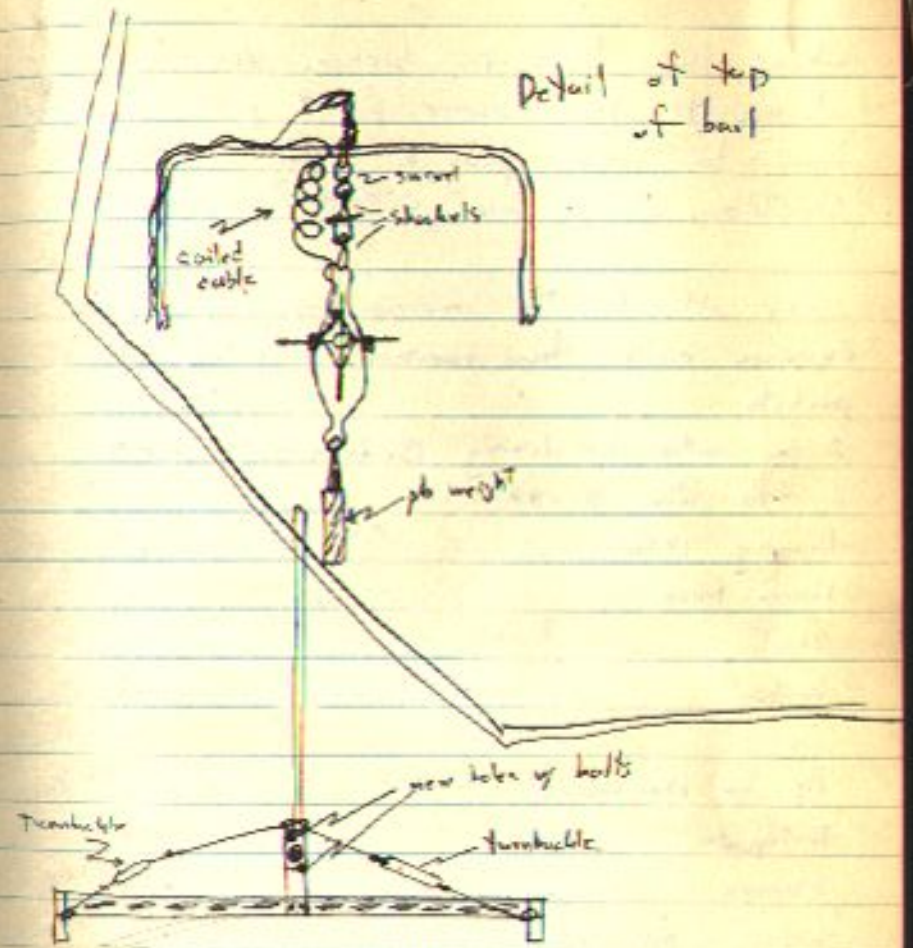
1130 Back at the dock. I think that if the mount is not absolutely flat, that the meter doesn't swivel freely, but tends to hang & possible on the downward direction. Capt. Schoene & I have taken off the hanger - little water on the stand, so bearings are apparently tight - and the meter. By suspending a double hanger from the top by a shackle & swivel and by putting extra bolts & guy wires on the upright bolt, we can make it secure. I will work on this this afternoon, straighten out the cable, collect & check the recorder from beacon #25, and have her all set to put in at slack water on

the morning. If it works, we will get at least 24 hrs of record from it. 24 hrs. of good record.

After chow I waited till Johnson had picked up some gas, & then he & I outbounded from the I.P.Co. docks down to Beacon #25 to recover the recorder. Back aboard we went over her pretty completely & found that even though we were getting V, V, V, keying OK, there was no D. We had a good D impulse at the end of the cable though. We found a bad 50?? relay & replaced it. All appears to be well with the recorder now.

As for the mount. I had Steve drill two more holes in the hinge plate & then bolt them tight. Boats then put cable & turnbuckle braces on the uprights for extra strength. I suspended the meter in the regular hanger from a chain of shackles & a turnbuckle. Tyrex was placed on a telephone cable receiver, marlined to the top of the bail & down along the sides to the base. 3/16" steel cable was secured to the top & taped lightly to the upright so it

Detail of top of bail



Side view of base

would break away with a jerk on it, so meter could be recovered soons down if necessary. At the base, the 3/16 was so taped that it held a 12-ft. coil of the cable, a coil that would be freed

when the tape is broken. Hooked it all up to the recorder & all goes well. Still have to secure plug & safety wire the shackles, & we are set to go

Eve. off to the movie w/ Capt Schoene

Expenses culled from various slips in various pockets.

2 pr booties for diving @ 2.84 —	5.68
2 rolls film @ .56	1.62
laundry 14 Mar.	.67
Mask frame	3.02
Short	2.00
Socks	.56
Beer	.40
Pipe for btm mount	1.57
Toothpaste	.44
Stamps	.86
Lndry & dry clng. 22 Mar.	.92
Lunch 23 Mar	2.00
Movie 22 Mar	.50
Food after the movie	.35
Paper	.20
Cable cutter	.75
Weeds	.25
Curtain Mtrl	2.50
~~Ldr~~ Dry Clng.	.55

Paper	.10
Film	.86
Movie w/ capt S.	.50
Limes Chisten	.45

Hotel 12, 13, 14 March

Spball 15 – 28 March

Meals above

12 - 0	19 - 3	26 - 3
13 - 3	20 - (2 1/2 Hall)	27 - 3
14 - 3	21 - (1 1/2 Hall)	28 - 3
15 - 3	22 - (2 1/2 Hall)	29 - 3
16 - 3	23 - 0	
17 - 3	24 - 3	
18 - 3	25 - 3	

13 days @ $1.45 = $18.85

(predicted)

Slack water — interval — Charleston — to Stat #5 — 0.3

	Slack	water	interval	Charleston flood	Charleston ebb	to Stat #5 flood	to Stat #5 ebb
	0534	—					
25	1154.2	12.4	+ 1.2				1.2
	1240.7	20.5	+ 2.8	2.8			
	2349.9	01.5	+ 1.6				1.6
	0626.4	09.0	+ 2.6	2.6			
26	1457 0.0	13.6	+ 1.6				1.6
	1728.5	20.4	+ 1.9	1.9			
	0048.8	02.5	+ 1.7				1.7
27	0720.3	10.0	+ 2.7	2.7			
	1258.9	14.7	+ 1.8				1.8
	1928.4	21.5	+ 2.1	2.1			
28	0147.8	03.5	+ 1.7	S. 12.1			1.7
	0844.3	((10.7))		D. 5		S 9.6	
				m 2.4		D 6	
						m 1.6	

Slack before flood at the bottom meter comes 2.4 hrs after slack at Charleston

Slack before ebb comes 1.6 hours afterwards.

So slack this morning is @ 147 or 1045

Recoiled the cable into the boat box. Changed to a three-swiveled swivel, safety waxed the shackles, tested again the recorder, wound & set the clock. Put a holding line on to keep the meter from banging & she is all set [illegible]. 0950 Leave IPC dock for Beacon #25

Back at the Gilbert from Beacon #25 We tied the Gilbert w/ a long line to Beacon #25. Put the recorder in the skiff & Mudge (Ens. Wil. Lee) & I took her over & mounted it on the beacon. Back to the Gilbert & lowered the meter with two recoverable lines, orienting the bale 70° to the current. Put cable box in the skiff & over the 200 ft to the beacon. Plugged in the meter cable, pushed start-button & nothing happened. I died right there. Once the waves of panic had left, I swooped & found the red lead from the battery had broken at the battery terminal. Fixed that, & she purred like a kitten VD, V2 V0 & times. Hernandez came over to see why the meter wasn't working, one hole where a peg on the harness fits on was too big for a good contact. I suggested stuffing wire into the hole, & she now is working well. She started recording at 1101 AM. I marked the 1115, 1130, & 1145 speed-ups on here. About 1135 the time ties stopped. Turned out to be too much

tension on the pen is adjusted that to a lighter one & all was OK. We may have her licked at last. I surely hope so.

Tape from the recorder @ 1135 is attached 7 revolutions in 82.1 secs = 11.7 secs = 0.6 kts & Direction is 360°. At the same time, sta #5 bottom meter had 0.5 (1130) to 0.6 (1200) so they jibe pretty well.

From 0800 25 March to 1000 28 March are 3 complete (~) tidal days. By counting the squares encompassed within the flood part & the ebb part of each curve, dividing by the number of squares on the abscissa, I got a mean velocity for that period. I then multiplied this value by the time between the two slacks to get the tidal excursion. Adding the flood excursions (26.15 naut miles) and the Ebb excursions (19.66 naut miles), there is a net flood excursion over the three days of 6.49 nautical miles.
6.49 naut. miles is 6.49 × 6080 = 39,460 ft in 294 hours = 134 ft/hr = 2.2 ft/min

1512 - Tuned to 3331 kc's & she is still beeping. V_1 V_2 V_3 D. Contact Interval is 39 secs or 0.2 kts. Direction ca. 190°, so she has turned & is lined up OK.
Bottom mount is meter #183

Beeps still coming in @ 1940. Six revolutions in 41.8 secs = 6.97 contact Int. or 1.1 kts. Dir ca. 180° Sta #5 on the bottom had 1.6 @ 1930 & 0.4 at sta #6 bottom meter.

At 2144, four revolutions in 51.2 secs or a 12.8 contact Interval = 0.6 kts.

Saturday 29. March
0706 Tape from the bottom mount shows 19 revols in 137 secs, 7.2 C.I. = 1.0 kts. @ 198°
Btm meter @ #4 is 2.1 @ 180° & at #5 is 1.6 @ 180
@ Sta #3, vel = 0.4 D [illegible]

At the bottom meter at station #6 the ebb excursion decreases steadily as it leaves the time of spring tides. Exc. in naut. mi.

Date:	25	26	27	28	29
Ebb Exc:	4.62,	4.10 & 3.68,	3.06 & 2.52,	1.68 & 1.65,	

Flood excursion shows no such regularity

1045 ; Underway for station beacon #25. I went on the shift with Hernandez to the beacon & climbed up. Opened recorder to find that tape had slipped back from the writing slate &c & was not visible through the window. Still murkery out, though. In putting her back we broke the tape used some masking tape to patch it up. To do this we had to remove batteries to get at the take-up reel; & in putting batteries back, we disconnected - inadvertently - one of the battery wires. So - naturally - we got no time tics or anything else. Once the panic had subsided, we found the hitch, wound the clock, checked everything & closed her back up. I was suited up, with my tanks & wgt. belt on the shift, so I tumbled up, rolled over & down the cables to 1) check to see tygex & 3/16 cables were not fouled, so meter could be recovered sans diver. 2) to see if tygex had become wound around swivels between bail & meter as the current reversed, 3) to get a bottom empl for the C of E., & 4) to attach the little brown buoy to the top of the bail by the nylon line.

It was just as cold & as dark as I had recalled from the last time. The tygex & 3/16" cables were both snagged & tangled under & one of the mount legs. The mud was so soft, I could force my arm in up to the elbow. I got them free & checking showed the quick-release for the 3/16" was still in place. Felt my way up to the top of the bail & down the shackels, & there were six twists in the tygex around the chain of shackels. Evidently she swings back & forth between flood & ebb & not all the way around. Back to the bottom to get the mud sample for the engineers - in labeled jar. Took little-brown-buoy out of my backpack & felt back up to the top of the bail & secured running end there & let her bob to the surface.

Back along cables to the beacon & up. I kept slight tension on the cables en route, so any slack will move at the beacon & not into the meter. Picked up the 9-thread recovery line & went back down the cables. I attached one end to the eye at the top of the bail & up with the other end to the buoy & secured it to it. There are now two ways of recovering the meter: either by the 3/16" & the release mechanism or by the

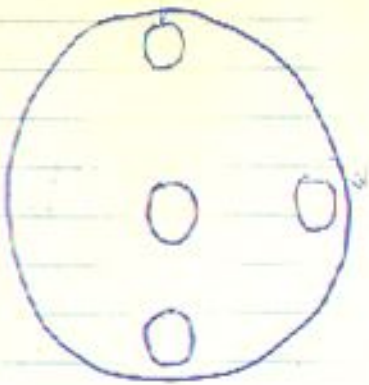
buoy & thread. Swam back to shift & on to the Gilbert.

Recovered ~~meter~~ buoy #4. Top impeller lost 2 blades when buoy anchor cable ran back into it. Others OK, but meter #3 had strands of some fibrous material wrapped around forward impeller bearing causing him to turn harder than normal. Velocities on this meter may be slower than the current. Note should be made in the book. (done HRS)

Recovered buoys 5 & 6 with no incident. It is easier to mount & dismount the meters if we use 2 half bowsers (8) instead of one full one. 1304 & 1455 tapes taken on the bottom mount, & she is still going.

Although I will leave this evening, the bottom mount will stay down Sun, Mon, & Tuesday to arrive at least four days of record.

Craytons Charter Service
Seatow S.C.



N.Y.C.

Harmer Gibbs 2-0174

Jane McAuliffe

Imbo
LE-4-5611

Butch

White Plains 8-5074 (home)
WH 9-3284 (office)

Munyler D Study & Dave Morris
SW 16th
CH 3-6508

1 7/32nd G.M. Feet-wheel

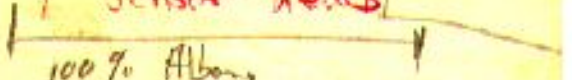
1 conductivity unit #2

1 Temperature unit #2

1 Frequency meter

ca. 200 ft. cable

1 Sensor head



100% Albany

90% Poughkeepsie

Drifting @ 5 kts E.M.

Have Hale come up on A.M.

-ST 3-9200 —

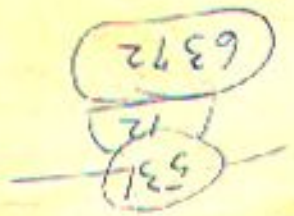
— Ex 760 —

At constant ‰, conductivity increases 4 units/5°C

At Constant temp, conductivity increases 3 units/4‰(sal) or 2‰(cl).

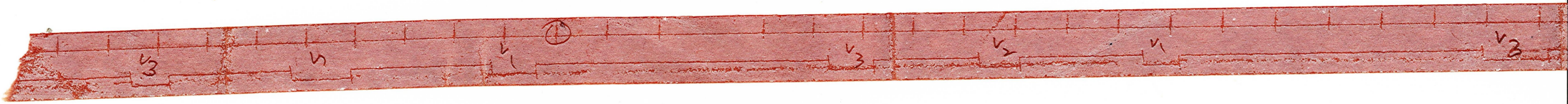
Salinity here should be on 2 to 35 ‰

Chlorinity range 1-19‰ (so conductivity - 0 to 15‰)



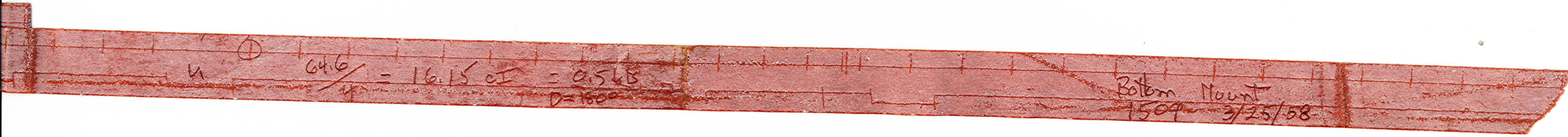
August 2014 -

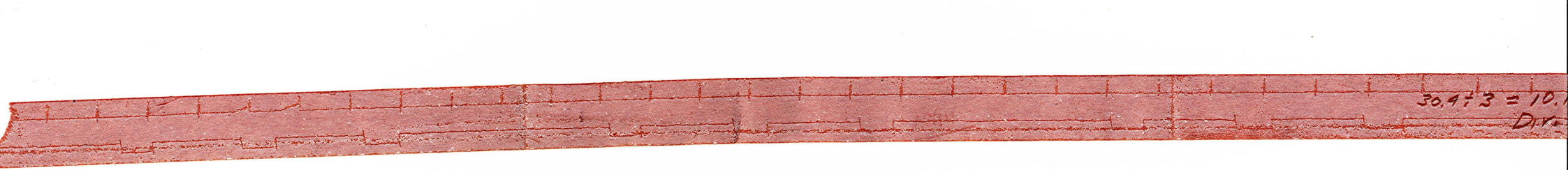
Scientists speculate that these were used for measuring water temperatures

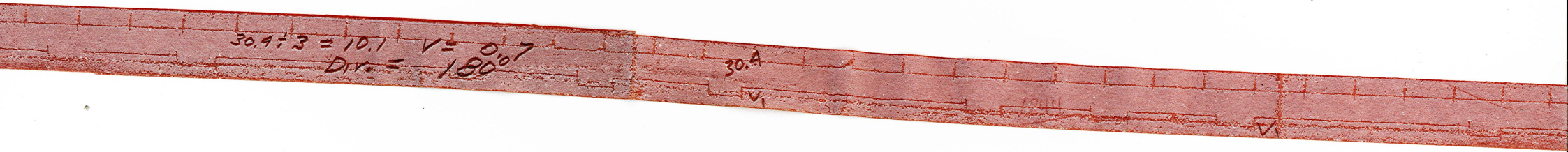



v_2
v_1
v_3
v_2
v_1

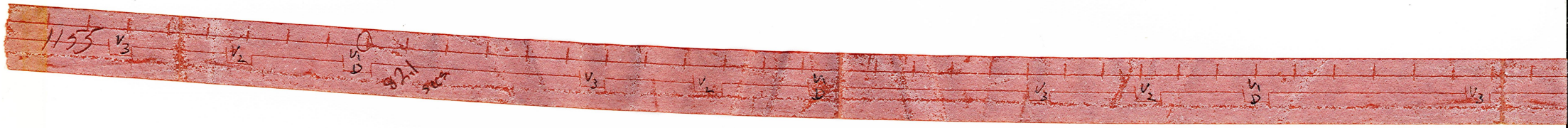

V3
V2
V1
V3
V2
V1


64.6
= 16.15 cI = 0.56B
D=160°
Bottom Mount
1509
3/25/58

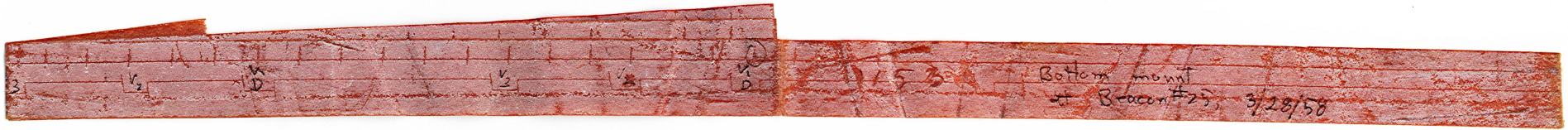

30.4÷3 = 10.1
Dr.


30.4 ÷ 3 = 10.1
D.r. = 180°7
30.4
V1
V1

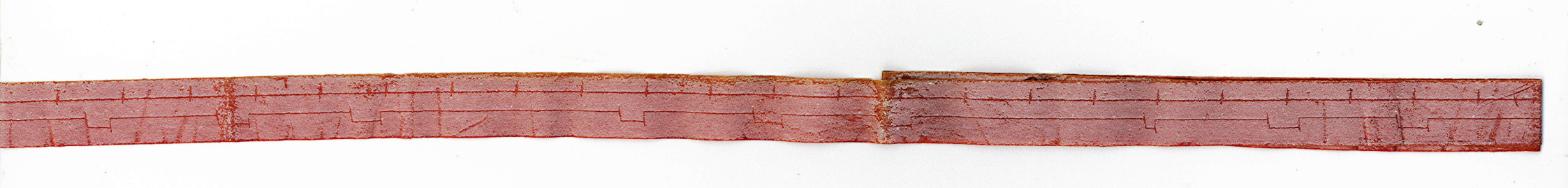

0
Bottom mount

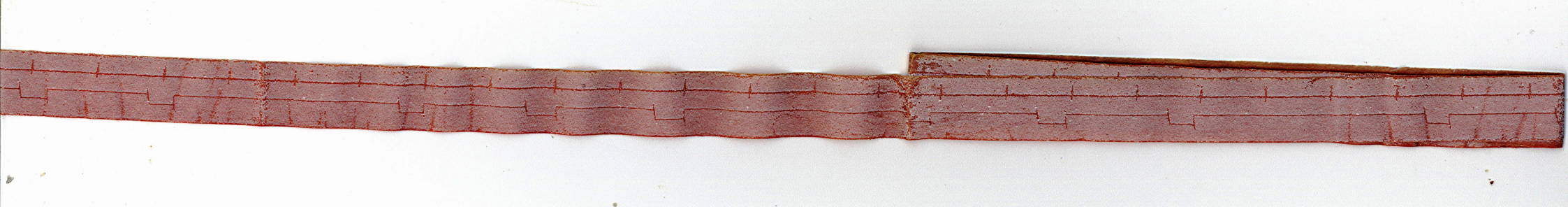

1155
1/3
1/2
1/D
9.21
1/3
1/2
1/D
1/3
1/2
1/D
1/3

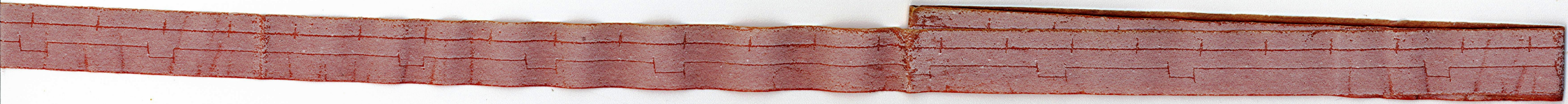

V2
V3
V1
D
V3
V2
V1
D
3
V2
V1
D

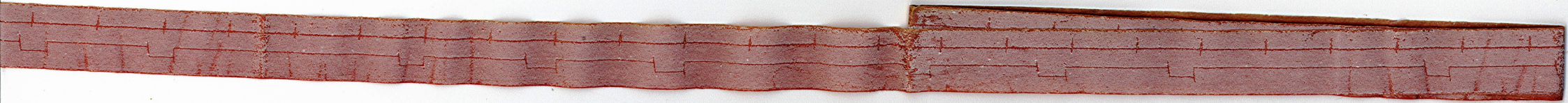

Bottom mount
Beacon #25 3/28/58

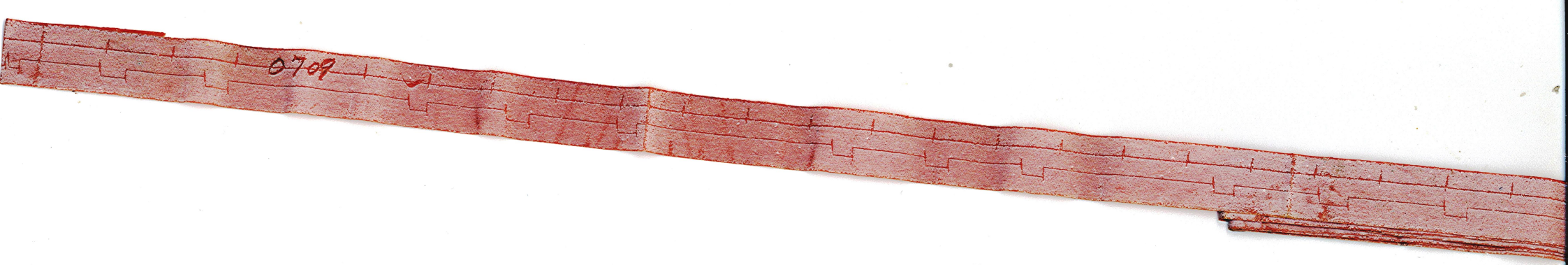
0706
BOTTOM MOUNT
195°
MAR 2 [illegible]
137 Series for 19[illegible]



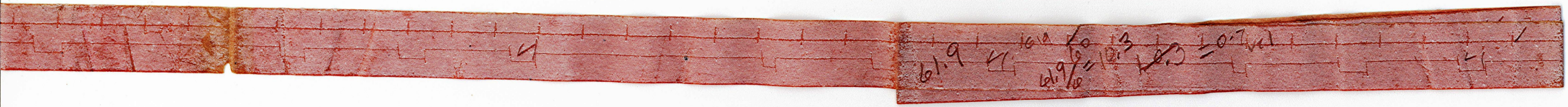


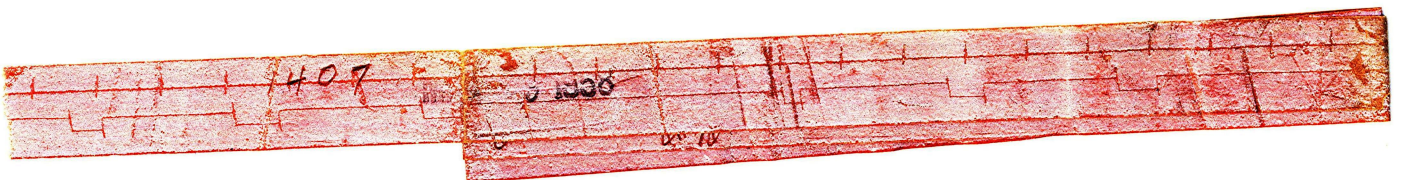





0709


0.7 VCI
bottom mount
MAR 23 1954




1407
1438