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AN OCEANOGRAPHIC SURVEY OF FURY AND HECLA STRAIT

by

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ABSTRACT

A total of 27 days of current and tide data and the results of 13 oceanographic stations obtained in Fury and Hecla Strait and its approaches are presented and an attempt made to explain some of the observed characteristics of these waters.

RESUME

Le présent rapport comprend les chiffres de courant et de marée pour une période de 27 jours, ainsi que les résultats obtenus par 13 stations océanographiques situées dans le détroit de Fury et Hecla et ses approches. On a également essayé d'expliquer quelques-unes des caractéristiques marines observées.

INTRODUCTION

During April and May of 1975 a two-man oceanographic party conducted a preliminary survey in the Fury and Hecla Strait area to obtain background data on which to plan a measurement program of the tidal currents, water and heat transport, and water quality, between the Gulf of Boothia and Foxe Basin through Fury and Hecla Strait.

PREVIOUS WORK

The first recorded observation of tide and water current through Fury and Hecla Strait was made in 1822 by Crozier (Parry 1824 pp 336-337) who reported a maximum tide of 8 feet 11 inches over a four day period. From observations of the current (in Labrador Narrows) "it would appear that the regular stream of flood-tide sets to the eastward, and that of the ebb to the westward, in this Strait; though, at this season, the latter is not always perceptible, on account of the rapid current permanently running against it in an easterly direction."

In the fall of 1910 two members of the complement of the DGS Arctic, Mr. J. Lavoie and Mr. L. Mathé, visited the western end of Fury and Hecla Strait, spending ten days in the vicinity of Cape Hallowell, and reported "that the Strait had been ice free three and a half months and that ice had not yet formed in the deeper waters by October 29th." (Bernier pp 86-87). Mr. Lavoie returned to the area in April 1911, continuing his explorations into Prince Regent Inlet (Bernier pp 101-103).

During March and April 1913 Mr. A. Tremblay twice passed through Adolf Jensen Sound and observed the open water features in it and the other two channels separating Baffin Island from Melville Peninsula (Tremblay 1921, pp 193-213).

In 1948 U.S. Naval Task Force 80, consisting of the icebreakers USS Edisto and USCGC Eastwind, passed through Fury and Hecla Strait (Arctic Circular, 1948, pp 90-91). Temperature and bathymetric data obtained are not available (Dunbar 1951, p 19).

The first synoptic oceanographic observations in the area were made in the eastern approaches to the strait by the Fisheries Research Board vessel M/V Calanus which wintered over at Igloolik in 1955-56 (Grainger 1959).

In 1956 the first systematic observations of temperature and salinity in the strait were obtained from HMCS Labrador (Campbell and Collin 1956; Collin 1958) in Fury and Hecla Strait, Committee Bay and the Gulf of Boothia.

The first current measurements were made from the CGS Baffin in September 1960 (Barber 1965).

FIELD TECHNIQUE

Using local transportation from Igloolik (Figure 1) a base camp was set up on the sea ice at Purfur Cove in the western part of Fury and Hecla Strait on April 24th, 1975 (Figure 2). A tide gauge was established and an electromagnetic water current meter deployed through the ice at Station No. 1 (Figure 3). Hydrocasts were taken at Stations No. 1 to No. 7. On May 9th it was necessary to discontinue tide and current measurement in the western part of Fury and Hecla Strait due to unseasonable melting of the snow cover on the overland portions of the trail to Igloolik. The base camp was moved to the eastern end of the Bouverie Islands, the tide gauge set up and the current meter re-established at Station No. 8. Hydrocasts were obtained at Stations No. 8 to No. 13 in the eastern approaches to Fury and Hecla Strait until May 31st when all gear was returned to Igloolik. See Annex I for survey log, Annex IV for logistic detail.

TIDE

An Ott type R-16 water level recorder, having a seven-day recording period, was mounted on a 10 cm diameter plastic (PVC) pipe 4 m long, filled with diesel oil (type 3 GP - 6 c) and frozen in offshore from the tidal hinge (Figure 4). The gauge wire ran through the plastic pipe to an anchor on the bottom and the ice level was recorded as the water level changed. Level checks were made by sounding to a fixed reference on the recorder housing.

The tide gauge was levelled to hydrographic survey monument No. 3867/1960 at Purfur Cove and three additional bench mark plugs installed

close to the gauge location:

May 3rd, 1975. Time 2208Z.

Reference	Elevation
Monument No. 3867/1960	0 m
BM No. 1/1975	+ 0.79 m
BM No. 2/1975	+ 0.25 m
BM No. 3/1975	+ 0.75 m
Water Level	- 3.00 m

Plugs were not available for the Bouverie Islands installation.

WATER CURRENT

A Marsh McBirney Type 711 electromagnetic current meter, having its detector mounted at the end of a 3 cm diameter sectional aluminum tube, was frozen into the ice inside a foam urethane plastic sleeve (aero tube 1 cm wall thickness for 3 cm O.D. pipe). This flexible sleeve prevented the aluminum tube from "freezing in" and allowed it to be adjusted to 9.5 m in depth, rotated and recovered at the end of the recording period. A sun compass (Figure 5) mounted on top of the aluminum tube was used to set the azimuth of the probe.

The N-S and E-W components of the current were recorded by an Esterline Angus recording galvanometer (Figure 6) switched at one minute intervals between the two channels which were coded, by sample length, for identification (Figure 7). The chart was scaled in the field and the components of the current reduced to polar coordinates.

The average flow at the eastern end of Fury and Hecla Strait (Station No. 8) over a 15 day period was 0.18 knots at 93.5°. The maximum and minimum flows over a diurnal* cycle were 0.48 knots at 120° and 0.12 knots at 41°. The minimum flow over any given 25 hour period was 0.02 knots at 327°. The peak flow recorded was 1.2 knots.

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* Taken between reversals at the maximum of eastward and westward flows

TEMPERATURE AND SALINITY

All hydrocasts were made in a 20 cm diameter hole bored through the ice with a gasoline-powered auger (Figure 8). The hand-powered winch was set up inside a double walled tent (Figure 9) where the temperature was maintained a few degrees above the water temperature. The thermometers, three per bottle, were read within 2°C of the temperature at which they were reversed. Water samples were drawn into 450 ml polypropylene bottles, frozen and returned to Ottawa where the melted sample was stirred vigorously for three minutes and the salinity determined on a Bissett Berman laboratory salinometer, type 6230, or a Guildline "Autosal", type 8400.

OXYGEN

A Yellow Springs type 51A oxygen meter was taken into the field and used to gain experience with its operation under field conditions. Tabulated values are given in Annex II.

WEATHER

Aviation weather was reported daily to DOE through the Polar Continental Shelf Project radio network and a running log maintained to provide an appraisal of spring flying conditions from April 26th to May 31st. (Annex III).

RESULTS

TEMPERATURE

The range of observed temperature in the water column is very small, a total of only 0.17°C for all stations and of 0.13°C for the deepest cast. Similar conditions were noted by Grainger (1959) at Igloolik. Of interest is the indication of cooling as the water passes through the Labrador Narrows where it was exposed to an ice-free area of 7.5 km^2 (Figure 10) or Adolf Jensen Sound where the ice-free area was 1 km^2

(Figure 11), before mixing with the colder Foxe Basin water. This is illustrated in the temperature/depth plot (Figure 12) which groups stations west of, close to, and east of, Labrador Narrows.

SALINITY

The salinity samples indicated a marked variation with time, as much as 3.2 $^{o}/oo$ over a period of three hours. In sampling two Knudsen bottles were used, the one closest to the surface and the deepest in the first cast, the second highest and second lowest in the second cast and so on. At the deepest station (No. 2) almost two and a half hours lapsed between the first and last cast.

When the salinity of samples taken on the same cast (up to one minute delay) is compared, it is found that a negative salinity gradient appears at some depth at each of the stations to the west of Labrador Narrows but does not show up east of the Narrows (Figure 13).

A series of hourly casts at depths of 10 m and 50 m taken at Station No. 1 (Figure 14) indicate a variation in salinity of up to 4.2 $^{o}/oo$ while the temperature at both levels remained within 0.02^{o}C.

It is felt that these apparently anomalous salinity profiles are the result of turbulent mixing of water originating in an area of high salinity gradients (Collin 1958, Figure 6), and occurring in a time scale comparable to the time required to complete a hydrocast. In passing through Labrador Narrows and Adolf Jensen Sound the water is further mixed and cooled (Figure 12) before diluting the more saline waters of Foxe Basin (Campbell 1964).

CURRENT

Nine days of current data were obtained at Station No. 1 before it was necessary to move to the eastern approaches of Fury and Hecla Strait. A progressive vector plot of the current at a depth of 7.5 m below the base of the ice cover (Figure 15) and a similar plot from data obtained at Station No. 8 over a period of 18 days (Figure 16) show a marked change in the character of the current during the recording period. Simultaneously recorded water level data from both sides of the strait were not available, but a comparison of predicted levels for Fort Ross (Prince Regent Inlet) and Hall Beach (Foxe Basin) (Canadian tide and current tables) shows that a shift occurs in the relationship between high high water east and west of Fury and Hecla Strait each lunar period (Figure 17).

WEATHER (AIR OPERATIONS)

From April 24th to May 31st it was estimated that for 37% of the daylight hours landings could be made on unmarked sea ice, that for 63% of the daylight hours landings could be made on marked ice strips and that for 85% of the time an aircraft could land at the Igloolik air strip.

Temperature

Maximum + 3°C
Minimum - 15°C
Median - 4°C

Visibility

Less than 1 mile	- 5 days
Less than 3 miles	- 5 days
Less than 10 miles	- 8 days
Greater than 10 miles	- 27 days

Obstruction to Vision

Fog	- 4 days
Snow	- 4 days
Blowing snow	- 2 days
Rain	- 1 day

Wind

Calm	- 5 days
Less than 10 mph	- 25 days
Less than 30 mph	- 35 days
Maximum 25 mph	

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ANNEX I

SURVEY LOG

April	24	Departed Igloolik for Purfur Cove with six snowmobiles and komatiks, travelled 80 miles in 8½ hours, camped on smooth ice just west of Purfur Cove.
	25	Set up the tide gauge at the western tip of Purfur Cove in 6 m of water, set out 3 bench marks.
	26	Completed Station No. 1.
	27	Set up current meter at Station No. 1.
	28	Completed Station No. 2.
	29	Completed Station No. 3.
	30	Returned to Station No. 1, able to get a round of sights for position.
May	1	Completed Station No. 4.
	2	Completed Station No. 5.
	3	Levelled from bench marks to tide gauge.
	4	Completed Station No. 6.
	5	Completed Station No. 7.
	6	Took a 12-hour time series at Station No. 1
	7	Recovered current meter and tide gauge. 4 skidoos and komatiks arrived from Igloolik and we packed up camp and set out for the east end of the strait.
	8	Camped at Quilliam Bay due to blowing snow, arrived at Sorachuk Island (Bouverie Islands) at 1500.
	9	Searched for suitable tide gauge location.
	10	Set up tide gauge.
	11	Set up current meter at Station No. 8.

Annex I

May 12 Took hydrocast at Station No. 8.

13 Took a hydrocast in Gifford Fiord. Station No. 9.

14 Took a hydrocast at Station No. 10.

15 Took a hydrocast at Station No. 11.

16 Took a hydrocast in Richards Bay, Station No. 12.

17 Travelled to Station No. 8 to check current meter.

18 Travelled to Baffin Island and returned to base camp.

19 Unable to travel due to weather.

20 Travelled to Station No. 8 to check current meter.

21 Unable to travel due to weather.

22 Travelled to Labrador Narrows. Photographed open water and selected a site for time lapse photography.

23 Repaired and maintained gear.

24 Travelled to Adolf Jensen Sound.

25 Took hydrocast, Station No. 13.

26 Travelled inland on Baffin Island and returned to camp.

27 Repaired tents and cleaned up oceanographic gear.

28 Took a load of gear to Igloolik.

29 Two snowmobiles and komatiks over from Igloolik, returned with tide gauge.

30 Picked up current meter, sent it in to Igloolik.

31 Packed up camp and returned to Igloolik.

ANNEX II

Station No. 1
Latitude 69° 52.1'
Longitude 84° 11.5'
Date 26/04/75 GMT
Wind 90° @ 05 M.N. Pressure 1004.0 MB
Temperature, dry -4°C
WW Code 42. Cloud ST 10 @ 1000' Visibility 5 M.N.
Water depth 67M.
Ice thickness 210 CM. Freeboard 19 CM.
Snow cover 5 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1735	5	-1.71	28.828	- . -
1830	10	-1.74	29.204	- . -
1850	20	-1.73	29.784	- . -
1920	30	-1.71	30.904	- . -
1850	40	-1.71	27.901	- . -
1735	50	-1.66	30.944	- . -
1830	65	-1.65	30.833	- . -

Annex II

Station No. 2
Latitude 69° 57.4'
Longitude 84° 57.5'
Date 28/04/75 GMT
Wind 0°@ 0 M.N. Pressure 1019 MB.
Temperature, dry -1°C
WW Code 02 Cloud thin as ' Visibility 20 M.N.
Water depth 209 M
Ice thickness 215 CM. Freeboard 19 CM.
Snow cover 7 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1750	5	-1.71	28.852	11.8
1840	10	-1.72	29.526	10.7
1935	20	-1.72	31.608	10.2
2005	30	-1.71	30.812	10.4
2040	40	-1.71	27.952	10.1
2130	50	-1.67	31.803	10.1
2040	75	-1.64	28.440	9.5
2005	100	-1.63	31.772	9.3
1935	150	-1.63	30.066	8.9
1840	200	-1.62	32.068	8.9

Annex II

Station No. 3
Latitude 69° 54.8'
Longitude 85° 40.0'
Date 29/04/75 GMT
Wind 200 °@ 20 M.N. Pressure 1021.0 MB
Temperature, dry -1°C
WW Code 02 Cloud St. 10 E4000' Visibility 25 M.N.
Water depth 168 M.
Ice thickness 190 CM. Freeboard 19 CM.
Snow cover 10 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L	
2030	5	-1.71	30.218	10.2	
2120	10	-1.71	31.199	10.8	
2150	30	-1.70	31.497	10.6	
2235	50	-1.68	28.433	11.4?	
2150	75	-1.63	32.285	10.4	
2120	100	-1.61	28.244	9.8	
2030	165	-1.60	30.069	10.2	unstable

Annex II

Station No. 4

Latitude 69° 49.4'

Longitude 83° 09.0'

Date 01/05/75 GMT

Wind 90°@ 02 M.N. Pressure 1025.7 MB

Temperature, dry -°C

WW Code 41 Cloud Fog 10 Visibility 5 M.N.

Water Depth 81 M

Ice thickness 220 CM Freeboard 19 CM

Snow cover 4 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1900	5	-1.72	28.255	10.6
1945	10	-1.72	30.444	10.5
2012	20	-1.72	30.888	9.9
2045	30	-1.72	28.666	10.3
2045	40	-1.72	29.204	9.0 ?
-	50	-1.72	29.757	10.3
2012	65	-1.71	30.413	9.9
1945	80	-1.73	30.817	9.9

Annex II

Station No. 5

Latitude 69° 55.3'

Longitude 84° 14.5'

Date 02/05/75 GMT

Wind 0° @ 0 M.N. Pressure 1020.7 MB

Temperature, Dry -4°C

WW Code 44 Cloud Fog 10/10 Visibility ¼ M.N.

Water Depth 117 M.

Ice Thickness 209 CM Freeboard 20 CM

Snow cover 5 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1735	5	-1.74	30.003	10.9
1820	10	-1.73	29.331	10.8
1846	20	-1.73	29.895	11.3 ?
1930	30	-1.73	28.870	10.7
2000	40	-1.72	29.887	11.3 ?
1930	50	-1.71	30.409	10.6
1846	75	-1.65	28.593	10.2
1820	110	-1.64	30.949	10.1

Annex II

Station No. 6
Latitude 59° 56.6'
Longitude 84° 12.5'
Date 04/05/75 GMT
Wind 270° @ 02 M.N. Pressure - MB
Temperature, Dry -7°C
WW Code 02 Cloud AS 10/10 Visibility 25 M.N.
Water Depth 78 M.
Ice Thickness 200 CM Freeboard 12 CM
Snow cover 20 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1750	5	-1.74	30.101	10.6
1829	10	-1.73	28.217	11.0
2008	20	-1.72	29.801	11.1
1952	30	-1.72	28.465	10.8
2008	40	-1.69	29.624	.
1829	50	-1.68	28.316	.
1750	75	-1.66	28.817	.

Annex II

Station No. 7
Latitude 69° 50.9'
Longitude 83° 03.0'
Date 05/05/75 GMT
Wind 270° @ 03 M.N. Pressure 1001.7 MB
Temperature, Dry -10°C
WW Code 02 Cloud AS 2/10 Visibility 25 M.N.
Water Depth 98 M.
Ice Thickness 207 CM. Freeboard 21 CM
Snow cover 3 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1500	5	-1.72	30.476	10.9
1540	10	-1.72	29.240	10.7
1625	20	-1.73	29.134	10.6
1702	30	-1.72	29.997	10.4
1702	40	-1.69	29.338	10.4
1625	50	-1.68	20.494	10.3
1540	75	-1.64	30.432	10.4
1500	95	-1.64	29.714	10.0

Annex II

Station No. 1
Latitude 69° 52.1'
Longitude 84° 11.5'
Date 07/05/75 GMT
Wind 0° @ 0 M.N. Pressure 1011.2 MB
Temperature, Dry -10°C
WW Code 02 Cloud Nil Visibility M.N.
Water Depth 67M
Ice Thickness 210CM Freeboard 19CM
Snow cover 3 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
0128	5	-1.74	29.011	10.1
0100	10	-1.73	28.499	10.2
0230	20	-1.73	30.436	10.1
0230	40	-1.66	31.359	- . -
0200	50	-1.65	30.425	9.4
0128	65	-1.64	29.146	9.4

Annex II

Station No. 1 (Time Series)
Latitude 69° 52.1'
Longitude 84° 11.5'
Date 06/05/75 GMT
Wind 0° @ 0 M.N. Pressure 1011.2 MB
Temperature, Dry -10°C
WW Code 02 Cloud Nil Visibility 25 M.N.
Water Depth 67 M
Ice Thickness 210 CM Freeboard 19 CM
Snow cover 3 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1600	10	-1.73	28.941	11.2
1600	50	-1.65	28.581	10.4
1700	10	-1.73	28.756	11.3
1700	50	-1.66	31.226	10.4
1800	10	-1.73	28.770	11.1
1800	50	-1.65	30.809	10.1
1900	10	-1.73	28.574	11.5
1900	50	-1.65	27.788	9.5
2000	10	-1.73	28.872	11.1
2000	50	-1.65	30.015	10.2
2100	10	-1.73	28.996	11.3
2100	50	-1.66	28.776	- . -
2200	10	-1.73	28.709	10.2
2200	50	-1.66	30.241	9.8
2300	10	-1.73	27.994	10.1
2300	50	-1.66	29.596	9.7
2400	10	-1.73	29.737	10.1
2400	50	-1.67	28.594	9.6
2500	10	-1.73	28.499	10.2
2500	50	-1.66	28.495	9.7
2600	10	-1.73	28.564	10.2
2600	50	-1.65	30.425	9.4
2700	10	-1.73	31.697	.
2700	50	-1.66	31.914	.

Annex II

Station No. 8
Latitude 69° 42.6'
Longitude 82° 04.0'
Date 12/05/75 GMT
Wind 330° @ 04M.N. Pressure 992.6 MB
Temperature, Dry -8°C
WW Code 02 Cloud St 2/10 E5000' Visibility 25 M.N.
Water Depth 75 M
Ice Thickness 170 CM Freeboard 16 CM
Snow cover 5 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1615	5	-1.74	30.405	10.6
1700	10	-1.73	30.647	10.4
1735	20	-1.72	31.179	10.5
1735	30	-1.73	29.622	10.5
1700	50	-1.73	30.616	10.4
1615	70	-1.73	30.663	10.3

Station No. 9
Latitude 70° 06.1'
Longitude 82° 05.0'
Date 13/05/75 GMT
Wind 0° @ 0 M.N. Pressure 990.2 MB
Temperature, Dry -8°C
WW Code 85 Cloud - Visibility 5 M.N.
Water Depth 23 M
Ice Thickness 210 CM Freeboard 23 CM
Snow cover 15 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
2000	5	-1.76	30.426	10.5
2030	10	-1.76	30.890	10.1
2030	15	-1.76	31.948	10.0
2000	20	-1.76	31.701	9.8

Annex II

Station No. 10
Latitude 69° 41.0'
Longitude 81° 36.0'
Date 14/05/75 GMT
Wind 310° @ 10 M.N. Pressure 990.9 MB
Temperature, Dry -9°C
WW Code — Cloud AC 3/10 AS 3/10 Visibility 20 M.N.
Water Depth 96 M
Ice Thickness 180 CM Freeboard 18 CM
Snow cover 6 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1800	5	-1.74	30.498	10.6
1845	10	-1.74	30.013	10.3
1920	20	-1.74	29.585	10.5
1950	30	-1.73	31.237	10.4
1950	40	-1.73	30.574	10.4
1920	50	-1.74	30.205	10.5
1845	75	-1.76	31.408	10.5
1800	95	-1.77	31.996	10.4

Annex II

Station No. 11
Latitude 69° 32.0'
Longitude 81° 21.0'
Date 15/05/76 GMT
Wind 0° @ 0 M.N. Pressure 991.9 MB
Temperature, Dry °C
WW Code 76 Cloud SC 10/10, 1000' Visibility - M.N.
Water Depth 77 M
Ice Thickness 160 CM Freeboard 14 CM
Snow cover 8 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1945	5	-1.75	30.463	10.1
2020	10	-1.75	30.737	10.2
2050	20	-1.74	30.827	10.2
2120	30	-1.74	31.070	10.4
2050	40	-1.74	31.118	10.3
2020	50	-1.74	31.049	10.3
1945	74	-1.76	30.994	10.0

Annex II

Station No. 12
Latitude 69° 38.1'
Longitude 82° 30.0'
Date 16/05/75 GMT
Wind 300° @ 05 M.N. Pressure 993.6 MB
Temperature, Dry -6°C
WW Code 73 Cloud ST 10/10 S- Visibility 2 M.N.
Water Depth 20 M
Ice Thickness 201 CM Freeboard 15 CM
Snow cover 15 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1715	5	-1.76	30.863	10.5
1800	10	-1.76	31.205	10.3
1800	15	-1.75	31.069	10.1
1715	20	-1.74	31.060	9.9

Annex II

Station No. 13
Latitude 69° 51.0'
Longitude 81° 27.5'
Date 25/05/75 GMT
Wind 0° @ 0 M.N. Pressure 1012.9 MB
Temperature, Dry -1°C
WW Code 41 Cloud SC 10/10 2000' Visibility 15 M.N.
Water Depth 130 M
Ice Thickness - CM Freeboard - CM
Snow cover 18 CM

Time GMT	Depth Metres	Temperature °C	Salinity °/oo	Oxygen ML/L
1725	5	-1.75	32.106	10.4
1830	10	-1.76	32.073	10.4
1802	20	-1.75	32.084	10.2
1900	30	-1.75	32.117	10.1
1930	40	-1.74	32.177	10.1
1900	50	-1.74	32.323	10.0
1830	75	-1.75	32.855	10.1
1802	100	-1.76	33.073	10.2
1725	125	-1.77	33.135	10.1

ANNEX III

WEATHER AT 1200 GMT

April	26	X 1/8 S -3 09 @ 03 S 10
	27	E 10 ⊕ 5 1F -4 27 @ 06 ST9SC1
	28	E 50 ⊕ 10 -1 30 @ 02 ST 10
	29	E 30 ⊕ 25 -1 18 @ 25 ST 10
	30	E 10 ⓪ 25 -4 27 @ 20 SC1
May	1	X 1/4F -4 27@02 F10
	2	X 1/4F -4 27@02 F10
	3	E 10 ⊕ 5 -S∝F -4 27@04 ST10
	4	0 25 -11 27@06
	5	0 25 -8 00@00
	6	025 -15 27@04
	7	E10⊕10 -6 09@06 ST10
	8	E5⊕3 S -1 09@10 ST10
	9	E30 ⊕ 20 -3 36@05 ST10
	10	025 -12 36@05
	11	025 -12 33@04
	12	050 ⓪25 -10 30@04 SC8
	13	E80 ⓪25 -13 33@10 AS8
	14	0 10-BS -8 30@10
	15	0 25 -11 30@02
	16	E 30 ⊕ 10 -S -10 30@04 ST10
	17	E 20 ⊕ 15 -11 30 @ 10 ST 10
	18	X 1/2 S -7 09@05 suns disk visible
	19	X 1/2 BS -3 12@15
	20	E 20 ⊕ 10 -S -4 00@00 SC10
	21	E 15 ⓪ 20 ⓪ 20 -8 09@15 ST 2 SC2
	22	E 20 ⓪ 25 -3 00@00 SC2
	23	E 30 ⊕ 25 -3 27@05 ST10
	24	0 25 -10 00@00
	25	E 20 ⊕ 20 -1 18@10 ST10
	26	E 30 ⓪ 70 ⓪ 25 +1 09@97 SC3 AS6
	27	E 15 ⓪ 20 ⓪ 25 -4 00@00 AC <1 AS < 1
	28	E 15 ⓪ 25 -1 09@02 AC < 1
	29	E 30 ⓪ 25 +1 30@02 SC8
	30	E 40 ⓪ 25 +3 09@02 SC 7
	31	⊕ -R

ANNEX IV

LOGISTICS

Instruments and camp gear were shipped air freight from Montreal to Igloolik, food and fuel were purchased at Igloolik.

Mr. Louis Illupalik was hired as a full time assistant and his snowmobile leased for field transportation. Up to six other men and snowmobiles were hired for periods of one or two days to move equipment and fuel to the base camps.

The cost of the survey breaks down as follows:

Air fare. Ottawa to Igloolik and return	$ 500.00
Air freight. Montreal to Igloolik and return at $0.68 per pound	2720.00
Field assistant at $5.00 per hour plus snowmobile at $2.00 per day plus $2.80 per hour	2822.00
Drivers and snowmobiles	974.00
Fuel at $0.85 per gallon	115.00
Total (1975 prices)	$ 7433.00

It is interesting to note that 37% of the cost is in transport to Igloolik, transport from Igloolik to the base camps was the same cost as STOL aircraft, if one were available in Igloolik, however, both camp moves were made in weather in which flying would not have been possible.

A total of 1500 miles of the survey was covered using a single Bombardier 14 HP Elan Skidoo and komatik. This machine was quite adequate for hauling sled loads which did not exceed 700 pounds (318 kg) at speeds of 9 mph (14.5 km/h) since 14 HP is more than can be transmitted through the track at this speed.

The only mechanical failures were six suspension springs, which were anticipated, and one front ski spring, which was not. Fuel consumption was 9.6 m/g (3.4 km/l)

Komatik sleds are in short supply and of doubtful quality. It would be advisable to bring material to the field for their construction.

Kerosene was not available in Igloolik and naptha was in short supply.

Figure 1 *Local transport used to move from Igloolik to Purfur Cove.*

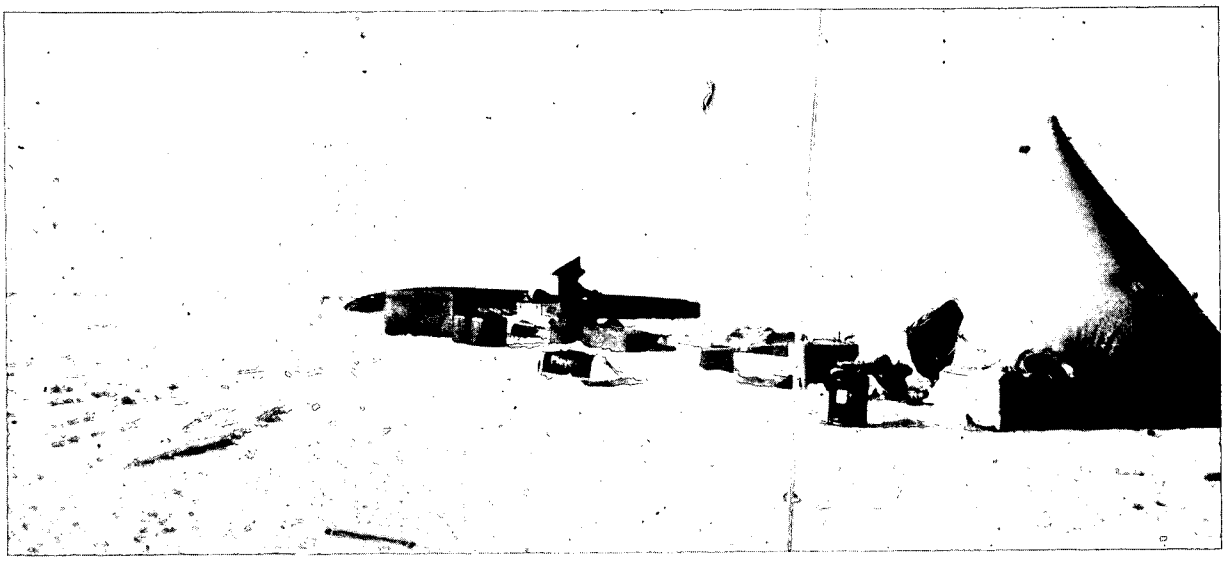

Figure 2 *Base camp, Purfur Cove.*

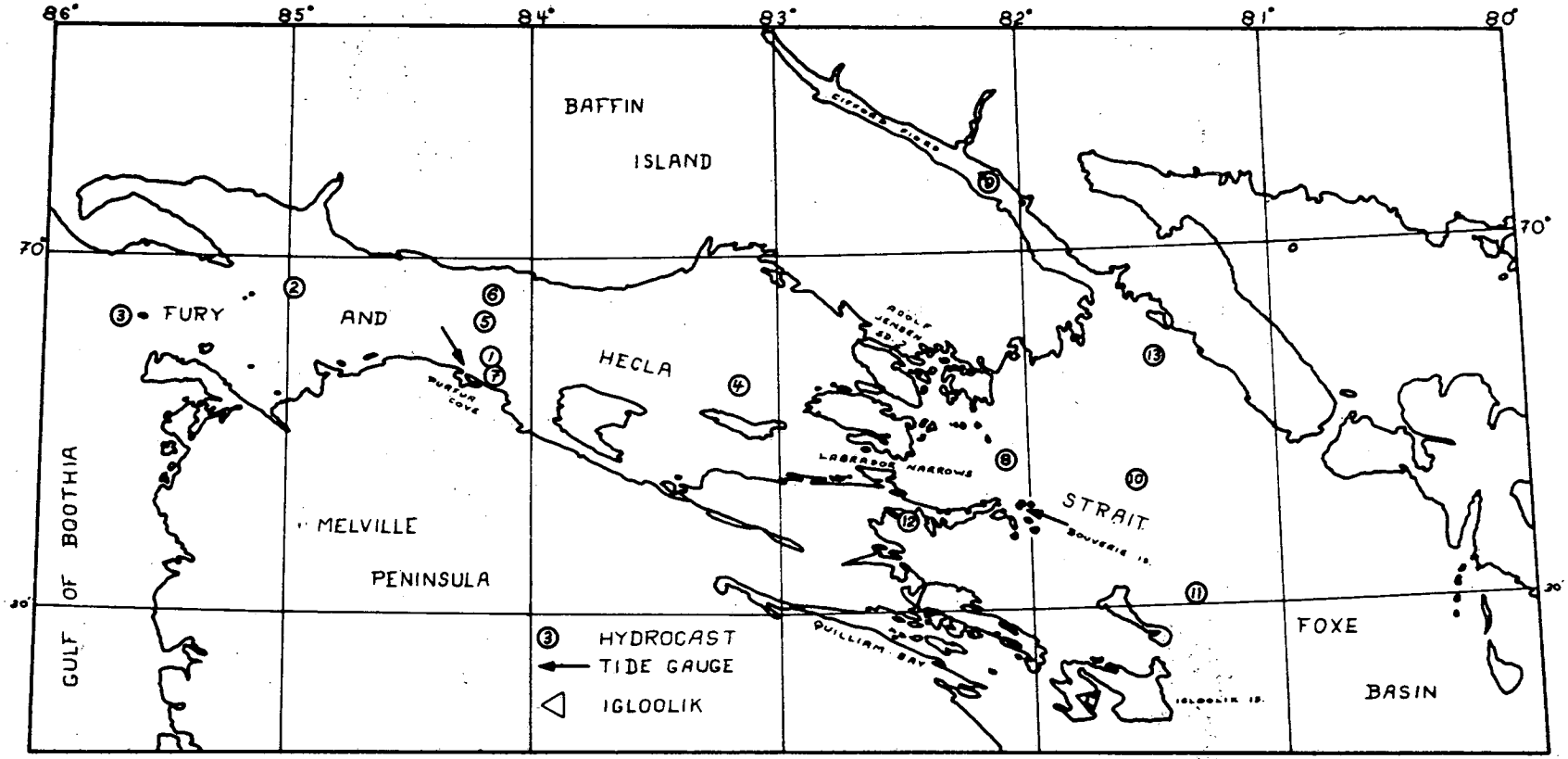

Fig. 3 Map of Fury and Hecla Strait showing location of Tide Gauges and Hydrographic Stations.

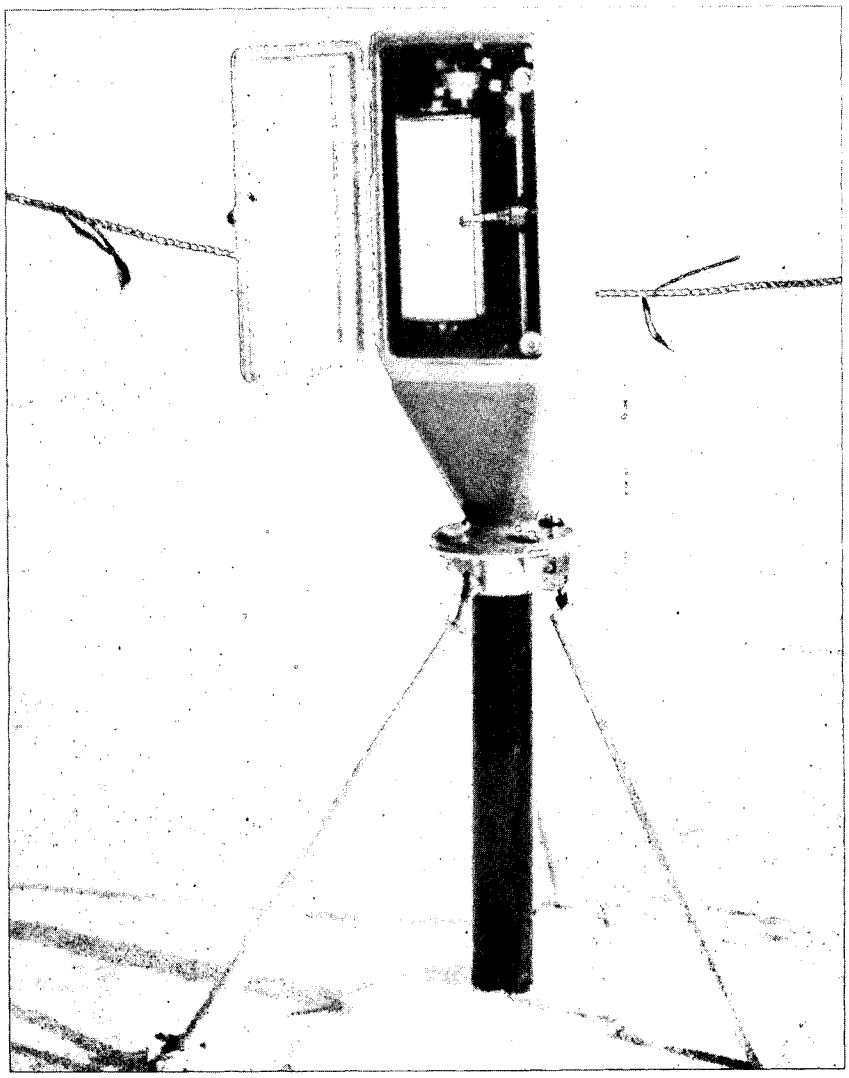

Figure 4 Tide gauge set up.

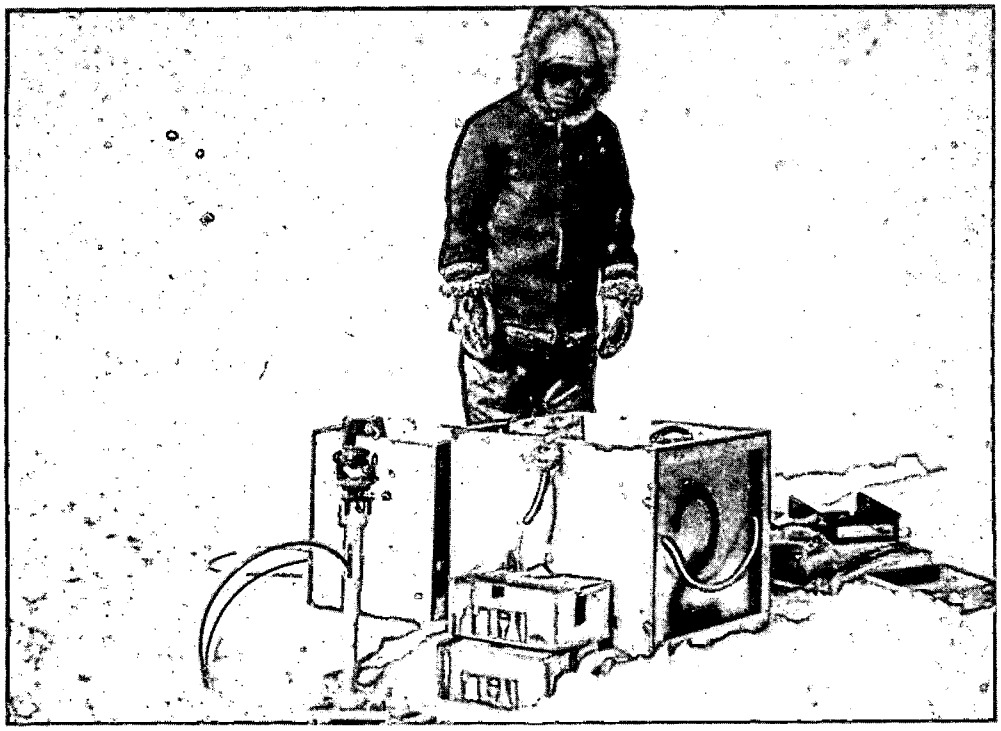

Figure 5 *Current meter probe with sun compass for azimuth setting.*

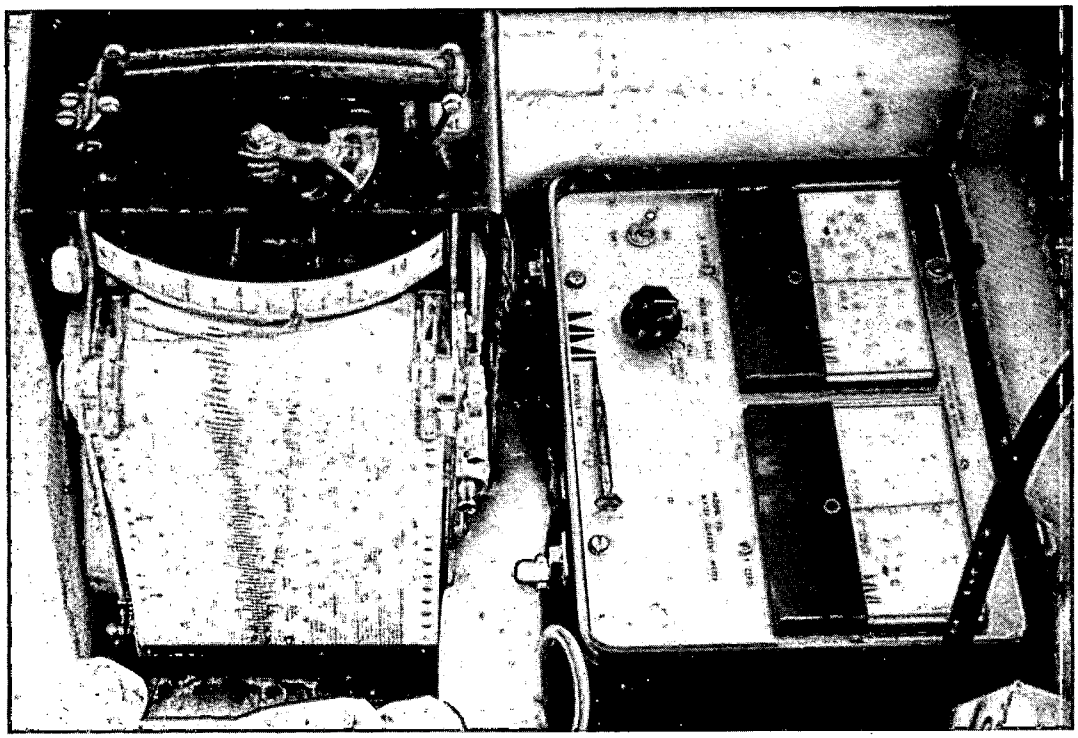

Figure 6 *Current meter recording system.*

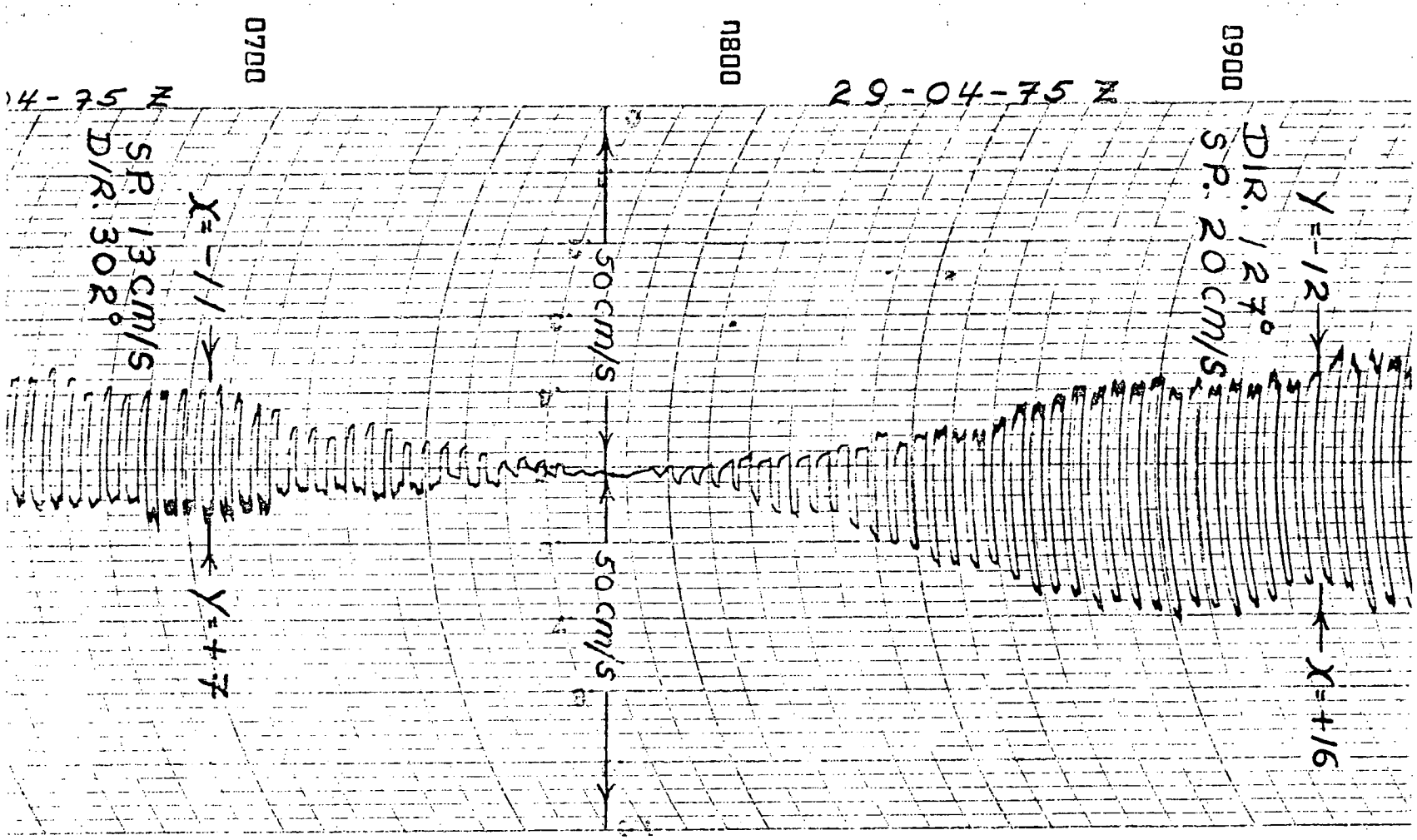

Figure 7 Sample current meter record.

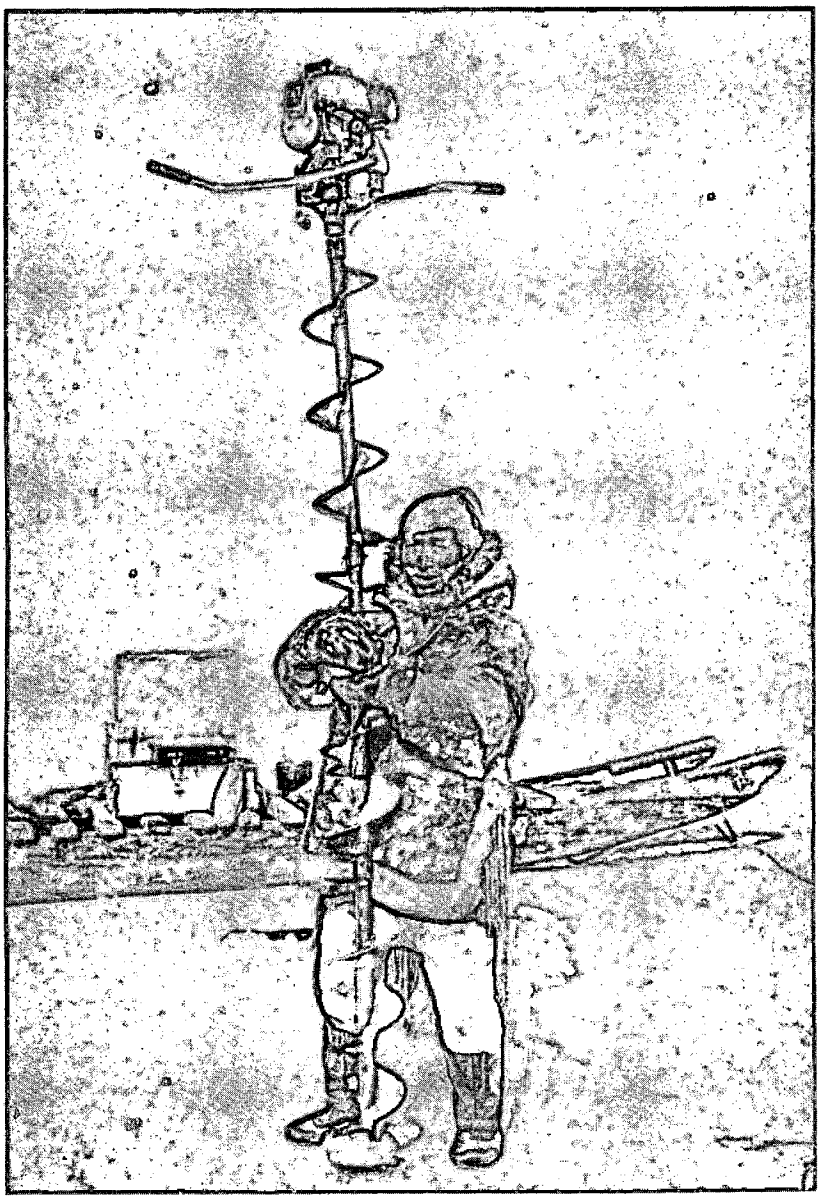

Figure 8 Gasoline driven power auger.

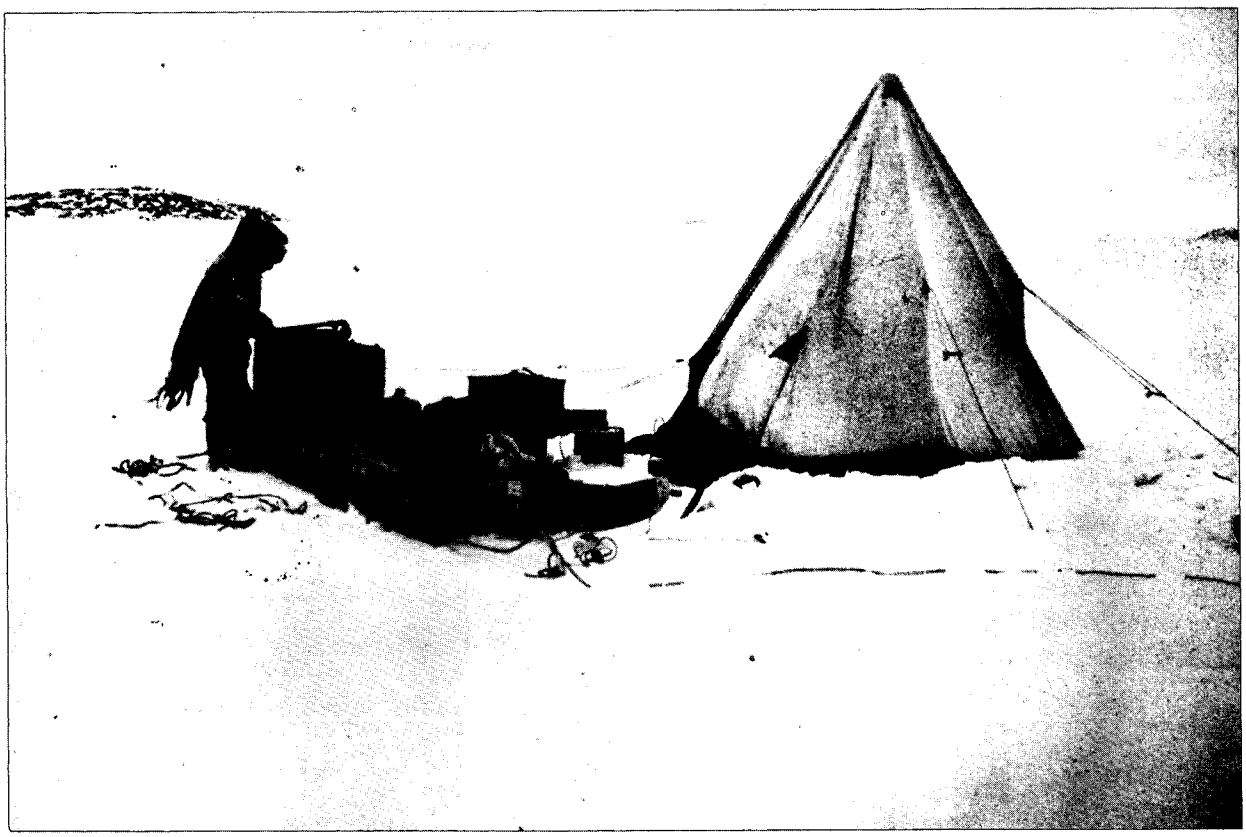

Figure 9 *Hydrographic tent.*

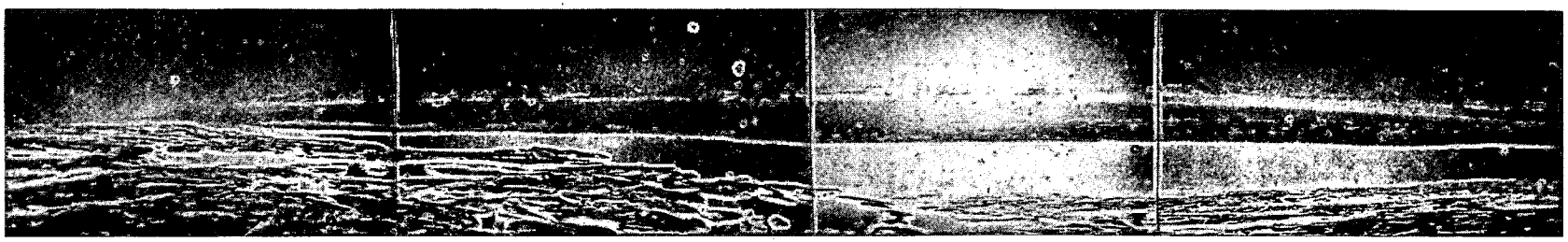

Figure 10 Labrador Narrows.

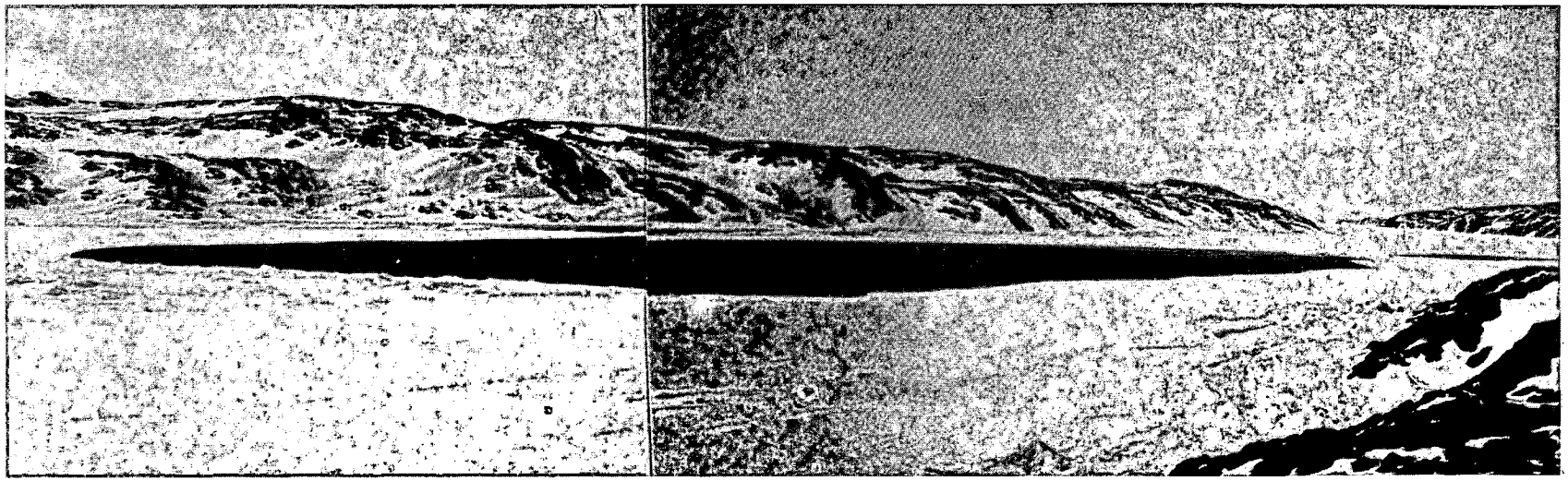

Figure 11 Adolf Jensen Sound.

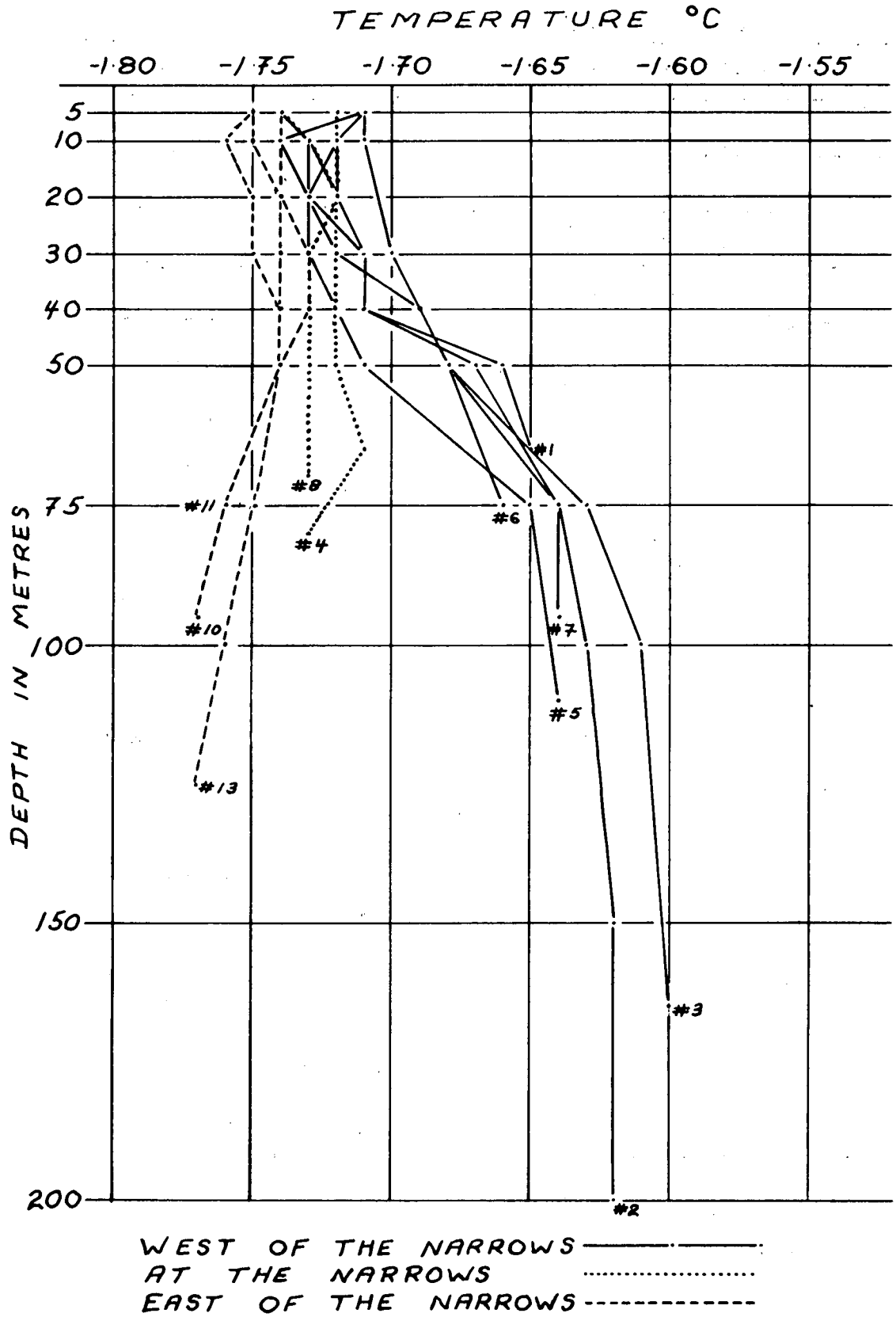

Fig. 12 Temperature Depth Plot

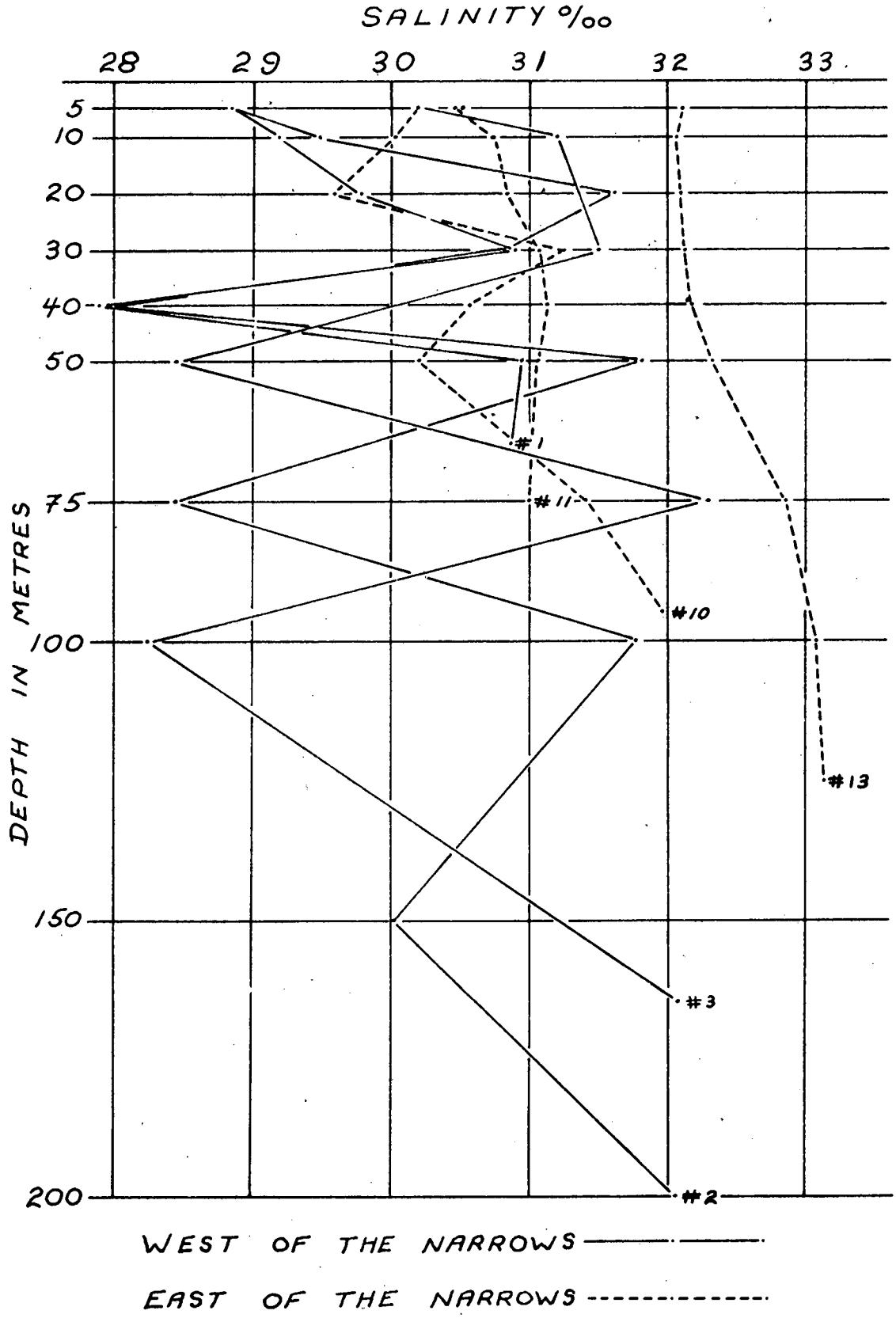

Fig. 13 Salinity Depth Plot

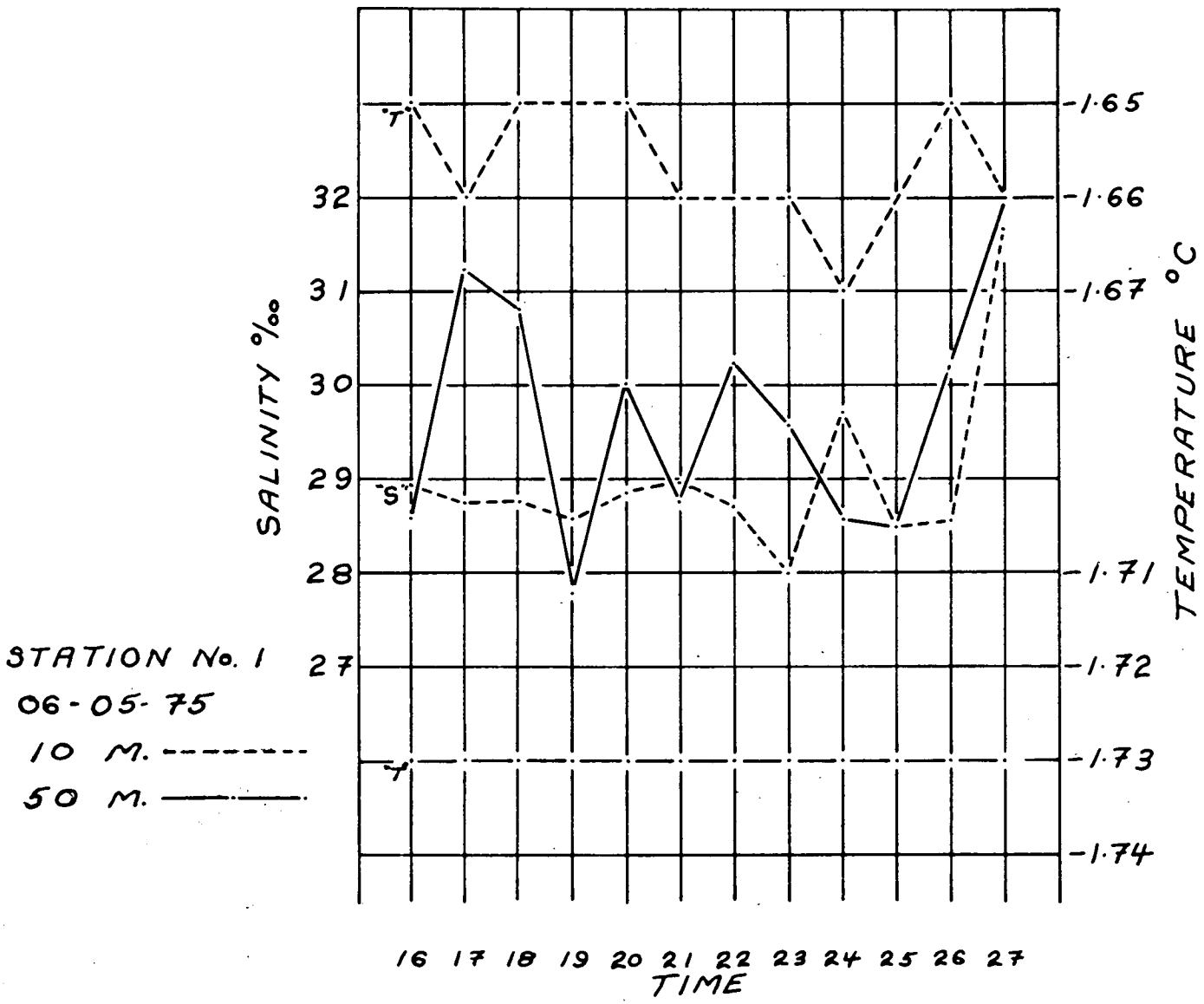

Fig. 14 Time Series at Station No. 1

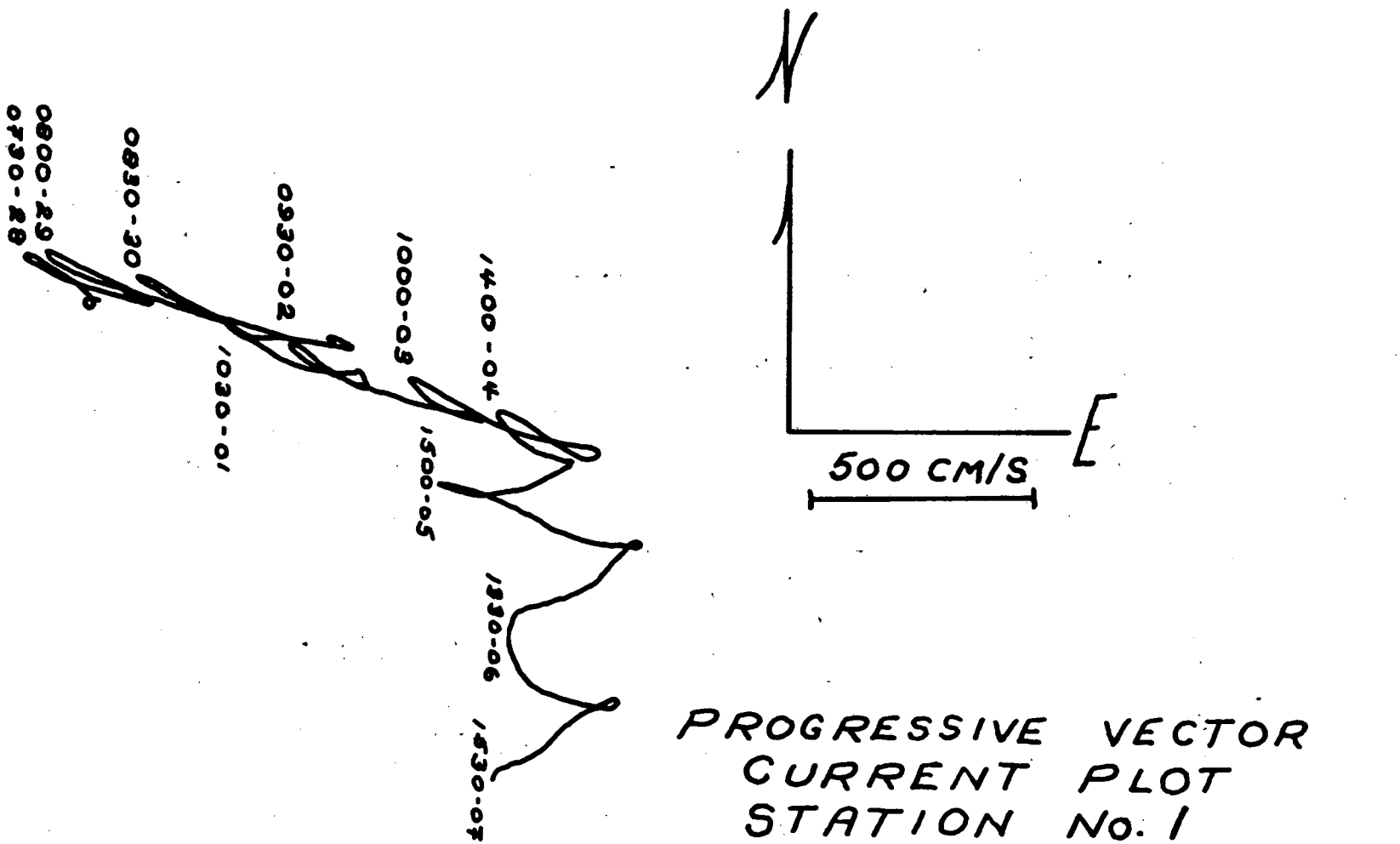

Fig. 15 Progressive Vector, Current Plot Station No. 1

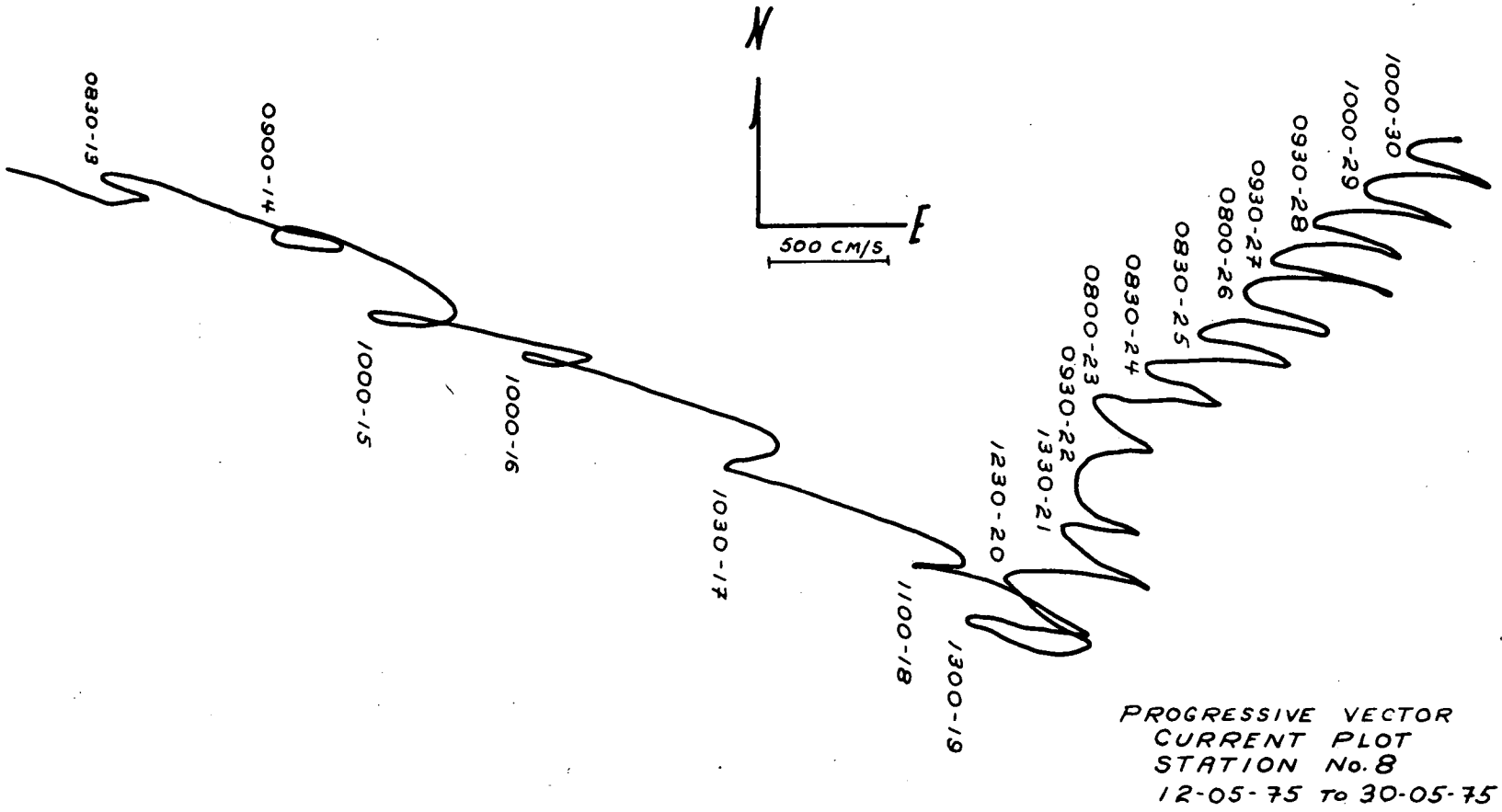

Fig. 16 Progressive Vector, Current Plot Station No. 8

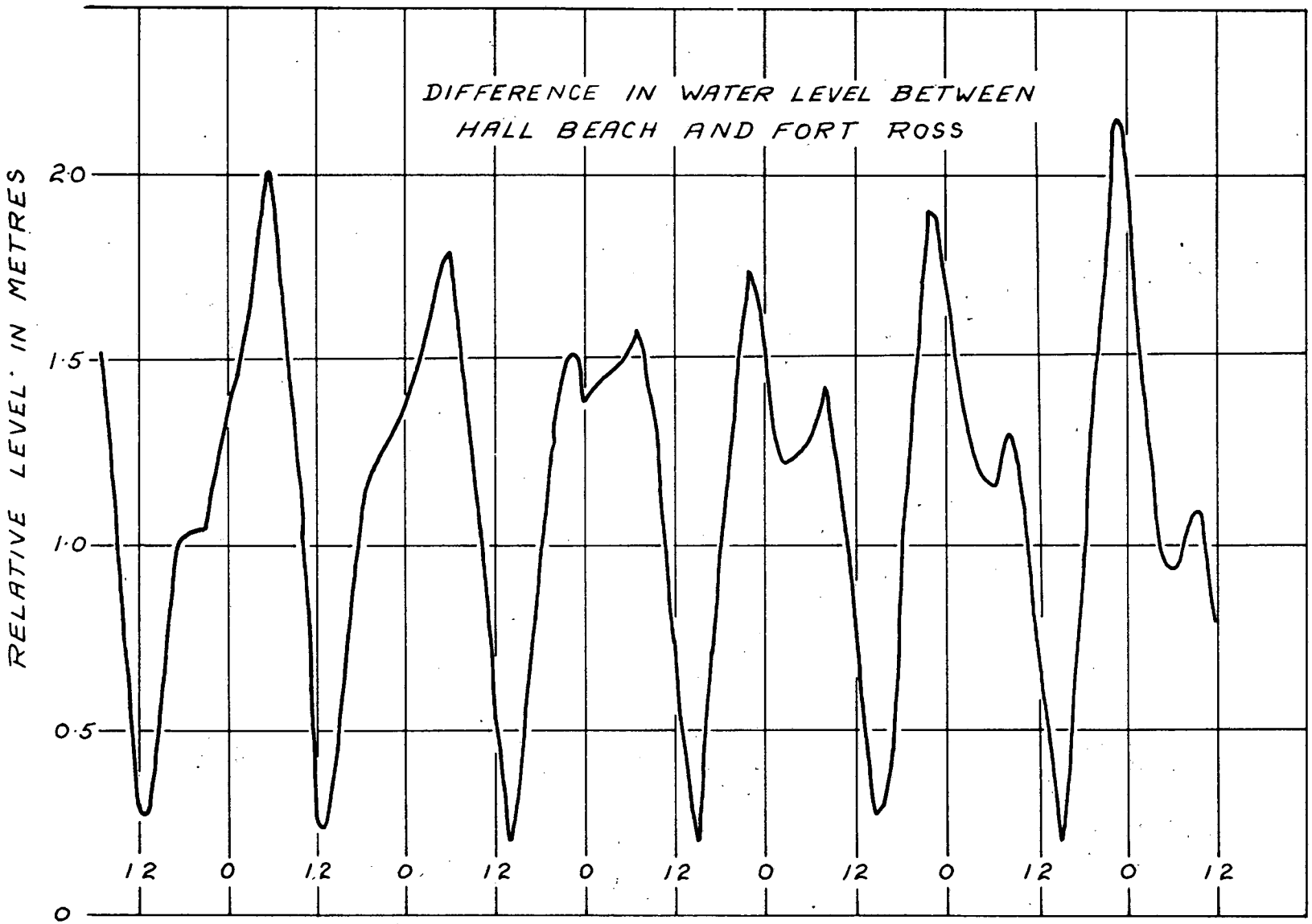

Fig. 17 Water Level Difference Between East and West End of Fury and Hecla Strait.

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A total of 27 days of current and tide data and the results of 13 oceanographic stations obtained in Fury and Hecla Strait and its approaches are presented and an attempt made to explain some of the observed characteristics of these waters.

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