GEOLOGICAL AND CRUISE REPORT ON THE BOTTOM SAMPLING PROGRAM AND OPERATION OF CSL TUDLIK ON THE CSS BAFFIN HYDROGRAPHIC CRUISE 84-015 JONES SOUND, DISTRICT OF FRANKLIN, N.W.T., CANADA AUGUST-SEPTEMBER 1984

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Ruffman, Alan. 1985. Geological and cruise report on the bottom sampling program and operation of CSL TUDLIK on the CSS BAFFIN hydrographic cruise 84-015, Jones Sound, District of Franklin, N.W.T., Canada, August-September 1984. Geomarine Associates Ltd., Halifax, Nova Scotia, Project 84-60, Report to the Atlantic Geoscience Centre, Geological Survey of Canada, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, 181 pp. plus 4 Enclosures, Universal Transverse Mercator Projection, Zone 16 or 17, Scale 1: 150,000.

INTRODUCTION AND PREVIOUS WORK

Jones Sound lies between Ellesmere and Devon Islands at latitude 76°N on the western side of Northern Baffin Bay (Figure 1). The Arctic Pilot Project proposed a tanker route into the gas deposits of the Sverdrup Basin in the Arctic Islands via Jones Sound and Fram Sound to the west. This proposal prompted the Canadian Hydrographic Service (Canada Department of Fisheries and Oceans) to initiate a two-year multidisciplinary study of the bathymetry, geology and geophysics of Jones Sound in 1983.

In 1983 CSS BAFFIN entered Jones Sound from August 2 to September 29 to conduct hydrographic surveys. The Atlantic Geoscience Centre of Bedford Institute of Oceanography participated on the 1983 cruise (BAFFIN 83-008) and in adverse ice conditions, collected underway geophysical data from BAFFIN (gravity magnetics, 3.5 kHz and 12 kHz hull-mounted profiler, as well as some seismic profiles using a 3000 or 5000 joule EG&G sparker source or a Huntec high resolution, deep-towed, boomer system). Thirty-three grab samples and three gravity cores were also obtained from BAFFIN. Seventeen Ponar grab samples were obtained from the hydrographic launch FRIGATE during the 1983 coastal surveys (Taylor and Frobel, 1984). Some support for the BAFFIN 83-008 cruise was given by HUDSON on cruise 83-023 when she entered Jones Sound in September 1983 and obtained two piston cores. Some geophysics data existed from two previous Atlantic Geoscience cruises (HUDSON 71-032 and HUDSON 77-024).

MacLean et al. (1984) reported on the 1983 surveys, giving an index map of their coverage (Figure 2), a map of the distribution of the unconsolidated surficial sediments (Figure 12), a map of the interpreted offshore bedrock geology (Figure 13) and two sub-bottom profiles (Figures 14 and 15) and a table of sample locations (Table 2 revised from MacLean et al. (1984)).

In 1983 the Canadian Hydrographic Service (CHS) obtained 7046 line-km of 30 kHz sounding data in the westernmost central part of Jones Sound and in the easternmost area (Figure 3). BAFFIN was used as a mother ship and put out high-speed hydrographic launches each morning. BAFFIN and the launches ran lines spaced at 1 km in the deep water and 0.5 km in the nearshore regions of less than 200 m depth wherever they could reach them. Coverage in 1983 was generally restricted by ice to the deeper parts of the basin and coverage seldom extended into shore except south and west of Coburg Island where some shoals

were also surveyed; three fjords in the north were also surveyed by point-to-point methods (Figure 3). The Canadian Hydrographic Service recorded their 1983 data on 30 kHz hull-mounted ELAC echosounders either on BAFFIN or on the launches. The 1983 CHS data are found on 1983 preliminary Field Sheets 9019 (UTM zone 16, CM 87°W) to the west and 9018 (UTM zone 17, CM 81°W) to the east at 1:150,000.

In the second year of the Jones Sound survey the Atlantic Geoscience Centre decided to not attempt a full multidisciplinary geophysical survey on the CHS cruise given the problems encountered with ice, logistics and ship time in 1983. Instead, it was decided to equip the Canadian Survey Launch (CSL) TUDLIK for shallower water, nearshore work and to put its operation under a contracted chief geoscientist for the 1984 season. Geomarine Associates Ltd. was the successful contractor and Mr. Alan Ruffman of Geomarine served on BAFFIN as the geoscientist from August 23, 1984 (departure from Halifax) to September 27, 1984 (return to Halifax).

STATEMENT OF WORK AND DELIVERABLES

a) Statement of Work

The purpose of the 1984 contract was to carry out a marine geological program in Jones Sound in conjunction with Canadian Hydrographic Service survey program on CSS BAFFIN cruise 84-015. The prime areas to be investigated were those on the shelf and slope around the margins of Jones Sound shoreward of the areas mapped in 1983 in BAFFIN 83-008 (Figure 2). It was desired to establish continuity with the previously-mapped offshore areas, wherever possible. The geological work was mainly to be done from one of BAFFIN's launches, TUDLIK, plus possibly some work from BAFFIN on an opportunity basis. Areas of operation largely were to be governed by the progress of the hydrographic program and ice conditions. The work was to include the following:

1. co-ordination and planning of the field program on a day to day basis with the cruise Hydrographer-In-Charge (Mr. Victor Gaudet) and his chief assistant (Mr. Julian Goodyear);

2. determination of desireable profile and sample localities to meet objectives of delineating principal sediment types and their distribution primarily in the shallow shelf and adjacent slope areas, and relevant other parameters e.g., iceberg scour occurrence, slumps, etc.; subject to logistical constraints imposed by the hydrographic program, ice, etc.;
3. operation and watchkeeping on an echosounder for geological data and sidescan from a launch, and on an opportunity basis from BAFFIN;
4. collection of seafloor sediment samples from the launch and from BAFFIN; making visual assessment of the material; taking subsamples; and recording relevant data;
5. interpretation of the data obtained from the echosounder and the sidescan sonar and from visual examination of the sediment samples, and the compilation of the interpreted geology on maps;
6. preparation and maintenance of day/time plots of the BAFFIN and launch TUDLIK tracks along which acoustic data are collected, water depths, and sample station locations, etc., and listings of these positions;
7. annotation of echosounder, sidescan, and sample data in prescribed manner, and their safe curation and;
8. preparation of geological and cruise reports.

b. Results and Deliverables

1. all echosounder records obtained for geological purposes, sidescan sonar records and sediment samples - all properly annotated as to day/time (GMT), station number, etc.;
2. log books;
3. plots on navigational chart or larger scale of the launch and ship tracks where data were collected (half-hourly minimum fixing and at major course alterations);
4. list of day/time (GMT) positions by latitude and longitude and water depths for each along geological survey tracks;
5. plot of sample station locations and annotated station data sheets;
6. compilation on chart scale of interpreted seabed sediment type, e.g. gravel, sand, silt, clay, till or diamicton, sediment boundaries where these can be established, and relevant seabed data, e.g. iceberg scours, slumps, etc.;

7. submission of brief weekly report on progress through Hydrographer-In-Charge;
8. geological and cruise reports to be submitted to AGC within 21 days following termination of the field work in a form suitable for open file or other release and;
9. all data and records acquired are the property of AGC.

The Scientific Authority for the TUDLIK contract on CSS BAFFIN's cruise 84-015 was Mr. Brian MacLean of the Atlantic Geoscience Centre of the Bedford Institute of Oceanography with Dr. Gus Vilks as his alternate in his absence. It was hoped by all concerned that the geological program from CSL TUDLIK and CSS BAFFIN could continue throughout the BAFFIN hydrographic program and as long as the mothership BAFFIN reamined in Jones Sound.

EQUIPMENT

CSS BAFFIN was equipped with a hull-mounted 12 kHz transducer with a Raytheon PTR transceiver and a Raytheon LSR dry paper recorder located in the instrument room of the uppermost plotting level. The CHS 30 kHz ELAC LAZ 72 echosounder transducer was similarly hull-mounted on BAFFIN and recorded in the instrument room. Both systems could be jointly slaved to receive and mark manually-initialed fix marks; fixes were manually initiated by the CHS watchkeeper and recorded in Miniranger ranges or Hi Fix readings both on the printer and manually in the watchkeeper's log book.

BAFFIN also had a fully-equipped hydrographic winch room with a large and a medium-sized Van Veen grab sampler available and a 2.4 m Benthos gravity corer (with five weights - 100 kg). The large Van Veen grab sampler was always used. The Benthos corer could just be used with the 2.4 m barrel by a coordinated use of a rope block and tackle to haul the finned head and weight stand inboard then lifting the core cutter end up and around through the opening in the ship's wall. To remove or replace the core liner, one had to extend it through an open door along the deck. (The short 1.8 m core barrel was never found onboard).

BAFFIN was also equipped with five hydrographic survey launches and the utility launch, CSL* TUDLIK. Her specification were as follows:

Date of Construction:	1962, Atlantic Bridge Co. Ltd., Lunenburg, Nova Scotia
Length:	11.3 m
Beam:	3.5 m
Draft:	1.1 m
"Depth" (Deck to keel):	1.8 m
Weight (in air):	circa 9100 kg
Engines:	dual Isuzu diesel
Cooling:	salt water-cooled, dual wet exhaust
Props:	twin screws
Horsepower:	125 HP
Hull:	fiberglass
Deck-mounted Winch and Davit:	hydraulic, 400 m of oceanographic wire
Radios:	VHF and single sideband
Radar:	Raytheon, 24 n mi
Compass:	magnetic

The Atlantic Geoscience Centre had placed aboard BAFFIN in July 1984 in St. John's, Nfld. the following equipment for use on TUDLIK:

a) EG&G small boat sidescan sonar fish and 50 m of cable with EG&G combined transceiver and wet paper recorder;

b) Raytheon RTT, 1000 dual 7.0/200 kHz profiler, transducer staff, modified Raytheon PTR and modified Raytheon DE 719 dry paper recorder with the 4 scales:

1. 0-55 ft or 0-16 m; plus x 2 switch-selectable option
2. 50-105 ft or 15-31 m; plus x 2 switch-selectable option
3. 100-155 ft or 30-46 m; plus x 2 switch-selectable option
4. 150-205 ft or 45-61 m; plus x 2 switch-selectable option

The 200 kHz frequency could be blanked out (and on this survey ceased to function);

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* Canadian Survey Launch

c) Hull-mounted ELAC LAZ 72, 30 kHz echosounder transducer (on the starboard side) with a standard CHS-employed ELAC dry paper recorder;

d) Hull-mounted ELAC 12 (?) kHz profiler transducer (in special fiberglass case) mounted on the port side (which would also record on the same ELAC dry paper recorder);

e) A CHS-provided Robertson SKR 82, 24 volt DC, gyro-compass was later requisitioned for use on TUDLIK's geological program. It had earlier been used on the CHS sweep program August 21 and 22, 1983 off Grise Fjord and had been removed to storage on BAFFIN for safekeeping by the ship's technicians.

CSS BAFFIN was equipped with two shore-based navigation systems. A Decca Hi Fix 6 system with a master and two slave stations was put out about August 14-18, 1984 at the start of the program to service the western part of Jones Sound. The Master station was placed on Cape Svarten with Slave 2 on Cape Sparbo and Slave 1 on Cape Hawse.

The Hi Fix system operated with minor interruptions for icing up and weather from August 19, 1984 (Day 232) to September 3, 1984 (Day 247). On September 3, 1984 Slave 2 went off the air just after the join had been completed with the earlier CHS hydrographic surveys of Fram Sound. The CHS Hydrographer-in-Charge decided the Hi Fix system would be demobilized and no further work done in the western and southwestern part of Jones Sound in 1984.

The second shore-based system was then put out to serve through to September 21, 1984 (Day 265). The Raytheon Miniranger RPS system then served for all the work in the eastern part of Jones Sound in 1984. It was an older version of Miniranger and it was hand-pressed to handle 5 to 6 mobiles at one time and seemed to function best with only 4.

The launch TUDLIK was not initially provided with a navigation system other than the vessel's own radar. Initially the spare Hi Fix receiver was authorized for TUDLIK use and fitted August 31 - September 1, 1984 for use once the Marine Ecology Laboratory program was completed. It was never used in that the Hi-Fix system was demobilized September 3, 1984 (Day 247).

On September 5, 1985 (Day 249), BIO authorized the release of a Miniranger system to TUDLIK and that on FLAMINGO was removed. This was then installed Sept. 6-7, 1984 (Days 250-251). It remained on TUDLIK till the end of TUDLIK's work Sept. 21, 1984 (Day 265) and served as an emergency back up to TUDLIK's radar.

TUDLIK used the Miniranger system on Sept. 9, 1984 (Day 253) in its abortive try to reach Brae Bay to work. It also used the Miniranger system on September 16, 1984 (Day 260) whenever the shore stations were in sight during the traverse along the south coast from Eastern Glacier to the east toward Belcher Point.

By that time it was realized that the TUDLIK use of the Miniranger shore stations might knock the hydrographic launches off the air. TUDLIK was then instructed to only use radar and hold the use of Miniranger for emergencies. All TUDLIK's work in "Tudlik Bay" on the north from Sept. 18-21, 1984 (Days 262-265) was done using radar for positioning.

CSS BAFFIN also had a standard transit satellite system in the instrument room. This system was available for positioning grab samples and gravity cores as required.

PROBLEMS AND CONSTRAINTS

a) ELAC 12 kHz Profiler on TUDLIK

There was some confusion generated onboard BAFFIN over the frequencies of the two hull-mounted transducers on TUDLIK and through a misunderstanding we were lead to believe that both transducers were 30 kHz when in fact the large transducer pod was installed as a 12 kHz system. When TUDLIK went out on her first traverse with the 7.0 kHz profiler working on September 19, 1984 (Day 263), a bar check was done on both the port and starboard transducer and it was found that the ELAC recorder was hooked up to the large port transducer (which at the time was believed to be 30 kHz); this is seen in the log entry of 1147 ADT, Wednesday, September 19, 1984 (Day 263).

After the return of TUDLIK to BIO at the end of the cruise, Mr. Art Parsons of the technical staff traced out the wires of the ELAC recorder and verified that the ELAC recorder was indeed hooked up to the port 12 kHz transducer. We believe the port transducer (12 (?) kHz apparently) was used for all TUDLIK's work in Jones Sound in 1984. However, at no time did the ELAC 12 (?)kHz profiler on TUDLIK ever obtain any penetration even in the softest of sediments except at 1723 ADT September 19, 1985 (Figure 18). It is a puzzle as to how this could be.

After the demobilizing of BAFFIN in Dartmouth in October, 1984 AGC was to take TUDLIK into Bedford Basin off the Institute where there are known soft sediments in the topmost veneer. It was planned then to verify the capabilities of the port 12 kHz system vs the starboard 30 kHz system. The results of this test are not not known to the writer at present.

b) Raytheon RTT-1000 7 kHz/200 kHz Profiler on TUDLIK

A detailed six-page letter of October 25, 1984 on equipment concerns, a brief note of October 5, 1984 regarding vessel concerns, and a long eleven-page letter of November 14, 1984 on related concerns have been previously submitted to the Scientific Authority and there is no need to review their contents in this report.

The Raytheon RTT-1000 system was a hybird marriage of a Raytheon PTR modified to drive a 7.0 kHz transducer and a DE 719 recorder modified to print the returning 7.0 kHz echos. The recorder was not programmable, hence, had a depth limit of about 125 m (i.e. 205 ft x 2). A very small part of Jones Sound is shallower than 125 m and there is virtually no part of Jones Sound shallower than 125 m that has any soft sediments that are penetratable by the 7.0 kHz frequencies. Thus, the 7.0 kHz profiler limited to 125 m was essentially of no use but to verify that the bottom was hard or at least firm.

It was possible to record the bottom and on occassion penetration into soft sediments in water deeper than 125 m by following the bottom very closely as the depth increased then turning up the gain as the bottom dropped off the bottom of the last (fourth) scale and then catching the reflections on the second or even the third sweep of the stylus. This was at best a makeshift solution and failed whenever one lost the bottom or if the bottom fell right in the transmission pulse on the second or third sweep of the first 0-16 m scale.

We were, however, able to get data in some areas deeper than 125 m (eg. Starnes Fjord). The hull-mounted 12 (?) kHz ELAC transducer on TUDLIK never gave any penetration even in the very soft-bottomed areas* where we could nurse the 7.0 kHz into showing the bottom on the second or third cycles of the scales; it should have since it gave a good bottom return as an echosounder.

c) EG&G Sidescan Sonar on TUDLIK

The sidescan sonar fish provided by AGC to the TUDLIK was a brand new fish. Its port side appeared to function as expected but it provided very strong cross-talk to the starboard side. The starboard side could never be adjusted to give good signals despite the best efforts of the ship's technicians and chief geoscientist on board. The cross-talk adjustment is not one easily done in the field even in good conditions and it was even harder to do on a launch. We also believe that the sidescan was always badly out of tune for at least the starboard side.

A hand-launched and recovered sidescan fish with 50 m of cable is difficult to launch and especially to recover at the best of times especially at full extension. TUDLIK found it best to stop to recover the fish if the water was deep enough; a small hand winch would make the job of recovery easier and prevent cable tangles in the future. We found it necessary to fly the fish fairly close to the bottom to get good returns and this left the fish vulnerable to collision. This danger was in fact realized September 18, 1984 (Day 262) on the second day of use in front of Jakeman Glacier in "Tudlik Bay" when the fins were lost and a large frond of seaweed recovered from the fish (biology sample T84-015-SW, Table 1). Without the fins the fish gave even worse data. By the last day of use the motor mechanic had made up some makeshift fins out of stainless steel but these were never put to use since only sampling was done on September 21, 1985 (Day 265).

The real problem with the sidescan use in Jones Sound from TUDLIK was that often the water was just too deep for good returns. In general the use of the sidescan on TUDLIK in 1984 has to be a disappointment but some changes could be made to allow for better handling and consistent data in those areas where it is shallow enough to be sidescaned from a launch.

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* Actually it did once, see Figure 18.

d) Raytheon 12 kHz Profiler on BAFFIN

The BAFFIN 12 kHz profiler was not operated for about the first 2255 km of the BAFFIN lines. It only got turned on after the AGC contract geoscientist got on board and requested that it be hooked up and slaved to the CHS fixes for the 30 kHz ELAC sounder on BAFFIN. It began to operate at 243/1640 GMT (August 30, 1984). BAFFIN ultimately recovered 3967 km of hydrographic data in 1984 of which about 1712 had the 12 kHz profiler operating. Thus, the BAFFIN 12 kHz profiler did not operate for 57% of the time (and for a further 6 hours or so on Day 244 when the CHS watchkeeper on duty turned it off after a paper tear rather then calling for help).

It would be the author's firm recommendation that the "Standing Orders" of the Canada Hydrographic Service be altered to ensure that whenever a low frequency echosounder/profiler is available on a survey and can be run without interference with the regular hydrographic work that it be run. Thus on BAFFIN (and HUDSON for that matter too) the 12 kHz or the 3.5 kHz profilers would automatically be turned on and logged whenever the vessels move along survey lines regardless of the location. The data would then be stored in the AGC archives for future and eventual use. On the BAFFIN 84-015 cruise such a change in the standing orders would have generated 2255 extra kilometers of 12 kHz data or an increase of 57% over that obtained. The add-on cost would have been about $200 or $0.10/km of data (ie the cost of the paper).

e) Positioning, Ice and Operations

The Geodetic Survey of Canada shore control points around Jones Sound are generally very high and accessible only by helicopter. Their height of 300-600 m makes them very susceptible to weather and icing conditions and hence it is a constant struggle to keep the navigation shore stations serviced. This is especially a problem for the Miniranger stations that require servicing and relocation more often that the Hi Fix shore stations. In fact BAFFIN's helicopter and crew were able to keep up with the hydrographic operation very well in 1984 and only 4 (or at most 5) days were lost because of flying or positioning problems.

The height of the shore stations was both to the operation's advantage for range and to its disadvantage for icing and servicing. The height also created shadows for the Miniranger near to shore and occasionally areas were rendered inaccessible. TUDLIK experienced shadowing on almost all of its traverse of September 16, 1985 (Day 260) along the south coast and often used 1 radar range and one Miniranger range to fix itself.

The fact that the Miniranger system was limited in the number of mobiles it could handle and the wish to preserve the batteries at the remotes meant that TUDLIK could not use the Miniranger after September 16, 1984 (Day 260). This limitation did not restrict TUDLIK"S work it simply meant that its positioning accuracy was somewhat degraded through its dependence on radar ranges and bearings.

BAFFIN also ceased to run lines after September 11, 1984 (Day 255) partly in response to the above problems (to reduce battery drain) and because the central regions were completed. There were still some areas where longer 12 kHz profiler tie lines could have been run after September 11, 1984, but the positioning system was unavailable; it was also unavailable for sampling. BAFFIN tended to sit in one location at night after September 11, 1984 (Day 255).

Ice presented little problem to operations in 1984 compared to 1983. This fact shows in the respective 1983 and 1984 line-kilometers of 30 kHz sounding data achieved; in 1983 BAFFIN 83-008 obtained 7,046 km and in 1984 BAFFIN 84-015 collected 17,594 km for an increase of 10,548 km or 150% over 1983. During the last 3 days of the project new ice caused some problems for all the launches. TUDLIK clogged her cooling water intakes twice September 21, 1984 (Day 265); the second clogging of the starboard engine intake did not melt out and it cost TUDLIK one sample since the winch hydraulics depended on the starboard engine.

First and second year ice moving in from Fram Sound and circulating counter-clockwise in the Jones Sound gyre began to clog up the southwestern part of Jones Sound about August 28, 1984 (Day 241). This ice prevented the very south and southwestern portions from being completed in 1984 (Fig. 4).

The most restrictive constraint to TUDLIK's operation in 1984 was water depth. TUDLIK's equipment was best for depths of less that 60-75 m. Its limit was essentially 125 m for the RTT 1000 7.0 kHz profiler though the 12 (?) kHz ELAC profiler was unlimited in depth (It just never gave any penetration!). TUDLIK was let off with the other hydrographic launches in the morning and then had to steam almost 2 hours in (and again back to the pickup spot) to get into depths where its gear could operate. Thus 3 to 4 hours of TUDLIK's day were used up in just steaming.

The above problem was compounded by BAFFIN's unwillingness to approach the shore even in areas where all the launch sounding had been done and often showed depths in excess of 100 m well into shore. The vessel was inordinately cautious and this meant that BAFFIN's sampling program and 12 kHz profiling program seldom got into depths less then 200 m and never into depths less than 117 m. TUDLIK had 400 m of wire on its winch, but TUDLIK was not used enough to close some of the shoreward gaps in sampling that one might have wished to cover; TUDLIK could not take cores in any case.

DATA COLLECTED

a) Onboard Field Log and Fix Data

The onboard field log and the sample data sheets are on file in the data section of the Atlanic Geoscience Centre. Fixes along almost all the 12 kHz lines of BAFFIN were generated by the Canadian Hydrographic Service and those provided to date as geographic co-ordinates are found in Tables 3 and 4 of Appendix 6 and 7 respectively.

Fixes along the BAFFIN 12 kHz line 400 and along all the TUDLIK lines in "Tudlik Bay" and along part of the south coast line on September 16, 1984 (Day 260) had to be carefully plotted onboard BAFFIN from the radar ranges or other positioning data available, then digitized from the charts as latitudes and longitudes. We thank Robin Heath, especially Glen Roger of CHS and in Halifax, Jennifer Edsall, for assistance in this chore. These digitized fixes are listed in Appendices 6 and 7.

Geographic co-ordinates were not generally directly generated by the CHS data system. With the Hi Fix data, the manually-recorded ranges were punched in manually and the data was plotted directly, but a listing of the corresponding UTM co-ordinates was given as a by-product. The UTM co-ordinates had to be then manually re-entered into another program to give the geographic co-ordinates.

With the Miniranger data the ranges were manually recorded then manually entered to plot directly with no intermediate UTM output. To get the UTM and eventually the geographic co-ordinates one had a further two step process. Since most of the 12 kHz lines of BAFFIN (i.e. once the system was turned on) were run on Miniranger, these additional steps were required or a new program had to be written to read the Miniranger values on the master disk and to print the geographic co-ordinates. There was not an opportunity for CHS to run these co-ordinates onboard BAFFIN and as yet not all geographic co-ordinates have been provided by CHS to complete the tables in Appendix 6. However, Enclosure 1 and 2 show all fixes and lines of 12 kHz profiler data correctly. All TUDLIK lines are correctly plotted on these two enclosures as well.

b) Grab Samples and Gravity Cores

The large Van Veen grab sampler was used from BAFFIN at 34 bottom grab stations; 33 obtained a sample. The positioning systems used ranged from the Hi Fix system, to the Miniranger system, to the ship's satellite system. Table 1 lists all the sample stations sequentially with the geographic positions, water depths, visual description and dates, etc. The positions of the 1984 (and the 1983) samples can be seen on Enclosures 1 and 2; Enclosures 1 and 2 are at 1:150,000 to match the scale of the 1983 and 1984 CHS field sheets 9019 (west) and 9018 (east).

Similarly, 14 gravity cores were collected from BAFFIN using the 2.4 m Benthos corer. Table 1 lists all the gravity cores and their station data and all cores from 1984 (and 1983) are plotted on Enclosures 1 and 2. The longest 1984 gravity core obtained was 177 cm. Specific core data is found in Appendix 5. All cores were stored vertically for shipment back to BIO.

CSL TUDLIK also attempted 25 bottom grab stations in 1984 of which 20 were successful; 2 obtained very little sample; 3 were empty or were misfires. A small Van Veen grab sampler was used from TUDLIK. All the particulars of the 1984 TUDLIK grab sample stations are found in Table 1 as well where station numbers of TUDLIK are prefixed by a T. The 1984 TUDLIK Van Veen (and the 1983 FRIGATE Ponar) grab sample stations are plotted on Enclosure 1 and 2 at 1:150,000.

All sample data sheets were kept in detail and are on file with the Atlantic Geoscience Centre at the Bedford Institute of Oceanography in Dartmouth; all the grab samples and cores were archived at AGC on the return of BAFFIN prior to being worked on by AGC personnel.

In plotting the 1983 BAFFIN 83-008 samples on Enclosure 1 and 2 in the field, it was found that some of the samples listed in the Table 49.1 on page 363 of MacLean et al. (1984) did not correlate in position with those plotted on their Figure 49.2 on page 361 (ibid). After the cruise this was sorted out and we have produced Table 2 with all corrections made to the 1983 sample positions; we have also added in the two 1983 HUDSON 83-023 piston core stations (and the 1968 PISCES dive location - see this report). The 1983 stations that required correction are listed in the caption to our Figure 2 (which is simply MacLean et al's. (1984) Figure 49.2).

c) Biological Samples

From the very first grab sample it was apparent that there was an interesting collection of biota available. I am indebted to Ms. Elizabeth Boulding of the Marine Ecology Laboratory of BIO for her initial interest in examining, collecting, washing and preserving the biological material from the first few grab samples. Alan Ruffman then continued the collection for the duration of the cruise.

The first few samples were washed in freshwater then saltwater was used thereafterwards. The biologic material was simply washed and placed in glass bottles or plastic bags, labeled and then frozen directly and kept frozen. Table 1 also lists the pertinent data for all the 51 benthic biologic samples taken in Jones Sound in 1984.

Outside some minor work done on August 15-16 and 20-21, 1968 from the CCGS LABRADOR "ICEPACK 8/68" cruise in 1968 (Herlinveaux, 1970), we do not believe any benthic biological material has ever been collected before in Jones Sound, save one sample of soft coral reported in Herlinveaux (1970) south of Hells Gate apparently at or near Oceanographic station No. 8 on August 20, 1968 (Appendix 9) and some clam shells collected on the beach at Grise Fjord also in 1968 (Appendix 9). ICEPACK 8/68 also ran four oceanographic stations in the Jones Sound area (Nos. 4, 5, 8 and 9) plus one at the north end of Hell Gate (No. 7) - see Appendix 9. (Note the plotted positions of Station Nos. 4 and 9 on Herlinveaux's index map (Appendix 9) do not match the listed geographic coordinates which may be in error (See Enclosure 2). Herlinveaux has provided a correct position to station 9; the coordinates to No. 4 are correct though it is misplotted on his index map (see Appendix 9).

The 1984 benthic collection consists of: numerous and several different types of worm burrows (including chaetoperis and an agglutinated variety), live worms, tunicates (solitary), a few bivalves, brachiopods, at least two types of brittle star, starfish (?), mya clams, limpets, rocks with serpulid worms, bryozoan patches, barnacles, sponges and hydroids, gorgonocephalus (basket stars), coral-like(?) filaments, copepods, hair-like filaments, other stick-like corals, a polyp of some sort, a spiralled dead shell, a frond of seaweed (T84-015-SW) and a sea urchin. An attempt was made to locate and freeze biological samples from every grab sample and to collect examples of all different creatures in each sample; however, the biological sampling was by no means quantitative. Each of the sample sheets filed at AGC contains a full record of the variety of biota saved.

No attempt was made to further classify the biota onboard. The whole collection was then turned over to Ms. Boulding of the Marine Ecology Laboratory (MEL) at BIO on BAFFIN's return to Dartmouth. MEL is having further work done on the collection (see memo in Appendix 8). The list of the geographical positions taken during the biological sampling program is found in Table 1; these fixes are the same positions noted in the original field log of Alan Ruffman and on the original sample sheets both of which are on file in the Atlantic Geoscience Centre's data archives. All bottom grab samples are plotted on Enclosures 1 and 2, but no separate annotation showing which grab samples had a biological sample saved has been added to the enclosures. Enclosures 1 and 2 also show the locations of the beach and the 128 m biological samples recorded in Herlinveaux (1970).

d) BAFFIN 12 kHz Profiler Data

As previously noted, the 12 kHz profiler on BAFFIN began to operate at 1640 GMT, August 30, 1984 (Day 243) and continued to operate until September 10, 1984 (Day 254) whenever BAFFIN was running controlled hydrographic lines. The five rolls of data are listed in Appendix 2. BAFFIN ran no further survey lines after 2304 GMT, September 10, 1984 (Day 254).

The BAFFIN's 12 kHz system was also operated whenever sampling was undertaken and two further rolls of data were collected on these occasions after September 10, 1984 (Day 254) (Appendix 2). Data were uniformally good with penetration seen into the soft veneer of sediment consistently where the veneer was present.

e) EG&G Sidescan Sonar Data

Data were only collected on three days, September 16, 18 and 20, 1985 (Days 260, 262 and 264); the three rolls are listed in Appendix 2.

The sidescan data were not consistent and were best on the first day even though one side suffered from serious crosstalk problems. On the second day of use the tail fins were lost and the data quality fell off to the extent that the sidescan was removed from the water. On the last day of operation very little of the sidescan data were of any real use.

f) RTT 1000 7.0 kHz Profiler Data

Data were only collected three days, September 18, 19 and 20, 1985 (Days 262, 263 and 264); the three rolls are listed in Appendix 2.

The 7.0 kHz data were generally of good quality except that the signal to noise ratio dropped off significantly as one followed the bottom into deeper water and tried to use the second and third cycles on the recorder. Bottom penetration was really only seen on one day, September 19, 1984 (Day 263) while TUDLIK was in Starnes Fjord.

g) 12(?) kHz ELAC Echosounder Data

TUDLIK operated its 12(?) kHz profiler (on the port side) on five days; September 16, 18, 19, 20 and 21 (Days 260, 262, 263, 264 and 265). The six data rolls are listed in Appendix 2.

The TUDLIK 12(?) kHz profiler data was always of good quality (except it never showed any penetration even in soft sediments)*. On September 19, 1985 (Day 263) the paper advance became intermittent and the paper uptake required constant nursing by a finger or else the paper stopped.

The BAFFIN 30 kHz echosounder was operated during the Atlantic Geoscience Centre sampling program after September 10, 1985 (Day 254); the two rolls of these data are also listed in Appendix 2.

h) Observations and Comments on Shoreline Geology

1. Northwest Coast - Some observations were made on Sept. 2, 9, 16, 18, 19, 20, 21, 1984 (Days 246, 253, 260, 262, 263, 264, 265) while the launch was proceeding on transit or survey in various parts of Jones Sound. On Sept. 2, 1984 Alan Ruffman rode the CHS Launch FRIGATE along the northwest coast and on two occasions raised beaches were observed on the eastern sides of the mouths of Hourglass Bay and Muskox Fjord (Fig. 6). These areas had been observed by Taylor and Frobel (1984) from a helicopter during BAFFIN 83-008.

2. South Coast - Brae Bay - On Sept. 9, 1984, TUDLIK made its first attempt to approach shore in Brae Bay and ran into engine trouble (Fig. 7). The median moraine of Sverdrup Glacier was observed in the distance (also seen by Taylor and Frobel 1984). One line of echosounding data from CHS launch FINCH was run well into the glacier front that day (Sept. 9, 1984) and FINCH discovered a significantly deeper hole in front of the glacier (see tracks on Enclosure 2). Launch FINCH struck very shallow water (circa 6m) about Fixes 19-20 and 22.5-23 in 1984 (Fig. 8). However to the south at the ends of these two lines the water dropped to about 160 m.

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* Actually it did once at 1723 ADT, September 19, 1985 (Fig. 18) in about 365 m of water in Starnes Fjord.

At the time we were unaware of the published results of Taylor and Frobel (1984) and their results were not on board with either the chief geoscientist or the hydrographers. In fact, Taylor and Frobel (1984) have documented this area extremely well in their Figures 3.5 and 3.6 (p. 29). We duplicate these figures here to show the two sounding lines of FINCH in 1984, the approximate area of the deeper 160 m water found by FINCH and the sill or terminal moraine (Fig. 8). Enclosure 2 also shows the samples taken on launch FRIGATE's 1983 lines.

Our interpretation of the 1959 air photos shown by Taylor and Frobel would go a bit further than they did. We have annotated their Figures 3.5 and 3.6 (Fig. 8) to show the patch of pack ice in front of the Sverdrup Glacier on July 17, 1959 as a grounded patch. Thus one may interpret the 160 m contour in a very general sense (Fig. 8) and then extend the limits of the sill or terminal end moraine to include the grounded ice area in 1959 and the shallows mapped by FINCH in 1984 (See Fig. 8 and Encl. 2). Futhermore, we believe one can include the shallow water around the two Narwhal Islets* (Area 1 on Taylor and Frobel's Fig. 3.5 seen on our Fig. 8) as part of this sill or terminal moraine (Fig. 8; Encl. 2).

3. South Coast - Eastern Glacier - On Sept. 16, 1984, TUDLIK surveyed along the south coast from Eastern Glacier east toward Belcher Point until stopped by pack ice (Fig. 7) just east of the "5th glacier" (that came down to the sea). In this area, the echo sounder and visual observations of the termini of the glaciers showed quite clearly the preservation of well-developed lateral moraines extending offshore (see later).

Also on Sept. 16, 1984, Julian Goodyear of CHS reported an observation from the helicopter of 2 islets off the end of the median moraine of Belcher Glacier (Fig. 7). The median moraine stems from a nunatak inland and exits in this bay as a series of two, low, flat, gravelly-sandy islets in very shallow water. This bay was never mapped by CHS in 1983 or 1984 and it will await a future survey for detailing.

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* Name coined from the Sept. 8, 1984 sighting of 10-12 Narwhals mating in Brae Bay (Appendix 4).

4. Tudlik Bay - Starnes Fjord - CSL TUDLIK worked in "Tudlik Bay" on September 18, 19, 20, 21, 1984 coincident with CHS work in the area (Fig. 9). Observations were made of shoreline features, raised beaches, outlines of sedimentary bedrock on top of Precambrian and related features (Figs. 9, 10, 11). The bedrock geology observations of sedimentary rock overlying massive rocks unconformally may help improve the bedrock geology of Frisch (1983) and Fortier et al. (1983) as shown by MacLean et al. (1984). (See Fig. 12 here). On Sept. 18, 1984 push moraines or terminal moraines were seen on the east coast of Tudlik Bay (Figs. 9 and 10). Jakeman Glacier was observed to have a nunatak of sedimentary rock in the distance (Photo 3) and clear lateral moraines could be seen to either side (Photo 3). The terminus of Jakeman Glacier appears to be at present virtually at sea level (Photo 3).

To the west of Jakeman Glacier, northeast of Fairman Point, sedimentary rock is clearly seen overlying massive Precambrian (?) or Devonian (See Fig. 12 for Frisch's (1983) and Fortier et al's. (1983) onshore geology which suggest we were seeing "undifferentiated" overlying "Devonian").

Similarly between what we called "Two-tone Hill" (Encl. 2, Fig. 10) and Fram Fjord there were other areas of lighter sedimentary rock overlying a massive darker rock (Figs. 9 and 10; Photo 4). "Two-tone Hill" itself may also represent a contact, hence the informal name used on board TUDLIK referring to the light (sedimentary?) and darker massive rock (Photo 5). Other outlines of sedimentary rock were seen above the junction of Starnes Fjord and its Tusk Arm* and in the distance near the head of the Fjord (Fig. 10 and Photo 6).

Raised beaches were observed in the low area between Fairman Point and Jakeman Glacier (Fig. 10) and possibly above the beach in the valley west of Amstead Point (Fig. 10; Photo 4) both in Tudlik Bay. A raised beach was also seen to the north of the terminus of Iceberg Glacier on the southwest side of Starnes Fjord (Figs. 9 and 11; Photo 7). Iceberg Glacier** was developing a large lateral moraine along its north side (Photo 7) and in this area the terrain appeared grossly striated possibly by readvances of glacial ice over the lateral moraine?

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* So dubbed since the crew of CSL FLAMINGO found a Narwhal's tusk on the small beach on the north side.

** So named for its prolific calving of icebergs into Starnes Fjord.

i) Relocation of PISCES Dive Position and Data

Pelletier (1968) reported on the August 16, 1968 dive of PISCES in Jones Sound from the CCGS LABRADOR's "ICEPACK 8/68" cruise (BIO Cruise No. LABRADOR 68-055). He gave very little specific data on the dive and no position other than a small general index map. Milne et al. (1969) and Milne (1969 a; b) reported on the various PISCES dives in 1968 but gave little specific data on the Jones Sound dive and no position other than a general index map. Milne et al. only indicated for August 16, 1968:

> "Into Jones Sound by morning. Oceanographic station taken. Two biological-noise flights made. Geological dive in PISCES to 1200 ft in Jones Sound. Heading for Norwegian Bay through Hell Gate."

Finally Herlinveaux (1970) wrote on the biologic and oceanographic observations (Appendix 9) but again there was no position for the PISCES dive in Jones Sound and no geologic data. (Note Herlinveaux's plotting of oceanographic stations 4 and 9 on his index map does not jibe with his listed positions; he later provided a correction to station 9 (Appendix 9)).

Inquiries were launched to Defense Research Establishment Pacific (DREP) in Victoria, to Dr. Bernie Pelletier in the Geologic Survey of Canada in Ottawa, and with the failure of these two approaches, we tried the Canadian Coast Guard in Dartmouth, Nova Scotia. Dr. Pelletier could never provide a position and only provided the 1968 Maritime Sediments article re the cruise with its very general geological observations; no specific Jones Sound PISCES dive observations were ever provided. Dr. Pelletier's records have not been seen nor have the photos* or samples been seen. Pelletier (1968) indicates that "more than 20 samples of sedimentary bedrock were collected from the sea floor and submarine scarps that form some of the walls of the Arctic channels" (p.70). However, he never tells us if this was the case in Jones Sound on the PISCES dive. Milne (1969a) indicates that photos "were taken at all dive locations" (p.69).

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* Herlinveaux's letter of April 17, 1985 indicates that the camera may have misfunctioned on the Jones Sound dive and that no photos are available (Appendix 9, end).

DREP eventually provided a position from Dick Herlinveaux from his log book (see letter in Appendix 10). This position is probably incorrect and is certainly about a half a degree in error in longitude. His letter of April 17, 1985 indicates that they may have had up to 0.5 degrees of error in the charts they had available (Appendix 9).

We have chosen to accept the position provided by Ken Curren of the Maritimes Office of the Canadian Coast Guard in Dartmouth, Nova Scotia after they went back to their original LABRADOR bridge log book (Appendix 10), plotted the 1218 ADT (1518 GMT), August 16, 1968 position as 10.25 n mi from Cape Waldegrave at a bearing of 018°, and then digitized the plotted position as 76° 08.2"N and 84°55.0"W. The 1218 ADT (1518 GMT) position is noted in the LABRADOR bridge log as: "1218 - C. Waldegrave, 018°-10.25 mi. Submarine submerged, sounding 153 fms, 1357 sub surfaced". Pelletier (1968) and Milne et al. (1969) cite the dive as in "1200 ft" (366 m or 200 fm).

The inconsistency in depth remains unresolved but may reflect a traverse down the edge of the shelf break by PISCES in this area*. Presumably Dr. Pelletier's geological log book, if located, might resolve this as well as providing important geological observations. The position of the PISCES dive is plotted on Enclosures 1 and 2 and it is that provided by the Canadian Coast Guard from LABRADOR's log book. This is the "A" position on the plot provided by K.C. Curren (Appendix 10) as a result of Captain Claude Green's replotting on CHS Chart 7950; the "B" position on the plot is that of BIO Oceanographic Station No. 5 as recorded in the LABRADOR'S bridge log at 1315 ADT (1615 GMT) (76° 06.8'N, 84°51.0'W).

It is clear that different log books were kept by different persons since the BIO Oceanographic Station No. 5 has a slightly different position in Herlinveaux (1970); he records it as 76°07.1'N, 84°54.0'W at 1642 GMT (Appendix 9; p. 38 and p. 57) and shows the depth of the oceanographic bottle Station No. 5 as 700 m (2297 ft or 383 fm) whereas the bridge log shows a depth of 435 fm (2610 ft or 796 m) at 1615 GMT. The PISCES surfaced at 1657 GMT. There certainly is an indication that while PISCES submerged in water of "153 fms" (918 ft or 280 m) it surfaced in waters of 700 to 796 m (393 to 435 fm) and Pelletier (1968) and Milne et al. (1969) refer to "1200 ft" (200 fm or 366 m).

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* Herlinveaux in a later letter (Appendix 9) notes, "In the area where the dive took place, the depth would change 100 fm over the length of the ship".

INTERPRETATION OF THE 1984 GEOPHYSICAL DATA

a) BAFFIN 12.0 kHz data, TUDLIK 7.0 kHz data - The thickness of the veneer of near-acoustically transparent mud was digitized from the 12.0 kHz records in Halifax by Ms. Jennifer Edsall and two new 1:150,000 Enclosures 3 and 4 were made up showing representative thicknesses. A colour-coded working sheet was used to contour the results.

The contouring could be done relatively well on Enclosure 4 (the eastern sheet) where BAFFIN ran a continuous series of side-by-side lines to cover a full block (Enclosure 2). On Enclosure 3 (to the west) it was much more difficult to contour definitively and the resulting map is replete with question marks. The main problem to the west is that the first 2255 km of 12.0 kHz profiler data from BAFFIN were just never collected hence there is a significant gap in the 1984 BAFFIN data.

We would recommend that the digitized 1983 mud thickness information from the BAFFIN cruise 83-008 (12 kHz data) be digitized and plotted on copies of Enclosures 3 and 4 with a view to recontouring the full data set to give the best isopach map possible. The 1983 Huntec deep-tow data should also be digitized and plotted to expand the data set for mud thickness.

However, even as it is there is a correspondence of the 1984 map with the map of unconsolidated sediments produced by MacLean et al. (1984) from the BAFFIN 83-008 cruise (Fig. 12). This is most evident in the west where a cross-hatched high of "coarser sediments" at 76°N, 86°W corresponds to the detailed area shaded at the same position on Enclosure 3.

To the east our isopach map of Enclosure 4 provides considerable detail to the map of MacLean et al. (1984) at least for one small area north of Brae Bay in the central part of Jones Sound. The protrusion of "coarser sediments" seen northwest of Ward Point on MacLean's map (Fig. 12) is also seen on our detailed map of Enclosure 4 as an area of zero thickness of mud (shaded).

No grain size analyses from the 1984 samples were available to the author to compare to the detailed contouring of the mud thickness in Enclosures 3 and 4. There is, however, a line of 12 grab samples and a line of 9 gravity

cores that traverse the very detailed easternmost contoured area (Enclosure 4). BAFFIN's gravity core 84-015-66 and HUDSON's piston core 83-023-53 both fortuitously penetrate into the thickest section of mud while other gravity cores (and grab samples) sample the areas of nominally zero thickness of mud. Certainly the visual observations of the cores suggest that the traverse will shed some light on the variations in the thickness of mud seen on the isopach map of Enclosure 4.

The western area on Enclosure 3 does not have as good coverage with grab samples and has no gravity cores from 1984. Indeed most grab samples appear to be in the areas of zero mud thickness.

The approximate axis of the mud deposition zone in Starnes Fjord is also shown on Enclosure 4. We believe the mud zone is continuous to the east of Arctic Shoal. The RTT 1000 7.0 kHz data on TUDLIK were also digitized to the extent possible and then were plotted on Enclosure 4. The RTT 1000 data showed the sediments to be highly and closely stratified. This is indicative of the very quiet conditions found in a fjord and of the seasonal variability of the sediment input. Most of the sediment introduced into Starnes Fjord comes from a series of active glaciers including Iceberg Glacier whose terminus is continuously calving icebergs directly into the waters of the fjord.

b) TUDLIK Sidescan Sonar Data and ELAC 12(?) kHz Data - The sidescan data were disappointing. Only the first day (September 16, 1984 - Day 260) was of any real use. That line showed scouring in between the two lateral moraines of the "2nd glacier" (Fig. 16) and it may have demonstrated bedrock off the "5th glacier" (Enclosure 4). A surprisingly smooth bottom was seen from the "3rd glacier" to the "5th glacier"; we are not certain if this is real or whether the sedescan fish was to high off the bottom. We have annotated Enclosure 4 along the track with some other lateral moraines seen on the echo sounder.

On September 18, 1984 (Day 262), the sidescan was virtually of no use. There were a number of spurious signatures on the sidescan but we do not believe any are interpretable as geology. We believe that the profiler/echosounder data allows one to define some areas of clear ice/iceberg scouring (Fig. 17), with a possible lower limit of 70 to 75 m, in the area of Lemieux Shoal in Tudlik Bay.

The sidescan sonar was used again on September 20, 1984 (Day 264) without much success partly because the water was so deep. We believe that the sidescan sonar verified that the top of Arctic Shoal was bedrock (Enclosure 4) where as the portion of Lemieux Shoal seen was probably covered with sediment (or till).

This same day (September 20, 1984) the ELAC 12(?) kHz profiler on TUDLIK showed a very subtle notch-like channel (?) feature on the axis of Starnes Fjord (Fig. 19; Enclosure 4) on both crossings of the mouth (Enclosure 2). It is not known if this is an erosional channel or a channel maintained by density flows down the axis of the fjord. The feature has a depth of only 2 m.

A similar channel-like feature was probably crossed obliquely between Fixes 40 and 40.5 on the September 19, 1984 run back down Starnes Fjord with only the ELAC running (Fig. 18). This portion of the record is unique to the 1984 TUKLIK work since it is the only time TUDLIK's port transducer showed any evidence of clear and significant penetration (Fig. 18).

c) CHS Hydrographic ELAC 30 kHz Data - CHS gathered a large amount of ELAC 30 kHz echo sounder data. We believe that at times this data can be used to map the presence of the soft veneer of pelagic mud. We recommend that the data be examined with this in mind to see if it would assist in expanding on a compilation of the 1983-84 12 kHz and Huntec deep-tow profiler data (earlier recommended).

Similarly on a number of occasions the echo sounder records a feature which can be seen from line to line. We show one such 25 m - deep bedrock-generated "notch" in Figure 20 from the end of Roll #5. This same (?) feature was mapped near the beginning of Roll #5 and is shown as a 14 m notch on Enclosure 4. These features can certainly be mapped and corelated to geology if a detailed bathymetry map is made.

We believe that with the density of launch and BAFFIN data achieved in Jones Sound from 1983 and 1984 that a really superb job can now be done to not only map the veneer of mud but also to map a significant amount of the bedrock geology (or at least the morphology that is derived from the bedrock). We recommend the bathymetry of Jones Sound be contoured in detail, using a geological perspective at a scale of 1:75,000 for a map to be published at 1:75,000 or 1:150,000.

Once the best bathymetry map has been achieved then the 1984 BAFFIN 12.0 kHz profiler's thickness of the surficial veneer of pelagic mud should be reposted and recontoured using all the BAFFIN 1983 12.0 kHz profiler data, all the BAFFIN Huntec deep-tow profiler data, and any 1983 or 1984 ELAC 30 kHz sounder data that assists, from 1983 or 1984. The final isopach map will show considerably more detail than seen on Enclosures 3 and 4 here.

The picture of the soft mud veneer shown in MacLean et al's.(1984) composite cross-Sound profile in their Figures 49.5 and 49.4 (our Figs. 14 and 15 respectively) is rather simplified. It appears that in the deeper part of the Sound towards the east a veneer of pelagic mud has built up almost like a contourite (Fig. 14). However, to the west the picture is not so simple (Enclosure 4) and in the westernmost parts of Jones Sound it is quite complex (Enclosure 3). We believe an isopach map of the mud combined with an excellent contoured bathymetry map (now possible) will allow a much greater understanding of the sedimentology especially when combined with the 1983 and 1984 bottom sampling data.

ACKNOWLEDGEMENTS

We should like to recognize and thank the input of the crew of the CSS BAFFIN to assist the TUKLIK program. The Chief Hydrographer, Mr. Vic Gaudet and his assistant, Julian Goodyear greatly assisted the program in many ways including the sacrificing of a gyro and a navigation system to TUKLIK. We also profited from the able and willing navigation assistance of Glen Roger of CHS.

Mr. Brian MacLean and Dr. Gus Vilks of AGC provided planning logistical support for the program. Mr. MacLean was the Scientific Authority. Ms. Betty Ann Brennan was the DSS Supervisor.

At Geomarine, Jennifer Edsall, Don Fox, Francis Kelly and Lori Duggan and Jean Miller all saw the report into its final form despite the tardiness of the author in producing the manuscript. The opportunity to share in the experience of surveying in Jones Sound was one the author will not easily forget. Mr. Ruffman thanks the Atlantic Geoscience Centre for the opportunity to share in: "That Narwhal torn
That ice-tormented sea." (with apologies to Yeats)

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FIGURES

FIGURE 1

Index map of Jones Sound taken from Figure 49.1 of MacLean et al. (1984). The two map sheets (west and east) of this report overlap somewhat at 84°W ie at South Cape.

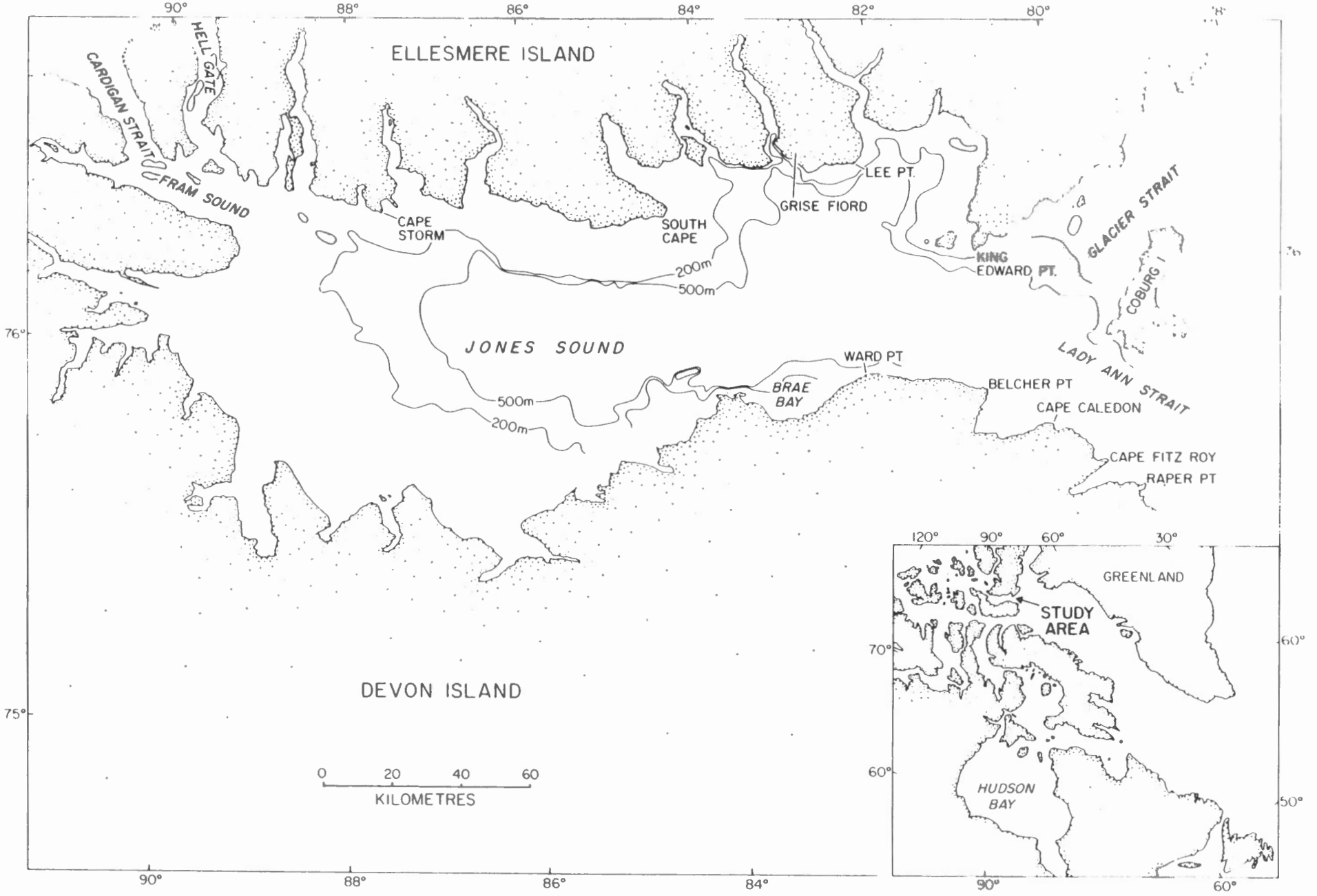

90°
88°
86°
84°
82°
80°
ELLESMERE ISLAND
CARDIGAN STRAIT
HELL GATE
FRAM SOUND
CAPE STORM
SOUTH CAPE
GRISE FIORD
LEE PT.
GLACIER STRAIT
KING EDWARD PT.
COBURG I.
200m
500m
JONES SOUND
WARD PT
BRAE BAY
BELCHER PT
LADY ANN STRAIT
CAPE CALEDON
CAPE FITZ ROY
RAPER PT
76°
75°
DEVON ISLAND
0 20 40 60
KILOMETRES
120°
90°
60°
30°
GREENLAND
STUDY AREA
70°
60°
50°
HUDSON BAY

FIGURE 2

Track chart and index map of the 1983 BAFFIN 83-008 cruise in Jones Sound taken from Fig. 49.2 in MacLean et al. (1984).

Note:
Sample 1 was incorrect in latitude in Table 49.1 in MacLean et al. (1984) but is correctly plotted on this map.

Sample 19 was incorrect in latitude in table 49.1 but is correctly plotted on this map.

Sample 20 was correct in table 49.1 but is incorrectly plotted on this map.

Sample 22 was incorrect in latitude in table 49.1 but is correctly plotted on this map.

Sample 24 was incorrect in longtitude in table 49.1 but is correctly plotted on this map.

Sample 28 was incorrect in latitude in table 49.1 but is correctly plotted on this map.

The track concentrations in 1983 reflect the areas of open water in 1983. There was little chance to gather data along the margins of Jones Sound in 1983. Positioning of geophysical tracks in 1983 was generally by satellite navigation and radar ranges and bearings.

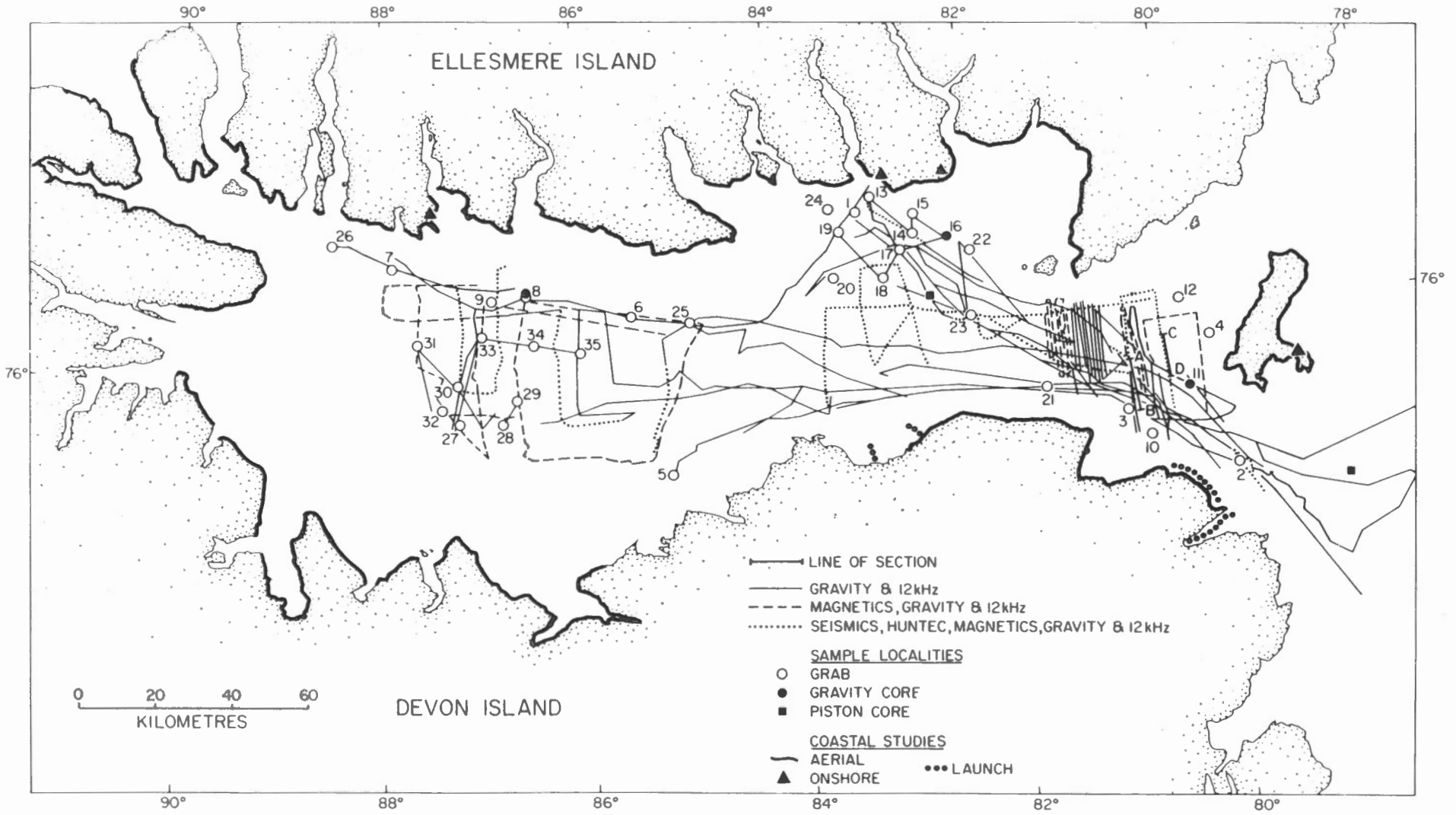

90°
88°
86°
84°
82°
80°
78°
76°
ELLESMERE ISLAND
DEVON ISLAND
0 20 40 60
KILOMETRES
LINE OF SECTION
GRAVITY & 12kHz
MAGNETICS, GRAVITY & 12kHz
SEISMICS, HUNTEC, MAGNETICS, GRAVITY & 12kHz
SAMPLE LOCALITIES
GRAB
GRAVITY CORE
PISTON CORE
COASTAL STUDIES
AERIAL
ONSHORE
LAUNCH

FIGURE 3

Index map to the areas covered by closely-spaced bathymetry lines in 1983. The 1983 CHS lines comprised some 7046 line-kilometers of data. The 1983 (and 1984) lines are generally spaced at 1000 m in waters greater than 200 m deep and at 500 m in waters shallower than 200 m. There were a few shoals investigated west and south of Coburg Island where 1983 launch lines were run right into shore. The map was taken from Swim (1983).

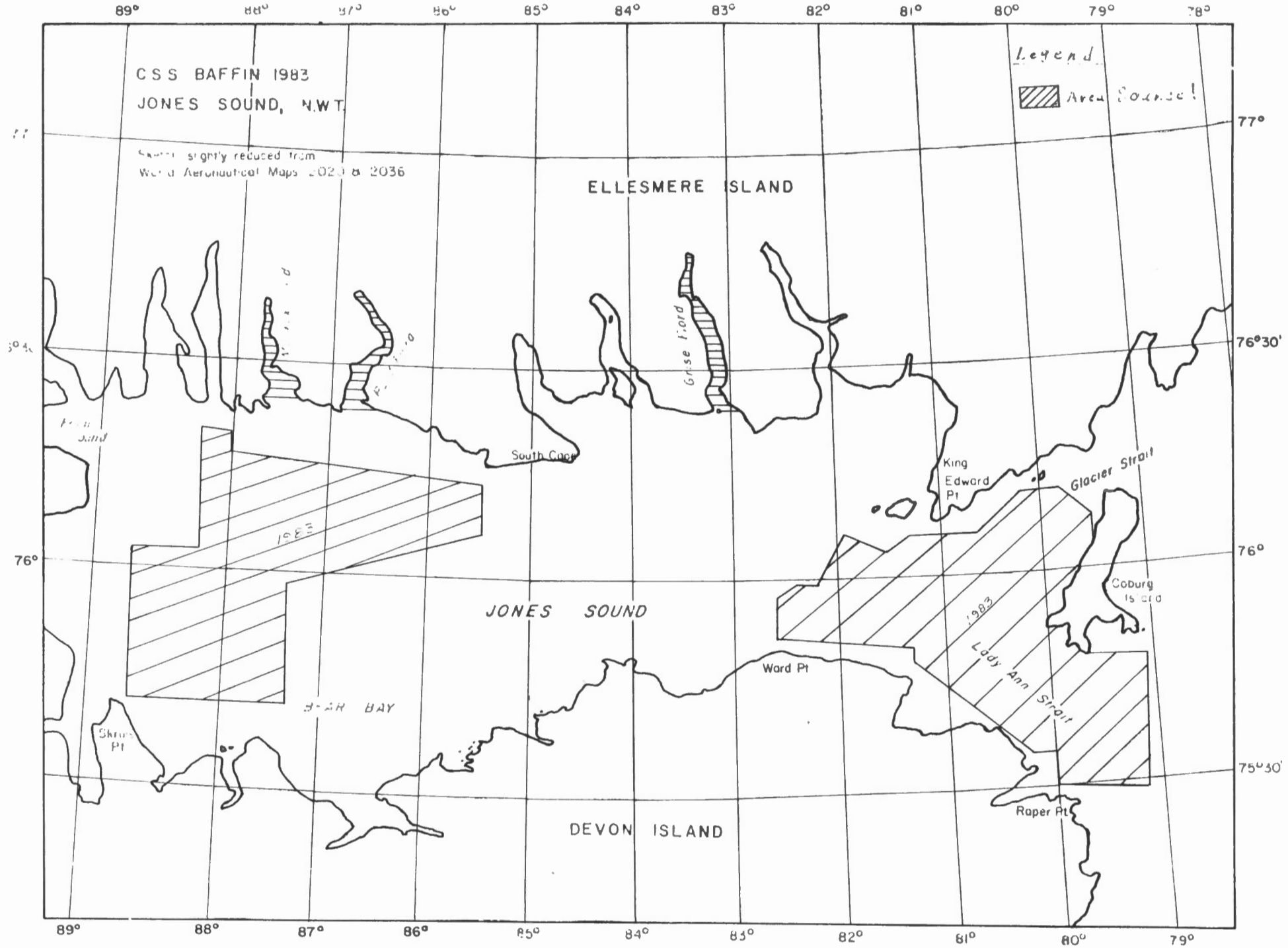

CSS BAFFIN 1983
JONES SOUND, N.W.T.
Legend
Area Sounded
Scale slightly reduced from
World Aeronautical Maps 2023 & 2036
ELLESMERE ISLAND
DEVON ISLAND
JONES SOUND
Grise Fiord
South Cape
King Edward Pt
Glacier Strait
Coburg Island
1983
Lady Ann Strait
Ward Pt
Raper Pt
Skraus Pt
BEAR BAY
89°
88°
87°
86°
85°
84°
83°
82°
81°
80°
79°
78°
77°
76°30'
76°
75°30'

FIGURE 4

Index map showing the area sounded with 30 kHz ELAC sounders in 1984 on BAFFIN 84-015 vs the area sounded in 1983 on BAFFIN 83-008. 17,594 km of data were obtained in 1984 vs 7,046 km in 1983 for a 150% increase from 1983 to 1984. The difference is almost entirely the result of less ice and a lack of serious problems in 1984. Only a few bays on the south and in the very southwestern part of Jones Sound were not mapped by the end of the two-year CHS program.

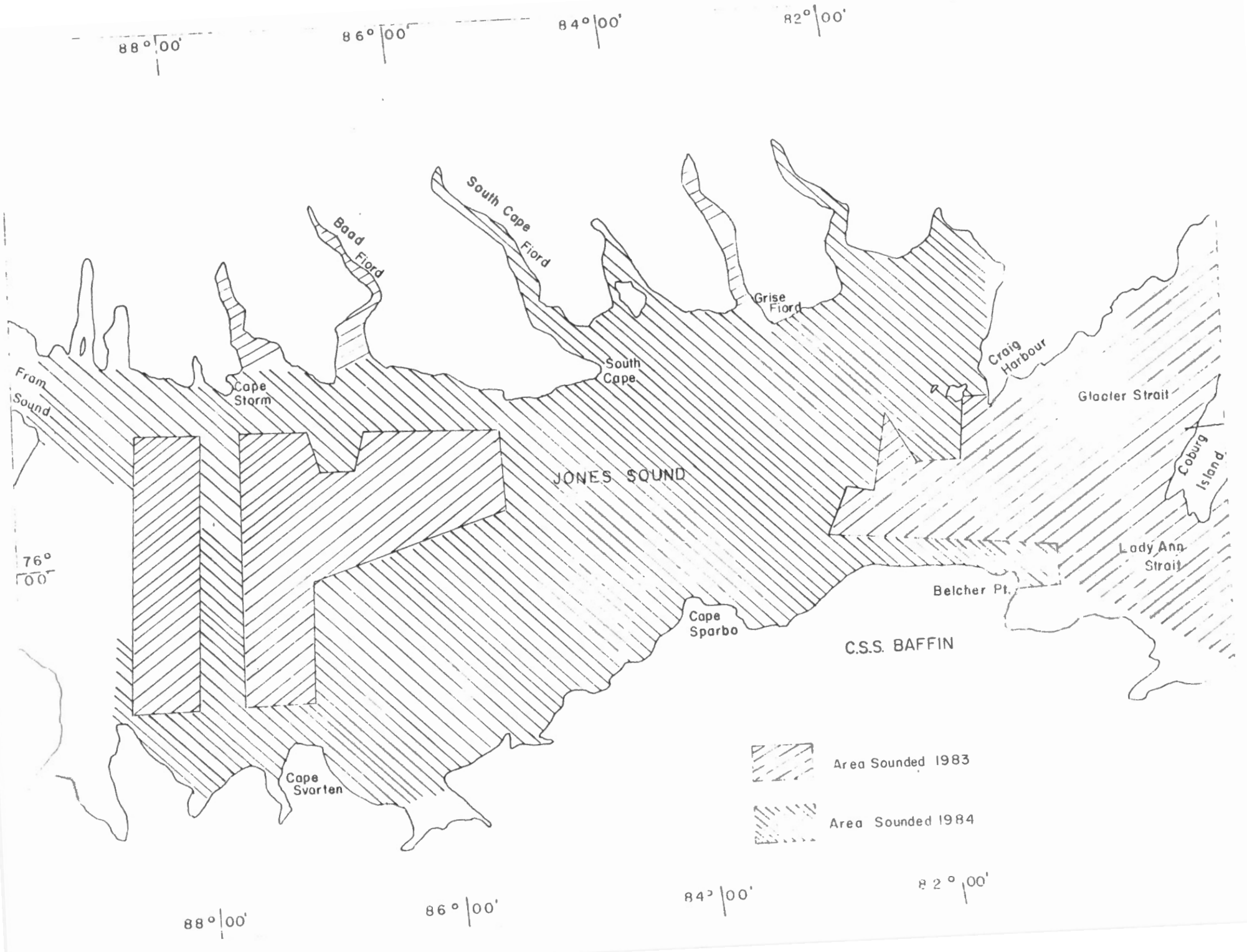

88° 00'
86° 00'
84° 00'
82° 00'
South Cape Fiord
Baad Fiord
Grise Fiord
Craig Harbour
Fram Sound
Cape Storm
South Cape
Glacier Strait
Coburg Island
JONES SOUND
76° 00'
Lady Ann Strait
Belcher Pt.
Cape Sparbo
C.S.S. BAFFIN
Cape Svarten
Area Sounded 1983
Area Sounded 1984
88° 00'
86° 00'
84° 00'
82° 00'

FIGURE 5

Cumulative graph of launch useage as kept on board BAFFin by Alan Ruffman. Note after the cruise was completed the Hydrographer-in-Charge's official cumulative total was revised to 17,594 km vs. the 16,995 summed here. Graph clearly shows respective hydrographic launch useage with TUDLIK's total barely showing along the bottom. The contribution of BAFFIN when she was working night and day (except for launch pickup and dropoff) is obvious as is her cessation of survey work after Day 255.

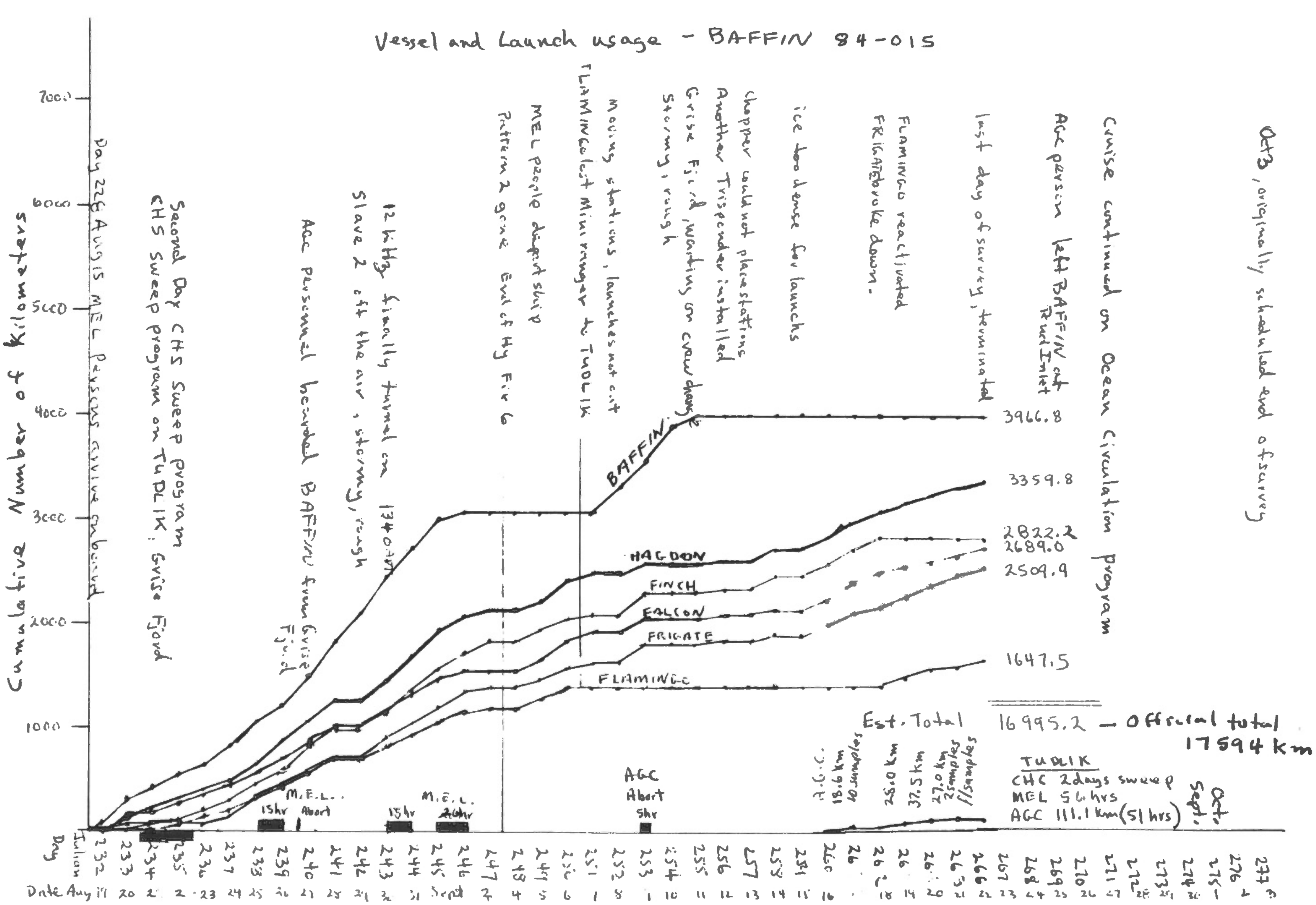

Vessel and Launch usage - BAFFIN 84-015
Cumulative Number of Kilometers
1000
2000
3000
4000
5000
6000
7000
Julian Day
Date
Day 226 Aug 15 MEL Persons arrive onboard
CHS Sweep program on TUDLIK; Grise Fjord
Second Day CHS Sweep program
AGC Personnel boarded BAFFIN from Grise Fjord
Slave 2 off the air, stormy, rough
12 kHz finally turned on 1340
Pattern 2 gone End of Hy Fix 6
MEL people depart ship
FLAMINGO lost Miniranger to TUDLIK
Moving stations, launches not out
Stormy, rough
Grise Fjord, waiting on crew change
Another Trisponder installed
Chopper could not place stations
ice too dense for launchs
FRIGATE broke down.
FLAMINGO reactivated
last day of survey, terminated
AGC person left BAFFIN at Pond Inlet
Cruise continued on Ocean Circulation program
Oct 3, originally scheduled end of survey
BAFFIN
HAGDON
FINCH
FALCON
FRIGATE
FLAMINGO
3966.8
3359.8
2822.2
2689.0
2509.9
1647.5
Est. Total 16995.2 — Official total 17594 km
M.E.L. 15hr Abort
15hr
M.E.L. 20hr
AGC Abort 5hr
18.6 km
25.0 km
37.5 km
27.0 km
TUDLIK
CHC 2 days sweep
MEL 56 hrs
AGC 111.1 km (51 hrs)
Sept.
Oct.

FIGURE 6

Portion of CHS Chart 7950 (CHS, 1974 - reprinted 1983) at 1:500,000 showing general area of launch FRIGATE's work on Septmeber 2, 1984 and certain observations of shoreline geological features made from the launch

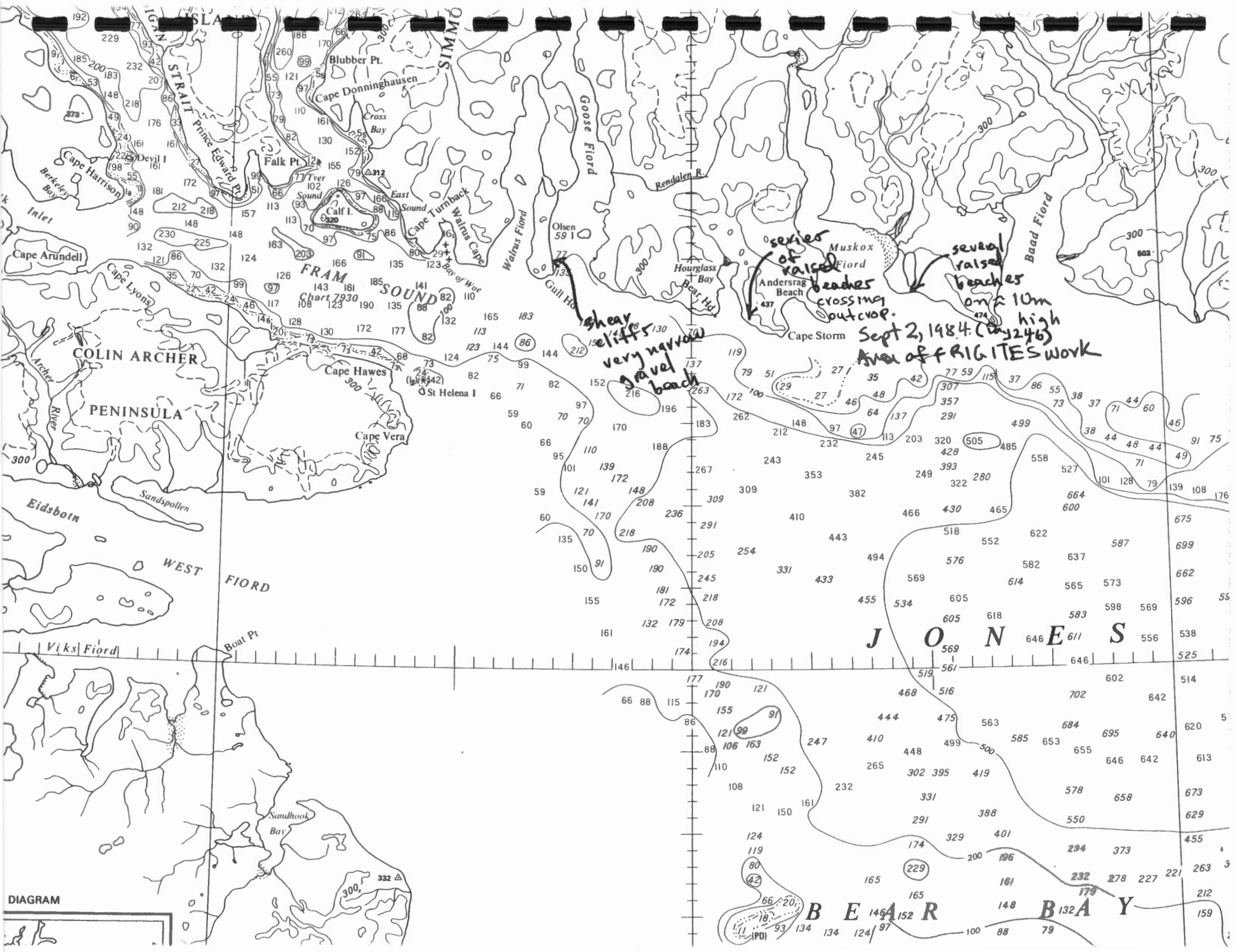
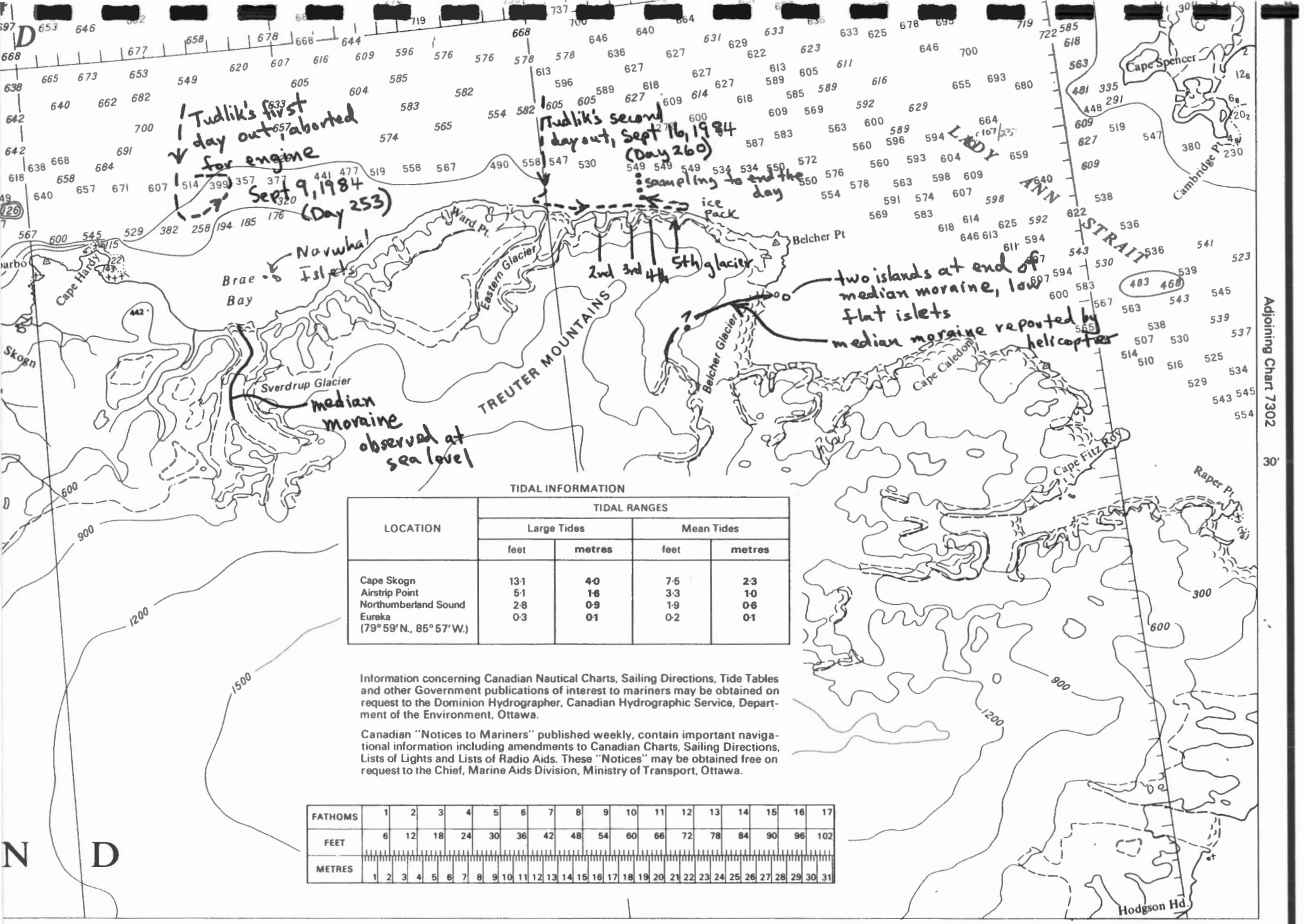

Blubber Pt.
Cape Donninghausen
Cross Bay
Devil I
Falk Pt.
Tver Sound
East Sound
Calf I.
Cape Turnback
Walrus Cape
Bay of Woe
Walrus Fiord
Goose Fiord
Rendalen R.
Olsen I
Gull Ho
Hourglass Bay
Bear Hd
Muskox Fiord
Andersrag Beach
Cape Storm
Baad Fiord
Cape Harrison
Berkeley Bay
Inlet
Cape Arundell
Cape Lyons
FRAM SOUND
Chart 7930
COLIN ARCHER PENINSULA
Archer River
Cape Hawes
St Helena I
Cape Vera
Sandspollen
Eidsbotn
WEST FIORD
Viks Fiord
Boat Pt
Sandhook Bay
DIAGRAM
J O N E S
B E A R B A Y
series of raised beaches crossing outcrop.
several raised beaches on ≈ 10m high
Sept 2, 1984 (Day 246)
Area of FRIGITES work
sheer cliffs very narrow gravel beach

FIGURE 7

Portion of CHS Chart 7950 (CHS, 1974 - reprinted 1983) of 1:500,000 showing general area of TUDLIK work on September 9 and 16, 1984, along south coast of Jones Sound. In Brae Bay and off Belcher Glacier observations of certain glacial features are noted



TIDAL INFORMATION

LOCATION	TIDAL RANGES			
	Large Tides		Mean Tides	
	feet	metres	feet	metres
Cape Skogn	13·1	4·0	7·5	2·3
Airstrip Point	5·1	1·6	3·3	1·0
Northumberland Sound	2·8	0·9	1·9	0·6
Eureka (79°59′N., 85°57′W.)	0·3	0·1	0·2	0·1

Information concerning Canadian Nautical Charts, Sailing Directions, Tide Tables and other Government publications of interest to mariners may be obtained on request to the Dominion Hydrographer, Canadian Hydrographic Service, Department of the Environment, Ottawa.

Canadian "Notices to Mariners" published weekly, contain important navigational information including amendments to Canadian Charts, Sailing Directions, Lists of Lights and Lists of Radio Aids. These "Notices" may be obtained free on request to the Chief, Marine Aids Division, Ministry of Transport, Ottawa.

FATHOMS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
FEET	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102
METRES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Adjoining Chart 7302

30′

Corrected Through / Corrigé d'après

Printed by Surveys and Mapping Branch, Department of Energy, Mines and Resources

Northwest Territories - Queen Elizabeth Islands

JONES SOUND, NORWEGIAN BAY AND QUEENS CHANNEL

7950

28 III 13'79

FIGURE 8

Reproduction of a modified version of Taylor and Frobel's 1984) Figures 3.5 and 3.6 (p. 29) showing the interpreted extent of the sill or terminal (end) moraine off the terminus of the Sverdrup Glacier in Brae Bay, Jones Sound. The shallow water around the Narwhal Islets is also interpreted to be part of the sill or terminal moraine. The figure has been modified to show approximate location of FINCH's 1984 lines relative to the 1983 FRIGATE lines and the deep 160 m hole in front of the glacier's terminus

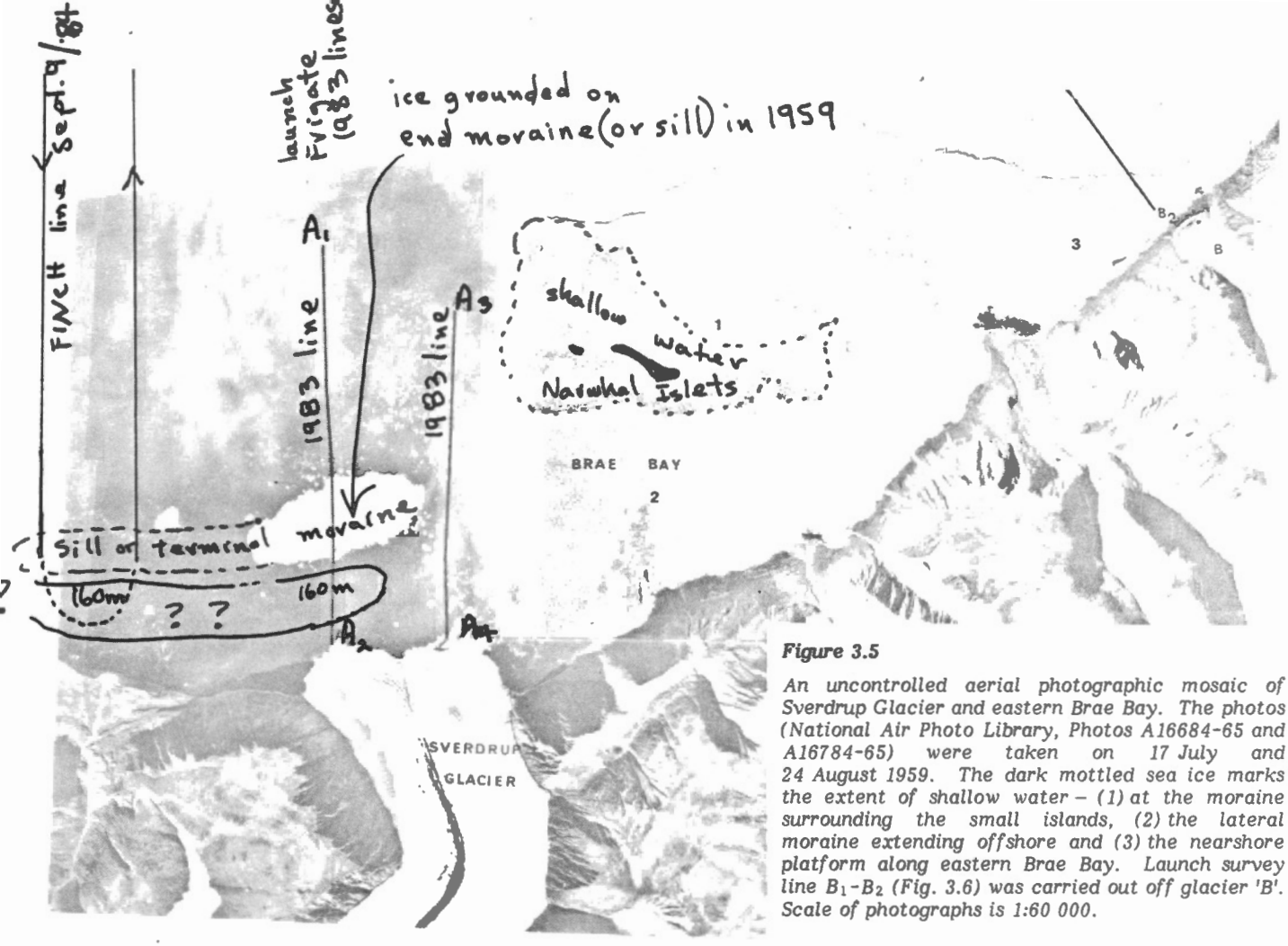


Figure 3.5

An uncontrolled aerial photographic mosaic of Sverdrup Glacier and eastern Brae Bay. The photos (National Air Photo Library, Photos A16684-65 and A16784-65) were taken on 17 July and 24 August 1959. The dark mottled sea ice marks the extent of shallow water – (1) at the moraine surrounding the small islands, (2) the lateral moraine extending offshore and (3) the nearshore platform along eastern Brae Bay. Launch survey line B_1-B_2 (Fig. 3.6) was carried out off glacier 'B'. Scale of photographs is 1:60 000.

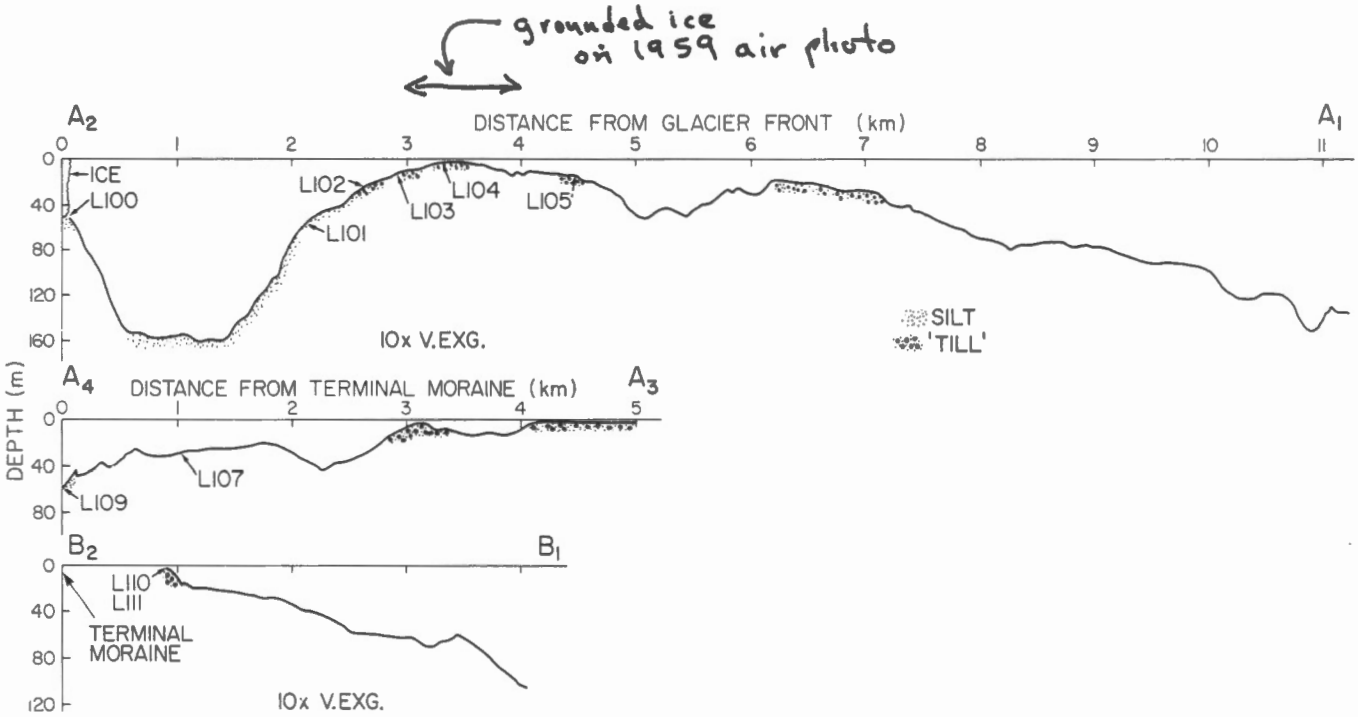


Figure 3.6. *Cross-sectional profiles of the nearshore bottom off Sverdrup Glacier (A_1-A_2 – western face and A_3-A_4 – eastern face) and off a smaller non-tidewater glacier (B_1-B_2) located along eastern Brae Bay. See Figure 3.4a for the location of survey lines.*

FIGURE 9

Portion of CHS Chart 7950 (CHS, 1974 - reprinted 1983) showing general area of TUDLIK work in "Tudlik Bay" on September 18, 19, 20 and 21, 1984. Observed geological features onshore are noted as well as general areas of grounded pack ice and bergy bits on Lemieux Shoal

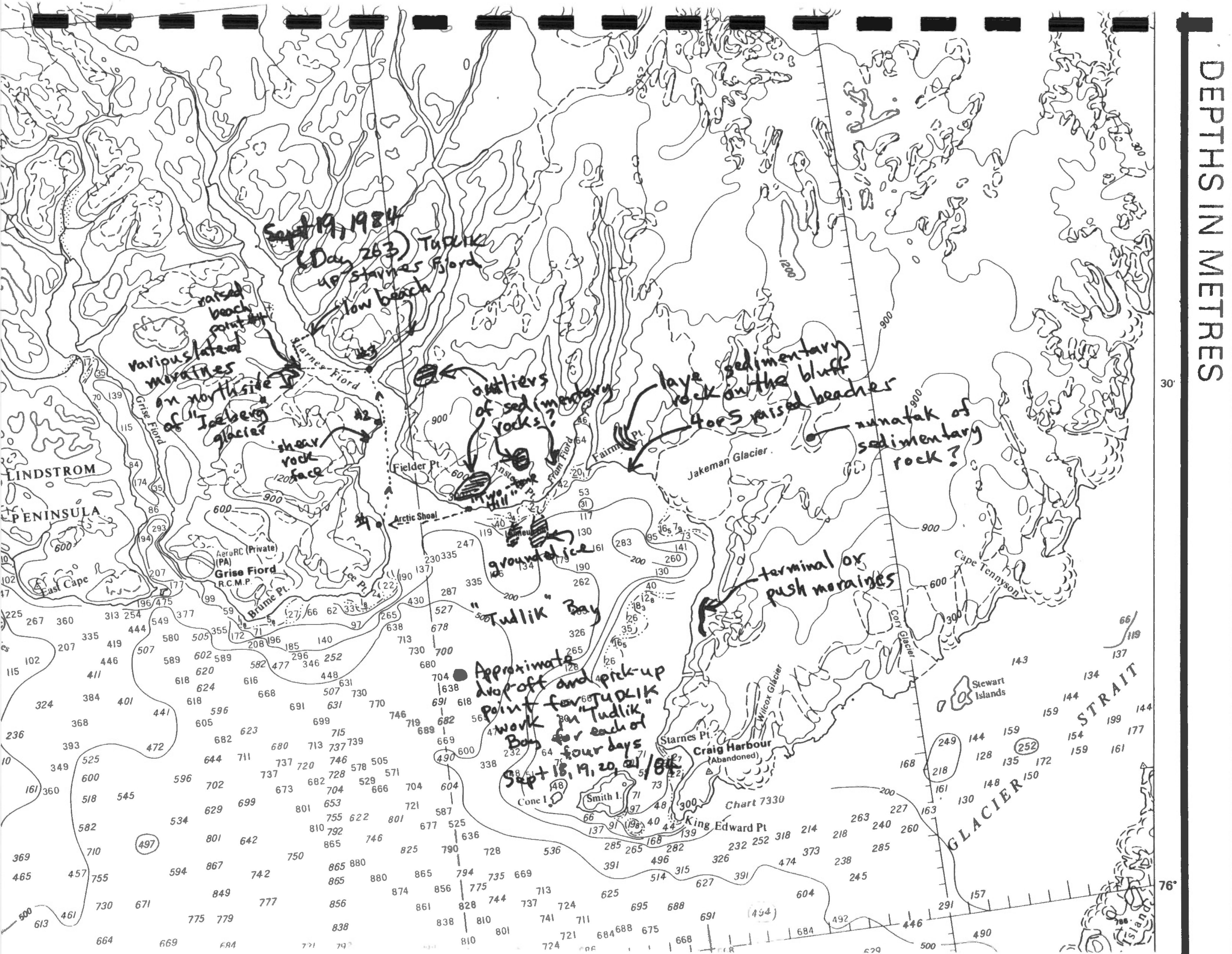

DEPTHS IN METRES
Sept 19, 1984 (Day 263) Tudlik up Starnes Fjord
low beach
raised beach point
various lateral moraines on northside of "Iceberg glacier"
Starnes Fiord
Grise Fiord
shear rock face
outliers of sedimentary rocks?
"two-tank hill"
Fielder Pt.
Flam Fiord
Fairm Pt.
large sedimentary rock on the bluff
4 or 5 raised beaches
nunatak of sedimentary rock?
Jakeman Glacier
Arctic Shoal
grounded ice
LINDSTROM PENINSULA
East Cape
Grise Fiord R.C.M.P.
AeroRC (Private) (PA)
Brume Pt.
Lee Pt.
"Tudlik" Bay
terminal or push moraines
Cape Tennyson
Cory Glacier
Approximate drop-off and pick-up point for TUDLIK work in "Tudlik" Bay for each of four days Sept 18, 19, 20, 21 /84
Wilcox Glacier
Starnes Pt.
Craig Harbour (Abandoned)
Smith I.
Cone I.
King Edward Pt
Chart 7330
Stewart Islands
GLACIER STRAIT
30'
76°

FIGURE 10

Enlarged portion of the 1:250,000 National Topographic Map of the "Tudlik Bay" area at the terminus of Jakeman Glacier north of Cone and Smith Islands, Jones Sound. The scale has been enlarged to 1:150,000 to match the CHS Field Sheets used in 1984. Map is annotated to show the general area of Arctic Shoal at the mouth of Starnes Fjord and the general area of Lemieux Shoal south of Anstead Point west of the mouth of Fram Fjord. Map is also annotated to show observations of sedimentary rock sitting unconformally on probable Precambrian basement and other features observed from CSL TUDLIK as she worked in the bay

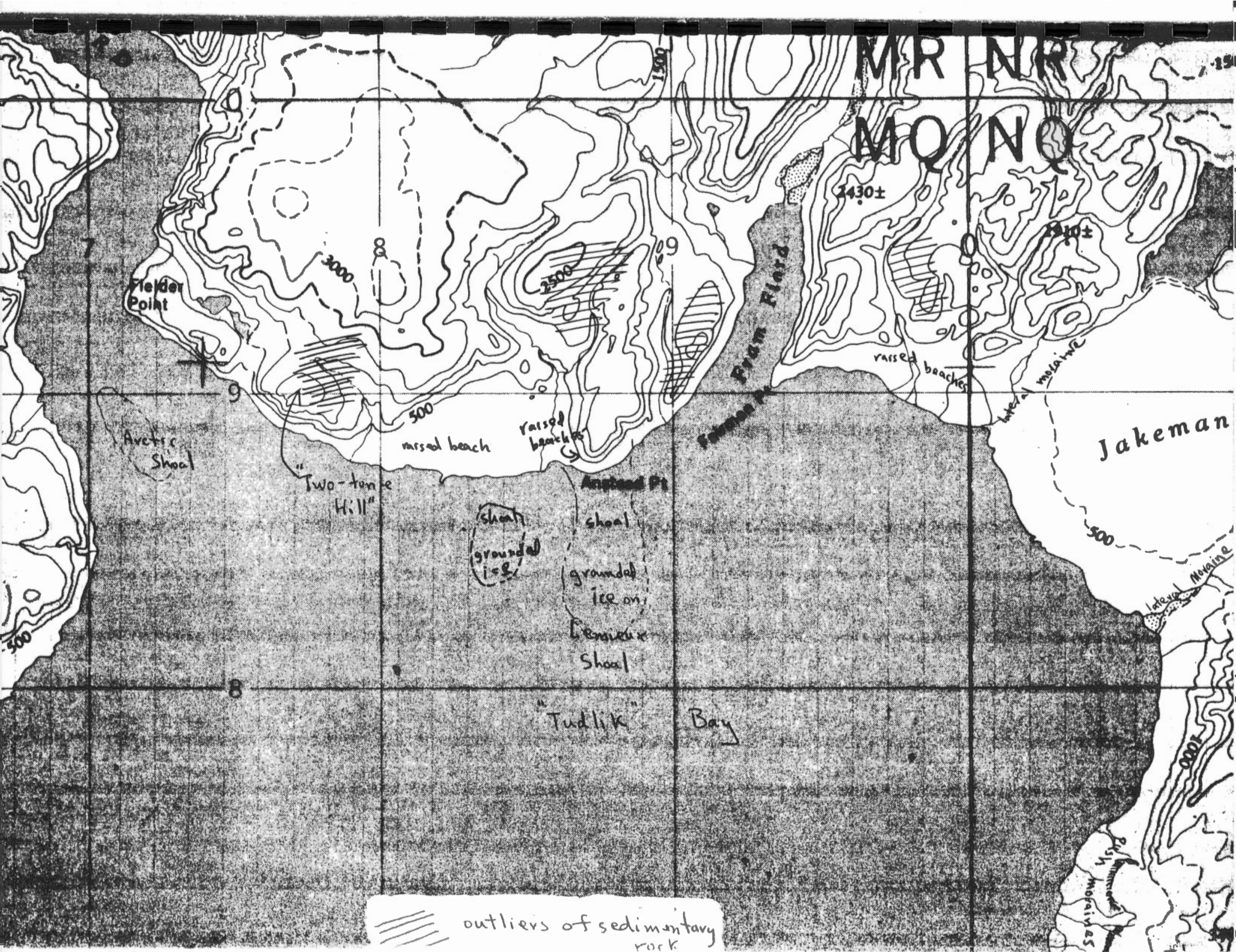
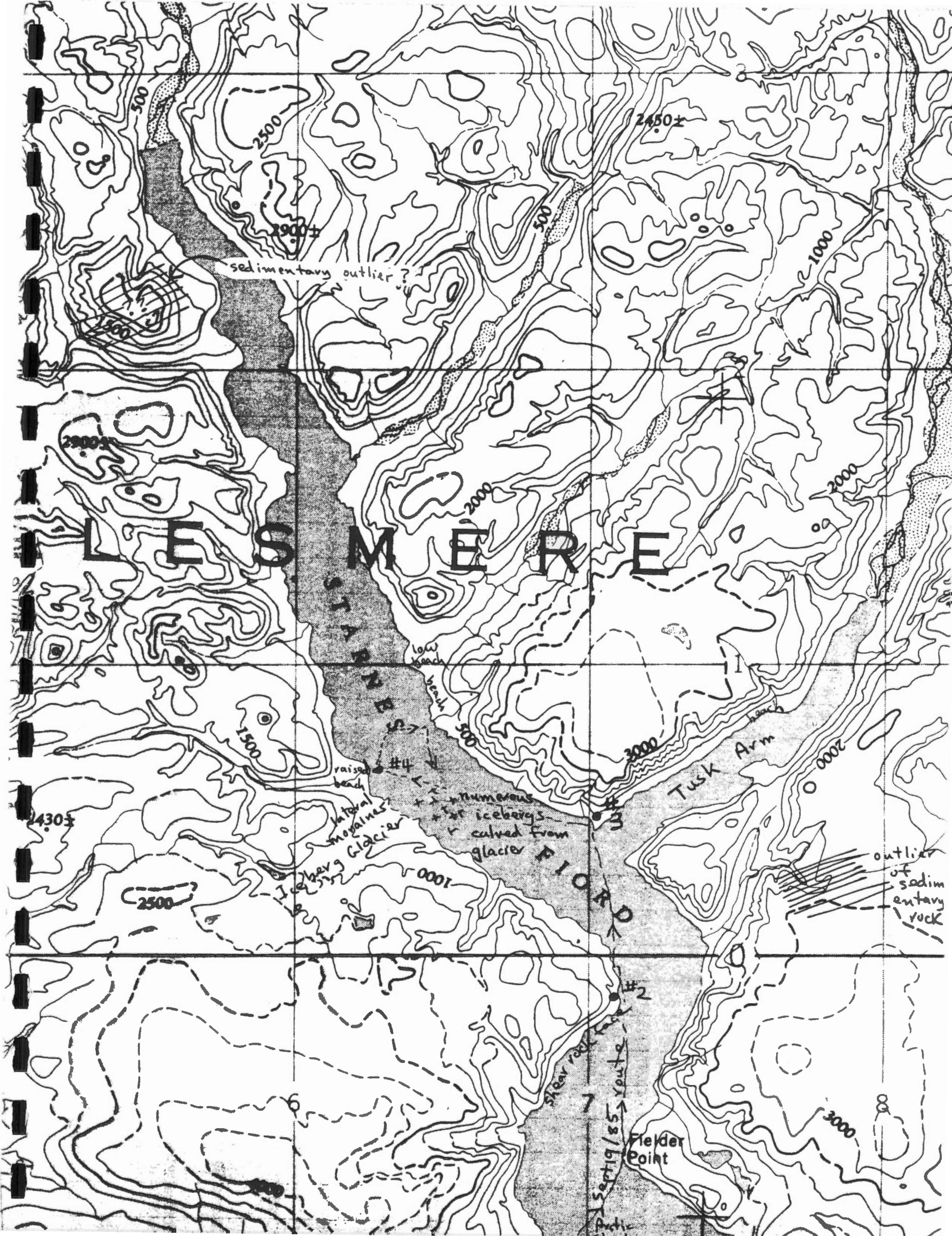

MR NR
MQ NQ
1500
2430±
2410±
7
8
9
0
3000
2500
Fletcher Point
500
raised beach
raised beaches
Fram Fiord
lateral moraine
Jakeman
Aretic Shoal
"Two-tone Hill"
Amstead Pt
shoal
shoal grounded ice
grounded ice on Lemieux Shoal
"Tudlik" Bay
lateral moraine
push moraines
outliers of sedimentary rock

FIGURE 11

Enlarged portion of the 1:250,000 National Topographic Map of Starnes Fjord and "Tusk Arm" to the northwest of "Tudlik Bay", Jones Sound. The scale has been enlarged to 1:150,000 to match the CHS field sheet used in 1984. Map is annotated to show the area of Arctic Shoal and "Iceberg Glacier" as noted on the September 19, 1984 traverse by CSL TUDLIK. Map also annotated to note various other glacial and geological features noted on the traverse up the fjord



L E S M E R E
STARNES FIORD
Tusk Arm
sedimentary outlier ?
2450±
2900±
2500
500
1000
2000
1500
3000
2430±
low beach
beach
raised beach
#4
#3
#2
numerous icebergs calved from glacier
lateral moraines?
Iceberg Glacier
outlier of sedimentary rock
shear rock face
route
Sept 19/85
Fielder Point

FIGURE 12

Interpreted map of the distribution of unconsolidated surficial sediments on the seabed in Jones Sound based on the 1983 BAFFIN 83-008 acoustic data and on the preliminary 1983 sample information. The number indicate the soft uppermost clay thickness in meters. The map was taken from Figure 49.3 in MacLean et al. (1984).

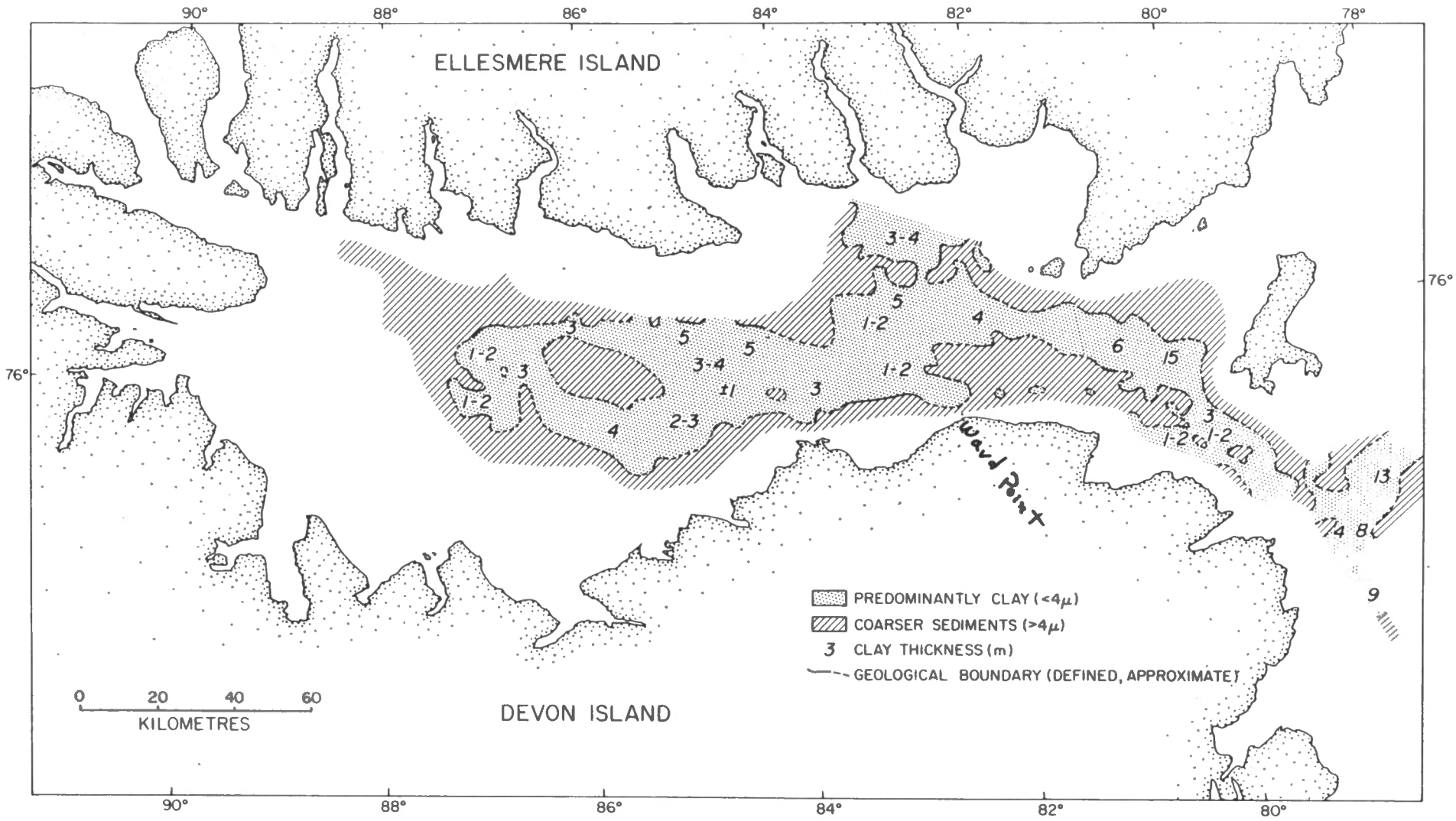

90°
88°
86°
84°
82°
80°
78°
76°
ELLESMERE ISLAND
DEVON ISLAND
Ward Hunt
PREDOMINANTLY CLAY (<4μ)
COARSER SEDIMENTS (>4μ)
3 CLAY THICKNESS (m)
GEOLOGICAL BOUNDARY (DEFINED, APPROXIMATE)
0 20 40 60
KILOMETRES

FIGURE 13

Map of MacLean *et al*'s. (1984) preliminary interpretation of the offshore bedrock geology in Jones Sound from BAFFIN 83-008 cruise. This figure was taken from Figure 49.6 in MacLean *et al*. (1984) and drew on the onshore bedrock geology from Frisch (1983) and from Fortier *et al*. (1983).

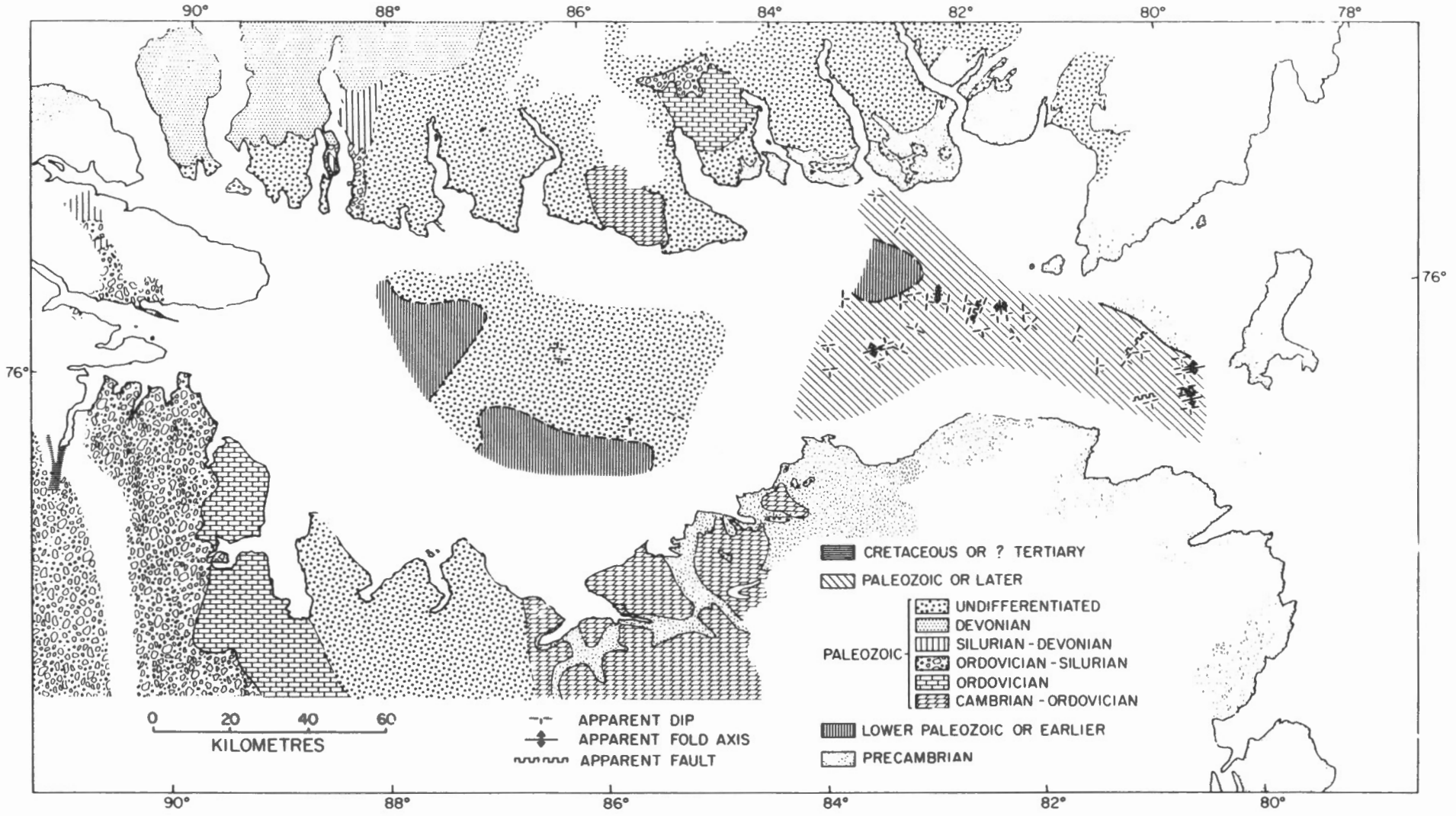
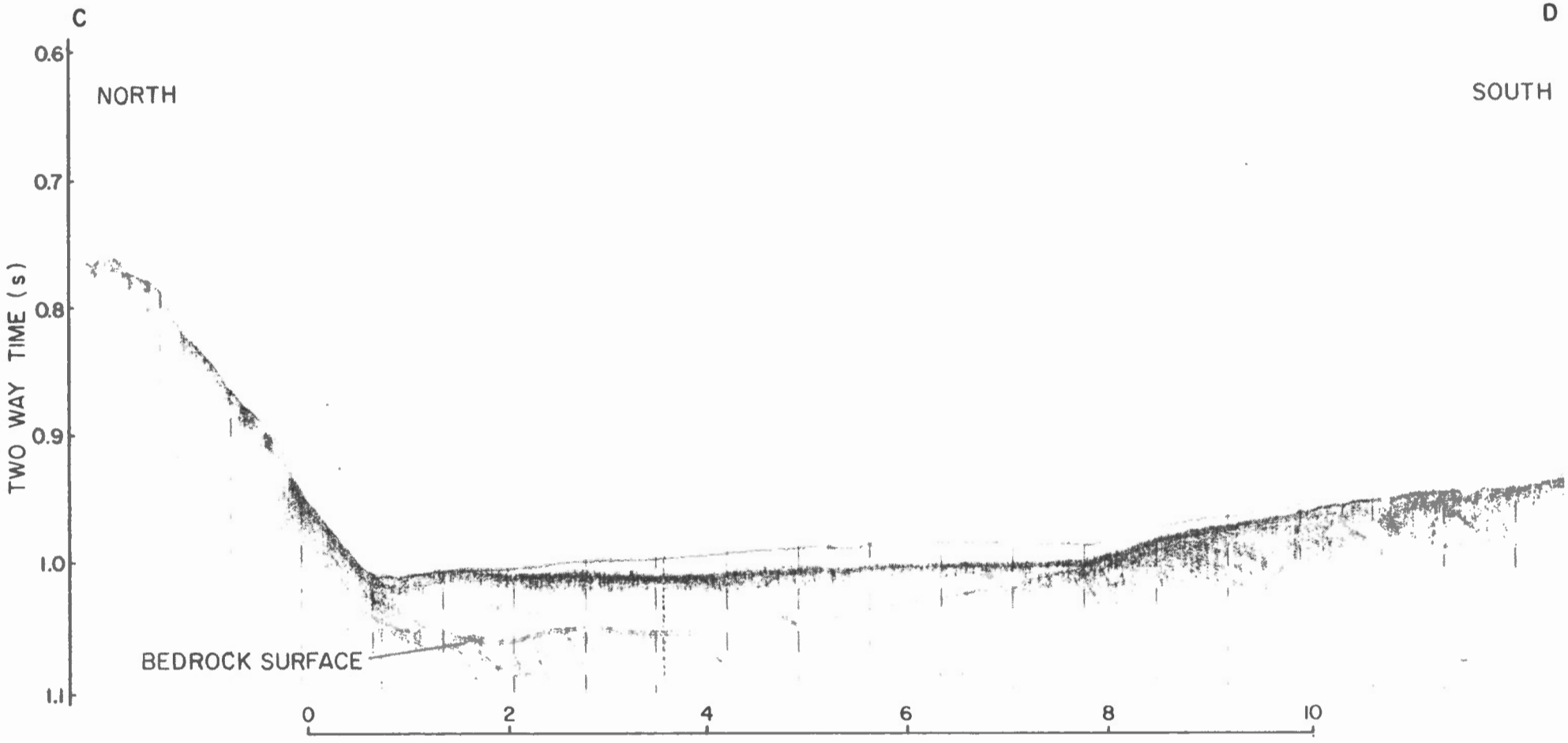

90°
88°
86°
84°
82°
80°
78°
76°
CRETACEOUS OR ? TERTIARY
PALEOZOIC OR LATER
PALEOZOIC
UNDIFFERENTIATED
DEVONIAN
SILURIAN - DEVONIAN
ORDOVICIAN - SILURIAN
ORDOVICIAN
CAMBRIAN - ORDOVICIAN
LOWER PALEOZOIC OR EARLIER
PRECAMBRIAN
APPARENT DIP
APPARENT FOLD AXIS
APPARENT FAULT
0 20 40 60
KILOMETRES

FIGURE 14

Reproduction of Figure 49.5 from MacLean et al. (1984) showing a section from north to south along line C-D across the axis of Jones Sound just west of Coburg Island (see index map in the earlier Figure 2). The data came from Huntec deep-towed boomer line and shows bedrock strata overlain by surficial sediments consisting of possible till or proglacial sediments and all overlain by a near-transparent veneer of soft clay. The clay is thickest in the centre of the Sound and thins towards the margins.


C
D
NORTH
SOUTH
0.6
0.7
0.8
0.9
1.0
1.1
TWO WAY TIME (s)
BEDROCK SURFACE
0
2
4
6
8
10

FIGUE 15

Figure 49.4 and caption taken from MacLean et al. (1984). Figure shows section A-B from north to south (see index map in the earlier Figure 2 for the location). Figure is of a seismic reflection profile obtained from a small sparker northeast of Belcher Point. The profile illustrates folded Palaeozoic or younger strata in the eatern part of Jones Sound. Overlying surficial sediments on the southern part of the section resemble glacial till. Huntec high resolution and 12 kHz acoustic data indicate that the latter material is exposed at the seabed in the south and that it thins and is overlain by clay to the north in the deeper water. This profile can be thought to fit on the south of profile C-D in the previous figure. Thus section C-D-A-B makes a composite sub-bottom profile across the eastern end of Jones Sound. The thin veneer of clay is not seen on this profile because it is transparent to the lower frequencies of the sparker.

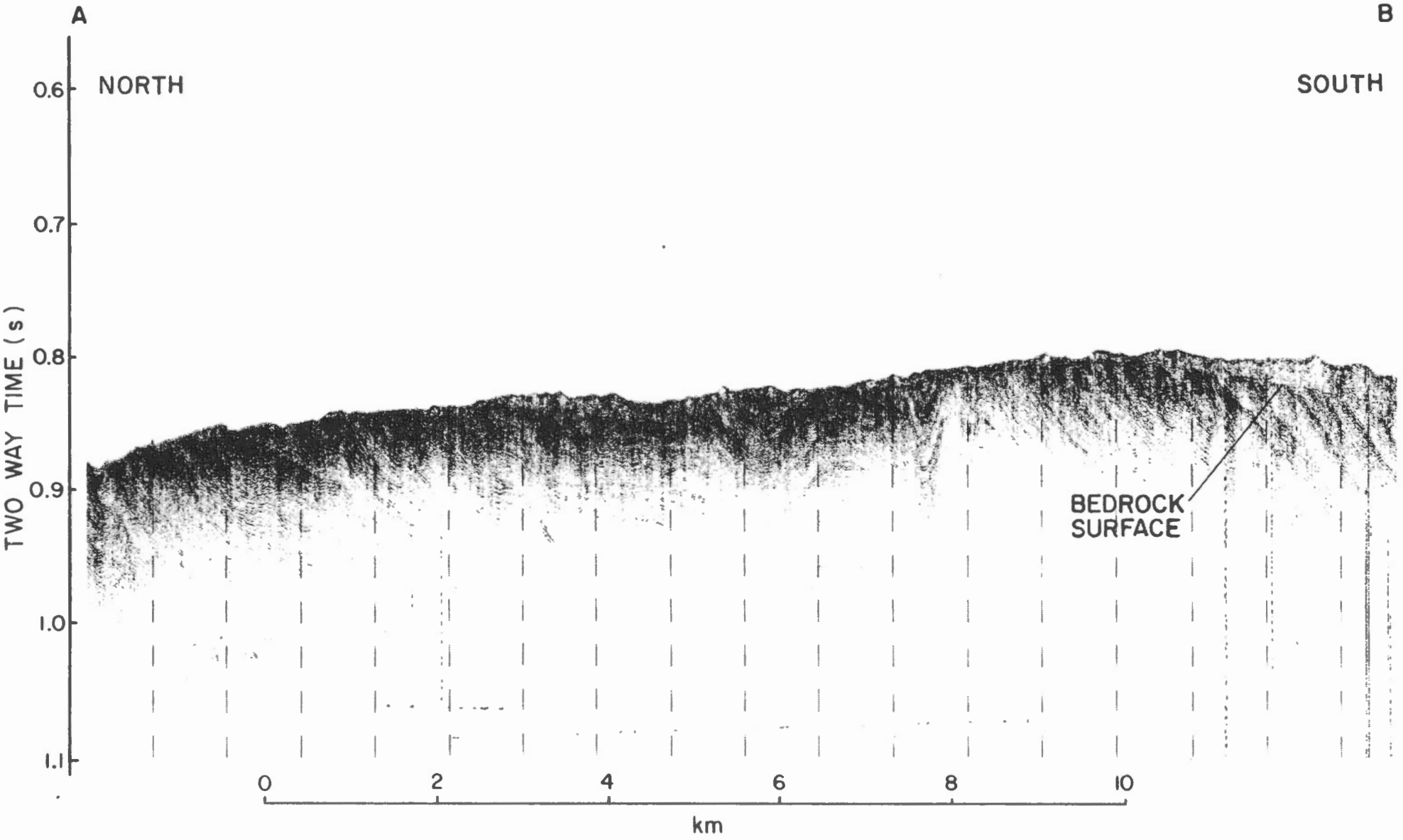

A
B
NORTH
SOUTH
0.6
0.7
0.8
0.9
1.0
1.1
TWO WAY TIME (s)
BEDROCK SURFACE
0
2
4
6
8
10
km

FIGURE 16

Portion of Roll #1 of ELAC 12(?) kHz data from TUDLIK on September 16, 1984. This record shows the two lateral moraines that straddle the 2nd glacier and the scoured area between them along the axis of the glacier.
Scale 0 to 200 m (40 m/division).

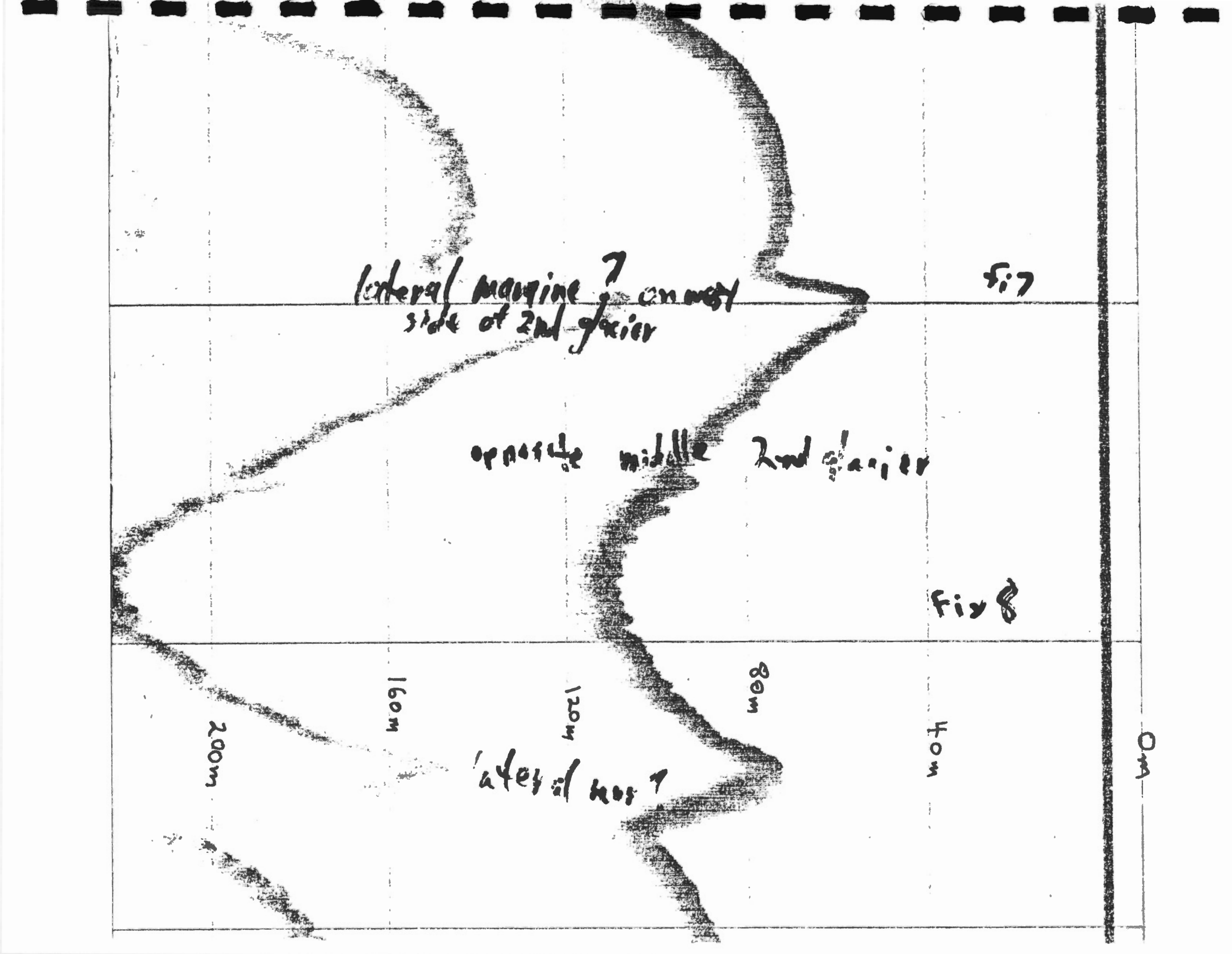


fig 7
lateral margine ? on west
side of 2nd glacier
opposite middle 2nd glacier
fig 8
200m
160m
120m
80m
40m
0m

FIGURE 17

Portion of Roll #4 of ELAC 12(?) kHz data from TUDLIK on Septmber 18, 1984. This record shows an area of about 40 m water depth between the two portions of Lemieux Shoal where it appears icebergs have done considerable scouring. Scale 0 to 50 m (10 m/division).

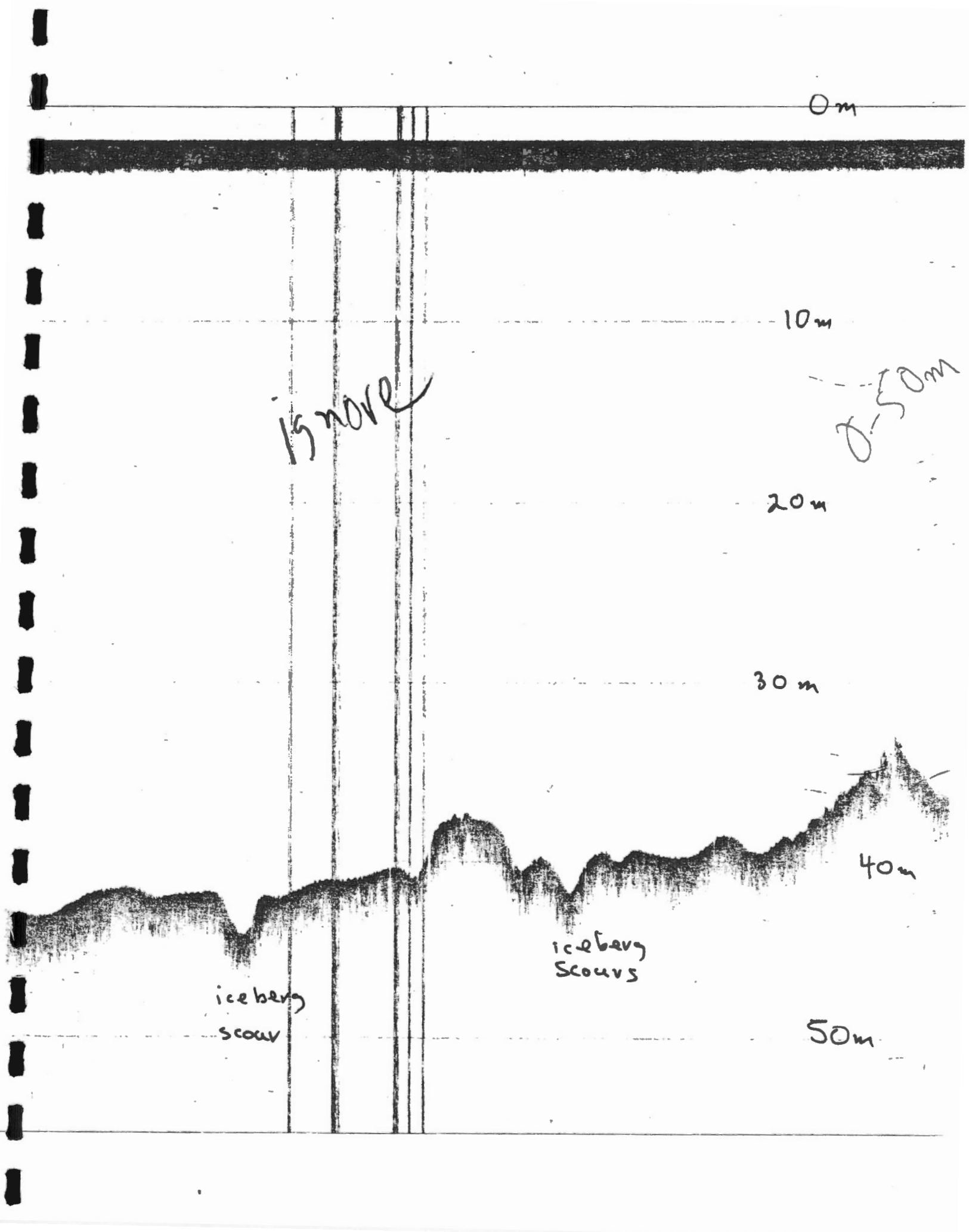

0m
10m
20m
30m
40m
50m
ignore
iceberg scour
iceberg scours

FIGURE 18

Portion of Roll #5 of ELAC 12(?) kHz data from TUDLIK on Septmber 19, 1984 on run back down Starnes Fjord. Record shows the only time when the TUDLIK 12(?) kHz profiler ever showed any penetration into the sediments. (We suspect a 30 kHz echosounder could also penetrate here in some of the deepest parts of the fjord.) Scale 200 to 400 m (40 m/division).

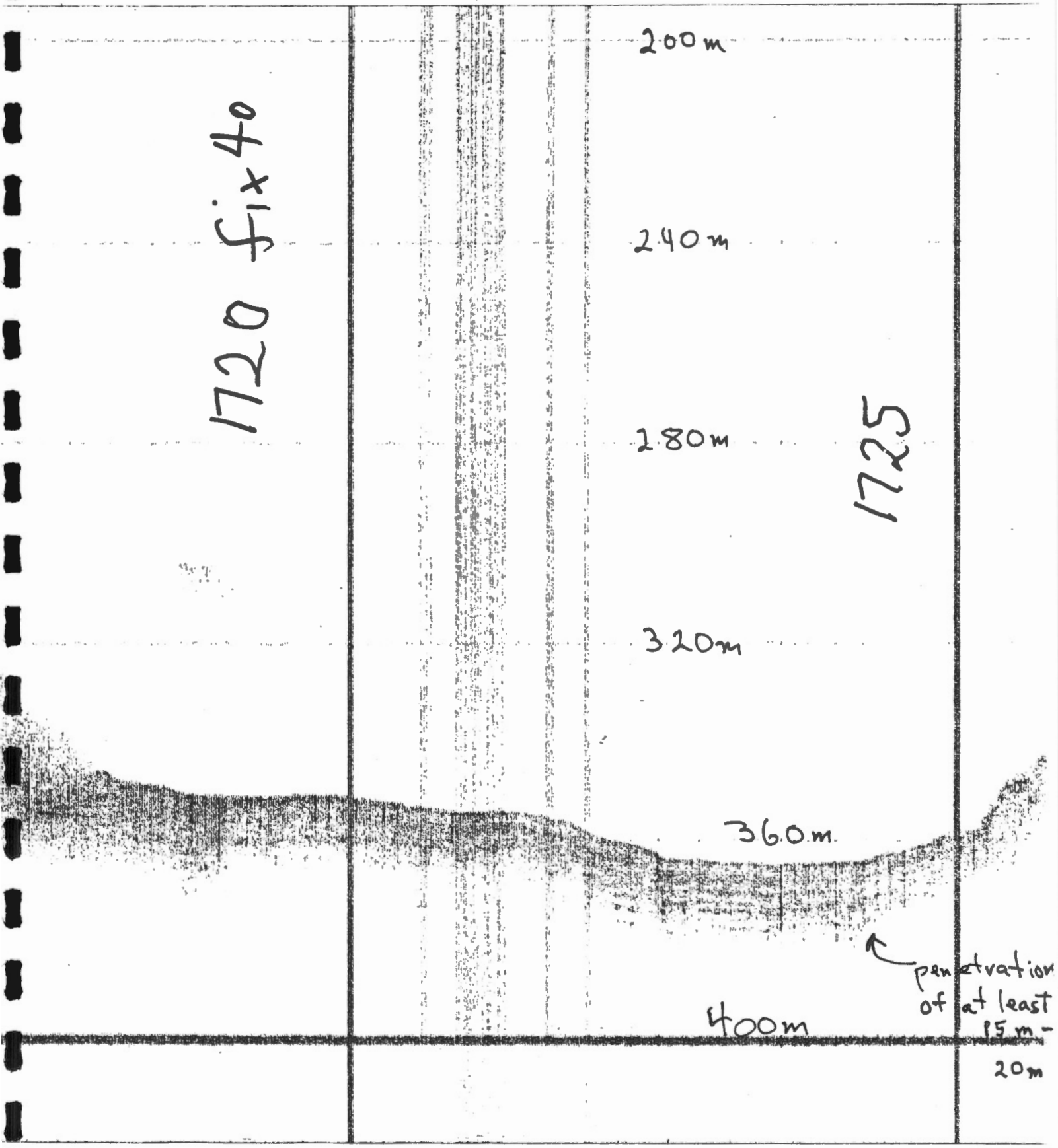

1720 fix 40
200m
240m
280m
1725
320m
360m.
penetration of at least 15m - 20m
400m

FIGURE 19

Portion of Roll #6 of ELAC 12(?) kHz data from TUDLIK on September 20, 1984 on run across the mouth of Starnes fjord. Record shows a possible channel-like notch in the axis of the fjord. Scale 200 to 400 m (40 m/division).

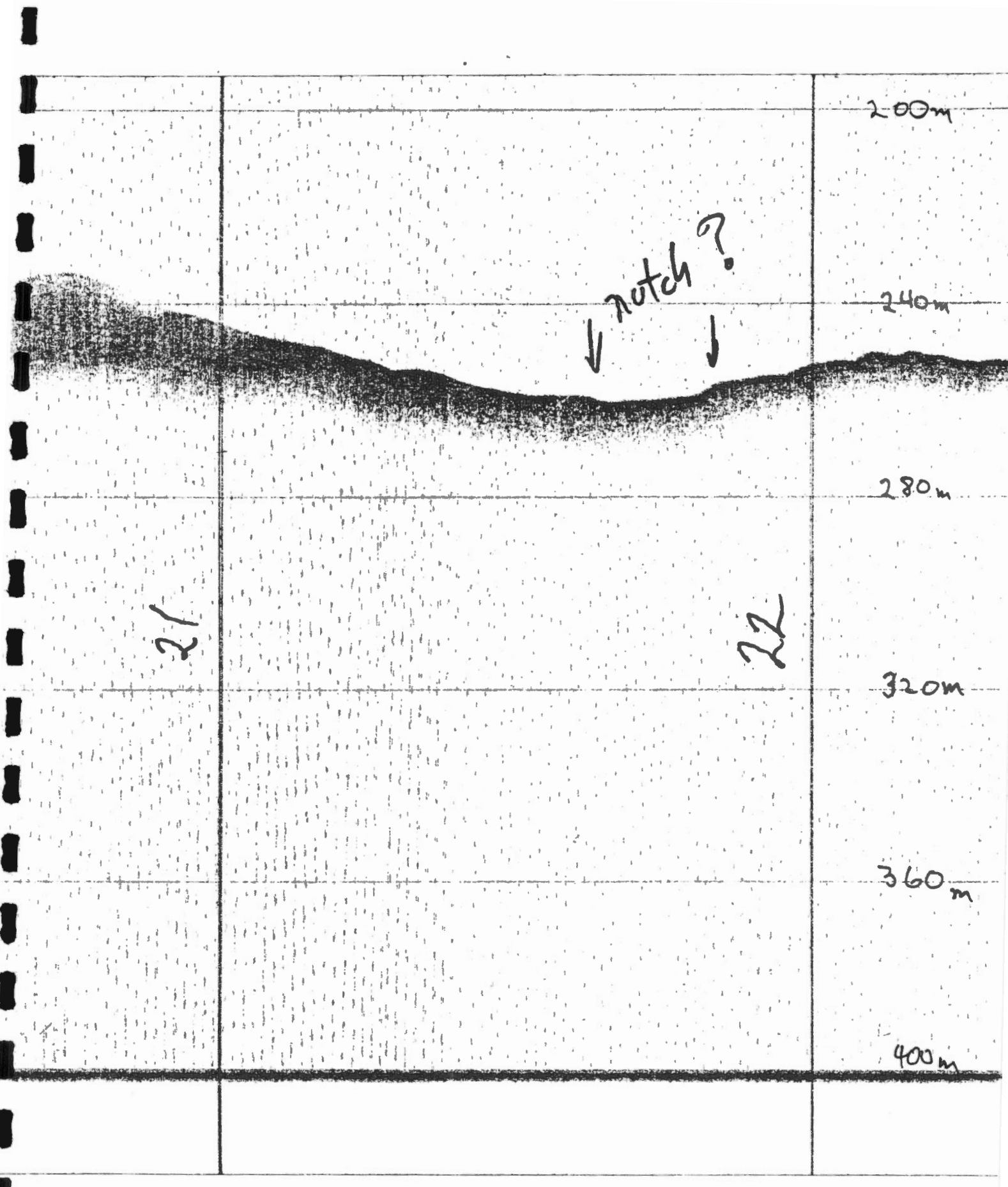
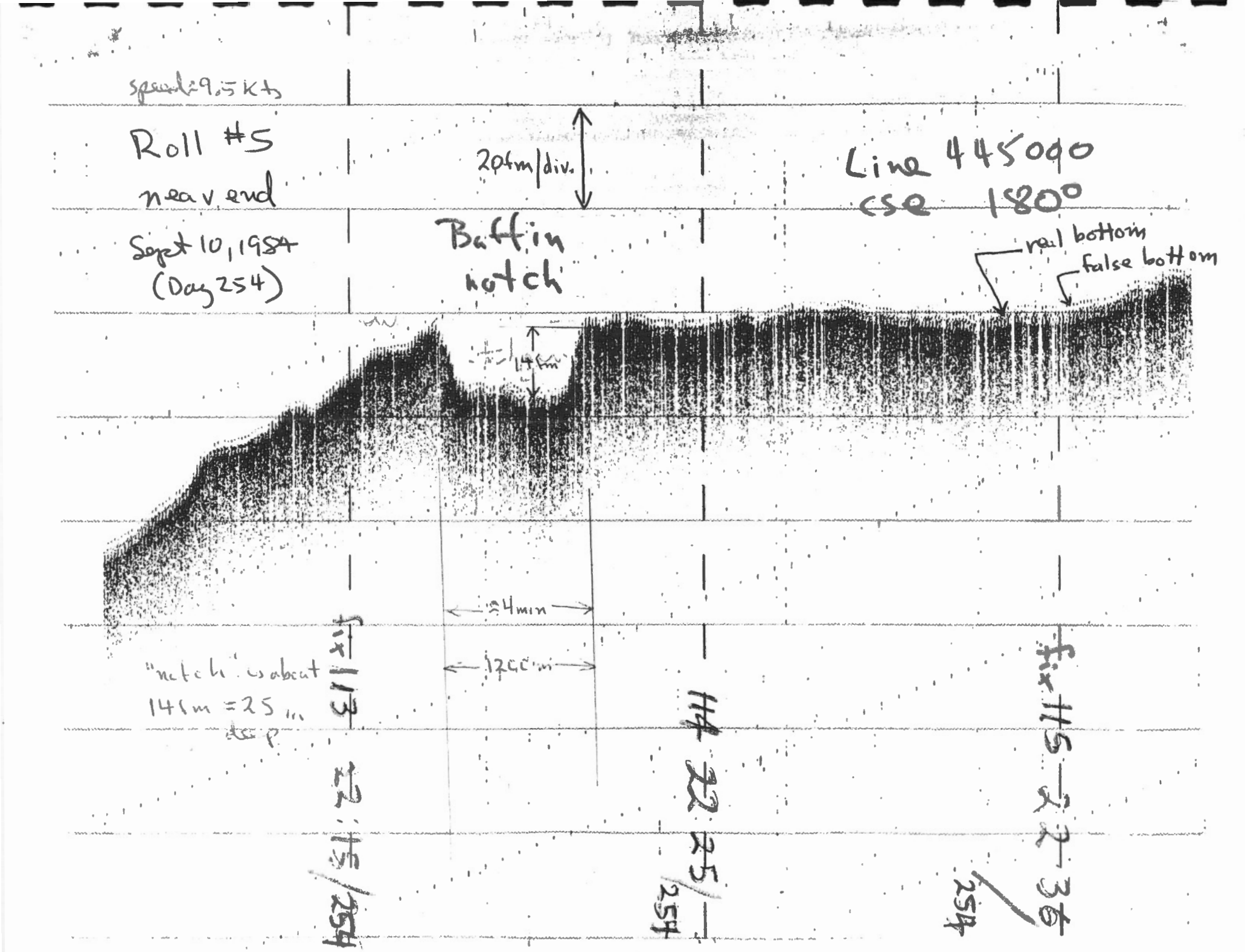

200m
notch ?
240m
280m
21
22
320m
360m
400m

FIGURE 20

Portion of BAFFIN's September 10, 1984, Roll #5 of 12 kHz profiler data showing a 1200 m wide "notch" about 25 m deep. This is most certainly a bedrock feature. The record also illustrates the false bottom that showed up only on the 400 to 800 or 200 to 600 fm scale. This problem could never by cleared up. Scale 20 fm/division.


speed 9.5 kts
Roll #5
near end
Sept 10, 1984
(Day 254)
20 fm/div.
Baffin notch
Line 445090
CSE 180°
real bottom
false bottom
≈14 fm
≈4 min
≈12 min
"notch" is about
14 fm = 25 m
deep
fix 113 / 254
fix 114 / 254
fix 115 / 254
fix 116 / 254

PHOTOS

PHOTO 1

CSL TUDLIK LEAVING CSS BAFFIN ON A MEL OUTING

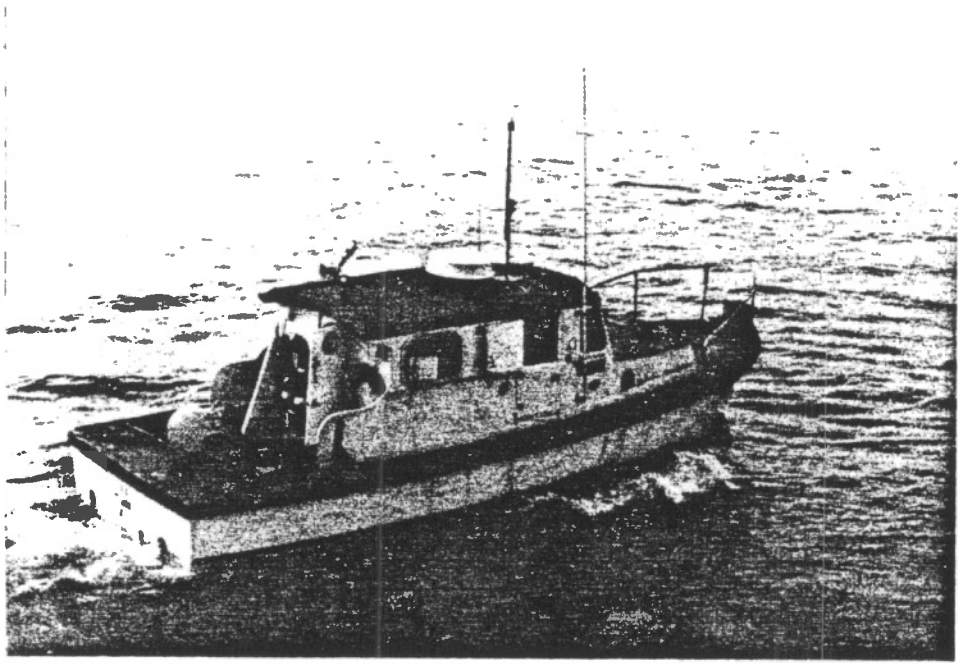


PHOTO 2

Composite photo to show the awkward rigging to hold staff of RTT 1000 7.0 kHz profiler's transducer (yellow cone) against the aluminium bracket on the port side of CSL TUDLIK. The wire was taped along edge of the staff. The segmented aluminum staff was held against the 90° bracket with an end-to-end pair of hose clamps placed above the flange. A bolted clamp (minus its rubber bushing), pinched from the engine room (orange), was used below the flange. It was quite awkward to rig and derig. The 200 kHz transducer is on the leading flange with the wire stay leading forward out of the bottom of the photo.

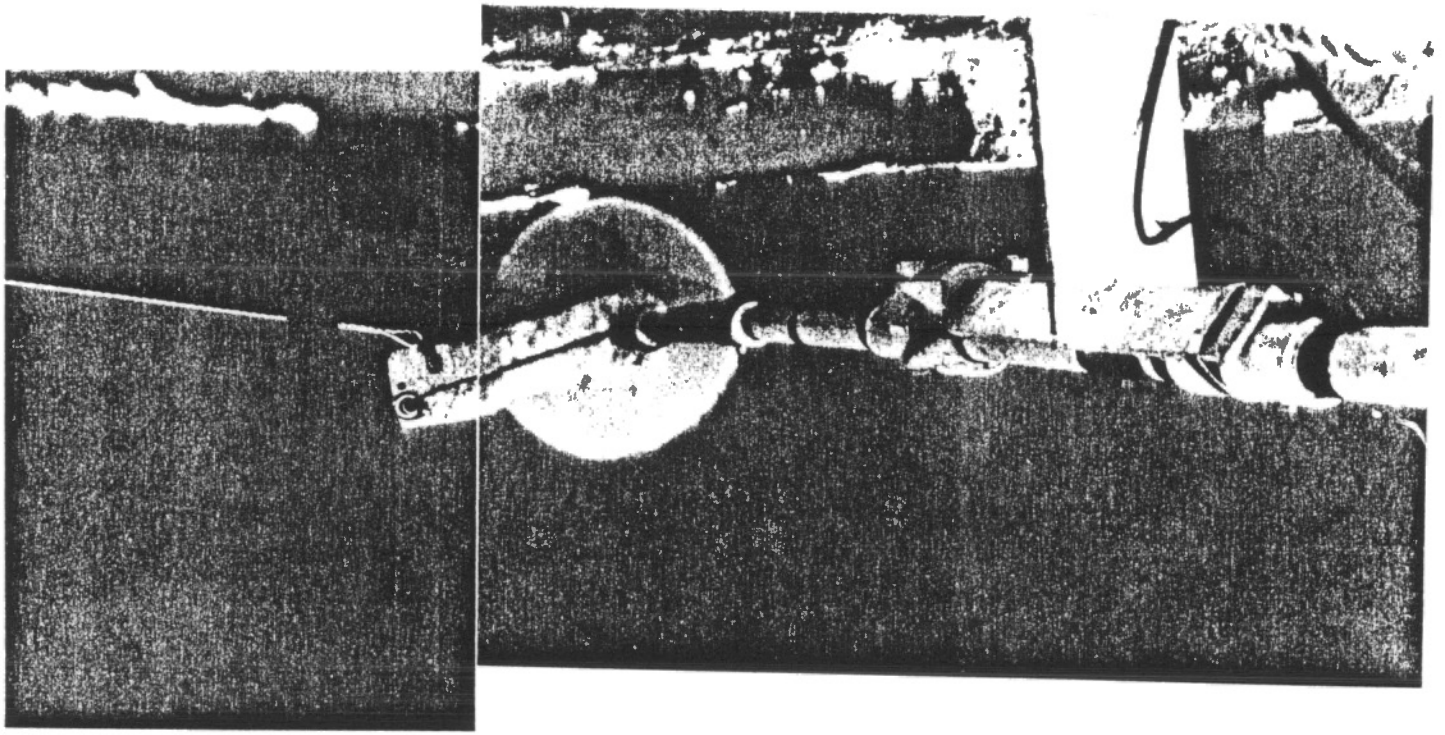


PHOTO 3

Composite view of Jakeman Glacier showing nunatak of sedimentary rock(?) in centre distance and lateral moraine to either side. Dark line at sealevel in left centre is the base of the glacier which is just about at sealevel here. Raised beaches were seen in the area to the left of the glacier (off the photo to the west).

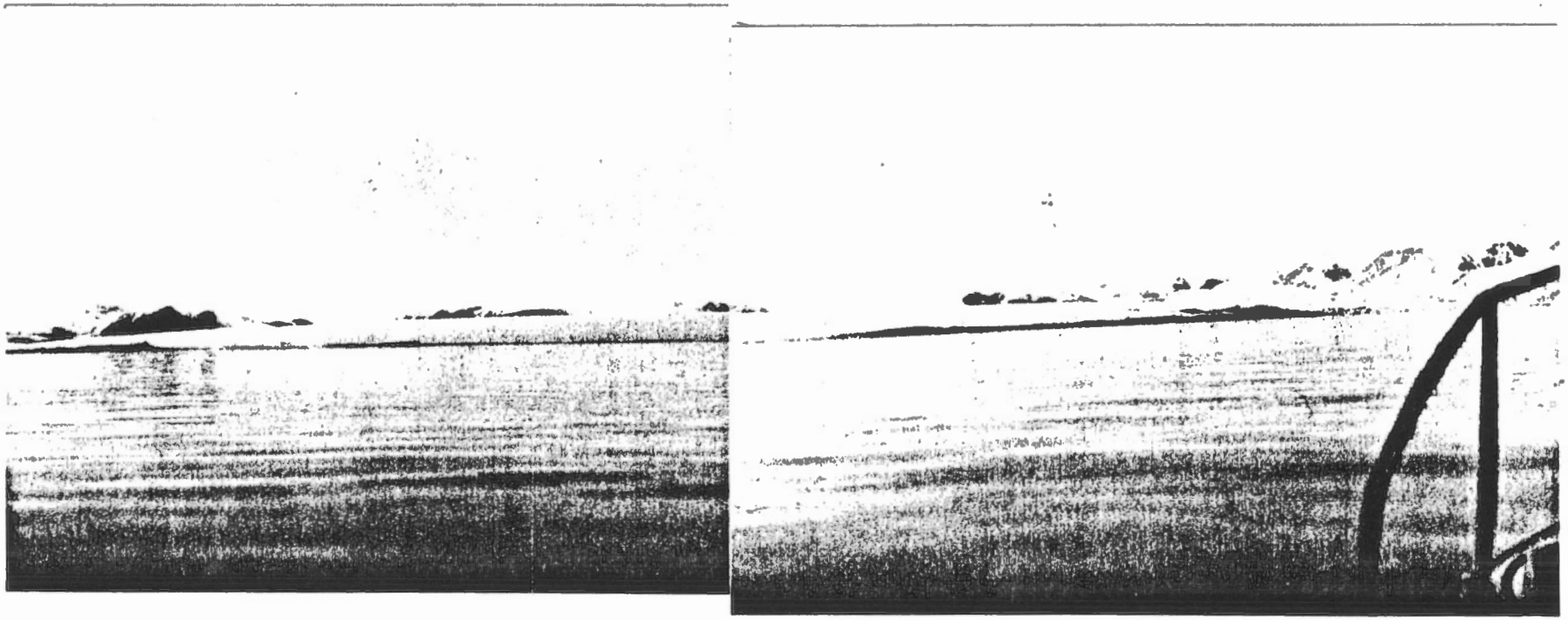


PHOTO 4

Photo on right is taken looking up Fram Fjord and lighter sedimentary rock can clearly be seen overlying darker massive rock along the west side of the Fjord. Amstead Point is to the left of the photo just out of sight.

The photo on the left is to the west and is looking at the beach to the west of Amstead Point. A contact (possible faulted) between the two rock types is seen.

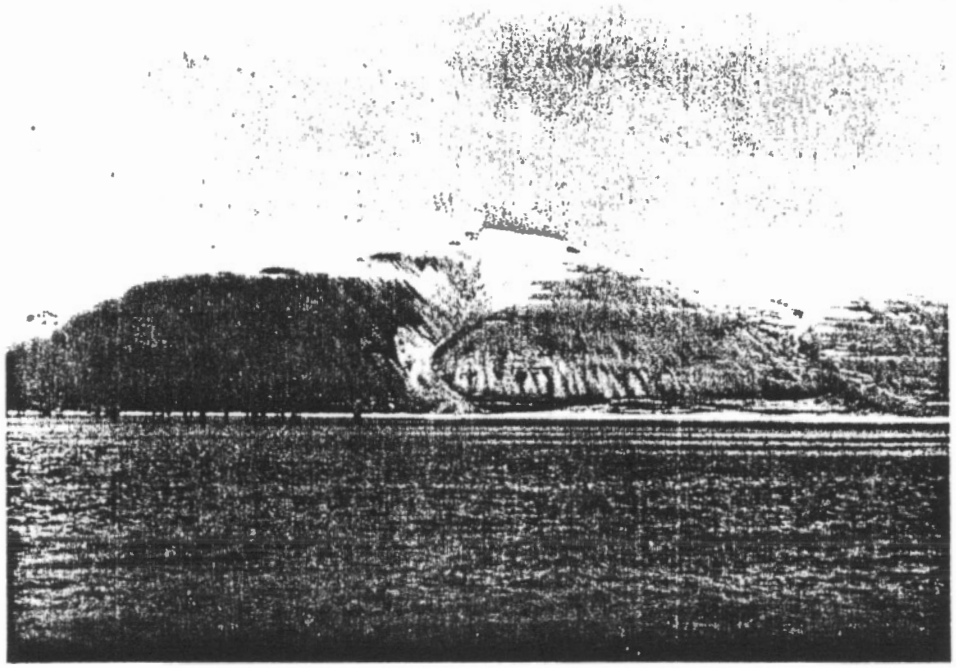


PHOTO 5

View of "Two-tone Hill" to right with Fielder Point beyond along the east side of Starnes Fjord. Starnes Fjord passes northward out of sight in the centre of the photo.

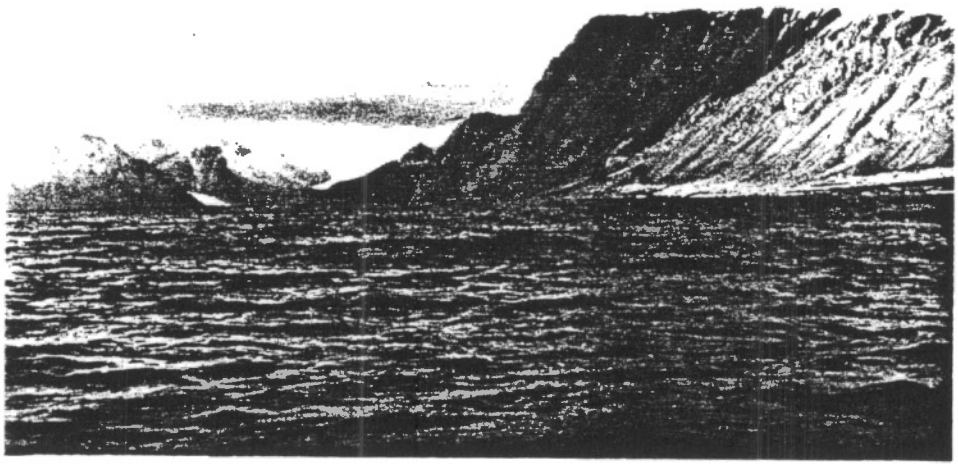


PHOTO 6

View up Starnes Fjord about opposite Tusk Arm. A sedimentary outlier can be seen in the distance. The large number of icebergs have calved from "Iceberg Glacier" out of sight to the left (southwest).

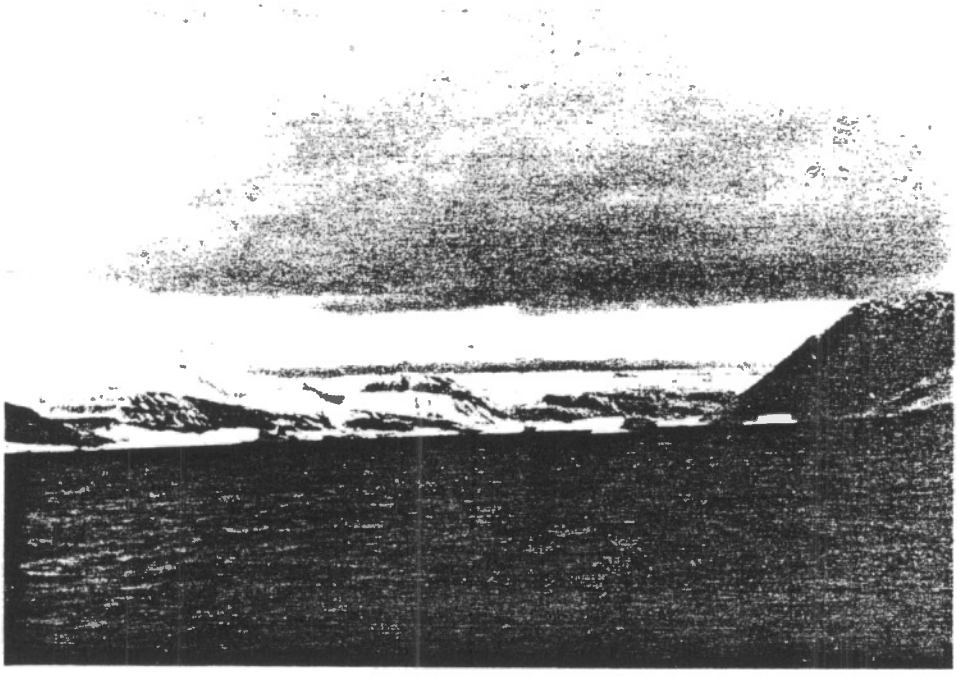


PHOTO 7

Composite view of "Iceberg Glacier" on the southwest side of Starnes fjord just above Tusk Arm. A well-developed series of lateral moraines were seen to the right (north) of the glacier. Further to the right a raised beach was observed.

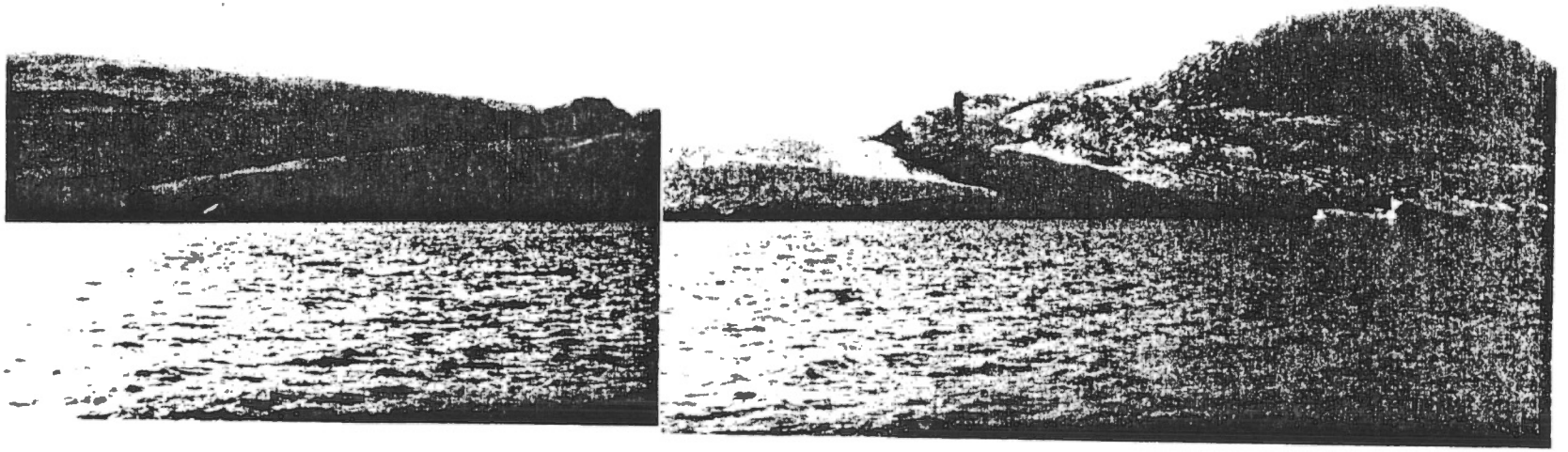


PHOTO 8

BAFFIN waiting in Tudlik Bay for the evening launch pickup on September 19, 1984 framed against Smith Island with Cone Island to the right.

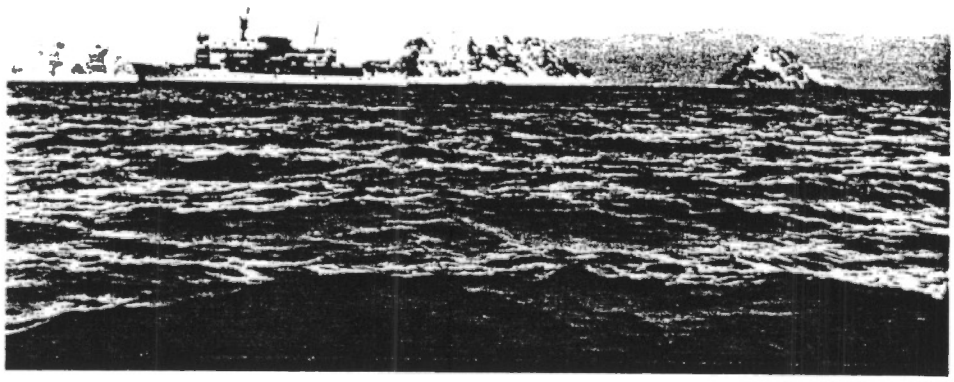
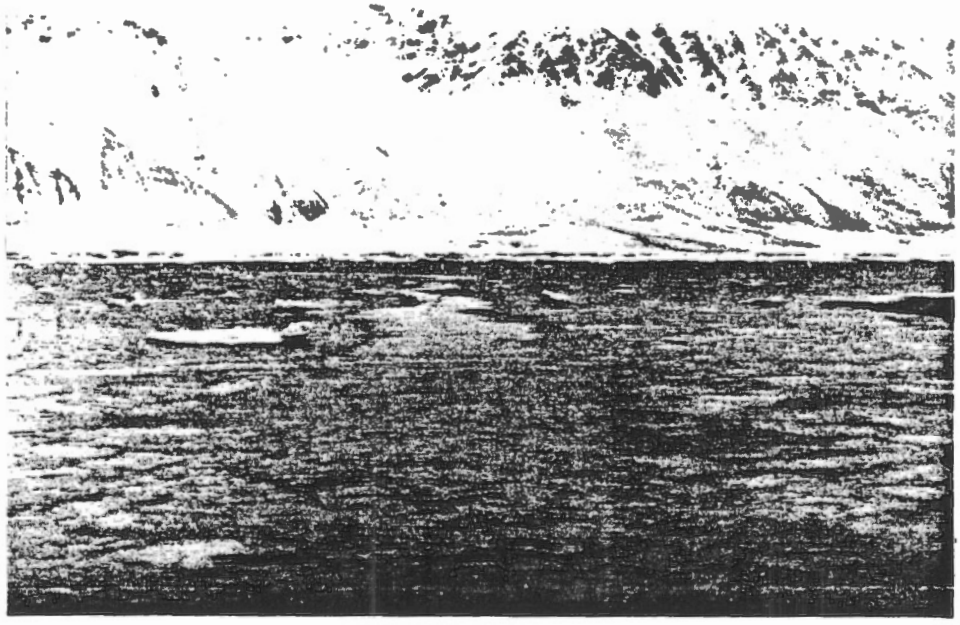


PHOTO 9

September 20, 1984, TUDLIK's last day of geophysical survey. New ice is rapidly forming in area in front of a snow-clad "Two-tone Hill", Tudlik Bay.



TABLES

TABLE 1

LIST OF SAMPLE STATIONS ON BAFFIN 84-015 CRUISE, JONES SOUND, AUGUST-SEPTEMBER, 1984

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
84-015-1	Aug. 29	242/0135	X		X	Hi Fix	75°46'48"	86°03'54.6"	245		gravelly-silty clay
84-015-2	Aug. 29	242/1240	X		X	Satellite	75°52'12"	84°34'24"	520		soft clay
84-015-3	Aug. 30	243/1344	X		X	Hi Fix	75°49'18"	86°53'42"	306		gravelly clay
84-015-4	Aug. 31	244/1130	X		X	Hi Fix	75°49'03.0"	87°36'34.2	160		cobblely clay
84-015-5	Sept. 1	245/0130	X		X	Hi Fix	75°58'13.8"	88°22'11.4"	117.5		gravelly clay
84-015-6	Sept. 1	245/1715	X		X	Hi Fix	76°10'28.8"	83°54'11.4"	225		gravelly clay
84-015-7	Sept. 2	246/0046	X		X	Hi Fix	76°14'09.0"	86°37'55.2"	447		gravelly clay
84-015-8	Sept. 2	246/1123	X		X	Hi Fix	76°13'06.0"	87°14'31.2"	227		1 boulder, biota on rock
84-015-9	Sept. 3	247/1326	X		X	Hi Fix	76°20'37.2"	89°03'18.6"	138		2 cobbles, 2 pebbles
84-015-10	Sept. 3	247/1330	X		X	Hi Fix	76°20'40.2"	89°03'06.6"	138		3 cobbles, same location as above sample
84-015-11	Sept. 3	247/2200	X			Radar	76°18'18"	88°59'00"	110		no sample, rock? half a dead bivalve
84-015-12	Sept. 4	248/1218	X		X	Satellite	75°49'37.8"	87°18'58.8"	186		gravelly clay
84-015-13	Sept. 5	249/2321	X		X	Satellite	76°07'58.8"	83°16'43.8"	757		clay
84-015-14	Sept. 6	250/1828	X		X	Satellite and Radar	75°52'15.6"	84°12'44.4"	545		clay
84-015-15	Sept. 7	251/1750	X		X	Satellite	76°17'01.2"	83°46'57.0"	265		gravelly clay
84-015-16	Sept. 13	257/1417	X		X	Miniranger	75°52'49.2"	82°24'37.8"	564		silty-clay
84-015-17	Sept. 13	257/1506	X		X	Miniranger	75°56'37.2"	82°34'32.4"	590		silty-clay
84-015-18	Sept. 13	257/1602	X		X	Miniranger	76°01'18.0"	82°40'57.6"	720		silty-clay
84-015-19	Sept. 13	257/1644	X		X	Miniranger	76°03'45.6"	82°46'01.2"	765		clay
84-015-20	Sept. 13	257/1729	X		X	Miniranger	76°06'24.6"	82°51'33.0	838		clay
84-015-21	Sept. 13	257/1843	X		X	Miniranger	76°09'06.6"	82°56'25.2"	848		clay
84-015-22	Sept. 13	257/1934	X		X	Miniranger	76°17'09.6	83°02'30.0"	615		Clay
84-015-23	Sept. 13	257/2019	X		X	Miniranger	76°14'28.2"	83°04'00.0"	670		clay
84-015-24	Sept. 13	257/2112	X		X	Miniranger	76°17'11.4"	83°06.50.4"	592		clay
84-015-25	Sept. 13	257/2201	X		X	Miniranger	76°19'44.4"	83°07'52.8"	598		silty-clay

* Where Applicable

TABLE 1 (Continued)

LIST OF SAMPLE STATIONS ON BAFFIN 84-015 CRUISE, JONES SOUND, AUGUST-SEPTEMBER, 1984

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
84-015-26	Sept. 14	258/2256	X		X	Miniranger	76°04'05.5"	82°11'39.5"	820		clay
84-015-27	Sept. 15	259/1240	X		X	Miniranger	75°55'10.2"	81°44'03.3"	570		clay
84-015-28	Sept. 15	259/1344		X		Miniranger	75°59'52.9"	81°37'36.9"	705	113	silty-clay
										14	core catcher
84-015-29	Sept. 15	259/1641		X		Miniranger	75°59'24.9"	82°59'46.6"	660	169	clay
84-015-30	Sept. 15	259/2129		X		Miniranger	75°56'05.3"	82°49'39.5"	588	112	silty-clay
84-015-31	Sept. 15	259/2210		X		Miniranger	75°53'44.7"	82°45'06.5"	555	103	silty-clay
84-015-32	Sept. 15	259/2315		X		Satellite and Radar	75°51'15.0"	82°47'06.0"	325	66	silty-clay
84-015-33	Sept. 15	259/2327	X		X	Satellite	75°51'22.8"	82°47'10.8"	352		Gravel
T84-015-34	Sept. 16	260/1720	X			Miniranger and Radar	75°48'23.4"	81°33'36.0"	43		rock? grab was empty
T84-015-35	Sept. 16	260/1730	X			Miniranger and Radar	75°48'30.0"	81°33'33.0"	133		empty, repeat
T84-015-36	Sept. 16	260/1738	X		X	Miniranger and Radar	75°48'30.0"	81°33'33.0"	127		gravel, same location as above
T84-015-37	Sept. 16	260/1800	X		X	Miniranger and Radar	75°48'40.8"	81°33'42.0"	193		muddy gravel
T84-015-38	Sept. 16	260/1825	X		X	Miniranger and Radar	75°49'00.6"	81°33'42.0"	238		rocky mud
T84-015-39	Sept. 16	260/1905	X			Miniranger and Radar	75°49'18.0"	81°32'51.0"	272		empty, repeat
T84-015-40	Sept. 16	260/1917	X		X	Miniranger and Radar	75°49'18.0"	81°32'51.0"	272		muddy gravel, same location as above

*Where Applicable

T = C.S.L. TUDLIK

TABLE 1 (Continued)

LIST OF SAMPLE STATIONS ON BAFFIN 84-015 CRUISE, JONES SOUND, AUGUST-SEPTEMBER, 1984

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
T84-015-41	Sept. 16	260/1945	X			Miniranger and Radar	75°49'45.0"	81°32'12.0"	318		misfire, repeat
T84-015-42	Sept. 16	260/1956	X		X	Miniranger and Radar	75°49'44.4"	81°31'57.0"	311		muddy gravel, same location as above
T84-015-43	Sept. 16	260/2023	X		X	Miniranger	75°50'00.0"	81°31'00.0"	399		muddy gravel
84-015-44	Sept. 17	261/1141		X		Miniranger	76°01'51.6"	82°23'46.3"	765	157	clay
84-015-45	Sept. 17	261/1202	X		X	Miniranger	76°03'47.8"	82°27'52.1"	761		clay
T84-015-SW	Sept. 18	262/1724			X	Estimate from radar fix No. 17, Line A	76°28"00.8"	81°09'12.0"	50?		seaweed snagged on sidescan fish in front of or west of Jakeman Glacier, Tudlik Bay
T84-015-46	Sept. 20	264/1930	X			Radar	76°27'49.8"	81°47'36.0"	16		gravel
T84-015-47	Sept. 20	264/1943	X		X	Radar	76°27'49.8"	81°47'36.0"	16		gravel, repeat of above station
T84-015-48	Sept. 20	264/1957	X			Radar	76°27'37.2"	81°49'48.0"	127		gravel?
T84-015-49	Sept. 20	264/2004	X		X	Radar	76°27'37.2"	81°49'48.0"	125		gravelly-mud, repeat of above station
T84-015-50	Sept. 21	265/1547	X		X	Radar	76°23'57.6"	82°09'42.0"	32		gravel, see biota on rock (lithothamnium)
T84-015-51	Sept. 21	265/1557	X		X	Radar	76°23'47.4"	82°08'45.0"	73		gravel
T84-015-52	Sept. 21	265/1607	X		X	Radar	76°23'27.0"	82°08'27.0"	171		muddy gravel
T84-015-53	Sept. 21	265/1628	X		X	Radar	76°23'10.8"	82°08'48.0"	275		gravel? serpulid worm on rock in sample
T84-015-54	Sept. 21	265/1651	X		X	Radar	76°23'36.6"	82°05'28.8"	322		muddy gravel
T84-015-55	Sept. 21	265/1729	X			Radar	76°24'12.0"	82°02'00.0"	131		gravelly mud
T84-015-56	Sept. 21	265/1737	X		X	Radar	76°23'54.6"	82°01'24.0"	136		gravelly silt

* Where Applicable

T = C.S.L. TUDLIK

TABLE 1 (Continued)

LIST OF SAMPLE STATIONS ON BAFFIN 84-015 CRUISE, JONES SOUND, AUGUST-SEPTEMBER, 1984

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
T84-015-57	Sept. 21	265/1803	X		X	Radar	76°24'18.0"	81°57'24.0"	327		gravelly silt
T84-015-58	Sept. 21	265/1845	X		X?	Radar	76°24'53.4"	81°55'45.0"	337		gravelly clay
T84-015-59	Sept. 21	265/1918	X		X	Radar	76°24'21.0"	81°54'48.0"	389		clay
T84-015-60	Sept. 21	265/1951	X		X?	Radar	76°23'07.8"	81°54'58.8"	373		cobbly-mud
84-015-61	Sept. 22	266/1240	X		X	Satellite	76°21'58.8"	83°05'45.6"	578		pebbly-clay
84-015-62	Sept. 22	266/1253		X		Satellite	76°21'57.6"	83°05'15.0"	576	164	clay
84-015-63	Sept. 22	266/1333		X		Satellite	76°19'10.8"	83°11'44.4"	524	105	clay
84-015-64	Sept. 22	266/1431		X		Satellite	76°15'46.8"	83°10'23.4"	612	63	clay
84-015-65	Sept. 22	266/1529		X		Satellite	76°11'01.8"	83°08'07.2"	657	41	sandy-clay, may be disturbed from sliding in liner
84-015-66	Sept. 22	266/1627		X		Satellite	76°07'05.4"	83°05'30.6"	822	143	clay
84-015-67	Sept. 22	266/1725		X		Satellite	76°02'46.8"	82°59'55.2"	677	164	clay
84-015-68	Sept. 22	266/2020		X		Satellite	76°19'57.0"	83°48'26.4"	149	61	gravelly-clay
84-015-69	Sept. 22	266/2027	X		X	Satellite	76°20'03.0"	83°48'27.0"	140		gravel?
84-015-70	Sept. 22	266/2032	X		X	Satellite	76°20'05.4"	83°48'30.6"	132		gravel
84-015-71	Sept. 23	267/1131	X		X	Satellite	75°39'50.4"	79°39'55.2"	538		clay
84-015-72	Sept. 23	267/1157		X		Satellite	75°40'02.4"	79°35'25.2"	542	163	clay
										14	core catcher

* Where Applicable

T = C.S.L. TUDLIK

TABLE 2

Sample Stations from BAFFIN 83-008, Jones Sound, August-September 1983

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
83-008-1**			X				76°20.4'	83°48.5'	543		Shipek Grab
83-008-2			X				75°38.3'	79°46.8'	532		Shipek Grab
83-008-3			X				75°48.5'	80°45.0'	567		Shipek Grab
83-008-4			X				75°57.4'	79°50.1'	582		Shipek Grab
83-008-5			X				75°44.9'	85°09.9'	210		Shipek Grab
83-008-6			X				76°08.0'	85°30.0'	631		Shipek Grab
83-008-7			X				76°15.5'	87°55.3'	250		Shipek Grab
83-008-8			X				76°11.5'	86°39.9'	652		Shipek Grab
83-008-8a				X			76°11.5'	86°39.9'	652	81	Gravity Core
83-008-9			X				76°10.8'	86°53.9'	380		Shipek Grab
83-008-10			X				75°44.3'	80°35.5'	598		Shipek Grab
83-008-11				X			75°50.5'	80°07.0'	560	148+cc	Gravity Core
83-008-12			X				76°03.2'	80°06.0'	170		Shipek Grab
83-008-13			X				76°24.2'	83°01.4'	560		Shipek Grab
83-008-14			X				76°16.8'	82°38.9'	690		Shipek Grab
83-008-15			X				76°19.8'	82°36.1'	635		Shipek Grab
83-008-16				X			76°15.9'	82°18.0'	750	173+cc	Gravity Core
83-008-17			X				76°14.5'	82°46.6'	706		Shipek Grab
83-008-18			X				76°11.0'	83°00.0'	640		Shipek Grab
83-008-19**			X				76°18.0'	83°24.1'	572		Shipek Grab
83-008-20			X				76°13.5'	83°28.0'	558		Shipek Grab
83-008-21			X				75°53.0'	81°30.0'	570		Shipek Grab
83-008-22**			X				76°13.6'	82°06.9'	570		Shipek Grab
83-008-23			X				76°04.2'	82°10.0'	832		Shipek Grab

* Where Applicable

** Position in this table has been corrected from Table 49.1 presented in Current Research, Part A, G.S.C. Paper 84-1A, page 363. The position of 83-008-20 was listed correctly in that report, but misplotted on Figure 49.2 on page 361.

TABLE 2 (Continued)

Sample Stations from BAFFIN 83-008, Jones Sound, August-September 1983

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
83-008-24			X				76°21.5'	83°31.0'	228		Shipek Grab
83-008-25			X				76°07.0'	85°09.0'	777		Shipek Grab
83-008-26			X				76°19.5'	88°31.0'	220		Shipek Grab
83-008-27			X				75°53.5	87°15.5'	218		Shipek Grab
83-008-28**			X				75°53.3'	86°53.0'	382		Shipek Grab
83-008-29			X				75°56.2'	86°42.5'	572		Shipek Grab
83-008-30			X				75°59.0'	87°17.0'	400		Shipek Grab
83-008-31			X				76°04.5'	87°40.0'	316		Shipek Grab
83-008-32			X				75°55.5'	87°25.5'	247		Shipek Grab
83-008-33			X				76°05.8'	87°01.0'	581		Van Veen Grab
83-008-34			X				76°04.4'	86°29.9'	543		Van Veen Grab
83-008-35			X				76°03.0'	86°03.0'	520		Van Veen Grab
83-008-L100			X				75°44.8'	83°15.5'	45		Ponar From Launch
83-008-L101			X				75°45.4'	83°16.0'	60		Ponar From Launch
83-008-L102			X				75°46.2'	83°15.4'	27		Ponar From Launch
83-008-L103			X				75°46.3'	83°15.4'	16		Ponar From Launch
83-008-L104			X				75°46.7'	83°15.3'	5.5		Ponar From Launch
83-008-L105			X				75°47.4'	83°15.4'	17		Ponar From Launch
83-008-L106			X				75°48.8'	83°15.0'	17		Ponar From Launch
83-008-L107			X				75°44.9'	83°12.5'	30		Ponar From Launch
83-008-L108			X				75°44.8'	83°11.0'	50		Ponar From Launch
83-008-L109			X				75°44.7'	83°11.0'	68		Ponar From Launch
83-008-L110			X				75°47.6'	82°44.7'	6		Ponar From Launch
83-008-L111			X				75°47.8'	82°44.5'	12		Ponar From Launch
83-008-L112			X				75°36.0'	80°08.5'	44		Ponar From Launch

* Where Applicable

** Position in this table has been corrected from Table 49.1 presented in Current Research, Part A, G.S.C. Paper 84-1A, page 363.

TABLE 2 (Continued)

Sample Stations from BAFFIN 83-008, Jones Sound, August-September 1983

Station Number	Date	Julian Day/Time (GMT)	Grab Sample	Core Sample	Biota Sample	Positioning System Used	Latitude	Longitude	Water Depth (m)	Core Length* (cm)	Description and Comments
83-008-L113			X				75°36.0'	80°08.5'	41		Ponar From Launch
83-008-L114			X				75°36.0'	80°08.5'	85		Ponar From Launch
83-008-L115			X				75°32.8'	80°05.0'	53		Ponar From Launch
83-008-L116			X				75°28.7'	80°22.5'	78		Ponar From Launch
Sample Stations from HUDSON 83-023, Jones Sound, September 1983											
83-023-52				X			75°35.2'	78°41.5'	512	885	Piston Core
83-023-53				X			76°07.5'	82°30.0'	865**	465	Piston Core
Submersible PISCES Dive Station from C.C.G.S. LABRADOR (ICEPACK 8/68 CRUISE), August 1968 (BIO CRUISE LABRADOR 68-055)											
Dive	Aug. 16	230/1518				radar range and bearing	76°08.2'	84°55.0'	280		Start of dive, position good to about 2 n mi PISCES worked down slope to the south into deeper water of about 366 m
		230/1657							366(?)		end of dive

* Where Applicable

** From Chart

APPENDICES

APPENDIX 1

BAFFIN 84-015 OPERATIONS LOG

APPENDIX 1

BAFFIN 84-015
OPERATIONS LOG - C.S.L. TUDLIK

Wednesday, July 18, 1984 - Julian Day 200

Contract awarded to Geomarine Associates Ltd. to provide services onboard CSS BAFFIN in Jones Sound.

circa Saturday, July 28, 1984 - Day 210

TUDLIK and AGC gear loaded onto BAFFIN in St. John's, Newfoundland.

Monday, August 20, 1984 - Day 233

Meeting between Alan Ruffman and Brian MacLean to discuss program.

Thursday, August 23, 1984 - Day 236

Alan Ruffman departs from Halifax for Montreal for overnight.

Friday, August 24, 1984 - Day 237

Met Robin Heath at airport. Nordair flight to Frobisher Bay - continuing flight to Resolute by jet cancelled - 6 hour delay and continue by Bradley 748 via Hall Beach. Arrived in Resolute at 2400.

Saturday, August 25, 1984 - Day 238

In Resolute, contacted Ken Borek Air Ltd. and Bradley Air Services Ltd. regarding flight to Grise Fjord.

Sunday, August 26, 1984 - Day 239

Sent message to BAFFIN after Bradley's offered us a split charter to Grise Fjord. Left at 1900 and reached Coop Transit Hotel in Grise Fjord by 2100. Jones Sound calm and virtually clear of ice.

Monday, August 27, 1984 - Day 240

Helicopter came from ship at 0900, 45 min. flight to BAFFIN in southwest Jones Sound. Mail and stove parts delivered. Signed on. Discussed program with chief hydrographer, Vic Gaudet, and Captain Norton. There was concern regarding TUDLIK's ability to navigate with only a frozen magnetic compass and radar. The extra Hi Fix system is used as a spare and there is no spare miniranger; we only have 5. Sent message to Brian MacLean.

Mate and Alan Ruffman went to ship's hold and located RTT 1000, transducer and DE 719 recorder, the sidescan cable, fish and recorder, Benthos corer head and barrel (on front deck) and grab samplers.

Tuesday, August 28, 1984 - Day 241

Robin Heath stood a watch then went out on Launch FRIGATE. Brian MacLean sent message indicating that a CHS message from Reg Lewis has been sent freeing up a CHS Hi Fix receiver. (This message was not received for nine days.) Office material not yet located, used supplies brought along - started log. Winds rose towards evening. Grab sample 84-015-1 taken after launches recovered in evening.

Wednesday, August 29, 1984 - Day 242

Shore Station #2 on Cape Sparbo blew over during night. Ship steered to east to get helicopter in to service the station.

Grab sample 84-015-2 while standing off Cape Sparbo. Elizabeth Boulding of MEL is collecting and freezing biota from grab samples.

Requested that BAFFIN's 12 kHz echosounder be started and slaved to CHS fixes on their ELAC echosounder; 12 KHz sounder had not been run up to this point of the cruise. Slave 2 put back on air by 1130 ships time. Was -2°C on ship and -6°C at site. Launches did not work today because of delay in getting slave 2 on the air.

Thursday, August 30, 1984 - Day 243

Very calm day. Five launches away. Grab sample 84-015-3. Sent message to Brian MacLean regarding lost box of office supplies. Fixes on ship's 12 kHz profiler slaved to ELAC echosounder of CHS. 12 kHz finally started at 1340 ADT. TUDLIK went out overnight for 15 hours with MEL personnel and gear using radar only. 12 kHz operated all day and night. Spoke to technicians re Raytheon slaving today. Vic has conveyed my request. Started at 1640 GMT. Captain proposed Robin Heath leave on the 5th.

Friday, August 31, 1984 - Day 244

Five launches out in south-west area. Grab sample 84-015-4. 12 kHz profiler operated all day and night. Extra line with Fixes A to J run for 12 kHz only (between CHS Fixes 105 and 106). Grab sample 84-015-5 taken in evening when launches recovered. First significant flow ice of the season seen by BAFFIN and by launches in the south-west. Spare Hi Fix receiver put in TUDLIK.

Saturday, September 1, 1984 - Day 245

Five launches out along north shore. TUDLIK put out with MEL personnel and gear for 26 hours to go up South Cape Fjord. TUDLIK would not start on lauching; the batteries had been run dead.

Grab sample 84-015-6 off the mouth of South Cape Fjord when TUDLIK launched. Grab sample 84-015-7 later in the evening off South Cape Fjord when launches picked up. Steamed line to the west and back during the day. Assigned desk in forward plotting room on port side.

Sunday, September 2, 1984 - Day 246

Grab sample 84-105-8 taken by crew when five launches put over in morning. Alan Ruffman rode launch FRIGATE to learn to use Hi Fix receiver. Observed raised beaches in mouth of Hourglass Bay and Muskox Fjord. Ship ran a line with 12 kHz only for AGC (Line 300). No grab sample permitted in evening. Ship then sat all night with no work being done. Requested that Benthos corer be brought up and assembled this morning.

Monday, September 3, 1984 - Day 247

Ship launched five hydrographic launches and BAFFIN sat nearby in mouth of Fram Strait. Launch FALCON had engine problems. Grab samples 84-015-9, 10 and 11 in area. At 1500 ADT Pattern 2 went off the air (Slave 2). The decision was made to scrap the chain and to recover the stations. Slave 1 was recovered from Cape Hawse. Had a long discussion with Vic Gaudet and Julian Goodyear regarding program and drafted telex and long letter to Brian MacLean. Ship moved to Cape Svarten. Helicopter could not get in because of snow.

Tuesday, September 4, 1984 - Day 248

Launches did not work because there was no positioning system. Ship sat for most of day off Cape Svarten waiting on weather for helicopter to get in to remove the master Hi Fix station; the weather did not clear. Grab sample 84-015-12 off Cape Svarten. MEL cleaned out TUDLIK. Samples moved to rear lab as MEL packed up. In evening BAFFIN moved over towards Grise Fjord. Ship then sat most of night off Grise Fjord; election on TV.

Wednesday, September 5, 1984 - Day 249

Five launches over after helicopter put out Trisponders in morning. Captain and Voc phoned BIO re TUDLIK program. Heath stayed. Mini-ranger to go in TUDLIK. MEL people left ship and Janice Trotte took envelope to Geomarine with letter report to Brian MacLean. Grab sample 84-015-13 off Grise Fjord. Ship sat most of night until early morning. Concern over TUDLIK's battery charging problem. Motor mechanic had vessel torn apart. TUDLIK's winch was left on at one point and the wire tangled in the process.

Thursday, September 6, 1984 - Day 250

In early morning BAFFIN moved over to Cape Sparbo and in a quick operation recovered the Slave 2 Hi Fix Station. Moved back to north side and put over five hydrographic launches by 1000 ADT. Picked up Grise Fjord mountie and wife for visit and lunch. Vessel moved to Cape Svarten. Helicopter landed crew and moved station down onto beach before returning to ship. The clearing of stations meant that the technicians were not available to assemble TUDLIK. Grab sample 84-015-14 off Cape Svarten. In evening technicians got gyro and miniranger installed in TUDLIK. It was realized that no one knew frequency of large encased port transducer on TUDLIK; other one on the starboard side is 30 kHz. Ship moved back towards Grise Fjord in late afternoon to return mountie and wife and to recover launches. Sat night off Grise Fjord.

Friday, September 7, 1984 - Day 251

Sent message requesting frequency of large port transducer on TUDLIK via Geomarine. Four launches used off South Cape Fjord. FLAMINGO went in to set a tide guage on islet at mouth of Grise Fjord. There is a DND-DREP recording station on the islet as well. Mounting for 7.0 kHz transducer devised on port side (outboard side) of TUDLIK that was to be permanently in place for survey. The proper bracket on starboard side mount for the davit could not be used because it would interfere with launch and recovery of TUDLIK. The bracket was also not designed for the 7.0 kHz transducer staff.

Could not find sidescan paper and considered cutting Alden paper on handsaw. Found an unmarked box in computer room with paper and also finally found office supplies box buried up there too.

TUDLIK's DE 719 recorder for RTT 1000, the Raytheon PTR for the 7.0 kHz and the EG & G recorder for sidescan installed. DE 719 found not to be recording properly. No manuals are available on 7.0 kHz conversion; There is also no manual on the DE 719 recorder on board. Grab sample 84-015-15. Ship sat the day off South Cape Fjord area. In evening ran a line of 12 kHz for AGC only on satellite fixes over to Cape Svarten (Line 400) and helicopter recovered master station left on the beach then the ship sat for the night in the deep water off Cape Svarten.

Saturday, September 8, 1984 - Day 252

Ship moved to the north side in the early morning to recover miniranger stations then moved to south side to set out Miniranger stations. Hydrographic launches did not work. BAFFIN began sounding east of 84°W and 12 kHz lines gathered concurrently. No sampling today. Lines run throughout night. Plotted 12 kHz fixes tonight.

Sunday, September 9, 1984 - Day 253

Four launches away to work south shore. TUDLIK put over (without 7.0 kHz profiler ever being put in order). TUDLIK steamed for Brae Bay and Cape Hardy. Starboard engine boiled nearly dry after an hour's steam. Were ordered back to the ship. Never got into less than 550 m of water! BAFFIN ran 12 kHz all day and night. As a result of TUDLIK's failure, Alan Ruffman released Robin Heath for return to BIO. TUDLIK must be kept plugged in to prevent batteries from running down and certain switches kept off to prevent the solenoid from shorting out the batteries. Sent update message to Brian MacLean. Plotted 12 kHz lines, made table of samples for Julian Goodyear, plotted.

Monday, September 10, 1984 - Day 254

BAFFIN ran 12 kHz lines all day. Launches did not go out today on account of high winds. Gap with 1983 survey closed today (ie BAFFIN's 84-015 work now joins the 83-008 work). Plotted lines and samples. Found some errors in 1983 plots?

Tuesday, September 11, 1984 - Day 255

Launches did not work on bathymetry today. Vessel moved close to Grise Fjord and FINCH put over to permanently monument tide guage location on islet in mouth of Grise Fjord. Ship sat waiting for crew change. Robin Heath left. Winch room floor got painted so could not use. Sent Brian MacLean note with crew change. Sent mammal report to Deborah Ford. Message from Brian that large port transducer on TUDLIK was 30 kHz. (It was never realized onboard that it was in fact a 12 kHz transducer specifically installed for TUDLIK's Jones Sound work.) Adam Kerr of CHS arrived onboard. Vessel moved to south side then sat for night. Plotted rest of 12 kHz data.

Wednesday, September 12, 1984 - Day 256

Miniranger stations placed on south shore in early morning and four hydrographic launches out. Little accomplished because the navigation stations were difficult to use today. FRIGATE blew a gasket. Other three launches in early. The technicians worked on DE 719 recorder. The manuals sent by BIO were not for the modified 7.0 kHz version. BAFFIN sat in one place for much of day. Ruffman and Adam Kerr discussed AGC program. Could not recover one station at Grise Fjord so vessel steamed to Ward Point at night, then sat.

Thursday, September 13, 1984 - Day 257

Helicopters could not fly to change batteries so launches could not work. BAFFIN collected grab samples 84-015-16 through 25 inclusive in line across Jones Sound. Adam Kerr taken to Grise Fjord to return to Resolute via Ken Borek Air Ltd. BAFFIN returned to south shore and sat for the night.

Friday, September 14, 1984 - Day 258

Helicopter could fly. New station placed near Ward Point. Ice was too dense to work off the south shore. Four launches worked in the middle of Sound southwest of the Smith Island - Cone Island area. Did not consider TUDLIK because the water was too deep. BAFFIN sat for the day to conserve miniranger batteries. We now have an extra miniranger. Did grab sample 84-015-26. Ship sat for the night. Found the 2 missing boxes of Raytheon LSR paper in the after lab today while searching for 20-25 missing sample buckets. Have never found shorter barrel for the corer.

Saturday, September 15, 1984 - Day 259

Launches did not go out today because ice deemed too dense along south shore. Grab sample 84-015-27 and 33. First gravity cores of cruise 84-015-28, 29, 30, 31, and 32. The cores form the beginning of a line of cores across the Sound. BAFFIN sat in deep water for night. Technicians finally got 7.0 kHz RTT 1000 profiler going.

Sunday, September 16, 1984 - Day 260

TUDLIK put over and steamed 1.5 hours into Eastern Glacier on the south shore. The 7.0 kHz staff was sheared off near shore and this cut the 7.0 kHz transducer cable. About 18.6 km of sidescan sonar data collected; only the port side of the sidescan was working. Then ten grab samples collected from TUDLIK (T84-015-34 to 43 inclusive). On return sounded about a small berg to see if it might be aground; it was not. Four hydrographic launches worked today. BAFFIN sat overnight.

Monday, September 17, 1984 - Day 261

Four launches used in center of Sound. TUDLIK not put in since water was so deep. BAFFIN remained in the area. Core 84-015-44 taken, also grab sample 84-015-45. Helicopter had to overtorque to get off Smith Island in the evening as a consequence of icing up. BAFFIN sat all day and again all night. 7.0 kHz profiler cables repaired by technicians. TVG is not firing on starboard side of the sidescan; techs did not get to it today.

Tuesday, September 18, 1984 - Day 262

Four hydrographic launches and TUDLIK put in. TUDLIK had a 2 1/2 hour steam to get close to Jakeman Glacier and to begin a counter-clock-wise track around the shore. Used 7.0 kHz after installing the staff (did not steam with it in water). 7.0 kHz and sidescan used on the traverse until the sidescan lost its fins and was clearly not working. Collected seaweed sample from sidescan (T84-015-SW). 28 km of 7.0 kHz profiler data collected; 7 km of sidescan data collected. BAFFIN sat during the night. BAFFIN had to take the helicopter pilot into Grise Fjord today to see if helicopter would be allowed to fly. It was. FINCH apparently seized its engine today at end of day.

Wednesday, September 19, 1984 - Day 263

Four hydrographic launches over (FLAMINGO replacing FINCH) with TUDLIK out near Cone Island. Two and a quarter hour steam for TUDLIK to mouth of Starnes Fjord where 7.0 kHz transducer of RTT 1000 was put in the water. Somewhat rough with the wind down the Fjord. Line 1 was across the mouth of the fjord across the area of "Arctic Shoal" on chart. Line 2 proceeded up the Fjord from point-to-point using radar. The sidescan was left on BAFFIN today to allow the technicians to work on it and only the ELAC and 7.0 kHz profiler (RTT 1000) were used on TUDLIK. 7.0 kHz data recorded from depths greater than 125 m by going to second and third cycles on x 2 scale on the DE 719. Were getting penetrations as we went up the Fjord. Did not get to head before time ran out. Ran only ELAC sounder on full speed return. Found only 10 m of depth as we crossed Arctic Shoal. CHS had found 20 m a bit earlier in the day. 31.5 km of 7.0 kHz and 38 km of ELAC data gathered by TUDLIK today. Ship sat for the night. TUDLIK's ELAC echosounder was constantly jamming all day and needed a constant finger to nurse it along. Was replaced at night.

Thursday, September 20, 1984 - Day 264

Cruise ends on or before Sunday, September 23, 1984 announced after breakfast. Four hydrographic launches and TUDLIK out. FLAMINGO mapped Arctic Shoal, HAGDON went up Starnes Fjord. TUDLIK used 7.0 kHz RTT 1000 and sidescan on line across mouth of Starnes Fjord and over Arctic Shoal. Water depth was just deep enough in axis of fjord to put the bottom echo in the second cycle transmission pulse so one could not see any penetration. Very rough. New ice forming in close to shore. Sidescan operated without fins, showed little good data. Did four grab sample stations after a difficult time to put up davit; ice was frozen in the bottom of the mounting bracket. Grab samples T84-015-46 through 49 inclusive. We had two tangles of the cable on the winch today. BAFFIN sat during day and sat again at night. FLAMINGO found only 3 m on Arctic Shoal.

Friday, September 21, 1984 - Day 265

TUDLIK and four hydrographic launches went over. A lot of new ice and it was not possible to work between Starnes and Fram Fjords. TUDLIK took eleven grab samples: T84-105-50 to 60 inclusive. TUDLIK's engines clogged with ice or slush on two occasions. The

final clogging was of the starboard engine which controlled the winch hydraulics and thus cost TUDLIK one additional grab sample. HAGDON went to head of Starnes Fjord and FLAMINGO went down small arm ("Tusk Arm") FALCON went up Fram Fjord a bit. FRIGATE found a probable push moraine in front of Jakeman Glacier. FRIGATE was breaking up to 4 in (0.33 m) of ice at time today. BAFFIN then sat all night after moving west to an area off South Cape Fjord.

Saturday, September 22, 1984 - Day 266

Last full day in Jones Sound. Four hydrographic launches over to run point-to-point. Helicopter could not put out miniranger stations because of weather. The launches mapped in South Cape Fjord and in Harbour Fjord plus the approaches. Helicopter recovered the Grise Fjord tide guage and saw a herd of some 2000 Beluga whales in Harbour Fjord along the east side. Ship obtained gravity cores 84-015-62 to 68 inclusive plus grab samples 84-015-69 and 70 to complete the line of cores and samples across Jones Sound. Ship steamed east until about midnight then sat all night in ice.

Sunday, September 23, 1984 - Day 267

While the helicopter tried unsuccessfully to recover a submersible tide guage from 1983, grab 84-105-71 and core 84-105-72 off Coburg Island were obtained. BAFFIN then steamed out into Baffin Bay and south across mouth of Lancaster Sound. All samples and cores put in after lab. Gear packed up.

Monday, September 24, 1984 - Day 268

BAFFIN in Pond Inlet at day break. Arrived at town of Pond Inlet by 1030 ADT. Anchored. Three hours liberty granted crew. Purchased a First Air ticket for next morning to Frobisher Bay. Met Sophie Steltner and talked to Herman on VHF radio for one hour. All materials packed and stowed. List made up of their location for Vic and for the mate. Requested mate lash down the goods stored in TUDLIK. Samples have already been lashed. Cores are lashed vertically.

Tuesday, September 25, 1984 - Day 269

Early morning flight with Glen Rogers from Pond Inlet to Clyde River to Broughton Island to Pangnirtung and to Frobisher Bay. No space became available on Nordair flight south so had to stay in Frobisher Bay overnight.

Wednesday, September 26, 1984 - Day 270

Space available on evening flight to Montreal. Arrive 2255 and overnight in Montreal.

Thursday, September 27, 1984 - Day 271

To Halifax. (In fact, Mr. Ruffman spent and extra day in Frobisher and four days in Ottawa visiting friends on way home.)

APPENDIX 2

LOGS OF DATA ROLLS

1. Log of EG&G Sidescan Sonar data from CSL TUDLIK
2. Log of 7.0 kHz Raytheon RTT 1000 profiler data from CSL TUDLIK
3. Log of 30 kHz ELAC Echosounder data from CSL TUDLIK
4. Log of 12 kHz Raytheon Sounder data from CSS BAFFIN

APPENDIX 2

Log of EG&G Sidescan Sonar Data from TUDLIK

Roll #1: September 16, 1984 TUDLIK 260/1050 ADT - 260/1313 ADT
Roll #2: September 18, 1984 TUDLIK 262/1249 ADT - 262/1426 ADT
Sidescan left with technicians on September 19, 1984
Roll #3: September 20, 1984 TUDLIK 264/1220 ADT - 264/1536 ADT
Sidescan not used on September 21, 1984 on account of ice and sampling

Log of 7.0 kHz Raytheon RTT 1000 Profiler Data from TUDLIK

7.0 kHz profiler sheared and severed wires September 16, 1984
Roll #1: September 18, 1984 TUDLIK 262/1249 ADT - 262/1650 ADT
Roll #2: September 19, 1984 TUDLIK 263/1127 ADT - 263/1618 ADT
Roll #3: September 20, 1984 TUDLIK 264/1214 ADT - 264/1704 ADT
7.0 kHz profiler not used on September 21, 1984 on account of ice and sampling

Log of 12(?) kHz ELAC Echosounder Data from TUDLIK and 30 kHz Data from BAFFIN

Roll #1:	September 16, 1984	TUDLIK	260/1050 ADT - 260/1500 ADT	
Roll #2:	September 16, 1984	TUDLIK	260/1525 ADT - 260/1723 ADT	
Roll #3:	September 14-17, 1984	BAFFIN	257/1117 ADT - 261/0902 ADT	re samples
Roll #4:	September 18, 1984	TUDLIK	262/1249 ADT - 262/1757 ADT	
Roll #5:	September 19, 1984	TUDLIK	263/1127 ADT - 263/1835 ADT	
Roll #6:	September 20, 1984	TUDLIK	264/1214 ADT - 264/1704 ADT	
Roll #7:	September 21, 1984	TUDLIK	265/1247 ADT - 265/1651 ADT	
Roll #8:	September 22-23, 1984	BAFFIN	266/0940 ADT - 267/0857 ADT	re samples

Log of 12 kHz Raytheon Sounder Data from CSS BAFFIN

Roll #1:	August 30, 1984	BAFFIN	243/1340 ADT - 243/2359 ADT
Roll #2:	August 31, 1984	BAFFIN	244/0000 ADT - 245/1925 ADT
Roll #3:	August 31-September 1, 1984	BAFFIN	244/1022 ADT - 245/1925 ADT
Roll #4:	September 1-9, 1984	BAFFIN	245/2318 ADT - 253/0741 ADT
	(no data on days 247, 248, 249, 250)		
Roll #5:	September 9-10, 1984	BAFFIN	253/1134 ADT - 254/2004 ADT
Roll #6:	September 10-13, 1984	BAFFIN	254/2119 ADT - 257/1901 ADT
Roll #7:	September 14-23, 1984	BAFFIN	258/1956 ADT - 267/0857 ADT

APPENDIX 3

TUDLIK USE ON BAFFIN 84-015 CRUISE

APPENDIX 3

TUDLIK USE ON BAFFIN 84-015 CRUISE

August 21-22, 1984	CHS	Sweep program off Grise Fjord
August 25-26, 1984	MEL	Off Cape Storm, 15 hour night-time drift
August 27, 1984	MEL	Not allowed out by Captain, aborted after brief start, 1 hr. approximately.
August 30-31, 1984	MEL	Off Cape Sparbo, night-time drift, 15 hours.
September 1-2, 1984	MEL	Into South Cape Fjord, work off glacier, 26 hours.
September 9, 1984	AGC	Abortive try for Brae Bay. Engine over heated, 5.25 hours.
September 16, 1984	AGC	South coast; Eastern Glacier east to 5th glacier using sidescan only (7.0 kHz sheared), 10 grab samples using small van veen, 18.6 km of data, 10.5 hours.
September 18, 1984	AGC	Jakeman Glacier; sidescan and 7.0 kHz profiler. 28 km of 7.0 kHz and ELAC data; 7 km of sidescan data, 10 hours.
September 19, 1984	AGC	Up Starnes Fjord; 7.0 kHz profiler. 17.5 km of 7.0 kHz data; 38 km of ELAC data, 10.75 hours.
September 20, 1984	AGC	Mouth of Starnes Fjord, Sidescan and 7.0 kHz profiler in area of Arctic Shoal. 4 grab samples, 20 km of data (not very good data), 9.75 hours.
September 21, 1984	AGC	Mouth of Starnes Fjord, 11 grab samples. Problems with ice clogging engine, 10 hours approximately.

TOTAL ACTUAL USEFUL USAGE

CHS - 2 days, circa 24 hours.

MEL - 56 hours, 3 trips.

AGC - 51 hours, 5 trips, one other abortive try @ 5.25 hours.

APPENDIX 4

Mammal Reports sent in as a result of contacts made at Polar Continental Shelf Project base camp in Resolute Bay.

84-60

September 11, 1984
(Jones Sound, CSS BAFFIN)

Ms. Deborah Ford
International Wildlife Fund,
Narwhal Project/Eclipse Sound
Education Department
Vancouver Aquarium
Stanley Park,
Vancouver, B.C.

Dear Deborah:

In Resolute, you and Tom Strong separately told me of your Narwhal projects as we sat about PCSP tables. You were interested in whale reports. Well as it turns out the BAFFIN and her five launches which fanned out each day to map the nearshore waters are not very good narwhal or bowhead observation platforms - or else there are virtually none to be seen. However, they are great for bears and super for walrus.

We have one report of four Narwhals at about 2345 GMT August 23, 1984, south of Baad Fjord on the north shore of Jones Sound at about 76°15' North, 86° 30" West from the helicopter as it flew to service the Hi Fix Slave 1 on Cape Hawse. One narwhal was significantly larger that the other three and had a longer tusk. The "pod" was swimming west (towards Fram Sound?). The observation was by Harry Dale, the pilot and reported to Alan Ruffman on August 27, 1984 and he seemed quite precise in his recollection.

We have another narwhal sighting by Harry Dale, Julian Goodyear, the assistant hydrographer and Dave Thornhill, a junior hydrographer in the chopper at about 1300 GMT Saturday, September 8, 1984, at 75°50.2'N, 83°36.0'W just to the east of Cape Hardy at the northwest side of Brae Bay. Dale who was flying said 10, Goodyear said 12 and Thornhill said 2 dozen.

/2...

Goodyear is most precise and is a precise person; "four groups of two, one group of three, one solitary" was his report for a total of twelve. The narwhals were on their side or on top of each other and the assumption was that they were mating. No photos. One had a 10 ft tusk out of the water. One was quiet so they thought it was dead and flew down to see; it was not. Thornhill saw them as white with black spots and was quite certain there were "two dozen"; so take your pick.

I saw a jet black whale tail of an unidentified species that was diving out the back of a launch at about 1530 GMT, Sunday, September 9, 1984, at very approximately 75°55'N, 83°00'W northeast of Brae Bay.

The bridge has seen a "whale" on one other occasion, but it is not documentable. Apparently, last year in August or September, the helicopter pilot saw a polar bear eating a Narwhal (and the tusk went south) and this year on August 27, 1984, a woman from Allelix, a biotech firm in Toronto, found a Narwhal tusk on the beach at Grise Fjord (it too went south).

Along the south shore in Bear Bay, especially to the west, well over 300 walrus have been observed from August 27-31, 1984, by the launches. The launches run lines 1 km apart then move over 1 km along the shore and start out again; thus, I suspect the numbers are about right or in fact low. One fellow on one launch feels he alone has seen 300 walrus and there are five launches so it could be significantly higher. There was an incident (at Grise?) last year of a walrus "attacking" a boat and holeing it with his tusks.

The same launches in Bear Bay saw at least three polar bears, one solitary and probable mother and cub. Different launches saw polar bears on several days so you cannot be sure of the total number; in our eyes "Bear Bay" has lived up to its name.

Jones Sound has a counter clockwise gyre like Lancaster Sound and the ice that enters from Fram Sound immediately swings south and tends to pack the south shore of the Sound. This is the same as Lancaster Sound. In 1978, I did quite a bit of surveying in Lancaster Sound and it was the same phenomenon; as we approached the south side, the ice was all bunged up and it was in this area that we saw the wildlife.

I did see five or six walrus swimming on Sunday, September 2, 1984 at 1315 GMT just to the east of Muskox Fjord on the north shore in front of a small lake on the 1;250,000 map in 5 to 10 m of water 50-100 m from shore (they did not puncture our launch). No Muskox. Helas.

/3...

I trust the above data are of interest and that you will pass on the bear/walrus notes to those who would need them. I have forgotten the chap's name in Montreal. A copy of this will go to Tom Strong in Winnipeg to tell him of the narwhals. If we see more by October 3, I will report again.

I will be interested in your various finding on narwhals as they reach paper or print.

Yours truly,

Alan Ruffman
Vice President

AR/ld
T01/917

cc: Tom Strong, Freshwater Institute
Canada Dept. of the Environment
501 University Ave.
Winnipeg, Manitoba

84-60

March 8, 1985

Ms. Deborah Ford
International Wildlife Fund,
Narwhal Project/Eclipse Sound
Education Department
Vancouver Aquarium
Stanley Park,
Vancouver, B.C.

Dear Deborah:

Let me follow up on my letter of September 11, 1984 with a mammal report for the later part of the BAFFIN 84-015 cruise in Jones Sound. BAFFIN only remained in the Sound till mid-morning on Sunday September 23, 1984 then left for Pond Inlet as new ice formation was beginning to make launch work difficult.

On Wednesday September 13, 1984 apparently a large head of Beluga whales came in close to Grise Fjord and the whole community set out to the kill. On Thursday the 10th our helicopter pilot estimated about 25 carcasses hauled in on the cobble-gravel beach in front of the community. The RCMP officer, Jim Herman reported the total herd as "hundreds". The Eskimoes shot and harpooned those killed.

On Sunday September 16, 1984 a pair of polar bears were seen on top of Belcher Point on the southeastern side of Jones Sound. These two later interferred with a navigation trisponder and knocked it off the air. It appeared from the tracks that their curiousity brought them back to the site after the helicopter had set the station and left.

The launches saw some Beluga whales in the same area as they ran lines north of Belcher Point that same day; Sunday September 16, 1984. There was not an estimate of numbers given.

On Tuesday September 18, 1984 a small herd of Muskox (no estimate of numbers) was seen on the large beach between Fram Fjord and Starnes Fjord on the north side of Jones Sound ("Tudlik Bay").

/2...

On Friday September 21, 1984 one of the hydrographic launches spotted a 2.1 m long Narwhal tusk on a small beach half way up in the north shore of the marked northeast trading arm ("Tusk Arm") of Starnes Fjord. It had clearly been there a while since it was covered in algal growth (But it cleaned up well). The Narwhal must have died nearby since ice would never drift up into this fjord; the flow of glacial ice into the fjord tends to debouch icebergs into "Tudlik Bay" of Jones Sound.

The same launch saw a solitary Muskox on the northest point right at the junction of Starnes Fjord and the northeast trending "Tusk Arm".

On Saturday September 22, 1984 the helicopter went into Grise Fjord to recover the tide gauge as the vessel sat off the mouth of South Cape Fjord. On its return it spotted a massive herd of Beluga whales. The people on board estimated that the herd was 2 miles long as a string of four abreast Belugas swimming in line north along the east side of Harbour Fjord. Mr. Jullian Goodyear of the Canadian Hydrographic Service at the Bedford Institute of Oceanography has photographs. There is no estimate of numbers - it was a spectacular sight apparently.

I trust the above information may be of use to you and your collegues.

Regards,

Alan Ruffman

AR/dd

cc: Tom Strong, Freshwater Institute
Canada Dept. of the Environment
501 University Ave.
Winnipeg, Manitoba

APPENDIX 5

GRAVITY CORE LENGTHS

CSS BAFFIN 84-015

JONES SOUND

AUGUST - SEPTEMBER, 1984

APPENDIX 5

1984 Core Lengths		Water Depth	Length
BAFFIN	84-015-28	705 m	113 cm + cc of 14 cm = 127 cm
	84-015-29	660 m	169 cm
	84-015-30	588 m	112 cm
	84-015-31	555 m	103 cm
	84-015-32	325 m	66 cm
	84-015-44	763 m	157 cm
	84-015-62	576 m	164 cm
	84-015-63	524 m	105 cm
	84-015-64	612 m	63 cm
	84-015-65	657 m	41 cm
	84-015-66	822 m	143 cm
	84-015-67	677 m	164 cm
	84-015-68	149 m	61 cm
	84-015-72	542 m	163 cm + cc of 14 cm = 177 cm

1983 Core Lenths			
BAFFIN	83-008-8a	652 m	81 cm gravity core
	83-008-11	560 m	148 + cc gravity core
	83-008-16	750 m	173 + cc gravity core
HUDSON	83-023-52	572 m	885 cm piston core
	83-023-53	865 estimated from chart	465 cm piston core

APPENDIX 6

TABLE 3 LISTING THE DAY/TIMES AND GEOGRAPHIC POSITIONS FOR THE FIXES ALONG ALL UNDERWAY GEOPHYSICAL LINES GATHERED BY CSS BAFFIN (12 kHz SOUNDER), AUGUST-SEPTEMBER 1984, JONES SOUND

TABLE 3

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Aug. 30/84	516000E	000°	61	243/1653	76°02.42'	86°21.38'	607	Began in the middle of a line, lines on HiFix
Aug. 30/84	516000E	000°	62	243/1706	76°04.73'	86°21.16'	560	
Aug. 30/84	516000E	000°	63	243/1716	76°06.52'	86°20.94'	582	EOL
Aug. 30/84	8444000N	270°	64	243/1721	76°06.61'	86°24.17'	561	SOL
Aug. 30/84	8444000N	270°	65	243/1725	76°06.55'	86°27.56'	545	EOL
Aug. 30/84	513000E	180°	66	243/1726	76°06.37'	86°28.15'	543	SOL
Aug. 30/84	513000E	180°	67	243/1735	76°04.76'	86°28.21'	598	
Aug. 30/84	513000E	180°	68	243/1746	76°02.51'	86°28.43'	644	
Aug. 30/84	513000E	180°	69	243/1757	76°00.25'	86°28.60'	678	
Aug. 30/84	513000E	180°	70	243/1808	75°58.18'	86°28.74'	658	
Aug. 30/84	513000E	180°	71	243/1819	75°56.06'	86°29.06'	585	
Aug. 30/84	513000E	180°	72	243/1830	75°53.91'	86°29.07'	516	
Aug. 30/84	513000E	180°	73	243/1841	75°51.89'	86°29.26'	466	
Aug. 30/84	513000E	180°	74	243/1852	75°49.79'	86°29.41'	454	
Aug. 30/84	513000E	180°	75	243/1900	75°48.38'	86°29.58'	208	EOL
Aug. 30/84	512000E	000°	76	243/1905	75°48.20'	86°31.67'	192	SOL
Aug. 30/84	512000E	000°	77	243/1910	75°49.03'	86°31.73'	272	
Aug. 30/84	512000E	000°	78	243/1922	75°51.11'	86°31.50'	466	
Aug. 30/84	512000E	000°	79	243/1933	75°53.18'	86°31.24'	479	
Aug. 30/84	512000E	000°	80	243/1940	75°54.54'	86°31.26'	514	
Aug. 30/84	512000E	000°	81	243/1948	75°55.91'	86°31.30'	569	
Aug. 30/84	512000E	000°	82	243/1956	75°57.30'	86°31.16'	604	
Aug. 30/84	512000E	000°	83	243/2003	75°58.70'	86°31.11'	651	
Aug. 30/84	512000E	000°	84	243/2012	76°00.48'	86°30.92'	680	
Aug. 30/84	512000E	000°	85	243/2023	76°02.29'	86°30.72'	655	EOL
Aug. 30/84	511000E	180°	86	243/2030	76°02.05'	86°33.19'	655	SOL
Aug. 30/84	511000E	180°	87	243/2041	75°59.92'	86°33.31'	669	
Aug. 30/84	511000E	180°	88	243/2052	75°57.76'	86°33.41'	611	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Aug. 30/84	511000E	180°	89	243/2103	75°55.76'	86°33.63'	552	
Aug. 30/84	511000E	180°	90	243/2114			472	
Aug. 30/84	511000E	180°	91	243/2121	75°52.39'	86°33.45'	443	
Aug. 30/84	511000E	180°	92	243/2132	75°50.35'	86°33.62'	476	
Aug. 30/84	511000E	180°	93	243/2139	75°48.97'	86°34.04'	249	EOL
Aug. 30/84	8415000N	270°	94	243/2151	75°49.90'	86°35.67'	406	SOL
Aug. 30/84	8415000N	270°	95	243/2203	75°49.89'	86°43.05'		
Aug. 30/84	8415000N	270°	96	243/2215	75°49.89'	86°50.91'	305	
Aug. 30/84	8415000N	270°	97	243/2227	75°49.87'	86°59.32'	256	
Aug. 30/84	8415000N	270°	98	243/2239	75°49.87'	87°08.78'	185	
Aug. 30/84	8415000N	270°	99	243/2248	75°49.85'	87°17.80'	146	
Aug. 30/84	8415000N	270°	100	243/2300	75°49.79'	87°20.33'	143	
Aug. 30/84	8415000N	270°	101	243/2312	75°49.84'	87°28.65'	146	
Aug. 30/84	8415000N	270°	102	243/2326	75°49.80'	87°39.40'	124	
Aug. 30/84	8415000N	270°	103	243/2332	75°49.80'	87°43.63'	123	EOL
Aug. 31/84	8415500N	090°	104	244/0043	75°50.14'	87°41.00'	132	SOL
Aug. 31/84	8415500N	090°	105	244/0056	75°50.13'	87°30.16'	143	
Aug. 31/84	8415500N	090°	A	244/0110	75°49.48'	87°20.99'	155	
Aug. 31/84	8415500N	090°	B	244/0120	75°49.49'	87°13.60'	168	
Aug. 31/84	8415500N	090°	C	244/0130	75°49.49'	87°07.01'	181	
Aug. 31/84	8415500N	090°	D	244/0138	75°49.82'	86°56.39'	260	
Aug. 31/84	8415500N	090°	E	244/0146	75°49.48'	86°55.43'	293	
Aug. 31/84	8415500N	090°	F	244/0153	75°49.51'	86°50.26'	337	
Aug. 31/84	8415500N	090°	G	244/0200	75°49.48'	86°45.18'	351	
Aug. 31/84	8415500N	090°	H	244/0204	75°49.46'	86°41.95'	388	EOL
Aug. 31/84	8413200N	160°	I	244/0213	75°48.20'	86°39.93'	198	SOL
Aug. 31/84	84132[illegible]N	160°	J	244/0216	75°48.20'	86°38.43'	260	EOL
Aug. 31/84	510000E	000°	106	244/0219	75°49.25'	86°36.07'	258	SOL
Aug. 31/84	510000E	000°	107	244/0225	75°50.25'	86°36.12'	441	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Aug. 31/84	510000E	000°	108	244/0232	75°51.59'	86°36.20'	422	
Aug. 31/84	510000E	000°	109	244/0240	75°52.92'	86°36.14'	432	
Aug. 31/84	510000E	000°	110	244/0247	75°54.26'	86°36.02'	477	
Aug. 31/84	510000E	000°	111	244/0254	75°55.60'	86°36.00'	532	
Aug. 31/84	510000E	000°	112	244/0259	75°56.48'	86°35.91'	552	End of roll 1
Aug. 31/84	510000E	000°	1	244/0300	75°56.69'	86°35.85'		Start of roll 2
Aug. 31/84	510000E	000°	2	244/0310	75°58.33'	86°35.76'	611	
Aug. 31/84	510000E	000°	3	244/0318	75°59.71'	86°35.69'	653	
Aug. 31/84	510000E	000°	4	244/0330	76°02.12'	86°36.05'	651	
Aug. 31/84	510000E	000°	5	244/0339	76°03.34'	86°35.37'	633	EOL
Aug. 31/84	509000E	180°	6	244/0346	76°03.45'	86°37.67'	627	SOL
Aug. 31/84	509000E	180°	7	244/0357	76°01.52'	86°37.87'	660	
Aug. 31/84	509000E	180°	8	244/0406	75°59.50'	86°38.01'	571	
Aug. 31/84	509000E	180°	9	244/0417	75°57.46'	86°38.02'	571	
Aug. 31/84	509000E	180°	10	244/0427	75°55.38'	86°38.20'	510	
Aug. 31/84	509000E	180°	11	244/0438	75°53.45'	86°38.38'	435	
Aug. 31/84	509000E	180°	12	244/0450	75°51.08'	86°38.46'	417	
Aug. 31/84	509000E	180°	13	244/0502	75°48.95'	86°38.64'	216	EOL, End of roll 2
				244/1214				Start of roll 3
Aug. 31/84	504000E	000°	43	244/1322	75°51.48'	86°49.93'	355	SOL
Aug. 31/84	504000E	000°	44	244/1333	75°53.33'	86°49.96'	399	
Aug. 31/84	504000E	000°	45	244/1344	75°55.22'	86°49.76'	485	
Aug. 31/84	504000E	000°	46	244/1355	75°57.12'	86°49.78'	499	
Aug. 31/84	504000E	000°	47	244/1407	75°59.07'	86°49.61'	525	EOL
								Fixes missed at SOL, changing stylii
Aug. 31/84	503000E	180°	50	244/1433	75°55.03'	86°52.06'	461	
Aug. 31/84	503000E	180°	51	244/1444	75°53.18'	86°52.05'	384	
Aug. 31/84	503000E	180°	52	244/1455	75°51.34'	86°52.17'	351	
Aug. 31/84	503000E	180°	53	244/1506	75°49.75'	86°52.22'	280	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)		Comments
Aug. 31/84	502000E	000°	54	244/1512	75°49.62'	86°54.29'	271	SOL	
Aug. 31/84	502000E	000°	55	244/1514	75°49.99'	86°54.27'	289		
Aug. 31/84	502000E	000°	56	244/1525	75°51.79'	86°54.45'	349		
Aug. 31/84	502000E	000°	57	244/1532	75°53.00'	86°54.43'	373		
Aug. 31/84	502000E	000°	58	244/1543	75°54.84'	86°54.34'	422		
Aug. 31/84	502000E	000°	59	244/1554	75°56.65'	86°54.00'	481		
Aug. 31/84	502000E	000°	60	244/1603	75°58.15'	86°54.34'	483		
Aug. 31/84	502000E	000°	61	244/1606	75°58.74'	86°54.16'	490	EOL	
Aug. 31/84	501000E	180°	62	244/1613			472	SOL	
Aug. 31/84	501000E	180°	63	244/1617	75°56.82'	86°55.30'	477		
Aug. 31/84	501000E	180°	64	244/1625	75°55.45'	86°55.46'	470		
Aug. 31/84	501000E	180°	65	244/1634	75°53.63'	86°55.56'	377		
Aug. 31/84	501000E	180°	66	244/1643	75°51.94'	86°55.72'	362		
Aug. 31/84	501000E	180°	67	244/1652	75°50.22'	86°55.80'	318		
Aug. 31/84	501000E	180°	68	244/1657	75°49.35'	86°55.93'	282	EOL	
Aug. 31/84	500000E	000°	69	244/1702	75°49.23'	86°58.19'	260	SOL	
Aug. 31/84	500000E	000°	70	244/1708	75°50.11'	86°58.15'	304		
Aug. 31/84	500000E	000°	71	244/1719	75°51.82'	86°58.10'	344		
Aug. 31/84	500000E	000°	72	244/1730	75°53.56'	86°57.91'	351		
Aug. 31/84	500000E	000°	73	244/1740	75°55.29'	86°57.83'	463		
Aug. 31/84	500000E	000°	74	244/1748	75°56.59'	86°57.69'	474		
Aug. 31/84	500000E	000°	75	244/1754	75°57.49'	86°57.64'	461	EOL	
Aug. 31/84	499000E	180°	76	244/1759	75°57.60'	86°59.91'	454	SOL	
Aug. 31/84	499000E	180°	77	244/1806	75°56.30'	87°00.04'	463		
Aug. 31/84	499000E	180°	78	244/1816	75°54.55'	87°00.20'	399		
Aug. 31/84	499000E	180°	79	244/1822	75°53.40'	87°00.32'	322		
Aug. 31/84	499000E	180°	80	244/1831	75°51.69'	87°00.47'	322		
Aug. 31/84	499000E	180°	81	244/1837	75°50.57'	87°00.32'	296		
Aug. 31/84	499000E	180°	82	244/1842	75°49.72'	87°00.49'	271	EOL	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Aug. 31/84	498000E	000°	83	244/1847	75°49.67'	87°02.51'	238	SOL
Aug. 31/84	498000E	000°	84	244/1849	75°49.94'	87°02.81'	252	
Aug. 31/84	498000E	000°	85	244/1859	75°51.55'	87°02.82'	302	
Aug. 31/84	498000E	000°	86	244/1910	75°53.25'	87°02.69'	305	
Aug. 31/84	498000E	000°	87	244/1921	75°54.97'	87°02.44'	410	
Aug. 31/84	498000E	000°	88	244/1928	75°56.12'	87°02.41'	450	
Aug. 31/84	498000E	000°	89	244/1935	75°57.30'	87°02.27'	448	EOL
Aug. 31/84	497000E	000°	90	244/1942	75°57.41'	87°04.49'	437	SOL
Aug. 31/84	497000E	000°	91	244/1950	75°55.95'	87°04.70'	433	
Aug. 31/84	497000E	000°	92	244/1959	75°54.23'	87°04.76'	304	
Aug. 31/84	497000E	000°	93	244/2008	75°52.54'	87°04.92'	296	
Aug. 31/84	497000E	000°	94	244/2017	75°50.86'	87°05.00'	256	
Aug. 31/84	497000E	000°	95	244/2022	75°49.97'	87°05.14'	221	EOL
Aug. 31/84	496000E	000°	96	244/2027	75°49.91'	87°07.36'	212	SOL
Aug. 31/84	496000E	000°	97	244/2034	75°51.26'	87°07.43'	262	
Aug. 31/84	496000E	000°	98	244/2045	75°52.94'	87°07.21'	254	
Aug. 31/84	496000E	000°	99	244/2055	75°54.62'	87°07.15'	307	
Aug. 31/84	496000E	000°	100	244/2106	75°56.34'	87°06.99'	435	
Aug. 31/84	496000E	000°	101	244/2112	75°57.23'	87°06.93'	428	EOL
Aug. 31/84	8431000N	270°	102	244/2120	75°58.09'	87°08.33'	413	SOL
Aug. 31/84	8431000N	270°	103	244/2134	75°58.40'	87°20.31'	333	
Aug. 31/84	8431000N	270°	104	244/2143	75°58.58'	87°27.10'	282	
Aug. 31/84	8431000N	270°	105	244/2155	75°58.73'	87°36.73'	223	
Aug. 31/84	8431000N	270°	106	244/2215	75°58.95'	87°52.55'	146	
Aug. 31/84	8431000N	270°	107	244/2231	75°59.32'	88°05.38'	106	
Aug. 31/84	8431000N	270°	108	244/2241	75°59.42'	88°13.33'	91	
Aug. 31/84	8431000N	270°	109	244/2246	75°59.41'	88°15.21'	91	EOL
Sept. 1/84	464000E	000°	110	245/0147	75°59.67'	88°24.93'	93	SOL
Sept. 1/84	464000E	000°	111	245/0152	76°00.32'	88°25.66'	96	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 1/84	464000E	000°	112	245/0208	76°02.21	88°26.30'	108	
Sept. 1/84	464000E	000°	113	245/0218	76°03.47'	88°25.58'	154	
Sept. 1/84	464000E	000°	114	245/0229	76°04.83'	88°25.31'	150	
Sept. 1/84	464000E	000°	115	245/0239	76°06.40'	88°26.14'	139	
Sept. 1/84	464000E	000°	116	245/0244	76°07.18'	88°27.08'	132	EOL
Sept. 1/84	464500E	000°	1	245/0306	76°07.22'	88°24.55'	143	SOL
Sept. 1/84	464500E	000°	2	245/0309	76°07.48'	88°24.45'	134	
Sept. 1/84	464500E	000°	3	245/0315	76°08.25'	88°26.16'	128	
Sept. 1/84	464500E	000°	4	245/0319	76°08.94'	88°26.16'	139	
Sept. 1/84	464500E	000°	5	245/0325	76°09.51'	88°26.12'	128	EOL
Sept. 1/84	465000E	180°	6	245/0333	76°09.42'	88°23.13'	143	SOL
Sept. 1/84	465000E	180°	7	245/0336	76°09.09'	88°23.75'	154	
Sept. 1/84	465000E	180°	8	245/0338	76°08.71'	88°24.31'	132	
Sept. 1/84	465000E	180°	9	245/0348	76°07.14'	88°23.25'	132	
Sept. 1/84	465000E	180°	10	245/0351	76°06.80'	88°22.94'	132	
Sept. 1/84	465000E	180°	11	245/0359	76°06.11'	88°23.59'	135	
Sept. 1/84	465000E	180°	12	245/0408	76°04.42'	88°22.97'	154	
Sept. 1/84	465000E	180°	13	245/0412	76°03.76'	88°23.10'	163	
Sept. 1/84	465000E	180°	14	245/0415	76°03.23'	88°23.08'	154	
Sept. 1/84	465000E	180°	15	245/0417	76°02.87'	88°23.12'	150	
Sept. 1/84	465000E	180°	16	245/0424	76°01.66'	88°23.77'	88	
Sept. 1/84	465000E	180°	17	245/0426	76°01.34'	88°23.78'	106	
Sept. 1/84	465000E	180°	18	245/0434	76°00.12'	88°23.31'	75	
Sept. 1/84	465000E	180°	19	245/0436	75°59.80'	88°23.38'	84	
Sept. 1/84	465000E	180°	20	245/0438			91	
Sept. 1/84	465000E	180°	21	245/0441	75°59.00'	88°23.10'	84	EOL
Sept. 1/84	466000E	000°	22	245/0446	75°58.89'	88°20.28'	95	SOL
Sept. 1/84	466000E	000°	23	245/0456	76°00.29'	88°20.61'	77	
Sept. 1/84	466000E	000°	24	245/0502			102	
Sept. 1/84	466000E	000°	25	245/0505	76°01.61'	88°20.60'	117	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 1/84	466000E	000°	26	245/0508	76°01.90'	88°20.59'	128	
Sept. 1/84	466000E	000°	27	425/0513	76°02.71'	88°19.98'	152	
Sept. 1/84	466000E	000°	28	425/0519	76°03.64'	88°20.40'	161	
Sept. 1/84	466000E	000°	29	425/0524	76°04.26'	88°20.46'	161	in ice
Sept. 1/84	466000E	000°	30	425/0530	76°04.62'	88°19.46'	157	
Sept. 1/84	466000E	000°	31	425/0533	76°05.09'	88°19.94'	150	EOL for ice
Sept. 1/84	467000E	180°	32	425/0539	76°05.05'	88°17.68'	154	SOL
Sept. 1/84	467000E	180°	33	425/0544	76°04.30'	88°18.34'	161	
Sept. 1/84	467000E	180°	34	425/0547	76°03.90'	88°18.23'	165	
Sept. 1/84	467000E	180°	35	245/0551	76°03.23'	88°17.59'	165	
Sept. 1/84	467000E	180°	36	245/0557	76°02.33'	88°17.63'	157	EOL
Sept. 1/84	470000E	180°	37	245/0623	76°02.33'	88°09.79'	168	SOL
Sept. 1/84	470000E	180°	38	245/0631	76°01.12'	88°10.21'	150	
Sept. 1/84	470000E	180°	39	245/0640	75°59.96'	88°09.92'	113	
Sept. 1/84	470000E	180°	40	245/0644	75°59.56'	88°10.18'	106	
Sept. 1/84	470000E	180°	41	245/0648	75°59.03'	88°10.66'	91	EOL
Sept. 1/84	471000E	000°	42	245/0704	75°59.09'	88°07.61'	95	SOL
Sept. 1/84	471000E	000°	43	245/0715	76°00.37'	88°07.55'	137	
Sept. 1/84	471000E	000°	44	245/0723	76°01.52'	88°07.52'	165	
Sept. 1/84	471000E	000°	45	245/0730	76°02.67'	88°07.52'	179	
Sept. 1/84	471000E	000°	46	245/0740	76°04.17'	88°07.47'	170	EOL
Sept. 1/84	8446000N	090°	47	245/0802	76°07.71'	88°05.38'	223	SOL
Sept. 1/84	8446000N	090°	48	245/0811	76°07.52'	87°57,87'	245	
Sept. 1/84	8446000N	090°	49	245/0821	76°07.34'	87°50.17'	285	
Sept. 1/84	8446000N	090°	50	245/0831	76°07.14'	87°42.60'	337	
Sept. 1/84	8446000N	090°	51	245/0841	76°06.95'	87°34.83'	340	
Sept. 1/84	8446000N	090°	52	245/0852	76°06.77'	87°26.20'	435	
Sept. 1/84	8446000N	090°	53	245/0903	76°06.57'	87°18.30'	494	
Sept. 1/84	8446000N	090°	54	245/0914	76°06.34'	87°09.66'	527	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 1/84	8446000N	090°	55	245/0927	76°06.11'	87°00.43'	567	
Sept. 1/84	8446000N	090°	56	245/0941	76°05.86'	86°50.42'	578	
Sept. 1/84	8446000N	090°	57	245/0955	76°05.60'	86°40.54'	585	
Sept. 1/84	8446000N	090°	58	245/1009	76°05.32'	86°31.17'	545	
Sept. 1/84	8446000N	090°	59	245/1021	76°05.07'	86°22.34'	622	
Sept. 1/84	8446000N	090°	60	245/1030	76°04.80'	86°13.88'	614	
Sept. 1/84	8446000N	090°	61	245/1042	76°04.55'	86°05.79'	622	
Sept. 1/84	8446000N	090°	62	245/1055	76°04.30'	85°58.00'	677	
Sept. 1/84	8446000N	090°	63	245/1107	76°04.05'	85°50.46'	688	
Sept. 1/84	8446000N	090°	64	245/1119	76°03.77'	85°43.14'	684	
Sept. 1/84	8446000N	090°	65	245/1131	76°03.53'	85°36.04'	713	
Sept. 1/84	8446000N	090°	66	245/1143	76°03.24'	85°29.13'	719	
Sept. 1/84	8446000N	090°	67	245/1154	76°02.97'	85°22.40'	717	
Sept. 1/84	8446000N	090°	68	245/1203	76°02.68'	85°15.87'	732	
Sept. 1/84	8446000N	090°	69	245/1251	76°02.48'	85°11.62'	739	
Sept. 1/84	8446000N	090°	70	245/1303	76°02.19'	85°05.21'	743	
Sept. 1/84	8446000N	090°	71	245/1314	76°01.91'	84°59.43'	743	
Sept. 1/84	8446000N	090°	72	245/1325	76°01.60'	84°53.72'	724	
Sept. 1/84	8446000N	090°	73	245/1337	76°01.24'	84°48.18'	732	
Sept. 1/84	8446000N	090°	74	245/1348	76°00.93'	84°43.39'	721	
Sept. 1/84	8446000N	090°	75	245/1400	76°00.55'	84°39.11'	732	
Sept. 1/84	8446000N	090°	76	245/1413	76°00.16'	84°35.74'	710	
Sept. 1/84	8446000N	090°	77	245/1424	75°59.77'	84°34.17'	647	
Sept. 1/84	8446000N	090°	78	245/1436	75°59.42'	84°34.22'	552	EOL
Sept. 1/84	583500E	000°	79	245/1439	75°59.88'	84°32.74'	512	SOL
Sept. 1/84	583500E	000°	80	245/1449	76°01.51'	84°28.24'	472	
Sept. 1/84	583500E	000°	81	245/1506	76°03.97'	84°23.11'	307	
Sept. 1/84	583500E	000°	82	245/1514	76°05.46'	84°20.63'	227	
Sept. 1/84	583500E	000°	83	245/1525	76°07.47'	84°17.97'	154	
Sept. 1/84	583500E	000°	84	245/1532	76°09.52'	84°15.93'	166	
Sept. 1/84	583500E	000°	85	245/1547	76°10.67'	84°15.09'	113	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 1/84	8436000N	270°	86	245/1828	75°54.73'	85°03.88'	662	SOL
Sept. 1/84	8436000N	270°	87	245/1839	75°54.89'	84°54.66'	625	
Sept. 1/84	8436000N	270°	88	245/1848	75°55.08'	84°48.64'	614	
Sept. 1/84	8436000N	270°	89	245/1900	75°55.31'	84°45.41'	640	
Sept. 1/84	8436000N	270°	90	245/1911	75°55.55'	84°44.71'	668	
Sept. 1/84	8436000N	270°	91	245/1922	75°55.79'	84°46.51'	673	
Sept. 1/84	8436000N	270°	92	245/1929	75°55.95'	84°48.43'	662	
Sept. 1/84	8436000N	270°	93	245/1936	75°56.11'	84°50.75'	658	
Sept. 1/84	8436000N	270°	94	245/1942	75°56.29'	84°53.39'	662	
Sept. 1/84	8436000N	270°	95	245/1955	75°56.60'	84°59.40'	655	
Sept. 1/84	8436000N	270°	96	245/2007	75°56.93'	85°06.10'	651	
Sept. 1/84	8436000N	270°	97	245/2019	75°57.27'	85°13.33'	636	
Sept. 1/84	8436000N	270°	98	245/2034	75°57.66'	85°22.93'	658	
Sept. 1/84	8436000N	270°	99	245/2044	75°57.90'	85°28.95'	620	
Sept. 1/84	8436000N	270°	100	245/2056	75°58.53'	85°37.49'	585	
Sept. 1/84	8436000N	270°	101	245/2109	75°58.50'	85°45.91'	552	
Sept. 1/84	8436000N	270°	102	245/2122	75°58.83'	85°54.91'	505	
Sept. 1/84	8436000N	270°	103	245/2135	75°59.14'	86°04.29'	512	
Sept. 1/84	8436000N	270°	104	245/2148	75°59.40'	86°14.05'	594	
Sept. 1/84	8436000N	270°	105	245/2202	75°59.74'	86°24.46'	647	
Sept. 1/84	8436000N	270°	106	245/2217	76°00.03'	86°35.48'	651	
Sept. 1/84	8436000N	270°	107	245/2225	76°00.20'	86°41.36'	640	EOL, End of roll 3
Sept. 2/84	8436000N	270°	109	246/0229	76°00.02'	86°43.34'	649	SOL, Start of roll 4
Sept. 2/84	8436000N	270°	110	246/0238	76°00.27'	86°50.09'	510	
Sept. 2/84	8436000N	270°	111	246/0241	76°00.43'	86°52.22'	563	
Sept. 2/84	8436000N	270°	112	246/0243	76°00.53'	86°53.91'	556	
Sept. 2/84	8436000N	270°	113	246/0248	76°00.70'	86°57.49'	534	
Sept. 2/84	8436000N	270°	114	246/0254	76°00.86'	87°03.15'	494	
Sept. 2/84	8436000N	270°	115	246/0259	76°00.91'	87°04.98'	479	
Sept. 2/84	8436000N	270°	1	246/0302	76°00.93'	87°06.06'	468	
Sept. 2/84	8436000N	270°	2	246/0315	76°01.00'	87°14.89'	406	
Sept. 2/84	8436000N	270°	3	246/0328	76°01.22'	87°24.21'	357	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 2/84	8436000N	270°	4	246/0338	76°01.36'	87°31.13'	311	
Sept. 2/84	8436000N	270°	5	246/0347	76°01.50'	87°37.67'	274	EOL
Sept. 2/84	8425000N	090°	6	246/0422	75°55.43'	87°37.53'	154	SOL
Sept. 2/84	8425000N	090°	7	246/0436	75°55.24'	87°26.57'	192	
Sept. 2/84	8425000N	090°	8	246/0447	75°55.05'	87°17.84'	265	
Sept. 2/84	8425000N	090°	9	246/0459	75°54.84'	87°08.93'	318	
Sept. 2/84	8425000N	090°	10	246/0510	75°54.60'	87°00.18'	399	
Sept. 2/84	8425000N	090°	11	246/0520	75°54.46'	86°52.47'	475	
Sept. 2/84	8425000N	090°	12	246/0530	75°54.20'	86°44.98'	494	
Sept. 2/84	8425000N	090°	13	246/0540	75°54.12'	86°37.84'	536	
Sept. 2/84	8425000N	090°	14	246/0550	75°53.91'	86°30.58'	552	
Sept. 2/84	8425000N	090°	15	246/0600	75°53.74'	86°23.93'	600	
Sept. 2/84	8425000N	090°	16	246/0610	75°53.54'	86°16.38'	655	
Sept. 2/84	8425000N	090°	17	246/0620	75°53.32'	86°09.52'	669	
Sept. 2/84	8425000N	090°	18	246/0630	75°53.09'	86°02.67'	669	
Sept. 2/84	8425000N	090°	19	246/0640	75°52.85'	85°55.40'	625	
Sept. 2/84	8425000N	090°	20	246/0650	75°52.65'	85°48.19'	611	
Sept. 2/84	8425000N	090°	21	246/0700	75°52.43'	85°41.16'	625	
Sept. 2/84	8425000N	090°	22	246/0712	75°52.11'	85°32.76'	677	
Sept. 2/84	8425000N	090°	23	246/0724	75°51.78'	85°25.22'	680	EOL
Sept. 2/84	300	180°	300	246/1722	76°14.22'	83°54.79'	154	SOL, line run only for AGC on HiFi
Sept. 2/84	300	180°	301	246/1742	76°11.44'	83°49.02'	208	
Sept. 2/84	300	180°	302	246/1754	76°08.73'	83°54.25'	406	
Sept. 2/84	300	180°	303	246/1800	76°06.01'	83°53.63'	497	
Sept. 2/84	300	180°	304	246/1810	76°05.18'	83°57.06'	508	
Sept. 2/84	300	270°	305	246/1820	76°05.18'	84°03.95'	644	
Sept. 2/84	300	270°	306	246/1830	76°05.19'	84°11.22'	717	
Sept. 2/84	300	270°	307	246/1840	76°05.18'	84°18.34'	731	
Sept. 2/84	300	270°	308	246/1900	76°05.17'	84°26.13'	731	
Sept. 2/84	300	270°	309	246/1910	76°05.15'	84°32.39'	724	
Sept. 2/84	300	270°	310	246/1920	76°05.08'	84°40.05'	731	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 2/84	300	270°	311	246/1930	76°05.02'	84°47.12'	731	
Sept. 2/84	300	270°	312	246/1940	76°04.99'	84°54.33'	739	
Sept. 2/84	300	270°	313	246/1950	76°04.98'	85°01.67'	728	
Sept. 2/84	300	275°	314	246/2000	76°04.94'	85°09.13'	728	
Sept. 2/84	300	275°	315	246/2010	76°05.09'	85°16.57'	726	
Sept. 2/84	300	280°	316	246/2021	76°05.33'	85°24.88'	719	
Sept. 2/84	300	285°	317	246/2030	76°05.53'	85°31.27'	719	
Sept. 2/84	300	285°	318	246/2040	76°05.84'	85°38.45'	411	
Sept. 2/84	300	285°	319	246/2050	76°06.18'	85°45.75'	702	
Sept. 2/84	300	285°	320	246/2100	76°06.51'	85°53.74'	699	
Sept. 2/84	300	285°	321	246/2118	76°14.32'	86°15.48'	669	
Sept. 2/84	300	285°	322	246/2147	76°08.11'	86°27.38'	640	
Sept. 2/84	300	285°	323	246/2220	76°09.60'	86°51.01'	362	
Sept. 2/84	300	285°	324	246/2224	76°10.13'	87°00.36'	355	
Sept. 2/84	300	285°	325	246/2255	76°10.92'	87°15.09'	307	
Sept. 2/84	300	285°	326	246/2308	76°11.44'	87°23.77'	300	
Sept. 2/84	300	285°	327	246/2319	76°11.94'	87°32.14'	311	
Sept. 2/84	300	290°	328	246/2330	76°12.72'	87°38.89'	278	
Sept. 2/84	300	290°	329	246/2340	76°13.49'	87°45.33'	263	EOL, End of Hi Fix positioning
Sept. 7/84	400	240°	400	251/2230	76°04.15'	85°01.90'	717	SOL, Line run only for AGC on satellite and dead reckoning
Sept. 7/84	400	240°	401	251/2240	76°03.30'	85°09.50'	702	
Sept. 7/84	400	240°	402	251/2250	76°02.50'	85°16.65'	688	
Sept. 7/84	400	240°	403	251/2300	76°01.65'	85°24.02'	655	
Sept. 7/84	400	240°	404	251/2310	76°00.82'	85°31.02'	640	
Sept. 7/84	400	240°	405	251/2320	76°00.05'	85°38.25'	607	
Sept. 7/84	400	240°	406	251/2330	75°59.40'	85°43.90'	582	
Sept. 7/84	400	240°	407	251/2340	75°58.62'	85°48.65'	560	
Sept. 7/84	400	240°	408	251/2350	75°57.80'	85°54.95'	552	
Sept. 8/84	400	240°	409	252/0000	75°57.10'	86°01.20'	565	
Sept. 8/84	400	240°	410	252/0010	75°56.32'	86°07.35'	644	
Sept. 8/84	400	240°	411	252/0020	75°55.50'	86°13.75'	656	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 8/84	400	240°	412	252/0030	75°54.39'	86°19.70'	673	
Sept. 8/84	400	240°	413	252/0040	75°53.21'	83°24.40'	655	
Sept. 8/84	400	240°	414	252/0047	75°53.12'	83°25.25'	594	
Sept. 8/84	400	240°	415	252/0050	75°52.74'	86°30.85'	594	
Sept. 8/84	400	240°	416	252/0100	75°52.29'	86°37.33'	490	
Sept. 8/84	400	240°	417	252/0110	75°51.90'	86°44.01'	432	
Sept. 8/84	400	240°	418	252/0120	75°51.60'	86°50.70'	397	
Sept. 8/84	400	240°	419	252/0129	75°51.32'	86°56.50'	355	
Sept. 8/84	400	200°	420	252/0130	75°51.20'	86°56.66'	355	
Sept. 8/84	400	200°	421	252/0140	75°49.91'	86°59.75'	296	EOL
Sept. 8/84	425000E		14	252/1619	75°56.35'	83°45.25'	680	EOL, Profiler turned on at EOL, operating on Miniranger
Sept. 8/84	426000E	000°	15	252/1629	75°57.45'	83°43.45'	669	SOL
Sept. 8/84	426000E	000°	16	252/1644	75°59.90'	83°43.50'	647	
Sept. 8/84	426000E	000°	17	252/1653	76°01.45'	83°44.25'	651	
Sept. 8/84	426000E	000°	18	252/1704	76°03.25'	83°44.50'	657	
Sept. 8/84	426000E	000°	19	252/1716	76°05.45'	83°45.10'	607	
Sept. 8/84	426000E	000°	20	252/1723	76°06.70'	83°45.00'	633	
Sept. 8/84	426000E	000°	21	252/1735	76°08.70'	83°45.40'	468	EOL
Sept. 8/84	427000E	180°	22	252/1746	76°08.00'	83°43.00'	560	SOL
Sept. 8/84	427000E	180°	23	252/1754	76°06.70'	83°42.65'	651	
Sept. 8/84	427000E	180°	24	252/1804	76°04.75'	83°42.65'	624	
Sept. 8/84	427000E	180°	25	252/1814	76°03.15'	83°42.00'	655	
Sept. 8/84	427000E	180°	26	252/1825	76°01.25'	83°41.60'	646	
Sept. 8/84	427000E	180°	27	252/1836	75°59.30'	83°41.60'	658	
Sept. 8/84	427000E	180°	28	252/1848	75°57.25'	83°41.40'	675	
Sept. 8/84	427000E	180°	29	252/1853	75°56.50'	83°41.10'	678	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 8/84	428000E	000°	30	252/1901	75°56.65'	83°38.60'	678	SOL
Sept. 8/84	428000E	000°	31	252/1912	75°58.60'	83°40.00'	655	
Sept. 8/84	428000E	000°	32	252/1925	76°00.90'	83°40.25'	636	
Sept. 8/84	428000E	000°	33	252/1933	76°02.20'	83°40.80'	662	
Sept. 8/84	428000E	000°	34	252/1943	76°03.95'	83°40.90'	649	
Sept. 8/84	428000E	000°	35	252/1952	76°05.50'	83°41.40'	669	
Sept. 8/84	428000E	000°	36	252/2006	76°07.70'	83°41.65'	611	
Sept. 8/84	428000E	000°	37	252/2012	76°08.50'	83°42.05'	549	EOL
Sept. 8/84	429000E	180°	38	252/2018	76°08.75'	83°39.75'	596	SOL
Sept. 8/84	429000E	180°	39	252/2026	76°08.05'	83°39.80'	647	
Sept. 8/84	429000E	180°	40	252/2035	76°05.85'	83°39.00'	699	
Sept. 8/84	429000E	180°	41	252/2047	76°04.00'	83°38.50'	651	
Sept. 8/84	429000E	180°	42	252/2058	76°02.00'	83°38.20'	655	
Sept. 8/84	429000E	180°	43	252/2110	76°00.05'	83°38.10'	647	
Sept. 8/84	429000E	180°	44	252/2120	75°58.20'	83°37.40'	658	
Sept. 8/84	429000E	180°	45	252/2132	75°56.25'	83°36.65'	673	EOL
Sept. 8/84	430000E	000°	46	252/2138	75°56.00'	83°34.55'	677	SOL
Sept. 8/84	430000E	000°	47	252/2149	75°57.90'	83°34.35'	669	
Sept. 8/84	430000E	000°	48	252/2200	75°59.75'	83°35.40'	636	
Sept. 8/84	430000E	000°	49	252/2211	76°01.65'	83°35.60'	647	
Sept. 8/84	430000E	000°	50	252/2222	76°03.75'	83°36.20'	647	
Sept. 8/84	430000E	000°	51	252/2234	76°05.75'	83°36.55'	695	
Sept. 8/84	430000E	000°	52	252/2246	76°07.50'	83°36.35'	657	
Sept. 8/84	430000E	000°	53	252/2253	76°08.75'	83°37.30'	644	EOL
Sept. 8/84	431000E	180°	54	252/2259	76°09.25'	83°35.25'	644	SOL
Sept. 8/84	431000E	180°	55	252/2312	76°07.25'	83°35.10'	684	
Sept. 8/84	431000E	180°	56	252/2324	76°05.05'	83°34.40'	691	
Sept. 8/84	431000E	180°	57	252/2337	76°03.15'	83°33.90'	655	
Sept. 8/84	431000E	180°	58	252/2348	76°01.25'	83°33.75'	653	
Sept. 8/84	431000E	180°	59	252/2359	75°59.55	83°33.25'	629	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 9/84	431000E	180°	60	253/0009	75°57.70'	83°32.65'	677	
Sept. 9/84	431000E	180°	61	253/0014	75°56.80'	83°32.90'	680	EOL
Sept. 9/84	432000E	000°	62	253/0020	75°56.30'	83°30.65'	680	SOL
Sept. 9/84	432000E	000°	63	253/0037	75°59.25'	83°30.65'	644	
Sept. 9/84	432000E	000°	64	253/0048	76°01.05'	83°31.75'	655	
Sept. 9/84	432000E	000°	65	253/0058	76°02.90'	83°32.10'	658	
Sept. 9/84	432000E	000°	66	253/0109	76°04.75'	83°32.15'	688	
Sept. 9/84	432000E	000°	67	253/0120	76°06.85'	83°32.40'	724	
Sept. 9/84	432000E	000°	68	253/0133	76°09.00'	83°32.00'	?	Gap in record
Sept. 9/84	432000E	000°	69	253/0150	76°09.15'	83°32.60'	592	EOL
Sept. 9/84	433000E	180°	70	253/0201	76°10.40'	83°30.80'	746	SOL
Sept. 9/84	433000E	180°	71	253/0213	76°08.40'	83°30.75'	728	
Sept. 9/84	433000E	180°	72	253/0224	76°06.50'	83°30.55'	655	
Sept. 9/84	433000E	180°	73	253/0236	76°04.50'	83°30.00'	657	
Sept. 9/84	433000E	180°	74	253/0246	76°02.60'	83°28.80'	658	
Sept. 9/84	433000E	180°	75	253/0257	76°01.80'	83°28.90'	644	
Sept. 9/84	433000E	180°	76	253/0259	75°59.00'	83°28.75'	662	
Sept. 9/84	433000E	180°	77		75°58.30'	83°28.50'		
Sept. 9/84	433000E	180°	1	253/0300	75°58.15'	83°28.40'	671	
Sept. 9/84	433000E	180°	2	253/0314	75°56.75'	83°28.45'	680	EOL
Sept. 9/84	434000E	000°	3	253/0317	75°56.75'	83°26.20'	680	SOL
Sept. 9/84	434000E	000°	4	253/0333	75°59.40'	83°26.05'	638	
Sept. 9/84	434000E	000°	5	253/0349	76°02.10'	83°26.60'	657	
Sept. 9/84	434000E	000°	6	253/0403	76°04.55'	83°27.40'	678	
Sept. 9/84	434000E	000°	7	253/0413	76°06.45'	83°27.65'	743	
Sept. 9/84	434000E	000°	8	253/0420	76°07.75'	83°27.90'	757	
Sept. 9/84	434000E	000°	9	253/0431	76°09.25'	83°28.25'	702	EOL
Sept. 9/84	435000E	180°	10	253/0438	76°09.15'	83°26.05'	713	SOL
Sept. 9/84	435000E	180°	11	253/0449	76°07.75'	83°25.95'	757	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 9/84	435000E	180°	12	253/0500	76°05.75'	83°25.40'	702	
Sept. 9/84	435000E	180°	13	253/0511	76°04.00'	83°25.20'	669	
Sept. 9/84	435000E	180°	14	253/0521	76°02.45'	83°24.75'	668	
Sept. 9/84	435000E	180°	15	253/0533	76°01.55'	83°24.60'	657	
Sept. 9/84	435000E	180°	16	253/0540	75°59.25'	83°24.25'	640	
Sept. 9/84	435000E	180°	17	253/0545	75°58.50'	83°24.45'	657	
Sept. 9/84	435000E	180°	18	253/0556	75°56.80'	83°23.20'	678	EOL
Sept. 9/84	436000E	000°	19	253/0602	75°56.75'	83°21.80'	677	SOL
Sept. 9/84	436000E	000°	20	253/0613	75°58.25'	83°22.00'	662	
Sept. 9/84	436000E	000°	21	253/0624	76°00.35'	83°22.20'	658	
Sept. 9/84	436000E	000°	22	253/0638	76°02.75'	83°22.60'	657	
Sept. 9/84	436000E	000°	23	253/0645	76°04.25'	83°23.05'	666	
Sept. 9/84	436000E	000°	24	253/0653	76°05.50'	83°23.45'	724	
Sept. 9/84	436000E	000°	25	253/0707	76°07.80'	83°23.60'	732?	Greater than 732 m depth
Sept. 9/84	436000E	000°	26	253/0715	76°09.25'	83°23.60'	710	EOL
Sept. 9/84	437000E	180°	27	253/0724	76°10.05'	83°21.80'	662	SOL
Sept. 9/84	437000E	180°	28	253/0731	76°09.00'	83°21.80'	735	
Sept. 9/84	437000E	180°	29	253/0742	76°06.90'	83°21.10'	746	
Sept. 9/84	437000E	180°	30	253/0753	76°05.15'	83°20.60'	728	
Sept. 9/84	437000E	180°	31	253/0803	76°03.30'	83°20.40'	644	
Sept. 9/84	437000E	180°	32	253/0814	76°01.60'	83°20.25'	660	
Sept. 9/84	437000E	180°	33	253/0827	75°59.50'	83°19.80'	640	
Sept. 9/84	437000E	180°	34	253/0835	75°58.10'	83°19.50'	666	
Sept. 9/84	437000E	180°	35	253/0845	75°56.75'	83°18.95'	675	EOL
Sept. 9/84	438000E	000°	36	253/0853	75°56.40'	83°17.00'	673	SOL
Sept. 9/84	438000E	000°	37	253/0903	75°58.00'	83°17.25'	662	
Sept. 9/84	438000E	000°	38	253/0912	75°59.75'	83°17.95'	644	
Sept. 9/84	438000E	000°	39	253/0922	76°01.35'	83°18.15'	655	
Sept. 9/84	438000E	000°	40	253/0931	76°02.90'	83°18.25'	649	
Sept. 9/84	438000E	000°	41	253/0941	76°05.00'	83°18.55'	717	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 9/84	439000E	180°	42	253/0948	76°05.25'	83°16.50'	732	SOL
Sept. 9/84	439000E	180°	43	253/1002	76°02.95'	83°16.10'	655	
Sept. 9/84	439000E	180°	44	253/1013	76°01.20'	83°16.00'	658	
Sept. 9/84	439000E	180°	45	253/1025	75°59.25'	83°15.40'	640	
Sept. 9/84	439000E	180°	46	253/1034	75°58.80'	83°15.25'	658	
Sept. 9/84	439000E	180°	47	253/1041	75°57.70'	83°15.25'	666	EOL, End of roll 4
								Start of roll 5
Sept. 9/84	439000E	000°	60	253/1434	76°04.65'	83°16.20'	684	SOL, short line
Sept. 9/84	439000E	000°	61	253/1453	76°06.55'	83°16.75'	772	
Sept. 9/84	439000E	000°	62	253/1504	76°08.35'	83°16.75'	757	EOL
Sept. 9/84	441000E	180°	63	253/1514	76°07.75'	83°12.55'	783	SOL
Sept. 9/84	441000E	180°	64	253/1522	76°06.30'	83°12.10'	796	
Sept. 9/84	441000E	180°	65	253/1523	76°06.15'	83°11.65'	790	
Sept. 9/84	441000E	180°	66	253/1535	76°04.00'	83°11.95'	675	
Sept. 9/84	441000E	180°	67	253/1544	76°03.55'	83°11.55'	662	
Sept. 9/84	441000E	180°	68	253/1554	76°00.85'	83°11.45'	660	
Sept. 9/84	441000E	180°	69	253/1606	75°59.00'	83°11.05'	640	
Sept. 9/84	441000E	180°	70	253/1614	75°57.75'	83°10.85'	644	
Sept. 9/84	441000E	180°	71	253/1620	75°56.85'	83°10.50'	657	EOL
Sept. 9/84	443000E	000°	72	253/1646	75°56.75'	83°06.45'	633	SOL
Sept. 9/84	443000E	000°	73	253/1657	75°58.00'	83°06.45'	644	
Sept. 9/84	443000E	000°	74	253/1659	75°58.45'	83°06.50'	647	
Sept. 9/84	443000E	000°	75	253/1710	76°00.75'	83°06.85'	658	
Sept. 9/84	443000E	000°	76	253/1718	76°02.30'	83°06.85'	657	
Sept. 9/84	443000E	000°	77	253/1722	76°03.00'	83°07.05'	662	
Sept. 9/84	443000E	000°	78	253/1747	76°03.95'	83°07.10'	678	
Sept. 9/84	443000E	000°	79	253/1758	76°05.85'	83°07.45'	797	
Sept. 9/84	443000E	000°	80	253/1808	76°07.40'	83°07.95'	805	
Sept. 9/84	443000E	000°	81	253/1817	76°08.65'	83°07.75'	794	
Sept. 9/84	443000E	000°	82	253/1823	76°09.40'	83°08.30'	775	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 10/84	445000E	180°	114	254/0125	76°02.00'	83°02.50'	662	
Sept. 10/84	445000E	180°	115	254/0136	76°00.30'	83°02.50'	658	
Sept. 10/84	445000E	180°	116	254/0146	75°58.75'	83°02.10'	647	
Sept. 10/84	445000E	180°	117	254/0157	75°56.95'	83°01.90'	614	
Sept. 10/84	445000E	180°	118	254/0201	75°56.10'	83°01.95'	625	EOL
Sept. 10/84	446000E	000°	119	254/0206	75°56.30'	82°59.25'	618	SOL
Sept. 10/84	446000E	000°	120	254/0212	75°57.30'	82°59.25'	607	
Sept. 10/84	446000E	000°	121	254/0220	75°58.60'	82°59.50'	646	
Sept. 10/84	446000E	000°	122	254/0229	76°00.25'	82°59.50'	657	
Sept. 10/84	446000E	000°	123	254/0239	76°01.75'	83°00.25'	664	
Sept. 10/84	446000E	000°	124	254/0248	76°03.45'	83°01.00'	691	
Sept. 10/84	446000E	000°	125	254/0257	76°05.15'	83°01.00'	768	
Sept. 10/84	446000E	000°	1	254/0301	76°05.75'	83°01.15'	801	
Sept. 10/84	446000E	000°	2	254/0304	76°06.00'	83°00.65'	816	EOL
Sept. 10/84	447000E	180°	3	254/0310	76°06.10'	82°58.55'	816	SOL
Sept. 10/84	447000E	180°	4	254/0321	76°04.30'	82°58.45'	735	
Sept. 10/84	447000E	180°	5	254/0328	76°02.95'	82°58.30'	673	
Sept. 10/84	447000E	180°	6	254/0337	76°01.55'	82°57.95'	673	
Sept. 10/84	447000E	180°	7	254/0347	76°00.05'	82°57.95'	655	
Sept. 10/84	447000E	180°	8	254/0357	75°58.35'	82°57.40'	644	
Sept. 10/84	447000E	180°	9	254/0408	75°56.80'	82°57.50'	605	EOL
Sept. 10/84	448000E	000°	10	254/0412	75°56.70'	82°55.25'	600	SOL
Sept. 10/84	448000E	000°	11	254/0421	75°58.30'	82°55.30'	640	
Sept. 10/84	448000E	000°	12	254/0431	76°00.05'	82°55.40'	655	
Sept. 10/84	448000E	000°	13	254/0440	76°01.65'	82°55.70'	678	
Sept. 10/84	448000E	000°	14	254/0450	76°03.20'	82°55.70'	682	
Sept. 10/84	448000E	000°	15	254/0459	76°04.90'	82°56.40'	770	
Sept. 10/84	448000E	000°	16	254/0502	76°05.45'	82°56.35'	794	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 9/84	442000E	180°	83	253/2013	76°10.45'	83°10.35'	662	SOL
Sept. 9/84	442000E	180°	84	253/2021	76°09.75'	83°10.25'	739	
Sept. 9/84	442000E	180°	85	253/2025	76°09.35'	83°10.60'	764	
Sept. 9/84	442000E	180°	86	253/2039	76°07.75'	83°10.00'	797	
Sept. 9/84	442000E	180°	87	253/2050	76°05.85'	83°09.55'	786	
Sept. 9/84	442000E	180°	88	253/2101	76°04.10'	83°09.45'	680	
Sept. 9/84	442000E	180°	89	253/2112	76°02.40'	83°08.95'	655	
Sept. 9/84	442000E	180°	90	253/2122	76°01.75'	83°08.95'	658	
Sept. 9/84	442000E	180°	91	253/2133	75°59.00'	83°08.50'	646	
Sept. 9/84	442000E	180°	92	253/2143	75°57.40'	83°08.25'	633	
Sept. 9/84	442000E	180°	93	253/2147	75°56.80'	83°08.20'	644	EOL
Sept. 9/84	444000E	000°	94	253/2305	75°56.80'	83°04.00'	620	SOL
Sept. 9/84	444000E	000°	95	253/2324	76°00.00'	83°04.50'	651	
Sept. 9/84	444000E	000°	96	253/2332	76°01.60'	83°04.55'	655	
Sept. 9/84	444000E	000°	97	253/2339	76°02.65'	83°04.70'	666	
Sept. 9/84	444000E	000°	98	253/2355	76°05.50'	83°05.00'	775	
Sept. 10/84	444000E	000°	99	254/0001	76°06.60'	83°04.50'	812	
Sept. 10/84	444000E	000°	100	254/0005	76°07.25'	83°05.50'	812	
Sept. 10/84	444000E	000°	101	254/0011	76°08.25'	83°05.35'	816	
Sept. 10/84	444000E	000°	102	254/0015	76°08.85'	83°04.60'	812	
Sept. 10/84	444000E	000°	103	254/0019	76°09.45'	83°05.05'	786	
Sept. 10/84	444000E	000°	104	254/0024	76°10.25'	83°06.00'	757	
Sept. 10/84	444000E	000°	105	254/0025	76°10.45'	83°06.40'	757	
Sept. 10/84	444000E	000°	106	254/0027	76°10.80'	83°06.40'	691	EOL
Sept. 10/84	445000E	180°	107	254/0035	76°10.40'	83°03.55'	757	SOL
Sept. 10/84	445000E	180°	108	254/0040	76°09.45'	83°04.15'	797	
Sept. 10/84	445000E	180°	109	254/0045	76°09.70'	83°04.15'	823	
Sept. 10/84	445000E	180°	110	254/0049	76°08.00'	83°03.65'	823	
Sept. 10/84	445000E	180°	111	254/0055	76°07.05'	83°03.65'	817	
Sept. 10/84	445000E	180°	112	254/0102	76°05.90'	83°02.85'	801	
Sept. 10/84	445000E	180°	113	254/0115	76°03.65'	83°02.85'	680	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 10/84	449000E	180°	17	254/0507	76°05.25'	82°54.40'	796	SOL
Sept. 10/84	449000E	180°	18	254/0516	76°03.75'	82°54.00'	728	
Sept. 10/84	449000E	180°	19	254/0527	76°02.00'	82°53.60'	677	
Sept. 10/84	449000E	180°	20	254/0540	75°59.90'	82°53.35'	657	
Sept. 10/84	449000E	180°	21	254/0553	75°57.70'	82°53.30'		
Sept. 10/84	449000E	180°	22	254/0559	75°56.83'	82°53.05'	598	EOL
Sept. 10/84	450000E	000°	23	254/0604	75°56.70'	82°50.50'	594	SOL
Sept. 10/84	450000E	000°	24	254/0613	75°58.25'	82°51.10'	635	
Sept. 10/84	450000E	000°	25	254/0622	75°59.85'	82°51.20'	658	
Sept. 10/84	450000E	000°	26	254/0631	76°01.50'	82°51.30'	677	
Sept. 10/84	450000E	000°	27	254/0640	76°03.15'	82°51.45'	726	
Sept. 10/84	450000E	000°	28	254/0649	76°04.70'	82°51.55'	779	
Sept. 10/84	450000E	000°	29	254/0655	76°05.50'	82°51.60'	814	EOL
Sept. 10/84	451000E	180°	30	254/0705	76°04.50'	82°49.25'	779	SOL
Sept. 10/84	451000E	180°	31	254/0713	76°03.00'	82°49.10'	728	
Sept. 10/84	451000E	180°	32	254/0723	76°01.45'	82°48.75'	693	
Sept. 10/84	451000E	180°	33	254/0733	75°59.75'	82°48.60'	658	
Sept. 10/84	451000E	180°	34	254/0747	75°57.65'	82°48.47'	625	
Sept. 10/84	451000E	180°	35	254/0751	75°56.78'	82°48.35'	596	EOL
Sept. 10/84	452000E	000°	36	254/0800	75°56.73'	82°46.25'	594	SOL
Sept. 10/84	452000E	000°	37	254/0804	75°57.75'	82°46.05'	622	
Sept. 10/84	452000E	000°	38	254/0814	75°59.19'	82°46.44'	647	
Sept. 10/84	452000E	000°	39	254/0824	76°00.90'	82°46.59'	691	
Sept. 10/84	452000E	000°	40	254/0837	76°03.00'	82°46.85'	737	
Sept. 10/84	452000E	000°	41	254/0846	76°04.55'	82°47.00'	786	
Sept. 10/84	452000E	000°	42	254/0852	76°05.55'	82°47.45'	823	
Sept. 10/84	452000E	000°	43	254/0856	76°06.10'	82°47.70'	830	
Sept. 10/84	452000E	000°	44	254/0859	76°06.50'	82°47.45'	834	
Sept. 10/84	452000E	000°	45	254/0901	76°06.80'	82°47.45'	838	
Sept. 10/84	452000E	000°	46	245/0908	76°07.85'	82°47.20'	836	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 10/84	452000E	000°	47	254/0917	76°09.40'	82°47.55'	838	
Sept. 10/84	452000E	000°	48	254/0922	76°10.25'	82°47.55'	797	EOL
Sept. 10/84	453000E	180°	49	254/0930	76°10.15'	82°45.80'	797	SOL
Sept. 10/84	453000E	180°	50	254/0935	76°09.50'	82°45.70'	838	
Sept. 10/84	453000E	180°	51	254/0943	76°07.80'	82°45.50'	838	
Sept. 10/84	453000E	180°	52	254/0950	76°06.65'	82°45.10'	838	
Sept. 10/84	453000E	180°	53	254/0952	76°06.25'	82°45.40'	832	
Sept. 10/84	453000E	180°	54	254/1001	76°04.55'	82°45.00'	790	
Sept. 10/84	453000E	180°	55	254/1011	76°02.95'	82°44.65'	746	
Sept. 10/84	453000E	180°	56	254/1021	76°01.35'	82°44.55'	708	
Sept. 10/84	453000E	180°	57	254/1030	75°59.75'	82°44.40'	666	
Sept. 10/84	453000E	180°	58	254/1040	75°58.25'	82°43.85'	636	
Sept. 10/84	453000E	180°	59	254/1050	75°56.60'	82°43.85'	587	EOL
Sept. 10/84	454000E	000°	60	254/1100	75°56.70'	82°41.80'	585	SOL
Sept. 10/84	454000E	000°	61	254/1107	75°58.25'	82°41.90'	640	
Sept. 10/84	454000E	000°	62	254/1116	75°59.80'	82°42.25'	666	
Sept. 10/84	454000E	000°	63	254/1125	76°01.25'	82°42.50'	713	
Sept. 10/84	454000E	000°	64	254/1135	76°02.85'	82°42.80'	752	
Sept. 10/84	454000E	000°	65	254/1144	76°04.50'	82°42.30'	794	
Sept. 10/84	454000E	000°	66	254/1154	76°06.25'	82°42.80'	834	
Sept. 10/84	454000E	000°	67	254/1200	76°07.25'	82°42.80'	838	
Sept. 10/84	454000E	000°	68	254/1208	76°08.45'	82°42.80'	841	EOL
Sept. 10/84	455000E	180°	69	254/1213	76°08.30'	82°40.55'	841	SOL
Sept. 10/84	455000E	180°	70	254/1228	76°05.50'	82°40.80'	828	
Sept. 10/84	455000E	180°	71	254/1238	76°03.75'	82°40.15'	775	
Sept. 10/84	455000E	180°	72	254/1248	76°02.00'	82°39.80'	366	
Sept. 10/84	455000E	180°	73	254/1259	76°00.25'	82°39.25'	689	
Sept. 10/84	455000E	180°	74	254/1310	75°58.50'	82°39.10'	640	
Sept. 10/84	455000E	180°	75	254/1319	75°57.00'	82°39.35'	600	
Sept. 10/84	455000E	180°	76	254/1320	75°56.85'	82°39.10'	589	EOL

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 10/84	456000E	000°	77	254/1325	75°56.75'	82°36.90'	585	SOL
Sept. 10/84	456000E	000°	78	254/1335	75°58.40'	82°37.20'	636	
Sept. 10/84	456000E	000°	79	254/1345	76°00.10'	82°37.45'	684	
Sept. 10/84	456000E	000°	80	254/1356	76°01.80'	82°37.60'	732	
Sept. 10/84	456000E	000°	81	254/1406	76°03.70'	82°38.00'	779	
Sept. 10/84	456000E	000°	82	254/1413	76°04.75'	82°39.05'	814	
Sept. 10/84	456000E	000°	83	254/1424	76°06.25'	82°38.00'	838	
Sept. 10/84	456000E	000°	84	254/1428	76°07.00'	82°36.00'	841	EOL
Sept. 10/84	457000E	180°	85	254/1432	76°06.80'	82°36.00'	841	SOL
Sept. 10/84	457000E	180°	86	254/1445	76°04.70'	82°35.60'	823	
Sept. 10/84	457000E	180°	87	254/1455	76°02.79'	82°35.79'	766	
Sept. 10/84	457000E	180°	88	254/1508	76°00.62'	82°35.50'	657	
Sept. 10/84	457000E	180°	89	254/1516	75°59.10'	82°35.38'	657	
Sept. 10/84	457000E	180°	90	254/1521	75°58.33'	82°35.29'	625	EOL
Sept. 10/84	458000E	000°	91	254/1527	75°58.25'	82°33.14'	625	SOL
Sept. 10/84	458000E	000°	92	254/1534	75°59.42'	82°33.15'	669	
Sept. 10/84	458000E	000°	93	254/1544	76°01.20'	82°33.50'	726	
Sept. 10/84	458000E	000°	94	254/1556	76°03.14'	82°33.64'	785	
Sept. 10/84	458000E	000°	95	254/1601	76°04.09'	82°33.77'	808	
Sept. 10/84	458000E	000°	96	254/1606	76°04.77'	82°35.05'	827	
Sept. 10/84	458000E	000°	97	254/1613	76°05.99'	82°33.72'	841	EOL
Sept. 10/84	459000E	180°	98	254/1624	76°04.85'	82°31.61'	827	SOL
Sept. 10/84	459000E	180°	99	254/1636	76°02.76'	82°31.35'	779	
Sept. 10/84	459000E	180°	100	254/1646	76°00.99'	82°31.14'	724	
Sept. 10/84	459000E	180°	101	254/1658	75°58.93'	82°30.95'	640	
Sept. 10/84	459000E	180°	102	254/1705	75°57.60'	82°30.78'	604	EOL
Sept. 10/84	460000E	000°	103	254/1711	75°57.57'	82°28.55'	602	SOL
Sept. 10/84	460000E	000°	104	254/1721	75°59.13'	82°28.69'	647	
Sept. 10/84	460000E	000°	105	254/1730	76°00.68'	82°28.84'	721	

TABLE 3 (continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984 CSS BAFFIN GEOPHYSICAL LINES, JONES SOUND

Date	Line #	Heading	Fix	Julian Day/ Time (GMT)	Latitude	Longitude	Depth (m)	Comments
Sept. 10/84	460000E	000°	106	254/1740	76°02.31'	82°29.07'	768	
Sept. 10/84	460000E	000°	107	254/1749	76°03.91'	82°29.17'	812	EOL
Sept. 10/84	8443000N	270°	108	254/1751	76°04.00'	82°29.74'	816	SOL
Sept. 10/84	8443000N	270°	109	254/1800	76°03.80'	82°35.50'	801	
Sept. 10/84	8443000N	270°	110	254/1813	76°03.85'	82°44.05'	777	
Sept. 10/84	8443000N	270°	111	254/1827	76°03.75'	82°53.50'	739	
Sept. 10/84	8443000N	270°	112	254/1840	76°03.75'	83°01.75'	702	
Sept. 10/84	8443000N	270°	113	254/1853	76°03.70'	83°11.00'	666	
Sept. 10/84	8443000N	270°	114	254/1908	76°03.65'	83°19.60'	655	
Sept. 10/84	8443000N	270°	115	254/1922	76°03.50'	83°30.00'	647	
Sept. 10/84	8443000N	270°	116	254/1940	76°03.35'	83°41.20'	658	
Sept. 10/84	8443000N	270°	117	254/2001	76°03.25'	83°54.00'	669	EOL
Sept. 10/84	8428000N	090°	118	254/2101	75°55.25'	83°53.80'	666	SOL
Sept. 10/84	8428000N	090°	119	254/2111	75°55.40'	83°45.40'	678	
Sept. 10/84	8428000N	090°	120	254/2122	75°55.40'	83°37.50'	669	
Sept. 10/84	8428000N	090°	121	254/2130	75°55.45'	83°30.45'	682	
Sept. 10/84	8428000N	090°	122	254/2146	75°55.70'	83°17.40'	677	
Sept. 10/84	8428000N	090°	123	254/2159	75°55.63'	83°07.70'	642	
Sept. 10/84	8428000N	090°	124	254/2209	75°55.67'	82°59.93'	629	
Sept. 10/84	8428000N	090°	125	254/2220	75°55.80'	82°51.35'	585	
Sept. 10/84	8428000N	090°	126	254/2233	75°55.88'	82°41.52'	571	
Sept. 10/84	8428000N	090°	127	254/2240	75°55.91'	82°35.68'	567	
Sept. 10/84	8428000N	090°	128	254/2253	75°55.97'	82°26.13'	567	
Sept. 10/84	8428000N	090°	129	254/2304	75°56.00'	82°17.45'	567	EOL, End of roll 5
Sept. 11/84	451000E	000°	130	255/0019	76°04.20'	82°48.50'	?	SOL, Start of roll 6
Sept. 11/84	451000E	000°	131	255/0031	76°06.30'	82°49.00'	830	
Sept. 11/84	451000E	000°	132	255/0039	76°07.55'	82°49.75'	838	EOL, End of BAFFIN 12 kHz data

APPENDIX 7

TABLE 4 LISTING THE DAY/TIMES AND GEOGRAPHIC POSITIONS FOR THE FIXES ALONG ALL UNDERWAY GEOPHYSICAL LINES GATHERED BY CSL TUDLIK (RTT 1000 7.0 kHz PROFILER, SIDESCAN SONAR AND ELAC SOUNDER) ON THE BAFFIN 84-015 CRUISE, AUGUST-SEPTEMBER 1984, JONES SOUND

TABLE 4

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984
CSL TUDLIK GEOPHYSICAL LINES, JONES SOUND

Date	Line No.	Fix	Julian Day/ Time (GMT)	Latitude	Longtitude	Depth (m)	Comments
Sept. 16/84	1	1	260/1350	75°49.88'N	82°03.55'W	128	SOL at western side of Eastern Glacier south coast, Start Roll #1, begin survey on port 12.0(?) kHz transducer(?)
Sept. 16/84	1	2	260/1357	75°49.60'	82°01.80'	97	
Sept. 16/84	1	3	260/1408	75°49.27'	81°59.90'	185	western edge of Eastern Glacier, lateral moraine?
Sept. 16/84	1	4	260/1420	75°49.02'	81°56.20'	193	lateral moraine(?) on east of Eastern Glacier
Sept. 16/84	1	5	260/1431	75°48.98'	81°52.05'	194	
Sept. 16/84	1	6	260/1435	75°49.01'	81°50.95'	156	
Sept. 16/84	1	7	260/1443	75°49.08'	81°48.60'	153	lateral moraine on west of "2nd Glacier"
Sept. 16/84	1	8	260/1449	75°49.11'	81°46.50'	103	lateral moraine on east of glacier
Sept. 16/84	1	9	260/1455	75°49.09'	81°44.92'	88	
Sept. 16/84	1	10	260/1504	75°49.08'	81°41.92'	190	
Sept. 16/84	1	11	260/1508	75°49.02'	81°40.65'	95	western edge of "3rd glacier"
Sept. 16/84	1	12	260/1515	75°48.92'	81°38.92'	92	
Sept. 16/84	1	13	260/1520	75°48.82'	81°37.60'	145	
Sept. 16/84	1	14	260/1528	75°48.70'	81°35.30'	153	
Sept. 16/84	1	15	260/1536	75°48.52'	81°33.01'	145	
Sept. 16/84	1	16	260/1547	75°48.40'	81°30.70'	117	western edge of "5th glacier"
Sept. 16/84	1	17	260/1554	75°48.20'	81°28.60'	77	
Sept. 16/84	1	18	260/1556	75°48.19'	81°28.15'	52	eastern edge of "5th glacier", reverse course
Sept. 16/84	1	19	260/1557	75°48.11'	81°28.20'	57	
Sept. 16/84	1	20	260/1600	75°48.11'	81°28.75'	85	
Sept. 16/84	1	21	260/1603	75°48.22'	81°30.00'	87	
Sept. 16/84	1	22	260/1613	75°48.40'	81°33.00'	116	EOL near "5th glacier". Begin grab samples (see end of Roll #1 and Roll #2)
Sept. 18/84	A	1	262/1549	76°24.49'	80°50.30'	62	SOL off Jakeman Glacier, "Tudlik Bay", Start Roll #4 (note Roll #3 from sampling on BAFFIN). Calibrate both tranducers before survey began. Operating on 12(?) kHz transducer on port side
Sept. 18/84	A	2	262/1552	76°24.60'	80°51.33'	88	
Sept. 18/84	A	3	262/1558	76°24.83'	80°52.70'	102	
Sept. 18/84	A	4	262/1604	76°25.14'	80°53.98'	73	
Sept. 18/84	A	5	262/1607	76°25.31'	80°54.75'	-	no depth (power off)
Sept. 18/84	A	6	262/1613	76°25.50'	80°55.35'	-	no depth (power off)
Sept. 18/84	A	7	262/1618	76°25.71'	80°56.50'	17	
Sept. 18/84	A	8	262/1621	76°25.88'	80°56.80'	38	
Sept. 18/84	A	9	262/1626	76°25.91'	80°57.95'	53	
Sept. 18/84	A	10	262/1629	76°26.01'	80°58.80'	50	
Sept. 18/84	A	11	262/1637	76°26.60'	80°59.80'	44	
Sept. 18/84	A	12	262/1646	76°26.95'	81°01.05'	22	
Sept. 18/84	A	13	262/1655	76°27.50'	81°02.00'	30	
Sept. 18/84	A	14	262/1703	76°27.94'	81°03.30'	27	
Sept. 18/84	A	15	262/1710	76°28.42'	81°04.60'	25	
Sept. 18/84	A	16	262/1721	76°28.10'	81°07.03'	12	sidescan hit bottom
Sept. 18/84	A	17	262/1726	76°28.01'	81°09.20'	8	sample of seaweed T84-015-SW, stopped
Sept. 18/84	A	18	262/1735	76°28.00'	81°11.98'	19	started again
Sept. 18/84	A	19	262/1745	76°28.00'	81°15.00'	39	
Sept. 18/84	A	20	262/1801	76°28.02'	81°19.40'	46	
Sept. 18/84	A	21	262/1810	76°27.85'	81°22.25'	83	axis of Fram Fjord

TABLE 4 (Continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984
CSL TUDLIK GEOPHYSICAL LINES, JONES SOUND

Date	Line No.	Fix	Julian Day/ Time (GMT)	Latitude	Longtitude	Depth (m)	Comments
Sept. 18/84	A	22	262/1821	76°27.82'	81°24.90'	27	west edge of Fram Fjord
Sept. 18/84	A	23	262/1833	76°27.74'	81°28.02'	51	
Sept. 18/84	A	24	262/1843	76°27.50'	81°31.15'	37	
Sept. 18/84	A	25	262/1855	76°27.32'	81°36.05'	15	Lemieux Shoal, east edge
Sept. 18/84	A	26	262/1910	76°27.11'	81°39.10'	12	Lemieux Shoal, west edge
Sept. 18/84	A	27	262/1920	76°27.03'	81°42.15'	42	
Sept. 18/84	A	28	262/1930	76°26.91'	81°44.80'	71	
Sept. 18/84	A	29	262/1940	76°26.78'	81°47.45'	121	
Sept. 18/84	A	30	262/1950	76°26.73'	81°48.03'	237	edge of Starnes Fjord off "Two-Tone Hill"
Sept. 18/84	A	31	262/2008	76°24.22'	81°53.50'	439	
Sept. 18/84	A	32	262/2027	76°21.32'	81°53.00'	425	
Sept. 18/84	A	33	262/2047	76°18.79'	81°46.50'	640?	
Sept. 18/84	A	34	262/2057	76°17.50'	81°43.80'	656?	EOL/EOD at mouth of Starnes Fjord, End Roll #4
Sept. 19/84	1	1	263/1427	76°28.59'	81°50.85'	62	SOL, mouth of Starnes Fjord opposite "Two-tone Hill" (in the lee), start roll #5
Sept. 19/84	1	2	263/1432	76°28.48'	81.53.01'	225	
Sept. 19/84	1	3	263/1437	76°28.49'	81°54.95'	265	axis of Starnes Fjord
Sept. 19/84	1	4	263/1442	76°28.49'	81°57.01'	250	
Sept. 19/84	1	5	263/1452	76°28.30'	82°00.70'	235	
Sept. 19/84	1	6	263/1502	76°28.19'	82°03.45'	155	area of Arctic Shoal
Sept. 19/84	1	7	263/1517	76°28.12'	82°06.90'	78	
Sept. 19/84	1	8	263/1520	76°28.29'	82°09.33'	14	EOL on other side of fjord, stopped for meal
Sept. 19/84	2	9	263/1605	76°28.49'	82°08.30'	61	SOL, begin to procced up Starnes Fjord
Sept. 19/84	2	10	263/1615	76°29.11'	82°07.15'	256	
Sept. 19/84	2	11	263/1625	76°29.84'	82°06.80'	379	Fix 11.7, axis of Starnes Fjord
Sept. 19/84	2	12	263/1635	76°30.49'	82°06.65'	335	
Sept. 19/84	2	13	263/1645	76°31.10'	82°06.35'	32	across fjord at Fielder Point
Sept. 19/84	2	14	263/1650	76°31.54'	82°06.30'	100	
Sept. 19/84	2	15	263/1700	76°32.40'	82°06.50'	323	Fix 15.6, axis of fjord
Sept. 19/84	2	16	263/1710	76°33.05'	82°06.70'	352	
Sept. 19/84	2	17	263/1720	76.33.81'	82°06.75'	10	
Sept. 19/84	2	18	263/1730	76°34.61'	82°06.50'	130	
Sept. 19/84	2	19	263/1740	76°35.36'	82°06.90'	162	
Sept. 19/84	2	20	263/1750	76°36.33'	82°07.80'	310	axis of fjord
Sept. 19/84	2	21	263/1800	76°37.12'	82°08.60'	148	A/C to port
Sept. 19/84	2	22	263/1810	76°37.28'	82°12.00'	228	
Sept. 19/84	2	23	263/1820	76°37.50'	82°15.63'	292	approximate axis of fjord, opposite Iceberg Glacier
Sept. 19/84	2	24	263/1830	76°37.70'	82°18.90'	258	
Sept. 19/84	2	25	263/1840	76°37.98'	82°22.90'	210	
Sept. 19/84	2	26	263/1850	76°38.15'	82°26.28'	75	approach beach, A/C to starboard to cross fjord
Sept. 19/84	2	27	263/1900	76°39.08'	82°27.35'	148	
Sept. 19/84	2	28	263/1905	76°39.41'	82°27.70'	165	Fix 28.7, axis of fjord
Sept. 19/84	2	29	263/1915	76°39.90'	82°25.85'	165	
Sept. 19/84	2	30	263/1918	76°40.05'	82°24.48'	15	EOL, take out 7.0 kHz profiler, head back down fjord
Sept. 19/84	3	31	643/1927	76°39.81'	82°24.60'	157	SOL, running back down fjord at full speed
Sept. 19/84	3	32	263/1930	76°39.29'	82°23.13'	230	Only ELAC sounder operating

TABLE 4 (Continued)

TABLE OF FIX POSITIONS AND DEPTHS ALONG 1984
CSL TUDLIK GEOPHYSICAL LINES, JONES SOUND

Date	Line No.	Fix	Julian Day/ Time (GMT)	Latitude	Longtitude	Depth (m)	Comments
Sept. 19/84	3	33	263/1935	76°38.34'	82°21.33'	262	
Sept. 19/84	3	34	263/1940	76°37.80'	82°18.80'	281	
Sept. 19/84	3	35	263/1950	76°36.71'	82°13.95'	276	
Sept. 19/84	3	36	263/1955	76°36.34	82°11.25'	212	
Sept. 19/84	3	37	263/2000	76°35.99'	82°08.65'	245	A/C to starboard
Sept. 19/84	3	38	263/2005	76°35.50'	82°06.85'	275	
Sept. 19/84	3	39	263/2010	76°34.80'	82°04.99'	325	
Sept. 19/84	3	40	263/2020	76°33.15'	82°06.10'	351	
Sept. 19/84	3	41	263/2030	76°31.69'	82°07.25'	225	off Fielder Point
Sept. 19/84	3	42	263/2035	76°30.82'	82°07.70'	228	
Sept. 19/84	3	43	263/2040	76°30.00'	82°07.00'	404	A/C to 155°
Sept. 19/84	3	44	263/2045	76°29.48'	82°05.85'	333	
Sept. 19/84	3	45	263/2050	76°28.80'	82°04.60'	77	Fix 45.1, on top of "Arctic Shoal", 20 m minimum depth
Sept. 19/84	3	46	263/2055	76°28.09'	82°03.50'	200	
Sept. 19/84	3	47	263/2100	76°27.20'	82°02.60'	234	
Sept. 19/84	3	48	263/2105	76°26.42'	82°01.15'	219	
Sept. 19/84	3	49	263/2110	76°25.65'	82°00.05'	188	
Sept. 19/84	3	50	263/2115	76°24.93'	81°58.01'	236	
Sept. 19/84	3	51	263/2120	76°24.29'	81°55.90'	375	
Sept. 19/84	3	52	263/2125	76°23.63'	81°54.12'	365	
Sept. 19/84	3	53	263/2130	76°23.01'	81°52.02'	440	axis of Starnes Fjord?
Sept. 19/84	3	54	263/2135	76°22.37'	81°50.40'	428	EOL/EOD, mouth of Starnes Fjord, End of Roll #5
Sept. 20/84	1	1	264/1514	76°27.40'	81°44.25'	22	SOL, mouth of Starnes Fjord on east in lee of "Two-tone Hill", Start of Roll #6
Sept. 20/84	1	2	264/1520	76°27.37'	81°42.60'	24	
Sept. 20/84	1	3	264/1524	76°27.28'	81°41.99'	25	
Sept. 20/84	1	4	264/1531	76°26.95'	81°42.15'	53	
Sept. 20/84	1	5	264/1536	76°26.99'	81°43.90'	45	
Sept. 20/84	1	6	264/1542	76°27.08'	81°45.50'	50	
Sept. 20/84	1	7	264/1548	76°27.20'	81°46.85'	70	
Sept. 20/84	1	8	246/1558	76°27.40'	81°49.08'	208	
Sept. 20/84	1	9	264/1600	76°27.58'	81°51.70'	274	axis of Starnes Fjord
Sept. 20/84	1	10	264/1618	76°27.68'	81°54.25'	229	
Sept. 20/84	1	11	264/1632	76°27.71'	81°57.15'	221	
Sept. 20/84	1	12	264/1642	76°27.90'	81°58.80'	225	
Sept. 20/84	1	13	264/1652	76°28.18'	82°00.20'	226	
Sept. 20/84	1	14	264/1705	76°28.53'	82°03.48'	91	
Sept. 20/84	1	15	264/1715	76°28.51'	82°04.95'	38	on Arctic Shoal
Sept. 20/84	1	16	264/1722	76°28.51'	82°05.49'	63	A/C, Fix 16.4, Arctic Shoal, 33 m
Sept. 20/84	1	17	264/1728	76°28.79'	82°04.75'	119	Fix 17.4, Arctic Shoal, 9 m
Sept. 20/84	1	18	264/1733	76°28.59'	82°03.00'	75	
Sept. 20/84	1	19	264/1745	76°28.41'	82°00.40'	234	
Sept. 20/84	1	20	264/1755	76°28.20'	81°58.25'	240	
Sept. 20/84	1	21	264/1806	76°28.12'	81°55.40'	244	Fix 21.7, axis of fjord, notch?
Sept. 20/84	1	22	264/1816	76°27.99'	81°53.01'	253	
Sept. 20/84	1	23	264/1818	76°27.89'	81°50.01'	150	
Sept. 20/84	1	24	264/1836	76°27.88'	81°47.80'	18	EOL/EOD, edge of fjord, commence sampling (also on Roll #6), End of Roll #6, Roll #7 has TUDLIK sampling from September 21, 1984, Roll #8 has BAFFIN sampling

APPENDIX 8

MARINE ECOLOGY LABORATORY MEMO REGARDING WORK BEING DONE ON JONES SOUND BIOLOGICAL SAMPLES FROM BAFFIN 84-015

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

TO / À: Brian MacLean
EMG, AGC

RECEIVED DEC 19 1984

FROM / DE: Elizabeth Boulding
Biological Oceanography

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE/NOTRE RÉFÉRENCE: Boulding
YOUR FILE/VOTRE RÉFÉRENCE
DATE: December 14, 1984

SUBJECT / OBJET

BIOLOGICAL SAMPLES FROM GRAB AND CORES ON BAFFIN - 84-015

Sorry I've been so long in replying to your memorandum. You will be relieved to hear that the samples are safely back in the freezer locker at B.I.O. I am grateful to Dr. Ruffman for taking time to collect them and agree that these samples comprise an important collection in an unknown area.

In order to make the best use of this collection it is necessary to have accurate identification of the invertebrate species present. This job would best be done by specialists on the different invertebrate groups such as those associated with the National Museum in Ottawa. I have written the Museum to see if they are interested enough in this collection to identify the species without charge.

Once the species are identified it would be interesting to look for correlations between the presence of the larger conspicuous species and bottom type. It is unusual to have such detailed information on the sediments coupled with such precise co-ordinates for the sampling locations, and pleasant to meet geologists who are interested in biology.

I will keep you informed as this progresses.

Elizabeth Boulding

Elizabeth Boulding

cc: Trevor Platt, MEL
Brian Irwin, MEL
Ed Horne, MEL
Alan Ruffman, Geomarine Assoc.

APPENDIX 9

PORTIONS OF DICK HERLINVEAUX'S 1970 "ICEPACK 8/68" REPORT REGARDING BIOLOGICAL SAMPLES IN JONES SOUND AND FOUR OCEANOGRAPHIC STATIONS (ALSO LETTER OF HERLINVEAUX'S OF APRIL 17, 1985)

Note: We believe the biological sample of soft coral on p. 13 (Figure 7) may have come from Oceanographic Station 8 (p. 9; Figure 3) as opposed to the broad area shaded on Figure 4 (p. 10). The position on p. 28 however, does not exactly match that on pages 41 or 57 but is fairly close (see letter at end of Appendix 9 and last note below for explanation from Herlinveaux).

Note: The position of the Grise Fjord beach sample seen in Figure 9 (p. 15) given on p. 28 is somewhat in error and plots offshore. (Herlinveaux's letter of April 17, 1985 corrects this to 76°26'N, 83°00'W; we would digitize the beach sample as 76°24'N, 82°52'W assuming it to have come from the beach in front of the community of Grise Fjord and using the 1984 CHS field sheets.)

Note: The positions of oceanographic stations 4 and 9 given on pages 37, 42 and 57 do not nearly match the index map on p. 9 (Figure 8); there must be an error somewhere (?). (Herlinveaux's letter of April 17, 1985 corrects station No. 9 to 76°45'N, 79°21'W in 297 fm. This too is incorrect and should probably be one degree further south at 75°45'N, 79°21'W to match the index map he presented (1970). Station No. 4 has the correct geographic coordinates in his 1970 report but was shown a bit too far west on the index map). No. 9 has been corrected on Enclosure 2 to fall south of Coburg Island.

Note: Herlinveaux reports in his letter of April 17, 1985, "The 'soft coral' was picked up on bottles from an aborted station I tried to take in East Sound - there is a small 'sill' at the mouth which my bottle got hung up on."

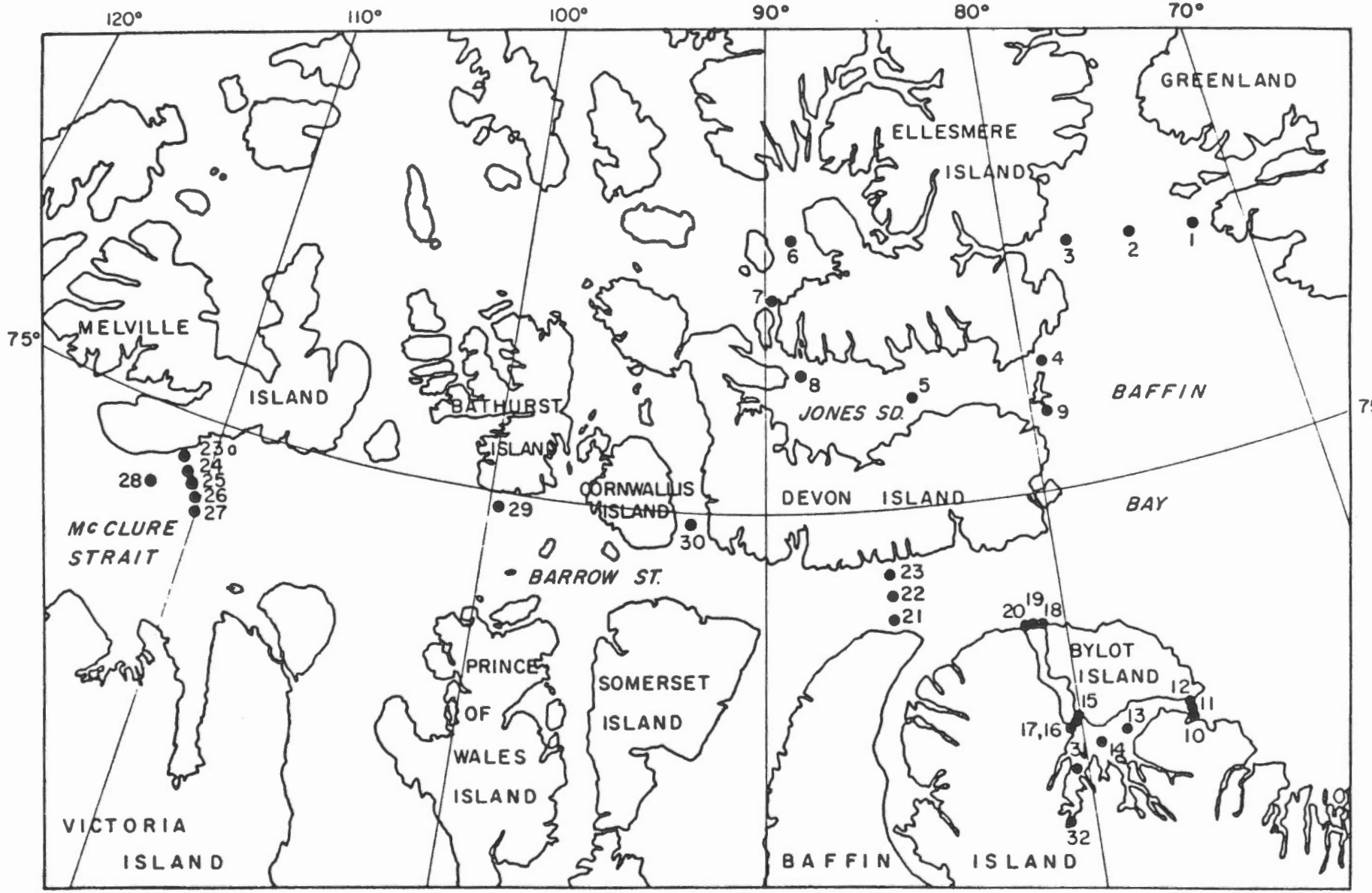


Fig. 3. Positions of oceanographic stations occupied from CCGS LABRADOR during Icepack 8/69

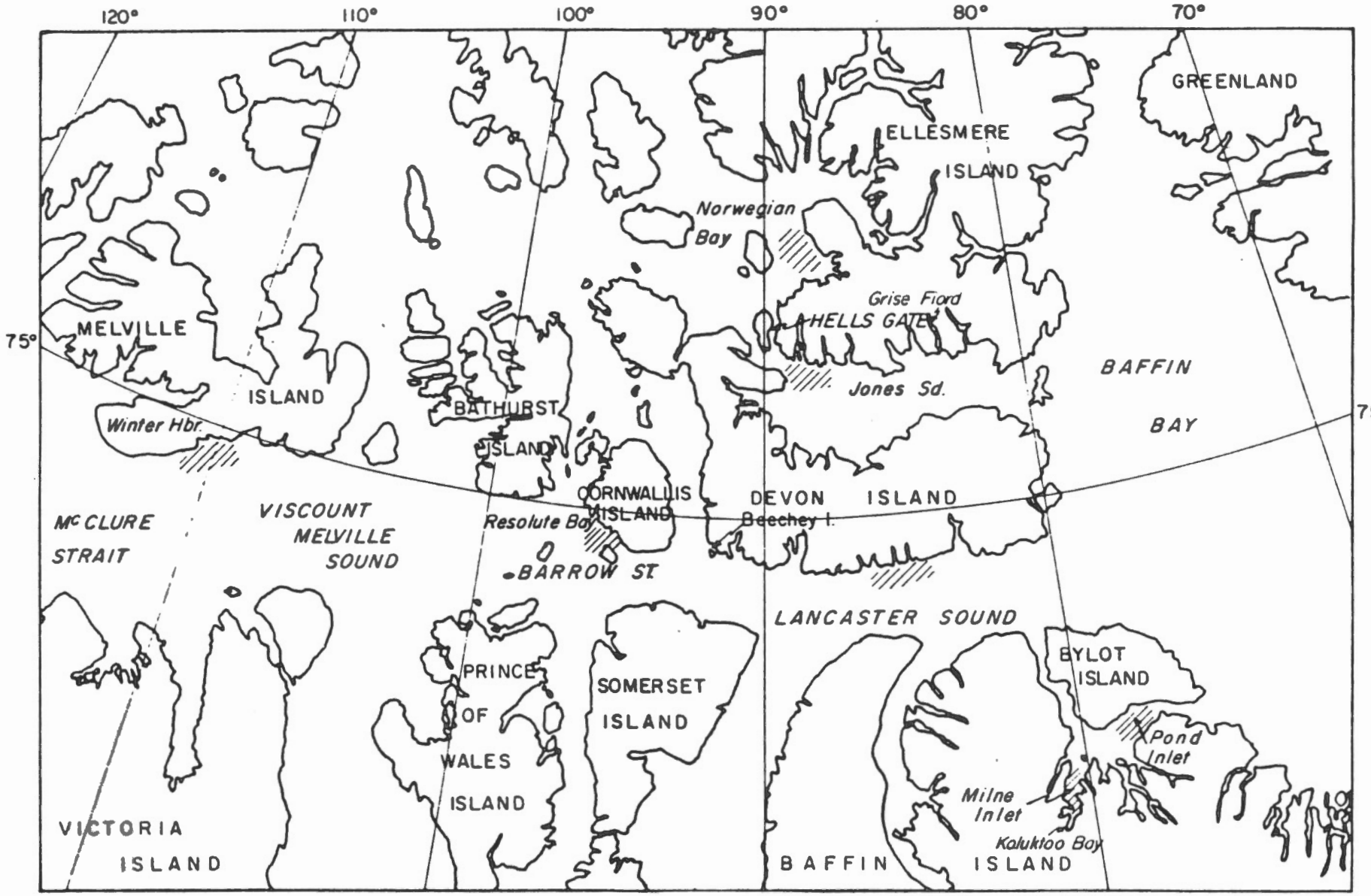


Fig. 4. The cross-hatching designates the areas from which biological samples were obtained.

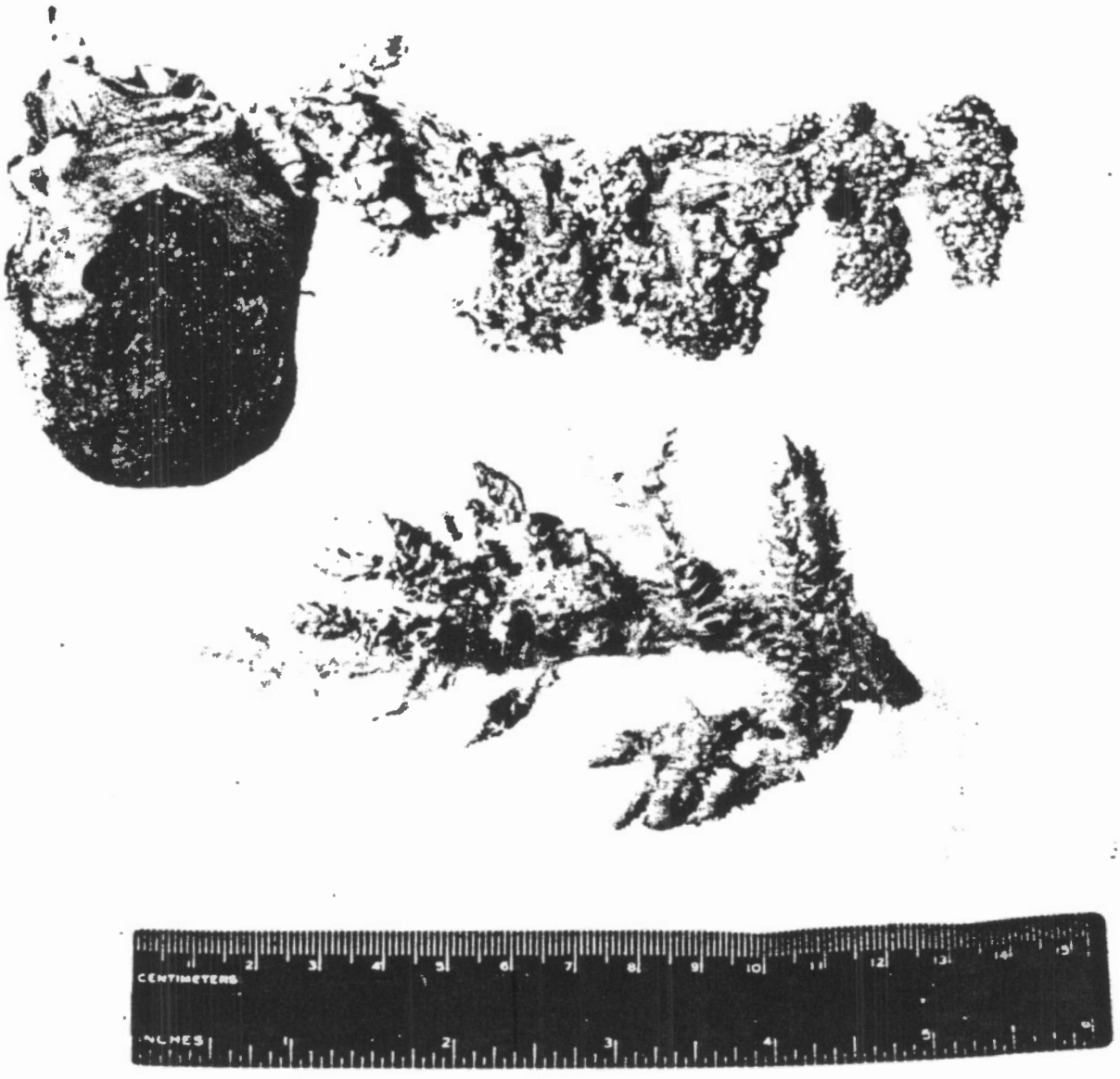


Fig. 7. Soft coral taken at Pond Inlet from 37 m depth. Soft coral taken near southern entrance to Hell's Gate at 128 m depth.

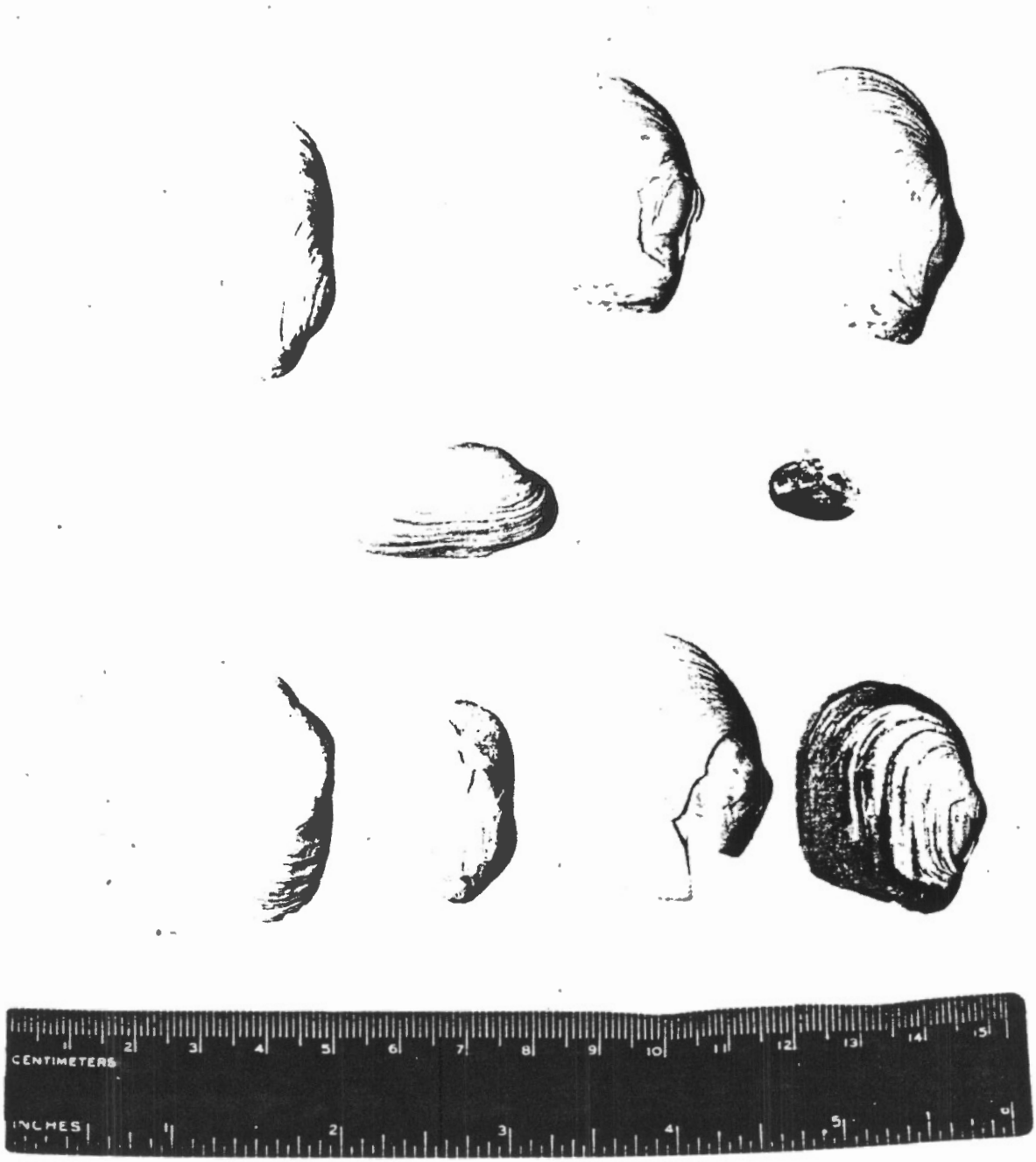


Fig. 9. Collection of clam shells from the beach at the mouth of Grise Fjord.

Table 1. Biological bottom samples collected from the Canadian Arctic Archipelago.

	Sample	Depth (m)
A.	Pond Inlet - 72°42'N 77°55'W	
	Buccinum sp egg capsules (snail)	on beach
	Eunephthya rubiformis (soft coral)	37
	Holichondria sp (sponge)	73
	Paramphithoe cuspidata (crustaceans)	37
	Duvancelia sp (nudibranch)	
	Mytilus edulis (mussel)	on beach
	Astarte borealis (clam)	"
	Hiatella arctica (clam)	"
	Musculus niger (mussel)	"
B.	Milne Inlet - 72°21.7'N 80°17'W	
	Mytilus edulis (mussel)	"
	Astarte borealis (clam)	"
	Hiatella arctica (clam)	"
	Panomya arctica (clam)	on polar ice
	Acmaea sp (limpet)	"
C.	Norwegian Bay - 77°28'N 89°13'W	
	Two unknown anemones	332
	Colus (snail)	332
	Gorgonocephalus	332

Table 1 continued

Sample	Depth (m)
D. Jones Sound - southern entrance to Hell's Gate - 76°26'N 89°20'W	
Neospongodesup (soft coral)	128
E. Lancaster Sound - 74°18'N 81°08'W	
Stegopoma plicatile - hydroid (weed) on hydrophone	460
F. Resolute Bay - 74°30'N 94°40'W	
Ophiocanthasp sp (brittle star)	104
Ophiura sausi (brittle star)	104
Strongylocentrotus duobachiensii (sea urchin)	104
G. Creek bed at Resolute Bay - 74°42'N 94°40'W	
(subfossil) Mya truncata	
Hiatella arctica	
H. Grise Fjord (settlement) - 82°50'W 76°23.2'N	
Hiatella arctica (clam)	beach
Mya truncata (clam)	"
Musculus niger (mussel)	"

Polychaeta and other animals identified

Species	Depth (m)	Location
Onuphis conchylega	274	Milne Inlet
Lumbrinereis hencerra	274	" "
Nephthys	329	Norwegian Bay

Table 1 continued

Species	Depth (m)	Location
Onuphis conchylega	146	Winter Harbour
Telepsarus costarsum	146	" "
Polapulus	146	" "

Table 3. Seaweeds collected from Grise Fjord, Pond Inlet and Beechey Island.

Grise Fjord		
	Brown alga	*Fucus disticus*
Pond Inlet		
	Brown algae	*Fucus disticus*
		Desmarestia aculeata
		Laminaria saccharina
	Green alga	*Ulothrix*
Beechey Bay and Pond Inlet		
	Brown algae	*Fucus disticus*
		Laminaria saccharina
		Laminaria groenlandica
		Agarum cribrosum
		Desmarestia aculeata
	Red algae	*Rhodymenia palmata*
		Halosaccion ramentaceum
	Green alga	*Ulva*

Explanation of Data Record headings

Observed data

REFERENCE NO. - Year - cruise number - consecutive station number.

DATE - Day/month/year.

POSITION - Latitude and longitude in degrees and minutes.

GMT - Greenwich mean time when the messenger was released for the first cast.

TEMP. - Temperature was measured with reversing thermometers which were read to 0.01°C. At the surface the temperature was measured with a surface thermometer which was read to 0.2°C.

SAL. - Salinity values in ppt were determined using a conductivity salinometer. The salinometer has an accuracy to ± .02‰.

DEPTH - Depth is given in metres.

OXY - Dissolved oxygen concentration in $m\ell/\ell$ as determined by Winkler method. A value of 0.00 indicates that an oxygen sample was not obtained.

Derived quantities

PRESS - Pressure in decibars. For these data pressure is treated as a derived quantity.

SIGMA T - Specific gravity anomaly.

SVA - Specific volume anomaly.

THETA - Potential temperature in degrees Celsius.

SVA (THETA) - Potential specific volume anomaly.

DELTA D - Geo-potential anomaly in J/kg.

POT. EN. - The potential energy anomaly in units of $10^6/cm^4$.

SOUND-VELOCITY - The velocity of sound in metres/sec^{-1}, computed from Wilson's formula (1960).

PACIFIC OCEANOGRAPHIC GROUP
REFERENCE NO. 68-55- 4 DATE 25/ 8/68
POSITION 76-17.5N. 77-56.0W GMT 23.9
HYDROGRAPHIC CAST DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	0.90	24.560	0	19.707	803.1	0.90	803.1	0.00	0.00	9.75	1439.
10	2.16	32.040	10	25.618	238.2	2.16	237.9	0.52	0.01	8.70	1455.
20	2.53	32.480	20	25.940	207.6	2.53	207.2	0.75	0.05	8.90	1457.
30	1.28	32.780	30	26.270	176.2	1.28	175.9	0.94	0.10	9.09	1453.
50	-0.43	33.080	50	26.601	144.6	-0.42	144.5	1.26	0.23	8.41	1445.
76	-1.20	33.290	75	26.798	125.6	-1.19	125.8	1.60	0.44	8.10	1443.
101	-1.32	33.370	100	26.867	119.9	-1.32	119.3	1.91	0.72	8.05	1443.
126	-1.37	33.480	125	26.957	110.2	-1.37	110.7	2.19	1.05	7.83	1443.
151	-1.47	33.550	150	27.017	104.4	-1.46	105.1	2.46	1.43	8.00	1443.
177	-1.56	33.580	175	27.043	101.7	-1.55	102.6	2.72	1.87	7.88	1443.
202	-1.43	33.610	200	27.064	99.6	-1.43	100.6	2.98	2.35	7.89	1444.
273	-1.08	33.760	270	27.175	89.0	-1.09	90.1	3.65	3.95	7.42	1447.

PACIFIC OCEANOGRAPHIC GROUP
REFERENCE NO. 68-55- 5 DATE 16/ 8/68
POSITION 76- 7.1N, 84-54.0W GMT 16.7
HYDROGRAPHIC CAST DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	0.70	23.250	0	18.663	903.6	0.70	903.6	0.00	0.00	0.45	1436.
10	-0.06	31.610	10	25.402	258.7	-0.06	258.5	0.58	0.01	2.05	1444.
20	-0.61	32.590	20	26.213	181.5	-0.61	181.3	0.79	0.05	8.53	1443.
30	-0.80	32.820	30	26.405	163.2	-0.79	163.1	0.96	0.09	7.42	1443.
50	-0.89	32.970	50	26.530	151.3	-0.89	151.3	1.28	0.22	7.59	1443.
76	-0.95	33.120	75	26.653	139.4	-0.94	139.6	1.64	0.45	9.09	1444.
101	-0.99	33.220	100	26.735	131.5	-0.99	131.8	1.99	0.76	7.89	1444.
126	-0.99	33.300	125	26.800	125.3	-0.99	125.6	2.31	1.13	7.61	1444.
151	-0.96	33.440	150	26.912	114.5	-0.96	115.0	2.61	1.56	7.19	1445.
202	-0.81	33.730	200	27.141	92.7	-0.81	93.3	3.14	2.49	6.77	1447.
303	-0.56	34.030	300	27.373	70.6	-0.56	71.3	3.94	4.55	5.92	1450.
505	-0.41	34.160	500	27.472	61.0	-0.42	61.9	5.25	9.94	5.84	1455.
708	-0.27	34.240	700	27.530	55.4	-0.29	56.4	6.43	17.15	5.18	1459.

PACIFIC OCEANOGRAPHIC GROUP
REFERENCE NO. 68-55- 7 DATE 20/ 8/68
POSITION 76-53.6N, 89-49.0W GMT 0.9
HYDROGRAPHIC CAST DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	-1.02	28.660	0	23.052	482.4	-1.02	482.4	0.00	0.00	0.59	1436.
10	-1.18	32.070	10	25.811	219.7	-1.17	219.6	0.35	0.01	0.49	1440.
20	-1.29	32.290	20	25.992	202.5	-1.28	202.4	0.57	0.04	0.23	1440.
30	-1.24	32.520	30	26.177	184.9	-1.24	184.8	0.76	0.09	9.33	1441.
50	-1.18	32.740	50	26.353	168.0	-1.18	168.1	1.12	0.24	8.38	1441.
76	-1.09	32.970	75	26.536	150.5	-1.08	150.7	1.52	0.50	7.94	1443.
101	-0.90	33.390	100	26.870	118.8	-0.90	119.0	1.86	0.80	7.25	1445.
126	-0.71	33.690	125	27.105	96.5	-0.71	96.7	2.13	1.11	6.91	1446.

PACIFIC OCEANOGRAPHIC GROUP
REFERENCE NO. 68-55- 8 DATE 20/ 8/68
POSITION 76-23.5N, 89-12.5W GMT 8.5
HYDROGRAPHIC CAST DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	-1.13	31.670	0	25.486	250.4	-1.13	250.4	0.00	0.00	9.30	1439.
9	-0.68	31.710	9	25.505	248.8	-0.68	248.6	0.23	0.01	9.52	1442.
19	-0.83	32.510	19	26.156	186.9	-0.83	186.8	0.45	0.04	8.52	1442.
39	-1.04	32.590	39	26.227	180.0	-1.03	180.0	0.81	0.15	8.66	1442.
65	-1.14	32.630	64	26.263	176.5	-1.14	176.6	1.26	0.39	8.31	1442.
90	-1.05	33.000	89	26.559	148.2	-1.05	148.5	1.67	0.71	7.71	1443.
115	-0.95	33.310	114	26.807	124.7	-0.95	125.0	2.02	1.06	7.26	1444.

Note: correct position probably 75°45'N 79°21'W

AR Apr. 29/85

PACIFIC OCEANOGRAPHIC GROUP
REFERENCE NO. 68-55- 9 DATE 21/ 8/68
POSITION 76-11.1N. 79-43.0W GMT 9.9
HYDROGRAPHIC CAST DATA

PRESS	TEMP	SAL	DEPTH	SIGMA T	SVA	THETA	SVA (THETA)	DELTA D	POT. EN	OXY	SOUND
0	1.20	30.810	0	24.697	325.6	1.20	325.6	0.00	0.00	9.04	1449.
10	1.00	31.370	10	25.157	282.0	1.00	281.8	0.31	0.01	9.19	1449.
20	0.90	32.450	20	26.029	199.1	0.90	198.9	0.55	0.05	9.62	1450.
30	0.88	32.710	30	26.238	179.2	0.88	178.9	0.74	0.10	9.62	1451.
50	0.50	32.950	50	26.452	158.8	0.50	158.6	1.08	0.24	8.48	1450.
76	-0.22	33.060	75	26.576	146.9	-0.22	146.9	1.46	0.48	7.97	1447.
101	-0.86	33.170	100	26.691	135.8	-0.86	136.0	1.82	0.80	7.97	1444.
126	-1.20	33.260	125	26.774	127.6	-1.19	128.1	2.15	1.18	8.36	1443.
151	-1.17	33.380	150	26.870	118.4	-1.17	119.0	2.46	1.62	7.75	1444.
177	-1.13	33.470	175	26.942	111.5	-1.13	112.2	2.75	2.11	7.43	1445.
202	-1.01	33.720	200	27.140	92.7	-1.01	93.4	3.01	2.60	6.99	1446.
303	-0.58	34.070	300	27.407	67.5	-0.58	68.1	3.77	4.55	6.10	1450.
505	0.28	34.170	500	27.446	64.5	0.26	64.4	5.11	10.00	6.10	1458.

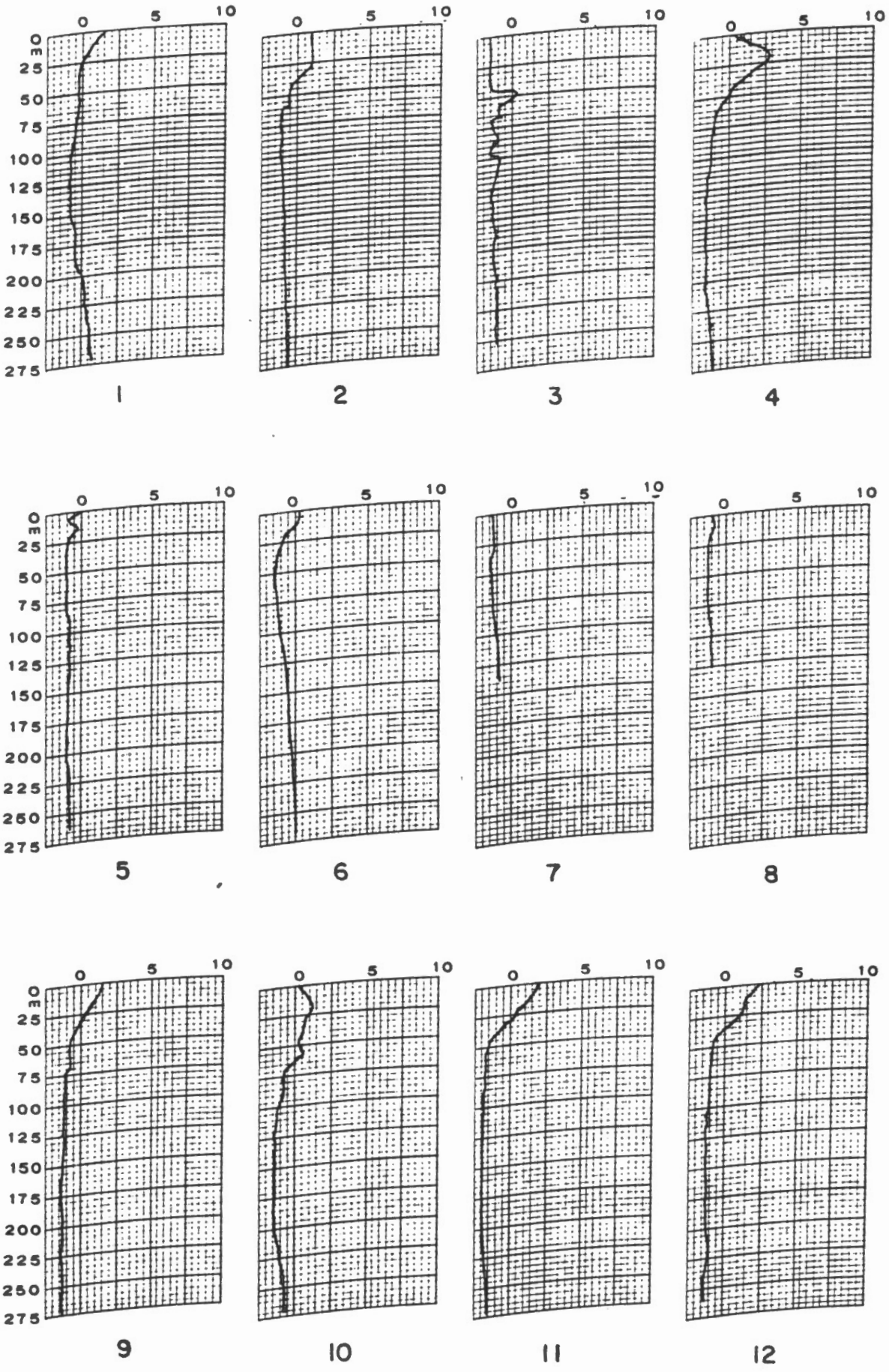
Bathythermogram Positions

BT No.	Lat. N	Long. W	Bottle Station No.
1	76°59.5'	71°50'	1
2	77°00'	74°10'	2
3	67°55'	76°09'	3
4	76°17.5'	77°56'	4
5	76°07.1'	84°54'	5
6	77°28'	89°13'	6
7	76°53.6'	89°49'	7
8	76°23.5'	89°12.5'	8
9	76°11.1'	79°43'	9
10	72°44.5'	76°43'	
11	72°46.4'	76°38.7'	10
12	72°48.3'	76°35.6'	
13	72°42.6'	78°30.4'	11
14	72°47.4'	80°16.5'	
15	72°49.3'	80°07.5'	12
16	72°50.8'	80°01'	
17	73°40'	80°56'	
18	73°40'	81°11.5'	13
19	73°40'	81°23'	
20	73°54.8'	86°02'	
21	74°10'	85°59.4'	14
22	74°25'	86°00.5'	
23	74°46'	110°22'	
24	74°42'	110°02'	
25	74°38.5'	109°47.5'	15
26	74°18.0'	110°00'	16
27	74°27'	113°48'	17
28	74°22.3'	114°36'	18
29	74°50.8'	99°34'	19
30	74°45'	92°44'	20
31	72°20'	80°32'	21
32	72°04.5'	80°48'	22

Note: Correct position of station No. 9 is probably 75°45'N, 79° 21'W

Alan Ruffman

April 29, 1985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April 17, 1985

Mr. Jon Thorliefson
for Chief/DREP
FMO Victoria
British Columbia
V0S 1B0

Dear Jon,

RE: Letter from Geomarine Associates Ltd.

The positions given in Technical Report #159 were taken off the work sheets and provisional chart (7070?) published around 1955, and it seems to me that we had discrepancies between 2-6 miles from "chart" to "chart". The position given for the dive could easily be out 0.5 degrees. In the area where the dive took place, the depth would change 100 fm over the length of the ship. The year before, I ran an echo sounder through this area to look at the drop offs, and I have enclosed an example of the features in the area. There are areas steeper than this.

The longitude and latitude for Station 4 is correct, but Station 9 is wrong and should be 76°45' 79°21' 297 fm. On the index map, Station 4 should be a little to the east.

I have no bottom photos from the dive in Jones Sound. I believe Bernie had trouble with the camera.

The "soft coral" was picked up on the bottles from an aborted station I tried to take in East Sound -- there is a small "sill" at the mouth which my bottle got hung up on.

Grise Fjord position should read 76°26'N, 83°00'W.

I hope this will answer some of the questions. Thanks for bringing these discrepancies to my attention.

Yours truly,

R. H. Herlinveaux

RHH/is
Encl.
cc Alan Ruffman

APPENDIX 10

Material regarding the correct position of the August 16, 1968 PISCES dive in Jones Sound. February 8, 1985 letter and attachments from Ken Curren, Maritimes Offoce of Canadian Coast Guard regarding the position of the August 16, 1968 PISCES dive in Jones Sound (LABRADOR cruise 68-055). Also a January 25, 1985 letter from Defense Research Establishment Pacific regarding the same position. We have accepted the Coast Guard position as the best.

Canadian Coast Guard | Garde côtière canadienne

P.O. Box 1013, Dartmouth
Nova Scotia B2Y 4K2

Your file Votre référence

Our File Notre référence
9150-15

February 8, 1985

Mr. Alan Ruffman
Vice President
Geomarine Associates Ltd.
P.O. Box 41, Stn. M
Halifax, N.S.
B3J 2L4

SUBJECT: PISCES Feasibility Study - 1968

Dear Mr. Ruffman;

We are pleased to enclose photocopies of information requested in your letter of January 14, 1985.

Enclosed please find:

- Section of Jones Sound Chart No. 7950.
- CCGS LABRADOR Log Entries for Aug. 16, 1968.
- Memorandum from Commanding Officer, CCGS LABRADOR dated Feb. 2, 1985, which is self-explanatory.

Pisces Dive Position, 76°08.2'N 84°55'W in 153 fathoms of water, has been plotted on the chart as requested.

We trust the enclosures will be of value to you and please contact us if we can be of further service.

Yours truly,

K.C. Curren
Director General
Canadian Coast Guard
Maritimes

Enc.

Canada

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

021820

TO / À: R.M.F.S. Maritimes

FROM / DE: Commanding Officer C.C.G.S. Labrador

FEB 6 9 12 AM '85

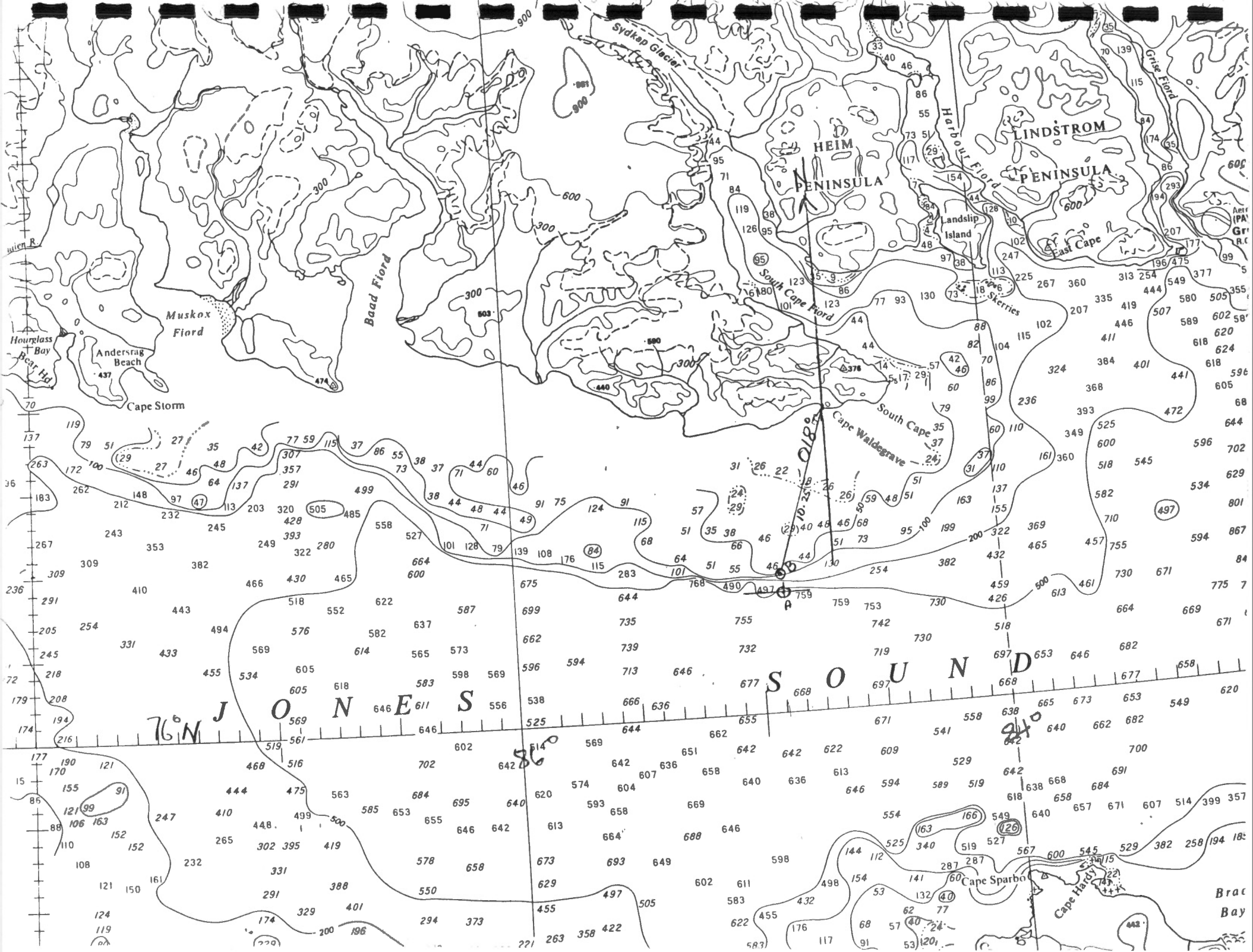
SECURITY - CLASSIFICATION - DE SÉCURITÉ	
OUR FILE / NOTRE RÉFÉRENCE	9150 - LAB
YOUR FILE / VOTRE RÉFÉRENCE	9150-15
DATE	February 02, 1985

SUBJECT / OBJET: PISCES FEASIBILITY STUDY - 1968:

Reference your 9150-15. I am enclosing a photo copy of section of Jones Sound, chart 7950 and photo copy of Ship's Log from August 16, 1968, the day concerned, giving position of dive and conditions during same. The position is plotted on the photo copy in position 76°08.2N 84°55'W, in 153 fathoms of water.

I hope this will suffice your request, please advise any further info required.

C. Green
Commanding Officer
C.C.G.S. Labrador


Sydkap Glacier
HEIM PENINSULA
Harbour Fiord
LINDSTROM PENINSULA
Grise Fiord
Landslip Island
East Cape
Skerries
South Cape Fiord
Baad Fiord
Muskox Fiord
Hourglass Bay
Bear Hd.
Andersrag Beach
Cape Storm
Cape Waldegrave
South Cape
018°
10.25
50
JONES SOUND
76°N
Cape Sparbo
Cape Hardy

National Défense
Defence nationale

RECEIVED JAN 3 0 1985

3636K-1(DREP)

Defence Research Establishment Pacific
FMO Victoria, B.C.
VOS 1BO

25 Jan 85

Mr.Alan Ruffman,Vice President
Geomarine Associates Ltd.
P.O. Box 41
Station M
Halifax, Nova Scotia
B3J 2L4

References: A. Letter A.Ruffman/DREP,GAI Ref. No. 84-60, 14 Jan 85
B. Telecon Thorleifson/Herlinveaux, 25 Jan 85

Dear Mr.Ruffman:

The only concrete record of the position of the August 1968 PISCES dive in Jones Sound was obtained from Dick Herlinveaux (reference B). The information as recorded in his log book is listed below:

- The position of the PISCES dive was just west of Cape Waldergrave at 76-08.5 N, 85-25 W.

- The dive occurred at a sharp drop off that is shown on the charts.

- The position is accurate to five miles in longitude. It depended largely on ice cover.

- The latitude should be accurate as the dive occurred along the steep drop off.

Mr. Herlinveaux thought that Dr. Pelletier had kept good records of the geological findings.

There are no other records of the dive in log books at DREP and enquiries in regard to PISCES records have indicated that no record or log of the dive were saved.

We have not checked into LABRADOR log books at this time. However, it is unlikely that any details of the geological data from the dive would be contained in such a log.

If you require more details, it may be useful to discuss the details with Dick Herlinveaux. He can be contacted at:

Telephone: mornings - (604) 656-8268
home - (604) 656-5301

Address: 935 Birch Road
R.R #4
Sidney, B.C.
V8L 4R4

Yours truly,

Jon Thorleifson, for
Chief/DREP

Energy, Mines and Resources Canada
Earth Sciences
Geological Survey of Canada
601 Booth Street
Ottawa, Ontario
K1A 0E8

Énergie, Mines et Ressources Canada
Sciences de la Terre
Commission géologique du Canada
601, rue Booth
Ottawa (Ontario)
K1A 0E8

3 May 1985

Your file Votre référence

Our file Notre référence

Mr. Alan Ruffman
Vice-President
Geomarine Associates Ltd.
P.O. Box 41, Stn. M
Halifax, Nova Scotia
B3J 2L4

Dear Alan:

I received your note regarding the PISCES dive in Jones Sound on August 16, 1968. As far as I know the PISCES owner never kept a geological log. Photos were taken by Al Milne and Dick Herlinveaux, and were included in a Defense Research Board report by Milne et al. No bedrock samples were recovered; the other material has long since been lost, but it was unsolidated sediment and cobble and would serve no useful purpose for geological mapping.

In Jones Sound, I made the dive to 1200 feet. Actually we were observing bedrock but could find no place to land the submarine because the rock surfaces were steep (75^{o}-80^{o}). Some of these surfaces may have been joint (or fault?) planes, but it was difficult to tell. Small benches occurred but these were too narrow for a perch. On the bottom, we observed a few worms, one sculpin and a starfish in an otherwise undisturbed seabed of silty sand and mud. The water was exceedingly clear with at least 30-40 feet of visibility from the submarine's lights.

Overall, the purpose of these dives was to test the feasibility of using a submersible for scientific research in the Arctic, and to recover equipment on the seabed. We also wished to examine the prospect of under-water mapping, but not necessarily undertake it. Although we were on the icebreaker for 6 weeks, we only dived on 14 days, and these days had to be shared with 4 other scientists. You have all the literature on the subject, and I regret that I can help you no further. Very best for now.

Sincerely,

B.R. Pelletier,
Terrain Sciences Division.

BRP:lm

Canada

APPENDIX 11

MATERIAL FROM CCGS LABRADOR BRIDGE LOG BOOK AND PLOTS FROM TRANSPORT CANADA REDGARDING THE RELOCATION OF THE 1968 LABRADOR OCEANOGRAPHIC STATIONS NOS. 4, 8 AND 9
(ADDED MAY 5, 1985)

APPENDIX 11

(Added May 5, 1985)

Material From CCGS LABRADOR Bridge Log book and Plots From Transport Canada Regarding the Relocation of the 1968 LABRADOR Oceanographic Stations Nos. 4, 8 and 9

The comparative data are:

Cruise 68-55 Station No. Date Time	Position From LABRADOR Logbook (depth - fm)	Position from Original Report by Herlinveaux (1970)	Position as Corrected by Herlinveaux (letter April 17/85)
No. 4 Aug. 15, 1968 2354 GMT	76°17.0'N 78°00.0'W (?)	76°17.5'N 77°56.0'W	no change 76°17.5'N 77°56.0'W
No. 8 Aug. 20, 1968 0830 GMT	76°22.3'N 89°12.0'W (75 fm)	76°23.5'N 89°12.5'W	no change 76°23.5'N 89°12.5'W
No. 9 Aug. 21, 1968 0954 GMT	75°41.0'N 79°38.0'W (297 fm)	76°11.1'N 79°43.0'W	76°45.0'N 79°21.0'W (should be: 75°45.0'N, 79°21.0'W we believe)
"soft coral" Aug. 20?, 1968 circa 0900 GMT	no note of this "aborted station" in ship's log	"Near southern entrance to Hell's Gate" 79°26.0'N 89°20.0'W (128 m = 70 fm)	no change 76°26.0'N 89°20.0'W (70 fm)
Grise Fjord beach shell samples	no note	76°23.2'N 82°50.0'W	76°26.0'N 83°00.0'W

The Canada Department of Transport (Coast Guard) provided plots of the LABRADOR bridge log's radar position vs the log's geographic co-ordinates for stations Nos. 4 and 8. One must select from among the log's geographic or radar positions and Herlinveaux's (1970) report positions. Herlinveaux may well have kept a different log from the bridge log, hence, recorded different data?

Transport Canada / Transports Canada
Coast Guard / Garde côtière
P.O. Box 1013, Dartmouth
Nova Scotia
B2Y 4K2

Your file / Votre référence

Our File / Notre référence
9150-15

April 29, 1985

Mr. Alan Ruffman
Vice President
Geomarine Associates Ltd.
P.O. Box 41, Stn. M
Halifax, N.S.
B3J 2L4

SUBJECT: CCGS LABRADOR - Arctic Program - 1968

Dear Sir:

Please find enclosed reports from CCGS LABRADOR concerning your requests contained in your memorandum dated April 3, 1985.

I trust this information will provide you with the information you require.

Yours truly,

G.J.M. Williams
A/Regional Manager Fleet Systems
Canadian Coast Guard Maritimes

Enc.

Canada

Government of Canada / Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

0 0 2 0 1 8

TO / À

R.M.F.S.
MARITIMES

FROM / DE

COMMANDING OFFICER
C.C.G.S. LABRADOR

APR 23 9 09 AM '85

SECURITY - CLASSIFICATION - DE SÉCURITÉ
OUR FILE/NOTRE RÉFÉRENCE 9150 - LAB
YOUR FILE/VOTRE RÉFÉRENCE 9150 - 15
DATE 22 APRIL 1985

SUBJECT / OBJET ARCTIC VOYAGE 1968

Reference your memorandum 9150-15, dated 16 April 1985 on the above subject.

Please find enclosed copies of the LABRADOR Log Books for the dates 15, 16 20 and 21 August 1968, with the Station Positions highlighted, also copies of the charts with the psoitions of Stations 4,5,8 and 9 plotted on them.

The errors appear to be on the sheet of paper entitled "BATHYTHERMOGRAM POSITIONS".

The chart showing positions of Oceanographic Stations are in agreement with the positions in the Labrador's Log Book.

Trusting this information may be of some help to you, but if not I will be glad to provide whatever is available for you.

E.A. Hann
Commanding Officer
C.C.G.S. Labrador

Enclosures:

NT SHIP *Labrador*

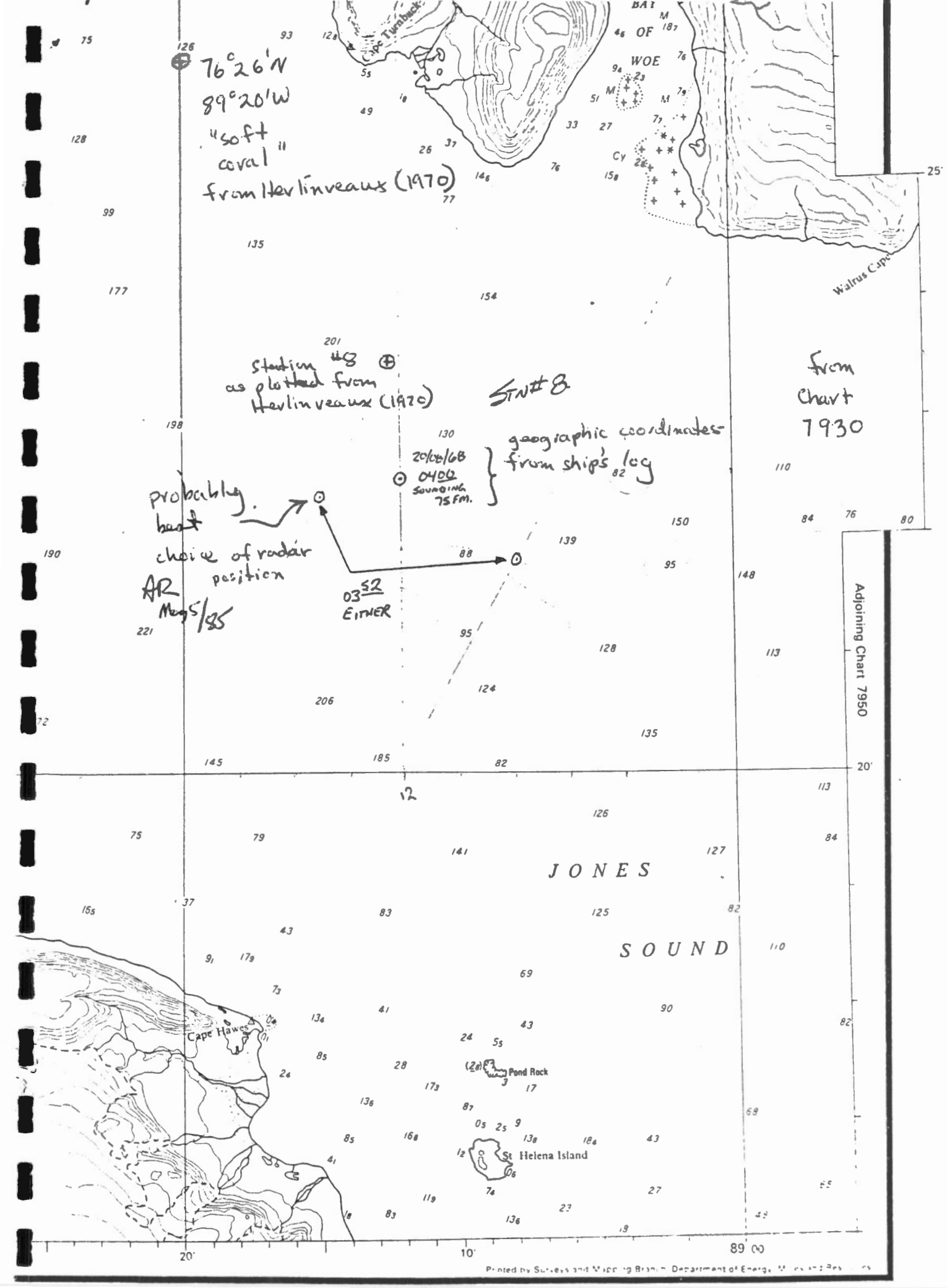
Officer *R-1-P #1* DAY OF WEEK *Tuesday* DATE *Aug 20th* 19*68*

Bar	TEMPERATURE Air	TEMPERATURE Sea	LOOKOUTS Name	REMARKS
				77-53 N 79-49 W
			Stone L/o	
			Oakey	00[30] Headland 086 - 2.2 mi O/C 180
			Symes	0200 Blubber Pt. 030. 3.0 mi.
				02[30] Calf Head Pt - 156 - 6.2 mi.
Pos: 76-35 N			Oakey	03[00] Calf Head 158°. 3.8 mi. 03[15] a/c 150
79-49 W.				03[52] Bay of Wood point. 030. 3.2 mi.
2497	32		Symes	Arrived on Oceanograph Station No. E
			Lornette	03[52] 1st Bottle away. [redacted] RB
			Willis	04[00] POS. 76-22-30 N' 79-12 W Sdg 75 fms [redacted]
			Lornette	04[15] Messenger away 04[20] BT + Bottles Cast completed Proceed WIGHTING
			Macdougall	0500 GULL Hd. Brg 011 T x 3.6 M/N. Co 104 T 1000 115 dg. Sdg. 122 fms
			Lornette	0600 C. STORM Brg 005 T x 4.1 M/N. " " " Sdg. 120 fms
			Willis	0700 BORD FIORD WEST Pt Brg 300 T x 7.5 M/N.
			Lornette	0800 Posn lat 76 10 N - 85 46 W Co 104 T Var. to avoid Floes.
29.92	32° +		Macdougall	fair + clear. Sp 14 Kts. -M
			WOODSWORTH	0815 C. WALDEGRAVE BRG. 062 x 13.3 m. c/o 104(T) 106(C) 116 MAG
			KEOUGHAN	0900 C. WALDEGRAVE BRG 034 x 9.0 m. c/o 104(T) 106.2 116 MAG
			WOODSWORTH	0930 C. WALDEGRAVE BRG. 011 x 8.8 m.
			BARNES	1000 C. HARDY BRG. 175 x 15.9 m. VAR CO. IN ICE BASE CO. 104
			WOODSWORTH	1030 C. HARDY. BRG 200 x 17.5 m " " " " " 104
			KEOUGHAN	1100 GRISE FIORD Pt. 018 x 19.3 m C/o 000 FOR HELICOPTER
			WOODSWORTH	1145 GRISE FIORD Pt 026 x 15.6 m STOPPED AWAIT FLIGHT.
29.40	29		BARNES	1200 76 0 N. 83-10 W Lights taken in at A.M.
				FOG PATCHES - HEAVY ICE FLOWS

Long. Course Dist. Current

" " " Var.

				12[00] Proceeded towards Grise Fiord.
			Oakey	13[00] Grise Fiord 012 - 9.5 mi.
				13[30] Coal Pt. 012. 7.6 mi.
			Symes	13[45] Coal Pt. 055 7.9 mi. heavy pack in col.
				15[00] Grise Fiord Pt 105. 5.7 mi. a/c 180
			Oakey	15[30] Coal Pt. 337 - 3.7 mi.
				15[45] Coal Pt 3.6 - 3.1 mi.
.87	37		Symes	16[00] Coal Pt. 300 3.1 mi Sdg 168. Sky clipped
			Lornette	clear throughout watch.
			Macdougall	16[25] Let go Port Anchor 45 fms water 8 shackles chain out.
			Lornette	1650 Brought up. Engines taken off the line on 1/2 Hr. Standby
			Willis	Anchorage Brgs. NW Small Island Brg 051 T Hookman land 035 T
			Lornette	Dist from nearest land 2½ cables. (GRISE FIORD)
			Macdougall	2000 Ship Remain at Anchor Pos as above (GRISE FIORD)
.87	36°		Lornette	Foggy weather southerly ice clear in vicinity
			Willis	FIRE ROUNDS MADE REGULARLY
			WOODSWORTH	ANCHOR BEARINGS CHECKED FREQUENTLY. FIRE ROUNDS REPORTED REGULARLY
			[illegible]	[illegible]


76°26'N
89°20'W
"soft coral"
from Herlinveaux (1970)
Station #8
as plotted from
Herlinveaux (1970)
STN#8
from Chart 7930
20/08/68
0400Z
SOUNDING 75 FM.
geographic coordinates from ship's log
probably best choice of radar position
AR Mags/85
03 52
EITHER
Cape Turnback
BAY OF WOE
Walrus Cape
JONES
SOUND
Cape Hawes
Pond Rock
St Helena Island
Adjoining Chart 7950
25'
20'
10'
89 00

TO R. I. P. Stations DAY OF WEEK Thursday DATE Aug 15 19

171

Wind	Force	Bar	Temperature Air	Temperature Sea	Lookouts Name	Remarks
						Lat. 77-00 N Long 71-40 W
					Makell	0000- Messenger away
					Oakey	0015- Bottle on surface C Parry 083-B.T.
						0016- Core on surface. Ship carry
					Symes	at No 1 Station proceeded to Station to
						Oceanography Station.
					Oakey	01^00 C. Parry 083 - 10. mi.
						02^00 C. Parry 088 - 20 mi 02^40 ...
NW	3	2995	36		Symes	03^00 Nordeste Isld. 166 - 17.2 mi.
					Algood	04^00 Nordeste Isld 20.2 mi. Hakluyt Isld
					Macdougall	0431 On #2 Sta. Lat 77-00 N - 74-16 W Stg 31 fm
					Algood	1 BT. 1 SET Bottle 0532 Sta completed Proceed
					Willis	0600 Posn Lat 77-00 N - 74-31 W Co 275 T 30 ...
					Algood	0700 Posn Lat 77.00 N - 75-00 W Co 275 T Stg 3...
					Macdougall	0800 Posn Lat 77.00 N - 75-50 W Var Co westward thru
					Algood	pack toward Cape Combermere
NW	1	29.97	32.7		Willis	
[illegible]					PELLERINE	0910 C COMBERMERE 276 x 29.1 m VAR COURSES IN ICE BASE CO 2..
AIRBORNE					BARNES	0950 C. COMBERMERE 281 x 26.2 m STOPPED
ON DECK					PELLERINE	1025 COMM STA #3. BOTTLE DIP. 1044 BOTTLE DIP COMPLETE
OXN ICE RECCO					KEENAN	1055 - 1104 B.T. DIP #3 STA COMPLETE.
OXN " "					PELLERINE	1105 6 ENGINE ON LINE FULL AHEAD BASE CO 090 VAR CO IN IC..
					BARNES	1130 C. COMBERMERE 281 x 27.6
					PELLERINE	1200 76-44 N 76-66 W BASE CO 270 VAR CO IN ICE.
ENE	1	30.1	43		KEENAN	FINE & CLEAR. 9/10 + POLAR ICE. Lights taken in at

Long. Course. Dist. Current.

" " " Var.

Wind	Force	Bar	Air	Sea	Name	Remarks
CAD airborne					Makell	12^30 Various Courses working ...
landed						ice floes.
CAD airborne						12^40 C. Combermere 263. 30 mi.
CAD on flight deck.					Symes	14^12 Nordeste Isld. 104 - 29.2 mi ...
						14^40 Nordeste Isld 100 - 26.2 mi. ...
					Oakey	15^00 Nordeste Isld @ 100 - 24.2 mi.
						15^30 Nordeste Isld 096 22.1 mi. 280 ...
	2	30.02	42		Symes	16^00 Pos Lat 76-43 N 74-40 W 275 ...
					Algood	1615 CAD away on ice Recco 1648 CAD return ...
					Willis	1710 C. Norton Shaw Brg 262 T x 38 M/M Co 255 T x 255 ...
					Algood	1800 C. Norton Shaw " 270 T x 33 M/M " 255 ...
					Macdougall	1900 C. Norton Shaw " 281 T x 19.5 M/M. " 255 ...
					Algood	1930 Entering ice pack. C. Norton Shaw Brg 281 T x 14 M/M.
					Willis	2000 C. Norton Shaw Brg 303 T x 10.5 M/M. in Heavy areas of
					Algood	winter floes. Drifting fine & clear. calm. [redacted]
	1	30.05	45.0		Macdougall	2000 STOPPED FOR OCEANOGRAPHY STA #4. 76 17 N. 71 ... W [redacted]
CAD AIRBORNE. ICE RECCO.						2030 - 2036. B.T. DIP.
CAD AIRBORNE.					BARNES	2040 - 2110 BOTTLE DIP.
CAD ON DECK.						2110 COMPLETE DIPS. FULL AHEAD 090 VAR CO IN ICE
2110 CAD FLIGHT.						
CAD ON DECK					KEENAN	2240 C. NORTON SHAW BRG 295 x 15 ...

DEPARTMENT OF TRANSPORT—MARINE SERVICE SHIPS

MENT SHIP *Labrador*

l TO *Bylot Isld area* DAY OF WEEK *Wednesday* DATE *Aug 21st* 19

	Force	Bar	Temperature Air	Temperature Sea	Lookouts Name	Remarks
						Grise Fiord
					Horne	0018 Six Engines on line 0030 Commenced [illegible]
					Oakey	0047 Awaited [illegible] proceeded
						0112 Grise Fiord 040 - 2.2 mi c/c 140
					Symes	0130 Grise Fiord 344 - 5.0 mi. Sdg 38? fms
						0200 Grise Fiord Pt 325 - 10.9 mi Sdg 31? fms
					Oakey	0300 Cone Isld 100 - 6.0 mi. c/c 130°
						0330 Cone Isld 045 - 5.0 mi.
	3	2986	29		Symes	0400 - King Edward Pt 040 ? mi Sdg 370 fms
					Doucette	0500 Belcher Pt 233T x 9.1 m/m Co 130T 135G 142 deg Sdg 37?
					Macdougall	0600 C. Raper 167T x 13.2 m/m " 136G. Sdg 248
					Doucette	0627 Stopped on #9 Sta Lat 75 41 N - 79 38 W Sdg 297 fms. [redacted]
					Wallis	1 BT. 1st Bottle 2 Core [redacted]
					Doucette	0745 Station completed Proceed on Co 139T 140G. 155 deg.
					Macdougall	0800 Posn Lat 75 39 N - Long 79 28 W Co 139T 140G 155 deg. Sdg 3?
	5	29.87	33		Doucette Wallis	Cloudy & clear. open ice sp 14.5 Knots. Smooth Sea.
[illegible]					WOODWORTH	0855 RAPER PT 272 x 13 m c/co 180(T) 182(G) 270 mag
					BARNE	0942 S. PT BOWES I. BAY 268 x 13 m 180(G) 262 mag Var Co in ICE FLOW
[illegible]					WOODWORTH	
					KEOUGHAN	10?? S PT BOWLES BAY 285 x 13.3 m Var Co in HEAVY ICE FLOW
[illegible]			ICE [illegible]		WOODWORTH	1045 N. C NORSBURG 248 x 15.4.
					BARNES	1110 SNOW ISLD 240 x 12 m c/c 190(T) 192(G) 2??
	4	29 87	38		WOODWORTH	1145 C. COCKBURN 293 x 9.4 m TURN [illegible] c/co 225.
					KEOUGHAN	1200 74 53 N 78 46 W

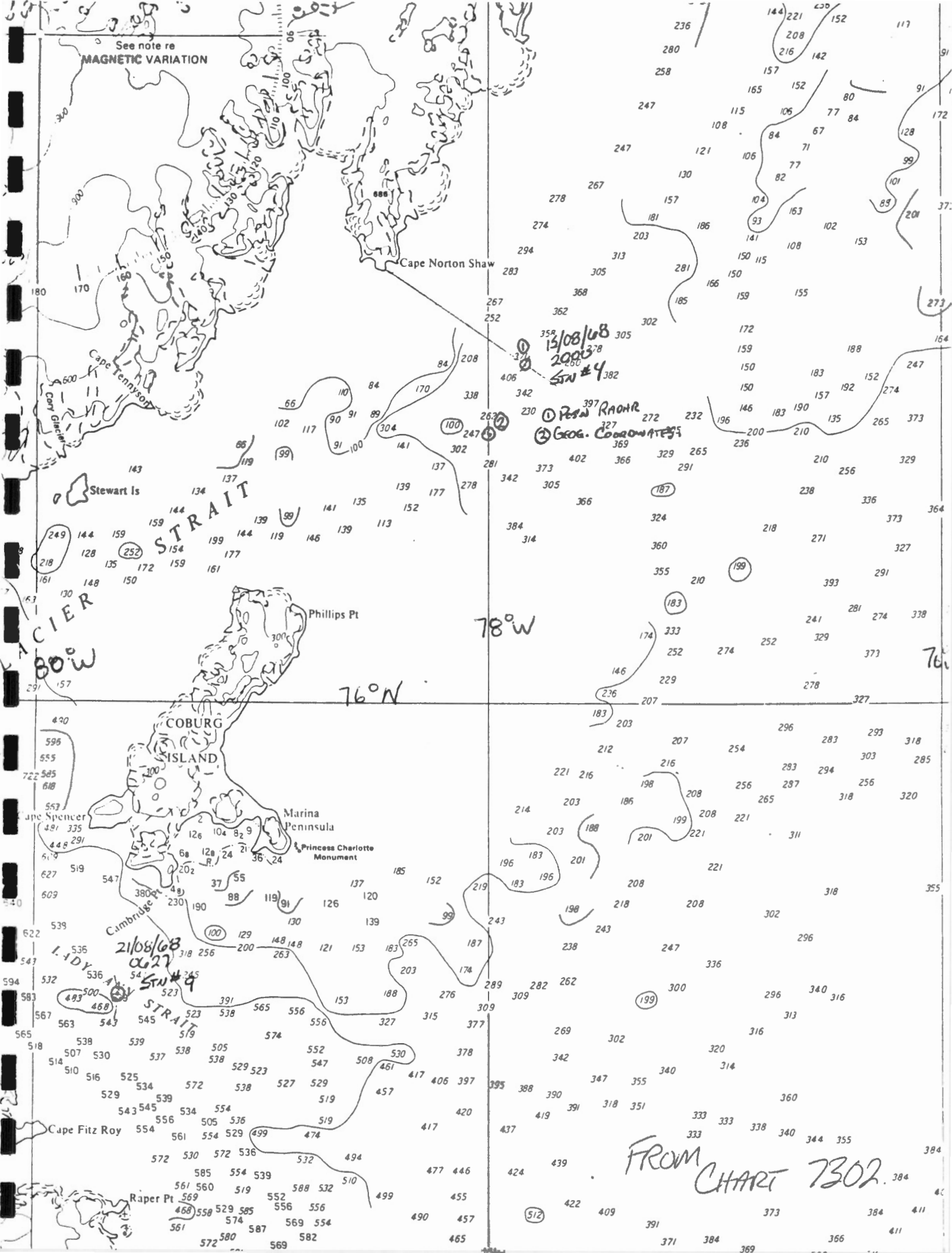
Lights taken in at

FINE & CLEAR. HEAVY ICE FLOW.

Long. Course. Dist. Current.

" " " Var.

	Force	Bar	Air	Sea	Name	Remarks
deck.					Horne	1200 C. Cockburn 270°. 8.0 mi. c/c 158
					Oakey	1330 C. Cockburn 290. 13.6 mi.
?°N						1400 C. Cockburn 307° - 20.0 mi Sdgs 2?? fms
					Symes	c/c 163°
						1500 DR. POS. 74 - 30 N 78 - 06 W
					Oakey	1530 DR POS 74 - 23 N 78 - 00 W. 3?? fms
						1600 Lat 74 - 16 N 77 - 52 W
?W	4	2986	50		Symes	Fine & clear. Mod sea & swell
					Doucette	1700 Posn Lat 73 58 N - Long 77 17 W Co 158T 159G. 229 deg
					Wallis	1800 Posn Lat 73 47 N - Long 77 01 Co 158T - 5. 23? deg. Sdg ??
					Doucette	1900 C. WALTER BATHURST 185 T x 15 m/m. Co 158T - 5 Sdg ??
					Macdougall	2000 Posn Lat 73 22 N - Long 76 25 W c/c 130 T. ? 131 deg Sdg
					Doucette	fine & clear.
					Wallis	2005 - 4 ENGINE ON LINE PROCEEDING TO 71 55 N 76 30 W FOR SUB DIV.
	3	2987	40		Doucette Macdougall	2030 C. WALTER BATHURST 265 x 11.5 m


See note re
MAGNETIC VARIATION
Cape Norton Shaw
Cape Tennyson
Cory Glacier
Stewart Is
STRAIT
Phillips Pt
80°W
78°W
76°N
COBURG
ISLAND
Cape Spencer
Marina
Peninsula
Princess Charlotte
Monument
Cambridge
LADY
STRAIT
Cape Fitz Roy
Raper Pt
15/08/68
2003
STN #4
① Posn RADHR
② GEOG. COORDINATES
21/08/68
0627
STN #9
FROM CHART 7302.

Positions Accepted by Alan Ruffman,
Geomarine Associates Ltd., May 5, 1985

CCGS LABRADOR Cruise 68-55 Station No. Date Time	Accepted Position	Reasoning
No. 4 Aug. 15, 1968 2354 GMT	76°17.5'N 77°56.0'W (Herlinveaux, 1970)	Assume Herlinveaux had a different log, all positions are fairly close
No. 8 Aug. 20, 1968 0830 GMT	76°23.5'N 89°12.5'W (Herlinveaux, 1970)	as above
No. 9 Aug. 21, 1968 0954 GMT	75°45.0'N 79°21.0'W (corrected latitude from Herlinveaux's letter of Apr. 17/85)	as above?
"Soft Coral" Aug. 20?, 1968 circa 0900? GMT	76°26.0'N 89°20.0'W (Herlinveaux, 1970)	Have assumed that Herlinveaux's "aborted station" was different from Station No. 8 and was to the north of Station No. 8 "near southern entrance" to Hell's Gate.
Grise Fjord shell samples from beach	76°24.0'N 82°52.0'W (redigitized by Geomarine in May/85)	as redigitized from 1984 field sheets to fall on beach not in land or offshore