

HUDSON 70

19 November 1969 – 16 October 1970



A Major Canadian Multidisciplinary
International Oceanographic Expedition

First Ever Circumnavigation of the Americas



Dr. Cedric Mann



Capt. David Butler



Summary Statistics

- 128 participating scientists from 5 countries
- 330 days
- 9 legs
- 104,000 km
- 5 oceans

Ports of Call

- Rio de Janeiro, Brazil
- Buenos Aires, Argentina
- Puerto Williams, Chile
- Punta Arenas, Chile
- Puerto Natales, Chile
- Puerto Montt, Chile
- Valparaiso, Chile
- Papeete, Tahiti
- Vancouver, BC
- Victoria, BC
- Tuktoyatuk, NWT
- Resolute, NWT

Participating Organizations

- Atlantic Oceanographic Laboratory (BIO)
- Marine Ecology Laboratory (BIO)
- Canadian Wildlife Service (BIO)
- Defense Research Establishment Atlantic (Dartmouth)
- Marine Sciences Branch (Ottawa)
- Geological Survey of Canada (Ottawa)
- National Research Council (Ottawa)
- National Museum of Natural Sciences (Ottawa)
- Pacific Oceanographic Group (Nanaimo)
- Institute of Oceanography (Dalhousie)
- Institute of Oceanography (UBC)

Participating Organizations

- Queens University
- University of Toronto
- McGill University
- Trent University
- Woods Hole Oceanographic Institution (US)
- Scripps Institute of Oceanography (US)
- Oregon State University (US)
- University of Washington (US)
- Royal Navy (UK)
- Argentinian Navy
- Various Chilean universities

General Program

- Physical oceanography
- Chemical oceanography
- Biological oceanography
- Marine geology
- Geophysics
- Geodesy
- Hydrography
- Underwater acoustics

Departure from BIO

19 November 1969

Sendoff Speeches, including Joe Greene, Minister of Department of Energy, Mines and Resources (DEMR)



Letting Go The Lines



Farewell for Eleven Months

Following Summer Around the Americas



Goodbye BIO



Down the Harbour



Leg 1: Halifax to Rio de Janeiro



19 November to 14 December 1969

Dr. C.R. Mann, Chief Scientist

Leg 1 Program

- Bathymetry (8,265 km)
- Gravity (7,037 km)
- Magnetism (7,778 km)
- Cores (3)
- Bathysonde (STD) casts (12)
- Expendable Bathythermographs (90)
- Knudsen/Niskin casts (11)
- Surface plankton tows (21)
- Surface neuston tows (4)
- Vertical plankton tows (25)
- Isaac Kidd mid-water trawls (13)
- Acoustic scattering layer observations (21)
- In-situ production experiments (10)
- Marine mammal sound recordings (2)

On the Bridge



Captain's Puppy



Sargasso Sea Ship Doctor's Dog



Crossing the Equator Certificate



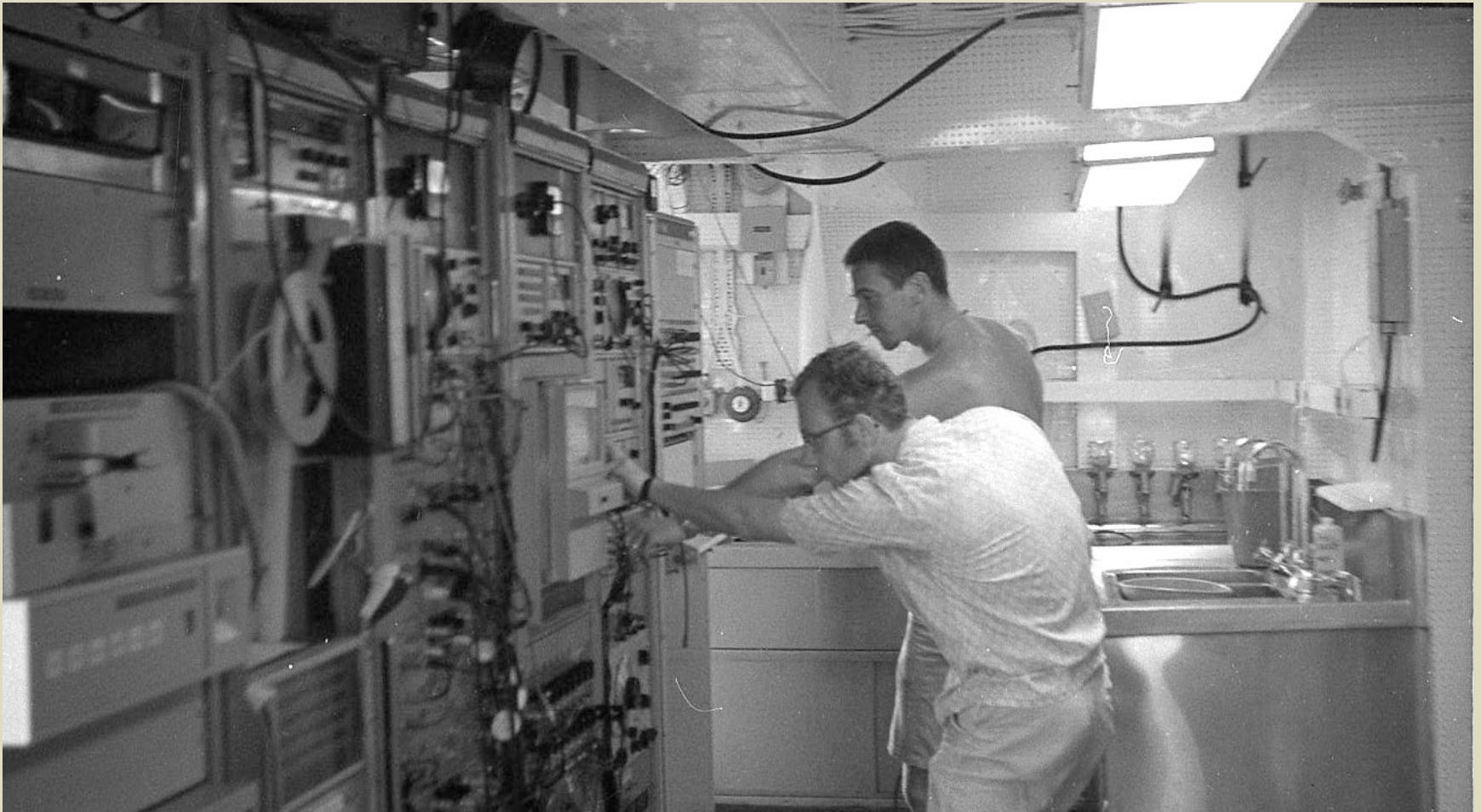
Ced Mann at Bathysonde Controls



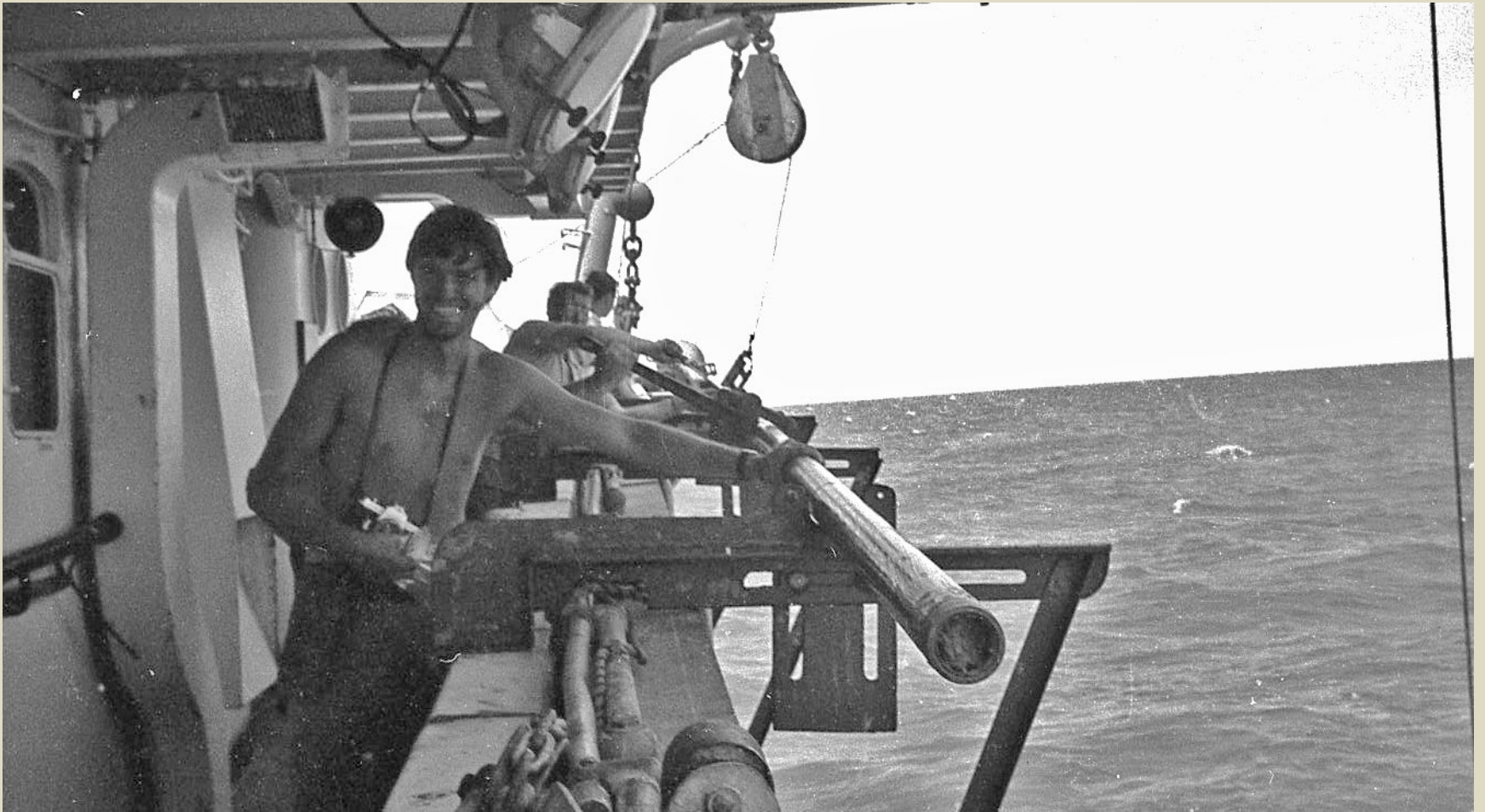
Sonar Cone for Deep Scattering Layer Studies



Oreste Bluy and George Gill at Sonar Controls



Recovering Corer



Manning the Geophysics Console (Depth, Gravity and Magnetics)



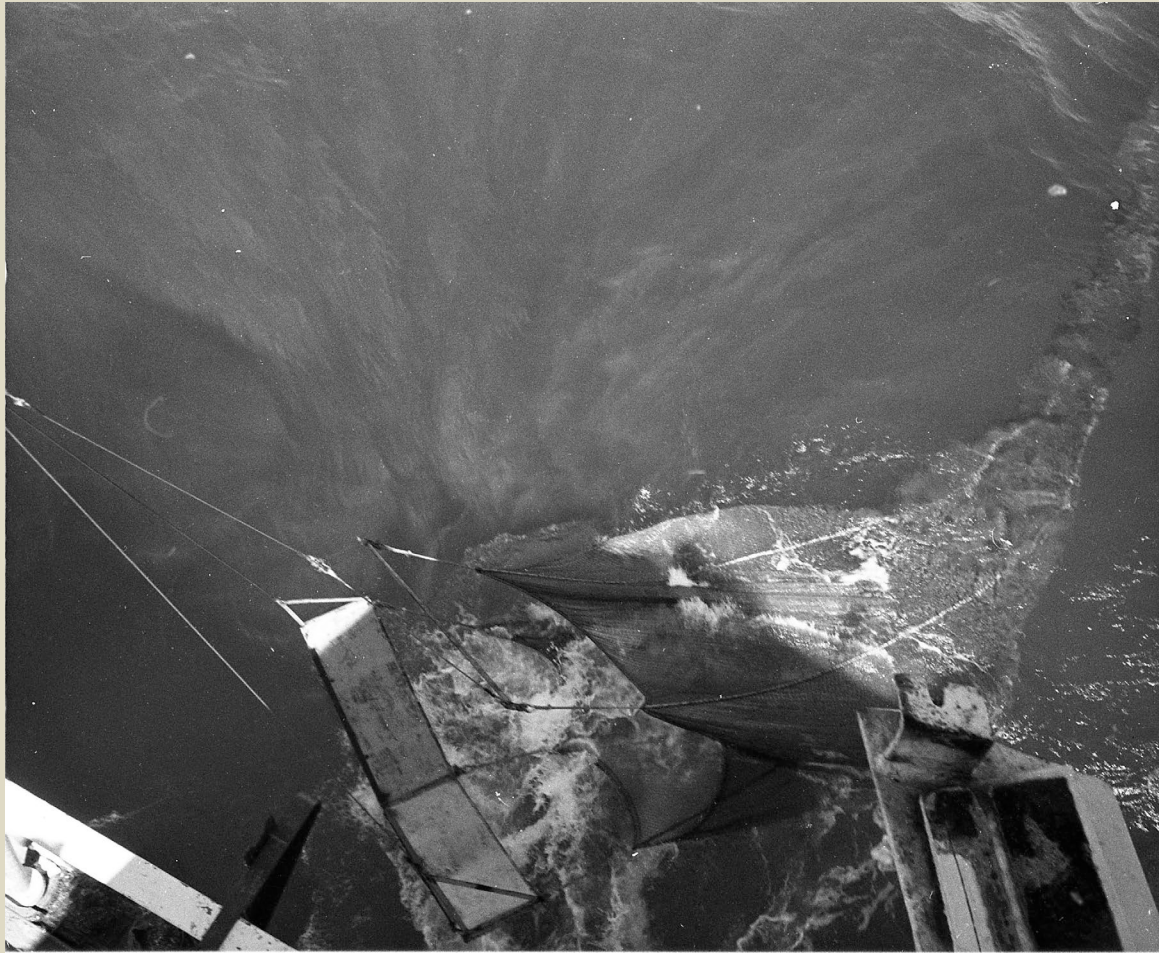
Lifeboat Returning from Phytoplankton Production Experiments in Tropical Squall



Safely Back Unloading Gear



Recovering Isaacs Kidd Mid-Water Trawl



Mid-Water Trawl on Deck



Mid-Water Trawl Catch



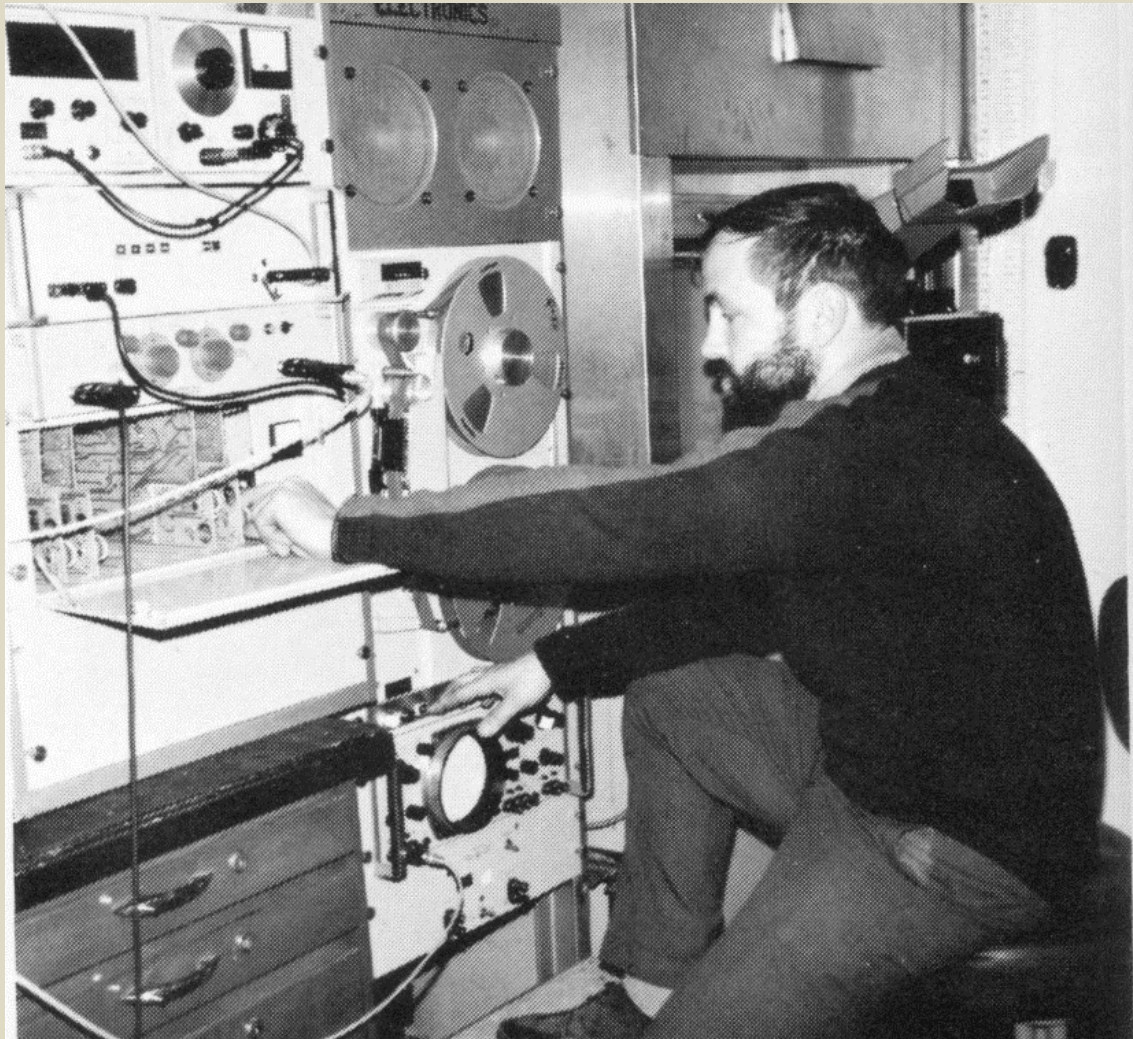
Shark Caught by Crew



Whale Watch



Peter Beamish Recording Whale Sounds



Arriving in Rio



Leg 2: Rio de Janeiro to Buenos Aires



20 December 1969 to 16 January 1970

Dr. C.R. Mann, Chief Scientist

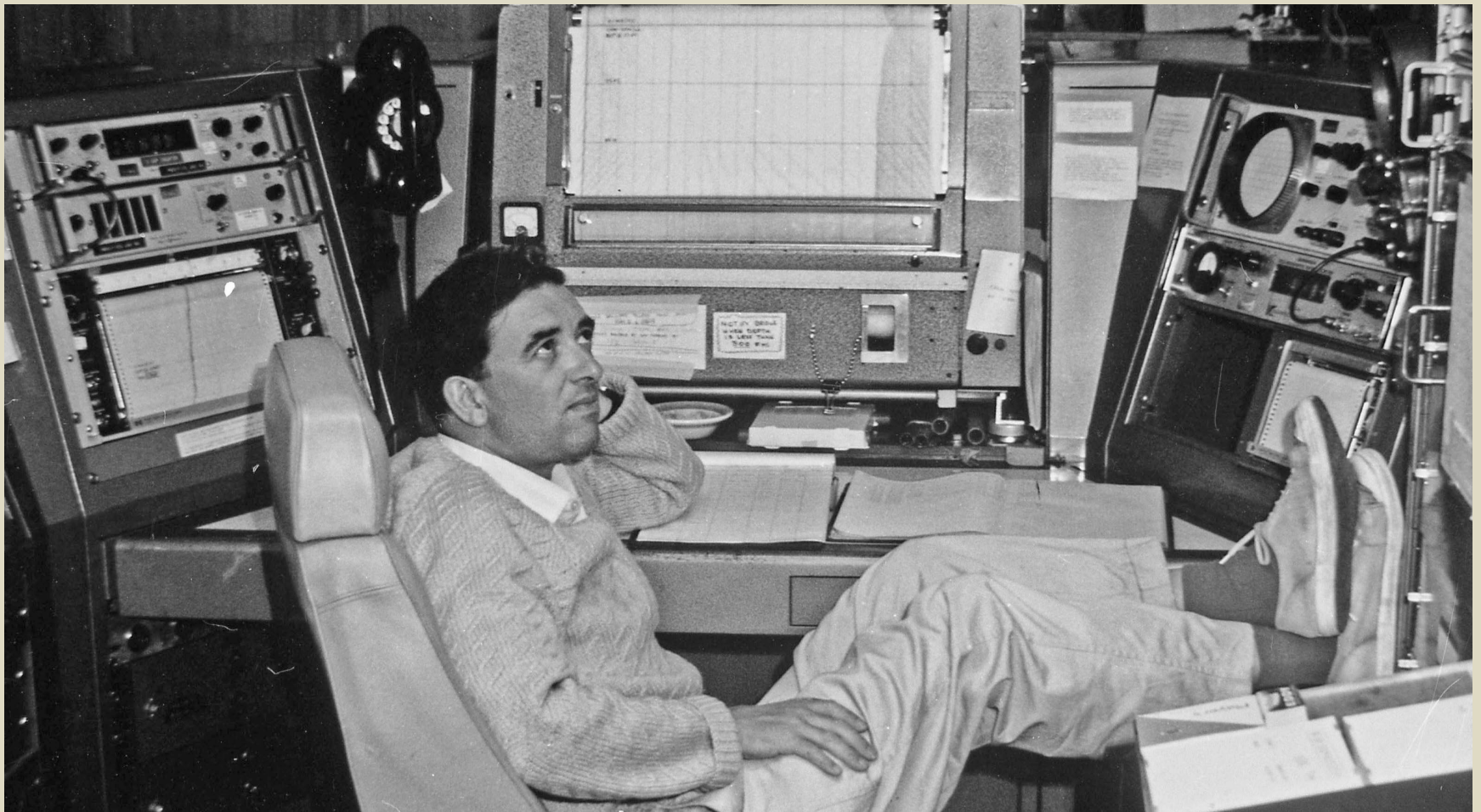
Leg 2 Program

- Bathymetry (6,056 km)
- Cores (3)
- Expendable Bathythermographs (162)
- Bathysonde (CTD) casts (16)
- Knudsen/Niskin casts (20)
- Surface plankton tows (36)
- Vertical plankton tows (32)
- Oblique plankton tows (18)
- Deep multiple plankton tows (15)
- Isaac Kidd mid-water trawls (14)
- Acoustic scattering layer observations (23)
- Recordings of marine mammal sounds (1)

Leaving Rio



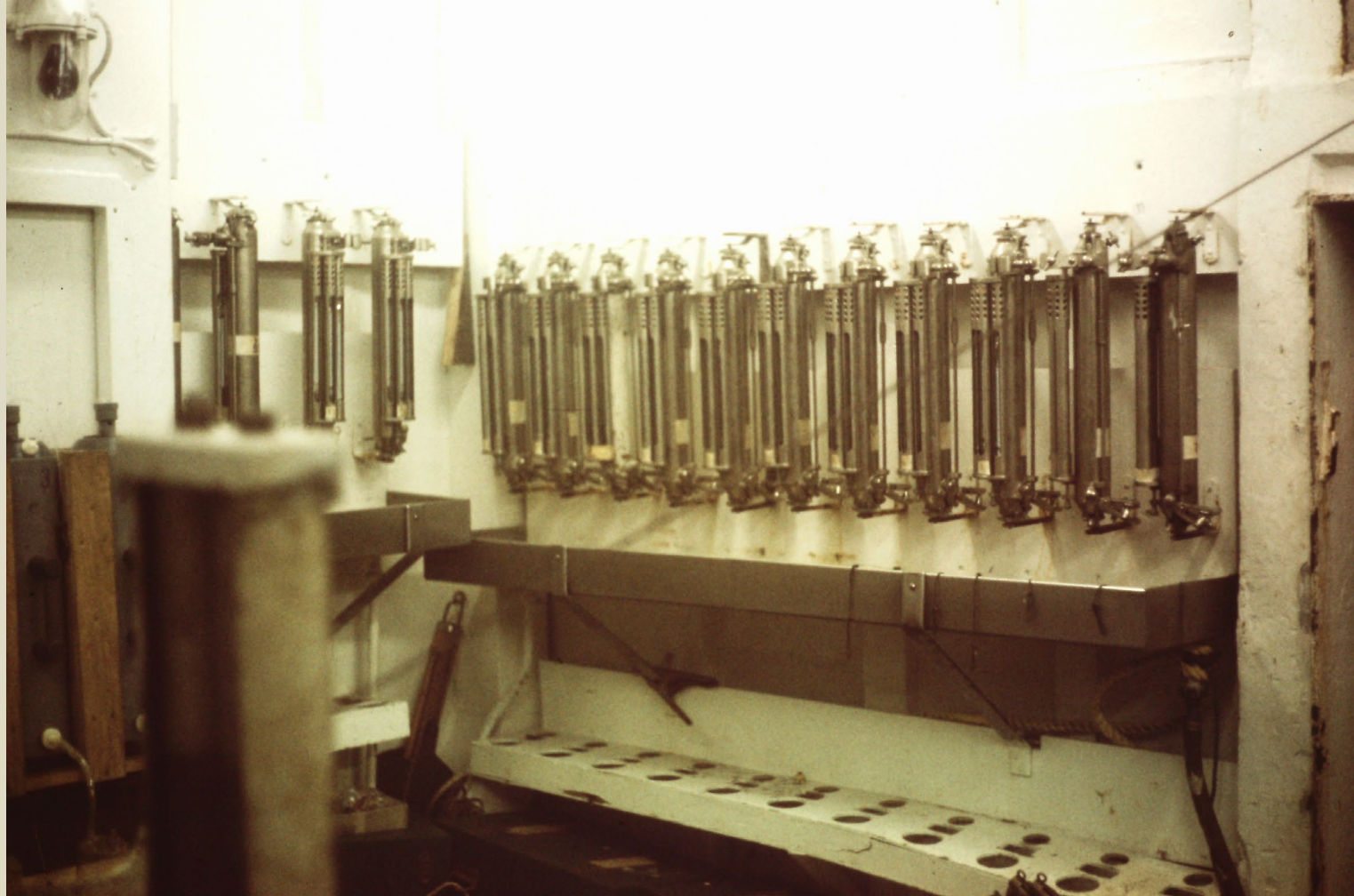
Manning the Geophysics Console



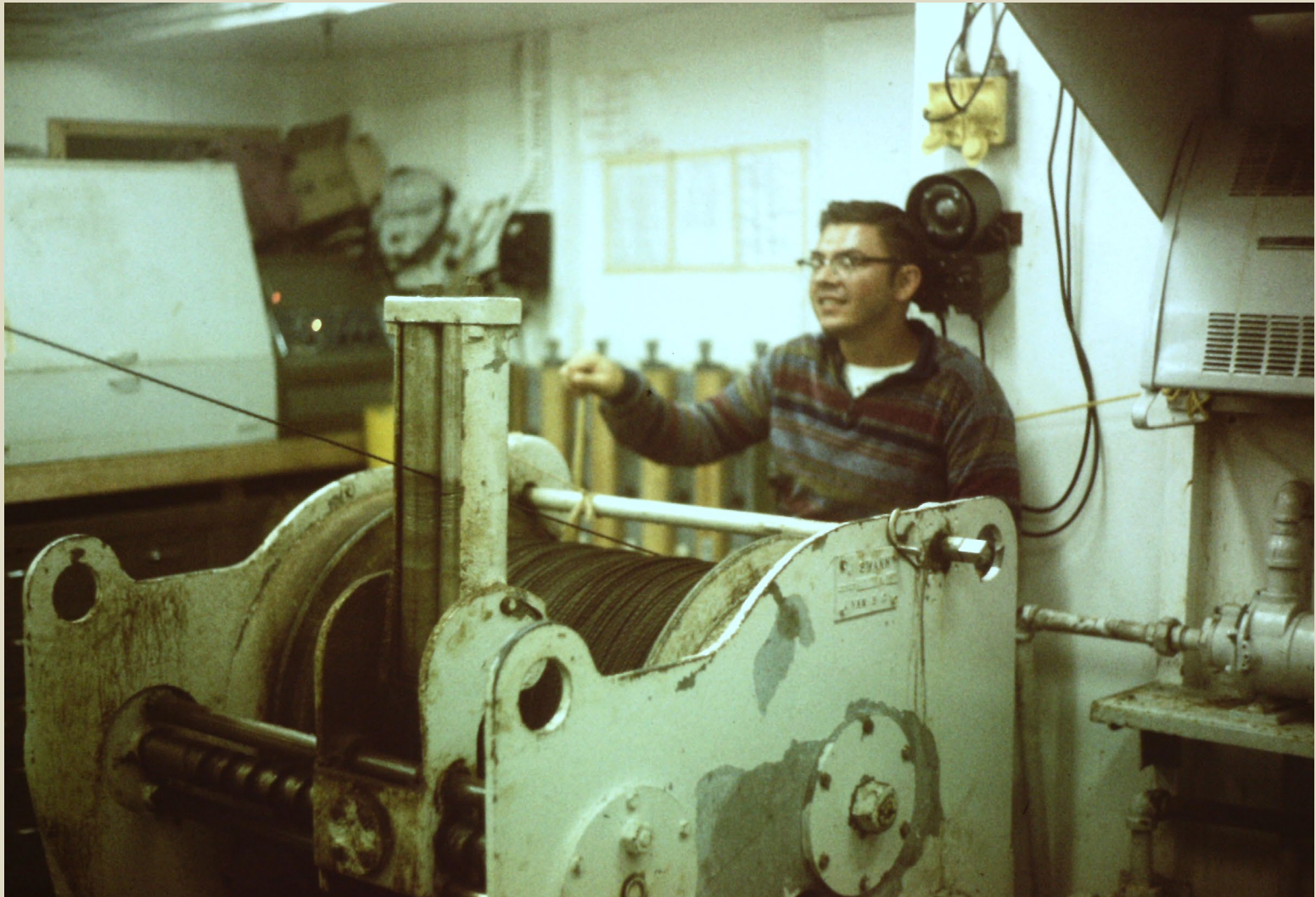
Main Geophysics Lab



Knudsen Bottles in Winch Room (for temperature, salinity, oxygen)



Iver Duedall at the Hydrowinch



Georgiana Deevey and Carol Lalli in the Lounge



Examining Plankton Tow

Bob Conover, Russ Melanson, Fred Meagher



Examining Zooplankton

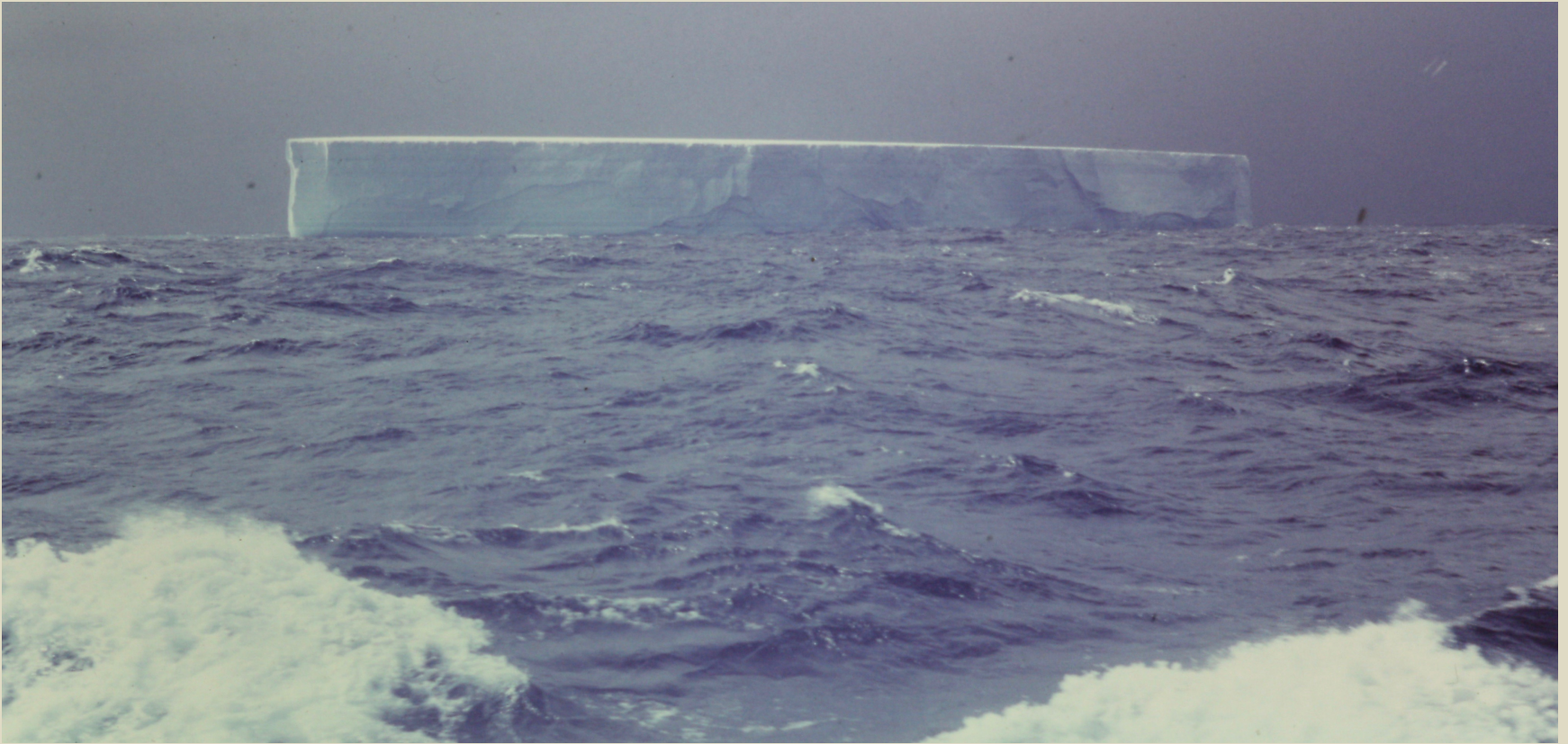
Carol Lalli, Bob Conover and Georgiana Deevey



Pete Wangersky and Peter Wadhams in the Lounge



Iceberg South of the Antarctic Convergence



Arriving in Buenos Aires



Leg 3: Buenos Aires to Punta Arenas



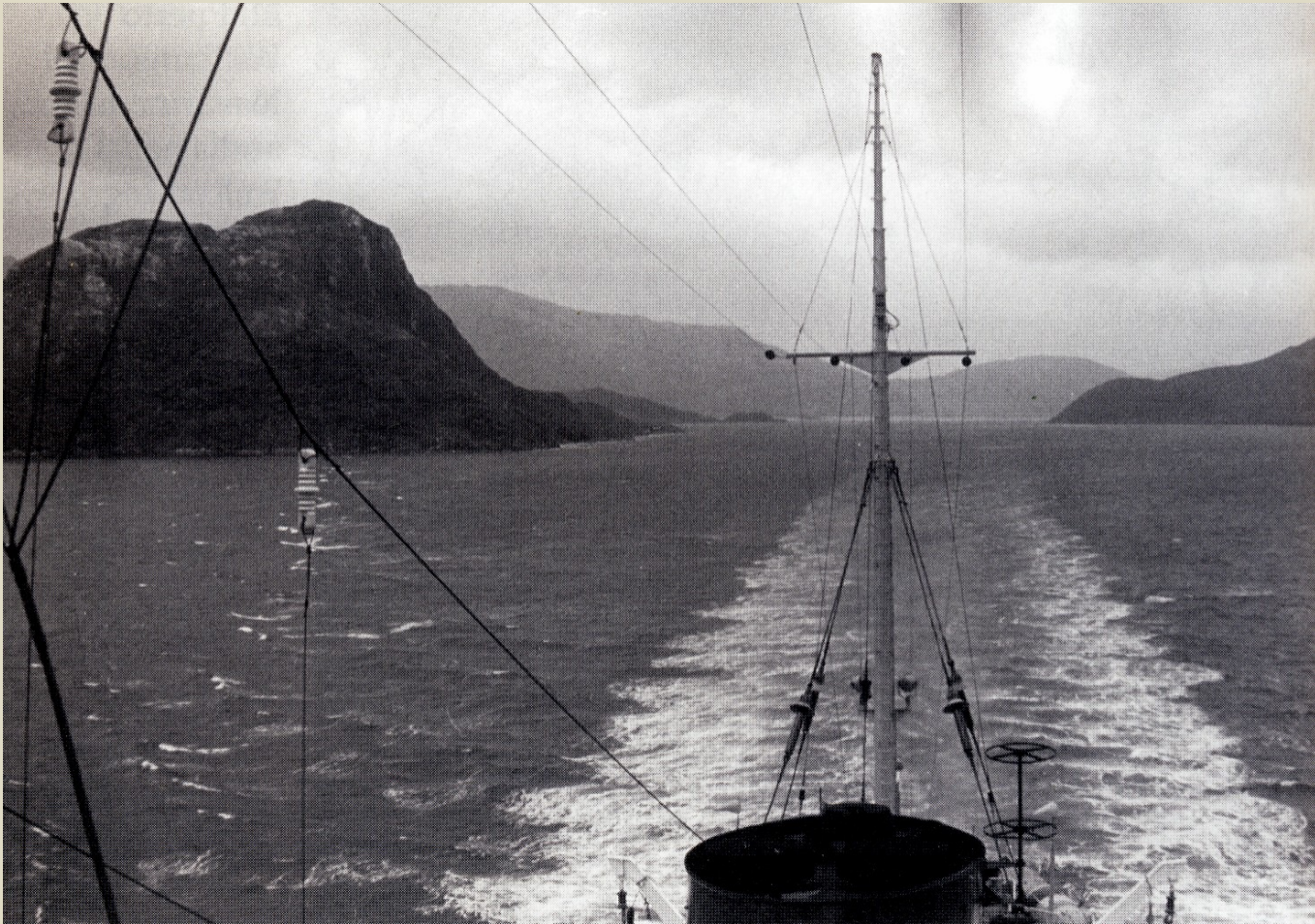
22 January to 23 February 1970

Dr. C.R. Mann, Chief Scientist

Leg 3 Program

- Bathymetry (6,852 km)
- Cores (3)
- Expendable Bathythermographs (32)
- Bathysonde (CTD) casts (10)
- Knudsen/Niskin casts (16)
- Nephelometer casts (8)
- Current meter moorings (4)
- Surface plankton tows (16)
- Vertical plankton tows (34)
- Epibenthic sled tows (11)
- Anchor dredge grabs (1)
- Smith MacIntyre grabs (3)
- Bird count watches (23)
- Launch operations (Invertebrates and marine algae)

Beagle Channel



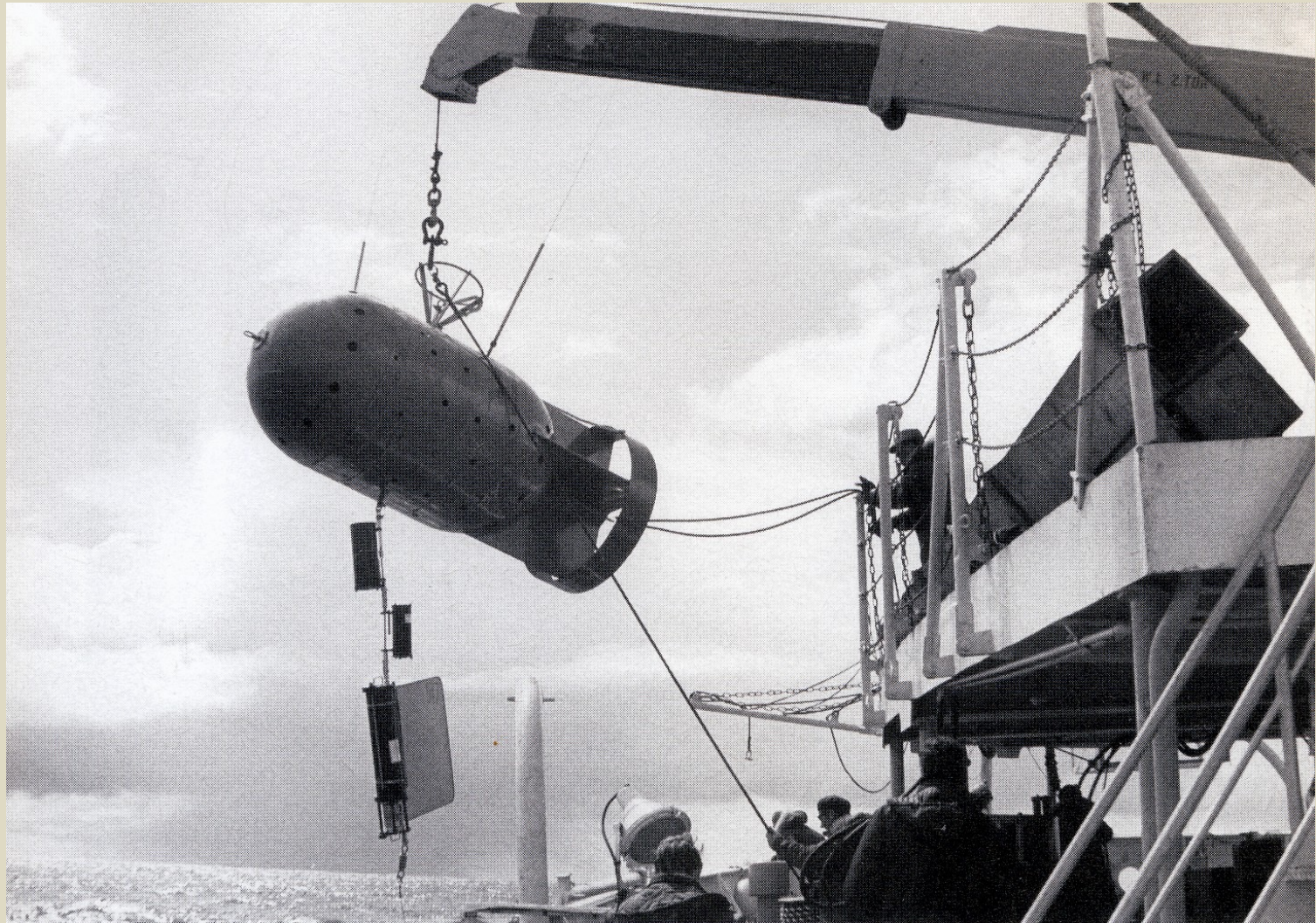
Puerto Williams



Cape Horn



Deploying Current Meter Mooring in Drake Passage



Braincon Current Meter

Joe Avery (Bos'n)



Stan the Winch Man



Deploying the Epibenthic Sled in Bransfield Strait



Recovering the Epibenthic Sled

Bob Hessler and Eric Mills



South Sandwich Islands



Admiralty Bay



Whale Bones at Admiralty Bay



Admiralty Bay



Going Ashore at Deception Island



Wrecked Chilean Weather Base Deception Island



Deception Island



Magellan Monument in Punta Arenas



Leg 4: Punta Arenas to Valparaíso



1 March to 7 April 1970

Dr. George Pickard, Chief Scientist

Leg 4 Program

- Bathymetry (3,190 nm)
- Knudsen casts (180)
- Bathythermograph casts (154)
- STD casts (173)
- Surface plankton tows (36)
- Vertical plankton tows (58)
- Oblique plankton tows (65)
- Deep multiple plankton tows (15)
- Clarke-Bumpus tows (58)
- Isaac Kidd midwater trawls (28)
- Acoustic scattering layer observations (58)
- Bottom grabs (41)
- Bird counts (all daytime stations)

Chilean Fjords



George Pickard Conducting Bottle Cast



Puerto Natales, Chile



Fjord near Puerto Natales, Chile



Puerto Chacabuco, Chile



Deploying Bathysonde



Clarke-Bumpus Zooplankton Sampler



Chilean Fjords



Chilean Fjord Survey Team



Leg 5: Valparaíso to Papeete



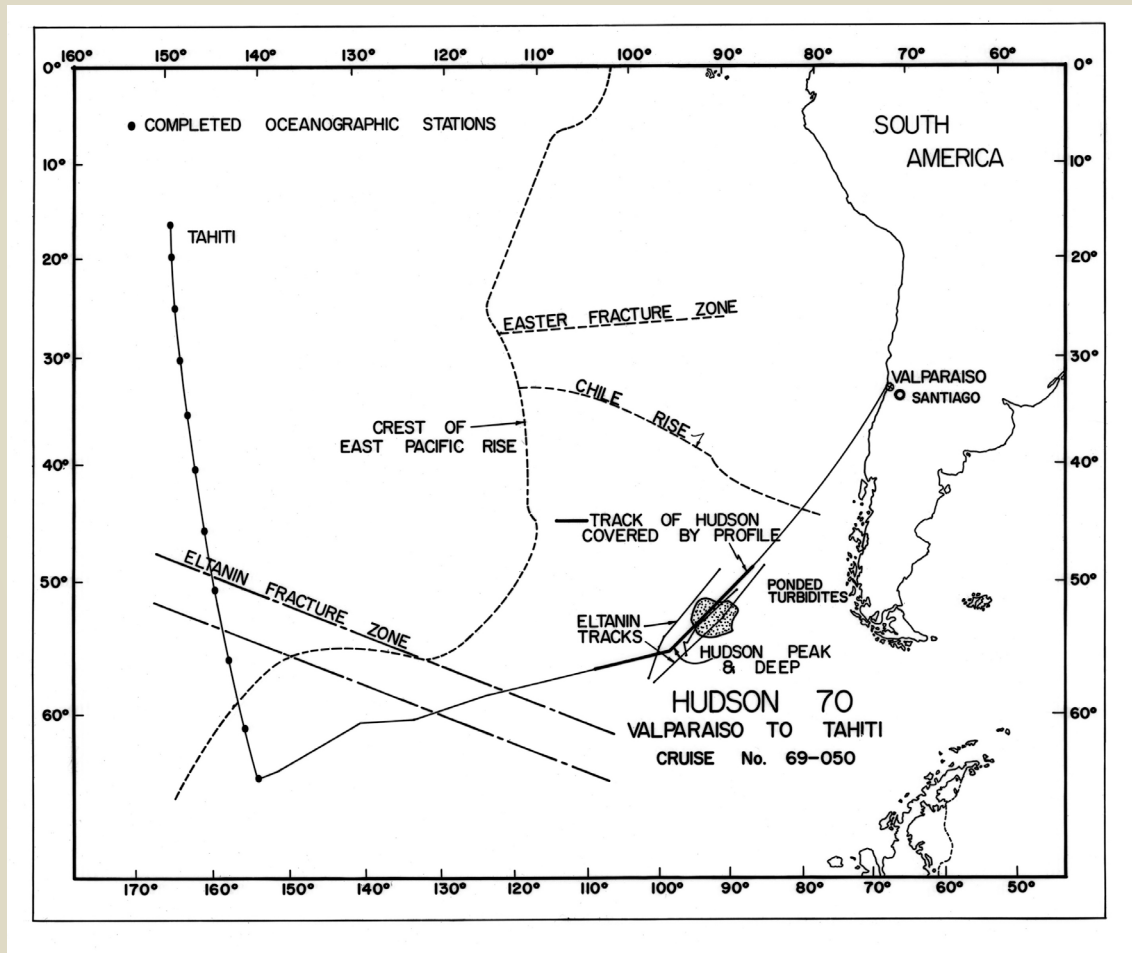
15 April to 12 May 1970

Mr. R.C. Melanson, Chief Scientist

Leg 5 Program

- Bathymetry (21,853 km)
- Gravity (21,853 km)
- Magnetics (21,853 km)
- Cores (1)
- Expendible bathythermograph casts (240)
- Bathysonde casts
- Knudsen/Niskin casts (13)
- Surface plankton tows (25)
- Vertical plankton tows (14)
- Oblique plankton tows (18)
- Acoustic scattering layer observations

Discovering New Peak and Deep Subsequently Named After Hudson



Staff in Lounge



Approaching Tahiti



Tahiti



Tahiti



Charlie Schafer, Ken Freeman and Madu Paranjape in Tahiti



Leg 6: Papeete to Vancouver



16 May to 12 June 1970

Dr. W.M. Cameron, Chief Scientist

Leg 6 Program

- Bathymetry
- Gravity
- Magnetics
- Piston Cores
- Expendible bathythermograph casts
- Bathysonde casts
- Knudsen/Niskin casts
- Surface plankton tows
- Vertical plankton tows
- Oblique plankton tows
- Acoustic scattering layer observations

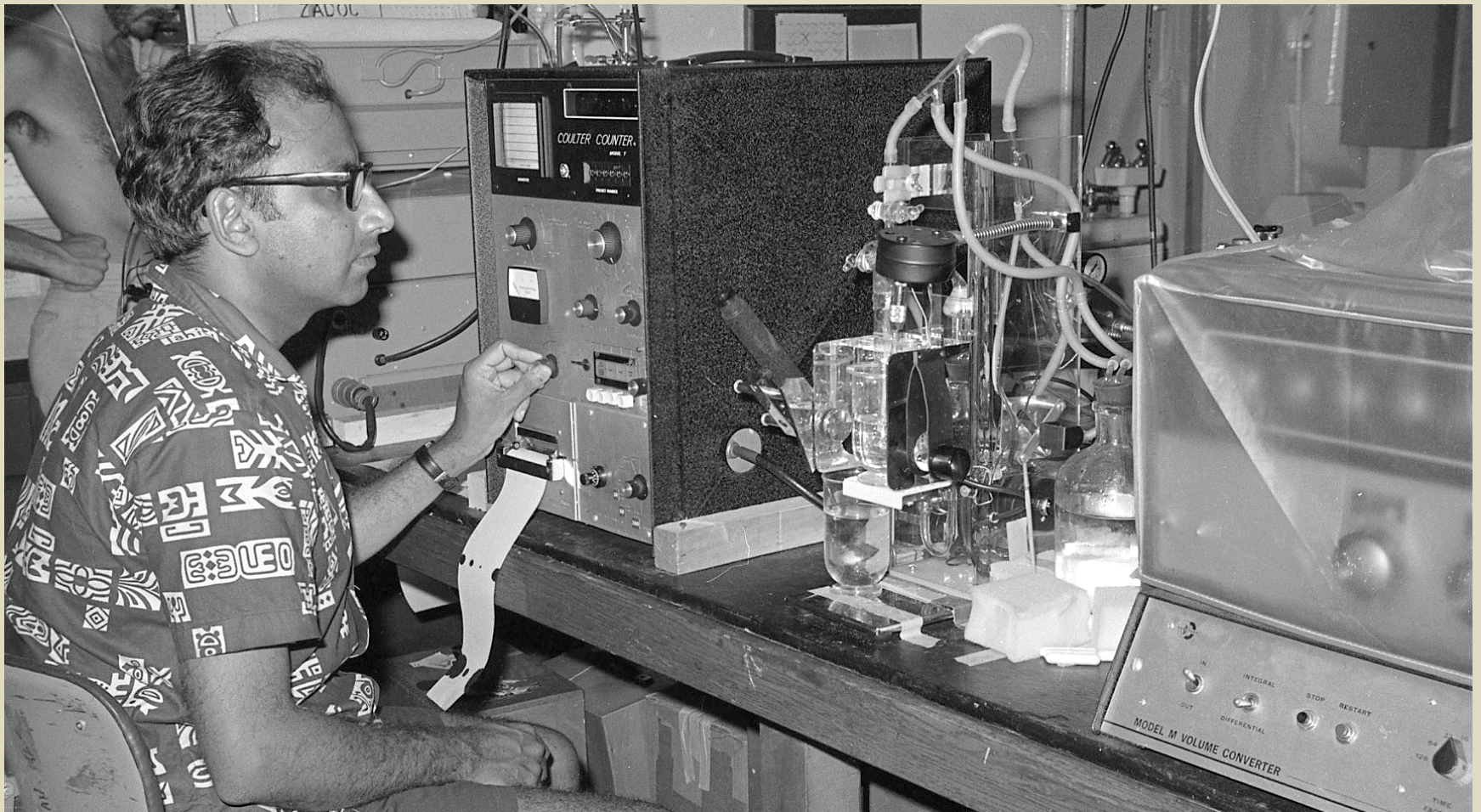
Jon Sharp, Bill von Arx, Pete Wangersky, Charlie Schafer and Anand Prakash in Library



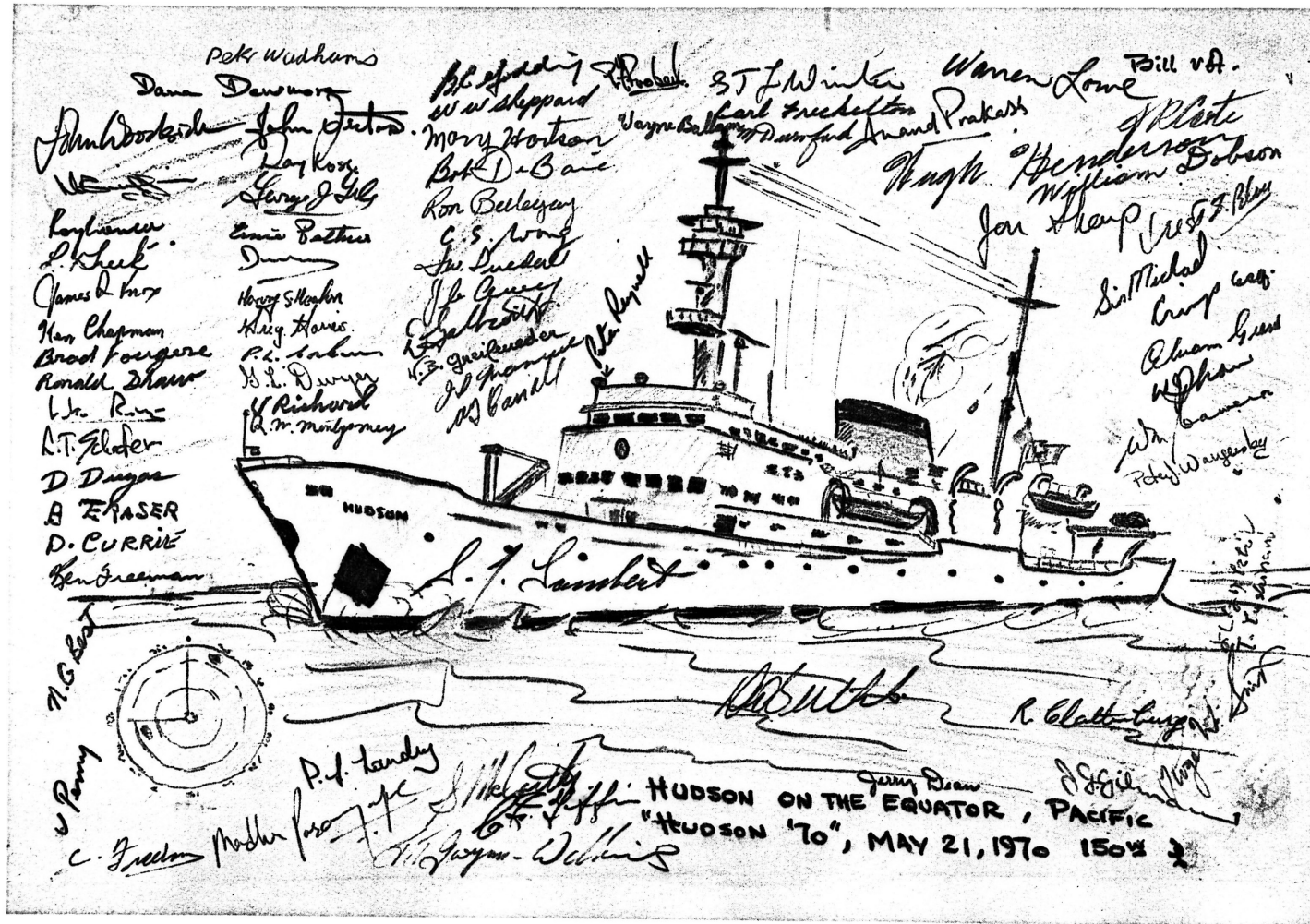
Ken Freeman and Squid



Anand Prakash Measuring Particles with Coulter Counter



Crossing the Equator Again



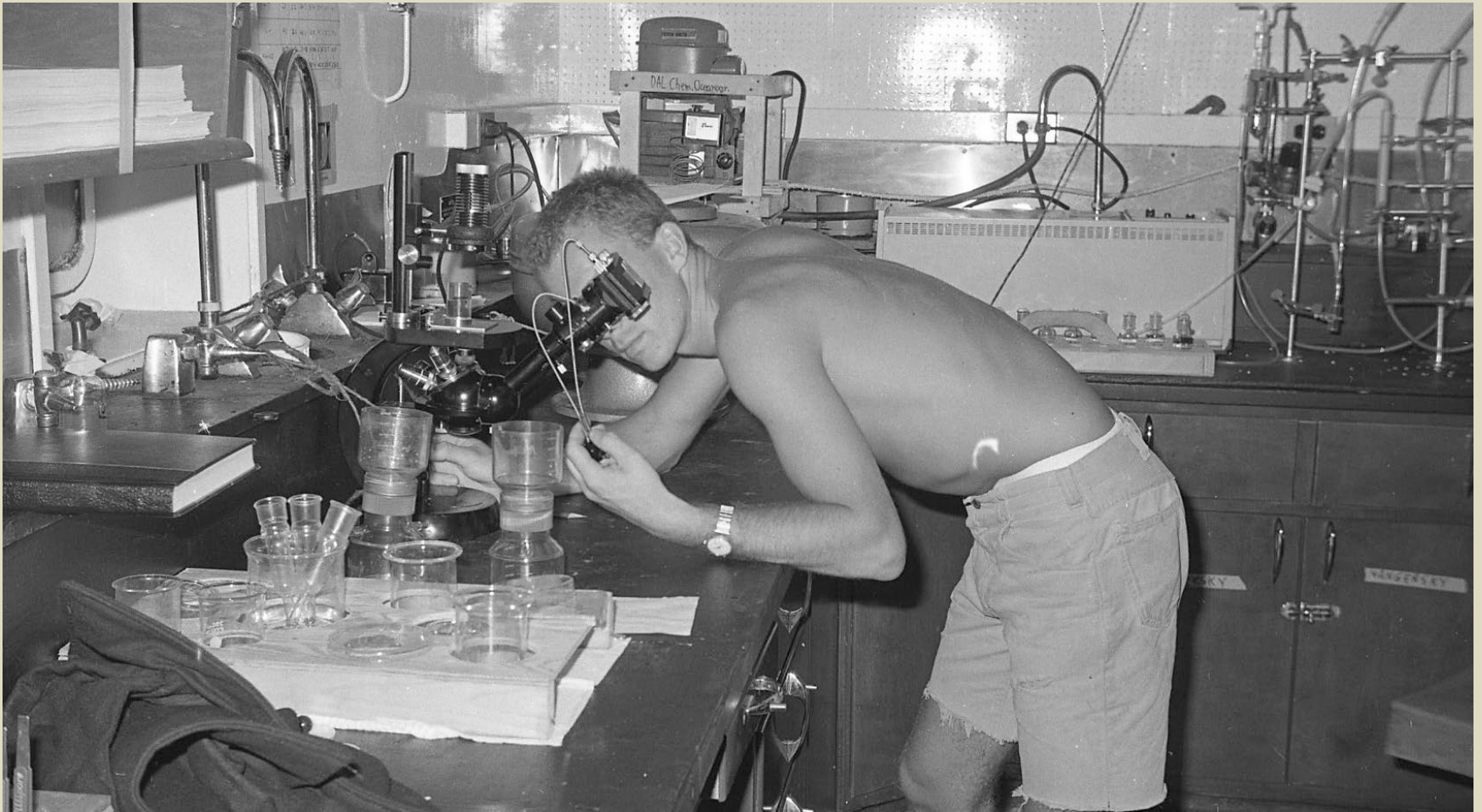
Bruce Carson, Fred Meagher, Dave Butler and Sam Lambert at the Bar



Repairing Plankton Nets



Photographing Plankton



Charlie Schafer Servicing Pinger



Arriving in Vancouver



Leg 7: Vancouver to Victoria



12 July to 5 August 1970

Dr. C.D. Maunsell, Chief Scientist

Leg 7 Program

- Bathymetry (6,933 km)
- Gravity (6,933 km)
- Magnetics (6,933 km)
- Seismic reflection profiling (1,675 km)
- Reversed seismic refraction lines (621 km)
- Heat flow stations (13)
- Dredging stations (17)

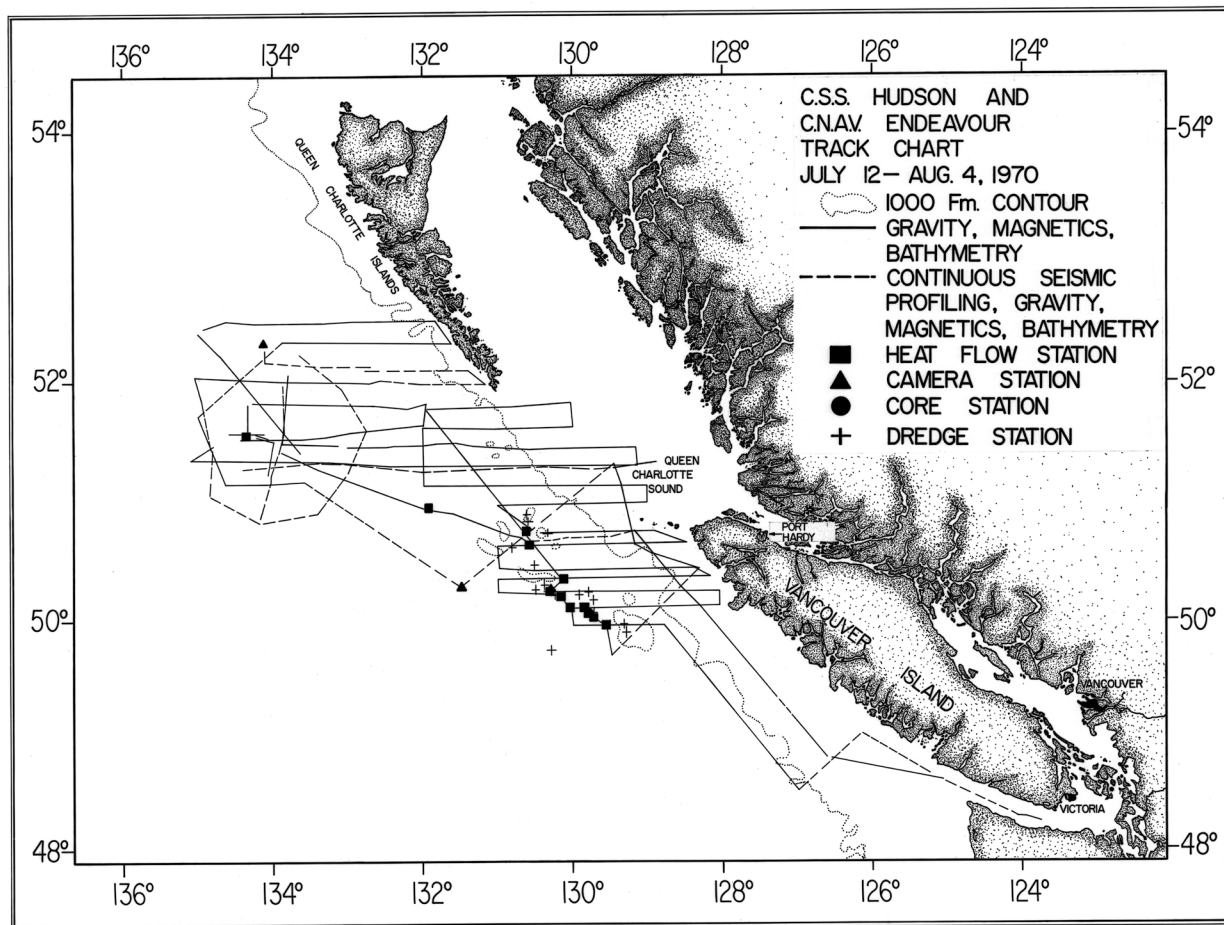
Departing Vancouver



Joined by CNAV *Endeavour* for Seismic Surveys



Geophysical Survey Lines



Deploying Marker Buoys for Seismic Shooting



Leg 8: Victoria to Resolute



13 August to 22 September 1970

Dr. B.R. Pelletier, Chief Scientist

Leg 8 Program

- Bathymetry (9,653 km)
- Gravity (9,653 km)
- Magnetics (9,653 km)
- Seismic reflection profiling (2,194 km)
- Side scan sonar (1,200 km)
- Cores (71)
- Knudsen casts (41)
- Surface plankton tows (211)
- Vertical plankton tows (229)
- Oblique plankton tows (2)
- Sled trawls (1)
- Van Veen grabs (116)
- Sediment dredges (11)
- Camera stations (7)
- Underwater television stations (4)

Pack Ice in the Beaufort Sea



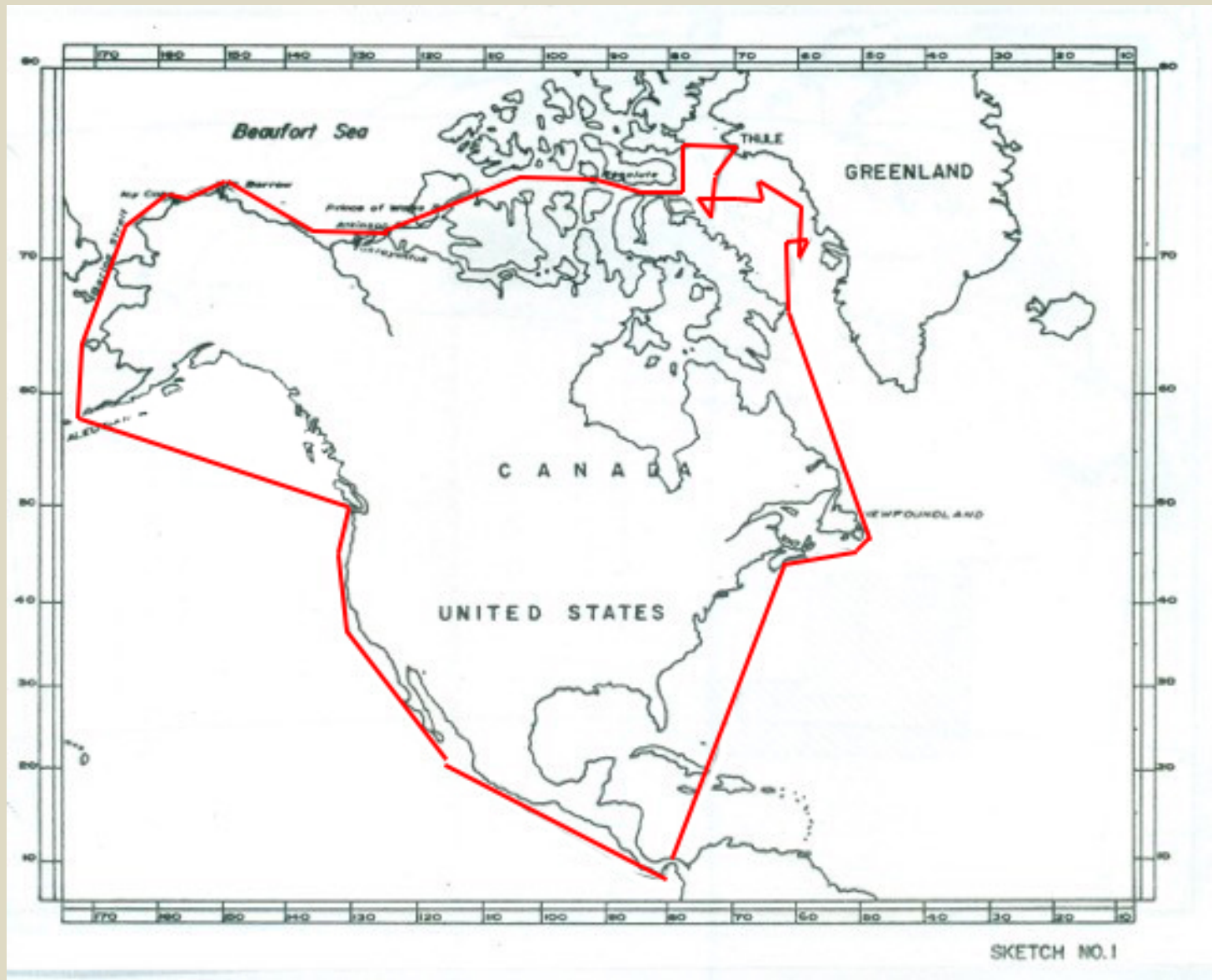
Beaufort Sea



Joined by CSS *Baffin* via Panama Canal



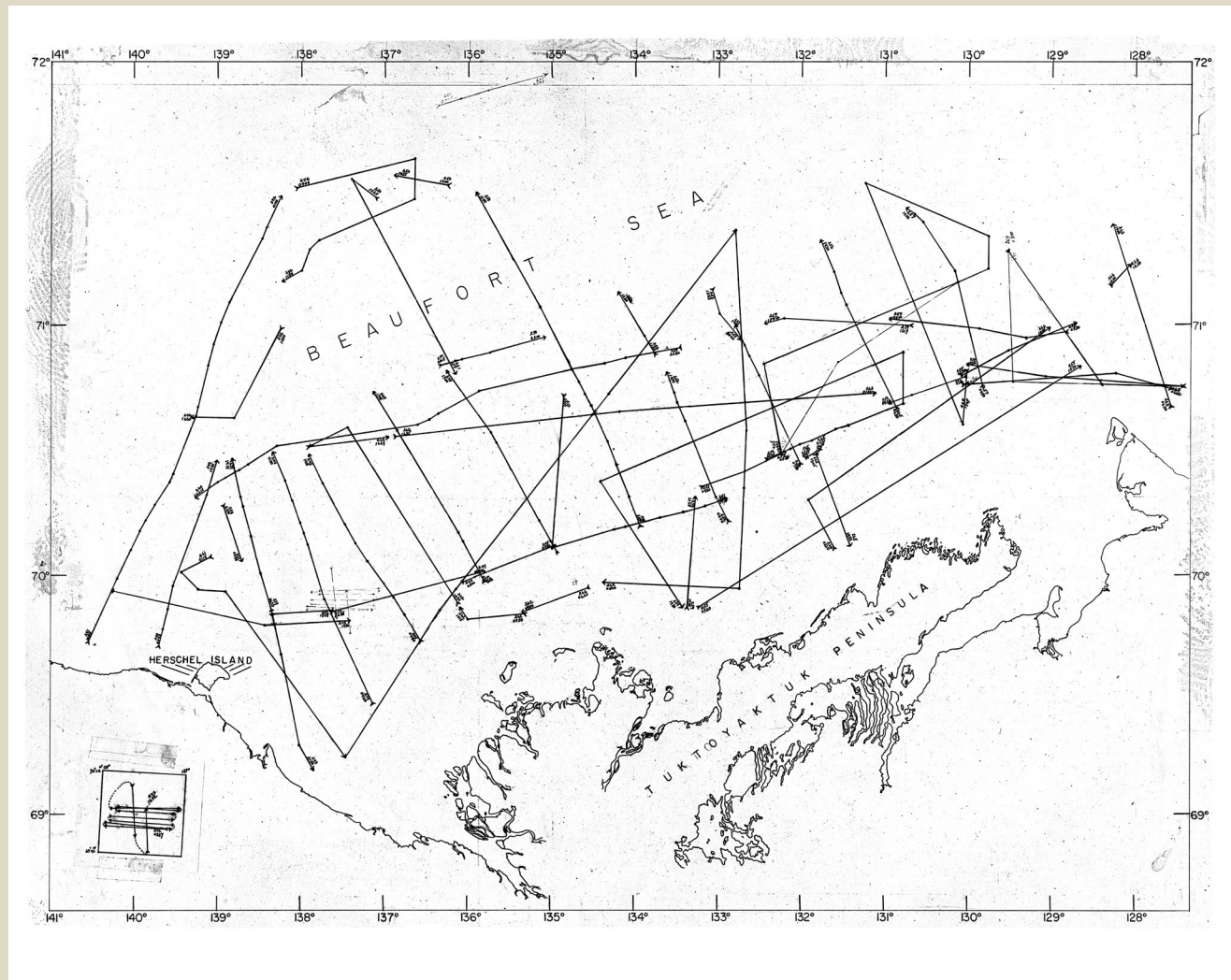
CSS *Baffin* Track



Also Joined by CSS *Parizeau* from
Victoria



Beaufort Sea Survey Tracks



Helicopter Used for Ice Reconnaissance and Ferrying Staff



Visiting Herschel Island



Bosko Loncarevic at the Geophysics Console



Ced Mann Hanging Knudson Bottle



Deploying Plankton Nets



Gus Vilks Retrieving Plankton Net



Deploying Van Veen Sediment Grab



Mike Gorgeatt Emptying Van Veen Grab



Recovering Sediment Dredge



Examining Beaufort Sea Mud



Deploying Piston Corer



Recovering Piston Corer



Bernie Pelletier and Chris Havard Examining Sediment Cores



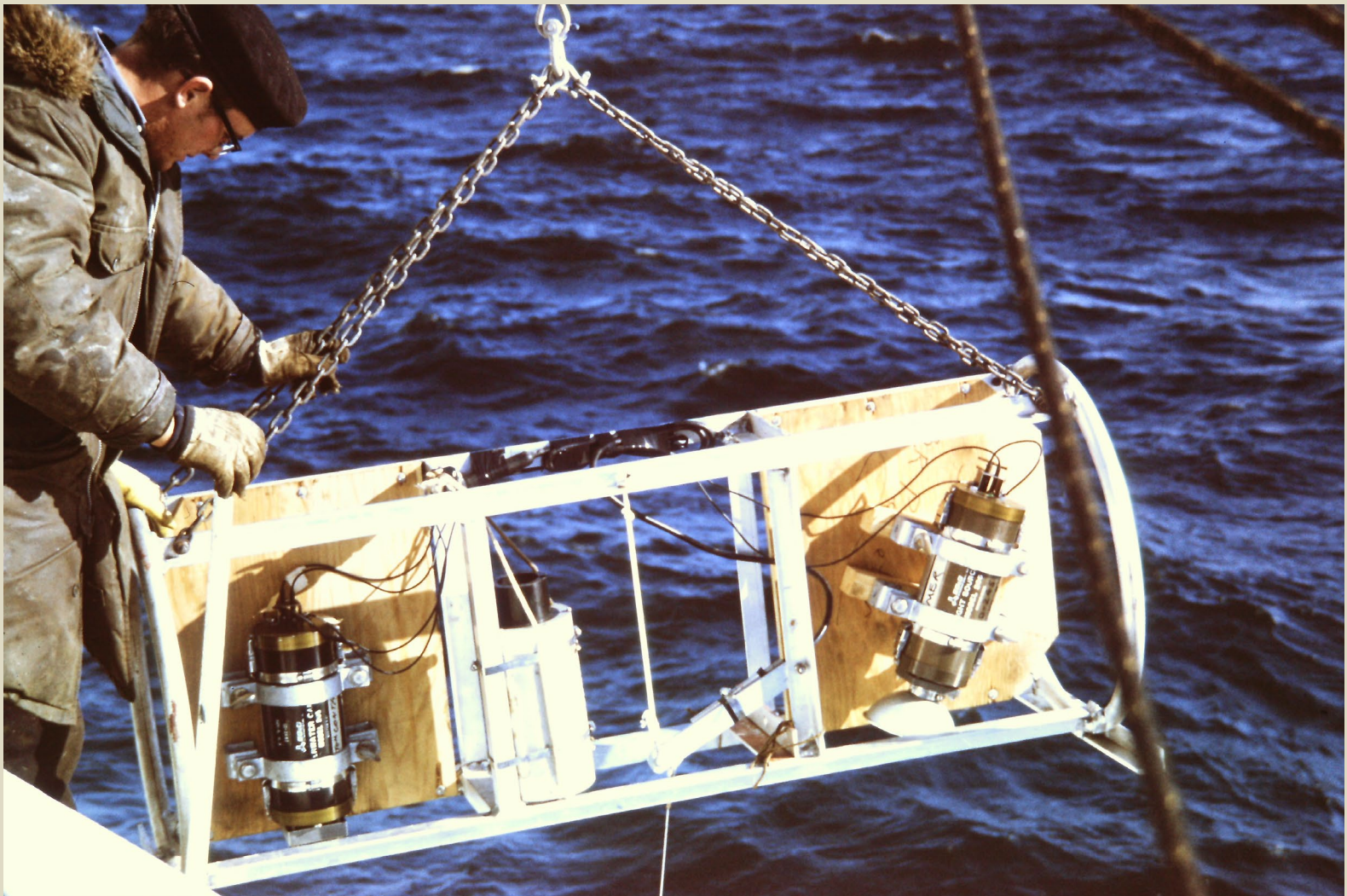
Recovering the Epibenthic Sled



Recovering the Rock Dredge



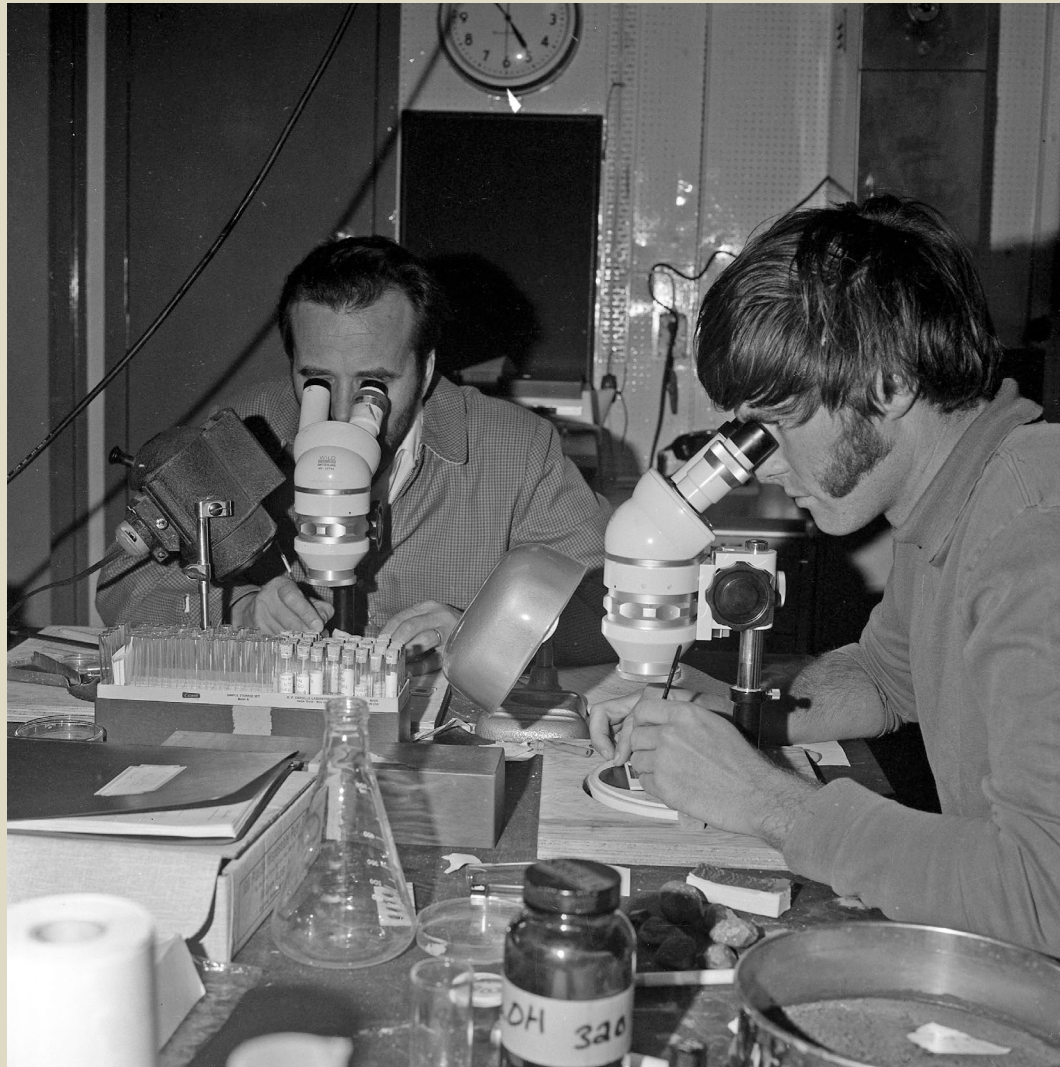
Deploying the Seabed Camera



Deploying Underwater TV



Examining Plankton Samples



Determining Water Salinity with Salinometer



Performing Oxygen Titrations



Storing Sediment Samples



Beaufort Sea Ice



Deploying Lifeboat for Shore Parties



Pingo on MacKenzie Delta



Shore Party



Refueling off Tuktoyatuk



Polar Bear Tracks



Polar Bear

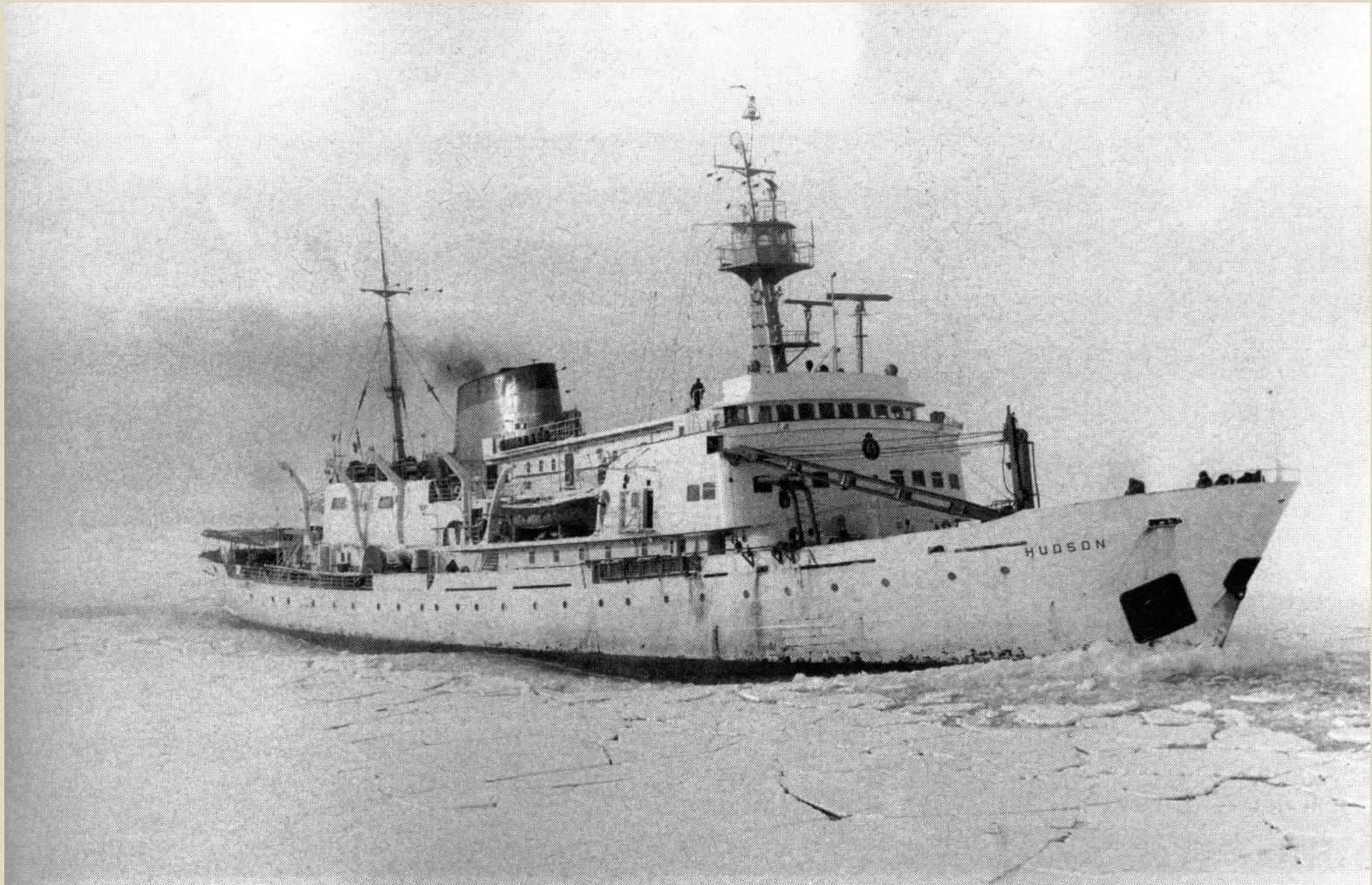


Planning Route Through the Northwest Passage

Gus Vilks, Dave Butler, Bernie Pelletier, Roy Gould



Breaking Ice in the Northwest Passage



Dave Butler on the Bridge



Icebreaker CCGS *John A. Macdonald* Helped Clear the Way



Steaming Through the Northwest Passage



Northwest Passage



Northwest Passage



Celebratory Dinner After Traversing the Northwest Passage



CCGS *John A. Macdonald* and CSS *Baffin* in Lancaster Sound



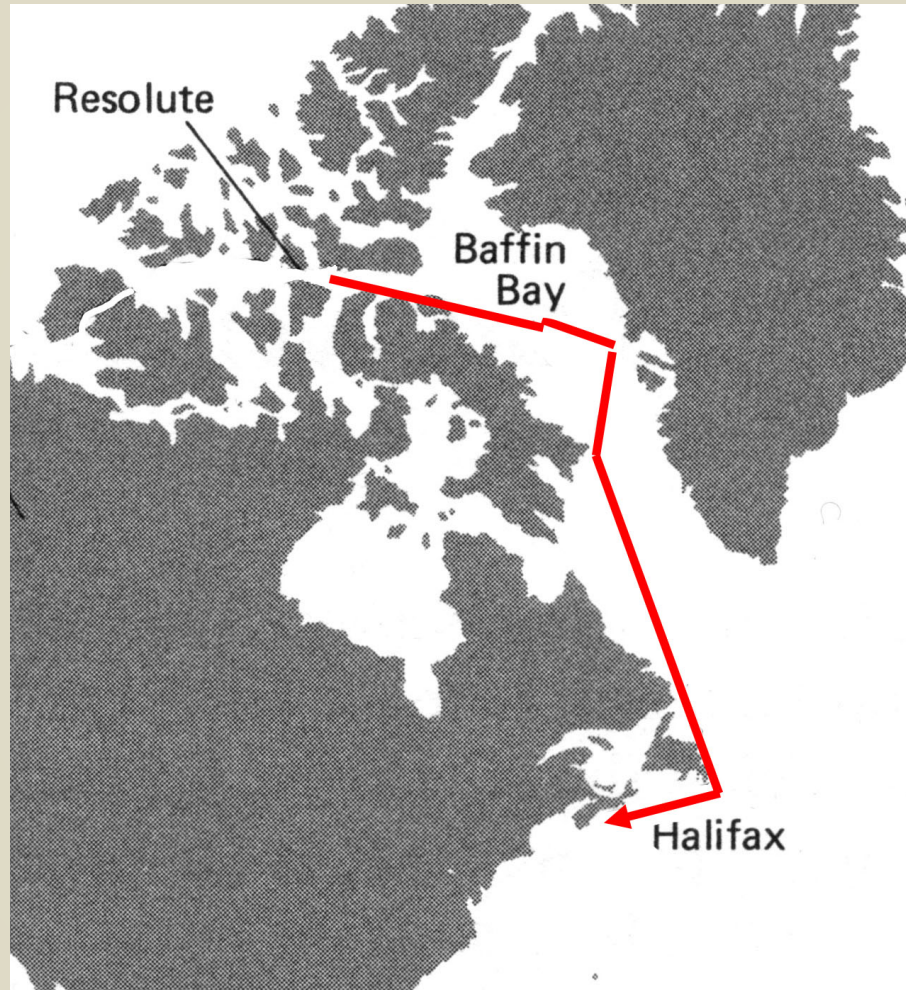
Installing Hudson 70 Plaque near Resolute



Arrival in Resolute



Leg 9: Resolute to Halifax



30 September to 16 October 1970

Dr. D.I. Ross, Chief Scientist

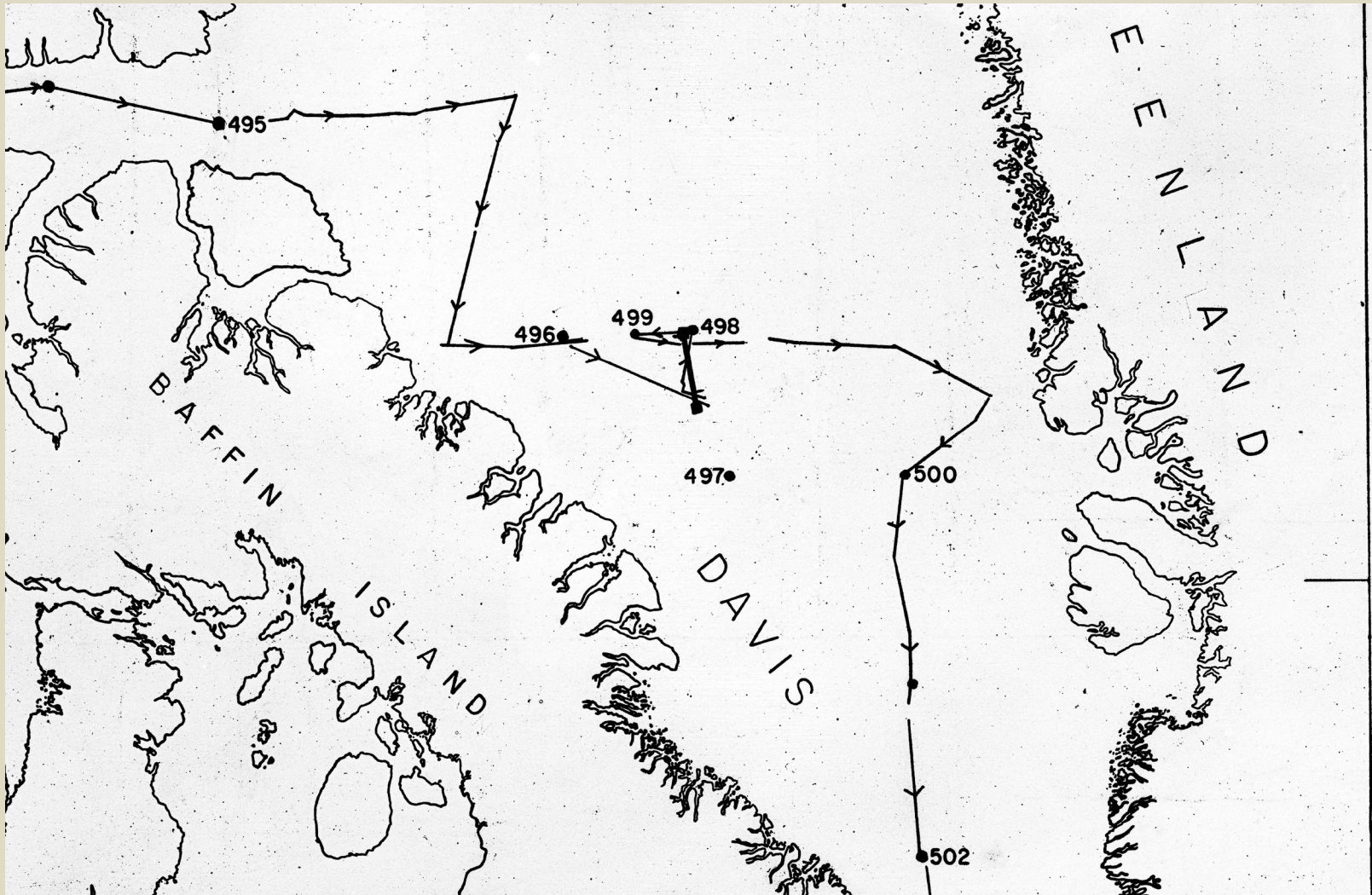
Leg 9 Program

- Bathymetry (4,630 km)
- Magnetics (4,630 km)
- Gravity (4,630 km)
- Seismic reflection profiling (777 km)
- Reversed seismic refraction line (253 km)
- Core stations (3)
- Bottle casts (10)
- Plankton tows (15)

Joined by USCGC *Edisto* for Seismic Surveys



Geophysical Survey Lines in Baffin Bay



Heading for Home



Crossing the Grand Banks



Return to BIO

16 October 1970

(the same day the federal government declared a state of emergency under the War Measures Act to deal with the FLQ crisis in Quebec)

Coming Up the Harbour with *CSS Baffin*



Passing Under the MacDonald Bridge



Moving Up the Narrows with Fireboat Salute



Under the Newly Completed MacKay Bridge



CSS *Baffin* Approaching BIO



Throwing the Lines



Welcome Home Speeches

Bill Ford (BIO Director)



Welcome Home Speeches Joe Green (Minister DEMR)



Joe Green Presenting Commemorative Plaque to Dave Butler



Hudson 70 Medal for All Participants



Bill Ford Presenting Hudson 70 Medal to Sam Lambert (Chief Engineer)



Results of Hudson 70 Presented in Numerous Publications (>50)

- Peer-reviewed scientific journals
- Technical reports
- Graduate student theses

Honorary Degrees Awarded

- Capt. David Butler – Brock University (1971)



- Dr. Cedric Mann – Nova Scotia Technical College (1972)



General Accounts of Hudson 70

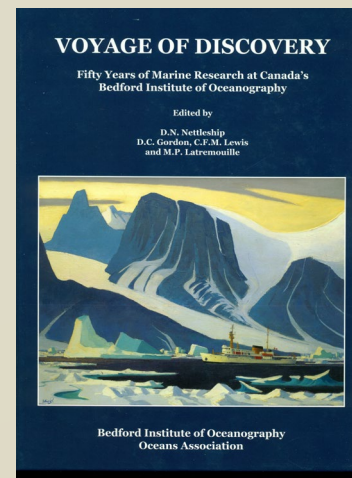
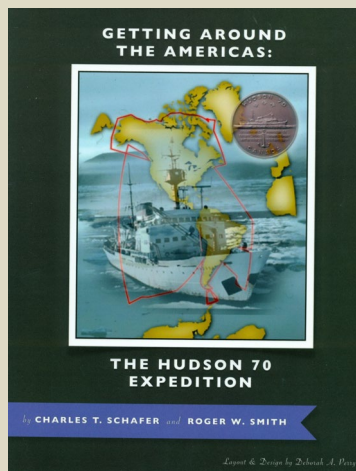
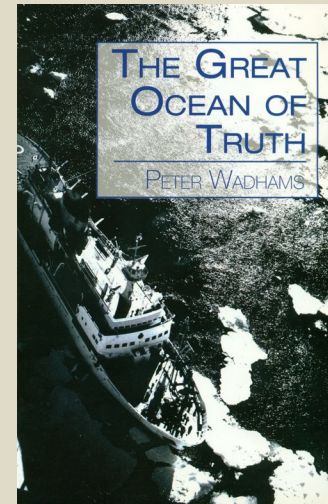
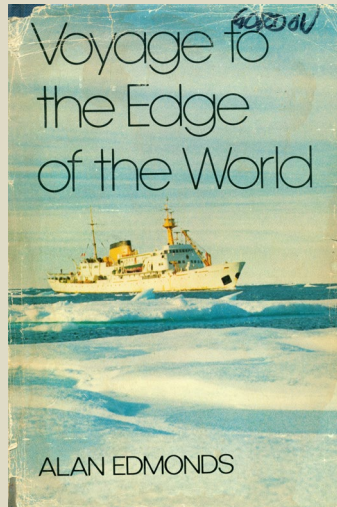
Edmonds, A. 1973. Voyage to the Edge of the World. McClelland and Stewart Limited. 254 p.

Wadhams, P. 2009. The great ocean of truth. Melrose Books. 378 p.

Schafer, C.T. and R.W. Smith. 2012. The Hudson 70 Expedition. VBW Publishing. 69 p.

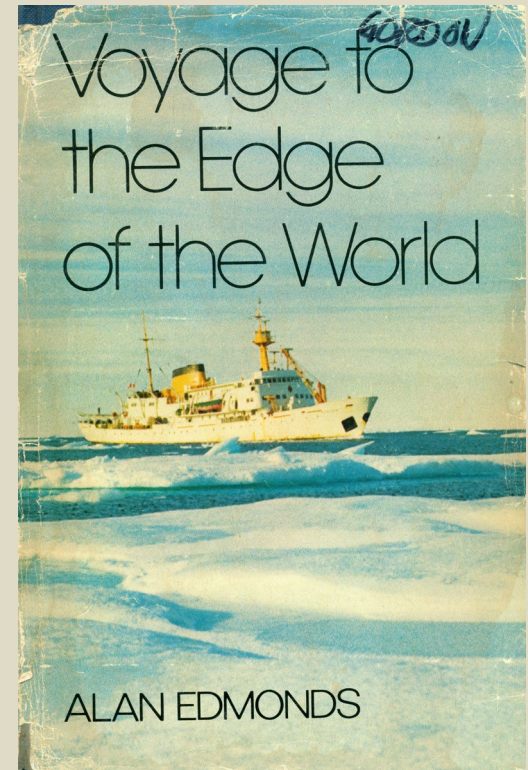
Wadhams,. P. 2014. The Hudson-70 voyage of discovery: the first circumnavigation of the Americas. In: Voyage of Discovery. BIO Ocean Association. Pp. 21-28.

Books in BIO Library



Book Launch in 1973

Alan Edmonds, Dave Butler and Bill Ford



Films

- Hudson 70. A National Film Board of Canada film (1972) (NFB522478) (27 min)
- Home movies taken by Iver Duedall posted on YouTube (Google 'Iver Duedall Hudson 70')

The Hudson 70 Expedition

A Proud Accomplishment for Canada and BIO



This pictorial profile of the Hudson
70 Expedition was assembled by
Don Gordon (DFO Emeritus
Scientist) and
Kelly Bentham (BIO Photo Unit)
from BIO Photo Archives and
Cruise Reports

2019