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VOICEPIPE

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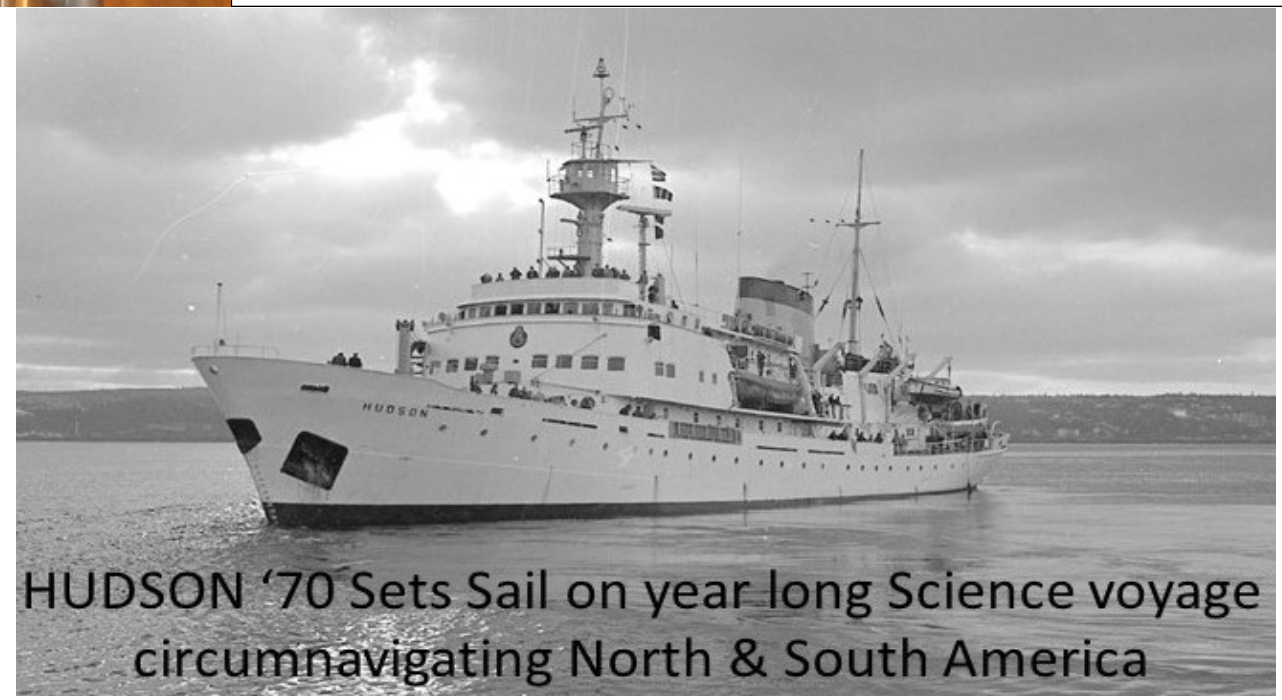
The Newsletter of the BIO-Oceans Association



Hudson 70 Anniversary

Our feature article this edition is a celebration of the fiftieth anniversary of the Hudson 70 expedition. The CSS *Hudson* set out from BIO on November 19, 1969, sailed south around South America, then continuing north through the Pacific up to the Arctic Ocean. *Hudson* continued through the Arctic Ocean arriving back in Halifax on October 16, 1970 becoming the first ship to circumnavigate the Americas.

What is maybe more remarkable is the story of the science that came from the expedition. To highlight that, we have republished an article from the Bedford Institute Biennial Review1969-70 written by Dr. Cedric Mann that outlines the work carried out on the voyage. Using this article also highlights the importance of the BIO annual reviews as a record of the scientific activities of the institute. A later BIO publication can be found online at https://waves-vagues.dfo-mpo.gc.ca/Library/151809.pdf. This huge publication produced in 1987 contains all the cruise reports, an atlas of the physical oceanographic data collected, a bibliography of published papers, and copies of the most of these papers and was presented to Dr. Mann on his retirement that year.

The Oceans Association will be organizing events throughout 2020 to celebrate Hudson 70 so stay tuned for further information.

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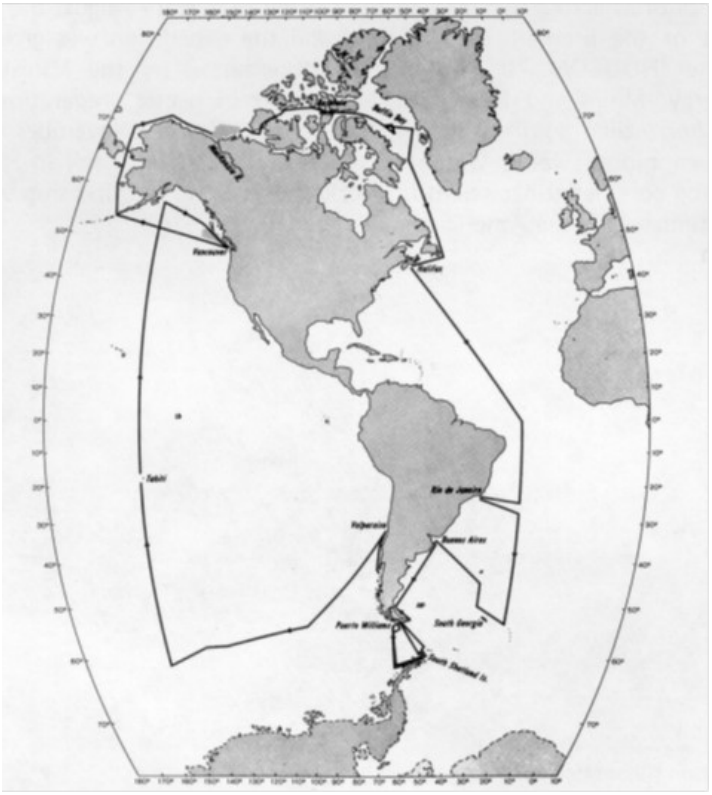
The Hudson 70 Expedition
(C.R. Mann)

One of the major projects undertaken by the Bedford Institute in 1969 and 1970 was an oceanographic expedition around North and South America on the CSS *Hudson.* The aims of the expedition were to make a significant contribution to the exploration of the world's oceans at the beginning of the international Oceanographic Decade and to continue the exploration of the Canadian continental shelf. A preliminary scientific program was drawn up in January 1968 which was then reviewed and revised during the following summer as requests to take part in the expedition were received from many scientists from laboratories across Canada and the United States. By August the major part of the program was finalized and the expedition was given the name 'HUDSON 70'. Following authorization by the Minister of Energy, Mines and Resources, and a year of hectic preparation, the *Hudson* sailed south from Halifax on the 19th of November 1969. Eleven months later, October 16, 1970, she arrived back in Halifax having completed her scientific work and become the first ship ever to circumnavigate the Americas.

The first leg of the voyage took the *Hudson* down the South Atlantic Ocean to the vicinity of South Georgia with a call at Rio de Janeiro enroute. Acousticians, biologists, chemists, geologists and physical oceanographers made up the scientific party, most of whom sought samples for studies of oceanwide distributions. The long transect of the South Atlantic provided the opportunity to collect on this scale. As the ship proceeded south, plankton hauls were made at different depths from the surface to 1500 metres; the acoustic characteristics of the deep scattering layer were mapped and mid-water trawls made to sample the fish in it; sea water samples were collected for chemical analysis; and measurements were made of the size and distribution of particulate matter at the sea surface. Experiments were conducted on the feeding habits of plankton and on the process of photosynthesis, and the sounds emitted by whales were recorded whenever they were sighted. Altogether the ship was very busy with every square foot of laboratory space occupied and a full 12 hours required at each station to make all the collections and observations. Christmas day was celebrated in the middle of the south Atlantic with Christmas dinner,and a station.

From the vicinity of south Georgia, *Hudson* sailed to Buenos Aires, then south to work between South America and Antarctica. Four buoys, each carrying three current meters and three temperature recorders were laid across the Drake Passage and recovered



Hudson's track and main ports of call.

after 11 days. Recovery of the current meters, all of which worked except one, was a major achievement as the recorders contribute the first comprehensive set of direct current measurements across this important passage. A set of mud samples for a study of the emergence of benthic fauna in polar regions was collected in the bays of the South Shetland Islands. Sea water samples for trace element analysis were collected in the deep waters of Drake Passage. While *Hudson* was laying the current meters and collecting the mud samples a launch party left at Puerto Williams, a Chilean Naval Base, to collect fresh and salt water invertebrates and intertidal algae in the coastal channels of Tierra del Fuego. Of the collection of invertebrates, about one-third are probably new to science. An unexpected discovery was a primitive species of beach flea which has changed little in 100 million years.

From Puerto Williams the *Hudson* sailed to Punta Arenas and then carried a party of Canadian and Chilean scientists to study the physical oceanography, chemistry, and biological life of the Chilean fjords. These fjords whose marine characteristics were unexplored, extend early 100 miles along Chile's southern coast. Thirty-three fjords were visited and it was found they could be classified into three groups: northern, middle and southern. The northern group has clear surface water and high productivity; the middle group has less saline and very silty surface water (due to rock

flour from glaciers); and the southern group, opening off the Strait of Magellan, has subsurface water of markedly different characteristics from the others, indicating that it might have its origin in the Atlantic rather than the Pacific. Besides affording the opportunity to study and compare Chilean and west coast Canadian fjords, the expedition provided valuable information that Chilean oceanographers can use to plan further work.

Dr. R.R. Hessler, Scripps Institute of Oceanography, and Dr. E.L. Mills, Institute of Oceanography, Dalhousie University, recovering a benthic sled in the Antarctic. The sled collects a sample of mud for studies of bottom fauna.

Valparaiso was reached on April 15. Here most of the biologists and chemists who had taken part in the South Atlantic leg of the expedition rejoined the ship to continue their work in the Pacific. Magnetometry and gravimetry were added to the observations, the latter to calculate the slope of the sea surface from Antarctica to Alaska to provide a base measurement for the determination of ocean currents by satellite observations. The track provided the longest continuous gravity line along any meridian. An unexpected deep trench with adjacent peaks was found in the South Pacific; this indicates that the Pacific has not moved as a single block and that more trenches may be found in future surveys.

As the ship approached Vancouver, the only serious setback of the voyage occurred due to fatigue in a cover plate of one of the main engines. Repairs to engines reduced the time available for the geophysics program off the coast of British Columbia from six to four weeks. Despite the delay, the *Hudson* with the CNAV *Endeavour* carried out most of the planned two-ship geo-physical survey over the continental shelf and slope between Vancouver Island and the Queen Charlottes. The object of the survey, comprised of gravimetry, magnetometry, bathymetry, seismic profiling, heat flow measurements and coring, was to study Continental Drift; the results support the hypothesis that the ocean floor is drifting away from the mainland. In the Explorer Trench a record high heat flow, measured in cooperation with the University of Washington, showed the trench to be an active zone of rifting, explaining some of the earthquake activity on the west coast.

On August 13 the *Hudson* left Victoria to work in the Beaufort Sea, travel through the Northwest Passage to Baffin Bay, and return to Halifax. Four weeks were spent in the Beaufort Sea as part of a two-ship program of geology and hydrography with the Bedford Institute's other major ship, the CSS *Baffin,* which had come west through the Panama Canal and gone into the Beaufort Sea two weeks earlier. The team of geologists and geophysicists on the *Hudson* obtained an extensive sampling of the sediments on the Beaufort Sea shelf, together with reflection profiles and gravity measurements. The discovery of extensive bands of coarse sands 30 to 60 metres below sea level, probably representing relic beaches, and of sediment-filled depressions in the earth's crust will contribute greatly to an understanding of the geological history of the Canadian Arctic. Samples of foraminifera and plankton obtained in the water masses of the Beaufort Sea, and through the Prince of Wales Strait into Baffin Bay form the most comprehensive single collection through the archipelago. A major part of the collection will be retained at the National Museum, Ottawa, as the basis of a description of specimen types and as a national reference. The foraminifera collection is of considerable interest because from it, together with information from cores, much can be learned about the past history of the Arctic Ocean.

The Northwest Passage was traversed between September 22 and September 30. Transcending the rounding of Cape Horn, this was the most exciting part of the voyage, particularly as it had been left so late in the season with the risk of being caught in the ice for the winter. The passage was made through the Prince of Wales Strait, with the *Hudson* and the *Baffin* proceeding independently to its northern end where they were met by the ice-breaker, the *John A. MacDonald.* The three ships sailed in convoy through heavy ice in Viscount Melville Sound to Resolute where a jubilant party celebrated the west-to-east journey and the virtual success of the rounding of the Americas.

It seemed a fitting end that the final major experiment of the voyage, to determine whether the crust beneath Baffin Bay was continental or oceanic, should be successful. The United States Coastguard Cutter, the *Edisto,* with a party from the Bedford Institute aboard, joined the *Hudson* in Baffin Bay to act as shot-ship for a seismic refraction profile of the crust beneath the Bay. This was one of the few experiments where an analysis could be completed quickly on board. The profile proved conclusively that Baffin Bay has an oceanic structure and settled one of the important questions about the geology of the eastern Arctic. From Baffin Bay, the *Hudson* sailed for Halifax arriving home on the 16th of October, 1970.

By any measure, this expedition was a success. The *Hudson* sailed 55,000 miles, carried 122 scientific staff during the course of her voyage, and generated an impressive statistic of samples and observations. All of the scientific program was completed and most of the scientists collected many more samples than they had set out to obtain. Much of the credit goes to the crew of the ship, to Captain D. Butler, who completed the circumnavigation, and to Captain F. Mauger, who was captain during the west coast survey. HUDSON 70 was a collaborative venture and its success was due in large part to the efforts and cooperation of the Chief Scientists each of whom organized their own part of the program. They are listed below:

C.R. Mann	Halifax to Punta Arenas
G.L. Pickard	Punta Arenas to Valparaiso
R.C. Melanson	Valparaiso to Tahiti
W.M. Cameron	Tahiti to Vancouver
C.D. Maunsell	West Coast Survey
B.R. Pelletier	Vancouver to Resolute
D.I. Ross	Resolute to Halifax

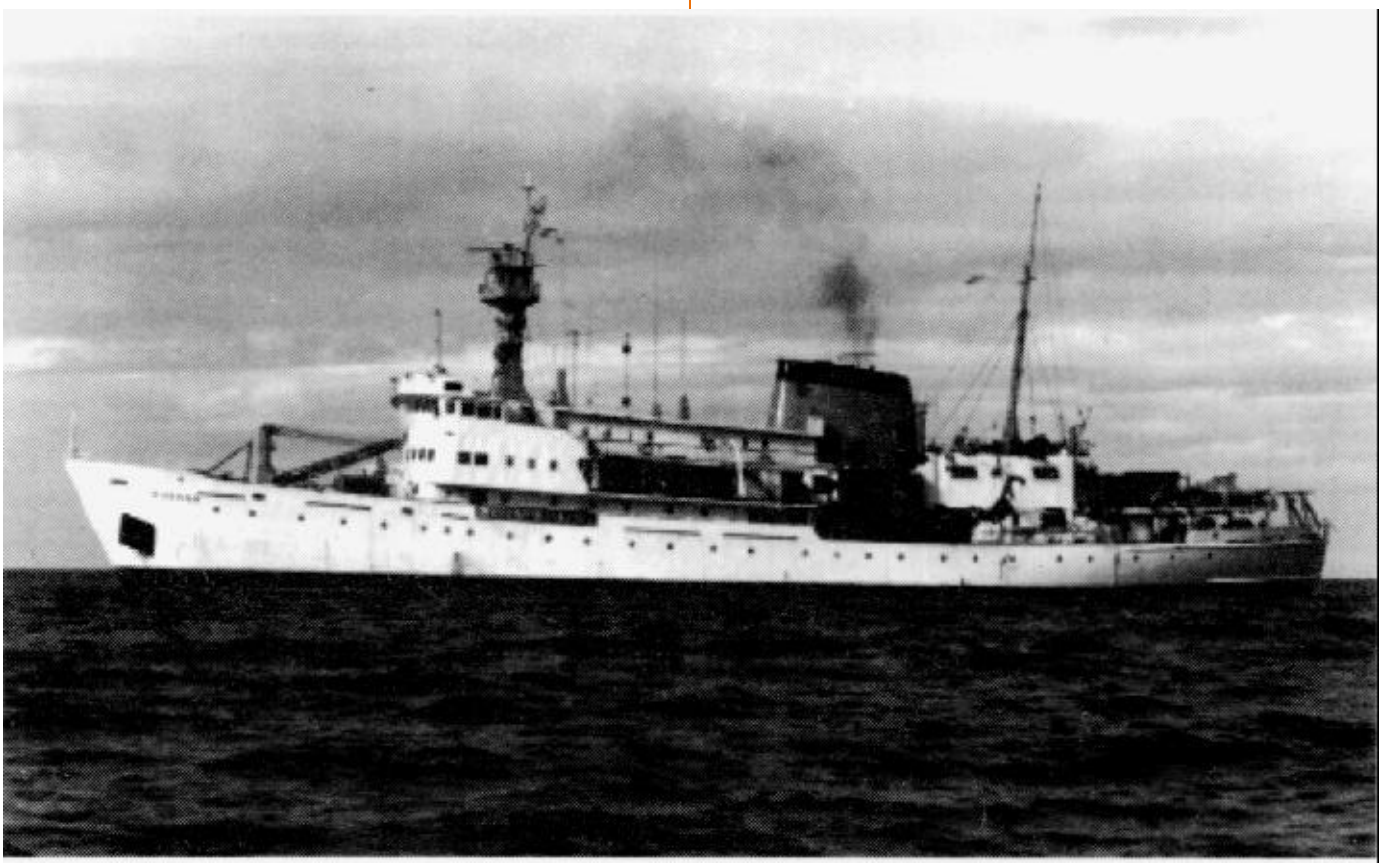
(Reprinted from the Bedford Institute Biennial Review, 1969-70, p. 3-9)

C.S.S. *HUDSON* is a diesel-electric-driven ship designed and used for multi-disciplinary marine science research. The ship is owned by DFO and is operated by the department's Scotia-Fundy Region. The Atlantic Geoscience Centre of the Department of Energy, Mines, and Resources is a major user of this vessel.

Hull . . . . . .Lloyds Ice Class I
Built 1962
Length . . . . . .90.4 m
Breadth . . . . . 15.2 m
Draft . . . . . 6.3 m
Freeboard to working deck . . 3.2 m
Displacement . .. . 4,847 tonnes
Gross tonnage . . . . . 3,721 tonnes
Full speed . . . . . 17 knots
Service speed . . . . . 13 knots
Endurance . . . . . 80 days
Range at service speed . . 23,000 naut. mi.
Complement . . . . . 31 scientific staff

Twin screws
Bow thruster for holding position
Computer system
Heliport and hangar
205 m^2 of laboratory space

(From 1990-91 BIO Annual Report p. 138; the photo of CSS Hudson below is from the same source)



From the President

Let me take this opportunity in my first message in the ***VoicePipe*** for 2020 to wish all members of the BIO Oceans Association and readers of this newsletter a happy and prosperous New Year. This New Year has several occasions for celebration and commemoration.

Fifty years ago, CSS *Hudson* was on its momentous scientific voyage circumnavigating the Americas. The *Hudson* left BIO in November 2019 and was in Rio de Janeiro, Brazil just before Christmas in 1969. One of the products that has resulted from Don Gordon's work on the BIO Photolab archives is a power point presentation he authored of the Hudson 70 voyage. With Kelly Bentham's help it will soon be displayed on one of the video screens at BIO for all to see. Don will also be making a presentation at BIO in the near future. One of the points not as well remembered is that the CSS *Baffin* circumnavigated North America via the Panama Canal in 1970 and joined the *Hudson* for their seismic surveys off of British Columbia and their transit through the Northwest Passage. *Hudson* and *Baffin* returned to BIO in October 1970. The OA has planned a joint lecture on Hudson 70 with the Nova Scotia Institute of Science to mark the end of the voyage in October. Other events are being considered over the year, watch for announcements.

In CSS / HMCS *Acadia* news, Don Gordon, Kelly Bentham and I met with Roger Marsters and Amber Laurie, curation staff from the Maritime Museum of the Atlantic, and David Rollinson from Industrial Heritage Nova Scotia to review the Photolab collection for photographs of the *Acadia*. The MMA staff plan to return to review the collection in more detail with the idea of adding copies of some of the photographs to their collection. As well, we understand that repair work is continuing on the *Acadia* below decks.

Twenty years ago under Dale Buckley's leadership, the OA initiated the presentation of the Beluga Award. The OA Executive has asked the Beluga Award committee to include a celebration of this achievement in their plans for the Beluga Award ceremony for 2020. In other Beluga news, Randy King has taken the helm as chair of the Beluga Award Committee replacing Melanie MacLean. Randy has been contributing to the OA activities by leading our efforts on the equipment archives with Philip Spencer and David McKeown. Beluga Award nominations are open now. Please take some time to consider who you think is contributing to the work and community of BIO in an exceptional way and bring forward their name to the Beluga Award Committee.

Boat harbor at Santa Cruz, Ecuador. Photo - Jim Ross

International Development and BIO Alumni (Jim Ross)

The Canadian Executive Service Organization (CESO) is an international economic development organization with 50 years working in Canada and around the world. CESO believes that developing a strong economic infrastructure lies at the heart of sustainable change and inclusive growth, including the eradication of poverty. CESO's Volunteer Advisors (VAs) are senior-level professionals from the private and public sector with an average of 25 years professional experience. VAs help catalyze local economic growth by transferring their skills and knowledge to our partners and clients.

I have been a VA with CESO for about 19 years and have completed 13 assignments overseas. My most recent assignments took me to Ecuador, where I spent a month in the Galapagos Islands working on a project with the municipal government and a fishing co-op. Following on that, I undertook an assignment with the Ministry of Production, Foreign Trade, Investments and Fisheries to carry out a needs assessment of the Vice Ministry of Aquaculture and Fisheries. The assignment was to determine the best practices to strengthen the institutional capabilities of the Vice Ministry as they related to artisanal fisheries, aquaculture, and commercial fisheries.

This project identified several areas where assistance would be of value to strengthen specific capabilities of the Vice Ministry. To date, several short-term assignments have been identified where the Ministry requires the assistance of specialist VAs who understand the best practices and strategies applied to the control of fishing resources. This would require advisors who understand the technological tools that would allow the Ministry to better manage the technical information generated by the various fishing activities carried out in the

territory. Additionally, advisors would need expertise in fisheries issues with a focus on the industrial sector, specifically the practices related to the processing of fishery products. They would be required to contribute to the preparation of an appropriate roadmap for the promotion of mariculture (Pacific oyster culture) in Ecuador, and to impart theoretical and practical training in the analysis of biotoxins in fish and antibiotics used in the aquaculture industry with the aim of expanding and improving the knowledge base of technical personnel in the Ministry.

Processing swordfish for international markets.

It is likely that there will be more assignments with the Aquaculture and Fishing Vice Ministry in the future. In my experience, working with CESO is a unique and rewarding experience. If any Oceans Association members are interested in further discussing any of these assignments, or other opportunities with CESO, you may contact me through the Newsletter Editor.

It was not all work, Stahl Suarez Castellanso (International Cooperation Officer) and Jim Ross.

Beluga Award 2020

This year marks the 20th anniversary for the Beluga Award. As you know, this annual award recognizes employees who have exhibited unselfish dedication to community spirit at the Bedford Institute of Oceanography (BIO). The Award recognizes individuals in any professional or technical field, craft or skill who have made exceptional contributions to the success of BIO projects, initiatives or programs. These contributions should exemplify unselfish effort that encourages cooperation and fosters the team-work approach of BIO. All present and past employees who work or have worked at BIO in any field or specialization are eligible. It is intended that this Award should recognize all professions including ship's crew, administrative personnel, technicians and scientists.

Randy King, the new chair of the Beluga Award committee, is looking for nominations for this year's award. At the Award ceremony this year, we hope to have an anniversary celebration to honour the first twenty years of the Beluga Award. The past winners are:

2019 Ruth Jackson
2018 Andrew Cogswell
2017 Kate Jarrett
2016 Glen Morton
2015 Barry MacDonald
2014 Claudia Currie
2013 Robert Murphy
2012 Don Gordon
2011 Brian Beanlands
2010 Sherry Niven
2009 Bruce Anderson
2008 Borden Chapman
2007 Murray Scotney
2006 Joe Bray
2005 Jacqueline Dale
2004 Dave McKeown
2003 Art Cosgrove
2002 Peter Vass
2001 Roger Belanger

RMS Titanic and Science: The Titanic Society of Atlantic Canada (Steve Blasco)

Views of Captain Smith's day cabin from the starboard boat deck. Taken before RMS Titanic sailed, 1912. Captain Smith and Chief Purser McElroy both perished.

Interest in the wreck of the *RMS Titanic* goes beyond the history of the ill-fated voyage, fate of passengers and crew, Edwardian archaeology and published literature (over 1,000 books to date). Surprisingly, deep sea oceanography, marine biology, seabed geology, marine chemistry and metal deterioration have also captured the attention of both the science and public communities. The executive board of Titanic Society of Atlantic Canada (TSAC) has members whose expertise covers the former cultural interests. Steve Blasco was asked to be the science research advisor on the board. Steve assumed the role would be minor and of peripheral interest to *Titanic* buffs. How wrong can one be …

Science queries started the moment Steve joined the TSAC board. Barrie Clarke, an emeritus petrologist at Dalhousie University spent 15 years resolving the whereabouts of the source rock for the majority of the 150 gravestones at the 3 Halifax cemeteries. Commonly called 'black granite', Barrie determined the rock type used to carve the gravestones was a 421 million year old gabbro mined from a small abandoned quarry near St. Stephen, New Brunswick. First off the science block, was to launch a very successful TSAC sponsored geological field trip to explore the now overgrown quarry.

Presentations and commentaries at various TSAC sponsored events (such as the 107th Commemoration of the tragedy) provided opportunities to profile the scientific discoveries made by BIO and other Canadian scientists. These included double the number of benthic fauna species predicted for the site; very mobile seabed sediments unexpectedly found at 3,800 m water depth; the discovery that the wreck was imbedded in an ancient submarine landslide scar in Titanic Canyon; and a new species of iron metabolizing bacteria. Ken KarisAllen, a materials expert with National Defence Canada, made an amazing discovery -*Titanic'*s hull plating was forged out of brittle steel. As recently as August, 2019, the National Geographic Society recognized the brittle steel as a Canadian discovery.

Titanic Channel video-taped interviews with TSAC members, some focused on Canadian scientific investigations at the wreck site. The videos have become popular with website browsers. NRCan has also posted video clip interviews on the department's 'Simply Science' website.

Almost the same perspective image of Smith's day cabin was taken by submersible mounted IMAX camera in 1991. The changes are significant, from rusticle growth to the consumption of wood deck planking by Teredo worms.

At TSAC meetings, an ongoing feature is the update on the status of Romandisea *Titanic,* a theme-park full-size replica of *Titanic* under construction in China by Wuchang Shipbuilding Industry Group Co Limited. In addition, *Titanic ll* is also under construction in China by the Blue Star Line. For those interested, this operational replica is due to sail in 2022. If not superstitious,

you too can book passage for the 'second' maiden voyage from Southampton to New York. State-of-the-art navigation, welded (not riveted) hull plating and lifeboats for all should reduce the risk of a second tragedy (hopefully).

Also on TSAC's science agenda, in August, 2019, OceanGate Inc. completed a dive to the wreck site at 3,800 meters using the company's new *Titan* high-tech, carbon-fibre/titanium, 5 person submersible to test a new digital 3D video system. Submersible dives to the wreck site will start in 2021 and continue annually for several years. From a scientific perspective, the submersible will collect 4D video data over time to document the rate of deterioration of the wreck. Legacy BIO biological, geological and chemical data will contribute to temporal research on processes active in the deep North Atlantic (see figures). For only $158,000 CAD you too can go to sea and participate in a dive to *Titanic.*

In April 2018, TSAC launched a new, well-received colour brochure on *Titanic* and its Halifax connections. BIO science is highlighted in the brochure. Ongoing public interest in the BIO *Titanic* science exhibit has resulted in the Oceans Association, in collaboration with TSAC, proposing an update to the exhibit to highlight BIO scientific discoveries.

To keep abreast of cultural and scientific developments, join TSAC. General meetings are held Sunday afternoon, trimonthly at the Maritime Museum of the Atlantic. For more information and meeting dates contact: titanicsociety@eastlink.ca) or the MMA website events calendar.

Just what will be seen in 2021- intact, corroded by rusticles, collapsed?

2019 A. G. Huntsman Award – Dr. Adina Paytan

Dr. Adina Paytan receives the 2019 A. G. Huntsman Award from the Honourable Arthur J. LeBlanc, Lieutenant Governor of Nova Scotia. (DFO photo, Kelly Bentham)

The 2019 A.G. Huntsman Award was presented to Adina Paytan in recognition of her discoveries in the paleoceanographic history of important elements used to recreate the geochemical history of the planet and of outstanding contributions to understanding the biogeochemical links between global earth-ocean-atmosphere nutrient controls on carbon productivity and paleoclimate.

Adina Paytan is a Research Scientist at the University of California Santa Cruz. She studied Biology and Geology at the Hebrew University in Jerusalem, and also Science Education at the Weizmann Institute of Science in Rehovot. Later, she obtained a Masters degree in oceanography at the Hebrew University, followed by a PhD degree and postdoctoral fellowship at the Scripps Institute of Oceanography in San Diego.

Dr. Paytan's research interests lie in the fields of biogeochemistry, chemical oceanography, and paleoceanography. An overarching goal of her research is to understand the processes and feedbacks operating

in the Earth System and how they relate to global changes in climate and tectonics. In addition, Dr. Paytan is interested in natural and anthropogenically-induced perturbations that affect biogeochemical processes and their impact on humans and the environment.

The A. G. Huntsman Award was established in 1980 by the Canadian marine science community to recognize excellence of research and outstanding contributions to marine sciences. It is presented by the Royal Society of Canada. The award honours marine scientists of any nationality who have had and continue to have a significant influence on the course of marine scientific thought. The Award is named in honour of Archibald Gowanlock Huntsman (1883– 1973), a pioneer Canadian oceanographer and fishery biologist.

The A.G. Huntsman Award was established through initial principal contributions from Fisheries and Oceans Canada, Natural Resources Canada, the Province of Nova Scotia, and the Canadian Association of Petroleum Producers. Additional endowment was later granted from the LiFT Family Fund through Gift Funds Canada. The Lieutenant Governor of Nova Scotia is Honorary Patron of the A.G. Huntsman Award.

Dr. Patel and Lt.-Gov. LeBlanc with Professor Vijaya Raghavan, President of the Academy of Science, Royal Society of Canada. (DFO photo, Kelly Bentham)

Article courtesy of the A. G. Huntsman Foundation website (http://www.huntsmanaward.org/index.htm)

A Wonderful Visit To Haida Gwaii (Don Gordon)

This past September my wife Joleen and I made a wonderful trip to Haida Gwaii. The week before, we kept an anxious eye on Dorian as it worked its way up the eastern seaboard. We were relieved to be on the last flight out of Halifax just before the airport was shut down.

Lying off the coast of northern British Columbia, Haida Gwaii is the heartland of the Haida First Nation. It is separated from the mainland by the Hecate Strait and Alaska by the Dixon Entrance. It used to be known as the Queen Charlotte Islands but was renamed in 2010 as part of a BC provincial bill containing a reconciliation protocol to engage the Haida in joint decision-making. Haida Gwaii translates as 'Islands of the People'. It consists of more than 400 islands, the main ones being Graham Island at the north end and Moresby Island at the south end. At the time of colonial contact, the population was roughly 30,000 but during the 1800s approximately ninety percent died from smallpox so that by 1900 only 350 remained. Today the population is about 4,500, all on Graham Island, of which approxi-

mately 45% are Haida. The major industries are logging, fishing and tourism. The two major communities and commercial centres are Masset and Queen Charlotte while most Haida now live in the old villages of Skidegate and Old Massett.

Haida Gwaii is served by 2-hour turboprop flights from Vancouver to either Masset or Sandspit. There also is regular ferry service from Prince Rupert. Rental cars are available at several locations. There is only one highway on the island that runs north and south about 120 km from Masset to Queen Charlotte. Visitors can be accommodated in numerous lodges and housekeeping cottages. Several campgrounds are also available. Numerous cafes, restaurants and food stores are scattered about the island to nourish body and soul. Sadly, however, there are no Tim Horton's.

We enjoyed visiting the numerous museums, galleries and craft shops throughout Graham Island using our rental car. Most impressive was the Haida Gwaii Museum just outside Skidegate. It is housed in series of reconstructed longhouses with poles along the beach.

Haida Gwaii Museum (D. Gordon photo)

One of these is an open shed containing several Haida canoes. Another, not open to the public, contains the canoe that the noted Haida artist Bill Reid carved for Expo 86 and later paddled up the Seine in 1989. It also contains the memorial pole he carved for the village of Skidegate in 1976. The building of both these artefacts helped rekindle the interest of the Haida in their unique heritage. The Museum also has an extensive collection of artefacts depicting all aspects of Haida history and culture.

Just outside Port Clements, we visited the site of the 'golden spruce' on the Yakoun River. This 300-year-old Sitka spruce, covered with luminous gold needles, was sacred to the Haida but cut down in 1997 as an act of protest against over-logging. This incident has been described in *The Golden Spruce* by John Vaillant (2005) which is an excellent read. A seedling grafted from the original tree is now growing inside a high metal protective fence in Port Clements and seems to be doing well.

We also enjoyed the numerous hiking trails throughout the island. Many of these go through lovely old growth forest while others skirt the shoreline. One of particular note is the Spirit Lake Trail inland of Skidegate. This is a 4 km round trip hike along well-maintained trails which circle a pair of lakes with picnic tables along the way. Another fine hike was the Tow Hill trail near the northeast tip of the island. This 2 km hike affords fine views toward Rose Spit to the east and Masset in the west.

Without a doubt the highlight of our trip was our visit to Gwaii Haanas, the remote southern half of Haida Gwaii. Gwaii Haanas translates as 'Islands of Beauty' and is an international treasure. It includes a National Park Reserve, a National Marine Conservation Area and the Haida Heritage Site. For more than 12,500 years, the lives of the Haida have been interwoven with this remarkable environment. Their communities thrived on the abundance of the sea, sky and land that provided resources as well as cultural and spiritual sustenance. Haida knowledge of their homeland is intimate and rich with the teachings of generations. Because of this deep connection to the environment, the Haida joined the effort to stop logging. In 1985, the standoff on Lyell Island with the logging industry brought the conflict to a head and drew international attention. This led to the unique situation where the Council of the Haida Nation and the Government of Canada negotiated an agreement

Tour boat to Gwaii Haanas (D. Gordon photo)

to protect Gwaii Haanas as a place of international value. As part of this agreement, Gwaii Haanas is coopera-

tively managed by the Archipelago Management Board which is made up of representatives from the Council of the Haida Nation and the Government of Canada. It is unique in that it is one of the few areas in the world that is protected and managed from the seafloor to mountain peaks.

Numerous companies run excursions out of Queen Charlotte to explore Gwaii Haanas. Some are multiday trips while others are for one day. We elected to take a day trip with Haida Style, a small operation run by two Haida brothers. Our vessel was a 32-foot aluminum hull landing barge with cabin and head powered by two 250 hp outboards that cruised at over 20 knots. A bow ramp provided easy access ashore when the boat was beached. The crew of three were all knowledgeable locals and most accommodating. It turned out that the Haida guide was also a basket maker and my wife Joleen discovered that she had met her grandmother at a conference some years ago.

Scheduled stops for the day were Skedans, Hotspring Island and Windy Bay. Time and distance did not allow us to visit Anthony Island (also a UNESCO World Heritage site) and Tanu, the two other Haida heritage sites. During the summer, these five sites are occupied by resident Haida watchmen to protect the natural and cultural heritage of the abandoned village sites, provide information to visitors and assist in cases of emergencies.

Skedans, Louise Island (D. Gordon photo)

It was about a 2.5 hour ride to Skedans, on the east side of Louise Island. At its height, the village had between 25 to 30 longhouses and about 50 poles. We went ashore to see the remaining poles that were in various stages of decay as well as the foundations of the longhouses. After enjoying coffee and muffins on the beach, we proceeded further south to Hotspring Island. Here we walked across the island on a shell-lined trail through old growth forest to three hot springs where we enjoyed a relaxing soak while the crew prepared a delicious lunch featuring grilled local venison and salmon. Once back on board our vessel, we began the return trip. It took us about an hour to reach Windy Bay on the east side of Lyell Island. This site is symbolic to Gwaii Haanas National Park Reserve because it was here in 1985 that the Haida took their determined and successful stand against clear-cut logging practices on Moresby Island. This event resulted in the creation of Gwaii Haanas and the erection of a legacy pole that had been recently restored. We were also taken on a hike through more old growth forest to see a thousand year old Sitka spruce tree.

Legacy Pole, Lyell Island (D.Gordon photo)

It was a wonderful and full day on the water with our three excursions ashore. Total distance traveled was about 200 km round trip. Along the way we saw abundant wildlife including seals, Steller sea lions, humpback whales and numerous seabirds. Back on the dock in Queen Charlotte, I had an interesting chat with one of the co-owners of Haida Style who had come down to greet us. He is involved with the governance of Haida Gwaii and was particularly interested in environmental issues. I told about my scientific background and later sent him the articles on oil spills and tidal power in *Voyage of Discovery* for which he was most appreciative.

This wonderful adventure was certainly the trip of a lifetime. We were most fortunate to meet so many wonderful people in the Haida community and were impressed by their warmth, openness and pride in their heritage and language. We highly recommend a visit if you have not already done so. It is special spot in Canada. If you do go, plan on spending at least a week to soak it all in.

Editor's Keyboard:

This edition runs the gamut from historical records of the Hudson 70 expedition to volunteer work being done by BIO alumni to accounts of travel by our members. We also have articles on our work with the Titanic Society and a call for nominations for the 2020 Beluga Award. All these articles show the breadth of the activities of our association and our members. I welcome submissions from other members so we can continue to highlight these activities.

The OA has discussed the importance of continuing to chronicle the scientific work conducted at BIO, especially through the production of a regular report of BIO activities. This edition of the *Voicepipe* demonstrates the utility of those reports by republishing an article from the 1969-70 Report. It is important at the time to publicize the Institute's activities so people can understand the importance of work being done at BIO, and maybe just as critically, it serves as a historical record of that work. We hope that BIO management will recognize the need to produce such reports.

ABOUT THE BIO-OCEANS ASSOCIATION

The Bedford Institute of Oceanography Oceans Association (BIO-OA) was established in 1998 to foster the continued fellowship of its members; to help preserve, in cooperation with the Institute's managers and staff, BIO's history and spirit; and to support efforts to increase public understanding of the oceans and ocean science. Membership is open to all those who share our objectives. Most current members are present or past employees of BIO or of the federal departments of Environment, Fisheries and Oceans, and Natural Resources (or their predecessors) located in the Halifax Regional Municipality. Membership is $10.00 per year, $40.00 for five years, or $150.00 for a lifetime membership.

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