# A little light on what's going on! Standard Back Standard

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# Navigating Canada's Northern waters

Former Admiral Nigel Greenwood realizes his dream of becoming an ice navigator Pages 18-24

Voyages into Mystical Territory

By Admiral (Ret'd) Nigel Greenwood, NAC-VI

# There is nothing quite so attractive as a voyage into

For me, a life-long passion for the Arctic was just a virtual passage through the ice-infested waters of naval history until after my retirement from the RCN in 2012. Since then, I have been able to indulge and advance this interest in more tangible ways that in some senses parallels the Navy's re-engagement in the Arctic. Coincident with my own polar apprenticeship, the RCN has become more serious about navigation in ice, a specialist expertise that has been, at best, notional in the Canadian Navy since the transfer of HMCS Labrador to the Canadian Coast Guard in 1957. The imminent launch of HMCS Harry Dewolf, the first of the RCN's class of Arctic Offshore Patrol ships, concurrent with climate-change-driven surge of interest in the Northwest Passage and the recent adoption of the International Maritime Organization's (IMO) Polar Code, mean that the previous benchmarks of polar operations are shifting in significant ways.

the unknown. This is true whether this is a physical voyage or a virtual excursion into a domain of knowledge that promises intrigue, amazement and reward.

#### Imagination and Mystery

Since the days of Pytheas the Greek (325 BC), man has been lured north by the Pole star and Great Bear constellation as well as fantastic tales of frozen seas and real great (white) bears. The attractions of unusually toothed and tusked and horned sea life was matched with rumours of a quick route to Oriental riches to portray a domain of equally unimaginable challenges and rewards. In a real way, this incentive still holds as the appetite for Arctic oil and gas waxes and wanes.

The additional romance of mystery is another attraction. The recurrent scandals of false gold (Frobisher), the tabooed horrors of cannibalism (Franklin), the eerie reappearance of abandoned ships (HMS Resolute), improbable meetings of lost individuals (Nansen) and contested reports of glorious achievement (Cook and Peary) exert a powerful impact on the imagination. When these are coupled with fears of cold, darkness and loneliness, Robert Service's "strange things done in the midnight sun..." only scratches the surface of the oddly driven characters that have sought fame and fortune in the north.

The mystery of white space on the map also enticed explorers, scientists and prospectors to venture into the north in pursuit of understanding. Up until the mid 1950s with the completion of aerial surveys by the RCAF, this was seen as overwhelmingly geographic-the fillingin of the chart-but even in the 1800s this was a simplification. Franklin's last mission was as much about examining terrestrial magnetism as it was about tracing that last bit of Arctic coastline that he had not already walked himself. In the late 1800s, this effort continued with scientific expeditions that laid the groundwork of what we understand today of oceanic circulation, and the geology of the Arctic Archipelago, as well as the biology and anthropology of the Arctic. This scientific effort continues today with scientific investigation that extends from the heights of the atmosphere to the underlying strata of submarine geology, seeking to satisfy the increasing demand for data in support of modern Arctic "claims", whether they be jurisdictional, economic, political or polemical.

Increasingly, there is another class of northern quester. These are the adventurers and tourists who aim to go "where many have gone before"-and died doing so—but to do so in novel ways that establish their own tenuous "ne plus ultra." In recent years we have seen NWP transits by kayaks (at least traditional and culturally appropriate), Hobie-cats, fast rigidhull inflatable boats, assorted yachts, and even paddle-board. The yachts-some shockingly unprepared-were the largest component of through-traffic (i.e. non-destination, ocean-to-ocean transits) in 2017. The celebrations of accomplishment by some of these epic adventurers do not always mention the assistance provided by coast guards (up to and including actual deck-passage for small craft).

## A Long Way Round to Four Arctic Voyages

I must admit to a degree of similar ambition. In my early career as a naval navigator, the polar regions always represented the epitome of the navigator's art—the greatest difficulty, most severe consequences and almost unlimited opportunity—and were thus undeniably attractive. Despite various attempts during my years of naval service, the closest I got was in 1982, painting the bullnose of *Annapolis* blue in the relatively warm waters of a NATO exercise north of Norway.

A better opportunity showed itself in 2013 after my retirement from the RCN. Against the popular wisdom that it is unwise for admirals to get too close to the actual practice of navigation, I mustered myself up for the Ice Navigation course at the Marine Institute of Memorial University. With a recently-refreshed certificate as Master Mariner in my pocket—obtained in 1996 during a rush of enthusiasm for my first desk job at NDHQ!—I had visions of immediate employability as an ice-navigator. Parttime employment as a mentor in the RCN's navigation simulator complex at Venture, the RCN's school for naval officers, supplemented this experience with exposure to modern radars and ECDIS. Then nothing happened...until 2015.

Out of the blue, I got a call to go at short notice to Cambridge Bay to relieve an ice-navigator on a super-yacht. The incumbent was required to return to his day-job as a harbour pilot on England's south coast. As the ship was westbound, the most difficult part of the passage (and ice) had already been negotiated. On five days notice I flew to the central Arctic to join a 2014 Dutch-built private ship of 90m LOA, about 3,000 tons displacement and acres of glass, chrome and marble.

This is truly the way to go to sea! Upon departure of the owner and guests in Cambridge Bay, the ship was left with 26 crew and one ice-navigator (me). At 57, I was the oldest person onboard by at least 10 years, followed by the Chief Engineer (about 45) and then the Master (about 35), with the remainder of the mixed crew averaging about 28 years old. The ship was fitted with two 40-foot launches, two rescue boats, four jet-skis and a helicopter pad. It had all the most modern navigational gear, full internet connectivity, a gym and a spa. Fortunately, the two chefs remained onboard to add privileged quality to the pampered existence. I resided in splendor in the vacant and palatial guest accommodations. And we saw no ice, so I was celebrated as a particularly effective ice-navigator.

The next year, with intelligence that a recently retired CCG captain and former Sea-Cadet chum from Powell River was about to land a job as ice-navigator for a two-way transit of the NWP, I volunteered to understudy him as ice navigator onboard the RRS Ernest Shackleton (ES), scheduled to provide logistic support and ice-capable escort to the MV Crystal Serenity (CY).

Built in 1996 for the North Sea oil and gas industry, the ES is relatively small at 80m length overall (LOA) and about 5,000 tons displacement. She has been on long term charter to the British Antarctic *Continued on page 22*  Survey (BAS) and is used primarily for resupply of BAS research stations out of her "home port" in Stanley, Falkland Is. Off-season, she refits in Denmark and is available for charter, hence her engagement for Crystal Serenity's landmark voyage as the largest cruise ship (68,000 GT) to attempt the NWP.

Captain Marc Rothwell (ex-CCGC Louis St-Laurent) and I joined ES on Aug. 7 in St. John's where the ship was embarking expedition stores. Not only would ES provide assistance and contingency support to CY, but also carry about half the contingent of guides, naturalists, divers, and photographers that would provide expedition support to CY. This totaled about 30 extra people in ES, including the boat-drivers/ guides for the 15 RHIBs (from 8 to 40 passenger) and 12 kayaks. All of this gear was set-to-work, tested and run-in as the ship made its way through the NWP (via Bellot Strait) to Ulukhaktok (Holman) on the west side of Victoria Island to meet CY.

This being accomplished on Aug. 27, ES accomplished a record movement of more than 900 people off and back to CY for shore excursions, boat rides, kayak trips and helicopter flights in a routine that would set the pattern for five stops in the Canadian Arctic. Three of these occasions included interaction with local people in Ulukhaktok, Cambridge Bay and Pond Inlet, visits that had been carefully planned with local authorities. Finally, having transited Baffin Bay for a couple visits in Greenland, ES took leave of CY to return to Newfoundland for off-load of expedition gear on Sept. 14.

While much of the ES's passage was in ice-free (no ice in sight) or open water (less than 1/10 ice coverage), the trip proved a perfect apprenticeship to ice-navigation. Not only was I able to understudy an officer (and friend) of substantial polar experience, but the master, Captain John Harper, was able to demonstrate the ship's capabilities in the ice remaining off the east coast of Baffin Island as we made our way north.

While relatively low in ice-classification due to her power, the ES has a

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strong hull and was able at a run to break through almost two metres of thick firstyear ice. In addition, the ship carried the latest version of Ice-Nav, a Canadian computer system for over-laying ship's position and radar picture on current ice-charts provided by the Canadian Ice Service. These assisted significantly with the tactical avoidance of ice, even though the year proved to be a particularly light ice year in the critical sections of Victoria Strait where Franklin was lost.

While actual ice experience in ES was particularly light for the distance and time traversed, it was enough to whet my appetite for the following summer. In 2017, the opportunity was guaranteed to satisfy: my good friend and mentor in ice-navigation, Captain Duke Snider-well-known to members of NAC Vancouver Island as the head of Martech Polar Consulting and President of the Nautical Institute-offered me the chance to back him up as Assistant Ice Navigator for a transit of the Finnish multi-role support vessel (MSV) Nordica from Vancouver to Nuuk, Greenland. This passage—to relocate the ship from Pacific to Atlantic and to jointly celebrate Finland 100/Canada 150-was offered as an Arctic experience to an eclectic selection of academics, journalists, coast guard observers and wildlife specialists, resulting in an extended series of pre-dinner lectures to exchange ideas. And we saw lots of ice, so the icenavigators were happy!

Captain Snider had sailed with Nordica and her sister ship Fennica the previous year, in which they had set a record for the latest season transit of the NWP. These ships were built for Baltic ice escort and winter waterway clearance, but are also configured for utility in the oil and gas industry off-season. Accordingly, they have a relatively high ice-class, good power and superb manoeuvrability with twin azimuthing thrusters aft and multiple athwart-ship thrusters. They are fitted with advanced technology and controls for conducting underwater work while maintaining station with dynamic positioning. They have as permanent crew some of the most experienced ice navigators anywhere as well as excellent cooks!

For the second year, Nordica found herself in the Pacific with the NWP being the quickest route home, this time early in the season. In fact, it turned out to be the earliest NWP transit on record, with Nordica passing Point Barrow on July 16 and arriving at Nuuk on July 29. Victoria Strait and Larsen Sound, and indeed up through Franklin Strait to Peel Sound, all provided ample examples of differing ice regimes to demonstrate the capabilities and limitations of this icebreaker. For me, it was a master-class in ship manoeuvring in ice, but also, and very importantly, the skills and pitfalls of distinguishing first-year (relatively passable) from multi-year (harder, more dangerous) ice.

I arrived home on Aug. 5, thrilled with this significant improvement in my knowledge and understanding of ice navigation, and enough time with training and previous deployments to be recognized by Transport Canada in their list of qualified ice-navigators. I soon got a call offering a return trip through the NWP, this time as the principal ice-navigator. The task was to provide local knowledge, ice advice and assist with interface with MCTS (coast guard radio and traffic services) as well as Transport Canada for the transit of the Chinese research ship Xue Long from Nuuk, Greenland, to Nome, Alaska. By Aug. 25 I was on my way back to Nuuk.



Xue Long is a large ship, of 21,000 tons displacement (about the same as our last class of AOR), 167m LOA, built in 1993 in the Ukraine. She has been busy in Chinese service for many years servicing their Antarctic research stations. This past summer, Xue Long undertook a circumpolar voyage of scientific inquiry for the Polar Research Institute of China.

With a crew of 96 mariners and scientists, Xue Long left her home port of Shanghai in July and proceeded through the Bering Strait for an east-west transit across the top of Russia, into the Atlantic and through the NWP.

While Xue Long has completed more than 30 voyages to Antarctica, this was only its eighth Arctic voyage and its first to transit the NWP. I boarded in Nuuk, Greenland, joining two Canadian hydrographers and one Department of Fisheries and Oceans (DFO) representative embarked earlier from a CCG vessel in Davis Strait. From here, our track took us up the east coast of Baffin Island, conducting bathymetric and oceanographic surveys while mostly skirting the ice edge. After this, the ship's track wound through Lancaster Sound to Peel Sound and then through the most common, southerly NWP route to the Beaufort Sea. After a couple weeks conducting science in the Beaufort and Chukchi Seas, I was landed in Nome, Alaska, concluding my busiest summer at sea since I was a Lieutenant Commander!

#### Sovereignty and Commercial Viability

For those who ponder the intent of this voyage and perceive a challenge

to Canada's jurisdiction in the NWP, I should point out that Xue Long complied with every requirement of Canadian regulations during the transit. The presence of the Canadian hydrographers and DFO representative provided the authority for the science work in Canadian waters, and my expertise as an icenavigator was employed to ensure that all reporting in accordance with CCG and Transport Canada requirements was done properly.

The close attention of Canadian government agencies was well noted by the crew as Xue Long was hailed by government ships and aircraft at least every day of the voyage, even if some of this provoked some mirth as when we were ordered to heave-to by "Warship *Continued on page 24*  *Edmonton*" off Cambridge Bay—"where is the cannon?" the master asked me.

My own naval background was known and acknowledged by my hosts, but not probed in any searching way beyond a few skill-testing questions on navigational practices. Demonstration of my recently refreshed skills at applying parallel indexes, as well as calculating iceberg heights by vertical sextant angles, seemed to put them at ease that my presence was not more sinister.

The passage of Xue Long proved the navigability of the NWP to the Chinese in a way that they had not previously experienced, while providing the opportunity for a "flag-waving" circumpolar voyage. But it also proved the limitations.

Their expectation of a straightthrough transit of Barrow and McLure Straits was immediately discouraged as being beyond the ice-capability of the ship. The passage of Franklin and Victoria Straits, which at a date two weeks earlier the previous year had been almost ice-free, required careful navigation at 5-8 knots to avoid elements of hard, old ice in 5-7/10ths of decayed thick first-year ice (up to 2m thick). During Xue Long's transit of this area, the ice was the fourth heaviest in the last 10 years. This contrasted with the nearrecord lack of ice the previous year.

This unpredictability, along with careful examination of limiting depths in Cache Point Channel—at the west end of Coronation Gulf, west of Cambridge Bay—are enough to convince most mariners that an expeditious and economical passage is not guaranteed, and that a passage of any commercial ship of greater than 12m draft is to be attempted with extreme care.

The spectres of security and environmental risks are frequently raised as concerns, with the prospect of increased voyages in conditions of disappearing ice posing a threat to sovereignty. The reality is somewhat different.

The greatest number of transiting vessels in the NWP this past year were yachts, some spotted by us in Xue Long in seemingly incredible conditions of ice-constraints. Larger vessels, by contrast, have been seen to plan their voyages with the greatest attention to environmental, legal and insurance liabilities so as not to leave anything to chance. This is particularly true of destination voyages for eco-tourism or for resource extraction, as well as for the few commercial through-transits.

Several developments in the past few years have, in fact, contributed to a safer environment for navigation in the Arctic and particularly the NWP, and not just due to wishful thinking associated with "global warming" (i.e. climate change, not all of it warming).

The adoption of the IMO Polar Code has codified, at a global level, agreed standards of knowledge, training and preparation for operations in polar waters. The associated Polar Waters Advanced Training Certificate constitutes a basic recognition of preparation for polar voyages. Canada, for its part, maintains a higher standard for the award of the PWAC than is strictly required for compliance with the Polar Code, requiring both time in polar waters and time in ice.

Concurrent with this codification, the Nautical Institute's recently-introduced Ice-Navigator qualification scheme

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Canada is also contributing to the safety of polar navigation in the quality of its national ice forecasting and reporting service, as well as numerous home-grown efforts to quantify and manage navigational risks in ice. Additionally, the Pilotage Review that is underway may further address safety and sovereignty in the north through the imposition of navigational supervision by Canadian-certified officers.

### Call of the North...

There is a lot to attract attention in the north, notwithstanding resolution of the mystery of the final resting places of Franklin's ships and the decreasing novelty of access. This vast region is full of grand vistas, intriguing sights, and engaging people. For adventurers, scientists and eco-tourists, there are many personal discoveries to make. For commercial interests, there are intriguing opportunities for future resource extraction. And for everyone, there are indigenous societies and cultures to understand and respect.

The RCN is again approaching a domain of deep (corporate) cultural history. The manner in which it does this will not only inform its tactical activities in the north, but will develop a better appreciation of the broader aspects of this country's maritime power.

The imminent introduction of the RCN's first ice-capable ships in three generations will not relieve the CCG of any duties, but will add further government presence in the NWP. Much effort is going into preparing the first few officers to command and navigate the Harry DeWolf class ships. Such training and preparation will have to be sustainedand those officers maintained in this employ for some time—if the RCN is going to operate these ships safely and develop a cadre of its own experts available to teach their successors. Otherwise, the navy may find itself in the situation again of ceding this territory to the coast guard.