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 From the Los Angeles Times

Melting Ice, Winds of Change

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RESOLUTE BAY, Canada — For 500 years, explorers nudged their ships through these Arctic waters, vainly seeking a shortcut to the riches of the East. The Northwest Passage, a deadly maze of sea ice, narrow straits and misshapen islands, still holds the traces of those who failed.

There are feeble cairns, skeletons lying face down where explorers fell, makeshift camps piled high with cannibalized bones and, on one rocky spit, a trio of wind-scoured tombstones. Whole expeditions, hundreds of men and entire ships, are missing to this day. The first explorer to survive a crossing, in 1906, spent several winters trapped by ice.

Despite that -- or maybe because of it -- Canadian Mountie Ken Burton wanted nothing more than to join the pantheon of polar explorers who had threaded their ships through the passage's narrow ice leads and around its shimmering blue-green icebergs.

In the summer of 2000, Burton gingerly nosed a 66-foot aluminum patrol boat into the heart of the Northwest Passage. Ice floes could crumple the boat like paper. Even the smallest iceberg, a growler, could rip apart its delicate hull.

But there were no bergs. No growlers. No thin cakes of pancake ice. To his surprise, Burton found no ice at all. A mere 900 miles south of the North Pole, where previous explorers had faced sheets of punishing pack ice, desperation and finally death, Burton cruised past emerald lagoons and long sandy beaches. Crew members stripped and went swimming. Burton whipped through the passage, "not hurrying," in a mere 21 days.

"We should not, by any measure, have been able to drive an aluminum boat through the Arctic," said Burton, still astonished and just slightly disappointed. "It was surreal."

It was also a glimpse of the future. For several summers now, vast stretches of the Northwest Passage have been free of ice, open to uneventful crossings by the flimsiest of boats. Climate experts now blandly predict what once was unimaginable: In 50 years or less, the passage will be free of ice throughout the summer, a prospect that could transform the region and attract a flotilla of cruise ships, oil supertankers and even U.S. warships.

"It's something no one would have dreamed up for our lifetime," said Lawson Brigham, deputy director of the U.S. Arctic Research Commission and former captain of the U.S. Coast Guard icebreaker Polar Sea, which made it through the passage in 1994.

The parting of the ice is the product of natural, long-term atmospheric patterns that have warmed the Arctic in recent decades and, to a lesser extent, the gradual heating of the planet by greenhouse gases.

The planet's temperature has risen 1 degree Fahrenheit over the last century. In the Arctic, temperatures have risen 3 to 4 degrees. In these northern seas, at the boundary between water and ice, that small difference has changed the landscape for thousands of miles.

"The image of the Arctic was always one of an ice-locked, forbidden spot," said James P. Delgado, director of the Vancouver Maritime Museum and author of "Across the Top of the World: The Quest for the Northwest Passage." "If we as a species have wrought this change, it's humbling, given its history as such a terror-filled place."

'Panama Canal North'

The receding ice is throwing open a gateway to the Far North, a region long defined by its isolation, sparse population and stark, simple beauty. Ship traffic could carry with it a rush of civilization and commerce.

"It's not just about transport; it's about the whole development of the Arctic frontier," said Lynn Rosentrater, a climate-change officer with the World Wildlife Fund in Norway. "It's going to happen, so we need to plan for it."

The once-deadly route has been re-christened "Panama Canal North" by shippers eager to shave nearly 5,000 miles off the trip from Europe to Asia. Already, a parade of strange ships and faces is streaming through the passage. Canadian transit officials who monitor the route dub the newcomers "UFOs," for "unaccustomed floating objects."

These have included, in the last few years, a Russian tug that dragged a five-story floating dry dock through the passage, adventurers skimming through in sleek sailboats and a boatload of Chinese sailors that arrived unannounced in the Arctic village of Tuktoyaktuk, disembarked to take photographs and left abruptly when a local Mountie arrived.

This summer, the Canadian navy sent warships north of the Arctic Circle for the first time since the end of the Cold War. And U.S. naval officers are circulating a report called "Naval Operations in an Ice-Free Arctic" that discusses, among other things, the need for a new class of ice-strengthened warship to patrol newly opening Arctic waters.

The Northwest Passage winds through land so far north it doesn't appear on most maps, a rolling tundra cut by wild rivers and deep fiords dotted with icebergs, walruses and ghostly white beluga whales. It is too far north for trees or shrubs, too far north for paved roads and, in most places, too

far north for people.

The Inuit-controlled territory Nunavut, which includes much of the passage and stretches across 750,000 square miles, is home to just 26,745 people. That's like sprinkling the population of South Pasadena into a few villages in an area 4 1/2 times the size of California.

Nunavut's capital, Iqaluit (pronounced ee-KA-loo-it), is already something of a boomtown. Chosen as the government seat when the territory was carved from the Northwest Territories in 1999, the town of 5,000 people includes

a lavish \$12-million legislative building.

Just down the street is the Kamotiq Inn, an aging, igloo-shaped restaurant that serves shavings of raw, frozen caribou meat and cold bottles of Canadian beer. Farther down, a grocery offers fresh basil, prosciutto and Thai curry paste.

It is a confluence of government dollars and commercial opportunity. Though the territory of Nunavut is 85% Inuit, outsiders -- government workers, hermits and fortune-seekers -- are trickling in. French Canadian cabbies dream of retiring to tropical islands as they drive 18-hour shifts. South Indian hotel magnates rent snowmobiles to North Pole-bound adventurers as they wait for a boom to hit remote Inuit villages. And hardy construction workers leave their families behind in Halifax to come here and build apartment buildings.

And then there are the Inuit, many of whom feel change is coming too fast. In a place where most still put food on the family table by hunting musk oxen, caribou and seal, there is growing fear that these changes in the weather herald the end of a way of life that dates to the end of the last Ice Age.

"We are a people who only 50 years ago lived only in igloos," said Sheila Watt-Cloutier, who lives in Iqaluit and heads the Inuit Circumpolar Conference, a global organization fighting to preserve Inuit culture. "Now, the land is changing literally right under our feet."

With each summer warmer than the last, and with species such as dragonflies and moose showing up for the first time, many here are bracing for a stranger, warmer world. Unlikely as it seems in a town where residents still skin and dry seals in their frontyards, some of those taking a long-range view hail this remote outpost as the next Singapore.

"If it's handled correctly, you sit on an international strait, take a proactive stand and profit nicely," said Rob Huebert, the associate director of the Center for Military and Strategic Studies at the University of Calgary.

It was the promise of wealth that first drew European explorers to the passage. John Cabot first sought the shortcut in 1497. English pirate Martin Frobisher reached the mouth of the passage in 1576 but stopped his quest after finding what he took to be gold. It turned out to be worthless ore.

Ill-Fated Expedition

The most famous voyage was Sir John Franklin's expedition of 1845. Laden with 100,000 pounds of meat, a steam engine for heat and a library of 2,400 books, the two-ship expedition was the pride of the British Admiralty.

The 61-year-old Franklin died shortly after his ships entered the passage, apparently of a heart attack. His men, addled by lead poisoning from their canned provisions, were trapped by ice. They attempted to walk to safety, hauling unnecessary luxuries such as books and bolts of silk cloth. All 128 men perished. Subsequent expeditions revealed, to the horror of Victorian England, evidence of cannibalism.

The passage wasn't traversed until 1906, when legendary polar explorer Roald Amundsen completed the trip after three years. The feat was not accomplished again until Canadian Mountie Henry Larsen took a schooner with a hull made of 2-foot-thick Douglas fir through the passage and then back again in the 1940s.

Although common sense mandated that the passage could never be practically used, the siren call of the shortcut has never been silenced. The first contemporary test of the passage for commerce was prompted by the modern-day equivalent of spice: crude oil. In 1969, Humble Oil & Refining Co. sent through a 114,000-ton supertanker. Double-hulled and ice-strengthened, the Manhattan became the world's biggest icebreaker.

The 43,000-horsepower monster easily cruised through 15-foot-thick piles of ice and would reverse, gather steam and try to plow through 40-foot ridges of ice. But it ground to a halt several times and broke free only with the help of a Canadian icebreaker. The ship eventually reached Prudhoe Bay with several holes in its hull.

"When all was said and done, economically, it didn't make sense," Huebert said.

That was before the ice started its retreat.

The Canadian Ice Service reports that Arctic ice has disappeared at a rate of about 3% each decade since the 1970s. It is getting thinner as well. Ice sheets that used to be 10 feet thick are now less than 6 feet from top to bottom. Last month, scientists at the National Snow and Ice Data Center in Boulder, Colo., announced that Arctic sea ice had reached a record low since satellite measurements started 24 years ago.

"In some years now, you can do the Northwest Passage almost in a rowboat," said the Canadian Ice Service's Lionel Hache.

The passage remains notoriously unpredictable from year to year, and even from week to week. In August, it was clogged with some of the thickest ice seen this decade, said J.P. Lehnert, the officer in charge of the Canadian Coast Guard station in Iqaluit.

Warmth May Worsen Ice

In one of the many strange nuances of the global climate, the appearance of this thick, multiyear ice may be a result of warming, not cooling. In recent years, ice bridges that usually last all summer and keep out the harder and colder ice from the north were not in place, allowing this brawnier ice to travel south.

"Ironically, warm weather can give us worse ice conditions," said Henry Hengeveld, Environment Canada's senior advisor on climate change.

To those who have been watching the passage, it seems only a matter of time before all manner of ships, from supertankers to sailboats, start plying these once-formidable waters.

A few new ships test the waters each year. A hardy breed of tourists has begun disembarking from massive icebreakers in the few small towns along the passage. They could soon cruise through on skimpier vessels. A sailboat from New Zealand recently made the transit.

There are no traffic jams yet. But shipping companies in Europe and Asia are quietly sniffing out opportunities.

"The incentive is there," Huebert said. "You cut a huge amount of travel time, and in international shipping, time is money."

The largest supertankers, which don't fit through the Panama Canal and must go around South America, would save even more time.

The discovery of mineral resources in the far north, such as the diamond strikes of the Northwest Territories, could spur efforts to export such riches by ship. Canada's vast stores of fresh water may one day be valuable enough to export to drier regions.

Experts on the Arctic environment worry that shipping could have deleterious effects but also say there will be no way to keep the traffic out. Dave Cline, a consultant in Alaska and expert on northern shipping, fears that ships could disrupt the polar bears and bowhead whales that live amid the ice and could jeopardize eider ducks that congregate by the thousands in *polynyas*, open water areas within ice sheets.

He's also concerned about smuggling of polar bear hides and walrus tusks and about the trash that would be left behind by waves of tourists. "It'd be a whole new world up there," Cline said.

The biggest concern is an oil spill in places more pristine and harder to reach than Alaska's Prince William Sound, an area only now recovering from the 11 million gallons of oil spilled by the Exxon Valdez in 1989.

The person whose phone will ring in the middle of the night if there is such a spill is Earl Badaloo, Nunavut's director of environmental protection services. He's worried enough about it that he keeps track of what he calls "the incidents" -- recent crossings of the passage by ships.

"Five vessels went through in 2000; only two requested permission," he said, quickly scrolling through a list on the computer in his office in Iqaluit.

Although Canada has stringent shipping rules for its northern waters, compliance is voluntary.

In 1996, the tourist vessel Hanseatic ran aground on a sandbar in the passage. The weather was good, those aboard were evacuated safely and very little fuel leaked into the passage. Many fear the next grounding may not end so happily.

"When you're dealing with land all over the bloody place and tons of icebergs floating around you, you make one mistake or your boat's a rust bucket, and you're going to have oil and toxins all over the place," Badaloo said. "It would be really, really messy."

The most northerly human settlement on the passage, and in all of Canada, is Grise Fiord, about 900 miles from the North Pole. The Inuit call the town *Aujuttuq*, for "place that never thaws out." Even the Inuit find some places too cold. These bleak shores were not settled voluntarily.

During the Cold War, the Canadian government decided to relocate a few Inuit families from the relative warmth and good hunting grounds of northern Quebec to the country's northern reaches: the bleak, rocky shores of Ellesmere and Resolute Bay on Cornwallis Islands, where there is little to hunt and even less to gather.

So many American military personnel had flooded into the Arctic to monitor Russian threats by air and sea from stations at Eureka and Alert that the Canadians feared losing control of their northern flank. The Inuit were human flagpoles, dispatched north to establish Canadian sovereignty.

Since then, the Canadians have considered the frozen archipelago of ocean, ice and islands to be their land and the Northwest Passage to be their internal waterway. "It's ours," said Col. Kevin McLeod, commander of the Canadian Northern Forces.

Any waterway that connects two oceans is considered international waters, but with the passage impenetrable, no countries had pressed Canada on the issue. With an open passage, all that has the potential to change. "Our sovereignty," said passage expert Huebert, "is on thinning ice."

Since an open passage would link two oceans, U.S. State Department officials argue it should be treated as international waters, open to all who wish to pass.

"It's one of those issues on which we've agreed to disagree," said a spokesman at the U.S. Embassy in Ottawa.

With the waters open to new traffic, Canadians are taking a renewed interest in their Arctic backyard.

"I never imagined I'd be this far north, but these are our waters and we should know what's going on in them," said Canadian Naval Lt. Cmdr. Chris Ross as his warship, the *Goose Bay*, stood anchored in Frobisher Bay outside Iqaluit, the first warship to pass this far north in 14 years.

Fears of Lawlessness

A prominent concern is illegal fishing. As ice recedes, rogue vessels have been moving into the area, lured by the rich Arctic seas, which are almost wholly unregulated.

"They're just scooping the shrimp up. They're scooping the turbot up," said Lt. Cmdr. Scott Healey, a Canadian navy officer who spent 10 years aboard coastal patrol vessels out of Halifax and watched the once-rich North Atlantic fishery collapse.

International waters elsewhere have been plagued with modern piracy and frontier lawlessness.

"You become a magnet for smuggling humans, diamonds, guns, drugs," Huebert said. "We're blind if we think that just because we're Canadian it's not going to happen."

How best to patrol the passage remains a question. It all depends on how quickly the ice melts and how brave interlopers are. "I don't want to scream, 'The sky is falling and we have to build a nuclear-powered icebreaker in the next 18 months,'" McLeod said. "But we don't want to get behind the eight ball."

U.S. Navy officials are worried about falling behind as well. Their report an ice-free Arctic cites the potential need for an entirely new class of Navy ships -- icebreakers -- and a new focus on a harsh part of the globe the military has been able to ignore since the Soviet Union broke up.

"There's no logistics base up there. There's no place to get resupplied. There's bad weather. The charts are woefully bad," said Dennis Conlon, an oceanographer with the Office of Naval Research, which commissioned the report. "It's your basic nightmare in terms of running an operation."

If the ships come, so will the infrastructure: hotels, bars and even stoplights.

The vision is almost unimaginable to the Inuit, who are still reeling from the first wave of change: the trickle of explorers, whalers and soldiers who penetrated this frozen realm and altered it forever.

"We didn't know what a cold was -- or what measles were -- until the whalers came. And we had no problems with alcohol until 1940," said Dinos Tikivik, 39, a corrections officer and member of the Canadian Rangers, an Inuit and Indian reserve force that patrols Canada's most remote regions.

Today's Inuit face an epidemic of broken families, alcoholism, poor education and the highest suicide rates in Canada. Many, like Peter Irniq, 55, an Inuk who was born in an igloo in Repulse Bay but now lives in an elegant house in Iqaluit and serves as the territory's commissioner, blames many of the problems on the relentless encroachment of the modern world. Watt-Cloutier, the Inuit leader, fears that the destiny of her people is in the hands of strangers who see opportunity where the Inuit simply see home. With each new ship that pulls in and with each new patch of clear water, the isolation that has protected them for 5,000 years is melting away.

"They say it would be easier if we move over and modernize," she said. "Easier for whom?"

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