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Prologue: Beginnings

The *Ever Given* is among the largest oceangoing vessels ever built, a giant floating slab of steel that appears, to use one memorable description, “more sideways sidescraper than boat.” More than 1,300 feet long and almost 200 feet wide, it was en route from Tanjung Pelepas in Malaysia to Rotterdam, stacked high with containers full of furniture and pillowcases, bicycles and barbecues, swimwear, microchips, sex toys, and myriad other vital components of twenty-first-century Western living, when, in the early hours of March 23, 2021, it steamed north into the Suez Canal.

That stage of its voyage had barely begun when, at approximately 7:40 a.m. local time, a fierce windstorm swept out of the desert. Gusts of close to fifty miles per hour buffeted the *Ever Given*'s fourteen stories of containers, which effectively acted like a giant sail, pushing the ship toward the canal's edge. In the wheelhouse, the pilots argued with each other and with the ship's captain over the appropriate corrective actions, countermanding each other's orders as the vessel whipsawed in the wind until the bow ground into the canal's eastern bank and its stern swung outward. Such was the vessel's size that by the time the storm abated, the *Ever Given* had completely blocked the canal.

At that moment, 15 vessels were stuck behind it in the northward queue. Five days later, with the *Ever Given* still a day away from being freed, at least 369 ships were waiting to pass through the canal from either end, including 41 bulk carriers, 24 crude oil tankers, 2 Russian navy vessels, and the *Ever Given*'s sister ship, the *Ever Greet*. The blockage added further delays and price increases to a global supply chain that was already bursting at the seams as a result of the unprecedented stresses caused by a global pandemic; *Lloyd's List* estimated that the shipping industry incurred losses in the region of \$400 million every day that the *Ever Given* remained in situ. Egypt announced afterward that it would widen the part of the canal in which the *Ever Given* had become a temporary resident, much as it had previously widened a more northerly segment of the canal to encourage more ship traffic. That previous widening, however, had not had the desired effect: instead of more vessels, it encouraged larger ones, of which the *Ever Given* was but one example. In the accident's aftermath, industry postmortems focused on the growing reliance on a smaller

number of larger ships and the concomitant risks that entailed; but from points farther north came mischievous whispers that a greater problem was the fact that so much of the world's transoceanic shipping trade is funneled through two narrow bottlenecks—the Suez and Panama Canals—and that what was really needed was the development of alternative routes. Specifically, those voices reasoned, the future of global shipping lay in the Arctic.

On its face, the notion of a major commercial shipping lane in the Arctic seems absurd. This is, after all, a part of the world that was described by early twentieth-century Arctic missionary S. K. Hutton as a “bare and desolate waste, silent but . . . for the dismal howling of the hungry wolf, or the even more dismal howling of the wind,” its constituent parts dismissed by Charlotte Brontë in *Jane Eyre* as “those forlorn regions of dreary space,” a region whose very name is used as a descriptor of bitter cold. And indeed, the Arctic can be staggeringly frigid: the lowest temperature ever recorded in the Northern Hemisphere was a scarcely comprehensible -93.3°F , recorded atop the Greenland ice sheet in December 1991; even in the central Siberian Arctic, the average winter temperature is between -30°F and -35°F . In Utqiagvik, Alaska, the northernmost town in the United States, the Sun disappears below the horizon in November, not to appear again until January—and even then, initially for only fifty minutes.

There are a number of ways to define the Arctic, all of which serve to emphasize the region's harsh environment. They include the tree line—north of which forest yields to tundra—and its marine equivalent, the southern limit of winter pack ice. Another is the 10°C (50°F) isotherm, a line that delineates the average temperature during the warmest month of the year—north of that line is the Arctic; immediately south of it is the subarctic. The Arctic Circle, which encircles the globe at latitude $66^{\circ}30'\text{N}$, marks the point above which the Sun does not set on the summer solstice or rise on its winter equivalent, but it is not an ecologically useful delineation.

The entire Arctic, depending on how it is defined, covers an area of approximately 11–14.5 million square miles of land and sea, and it is permanently inhabited by no more than four million people, less than half the population of New York City in an area forty-five thousand times as large. Nunavut, the largest territory in Canada—which is itself the second-largest country in the world—is home to a little fewer than 40,000, and its most populous municipality, Iqaluit, boasts roughly 7,500 residents.

But the Arctic is more than cold and ice and empty spaces. As early twentieth-century explorer Vilhjalmur Stefansson, perhaps the region's most evangelical nonresident advocate, sarcastically observed, the region "is lifeless, except for millions of caribou and foxes, tens of thousands of wolves and muskoxen, thousands of polar bears, millions of birds, and billions of insects." And few as the region's inhabitants may be, some of them live in towns and cities that compare favorably in size with those in any number of more salubrious climes: 75,000 or so in Tromsø in Norway; 178,000 in Norilsk in Siberia; and almost 300,000 in the region's biggest city, Murmansk, on Russia's Kola Peninsula—roughly as many people as live in Saint Louis, Missouri, or Venice, Italy. And yes, there are commercial sea routes, including one that lies entirely above the Arctic Circle that sweeps farther north than any point in Alaska or Scandinavia and carves a path north of Russia. In its entirety, from the Bering Strait in the east to the Barents Sea in the west, it is known as the Northeast Passage; to Russia, the part of the journey that encompasses its national waters—and which comprises 90 percent of the passage's full extent—it is the Northern Sea Route (NSR). And it is that route that Russian authorities advanced as an alternative to the Suez Canal as crews struggled to free the *Ever Given*.

"Obviously, it's necessary to think about how to efficiently manage transportation risks and develop alternative routes to the Suez Canal, first and foremost the Northern Sea Route," Nikolai Korchunov, Moscow's ambassador-at-large, told the Interfax news agency. "The appeal of the Northern Sea Route will grow both in the short- and long-term."

The development of the NSR has been decades in the making. After centuries of exploration and tentative commercial activity along parts of the northern Russian coast, the Soviet Union in 1932 formed the Directorate of the Northern Sea Route to develop the passage as a viable transport route. Two years later, the icebreaker *Fyodor Litke* became the first vessel to transit the entire route, east to west, in one season, and two years after that it returned to escort the first two warships to transit the passage, the *Voykov* and the *Stalin*.

Over the subsequent ninety years, the NSR has come to assume an oversize importance in the collective Russian psyche, an integral symbol of a prosperous Arctic future. And that importance has been reflected in growing governmental investment, particularly under the reign of Vladimir Putin. In 2021, almost 35 million tons of cargo traveled along the route, a fifteenfold increase over the preceding decade; a 2018 decree from Putin set targets of 80

million tons by 2024 and 110 million by 2030. The number of voyages involved in transporting that much cargo also has been increasing: from 18 in 2015 to 85 in 2021. But while such figures may seem impressive out of context, and are certainly notable, they also show just how far away the NSR is from challenging the Panama and Suez Canals, which average approximately twelve thousand and eighteen thousand transits each year, respectively.

That said, the NSR is orders of magnitude more developed as a transit route than another putative passageway through the Arctic that has, if anything, been even more celebrated for its potential, even as it has proven more resistant to human desires. Starting, like its Northeast cousin, in the Bering Strait, and threading its way through Canada's Arctic islands to the Atlantic Ocean, the Northwest Passage occupies a singular place in the mythologies of Canada and its former colonizer, Britain, the result of centuries of frequently desperate attempts to probe its secrets, attempts that time and again foundered in the face of opposition from unyielding Arctic ice.

Historical interest in finding such a pathway was understandable. Prior to the opening of Suez in 1869, the only available options for transoceanic travel involved sailing south of Africa or, yet more treacherously, South America—options that, at various points in history, presented as much of a geopolitical challenge as a navigational one.

That such interest endures owes much to the lingering romantic attachment to the *idea* of a Northwest or Northeast Passage, the notion that anything that has involved so much sacrifice and effort over so many generations should not be too easily cast aside. It is testament, too, to the tightness with which Canada and Russia cling to their image as Arctic superpowers and the role that those prospective passageways may yet play in manifesting that image. It is a result also of cold calculation, of the recognition that an unimpeded journey through the Northwest Passage from, say, Rotterdam to Yokohama would be approximately 4,500 miles shorter than one via the Panama Canal, or that a similar voyage through the Northeast Passage would be roughly 40 percent shorter than traveling through the Suez Canal.

But the reason Putin is able to proclaim that “the Arctic is the shortcut between the largest markets of Europe and the Asia-Pacific region” with any kind of seriousness, or that an editorial on *Al Arabiya* can lament, in the shadow of the *Ever Given* incident, that navigating the Northwest Passage is “getting closer” and that it “will eventually replace the Suez Canal as the world's favored shipping route to link the Atlantic and Pacific Oceans,” is

that circumstances are not what they were when Victorian explorers were dying on the ice that crushed their ships.

The climate is changing, the world is warming, and the Arctic is melting. As a result, while the Northwest and Northeast Passages are not yet reliably navigable, they are at least somewhat and seasonally so. The Northwest Passage, which had not been transited at all prior to 1906, and had been so only four times by 1954, saw twenty-five transits in 2021 alone—a consequence of sturdier ships and a stronger commercial imperative, certainly, but also of the fact that, at least for a couple of months per year, navigating Canada's Arctic waters is significantly less hazardous than had long been the case. That is why former US secretary of state Mike Pompeo, chief diplomat of an administration that did not even recognize the scientific realities of global warming, nonetheless argued in 2019 that “steady reductions in sea ice are opening new passageways and new opportunities for trade. This could potentially slash the time it takes to travel between Asia and the West by as much as 20 days. Arctic sea lanes could [become] the 21st-century Suez and Panama Canals.” It is a prospect that has countries other than Canada and Russia, friends and foes alike, watching with anticipation. It has helped ignite a simmering and thus far low-grade dispute between Canada and the United States. And as China has grown in economic might and geopolitical heft, it too has begun exploring the expansion of its naval and commercial reach by investing in its own fleet of icebreakers, seeking a seat at the table of Arctic nations, and exploring the prospect of itself taking advantage of new pathways through the ice—through North America, across the top of Russia, or even via the North Pole.

There is a certain circularity about China's involvement in the search for a passage through Arctic ice, since it was to reach China that European nations began that search more than half a millennium ago.



The two small ships that sailed down the River Thames early in the summer of 1576 were on a special mission. The *Michael* and the *Gabriel* were setting out on an expedition into the unknown, the import of which was underlined by the fact that as they passed the royal palace in Greenwich, Queen Elizabeth I herself waved from her window. The two ships, under the command of Martin Frobisher, were on a quest to find a seaway from the Atlantic to the Pacific across the top of North America. Frobisher was convinced that, just as Ferdinand Magellan had found a route between the two oceans to

the south of the Americas, he would uncover a more northerly path, “that such a passage was as plausible as the English Channel.”

Such optimism proved misplaced. Frobisher reached the west coast of Greenland and the easternmost extent of the Canadian Arctic, lost five men who went ashore but did not return, and kidnapped an Inuk, who caught a cold on the voyage home and died shortly after the ships arrived back in England. Frobisher did not, however, find the Northwest Passage.

His desire to do so was anchored not in a desire to explore for exploration's sake but in a series of developments that had unfolded in short order at the tail end of the previous century, a decade described by historian Felipe Fernández-Armesto as the “great leap forward” in western European exploration. To understand those developments, we begin with Christopher Columbus.

When Columbus set sail from Palos de la Frontera in August 1492, it was with the intention of finding a route across the Atlantic to Asia, specifically China. The area enticed with promises of spices and gold, but land routes from Europe to the region were long and challenging and frequently dominated by Muslim traders, while the Portuguese had developed and monopolized a sea route to the east around Africa. Columbus, born in Genoa but soliciting support from Portugal's Spanish rivals, proposed sailing west, in the process transforming the Atlantic from a frontier precluding Europe's westward expansion into a corridor facilitating it. He was not the first to give voice to such an idea; but the notion had previously failed to gain traction because of the consensus that Asia was simply too distant for such a voyage to be plausible.

Contrary to lore, neither Columbus nor his contemporaries believed the world to be flat. He did, however—whether out of conviction or convenience—argue that it was smaller than was generally agreed. Around 500 BCE, Pythagoras had proposed that Earth was essentially spherical, and approximately 180 years later, Aristotle proffered evidentiary documentation: constellations change their apparent position in the sky as a traveler moves north or south; Earth casts a circular shadow on the Moon during a lunar eclipse; ships disappear hull first when they sail over the horizon. In approximately 220 BCE, Eratosthenes went one further, using shadows cast by sticks at noon to produce an estimate of the circumference of the spherical Earth that was within spitting distance of what we now know to be the correct value of 24,900 miles at the equator. Columbus, however, promoted a fringe theory that suggested the planet was as much as 20 percent smaller

than the figures of Eratosthenes and reality. On top of that, he argued, China extended farther eastward than had been previously recognized; accordingly, he insisted, it would be possible to reach Asia “in a few days.”

It in fact took him a couple of months to make landfall, on October 12, 1492, probably on what is now known as San Salvador Island in the Bahamas. Although he spent a great deal of effort trying to establish otherwise, it is not a matter of dispute that neither the Bahamas nor Cuba, where he landed twelve days later, nor Hispaniola, which he reached on December 4, is in Asia; nor does it appear that, upon his return, many bought his sometimes convoluted assertions to the contrary. Indeed, it was the recognition that Columbus had in fact stumbled across lands hitherto entirely unknown to Europeans that prompted a new wave of exploration, motivated by trade, colonization, religious conversion, and combinations of these—as well as, ironically, a recognition that Columbus’s voyages revealed there were staging posts in the ocean that could be used for rest and resupply en route to Asia.

Two years after Columbus’s voyage, and in response to a growing diplomatic contretemps over his pronounced discoveries, Spain and Portugal signed the Treaty of Tordesillas, which effectively divided up new lands between them via a line of demarcation 370 leagues (approximately 345 miles) west of the Cape Verde Islands—roughly longitude 46 degrees 30 minutes west. Everything west of that line would be Spain’s; anything to the east, Portugal’s. That effectively granted Spain the right to the Americas (except for the as-yet-unknown-to-the-signatories eastern part of Brazil, which fell on the Portuguese side of the line) and ceded Africa to Portugal. The feelings and opinions of the people who already resided on those continents were neither considered nor acknowledged; the only concession of sorts to preexisting human presence was the caveat that any discovered nations with a “Christian King” would not be colonized.

No other country recognized the treaty, but such was the dominance of the Iberian nations’ fleets that it soon assumed a force of *de facto* recognition, if not one of *de jure*. An initial wave of post-Columbian expeditions had not yet established the continental nature of the Americas, encouraging continued searching for routes to the east via the west, through and around these newly discovered lands; denied footholds to the south as a result of a rapidly growing Spanish and Portuguese presence, other nations looked to find routes to the north.

In 1497, John Cabot, a Venetian citizen, left the English port city of Bristol with “one ship of fifty toneless [tons] and twenty men and food for seven

or eight months," carrying a commission from England's Henry VII and a remit to pursue a more northerly course than had Columbus. On June 24, he and a small party set foot on what was probably Newfoundland but may have been Cape Breton Island or possibly Nova Scotia. Unlike Columbus, he had reached the North American continent, but like him, he seems to have believed—or at least proclaimed—that he had made it to Asia, declaring his landing spot to be "the country of the Great Khan." King Henry awarded him the sum of £10 for his labors, and the following year, Cabot set out again, this time at the head of an expeditionary force of five ships. Its fate is uncertain; one of the five ships apparently became separated from the rest and limped, storm damaged, into port in Ireland. Recent research indicates that Cabot may have been alive and well in England in 1500 and suggests not only that the rest of his fleet did reach Newfoundland, but also that some members of his expedition may have founded a community, including North America's first Christian church, there. But details of the voyage and its aftermath are sketchy at best, and for several centuries it was assumed that all had perished at sea. Cabot was widely believed, in the words of one contemporary author, to have found the new lands "nowhere but on the very bottom of the ocean, to which he is thought to have descended together with his boat, the victim himself of that self-same ocean; since after the voyage he was never seen again anywhere."

Even if Cabot did perish, his influence and involvement did not. In 1499, William Weston, a Bristol merchant who appears to have been an associate of Cabot, set sail, according to correspondence authored by the king, "for to serche and fynde if he can the new founde land." The late historical researcher Alwyn Ruddock, who was the first to suggest Cabot had not perished on his 1498 voyage, believed that Weston returned to Newfoundland and continued north as far as the entrance to what we now know as Hudson Bay, a journey that would have taken him into ice-covered waters. "The only plausible explanation" for such a route, opined Evan Jones and Margaret Condon of the University of Bristol's Cabot Project, "was that the explorers were looking for a northern route around the landmass." If so, they noted, it was not only the first English-led expedition to America; it was also the first journey undertaken specifically to find not new land but a passage through and around that land to Asia. It would not be the last.

Cabot's son Sebastian may have participated in or led as many as three expeditions in the first decade of the sixteenth century, the last of which, conducted from 1508 to 1509, reportedly consisted of two ships and three

hundred men and reached as far north as Hudson Bay and then as far south as Chesapeake Bay, close to what is now Washington, DC. By the middle of that century, he was Governor for Life of the Muscovy Company, granted a monopoly by Elizabeth I on trade with Russia and areas to the north. The Muscovy Company evolved from the Mysterie and Company of Merchant Adventurers for the Discoverie of Regions, Dominions, Islands and Places Unknown, whose first venture was in search of an alternative route to Cathay (China and environs): a Northeast Passage, across the top of Eurasia. That venture saw three ships—the *Edward Bonaventure*, the *Bona Confidentia*, and the *Bona Esperenza*—depart England in May 1553; only the *Edward* returned. The other two were swept east into what is now the Barents Sea during a storm and were forced to spend a winter on the Murman Coast of the Kola Peninsula, where their combined crews of approximately seventy officers and men “perished miserably from the effects of cold, or hunger, or both.” The surviving vessel made it as far as the site of present-day Arkhangel'sk, on the coast of the White Sea, where its appearance initially terrified local fishermen, who threw themselves to the ground and tried to kiss the feet of the captain, Richard Chancellor. Chancellor learned from them that the country was called “Muscovy, which hath the name also of Russia the White,” and that it was ruled by Ivan Vasilyevich—who would later become known as Ivan the Terrible and who, upon being advised of “the arrival of a strange nation,” summoned Chancellor to the country's capital, Moscow, where he presented him with a letter to the king that granted freedom of trade to English ships.

The following spring, Chancellor returned to his ship and sailed home, where his news of a new market to the east was received with rapturous enthusiasm. Tragically, he perished on his return from a second voyage in a fierce storm that also finally claimed the *Bona Esperenza* and the *Bona Confidentia*, which were being sailed back to England by new crews from their enforced sojourns on the Kola Peninsula.

Where the English went, the Dutch—newly expansive after proclaiming independence from Spain in 1581—followed. Between 1594 and 1597, three successive voyages, led by Willem Barents and Jacob van Heemskerck, sought to find a route to Cathay by rounding the Russian Arctic archipelago of Novaya Zemlya. The voyages were not without success: they charted the coast of Novaya Zemlya and made the first confirmed sighting of Spitsbergen (although Barents and van Heemskerck thought it to be part of Greenland). But the first two voyages were halted by ice in the Kara Sea, to the east of

Novaya Zemlya, and the third saw Barents's ship entombed in ice and the crew forced to spend the winter of 1596–97 marooned ashore, barricading themselves against predatory polar bears.

While the primary focus was on putative passages to the northwest and northeast, there were some efforts to explore the potential of a third pathway: a route through the Arctic Ocean via the North Pole. The suggestion had been made by, among others, Bristol merchant Robert Thorne, who in 1527 declared in response to skeptics that "there is no land uninhabitable, nor sea unnavigable." The failure of expedition after expedition challenged the credibility of his assertion.

In 1607, Henry Hudson—about whom little is known prior to this commission—was dispatched by the Muscovy Company in search of Thorne's putative polar passage. After passing close to the east coast of Greenland, he turned northeast, spied Spitsbergen, and reached about 80 degrees North (80°N) before, being faced by an impenetrable sea of ice, turning south. The following year, the Muscovy Company sent him in search of the Northeast Passage; he explored and landed on the coast of Novaya Zemlya, attempted and failed to pass south of the archipelago, finding his way again blocked by ice, and then turned west in search of a nonexistent "Willoughby's Land." His achievements had fallen far short of what his benefactors hoped for, and with his return the Muscovy Company opted out of funding any more efforts to find a way through the ice of the eastern Arctic.

Hudson turned to the Dutch—specifically, the Amsterdam chapter of the Dutch East India Company, which sponsored his return to the Russian Arctic in 1609. Once again, he searched for a route south of Novaya Zemlya; once again, he found his way blocked by ice. This time—and, alas for Hudson, not for the final time in his career—his crew threatened to mutiny if he persisted in his quest to push through the ice, and so he turned west and sailed across the Atlantic in pursuit of the Northwest Passage. In early September, he reached the mouth of a mighty river that now bears his name; the following year, he returned, on what would be his final journey. Passing through what is now Hudson Strait, he found himself in what at first appeared to be open ocean, which he assumed to be the Pacific. But he had not completed the Northwest Passage; what he thought was an ocean was in fact a largely enclosed body of water now known as Hudson Bay, in which his ship became entrapped by ice over winter. That winter was not a pleasant one: as food supplies diminished, some of the crew became fractious and even deeply hostile, believing that Hudson was hoarding rations for himself and his favorites.

By the time the ice had released its grip and the ship prepared to leave for England, the situation onboard had devolved into open rebellion: on June 23, 1611, mutineers placed Hudson, his teenage son, and seven crew members who had scurvy or who were considered loyal to Hudson into a small boat and lowered them over the side to their fate, never to be seen again.

Upon their return, the surviving eight crew members faced remarkably little sanction for their actions: partly, probably, because they made a point of affixing the blame for organizing the revolt on crewmates who had perished on the journey home and were thus unable to offer contrary narratives; and partly, possibly, because the knowledge of the area they brought back with them rendered them too valuable to rot in incarceration. Of foremost interest among the information that they reported was Hudson's belief that they had found the Northwest Passage, which sparked a final, dying ember of voyages seeking either affirmation or refutation.

None of these voyages found a Northwest Passage, any more than Chancellor, Barents, or the Muscovy Company had succeeded in navigating a path to the Northeast. And yet the expeditioners of the seventeenth century had come closer to uncovering the secret entryway to the Canadian Arctic than anyone realized. On March 26, 1616, the *Discovery*—the same ship from which Henry Hudson had been expelled four years previously—set sail from Gravesend on the River Thames under the command of Robert Bylot (one of the crew who had set Hudson adrift) and with William Baffin as navigator. Their orders were to retrace and expand upon a trio of voyages led by John Davis between 1585 and 1587, who at his northernmost point had sailed north of 72°N; had encountered whales, Inuit, and “white beares of monstrous bignesse”; had painstakingly mapped the coastal areas he encountered; and had declared confidently that “it appears that from England there is a short and speedie passage into the South Seas, to China, Molucca, Philippina, and India, by northerly navigation.” To this end, they entered the strait between southwestern Greenland and eastern Canada that now bears their predecessor's name, sighting Greenland in mid-May and continuing northward up its western coast. On May 30, they passed the most northerly point reached by Davis and entered waters subsequently known as Baffin Bay, which had not been seen by Europeans since Viking times. On July 5, they reached the northernmost point of their expedition before swinging about and sailing down the west side of Baffin Bay, along the eastern coast of northernmost Canada. Here, they identified and named Lancaster Sound, which we now know is the primary entryway to the Northwest Passage; but the ship's crew

was by now beginning to succumb to the crippling embrace of scurvy, and the priority of Baffin and Bylot was to set ashore at a place where they could procure curative herbs. Of Lancaster Sound, Baffin noted little other than that its entrance was full of ice. The prospects of a Northwest Passage, he concluded, appeared grim.

Even so, his observations might have encouraged further examination had they been made widely available; in the event, however, they fell victim to an ill-timed misfortune. Previous English Arctic voyages had been compiled and chronicled by Richard Hakluyt, writer and evangelical proponent of his country's colonization of North America, as part of his three-volume work *The Principal Navigations, Voiages, Traffiques and Discoveries of the English Nation*, published in 1589 and greatly expanded between 1598 and 1600. He continued his work after the publication of his magnum opus, but he died just three months after the *Discovery* returned to England; the man who assumed his responsibilities, the Reverend Samuel Purchas, chose to include only a truncated narrative in his successor work, *Hakluytus Posthumus, or Purchas his Pilgrimes*. In a marginal note accompanying the narrative, Purchas remarked that "this map of the author, with the tables of his journal and sayling, were somewhat troublesome and too costly to insert."

Baffin's had been perhaps the most magisterial and consequential of all the attempts thus far to find the Northwest Passage, but his findings almost immediately faded into obscurity. By the nineteenth century, most maps of the region no longer even included Baffin Bay. England had led the attempt to find routes through the Arctic to the east; and now, in the face of failure after failure, ice barrier after ice barrier, it turned its back on the pursuit. Noted author Jeannette Mirsky: "For two hundred years the wake made by the *Discovery* was lost; no other ship plowed the waters of Baffin Bay; and not until England had gone through her civil wars, settled and lost her colonies in America, and shipped Napoleon safely off to St. Helena did she turn north again."



That the rise of the second wave of Arctic exploration was concomitant with the fall of Napoleon I was not coincidental. In 1793, six years prior to Napoleon's seizure of power, the British naval fleet totaled approximately 500 vessels; by the time of the Battle of Trafalgar in 1805, that number had swelled to 950, with accompanying increases in personnel. With Napoleon's

final exile in 1816, all those ships, officers, and men that had been specifically commissioned and recruited for the task of defeating his empire were suddenly without purpose.

Enter John Barrow: born in northwest England in 1764, he was appointed in 1803 as the second secretary—and thus principal bureaucrat—at the Admiralty, a position he occupied, outside of one brief interruption, for forty-one years. It was Barrow who proposed that there could be no better application of suddenly available personnel and materiel than toward exploration, particularly of the Arctic. It was a notion that received immediate and vigorous pushback: exploration cost money, and money was in short supply during a postwar era of austerity. But Barrow's pitch was artfully designed and skillfully delivered: it would be embarrassing—nay, humiliating—were Britain, which had been at the forefront of Arctic exploration two centuries previously, to now sit back as the glow of victory faded and allow rival nations to fill in the maps that Britons had outlined.

That argument struck home, earning Barrow the backing he sought and securing him funding in 1818 for a pair of synchronous expeditions, one of which sought to find the Northwest Passage and one of which probed for a path to the North Pole. Others followed, both under Barrow's aegis and independent of it, with varied degrees of success and privation. One, under the command of Sir John Ross, was forced to spend four winters trapped in the Northwest Passage's icy grip before being able to strike out in small boats and head far enough out into open water to be able to attract the attention of a passing whaler.

Virtually ever present in these efforts was Ross's nephew, James Clark Ross, who between 1818 and 1833 sailed on no fewer than six Arctic expeditions, two of them with his uncle, by the end of which he had surely spent far more time in the region than any European explorer. His reward was to be given command of his own expedition, to the other end of the world, mapping the coast of Antarctica aboard HMS *Erebus* and HMS *Terror*.

Erebus and *Terror* had been built as bomb ships—specialized naval vessels constructed and equipped to bombard land-based positions with mortars; stout and sturdy, their hulls built to withstand the recoil of launching powerful explosives in a high arc, they were theoretically ideal vessels for withstanding the pressures of polar ice.

Terror was the elder of the two; launched in 1813, it participated in the Battle of Baltimore, its bombs among those later immortalized by Francis Scott Key as “bursting in air.” *Erebus*, built in 1826, endured an initially idle

existence, other than a couple of years' service in the Mediterranean Sea, before sailing south with Ross.

Ross's Antarctic expedition, conducted between 1839 and 1843, was a resounding success, as testified to by the string of locations on the frozen continent—Ross Sea, Ross Island, the Ross Ice Shelf, among others—that today carry his name. Upon his return, he was asked to take the same two ships north on what was hoped to be a final, glorious voyage into the Northwest Passage, but he demurred; after four years in the Antarctic on top of four unplanned winters frozen into the Arctic and a handful of other Arctic expeditions, he had simply had enough.

Command of the expedition was ultimately bestowed upon Sir John Franklin, who had himself been a leader of a pair of Barrow's Arctic ventures—one by sea and one by land—before a spell as lieutenant governor of the British penal colony of Van Diemen's Land (now Tasmania). He did not, on the face of it, appear a tremendous fit: he was closing in on seventy years of age, and neither of his previous efforts had been particularly successful, with the overland venture ultimately something of a disaster. One of the members was shot dead by another, having been accused of killing four others and even feeding the flesh of three of them to some of the rest of the party; and, after Franklin waited too late in the year to turn the expedition back south, conditions became so dire that ten of the party died on the march home and the rest were reduced to consuming their footwear, earning Franklin the unwelcome sobriquet of the Man Who Ate His Boots.

Even so, Franklin was a genial and popular fellow, and the public mood was of great expectation as, on the morning of May 19, 1845, the two ships, with their combined complement of 129 men, one Newfoundland dog, one cat, and one monkey—the latter a gift to the officers of *Erebus* from Lady Jane Franklin—made their way out of the River Thames. They sailed up the North Sea to Stromness in Scotland and thence onward toward the Arctic. By late June, they had rounded Cape Farewell at the southern tip of Greenland and continued into Davis Strait. On July 26, they encountered the whaling vessels *Enterprise* and *Prince of Wales*; after a brief visit between the ships, the whalers continued on their way, leaving *Erebus* and *Terror* waiting for the ice to clear so they could sail into Lancaster Sound and the unknown.

In August 1848, with no word yet received from Franklin or his men, the Admiralty launched three search expeditions, none of which achieved success, denied either by searching in the wrong area or by impenetrable ice. Two years later, fully fifteen expeditions—some funded by the

Admiralty, others supported by private donors, all responding to the urgings of Lady Franklin—scoured the Passage for clues of Franklin's well-being or whereabouts.

The first such clue was uncovered on August 23, 1850, when Captain Erasmus Ommanney of the *Assistance* found stores and fragments of clothing on a beach on Devon Island, on the northern shore of Lancaster Sound, from where he spied a cairn on adjacent Beechey Island. The cairn, oddly, contained no note, nothing to confirm that Franklin had been there or to inform as to his subsequent whereabouts. But the discovery prompted several of the other vessels involved in the hunt to converge on Beechey, and one week after Ommanney saw the cairn, another search party made the first real breakthrough: signs of a winter camp on Beechey Island and, on the camp's edge, three graves, each marked with a wooden headstone.

The first of the three to have died was John Torrington, who, according to his tombstone, "departed this life January 1st A.D. 1846 on board of H.M. ship Terror, aged 20 years." He was followed just a few days later by John Hartnell, able seaman on *Erebus*, who "died January 4th 1846 aged 25 years." Hartnell's shipmate William Braine, part of the consignment of Royal Marines, died "April 3rd 1846, aged 32 years." There was no explanation of how or why they had died; nor did the rest of the campsite provide any answer at all. If anything, the findings only deepened the mystery. There were items of clothing, a few scraps of paper, pieces of rope, and fragments of sail. Bizarrely, there was a collection of six hundred food tins, stacked in a pile, emptied of their original contents and filled with gravel.

The searchers had found where Franklin had been but not where he had gone. The following year, a further five ships were dispatched; but after four of them were abandoned in the crushing ice with no further signs of success, enthusiasm for future search efforts began to pall.

Then, in April 1854, a party of four men, led by Scottish explorer John Rae and including interpreter and guide William Ouligbuck, were a few weeks into a journey to chart part of the coast of the Canadian Arctic Archipelago when they encountered two Inuit, named See-u-ti-chu and In-nook-poo-zhe-jook, the latter of whom was wearing a gold cap band. When Rae and Ouligbuck asked him where he had procured it, he replied that although he himself had not previously met any *kabloonas*, or white men, a number of them—at least thirty-five to forty—had starved to death west of a large river, and it had come from one of them. In-nook-poo-zhe-jook had not been to that place and could not tell them how far it was exactly, other than

to suggest it was about a ten- to twelve-day journey. He either could not or would not locate it on a map, but he insisted that many dead bodies could be found there still. Rae bought the band from him and promised that he would pay for any similar trinkets that he or others might have.

Several weeks later, Rae and his party returned to the base from which they had set out, to find several Inuit families had pitched tents nearby and were waiting for them, with more objects to trade and more information to give. They told Rae and Ouligbuck that four years previously—that is, in 1850—several Inuit families hunting seals near the shore of King William Island had encountered about forty white men traveling southward over the ice and dragging a boat and sledges. None of the men could speak Inuktitut, but through sign language they indicated that their ships had been crushed in the ice and that they were heading to where they expected to find deer to shoot. The men appeared thin, and they traded for a small seal, or a piece of seal meat, from the Inuit.

Later that same season, Rae reported his interlocutors as telling him that the “bodies of some thirty persons and some Graves were discovered on the continent, and five dead bodies on an island near it.” Some of the bodies, he continued, “had been buried (probably those of the first victims of famine); some were in a tent or tents; others under the boat, which had been turned over to form a shelter, and several lay scattered about in different directions.” From its description—a telescope strapped over its shoulders and a double-barreled shotgun underneath it—Rae inferred that one of the bodies was of an officer.

Their testimony was given extra credibility by the items those who gave it had in their possession and sold to Rae: a brass compass, a chronometer case, a surgeon’s knife, and forks and spoons engraved with the initials of some of the officers onboard *Erebus* and *Terror*, including Harry Goodsir, assistant surgeon on *Erebus*, and Francis Crozier, captain of the *Terror* and the expedition’s second-in-command. Any lingering uncertainty as to exactly which group of men the objects belonged was disabused by one item in particular, a silver plate engraved with the name Sir John Franklin.

There could no longer be any doubt. The Inuit had seen the survivors of Franklin’s expedition; but if the physical evidence reinforced the veracity of their accounts, it also made them all the more chilling, particularly given one detail that drowned out all the others: “From the mutilated state of many of the bodies,” wrote Rae, “and the contents of the kettles, it is evident that our wretched countrymen had been driven to the last resource—cannibalism—as a means of prolonging existence.”

Rae contained all these details in a report to the Admiralty, which swiftly made its way to the pages of the *London Times*, where it detonated with a concussive impact that reverberated throughout the corridors of British society. The suggestion that Franklin's men had resorted to cannibalism set public opinion ablaze, fanned by nobody more so than Charles Dickens, friend of Lady Franklin and the country's foremost author, who used his own magazine, *Household Words*, to fulminate in righteous anger. Dickens, seeking solace in a mixture of equal parts patriotism and racism, excoriated Rae's reports from his Inuit informants as "the vague babble of savages." He insisted that if mutilated corpses had indeed been found, then the "covetous, treacherous, and cruel" savages who claimed to have found them were among the likelier mutilators. Certainly, he insisted, the officers and men of the *Erebus* and *Terror* could not have committed such heinous acts; "the noble conduct and example of such men, and of their own great leader himself, . . . belies it, and outweighs by the weight of the whole universe the chatter of a gross handful of uncivilised people."

Even so, Dickens conceded that the physical evidence led to an inevitable conclusion that the expedition's members were dead. Lady Franklin was unsatiated, but the Admiralty made it clear that it would not be moved to send yet another search party; apart from the growing pile of corpses and shipwrecks accrued in the search for the Northwest Passage and now for Franklin, its resources were once more tied up in war, this time in Crimea. She was, however, able to persuade Captain Francis Leopold McClintock, veteran of two searches for her husband, to make one more, with an all-volunteer crew of twenty-five aboard the steam yacht *Fox*. She acknowledged that Sir John, seventy years old when he had departed a decade earlier, was surely dead; her fight now was for his legacy, her desire to disprove Inuit tales of cannibalism and establish that he had pieced together the segments of the Northwest Passage.

McClintock was not able to establish the definitive proof she sought for either of those goals, but he was able to provide confirmation of a different kind. A series of sledge parties from the *Fox*—led by McClintock; his second-in-command, William Hobson; and the ship's master, Allen Young—found enough evidence on King William Island to ascertain that it was indeed there that at least the majority of the *Erebus* and *Terror* crew met their fate. Encounters with Inuit on the island elicited descriptions of a three-masted ship "crushed by the ice out in the sea to the west of King William's Land" and later of a second ship, "which was forced on shore by the ice." There were

stories of the body of a “very large man” with “long teeth,” found onboard one of the ships; of white men heading south to a “large river” and of their bones being found the following winter; of men who “fell down and died as they walked along.”

Then, on May 6, 1859, Hobson's sledging team found a cairn containing a cylinder. In the cylinder was a printed form, one of many sent with the *Erebus* and *Terror* for recording their position, filled in by Lieutenant Graham Gore of the *Erebus*:

28 May 1847 H.M.S.hips Erebus and Terror Wintered in the Ice in Lat. 70°5'N Long. 98°23'W. Having wintered in 1846–7 at Beechey Island in Lat. 74°43'28"N. Long. 91°39'15"W. after having ascended Wellington Channel to Lat. 77° and returned by the °West side of Cornwallis Island. Sir John Franklin commanding the Expedition. All well. Party consisting of 2 Officers and 6 Men left the ships on Monday 24th May 1847—Gm. Gore, Lieut., Chas. F. Des Voeux, Mate.

Gore had made a mistake: given the dates on the Beechey Island graves, it was clear the expedition had wintered there a year earlier than stated in the note. Such a concern was secondary, however, to the information detailed in the writing around the form's edges, added eleven months after the original note and revealing that the situation was now far from “all well”:

25th April 1848 HMShips Terror and Erebus were deserted on the 22nd April 5 leagues NNW of this having been beset since 12th Sept 1846. The officers and crews consisting of 105 souls under the command of Captain F.R.M. Crozier landed here. . . . Sir John Franklin died on the 11th of June 1847 and the total loss by deaths in the Expedition has been to this date 9 officers and 15 men.—James Fitzjames Captain HMS Erebus F.R.M. Crozier Captain & Senior Offr And start on tomorrow 26th for Backs Fish River.

Elsewhere on the island, McClintock found a skeleton of a man, face down and partially dressed, later identified as likely being a steward from *Terror*; nearby on the ground, a pocketbook contained a series of drawings and writings, the latter of which McClintock presumed to have been in German but were in fact in English, yet often spelled both phonetically and backward.

Farther up the coast, a large boat sat entombed in drifting snow, close to a sledge on which it had almost certainly been dragged. The boat contained an abundance of supplies, some surprising: blankets, boots, and clothing but also books, plates, and engraved forks, knives, and spoons. In the boat also were a pair of rifles and two more skeletons—one of a seemingly strong and fit middle-aged man, one of someone younger and slighter.

Once again, the discoveries raised more questions than answers. What had happened between the message that all was well and the death, two weeks later, of Franklin? Why, apart from the so-called Victory Point note, were there no other descriptions of the expedition's whereabouts and plans? Why was the bow of the boat containing the two skeletons pointed north, toward the abandoned ships, rather than south, the direction in which the men were traveling? And where were the ships?

Nonetheless, the underlying mystery was solved. John Franklin was dead, his men with him. The search for the Northwest Passage had consumed vast amounts of money, time, materiel, and lives. The answer it had yielded—that a passage, or rather passages, existed, but seemingly at no point free of ice in totality—was emotionally unsatisfying, and all the more so given the effort required to provide it. A pursuit that had been given impetus by a treaty between Portugal and Spain had reached a deadly conclusion four centuries later, a quest fueled by dreams and aspirations wrecked on the icy shores of reality.

The search for the Northwest Passage was over.

A century and three decades after McClintock confirmed the outline, if not the details, of Franklin's fate, Dr. James Hansen took his seat in a committee room of the United States Senate. It was a stifling June day in Washington, DC, with the mercury nudging close to 100°F; and Hansen, head of the National Aeronautics and Space Administration's Goddard Institute for Space Studies, testified that the heat wave was not an anomaly and that human activity was responsible for increasing temperatures across the globe.

"The earth is warmer in 1988 than at any time in the history of instrumental measurements," Hansen told the senators, adding that there was "only a 1 percent chance of an accidental warming of this magnitude. . . . The greenhouse effect has been detected, and it is changing our climate now."

The echoes from Hansen's alarm reverberated widely. The following day, the *New York Times* reported that "global warming has begun." But while

Hansen's testimony was a key early moment in alerting the United States to the realities of global warming, and while 1988 was a pivotal year in terms of mobilizing the international community to address the threat it presented—the United Nations General Assembly endorsed the establishment of the Intergovernmental Panel on Climate Change that December—the warning bells had been ringing for much longer.

The scientific fundamentals were laid down as far back as 1824 by French physicist Joseph Fourier, who wondered why, given that Earth was constantly being bombarded by solar radiation, the planet did not become progressively hotter until it was a baking and barren rock. The answer, he deduced, was that much of that radiation was reflected out into space, but that gases in Earth's atmosphere were trapping some of the heat—a phenomenon that came to be known as the "greenhouse effect." Thirty-five years later, British scientist John Tyndall identified the gases most likely to be responsible for the planet's warming blanket: methane, water vapor, and carbon dioxide (CO_2). It was Swedish scientist Svante Arrhenius who in 1896 calculated that a small increase in CO_2 concentrations might warm the atmosphere sufficiently to allow the formation of greater quantities of water vapor—which in turn could lead to further warming. Such increases, Arrhenius noted, were not entirely hypothetical: the Industrial Revolution had been made possible by, and resulted in, the combustion of large amounts of fossil fuels such as coal—a process that had released the carbon those fuels contained into the atmosphere, where it had combined with atmospheric oxygen to create CO_2 . If the levels of atmospheric CO_2 were to double, he calculated, Earth could see warming of up to 8°F or 9°F; fortunately, he estimated, such an eventuality would be unlikely for another two thousand years or more.

Barely four decades later, English steam engineer and amateur climatologist Guy Stewart Callendar published evidence that not only had global land temperatures increased over the previous fifty years, but this increase correlated with higher concentrations of CO_2 in the atmosphere. In the 1950s, Charles Keeling calculated that the level of atmospheric CO_2 was approximately 310 parts per million (ppm)—that is, for every million molecules of atmospheric gas, 310 were CO_2 —and began a series of daily measurements from atop Mauna Loa in Hawaii, which have shown that atmospheric CO_2 levels continue to trend upward.

Prior to the Industrial Revolution, the concentration of CO_2 in the atmosphere was approximately 285 ppm; by the time Hansen addressed the Senate, it had climbed to 350 ppm, and as I write this in mid-2024, it is roughly

426 ppm. During that time, and contra Arrhenius's belief that major warming would unfold on a timescale of centuries or even millennia, average global temperatures have already climbed by approximately 2°F since he made his calculations, with two-thirds of that warming taking place since 1975. Such increases, however, are not uniform; while the world has been warming, the Arctic has been warming most of all, roughly twice as much as the global average. In 2020, temperature across the region was approximately 4°F higher than the average between the years 1981 and 2010.

There are several reasons why the Arctic should be especially prone to warming. The “weather layer” of the atmosphere known as the troposphere is thinner above the poles than at the equator and so requires less energy to create a given amount of warming. Additionally, in the humid tropics, a sizable proportion of the Sun's energy is expended on evaporation; in the dry air of the Arctic, that energy leads directly to heating. And the Arctic contains a number of feedback mechanisms that exacerbate warming, primarily in the form of what is known as albedo: snow and ice cover in the polar regions reflects sunlight, meaning that those areas have a high albedo, but as that snow and ice melts, it exposes darker rock and water underneath, which absorbs more heat, prompting more heating and further melt.

Since 2007, the National Oceanic and Atmospheric Administration (NOAA) has been documenting observed year-on-year changes in the Arctic environment in an annual Arctic Report Card. Some of the more recent and notable documented impacts of increased Arctic temperatures: record low June snow cover in Siberia; extensive wildfires in northern Russia; “browning” of the tundra in North America; rainfall on the Greenland ice sheet; thawing permafrost that damages infrastructure and, in turn, releases additional stores of carbon into the atmosphere. But arguably the most visible, dramatic, and easy-to-comprehend change is in the extent of Arctic sea ice.

From mid-September until mid- to late March, Arctic sea ice steadily expands in area before decreasing with the return of warmer weather and longer days until it reaches its minimum extent and the cycle begins anew. Since 1979, microwave sensors on satellites have provided uninterrupted imagery of Arctic sea ice, and from the earliest years of analysis, there has been evidence that the extent of that sea ice was in decline. Initially, however, that decline was halting; for the first dozen or so years of observation, low summer ice coverage would be followed by a return to average, or near-average, conditions in the winter. That changed in 2002, when the September sea ice minimum fell to a record low of 2.3 million square miles, more

than 400,000 square miles below the 1979–2000 average and almost 66,000 square miles less than the previous record low. The next few years saw a mild rebound, another fall in 2005, and then, in 2007, a collapse.

That year, a confluence of atmospheric conditions laid waste to an ice cap that had not recovered strongly from the previous summer. The result was a September minimum sea ice extent of 1.65 million square miles, 23 percent lower than the previous low and 39 percent lower than the average during the satellite era. “Huge chunks of ice were missing,” Mark Serreze, director of the National Snow and Ice Data Center, later wrote. He described viewing the collapse with “a sense of morbid fascination. . . . I had never seen anything like this before.” In an interview with the *Washington Post* thirteen years later, he described that year as “the beginning of the ‘new Arctic.’ Since 2007 it [has] been one piece of bad news after another.”

As epochal as 2007 was, it would soon be surpassed. The year 2012 usurped its position as having the lowest sea ice minimum on record, and 2020 slotted into second place, while 2016 and 2019 would join 2007 in a statistical tie. As of July 2024, the seventeen lowest Arctic sea ice years were the seventeen most recent Arctic sea ice years.

Serreze has described Arctic sea ice as being in a death spiral as more Arctic warming begets further Arctic melting, which facilitates additional warming and yet more melting, the process potentially continuing absent correction until the cycle may be unstoppable.

(Although similar, “area” and “extent” are not quite the same. Area is the total amount of surface covered by sea ice; extent is the entire space within the outer boundary of sea ice coverage, including areas of open water. In the words of the National Snow and Ice Data Center, “A simplified way to think of extent versus area is to imagine a slice of Swiss cheese. Extent would be a measure of the edges of the slice of cheese and all of the space inside it. Area would be the measure of where there is cheese only, not including the holes.”)

While much focus is on the declines in Arctic sea ice area or extent, of arguably greater import is the even more dramatic decline in sea ice *volume*—and, at the same time, in its age.

Look at a graphic of Arctic sea ice extent over the course of a year and two things become immediately evident: there is, unsurprisingly, far more ice in winter than in summer; but there is some degree of sea ice coverage year-round. Some of the ice that forms in winter, in other words, persists through the following summer and into the following fall, and some of that ice survives yet further, into a third year or even beyond. And the longer sea

ice lasts, the more likely it is to continue to last because with each successive winter, it becomes progressively thicker: while first-year ice may be just a few feet thick, so-called multiyear ice can extend to a depth as great as fifteen feet. But increasing temperatures not only prevent ever-larger amounts of fresh ice from surviving into a second year; they also chip away at the older ice, reducing overall sea ice cover not only in extent but also in thickness and thus volume. According to data compiled by the Polar Science Center at the University of Washington, average Arctic sea ice volume in November has fallen from 4,828 cubic miles (mi³) in 1979 to 3,781 mi³ in 2001 and 2,254 mi³ in 2021. According to the National Snow and Ice Data Center, the amount of multiyear ice coverage in the Arctic declined from 61 percent in 1984 to just 34 percent in 2018, and just 2 percent was composed of the thickest, oldest ice that had persisted for five years or longer—raising the prospect, said Serreze, of a future in which multiyear ice could effectively cease to exist and “sea ice will be but a seasonal feature of the Arctic Ocean.”

That would matter for multiple reasons. Species such as polar bears that live and hunt on the surface of the sea ice would be most immediately and obviously at risk of depletion in, or extirpation from, those regions where their habitat was but a temporary feature; so, too, the ice-dependent species on which they prey. Thinning or absent ice, and any consequent alteration in the finely balanced timeline of ice melt and growth, could have comprehensive and complex consequences for the entire Arctic marine ecosystem to an extent that scientists are only beginning to unravel. For the people who live and subsist in the Arctic, and for whom sea ice is not just integral but fundamental to their history, culture, and survival, the changes would be profound, threatening the existence of a way of life that has thrived for millennia. Although the evidence remains inconclusive, declining Arctic sea ice may also have significant impacts on climatic conditions in lower latitudes as warmer temperatures disrupt oceanic and atmospheric circulation patterns.

And yet, where many see disruption and challenges, others sense opportunity, and not just in the opening of possible trade routes. In 2007, a Russian submarine planted a titanium flag on the seabed at the North Pole, and in October 2019, Russia's ministry of defense proclaimed that it had collected enough evidence to support a territorial claim to much of the Arctic Ocean. Canada has exerted a counterclaim, while Denmark has laid down its own metaphorical marker, based on the fact that a large area up to and beyond the North Pole is connected to the continental shelf of Greenland.

Some observers worry about the impact of increased traffic and development on wildlife and the environment, in the form of increased noise and development and the potential for accidents, oil spills, and pollution. Others envisage a scenario in which regional development and economic growth empower and enrich the peoples of the North. Some see competition, the emergence of a truly cold war as great powers jostle over issues of access and territory. The United States military reportedly frets about an “icebreaker gap”; defense think tanks compare growing tensions in the Arctic to those in the South China Sea; and the first Donald Trump administration clumsily declared a desire to purchase Greenland and responded in a huff when the notion was airily dismissed by Denmark. Yet there is a case to be made that such conjecture is overwrought and overblown, particularly given the existence of established treaties that promote a history of cooperation within the Arctic and the fact that Arctic nations are merely conducting due diligence in anticipation of the region ultimately becoming at least seasonally ice-free.

What is clear, however, is that absent steps to address climate change, the Arctic will undergo significant change in the coming decades. Indeed, it is already doing so, to an extent that the Arctic of today would in many ways be barely recognizable, both to those who first searched for passages through its frozen waterways and to those whose presence preceded them by centuries.

Northwest

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