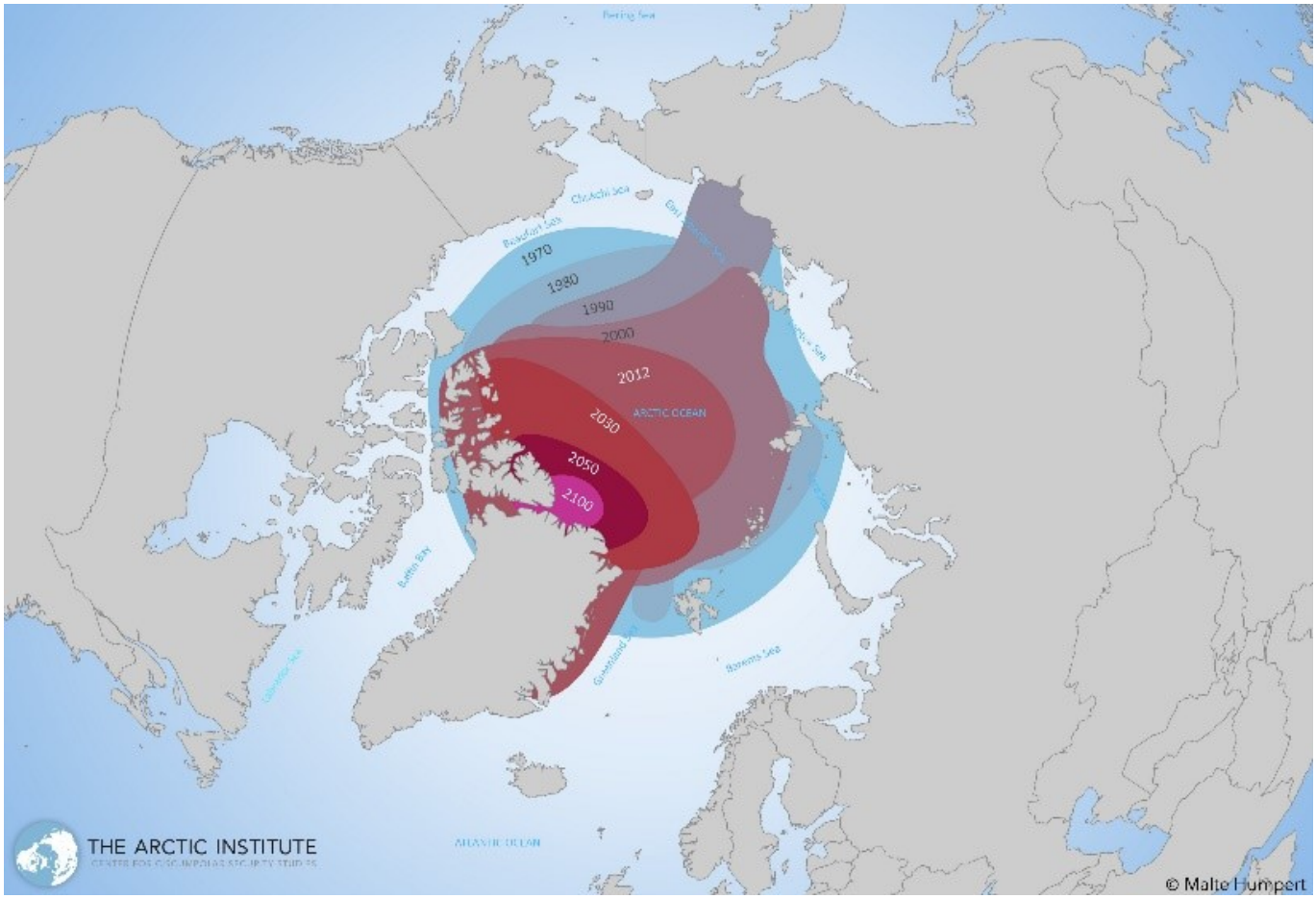
To fully understand contemporary Arctic globalization, and its significance to world politics, it is essential to understand the geopolitical connections interlinking the Arctic region to rest of the world across time. This interlinkage has a geospatial dimension that extends beyond the Arctic due to the region's increasing global influence (as a consequence of both climate change and historical processes of globalization), and a temporal dimension as well. The geospatial dimension is well understood today, thanks in large measure to climate scientists and their important work informing the world of the Arctic/global nexus, in addition to the many Arctic actors and scholars engaged in responding to the many pressing climate challenges affecting the region. Less well understood is the temporal dimension, which when considered is usually framed by a narrow snapshot of modern historical time, in which climate change (and, in particular, the polar thaw) is paramount. But a longer time horizon challenges us to rethink what Arctic means, and how long it has been connected to the world system, with multiple cycles of warming and cooling of global significance across the ages. To gain insight into contemporary Arctic globalization, these temporal, global dynamics can be illustrative and informative for re-contextualizing Arctic globalization as a dynamic and ongoing process that predates the rise of humanity.

We will thus look back almost a billion years (or Giga-annum (Ga)), deep into geological time and from there into human prehistory, extending our time horizon for understanding Arctic globalization through the lens of over 700 million years of Arctic globalism (before the rise of humanity) and globalization (after the start of human time in prehistory). Often, Arctic globalization is contextualized by much more ephemeral and recent snapshot in time, whether our present polar thaw, or during the Cold War (1945-90) and World War II (1933-45) periods of the 20th century, and even as "far back" as the late 19th century, such as the 1867 Alaska Purchase that made the United States an Arctic state. In some of my more historic work, I even look as "far back" in time as the colonial era's Fur Empires, from around the 16th century onwards, when the Arctic was first integrated with the global economic system While these eras all help to reinforce the idea of the Arctic as central to globalization, they all are, comparatively speaking, relatively recent events in the human story, and in the modernization of the world. But to gain deeper insight into the planetary dimensions of Arctic globalization with its enduring geographic and geopolitical centrality – and to help guide our geopolitical insights as we look forward in time to imagined Arctic futures – we will need to journey much, much further back in time, to deep (geological) history, before the rise of humanity. [See **Image 1**]

Image 1: The View from the North



Caption 1: ***A polar-centric view of the northern hemisphere reveals the Arctic's inherent and enduring geographic centrality, of increasing salience to Arctic globalization as the polar sea ice continues its historic retreat.***

Source 1: Malte Humpert, "Arctic Summer Ice Extent 1970-2100," Maps: Visualizing the Arctic, The Arctic Institute, May 17, 2016, https://www.thearcticinstitute.org/wp-content/uploads/2016/07/Summer-Ice-Extent-1970-2100-high-res.jpg.

Indeed, we'll start our journey over 720 million years ago – for a much deeper examination of the interplay of geology, climate, biology and later humanity with the Arctic across a vast

stretch of time. This truly "far back" view integrating deep geological and both prehistoric and historic human time will help us frame the remarkable endurance of Arctic globalization across the ages – from its deep geological roots deep in the Cryogenian Period (720-635 million years, or Mega-annum, ago) of the Precambrian Age when early life evolved and thrived, showing how the Arctic region and/or Arctic geophysical conditions have had planetary-scale influences across a vast stretch of time that dwarves human time by many orders of magnitude. The Cryogenian Period is also known as "Snowball Earth," a 100 million plus years when Earth's traditionally "polar" cryosphere experienced a global expansion that ultimately entombed our entire planet in ice. From here, we will leap forward to the Last Glacial Maximum in which much of the Earth was covered by glaciers, during the Late or Upper Pleistocene Epoch some 29,000 to 19,000 years ago when the first prehistoric waves of Arctic globalization took place during the last Ice Age. And from there, we'll fast forward to our own contemporary time of the Anthropocene when the polar thaw began to whittle away at our very comprehension of Arctic. These three snapshots spanning nearly a Giga-annum, fully one quarter of Earth's existence, will help to illuminate and inform our understanding of Arctic globalization across the eons.

Indeed, the Arctic has been central to several important chapters in Earth's most recent Giga-annum, a period we can think of as "deep history" (measured in geological, and not human, time) but which includes human prehistory as well as historic times. At various times in this long temporal gulf, the Arctic has served as either a geopolitical 'Rimland' (the term popularized after World War I, as global naval power was on the rise, by geopolitical theorist Nicholas J. Spykman), 'Heartland' (the contending concept popularized by his predecessor and theoretical arch-rival, Halford J. Mackinder, in the latter years of the colonial era prior to the cataclysm of World War I) or as the isolated 'Lenaland' (a term also coined by Mackinder but seldom used today, despite my efforts to popularize it over the years), as we have traditionally imagined the Arctic before the Anthropocene and its accelerating polar thaw. This deep dive across such a vast temporal sweep firmly contextualizes the Arctic at the geostrategic center of the world time after time, suggesting it may well be Earth's first and most enduring "Geographical Pivot" (the term Mackinder coined to described the Heartland's enduring geopolitical importance) fostering globalization – with the Arctic center stage for several major acts of Earth's continuing story, from the aptly named Cryogenian period of the Precambrian (hundreds of millions of years ago); through the Ice Age of the late Pleistocene in human prehistory when 'Arctic'

again expanded southward, this time bringing waves of humanity with it (tens of thousands of years ago); the medieval era. and in particular the Viking maritime migrations across the icy North Atlantic (hundreds of years ago); to our contemporary world, with its polar thaw and consequent rise in maritime access once again – and whether in its expansion or retreat, serving as a land, sea or ice bridge between continents and cultures (called by some the "stepping stones of giants").

Our starting point thus begins when all the world is believed to have been entombed in ice during the Precambrian's Cryogenian Period, a time more commonly known as Snowball Earth that is understood, upon its ultimate thaw, to have been triggered by the proliferation of multicellular life on Earth, part of the "Age of Early Life" that defines the Precambrian, when continents rose, and our atmosphere fully developed. Our next stop is more recent time (relative to Snowball Earth), but still far back compared to the most timeframes that inform our understanding of Arctic globalization – the Last Glacial Maximum (LGM) of the Late Pleistocene, from around 29,000 to 12,000 years ago, during which waves of migrating humans found their way to and/or through the Arctic in quest of new hunting and/or fishing territories, whether for prehistoric big game like wooly mammoths to smaller marine mammals and fishes. Their routes were, quite plausibly, varied – the most popular, and first to gain wide acceptance, being by foot along the coastal lowlands of the Bering Land Bridge that formed a land corridor traversing Beringia some 14,000 years ago. But archaeologists, finding evidence (in the form fossilized of human footprints) of an earlier arrival, postulate a use of the more northeasterly and earlier-accessible Mammoth Steppe route through what is now northern Alaska, Yukon and southwestern NWT) into today's Prairie Provinces and Plains States; and/or a Pacific maritime crossing (along what has been dubbed the "Fertile Shore," "Kelp Highway," or more simply "Coastal" route) adjacent to Beringia, and accessible both before its land bridge opened (an opening that is believed to have lasted some 5,000 years), and after it was inevitably flooded by melting glaciers after the LGM concluded, some 13,000-11,000 years ago. More controversial and with less scientific evidence is the "Solutrean Hypothesis" across the North Atlantic's "Icy Crescent" from Europe, a largely hypothetical, alternative prehistoric Atlantic maritime crossing skirting the icy coasts of the that link northern Europe to the Americas through what is now Iceland, Greenland, Labrador and Newfoundland, and that would again, many millennia later, transport seafaring medieval Vikings to North America. One can think of this as an ideological "Make Prehistory Great Again" counter-narrative to more scientific

interpretations of America's peopling along the very path some feared might entice invading Nazis to North America in World War II, particularly after Imperial Japan occupied the Outer Aleutian Islands at the outset of World War II along the ancient maritime route adjacent to Beringia, a prelude to yet another invasion that might have, but in the end did not, transpire.

Whether by land through Beringia or along the more northern Mammoth Steppe, or by sea across the Pacific's Kelp Highway (along the Fertile Coast) or the Atlantic's Icy Coast this multiplicity of migration routes and its extended waves of human migration had profound impacts on the Americas, which had as yet remained unpeopled, and with wildlife yet unharvested. Though prehistoric, the geopolitical consequences of this dynamic utilization of the Arctic as a strategic pivot through which humanity flowed, were profound – and indicative of the future geopolitical significance of the Arctic. A half-millennium after the Vikings braved the North Atlantic's Icy Coast, in the colonial period, commercial enterprises rooted in European capitals voyaged to/through the Arctic in quest of marine mammals, setting up shop in what became lightly settled Fur Empires such as the Russian-American Company (seeking to satisfy China's seemingly insatiable appetite for sea otter pelts) and the Hudson's Bay and Northwest Companies (seeking to satisfy Europe's equally insatiable appetite for beaver pelts), while commercial whalers sought precious whale oil to illuminate expanding cities as globalization began to vigorously integrate the Arctic's resource frontiers with European markets – decimating ecosystems and endangering otherwise sustainable Indigenous subsistence. And in our own time, anthropogenic climate change is fast opening up even more of the Arctic to contemporary natural resource exploration, and in time the long-isolated marine sanctuary afforded by Central Arctic Ocean's once permanent ice cover will be at risk, suggesting a final chapter in this long story of Arctic globalization that dates back 20,000 years.

While most discussions of the Arctic globalization focus upon relatively recent events from the Fur Trade to the end of the Cold War to frame our understanding, it is important to look further back in time for a deeper temporal perspective of Arctic globalization, in both human and geological time scales. Indeed, understanding the interplay of not just human life (since the Beringian migrations of the LGM) but life itself (starting with "Snowball Earth") on polar ecosystems across this vast stretch of time can yield new insights into Arctic globalization that are relevant to our own time, and provide a more diverse view of

the interconnections of the Arctic to our entire planet across a vast sweep of geological time, reflecting the global and enduring interconnections of the Arctic region to the nonpolar world, and its fragile and yet resilient web of life that increasingly unites humanity to so many polar species that humanity has sought.

Each of these periods noted above may be understood as a distinct "Age of the Arctic," with Snowball Earth being the age when all the Earth became a polar icescape, suggesting that "Arctic" (commonly understood to be the northern "end of the Earth," and one of the two "polar regions" (with some considering the high Himalaya a "third pole" of its own) is of itself a narrowly conceived era of divergence between both the nonpolar world and the frozen extremes of the Earth (whether the North and South polar regions, or the high alpine, glaciated components of Earth's cryosphere), and between an unchanging temporal and spatial frozen state, and our current era, the Anthropocene, with its accelerating polar thaw driven by anthropogenic climate change (what Canadian Arctic expert, author and journalist Ed Struzik foresaw in 1992 as a looming "End of Arctic."[1] But in between these poles of divergence, the polar world has in fact ebbed and flowed with a dynamic cycle evident in the geological record, even though the human experience of Arctic is bookended by the frozen world of the ice age during the LGM, and today's warming (and sometimes burning) Earth. Below, we will journey through prehistory, from Snowball Earth some 720 million years ago to the more recent LGM some 20,000 years ago, when humanity began its very first wave of Arctic globalization, to our own time, the Anthropocene, with its polar thaw and consequent acceleration of Arctic globalization.

From The Ages of the Arctic to the End of Arctic

When teaching these many Ages of the Arctic that appear in history (and prehistoric deep history) as I did while visiting the University of Akureyri as a Fulbright Scholar in 2020, I often start with the prescient architect of America as an Arctic state, William H. Seward, who as Secretary of State during and after the Civil War positioned the recently reunified United States for its global rise by expanding to the polar region; author Ed Struzik, whose prescient "The End of Arctic" cover story in *Equinox* magazine (noted above) was published in 1992, decades before most of us became aware of the polar thaw; and pioneering Arctic international relations theorist Oran Young, whose equally prescient 1985 *Foreign Policy* article, "The Age of the Arctic"[2] framed Arctic international relations through a

geopolitical lens centered upon the North Pole just five years before Struzik foresaw the Arctic's very end). Whether we joyfully welcome the arrival of the "Age of the Arctic" proclaimed by Young or mourn the "End of Arctic" as foreseen by Struzik, it becomes clear that these contending visions of the Arctic span a diverse range of sentiments regarding what we may gain versus what we may lose, much as experienced at the dawn of life on Snowball Earth, and later at the dawn of human globalization during the LGM. Whether we are at the dawn of a new "Age of the Arctic" or in the first spasms of the "End of Arctic," we find ourselves in Hegelian dialectic that seems to oscillate across the ages between Oran Young's optimistic "Age of the Arctic" and Ed Struzik's pessimistic "End of Arctic," and this oscillation can be traced all the back to Snowball Earth (some 720 million years ago) and all the way up to our present time.

Indeed, my view is that these are all chapters in a pendular and expansive age of Arctic dynamism that resonates across geological history and may even apply to our quest for life beyond Earth at the interface between ice and liquid water, whether on the icy moons of Jupiter or deep in Pluto's core, or on exoplanets circling distant stars in those solar systems' habitable zones. Back here on Earth, if we broaden the time scale of our discussion, and consider human prehistory and deeper geological history as a continuous story, we can view this new, enduring age of Arctic dynamism as one that extends from deep into Earth's past into our own time. The immediate relevance of deep history to the present may not always be obvious, since it not only predates the evolution of humanity, but marks the transition from single-celled life to more complex multicellular life. But as metaphor – to help us understand the range of changes in Arctic climate that we observe across the eons (measured in billions of years) – w come to understand the Arctic as an inherently dynamic place where change in many ways is the norm, and not the exception. In such a world, Arctic climate change is not a crisis or ephemeral event but the status quo for at least the last quarter of our planet's (and solar system's) very existence. Arctic dynamism embodies a dynamic fluidity and perpetual motion that greatly contrasts with the traditional view of a frozen and unchanging Arctic. Whether we look much deeper into the past, to geological history (hundreds of millions of years, or Mega-annum (Ma) ago), or less deeply to human prehistory (tens of thousands of years ago), or even more recently to the colonial era when globalization began to modernize (measured in hundreds of years, or centuries), we find some intriguing connections to and parallels with the Arctic of our own time. And while contemporary Arctic globalization has been deeply impacted by anthropogenic climate

change, if we recontextualize man-made effects as only the latest biological disruption to the Earth climate system by the world's current apex predator and predominant species, human beings, we can more readily understand the connection to the biological renaissance that followed Snowball Earth, and other periods in which climate change resulted from disequilibria to Earth's biosphere by runaway carbon or methane production by one species or another across the ages. The Anthropocene thus becomes more a norm and less a deviation from historical trends across geological time.

Indeed, when we turn our attention to the many worrisome manifestations of Arctic climate change today, we find not a break with the past but a reconnection to it that is often overlooked. In the murky depths of geological and human history, we can both contextualize and transition from the contending Ages of the Arctic to a broader discussion of Arctic climate (and its dynamic change) reaching deeply back in time, indeed, all the way back to the Cryogenian period (from Greek *kryos* (cold) and *genesis* (birth), when our entire planet is believed to have been entirely covered in snow and ice from pole to pole with a planetary-wide cryosphere that in essence defined our entire planet to be *Arctic* – in striking contrast to today's world, defined since the end of the LGM by a much smaller cryosphere in just our polar regions and in high alpine glaciers like in the Himalaya (called by some the "Third Pole"), where what remains of the Arctic is a mere fraction of the Earth's earlier cryosphere, and even when combined with the other cryospheric holdovers from deep antiquity, conveys not only an extreme of climate and geography, but a dynamism as well. By broadening our time-scale for this extended age of Arctic dynamism, and considering both prehistory and geological history, the immediate relevance of such deep history to understanding our present-day Arctic will become clear; indeed, understanding the range of changes in Arctic (and global) climate that we can observe across the eons, we are reminded that Arctic is dynamic and where change, in so many ways has been the norm, one that is accelerating in our time, but well within the range of climatic variation that deep history presents to us.

Snowball Earth: An Age of Ancient Arctic Globalism

Indeed, geological history provides us with some compelling metaphors for understanding the Arctic, its place in our planetary history, and its place in the human story. "Snowball Earth," during the aptly-named Cryogenian period that started over 700 million years ago, is believed to have been essential to kick-starting evolution beyond microorganisms by

toughening up early life forms through shell formation and other adaptations to the era's planet-wide deep freeze; the Paleocene/Eocene boundary (where these two epochs transition, around 56 million years ago), when tropical forests colonized the High Arctic, forming what is now a somewhat counterintuitive oasis of "tropical" life that stretches the imaginations of those who perceive the Arctic as perpetually frozen; and the period that followed the LGM, a relatively recent 20,000 odd years ago, when sea levels dropped, revealing the Beringian land bridge connecting Eurasia to North America – one of the principal, but no longer considered only migration routes for the peopling of the Americas, extending humanity to every continent (with, until our own time, the singular exception of Antarctica).

Near the end of the Proterozoic Eon, which ran from 2.5 billion years ago to around 500 million years ago, Earth had an ice age like no other during Snowball Earth. While not everyone agrees on the details, most agree that all or nearly all of Earth became frozen over, and this frigid period is aptly called the Cryogenic. The theory is that there was so much oxygen replacing carbon dioxide in the atmosphere that temperatures dropped to freezing even at the equator – with an echo of today's climate change (but whose direction is in reverse). It was in essence the opposite of today's excess atmospheric carbon that is warming the Earth. Some believe that the challenge of surviving Snowball Earth toughened life up, hence the notion of it "kick-starting" evolution, in a new, robust directions. After the big thaw that followed (some 600 million years ago), life proliferated, much as it would yet again after the last Ice Age, when humanity ascended and globally proliferated. Snowball Earth can thus be understood as a vital mechanism for life's (and later humanity's) forward evolutionary journey, suggesting that what we think of as Arctic is indeed central to the story of life and humanity on Earth – that just as "all roads lead to Rome" during *Pax Romana* two millennia ago, the Arctic has been a central crossroads and springboard of life for planet Earth. As today's Arctic thaws, it can continue to serve in this central role, perhaps more visibly and obviously than in the past. Some scholars see Snowball Earth as more snow, less ice, and thus called a less cryogenic "Slushball Earth."[3]

Archaeologists have long known from the ancient fossil record that Canada's Arctic tundra was formerly covered in rich forest during the Paleocene/Eocene boundary, and the few visitors to venture as far north as the Queen Elizabeth Islands in Canada's High Arctic often come across the petrified forests from this time long ago. As University of Saskatchewan

paleobotanist Christopher West describes, “The heady aroma of magnolia blossoms and lotus flowers might have wafted to your nostrils if you had gone for a walk 56 million years ago in the lush green forest which covered Canada’s northernmost islands.”[4] West further describes: “It’s very surprising how similar these ancient polar forests were to some of our modern forests. … The presence of these forests gives us an idea about what could happen over long periods of time if our modern climate continues to warm, and also how forest ecosystems responded to greenhouse climates in the distant past.”

If we consider the metaphorical fluidity and centrality of “Arctic” to our world – and how at one point in time (long ago, in the Cryogenian), our entire world was a world of ice and snow, not unlike like what Pluto looks like in our outer solar system today, with its famed ice mountains and continent-sized glaciers; while at another point in time (after Snowball Earth underwent its transformative thaw), even the highest of High Arctic territories became veritable “tropical” paradises teaming with life, from dense and fertile forests to productive waters with abundant marine life; and then at another point in time, one closer to our time, as the last Ice Age ended, a Eurasian/North America transit corridor opened up between the old and new worlds, globalizing the human story with the peopling of the Americas (whether by land or by sea, or by both). Each of these snapshots in deep-history presents us with a different metaphor for the future Arctic that remain connected to one another by their facilitation of the human journey. A land of perpetual ice and snow, as many had expected the Arctic to remain forever until just over a decade ago, was not a barrier to life’s evolutionary advance, but instead a corridor connecting deep time with our time and uniting the whole of the world at its top.

An increasingly warm and fertile region today, where plant and animal life that evolved far to its south is now taking root and thriving, was once itself a warm and fertile region, perhaps even more so, than we can now glimpse in our future. And as a strategic transportation corridor uniting the continents, the emergent sea lanes so widely discussed as part of our future (and perhaps a seed for future conflict, as many emergent Arctic cold warriors predict), are not unlike those of yesteryear. Each of these ages of the Arctic starting in deep geological history and continuing to the dawn of humanity and from there to our own time, is intriguing unto itself, but the dynamic range of variation in the ages of the (inclusive of Struzik’s foreseen “End of”) Arctic, is perhaps the most compelling takeaway. The Arctic as a dynamic and at times paradoxical state of change, oscillating

between its polar extremes while always nudging life (and humanity) further along its road to tomorrow, helps us to understand and contextualize Arctic of today, where change, from the extremes of freeze and thaw, is of itself the common thread that united this disparate ages that span almost a billion years of Earth's story.

Prehistoric (Ice Age) Foundations of Arctic Globalization, from 30,000 B.C.E to the Present

Discussions of Arctic globalization are often limited in their time horizon to the current period of polar thaw or look back from our present 21st century to World War II and the Cold War when the Arctic region played a central geopolitical role. Some historians gaze further back in time, to the 19th century when the Arctic states now sovereign in the polar world expanded north, including America's own 1867 purchase of Alaska from the Russian Empire, then in fateful retreat from North America. Elsewhere, I have looked back to the colonial era, when the Arctic was first economically integrated with the world economy during through the fur and marine mammal trade.

But here, I refocus my historical lens to gaze even further back in time, to prehistory (or as some now call it, paleohistory) – and in particular, the Ice Age, helping to foster a deeper understanding of the roots of Arctic globalization that become evident with such an extended time horizon. Indeed, looking back to humanity's epic prehistoric peopling of the Americas during the Last Glacial Maximum in the late Pleistocene, we bear witness to Arctic's emergence as humanity's first truly global geopolitical pivot. In our discussion, we will consider the principal theories associated with these prehistoric, trans-Arctic migrations that took place around 20,000 (starting as early as 30,000, and continuing to as recently as 12,000) years ago – which will help to contextualize our more contemporary Arctic migrations that continued into the middle of the 20th century, and which are expected to resume in the future under the environmental, ecological, and economic pressures of Arctic climate change.

One of these theories can be described as a proto-Clausewitzian Beringian Land Bridge theory,[5] a proto-Mahanian Fertile Shore, Kelp Highway or Coastal theory[6] and a more protracted, bi-directional Standstill theory that postulates an extended (multi-millennia) human presence in Beringia, which remain unflooded for some 5,000 years, from which

subsequent generations migrated bi-directionally forth to the Americas and back again into Eurasia.[7] There are numerous debates and contending views on archaeological support for one or another but knowing the diversity and ingenuity of our species it seems plausible to me that all three are correct to at least some degree, and not mutually exclusive of one another. In the case of how the Americas became peopled, all of the above may in fact be the most correct answer.

The original Beringian Land Bridge theory postulates the opening of an ice-free passage enabling migration in search of megafauna (the Clovis spear hunters, who specialized in big game like mammoth, which went extinct around this time) some 13,500 years ago.[8] The Fertile Shore theory (also known as the Kelp Highway or Coastal theory), postulates a maritime migration along the fertile and life-sustaining Pacific coast. Archaeological evidence indicates humanity arrived thousands of years before the ice-free corridor opened up, but along much of this postulated route, sea level rise has erased any archaeological record. But not for all of their route, such as along coastal British Columbia where there was a much smaller sea level rise of just two meters, preserving some of the archaeological record, and revealing increasing evidence of a maritime expansion, which is all the more plausible considering the Austronesian expansion across the Pacific a millennium ago crossed the open Pacific, a much riskier feet even if much later in the human story.

Beringia is the region stretching from the Lena River in Siberia to the Mackenzie River in Canada, along which I lived during the 1990s. It also includes the Yukon River watershed, which forms a riverine trade route from the Bering Sea all the way into the Yukon and across its border into northern British Columbia, an active migration route from the late Pleistocene. Interest in Beringia has grown in lockstep with the proliferation of theories on Beringian migration. On the Alaska side of Beringia, named the Seward Peninsula for William H. Seward, whose 1853 “Destiny of America” speech presented America’s polar ambitions as part and parcel of its rise as a global power, a vision that he achieved at least in part with the Alaska purchase fourteen years later. And more than a century after, in 1978, then President Carter created a new national monument celebrating Beringian heritage, the Bering Land Bridge National Preserve on the Seward Peninsula, just across from Chukotka in Siberia, which two years later, as part of the sweeping Alaska National Interest Lands Conservation Act (ANILCA) that redressed the exclusion of subsistence protection from the Alaska Native Claims Settlement ACT (ANCSA) of 1971, it became a

national preserve which opened these very lands to subsistence hunting by natives, linking, at least metaphorically, the original indigenous migration across Beringia to the restoration of indigenous subsistence to those very lands.

The shared heritage of the Beringian region, and the remembrance of the Ice Age interconnection of Siberia to Alaska via the land bridge, is the focus of a U.S. National Park Service research program that supports researchers on both sides of the bridge, helping to preserve its collaborative spirit in our own time, including geologist David Hopkins who conducted field research in the Seward Peninsula, and who worked with an interdisciplinary group of scholars to document the land bridge theory of migration across what is now the strait separating the United States and Russia. The region, like adjacent parts of Alaska, has been experiencing profound effects of climate change, and over a decade ago, the Bering Land Bridge National Preserve experienced a sudden and massive die-off of an entire muskox herd from a storm surge that shattered sea ice, causing them to plunge into the icy depths, providing us with a bridge not only linking the two continents that nearly meet in Beringia, but the two extremes of Arctic climate that profoundly influenced humanity in the same region: the Ice Age land bridge that brought humanity to the Americas, and the current polar thaw, which appears to be fast bringing the last chapter of the Ice Age to its end in our time.

The Many Migration Mysteries and Ambiguities of Ice Age Globalization

The debates behind the theories of Beringian migration, and the politics of the routes supposedly taken, and their alignment with archaeological, paleobiological, and indigenous origin legends, also reveal to us the passions unlocked in looking back deep in time. Science does seem to support a more complex history and prehistory than many presume, and perhaps a longer sojourn in Beringia that cultivated the emergence of a new, Arctic or trans-Arctic culture, something like the mythical lost continent of Atlantis that was swallowed up by the sea covering the tracks left behind. It shows us how the Arctic has been part of globalization for at least 20,000 years, shaping the destiny not only of the North, but of the continent and hemisphere, perhaps the world. We see in our look back that there was an Age of the Arctic long before there were theorists to postulate the emergence of such an age. And visionaries like William H. Seward who foresaw a destiny in the Arctic for the United States, were prescient in seeing value in this far and remote geography for a nation

just exiting the maelstrom of civil warfare, and reuniting as a people, though the ages of the Arctic and its dynamism as a catalyst for the evolution of complex life, and later the globalization of humanity, has roots deeper in time. For humanity, it was every bit as important that the Ice Age started as it ended, and at both the beginnings and ends of the LGM, it brought Earth's continents, seas and peoples together, stimulating march of humanity to the Americas from Eurasia, completing the human journey, the Arctic's first wave of globalization – the Arctic as a crossroads that would reappear millennia later, in our time.

A variation of classic Beringian Land Bridge Theory that better corresponds to the more complex archaeological and genetic record, is the Standstill Theory postulating the emergence and genetic differentiation of "Beringians" as distinct from Asian peoples, thus emerging as a separate trans-Arctic group that started arriving as far back as 36,000 years ago, and "stalled" in Beringia around 21,000 years ago, enjoying upwards of 5,000 years of Beringian isolation and civilizational and cultural development before splitting into three separate waves as post-Ice Age warming commenced, migrating south (to South America), southeast (to the rest of North America), and finally, northeast (into the Arctic), bringing Aleut, Yupik and Inuit now indigenous to Arctic North America.

The Dorset people (called the Tuniit by the Inuit) came before the modern Inuit, and peopled the Arctic from around 500 BC through to the middle ages (1000 to 1500 AD), subsisting primarily by seal hunting and land mammal hunting but not apparently by whaling; they were eventually displaced by the more modern Thule migration, which started around 1000 AD, and which introduced new technology including whale and walrus hunting tools and long distance sleds, and the Thule either crowded out the Dorset, outcompeting them for game, or possibly annihilated them through war. It is quite possible that the Inuit thus "conquered" a hitherto peopled Arctic from an earlier indigenous people, practicing a form of expansion we nowadays associate with state expansion that either absorbs, displaces or annihilates smaller, sub-state entities in the path of expansion. At the very least, the Inuit expansion across the Arctic, which has roots in late prehistory (commencing just a few thousand years ago), has continued into the mid-20th century (facilitated by the modern state, in particular Canada – which sought to settle the Queen Elizabeth Islands with an "indigenous" populace that was in fact exogenous to the High Arctic, the Inuit of northwestern Quebec in the 1950s – and thus completed, in contemporary times, a

migration with ancient roots – and is thus not entirely rooted in the distant haze of prehistory known as "Time Immemorial," challenging our conception of indigeneity, forcing us to recognize peoples from prehistory, and early history, were not necessarily unique in their trans-Arctic geographical migrations and expansions from our own time, and may well have practiced a form of colonial and imperial expansion we now associate with states.

This not only challenges our understanding of what indigeneity is but forces us to re-align our conception of sovereignty with mobility – as the early Ice Age cultures were on the move, and even once settled practiced much dynamic seasonal migration in search of game or living marine resources. The epic Thule migration, according to some, may have crossed the entirety of the Arctic from Alaska to Greenland in just a few years (owing to the survival of fragile pottery found along the entire migration route, which is not thought to have been able to survive much longer.) And so we gain insight from the past not only into the deep-geological time impacts of "Arctic" climate (when "Arctic" could be said to define the planetary state during Snowball Earth) on life and its evolution, but also the broad, millennia-long impact of "Arctic" globalization on humanity (with Ice Age origins, when "Arctic" extended across much of North America), and the ambitions of humanity as it encountered new lands and waters, crossing new frontiers, and settling new territories far from their starting point.

After the Ice: Accelerated Arctic Globalization in a Warming World

Thinking about the peopling of the Americas in prehistoric times, and the dueling theories of Ice Age migration, I quite like having multiple theories to ponder, and do not see it as an either-or, one-size-fits-all situation, since each of these trans-Arctic migration theories contains its own metaphorical value for thinking about our own time. Some find there is much that is counterintuitive about the original Bering Land Bridge theory – including its non-alignment with so much of the archaeological record. The newer coastal theories have much that is appealing, including an alignment with recent coastal archaeology and an embrace of maritime migration– and is a logical explanation for seafaring peoples who may not have needed to head north by land, but instead ventured out onto littoral or even open seas. As noted above, when you consider the success of the Austronesian expansion across nearly all of Oceania, and perhaps as far east as the coast of South America, an earlier maritime explanation cannot be dismissed outright, at least as a partial explanation for the

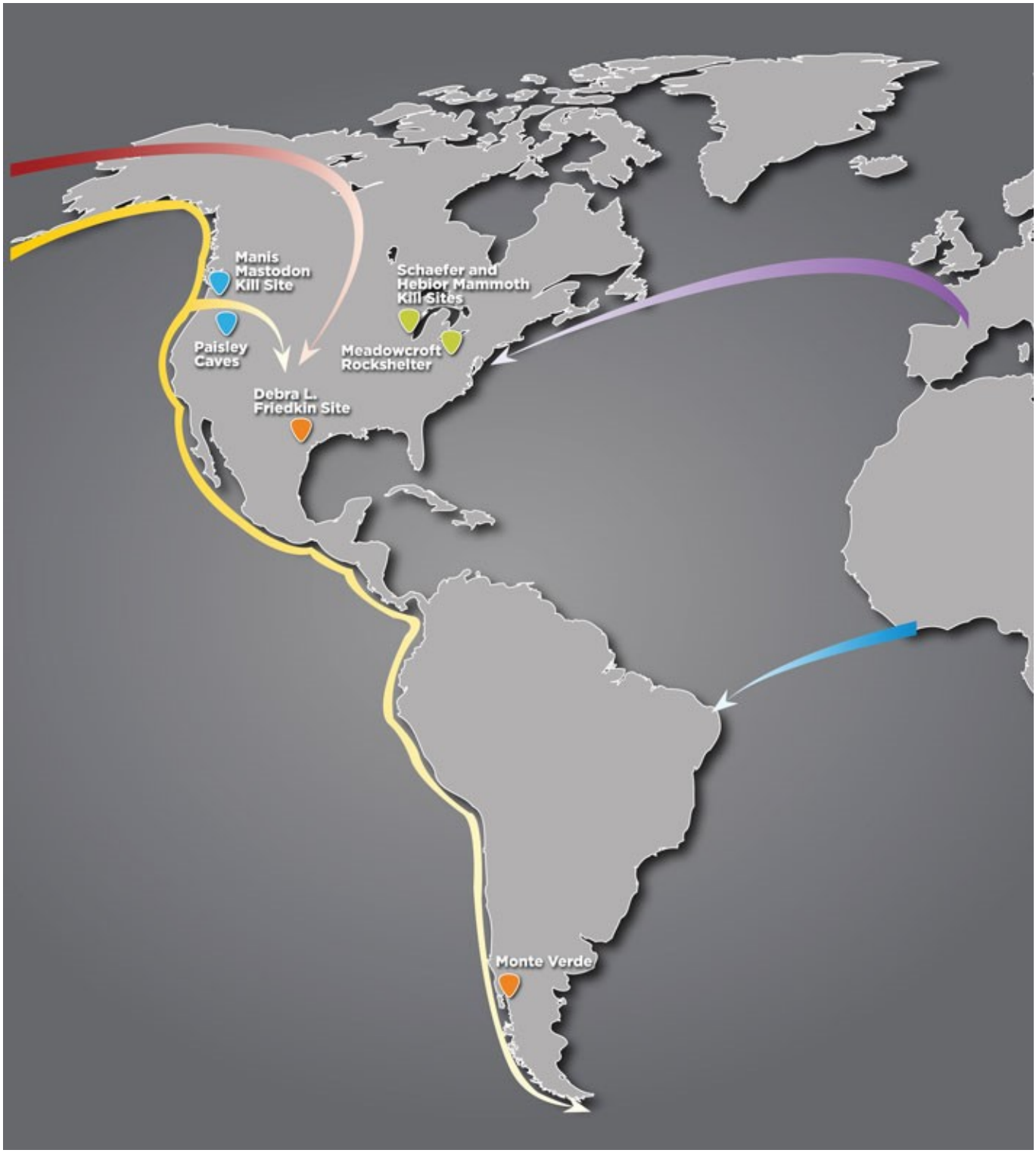
peopling of Americas.

As well, there are some intriguing cultural parallels across the North Pacific, such as between the Ainu in and around the island of Hokkaido and the Kurils, and several of the B.C. coast First Nations, which shared bear worship, subsisted off migrating salmon, and erected magnificent totem poles, to reinforce the plausibility of a direct maritime bridge. On the other hand, the Thule migration and prior Dorset routes clearly arced toward the far north/northeast – and were among the last of the large migrations from the general vicinity of Beringia, suggesting that at least some peoples headed that north through Beringia after earlier routes had been sufficiently peopled, perhaps facing competitive pressures from earlier, and in some cases, larger groups further south, or potentially – fostered by adaptation to the cold, Ice Age Beringian landscape, found the Arctic coast to be comparably hospitable than the steppes of Central Asia from which they started, and were well adapted by their transit through or "standstill" in Beringia. The original Clovis/megafauna-hunter explanation across a more northerly Mammoth Steppe may similarly explain just one path of migration for big-game hunting peoples, while excluding the many maritime/fishing peoples who either stayed along the coast or traveled across open ocean like the Austronesians. Each of these theories thus captures one part of the mosaic of prehistoric, trans-Arctic migrations to the Americas.

One can imagine a grand clash between maritime peoples and interior game hunters that may have played out across Eurasia and into the Americas – the former providing a prehistoric proto-Mahanian strategic (intuitively recognizing the strategic pre-eminence of a sea power) and Spykmanian geopolitical (intuitively recognizing the strategic pre-eminence of a maritime Rimland) conception of migratory expansion by sea, and the latter a prehistoric proto-Clausewitzian strategic (intuitively recognizing the strategic pre-eminence of a land power) and Mackinderian geopolitical (intuitively recognizing the strategic pre-eminence of the interior Heartland) conception of migratory expansion by land – bumping into each other at interfaces such as river deltas and across the entirety of Ice Age Beringia. The relatively recent strategic competition between Athabaskan and Inuit peoples from the Yukon-Kuskokwim Delta, up and over the Yukon watershed to the Brooks Range and into the Mackenzie Delta, and along the Nunavut boundary with the northern prairies; and perhaps the hypothesized prior Thule-Dorset clash (which may well have been an early manifestation of the more modern Inuit-Athabaskan clash), aligns with this somewhat. If we superimpose

all these regional rivalries between migrating prehistoric peoples, some with maritime strengths and others better adapted to the interior, we can comparatively understand both the emergence of so many different hypothesized migration corridors as well as their modern variants – each tailored to the strategic and economic cultures of the people involved in their utilization, whether defined by the sea, its coasts, and/or in the interior. At the very least, it creates some intriguing metaphors to frame contemporary discussions of the various Arctic shipping routes, and who favors which and why. [See **Image 2a**]

Image 2a: Destination: The Americas



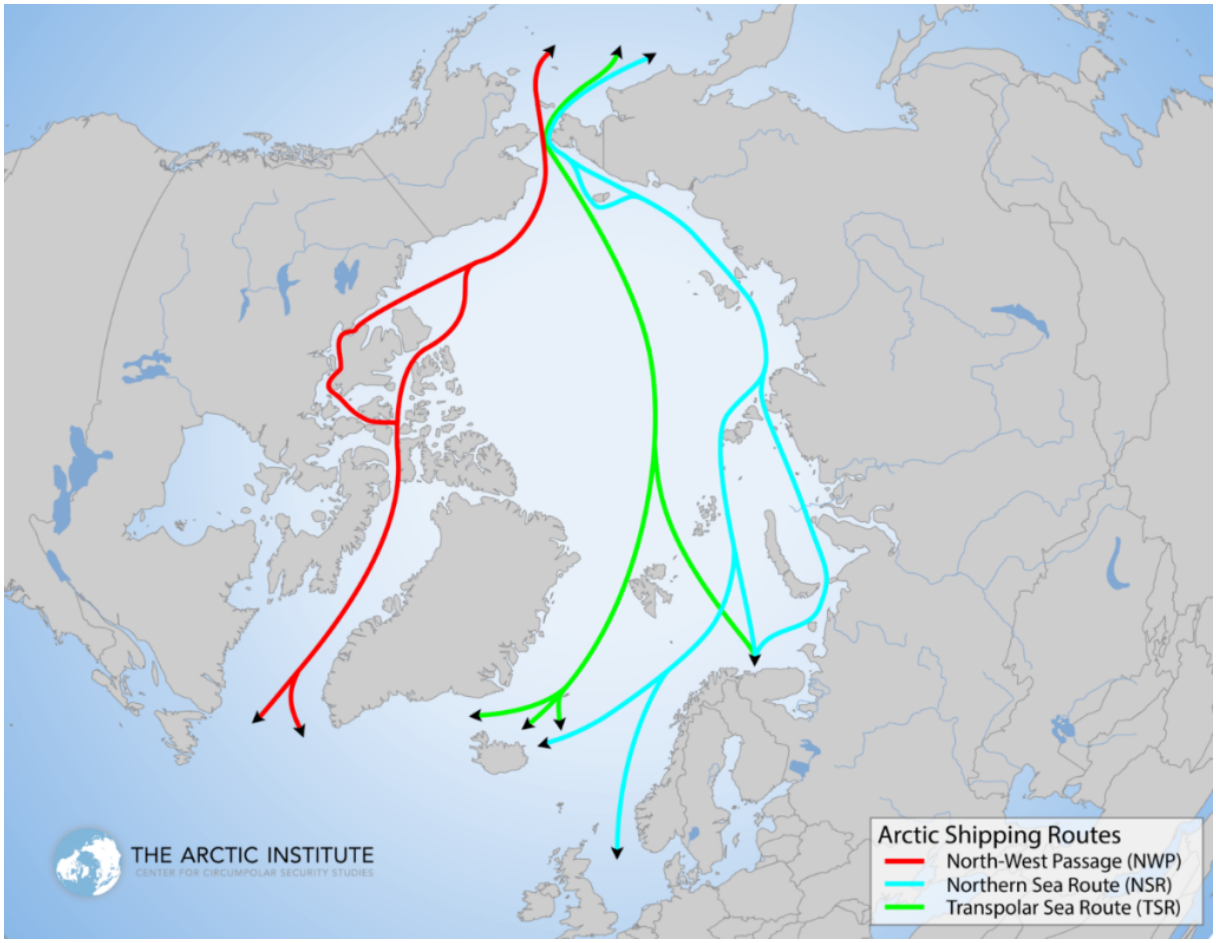
Caption 2a: ***The proliferation of theorized Ice Age migration routes to and through***

the Arctic is reminiscent of the emergent Arctic trade routes of the Anthropocene.

Source 2a: Nikhil Swaminathan, "Destination: The Americas," Archaeology Magazine, September/October 2014, https://archaeology.org/issues/september-october-2014/collection/peopling-the-americas-paradigms/.

Indeed, the debates over these prehistoric migration routes through the Arctic remind me of the contemporary debates over future Arctic shipping routes – and whether the Northern Sea Route (NSR), Northwest Passage (NWP), or a Transpolar Route will emerge as future marine transit highways, not just hypothesized proposals – or as described by Malte Humpert, a fully utilized "golden waterway" and not a "niche trade route."[9] [See **Image 2b.**]

Image 2b: Arctic Sea Routes: NSR, NWP and Transpolar Route



Caption 2b: ***Arctic shipping routes: 'golden waterways' or 'niche trade routes'?***

Source 2b: Malte Humpert, "The Future of the Northern Sea Route – A 'Golden Waterway' or a Niche Trade Route," The Arctic Institute, September 15, 2011, https://www.thearcticinstitute.org/future-northern-sea-route-golden-waterway-niche/.

More likely, in time, all three routes will find appreciative users whose needs are met by one or another, whether it's security concerns (that currently aligns Chinese maritime interests with Russia's NSR, while leaving Japan, until 2022 caused Tokyo to split with Moscow over its Ukraine invasion, a major investor in the NSR, now on the sidelines), or simple questions of the shortest path between departure ports and arrival destinations, or thornier questions of future ice conditions as pack ice breaks apart and drifts south). It is true the NSR is the first of the Arctic marine transport routes to be properly commercialized; but the NWP is

expected to eventually follow in its wake, after an initial lag in development caused in part by Canada's less exuberant embrace of Arctic shipping (fearing the environmental and security consequences) and its less attractive ice conditions (compounded by an insufficiency of icebreakers to ensure the trade route can stay open).

Many hope that a direct route over the pole will open up, avoiding any conflicts with sovereigns like Russia and Canada, who view these passages as territorial even when most believe otherwise, with UNCLOS, as the ice retreats and Article 234 (Ice-Covered Areas) becomes less relevant. Article 234 of UNCLOS states: "Coastal States have the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice-covered areas within the limits of the exclusive economic zone, where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation, and pollution of the marine environment could cause major harm to or irreversible disturbance of the ecological balance. Such laws and regulations shall have due regard to navigation and the protection and preservation of the marine environment based on the best available scientific evidence."[10] This would be welcome to Japan, whose isolation of Moscow has come, for now, at the cost of its continued role in the NSR, and to China, whose alignment with Russia, while of near-term benefit, is less appealing than an alternate trade route independent of any single sovereign, friendly or not. In this way, a continued polar thaw would, in time, displace both the NSR and NWP in favor of a trans-polar route.

One can imagine, two dozen millennia ago, various groups of Ice Age humanity having, in their own way and through their selected routes, a similar "debate": across the land bridge of Beringia (or the adjacent waters of the "Fertile Coast" or "Kelp Highway"), over the Mammoth Steppe to its north; or even across the icy North Atlantic. This multiplicity of migration routes and diversity of direction positions the Arctic as a crossroads of globalization since ancient times, linking Asia, Europe and the Americas through or adjacent to Beringia, the Mammoth Steppe or the High North Atlantic's Icy Crescent, each forming a prehistoric "Middle Ground" where distinct precursor civilizations seeded what would become America's rich mosaic of Indigenous diversity. How little the world has changed in over 20,000 years – or, in other measures, 200 centuries; 7.3 million days; or 630.72 billion heartbeats – and yet, how much the world has changed! This perhaps is both the paradox

and lesson of this ongoing age of "Arctic dynamism," from the deep geological time of Snowball Earth, when multicellular life proliferated; to the first wave of Arctic globalization during the LGM, in human prehistory; to our own present moment in time, the Anthropocene, with its accelerating polar thaw. The Arctic united us all, regardless of our origins, regardless of our present "Arcticness." Accordingly, it is here for all of us, whether America, Russian or Chinese, or any of the many nations that look to the Arctic for their futures, or in their pasts (or both).

Our deep dive across this vast, at times overwhelming sweep of time, finds the Arctic has and remains at the geostrategic center of the world – or, as Cyndi Lauper might remind us, "*If you're lost you can look, and you will find me, time after time; If you fall I will catch you, I will be waiting, time after time*." This positions, contextualizes and reinforces the Arctic as Earth's first and most enduring geographical pivot – central to the evolution and proliferation of multicellular life in deep geological time; to the flow of humanity across the polar region to the Americas during the first wave of Arctic globalization in the prehistoric Ice Age; to our contemporary world of the Anthropocene, serving as a bridge between continents and cultures, the long-imagined "stepping stones of giants" – and increasingly, for the rest of us as well.

Endnotes

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