Inventing Greenland – Designing an Arctic Nation

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By

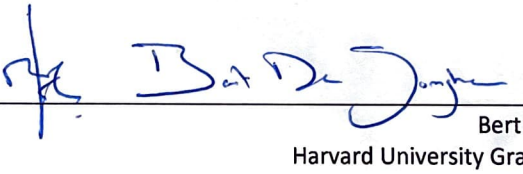
Bert Germain M. De Jonghe
Master of Landscape Architecture, The Oslo of Architecture and Design, 2018

Submitted in partial fulfillment of the requirements for the degree of

Master in Design Studies
Urbanism, Landscape, Ecology

At the Harvard University Graduate School of Design

May, 2021

Signature of the Author 

Bert Germain M. De Jonghe
Harvard University Graduate School of Design

Certified by Charles Waldheim

Charles Waldheim
John E. Irving Professor of Landscape Architecture
Harvard University Graduate School of Design

Bert Germain M. De Jonghe
MDes ULE Independent Thesis
Advisor Charles Waldheim
Harvard University GSD

2021

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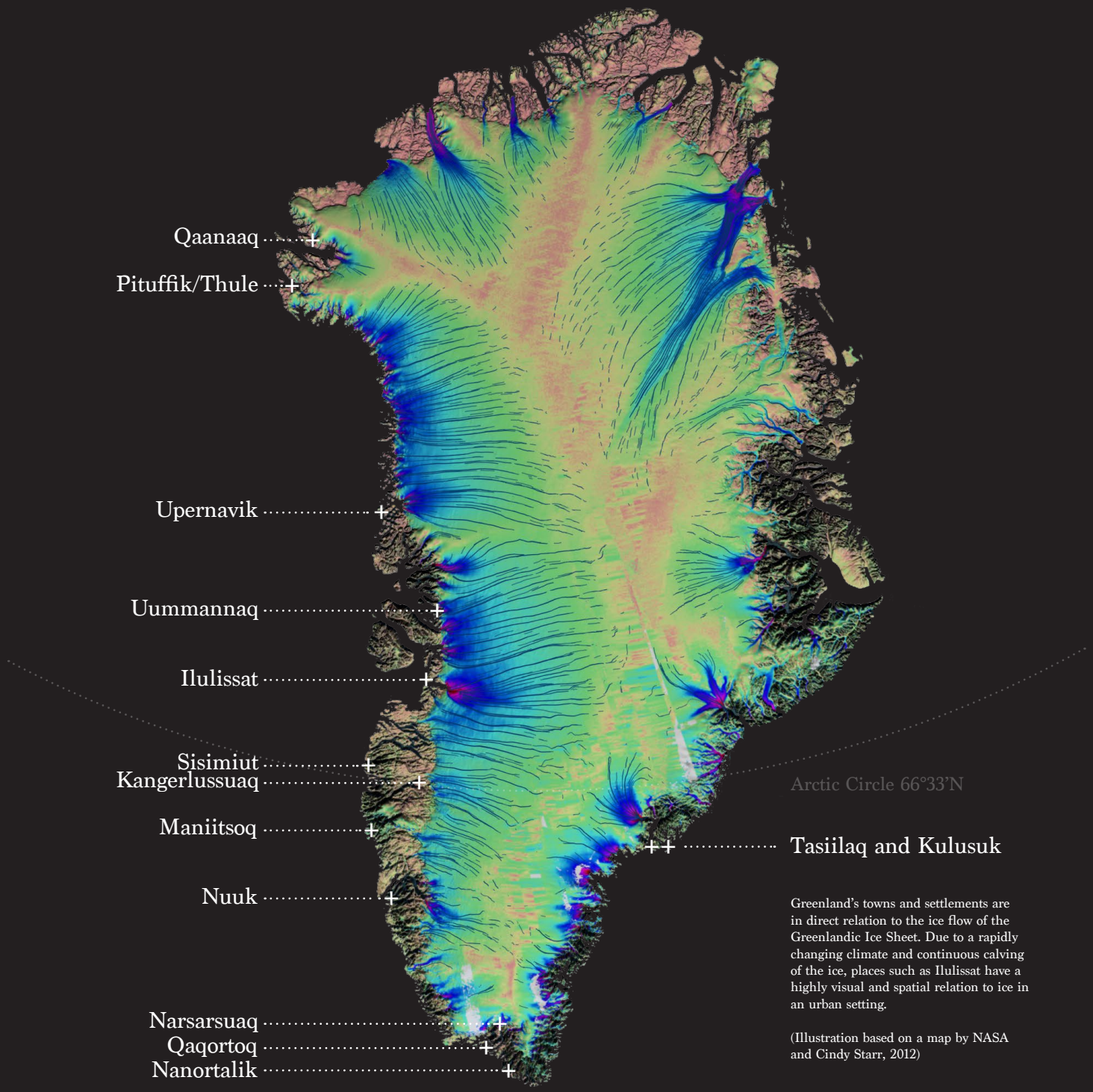
Greenland is located between North America, Europe, and the Russian Federation.

(Illustration based on the Fuller map projection)



Greenland's towns and settlements are in direct relation to the ice flow of the Greenlandic Ice Sheet. Due to a rapidly changing climate and continuous calving of the ice, places such as Ilulissat have a highly visual and spatial relation to ice in an urban setting.

(Illustration based on a map by NASA and Cindy Starr, 2012)

Facts

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Facts

— Greenland is a self-governing region within the Kingdom of Denmark.

— In Greenlandic, the country is called Kalaallit Nunaat ("Country of the Greenlanders").

— With an area of 2,166 million km², Greenland is the world's largest island.

— Greenland is divided into five municipalities: Sermersooq, Kujalleq, Qeqertalik, Qeqqata, and Avannaata.

— Most of Greenland's 56,000 inhabitants live along the island's southwest coast.

— Inuit make up 89 percent of the country's population.

— Nuuk is the capital and inhabits approx. 18,000 people.

— 81 percent of Greenland is covered by ice.

— The northernmost point of Greenland, Cape Morris Jesup, is only 740 km below the North Pole.

— The southernmost point is Cape Farewell, which lies at about the same latitude as Oslo, Norway.

— Greenland is a bilingual country where (West-) Greenlandic is the primary language, and Danish is the other.

Introduction

INVENTING GREENLAND

Introduction

Inventing Greenland is a critical and timely assemblage of stories highlighting a shifting landscape—one born from the imagination, projections, and ambitions of a wide range of actors. Today, especially within the design discipline, there is a lack of understanding of Greenland as a complex constellation of perspectives, histories, and forces. This book aims to fill that knowledge vacuum. Geared towards architects, landscape architects, and urban planners, this book combines spatial sensibilities with local cultural, social, and environmental realities. More specifically, spatial sensibility is understood as a way of responding to and reading beyond a diverse array of relationships in the built environment. Furthermore, *Inventing Greenland* provides a broad understanding of a unique island undergoing intense transformation while drawing attention to its historical and current challenges and emerging opportunities. Distinctly, each individual story is anchored to a common thread and interest in architecture, landscape architecture, and urbanism.

In the past, the extremeness of Greenland's landscape did not impede Norsemen from becoming Greenland Vikings, the first immigration of Inuit hunting tribes, and European explorers from searching for new trade routes and eventually reaching the North Pole. Every single one of them read, saw, and understood the Greenlandic landscape differently, while projecting their hopes and dreams onto new landscapes, seascapes, and icescapes. As will become apparent, similar hopes and dreams of the early settlers and explorers continue in postcolonial times in a different set of actors, among them the U.S. military, foreign investors, and an Inuit-run government.

Today, with just 56,000 residents, Greenland's sparse population is dispersed over a large number of settlements across a vast area. As an enormous ice sheet covers 81% of Greenland's land surface, people live along the rugged shorelines, mostly in the western region—a thin stretch of habitable land stretching from Qaanaaq in the north (77.46°N) to Nanortalik in the south (60.14°N). The story of Greenland's settlement and urbanization processes is

an important but historically challenging narrative to tell. While urbanization in Greenland was used in the past by Danish colonists as a means of imprinting and managing Danish culture onto a seemingly unruly society and landscape, today, urbanization is more associated with forward-looking, bottom-up nation-building. From this point of departure, the reader is first introduced to a brief historical overview through the lens of Greenland's recent history of urbanization. Drawn from mostly historical and anthropological research by Scandinavian scholars, the first chapter covers the rise and fall of the Greenland Vikings, the migration of Inuit hunting tribes from the Arctic shores of North America to Northwest Greenland, Danish colonialist policies to "modernize" (or more precisely, further "Westernize") both the country and Inuit society, and finally, introducing the lengthy process of decolonization with the Home Rule act (1979) and Self Rule act (2009). This sets the stage for a more advanced discussion in the second chapter, including past housing issues in Nuuk due to Danish policies and European-inspired housing blocks, exemplified by 'Block P,' an infamous, 200-meter-long five-story apartment complex in Nuuk, Greenland's capital. As numerous issues persist, this chapter critiques what went wrong with past housing and urban planning projects in order to set the stage for contemporary proposals situated within the surrounding landscape that both emphasize a strong sense of community and empower local cultural identities.

Next, Greenland's contemporary housing problems have multiple historical roots that involve not only urban planning imposed from the outside, but also foreign aesthetics and categorization schemes, too. More specifically, in the 1950s and 60s, the work of Danish architects contributed heavily to a "chromatic geography" of colorful prefab housing typologies in Greenland (Doherty, 2011). In this, a chromatic geography is understood as a color scheme or color code representing a Danish colonial approach to codify and control Greenland's urban, resource-rich landscapes. Therefore, the third chapter explores the history, meaning, and

potential for a more locally relevant future use of such categorizations. One specific example argues that color can be a strong design tool that connects aesthetics and politics; this by linking together an eastern Greenlandic village's color scheme with the looming political decision to relocate its airport—an infrastructure originally built by the U.S. military and of which the village is highly dependent.

Through the lens of U.S. military infrastructure projects, influence, and geopolitics, the fourth chapter goes back in time and focuses on how Western views and representations of Greenland shifted as world wars and the emergence of airpower transformed Greenland from a desolate and barren landscape to a strategic military outpost in the Arctic. By becoming a strategic Arctic node, Greenland entered a new era that opened up the island to the world, new technologies, and geopolitical tensions. Furthermore, the reader is introduced to the evolution of Greenland's airspace, largely with regard to the U.S., Greenland's next-door military superpower. In doing so, this chapter underscores that Greenland's "aeroscape" was constructed to the needs of American military colonialism rather than those of local Greenlanders.

Next, the fifth chapter explores past and present construction techniques used by the U.S. military and international research initiatives, specifically with regards to projects located under the Greenlandic ice sheet. In this, the first example is Camp Century, a nuclear-powered U.S. military base. Just 800 miles from the North Pole, this military base lay at the vanguard of U.S. military power, both physically and technologically. The project's spatial qualities, polar construction techniques, and environmental consequences are briefly considered to illustrate its combination of technological innovation and ecological destruction. This historical example is followed by a more contemporary endeavor. More specifically, today, an international group of researchers at the EastGRIP ice-core drilling camp, located under the Greenlandic ice sheet and roughly 400km inland, are

building upon Camp Century's example—albeit not in the same location—with new, temporary, and environmentally friendly building techniques such as giant inflatable balloons to create cylindrical tunnels in the ice.

From activities located under the ice, the sixth chapter shifts focus to a west Greenlandic town's strong relation with and understanding of ice. More specifically, the UNESCO World Heritage-listed town of Ilulissat is located on the west coast of Greenland, 250 km north of the Arctic Circle and at a point where the Greenland Ice Sheet flows out to sea via the Jakobshavn tidewater glacier, also known as Sermeq Kujalleq. Researchers have studied this very productive glacier for over 250 years, which has helped develop our understanding of a rapidly changing climate (Bosson et al., 2019). The almost continuous calving of the ice front also results in a highly visual and spatial relation to ice in an urban setting. For this particular reason, the town forms one of Greenland's leading tourist destinations. Since the town of Ilulissat sits at the intersection of distended global tourist networks, climate change science, rich ecosystems, hunting grounds, and more, constant change and movement in the landscape are an intricate part of the region's inhabitants, identity, and cultural knowledge.

As exemplified in the seventh chapter, this highly dynamic environment also relates back to the Greenlandic Inuit culture at large. More specifically, this chapter draws the connection between collective memory, food networks, and urban futures within a Greenlandic context. In Inuit culture, the formation of a collective memory drawing together the island's landscapes, safe travel routes, and hunting grounds has generated "a simultaneously real and imaginary geography" weaving together people, stories, food, and landscape (Rundstrom, 1990). Geographies like this are considered "memoryscapes" supporting rich and intergenerational food networks, which are still used and of vital importance today (Nuttall, 1992). Due to changing climatic, economic, and technological contexts, people continuously adapt and overlay these food networks with

new ways of traveling or start to create new networks, sometimes referring to recently introduced types of food. Anticipating and designing for the emergence of these new networks can help ensure the availability of food and promote job opportunities and economic growth. In this narrative, supporting infrastructures, such as marine, airport, or road infrastructure, is of growing importance. Ultimately, this chapter argues that new "memoryscapes," food networks, and their infrastructural outgrowth can also be seen as the blueprint of future urbanization processes and settlement patterns.

Next, as seen in the eighth chapter, this transitional process can benefit from a highly collaborative approach, not only among local Inuit, but also with international scientists, engineers, and designers at large, resulting in the co-production of knowledge. The co-production of knowledge between Inuit cartographers and European explorers, Greenlandic scientists and international scientists, and local and international institutions offer valuable examples highlighting the benefits of a collaborative spirit, which can result in unique cartographic practices and academic projects. These precedents also set the stage to discuss recent collaborations in the field of architecture, and the lack thereof. While, Greenland has found its way to internationally acclaimed architecture offices; in return, they need to find their way to the Greenlandic people, its landscapes, and cultural understandings.

The ninth chapter underscores that climate change is not only a scientific problem, but a social one, too. So, in order to avoid repeating past mistakes of development under colonialism, successful climate resilience and adaptation in Greenland will require an inclusive social model and an embrace of contemporary design methods and tools that reaffirm traditional values and priorities, which together could lead to the emergence of a new northern vernacular architecture and the overall reimagination of Greenland's built environment. Today, a contemporary northern vernacular

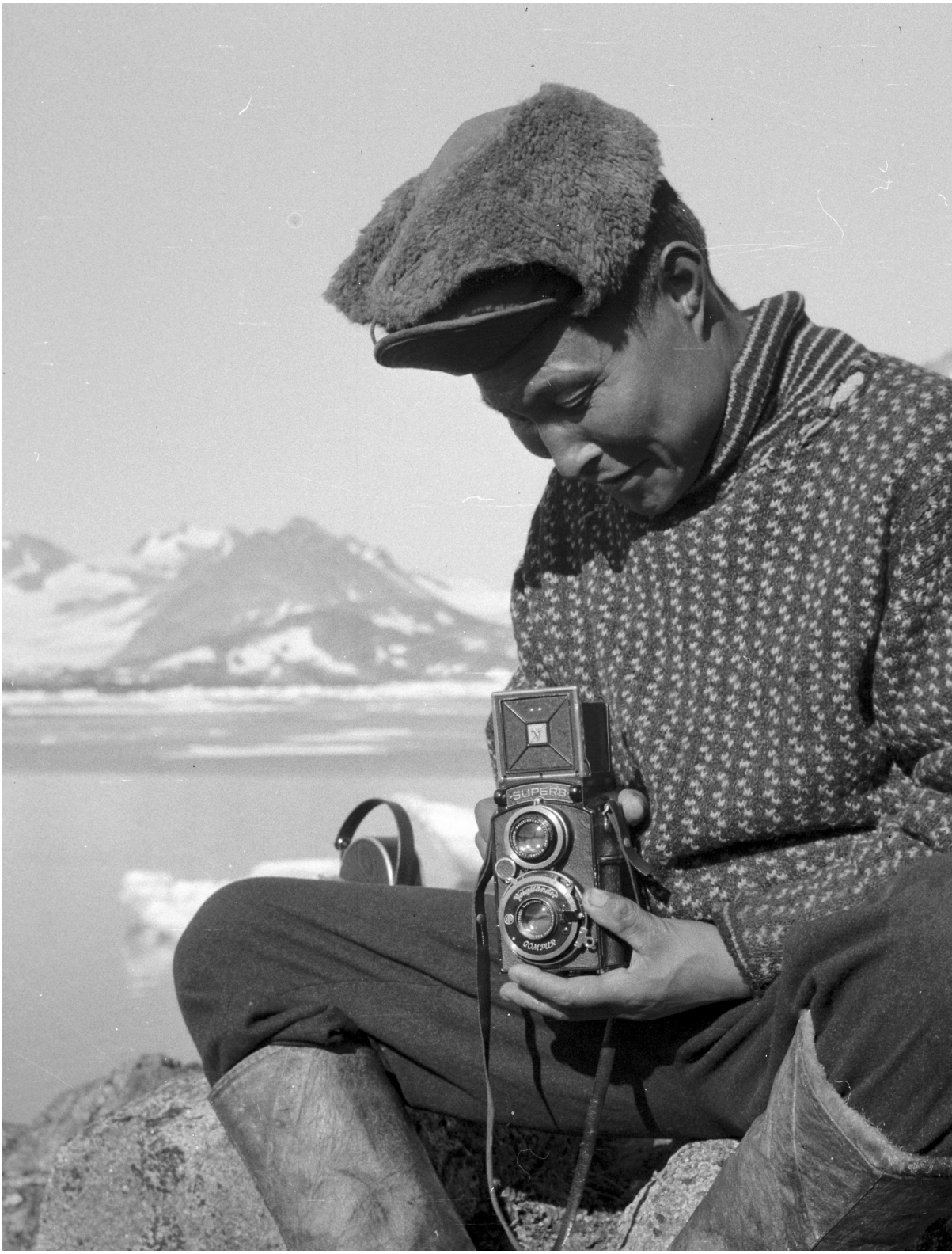
architecture within a Greenlandic context has so far come to limited progress. When it does, the Greenlandic concept of "common land"—meaning that, together, the community and its citizens own every single square meter of Greenlandic territory—can be a valuable tool to overlay climate adaptive strategies, human agency, and emerging architectural and urban typologies in favor of the collective and result in strong and coherent plans. By presenting several examples, it becomes clear that an adaptive Greenlandic built environment, as well as a nation, is a complex and continuous process that at the same time is inspired by and impacts many aspects of Greenlandic life. Furthermore, this transformational process is situated in a national and geopolitical context where external forces and design influences are at play. For example, in contrast to the hard military presence of the U.S. in Greenland, important to note is the rise (and so far, diffuse influence) of the East in the Arctic regions and their shifting imagined geographies towards new northern frontiers. Although a Chinese presence in Greenland has so far been limited, the rising polar power of China might also influence the rapidly shifting Greenlandic urban landscapes and architectures.

A note on transparency: the author of this book is neither from Greenland nor Denmark, but Belgium. The author's first research trip to Greenland (Kangerlussuaq, Nuuk, Kulusuk, and Tasiilaq) was in 2017, including many conversations with local people, followed by intense design research, which eventually resulted in two master theses (at the 'Oslo School of Architecture and Design' in 2018 and the 'Harvard University Graduate School of Design' in 2021). Also, the generous support from the Penny White Project Fund (Harvard GSD) allowed the author to conduct more on-site research (Nuuk, Narsarsuaq, and Qaqortoq). As an outsider, many of those early investigations were more about looking and understanding than finding. However, this is also one of the book's limitations. Even though the material emerged from extensive research conducted over several years' time, the author writes in his own voice. In this, it is important to be aware of the often distorted narratives and histories in Western scholarship and how they have framed Greenland in the past. Recognizing this, one of the underlying hopes of this research is to contribute to deconstructing, decentering, and reframing of existing perspectives. Therefore, it is essential to know what those perspectives are, position them in time, and explore ways to collectively move forward.

A note on methodology: this book project started to grow organically through extensive research, including site visits, archival research (Arktisk Institut), publications, interviews with local Greenlanders (both in-person and virtual), and many discussions with students, academics, and mentors. By exploring and gathering different exciting stories and weaving them together, the following nine chapters presented themselves: (1) a moment in time; (2) housing issues in Nuuk; (3) chromatic geographies and material economies; (4) the evolution of Greenland's airspace; (5) subsurface construction: Camp Century and EastGRIP; (6) tourism in Ilulissat; (7) collective memory, food networks, and urban futures; (8) co-production of knowledge; and (9) climate adaptation, human agency, and common land. Within each chapter, the underlying

question, “What is at stake for a contemporary audience?” is posed in order to develop the stories further and bring them into the present. Also, the book’s title is deliberately chosen to highlight that the idea of Greenland is a social construct, and because of that, it can be changed for the better—ideally, by the people living there today rather than from the outside.

Acknowledgments: I am grateful for the many people who have contributed to the process of realizing this book. Special thanks to my primary advisor Charles Waldheim for his guidance, mentorship, and support from start to finish. Many thanks to Mia M. Bennett for her constructive comments on two early drafts of the book and the collaborative work leading up to chapter 4. More specifically, chapter 4 is a small part and rewritten version of an unpublished paper by Bennett and me. Furthermore, thanks to Danielle Choi, Kira Clingen, and Adriana Pablos Llona for their helpful comments and support during monthly MDes Thesis Working Sessions. Thanks to the American Association of Geographers for the opportunity to let me present this book’s third chapter, “Chromatic Geographies and Material Economies,” at their annual meeting on April 9th, 2021. Thank you to the people who I have met at Harvard University and who have supported directly or indirectly early versions and parts of this project, among others: Alex Wall, Yvonne Fang, Antoine Picon, Jesse M. Keenan, Jeffrey S. Nesbit, Halla Hrund Logadóttir, Blake Mitchell, Susan S. Fainstein, Robert Gerard Pietrusko, and Joel Clement. Thank you to the people at the Oslo School of Architecture and Design: Thomas Juel Clemmensen, Annie Breton, Eimear Tynan, Marianne Lucie Skuncke, Mari Bergset, Luis Callejas, Janike Kampevold Larsen, Peter Hemmersam, Kjerstin Uhre, Nick Gulick, Marta Kovacova, and others. Thank you to the people I have met on my travels in Greenland, such as: Aganni Peter Mathiassen, Maja, Søren, Dennis, Fredrik Wille, Justine Wille, Jesper Postas Krogh, Morten Mikkelsen, Matt Spenceley, and many more. Thank you to my parents, family, and friends.



An inhabitant of Kulusuk, East Greenland, looks to his village through a new lens.

(Image by Jette Bang, 1961)
(Courtesy of the Arktisk Institut)

Chapter 1 - A Moment in Time

Much has been published about the history of Greenland, and it is not the author's intention to reiterate this in full detail. However, this brief historical introduction—drawn from mostly historical and anthropological research by Scandinavian scholars—is critical to understand the following chapters.

The ancestors of the present-day Inuit in Greenland, who make up 89 percent of the country's population, are the Thule Inuit (Lynnerup, 2015). Prior to that, archeological findings show evidence of the Saqqaq culture (2500 BC - 800 BC), Independence I culture (2400 BC - 1000 BC), Independence II culture (700 BC - 80 BC), the Dorset culture (500 BC - 1500 AD), as well as Norsemen from Iceland exploring the southwest of Greenland. More specifically, in 982, over five hundred years prior to the Thule Inuit's settlement in Greenland, Eric Thorvaldsson (better known as Eric the Red) was banished from Iceland and led many other disgruntled Vikings to southern Greenland (Doel R.E., 2016: 4). According to the Icelandic Saga of Eric the Red, Eric is the person who coined the name "Greenland," a moniker promising "verdant pastures and boundless opportunities in a new world" chosen to attract more Norsemen to settle (Nuttall, 2017: 27). Residing in two colonies called the Eastern and Western Settlements, the Greenland Vikings peaked with around 6000 people and 300 farms (Doel R.E., 2016: 4). They "built manor houses [...]; they imported stained glass; they raised sheep, goats and [miniature] cattle; they traded furs, walrus-tusk ivory, live polar bears and other exotic Arctic goods with Europe" (Folger, 2017). Today, one of the best preserved Norse ruins in Greenland is Hvalsey Church, located close to the modern-day settlement of Qaqortoq. In the past, a relatively warm current flowing along the west coast of Greenland is believed to have provided fair conditions that allowed the settlers to maintain their Icelandic way of living. Yet between the thirteenth and fifteenth centuries, after almost five centuries of inhabiting the fjords of southern Greenland, the Greenland Vikings vanished (Nuttall, 2017: 8). Several theories try to explain why this happened. One common

explanation highlights a changing climate as a major cause, and the Vikings' difficulty to adapt (Diamond, 2003). Additionally, a changing market economy and the devastation wrought by the Black Death in Europe, peaking from 1347 to 1351, meant that the Vikings' lifeline to the 'civilized' world was broken (Folger, 2017). As a result, "the Greenland Vikings were essentially victims of globalization and a pandemic" (Folger, 2017)—a rather dark auguring of contemporary global events over half a millennia later. Today, on the contrary, the Greenlandic society is one of the least scathed by the COVID-19 global health crisis, having benefited from its remoteness and sealing itself off from the world (Landslægeembedet, 2021).

Around 1300 - 1400 AD, small groups of Inuit hunting tribes from the Arctic shores of North America entered Greenland in the northwest, specifically in the Thule region, hence the naming of their culture (Taagholt, 1991). As this is an ancient Greek and Latin term, it is worth noting the foreign naming of their lands and

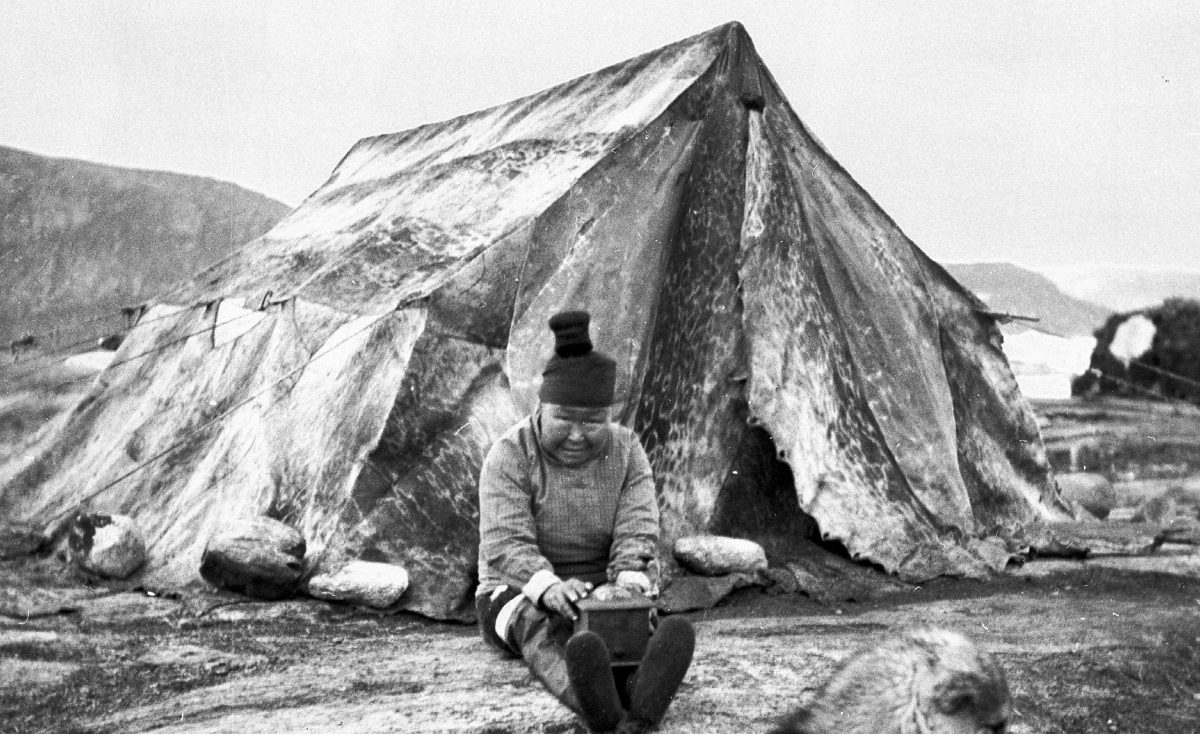
One of the best-preserved Norse ruins in Greenland is Hvalsey Church, located close to the modern-day settlement of Qaqortoq, South Greenland.

(Image by Jette Bang, 1961)
(Courtesy of the Arktisk Institut)

A traditional turf house in Kullorsuaq, northwestern Greenland.

(Image by Jette Bang, 1936)
(Courtesy of the Arktisk Institut)

people. In ancient Greek and Roman literature, Thule is the farthest north, and Ultima Thule is a metaphorical place beyond "the borders of the known world" (Herrero, 2015: 122). This can be seen as a foreign/Western imposition on its landscapes, cultures, and toponymy. By 1500 AD, the Thule people had spread almost entirely around Greenland, exploring and hunting its coasts and fjords (Gulløv, 2004). By the end of the 18th Century, the "Little Ice Age"—which already started with an initial temperature drop around 1300—started drastically changing settlement patterns in Greenland. During that period of cooling, population numbers on the northern and northeastern coast declined to practically zero (Lynnerup, 2015). This highlights the outsized impact of climatic shifts on Greenlandic society given the terrain's and latitudinal 'extremeness.' New population centers appeared on the west coast, which is the area where most of the present-day Greenlanders live. Today there is still a noticeable East/West Greenland divide that cuts across social, economic, and linguistic lines.



A traditional seal skin tent in Qaarusulik, western Greenland.

(Image by Jette Bang, 1936)
(Courtesy of the Arktisk Institut)

In terms of habitation, the Thule Inuit occupied semi-subterranean homes during winter, consisting of snow, stones, whalebones, and turf. In summer, they moved to skin tents structurally supported by whale bones or driftwood. In contradiction to the Western imagination, an igloo—an Inuit winter house exclusively made of snow—was mainly used by hunters on long hunting expeditions, not as a permanent snow house. Furthermore, the concept of kinship is also central to Greenlander's traditional relationship to the built environment and to the land itself. The concept of common land (see chapter 9) and large communal turf houses occupied up until the 1920s helped reinforce those social bonds (Elixhauser, 2018: 77). Turf houses (in Greenlandic, ittilorat) accommodated multiple families at once during the long winter months and food was shared. In other words, these different types of Inuit architecture highlight a semi-nomadic and communal way of living. Although now abandoned for nearly a century, the turf houses continue to figure positively in the "collective imagination" of the (east) Greenlandic people (Elixhauser, 2018: 79).

In the past, Inuit people were semi-nomadic, and "seasonality shaped every aspect of traditional life" (Sheppard et al. 2017: 27). Temporary settlements were linked to the migration routes of marine mammals such as whale, seal, porpoise and walrus, which were

hunted and used for "food, fuel, clothing, kayak skins, and tent material" (Grydehoj, 2014: 209). When Danish colonization started in 1721, largely via the activities of Hans Egede, a Dano-Norwegian Lutheran missionary, the process drastically reshaped Inuit culture, and often divorcing it from the landscape (Gulløv, 2004). One example are the dramatic changes in settlement patterns (Sejersen, 2007: 27). Namely, "as trading posts and settlements were established, Inuit themselves were encouraged by Danish traders and administrators to move around the fjords, islands, and skerries of the west coast to explore for and exploit living marine resources" (Nuttall, 2017: 9). Here, marine resources are understood as primarily fish, such as cod. Furthermore, because of a Danish isolationist policy lasting almost 200 years and strongly controlled trade, Greenland became a productive and lucrative Arctic territory for its colonizer (Nuttall, 2017: 10). Early trading posts, such as Godthåb (present-day Nuuk), became influential economic hubs that are still active and thriving today.

After World War II, Denmark halted its long-lasting isolationist policy, and shifted its priorities to social welfare and infrastructural change as part of an effort to "modernize" (or more precisely, further "Westernize")

Danish-designed prefab houses in Nuuk, western Greenland.

(Image by Jette Bang, 1961)
(Courtesy of the Arktisk Institut)

both the country and Inuit society (Nuttall, 2017: 10). The colonial Danish government translated this commitment in its G-50 policy which begun in 1950 and was carried out by the so-called Greenland Technical Organization (GTO). They exacerbated and formalized the colonial process of breaking Greenlandic traditions by further forcing Inuit people to abandon their culture and relocate into so-called modern homes. In other words, by urbanizing Inuit society, Denmark wanted to "improve" conditions in Greenland (Sejersen, 2007: 27). This commitment was followed by the Danish G-60 policy, concentrating economic development in Nuuk, Paamiut, Sisimiut, and Maniitsoq. In monetary terms, "Greenland's modernization efforts depended on direct Danish government subsidies, which quadrupled (from DKK 28 million to DKK 109 million annually) between 1950 and 1962" (Nielsen, 2016: 55). Money was flowing to Greenland, but the voices of its people were ignored. Not including Inuit people in policymaking spurred numerous urban and social problems. Also, changes in traditional lifestyles led to decreases in fishing and hunting opportunities, increased rates of unemployment, and psychological stress. In turn, to this day, these detrimental effects have contributed to elevated rates of alcoholism and domestic abuse and led to poor health outcomes. For example, recent research has highlighted that, today, "alcohol is the single most important public health challenge in Greenland" (Bjerregaard, 2020). While modernization and cultural traditions can exist in harmony, it has proven challenging to find balance.

In 1953, the initial process of decolonization commenced when Denmark voted to change the Danish constitution and integrate Greenland as a county in the Kingdom of Denmark, which was followed by the United Nations' recognition of Greenland's new status in 1954 (Olesen, 2019). In 1979, decided by public referendum, Home Rule was implemented in Greenland, followed in 2009 by another referendum in favor of Self Rule. The Home Rule act was the first major stepping stone for the people of Greenland, as they now had the right to elect

Sisimiut is the second-largest town in Greenland. It is located in central-western Greenland, approximately 320 km north of Greenland's capital, Nuuk.

(Image by Mads Pihl)

their own parliament and government (Government of Greenland, 2020). Worth noting is that, after a dispute about fishing rights with Brussels, Greenland initiated a public referendum in 1982 and left the European Union in 1985. The Greenland Treaty of 1985 formalized this so-called "Grøxit" (De Gruyter, 2020). Today, Greenland has become a (post)-colonial territory in the midst of a still-ongoing decolonization process that may result in full independence from the Kingdom of Denmark (Carruth, 2016).

Furthermore, it is important to underscore the relatively fast pace of change. Greenland went from being isolated under Danish control to a "dynamic, modern society based on technological infrastructure, urban development, democratic governance, and international relations" (Nielsen, 2016: 48). Today, strong political and economic ties continue to link Denmark and Greenland. For example, Denmark still controls the island's international trade, military, and foreign affairs. Copenhagen also still contributes two-thirds of Greenland's budget, making Greenland highly financially dependent. Furthermore, although Greenland's current prime minister, Kim Kielsen (2020), staunchly supports full Greenlandic

sovereignty, this is difficult to realize because not everyone agrees on this outcome. Some argue that ever since Danish colonization took hold, inevitably, "the future of Greenland [...] is a hybrid Greenlandic-Danish future" (Grydehoj, 2014: 218). This relationship will likely manifest across the urban landscape of Greenland for a long time into the future, especially when Danish materials, engineers, and architects continue to shape and design Greenland's buildings, streets, and neighborhoods. This influence is, among other places, visible in Nuuk's multistorey buildings largely following Danish/Western examples (see chapter 8).

Also, importantly, Greenland's process of decolonization "necessitated for the first time a center" (Grydehoj, 2014: 211). Since Godthåb (present-day Nuuk) was the seat of government for the Danish colony of South Greenland, it had the necessary infrastructural and administrative networks in place. As a result, Nuuk became the economic, political, and administrative heart of contemporary Greenland. As a former small fishing village, Nuuk emerged and transformed relatively fast into something resembling a European city with agglomeration tendencies. As of 2020, 18,000 people live in Nuuk, or more than 30% of the nation's population (Statistics Greenland, 2020). Since the country's population growth, economic growth, and attraction of investments, is largely centered around Nuuk, the city has become a magnet of unusual proportions. To put this in perspective, in the United Kingdom—a country considered to be dominated by its capital—in 2019, "only" 13.8% of people lived in London. This highlights Nuuk's extremely disproportionate weight within Greenland's geography and demography. To support its outsized population, public housing in Nuuk has been and continues to be of major importance. That is not to say that public housing is less important in other towns and settlements. However, over the years (and as highlighted in the next chapter), the Danish-funded and Danish-designed housing and infrastructure—which contributed heavily to transforming Nuuk into a city—has not come without its problems.

Aerial view of Nuuk,
capital of Greenland.

(Image by Aningaaq R. Carlsen)

Chapter 2 - Housing Issues in Nuuk

Highlighted in white is Nuuk's infamous Block P—a 200m-long, five-storey high building that testified to the failure of Danish housing policy in the 1960s.

(Image by Diego González)

As Greenland's capital and only city, Nuuk plays a prominent role in the history of urbanization and housing in Greenland—and the many social ills that have resulted from this process, which are exemplified by a range of historical and contemporary housing projects. As numerous issues persist, there is a need to critique what went wrong with past housing and urban planning projects in order to set the stage for contemporary proposals situated within the surrounding landscape that both emphasize a strong sense of community and empower local cultural identities.

The GTO's aforementioned forced relocation of Inuit people into "modern" homes in the 1950s and 60s (see chapter 1) is exemplified by Nuuk's infamous Block P. The 200m-long, five-storey high building testified to the failure of Danish housing policy in the 1960s. At one time, it was occupied by 1% of Greenland's population (Vindum et al., 2012). This was a jarring shift, as Inuit were semi-nomadic only decades prior.

However, Block P was entirely unsuitable for traditional Inuit lifestyles, just like other housing blocks built during this time. For example, "hallways were too narrow for people wearing heavy outdoor clothes, and there was no place for their dogs or dogsleds" (Vindum et al., 2012). The cultural center Nordatlantens Brygge in Copenhagen writes that Block P was "a type of housing that originated in a decidedly different social structure from that which most of the residents came from: a hunting, fishing society. For those of them who found it particularly difficult to adapt to the new conditions, the move had major personal and social costs and negative consequences" (Nordatlantens Brygge, n.d.). Journalist Philip Lauritzen takes an even more critical standpoint. He states that "although [Block P] provided toilets and running water for everyone, [it] soon became an architecturally designed bomb of social maladjustment" (Vindum et al., 2012).

Others, namely those involved in Block P's administration, had a more sympathetic view of the housing complex: Else Løvstrøm, communications officer of Block P's management association, offered, "Block P contains all good and all bad. Many have lived harmonious lives in that building, really good lives, but others have had a really hard time. It is very mixed" (Nielsen, 2016: 48). In response to unfavorable public opinion towards Block P, the Greenlandic Home Rule and Nuuk City Council decided in 2010 to demolish the building, which occurred two years later. Residents were offered housing in the city's Qinngorput district (Sermitsiaq, 2010). Yet this relocation came with its own issues. For example, since the new housing is located in the shadow of the Ukusissat mountain, "half of the almost 1,000 residents [are] denied sunshine and warmth during the winter months" (Sørensen et al., 2013: 186). Following this somber observation, it is unclear and questionable if former Block P residents, or Nuuk citizens in general, had any involvement in the design process of the new housing at Qinngorput.

The Suloraq towers in Nuuk's suburb Qinngorput below the Ukusissat mountain.

(Image by Mads Pihl)

In the years before Block P's demolition, Sermersooq Municipality (with Nuuk as its central city) and the Government of Greenland prepared a combined strategic master plan for the site of Block P and its adjacent neighborhood, Tuujuk (Uhre et al., 2017: 188). The Tuujuk neighborhood was a collection of several smaller housing blocks built in the early 1960s. The new master plan was advised by Dahl & Uhre Arkitekter, Tegnestuen TNT Nuuk, Asplan Viak landscape, MDH Architects, Steinsvik Arkitekter A/S, Inuplan A/S, Fantastic Norway, Regional Associates + 42 Architects, and M:ARC ApS + Arkitekti ApS. Coming from Denmark, Norway, UK, and Greenland, the group of design offices appears diverse, and, although the teams conducted a careful "reading" of the project's relation to its surroundings—more specifically, in terms of the ecological, social, and micro-climatical context—only a limited number of ideas and spatial qualities made it to today's situation and future plans.

As an example, the contribution of Tromsø-based Norwegian architecture office Dahl & Uhre Arkitekter to the new Block P and Tuujuk master plan is worth critiquing. In collaboration with Greenlandic architecture office Tegnestuen tnt Nuuk, they proposed a project called "Nunarsuup Qeqqani Nuup Qeccani" (or "In the Middle

of the World, in the Middle of Nuuk"), which involved an inclusive, participatory, and dialogue-oriented design process. The many conversations and workshops with locals "informed and shaped the design of the spatial structure of the strategy plan, which in turn informed further dialogues" (Uhre et al., 2017: 174). This process of "oral knowledge exchange" also sought to integrate the strong tradition of storytelling in Inuit culture (Uhre et al., 2017: 182). The project itself revolved around a historic Arctic wetland on Block P's grounds and provided an avenue for imagining a reorganized urban pattern for Nuuk (Uhre et al., 2017: 186). This re-introduced Arctic wetland would be tied into Nuuk's existing open surface water system and the city's ecological network. Furthermore, vital city-wide upgrades would be needed to accompany new housing with comfortable and coherent streetscapes, shelter for the wind, connections to informal pathways, and places to sit and play. Within the overall master plan, there were also guest and experimental architectural offices that critically addressed some of the site's social issues. For example, "The House of Families" was a proposal by the group Fantastic Norway, where young and single-parent families could find a welcoming and warm community within Nuuk's wider community.

Strategic master plan for the site of Block P and its adjacent neighborhood, Tuujuk.

(Illustration by Dahl & Uhre arkitekter, TNT nuuk A/S, MDH Arkitekter, Fantastic Norway, 42 Architects, Regional Associates, Asplan Viak landskap M:ARC and Arkitekti)

Block R, Tuapannguit, Nuuk, in the late 1960s.

(Image by Inger Oxholm Campsie)
(Courtesy of the Arktisk Institut)

As mentioned, Block P was representative of other apartment blocks in Nuuk and the rest of Greenland. For example, the buildings Q, R, S, T in Tuapannguit, Nuuk, all from the same period as Block P, had similar tragic conditions but were smaller in size. Because of their smaller building size and view towards the sea, they were initially quite popular. Later, because of similar negative circumstances as Block P, some of the buildings in Tuapannguit were torn down, replaced, or renovated. The demolition and waste management were carried out in a careless manner, with some of the buildings' rubble dumped in the nearby fjord, negatively impacting local marine ecology (Sørensen et al., 2013: 176). In the 1970s, rising above the Tuapannguit housing complexes and on top Radiofjeldet (Radio Mountain), several new housing blocks were constructed. Today, they still dominate Nuuk's "skyline," as seen from the sea where many people take their boats for hunting, fishing, or leisure. However, at the time, knowing what was happening in Block P and other apartment blocks, this would have been an

Northern lights over Radiofjeldet, Nuuk.

(Image by Rebecca Gustafsson)

opportune time to start thinking about new housing typologies informed by the local context, in addition to investing and improving existing housing blocks. Instead, emerging and known problems were reintroduced to new places in Nuuk.

One more recent and valuable example is the on-going project regarding a new urban district as part of Nuuk, called, Siorarsiorfik. Initially, the project came to life as an international design competition in 2017 and was won by the Nordic Office for Architecture. As a side note, it is worth criticizing Nuuk's need to hold international design competitions for local neighborhoods, as well as its continued attraction of foreign/Scandinavian design firms for the development of its built environment (see chapter 8). Today, the large-scale and long-term planning project of Siorarsiorfik includes 3400 new homes, several new schools, cultural facilities, and commercial areas, resulting in Greenland's largest urban development project (Nuuk City Development A/S, 2018). Positively, the increase in housing resulting from this project may help to alleviate the severe accommodation shortage in Nuuk. Furthermore, in Siorarsiorfik, the designer's proposal emphasizes a strong sense of community, being in constant dialogue with its surroundings (exemplified in a good understanding of microclimates in an Arctic context, light conditions, and topography), and in general pushing architectural solutions that benefit both human

and economic growth. Negatively, new districts such as this, similar to the new Qinngorput district, highlight even more Nuuk's scattered urbanization processes and spatial fragmentation (due to ridges, rocky hills, and rugged shorelines), resulting in people relying heavily on automobile transport (Grydehoj, 2014). In this narrative, an in-depth transportation analysis might reveal the need to rethink the current public transportation network.

Conclusively, the disproportionate weight of Nuuk within Greenland's geography and demography has resulted in a concentration of urban housing problems in one city. Yet similar urban issues, albeit at a smaller scale, are also apparent in emerging small to medium-sized towns, such as Sisimiut, Ilulissat, and Qaqortoq, many of which may be poised to grow as new infrastructure like airports and roads are built there and as the population of Greenland becomes further concentrated into a few key large settlements. Since many of the issues mentioned in this chapter are part of the present, this calls for an immediate addressing, an overdue influx of local and foreign expertise (i.e., community representatives, urban planners, landscape architects, etc.), and an accelerated design exploration into alternative housing typologies for Greenland's urban landscape.

Visual representation, Siorarsiorfik, Nuuk.

(Illustration by Nordic Office for Architecture)

Chapter 3 - Chromatic Geographies and Material Economies

Aerial view of the colorful village of Upernavik in northwestern Greenland. This scene is representative of many other small settlements in Greenland.

(Image by Weimin Chu)

Greenland's contemporary housing problems have multiple historical roots that involve not only urban planning imposed from the outside, but also foreign aesthetics and categorization schemes, too. In the 1950s and 60s, the work of Danish architects such as Viggo Møller-Jensen and Tyge Arnfred contributed heavily to a "chromatic geography" of colorful prefab housing typologies in Greenland (Vindum et al., 2012; Doherty, 2011). This chromatic geography—a term coined by Gareth Doherty, Associate Professor of Landscape Architecture at Harvard University—can also be understood as a color scheme or color code representing a Danish colonial approach to codify and control Greenland's urban, resource-rich landscapes. This chapter explores the history and meaning of such practices and the potential for their positive transformation.

The evolution of the Danish-designed prefab houses in Greenland has multiple origins difficult to disentangle. To briefly summarize, in the early 1950s, there were

over forty different housing types eligible to be built with financial support from Denmark. In 1955, this number was reduced to approximately eight and further standardized (Bjarløv et al., 2011: 1526). The types differed in size from 35m^2 to 120m^2 and were inconsistently numbered as followed: 1, 2, 3, 5, 10, 16, 17, and 25. In the 1960s, type 18D, 67/8, 67/12, 67/14, and 67/16 were added to the list. Throughout the 1970s, 80s, and 90s, the housing typologies were updated under the name of "Illorput"—for example, Illorput 43 and Illorput 82 (Bjarløv et al., 2011: 1526). In 1998, the latest series, called "Illorput 2000," was introduced. Among other improvements, this series facilitated a more efficient use of insulation, often incorporated concrete and steel structures, and provided a longer service life. Today, a significant portion of the Greenlandic population still lives in Illorput-type houses.

Illorput-type houses in Upernavik, northwestern Greenland.

(Image by Weimin Chu)

In the past, these buildings carried facades whose color indicated the building's function. Within Danish colonial design typologies, commercial and institutional buildings were red; hospitals were yellow; police stations were black; buildings related to communication infrastructure (such as telephone) were green; and fish processing plants and infrastructure related to drinking water were blue (Dzik, 2015). Because of a lack of usable timber in Greenland, these buildings were shipped as prefabricated housing kits from Denmark to Greenland (Vindum et al., 2012: 47, Dzik, 2015). In other words, the scarcity of wood as a building material influenced the Greenlandic built environment and its architectural choices. Worth noting is that the lack of native Greenlandic timber was already apparent during the period of the Greenlandic Vikings, by which they had to sail to "Markland" (present-day Newfoundland, Canada) to collect wood (Charpentier Ljungqvist, 2005: 49). Today, while some of the underlying functions indicated by the colors remain, the importance of the colorful facades is now more appreciated from the outside given their picturesque qualities enjoyed by tourists, for instance.

The linkage of color to function and land use also suggests that Greenland can be seen as a "vertical" or "volumetric" territory (Dodds et al., 2016), in which color reflects a material economy firmly anchored in natural resources located beneath the land, ice, or ocean surface. One example is the color blue, related to the primary industry of the Greenlandic economy, fishing. For example, the 38 fish processing facilities of Greenlandic state-owned seafood company Royal Greenland, which are scattered up and down the country's west coast, are all blue. Fish processing plants are often located along the water's edge in a city's or village's harbor, allowing fishing boats to dock and easily transfer their products such as shrimp, Greenland turbot, cod, crab, and lumpfish roe. A second example is today's architectural trend of letting the natural color of a building material "speak for itself." In other words, materials such as wood or concrete—while still mainly imported—are left "uncolored." Although in

The University of Greenland occupies a collection of buildings with "uncolored" wooden facades.

(Image by Rebecca Gustafsson)

most cases, still designed by foreign/Danish architects, this is an interesting break from the past. Many recent architecture projects and proposals have used this technique such as the University of Greenland and Nuuk's Katuaq Cultural Center, while the newly proposed National Gallery of Art in Nuuk would, too.

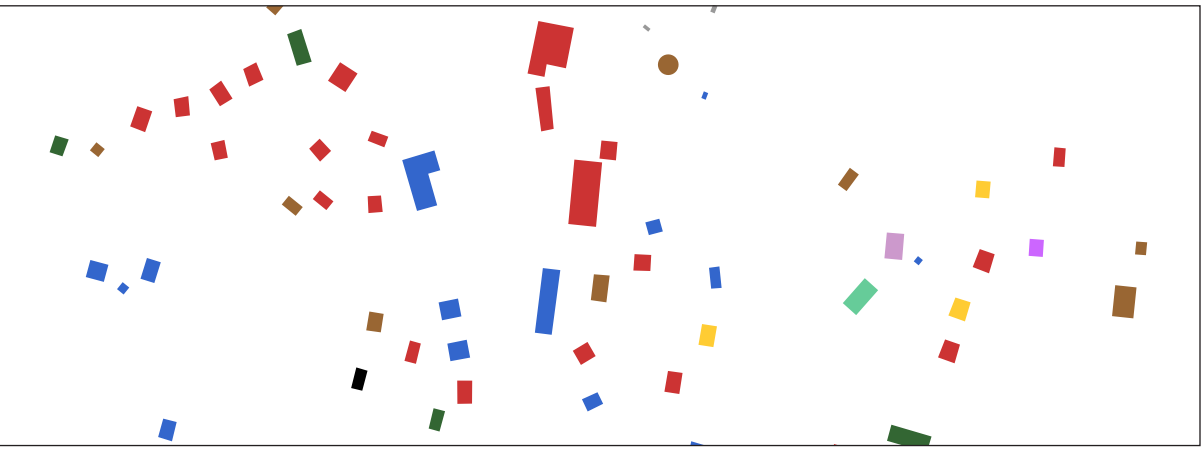
"Uncolored" concrete and wooden facades can be linked to emerging or future material economies, respectively glacial sediment and forestry. In terms of concrete, the melting of the Greenlandic icebergs and glacial erosion creates massive amounts of sediment, seen as sand, gravel, mud, or rock flour. The products of glacial erosion are valuable for global markets. However, the abundance of Greenlandic sand and gravel can also be used for local urban expansion and infrastructural improvements (Bendixen et al., 2019). In terms of wood, if climate change were to make forestry both environmentally and economically viable in southern Greenland, the country could depend less on importing wood as a construction

material. Although there is still a long way to go, due to a changing climate, opportunities for forestry in southern Greenland are improving. For example, the Greenlandic Arboretum in Narsarsuaq, located in southern Greenland, has been collecting and experimenting with trees from the Alpine and Arctic tree line regions (Climate Greenland, n.d.). Today, besides this unique arboretum, other forest plantations are rare. For future forest plantations, worth examining are the climatic conditions and species in the forest of the Qinngua valley, South Greenland. This is the most well-known natural forest in Greenland and initially protected by law in 1930 by the Danish Colonial Administration (Høegh, n.d.). The north-south orientation of the fjord, considerable distance to the sea and icesheet, and surrounding mountains blocking cold winds, constitute to the beneficial microclimate for downy birches (Betula pubescens), gray-leaf willows (Salix glauca), and Greenlandic mountain ash (Sorbus groenlandica) (Edwards et al., 2010).

One can also look beyond a building's individual color or materiality and focus on a larger collection of buildings and the potential positive future use of color-coding the urban landscape. Reimagining new color schemes, color codes, or chromatic geographies, and embracing new meanings, identities, and collective values could help create a unique urban landscape that empowers the current nation-building process. Connecting aesthetics and politics, color can be a strong design tool when proposing specific "programs, forms, and policies" (Doherty, 2011). As a result, color could become a "collective" and "vernacular expression" that looks beyond Greenland's volumetric imaginaries and anticipations (Swirnoff, 2000). Furthermore, by dint of being visible and bold, color could symbolize to both residents, visitors, and investors, a confident Greenland, instead of a country whose future is more extractive and tied to its earthly resources.

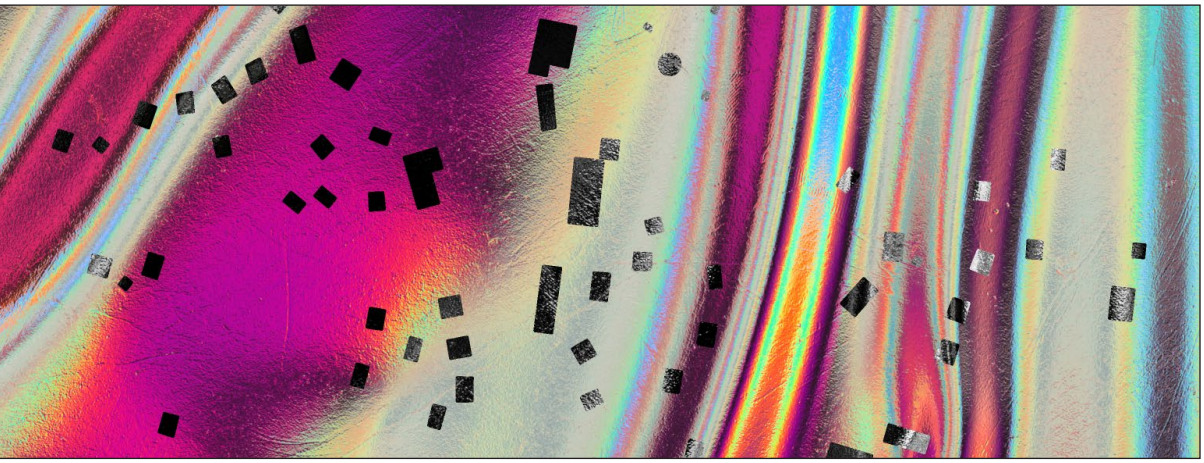
The following conceptual example focuses on the politics and aerial connection between Tasiilaq and Kulusuk village, east Greenland, and could be a first step towards

realizing a newly colored urban landscape. In summary, this project argues that a possible relocation of Kulusuk's airport to neighboring Tasiilaq—recommended by the Transport Commission of Greenland in 2011—would have a dramatic impact on the local community of Kulusuk, which is already experiencing a rapid drop in population. To emphasize this strong dependency, the air routes above Kulusuk village, being generally invisible, can be made visible as an imprint in Kulusuk's chromatic geography. In doing so, creating an aesthetic and political statement about the importance of aerial connections and airport infrastructure for remote communities in Greenland. It is important to note that the presented visual representation is an example, and any further design work should follow the collective and local input of Kulusuk's residents.



This map visually represents a small part of the existing color scheme at Kulusuk village (in 2017).

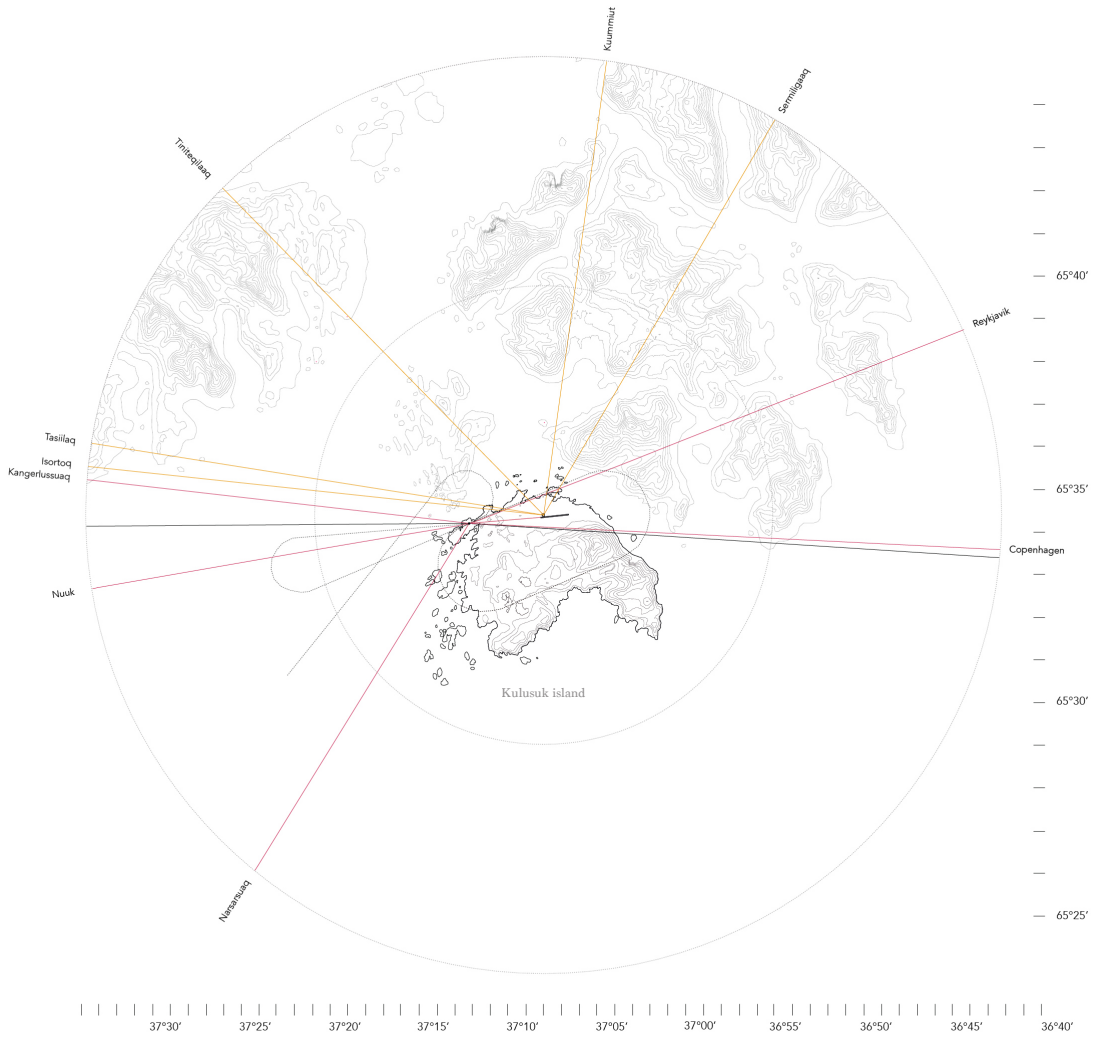
(Illustration based upon photographs and on-site sketches by Bert De Jonghe)



Left: The air routes above Kulusuk village, being generally invisible, are made visible as an imprint in Kulusuk's new chromatic geography.

Top right: A map of Kulusuk island and its surroundings in relation to air routes connected to Kulusuk Airport. Red lines represent airplane routes and yellow lines represent helicopter routes.

(Illustrations by Bert De Jonghe)



Tasiilaq (pop. 2000) and Kulusuk (pop. 240) are two small towns in east Greenland. They are physically separated but strongly dependent upon one other, as Tasiilaq's only connection to the rest of the country is through the airport located on Kulusuk island. Kulusuk, often called the "Gateway to East Greenland," itself fully depends on its mobility infrastructure (sea and air) to provide both cargo and a means of income. Mobility infrastructure, in this case airports, can be understood as the facilitator to connect people and link settlements, "while distancing those places that are not [...] connected" (Hannam et al., 2006: 6). Tasiilaq needs Kulusuk airport as a transport hub to allow its community to travel and tourists to come

visit. Furthermore, on a different level, the military/ civilian airport of Kulusuk serves not only as a hub of Greenlandic aviation and wider regional and global networks: it also plays a crucial role at the local scale (Dzik, 2015). The airport terminal forms a social meeting place for locals, hotel guests, tourists & airport personnel.

With almost over 2000 inhabitants (as of 2020), Tasiilaq is one of the fastest-growing and most populous towns in eastern Greenland. To satisfy this growth, the Transport Commission of Greenland recommended in 2011 to relocate the airport from Kulusuk to Tasiilaq (Bendsen et al., 2011). However, this would have a large impact on the local community of Kulusuk, which is already experiencing a rapid drop in population. In an interview with the author, the manager of Kulusuk's sole hotel described the facility as "only here because of the airport." He also described a shift in people's habits away from subsistence activities and towards the market economy: "To keep the people in Kulusuk there has to be more job opportunities. People are slowly moving away from hunting and fishing; they need something else" (Hotel manager, Kulusuk, 2017). In another interview, a teacher at the local school described Kulusuk's reliance on the airport in more fatalistic terms. When asked about the impacts of the airport's potential closure, he affirmed: "Very short answer: if they close the airport - Kulusuk is finished. Kulusuk is dependent on the airport. If they close the airport, it would be very, very bad for the village" (School teacher, Kulusuk, 2017).

As a result, relocating Kulusuk's airport would dramatically alter the spatial and social relationships within and between Kulusuk and Tasiilaq. However, some Greenlandic policymakers are calling for the airport's relocation as both a necessary economic step and a move away from Danish and American histories. This because the current configuration of Greenland's airports and air routes—its "aeroscape"—is the direct outgrowth of American military interventions made during and after World War II to fulfill geostrategic imperatives rather

than local needs, meaning the largest airports are located far from local settlements. Aligning Greenland's aeroscape with centers of population and economic activity, however, could disconnect the settlements which initially arose to support American-built airports, and whose continued existence depends on their operation. As postcolonial nations work to reconfigure infrastructural networks to better match local needs, the difficulties that Greenland is encountering within this transition underscore the challenges of including communities whose origins lie in military and colonial interventions within new nation-building projects. In this, color can be a valuable design tool and vernacular expression to visualize the needs, desires, and difficulties of those communities who are seemingly left behind in the nation-building process.

Kulusuk Airport, eastern Greenland, as seen from the runway. In the back, an airplane of Air Iceland Connect returns to Reykjavik, Iceland.

(Image by Bert De Jonghe)

Tasiilaq village, eastern Greenland, covered in large amounts of snow.

(Image by Mads Pihl)

Chapter 4 - The Evolution of Greenland's Airspace

Across the Arctic, a great deal of commercial aviation infrastructure has its roots in World War II military operations and their protraction during the Cold War (Farish & Lackenbauer, 2009). Although many of these military imperatives have weakened, the path dependency of air transportation networks, which require enormous amounts of fixed capital, makes them difficult to alter. As air power became the key to global military might in the twentieth century, Greenland's neighbor, the U.S., started building airstrips and missile defense sites in the country as a matter of national security. American interest heightened following the Nazi invasion of Denmark on 9 April 1940, which had controlled Greenland since the early eighteenth century. With Denmark unable to send supplies to Greenland, let alone exercise sovereignty over it, the Danish ambassador to the United States, Henrik de Kaufmann, disobeyed the Danish Government and signed an agreement granting American access to the world's largest island (Rahbek-Clemmensen & Nielsen, 2020). In addition to civilian resupply and the construction of facilities such as weather stations, ports, depots, search-and-rescue stations, and more, this agreement made it possible for the U.S. to establish military airbases on Greenlandic soil. However, Greenland's aeroscape was constructed to the needs of American military colonialism (Heymann et al., 2010) rather than those of Greenlanders.

The U.S. Air Force providing fuel for Kangerlussuaq Airport.

(Image by Bent Helmudt, 1951)
(Courtesy of the Arktisk Institut)

Aerial view of Kangerlussuaq Airport.

(Image by Malik Broens)

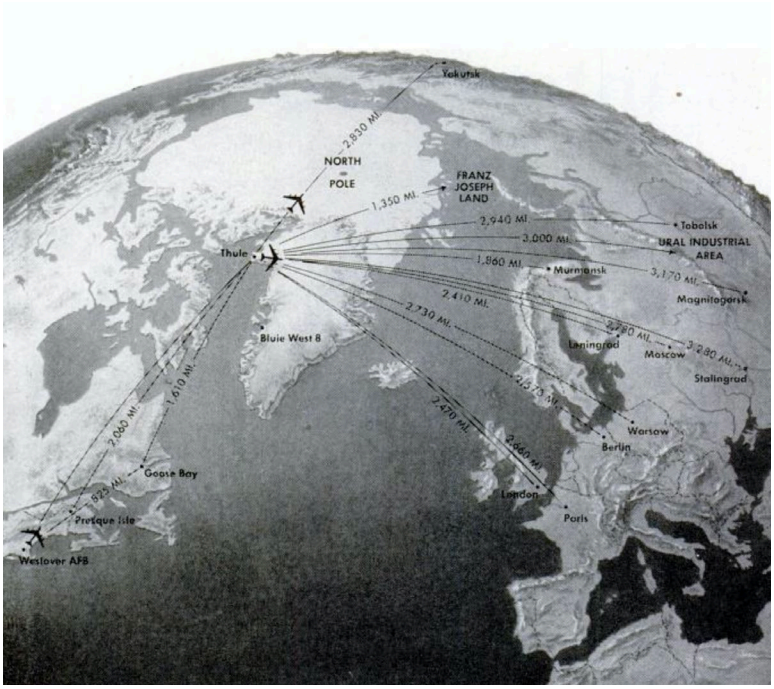
In 1942, the first American airport in Greenland was established at the mouth of Greenland's longest fjord at Kangerlussuaq, which offered fog-free weather and was suitable for a long runway. Aside from an intermittent caribou camp little used in the twentieth century, the site appeared to have little local relevance at the time of the airport's construction (Grønnow, 1986). The closest town, Sisimiut, lies 130 km to the west. With an asphalt runway of 1700m long, and later extended to 3000m, the airport was and is a hub for international air traffic. As of 2020, the settlement's economy and population of 508 people is almost entirely reliant on the airport and tourist industry. This is also visible in the architecture of its buildings, being largely barrack-like housing facilities. Also, in 1942, another airport was built in Narsarsuaq, south Greenland, in the relatively fog-free Tunulliarfik Fjord. Among the locations of the 17 defense installations built before the war's end (Petersen, 2011), Narsarsuaq was unusual in that several settlements were nearby. The area has a history of habitation that can be traced back to Norse explorer Erik the Red's eastern Viking colony. After the war in 1956, the American military built a third fully-fledged airport on the small, discontinuously inhabited island of Kulusuk to support construction of a radar station (DYE-4) that formed part of the Distant Early Warning Line built

from Alaska across Canada to Greenland to warn against Soviet missiles (Elixhauser, 2019). Kulusuk followed the pattern of constructing an airport in a location far from existing settlements: while a Danish missionary had been established on the island in 1909, other nearby areas offered better hunting grounds, and most of the region's population was based in the town of Tasiilaq 20 km away on another island (Dzik, 2015). Yet as in Kangerlussuaq and Narsarsuaq, in Kulusuk, a settlement directly adjacent to the airport with a couple of hundred people soon grew to support its operations.

While Greenland was returned to Denmark at the war's end, domination of Greenlandic airspace did not suffice for a U.S. government increasingly concerned about the Soviet threat. In 1946, Washington, D.C. offered to purchase the island, referred to by the Pentagon as "the world's largest stationary aircraft carrier" (Doel, 2016, p. 29), from Copenhagen for $100 million. While Denmark rejected the proposal, the signing of a bilateral defense agreement in 1951 allowed the U.S. to build a major air base (i.e., Thule Air Base) in northwestern Greenland, where the glacial outwash plain offered a suitable site, along with access to the sea that could enable ships to bring in construction materials and cargo.

To prevent the thawing of the permafrost underneath the—usually dark asphalt—runway surface, workers painted the entire airfield white to reflect the sun's heat

(Thule Air Base, 1989). (Image by Lee E. Schading)



Distances from Thule Air Base to major cities, airports, and strategic points.

(Life Magazine, 1952)

In Life Magazine of 22 September 1952, American audiences were introduced to the triumphal story of Thule Air Base's construction, including many images (Life, 1952). At the time, it was considered a marvel of technological development. One interesting spatial element to note is the color of its runway. To prevent the thawing of the permafrost underneath the—usually dark asphalt—runway surface, workers painted the entire airfield white to reflect the sun's heat (Bjella K., 2013). However, in Life Magazine and other media outlets, American audiences were left in the dark that this area was far from a cultural void or empty land. Construction of Thule Air Base began in 1951 on the outskirts of the Greenlandic village, Pituffik. As the base expanded to become the second-largest in the U.S. Air Force (Martin-Nielsen, 2012), the Danish government forced the village residents to relocate 130 km north to a new town called Qaanaaq (Takahashi, 2019). They had to move by dogsled, as the new settlement lacked an airstrip. Dozens of Inughuit (Inuit) households lost their homes. Among them were "veterans from the great expeditions" such as

a 64-year old elder named Odak, who assisted American explorer Robert Peary on his expedition to the North Pole in 1909. But by 1953, the settlement "lay abandoned, and the whole surface of the peninsula [named Uummannaq] was scraped and ploughed by bulldozers, so nothing of the original structure remained" (Sørensen, 2010, p. 42). In addition to relocation, in 1968 native Inuit were asked to assist in the cleanup of a crashed nuclear bomber (B-52) in the nearby Wolstenholme Fjord; however, this crash site included radioactive contamination (Doel R.E., 2016: 12). The forced relocation and cleanup highlight the complicated history of Thule Air Base and American influence in Greenland in general. Today, indigenous rights activists have disputed the continued prominence of the air base and its disruptive historical legacy.

In the 1950s, as American and NATO forces expanded their operations on the world's largest island, transportation demands increased. The development of commercial air routes between North America and Europe via Greenland, Iceland, and northern Canada also opened new opportunities for airport development. In 1953, Greenland's status from a Danish colony to county led authorities to begin developing tourism using two airports constructed by the U.S. military as hubs. In 1958, charter flights began carrying tourists from Iceland to Narsarsuaq, where they stayed in the decommissioned U.S. army barracks. Runways initially developed to support foreign military jets began instead supporting aircraft filled with foreign tourists. The following year, charter flights began carrying tourists from Iceland to nearby Kulusuk, a journey still popular today as a day trip from Iceland to Greenland. In the 1960s, SAS (Scandinavian Airlines) began more regularly flying Danish tourists to Narsarsuaq (Tommasini, 2014), exemplifying how infrastructure remained oriented to external demands while contributing to the local economy, too.

Even the early air routes flown by flag carrier Air Greenland, established in 1960 (initially as Grønlandsfly), met external rather than internal demands. The airline's

Passengers boarding an airplane at Kulusuk Airport.

(Image by Ed Miller, 1973)

two initial investors were Scandinavian Airlines (the flag carrier of Denmark, Norway, and Sweden) and Danish mining company Kryolitselskabet Øresund, which took over the strategic cryolite mine outside Ivigtut in southern Greenland from the U.S. after the war. Even though the governments of Greenland and Denmark became shareholders in Air Greenland in 1962, through the 1970s, Air Greenland's routes mainly served military and mining activities scattered around the country, using helicopters and helipads. One destination was the cryolite mine, pejoratively described by locals saying, "Ivigtut is not Greenland." Foreigners traveling by air had easier access to Ivigtut than Native Greenlanders on land, who were only allowed to enter the mine site once weekly to buy imported goods (Berry, 2012, p. 224). Finally, following the establishment of home rule in 1979, Greenland's aeroscape was gradually designed to meet the needs of a nascent Greenlandic nation. The transformation of Greenland from a Danish province into an autonomous constituent within the Kingdom of Denmark, led the new Home Rule government to invest in building helipads in villages inaccessible by boat in winter and subsidizing air routes to them, improving the supply of food and services (Larsen, 1992). In the 1980s, direct flights were established to Iqaluit (the capital of Nunavut, Canada)

Airport as crucial infrastructure connected to the small village of Upernavik, northwestern Greenland.

(Image by Weimin Chu)

and Iceland. The former route was usually empty and was ultimately discontinued due to low demand. So, too, was a direct route between Kangerlussuaq and Baltimore that Air Greenland briefly operated in 2007. Rather than intercontinental commercial air traffic supporting the development of Greenland as imagined during the early postwar period and as is now once again fantasized, the expansion of the aeroscape to connect Greenland's scattered settlements helped consolidate the country as a functioning logistical space and nation.

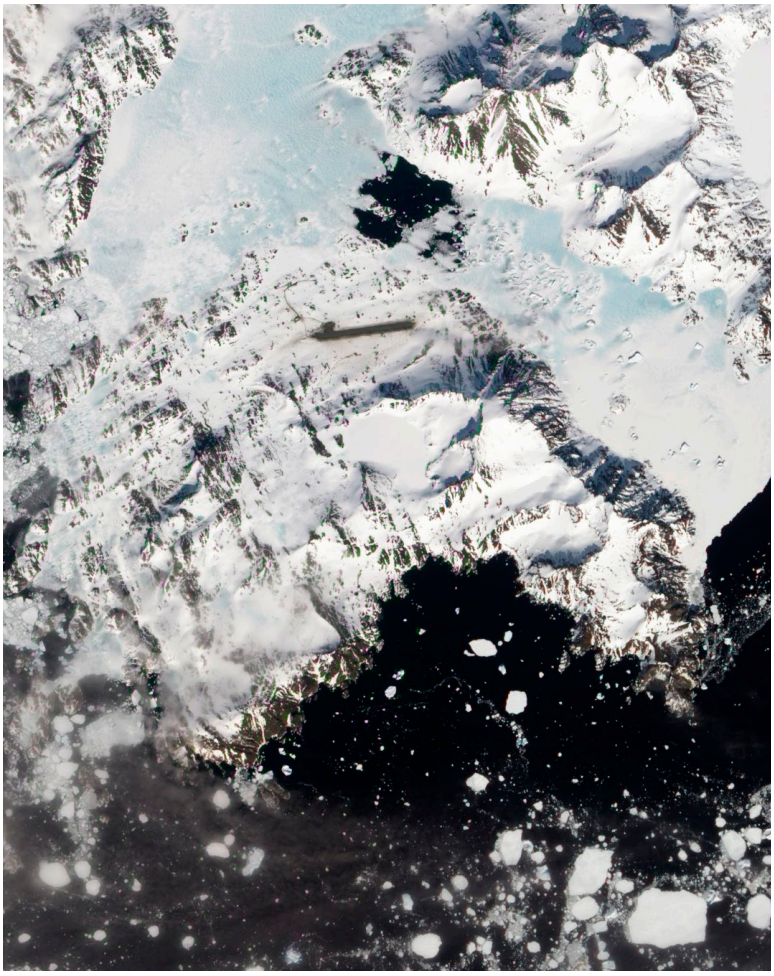
Important to note is that, American World War II and Cold War projects have had in addition to dramatic human impacts—such as forced relocations of Inuit settlements—also major environmental consequences. For example, American photographer Ken Bower has documented those environmental atrocities at the former American Air Base, Bluie East Two, a place the local Inuit call "American Flowers." In reality, it is nothing but excessive amounts of rusted and leaking oil barrels, and old vehicles and structures. Bluie East Two is located between the villages Kuummiut and Sermiligaaq, alongside the Ikateq Fjord in eastern Greenland. It was operational from 1942 to 1947 and served as a minor U.S. Army airfield to refuel airplanes during an Atlantic

crossing. However, today, there is still an estimated amount of 200.000 oil barrels on-site (Kromann, 2019). The leaking oil has found its way to the land and water, resulting in a heavily damaged ecosystem and an "unfertile" landscape deprived of hunting and fishing grounds (Elixhauser, 2018: 119). In 2018, Greenland's prime minister Kim Kielsen and the Danish Minister of Trade and Industry Esben Lunde Larsen came to an agreement to clean up the disused military installations and waste at Ikateq (Kromann, 2019). The clean-up is expected to take several years. As seen in historical examples, Inuit had limited to no say in the militarization of their lands; although, the local communities and ecosystems are the ones affected by the drastic and often long-term impacts.

Conclusively, while Greenland's aeroscape was initially designed to match American security needs, in its pursuit of greater independence from Denmark, the Greenland Self Government is both centralizing and globalizing it. As the country's aeroscape is streamlined within the country's territorial limits and extended beyond them to attract global capital and tourists, the country's cozy airports where distant relatives are bound to run into each other may be replaced by slick, anonymous international

Excessive amounts of rusted and leaking oil barrels at the former Bluie East Two site, Ikateq, eastern Greenland.

(Image by Ken Bower)



On Kulusuk island, Kulusuk airport's gravel runway is the only visible infrastructure as seen from outer space.

(Satellite image by NASA's Earth Observing-1 satellite, 2006)

airports—prototypical "non-places" (Augé, 1995). The remaking of Greenland's aeroscape has implications for not only geopolitics and geoeconomics, but for the viability of local livelihoods and entire villages that have come to depend on airports built by the U.S. military in the mid-twentieth century. One effect of Greenlandic self-rule may be the reconfiguration of the country's aeroscape to support needs determined by the center of Greenlandic political and economic activity: Nuuk. As a result of this centralization, the economic and social underpinnings of settlements that became lively places both because of and despite American military interventions may disappear. While the "imperial debris" of bygone empires usually

take the form of crumbling ruins (Stoler, 2008), vibrant places with their own histories and meanings can also endure. Post-colonial nation-building efforts that exclude post-imperial places from rationalized economic and political networks may cause their demise.

One externality of Greenland's self-rule may thus be the infrastructure, livelihoods, and deep sense of place that have formed in villages whose original imperatives for existing—American military objectives—have long since dissipated. Several interviewees in Kulusuk made clear that they believe the government wishes for people to move to Tasiilaq or even farther west. The remaking of the country's aeroscape may also advance the remaking of its landscape, serving to align the "volume" of Greenland. While the "everyday distributions and social life of infrastructure" (Anand et al., 2018: 13) command attention, the consequences of its redistribution and demise, or the afterlife of infrastructure, should, too. Across the Arctic and beyond, as Indigenous Peoples gain sovereignty over their lands, they will undoubtedly build infrastructural networks more attuned to their needs than previous military or colonial powers ever did. Accommodating the people "in between" who have been transforming colonial and imperial imprints on the landscape into their homes for hundreds of years, however, will require difficult trade-offs in the Indigenous-led design of infrastructure, logistics, and nation-states.

Housing barracks at Kangerlussuaq Airport.

(Image by Filip Gielda)

Qaqortoq's heliport, which works in direct contact with Narsarsuaq Airport, is vital for the people of Qaqortoq, south Greenland.

(Image by A.R. Carlsen)

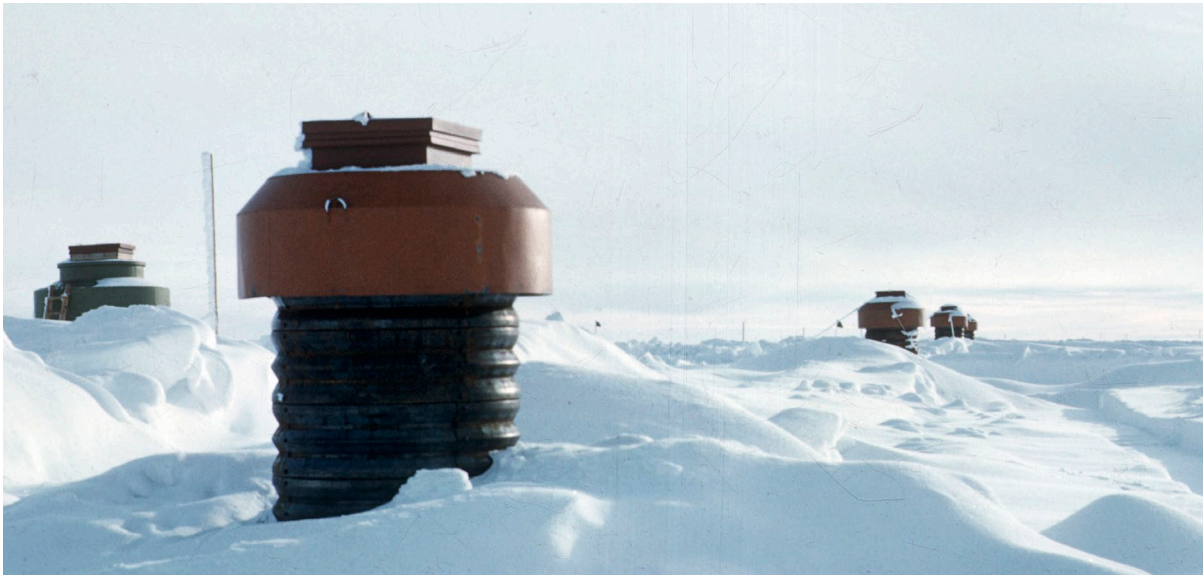
Housing barracks at Narsarsuaq Airport.

(Image by Mads Pihl)

Chapter 5 - Subsurface Construction: Camp Century and EastGRIP

Chapter 5 - Subsurface Construction: Camp Century and EastGRIP

During World War II and the Cold War, governments surrounding the Arctic Ocean transformed the region into a strategic territory (Bruun, 2020: 167). Many of them, including the United States, identified this extreme part of the world as an area "in which total life support had to be supplied through technology" (Hemmersam, 2016: 416). Greenland—located between North America, Europe, and the Soviet Union—became an important node and a potential "theatre of war" whenever there were increased tensions between the East and the West (Doel R.E., 2016: 3). The U.S. perceived Greenland as a cultural void where everything had to be imported, modular, and prefabricated (Hemmersam, 2016: 416). In addition to military airport infrastructure, one of the most prominent examples of this perspective is Camp Century, often referred to as the "Cold War city under the ice." Camp Century was a nuclear-powered U.S. military base under the Greenlandic ice sheet. Being under the ice served two purposes, protection against the harsh climatic conditions and a limited "risk of detection by long-range surveillance" (Heidbrink, 2018: 136). Just 800 miles from the North Pole and 500 miles further north than the northernmost city in the U.S., Utqiagvik, this military base lay at the northernmost edge of U.S. military power, both



Camp Century, as seen from above ground, 1960.

(Courtesy of the Arktisk Institut)

Newly cut trenches in the Greenlandic ice sheet are being covered with corrugated steel arches, Camp Century, 1962.

(Image by Børge Fristrup)
(Courtesy of the Arktisk Institut)

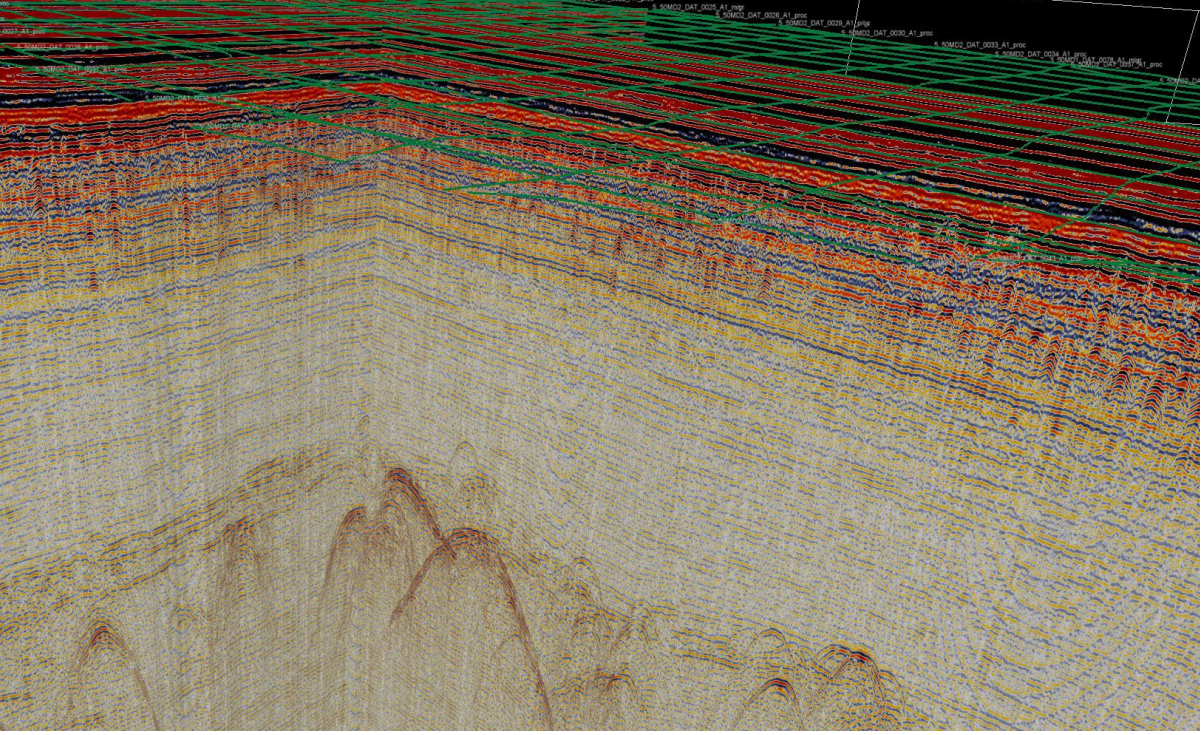
physically and technologically. Here, behind the mask of a scientific research station and intense media coverage to the American public, the U.S. Army Corps of Engineers explored and studied options to implement another military project, Project Iceworm. Under the Greenlandic ice sheet, this top-secret project aimed to deploy a massive network of tunnels (more than fifty thousand square miles) paired with rail-based ballistic missiles in constant motion (Heidbrink, 2018: 138). Eventually, Project Iceworm was aborted because they realized the ice sheet was too unstable for such a large infrastructural endeavor. In contrast to its experimental projects, Camp Century was operational for several years. More specifically, Camp Century was built during the late 1950s and early 1960s and operated until 1966-67 (Nielsen et al., 2016: 212).

Located deep in the ice sheet and 250km east of Thule Air Base, which lay on the coast, snow tractors and trailers transported most military personnel and equipment from Thule to Camp Century. During construction, workers cut trenches out of the ice of about 8-10 meters deep, followed by capping the openings with "corrugated steel arches" (Nielsen et al., 2016: 204). Snow would accumulate above the structure, harden, and cover the cut trenches in their entirety. As a result, the elaborate network of tunnels constituted, in the end, a "city"—with "living quarters, a library, workspaces, recreation facilities, a theater, and a

church" (Nielsen et al., 2016: 204). All of these buildings were "standardized and prefabricated" in the U.S. and eventually placed in Camp Century's tunnels connected to its main tunnel, called Main Street (Nielsen et al., 2016: 204). In other words, the U.S. military planners aimed to create an "artificial environment" replicating the "typical" American way of life, without dealing with nature itself (Heidbrink, 2018: 145). In 1967, because of the constant motion of the ice and high maintenance, the U.S. military abandoned the site and left its waste behind in the ice, thinking it "would be preserved for eternity

A prefabricated building in one of the tunnels at Camp Century.

(Image by Børge Fristrup)
(Courtesy of the Arktisk Institut)



Camp Century's tunnel infrastructure can be seen as arches in radar reflections.

(Courtesy of the Geological Survey of Denmark and Greenland, GEUS)

by perpetually accumulating snowfall" (Colgan W. et al., 2016: 8091). Over half a century later, the weight of the snow and ice has crushed the arches and tunnels entirely. However, more importantly, due to climate change, the "physical, chemical, biological, and radiological wastes abandoned at the site" are moving (Colgan W. et al., 2016: 8091). This could have disastrous environmental effects when the toxic waste reaches rivers or the ocean. For designers and others, Camp Century represents a marvel of polar engineering and construction. However, properly decommissioning sites like this in environments such as northern Greenland, should be equally or even more important than pushing the boundaries of technological innovation in the extreme north.

The core idea of living under and with the ice is not new. This concept can be traced back to the Inuit winter house, also known as the igloo, which provided temporary shelter to semi-nomadic Inuit. Camp Century lacked this ephemerality in construction, which might have been the reason for its failure. Also, by copying typical American military base logics to an extreme environment as the Greenlandic ice cap, the U.S. military planners failed to recognize centuries of Indigenous-expertise of living with the ice. Today, an international group of researchers at the EastGRIP ice-core drilling camp, located under

the Greenlandic ice sheet (roughly 400km inland), are building upon Camp Century's historical example—albeit not in the same location—with new, temporary, and environmentally friendly building techniques. Since 2012, polar scientists led by physicist and pioneer Jørgen Peder Steffensen have been using giant inflatable balloons to create cylindrical tunnels under the ice (Kintisch E., 2017). Tunnels created with this technique still contract and deform, however, slower than using the traditional trench technique supported with steel arches.

The newly developed balloon technique is put into effect as follows: first, similar to Camp Century, deep trenches are cut out of the ice. Second, large uninflated linear balloons (up to 40 meters long) are lifted in the open trenches. Some of them are placed vertically to create access holes. A so-called "balloon trench designer" coordinates the entire process (EastGRIP, 2021). Third, once in position, machines start the relatively long process of inflating the balloons. Fourth, fully inflated, the balloons are slowly covered with blown snow, which hardens the tunnels' supporting structure. At this point, only the balloons serving as an access hole peek up over

Before covering with snow, balloons are carefully placed and slowly inflated in the open trenches at EastGRIP.

(Courtesy of EastGRIP)

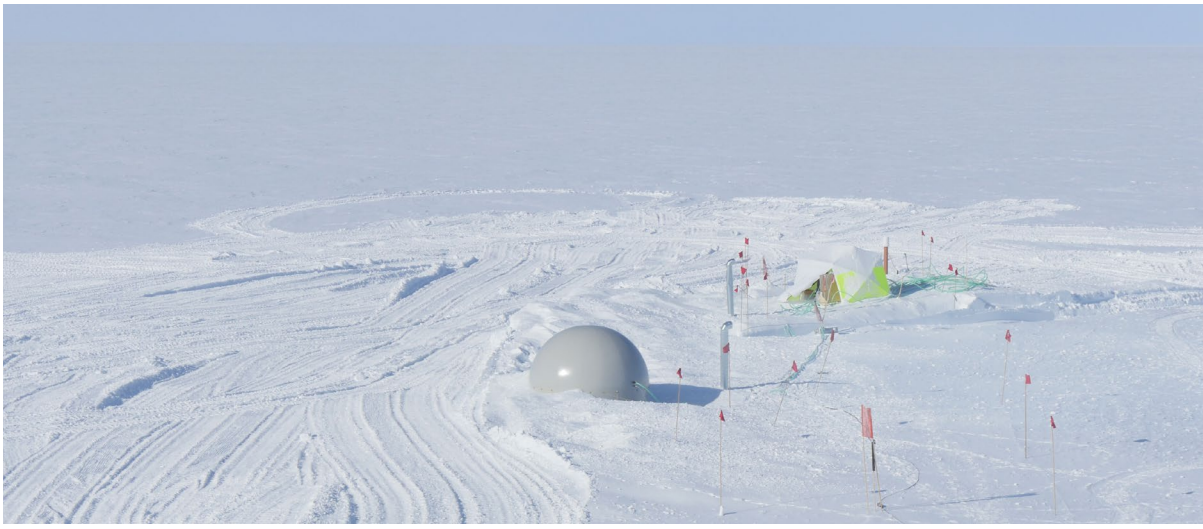
the icy surface. The rest of them have been fully covered with snow and are allowed time to harden. Finally, once the snow is set and structurally strong, the balloons are deflated and hoisted up through the access hole. After trimming the newly casted tunnels' walls and floors, workers lay a simple wooden base, which is easy to remove once research activities are finished, and in doing so, leaving limited to no trace in the ice. Conclusively, since the balloons are relatively cheap to transport, reusable, and environmentally friendly, this technique can be adopted for research camps in other snowy environments, such as Antarctica or the Himalayas. Among many other possible problems, however, this technique's temporal nature might make it challenging to adopt in, for example, contemporary urban settings. On the one hand, so far, inflatable architecture has not found its way to Greenland's urban landscape. On the other, as the world's second-largest ice sheet covers Greenland; settlements, towns, and cities do, however, have a strong relation with and understanding of ice, for example (and as seen in the next chapter), in the town of Ilulissat, West Greenland.

Once the balloons are fully inflated, they are slowly covered with blown snow, which hardens the tunnels' supporting structure.

(Courtesy of EastGRIP)

A large airplane—delivering food, materials, and people—sits at the "skiway" near the EastGRIP camp.

(Courtesy of EastGRIP)



EastGRIP camp as seen from above and at a moment when all the tunnels are covered with snow.

(Courtesy of EastGRIP)

A view from inside one of the tunnels at the EastGRIP camp.

(Courtesy of EastGRIP)

Chapter 6 - Tourism in Ilulissat

The continuous calving and flow velocity of the icebergs results in a rhythmic and ever-changing skyline of Ilulissat, West Greenland.

(Image by Inesa Matuliauskaite)

The UNESCO World Heritage-listed town of Ilulissat is located on the west coast of Greenland, 250 km north of the Arctic Circle and at a point where the Greenland Ice Sheet flows out to sea via the Jakobshavn tidewater glacier, also known as Sermeq Kujalleq. Researchers have studied this very productive glacier for over 250 years, which has helped develop our understanding of a rapidly changing climate (Bosson et al., 2019). The almost continuous calving of the ice front results in a highly visual and spatial relation to ice in an urban setting.

However, due to the continued publicity of floating icebergs in a seemingly untouched natural environment, Ilulissat's unique urban landscape and local culture get limited attention of people outside of Greenland, which further reinforces tourists' expectations of an "untouched and human-free landscape" (Smed, 2017). In this, Ilulissat's local "culture is undermined as a value in itself" (Smed, 2017). Furthermore, Greenland's national tourist and marketing organization "Visit Greenland," which emphasizes mostly nature-based touristic activities such as dog sledding, hiking, kayaking, and more, can

play an important role in underscoring and promoting Ilulissat's strong cultural and urban connection with the ice, which might result in a more contemporary view by tourists, and others, of life in Greenland. In addition, and as highlighted in this chapter, designers can also play a critical role in positively reorienting the views of Ilullisat's visitors and creating new understandings and valuable experiences anchored in a unique landscape.

Historically, the ice flow and its connection to human settlement in this particular region are profound and can be traced back for centuries. For example, even before the establishment of Jakobshavn (now Ilulissat) as a colony in 1742, there were many settlements in this region, including Sermermiut on the north side of the fjord and Qajaa on the south side of the fjord. Furthermore, Sermermiut in Greenlandic means "the place of the glacier people" and highlights linguistically the strong connection to its neighboring glacier (GEUS, 2021). People decided to settle next to this glacier because it is home to a rich and biodiverse ecosystem. More specifically, the glacier's meltwater contains large quantities of nutrients, and "the turbulence caused by the constant motion of calving icebergs brings warm and nutritious water from the deeper layers up to the surface" (GEUS, 2021). This results in massive amounts of plankton, attracting a wide range of crustaceans, fish, marine mammals, and birds. In other words, the

Fishing boat in Disko Bay, near Ilulissat, West Greenland.

(Image by Benjamin Hardman)

Enormous iceberg in the front, the town of Ilulissat in the back.

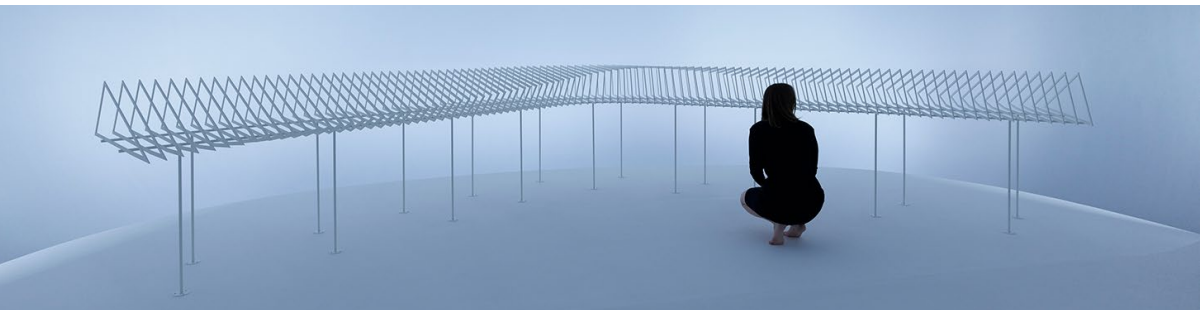
(Image by Stian Klo)

ice facilitated rich hunting grounds, which, in effect, supported human life in this extreme polar environment. It was only in 1991 that tourism came into the limelight—this as a part of the national development strategy of Greenland (Kaae, 2002). In the years following, Ilulissat became a polar tourism destination and a part of the global tourism industry, mostly dominated by the West. Furthermore, worth noting is that Ilulissat's icebergs don't only attract visitors from far away: they also travel long distances themselves. For example, the fate of the *Titanic* was sealed when a large iceberg calved and began its life into a west Greenlandic fjord in 1911, perhaps from the Jakobshavn glacier near Ilulissat (Bigg et al., 2014).

Today, capitalizing on Sermeq Kujalleq's natural amenities, just outside town lies the "Ilulissat Icefjord Centre" designed by Danish architecture office Dorte Mandrup. A minimalist 1:12 model was presented at the Venice Biennale of 2018, and the project has been under construction since 2019. According to the architects, the building was designed to "blend in with the impressive landscape while offering local residents, tourists, and climate researchers the ultimate vantage point from which to absorb the historic atmosphere of the Icefjord" (Dorte Mandrup, n.d.). This idea follows the Western aesthetic tradition of viewpoints and framing the landscape (Urry, 1992). However, one can critique if this is the right way

to engage with the ice. In this, one aspect is elevation. Viewpoints are mostly located on a high point in the landscape, although, if one follows local notions of seeing and experiencing the ice, this would be from a low point close to the water, such as seen from a kayak or umiak. A second aspect is to not see the ice as something to frame and separate from the city, but as an extension or vital part of a city in motion. The continuous calving and flow velocity of the ice results in a rhythmic and ever-changing skyline of Ilulissat and portrait of the broader region. This dynamic way of seeing the urban landscape—as well as the region's rich cultural history—is currently undervalued and needs to come to the fore in any future design project.

Furthermore, following a significant topic in the field of Arctic tourism studies and adding another layer of complexity to Ilulissat, it is important to briefly touch upon the interplay between tourism and sustainable



A 1:12 model of the Ilulissat Icefjord Centre at the Venice Biennale, 2018.

(Image by Dorte Mandrup)

Visual representation of the Ilulissat Icefjord Centre.

(Image by Dorte Mandrup)

adaptation and growth of the respective impacted community (Kaján, 2014). This because, in addition to a long waitlist for housing, the growing number of tourists require more places to stay, which raises the need for the urban expansion of Ilulissat and a spatial analysis of how to carefully balance these demands. Since Ilulissat aims to be "the number one 'green' tourist destination in the Arctic," this will require "special emphasis on CO2 neutrality, waste management, renewable energy, and energy-efficient solutions," as well as sustainable construction techniques and critical design proposals that incorporate the town's strong relation to the ice (Ilulissat steering group, 2018). However, since the Ilulissat ice fjord is also a UNESCO World Heritage site, restrictions on expansion apply and are translated in a "landscape buffer zone" and "near-urban buffer zone" (Ilulissat steering group, 2018). Following UNESCO's zoning guidelines, urban expansion is only possible towards the north, away from the ice fjord. In doing so, potentially disconnecting the town from the ice fjord and eventually building too close to Ilulissat's existing airport, which in itself comes with building restrictions. In other words, Ilulissat sits in a peculiar position. However, these limitations can also be a catalyst to find opportunities to reimagine new relationships between Ilulissat's built and natural environment, as well as tourism, culture, and its ice fjord in particular. Finally, in this case, neighboring Iceland—which went through an immense spike in tourist numbers in the last decade and arguably reached the critical level of overtourism—can be a helpful precedent and guide for Greenland, and Ilulissat in particular.

Conclusively, the town of Ilulissat sits at the intersection of a vast network of people, distended global tourist networks, climate change science, rich ecosystems, hunting grounds, and more. In effect, constant change and movement in the landscape are an intricate part of the region's inhabitants, identity, and cultural knowledge. As exemplified in the next chapter, this highly dynamic environment also relates back to the Greenlandic Inuit culture at large.

Chapter 7 - Collective Memory, Food Networks, and Urban Futures

For many centuries, Inuit have hunted seals for food, clothes, and income. In other words, seal hunting is a vital part of Greenlandic culture and economy.

(Image by Kim Insuk)

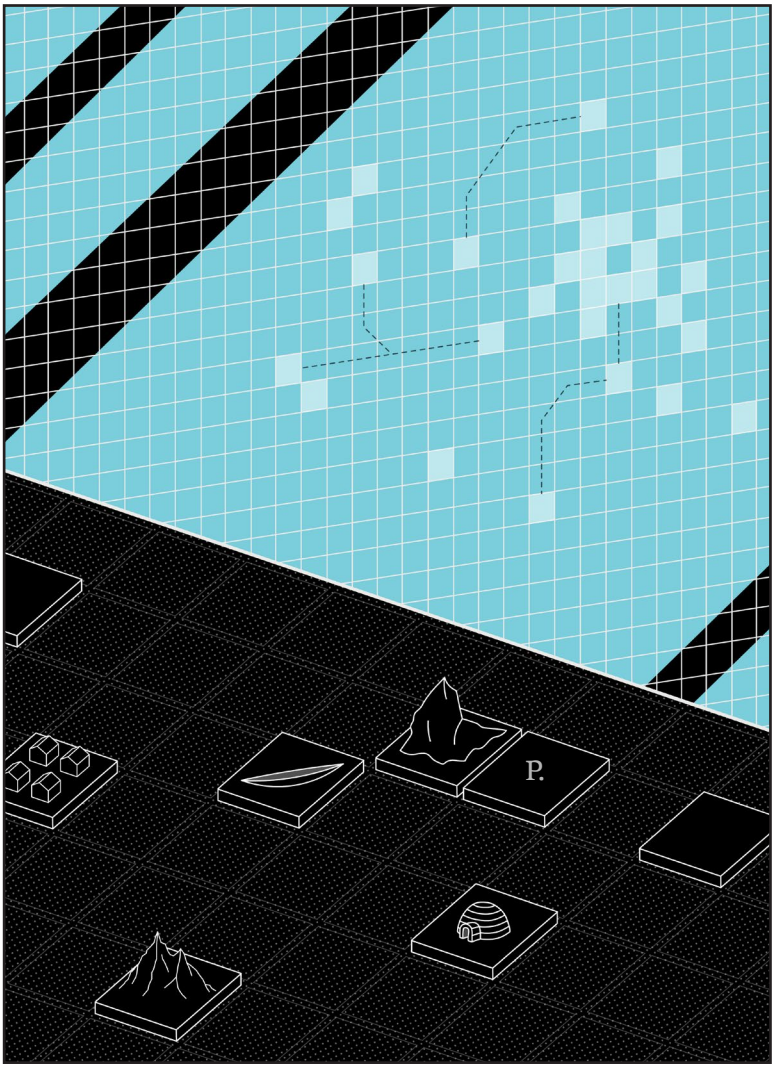
In Greenlandic Inuit culture, a collective memory of its landscapes, safe travel routes, and hunting grounds has produced "a simultaneously real and imaginary geography" weaving together people, stories, food, and landscape (Rundstrom, 1990). Geographies like this are considered "memoryscapes" supporting rich and intergenerational food networks, which are still used and of vital importance today (Nuttall, 1992). However, due to changing climatic, economic, and technological contexts, people continuously adapt and overlay these networks with new ways of traveling or start to create new networks, sometimes referring to recently introduced types of food. Anticipating and designing for the emergence of these new networks can, for example, help ensure the availability of food and promote job opportunities and economic growth. In this narrative, supporting infrastructures, such as marine, airport, or road infrastructure, is of growing importance. This chapter limits its focus to road infrastructure because it is currently the least developed in Greenland, it can (among others) be valuable to connect farming communities in the south of Greenland, and it is presently not widely discussed in the existing literature.

Ultimately, new "memoryscapes," food networks, and their infrastructural outgrowth can also be seen as the blueprint of future urbanization processes and settlement patterns.

Among Inuit, wayfinding and traveling through the landscape is more than just moving from point A to B: it is a way of being (Aporta C., 2004: 13). Moving is deeply embedded in Inuit culture, implying "a multisensory monitoring of one's surroundings," and involves various (often physical) ways of communicating about orientation, travel routes, and hunting grounds (Elixhauser, 2018: 50). Here it is important to underscore the relation between wayfinding and food. In this dynamic environment and in-between the different lines of movement, there are also moments of rest, pause, and reflection—for example, in the Inuit winter house used by hunters during long hunting expeditions. Connecting these lines (travel routes) and points (such as settlements and hunting grounds) results in an elaborate and vast food network. In addition to orientation and hunting, a strong tradition in storytelling and leadership accompanies traveling on the land, snow, and ice. The ability to communicate an in-depth knowledge of routes and place names is of high social value and a source of personal pride (Aporta C., 2004: 32). Through myths, proverbs, and tales, connected

Among Inuit, wayfinding and traveling through the landscape is a way of being and deeply embedded in one's culture.

(Image by Matthew Reichel)

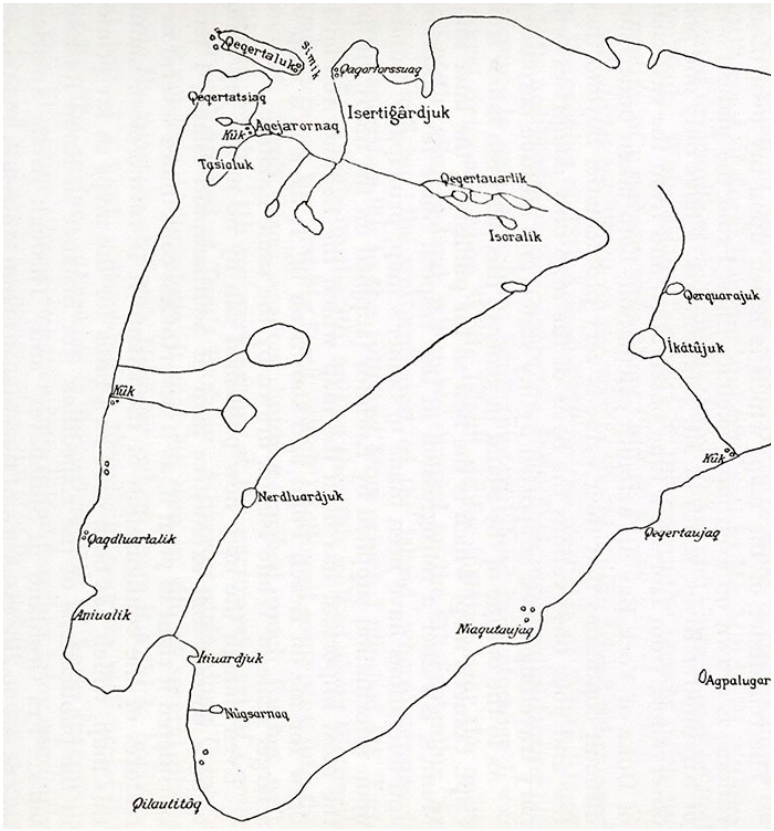


Through myths, proverbs, and tales, connected to places names (P.), topographic features, and encounters with people and animals, a collective memory develops itself.

(Illustration by Bert De Jonghe)

to places names, topographic features, and encounters with people and animals, a collective memory develops itself (Whitridge, 2002). Here the notion of "memoryscape"—a term coined by social anthropologist Mark Nuttall—is important and touches upon the vital interconnectedness of Greenland's natural and cultural landscape, resulting in "a simultaneously real and imaginary geography" (Nuttall, 1992; Rundstrom, 1990). This collective memory and complex relation to the landscape is transmitted from one generation to the other. Similar to Nuttall's "memoryscape," anthropologist Tim Ingold, as well as writer and academic Michael Bravo, have touched upon

similar observations, although seen through different lenses. Ingold, for example, has argued in more general terms for a "dwelling perspective, [...] according to which the landscape is constituted as an enduring record of—and testimony to—the lives and works of past generations who have dwelt within it, and so doing, have left there something of themselves" (Ingold T., 1993: 152). In turn, Bravo highlights within Inuit society an "intimate matrix of connections" and a "succession of shifting horizons" that are "at once geographical and emotional" (Bravo M., 2019: 20). Importantly, within the Inuit ethnography, this culturally complex and "historically sedimented" relationship is not solely confined to the land; it also includes the sea and icescapes (Whitridge, 2002). As a result, with the changing seasons, ways of seeing, moving, and navigating change accordingly. For Inuit, secondary to this story is the act of map-making.



Inuit map, drawn from memory of Southampton Island at the mouth of Hudson Bay and collected on the Fifth Thule Expedition (1921-1924). Greater detail of the inlets' shores indicates that the best fishing grounds and campsites were found there.

(Text by Michael Engelhard)
(Image courtesy of Pan-Inuit Trails)

Ole Andreassen from the village of Ikerasak, western Greenland, shows his catch of the day—including fish and bird eggs—in a well-equipped kayak.

(Image by Jette Bang, 1936)
(Courtesy of the Arktisk Institut)

In the past, Inuit map-making occurred in several forms, from ephemeral mapping in the snow, sand, or pencil and paper, to rare and infrequent wooden tactile maps. Inuit enforced their strong linkages between people, place, and its past through these different forms of map-making. Here, accuracy was of high value, although ways of measurement were different from Western conceptions. For example, the maps' scale was often deliberately distorted, not to reflect distance, but travel time (Fossett, 2003). Because of the often difficult travel conditions, knowing one's approximate travel time instead of distance could save lives. Also, it is known that Inuit map-makers would increase the scale of the map when they got closer to home, or when they want to highlight good hunting grounds and campsites (Sejersen, 2004). In doing so, revealing more layered details, stories, and information about a particular travel route or place. Today, climatic, economic, social, and technological changes influence traditional ways of wayfinding and transportation. Contributing elements are, for example, the use of snowmobiles, air travel, and GPS. In many ways, these factors are an extension of the Inuit way of life instead of a replacement or erosion of cultural knowledge (Sheppard et al., 2017: 16). Although, the possible overreliance on technology, especially for young people, can result in an increased risk when being out on the land.

Construction of the road between Kangerlussuaq and Sisimiut, 2020.

(Image by Dwayne Menezes)

Recent changes in technology, wayfinding, and transportation infrastructure also promise new economic opportunities for the Greenlandic people. One example is the new road project connecting the settlement of Kangerlussuaq—including Greenland's current international airport—and Sisimiut, Greenland's second-largest town. Construction began in July 2020 and will result in the first road connection between two Greenlandic settlements. The idea of this specific road project has been on the drawing boards for many years, and it is seen as "an important way to promote tourism, mobility, and other investments in the region" (Barnes J., 2020). Intercity roads, such as this example, are one way to improve accessibility, reduce transport costs, and spur economic growth. However, in addition to uncertain environmental impacts, Greenland's enormous distances, extreme climatic conditions, and high costs of maintaining roads make it practically impossible to scale up the Kangerlussuaq-Sisimiut project into a nationwide road network. So far, most Greenlandic road networks are within the borders of one city or settlement, and mainly located in the southern parts of Greenland. Potentially, the idea of Greenland's future road infrastructure should shift from becoming intercity connections to serving new and regionally emerging food networks. As seen in the

past, tracks, trails, and routes link settlements to hunting grounds, supporting Inuit livelihoods. These connections between Greenlandic culture, landscape, connectivity, and food, can serve future infrastructural projects by driving not only potential economic gains but also fostering a broader perspective of growth to comprise individual and cultural well-being, too, anchored within a local socio-cultural landscape.

Connecting and emphasizing new food networks such as the growing agricultural and sheep farming practices is one example of how to link economic and cultural development. Due to a changing climate, resulting in a longer growing season, extended periods of summer grazing, and higher average temperatures, a larger portion

Agricultural land in Narsaq, southern Greenland, connected by road to other fields and the nearby town. In the back, small icebergs are slowly passing by.

(Image by Aningaaq R Carlsen)

of (southern) Greenland will become more suitable for agriculture and sheep farming. For example, an early-stage network of underdeveloped gravel roads between sheep farms and small villages already exists in the area of Skovfjorden, South Greenland. Networks such as these can potentially include and support other initiatives and ideas, such as newly designed spaces revolving around the education of food resources, as already happening at the Upernaviarsuk Experimental Farm. Here, itself being a collection of agricultural plots, experiments primarily focus on cultivating new crops, sheep farming, and the teaching of prospective sheep farmers or greenhouse gardeners. Food networks as these can also reveal new spatial and social relationships and catalyze other small-scale economies and settlements to develop. As a result, in exploring alternative food futures, new "memoryscapes" anchored within a local-regional context may gradually emerge.

As alluded to earlier, these new "memoryscapes" and their infrastructural outgrowth can be seen as the blueprint of future urbanization processes and settlement patterns. Following this logic can counter mid-twentieth century centralization efforts by Denmark in Greenland and realign centers of growth to better match local needs. Furthermore, going from "memoryscape" to city can ensure sustainable development that is connected to local resources and economic/commercial structures. Moving away from Danish/European influenced ways of urbanization will support settlement patterns more responsive to Greenland, its people, and its landscapes. Doing so not only in the capital but in areas like Skovfjorden and elsewhere may help to reshape and cohere the country's urban identity and, among other impacts, potentially slow down the outmigration of youth from small settlements to Nuuk, Copenhagen, and beyond. As seen in the next chapter, this transitional process can benefit from a highly collaborative approach, not only among local Inuit, but also with international scientists, engineers, and designers, resulting in the co-production of knowledge.

Sheep farming in the area of Inneruulalik, South Greenland.

(Image by Aningaaq R Carlsen)

A worker is busy harvesting fresh lettuce at Upernaviarsuk Experimental Farm, South Greenland, for the local people and villages in its surroundings.

(Image by Mads Pihl)

Overview of Upernaviarsuk Experimental Farm, South Greenland, including greenhouses and an education center.

(Image by Mads Pihl)

Chapter 8 - Co-production of Knowledge

Gerhard Mercator's 1595 map "Septentrionalium Terrarum description," shows Greenland at a roughly correct size and location.

Exploring the cartographic co-production of knowledge between Inuit cartographers and European explorers, Greenlandic scientists and international scientists, and local and international institutions illuminates the benefits of collaboration. As exemplified here, this can result in unique map-making practices and academic projects. These precedents also set the stage to discuss recent collaborations in the field of architecture, and the lack thereof. While, Greenland has found its way to internationally acclaimed architecture offices; in return, they need to find their way to the Greenlandic people, its landscapes, and cultural understandings.

Around 1420-1439, Danish geographer Cladius Clavus was one of the first to map parts of the Arctic and label Greenland (Siguardsson, 1984). Clavus' map was followed by Gerhard Mercator's 1595 map "Septentrionalium Terrarum description," showing Greenland at a roughly correct size and location. Although Inuit were among the first to explore and utilize these territories as part of

daily life, from the fourteenth century onward, northern European and North American explorers, whalers, and scientists, dominated foreign explorations of the Arctic (Taagholt, 1991). Later, in the sixteenth century, encounters between Western explorers and Inuit were often troublesome, as documented in the hostilities between British explorer Sir Martin Frobisher (1535-1594) and Greenlandic Inuit (Loovers, 2020). Then, in the nineteenth century, emphasis was placed on a more collaborative approach between Arctic explorers and Indigenous Peoples. Many of those partnerships are included in original travel reports, such as the contributions of local Inuit Hans Hendrik (1834-1889), who played an important supporting role in several Arctic expeditions, or John Sakeouse (1797-1819), who assisted explorer John Ross (1777-1865) (Loovers, 2020). More recently, the Second Thule Expedition (1916-1918) which set out to map a little-known area of Greenland's north coast, was led by Knud Rasmussen in support by local Inûkitsoq. At least one expedition, the Fifth Thule

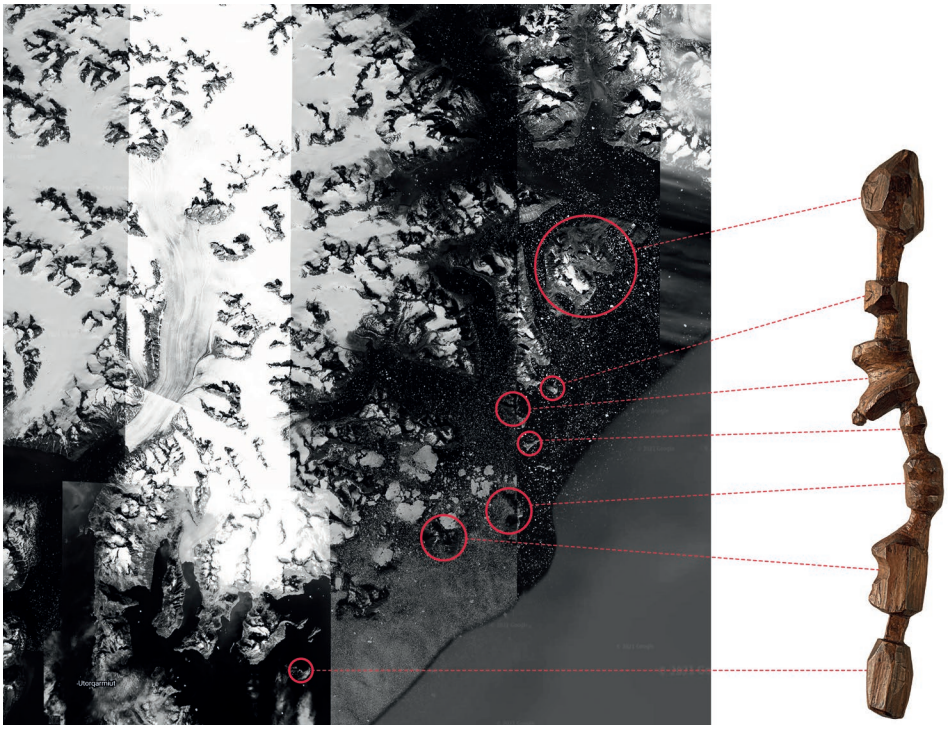
Left: Knud Rasmussen and Inûkitsoq, Second Thule Expedition

Right: Arnarulunguaq, Fifth Thule Expedition

(Courtesy of the Arktisk Institut)

Expedition (1921-1924), was assisted by an Inuit woman, Arnarulunguaq. Integral to the success of all of these Arctic voyages were the experiences, communication skills, and maps of local Inuit cartographers and interpreters. Over time, foreign explorers were highly fascinated by Indigenous perceptions of map-making, although it is said that the Inuit were mainly concerned with the "act of mapping", as opposed to the final product (Rundstrom, 1990). In the end, map-making was not only a product of power and a tool for colonization, but it also reflects a sense of collaboration and companionship between explorers and local Inuit to navigate Greenland's extreme landscapes safely.

One interesting encounter involved Danish naval officer and Arctic explorer Gustav Holm (1849-1940) and the Inuit (Tunumiit) of the Ammassalik coast of eastern Greenland. In the 1880s, the story goes that Holm led an expedition supported by "generations of navigational know-how" in the form of one-of-a-kind handheld wooden



One of the Ammassalik maps from the 1880s in relation to contemporary satellite imagery.

(Image of wooden map by David Trood, satellite image by Google Earth, collage by Bert De Jonghe)

maps (Delisle, 2016). For Holm's expedition, Inuit mapmakers carved out prominent coastal features in pieces of wood, such as "fjords, islands, nunataks and glaciers" (Bagrow, 1960: 27). These tactile maps were supposed to be felt by hand while moving along the Greenlandic rugged shores in an umiak (a type of open skin boat). Today, some people have argued that these devices were mainly used for storytelling instead of navigating the icy and treacherous waters of east Greenland (Harmsen, 2018). Also, it is peculiar that nowhere, in any museum collection in the world are there similar maps to be found (Harmsen, 2018). So, the intriguing wooden Ammassalik maps are considered anomalies and not representative of common navigational practice among the Inuit. Interestingly, since 2016, graduate students at the University of Greenland (in Greenlandic: Ilisimatusarfik, meaning 'an institution to promote wisdom') are building an online repository of 3D models of the Gustav Holm collection, called the Ersersaaneq project. Their aim is to make "these materials universally accessible" and demonstrate "that these materials are not only important to Greenlandic history but are also part of a larger global collection of indigenous world heritage" (Fleisher et al., 2018). In terms of materiality, these handheld wooden maps or storytelling devices were most likely made from driftwood. By interpreting ocean currents, one could argue that most of the wood along the east and west coast of Greenland originates from northern Russia, northern Canada, and Alaska. This argument is also exemplified by the ill-fated 19th-century Arctic exploration ship USS Jeannette. Greenlandic Inuit discovered pieces of the wreckage, although it sunk off the coast of Russia (Sides H., 2015). In addition to Arctic explorers, this material exchange reveals one of many connections between different Arctic regions. One moves at a local and intimate scale but is guided by a global material connection.

Following the Gustav Holm expedition and other precedents, a collaborative spirit is still present. For example, scientist Lene Kielsen Holm from the Greenland Climate Research Center asserts that, in contemporary

Nuuk Center,
Nuuk, West Greenland.

(Image by Filip Gielda)

Greenland, Indigenous Knowledge and science co-produce knowledge (Holm, 2020). This co-production of scientific knowledge is beneficial for both the local and global community. A similar mindset and collaborative approach can also be beneficial when it comes to local architecture, landscape architecture, or urbanism. However, deliberate collaboration and an anchoring of the project within local contexts is often missing, as the Nuuk Center (2005-2012)—the first shopping mall and the highest building in Greenland—demonstrates. Instead of designing and constructing a building adapted to Greenland's landscape and local culture, a multistorey building more appropriate for European cities was constructed. Compared to the adjacent Katuaq Cultural Center—constructed from 1994 to 1997, and one of Nuuk's most architecturally noteworthy buildings inspired by the northern lights and Greenland's mountains—the Nuuk Center lacks any reference or connection to its local context, both metaphorically and literally. Designed by Danish architects KHR Arkitekter, the Nuuk Center would

have benefited from local collaboration and participatory workshops, incorporating it within a more considerable rethinking of Nuuk's streetscape, and seeing this as an experiment in exploring a new northern vernacular architecture. Furthermore, instead of designing buildings with a Danish/European influenced vertical dimension, future buildings should focus on the horizontal dimension and lower the impact of shadows (see chapter 9). This idea is also exemplified by the Katuaq Cultural Center. As mentioned before, this building can be considered as a positive example of a project which emphasizes local Greenlandic influences within a contemporary and international design discipline. Designed by SHL Architects—based in Copenhagen, Aarhus, and Shanghai—the design is inspired by Greenland's dramatic

Interior of Katuaq Cultural Center, Nuuk, West Greenland.

(Image by Peter Lindstrom)

Visual representation of the National Gallery of Greenland, Nuuk.

(Image by Bjarke Ingels Group, BIG)

scenery and dancing night skies. In collaboration with local Greenlandic artist Buuti Pedersen, the building results in an expressive, light, and flexible environment for people to meet and enjoy Greenland's vibrant cultural scene. A final valuable example to highlight is the winning proposal, yet unbuilt project, for the new National Gallery of Greenland by Copenhagen and New York-based design firm Bjarke Ingels Group—in collaboration with local architecture offices TNT Nuuk, Ramboll Nuuk, and Inge Bisgaard (Arkitekti). By combining historical and contemporary Greenlandic art, standing in-between an old and new Greenlandic identity, and being located between the land and the sea at the water's edge, the gallery is straddling time, culture, and landscape. Furthermore, the building's circular shape follows the terrain's topography and, in doing so, creating "a unique hybrid between the abstract shape and the specific location" (Ingels, 2011). The building's geometry is a break from the commonly found square volumes, and its intentions are a welcoming invitation to both the city and its people, the waterfront and the sea, and the changing identities and understandings of Greenland as a whole. In other words, this architectural gesture and collaborative project invites a diverse range of activities and ties the National Gallery strongly into the cityscape of Nuuk.

Visual representation of the National Gallery of Greenland, Nuuk.

(Image by Bjarke Ingels Group, BIG)

Conclusively, although it is not a phenomenon only happening in Nuuk, the exoticism or othering seen in the city's architecture needs to be addressed whenever a new project enters the design process. Also, both positive and negative examples show that the co-production of knowledge within the design field of Greenland is relatively limited and implies that there is still room for improvement. Ultimately, the critical participatory approach can be turned upside down and create a new dynamic where, instead of international practices, local offices take the lead and push for Indigenous-led, culturally sensitive, and climate adaptive projects.

Graduating students celebrating in front of the Katuaq Cultural Center.

(Image by Aningaaq R. Carlsen)

Chapter 9 - Climate Adaptation, Human Agency, and Common Land

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Greenland, and the Arctic in general, are often associated with a rapidly changing climate. Due to climate change and its global and potentially cataclysmic consequences such as sea-level rise, coastal erosion, thawing permafrost, changing fish availability, and more, Arctic communities may need to rethink existing societal, cultural, and architectural paradigms. This paradigm shift also needs to align with the current nation-building process and propel Greenland into a more inclusive and alternative future. One important aspect is to develop climate resilience and adaptation strategies and actions from the ground up. Climate change is not only a scientific problem, but a social one, too. In order to avoid repeating past mistakes of development under colonialism, successful climate resilience and adaptation in Greenland will require an inclusive social model and an embrace of contemporary design methods and tools that reaffirm traditional values and priorities, which together could lead to the emergence of a new northern vernacular architecture and the overall reimagination of Greenland's built environment.

Anganni Peter Mathiassen, local resident of Kulusuk village, is happy to present his hometown to foreigners. At the same time, he is also worried about what the future might bring in terms of the rapidly changing climatic conditions.

(Interview and image by Bert De Jonghe, 2017).

The Arctic Council's 2016 'Arctic Resilience Report' defines (community) resilience as "the capacity of people to learn, share and make use of their knowledge of social and ecological interactions and feedbacks, to deliberately and effectively engage in shaping adaptive or transformative social-ecological change" (Carson et al., 2016: 8). In this definition, it is critical to underscore the social aspects, importance of Indigenous Knowledge, and connection to ecological processes. This type of resilience can engender a balance between social and environmental factors. Since resilience involves a response to change and finding an equilibrium to maintain a system's essential functions, climate adaptation can be seen as an "adjustment in natural or human systems to a new or changing environment" (USGCRP, 2018). Depending upon the adaptive capacity, the willingness of people to change, and the political/economic ambitions of the Greenlandic government, this can lead to a "total transformation of society" (Sejersen, 2015: 126). Importantly, throughout this transformative process, the Greenlandic society, its attitudes, and human agency should come to the fore.

One way of including and empowering local communities and their inhabitants to reimagining resilient and adaptive futures can happen through small hands-on projects and community meetings. One example that has the potential for replication in Greenland is the town of Vardø, in Norway's extreme northeast. The town has seen a rapid population drop since the 1980s because of a decline in fisheries. A small collective, working under the name of 'Vardø Restored,' are local people who wish to alter the future of their town and their region. They mainly focus on local development and restoration based on cultural heritage in commercial ownership. As buildings are being restored, new businesses are emerging, and old businesses are being brought back to life. And through this work, local pride and optimism towards the future are being restored as well (Brodey, 2015). Their local craftsmanship, knowledge, and enthusiasm spurred a unique body of work noticed by many others. In the process, international

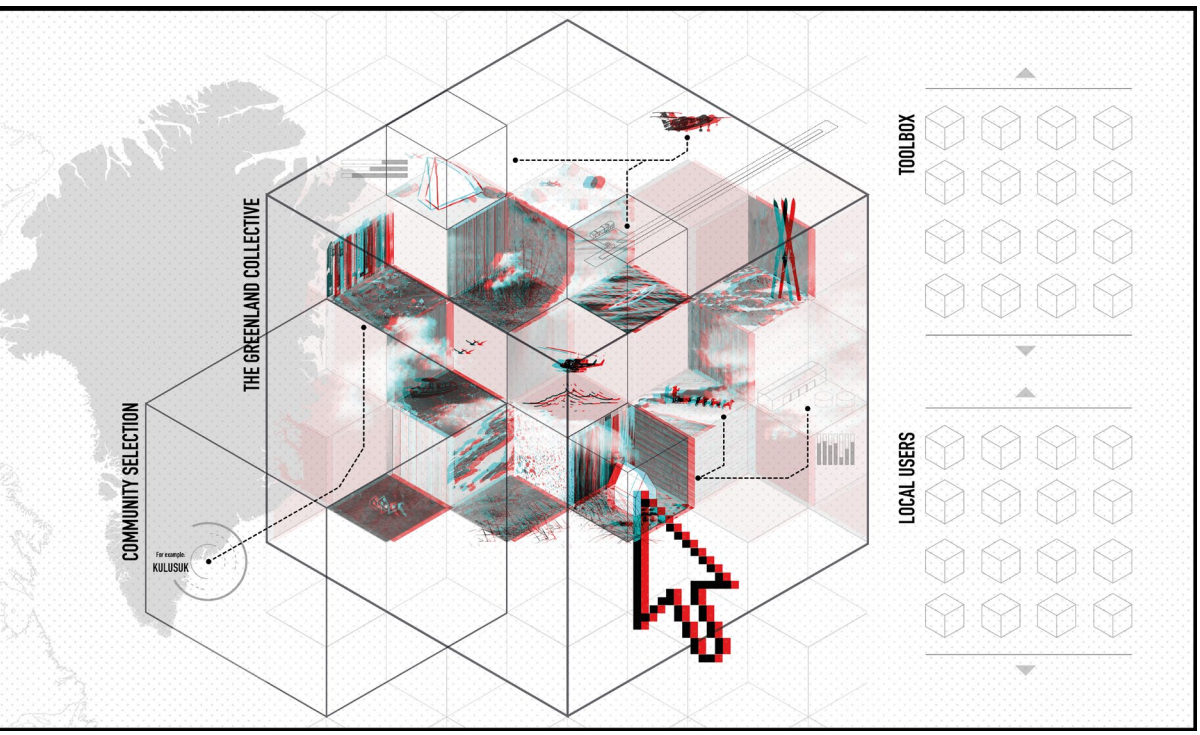
One of many artworks in Vardø, Norway.

(Image by Ian Cox)

artists joined the efforts, and they reintroduced the town to national and global tourism networks. In this, finding the right balance between emerging tourism and envisioning a new cultural and urban identity is important. In this same equation, for many other towns and cities in the Arctic, tourism can be replaced by singular economic interests such as mineral and resource extraction, which leads to an unhealthy and unsustainable economy, as seen in, for example, Russian monotowns and monocities. Therefore, there is a need for a diversified city model, both looking inwards to the local community and outwards to the opportunities beyond a city's borders.

In addition to small hands-on projects and community meetings, human agency and adaptive capacity on a wide range of topics can also be supported and cultivated with the help of digital tools. In this, the elders should be supported by the youth's voice, energy, and digital skills. When working digitally, a "virtual innovation platform" can be a potentially productive and interactive tool

that collects, synthesizes, and visualizes the day-to-day needs of Greenlandic communities and overlays its ideas and creativity. In this, every member of a Greenlandic community should have access to the online platform and be able to experiment with its virtual toolbox. For example, local people should be able to drag-and-drop different points, lines, and surfaces, to emphasize things that are of importance in the urban landscape today or in the future—this resulting in one collective body of local knowledge and demands. Throughout the process, people will see, for example, how their neighbor imagines the future or the changes their fellow residents are envisioning for their living environment. Local people might then vote for the most innovative, urgent, and useful proposals and use this platform to start a critical discussion with decision-makers. Furthermore, Greenland's geodata portal—NunaGIS—and Greenland's government—specifically the Ministry of Housing and Infrastructure—could take a leading role in funding and organization of citizen proposals. The author suggested



A "virtual innovation platform" can be a potentially productive and interactive tool that collects, synthesizes, and visualizes the day-to-day needs of Greenlandic communities and overlays its ideas and creativity.

(Illustration by Bert De Jonghe)

this idea earlier in a published opinion piece in the comprehensive Arctic news source "Arctic Today." In response to the author, the Minister of Housing and Infrastructure, Karl Frederik Danielsen, proposed that this "experimental, public centric, and explorative approach [...] might be organized as a research project in collaboration with Ilisimatusarfik (The University of Greenland) and other relevant partners" (Danielsen, August 2020).

During the in-person and virtual process of gathering, visualizing, and realizing local ambitions, glimpses of an emerging and new northern vernacular architecture in Greenland might surface. In recent decades, efforts have been made to design and propose a new northern vernacular architecture, although mainly elsewhere in the Arctic. Starting from the 1960-70s, people such as the Swedish architect Ralph Erskine (nicknamed 'The Arctic Architect of Modernism') urged for a more "culturally sensitive architecture" in northern climates (Hemmersam, 2016: 412, 413). Erskine is known for his project proposal for a new town in Resolute, Nunavut, Canada. However, in the end, he also failed to successfully respond to the diverse socio-cultural realities which were required for inclusive design strategies and actions (Sheppard et al., 2017: 36). Today, a contemporary northern vernacular architecture within a Greenlandic context has so far come to limited progress. When it does, the Greenlandic concept of "common land" can be a valuable tool to overlay climate adaptive strategies, human agency, and emerging architectural and urban typologies. Since common land is a concept unusual to most Western audiences, this needs some clarification. It represents a land that is held in common, has no market value, and cannot be owned (Sørensen et al., 2013: 176). In other words, the community and its citizens own every single square meter of Greenlandic territory.

In Greenland, every project, ranging from a simple tool shed to a complex airport infrastructure project, needs to apply for a so-called "land grant," whose issuance is

decided upon by the local municipalities (Riis, 2012: 210). A land grant can be understood as a "privilege" granted by the community to an individual or organization (Riis, 2012: 210). From a Western point of view, this concept is quite extraordinary. According to the Greenlandic-based architect Thomas Riis, "the reverse, [meaning] the private ownership of land, would be incomprehensible in [Greenland]" (Riis, 2012: 210). At first, one could argue that seeing the land as common is a promising way to organize and navigate urban planning processes in favor of the collective and result in strong and coherent plans. However, unfortunately, the reality tells a different story. As in the recent past, private and public spaces still generally follow Danish (GTO) planning schemes and traditions. This adherence to foreign design principles is problematic, as it results in a mismatch with the Greenlandic context and a failure to follow local knowledge and culture. Furthermore, because of top-down management, possible corruption, development in the wrong places, endless delays, and missed qualitative solutions to spatial problems, architect Riis argues that the Greenlandic way of "planning and managing land is an obstruction to the development of [its] society" (Riis, 2012: 210). Therefore, in order to use this concept as a productive and positive tool, a new interpretation and revitalization of one's understanding, and implementation, of Greenland's common land is a pressing issue.

Creative solutions in the urban landscape of Nuuk: a combination of utilities infrastructure and public staircases.

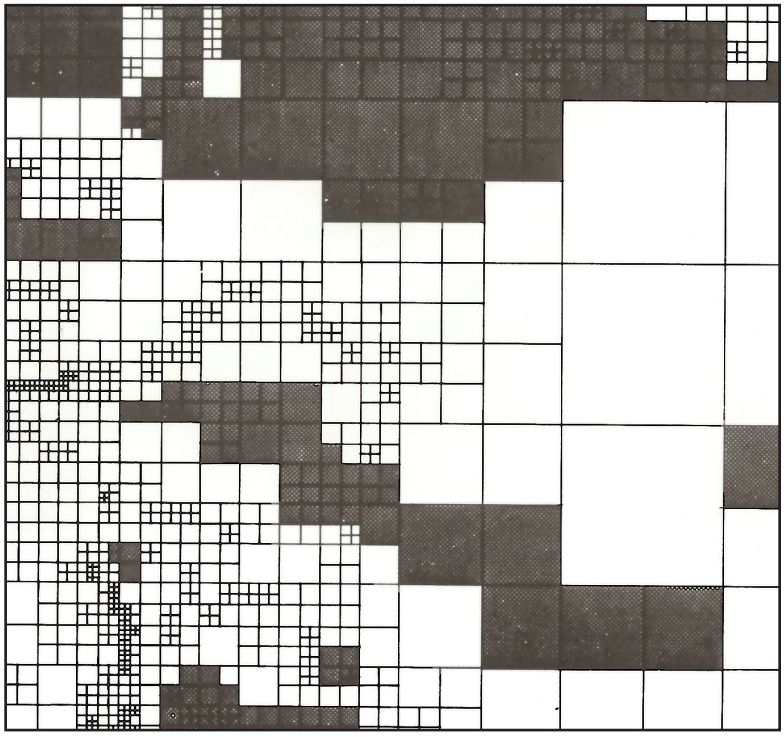
(Image by Siggi Anton)

A new northern vernacular architecture—proposed at the Danish pavilion, Venice Biennale, 2012.

(Image by Tegnestuen Vandkunsten)

A reimagination of common land can include many positive and collective benefits, and, compared to Western examples—where cities can seem fragmented—serve as a unifying factor in the urban fabric. For instance, through the lens of common land, a delicate balance can be found between ecological systems, socio-cultural needs, a growing housing market, and more. Through this same lens, common land can also benefit an urban design that accounts for local climatic conditions, such as heavy wind and snowdrift—resulting in a change in urban form, building heights, building envelopes, water management, and so on. More specifically, designing for snowdrift as well as understanding the dynamics of wind and snow (and its melting process) in an urban context, can lead to the successful positioning and design of streets and houses. Due to the concept of common land, interventions as these can be effectively realized at the city scale or masterplan-level. This results in a highly controlled way of dealing with snowdrift, resulting in a snow pile's smaller size and a displacement at a "tolerable distance away from [a] building and its approaches" (Sheppard et al., 2017: 131). Furthermore, optimizing the geometry of buildings can also alter the impacts of sun and shade in cold climate cities. This idea touches upon the reemerging concept of

"heliomorphism," which aims to revise and extend the concept of the solar envelope by architect Ralph Knowles (Harvard GSD, 2016). Heliomorphic form generation is "based on an understanding and the insightful manipulation of local environmental conditions," more specifically "the diurnal and annual rhythm of the sun," to plan, shape, and situate a building (Matus, 1988: 49). This results in a unique building envelope, or, in other words, solar envelope. This is relevant in, for example, Nuuk's Qinngorput district (as seen in chapter 2), where housing is located in the shadow of the Ukusissat mountain, and "half of the almost 1,000 residents [are] denied sunshine and warmth during the winter months" (Sørensen et al., 2013: 186). As seen in Qinngorput, a shift in the decision-making process of Nuuk's city council is necessary, as well as a reimagination of the heliomorphic form generation of buildings in Greenland's cities and towns. In this, the often technical and engineered approach to change needs to be overlayed with the cultural connotations of traditional indigenous habitation



Analysis of south-facing slopes in relation to light/shadow and the opportunity for urban development.

(Illustration by Vladimir Matus, 1988)

A model exemplifying Ralph Knowles' solar envelope.

(Courtesy of Ralph Knowles)

and contemporary ways of living—resulting in new spatial functions and combinations. This variational richness can, over time, create a design language of an architecture that is culturally sensitive and in constant dialogue with its surroundings.

Conclusively, reimagining an adaptive Greenlandic built environment, as well as a nation, is a complex and continuous process that at the same time is inspired by and impacts many aspects of Greenlandic life. Important to note is that, besides the small selection of examples mentioned above, there are many other ideas, concepts, and initiatives to unpack that can positively contribute to these multifarious and on-going processes. Also, all of this needs to be understood in a national and geopolitical context where external forces and design influences are at play. For example, in contrast to the hard military presence of the U.S. in Greenland, important to note is the rise (and so far, diffuse influence) of the East in the Arctic regions and their shifting imagined geographies towards new northern frontiers. China's growing presence in the Arctic has increased considerably during the past decade, which has offered plentiful economic opportunities and created new risks and concerns among the eight Arctic states and their people groups (Sun Y., 2020). In Greenland, Chinese presence has so far been limited because, "when strategic interests are at stake, Denmark steps in" (Ties et al., 2020). Potentially, in the near future, it will be possible to identify early design influences of the rising polar power of China.

Conclusion

Conclusion

Inuit in Greenland make up 89 percent of the country's population, and—as seen in the results of the most recent general elections of April 2021—they are voting for pro-environmental decisions and signal strong concerns about the impact of heavy industries such as mining. This most recent vote can be seen as a newly developing story in Greenland's larger narrative, which is composed of a wide range of perspectives, histories, and forces, including a long history of inhabitation stretching many centuries, different cultures, and rapidly changing climates. Inventing Greenland has focused intensely on portraying this complex constellation of projections, ambitions, and imaginaries, by unraveling a selection of intriguing stories. Furthermore, by combining spatial sensibilities with local cultural, social, and environmental realities, and weaving together historical and contemporary examples, this book resulted in a timely assemblage of stories anchored to a common thread and interest in architecture, landscape architecture, and urbanism. Distilled from this rich collection of stories, a few critical takeaways and points of discussion are as follows:

1. As Greenland's capital and only city, Nuuk plays a prominent role in the history of urbanization and housing in Greenland—and the many social ills that have resulted from this process. As numerous issues persist, there is a need to critique what went wrong with past housing and urban planning projects in order to set the stage for contemporary proposals situated within the surrounding landscape that both emphasize a strong sense of community and empower local cultural identities.

2. Connecting aesthetics and politics, color can be a strong design tool when proposing specific urban programs, forms, and policies. Reimagining new color schemes, color codes, or chromatic geographies, and embracing new meanings, identities, and collective values could help create a unique urban landscape that empowers the current nation-building process. Color could become a collective and vernacular expression that looks beyond Greenland's volumetric imaginaries and anticipations.

3. It is essential to call for greater attention to the consequences of excluding communities whose origins lie in military and colonial interventions from postcolonial nation-building projects. Across the Arctic and beyond, as Indigenous Peoples gain sovereignty over their lands, they will undoubtedly build infrastructural networks more attuned to their needs than previous military or colonial powers ever did. Accommodating the people "in between" who have been transforming colonial and imperial imprints on the landscape into their homes for hundreds of years, however, will require difficult trade-offs in the Indigenous-led design of infrastructure, logistics, and nation-states.

4. Due to potential disastrous environmental effects, properly decommissioning Cold War sites like the nuclear-powered U.S. military base "Camp Century"—located under the Greenlandic ice sheet—should be equally or even more important than pushing the boundaries of technological innovation in the extreme north.

5. Neighboring Iceland—which went through an immense spike in tourist numbers in the last decade and arguably reached the critical level of overtourism—can be a helpful precedent and guide for growing tourism in Greenland, and Ilulissat in particular.

6. New "memoryscapes," food networks, and their infrastructural outgrowth can be seen as the blueprint of future urbanization processes and settlement patterns. Following this logic can counter mid-twentieth century centralization efforts by Denmark in Greenland and realign centers of growth to better match local needs. Furthermore, going from "memoryscape" to city can ensure sustainable development that is connected to local resources and economic/commercial structures. Moving away from Danish/European influenced ways of urbanization will support settlement patterns more responsive to Greenland, its people, and its landscapes.

7. While Greenland has found its way to internationally acclaimed architecture offices; in return, they need to find their way to the Greenlandic people, its landscapes, and cultural understandings. Ultimately, the much needed critical participatory approach can, over time, be turned upside down and create a new dynamic where, instead of international practices, local offices take the lead and push for Indigenous-led, culturally sensitive, and climate adaptive projects.

8. Climate change is not only a scientific problem, but a social one, too. In order to avoid repeating past mistakes of development under colonialism, successful climate resilience and adaptation in Greenland will require an inclusive social model and an embrace of contemporary design methods and tools that reaffirm traditional values and priorities, which together could lead to the emergence of a new northern vernacular architecture and the overall reimagination of Greenland's built environment.

9. When Danish materials, engineers, and architects continue to shape and design Greenland's buildings, streets, and neighborhoods, Greenland's urban landscape will inevitably continue to portray a hybrid Greenlandic-Danish future.

10. Potentially, in the near future, it will be possible to identify early design influences of the rising polar power of China. In contrast to the hard military presence of the U.S. in Greenland, important to note is the rise (and so far, diffuse influence) of the East in the Arctic regions and their shifting imagined geographies towards new northern frontiers. Although a Chinese presence in Greenland has so far been limited, the rising polar power of China might also influence the rapidly shifting Greenlandic urban landscapes and architectures.

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Designing an Arctic Nation