

**Building with IQ (Inuit Qaujimajatuqangit): The Rise of a Hybrid Design Tradition
in Canada's Eastern Arctic**

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Résumé

Depuis la Seconde Guerre mondiale, le gouvernement canadien a encouragé les Inuits, une société de semi-chasseurs nomades, à s'installer dans des villages structurés afin d'accéder à des services essentiels. Toutefois, les Inuits n'ont jamais été consultés sur la conception, la taille ou l'emplacement des logements, appartenant au gouvernement, qui leur ont été attribués. Ceux-ci s'avèrent mal adaptés aux conditions climatiques arctiques et irrespectueux des traditions culturelles.

En réponse et en complément à ces logements, les Inuits ont produit une nouvelle génération de structures auto-construites intégrant des technologies et des matériaux locaux ou importés : porches, ajouts, traîneaux traditionnels, dépendances et cabanes isolées, reflètent mieux les besoins et les aspirations de la communauté contemporaine de chasseurs que sont les Inuits.

Telle une langue vernaculaire hybride, le dessin de cette architecture souvent informelle et bricolée mais toujours innovante et dynamique s'inspire, en les renouvelant, de principes de conception résolument indigènes.

En examinant ces créations encore modestes, la présente étude met en évidence :

- La place importante tenue par les Inuits en tant que constructeurs d'un espace hybride.
- Les indications précieuses, contenues dans ces constructions, pour la création d'un urbanisme arctique plus approprié et durable.

L'histoire de la conception architecturale est riche en catastrophes... Parmi elles figurent les tentatives du gouvernement du Canada pour fournir des solutions de logements aux résidents des collectivités de l'Arctique. Depuis les années 1950, ces initiatives - allant de la « maison de

matchbox » au multiplex - se sont toujours avérées problématiques : fissurations, moisissures, isolation insuffisante, stockage inexistant, petites chambres, implantation irréfléchie.

Une enquête sur le paysage culturel émergent dans et autour de la communauté inuit de Clyde River offre l'occasion d'examiner ces questions et propose un cadre pour la planification future.

Depuis plus de 6 000 ans, les humains ont adopté une approche pragmatique de la vie arctique. Le climat rude et les ressources limitées ne pardonnent pas les erreurs. Seul ce qui a fonctionné doit être répliqué. Dans un environnement hostile, les mauvaises idées ne sont pas seulement stupides ou gênantes, elles peuvent constituer des menaces vitales.

Force est de constater que les typologies classiques de planification urbaine et architecturale ne fonctionnent pas ici. Leurs conséquences sur la santé économique, sociale et publique menacent la durabilité de la colonisation du Nord ainsi que les affaires humaines. Un nouvel environnement bâti doit leur succéder.

Or, cet environnement hybride qui allie modernisme et culture traditionnelle, technologie contemporaine et matériaux ancestraux, ingéniosité et pragmatisme existe.

Il se trouve dans les murs des maisons du gouvernement, dans une vaste constellation de camps de chasse mobiles, il est la réponse ingénieuse et débrouillarde typique d'un peuple de constructeurs qui a de tout temps fait la preuve de son ingéniosité et de sa débrouillardise.

Or, cette réponse a jusqu'à présent été le plus souvent ignorée par les chercheurs de l'Arctique qui considèrent les constructions inuits comme l'inesthétique sous-produit d'un processus d'acculturation en cours.

Cette étude propose une analyse radicalement différente.

Elle met l'accent sur le rôle actif permanent des Inuits en tant que partenaires de la transformation de leur habitat.

Elle considère le choc du contact avec les cultures du sud ainsi que l'imposition de mise aux normes sanitaires comme de simples « perturbateurs temporaires » tout à fait assimilables par la culture traditionnelle.

En quelques décennies, le « creuset du Nord » a mis en place un processus de transformation de son architecture vernaculaire, au lieu d'adopter celle qui semblait vouloir lui être imposée. À la fois inattendue mais inévitable, non autorisée mais universelle, cette architecture est un produit hybride que s'approprie pleinement toute la communauté et destiné à unir les générations futures dans une tradition de construction unique et légitime.

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That was the day I arrived at Kuujjuaraapik, a small town at the mouth of the Great Whale River, on the coast of Hudson Bay, in Nunavik, Quebec. My good friend Esther Morin and her husband, Tsing Duong, both medical professionals, had worked in the region for more than 20 years. Over the course of three days, they introduced me to some of the most welcoming, soft-spoken, and affectionate people I have ever met. I belonged. But amid this alien northern landscape, I also discovered something that didn't belong. I found a community of cookie-cutter houses laid out in a suburban, linear pattern—a startlingly non-organic development, a phenomenon reflecting nothing of its local culture. Strolling the treeless grid, the only clue this was an Inuit community was the occasional stop sign reading “ᐃᓃᓃᓃᓃ”.

Then, we walked into a house (literally, since knocking is not the norm), and I sensed the first hints of a very different way of using space. That evening, Igah, a Kuujjuaraapik resident, explained Inuit housing had always been particularly adaptive to local environmental circumstances. She recounted how Inuit constructed tents of caribou skin in summer, which were replaced each winter by qammaqs and iglus, singularly sophisticated structures that for centuries allowed humankind to exist and even thrive in the planet's most formidable climate: entirely self-reliant and entirely connected to the land. She also described how everything had changed. Now,

she said, everyone lives in rented homes provided by the government. She didn't know why the houses look alike or why it took 10 years to get a new one. She told me that no one had a say in the materials, placement, or even colour of their dwelling.

When I returned home, I learned a lot more about recent Inuit history. I was determined to investigate further how these resilient and resourceful people were adapting to their new built environment. In Spring 2014, I traveled even farther north, to Clyde River, Nunavut, accompanied by Professor George Wenzel. As my external advisor and friend, George has been a font of insight about Inuit culture, kinship relations, and especially Clyde River. To him, I am forever grateful. Special thanks go as well to Professor Annmarie Adams, my thesis supervisor, for her support as mentor and inspiration. She is the academic and scholar I could only aspire to be. I am indebted to Annmarie for so much: her careful revisions of my essays, organizing my chapters and several discussions that helped me create a more linear argument. I am forever grateful for her diligent and thorough review of my final draft. I could not have submitted my manuscript without her careful and insightful edits and suggestions. As a member of my supervisory committee, Professor Robert Mellin offered expertise and steady guidance, which proved invaluable as I conceived and developed an illustration strategy for my work. I owe him thanks for drawing attention to the importance of sketching during fieldwork, and for inviting me to develop teaching skills as a guest critic in his studios.

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The study of Inuit cultural landscape has prompted my interest in building systems adaptable to northern climates and northern people. Indeed, perhaps the most fulfilling experience over the course of my doctoral studies was building a prototype dome based on the drawings of an Inuk friend who described his ideal house. This effort led to plans for building a cluster of demonstrator prototypes in Kuujjuaq in 2018 in partnership with the Tukia Foundation. My father Jan Havelka generously sponsored this initial project, and my son Jean-Nicolas Dackiw ensured its success as a design/build project through his skill, thoughtfulness, and perseverance. I also want to acknowledge the help of Andrew Murphy and Jacinthe Deguire for their hours of hard work on the prototype, as well as Vincent Duong for all his help with technical matters. My gratitude also goes to the Monolithic Dome Institute, especially to David South for sharing his experience constructing domes around the world, to Shotcrete Plus for their generosity in supplying equipment for the prototype, and the MAH brothers for their expertise in shotcrete application and artful troweling.

Most of all, I am grateful to my family for their encouragement and support throughout the entire project. My father Jan Havelka believed in my ideas about Inuit housing and Arctic building systems from the start, encouraging me to build a prototype before the end of my dissertation. He taught me how to repair things, to reuse and to salvage them, teachings that enhanced my appreciation for Clyde River's resourceful self-build culture. As a refugee and then an immigrant to Canada, he understands what it means to be displaced, then to adapt and to co-exist. For this I am eternally grateful. My mother Colette Fortier Havelka set an example for me; she wrote her Ph.D. and graduated from the Université de Montréal in 1983, at the age of 48 years. She continues to inspire me with her determined zest for life, her passion for learning, and her commitment to achievement. My uncle Jean, my mother's brother, was a steady hand throughout the prototype's construction. Without him, it may never have been finished.

My husband Walter, my toughest critic, was also an irreplaceable partner throughout the entire process, giving me the head space I needed. My children participated in this project in more ways than they know; they helped me build, clean, and furnish my prototype, and they always listened to my countless stories about northern life and my new Arctic friends.

Institutional Perspectives

To frame my research and to obtain a complete picture of northern housing issues and programs, I reached out to numerous governmental agencies, non-governmental organizations, researchers, and academics. In February 2011, I contacted the president of the Montreal chapter for Habitat for Humanity. The following month I spoke with the national manager for the Canada Mortgage and Housing Corporation (CMHC)'s Aboriginal Housing Program. I soon realized both initiatives reflected status quo solutions, ignoring local tradition and resources in favour of a southern-style wage labour formula. Nevertheless, both conversations centered firmly on the need to position Inuit as stakeholders and opportunity makers. How can they capitalize on what they have? Inspired and curious, I was determined to learn more about how Inuit used their urban living environment.

On my first trip to Nunavik, I conducted an extensive interview with the town's mayor and secretary treasurer. I also participated in a high-school project coordinated by a senior professor from Kuujuaapik. Supplied with disposable cameras, students were instructed to photograph anything related to eating. The filmic result disappointed critics—and academics. However, the exercise provided a wonderful opportunity to engage with high-school students and observe the atmosphere within a northern school. It also reminded me of the critical role organization plays when conducting research.

I consulted with MIT professor John Ochsendorf. A structural engineer, Ochsendorf brings together anthropology and archaeology in his work, reinterpreting ancient engineering technologies and traditions for contemporary use. Our conversation covered a wide range of topics, including how to diagnose Inuit housing problems, how long houses last at the 71st parallel north, how to find locals to build, as well as how many gallons of fuel are burnt and how many kilowatts are consumed per household. He provided guidance on how to shape the problem, the scope of the research project, and immediate research initiatives.

For a better understanding of contemporary thinking about northern housing, I turned to Shun Hui, project director of the Kautuq Construction Company for the Makivik Corporation. She explained in detail the strengths and weaknesses of existing building systems as well as the process of building in permafrost conditions. She outlined the major policies and key stakeholders that shape the current condition. Specifically, she shed light on government procedures that resist the exploration of new, potentially more costly systems. Hui also connected me with Michèle Bertol, the former southern urban planner for Nunavik communities for an even more comprehensive grasp of the entire planning process.

At the Université de Montréal, Professor Gonzalo Lizzaralde, with whom I had worked as an assistant researcher, provided insights into the relative merits of community- and technology-based solutions as well as the contemporary value of traditional technologies.

I spoke at length with the provincial education minister, Pamela Hine. A former president of the Nunavut Housing Corporation (NHC),² she described the homeownership option and the CMHC's role. She also related her experience organizing a local Habitat for Humanities affiliate. She underlined affordability as the essential challenge, pointing out that the organization had built 100 duplexes at \$280 per square foot. This interview shed light on the agency motive to maximize lot size by building multiplexes, containing mechanical rooms within the volume of the house, and building with wood.

After this initial consultation process, I submitted my project proposal for review and approval. In February 2014, I was directed to obtain approval for research involving human participants. Consequently, I applied for a Research Licence—Social Science and Traditional Knowledge Research from the Nunavut Research Institute. In keeping with the Nunavut Scientists Act, several expectations were built into the research licence. The project needed approval from the appropriate Regional Inuit Association to access or use Inuit-owned lands to

² The NHC was created in 2000 by the Northwest Territories Housing Corporation (Nunavut) Act. Its mandate as a public agency of the Government of Nunavut is to create, coordinate, and administer housing programs, giving access to affordable housing options to families and individuals.

conduct research. Additionally, the Nunavut Research Institute requested I submit yearly reports and a final report at the end of the research.

Terminology

In the context of this research, the expression “Indigenous peoples” means the earliest settlers of North America and their descendants. Canada’s constitution identifies three distinct Indigenous peoples: Indians, Metis, and Inuit. Until 1939, Inuit were still considered “Indian”. Each group possesses a unique heritage, languages, cultural models, and spiritual belief systems. “Indian” is used historically to identify indigenous people in Canada who are not Inuit or Metis. Here, “indigenous” literally modifies a noun that is “native to the area,” and “indigenous peoples” would therefore be equivalent to “Aboriginal peoples,” “Native peoples,” or “First peoples,” each term used interchangeably in different narratives while Aboriginal and Native are out of favour. Notably, Christopher Columbus christened North American Aboriginal peoples “*Una gente in Deos*” or a people in God later morphed into “Indian” (CBINAC, 2002).

The term “Inuit” refers uniquely to the Indigenous people of Arctic Canada—traditionally, occupants of the land (above the North American tree line) extending from the Mackenzie Delta to the High Arctic islands to the Labrador coast. The word “Inuit” means “the people” in Inuktitut, the language spoken by Inuit, and is the term Inuit use to refer to themselves. Therefore, the expression “the Inuit” is redundant. The term “Eskimo,” originally applied to Inuit by European settlers, is no longer used to refer to Inuit in Canada, being derived from an Algonquin term meaning “raw meat eaters” and found offensive by many people. However, the term is still commonly used in the United States to refer to Inuit in Alaska. Some of my Inuit friends take pride in referring to themselves as “Eskimo.” Although Inuit are not covered in the Indian Act from 1939, the Supreme Court of Canada interpreted the federal government’s power to make laws affecting “Indians, and Lands reserved for the Indians” as extending to Inuit.

Metis literally means “mixed blood” and refers to Canadians of mixed Aboriginal and non-Aboriginal ancestry. However, not all identify themselves as Metis, and Metis organizations in Canada have different criteria for who is considered Metis (CBINAC, 2002). However,

according to Statistics Canada (2016), 587,545 people identify as Metis, while there are 1,673,785 indigenous people: 977,230 are First Nations, and 65,025 Inuit.

While these numbers show differences, the notion of landscape unifies all elements in the Canadian environment. Landscapes provide the setting for our daily lives, connecting us as individuals and communities to our environment. When we speak of a “cultural landscape,” we acknowledge this exchange. Geographers define a cultural landscape as “a concrete and characteristic product of the interplay between a given human community, embodying certain cultural preferences and potentials, and a particular set of natural circumstances. It is a legacy of many eras of natural evolution and of many generations of human effort” (Fowler, 1999, p. 56). According to *World Heritage Cultural Landscapes: A Handbook for Conservation and Management*, Arctic hunter–gatherer cultures tend to have a symbolic and physical relationship to the land, inseparable from their spiritual beliefs. These symbolic and physical elements can only be described in terms of cultural landscapes. While “landscape” refers to a way of viewing our surrounding environment, cultural landscapes express a relationship between populations and their surroundings. Each community possesses a particular symbolic and physical relation to its environment, often deeply rooted in its culture, language, and way of life. This perspective shapes the community’s identity and is often closely related to its history and social structure.

For the purpose of this study, “mobile space” or “movable space” signifies any special-use structure, addition, shelter, or outbuilding that can be easily moved or taken apart.

The term “technology,” from the Greek *teknologia*, signifies the “systematic treatment of an art, craft, or technique”³ The best dictionary definition applicable to this circumstance is “the sum of the ways in which social groups provide themselves with the material objects of their civilization.”⁴

³ In John D. Trudel and Gerardo R. Ungson’s 1998 book entitled: *Engines of Prosperity: Templates For The Information Age*.

⁴ The Online Dictionary provides a more robust definition of technology as “the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science. It is the application of this knowledge for practical

A “village,” for the express purpose of my study, refers to any government settlement or community that is the primary place of residence. A “camp” is the product of one or more persons who decide to reside long enough at a site to haul necessary parts and/or materials to construct a living space that would constitute a secondary or tertiary, seasonal or weekend residence.

The *Oxford English Dictionary* defines “hybrid” as “the offspring of two animals or plants of different species, or (less strictly) varieties.” Accordingly, the term “hybrid technology” implies that different technologies are used alongside each other and work together by combining two different elements. I use the word “hybrid” to evidence that Inuit-built structures combine government-era housing technologies with Inuit design principles, foreign materials with traditional local materials, and Inuit technologies for hauling materials on *qamutiqs* with modern vehicles such as snow machines, ATVs, and trucks.

This research identifies how a community of Inuit contributes to their local urban form by adding to and altering the built environment around them without the explicit support of outside organizations and authorities. The given environment comprises finished individual houses, duplexes, triplexes, quadraplexes, five-plexes, and two 10-plexes provided by government agencies that did not intend for the structures to be altered. The Inuit built form studied in this project refer to all types of self-built transformations added to or built next to those government housing units to continue Inuit ways of life. They also include the cabins that may have been started within the community and then hauled overland to an outpost camp. They include as well transformations that may not involve heavy-duty construction work but nonetheless change the intended use of space or the intended use of a found object. This would include using an existing entrance as a workshop or storage space, and rearranging interior space and layouts by removing walls or by adding curtains or removable partitions.

The term “informal” references the type of activity executed primarily without a construction permit and built within town limits or on the surrounding land. The entire process is handled by individuals, families, or groups of kinship relations, and in some cases with the help of local carpenters. The process for building on the surrounding land requires an affirmation from the Hunters and Trappers Organization, which is accomplished by providing an approximate location. This research examines the physical form and appearance of those various structures. The legal, political, socio-cultural, and economical conditions of these manifestations remain outside the scope of this study but may be mentioned in some contexts.

This research does not intend to formulate strategies for future housing projects, nor does it aim at supporting specific design solutions.

The aforementioned terms and concepts have been made explicit in this section to facilitate reading of the manuscript, while the glossary that follows exemplifies the complexity of the local language and defines some common expressions used in the north. In the following glossary, the selected words from the Inuktitut language are among those that local people most commonly used to describe certain objects, actions, or places, even when otherwise speaking in English.

Glossary of Local Terms

<i>Honey Bucket</i>	A bucket used as a toilet.
<i>Iglu</i>	A house
<i>Ighulingmiut</i>	Snow-house clusters on the sea ice or during the sealing season called “aglu.”
<i>Iglulirijuuq</i>	To work on a cabin
<i>Igluralaaliaqta</i>	Let’s go to the cabin.
<i>Igluralaaq</i>	A cabin
<i>Igluralaattinnut</i>	Let’s go to my or our cabin.
<i>Igluvigaq</i>	A snow house, also “iglu” or “iglu” (plural for “igluit”) “tupiq”
<i>Ilagiit nunagivak-tangit</i>	Inuktitut term for “places used regularly for hunting, harvesting”
<i>illuaraq</i>	Outbuilding
<i>Innummariit</i>	Purely Inuit
<i>Inuit</i>	Inuktitut expression for “the People,” plural of “Inuk.” It is therefore redundant to add “the” before the expression Inuit. Inuk is for one, Inuuk is for two, Inuit is plural.
<i>Kangitugapiimiut</i>	People of Kangitugapik (the Inuktitut version of Clyde River)
<i>Nunaligalait</i>	Little town
<i>Piqqusilirivvik</i>	Place to keep the things we know

approximately 85,000 square kilometres or 32,000 square miles, about the size of Maine. It is 4,633 km (2,789 miles) from Montreal, a two- to three-day trip, comprising three flights: a jet from Montreal to Kuujuaq, a turboprop to Iqaluit, and then another turboprop to Clyde River. Around the cove, creating Patricia Bay, people have either sailed past, put up a camp, or built a house—for generations creating a landscape of places and memories that characterize this remote community called Kangitugaapik, often referred to as Clyde River. And for generations, this region served hunters and anglers who moved across the land and sea to pursue their prey: Arctic char, seal, whale, caribou, and polar bear (see Foote, 1967; Wenzel, 1984, for edible weight data). Today, about 1,100 people live together in a town on the western side of this pretty cove.

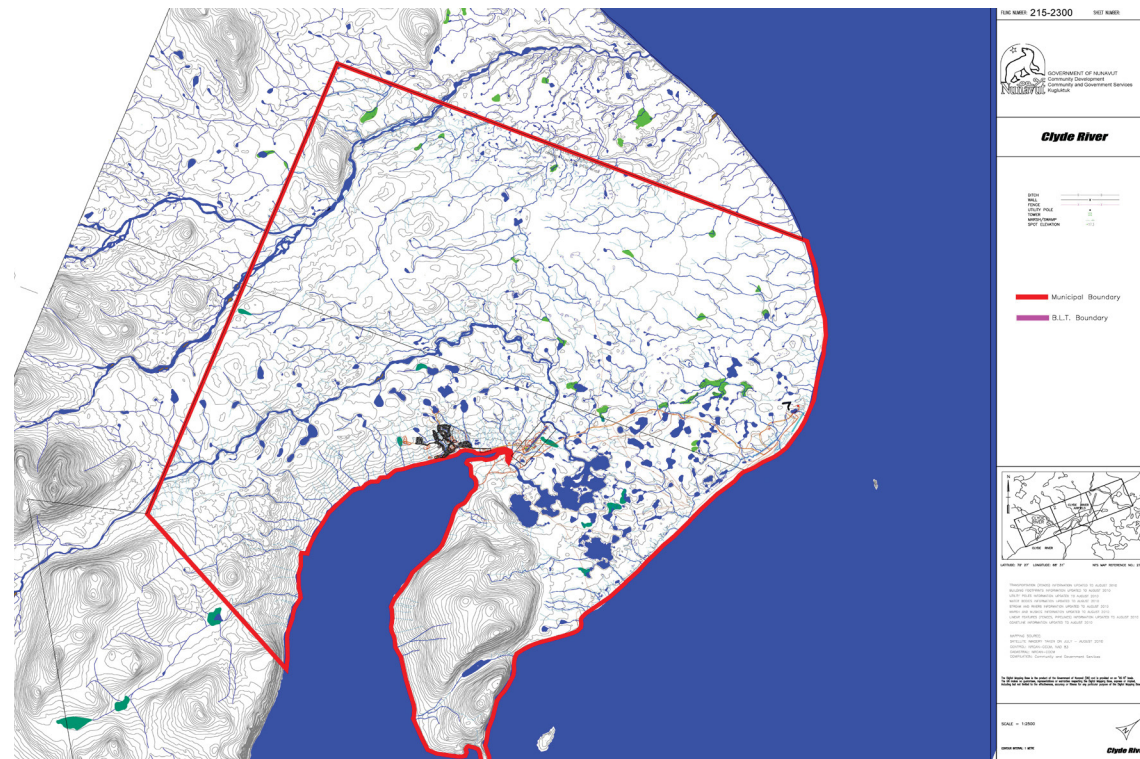


Figure 2. Clyde River municipal boundary (Clyde River Hamlet, 2016).

Change is everywhere in Clyde River: constant, kinetic, ephemeral. Like virtual particles scaled to everyday dimensions, change pops in and out of the horizon. A disturbance in the field, it appears and disappears at the sides of houses, in backyards, in alleyways, filling the vacuum

in almost every interstice. Sometimes mobile, always hybrid, a new layer of architecture is remodelling the cultural landscape and challenging existing philosophies in a community of Inuit residents who have been constructing their own houses for centuries, now adding to and transforming their prescribed government-planned and -built housing since the 1950s. It is in this town that I have been witnessing Inuit-built designs for several years.

When I first landed on Baffin Island in the High Arctic, I found myself intrigued not only by the powerful and stunningly treeless Nunavut landscape but also by the people themselves. From the young man who collected us at the airport, taking us into town (a 10-minute car ride at most) to the hotel administrator who explained how everything worked, these people—I realized—were interested in speaking about this very special place they call home. Little did I know how attached I would become to the place, to the people, to the cultural landscape. The genuine sense of sharing, the common spaces so unique to Arctic communities, and a new type of knowledge, *Inuit Qaujimagatuqangit* (IQ) (Nunavut Tunngavik Incorporated, 2000), made clear what it meant to belong momentarily to this unique place. Walking down its streets was as much about seeing as it was about being seen. Friendly faces often appeared briefly in the windows, observing the newcomers, before offering their truly welcoming disposition, especially when we were accompanied by George Wenzel, a familiar face in town. It made me feel like a cherished guest.

More than 100 houses, some pale grey or pale blue and others a deep shade of red, punctuate a predictable urban matrix, but the in-between spaces are what capture the attention. These spaces are used in unpredictable yet pragmatic ways and can change completely from one day to the next. Not conceived by town planners as active public spaces, the in-between is home to the production of outbuildings, adapted containers commonly referred to as “sea cans,” long rows of vehicles, *qamutiiqs* positioned and ready to go, and makeshift workshops. Layered with a network of informal paths, the community is abundant with unexpected and unplanned life, often at work on self-built, self-designed spaces.

Clyde River is representative because it resembles so many of the Nunavut communities. Renowned for its new Piqqusilirivvik Cultural Learning Centre built in 2011, Clyde River is more recently known for its fight against seismic testing (Skura, 2016). There, I could examine a completely new and, in my opinion, healthy phenomenon. It shows an impending energy and public activity belonging to people effecting change.

After 60 years, one would expect transformations to any settlement. However, Clyde River is actively different. Virtually all residents have modified or added to their homes; some have also constructed outbuildings beyond their homes. The residents have improved the orientation of doorways by adding small vestibules or porches, they have enclosed some outdoor landings, and they have added many wind-walls to relieve snow accumulation. Empty areas below staircases have become storage spaces or places to hang a child's swing. This impressive output of sheds and outbuildings may contribute to a general impression of disrepair; however, this impression is only telling of a real clash between government housing and what Inuit residents really want and need.

In this context, the government housing may be considered inadequate or just plain wrong, and one's initial reaction is to assume that these government interventions are indeed architectural failures. However, it would also be a failure to treat architecture as unchangeable and/or to consider architects, designers, and planners as responsible for answering every cultural and individual need. Therefore, an examination of how and why Clyde River residents have built around their houses and out on the land might explain more about a Canadian Arctic community's daily life and needs. This study reflects on pragmatic residential transformations with which people have healed their houses and communities, having shaped my scholarship in part through several studies on housing (e.g. Boudon, 1972, Adams, 1995; Dennis, 1995; Harris, 2013). These studies have prompted the mapping, documenting, and recording of the Clyde River transformations, as well as the interviewing process with many Clyde River residents.

From historical and anthropological studies on seasonal dwellings to contemporary research on government housing and its effect on health, the relationships between people and their houses have been recurring foci for research on Inuit. The analyses and conclusions from these studies constitute most contemporary work in the field, and they influence northern housing design and its policies. But they have rarely noticed the deep-rooted knowledge that already exists among Inuit communities. Principally, it is through the insufficiency of imposed housing design that information emerges on how Inuit conceive and create their relationships to space and housing, as well as how it affects their daily life. The introduction of IQ as a list of cultural principles (*Inuit Qaujimagatuqangit* signifying Inuit life principles unveiled by the Nunavut government) promote the idea that these deep-rooted psychological and fundamental perspectives could also impact housing policy in the north. My hypothesis is that resident-built works, from small structures to cabin building, not only reflect a cultural identity and resistance but also reveal principles that guide Inuit attitudes and behaviours toward their housing. These creations are therefore important markers toward a deeper understanding of IQ.

Through my research, I draw attention to the following: an Inuit community's existing capacity to construct its own housing, the importance of its IQ, the innovative responses to inadequate housing, and the significance of a cultural landscape. The relationship between building and IQ is both cultural and pragmatic, demonstrating a connection between Inuit and the environment. I also validate urban designer Dennis Pieprz's claim that "contrary to the best laid plans of mice and men (architects and urban designers) the public uses space in unpredictable and ingenious ways. The best spaces are often "self-designed", "semi-blank" slates with a lot of room around the edges for civic improvisation" (Pieprz, 2016, p.2). Inuit attitudes and behaviours relative to housing are subtler than government production might welcome or recognize.

Clyde River is enriched with such civic improvisation. It is a dynamic self-built vernacular tradition and is a good example of a healthy resident-built environment that has developed with

few restrictions. It is my deepest wish to see more Arctic residents contribute to the resourceful construction of this tradition and to participate fully in the future construction of their northern housing. While it is impossible to create formulae for Arctic living or to create an inventory of needs, spending time and listening to people's thoughts can help frame a more open system, which can accommodate changing needs and greater diversity in family configurations: "it remains nonetheless true that both the way in which we live and the homes we live in are products of the human mind as such are subject to constant modification" (Boudon, 1972, p.146).

The Canadian government, source of all financial support for Inuit settlements since World War II (WWII), has used these communities as testing grounds for a select few construction technologies. These technologies include pile construction, screw jack foundations to replace traditional wood cribbing, triple glazing, structural insulated panels (SIPs) to replace conventional wood framing, and design experiments such as duplexes, triplexes, quadraplexes, five-plexes, six-plexes, and 10-plexes, for cost-savings (Canada Mortgage and Housing Corporation, 2008). However, after spending several months in the Arctic over the past few years, one thing became clear: southern designers may have put their projects into practice, but not one of those designers has had to live in them. Thus, the generosity of Clyde River residents and other favourable circumstances offered me a unique connection to a community with ample space to conduct research on self-driven, self-built form or bricolage. It puts these ordinary places filled with self-built, ephemeral, and mobile architecture in juxtaposition to the generic housing and planning set up by the agencies working to provide housing to remote villages.

The need to examine Clyde River from a cultural landscape perspective persuaded me to seek additional guidance from a cultural anthropologist—which I found in George Wenzel. Even though, as an architect, I was tempted to make a portrait of my own observations, my architectural lens had to be adjusted. I was interested in understanding what Kangitugapiimiut thought about their own town, their own built form, and the discrepancy between what they were

given and what they added, the very gap between architect and dweller. I wanted to see it through their eyes.

My research could also have taken a technical or quantitative direction. Instead, I chose a cultural landscapes methodology. Acknowledging divergent interpretations of data, this methodology is important because it enables the "broadening, deepening, and refining of our understanding of the intricate webs of social and ecological spaces that help to define human groups and their activities" (Groth & Wilson, 2003, p. 22). As such, it is well suited for an exploration of both the built form and the subjective experiences of the people who build. This methodology highlights individuals and communities to become "a bridge between the built and natural world" (Hayden, 1997, p.111). In this research, I seek to cross that bridge. However, an architect had to design this examination, since the subject was spatial. As an architect, I can understand and describe the problems behind these built solutions and hopefully uncover some of the vital traditional design principles that Inuit hold as so important to their way of life.

This research is not particularly concerned with the architecture of the government houses, per se. While not insignificant and in aggregate embodying part of the problem, government housing does not, in itself, account for the occupants' responses to that architecture—the focus of my study. Furthermore, although I only consider one case study in this research, I believe it will reveal the more familiar conflict between an architect and planner's intentions for space or place and the ways in which people who live there transform space and place. Thus, I presume that in Clyde River this conflict has manifested in a hybrid design tradition that has evolved over time and is finding legitimacy.

My research questions are as follows:

- What determinants affect these hybrid structures?
- How does IQ translate into built form?

- How do user transformations (the product of multiple guiding principles) relate back to traditional Inuit knowledge?
- What are the patterns of spatial production and their determinants in government housing in Clyde River?
- How do these spontaneous productions of hybrid space demonstrate IQ?
- How have these productions of hybrid space contributed to the urban fabric?

My observations over the past three years have allowed me to document some of the new structures within the hamlet and across the surrounding land. This self-driven, self-built architecture, referred to as *Iminik Aqqisurialik* in Inuktitut,⁵ are the outcome of a series of reciprocal actions between community members and their built environments, as evident in data gathered at Clyde River from 2014 to 2016. I have drawn on eight weeks of observation and mapping, as well as some 40 interviews, revealing a panorama of spatial productions grounded in IQ, which articulates a cultural landscape specific to the eastern Arctic. To that end, I address four research objectives.

The first is to understand why residents make transformations. My analyses found that transformations directly attached to government housing (e.g., windscreens, porches, ramps, balconies, additional entrances, and chimney strapping) arise from plainly evident structural or siting deficiencies. I also found local stakeholders, including hamlet office staff, poorly informed about location, size, or designs of future housing projects.

The second is to understand why individual cabins and outbuildings are built the way they are, finding the presence of common design principles and methods. This demonstrates a common knowledge or sharing of knowledge, which includes the following similarities:

- Use of recycled and repurposed materials, such as plywood, 2×4s, and metal sheeting

⁵ “*Iminik Aqqisurialik*” means “self-to-be-assembled” or “resident-built/do-it-yourself (DIY) construction.”

- Use of trailers and containers (e.g., sea cans), water tanks, snow machine and car parts, palettes, and containers, as well as whale bones and other animal parts
- Awareness of Inuit housing history, from traditional qarmat plans to cabin plans similar to qarmat and snow-house seasonal dwellings
- Sensitivity to roof pitch
- Consideration of entryway orientation
- Addition of porches
- Use of *qamutiiqs* as transport

Additionally, I have found that the number of newly built structures, both within and outside town, directly correlates with the prevalence of accessible materials.

The third is to develop a better awareness of the urban and social fabric at Clyde River. I accomplished this by mapping all urban and rural spatial productions. I found that urban government houses for individuals or families were subject to the most transformations, and that, typically, peripheral outbuildings and rural cabins were entirely the products of renters or homeowner themselves. My investigation also reveals contempt and frustration among local residents who view the foreign urban planning strategy and its overall implementation processes as the product of ongoing government paternalism.

The fourth is to provide designers, architects, planners, and builders with insight into another building tradition. Capitalizing on local expertise—both cultural and technical—is critical to solving the distinct housing challenges that northern Canadians face. My inquiry shows that the construction and production of cabins in outpost settings is rooted in the desire to experience a life that follows traditional practices. Three themes dominated research participants’

city-to-camp movement: social and kinship relations, teaching and learning to be out on the land, and living like Inuit.

Fieldwork engages the processes of active looking, memory aids, informal interviewing, mapping, writing field notes, and patience (DeWalt & DeWalt, 2002; Kawulich, 2005). These processes were necessary for my research because virtually all documentation of self-built construction in the north is limited. Nevertheless, to lend context and to support comparisons and analysis, some secondary data, both qualitative and quantitative, were relevant to this study. For example, a survey of government documents on housing policies and programs proved a valuable source and included information from the Canada Mortgage and Housing Corporation (CMHC), the National Archives, the Natural History Museum Library, the Indian Affairs Library, the National Air Photo Library, the national population census, Avataq, and Statistics Canada. I also found the government of Nunavut census data was a rich source of statistical data relating to demographics, housing needs, income, and employment. These secondary sources also formed the foundation for chapter three.

Literature Review: Connecting Culture to Space

The older I grow and the longer I look at landscapes, the more convinced I am that their beauty is not simply an aspect but their very essence, and that beauty derives from the human presence. (Jackson, 2000, p. 31)

This section reviews scholarly perspectives used to understand the built environment through a socio-cultural lens. It begins with a view on the study of built form through anthropological scholarship that concerns itself with pre-industrial societies. After this, the review outlines the postwar, which led to a movement of reintroducing the social realm and end-users as important factors in the field of architectural design. This section then describes the transdisciplinary approach shared by Henry Glassie (1991, 1999, 2000), Robert Mellin (1991,

2008), Gerald Pocius (1979,1991) and others who analyze the meaning of material artifacts to shed light on vernacular architecture, before discussing scholars in cultural landscape theory who have influenced my methodology. This literature review thus establishes the logic of my theory and methodology, both relevant to the analysis of housing transformations and new structures found in and around Clyde River.

Everyday life, cultural practice, and social space are often the focus of study in the social sciences. This creates relationships between built and social space. The built environment comprises all that is human-made, ranging in scale and supporting human action. In other words, it is everything that distinguishes human-made intervention or transformation from the natural world it transforms. Built spaces also range from private houses to public buildings, to the spaces between houses or yards, to plazas, to the land itself, and even to less-defined cultural spaces that provide the setting for social gatherings and other human actions.

Inquiries into the connections between culture and space have a long history. Social theorist and American anthropologist Lewis Henry Morgan found that a house form would necessarily adapt to the associated economic activities of the cohabitating families within one structure. Morgan called this “communism in living” (Morgan, 1881, p. 63). Twenty-five years later, Marcel Mauss (1906/1979) also saw a connection between house form and social life. However, he did not believe in purely utilitarian reasons for seasonal variations in house size and form—from winter to summer. There was a social reason, he believed, to explain why Inuit built larger, combined, and more complex structures in the winter season, as opposed to smaller, individual units in the summer. Through his fieldwork, Mauss observed that seasonal activities had an impact on social life (e.g., a greater need to socialize in the darker, colder winter). Therefore, he deduced that the larger, combined households built in winter accommodated this need.

While it seems obvious today, these assertions were insightful and considered very modern by French anthropologist and ethnologist Claude Levi-Strauss in his later work (Dawson,

1997). With a similar point of view to Morgan and Mauss, Levi-Strauss wrote in a section entitled, *Social Morphology or Group Structure*: “In many parts of the world there is an obvious relationship between the social structure and the spatial structure of settlements, villages, or camps” (Levi-Strauss, 1963, p. 291). Houses, according to him, were a symbolic representation of the changeable relations within households; they embodied a kind of unity between close and distant lineages and a symbolism for complex kinship relations. He also studied the variations of form within different cultural regions, a sharp contrast from the typical systematic analysis of form through the study of materials and construction methods (Dawson, 1997).

However, after WWII, with the advent of new technologies, architects frustrated with the pure aesthetic notion of architecture began introducing more efficient design methods. Specifically, through advancing technology and optimizing systems, they enhanced performance and reduced costs. This movement was the precursor to “universal design” and the desire to find a “one-size-fits-all” solution, omitting essential factors such as culture, location, gender, and age. Thus, measures were formulated to accommodate the most basic human needs, and I argue that postwar government experiments in Arctic design were a consequence of this paradigm. Nevertheless, this movement also triggered opposing reactions and new ways of studying the built environment. The development of the systems approach accompanied yet contrasted with the soft science of the architectural design potential (i.e., finding the socio-cultural and economic underpinnings of the evolution of house form).

Christopher Alexander (1964) was one such opponent when he wrote his *Notes on the Synthesis of Form*. He argued that traditional societies had altered and shaped their houses to fit their social requirements (Dawson, 1997). In an effort to systematize these findings, he offered simple solutions to achieve both quality and useful patterns to organize space. Consequently, he and others (Alexander, Ishikawa, & Silverstein, 1977) wrote *A Pattern Language*, which provided a language of 253 parts for building houses and planning communities, and in the second part, he revealed the underlying theory. Essentially, it was a call for people to design

their own houses, “communities where the idea...comes from the observation that most of the wonderful places of the world were not made by architects but by the people” (front matters).

From an equally insightful user-friendly perspective, architect and founder of Environment for Behaviour Studies, Amos Rapoport (1969) argued that house forms can be different within indigenous societies’ design culture because houses are self-built; therefore, each can build according to needs and requirements. Rapoport, like Mauss, recognized the complexity of causes that influence architectural form but goes further to state that responses to the built environment are also subject to availability of materials, embodied construction methodology, and the geographical and climactic circumstances. Societies that construct their own dwellings with pragmatic and logical judgment worked with the surrounding constraints to find the most viable solutions, discarding the non-essential elements and placing more importance on essential core features that maintain their cultural identity.

At the same time, Rapoport’s understanding of the culturally sustaining built environment was significant for architects. It became invaluable not only for designed/built projects, where behaviours had to be understood because houses were built by people who did not live in them, but also to individuals studying vernacular architecture and vernacular landscape design. The entire environment of settlements is the subject of cultural landscapes. As Rapoport summarized: “one became more interested in vernacular design rather than in vernacular architecture as one developed a notion of house settlement systems, of behaviour setting systems, of the fact that people moved through environment organized in space and time. It became obvious that one had really to look at vernacular urban design, vernacular landscape design; one had to look at a whole environmental system, not just at architecture because people do not live in buildings but they live in systems of settings. So, we cannot understand one without looking at the other” (as cited in “An Interview,” 1979, p. 114).

A Fieldwork Approach

Renowned folklorist Henry Glassie (1999) was among the first to look at architecture by connecting people with places and artifact systems. Glassie is relevant to an examination of Inuit built form because he promoted a thorough approach to scholarship on cultural landscape and the vernacular tradition.⁶ His methodology is perhaps best exemplified in *Folk Housing in Middle Virginia* (1975), which presents an analysis of the structural variations of a community's vernacular architecture, giving meaning to the unique material culture. He referred to the organization of spaces and settlements as a "language" based on certain unwritten "rules" that produce the connections between spaces and its users. Furthermore, he examined the ways spaces were geometrically connected and how the geometry changed over time, thereby reflecting the symbolic transformation in a way of life. Glassie argued that the open plan of the asymmetrically shaped pre-1800s house was transformed into a more symmetrical, spatially subdivided house expressing an increase in individualism. He asserted that profound mental structures and rules exist and are expressed and strengthened in places people build and inhabit. These places, which are the backdrops to social relations and to cultural practices, have become the social spaces we speak of in terms of cultural landscapes.

In *Tilting*, part journal, part sketchbook, part oral history, architect Robert Mellin (2008) took into account houses, outbuildings, furniture, tools, and even the patterns made by footpaths in snow to uncover the origins of a cultural landscape. He exemplified the art of living in an old and remote fishing community through architectural specificities and local technologies related to the culture, climate, and fishing practices. This model was perhaps the most enlightening to my study.

J. B. Jackson, Carl Sauer, and Walter Taylor were three influential and prolific researchers in the field of cultural landscapes. Jackson's fieldwork experience as a combat intelligence

⁶ The cultural landscape movement has reached its public in two prominent events and publications: The Vernacular Architecture Forum and the journal *Landscape*, founded by J. B. Jackson in 1951.

officer in northern France during WWII helped him to understand the landscape via maps, photographs, guidebooks, and local geographies, through which he ultimately developed a theory of cultural landscapes.⁷ These visual media are useful strategies when documenting Inuit appropriations of space. Writing on vernacular landscapes, Jackson noted several examples of worthy built environments where the organization of space was dynamic and flexible, responding to changing conditions in ways that were not necessarily evident. He stated: "A vernacular landscape...is an impressive display of devotion to common customs and of an inexhaustible ingenuity in finding short term solutions" (2009, p. 151). Long after that, in his essay on "The Morphology of Landscape", Sauer (1938, p.343) articulated the essential principle behind cultural geography--"A cultural landscape is fashioned from a natural landscape by a culture group. Culture is the agent, the natural area is the medium. The cultural landscape the result". Then American anthropologist and archeologist Walter Taylor offered a more useful interpretation of culture.⁸ In *A Study of Archeology*, Taylor (1948) described culture as a mental construct, not directly observable but understandable through its various objectifications, be it ritual practice, social structure, or the material world. His is a definition that permits a comprehensive perspective that I find particularly powerful in the study of Inuit built forms.

More recently, Australian philosopher, Jeff Malpas⁹ is at the forefront of contemporary research on the importance of place. In his work entitled *Place and Experience*, Malpas (1999) articulates the concept that connects human lives to the places in which they live and

⁷ J. B. Jackson was born in 1909 and died in 1996. His *New York Times* obituary in 1996 best summarizes the relevance of his work: "In the journal *Landscape*, which he founded and edited for many years, and in works like 'American Space,' Mr. Jackson laid the groundwork for a new way of looking at the American landscape, a subspecialty sometimes referred to as cultural geography. For nearly 50 years, he roamed the nation, surveying field and forest but also registering the change wrought by human beings, regarding it as a kind of language. For Mr. Jackson, known as Brinck, front lawns and strip malls cried out for interpretation, an analysis of the political and cultural forces that shaped them."

⁸ Walter Willard Taylor, Jr. (1913–1997), was an American anthropologist and archaeologist who developed "conjunctive archaeology," a method of studying the past by combining elements of both the traditional archaeology of the period and the allied field of anthropology. This was exemplified in *A Study of Archeology* (1948).

⁹ Jeff Malpas was born in 1958 and is currently Professor at the University of Tasmania in Hobart, Tasmania. His book *Place and Experience: A Philosophical Topography* addresses the nature and philosophical meaning of the concept of place. His work has developed in two volumes, the second being *Heideggers Topology* in 2006 concentrating on the notions of place and 'topology' the term used by Heidegger himself as a 'topology of being'.

characterizes them as binding and permanent. The environment, or the space and place is therefore directly associated to the identity of self, providing the necessary bridge to culture.

Four other scholars offer distinct but overlapping perspectives and tools. First is professor and architect Natalija Subotincic. In “Sigmund Freud’s Cabinet in Vienna: Reconstruction of a Psychological Terrain,” she explored the realm between psyche and space, integrating photography and architecture to analyze the relationship between Freud’s theories and how he arranged his collections and furnishings (Subotincic, 2016). This notion of “terrain,” which links a particular theory to space, is invaluable with respect to Inuit psyche, spirituality, and cultural practices.

Second is architectural historian Annmarie Adams, who helped structure my conceptual approach to social spaces, providing various methodologies for investigation. Of greatest value is her assertion that the study of social spaces is relevant to the analysis of postwar houses: “It is only by investigating domestic space from the interior—and comparing that information to ideals established on the exterior—that we can begin to understand how houses actually work and represent people’s true experiences of the built environment” (Adams, 1995).

Third is Gerald Pocius.¹⁰ Many contemporary scholars have studied the spatial organization of objects, but Pocius’s book *A Place to Belong* (1991/2000) bridges the gap between the studies of imported and locally made objects. Pocius, in effect, stretched the boundaries of the vernacular, making no distinction between origins of objects (i.e., where they are made) because they are all part of the domestic landscape. Thus, his work shows that how a group appropriates an artifact (and attaches a cultural value to it) is as revealing as the artifact’s design. Furthermore, he has interpreted physical spaces, the experience of place, and the sense of community through the domestic life of residents in Calvert, Newfoundland, a 300-year-old fishing village, suggesting that a culture’s physical expressions can be misleading. He concluded that the basis of a cultural landscape is revealed not simply in the ordinary objects used by

¹⁰ According to the Royal Society of Canada, in September 2016, Pocius is English Canada’s leading interpreter of “Ordinary Objects.” <http://www.mun.ca/folklore/people/Pocius.php>.

the community but in the attitudes, values, and rituals that order the spaces—a socio-cultural structure formed by the burden to provide a community’s subsistence. Pocius then affirmed that assumptions based on the existence of artifacts alone cannot reveal a culture, especially when the community coexists between tradition and modernity, and his work on Calvert refuted the belief that modernization and a rise in material well-being inevitably brings about socio-cultural deterioration. Ultimately, Pocius sought to validate the importance of the most ordinary objects.

This enhanced regard for the importance of all objects and artifacts comprising spatial organization is critical to understanding the shift in Inuit domestic life. Pocius reminded us that one culture’s innovations may be integrated into another regardless of original intention. I have, for example, seen Inuit in Clyde River use discarded snowmobile tracks to make anti-skid footpaths leading to stairways and entrances—a detail found at the main stair to the Northern Store. In fact, a long list of objects from the modern high-tech world are used in remote northern communities, including GPS, the Internet, satellite TV, and ATVs (four-wheelers). Many traditional groups accept new ways and integrate them into their own cultural model (see Block, 1967). A good example is Inuit adoption of the snowmobile into their hunting practice as an indispensable tool for traversing the long distances to seasonal hunting grounds (Wenzel, 2013a).

Fourth is Arctic researcher William Kemp. Kemp (1971) stated: “If a snowmobile is perceived to have greater utility than a dog sled, then the ownership of a snowmobile will become one of the criteria defining the traditional Eskimo hunter” (p. 115). In other words, new technologies leading to hybrid construction reinstate the balance between tradition and modernity (Chance, 1965; Dorais, 1997; Kemp, 1971; Wenzel, 2013). When the Canadian Ranger Patrol needed durable sleds for long-distance travel, they chose Inuit traditional technology to deal with the rugged terrain. Today, qamutiqs—sleds traditionally used to haul supplies on snow and ice—are used to guard and to promote Canada’s sovereignty in these regions.

Building on the abovementioned theoretical and methodological foundations, I have conceptualized a layered method to analyze the production of the three types of Inuit self-built spaces included in my study (McCleod, 2004). Invaluable in this effort have been insights gained from the architectural debate about the appropriation of space discussed in Rapoport (1969) and Boudon (1972). Also critical is the notion of the production of space elaborated by French philosopher Henri Lefebvre (1991), who believed that bureaucratic regimentation provokes the desire to transform.

Architect and planner James Rojas (1991) described such a phenomenon in American cities as “the enacted environment.”(p.127) Dolores Hayden qualified this as “a bridge between the built and natural world” (Hayden, 1997, p.35). While Rojas translated the enacted environment into an understanding of spatial patterns associated with a particular ethnic group, Hayden situated it at the crossroads of cultural geography and architecture. She observed: “At the intersection of these fields lies the history of the cultural landscape, the history of human patterns impressed upon the contours of the natural environment. It is the story of how places are planned, designed, built, inhabited, appropriated, celebrated, despoiled, and discarded” (p.15).

In a fashion closely mirroring the East Los Angeles neighbourhoods recorded by Rojas (1991), Inuit have created an alternative space. A critique of the “given,” it produces a dialogue with its surroundings (Hayden, 1997)— especially the government’s stringent conventions regarding housing for subordinate groups. With these buildings, Inuit signal their presence as a united community, appropriating space to suit their needs and proclaiming oppositions between the past and present, public and private, tradition and modernity.

As perhaps befits the Arctic environment, Glassie (2000) characterized cultural landscapes in a more lyrical language: “Buildings, like poems and rituals, realize culture. Their designers rationalize their actions differently. Some say they design and build as they do because it is an ancient way of their people and place. Others claim their practice correctly manifests the

universally valid laws of science. But all of them create out of the smallness of their own “experience, people, and place” (p. 17). These creations provide a richer understanding of who Inuit are and gives an explanation of why this architectural variance exists. The real value of this dissertation is not that it ends the conversation on Inuit popular innovation but instead adds to the conversation on housing, health and self determination that is now underway.

Rapoport, Boudon, and Lefebvre: Appropriation and Production of Space

For a clearer understanding of why architectural modifications and new stand-alone structures arise in a given environment, I first turned to the architectural debate brought forward in the 1960s by Amos Rapoport and Philippe Boudon, who asserted that socio-cultural forces are modifying forces and that the appropriation of space is dependent on a cultural model. Although Rapoport referred to vernacular architecture as the context and Boudon to the transformations brought to architecture (as by the residents of Pessac, France), both considered the act of dwelling as a practice in which the built form can be appropriated and transformed within a socio-cultural framework originating in either a tradition or as a reaction to a given set of architectural elements.

Both views inform this study. On the one hand, Rapoport argued that vernacular architecture responds to two types of forces: socio-cultural forces and modifying forces. The socio-cultural forces influence the form while climactic conditions and construction methods modify the form. These forms become “accepted models that are adjusted, modified, and differentiated according to the needs of the inhabitants and the characteristics of the site.” For his part, Boudon saw appropriation through modifications provoked by the regimentation of space and prevention of such modifications as a cause for revolution (Stanek, 2011). This portrayal of how people move in and begin to live their lives “over, around, and against the architecture”

is mirrored for example in Boudon's study on Le Corbusier's project in Pessac. Boudon (1972) described Le Corbusier's conception of empty containers or "machines for living" in a low-cost homogenous structure and how they shaped the lived-in modifications constructed by inhabitants over time.

Lefebvre was critical of Rapoport's model of reasoning about the production of form. Nevertheless, he elaborated on the appropriation of space, also viewing it as the consequence of modifying a given model. In this process, an individual or collective body of work is produced. Lefebvre's understanding of the appropriation of space thus consisted of "the socialization of individual space and the simultaneous individualization of social space" (Stanek, 2011, p. 90). This conception, which he eventually called the production of space, perfectly coincides with Rapoport's account of the production of individual modifications to inherited models and of the process of assigning social meaning to produced space.

Can we not learn from these scholars who claim that the possibility to appropriate space occurs by introducing changes when they are intended? In the case of Pessac, the possibility of transforming space stems from "spatial generosity" and "architectural and technical characteristics: the open plan, the modular system, and the lack of definite functional distributions, of which the inhabitants took advantage" (Lukasz, 2011, p. 90). Boudon's sociological analysis of the transformations that Pessac has undergone, conducted 40 years after the construction, considers three variables: the changes made by the inhabitants, the disposition of the structure, and its location relative to the house and community. All three variables must be considered to evaluate properly the patterning of the peripheral spaces under examination.

Methodology

This research emerges from fieldwork conducted in four stages. The initial phase included a brief visit to the town of Kuujjuarapik in 2012. This was my first venture above the 55th parallel, but like everywhere else I've traveled, I expected to find an urban phenomenon that reflected local culture. Instead, I was surprised to find a community composed of repetitive houses laid out along a suburban street pattern. Residents, who lived in rented homes provided by the government, could not explain why all the houses looked alike or why it took about 10 years to get one. A respondent reported that townsfolk had no say in the materials, placement, or even colour of their dwellings.

In the spring of 2014, accompanied by George Wenzel, I got an overall view of the built environment to understand the types of transformations and to meet stakeholders. The season offered ample daylight—and considerable amounts of snow and sea ice. Temperatures rarely rose above freezing, which made note taking in the field a challenge. I spent my most valuable time on snowmobile journeys to Cape Christian and elsewhere, out on the land. These excursions allowed me to witness cabin construction outside the hamlet boundaries.

Following this trip, I created Tumbler and Facebook pages titled "Canada's Arctic Cabin Culture." Here I posted examples of the new vernacular architecture I had found out on the land. I also invited people to post their own photographs. This collection formed the foundation of the pragmatic building tradition this research project documents.

The third phase of fieldwork took place in August and September of 2015. I was accompanied by Émélie Desrochers Turgeon (2015), a graduate student who received a traveling grant for her master's thesis on northern architecture. We conducted most of the mapping, data collection, and interviews during this period. Two trips by truck to Cape Christian allowed us to document new cabin construction and witness the relocation of one cabin.

The fourth and final field expedition, in July and August of 2016, was an opportunity to further document interventions and learn more about the people who created them. On this occasion, I met with the town's new housing director, John Ivey. I also returned to Cape Christian, where I confirmed the dynamic nature of yet more new stand-alone cabin construction.

I used various approaches to answer my research questions. First, to appraise historical resources beyond journals, books, and newspapers, I explored materials from government and defence archives, various ministries, associations, institutes, and administrations, as well as those from individuals who represented the various subdivisions of the social housing landscape in the eastern Arctic. Second, I examined the point of view of government as a producer of space. The field work concedes that for many architects and bureaucrats alike, even today, the primary goal has been to produce necessary social housing in the most economical way possible while also satisfying the most basic needs. Although the early convictions were thwarted in later years, the architecture offered to Inuit needs to be examined in the context of pioneering broad and extensive social housing programs within an immeasurable landscape charged with uncharted and unfamiliar conditions.

This dissertation inevitably addresses the history of consultancy and policy in the north, privileging locally based decision making over process-driven bureaucratic solutions that make observations and decisions in foreign cultural contexts. The process reveals something of the priorities, be they functional, technical, or simply necessary for a society faced with a challenging context. With the government buildings put in place, many questions arise (e.g., whether they are successful), but the object of this study is not the government buildings themselves but rather how they are integral to the inevitable rise of self-built, ephemeral¹¹, and mobile architecture in Clyde River. Within one generation, the cultural landscape underwent a

¹¹ Ephemeral architecture throughout the thesis refers to a class of building designed to be distinguished by its impermanence and its informality. It is viewed as temporal, transitory and temporary. It may be a seasonal construction, an addition, a cabin or a tent or any type of self-built structure.

.fundamental transformation as prefabricated social housing replaced the original model of self-built dwellings.

The structured social housing defines a rigid northern urban development and is the answer that the CMHC formulated for the Northern dwellers. The selection of housing for southern veterans and families was far more discerning (offering a panoply of plans, sizes, and aesthetics), and the housing program was part of the government's grand ambition to revitalize the economy through housing construction. Although this ambition was not realized, it did allow for a gradual transfer of technologies to Arctic dwellers.

To reach a more complete understanding, I assembled, selected, and analyzed a compilation of primary sources, archival material, and photographic material gathered in Nunavut and Ottawa between 2011 and 2016. One of the most important sources was the CMHC archives, publishing plans and booklets from 1940 to 1970. These documents greatly enriched the realms of critical material, including scholarly articles, monographs, maps, pamphlets, publications, and contemporary books on Arctic issues. Furthermore, understanding the complex affiliations between the many stakeholders, federal government, territorial government, and various housing associations was one of the many challenges of this research. Meeting local residents during the ongoing fieldwork allowed me to negotiate these affiliations rapidly and to decipher the complexity of the territorial governance system.

Many scholars and critics contend that the government has been a colonial force acting to coerce Inuit assimilation into the Canadian mainstream. The fieldwork and the texts studied for this research reveal the variations of this narrative over time. Although Inuit were declared the responsibility of the federal government in 1939, the following period during the second world war meant the government's focus on the North was more about sovereignty than Inuit well-being (Bonesteel, 2006).

In the context of this study, house typology, materials, content, and functional concerns were up to the architect. Cost was the main constraint (Teodorescu, 2012). These architects were paid by the number of clients who would select their plan, so they conceived their work in a temporal context that affirmed building technology over psychological discourse or cultural need in the way that rural housing was lumped together with Native housing. As productivity markers surpassed the more imaginative and visionary forms of architectural discourse at the time, CMHC architects had to find satisfaction in the most urgent wants by providing the most basic economically feasible shelter. The evidence is in the comparison of the basic plans supplied to the north compared to the laboured plans offered in the south (Central Mortgage and Housing Corporation, 1947). According to the document entitled “Canada’s Relationship with Inuit: A History of Policy and Program Development”, the pragmatic approach adopted by the federal government meant testing house designs that fit the budget where the notion of culturally appropriate was limited to portability of materials and heat efficiency (Bonesteel, 2006).

Primary data: Interviews

As a qualitative approach, the semi-structured interview process incorporates a pre-determined set of questions with the opportunity to follow up in detail on particular themes. Often used in research, this method of inquiry allows both interviewer and interviewee to pursue unintended but potentially valuable avenues of inquiry.

I conducted 24 interviews in two communities, 20 in Clyde River and four in Iqaluit (Table 1). Most were in-person, carried out in private homes or at a local hotel (its fresh-baked bannock an added attraction). Each lasted about one hour. Most participants received a \$50 payment. I took notes by hand, occasionally via audio recording.

On site, I strove to include a broad cross-section of community stakeholders representing both builders and those who influence what is built. Focusing on all aspects of the informal

construction process, these conversational encounters offered insights into the experiences, perspectives, and actual practices of the builders, community members, their government representatives, and non-governmental actors.

Interviewees	Location	
	Clyde River	Iqaluit
Hamlet officials	3	
Nunavut Government Actors	2	
Non-governmental Actors	2	2
Southern Contractors	2	
Community Members	11	2
Total	20	4

After establishing who lived in the house and their occupations, conversation was directed to the motivations behind their transformations and new construction. My line of questioning split into three themes. First, I wanted to learn more details about the building process. Not just how they built, but where they obtained materials and how they were transported to the building site sharing paper and pencil as prompts to engage in sketching basic plans of their descriptions. Second, I probed for comment on issues related to the public and private rental housing market and the role of privately owned houses. Finally, I sought clues about the meaning of this makeshift design tradition within a broader cultural context.

Observation, Photography, Sketching, and Mapping

Observation uses all five senses to describe an existing place of activity, providing what Erlandson et al. (1993, p. 134) called a “written photograph” of that place and its activities. According to Marshall and Rossman (1991), observation is “the systematic description of events, behaviours, and artifacts in the social setting chosen for study” (p. 79). And among the five

senses, especially in some qualitative research methodologies, a visual mode of inquiry suggests a variety of material realities, ways of doing, and ways of understanding (Creswell, 2003). For this research project, observation, especially visual observation, was the primary data-collecting method.

Mapping, which makes new “ways of seeing” possible for the researcher and the research audience (Butler-Kisber & Poldma, 2010), informs this qualitative research method. Maps helped me store and make sense of data. Furthermore, according to Lynn Butler-Kisber and Tiiu Poldma: “Maps are created using hand-drawn sketches or virtual tools in a non-linear and visual format by drawing on paper to show the thinking as it emerges, or to represent ideas in their embryonic stage.”(p. 6) Therefore, I sketched out preliminary ideas for the research, which prompted some figure-ground drawings and schematic diagrams (Poldma, 2003).

The act of sketching helped me understand many aspects of the built environment, particularly floorplans, home transformations, and additions. Moreover, digital photography let me document outbuildings and cabins, providing a guide for subsequent drawings (Kress & Van Leeuwen, 1996).

Why It Matters

The IQ building forms are not made by carpenters and designers but by people collectively taking the design world into their own hands to make necessary changes to their houses. For example, at one site, a battered tin can sat next to a crudely painted plywood sheet, alongside other odds and ends that looked more like stuff one would pick up in a jumble sale than materials expected to be used on a construction project. Yet these humble bits and bobs have helped to correct defects, change policies, and even accommodate people who do not have a permanent home. The plywood, stamped with what looked at first glance like a company logo, actually was part of a crate and deployed as a way of bringing materials by sealift into Clyde River proper.

Meanwhile, the wood pieces, from one of thousands of palettes and containers, were transformed to respond to the Canadian government’s limited housing for hundreds of people in the north. In what can be described as a reaction to a crisis, this cacophony of recycled and repurposed materials succeeded in building dozens of cabins in just a few years. In this case, the story behind the artifacts of unregulated or uncontrolled construction has not been told.

There are the tiny porches built in agreement with the housing authority as a sign of understanding the poor entrance siting at government houses, sitting next to do-it-yourself (DIY) adaptations and reuse made from old coloured panels ripped out of abandoned housing from a different era. These are displayed next to finely crafted qamutiiqs or sleds designed by Inuit at various scales and for hauling different cargo. There are also structures made to be noticed, for drying and airing skins from the seals or polar bears. But some of the most powerful forms are the simplest ones—the ones that get hauled out on the land and show how the balance of power from within the community can be achieved with just a bit of ingenuity. In one corner, a cluster of large containers remain in a line, like metallic rocks. These are construction containers, transported by sealift, left to rot, and used to store materials during construction in 2016. Hence, one container came from Cape Christian, and the cleanup crew did not know what to do with it. According to Joatamie Qillaq: “So I brought it back to town and turned it into a storage shed” (Semi-structured interview, date withheld).¹² Either way, as photographs show, these can end up fully inhabited and added to, where the housing authority is undermined by an ingenious resident who can also tap into electric power and water delivery services without paying rent ¹³(Havelka, 2016).

This dissertation aims to document and analyze built interventions in Clyde River, to reveal design secrets unknown to or disregarded by southern planners and architects (including

¹² Where necessary, the names of interviewees and contextual details from their responses have been changed or simply omitted to protect their anonymity. Likewise, specific interview dates have been withheld from all citations to ensure anonymity for pseudonymous or unnamed interviewees who may or may not have been interviewed on the same day as named interviewees. In a contextual sense, all interviews were conducted between 2012 and 2016.

¹³ This is part of my presentation as co-curator of the Canadian Center for Architecture Design Charrette in Montreal, October 2016, titled “Re Assembling the North.”

myself), and to show how this production of space can and will inform future design and urban policymaking. Canada and indigenous people can reset their relationship and make right past wrongs. This survey of the Arctic's emerging cultural landscape offers waypoints for discussion.

I wrote this dissertation first and foremost to learn about building with IQ (deep-rooted design principles that belong to a culture so few have the ability to grasp, a culture unique to cold climates and a large part of Canadian folklore). How can contemporary Inuit architecture contribute to architectural thinking unless we clearly understand how their buildings embody knowledge? I also hope this dissertation will influence Inuit so they can see their interventions as an ideological shift that takes back their built environment. How can we balance a grass-roots context with more structured agencies?

Government-built housing for Inuit is an incomplete representation of shelter (or home) for Inuit life because it ignores IQ or traditional life *maligait*, the relationship to the land and climate, the need for mobility, and the social and spiritual rules specific to Inuit family and community. The basic government housing prototype demanded a host of tactics and technologies for correcting shortcomings. Not surprisingly, the material evidence of resident-built transformations and cabins out on the land are extraordinarily rich and riddled with how Inuit conceive of and equip themselves for a continued life of movement across the landscape. The eastern Arctic, with hunting grounds hundreds of miles apart, creating greater mobility demands on its inhabitants, gives reason to a people with a continued propensity to hunt and fish across the landscape, thriving in a variety of types of dwellings appropriate to the place.

I argue that the gap between the people and government agency is wide and unsustainable. Inuit who have reconfigured their spaces can inform policymaking. Inuit share a wealth of knowledge and an understanding of life in cold-climate communities that constantly informs their interventions. In fact, they automatically recreate a simple plan reminiscent of the

traditional *qarmat*, which has its roots in Dorset and Thule society, and correct some of the inherent conditions built into the imported infrastructure that hinders their lifestyle.

Inuit are finding freedom from government handouts and constraints. They are re-appropriating their space by transforming their built environments and returning to distant hunting grounds. These informal camps represent the community's true identity. I appreciate their experiments with self-construction, their appropriation of space, and the logic that informs an individual or a family to transform or build anew. The ability to find and repurpose leftover materials, as well as the emphasis on cultural practices unique to an ancient civilization adapting to new technologies, enables this rise of a new hybrid design tradition. This architecture holds the secrets to mobility, to the elasticity of cultural and seasonal activities, and to incremental building strategies. By appropriating the land between the houses and the ancestral hunting grounds, these new soft or ephemeral spaces (or thresholds) become the manifestation of real public space. And I respect the resulting improvements. They represent the community.

Scholarly research on this new cultural landscape has been limited and, I argue, presents a largely misleading portrayal of Inuit-built ephemeral and mobile architecture. Governmental agencies tend to consider Inuit-built modifications as the product of a society of "unsympathetic users" (Dawson, 2006) rather than as reflections of those longing for self-expression and self-realization. Meanwhile, anthropological studies have mostly concentrated on the internal activity and layouts of government housing as opposed to the modifications and self-built forms that generate activity around the houses. While these studies often report the inappropriateness or inadequacies of southern Canadian house design (e.g., Inuit must build snow walls and plywood deflectors above doorways that face prevailing winds), little has been learnt from the modifications and self-built forms Inuit have initiated. Yet these structures are telling of the deficiencies built into the government houses and suggest the need for a better understanding of contemporary Inuit culture, which would promote greater local participation in the designing and building processes. Moreover, for their part, historians (Whitney, 2009) often situate northern

housing within the confines of colonial intervention or acculturation, and architectural discourse has typically focused on traditional construction, such as snow houses, *qarmats*, and eight-sided tents (Dawson, Lee & Reinhardt, 2004).

In sum, extant research provides scant insight into the deep-rooted design principles that inform Inuit ephemeral and mobile architecture today. This dissertation presents a unique reflection on contemporary Inuit building practices. I argue that architecture, relying on the latest technical developments, has failed Inuit users, and I show how the signposts to a more satisfactory future already mark the landscape and stand to legitimize tradition. Finally, I propose success will mean furthering Inuit involvement.

Clyde River: A Typical Nunavut Settlement

Accordingly, this study of Clyde River contributes to the understanding of an ephemeral and informal self-built environment and the social structures that manifest it. It is important to understand that each community or hamlet is the result of its own historical narrative. Even though they share similar forces from the government's commensurate systems of governance, each community grows at its own rhythm and with its own unique territorial agreements. Rather than concentrating on related patterns between territories, my study addresses the character or singularity of Clyde River and arrives at an assessment from local circumstances and facts.

From an architectural standpoint, Clyde River is a perfect case study in the region for several reasons. It is similar to so many remote Inuit communities, and it has a good number of privately owned houses (about 30%). It also has a clear beginning at a fixed point in history due to the precise move from one side of the bay to the other in 1969. While it was necessary to go beyond the spatial limits of the hamlet of Clyde River to a region approximately 100 km in surrounding diameter, this case study is relatively defined and limited both geographically and

numerically. Yet, however limited the case study may be, the investigation pursued has much broader implications.

Although Clyde River has been a permanent settlement since the 1960s, it could have encouraged research on the opposition between living in a planned settlement and living more traditionally on the land, a topic many individuals have brought up during conversations. The research could also have examined the difference between the individual houses and the multiplexes or the difference between rented units and privately-owned homes. One could also have studied the prefabrication and building systems employed over the course of 60 years, which, relative to a continuous housing shortage, has been the primary consideration of government agencies.

Rather than confining my research to one particular element (the self-built form), I have considered elements of the material culture that involve some form of design and construction to understand everyday life as shown in the ordinary activities of Clyde River residents. As described by Wenzel (personal communication, February, 2013), most work has examined how form constrained culture, but none have studied how Inuit have altered the form to fit their cultural model. As Boudon stated, "It is essential to compare 'living' ...¹⁴ with architecture which, as an essentially synthetic discipline, is required to integrate the various technical, aesthetic and human factors involved in the building of houses".¹⁵ I am precisely concerned with how that synthesis has given rise to hybrid Inuit architecture.

This research covers the period from 1956 to the present. This opening is at the onset of the government's housing supply to northern territories and defines a logical point of entry into a long history of social housing and its consequences in a region that until then had lived in harmony with its environment (Tester & Kulchyski, 1994). The emergence of Inuit ephemeral architecture is not a product of government intrusion, per se. Rather, they have developed at

¹⁴ This expression is borrowed from Peter Dawson's *Seeing Like an Inuit Family: The relationship between house form and culture in northern Canada*.

¹⁵ In *Everyday America: Cultural Landscape Studies after J.B. Jackson* edited by Chris Wilson and Paul Groth

an accelerated pace as a reaction to and correction of the inadequacies built into government housing. Unlike Boudon's *Pessac Revisited* (1972), where the architect took account of prevailing social and economic factors and provided low-cost housing as empty containers, "machines for living in" could be inhabited and built according to individual needs. Here the government did not leave space for change. But Inuit found a way, their way.

Rationale

After WWII, responsibility for northern housing fell to the federal government. The typical narrative of the overly complicated construction process and media perceived failure, places the blame on a desire to absorb a unique society into the body of affordable housing initiatives dictated to low-income rural and Native Canadians. This transformation delivered not only suburban-style planning and numerous social services into newly sedentary communities but also ended the glorified era of "Eskimo" traditionalism, with its ingenious design principles seemingly disappearing rapidly after permanent settlements. Contrary to some interpretations of these transformative decades, I emphasize Inuit roles in the development of a new sense of place, reinforcing a difference between the early decades and the contemporary history of the region.

Many anthropologists and cultural geographers such as Peter Dawson, Jean Briggs, Frank Tester and Peter Kulchuski among others have lamented the lack of cultural fit in their studies of Inuit contemporary housing in this postwar period. Space Syntax analysis¹⁶ on the use of domestic space such as Dawson's have filled the gap in the scholarship until now, proposing to some degree design solutions that return the task to involving elders or community members to find more sustainable solutions. Researchers in Canada and elsewhere do abide by participatory consultations that provide frameworks for the design of experimental projects. There are also some examples and web sites that have made these projects available.

¹⁶ Information on Space Syntax is published in the 2005 Space Syntax 5th International Symposium and proceedings edited by A.V. Nes

A common thread linking the Canadian government's various attempts to solve the northern housing shortage is the urge to increase density. Units have been melded together vertically and horizontally as multiplexes to share mechanical systems components and reduce exterior wall surfaces. In the eastern Arctic, the government-led housing authority, known as the Nunavut Housing Corporation (NHC), continues to provide this type of housing—despite various studies confirming its incompatibility with the northern cultural model and its demonstrable failure to address demand. Excluded thus from the official planning, designing, and production of housing stock, Inuit have turned to an informal system of interventions unwelcomed by housing authorities. This type of self-driven transformation, common to developing-country societies, reuses or repurposes materials in a simple, logical, and often original way. In Inuktitut, the expression "Iminik Aqqisurialik" or "self-driven" describes the phenomenon.

The creative potential found in these sorts of popular adaptations has prompted the study of informal resident-built transformations in many settings. For instance, during the Rio de Janeiro Olympics, much attention was given to the informal building of *favelas*. At the Venice Biennale 2016, Alejandro Aravena, the exhibition's main curator, used several tons of recycled waste from the previous biennale as the setting for the entire venue. Working with the theme "Reporting from the Front," he encouraged architects to address the issue of housing waste. But in Clyde River the phenomenon is not new, and I was fortunate to visit at a time of abundant building materials. The phenomenon was especially evident when ownership was made possible due to various rent-to-own programs. I observed the phenomena on the outside of buildings during my first trip, and I recorded and mapped it throughout the entire community in 2015. I have also noted that the adaptations and modifications are spreading rapidly, affecting most projects in some way. Even rental units are subject to transformation.

Informal building activity is widespread throughout Nunavut, where the local housing authorities rarely interfere according to the land use planner in Kuujuaq (M-P. MacDonald, personal communication, on August 25th, 2015). It is less readily manifested in Nunavik

due to strict regulations relative to government housing and its rental programs. These transformations—additions, outbuildings, sheds, trailers, and cabins—have become an important part of the Arctic landscape, surrounding almost every housing unit. The self-driven and self-built approach has also addressed chronic housing shortages. Clyde River has become a dynamic mixed-use urban environment, utilizing public spaces to maximize available land. Therefore, these self-built environments, making use of outdoor space and adding necessary spaces to accommodate its everyday life, remind us of informal settlements while maintaining the benefits of government infrastructure and services. This hybrid urbanism combines both the formal and informal with characteristics of both worlds.

It is therefore crucial to understand these self-driven transformations and new built form to uncover patterns of change. These patterns can determine new ways of dealing with an extreme climate, uncovering traditional design principles and pinpointing the existing housing stock's inherent inadequacies.

Clyde River and Anthropological Foundations

To make sense of this phenomenon, one must acknowledge past Inuit occupancy of Baffin Island and Clyde River especially. The Clyde River region has been the focus of significant anthropological research, with scholars such as Franz Boas (1901), Marcel Mauss (1906/1979), Hugh Brody (1975), George Wenzel (1981), and David Damas (2002) making valuable contributions to our understanding of the local hunting culture and settlement patterns. Their descriptions of the swift and dramatic transformations in Inuit lifestyle reveal a struggle between cultural identity and modern times—accepting the advantages of village life while sustaining a connection to the land.

Boas (1901), the prolific German-American anthropologist and geographer, reported that in 1883 Inuit built no villages in the Clyde Inlet. Also unsettled were the nearby Inugsuin, Eglington, Sam Fjord, and Isabella Bay regions. He did, however, note that Inuit foraged these areas. Mauss (1906/1979) closely examined Inuit seasonal camps and amplified Boas' perspective on the importance of camp locations relative to favourable hunting spots. Settlement patterning is inherently related to resource and/or land use, all of which including aspects of time and space. In essence, settlement is about where people locate themselves to their best environmental advantage (Wenzel, 1981). Wenzel also asserted the close links among space, time, and movement for Inuit. And while his academic interest focused on the relationship between biological resources and Inuit settlement areas, Wenzel has been well versed in Inuit housing and virtually any other dimension of Inuit public and private life.

Wenzel (2008) has articulated the difficulty in researching Clyde Inuit settlement patterns due to the wide temporal gaps in documentation. Nonetheless, he emphasized the role of semantics and distinguished between the terms “Inuit settlement” and “Inuit community.” For him, “Settlement, whether conceptualized as an inhabited place or as a seasonally regulated complex of related habitation sites, exists as a spatial and temporal phenomenon, while community results from specific social structural and organizational features” (p. 18). Wenzel also underlined kinship as the core of Inuit society, thereby affecting all aspects of life from personal relations to social organization and, eventually, social space (see also Burch, 1980; Damas, 1963; Heirich, 1963). For Wenzel, “community” refers to permanence. Thus, the descriptor is synonymous with local band-*ilagiit*-winter villages, with settlement functionally related to community rather than the reverse.

Inuit travel from a camp or government settlement to their hunting grounds for many reasons. Although now partly reliant on store-bought fare, traditional foods from hunting and fishing still comprise 40% of their diet.¹⁷ In 1991, Borré determined that in Clyde River,

¹⁷ Eating traditional foods is sometimes referred to as “eating Inuktitut.”

health was critically associated to the soul (*Tanniq*) and body (*Tiimuit*). Eating country food—particularly seal—is still seen as essential to maintaining the life of the soul.¹⁸

Wenzel (2013b) also noted that Clyde River’s economy depends on both modern and traditional factors. He described it as a mixed economy comprising two different currencies, while Dorais (1997) claimed that Inuit society, in many respects, is as modern as its southern Canadian reciprocal. Published some 15 years after the Land Claims Agreement,¹⁹ Wenzel’s work explains the continued travel between villages and camps as a function of Inuit’s dual economic life, existing between wage labor and subsistence culture, between money and traditional food.²⁰ Displaced into centralized camps, away from bountiful hunting grounds, Inuit must travel greater distances and so need better gear. In the 1970s, according to Wenzel (2103a), Clyde Inuit still maintained four to five summer camps between 60 and 85 km from town and two “commuter camps” about 25 km from town. To reach them, necessary equipment such as snow machines, fuel, and motorized canoes—never required in the pre-contact era—now need money, the inevitable second currency (Wenzel, 2013a). Meanwhile, everyday camp life is an expression of subsistence culture and living Inuktitut.

Still, Inuit winter villages are not permanent. The cabins that are the setting for this study are the equivalent of semi-sedentary personal dwellings, where Inuit continue in their tradition. Wenzel (1994) believed this seasonal mobility, although patterned around the extended family, is now more an association of “non-kin resource providers” (p. 289). Perhaps it was also a means

18 The term “country food” describes traditional foods such as Arctic char, seal meat, whale, and caribou for daily survival—essentially eating what the land and sea provide.

19 The Nunavut Land Claims Agreement of 1993, between Inuit of the Nunavut Settlement Area (then part of the Northwest Territories) and the Government of Canada, refers to Arctic Islands, the mainland eastern Arctic, their adjacent marine areas, the Belcher Islands, and their associated islands and adjacent marine areas. The agreement was the basis for creating the new territory of Nunavut, which was officially established April 1, 1999. Under the deal’s terms, the new government gained jurisdiction over territorial matters, including wildlife and natural resource management, land-use planning and development, and property taxes.

20 George Wenzel’s semi-biographical article exposes the hybrid nature of contemporary Clyde River lifestyles with a mixture of historical facts, insider information, and data on the number of wage-earners and the decreasing number of hunters. His article also acknowledges evidence of residents’ passion for hunting, as well as their willingness to accept money as a necessary commodity to finance their subsistence culture. He noted that women, who traditionally pick berries and cook, often contribute financially to the hunts.

of self-assertion and a source of identity amid the abrupt centralization that followed the contact. Seasonal mobility, he said, is the result of Inuit in search of the best locations for exploiting resources because of Inuit’s deep-rooted interest in hunting. The principal economic orientation of local Inuit is wildlife harvesting, notably ringed seal (*Phoca hispida*), caribou (*Rangifer tarandus*), Arctic char (*Salvelinus alpinus*), narwhal (*Monodon monoceros*), and polar bear (*Ursus maritimus*). Of these, the seal, polar bear, and, to a lesser degree, narwhal also provide Clyde Inuit with export commodities (Wenzel, 2011).

Anthropological literature on Inuit cabins (Irwin & Stefansson, 1926; Brody, 1975; Dawson, 2004; Damas, 2002; Dombrowski, 2013), as necessary temporary shelters during hunting seasons, cites unpredictable weather or climate change as prompting their construction. Indeed, environmental changes have led to cabin construction along common travel routes and near hunting and fishing areas: “We build cabins around hunting areas now because of unpredictable weather and machines that break down, leaving people stranded”.²¹ But hunting and shelter are not the only reasons for building cabins in remote camps. Cabin construction allows for camp life, the sharing of country food, and the freedom to move when needed or wanted. Hugh Brody (1974) described the quality of life in the camps: “To the Eskimos from the camps, the settlement seems crowded, impersonal, and full of problems. In the camps, a group of families lived together by choice: anyone who felt oppressed by discord or tension could easily move to another place. Families that stayed together felt a mutual loyalty. Memories of the camps invariably recall the togetherness of life there”.²²

During the pre-contact and traditional/contact periods, the hunt—coming together out on the land—was an occasion to transmit centuries of acquired knowledge from one generation to the next. Inuit hunting necessitated transient or mobile working and living spaces, as families moved according to the hunting season. Boys were schooled in tracking, shooting, trapping, and

21 In Canada’s Arctic Cabin Culture website or facebook page. <http://cabinculture.tumblr.com/history>

22 In Hugh Brody’s 1974 report as research officer for Indian Affairs. The report is untitled and can be found at publications.gc.ca/collections/collection_2017/aanc-inac/R5-323-1974-eng.pdf.

making weaponry, while girls learned the arts of clothing and food preparation. Both girls and boys helped create shelters using snow, ice, sod, and skins as building materials. Hunting also incorporated a spiritual understanding of aquatic and terrestrial animal life as well as human behaviour. For instance, hunters would never orphan a bear cub, and strict local taboos limited caribou hunting.²³ Indeed, Inuit calendars are based, in part, on the lifecycles of animals.

Boas (1923) propelled Inuit subsistence culture into the academic forefront. His discerning insights, drawings, and elegant literary style significantly enhanced predecessors' work such as the work of John Franklin (1786-1847), Sir John Ross (1777-1856), Sir John Richardson (1848). Furthermore, he clarified that Inuit and other indigenous peoples acquired their cultural differences through social learning rather than through racial biological traits. An opponent of the popular "racist science," Boas "argued that culture developed historically through the interactions of groups of people and the diffusion of ideas, and believed no process prompted continuously 'higher' cultural forms".²⁴ For Boas, that which appears to be a pattern or structure in a culture is not consciously designed. Instead, it is the outcome of numerous mechanisms produced by the social environment in which people live and act. Beyond this, Boas' expedition poignantly describes the ethnographic, economic, and cultural geography of the Clyde Region (Wenzel, 2008).

This living cultural landscape presents challenges in the identification of its qualities and universal values because it exhibits complex processes that include people and cultural traditions working within a specific environment. To understand how these psychical and physical processes interact, it is essential to grasp the nature of the cultural landscape.

Dissertation Outline

²³ Policies that effectively criminalize traditional hunting, such as the European ban on sealskins and quotas for polar bear and narwhal, have forced indigenous people to refocus their skills, often to their detriment.

²⁴ All information on Boas comes from the Department of Anthropology at Columbia University in New York City where Boas taught from 1899 to 1940 and more specifically from *Race Language and Culture* from 1940.

This case study of a northern community's re-appropriation of space and structure is organized as follows.

The introduction set the foundation for my analytical approach. I reviewed anthropological aspects of Inuit studies and introduced the framework of cultural landscape along with the sociological and architectural stakes in the everyday and the ephemeral. I clarified my approach and research method, detailing its structure, fieldwork, and primary and secondary sources. I introduced the informal system of production found between the government-built housing and the surrounding land. I considered *IQ* or traditional Inuit life principles reflected in how Inuit approach built form, and I presented a summary of findings and thoughts on why building with *IQ* matters.

In chapter one, titled "Original Space," I find evidence of a lasting cultural know-how and a seasonal house typology, viewing the subject within time: not only linking past to present but also connecting Inuit technology to social organization and the seasons. I highlight the snow house, with its catenary vaulting technique—the embodiment of Inuit design knowledge.

In chapter two, "Government Space," I consider space in recent times, charting key events that shaped Clyde River, including the community's transfer across the bay in the late 1960s and early 1970s. I conclude that government interventions, in both design and execution, are massively imbalanced, privileging performance and efficiency over culture and tradition.

How Inuit react to and interact with their housing is deeply explored in chapter three, which features examples of my key findings. Field interviews and documentary film transcripts substantiate my claims. I address the north's ongoing housing crisis, closely examining the diverse spaces and their production to focus on three sorts of self-construction: porch additions, outbuildings, and mobile cabins. I then review the self-driven, self-built tradition of Inuit pragmatism, applying it not only to the material culture but also to specific cabins and their site-to-site transport.

I then conclude with a discussion of *IQ* in relation to Inuit building processes and as a governance model. I assert that *IQ* has been incorporated into a truly hybrid built environment for the north, where remnants of past traditions weave together with contemporary materials and technology to bring forward structures that exist under Inuit terms. As such, the philosophy and its manifestations can inform both Arctic and Canadian design principles and practices. Based on this information, I posit Inuit as essential producers of space, developing resident-built spatial transformations and a cabin culture, both of which playing a vital and ongoing role in Inuit identity and their connection to the land, their traditions, and future survival.

Chapter ONE

Original Space

Technology, social organization and the seasons are all here intertwined and characteristic of Inuit life. — (Nelson Graburn, qtd. in Hughes et al., 1965)

All Inuit (the North Alaskan Inupiat, Inuvialuit of the Canadian western Arctic, eastern Arctic Inuit, and Greenlandic Kalaallit) are characterized by a culture of mobility. Inuit families and individuals spend their entire lives moving around expansive areas in pursuit of harvestable resources—all while learning about the intricacies of the land. The need to travel during different seasons meant developing a sophisticated array of mobility-based technologies, skills, know-how, and clothing, which gave rise to a distinct and often site-specific material culture (Whitridge, 2016). These portable travel technologies, some assembled in situ, others reused from one site to another, impacted the plan and form of the house. These original and traditional skills almost seem a part of Inuit DNA, and perhaps they are. Yet, archeological and anthropological research shows cultural and technical similarities with two previous, less advanced societies—the Dorset and Thule cultures.

Like the Dorset and Thule, ingenuity and portable technologies are part of Inuit architectural thinking. That tradition was shared in much of their material culture by way of tools, technology, and built form. This chapter reviews prominent examples of original technologies and space-making forms and techniques within their historical and social contexts. I also examine design principles in various house types used in the eastern Arctic, from the Dorset to the Thule and to the beginning of the settlement era. These include the semi-subterranean whalebone house during the Thule era (CE 1000–1500) and the snow house and qarmat of the Historic Period (CE 1500–1950) as precursors to the architecture of the groups that inhabit the eastern Arctic (Swinton, 2008).²⁵ For a thorough guide to all traditional Arctic building

²⁵ The periods highlighted in this section are described in the Canadian Encyclopedia published in 2008 and revised in

typologies, the reader is referred to Lee and Reinhardt (2003). This important work covers Inuit and Yupiit dwellings and the architectural details taken from explorers' and ethnographers' photographs and illustrations from the late 19th and early 20th centuries, documenting the circumpolar regions, including Greenland, the Canadian Arctic, northwest Alaska, the Mackenzie Delta, and the Yup'ik area of southwest Alaska and the easternmost region of Siberia. For an even greater depth of anthropological analysis of space syntax, the reader is referred to Dawson (1997).

While historical accounts and archeological evidence identify dozens of Arctic dwelling types, they can be grouped into regions or families. The eastern Arctic typology is one such grouping, divided into two geographic sections: the east Canadian Arctic and Greenland. While my study focuses primarily on Clyde River as an example of the eastern Arctic, I do refer to examples found in Labrador and Greenland.

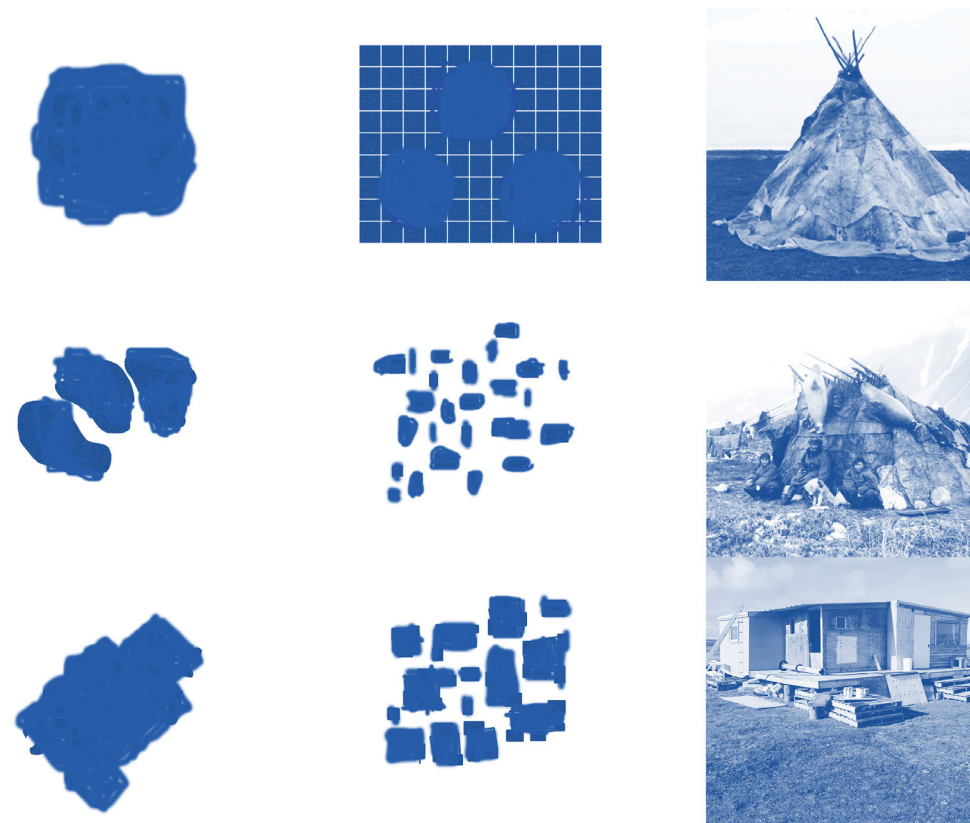


Figure 3. Breakdown of self-built dwelling typology (Giraldeau, 2016)

I focus on iconic dwelling forms found and used primarily in the eastern Arctic, such as the igluviak, an example of perfect portable technology assembled in situ (also known as snow house), the qaggiq or communal house, the qarmat, whalebone house or sod house, and the tupiq or tent. In a later section, I elaborate on other forms of material culture Inuit had to master to be married.

The know-how, construction materials, and forms varied according to the region, season, and social meaning. There is ample evidence of variations in both house size and shape, as mentioned in Dawson's account of spatial organization and the science of complexity (1997), whereby a plan may be circular, oblong, or rectilinear, depending on materials and the seasons. However, there are common threads and a discernible consistency in plan. On the one hand, Mathiassen (1928) compared the rectilinear driftwood houses of Point Barrow, Alaska, and the Mackenzie Delta region with the ovaloid construction of the eastern and central Arctic, recognizing their similarity in plan but their difference in form due to the materials at hand. On the other hand, Bird (1945) posited that the rectilinear forms took inspiration from the European whalers. Mauss (1906/1979) contended that, for social reasons, larger winter structures were built to accommodate larger groupings during the dark season. Concurrently, Raymond & Schledermann (1976) attributed the large Thule houses with the need to conserve fuel and materials while accommodating large food-sharing cultural practices during a period of environmental deterioration. Dawson (1997), however, justified form from the interior and believed it was a response to a language of social meaning underlying spatial practice and organization. Beyond the unit, he saw spatial planning as a consequence of local ways and regional rules. The hexagonal cluster formation had a direct link to the way Inuit used to settle, their type of subsistence patterns, and the locations that were chosen (Dawson, 1997).

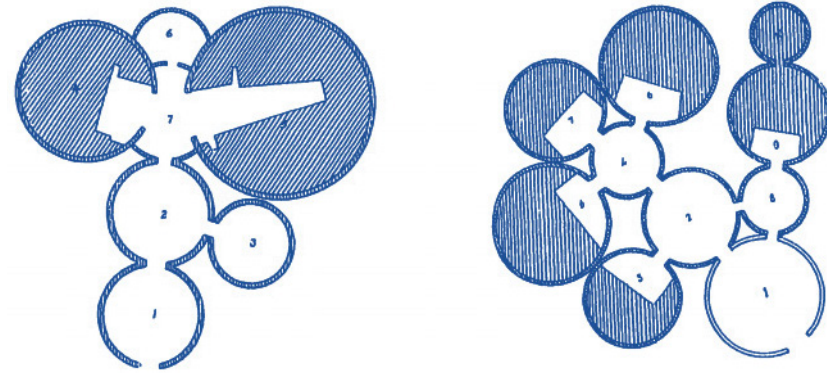


Figure 4. Floorplans of two iglulingmiut snow houses (Mathiassen, 1928).

The Dorset and Thule Influence

Genetically distinct from Inuit, a people known as the Dorset inhabited the Canadian Arctic and Greenland from 800 BCE to their apparent extinction in about CE 1500. They were named after Cape Dorset in the southern part of Baffin Island, where specimens of the earliest archeological evidence were found (Rowley, 1940). The first builders of snow houses, the Dorset lacked bow-and-arrow technology and specialized in harpooning sea mammals, usually through holes in the ice. Jenness (1925) first named this culture when certain findings could not be attributed to the Thule or to modern Inuit. This occurred in 1927 when Jenness (1925) was shown 1,500 specimens on the extremity of a sloping bank of turf on a series of granite islands, the closest point to Iglulik (Rowley, 1940). This site, abundant with walrus, was still a popular hunting ground where Inuit had constructed several houses in the 1930s. There he found four hollows in which there were many specimens that revealed different technical advances to the Thule and Inuit. Other more substantial finds on Ellesmere Island's Knud Peninsula offer evidence of long tensile structures spanning the foundations of low stone walls (Fig. 5-6).



Figure 5. Stone foundation and bones (Anonymous, n.d.). Figure 6. Semi subterranean low stone wall foundation (Anonymous, n.d.).

Here an original stone foundation and remnant bones scar the ground (figure 5). Dorset features were unlike those of Thule, but both in the manufacturing process and in the style of artifacts and tools, they were superbly adapted to living in cold climates—though unable to adjust when confronted with climate change. Whale bone was nonexistent as a material, and while many artifacts were perforated, they were gouged instead of drilled with a bow-drill. Among the artifacts are numerous harpoon heads with open sockets, fore-shafts, a barbed antler trident, and several knife handles made of antlers with a slit in the side edge. These sleds apparently had to be pulled since there is no trace of dog bones or harnesses. Jenness (1925) also found abundant snow knives and sewing needles. Most of the artifacts Jenness documents were made of chert or quartz, others of stone, slate, or nephrite. This is contrary to the Thule, for whom slate was a very common material. There are documented fragments of shallow bowls with a flattened bottom reminiscent of soapstone lamps or cooking pots. Jenness characterized these drawings as very different to the Thule and suggested that the absence of whale bone limited Dorset hunting to walrus, ring and bearded seal, polar bear, caribou, hares, and foxes. He also affirmed that the Dorset, unlike the Thule, did not live in stone dwellings but in houses made of snow and sod, of which no evidence is extant.



Fig. 1. *a*: soapstone lamp; *b*: carved antler; *c*: harpoon foreshaft; *d*: ice-creeper; *e*: knife-handle; *f*: scraper of caribou leg-bone; *g*: flint-flaker; *h*: sled-shoe; *j*: bone fish-spear.

Figure 7. Dorset Artifacts (Jenness, 1925).

A warming period from about 1000 CE to 1250 CE coincided with an ongoing northern migration and the Dorset were in decline by the advent of the Thule. Dorset artifacts have been found alongside Thule and it is assumed that these two cultures merged (Jenness, 1925).

The Dorset culture, where improvised technical and spatial production was a necessity, lasted over 1500 years. But its technology, appropriated by younger, more innovative cultures, continued. Among the most important inheritance were the small, triangular end-blades used as harpoon heads, soapstone seal oil lamps, or qulliq, and burins, pointed chisel-like flint tools used for engraving or making masks (figure 7).

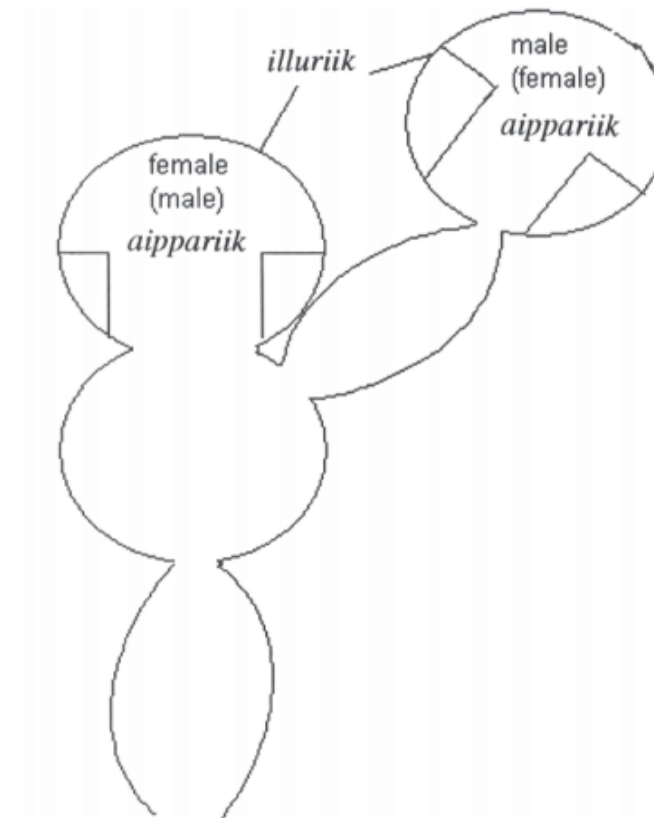


Figure 8. Plan of double house with a shared communal gathering space (Trott, 2006)..

The “double” house plan, (Trott, 2006), according to Wenzel (2008), is a transitional Thule-influenced Dorset design, whereby the Thule house on the right (Fig.9) was constructed on part of the Dorset’s left wall on a site named Ukkusialuk. Both conjoined houses used stones from each other’s construction. The arrows on the drawing indicate the entrance passages to each dwelling. Wenzel believed that they both had a rear bench for sleeping, and early Dorset houses were in fact rectangular, though I have not found a plan view.

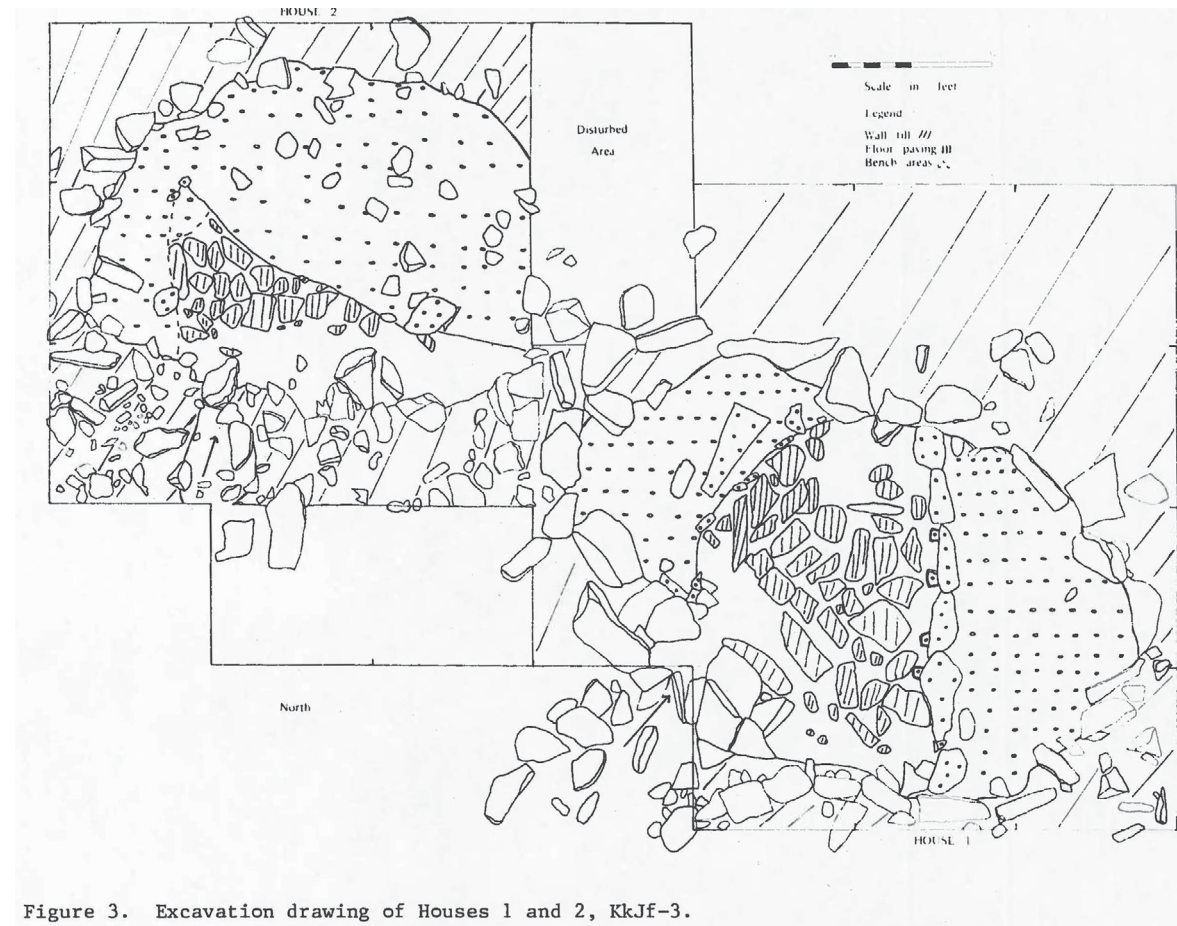


Figure 3. Excavation drawing of Houses 1 and 2, KkJf-3.

Figure 9. Plan of double Dorset house (Wenzel, 1979)

The small bone specimens scattered in the drawings do not seem to have a structural purpose. Wenzel, who lived in Aqviqtiug and excavated several sites, described the rear bench as the surface dedicated to sleeping and women's work. Men's work was performed on a side bench or on the floor. Some houses had an identifiable lamp area (an upright slab to shield the lamp or a stone "box" to protect the lamp). It is likely that houses had at least two and perhaps three lamps. While not every house had a side bench, the one on the rear was elevated above a paved stone slab flooring. The benches were built up with gravel, paved with smaller flat slabs, and covered with seal or caribou skins. Some benches even had projections supported by stone pillars with the area beneath likely used for storage (Wenzel, 2004).

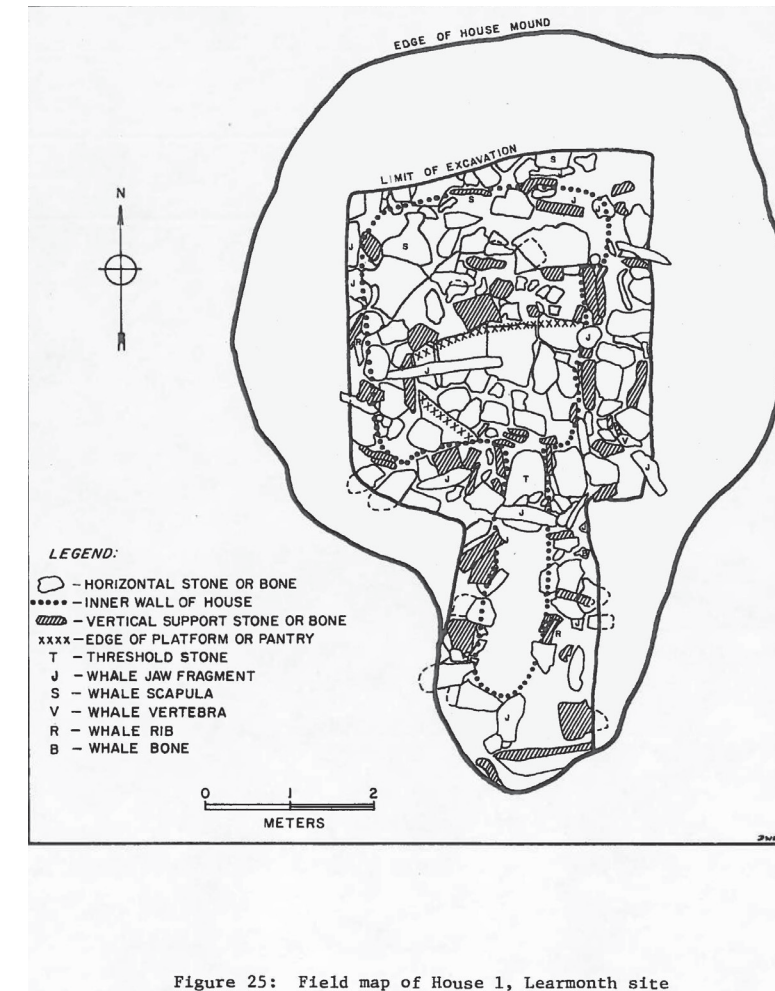


Figure 25: Field map of House 1, Learmonth site

Figure 10. Plan two of a double Dorset house (Wenzel, 1979).

The Thule

Around CE 1000, a people from the Bering Sea and Alaska's north coast began following bowhead whales eastward during the summer months. In a few centuries, the Thule, definite ancestors of today's Inuit, had spread out across the Canadian Arctic, Greenland, and Labrador

and are categorized by Mathiassen as being different in their material culture. Although many objects appeared in both cultures in different forms, the clay vessel, the bolas, the bird harpoon, and the baleen are characteristic to the Thule (Jenness, 1925). The Thule also boasted “harpoon heads with open sockets, arrowheads with long tangs for attachment to the shafts, women’s knives, mattocks, and picks made of massive whale bones” (p. 429). These details are contrary to modern-day cultural groups, whereby harpoon heads have a closed socket—the ulu or woman’s knife blade is fixed to the handle via a stem (figure 11)—and the soapstone vessels are more rectangular in form. While bone, ivory, and stone are common resources, in the Thule culture there was no drilling. Holes were made by gouging and usually in the thinnest part of the material.

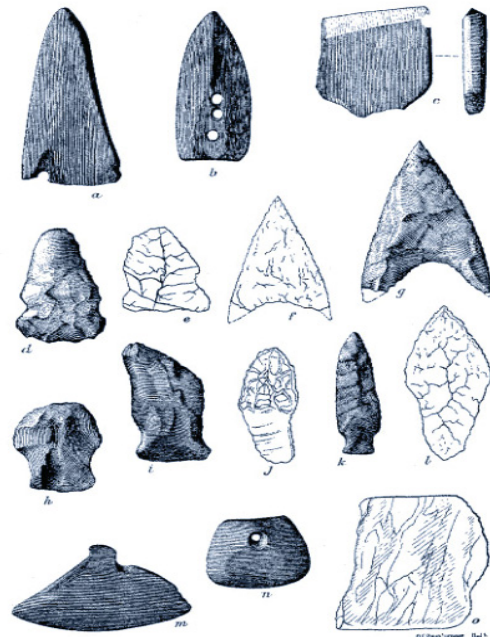


FIG. 4—Stone implements from Cape Dorset: a, single-edge knife of slate, broken; b, slate knife for lance or harpoon; c, adz blade of nephrite; d, flint knife; e, quartz knife; f, arrowhead of quartz; g, arrowhead of flint; h, flint scraper; i, curved-edge knife of flint; j, curved-edge knife of quartz; k, arrowhead of flint; l, lance head of quartz; m, n, women’s knives of slate; o, quartz rubbing stone. O, half natural size; a, b, k, m, n, seven-twelfths; the rest, two-thirds.

Tent dwellers in summer, the Thule spent winters in 9–12’-diameter semi-subterranean houses built of rocks, driftwood, sod, and whale bones (Desrosiers, n.d.). A jawbone could serve as an arch over an entranceway, ribs became peripheral posts, baleen a clothes-drying rack. Perhaps the most important Thule invention was the cold-trap passageway, a tunnel that emerged

in the shelter’s sunken floor, a detail typical to a traditional snow house. Sealed, it helped create comfortable indoor temperatures in the coldest winters. In figure 12, Pipkaknak enters his iglu, dinner in hand. A glazed skylight above illuminating his path is made of 6” thick lake ice.



Figure 12. Sky-lit snow house (Harrington, 1955).

This period also saw east-to-west migration. The Graenlandinga Saga recounts how Vikings discovered “three humps on the sandy beach just in front of the headland. When they went close, they found that these were three skin boats, with three men under each of them”(Nabokov,

Easton, 1989, p189). These are presumed to have been improvised overnight shelters similar to the umiak or walrus-skin boat used by Inuit hunters.



Figure 13. Traditional Qarmaq (Anonymous, n.d.).

In 1577, Martin Frobisher reported seeing impressive seasonal dwellings such as tents of sealskin and winter houses structured with whale bones and delineated with stones (figure 13). William Fitzhugh found traces of Thule presence in Labrador between CE 1250 and 1450 (Rankin 2009). Three Thule villages have been discovered on Baffin Island, and evidence suggests these were inhabited in winter and early spring and comprised approximately 25 to 35 people.

In the interim, a new concept of technology had arisen, one that did not limit itself to building materials and processes but defined itself more broadly as the understanding (skills and knowledge) of the dialectical relationship between humans and their environment (natural and built) in the production of a new superimposed built environment (McCleary, 1988). Thus, the

Thule, who typically lived in large settlements built along the coastline to favour the hunting of baleen whales, significantly contributed to Inuit culture. In a circumpolar region where Europeans struggled to survive, Thule thrived, aided by their arsenal of weapons and tools and traveling technologies. To hunt whales, they constructed one-person kayaks and larger boats called umiaks, using walrus ribs covered with walrus hide. Driftwood was cleverly transformed into dog sleds, with whalebone runners and braided sealskin harnesses and traces. Bones and ivory from sea mammals were carved into harpoons and lances, and muskox horn was used to reinforce the short, powerful Inuit bow.



Figure 14. Making an oil lamp (qulliq) with bone tools (Anonymous, n.d.).

Thule ingenuity extended to architecture. In winter, they lived in warm houses dug into the ground, which were lined with flat stones and framed with wood or whale ribs and jaws. This structure was wrapped with walrus skins under sod, piled for additional insulation. The

entrance to this dwelling type was conceived as a long tunnel with a deeper recess in the middle to trap the cold air below the minimum floor height. Inside the house, a family could sit or sleep comfortably on fur-covered stone platforms. The heat generated by lamps and bodies glazed the interior wall, creating a thick continuous layer to protect against cold and wind. In spring, the ground thawed, and the space began to accumulate with water. That meant it was time to move to skin tents until the next winter.

At northern Labrador's Killiniq and Staffe islands, archeologists uncovered a significant 750-year-old Thule settlement. Most houses found were shallow, 4×5-m rectangular structures. Some larger structures measuring 5×6 m featured a stone structure for supporting the roof, a stone floor, and a sleeping platform. Ulu knives, similar to those used by Inuit women, were found on the east side of the layout, and lances and harpoons were found on the west side—suggesting gender roles assigned to each side of the enclosed space. Cultural and ancestral ties with both earlier and contemporary Inuit groups came from these findings (Dawson, 1997; Mathiassen, 1928; McCullough, 1989).

As hunting practices developed, so too did dwellings. When whaling was abandoned in the 1600s and Inuit turned to sealing, the semi-permanent subterranean houses built on the coastline were replaced by winter camps of snow houses built on the sea ice. This change prompted the development of the snow house as the main winter dwelling in the eastern and central Arctic (Dawson, 1997). Furthermore, according to Mathiassen (1928), this move from the subterranean whalebone house to the snow house also brought about more communal-style living arrangements (see also Dawson, 1997). Anthropologists in the late 1970s estimated that Thule bands comprised 20–25 people, while historical surveys such as Mathiassen's determined that over 100 people lived in iglulingmiut or snow-house clusters on the sea ice. Dawson attested that British explorer Sir John Ross even discovered a population of 120 people inhabiting 12 snow houses, which implies approximately 10 persons per family. And Danish explorer Knud

Rasmussen (1931) found snow houses with a passage between them for a family and their two married sons.

Dawson (1997) like Damas (1988) confirmed the frequency of the clustering of dwellings in the eastern Arctic and that these clusters were likely based on close families and kin relations for the cooperation between members. Therefore, it is reasonable to assume that Dawson's argument of an architecture directly influenced by local rule, influenced the size of the structures for the period of the year in which activities must have taken place indoors. These seasonally generated forms ultimately symbolize the spatial organization of traditional Inuit domestic life.

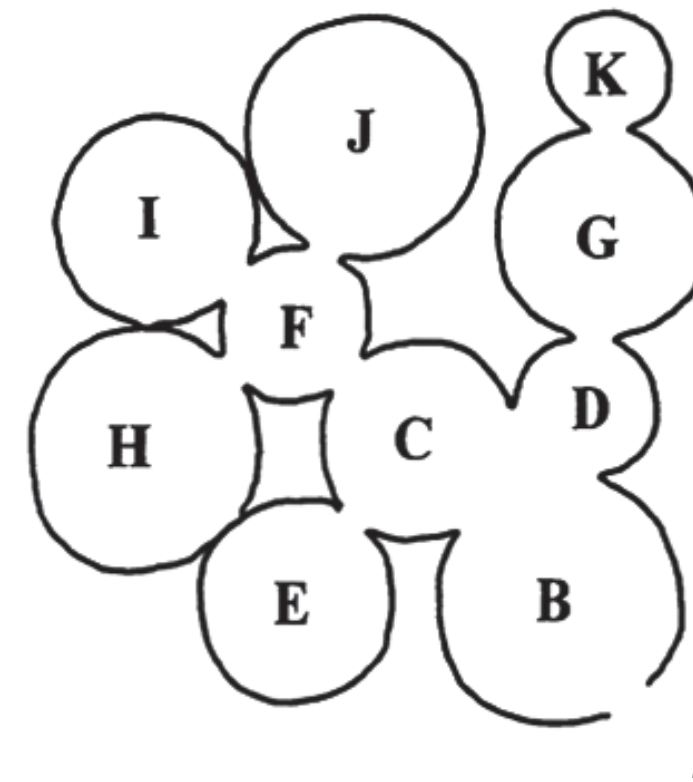


Figure 15. Plan of snow-house clusters (Mathiassen, 1927).

The second plan of a snow house was built by the same group and documented at Aua's River. This housed five families within 10 spaces. Each space opened into a common area, but Mathiassen (1928) did not identify their relative functions (figure 15). Therefore, it is probably similar to the first plan, where space one was for the dogs, space two was shared, and the larger

hatched spaces were family sleeping quarters. However, Damas described the hierarchy of spaces wherein the father inhabits the rearmost dome with his unmarried son, while the other domes were for the older, married sons or perhaps a son-in-law. The overall distribution and layout reflected the importance of the social structure; the relationships and the local rules gave space its order.

Social Organization: A Network of Relations

I argue that social organization of the household not only impacts placement and configuration of Inuit self-built dwellings but is central to the designs as well, allowing for constant transformation. This requires an a priori understanding that household relationships and kinship ties extend the house into clusters of households comprising settlements as both structural and social organizations. Inuit settlements were thus territorial units or groups of assembled families. These territorial units then describe a landscape with accessible boundaries encompassing a set of specific characteristics, allowing Inuit to pursue their seasonal activities where food is the social currency within and among settlements.

George Simmel's essay "The Metropolis and Mental Life" (1903) remains a classic on this topic as he positioned the small town as a comparative example to the industrial metropolis. Implicit in every relationship is the notion of identity. For generations, Inuit have identified with communal activities or family camp gatherings out on the land. Lisa Koperqualuk is an Inuk from the village of Puvirnituk on Hudson Bay's eastern shore. A cultural advocate and educator, she described the dynamic relationship between culture, environment, and built form that exists even today:

Most elders were raised in seasonal family camps—inland in summer, on the coast in winter. And families today still return to these places to go fishing or hunting. One single house

is *igluk*, the plural is *igluit*, and the dual form is *igluuk*. Similarly, one Inuk is one person, two people are *Inuuk*, and multiple people are referred to as *Inuit*. Outpost or family camps always had one leader, or *isumataq*, who gave the camp its identity. Each family member received a special name called *saunik*, which in Inuktitut means bone. Just as each bone plays a vital role in the body, the person bearing the name holds a special position within the family. Extended family members could be unrelated, but the given name endowed them with a relationship to the family very much like any other biological member. These relationships were crucial where people lived in tiny communities (Koperqualuk, 2016).

Because hunting was directly linked to Inuit identity, it is not considered a sport. It was, however, linked to house typologies. While Inuit men and women carry together the responsibilities for food, clothing, shelter, child-rearing, and emotional sustenance, men are more apt to hunt, and women jig or fish to feed their families. Each part of the harvest had a meaning and a utility in the fabrication of the home. As a right of passage, it was critical for each man to raise a team of dogs, build a qamutiik, an *igluk*, a qulliq or lamp, an ulu or woman's knife, and a kayak. All these skills needed to be known before marriage. Women's central role was creating the homestead, including both site selection and interior environment. These complimentary roles still exist today (Koperqualuk, 2016)

Mauss (1906/1979) said that settlement configuration depended "on the way in which environments act, not on the individual, but on the group as a whole" (p. 34). Settlement configuration was often characterized by dwellings surrounding a central structure, a communal gathering house called a *karigi*. While previous civilizations have impacted built material culture, the family organization established how much has been built, where and in what settlement configuration.



Figure 16. Mother with a child carried in the hood of an amautiq (Anonymous, n.d.).

Understanding the concept of family in Inuit terms is essential to understand the form of and relationship between forms in the winter clusters. Kinship terms for family help identify relationships between family members of the same domestic group and explain the two types of family, where kinship is collective and/or individualized. In 1871, Morgan published a book on kinship relations titled *Systems of Consanguinity and Affinity of the Human Family*. Cousins of all degrees are designated the same way if they belong to the same house.

Summer families were relatively patriarchal, as were winter families, because the father constituted the foundation of the family and was usually the provider (along with male children of hunting age). The disappearance of the father would result in the children being adopted or historically put to death. The mother was also crucial to the household and her disappearance would destroy the home as well. Both would try to remarry as soon as possible since it was essential to have descendants who would eventually hunt and care for the elderly parents (Schusky, 1974). However (and despite the consistent patriarchy), during the winter months “the rules of domestic life are completely different” (p. 64). The nuclear family individualized in summer disappeared within a larger group in winter and constituted a joint family that inhabited the same iglu or long house. The members who cohabitated not only had economic relations but also moral connections. The term that best designates these kinship bonds is iglugattigiit,

where “igluag” is from “iglu” or “house,” and “attigiit” is “kin.” The Danes in Greenland call this “husfaeller,” and the English call it “housemates.” This term designates all cousins that are an individual’s closest circle of kin after immediate family. An important characteristic of these housemates or individuals raised in the same household is that, as cousins, they were forbidden to marry.

Ownership and family

While the winter family is less patriarchal, the head or isumataq gains authority not by birth but by certain characteristics. Generally he is an older man, a good hunter or the father of one, and the owner of an umiak. As isumataq, his role is to apportion places and food and monitor or rectify internal differences.



Figure 17. Extended family busy with life among their snow houses.

Beyond the extended family, the other important grouping was the settlement, being an even larger family or clan. These inhabitants were referred to by a special term that is more than just a group or house but a sort of domestic unit (figure 17). Traditionally, individual property was limited to a few items such as clothes and amulets. Men might own a kayak and some

weapons. Women had a family lamp, a cooking pot made of soapstone, and some utensils (figure 18).



Figure 18. Making tea for 80-year-old blind man, Adamee, in his tent at Lake Harbour, NWT (Doucette, 1951).

A family together would own its tent, skin or canvas coverings, and sled. Interestingly, it would be the woman's umiak used for transporting the tent. The harvested game would not belong to the individual hunter but to the entire family—including the dogs (Johnson, 2013).



Figure 19. Sharing food with a team of dogs (Anonymous, n.d.).

The long house, a type most often found in Labrador and Nunavik, was jointly built, repaired, and owned by all housemates. Even the land was appropriated in a collective manner. The same collective rights over food within a household extended to the whole group of inhabitants (figure 20). Ownership of a nuclear family disappeared, and the provisions were shared by all.



Figure 20. Idlook's campsite at Aloutseevik, Curry Island, Eclipse Sound, North Baffin Island (Anonymous, 1953).

Mauss (1906/1979) concluded that the subtle transformations that existed in the evolving seasons were seen in social functions and echoed in the built environment. This complex layering of relationships manifested in a family unit within an extended family grouping and settlement, all interdependent like the components of a snow house.

The Winter Camp

These small winter settlements, inhabited year after year, were set on coastal lands, providing easy access to seal breathing holes. Prior to the establishment of a central regional population hub—known as Kangitugaapik for insiders, Clyde River for others—the typical winter settlement pattern was found in five to eight semi-permanent villages. Many winter-house technologies were used in those areas, using snow, sod, canvas, and wood. These winter settlements would be relinquished in May and put in place again in late September or October. The temporary nature of these winter places and their associated hunting activity forced inhabitants to continually adapt.



Figure 21. Community of winter houses, a village at Oopungnewing. Source *Arctic Researches and Life Among the Esquimaux: Being the Narrative of an Expedition in Search of Sir John Franklin in the Years 1860, 1861, and 1862* by Charles Francis Hall (1865), New York: Harper and Brothers. (Unknown artist based on sketches by C.F. Hall, 1865)

The Summer Camp

While the summer communities were more mobile, they maintained an analogous kin grouping. These camps were settled for a few days at a time, usually in valleys near favourable caribou hunting sites by the coast or at the head of the fjords. Toward summer's end, the return of the narwhal and Arctic char prompted longer stays in good harvesting grounds. During summer, Inuit were more apt to spread out on the land, especially during caribou hunts. According to Balikci (1968), prior to government settlement, Clyde River Inuit's extended families remained the structural liaison both in summer and winter. And although the Canadian government resettlement strategies started in the early 1950s, two of these earlier traditional extended-family villages remained active: Aqviqtiug in Ellington Fjord, with 28 members, and Alpatu (with 35 members) on Alexander Bay.

Clyde River's population was already 150 in 1950, and by 1969, the Alpatu population joined Clyde River to seek medical services, and only one family remained in Aqviqtiug. While the government's postwar relocation policy brought essential services to Inuit, in the collective memories, this was a difficult period of adjustments. Many more hunters had to share sealing areas closest to the settlement while the distance to these seal breathing holes increased their travel time. These government-imposed resettlements were unprofitable for the hunters, even with the demand for sealskins in the early 1960s, and eventually powerful snowmobiles and motorized canoes allowed the hunters continued access to more distant places. Thus, modern transport technology, especially the snow machine, helped Clyde River residents resume their traditional summer settlement patterns, although in a more restricted area, closer to the government village. However, the collapse of the fox trade, the expensiveness of fuel, and the residents' inability to repair their motorized boats, triggered the closing of these traditional camps, and more people moved into the Clyde River village, proper.

Pragmatic Architecture: Seasonal House Types

A local respondent named Robert Kautuk spoke at length about traditional qammaq construction:

Long ago when they had just sod houses, they would have a house like this: the main floor above ground level. I think we didn't want you guys to know. Here is the iglu [pointing to a round mug]; the porch [pointing to the handle], the doorway would be here; the porch, the floor would be here; the bedding would be like that [pointing to the back of the mug], higher than the doorway but below the bed, so the cold night air coming in wouldn't go up; and the warm air would push the cold air down and away. The bedding and the floor would be higher than the ground. The same would be in the qarmaq, just in the main dome. The top view, elongated instead of completely round such as with a snow house. The bed would be here [pointing to the side] instead of here. For the qulliq, it would be here [pointing to an area in front of the bed], and if you had visitors, they would be on either side. There would be another qulliq up here. The head would be close to the qulliq, facing inward but the floor would be the same in both plans.

The doors would be facing south, even if the house were facing the shoreline. The window would also be on the south side, next to the door: only one window. The base part, this would be drift wood or rocks—if they had whale bones or driftwood for the structure—then covered with skins or sod. The last time we did it, we used a web of strings; we built sort of a net and put the sod—interlaced it within—the grassy side on the outside.

It's just built into us. The last time we built one was with the cultural school about four hours from here. It's canvas, wood, and heather for insulation. It's the same material you use to cook with. It's a plant to start the fire. For the base, we use earth and grassy ground layered quite thick. We use heather for insulation. Women picked boxes of heather and piled it up in one place. It doesn't take long. It was maybe 6" all around: canvas inside, plus the heather, then canvas on top. The heather worked as it was usually dry. Before canvas, we used sealskins, and for the window we used bearded seal intestine stretched out. Once the soil gets dry, it's not damp inside. Since there are cabins and tents available now, we don't need to build these anymore. (Semi-structured interview)

For Mauss (1906/1979), three characteristics distinguish seasonal house types: in winter, “a cover of ice”; in the spring, “open waters for hunting seal”; and in summer, “a territory for hunting and fresh water for fishing” (p. 34). By definition, these separate and varied conditions only occurred in specific yet often remote locations. The changing landscapes and varying ecological conditions always carried with them information for the individuals who knew how to learn from it and to translate it. In the northern landscape, such receptive individuals gave rise to mobile seasonal houses, though in plans and forms that not only mimic one another but also minimize material use.

Figure 22 below demonstrates the simple relationship between shape and material. All five shapes have the same area with different perimeters; the oval or circle has the smallest perimeter and therefore uses the least material. This applies both in plan and in section. Furthermore, in every case, these dwellings were set up to intercept the movement of certain species to harvest. They were usually constructed in groupings, and the families and extended kinship relations would spend part of the year, often the fall, in the qarmat (tent with a stone foundation) and iglu (a sod house) that could be used from year to year. The igluviak (snow house) in winter and the

tupiq (tent) in summer had variable locations, and snow houses could be built on sea ice and therefore completely vanish (Nabokov & Easton, 1989).

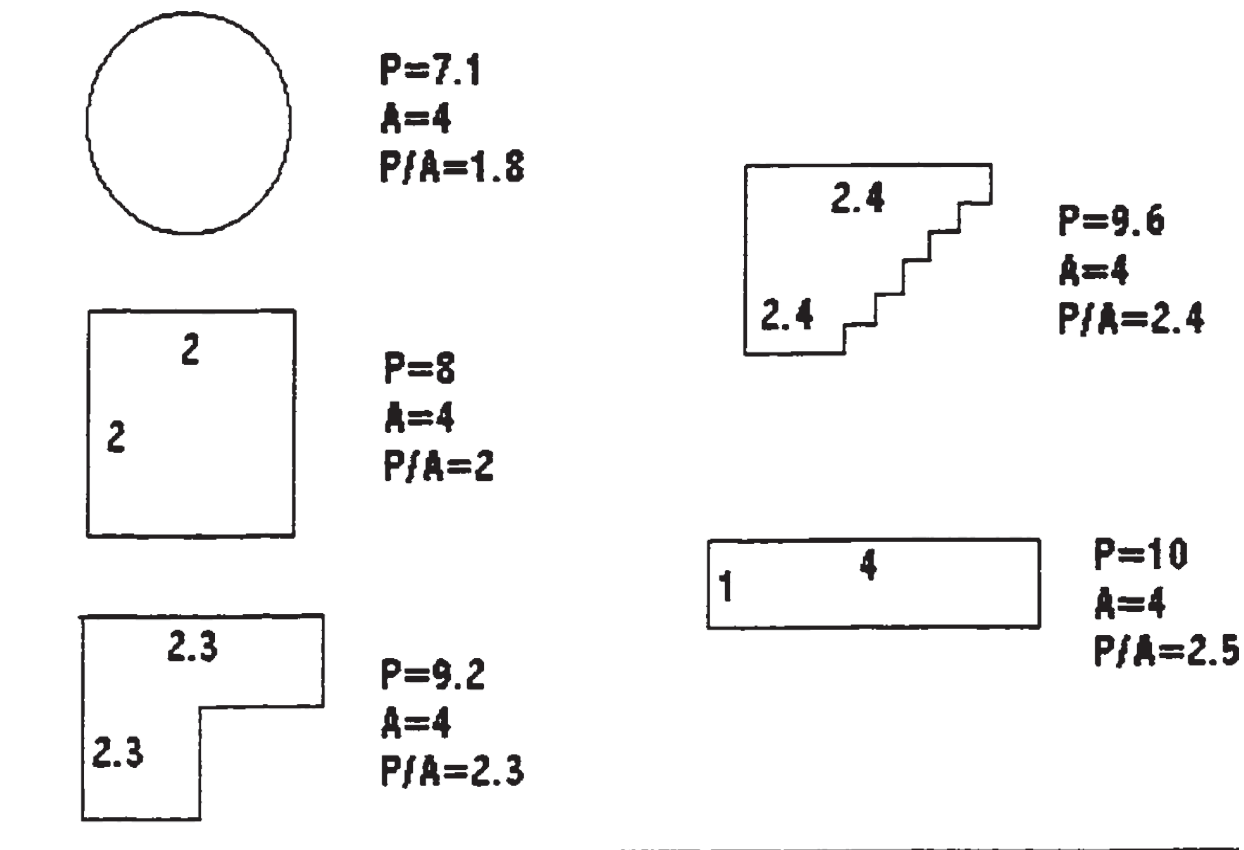


Figure 22. Relationship between the floorplan and perimeter-to-area (P/A) ratio (Strub, 1996). Each floorplan has the same area (four units) but a different P/A ratio.

Note the circular plan has the smallest ratio and therefore a more efficient design in terms of material quantity (figure 22).

The Qaggiq or Pinguavik

The largest of the traditional structures was the *pinguavik* in the eastern Arctic dialect, a Thule gathering place also referred to as *pinguaavik* (eastern Arctic dialect), *kazigi*, *karigi*, *kashim*, *keshagem*, *qaggiq* (iglulik dialect), *qargi*, and *qalgiq*—*kashim* is the European adaptation of an Inuktitut term meaning my place of assembly, the equivalent to a community hall. This structure, with its narrow benches built around a central hearth (not just at the back), was understood as a cultural space where the room size could vary. Several examples have been documented.

In 1899, in southwestern Alaska, Edward Nelson documented a *qaggiq* or *qagiit* to be 4×8 m in size. This winter gathering space could be built in several ways, according to the materials available. Above the treeline in central and eastern Arctic, wood being sparse, whale bone and baleen were the materials of choice (as found on the Pembroke site near Cambridge Bay, Nunavut, on Baffin Island). Otherwise, these structures were built of sod and driftwood, structured above an agglomeration of stones placed in a circular crescent form.

In the post-Thule phase, until the contact period with Europeans, the *qaggiq* construction and its materials changed to snow when the more temporary snow houses built on sea ice substituted for the subterranean winter house. This material permitted Inuit to construct *qaggiq* 5–8 m in diameter. The period between CE 1400 and 1600, also known as the Little Ice Age, is believed to have caused a shift away from the high Arctic and a change in hunting practice from the open-water bowhead whale hunts to seal hunting from seal breathing holes in the winter season (Maxwell, 1985). It therefore became necessary to live out on the sea ice during the winter months in many different locations, maximizing range and proximity to this seal harvesting.

These snow-built gathering spaces could house up to 60 individuals (Rasmussen, 1932; Stefansson, 1978); beyond 100 were once recorded in the central Arctic (Birket-Smith, 1929).

They were domed communal buildings constructed similarly to the snow house or igluit. They were round in plan, and sometimes three domes were grouped together. In the eastern Arctic, the favourite type was the single-space dome with a front entrance porch, although the multi-dome type was also reported (Griebel & Kitikmeot Heritage Society, 2013). Among Copper Inuit near Cambridge Bay, the qalgiit could constitute a main larger dome with appending smaller residential domes. The size of the main dome varied, depending on the number of adjoining residential domes. Several double-, triple-, and even quadruple-dome structures were reported (Jenness, 1922)

These communal houses, normally sheltering two to eight families, contained no compartments or benches. In these communal houses, the sleeping platforms doubled up as the main social space (figure 23)—a sleeping place by night was a place for crafts, maintaining equipment and tools or just socializing by day and dancing by night (figure 24). Sleeping was also communal, families slept side by side in a row with their head facing inward, feet aiming at the outside wall (Dawson 1997, p. 259; Balicki 1989, p. 80; Boas (1888) 1964, p. 136; Mathiassen 1928, p. 145).

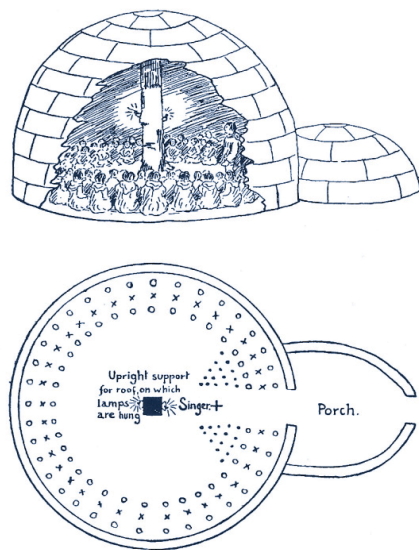


Figure 23. Side and plan view of a Baffin Island qalliq with a central snow pillar to support and a place for the lighting (Bilby, 1923).

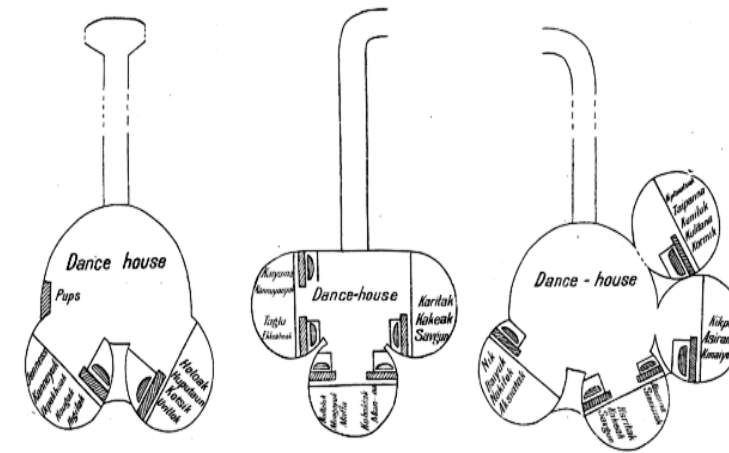


Figure 24. Copper Inuit dance houses (Jenness, 1932).

The sleeping platform was also a place where parents could oversee family members’ activities and conduct. The only activity bound to a fixed place was for cooking. This activity was primarily on the left side, next to the oil lamp. All the other spaces were undefined. Level changes and relative positions closer to or farther from the exterior wall determined movement. Settlements usually consisted of several huddled kashims. Not systematically arranged, several connected domes appeared to Mauss (1906/1979) as a large hall with supporting pillars.



Figure 25. Pod of snow houses (Anonymous, n.d.).

Mauss tells of 13 such settlements along one hundred and twenty miles of coastline, 392 inhabitants in thirteen houses, for an average of thirty people per house. This house type has

been detected from Baffin Island, to Hudson Bay and Alaska, and was well documented by the Moravian missionaries to Labrador (Damas, 1984). Mauss spotted an exceptionally large house on Greenland's eastern coast. In a town called Angmagssalik or Tassiilaq, eleven families made up of 58 individuals inhabited this expansive house. In the western Arctic however, this house type seems to have been the winter residence for men—both married and unmarried (Ray, 1978, p.45) and for gathering of hunters required for bowhead whaling. These *Kariyit* or *Karigi* in the singular were the club houses (figure 26. b) that were mostly positioned at high points to best observe incoming whales. However, as this practice moved from the western Arctic to the eastern Arctic, it was no longer reserved exclusively for men (Lee & Reinhardt, 2003, p.67). This cultural space was a real community hall for feasting, song and dance but also for conflict resolution of just for communal activities (Griebel, 2013, p.16).

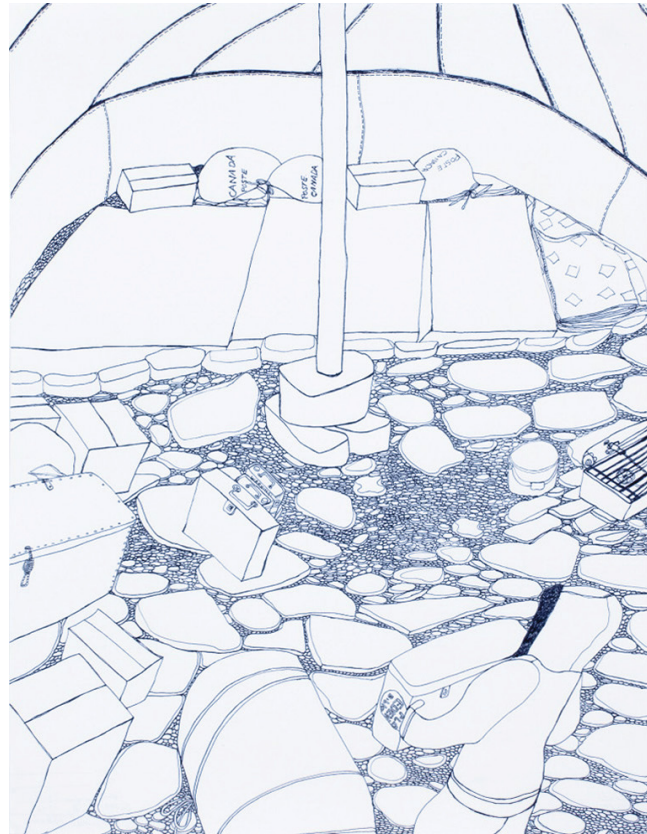


Figure 26. Large central iglu in a winter camp (Ashoona, n.d.)



Figure 26. b) Gathering inside a large Qaggiq *The journals of Knud Rasmussen*, Oana Spinu, © Distribution international inc.

Igluviak

Early chronicles described Arctic dwellers' snow houses with wonder and awe. It is a traveling structure that requires few tools, good knowledge of snow drifts, and some well-learned skills (Whitridge, 2016). Even today, this relentlessly ephemeral architecture, sheltering generations of human life at the extreme edge of the possible (Mathiassen, 1928; Stefansson, 1919), prevails as an engineering marvel. It presents the wonder of a perfectly curved contour in the shape of an inverted paraboloid or a catenoid (Kershaw, Scott, & Welch, 1996). The iconic catenary shape,²⁶ strong in compression and needing no internal supports, is the product of engineering choices leading to both the optimum height-to-diameter ratio and optimal use of material for the space created. Importantly, it puts into practice a series of heating principles that should be part of any builder's general understanding of cold-climate design (figure 27).

²⁶ The iglu is not a hemisphere but an inverted catenary. From the Latin for "chain," a catenary is the shape of a weighted flexible wire or chain held at both ends. By fixing the actual curvature and turning it upright, it would be the shape of the snow house. It was this complex design principle that allowed Inuit to inhabit these structures without the walls buckling over time. When the snow was of a poorer quality, the dwelling would be built taller, thus finding a more stable form [$Y = a(\cos h X/a - 1)$, $Y = \text{height}$, $X = \text{horizontal distance}$] (Weisstein, n.d.). According to the formula as proved by Leonhard Euler in 1744, the catenary is also the curve that, when rotated, gives the surface of minimum area (the catenoid) for the given bounding circle.

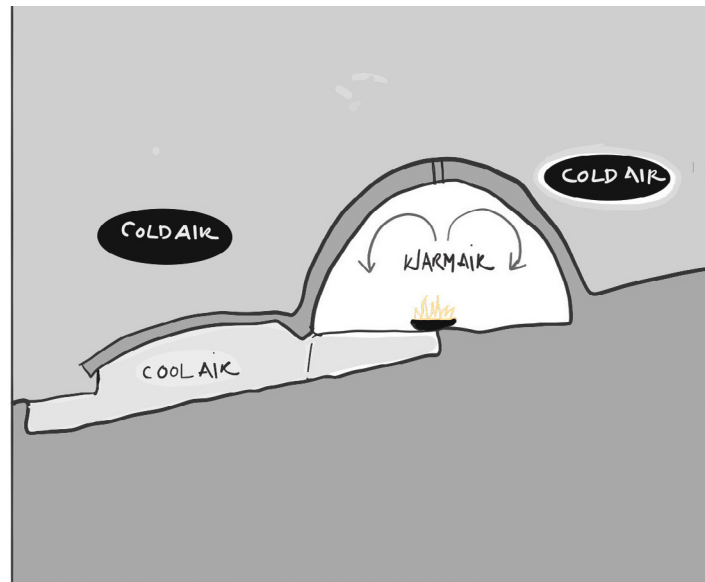


Figure 27. Diagrammatic section through a snow house

In the mid-1990s, a thorough investigation of the snow house was produced at Resolute in the high Canadian Arctic to evaluate the heating efficiency of a small- and medium-sized iglu. The results were astounding. The larger iglu was 4.1 m wide and made of 72 blocks, each weighing 23.6 kg; the smaller iglu had 46 blocks, each weighing 28.2 kg; therefore, the smaller one was about 75% of the larger iglu in space. The temperature differential from inside to outside was 45°C. It took the fat from one seal to heat up the smaller iglu every 6.3 days, and the larger iglu every 3.7 days, making the smaller iglu much more energy efficient. Curiously, the smaller iglu was lined with caribou skins whereas the larger iglu remained unlined. It is also interesting to understand that the meat from that very seal would feed a family of four for approximately the same amount of time. Body heat was calculated at 8–14% of the required energy to heat the winter house.

Interestingly, in 1966 Jumik noted that too thick a block would over insulate and induce melting, but Inuit have well understood these fluctuating aspects in weather, season, and location. While the entire science behind iglus was acquired through traditional knowledge, few quantitative studies have documented numerical values for temperature fluctuations. There are historic portrayals of snow houses by anonymous writers during Arctic travels that note

dimensions of 2.5–4.6 m in diameter and 2.7–3.1 m in height, where blocks were 0.61 m long and 0.15 m thick (Kershaw, Scott & Welch, 1996). Boas (1888) and Mathiassen (1928) have also noted that a skin lining the structural interior would increase the temperature from 1–3° to 10–20°.

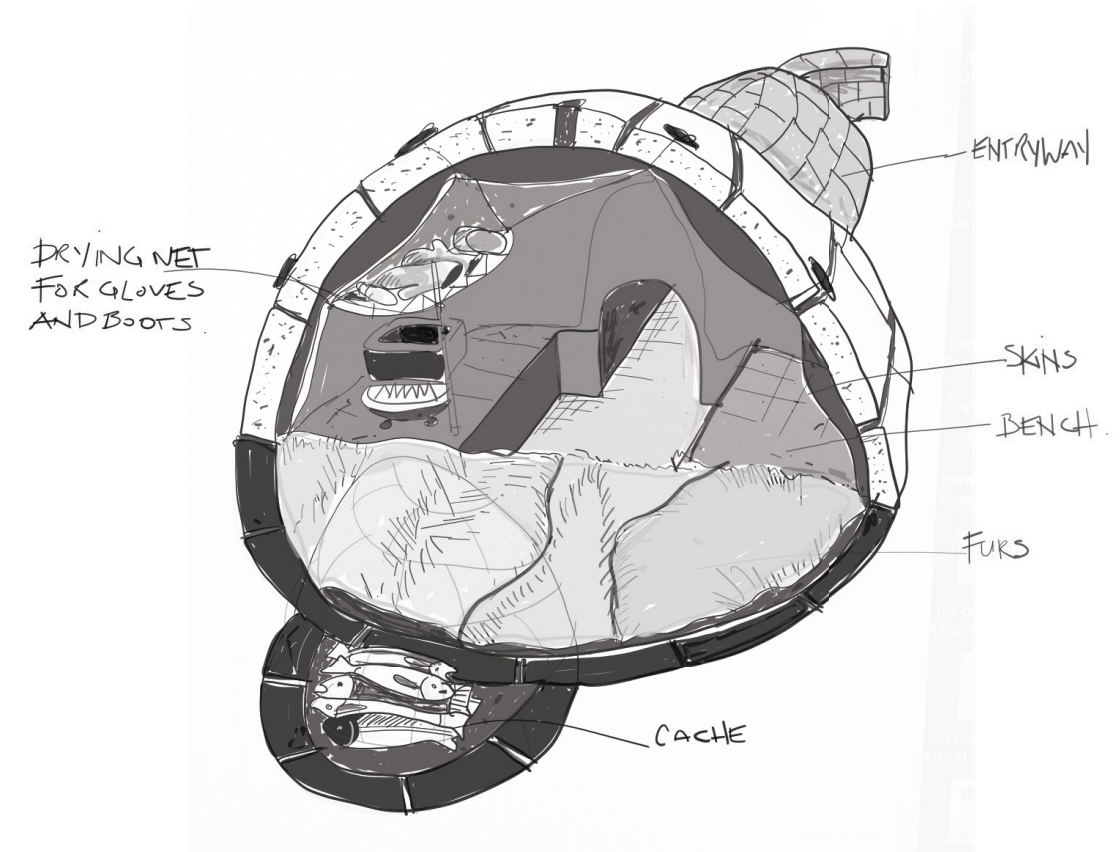


Figure 28. Sketch redrawn by author based on an archival drawing (Anonymous, n.d.).

Many other interesting considerations cause differences in the thermal characteristics of snow houses (figure 28), including the placement of the entry, the size and position of the bedding, the size of the kudlik (soapstone oil lamp), and the amount of lining and insulation (Kershaw, 1996). The kudlik could vary in size from 12 to 136 cm (Jenness, 1946; Scott, 1996), with smaller lamps used during travel and with temporary sheltering. Otherwise, in a typical semi-permanent house, the lamp would be no less than 60 cm (Scott, 1996). The most interesting part of the Kershaw paper is its discussion on the importance of wind and how, due to small

amounts of snowfall in Arctic deserts, snowdrifts that create packing snow (influencing its thickness, density, and hardness as a suitable iglu construction material) is part of the overall design consideration.

Large iglu

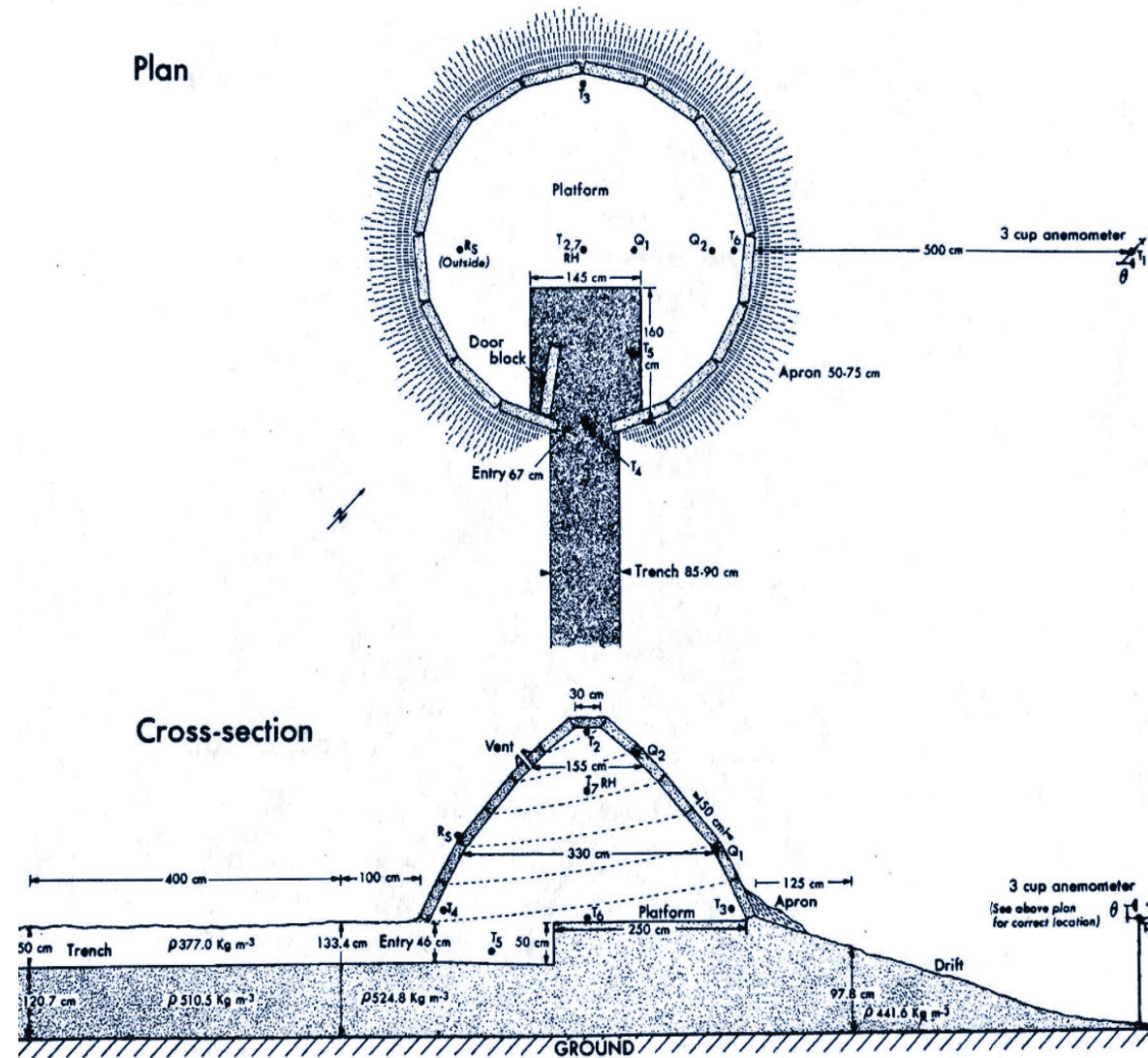


Figure 29. Large iglu in plan and section (Kershaw, Scott, & Welch, 1996).

Beyond Kershaw (1996), the only historical document regarding the time to build such a structure is in Boas (1888). He noted that a 25-block traveling iglu 1.5 m high and 2.1 m in diameter took two people two hours to build. In conclusion to the study, Boas compared the heat exchange through iglu construction to that of an insulated 2×4 wall construction (see Kershaw, Scott, & Welch, 1996).

Small iglu

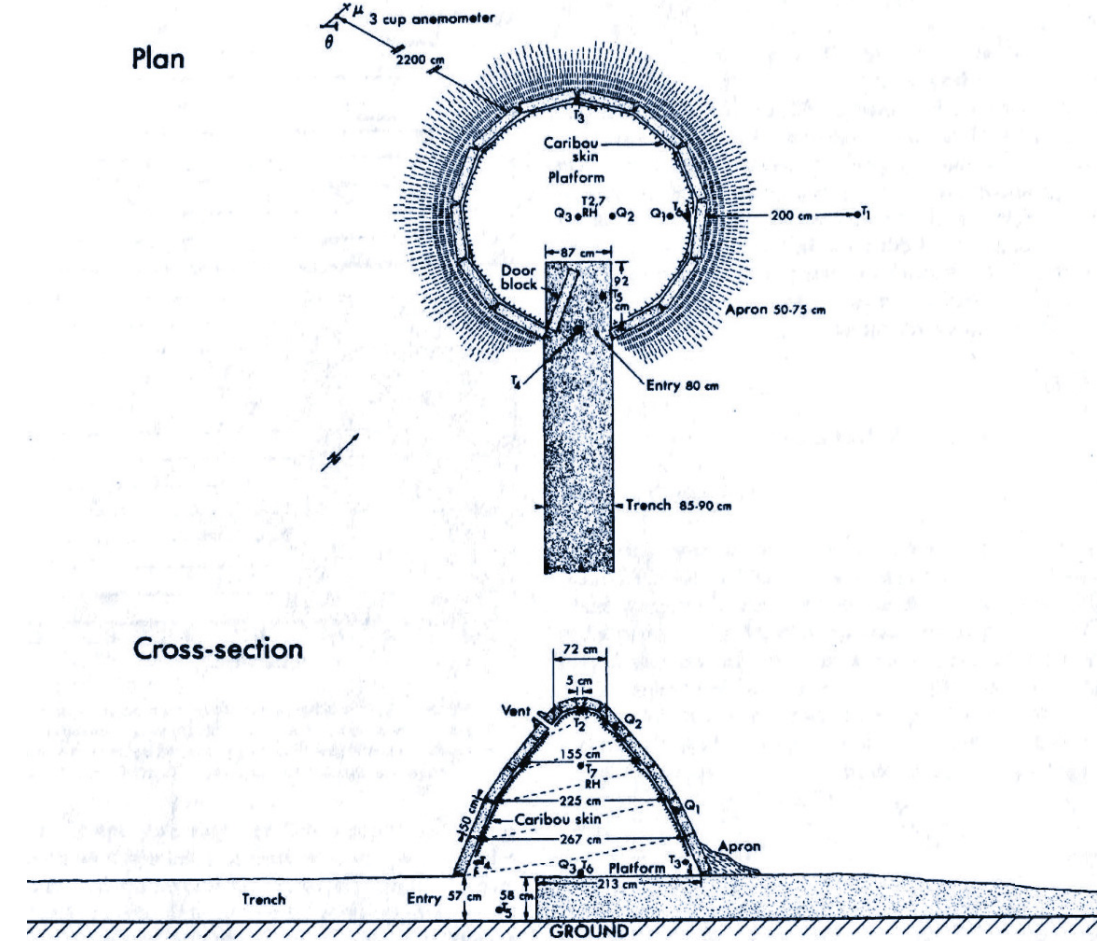


Figure 30. Small iglu in plan and section (Kershaw, Scott, & Welch, 1996)

These two iglus in Figure 29 and 30 were constructed using traditional methods learned from Inuit by H. E. Welch in Resolute in 1993 as an experiment for documentation, with design advice from Nangat Idlout, Herodier Kalluq, Tony Manik, Aleesuk Eckalook, and other family members. Having a geometric exterior, they covered rather than revealed the interior activities²⁷.



Figure 31. Buried entryway to an iglu (Walk, 1999).

²⁷ This notion of the geometric exterior as a covering rather than an internal revelation is from Glassie (2000) in his assessment of the central Asian Yurt.

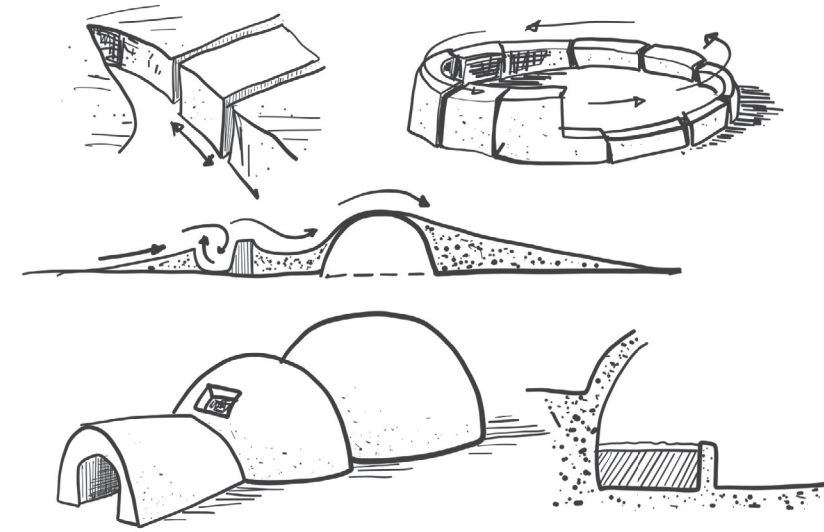


Figure 32. Iglu (Gabus, 1942).

Iglu interiors are traditionally tiered or terraced using an air-capture principle.²⁸ People sleep at the uppermost level, a fire in a kudlik burns mid-level while the bottom is a cold sump (figure 33a). Entrance passageways were dug under the walls and opened directly into the living space. The snow, being an excellent insulant and interior surface material, would keep the inside warm. With the heat of bodies and an oil lamp, a thin film of water would melt and refreeze, sealing holes. One small vent occurred on the ceiling, corked with moss, a skin, or even a mitten, but also left open as need be. The opening could be as large as 15 cm.

In this house form, each occupant had a set place, on the bench perhaps, or on a particular side. There was a relationship between the structure and the structure of the group. Space was not proportionate to the number of family members. A family of one, for instance, might occupy as much space as a large, multi-generation family. Beautiful and efficient, it is a model of lucidity and an engineering masterpiece. A later section on “Building an Arctic Snow House” further explores iglu technology and its modern meaning.

²⁸ Snow houses are built out of hard snow called “illusaq.” They are used as a temporary winter home by Canadian and Greenlandic Inuit. The word “iglu” (sing. igluk) is Inuktitut for “house” or “home.” It is also related to a town named Iglulik and Inuit people known as Iglulingmuit, both belonging to the Iglulik Island. Therefore, to Inuit, iglu need not be homes made of snow; it can also be cloth tents, sod houses, houses constructed of driftwood, and even wood buildings.

Less common in Alaska, Greenland, and Siberia, the snow house was more readily seen in northeast Canada, Baffin Island, and western Greenland. It is believed that the architecture of the snow house improved as one went farther west from Greenland and seemed to appear most frequently between King William Island (Qikiqtaq) and Coronation Gulf. Stefansson (1919) wrote: “The snow house is at its best (both in structure and how the people use it) from Dolphin and Union Strait, east to Baffin Island.”

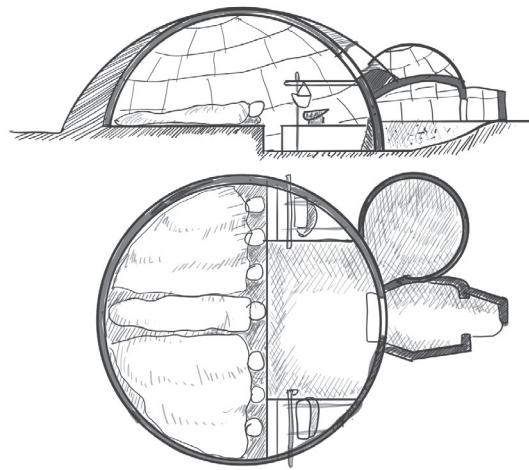


Figure 33. a) Scale and position of sleeping platform, table lamps, and food cache near the entry tuqsuk (Gabus, 1944) redrawn by author, 2017.

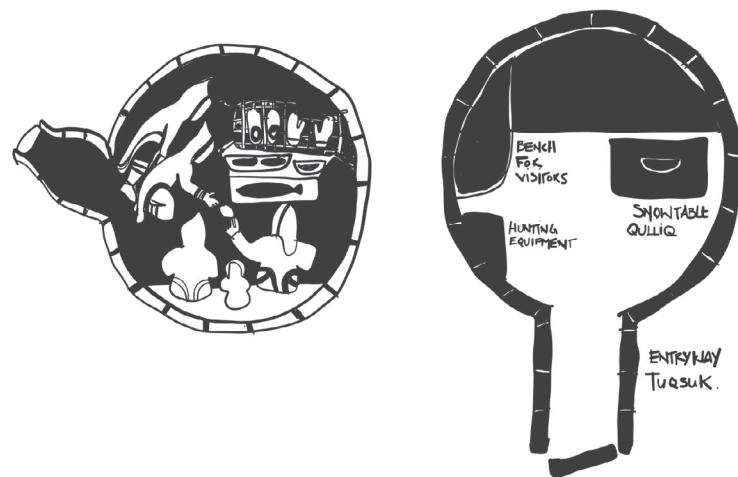


Figure 33. b) Daytime activity (Kalvak, 1970) redrawn by author. The second plan shows a space for the hunters' tools on the left, a visitor's corner, a snow table with a seal-oil lamp and the mother's space, as well as the platform at the back for sleeping.

Qarmat

Qarmats are considered an artifact of Thule culture, reinterpreted by subsequent Inuit societies. The difference, according to Mathiassen (1927), lies in the depth of construction and the length of time the construction was needed. According to his observations in 19th-century Baffin Island, the two predominant winter dwellings were the qarmat and the snow house (see also Dawson, 1997; Park, 1988). In essence, the qarmat could be built of snow walls and roofed with caribou hide or built inside abandoned semi-subterranean winter houses using the materials found within the hollow to build the new structure (Dawson, 1997). Boas (1901) sketched a qarmat that used whale ribs to structure the roof with a double layer of skins filled in-between with heather for insulation.²⁹ However, other anthropologists, such as Maxwell (1985), have highlighted the example of qarmats built aboveground and supported by three poles.

In an extensive interview with Charlie, an elder from Old Clyde River, I asked him to describe traditional qarmats as he knew them from his childhood:

Charlie on the assembly of a qarmat:[The qarmat is] two long platforms and a bed. It's sort of a couch or sitting place, yeah, high from the floor, and up there would be one whole long bed. We used leftover material from the construction or from old crates that were built in the old Clyde site. I was born on the other side [of the bay]. I was born in 1966. I was a little kid when the town moved. There are 2×4 frames in the walls and the ceilings—no 2×6s here in Clyde River. Maybe we would put a tent over it, and we would use heather as an insulation. We put two layers of canvas together. I remember, Mom would make some sort of layer out of flowers; I would help her. It was almost like papier-mâché; they would put this on

²⁹ According to the English dictionary, “heather” is also called “ling” or “heath.” It is a low-growing Eurasian ericaceous shrub, *Calluna vulgaris*, that grows in dense masses on open ground in the tundra and has small round shaped clusters of a whitish flowers, like cotton balls, used as insulation.

the walls. They would put any kind of paper onto it—old papers, as long as it was white. Everything was all timber; a skeleton that was wrapped. But the floor was also wood. This one was more wood because wood was available—just the skeleton was wood. It is still a practice being taught at Piqqusilirivvik Inuit Cultural School in Clyde River to all the students who participate in the program. (Semi-structured interview)

The most common house type in the Eastern Arctic was the qarmat. A winter and spring shelter, it used the same design principles as the winter snow house to preserve heat but was more elongated in shape. Whale bones served as structural members, with stones forming the perimeter wall. The structure was then arrayed in two layers of skins, 6–10” thick, insulated with dirt, sod, heather, moss, and packed snow. Inuit used stone slabs to cover the entrance passageway. A window made of dried bearded seal intestine would stretch over the straight wall above the passageway. This membrane, with the texture of parchment paper, easily resisted the cold, and its translucency, combined with the light inside, provided a guidepost for hunters returning after dark. It was usually composed of interconnected domes. Frobisher described this Baffin Island winter house as similar to an “oven’s mouth.”³⁰

30 Sir Martin Frobisher was an English seaman and privateer who made three voyages to the New World in search of the Northwest Passage. Each expedition landed in northeastern Canada, around today’s Resolution Island and Frobisher Bay, or Iqaluit as we now know it (Cooke, 2003).



Figure 34. Traditional qarmat made of skin and stones (Anonymous, n.d.).

Inside, on either end of the sleeping platforms, one or two soapstone lamps, cut into half-moons, lit the space. These small receptacles, with a wick made of moss, burned blubber. They were a constant reminder of the air quality within the dwelling. If circulation became insufficient, the flame would turn yellow and a ventilation airway at the top of the structure, called the nose or nostril, would be unblocked. As with the winter snow house, a wedge of turf or a set of mittens would then be removed from the nostril until the flame burned white once again. This way, the structure’s interior climate could be adjusted and monitored to create a layered feeling—cool by the feet and almost tropical at the head.

Although available materials varied little from region to region in Arctic tundras, the shape and size of the dwellings did. Some structures were said to resemble a ship’s hull, others pear-shaped, and others cruciform (figure 34). Houses found in Alaska had up to three windows, a gabled roof, and were completely covered in sod. At the front of the house lay storage huts for frozen meats, “props for boats,” and sometimes an area for dogs (Mauss, 1906/1979, p. 34). One such remaining foundation in Clyde River, near the house now reserved for sewing, is 24’ in diameter and has three benches made of wood and a perimeter made of stone. Lydia Jaypoody, an accomplished artist in Clyde River, represented the family working (figure 36) to make their qarmat in her painting titled *Preparing for Winter*.³¹

31 Lydia Jaypoody was an artist and grandmother in Clyde River. I received approval to reproduce this drawing from her granddaughter, Rebecca Hainnu, the school principal and good friend.



Figure 35. Traditional qarmat foundation, a site found in Clyde River (Havelka, Giraldeau, 2016).

In driftwood-abundant areas, houses may have been entirely built of logs and cruciform shaped. Floors were layered in wood planks or stone—if available. Without wood or whale bone, stone and turf sufficed to erect a miniature version of the Greenlandic house.

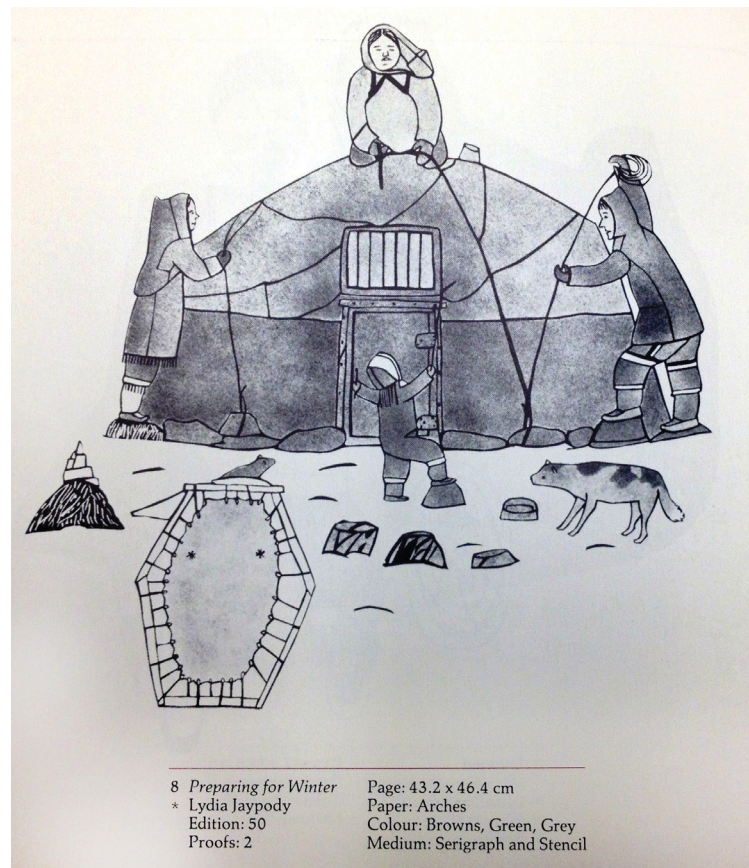


Figure 36. Preparing for Winter (Jaypody, 1983)

Inuit built rectangular houses up to 50’ long and 16’ wide. These structures featured three essential elements: the subterranean entryway, a bench or platform for lamps, and partitions to divide the bench into different sections, one per family. This design was usually constructed along a steep slope where the top of the back wall was either bermed or at grade with the slope. As Mauss (1906/1979) explained: “The walls are of stone or of wood covered with turf and often skins” (p. 34). One entered the house on one’s knees. The bench or platform was raised 18” from the ground and supported with stones and turf. In Greenland, the Mackenzie region, and Alaska, stakes were used to prop up the bench. At the front wall, another bench accommodated unmarried adolescents or guests.

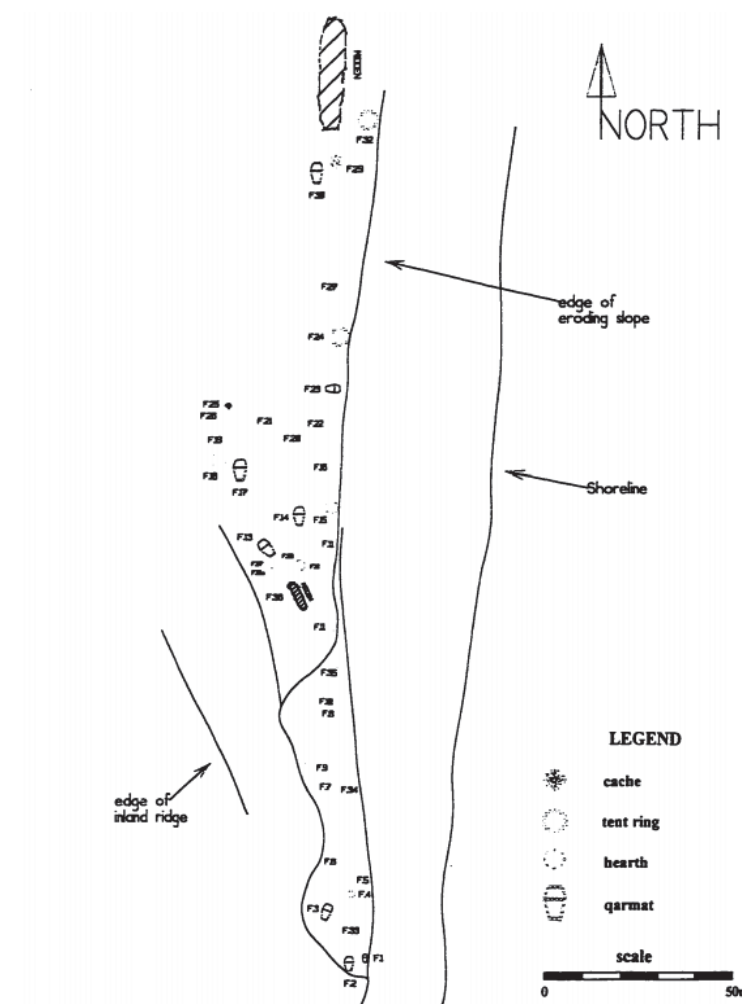


Figure 37. Traditional qarmats on a stretch of beach campsite (Dawson, 1997).

Notice that all entrances face south or southeast (figure 37). Unlike today's new insulated wood frame houses, sound passed through the thin material of the qarmat — the wind blowing, a passerby, or the presence of animals at a distance. Today, elders often put out a tent by their cabin preferring a connection to the sounds of the land. These tents, made from canvas, are called tupikhaq different from the octagonal double walled winter tent.

Tupiq

This section focuses on simple, resourceful but clever technical and engineering solutions such as the practice of building a tupiq. The tupiq or skin tent (plural tupiit) comprises several seal or caribou hides stitched together and drawn over a structure of wooden posts in the shape of a cone. It could be quickly assembled and flexibly conjoined with other tents or pitched accordingly. It takes 5–10 ugjuk (bearded seals) to stitch together a tupiq—fewer for a lone hunter, more for a family. Poles were arranged in a cone shape, with the layer of hide held down by large rocks (figure 38). The circular ones are called “amalukasa” and the four-sided ones are called “kipaariituuq.”



Figure 38. Making a *Tupiq* or tent (Anonymous, 1927). This is at a fish camp, east of Kittigazuit, and these Inuit men and boys, Oscar, Sydney, and Oliver, are repairing tools and nets and about to put up another tent.

The summer dispersion was diametrically opposed to the close winter cohabitation. Single-family tents were widely separated, with groups scattering along the coast and into the interior to hunt or for freshwater fishing (figure 39). However, these structures could be set up as clusters or settlements. Depending on the type of hunt, certain harvests required only adult males to travel alone or in non-family units, making it an all male activity (Whitridge, 2016). Otherwise, the size of the seasonal settlements varied according to the social and communal associations implied in the foraging exercise (Wenzel, 2003). The overall grouping of tents depended on the food resources and the configurations changed with the groups and the seasons. Portable and durable, the tupiq was summertime's primary shelter.

The typical summer shelter sites could even be found opposite winter communal houses or scattered along the fjords, while winter settlements could also overlap with summer sites. As winter approached, the tents served as roofing for a qarmat. Or an additional ring of snow blocks around the perimeter would cut the wind and afford tent dwellers extra protection. This family-built mobile dwelling was inhabited by one family that may include adopted children and a guest, a widow, or an elder relative or two. This structure would be carried and built to measure, allowing people a direct connection to the land (figure 40). There is no hole at the top since no smoke had to be let out. Mauss (1906/1979) wrote that when reindeer were not available, sealskins made up the tent surface. The siting is almost as important as the structure. The tents are wider at the base contrary to other traditional indigenous groups offering structural stability and deflecting strong winds. They are more commonly sheltered leeward of a prominent hill.



Figure 39. *Tupiq* or tent erected in Old Clyde River (Lunney, 1956b).

A Word about Wind

Robert Kautuk on wind: Where the wind is coming—between here [pointing from behind the mountain in Clyde river], the north, and the northwest—that’s where the wind comes. If you put another cabin there [pointing to an area immediately behind the first], next to the first cabin... This is your cabin and the first cabin. Try not to put extra stuff behind.



Figure 40. Tent site (Ashoona, 2006).

Wind is a weather condition of key concern to Inuit builders. Nunavut’s winds blow predominantly from the north and northwest. Therefore, entryways perpendicular to this axis are preferred.³² This insight is a small sample of a vast trove of Inuit indigenous knowledge gathered by Shari Fox Gearheard, a research scientist and long-time Clyde River resident. Gearheard’s close local connections have brought Inuit and scientists together in a range of projects to gather, share, and interpret climate-related information. One study found significant divergence between local scientific observations and Inuit reports (Arctic Research Consortium of the United States, 2011; see also Gearheard, 2010).³³

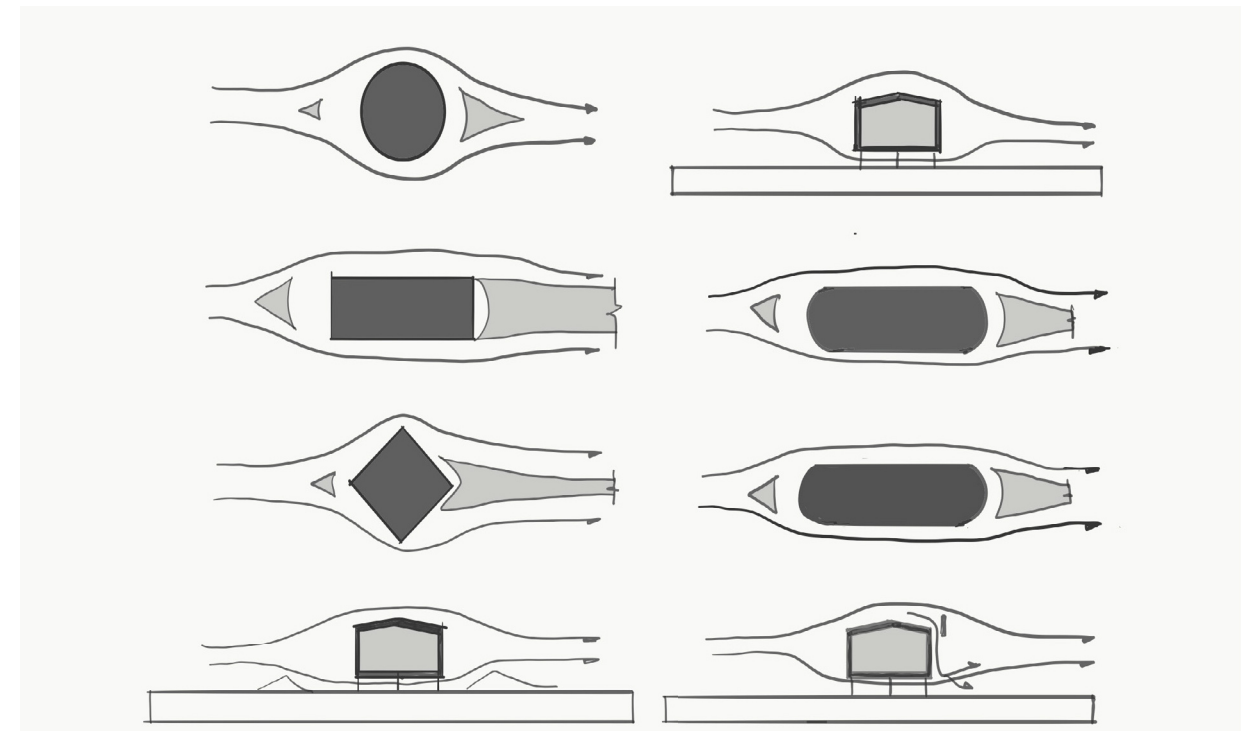


Figure 41. In the architectural realm, rules of thumb to avoid snow drifts based on a drawing by Harold Strub.

32 Mountains extend along the entire east coast of Baffin Island and spread across its northern regions. The Barnes Ice Cap (70°N, 73°15'W), west-southwest of Clyde, rises to 3,684'. Elevated flat areas, such as the Clyde River airport site, do exist. The airport is vulnerable to poor flying conditions, as clouds from below rise to the plateau. Meanwhile, strong winter winds frequently blanket the area with snow.

33 This information comes from ARCUS Arctic Research Consortium of the United States, Linking Inuit Knowledge and Scientific understanding of Environmental Change: A Case study in Wind Observations.

Harold Strub (1996) has eight rules of thumb for building in the Arctic (figure 41):

1. Make the building circular in plan.
2. If the building is rectangular, align the long axis parallel to the prevailing wind.
3. If the building is square in plan, align the diagonal axis parallel to the prevailing wind.
4. If the building must be raised to permit accelerated airflow beneath the structure, align the short axis parallel to the prevailing winds.
5. Shape the ground below the structure so that airflow accelerates most at the lee edge of the building.
6. Streamline the shape of the building by keeping the roof profile low or align the ridge with prevailing winds.
7. Place the plane of entryways and exits parallel to the prevailing winter wind, so that adjacent ground will be scoured.
8. As a last resort, apply panels to the building to deflect air flow into zones of stagnating air.

Thus, beyond the form, material, and construction, the orientation and location are fundamental considerations. These principles are all known to Inuit. The perfect siting, the compression of the building material, and the orientation of the entry acknowledge the wind, reflecting design principles that either compromise or thrive in their environment. As Nabokov and Easton (1989) summarized:

Although the arrangement of these houses within a camp was seemingly random rather than socially patterned, the general placement of the houses was critical to shield inhabitants from the weather. After the sea ice had frozen, the inhabitants began to cluster their iglus out on the ice on east-or south-facing drift slopes to avoid prevailing winds. East or south orientation of the individual houses kept snow from covering the ice window or the ventilation nose of the home. The passageways also were turned away from incoming drafts. If built on land, the dwellings nestled into the protective lee of cliffs and faced the beach (p. 195).

Building an Arctic Snow House

Only a few generations ago, virtually every Inuit knew the secrets to building an iglu. This vital knowledge was transferred orally and through observation and then gradual participation. Now, fewer Inuit possess the skill, but the internal layout of today's tents and cabins remains unchanged. These days, information transfer occurs mostly by way of the written word. Figure 42 is a photograph I took of an informative poster hanging in the local school's main hall.

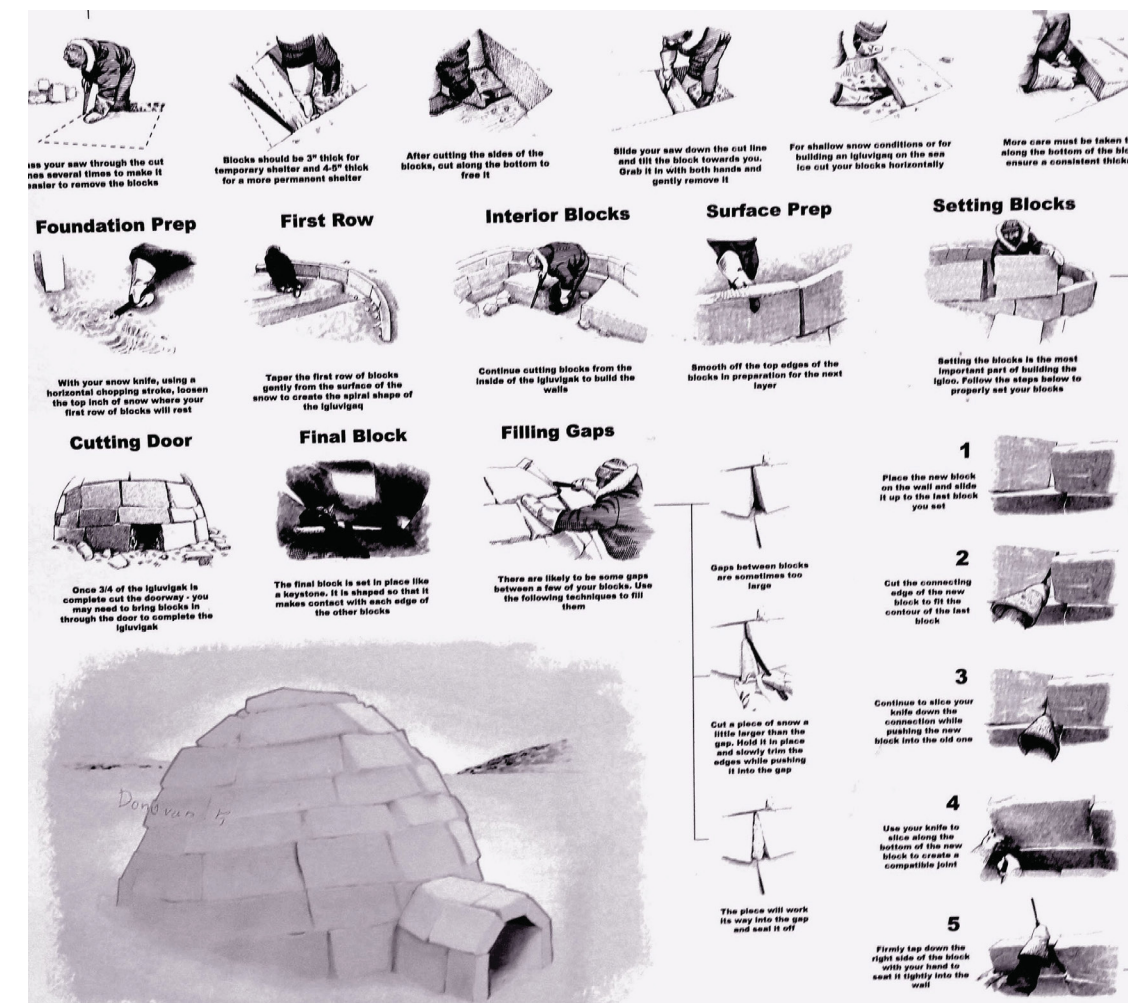


Figure 42. Poster of iglu building at the local school.

While each iglu was custom-built according to intended occupancy, a typical family iglu measured 10–15' in diameter and 7–10' high. Larger iglus were occasionally built. Vilhjalmur

Stefansson (1931), a Canadian Arctic explorer and ethnologist, described one iglu measuring 30' in diameter and 11' in height at its center. In all cases, only one tool and one material were used. The relationship between floorplan and perimeter demonstrates how the circle has the smallest ratio of perimeter to area (Strub, 1996).

Snow bricks are cut from hardened snow drifts using long knives. Once ivory or bone, today's knives are typically store-bought steel blades. As with any building technology, the quality of the material or building block is of utmost importance. Soft snow falls apart, while snow taken too close to sea ice crumbles like sugar. The best snow is taken from newly packed drifts of uniform consistency, ideally from a single snowfall.

Working from the inside, the bricks are placed by row, with the last ones sloped. The next row is built up on this slope, making a continuous spiral. Right-handed builders worked in a clockwise direction. The spiral design resulted in a space-efficient beehive shape. The key block is the final element and the most difficult to adjust (Figure 43). The last job is chinking or blocking all the gaps and joints with snow. This exercise could take as little as 1.5 hours (Wilkinson, 1949).



Figure 43. Venting an iglu (Paniloo, n.d.).

Two or three people can build an iglu in about a day. As one person lays blocks from the inside, another outside fills the gaps between each one with loose snow. He or she then covers the newly set block with a shovel of snow as if it were mortar. Any snow that slides down the dome's

face accumulates at the bottom rows. Here it forms a thickening of about 3'. Above this, walls taper from 8–10" until measuring only 4" at the roof. Thickness varies with outside temperature. A third person may cut and carry blocks to the site. When the snow blocks are first laid in, the gaps or wedge-shaped pieces of snow are forced in and gently rubbed down until the joints become solid and homogeneous. This increases the dome's overall solidity.

A tunnel under the wall serves as a doorway. It leads to a sunken area inside, the natiq, where dogs might sleep or where clothes are kept cool. If the snow below the iglu is sufficiently thick, it is advisable to place the door at least 6" below the level of the floor. "In a one-night camp, the door is set leeward. However, for a semi-permanent camp it is best to have it at right angles to the prevailing wind. Then, at the end of your alleyway, you make a turn in the trench like an elbow joint in a stovepipe and have this open to leeward. Still more practical is to have a kind of T-joint trench at the end of your alleyway. Then you can open one end and close the other as the wind changes and have an open door to leeward with minimum trouble"(Marshall, 1941, p.10).



Figure 44. Frame for hanging a kettle inside an iglu (Anonymous, n.d.).

In this fashion, levels, rather than rooms, divide an iglu's interior. Opposite the entrance, about two-thirds of the interior space is built up with snow to form a bed platform, its surface insulated with twigs and caribou or bear furs. On either side, a simple wood frame supported

a seal- or whale-oil lamp (Figure 44). Benches by the entryway were built to store food. Sometimes, smaller rooms were added for that purpose as well. For daytime light, a block of clear ice was set into the dome usually just above the doorway. When the house began melting in April and May, the roof would be removed and replaced with skins creating a half iglu/half tent structure.

The Layering of Materials for Climate Control

To maintain proper temperature control, the bed platform (igliuk) must be 18” above the top of the entrance door. If the snow below the iglu is insufficient to position the doorway 6” below, the bed platform must be built higher or the door blocked off with a block of snow. In ideal conditions, the tunneled entrance requires no closure of any kind. This may be why modern Inuit always keep their doors unlocked and even open wide when they are home. Furthermore, above the packed snow platform, a thick lining covers the floor to avoid heat transfer and melting the snow. Two layers of caribou hide or other skins are a perfect covering, with one layer hair side down and a top layer hair side up, in effect keeping the heat indoors. These layers beneath the sleeping bags or blankets suffice to prevent any thawing and stay dry throughout the winter months. These techniques were taught during WWII to air force personnel who would be subject to this climate.

From time to time, a snow house’s inside surface is glazed or iced. A hot flame (usually produced by a kerosene stove) can raise interior temperatures to as much as 80°F (32°C). This produces a coating of ice to make the structure windproof—and possibly polar bear proof. There have been several incidents where a half-ton polar bear had climbed on a dome that resisted the weight, not unlike an egg, which is strong in compression and brittle against a sideward blow. Stefansson claimed that after the glazing, the dome’s snow no longer radiates the chill that a

regular snow wall would discharge. Frozen earth will chill a room far more than that of a snow floor, and Inuit understand that concept, selecting floe edge over land for relative warmth.

When the sleeping platform is built 18” above the top of the door, below floor level, natural gravitational ventilation works best. The cold air from outside only comes through as fast as the hot air escapes from the roof nostril. Closing the door is rarely needed.

Stefansson (1921) importantly stated that the Arctic is not a bleak, frozen wasteland but a habitable region that must be developed: “It is human nature to undervalue whatever lands are distant and to consider disagreeable whatever is different.... It is chiefly our unwillingness to change our minds which prevents the north from changing into a country to be used and lived in just like the rest of the world.” Arctic temperatures of -50°F are rare. Still, even at that extreme, a 3”-thick dome would provide an indoor temperature near 60°F. At higher temperatures, the door can be kept open while sleeping.

Instinctively and by traditional experimentation, Inuit developed an empirical method of adjusting heat and ventilation. Snow’s insulating value depends on density, making comparisons with conventional building systems difficult. When fuel of any sort is used for heating, positive ventilation is required; therefore, the roof vent or nostril becomes necessary. Escaping heat enlarges the hole, and so a metal stovepipe is today used as a handy insert.

When the weather gets warmer outdoors (and body and cooking heat may also raise the indoor temperature), the snow dome begins to melt. If the door opening is between 5–8 square foot and a ventilation hole at the top supplying airflow is insufficient, then the dome’s outer thickness should be reduced from 4” to 2” to allow the colder temperature to keep the dome walls intact. When the fire is not burning and the door makes for sufficient ventilation, the ventilation hole in the roof can be blocked. Two mittens stuffed in the pipe were traditionally used (Whitridge, 2016).

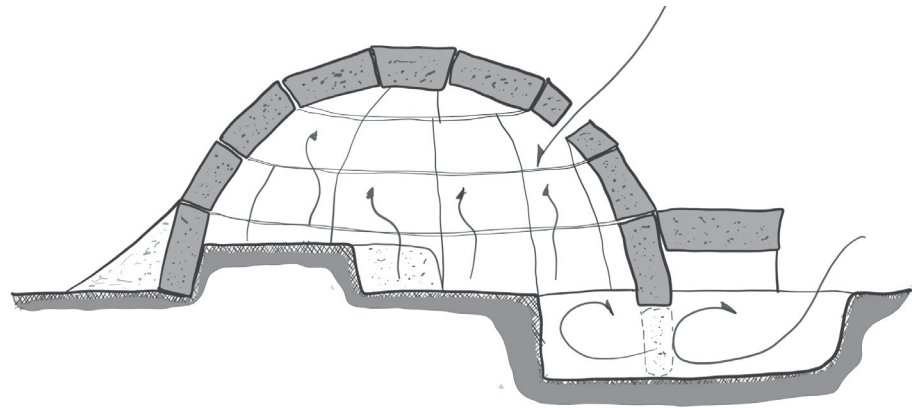


Figure 45. Diagrammatic section of an iglu. The farther up, the warmer it gets and as warm air rises.

This lower level protects the interior from cold drafts and functions like an air pocket (figure 45). During the better of winter, snow drifts create another level of insulation from the cold. The layering of these natural materials is an effective way of responding to a cold climate. Using found and renewable materials resourcefully, even a frozen material, can create a comfortable interior environment. The iglu is ingenious but it inevitably melts away without leaving a trace and is the shelter inhabited for the longest period in this culture of seasonal variation and mobility.

Material Culture for Mobility

It is said that the eastern Arctic required greater mobility than the western Arctic. In this vast rocky Canadian Arctic archipelago, free of all boreal trees, harsh seasonal variations, from drifting snow and covering ice to reduced daylight and constant wind, sweep the landscape. The principal large game, caribou, is transient and may spend the winter season and the breeding season hundreds of kilometres apart, while smaller species that hibernate in winter are scant and dispersed. The seasonal birds and fish appear in similar locations when maneuvering from the lakes to the sea. Thus, in a scheme to make a living and to cooperate with one another, the leading Inuit have had to spread throughout the landscape, addressing every seasonal change.

With the support of brisk and trustworthy transportation companions (i.e., their dog teams), with great seafaring know-how of their kayaks, and with the ability to adapt their lifestyle to ecological varieties, Inuit have understood and equipped themselves for the necessary mobility. The very elements of material culture that facilitated this movement were achieved in the layering of materials but also in the survival techniques and technologies necessary prior to marriage as mentioned in the previous section. These living cultural practices consisted of raising a team of dogs, making a qamutiiq, assembling a kayak, making an ulu, carving a qulliq, and sewing traditional winter clothing such as kamiit (boots), puala (mitts), inuinnak (pants), and the amauti (woman's coat).

The Arctic Dog or *Qimmiq*

To be a good hunter and eventually a good provider/husband required an elaborate toolkit, starting with the knowledge of how to raise a dog team. In sum, Inuit had to hunt to feed not only their families but also their dogs. Seasonal hunters left their families and communities for several days at a time. Inuit traveled to live, and at great expense. To travel, they built *Qamutiiqs* or sleds and *Kayaks*, both demanding in time and energy.³⁴ Human muscle propelled *kayaks* through water, but on ice, Inuit turned to the Arctic dog, the *qimmiq*, a biological piston engine, driving a semi-nomadic lifestyle (figure 46). The *qimmiq* also benefits from the layering effect for thermal protection and exposes a thick coat of long coarse waterproof hair that protects a finer softer layer beneath, the perfect accoutrement for harsh outdoor living. The males can weigh up to 40 kg and measure 70 cm at the shoulder. Their thick coats give them an air of grandeur and

³⁴ This was true until 1961 and 1962, when testing in the north began on the single-track vehicle called the snowmobile. Between 1927 and 1962, 13 patents were granted to inventors for snow vehicles, the oldest of which was for Carl J. Eliason of Sayner, Wisconsin, and his snow machine. In 1958, Joseph-Armand Bombardier designed the modern snowmobile and is considered the father of snowmobiling. He began commercial production of the Ski-Doo snowmobile in 1959, being granted a Canadian patent in 1960 and a US patent in 1962 for his endless-track vehicle. This was the beginning of the replacement of dog teams in all Inuit communities.

strength. They can be black and white, grey and brown, and they have spots on their muzzles, legs, or chests. Their tail is long and full, allowing them to curl up in a ball to cover their noses while their eyes, the distinctive feature, varies in colour from light blue to brown.



Figure 46. Arctic dog—Shari’s dog Umi (Havelka, 2014).

In the time before firearms, Inuit relied on dogs to protect them from polar bears. The dogs would gang up around the bear to provoke it while allowing the hunter time to prepare his weapon. The dogs also helped locate breathing holes in the sea ice because ring seals maintain several breathing holes while they search for food below. Because snow covers these tiny pyramidal apertures, seals feel ostensibly safe enough to take breaths under their cover between dives for food. The seals are 1.5 m long and weigh about 50–70 kg. Ringed seals give birth to a single pup, and the mother makes the small snow dome near that breathing hole called an “aglu” (perhaps the inspiration behind Inuit snow iglu) to shelter the newborn from the wind. Inuit hunters will wait by a seal’s breathing hole, sometimes making a small incision atop the mound and inserting a small tuft of hair or feathers that will quiver when the seal breaths beneath it. This ruffle gives the quiet hunter an indication of when to drive the harpoon into the hole. Once the seal is harvested, it is mounted directly to the back of the sled, hence the importance of the construction of the qamutiiq (Figure 47).

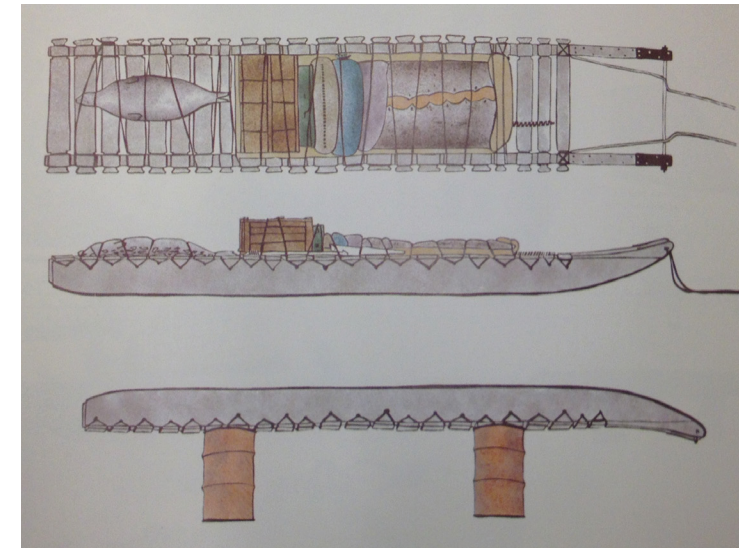


Figure 47. *Qamutiiq* or Sleds (Sanguya, 1983).

Making a *Qamutiiq* (Sled)

Inuit primarily build a qamutiiq to get to seals and then bring them back to camp. A light sled could travel 30 miles of flat ground a day. A heavy haul might cover only 10 miles a day (today, a snowmobile is up to four times quicker). Two adults can ride, sideways seated, at the front of a qamutiiq. At day’s end, the hunter(s) would build a small iglu and dine, along with the dogs, on raw or frozen meat. Anything edible was stored either within or atop the iglu (Boas, 1901; Riewe, 1991). Moreover, a qamutiiq, 8–12” long, would be made of driftwood or occasionally trees gathered during southern caribou hunts. The two wooden runners, comprising the full length, were linked by 2” crosspieces attached with sealskin lines (figure 48-49).

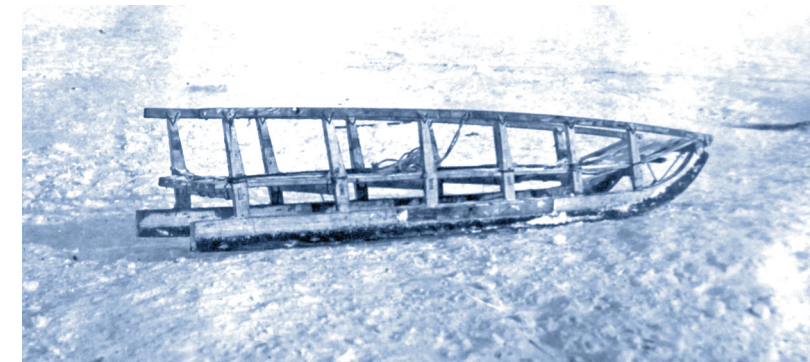


Figure 48. Traditional 1928 qamutiiq (sled) with mud skids retrieved from the National Archives.

Another line on the sled's front fastened the main 10'×20' trace to the dogs. The central trace acted as an axis from which lines went to each dog. These lines varied in length to create a fan pattern, allowing some dogs to be at the front while others ran closer to the sled. Like automobile tires, sled runners were matched to the season (Heath & Arima, 2004). In the coldest months, Inuit applied a coating of frozen mud, using a piece of caribou and wet bearskin as an applicator (figure 49). This produced a nearly frictionless surface. But springtime brought tougher, more uneven conditions—rock outcroppings and broken ice, known as “tuvak”—calling for a hardier runner fitted with bone or ivory. Most families had another short sled, used in both spring and

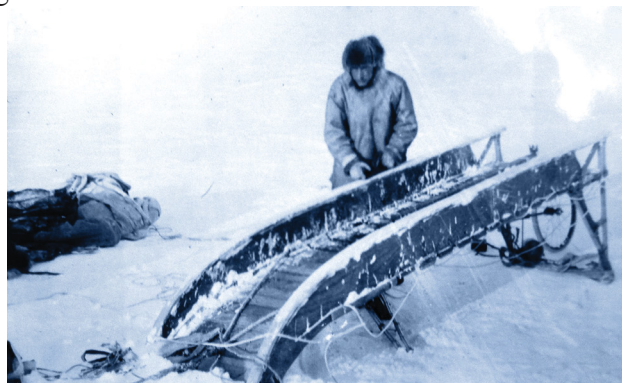


Figure 49. Making the skids smooth (Anonymous, 1928). A plane is used before the final coating of ice is applied.

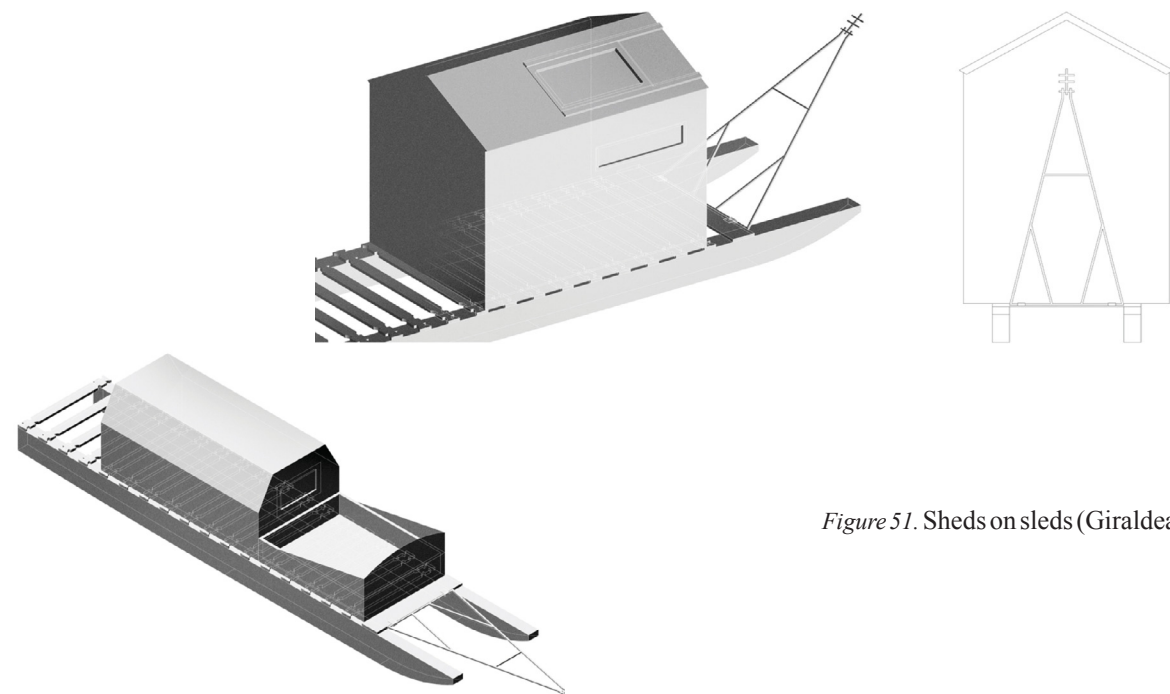


Figure 51. Sheds on sleds (Giraldeau).

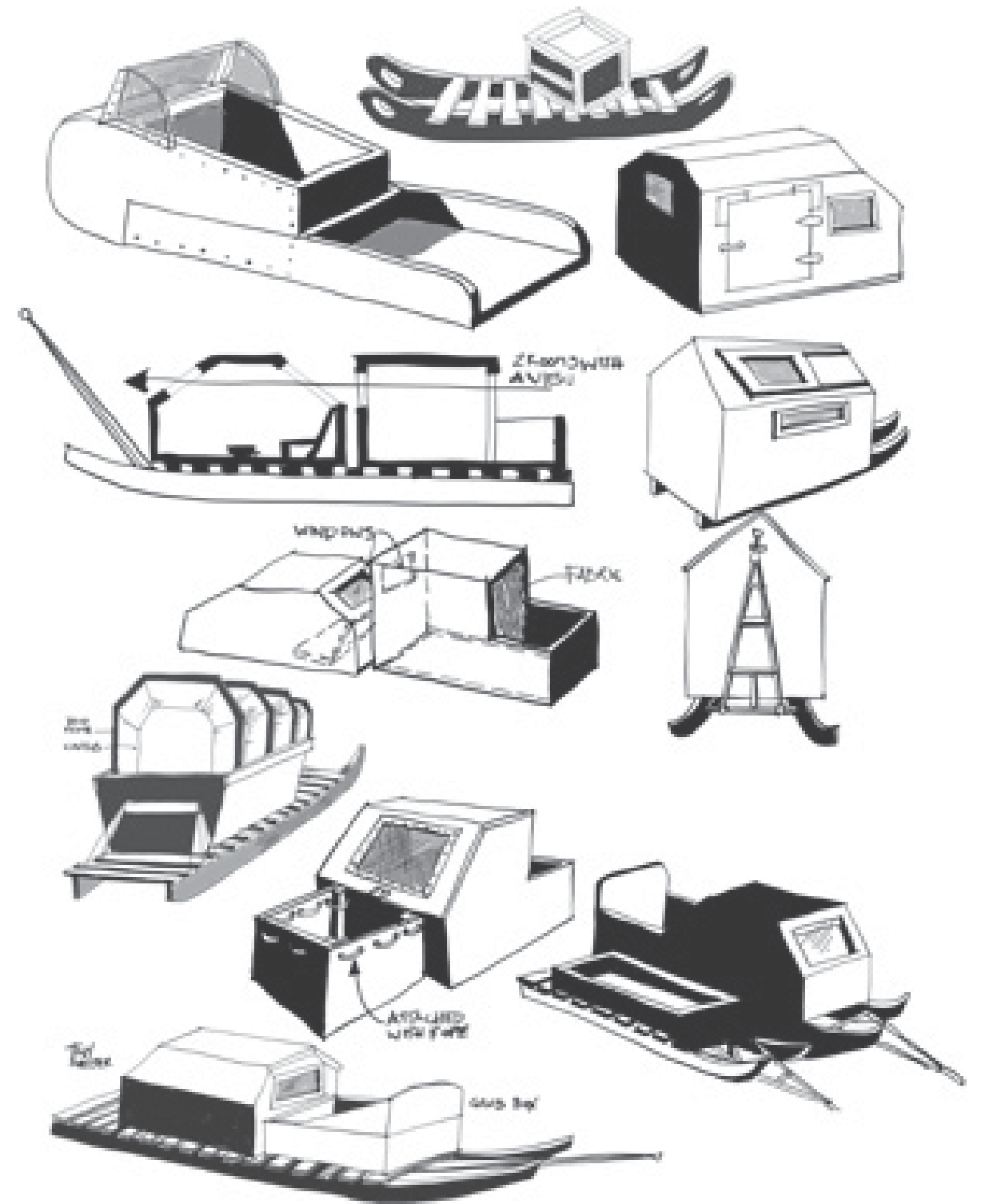


Figure 50. Typology of sleds (Havelka & Turgeon, 2015).

Assembling a Kayak

Kayaks were stored on snow or rock stands to prevent dogs from eating them. Skins and fat were used to patch them (Graburn, 1969).

According to Robert Kautuk: We used to build kayaks, traditional style, typical of this region—the way it was built without nails or hammers. We used sinews from seal or we used baleen. We used this for tying because it doesn't stretch, not like sinew. Baleen comes from whale and everything is all tied, so it was very flexible, like a living part of you. Well, I've made a perfect kayak; the way it was made was just perfect. At the new cultural school, they bought a kayak from England; they asked for the blueprints. The students afterward made one traditional kayak. Kayak is a person's name. (Semi-structured interview)

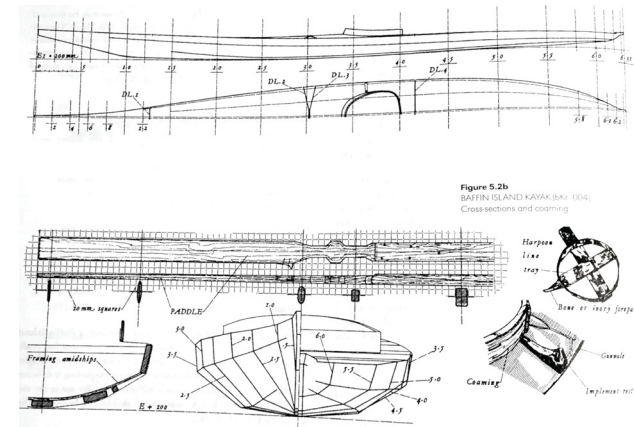


Figure 53. Clyde Inlet kayak from 1819 (Anonymous, n.d.).

Figure 52. Baffin Island kayak (Heath & Arima, 2004)

Figure 52 is a Clyde Inlet kayak, constructed between 1819 and 1820, on display at the Royal Albert Museum, Exeter, United Kingdom. Figure 53 illustrates the construction drawings of a traditional Baffin Island kayak (Heath & Arima, 2004).

Clothing

Clothing made for this climate follows similar principles, weighing only about 10 pounds, compared to twice to three times the weight of clothing worn by southerners in the cold. Using non-porous animal skins like caribou, trapping the air inside, provided perfectly adapted clothing for the climate, keeping in the warm air that will generally escape through seams and openings.³⁵ This air pocket would be loosely fitting with the fur side facing inward, allowing air circulation. Moreover, Inuit would make an amauti for women (figure 58-59), who would carry a child in their hood. The hood also allowed for neat packing.



Figure 54. Drying sealskins to make a sail (Anonymous, n.d.). Figure 55. Small children's sailboat childrens sailboat (Anonymous, n.d.).



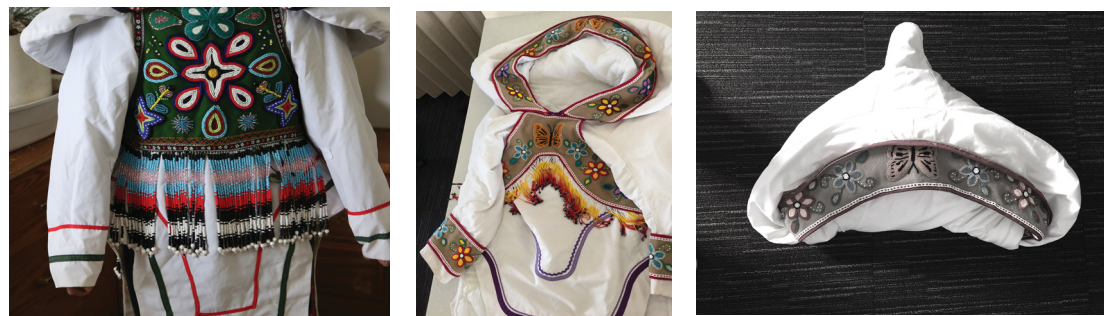
Figure 56. Preparing sealskins for clothing (Anonymous, n.d.).

³⁵ For a more detailed look at living in an iglu and Inuit traditional clothing, see Yue and Yue (1988).



Figure 57 a) Snow pants made of sealskins. b) Elder preparing the sealskin. This technique was taught at the Piqusilirivvik Cultural School.

Both Inuit men and women carry forward traditions of clothing production and sewing techniques, handed down from generation to generation over thousands of years (figure 57a-b). This would have been impossible without the development of the ulu knife. By making and wearing handmade traditional clothing, Inuit celebrate their accomplishments, show pride in being a part of a unique vibrant culture, and affirm their lasting connection to the natural and spiritual worlds of their ancestors. (Issenman, 1985).



Figures 58–59. Family heirloom, a beautiful amauti, made and embroidered by Clyde River residents.

Figure 60. Amauti rolled up in its hood.

Summary

The examination of societies inhabiting the eastern Arctic shows seasonality, social organization, and the technologies of mobility as the principal producers of “original space.” Significant imprints on the territory suggest that the mobility and technologies of Dorset and Thule cultures had a lasting impact on the architecture of Inuit groups until the 1950s. This indicates that the Arctic territory was made up of a network of relations—and these relations between places connected by a network of shared itineraries, bringing about connections between natural forms and social practices (Collignan, 2006).

Iconic dwellings differed in form (e.g., oblong, circular, and rectangular, with domes or flat-roof surfaces, and in clusters of varying sizes), but the internal layout of the individual unit remained consistent. In the case of mobile people, where movement occurs between places and in differently sized groupings, the reasons for displacement are multiple. The extended family, as the collective unit of production and social organization of the household, not only impacts placement and planning of self-built dwellings but is also central to the individual unit design and to the patterns of these units. These patterns have been consistent and characterize not only the Dorset and Thule but also the typical snow house, qarmat, and even tent.

Beyond the practical and sustainable house plans and patterns, a propensity to move between habitats creates a network of paths or trails, and warrants the pragmatic design of the qamutiq, seasonal clothing, portable tools and equipment. This material culture offers a set of knowledge and actions not only centered on the need to sustain a shared hunter–gatherer lifestyle but also holds the blueprint of an invaluable design practice that persists today. In this chapter, I have shown that the production of technologies to support this mobile lifestyle emerged according to its supposed accomplishments, its site of production, the materials at hand, the producer, and the user. Inuit are those skilled artisans and technical innovators across the entire Arctic territory, making their mobile lifestyle culturally meaningful to themselves, and much can

be learned from this cultural landscape. In the following chapter, “Government Space,” a new era and a new type of making and modifying this landscape began. I ask how these spaces affect the landscape, how they have been planned, and how the people afford them?

Chapter TWO

Government Space

The Setting: Domains and Dominions

Average temperatures on eastern Baffin Island range between -30°C in February to 10°C in July and August. Winds usually blow from the west and north with southerlies more frequent in summer. Wind speed varies with seasons: spring tends to be calm, summer brings moderate breezes, while fall and winter see the strongest winds, which create enormous snow drifts. The fjords and mountains facilitate gusts that can come from anywhere. Most precipitation falls from July to October. Snow continuously blankets mountainous regions but disperses along the coast from May to September. While the winter months may only see 2”–3” of snowfall, 6”–12” monthly are usual for September, October, and November.



Figure 61. From the individual resident-built traditional snow house and qarmat to the introduction of government multiplexes (Jaypody, 1983; Paniloo, 2017; Havelka, 2014).

For Inuit, this land and sea form an indivisible alliance and a psychic domain. “These coastal people” as Mauss (1906/1979) put it, “people of the water’s fringe,” (figure 62) are representatives of a culture and tradition that without this domain would disappear. The sea, the land, and their bounty are the focus of Inuit way of life. It is reflected in their art and crafts, and it characterizes their deepest connection to the world, a world now hovering between change and tradition.³⁶



Figure 62. People of the water’s fringe (Havelka, 2015).

³⁶ A recent exhibition by woman. artist. indigenous, Nadia Myre entitled “Scattered Remains” at the Montreal Museum of Fine Arts explores the vitality and creativity of indigenous communities that strike a balance between tradition and innovation.

Over the centuries, other nations, Vikings, whalers, soldiers, missionaries, and traders entered this domain but never remained long enough to menace an ancient way of life. In 1867, however, after four British colonies united to form a dominion, Inuit discovered that this new entity presumed their Arctic domain for Canada as well. Still, Inuit dominated the landscape with technologies and decision-making skills derived from the land. Although Arctic life imposed its hardships, Arctic dwellers celebrated their fate. According to Frank Carter, head of Canada’s federal northern administration in the late sixties, “Joy and pride flowed from that responsibility.”

³⁷ The introduction of foreign institutions and services, often in conflict with Inuit needs and desires, has diminished but not destroyed this agency.

Charlie on the advantages of the new houses: We first came to live here in 1939. We were urged to move to these houses. They said we got sick living in our sod houses. They said ice always formed inside our houses. That’s why we had new houses. They said we’d be less sickly. We were told to move. We got an oil stove instead of blubber lamps. But we just got sicker and sicker—because it was too hot probably. They kept insisting. It used to be warm [in a qarmat], but it is even warmer here now. That’s a real benefit. But despite the good—now we can wash everything yes—but we Eskimos never minded that much. Yes, the men don’t have to worry now; there is electric light and we’re delighted. Yes, the men don’t have to worry about that now. Homesickness, that’s the only thing now. (Semi-structured interview)

The previous chapter looked at traditional housing, settlements, and siting patterns. This chapter examines the impact of “government space”—the introduction of a housing system based on southern Canadian technological principles, planning practices, and cultural values.

³⁷ This part of the text is inspired by a document published in 1985 entitled *Inuit And Canada’s Ocean Management* by Frank Carter, who led Canada’s federal northern administration and helped plan and execute the transfer of much of that administration to the government of the Northwest Territories in 1967–1968.

This period, sometimes referred to as “engagement,” began following WWII and was triggered, some say, by an unlikely agent of change—US soldiers involved in northern defence. Until then, Inuit had mostly maintained their traditional way of life, using IQ, traditional guiding principles and technologies, to survive—even thrive. Yet, to Americans, Canada’s laissez-faire approach to Arctic dwellers was short-sighted, especially compared to the more engaged policies prevalent in Alaska and Greenland.³⁸ Spurred in part by these accusations, Ottawa decision-makers began sketching the outline of a new strategy. Aimed at raising Inuit living standards to levels comparable with southern Canadian rural villages (figure 63), the plan included delivery of healthcare, education, and housing to centralized locations. Hence, government experimentation in housing and housing delivery programs—government space—commenced (Anderson & Bonnesteel, 2010; White, Anderson, Morin, & Beavon, 2010).³⁹

One of those centralized locations was Clyde River. Like other northern communities, its residents have adapted to government space and centralized living in unexpected ways. Indeed, government space has become a foundation upon which Inuit have built, combining traditional design principles with contemporary materials to correct inherent building flaws. Further, Inuit in Clyde River are recreating a coastal community of residences in a “secondary type of settlement” (Damas, 1984, p. 129; Dawson, 1997, p. 219) where they can build their own cabins. In these instances, adjacencies echo Thule culture, and house plans replicate traditional snow houses. In this secondary settlement, people build in ways that are meaningful to them, with materials they now have at their disposal and proximities and locations they can control.

³⁸ According to Duffy (2014), one in 15 Canadian Inuit was literate at that time.

³⁹ A brief history of Federal Inuit Policy Development in Volume 7: A History of Treaties and Policies in the Aboriginal Policy Research Series. 2013, p157.

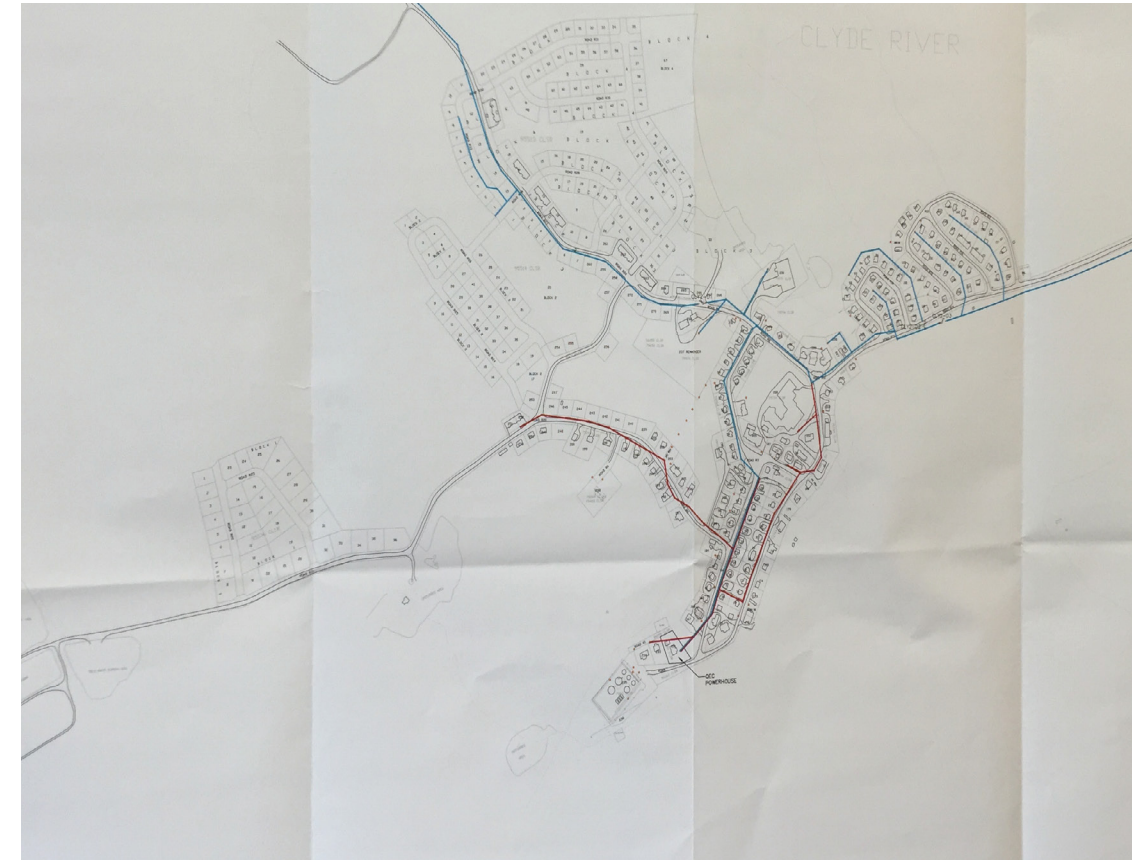


Figure 63. Southern Canadian style of suburban planning in Clyde River (Clyde River Hamlet, 2016). This includes pre-planned subdivisions and roads for the 196 preplanned lots.

Losing Control: Government Experiments

“The program for low-cost housing in the north is relatively new, and it is designed to meet unusual circumstances for which no previous experience in Canada provides a pattern. There are obvious problems in designing to fit the climate and customs of the people, and there are special problems of heating. The program must operate against a background of considerable economic distress. Therefore, it must be clearly recognized that every aspect of the program is subject to change” (Department of Northern Affairs and National Resources, 1965).

The transformation to government space began slowly. In the Clyde River region, the centers of gravity included the Hudson's Bay Company (HBC) trading post, built in 1923, and later the construction of the US military's Distant Early Warning (DEW) Line base at Cape Christian in 1955.⁴⁰ Drawn by trade, wage labour, health services, and often hunger, Inuit set about recycling materials from shipping crates and containers (figure 64) to build informal "shacks" (Duffy, 1988; Dawson, 1997). These hybrid creations, poorly insulated and often heated with makeshift devices, resembled traditional qarmats (sod and whalebone dwellings) in plan and functional space.



Figure 64. Beginning of a hybrid construction era, Resolute Bay, NWT (Lunney, 1956a).



Figure 65. Canvas tent, Resolute Bay, NWT (Lunney, 1956b).

In summer, tents remained the housing of choice (figure 65), but during the cold months, many Inuit would return to their qarmats or snow houses. Government officials and other observers noted that while Inuit did indeed maintain their traditional way of life, some of these structures had become unsanitary. At the same time, Inuit had become accustomed to the qallunaat (people of the south) presence and their ways. Inuit ate qallunaat foods, watched their films, and worked their jobs. As a result, by the 1950s, interest in living solely off the land had dwindled. Settlements expanded and became logical sites for nursing stations, trading posts, and schools (Rasing, 1994).

From 1945 to 1954, the government struggled to understand Inuit needs and develop appropriate strategies and policies. In 1954 the National Housing Act was created to promote various programs and to aid Inuit to afford various housing options (Yates, 1970). At that moment the US military, still involved in the DEW Line, criticized the Canadian government for not taking action based on growing health problems and the housing conditions its members saw in the settlements. Based on these and other observers' testimonies, a housing crisis in the Canadian Arctic prompted the government to respond quickly. Luring Inuit into the settlements for health benefits, education for their children, and for a family allowance diminished their hunt on the land in exchange for housing. Families whose children received academic instruction felt compelled to stay close to the schoolhouse. Some even built themselves qarmats or sod houses nearby to access the services, which in turn provided closer contact with the trading post.

⁴⁰ The DEW Line was a system of radar stations in the Arctic regions of Canada, the Aleutian Islands of Alaska, the Faroe Islands, Greenland, and Iceland for added security against Russian air missiles during the Cold War.



Figure 66. Idlook's campsite at Aloutseevik, Curry Island, Eclipse Sound, North Baffin Island (Anonymous, 1953). Wives and children are on the beach watching the hunters depart in the bigboat for the trip across the bay to the south where they will be put ashore to go on a 10-day caribou hunt. Note the sled dogs of the other hunters, and the two sod houses visible in the background.

Just after WWII, the newly created CMHC, then called the Central Mortgage and Housing Corporation,⁴¹ published a booklet titled *67 Homes for Canadians* (1947), a catalogue of house plans offered to veterans and other southern home buyers. These plans were far more elaborate than those proposed for the north. However, inasmuch as Inuit are also Canadian, that same year the CMHC began to offer financial aid to Inuit seeking to build their own homes, which was the beginning of a staggeringly long list of ineffective financing schemes, the likes of which continue to the present. It was also the beginning of government experiments with transposing a southern Canadian house type to a remote and largely unknown culture.

The Canadian government commenced experiments with many economical and transportable house typologies they considered “acceptable and adequate” (Yates, 1970, p. 45).

⁴¹ This was renamed the Canada Mortgage and Housing Corporation in 1979.

Some were generated by the Building Research Division of the National Research Council of Canada. Others simply came from Royal Canadian Mounted Police (RCMP) officials (Dawson, 1997; Nixon, 1984). Simple supports for the housing went from the box crib that was easily adjustable to the very expensive pile foundations (top drawing) and alternatively to the screw jack (figure 67). All new foundation types became too difficult for Inuit to adjust themselves. Contractors from the south were then required to make the high-cost adjustments periodically or in case of soil settlements.

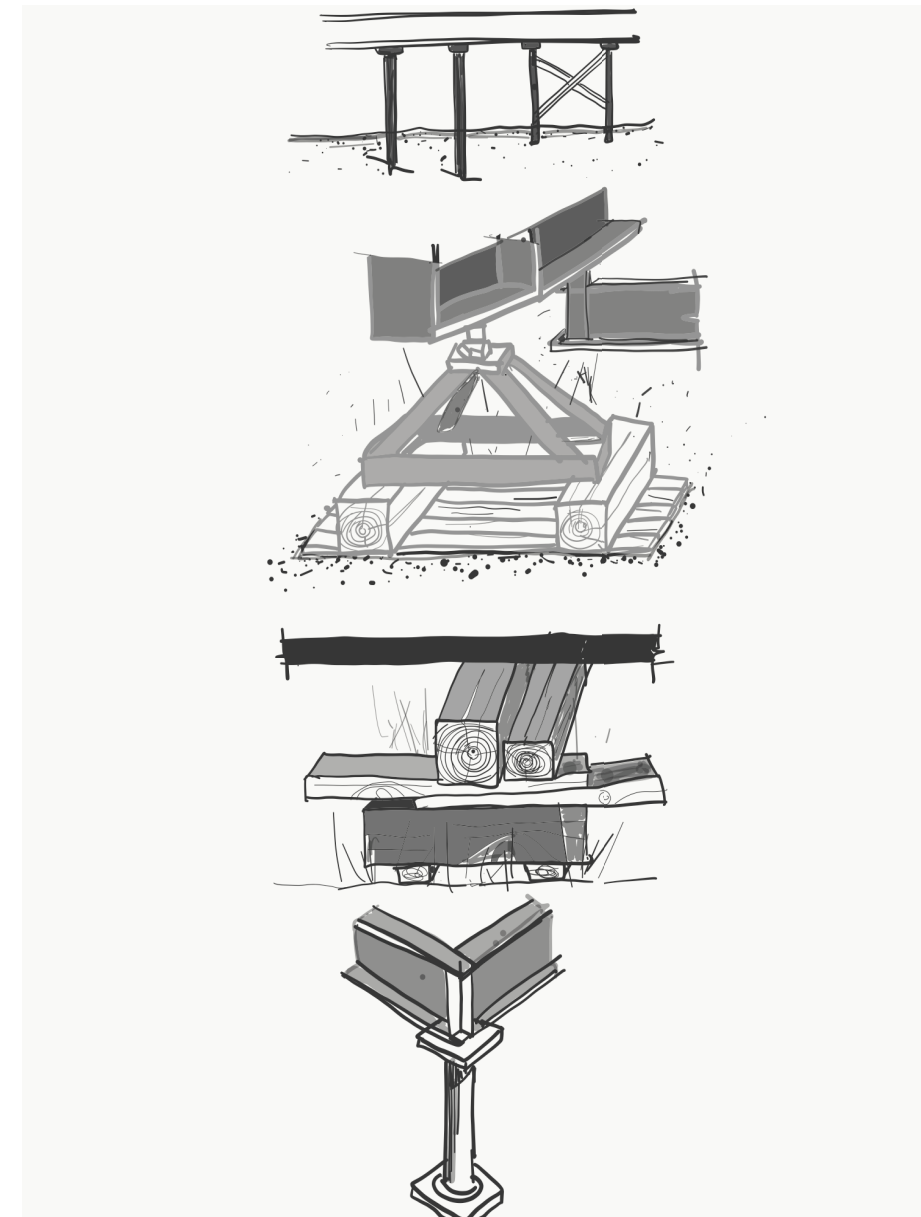


Figure 67. Post foundations, screw jacks, box cribbing, and piles (Turgeon, Havelka, 2017).

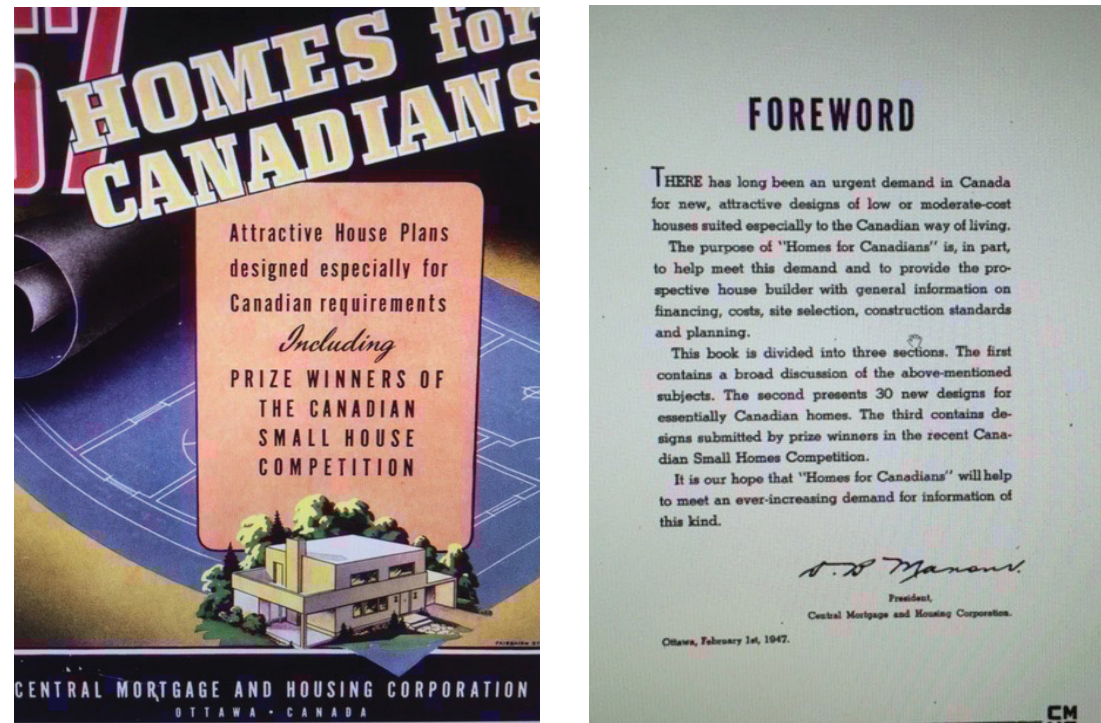


Figure 68. Cover and foreword (Central Mortgage and Housing Corporation, 1947). These were designed for the Canadian way of living and to respond to the growing demand for low-cost living.

The federal government took a pragmatic approach to housing. According to *Canada's Relationship with Inuit: A History of Policy and Program Development* (Bonnesteel, 2006), it aimed for a response compatible with the federal budget and that qualified as being portable, inexpensive, heat-efficient, and similar to the “traditional” Inuit house. In the previous chapter, I noted the design complexity of a traditional qarmat—its interior planning, orientation, and livability—and asserted its superior performance compared with the government’s initial housing solutions. However, the continuously growing influx of new families created urgency for housing, which eventually prompted the government to concentrate on the development of low-cost prefab housing solutions.

The government appeared willing to accommodate differing user needs. In practice, budget and options fell far short of that offered in their catalogue of homes for southern Canadians. Although government agencies in charge of this construction could purchase materials in bulk, the cost of materials transportation to the Arctic would more than offset any savings. Meanwhile,

heating remained expensive. Thus, faced with these added constraints, the government turned to less conventional approaches. For example, in 1956, a pilot program was set up in Cape Dorset to build iglu-shaped, Styrofoam domes, complete with wood flooring and 6” Styrofoam blocks that doubled as insulation.⁴²

These domes, some 14’ in diameter, were sized to accommodate a small nuclear family (Department of Northern Affairs and National Resources, 1960). Although the form resembled an iglu and reflected the cultural model, ultraviolet light degraded the Styrofoam blocks, which required regular maintenance. Nevertheless, Nixon (1984) said that many of the units were used between 1956 and 1959 (figure 69).



Figure 69. Iglu-shaped Styrofoam prototype referred to as plastic iglus (Anonymous, n.d.).

Because of its limited durability, the Styrofoam iglu option was deemed untenable. In 1957, work commenced on a quonset hut made of Styrofoam in Frobisher Bay (Iqaluit). The quonset

⁴² The Styrofoam was sufficiently translucent to allow light to enter the structure, even when seams were sealed and the exterior painted with an ultraviolet-light-resistant coating. Although the Department of Northern Affairs and National Resources (DNANR) conducted a variety of tests to improve the durability of these structures, they never became sufficiently effective to warrant distribution outside Cape Dorset, and their manufacture ceased after 1959. In 1957, the government conducted tests on several other types of structures at Iqaluit, including a Styrofoam-based structure with canvas walls called a quonset, and double-walled tents with wooden frames like those used by the RCMP (Duffy, 2014; Nixon, 1984).

was made of plywood arches fastened to sill plates and then covered with beveled Styrofoam panels. Both ends, also Styrofoam, were perforated with two windows and a door. Completely prefabricated, the 14'×18' unit cost \$450. Its barrel-vaulted structure was more popular with Inuit than the typical frame house models (Dawson, 1997; Nixon, 1984).

At about the same time, a group of RCMP officers posted in the Arctic experimented with a double-walled canvas tent. Like the Styrofoam iglu and quonset hut, government officials considered the double-walled tent a better fit with traditional architectural form (Dawson, 1996; Nixon, 1984). These tents also relied on wood frames with the double layer of canvas filled with an insulating particle named “aerator fiberglass” instead of the traditional heather Inuit gathered from the land (Nixon, 1984, p. 68). These canvas sheets for the outer skin were expensive (\$0.35/foot) and deteriorated with exposure to ultraviolet rays. That point notwithstanding, the ambition was eventually to develop less expensive versions of polyurethane nylons to make this type of shelter more accessible.

The Rigid Digit

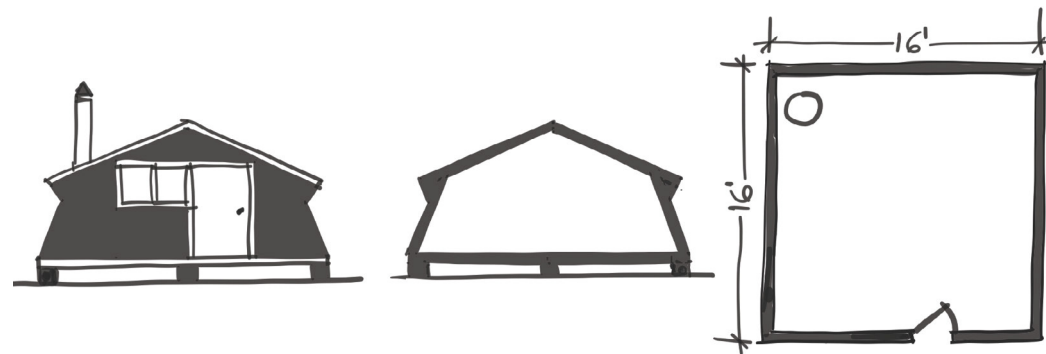


Figure 70. Rigid digit or model 319, Clyde River, 2016

Government officials selected wood as the building material, even though no indigenous wood can be found in the tundra and certainly not on Baffin Island. Nonetheless, in 1955, a small

dwelling, the last governmental attempt to replicate the traditional Inuit coaxial house pattern—the “Rigid Digit” or Model 319—was conceived (Dawson, 1996) (Fig. 70). The structure, insulated with rock wool and covered with a polyethylene vapour barrier, would enclose a single 16'×16' room—slightly larger than traditional skin tents and snow houses—with a wood floor and tin walls, using standard 4'×8' plywood sheets to avoid cutting and waste. The first “Rigid Digit” appeared in Iqaluit in 1958, with another 125 subsequently erected in 14 other northern communities.⁴³ In sum, it cost about \$420 to build, an inexpensive and suitable government expenditure for the Arctic.

The initial response was positive, and it became the recommended design for the first low-cost housing programs the government introduced beginning in 1959 (Dawson, 1997; Nixon, 1984). By comparison, the CMHC houses for southern Canadians at the time cost between \$6,000 and \$10,000 (Department of Northern Affairs and National Resources, 1965).



Figure 71. Remaining “Rigid Digit,” now used for storage.

“Rigid Digits” came with minimal furnishings—a cot, a table and two chairs, a sink, and an oil-burning stove (figure 71). With no plumbing, “honey buckets” (the euphemism for plastic toilet buckets) were picked up daily. Walls were relatively poorly insulated. The Department of

⁴³ This style of home provided no separate areas for quiet study or cleaning caribou skins. This flaw impeded the educational progress of Inuit children and their parents’ efforts at maintaining household hygiene (Nixon, 1984).

Northern Affairs and National Resources considered this prototype a compromise between the size and durability of an iglu or tupiq and a typical southern Canadian house.

Simultaneously, in Povungnituk (aka, Puvirnituk or POV), Nunavik, easy-to-build aluminium and plywood cabin-style dwellings were erected using basic wood frames, with plywood as an exterior sheeting and natural materials such as peat, moss, or sod as insulation.⁴⁴ The success of this simple, inexpensive construction was perhaps the most valuable example for the self-built cabins to come. Over time, with the variety of these government experiments, qarmats were almost completely eliminated. Today, only a few qarmat foundations exist in the region. Some examples of traditional qarmats are being built by elders and students in the Piqqusilirivvik Cultural School in Clyde River as a teaching tool to pass down essential ancestral building skills (Figs. 72–74).⁴⁵ The qarmat had several advantages. It was self-built, movable, and expandable to accommodate growing families, and it was part of an ancestral tradition extending back to the Thule era. The self-builders controlled the size, location, orientation, and proximity to other family members.



Figures 72–74. Teaching the traditional techniques of qarmat design to students at Piqqusilirivvik School, Clyde River.

In the years that followed, more elaborate housing solutions materialized. Government officials published a series of informational booklets to offer help in day-to-day living, security,

⁴⁴ An Atwell hut resembles the better-known quonset hut. The distinction lies in the materials. While the quonset is built with steel, the Atwell hut has wooden arches covered with insulated canvas. Both are about 20' wide but vary in length.

⁴⁵ Piqqusilirivvik is a cultural learning facility for Inuit, with programs in Clyde River, Baker Lake, and Iglulik. A division of Nunavut Arctic College, Piqqusilirivvik is dedicated to enabling the transfer of traditional culture and knowledge, via Inuktitut.

and home maintenance (Department of Northern Affairs and National Resources, 1965). These initiatives were intended to help “do something about it, even though housing is not the only problematic issue, all issues somehow seem to relate to housing” (Clyde River resident, semi-structured interview).

In 1955, waged laborers received a surplus US Coast Guard Atwell hut. Eventually, a series of alternate designs were made available, such as the Pulaarvik, the qarmat, the Tursuuk, the Angirraq, and standard plans 370, 395, 396, 397, 408, 409, 410, 411, 418, and 424. All these options cost \$2,000–\$5,000. As the respondent “Charlie” put it in Clyde River: “We started renting at \$2.00 per month. Later on... three-bedroom housing cost \$15.00 per month. We were told that it would always be this way, but today, it is now almost impossible to afford” (Semi-structured interview).

The Matchbox



Figure 75-76. Illukallak, the Inuktitut translation of “matchbox.”

In 1959, the government introduced the one-room matchbox, a minimally insulated flat-roofed wooden box only 12'×24'. Eventually, 125 units of the Model 370 were built in 14 Arctic communities (figures 75-76). These houses could be purchased for \$500 (Dawson, 1996; Department of Northern Affairs and National Resources, 1965). The subsidy offered was a one-time \$1,000 installment from the Eskimo Loan Fund and a housing loan that was

to be reimbursed at \$15/month for 20 years at 4% interest (Buchanan, 1981; Dawson, 1996). However, utility and service costs were not subsidized. The matchbox was locally called the “illukallak,” the Inuktitut translation of “matchbox.” This unit comprised a vestibule built within the volume of the box, a living area, and a bathroom. Walls and floors were built with plywood. Linoleum covered the floor. The roof was plywood on joists protected by Hypalon sheets or plastic sheathing.⁴⁶ The only special feature was the one exterior coloured panel. This was the most basic of shelter configurations yet perhaps the one that resembled qarmat designs the most in plan. Although there were welfare houses provided for free, the two room 336 square foot “tisi” (Model 411) was also prized. At the same time, Model 380, later referred to as the Model 512, for its 512 square ft of space, was introduced. Its floor layout was slightly different, but the choice of materials remained consistent. Ironically, the owner had to choose between having a slightly larger house or a bathtub. Still, without an inadequate cold porch, the ideal cold storage, many Inuit used the tub for storing large game and other country food.

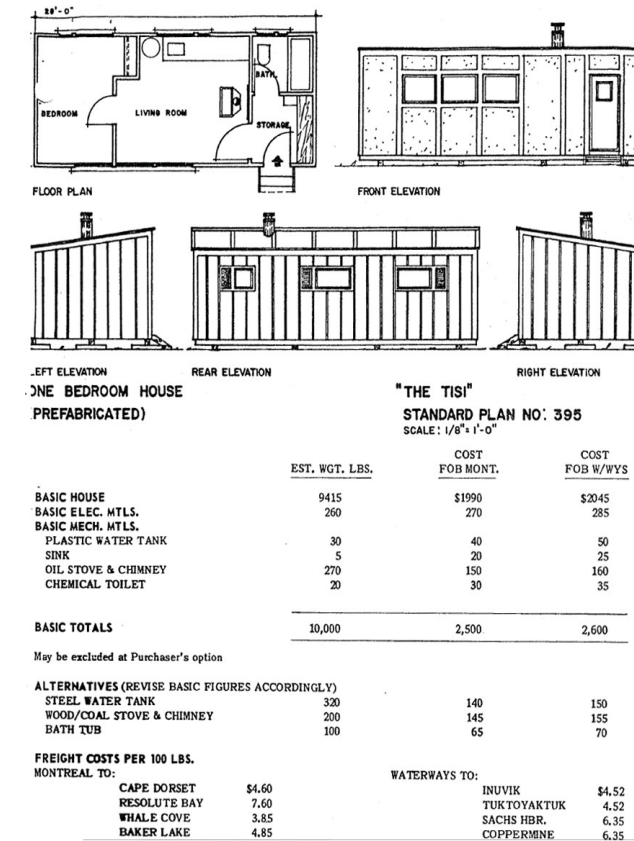


Figure 77. Standard plan 395 for 395 square feet of space.

In 1965, the Canadian government approved a housing program that would ship 1,560 matchbox houses to the North, and only eight to Clyde River. These houses were still expensive by Inuit standards and hardly better than traditional qarmats. Clyde River residents recall being promised good housing and low rents if they moved into the community.

An Arctic district survey revealed only 10% of the one-room houses had fewer than three occupants—most had five or more persons eating, sleeping, and living in one room (Buchanan, 1979). In one case, a single matchbox housed 11 people. Tuberculosis and other infectious diseases proliferated. Today, one matchbox remains in Clyde River. Nonetheless, in the mid-1960s, administrators across the region were still encouraging these ownership programs. The government subsidized part of the value of the house through the Eskimo Loan Fund. Unfortunately, poor insulation meant most structures were difficult to heat. Unpredictable Inuit income also meant that paying a mortgage and utility bills was virtually impossible. Thus,

⁴⁶ Hypalon (or CSM) is the trademark name for a type of synthetic rubber. Often used in roofing material and inflatable boats, Hypalon resists chemicals, ultraviolet light, and extreme temperatures.

the cost of utilities for Inuit had a substantial impact on housing programs and eventually on house designs. As Duffy (1988) stated, building professionals worked on the performance of construction materials to minimize the cost of utilities and building cost instead of improving on designs that responded to the cultural model of Inuit.

They were conventionally built, with typical 2×4 stud walls and 2×6 joist cathedral-ceiling roofs. The ceiling had an R-12 insulation rating, a slight increase from previous models. And this time, rent comprised a percentage of total income—from \$2.00 to \$67.00 per month for a three-bedroom house (Buchanan, 1981; Dawson, 1997; Duffy, 1988; Nixon, 1984; Redgrave, 1986). This three-bedroom 720-square foot unit (Fig. 78) was proposed as the new and improved design, intended to replace the older one-room buildings. These new experiments came with a kitchen table faced with a laminated plastic sheet, place settings for four people, cleaning equipment, cooking utensils, a double bed for the parents, and bunk beds for children (Dawson, 1997; Redgrave, 1986; Thompson, 1969). Despite all this, many residents had a persistent debt and were unable to meet their payments.⁴⁷

In 1966, the Department of Indian Affairs and Northern Development assumed responsibility for Inuit. The following year, the Government of the Northwest Territories (NWT) relocated to Yellowknife, where a new territorial civil service, the NWT Housing Corporation, would administer Inuit housing (Nixon, 1984; Thomas & Thompson, 1972). Soon after, the Territorial Ordinance was renamed the Territorial Purchase Program, and eventually the Northern Rental Purchase Program.⁴⁸ While it provided a few affordable solutions for NWT residents (Central Mortgage and Housing Corporation, 1970), the units' quality paled against housing for civil servants and remained inappropriate as an Inuit cultural model.⁴⁹ Still, Inuit were exposed

47 A statement made by Clyde River's Housing Association manager.

48 According to Nixon (1984), Inuit were not consulted about the design or manufacture of the government houses built in their communities. Heating and sanitation were often inadequate, rendering these houses little better than traditional Inuit homes in terms of their ability to lower mortality rates and the spread of respiratory disease.

49 Between 1968 and 1970, construction of federal government staff housing in the Keewatin region cost an average of \$39,730 per unit. During the same period, homes built for Inuit under the Northern Rental Housing Program cost an average of \$12,250 per unit (Duffy, 2014; Redgrave, 1985).

to new materials and new construction techniques. Even though few local residents were offered construction training or jobs, they gained new skills.

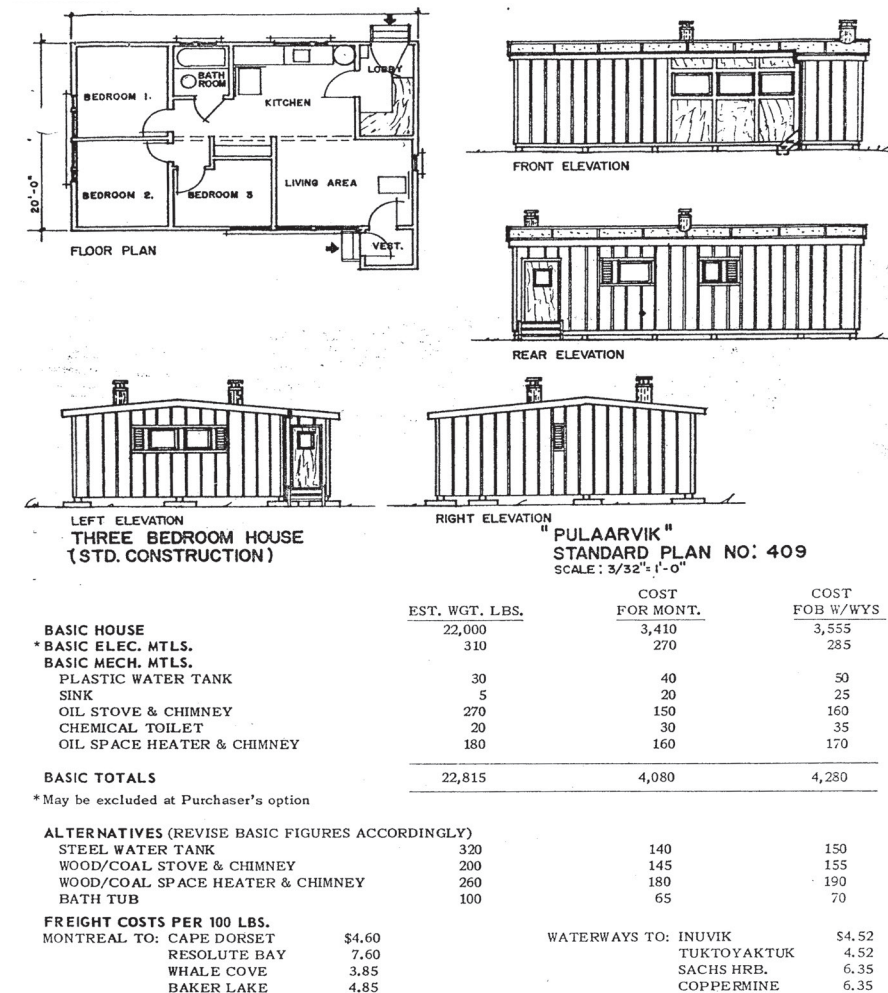


Figure 78. Three-bedroom house, 720 ft² (Department of Northern Affairs and National Resources, 1965).

Ultimately, however, the production schemes failed to accommodate the new settlements' pressing housing needs and growing populations. Overcrowded households led to unsanitary conditions, respiratory disease and rising infant mortality. Again, the federal government altered course, this time with an initiative aspiring to satisfy the needs of all northern communities by 1971. Among other things, it required that every tenant take an adult education program geared to help Inuit maintain and use their houses in the manner of southern Canadians.

The Northern Rental Housing Program

This began the Northern Rental Housing Program's second phase: home education aiming to teach Inuit how to maintain a household. C. M. Bolger (1967), director of the Department of Indian Affairs and Northern Development, wrote a report to outline the skills needed to use and maintain household appliances, equipment, and furnishings. These prescriptive measures were illustrated in booklets distributed to renters and homeowners.

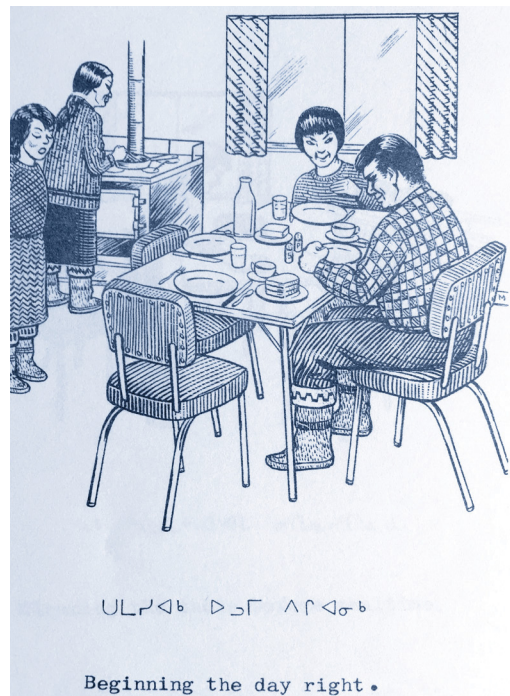


Figure 79. "Beginning the day right" (Department of Indian Affairs and Northern Development, 1968).

According to the 1972 report, Thomas and Thompson argue that the measures prescribed in the handbooks and classes assume Inuit have accepted southern Canadian values and practices. For example, men are responsible for harvesting animals and women for preparing and sharing food. In the report, Bolger (1972) wrongly assumes that Inuit women, like their southern counterparts, do most of the family grocery shopping (figure 80). However, the trading post phenomenon made men responsible for the purchase of non-traditional foods. Furthermore,

cooking classes involving multi-dish meals were attended by women and these meals required preplanning whereas Inuit typically served single-dish meals.

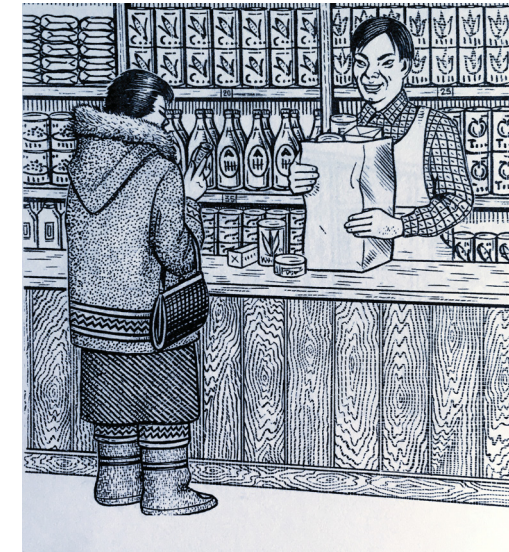


Figure 80. "Shopping for food" (Department of Indian Affairs and Northern Development, 1968).



Figure 81. "Getting food ready" (Department of Indian Affairs and Northern Development, 1968).

Traditional cooking techniques were used with non-traditional foods, which resulted in malnourishment (figure 81). Thomas and Thompson (1972) concluded that women used the classes more as a social gathering than as a learning experience. They also asserted that women lost their sense of personal esteem in the community since housework and household duties were

supposed to be part of the acquired skills prior to marriage. Therefore, phase two was thwarted by the lack of understanding of most traditional cultural practices in Inuit homes.

The rental program's third phase was the call to create local housing associations in each community to handle the day-to-day administration and maintenance of rental units (Buchanan, 1979; Dawson, 1997; Duffy, 2014; Redgrave, 1985; Thomas & Thompson, 1972). Created by the Department of Northern Affairs, these Inuit-run bodies would see individuals apply rent to home purchases.⁵⁰ They further acted as middlemen to deal with issues between Inuit renters and the government. This suggested Inuit had more control over their everyday lives. However, according to Redgrave (1985), housing topics were among the most antagonistic within a community and therefore these local associations were merely diverting the discontentment away from the government.

Since housing remained in short supply, housing association members were often challenged by family pressures, collusions, or affinities. Indeed, it was said that working for the Housing Association was the most difficult job in the community (Redgrave, 1985). Housing associations are charged with applying the rules of use for rentals. For example, tenants could not make modifications to their houses, such as demolishing a wall, adding a room, or painting. Some communities even banned carving within the house for sanitary reasons. With the multiple-bedroom layout of southern Canadian houses, Inuit who traditionally slept together in one room (Dawson, 1997; Nixon, 1984; Thomas & Thompson, 1972) have been coerced into using bedrooms for different age groups and genders (Dawson, 1997; Thomas & Thompson, 1972). The tendency is to use the rooms for storage or workspaces.

⁵⁰ Tenants within a community elected between three and nine housing authority members for a one-year term. The rental program, which subsidized the cost of heat and electricity, discouraged Inuit ownership of homes; ownership of homes required full payment for these services (Duffy, 2014; Nixon, 1984; Richardson, ; Thomas & Thompson, 1972). Housing was initially segregated, with government employees restricted to certain types of housing and neighbourhoods. These rules were lifted in the late 1960s, facilitating the development of friendlier relations among Inuit and government employees based on their neighbourly accommodations (Duffy, 2014; Richardson, 1976).

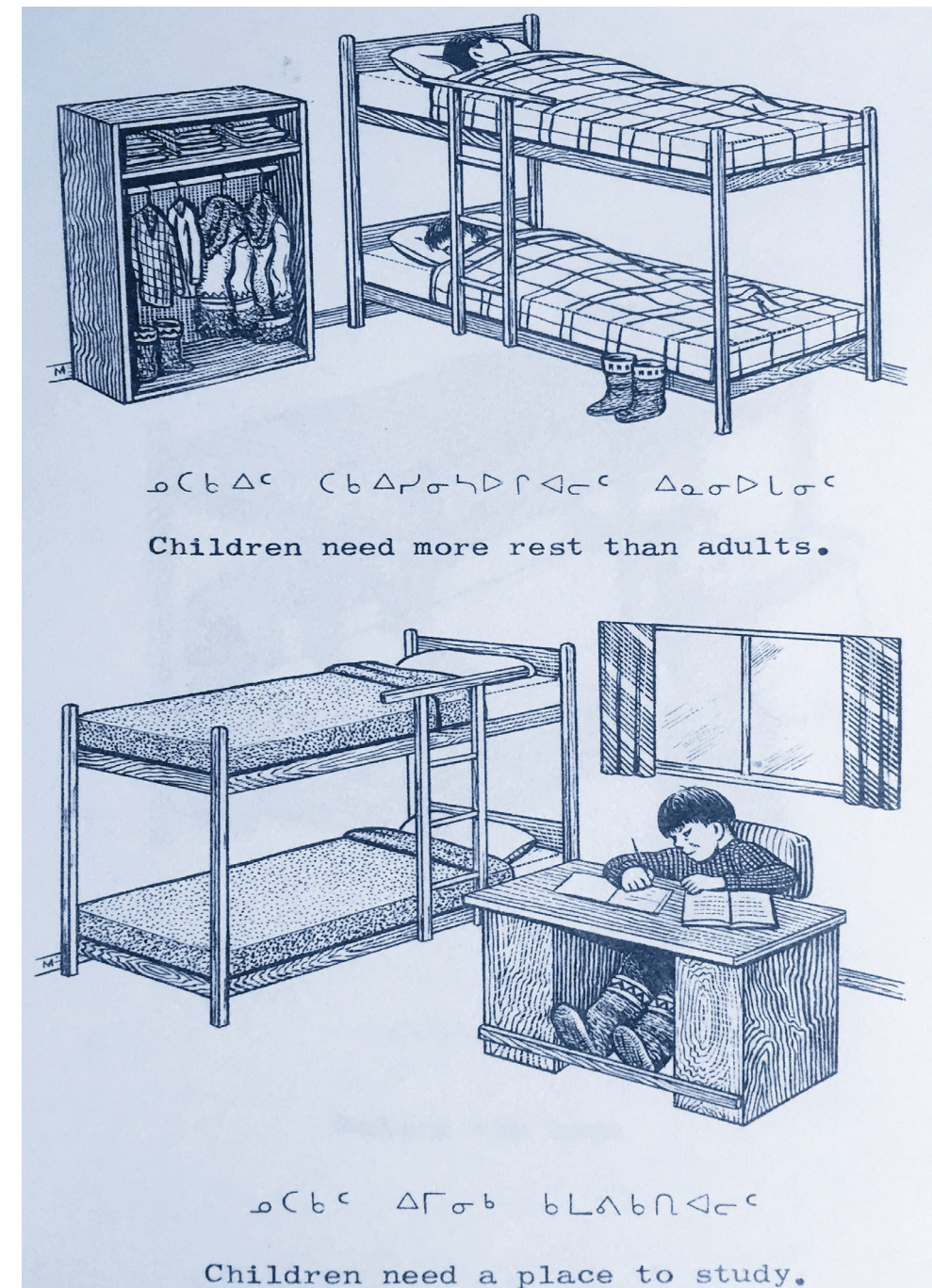


Figure 82. "Children need separate bedrooms from their parents" (Department of Indian Affairs and Northern Development, 1968).

The use of domestic space for traditional activities, such as bringing animal harvests into the living room for butchering, storing seals in the bathtubs, and preparing mechanical and hunting equipment indoors, was also prohibited. These culturally different yet forbidden ways of

using space were closely supervised by housing officers. Tenants who refused to adhere to these rules would be evicted or relocated to smaller units (Buchanan, 1979).

In the 1970s, other programs were introduced, still intending to coax families from rental assistance into homeownership. These initiatives were spurred, in part, by studies that showed other Canadians lived 2.5 times longer than Inuit (referred to as Eskimos at the time) did, and that 2.5% of Inuit developed tuberculosis (Tait, Nepton-Riverin, & Clark, 2007).

Despite upgrades provided over the years, there remained obvious differences between local residents' accommodations and those meant for qallunaat (Dawson, 1997; Nixon, 1984)—distinctions which sparked significant tensions (Dawson, 1997; Thomas & Thompson, 1972). A good example is the cold porch, which the Department of Northern Affairs referred to explicitly in their brochure as an ideal place for additional cold storage. Although few Inuit houses were ever supplied with large enough cold porches to accommodate storage units as indicated in Figure 83, the administration mistakenly anticipated the space would be large enough.



Figure 83. “Using and improving the cold porch” (Department of Indian Affairs, 1968, p. 65)

“It provides a place to shake snow from clothing and boots. Outside clothes may be hung here. Overshoes could be left here. This would keep the housecleaner and tidier. It would also eliminate the danger of falling linoleum floors as the bottom of overshoes will be wet from the snow” (Department of Northern Affairs and Northern Development, 1968, p. 65). These specific instructions had to assume the entrance porches were large enough to accommodate these actions.

Inuit participation in the design process was never considered. While ordering in bulk meant substantial government cost savings, homeowners and renters saw little benefit to their own bottom line. Serious inadequacies in the design of housing, inadequate building materials, and building practices incommensurate to the community needs became prevalent (Dawson, 1997; Strub, 1996). Because of the lack of regard to entrance position, snowdrifts often covered entrances and drafts seeped through walls and floors. Beyond these faults, overcrowding continued to contribute to high infant mortality rates, the spread of tuberculosis, as well as alcohol abuse and misconduct (Thomas & Thompson, 1972).

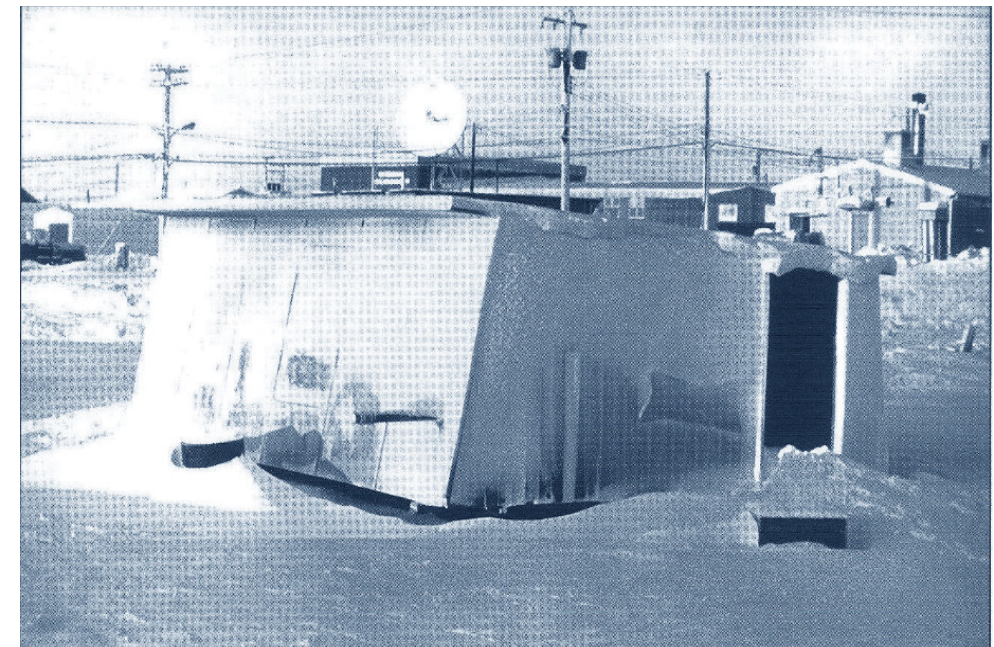


Figure 84. a) Example of the *Angirraq* house type introduced by the federal government at Cambridge Bay (Bushell, u.d.).

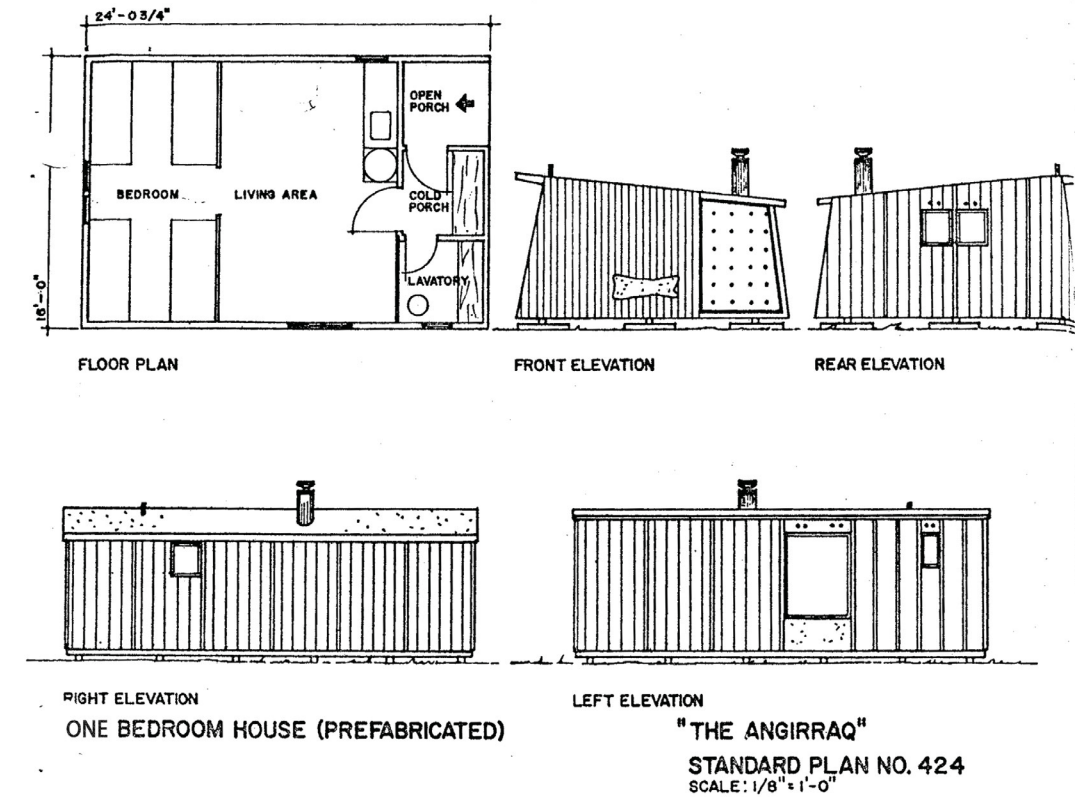
The Need for Production in Series

The popular “matchbox” was an easy and inexpensive prefab to produce. But it also proved inadequate regardless of the new housing rental programs. Even though residents could purchase the 5×10 m wood construction through instalments or with rent-to-own programs, the houses were still too expensive for most.⁵¹ While more than 1,560 were shipped north, overcrowding remained a problem. Meanwhile, the rapid weathering of the materials was hardly an improvement to the makeshift qarmats people had previously been building by themselves.

Redgrave (1985) and Dawson (1997) echoed the fact that overall only 10% of the one-room matchboxes surveyed housed fewer than three inhabitants. They usually housed five or more persons in the room. In Clyde River, according to the Qikiqtani Truth Commission, there were 18 one-room houses in 1965, for a population of 238. This prompted the construction of the 384-square foot prefabricated Angirraq or Model 424 (Fig. 84), which was designed by military groups and tested by the Tower Company in Quebec. This design was more resistant to the harsh Arctic climate but even smaller. Resembling the “Rigid Digit,” only a few prototypes were ever constructed. Today, any remaining matchbox Model 512s are mostly used as sheds for storage or workshops.

Sized with heating costs in mind, this tiny rectangular house still could not accommodate traditional Inuit food preparation practices. Meanwhile, despite its dimensions, high fuel and other household costs led to growing defaults. Overcrowding continued to erode residents’ health and social welfare, and larger three-bedroom units such as the Northwest Territories Rental (NTR) and Uruaq appeared.

51 Many Inuit opted to buy the smallest 280 square foot model homes. By 1965, 800 Inuit families had signed agreements to purchase homes on payment plans. Yet 90% had defaulted on payments and half made only one payment toward the purchase (Nixon, 1984; Richardson, ; Thomas & Thompson, 1972).



ONE BEDROOM HOUSE (PREFABRICATED)

	EST. WGT. LBS.	COST FOB MONT.	COST FOB W/WYS
BASIC HOUSE	10,865	1,910	2,105
*BASIC ELEC. MTLs.	300	150	165
BASIC MECH. MTLs.			
PLASTIC WATER TANK	30	40	45
SINK	5	20	20
OIL STOVE & CHIMNEY	200	150	155
CHEMICAL TOILET	20	30	35
BASIC TOTALS	11,420	2,400	2,525

*May be excluded at Purchaser's option

ALTERNATIVES (REVISE BASIC FIGURES ACCORDINGLY)

STEEL WATER TANK	320	140	150
WOOD/COAL STOVE & CHIMNEY	200	145	155
BATH TUB	100	65	70

FREIGHT COSTS PER 100 LBS.

MONTREAL TO: CAPE DORSET	\$4.60	WATERWAYS TO: INUVIK	\$4.57
RESOLUTE BAY	7.60	TUKTOYAKTUK	4.57
WHALE COVE	3.85	SACHS HBR.	6.35
BAKER LAKE	4.85	COPPERMINE	6.35
GRISE FIORID	7.60	SPENCE BAY	8.40
FORT CHIMO	3.10	AKLAVIK	4.57

NOTE: These figures are subject to change February, 1965.

Figure 84. b) The Angirraq, or Model 424 prefab one-room house model (Department of Northern Affairs and National Resources, 1965).

The NTR (Northwest Territory Rental)

The earliest post-matchbox houses, known as NTR units, date from the early 1970s. These single-family houses built along the shoreline in Clyde River were also referred to as HBC houses. Land availability allowed for relatively low density, and these prototypes had ample space around them, something Inuit cherish both for ease of parking their various vehicles and for adding or building outbuildings, workshops, and mobile cabins. Each house had a view to the bay and two entranceways, each with a porch. Typical layouts were basic, essentially reduced versions of small southern bungalows (figures 85-88). In addition, little consideration has been made of the NTR's positive attributes such as the box cribbing (simple to adjust), the two porches for added storage, and the simple construction that is easy to change or repair compared to the newer designs with more complex construction techniques. In fact, during a 2001 Nunavut Assembly meeting, concern about the NTRs came to the fore:

We are always thinking about the houses that were built in the early 70s, the NTRs. They are tiny today and they may be lived in by nine people, which is not good for social life. They have a little stove, and they put the washer and dryer beside the stove. When the washing machine or dryer work while trying to cook and set a little table, the space is crammed. People have to live with these realities every day, but we still call them three-bedroom houses. They should not be called three-bedroom houses. They should be one-bedroom units, because living rooms are smaller than sleeping areas. Living conditions have to be improved. (O'Brien, 2001, p. 464)

As a positive counterpoint, these houses faced the road and were parallel to the beach. This layout recognized the importance of two entryways: one facing the street and bay while the side door faced the neighbour, thus creating a public “in-between” space.

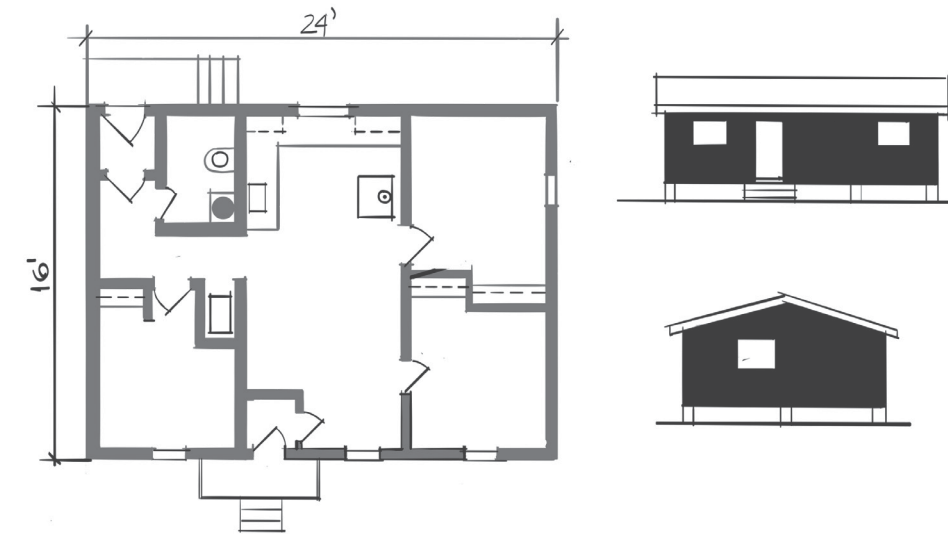


Figure 85. Plan of 1970s houses: The Northwest Territories Rental unit.

During winter, residents often blocked off east facing porches and used the space for work or storage. These houses were poorly insulated and required numerous renovations, their no-nonsense crib foundations⁵² and double entrances allowed users some degree of flexibility. Some Clyde River inhabitants who managed to purchase their homes removed a third bedroom wall to extend the family living area. The living-room windows face the water. The porch, with a compromised orientation, is used for additional storage. It is sealed off, while the other porch facing the “in-between” is in use and allows for ample vehicular parking.

Eventually, the government moved to an even more economical housing model with a more limited area to park vehicles and to build around the house: the duplex. Since then, most social housing developments have comprised a series of identical town houses, with the 10-plex now the model of choice. This has resulted in a much different urban development, featuring long wooden stairways to access the second floor. These house designs have one fire exit as a main entrance and vary in size from 420 square foot for a one-bedroom unit to 640 square foot for a two-bedroom unit.

⁵² The crib foundation, cribbing, or box crib is a wood structure used to support a house and is an easy and affordable solution for permafrost due to the easy adjustability.



Figures 86–88. Northwest Territories Rental units, Clyde River, from the 1970s (Havelka, 2014).

Two Arctic Utopias

Experimental approaches to Arctic urbanism and planning sometimes show a tendency to turn the northern city into an urban utopia through an idealization of a “pure life” under harsh conditions. One well-known example is Swedish visionary architect Ralph Erskine’s project for Resolute Bay. Another is German architect Frei Otto’s generic 1970–1971 Proposal for an Arctic City.

Commissioned by the Canadian government to plan a new town, Erskine’s radical project resembled a walled city with a multi-story enclosure that wrapped around three sides of a town center. It was unique in that it relied upon a coordinated participation of future Inuit residents (the imbalances in power between the qallunaat and Inuit troubled Erskine) who were asked about the location of the new town and about housing preference (i.e., the type of units they preferred: apartments or free-standing houses) (Dawson, 1997).

The project consisted of a continuous C-shaped wood plank building that would house the town hall, an HBC store, a hotel, and apartments for the white employees in the town. On the inside of the block, freestanding houses protected from the wind and snowdrifts would be built for the community of Inuit. Erskine intended to provide a sense of belonging, shelter, and

distinctiveness, and construction commenced in 1974. Soon after, however, a slowdown in oil and gas exploration led the government to withhold funding, and the project has been on hold ever since (Collymore, 1994).



Figure 89 a). Ecological Arctic town, Resolute Bay (Erskine, c. 1973).

The partly built project received mixed reviews. One Inuit family that moved into the apartment units for a short time disliked the shared walls and skimpy storage space, soon moving out (Figure 89b). It was Erskine’s attempt to engage with the community, to create an “environment that would promote interaction... to ethnically integrate an Arctic town” (Marcus, 2011). As Dawson (1997) pointed out, this rather odd project remains commendable among the attempts to address cost, transportability, and cold-climate performance, but fails in its planning early on by placing



Figure 89 b). Apartment complex built surrounding the single detached houses, section of Ecological Arctic town, Resolute Bay (Erskine, c. 1973).

Inuit families were in single detached houses at the center of the apartment complex design, hence maintaining segregation. Furthermore, the horseshoe design blocked the wind into the interior court and prevented Inuit from using the wind for snow clearing, a practice commonly used in the Arctic (Marcus, 2011).

In 1970, architects Frei Otto, Otto Warmbronn, Ewald Bubner and Kenzo Tange proposed building a two kilometre wide translucent dome which would provide a climate-controlled environment for up to 40,000 inhabitants. Built on a circular ring-beam foundation, a net of steel cables covered with a double layer of transparent foil would be inflated and condition the interior like a giant greenhouse. Shaped to minimize the effects of snow accumulation and harsh winds, nuclear energy supplied heat and ventilation within (figure 90).

Frei Otto, who died in 2015, had a lifelong passion for tensile and membrane structures, efficiently blending cable, fabric and air to produce radically lightweight building solutions, among the finest of which was the West German Pavilion at the Montreal Expo in 1967.

Otto's approach has had a lasting impact on many aspects of design. But his Arctic City concept went nowhere. The space-age approach to extreme climate was, simply, itself too extreme, manifesting a mindset that saw technology as a way to obviate negotiation with nature, suppressing natural conditions rather than appropriating them to one's advantage (Figure 90).

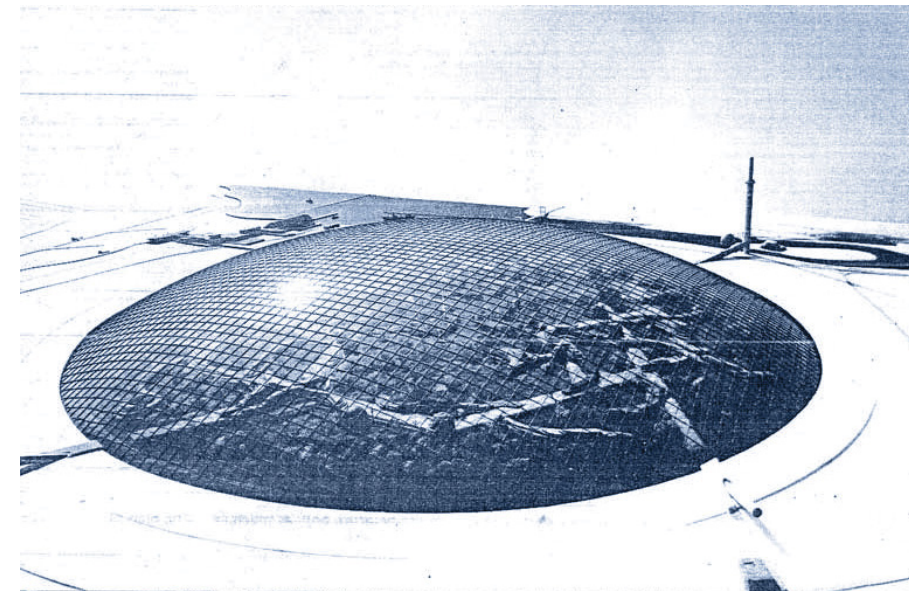


Figure 90. The Arctic city, a megastructure with a controlled interior climate to moving sidewalks where cars and pedestrians circulate on different levels.

Design and its discontents

Two decades after the success of the CMHC's 1947 small-house design catalogue, a new wood-frame construction manual published in 1967 proved equally influential. An essential on-site resource, it helped reduce a southern single detached house's construction time from 2,400 to 950 man hours. The CMHC focused on low-cost social housing, squeezing lot size and density. Southern Canadian housing standards grew to be among the world's best (Yates, 1970). As noted, in the north, however, throughout the 1960s and 1970s, government experiments fell short of expectations. Inuit still had to build their own shelters to satisfy the growing population, often by

combining tents, packing material, metal scraps, tar paper, and scrap lumber. Consequently, Inuit began to verbalize discontent with their relationship to the government agency and the desire to gain control:

Here's what I think—that this is the land where we were born. The Whites weren't born here, so why is it that they try to have all the authority over this? I've always loved this beautiful land. We never thought otherwise. Now they say we're only borrowing it. When I first heard that, I was utterly miserable. These whites here...I think they're merely visitors. They always go home to their land. If this was their land, they'd stay here. I think it's the Whites who borrow the land. The Whites here are the borrowers because it's the people's land (Jospeh Illauq, qtd. in Wilkinson, 1953).

On May 25, 1993, following 13 years of negotiations, representatives of the Government of Canada, the Government of the Northwest Territories, and the Tunngavik Federation of Nunavut, now Nunavut Tunngavik Incorporated (NTI),⁵³ signed the historic Nunavut Land Claims Agreement (figure 91). The largest Aboriginal land claim settlement in Canadian history, the agreement, in conjunction with the Nunavut Act, gave Inuit of the central and eastern NWT title to a separate territory called Nunavut. Barry Dewar (2009), a key member of the federal negotiation team, has described these two initiatives, which included various financial considerations along with the formation of management groups, a framework through which Inuit can build their homeland and define their territory: “the culmination of a generational effort by Inuit to reassume control of their destiny as a people through recognition of their Aboriginal land rights, and through political control provided by a new territorial government within their homeland” (para. 1).

⁵³ NTI is the territorial Inuit organization mandated to defend the rights and promote the interests of Nunavut Inuit and to carry out Inuit obligations under the Land Claims Agreement. NTI programs include an Inuit elders' benefit plan, a harvester support program, and a bereavement and compassionate travel program. It also provides financial support to Inuit development corporations and community economic development organizations, and to Nunavut Sivuniksavut (a post-secondary educational program). NTI maintains its head office in Iqaluit and regional offices in Rankin Inlet and Cambridge Bay, as well as a small office in Ottawa.

Nunavut Land Claims Agreement

- On July 9, 1993 the *Nunavut Land Claims Agreement (NLCA)* was signed by the Inuit (represented by the Tunngavik Federation of Nunavut, now Nunavut Tunngavik Inc. or NTI), the Government of Canada and the Government of the Northwest Territories. The *NLCA* was the basis for the creation of the new territory of Nunavut, which was officially established on April 1, 1999.
- Nunavut covers a geographical area of 2.1 million sq. km. (20% of the land mass of Canada) with a population of more than 28,000 people living in widely dispersed communities. It is estimated that by 2020 the population of Nunavut will be 44,000.

Figure 91. Nunavut Land Claims Agreement (Nunavut Surface Rights Tribunal, c. 2016).

How the Transition Played Out in Clyde River

The architecture of Clyde River is layered, and so is its history. It comprises mostly government-built houses and is laid out like a typical small postwar community. In the “old town” neighbourhood, modest housing units line broad unpaved roadways that parallel the shore. These official roads provide access to the airport, nursing station, school, two six-room hotels, the fuel farm and electrical plant, and a new cultural learning facility. Duplexes, triplexes, quadraplexes, five-plexes, and even a pair of 10-plexes bank intersecting roads that contour the

gentle slope upward, away from the water's edge toward the northern store and the surrounding "new town" area. The section between the old town center and the learning facility to the north is called the "old new town" and is configured around two U-shaped streets lined with a mix of single detached houses and rows of five-plexes built in the last 20 years. And virtually every government house features porches and other self-built additions and outbuildings. Meanwhile, its beachfront huts, workshops, storage sheds, and mobile cabins create another layer and dot the "in-between".

Clyde River or, rather, Kangtagaapik did not start this way. Its original site had been across the bay. But in 1970, residents were relocated after government authorities concluded it ill-suited for expansion. Concurrently, the RCMP detachment transferred from Cape Christian while an airstrip was built north of the community.⁵⁴ By 1974, the United States Coast Guard had abandoned its Cape Christian post, the remnants of which later becoming an important source of building materials. Seasonal camps remained at the old site. And by 1970's end, most Clyde River inhabitants lived in year-round homes. Inuit in the newly established government settlement had to generate cash to pay rent, buy goods from the HBC, and maintain their snowmobiles and motorboats. But jobs remained scarce during that period (Barber, 2015). While qallunaat agencies employed some Inuit, the main source of income still came from harvesting seal and other animals (Wenzel, 1989).

⁵⁴ The DNANR delivered a school to Clyde River in 1960. In 1963, Clyde River comprised the HBC and Department of Transport buildings, four low-cost Model 370 Inuit houses, two DNANR houses, a warehouse, the powerplant, and a school. The previous year, two incomplete kits for eight-bedroom hostels were delivered but never built. Additionally, four low-cost Inuit houses were delivered but never constructed. Clyde River seemed to be expanding until September of 1963, when the Assistant Administrator of the Arctic, R. L. Kennedy (1963), wrote the Director of the DNANR regarding poor building conditions in Clyde River. He noted the highly saturated muskeg soil that overlaid permafrost and the lack of a nearby source of gravel. Future expansion would be limited, he reported, and the search for an alternate town site began. By 1967, F. J. Williams Associates Ltd., a Toronto-based engineering firm, concluded the best location for the new town site would be the western side of Patricia Bay. The selection of that site was discussed with the "departments involved and with the local residents" and was deemed satisfactory to all (Stairs, 1966). However, while the old site became wet and swampy during summer, the new site was battered by winds and snow during winter (Hodgson, 1969).

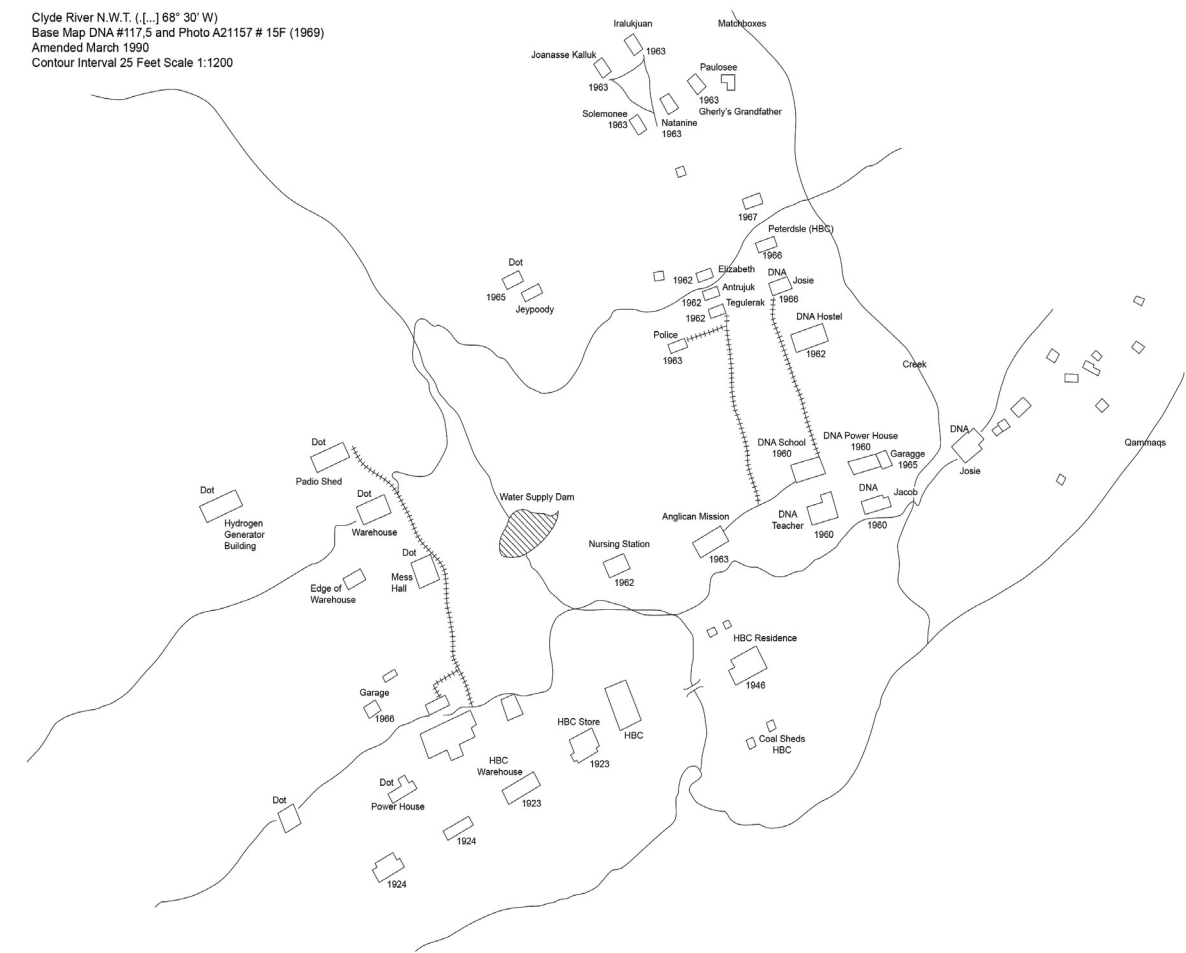


Figure 92. Redrawn map of Old Clyde River (Giraldeau, 2017).

This shows when the community was established on the southeast side of the bay. The first Hudson's Bay Company (HBC) post amid a small grouping of qarmats and built in the early 1960s around the HBC buildings was built in the 1920s. This siting was well sheltered from the winds due to the higher elevations beyond it that acted as a shield. Notice the rectilinear placement of the HBC buildings following the edge of the coastline while the qarmats have entrances facing south or east for better snowdrift protection (figure 92).

Today, Clyde River serves as an active weather station, and as an example in locally run not-for-profit educational facilities such as the Piquisilirviq Cultural School and the Illisasisiq community center, where some community residents have found full-time or part-time

employment. Several other residents generate income by guiding tours, teaching, photography, hunting, and carving, or through government employment.

Clyde from the Inside

On my first Clyde River field trip, I documented the experiences of people living in both government and private houses. I also interviewed the local housing association manager to understand an administrator’s perspective. Interviews took place in offices and homes in April and May of 2014 under conditions established by the Nunavut Research Institute and McGill University’s Ethics and Compliance Committee.

My first interview in April 2014 was with Marie, a woman who lived with her husband and five children in a rented 1970s NTR (Figure 93). Each one was old enough to remember living in traditional houses when Clyde River was on the other side of the bay. She had only one complaint about her house: not enough space. Her husband had closed the second access door to use the side porch as a tiny sculpting workshop. The front door, facing the road, separated a tiny porch and living room. The exterior door was permanently open, with the second door as the only transition between warm interiors and the cold exterior.



Figure 93. Inside a Northwest Territories Rental unit.

My next interview in April was with Levi, a widower, an “unsympathetic user” (Dawson, 1995) of his small two-bedroom unit in a 10-year-old five-plex, and the interview was conducted in his unit. He had lived there for three years, downsizing after his wife’s death left him unable to stay in his house. He was, unusually, not shy to complain about his new circumstances, and this elegant man began by pointing out a window and door knob that needed replacement—items for which he had been waiting over two years. He described how the thin walls made it easy to hear neighbours—an evident fact. He said that he would like more light in the kitchen and an outbuilding for storage. He also said the living room and kitchen were too small (Figure 94). Given the opportunity, he would remove the kitchen island, making room to butcher a large mammal carcass, and a bigger living room would let his extended family camp together when visiting.



Figure 94. Inside a new five-plex, facing the entryway. The only windows to the outside are from the living room and bedroom area.

Renée, another respondent and a mother of three, was more willing to share her hunting story than to speak about her house. This finding is revealing and attests to the ongoing importance of the hunting culture as part of Inuit identity today.



Figure 95. Inside a privately-owned four-bedroom two-story house. “But we aren’t allowed to make any changes; we can’t even paint the walls” (Respondent, semi-structured interview).

She recently killed a polar bear. “Everybody knows,” she said with pride. Its fur was prominently displayed on a hexagonal frame alongside her parents’ house’s porch (figure 96), a practical place to display the trophy in sight and remind all passersby that a great hunter lives there.



Figure 96. Hexagonal frame for polar bear hides, propped up on a building façade.

I conducted our initial formal interview in the kitchen of the tall grey two-story unit. Built in 1976, her parents had lived there 20 years. She and her family were temporary guests while

her own home was renovated. The five-bedroom apartment, normally home to five inhabitants, currently sheltered 13 people.

She has lived for nine years in a three-bedroom rental, now shared with her boyfriend and her children, ages four to 18 years. Two children sleep in the living room. Like the aforementioned elder man, she wished that the room were bigger to better accommodate family gatherings. She said her children wanted to draw on the stark white walls, but it is forbidden. She had done what she could to keep her space lively, lining walls with colourful travel souvenirs, crafts, and a variety of plants.

Joanna and Joatamie own their home, an old NTR. A proficient handyman, he converted one of the two porches into a storage room, with the side porch now the home’s main entrance. He had also remodeled the previously three-bedroom unit, extending the living space for large gatherings. Unlike Levi, however, they want a kitchen island for more counter space and plan on building one soon (figure 97).



Figure 97. This family has put much effort into decorating their house. They bought an old Northwest Territories Rental unit, demolished one room to make the living room larger for family gatherings, and hung family mementos with Christmas lights for a yearlong festive atmosphere. This is a house with a soul.

The Manager

The manager of the Clyde River Housing Association, a southern Canadian, oversees 179 public housing units, allocating housing, arranging repairs and maintenance, and collecting rents (ranging from \$60 to \$1,700 per month based on the previous year's income tax returns). Rent collection, she said, was the association's most difficult challenge. She asserted that few people paid either rent or utility bills in full. Yet the association's only recourse when encountering arrears, some exceeding \$100,000, was to ask the power company to limit the electricity.

Maintenance—especially freezing pipes and sewers—has posed another persistent challenge. Only one apprentice plumber lived in the community, resulting in long repair delays. For housing maintenance, there was a course available to local residents with possible apprenticeships. The manager also stated that Kangitugapimiut did not want to leave the community for a six-week apprenticeship and preferred that the Arctic College rotate into the communities. She then said that 75 families were on a waiting list, that people must reapply every six months, and the ranking was based on a point system. Rent was determined on income, and the tax return form is the proof of income. Anyone without a tax return would be charged the highest rent.

I was also informed that due to the government's inability to supply enough housing, an Iqaluit-based subcontractor was currently building two 10-plexes for 20 families and planned to sell them back to the government for the government to rent. For those who cannot pay, a local income support counsellor and welfare office could provide some assistance. However, problems occur because 20% of income goes toward rent, but when there are numerous wage earners in one household, rents can get very high. This situation can create tensions between households and discourage some from working for wage labour—not to mention that it affects credit. Other mechanisms to encourage people to pay rent included a contest in the monthly newsletter and bingo cards for those with a zero balance in the bank.

The manager also mentioned the problem with unmarried youth having to stay with relatives because families and elderly people were higher on the priority list.

For information about the 10-plexes scheduled for construction in 2015, I interviewed the hamlet's municipal leasing officer. He showed me plans for the pair of huge buildings on his computer. The project would feature a pair of 750 square foot two-bedroom apartments and eight 640 square foot one-bedroom apartments. A shared mechanical room would lower fuel and electricity costs. Oddly, the Government of Nunavut (GN) had not shared the building site's location with hamlet officials.

In summary, renters' main concerns have been as follows:

1. The communal room's small size
2. Lack of indoor storage space
3. The small or non-existent entry porch
4. The inability to make changes to the houses
5. Long waits for repairs, and
6. The absence of housing options for singles or elderly residents.

Homeowner respondents' biggest concern was the expensive electricity and maintenance, which involves bringing licensed tradespeople from the south to the community for the repairs. Storage within the house remained an issue, but they also often have built outbuildings or bought a sea can or container that they carefully placed near their house for added space. Some respondents have built special workshops, others have used the outbuildings as home offices, and some have made additions to their houses. They would move a door, add a porch, or move a stair if the entry sequence were poorly positioned relative to snowdrifts or to facilitate access to their

parked vehicles. Another common remark regarded the use of varying construction qualities and the limited housing options.

On the governmental side, the manager not only described the difficult maintenance issues and housing shortages but highlighted the increasing demographics, the substantial number of children in the community (more than half the population is under the age of 20 years), and the need to house a growing number of elderly men and women who do not necessarily have family members in the community or who would just rather live with other elders.

Joseph Idlout is the Inuk once featured on Canada's two-dollar bill. The Barry Greenwald documentary film "Between Two Worlds" (1953) described how southern administration wrought fundamental changes to his life, including the imposition of its own kind of housing. Curiously, my 2014 interviews showed that residents had little readiness to consider housing an imposition—or even to criticize it. In fact, many seemed attached to their community infrastructure as it was. This sentiment seemed most prevalent among young people—perhaps because they had developed skillful ways to adapt to it. One word, however, appears over and over in the transcripts: freedom followed by words about hunting and cabins. Documenting these distant camps would become the focus of my subsequent trips in 2015 and 2016.

Planned Cultural Change

David Thomas and Charles Thompson (1972) provided a comprehensive review of early housing remediation programs and the concurrent educational efforts intended to impress upon Inuit families the realities of a rental program, its regulations, and their responsibilities. Thomas and Thompson realized that administrators believed Inuit must adopt the southern Canadian cultural model. While their paper was intended to look at the consequences of certain

government policies on Inuit, they clearly suggested a great cultural misunderstanding. For example, they described the important role of women in the placement of Inuit homes and in the arrangement of the interior space, the sharing of food, not to mention their pivotal role as the center of the household while the men maintain their role as the prime decision-makers. Thus, traditionally, each gender was afforded a time and place to be in control. But the new housing almost eliminated the woman's role of searching and place-making. No changes can be made unless there is ownership.

The most insightful paragraph in Thomas and Thompson (1972), which explains a good portion of the blame, is found under the heading "Houses for Planners or Houses for People?" This section spells out the inherent problem with the housing programs as a complete replacement of all those individual roles each family member held with regard to their home, as temporary as those homes may have been. Thomas and Thompson observed:

[Inuit clients] have nothing to say about the location, construction, or interior arrangement of the houses, and we noted a failure to consult with the people who are the recipients of the program benefits. The need for housing in the north was perceived by government employees from the south, and solutions to the problem were devised in southern Canada. House models have followed architectural precedents from the southern world, to be built with construction materials imported into the north, and they often show little recognition of Eskimo cultural patterns and values. They have been designed and field tested in Ottawa, apparently by men who have had little experience in Arctic living. Each house type has been placed in the north in large quantities, at high cost, without first determining if it is truly adequate—not only for the climate but for the people.

Nonetheless, when the communities became too crowded in the early 1970s, the outpost camp program would provide individuals with a \$7,000 subsidy, and they would leave town.⁵⁵

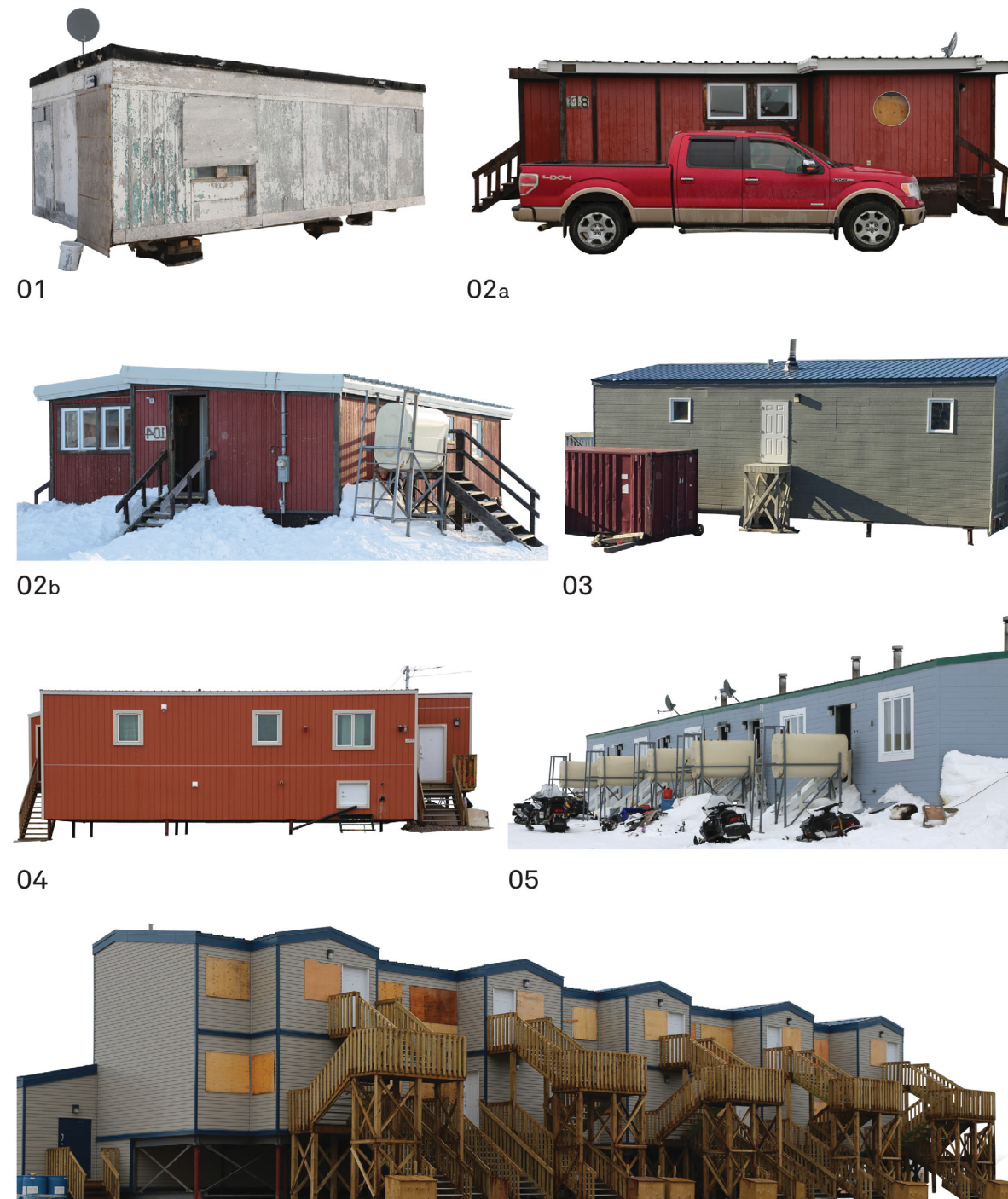


Figure 98. From the matchbox to the multiplex.

55 For additional information on northern housing policies, read Collings (2005).

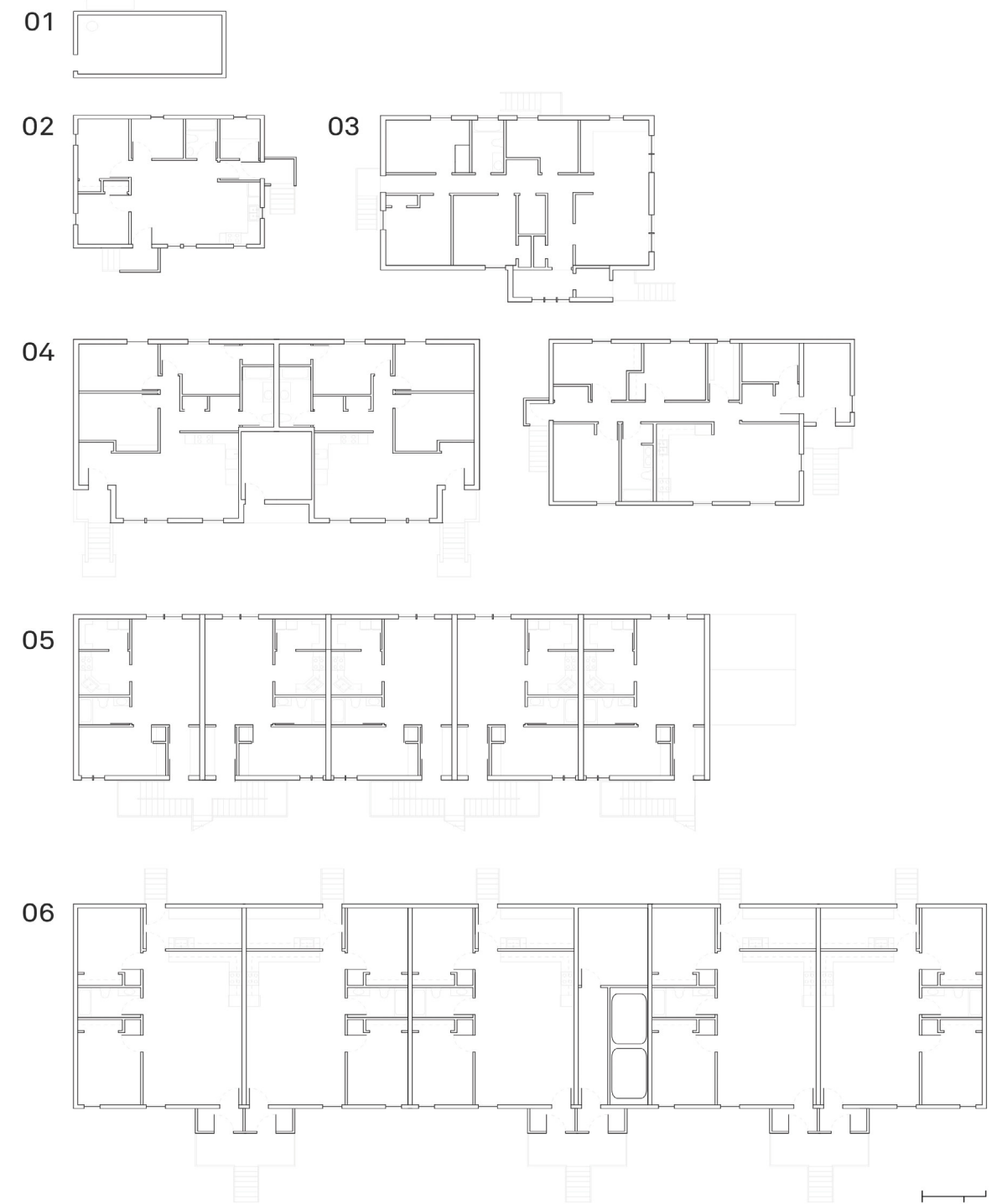


Figure 99. Plans of the matchbox to the 10-plex, correspondingly (Harlander, 2017).

The housing typology (figure 98, 99) and the mechanisms that have brought these typologies to reality are indeed made for foreign planners rather than users. It is surprising that I am writing this thesis in 2017, 44 years after Thomas and Thompson made their statements. Indeed, the story only gets worse: “I had no say to [which direction] the house would face or where it would be—even though I own it and had it built. [One consequence is] we never use my front porch because the wind blows snow up to my roof. I could shovel all winter long [and it still wouldn’t help]” (Respondent, semi-structured interview).

Thomas and Thompson (1972) went on to say that many changes were made to the model houses in the 10 years prior to their study and that every change proved inadequate: “Priority has been put upon low capital cost of the units and ways of transportation. Attention has been concentrated not on the long-range costs of replacing inadequate houses which may deteriorate after a few years, but upon the immediate cost of getting shelters in place so that short-range goals are met.” They consequently made an important recommendation: “We suggest in future, designers of houses for the Arctic should live for at least a limited period of time in their houses in an Arctic milieu, while they run tests on the basic design and construction materials for their suitability under Arctic conditions. At the same time, selected families should live in identical experimental models. The designers could then follow the suggestions made by the families before a house model is mass produced.”⁵⁶ They added that people teaching any level of expertise in the north “should firstly be Inuit themselves or have a very deep understanding of the culture. Inuit ought to hold senior positions and would aptly serve as mentors to the younger generations”. This important document thus admits that the government has become the prime landlord in the north, which created an inevitable and unsustainable dependency.

⁵⁶ Under the Northern Rental Purchase Program, which replaced earlier housing programs, the federal and territorial governments intended to construct 1,558 housing units within 43 northern communities. Of those, 1,378 housing units were ultimately constructed. Unlike earlier initiatives that concentrated on the eastern Arctic, this program included housing units for the Dene nation in the NWT and focused on the western Arctic, especially the Yellowknife region. Through the rental purchase program, rent payments were applied to home down payments. By 1987 this program had largely ended, as any houses left from the initial construction were in such poor condition that they were no longer saleable (Robson, 1995).

The housing branch of Indian Affairs and Northern Development recommended that each community have its own housing authority to act as representatives of the tenants in all consultations. It encouraged the idea “to correct faults in the houses themselves when possible; to make adjustments to their pattern of living; to enjoy the house and make it comfortable; and last but not least to learn to get things done by reporting them to the landlord through the Housing Authority” (Wilkinson, 1953). However, as governments tried to “ensure access to adequate, suitable, and affordable housing for all residents,” the housing delivery system has remained almost unchanged for 50 years (Dewar, 2009). One still must apply to the local housing office and then either be assigned a unit or placed on a long waiting list. Rent is assessed based on ability to pay—either 30% of household income or 25% for low-income families. However, as previously noted, a household income based on a dual economy of both subsistence and wage labour is difficult to access. The government eventually tried to improve the fairness by encouraging homeownership and increased rents to amounts above monthly mortgages. This homeownership assistance program was started in 1984 in the NWT.

To be more specific, with such testing in the present three-bedroom homes, there are no special areas for cutting and storing meat or for working on machinery such as skidoo and boat motors, which most Inuit now consider vital to their way of life. Seals are now often stored in the bathtubs and cut up in the living area, skidoos are repaired indoors, and the dining table is used as a work bench. Specific areas for these jobs could be provided in the houses. This might mean reducing the number of rooms designated as sleeping areas. However, the belief that persons of varying ages and of different gender require separate sleeping areas is a southern Canadian belief and not an Inuit one. Within the privacy of the home, Inuit have yet to adopt Canadian standards of bedroom morality concerning sleeping arrangements. Traditional patterns of space utilization are still employed as much as possible and a greater understanding of them on the part of the designers would result in a much different internal separation of rooms for the house.

Ownership and Rent Scales

One prominent Clyde River resident exclaimed:

I think ownership, what's the word [pause], is imperative! You want members of a society to be active members; give them something to own. I know the housing corporation gets tons and tons of money. I negotiated some of it back. Why not? In 1962, my parents were living off the land, and suddenly they had to pay a land lease, pay rent, taxes, and for what? They don't have very much. Our lots are not landscaped; we cannot buy gravel. We can maybe buy a load or two. But why? It's \$162 for a loader pail full of gravel, but it has to be crushed. It can't be the one from the airport because it is mud. That's the "guck" they give you for \$162.. It's mud.

My brother's next plan is to build a house. He doesn't want to bring himself down with a mortgage. He wants to build it himself. (Semi-structured interview)

Another resident added: "If you want to be employed, you got to own your own place. The rent skyrockets depending on your income or salary. My wife works at the school and makes almost \$100,000. So, we are in the highest bracket for rent. Salaries are high here because we are so remote. They've got more competition down there [in southern Canada]" (Semi-structured interview).

In 2000, the Nunavut Legislature created the NHC (Nunavut Housing Corporation). A crown corporation, the NHC provides both non-market rental public housing and non-market staff housing to Nunavut's communities. Funding is directed through the GN's Financial Management Board. This body decides yearly on how much of the territory's budget is allotted

to each community. On occasion, the federal government and the CMHC get involved by contributing special budgets for building more units. For example, on March 21, 2013, the government announced its intention to provide \$100,000,000 for additional housing in Nunavut as part of its proposed 2013/14 budget. Additional housing entails planning strategies. These special subsidies would then be approved by the Government of Nunavut (Nunavut Housing Corporation, 2014).

The NHC has a portfolio of housing units, building systems, and rent scales that are distributed among both public and staff tenants. In some instances, new units are built and leased from external property management companies: the 10-plexes in Clyde River being one example. To reduce costs, the NHC uses a series of housing templates for multiple communities. All templates are "reused". This phenomenon is starkly evident throughout Nunavut. Moreover, while the NHC tries to adapt designs to reflect individual community needs, the outcome is not always positive. One example is the use of SIPs (Structural Insulated Panels) for housing. Heat-loss calculations on a prototype found a 30% increase of thermal bridging when compared to conventional construction. Another experiment involved the use of pile foundations which requires drilling with heavy equipment and technicians trained in the South, which brings extra costs. While the technology has a role to play in certain permafrost conditions, it is often used in places that may be better served with simple and inexpensive wood cribbing. The consequences (high energy costs, retrofitting after structural failure) often negate the initial construction savings.

Although home ownership has increased (22 percent in Nunavut), Inuit continue to rely on social housing. The high cost of construction, a small housing market and a dependence on skilled labour to build deters self-reliance. One potential solution could be the renewal of previously successful programs creating incentives for people to build their own homes. Existing programs penalize working families by increasing rents which discourages individuals from seeking wage labour.

What Went Right Went Nowhere: Camp Century and Bubble Houses

The postwar period was a potent era for architecture. Technology promised and delivered dramatic social change. When it came to resolving housing shortages, governments tended toward ambitious solutions, planning neighbourhoods and entire cities to stimulate a new economy. In the north, this institutional ambition manifested in two promising but doomed schemes: Camp Century and Bubble Houses. Each is significant because of the skillful blending of new technology with local building traditions and materials, but neither had any lasting impact on the development of human settlements in the Arctic or housing construction.

Camp Century

In 1959, the US military began construction of Camp Century beneath the surface of the Greenlandic ice sheet. Intended as a ballistic missile base, the installation was decommissioned eight years later. A total of 21 trenches were cut and covered with arched roofs, within which prefabricated buildings were erected. With a total length of 3 km (1.9 miles), these tunnels also contained a hospital, a shop, a theatre, and a church. Two hundred people called it home, and maximum use was made of snow as a building material. Camp Century also utilized a cut-and-cover trenching technique, where long ice trenches were created with Swiss-made Peter Plows. These were essentially giant rotary snow-milling machines, enabling the construction of trenches built within Greenland's ice cap. Construction lasted 15 months, from June 1959 to October 1960, and the completed project cost \$7,920,000— including \$5,700,000 for a portable nuclear power plant (figure 100).

The camp was a complete underground city and consisted of 21 quonset hut-like roofs covering the 26'-deep trenches; the longest of which was 1,100' long and 26' wide. These tunnels contained independent prefabricated barrack-like buildings up to 76' long containing extensive living quarters, a large kitchen and canteen, a recreation hall, a theatre, hobby shops, laboratories, an infirmary and operating room, a communications center and library, a chapel,

a barber shop, bathing and toilet facilities, a cold-storage warehouse, storage tanks, equipment and maintenance shops, a standby diesel electric power plant, and a nuclear reactor. The camp was powered by a portable nuclear reactor that produced two megawatts of power for the entire facility. Prefabricated wood buildings and living quarters were erected in the resulting snow tunnels. Each 76'-long barrack contained a communal area and five 156 square foot rooms. An airspace several feet wide surrounded each building to minimize the action of melting, and to further reduce any heat buildup within the tunnels, 14"×40' air wells were drilled into the ground of the tunnel floors to add a cool air circulation.

While it was reported that Camp Century was built under the pretence of the Army Polar Research and Development Center, it served as a self-sufficient research facility for several years. The entire site included facilities that were more elaborate than any settlement to date and functioned more like a modern city of 200 people than as a research center, where supplies came via the Thule Air Base some 150 miles away. Beyond the cool air supply, an ice well, named the Rodriguez Well, produced 10,000 gallons of fresh water by pumping steam down the well daily.



Figure 100. Quonset hut covered in snow for camouflage and added insulation, erected atop subterranean trenches for living for the US military in Greenland (Colgan et al., 2016).

The use of snow as an insulator at Camp Century validates the techniques and material use of Inuit tradition. Snow, a porous material contains air pockets therefore has a high insulating potential and can protect from wind and the harsh Arctic climate. It carries with it its own ecosystem and all that lives in it must take advantage of it in order to survive and thrive. The average R value of snow is about R-1, approximately the same as wood chips (R-1) or straw

bales (R-1.5) but far better than wood (R-0.75) or brick (R-0.2). Inch for inch, snow is about half as good as rigid fiberglass panels (R-2.5), but snow packed thickly enough is able to make up the difference. For comparing thermal performance of materials, thermal conductivity (W/m-K) is fairer than R-value or its inverse, the U-value, because it is independant of the thickness of a particular product or assembly. To compare the thermal conductivity of specific local and imported building materials, see chart and formulas below. Notice the thermal conductivity of packed snow used for iglu building is not unlike that of concrete.

The secret is in the molecular structure of the snow crystal, which traps a lot of air. When snow melts on the surface, it forms a hard crust that has properties not unlike concrete. The snow used for iglus is hard packed, and the crystals are interlocked, which make it both strong and a good insulator. The more snow, the better it insulates. Beyond these qualities, snow acts as heat storage. It draws heat from the environment and protects the ground; thus, for example, it may be -16°C in the air immediately aboveground, but at the level of the soil, it is -2°C beneath the snow. Snow reflects sunlight, and as it is composed of a high percentage of air trapped within the snow crystals, it is a good insulator, slowing down the flow of heat from the warm ground to the cold air above.

$R \text{ value} = (m \times K) / W$ $U \text{ value} = 1 / R$ $\text{Thermal Conductivity} = \text{Thickness} / \text{RSI value}$

The R value in Imperial is 5.68 times larger than the RSI value in the metric system.

m=meters, K=kelvin, W=watt

Material	Thickness (m)	R Value Imperial	RSI value metric (RSI=R/5.68)	Thermal Conductivity
<i>Fiber board sheating</i>	<i>1" or 0.0254</i>	<i>2.64</i>	<i>0.465</i>	<i>0.082</i>
<i>Plywood</i>	<i>1" or 0.0254</i>	<i>1.25</i>	<i>0.220</i>	<i>0.115</i>
<i>Concrete 60 pounds</i>	<i>1" or 0.0254</i>	<i>0.52</i>	<i>0.092</i>	<i>0.277</i>
<i>Concrete 100 pounds</i>	<i>1" or 0.0254</i>	<i>0.21</i>	<i>0.037</i>	<i>0.687</i>
<i>Wood chips</i>	<i>1" or 0.0254</i>	<i>0.176</i>	<i>0.176</i>	<i>0.144</i>
<i>Straw bale</i>	<i>1" or 0.0254</i>	<i>1.50</i>	<i>0.264</i>	<i>0.096</i>
<i>Brick 4"</i>	<i>4" or 0.1016</i>	<i>0.80</i>	<i>1.141</i>	<i>0.721</i>

Material	Thickness (m)	R Value Imperial	RSI value metric (RSI=R/5.68)	Thermal Conductivity
<i>Fiber board sheating</i>	<i>1" or 0.0254</i>	<i>2.64</i>	<i>0.465</i>	<i>0.082</i>
<i>Undistrubed Snow</i>	<i>1" or 0.0254</i>	<i>1.0</i>	<i>1.176</i>	<i>0.144</i>
<i>Packed snow</i>	<i>1" or 0.0254</i>	<i>0.58</i>	<i>0.102</i>	<i>0.250</i>
<i>Still Water</i>	<i>1" or 0.0254</i>	<i>0.24</i>	<i>0.042</i>	<i>0.606</i>
<i>Air Space 1/2"</i>	<i>0.5" or 0.1027</i>			
<i>Ice</i>	<i>1" or 0.0254</i>	<i>0.068</i>	<i>0.012</i>	<i>2.180</i>
<i>Fiberglass panels</i>	<i>1" or 0.0254</i>	<i>2.50</i>	<i>0.440</i>	<i>0.058</i>
<i>Glass 1/4"</i>	<i>0.25" or 0.0064</i>	<i>0.91</i>	<i>0.040</i>	<i>0.040</i>
<i>Rock wool 1"</i>	<i>1" or 0.0254</i>	<i>3.80</i>	<i>0.038</i>	<i>0.038</i>
<i>Polyurethane foam 1"</i>	<i>1" or 0.0254</i>	<i>3.70</i>	<i>0.651</i>	<i>0.039</i>
<i>Sand dry</i>	<i>1" or 0.0254</i>	<i>0.02</i>	<i>0.004</i>	<i>0.150</i>

The values of thermal conductivity in the table above were calculated based on numbers from several sources including: the ASHRAE Handbook of Fundamentals, ColoradoENERGY.org (1967), and retrieved from www. engineering tool box.com.

Bubble Houses

On the other side of the Canadian border, engineer Wallace Neff, while working for a shipping company prior to WWII, was introduced to cement construction. He soon began developing and experimenting with air-forms, a way to sculpt space and provide its formwork with a simple inflatable pneumatic membrane. This building system, as he repeated, relied upon “Air-form construction permitting the best of modern design for the least money, yet permits building with material that is plentiful” (Airform International Construction Corporation, n.d.). He also believed they would allow for easy construction with very few portable tools and equipment, realizing a construction of beauty and efficiency. It had the potential through the defence housing corporation to be constructed quickly and at low cost for wartime housing: \$3000 for a single bubble, \$6,300 for a double bubble.

According to Jeffrey Head (2011), many people referred to them as iglus, including residents. It was clear in Neff's mind that this was not prefabrication but rather a method of constructing (figure 101).

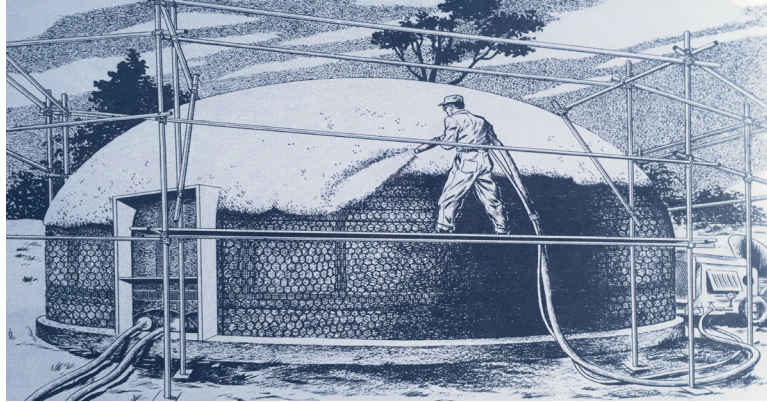


Figure 101. "A revolutionary method providing for a low cost, labour saving process in the form of a catenary of extremely rapid construction of permanent houses and building" (Neff, qtd. in Head, 2011).

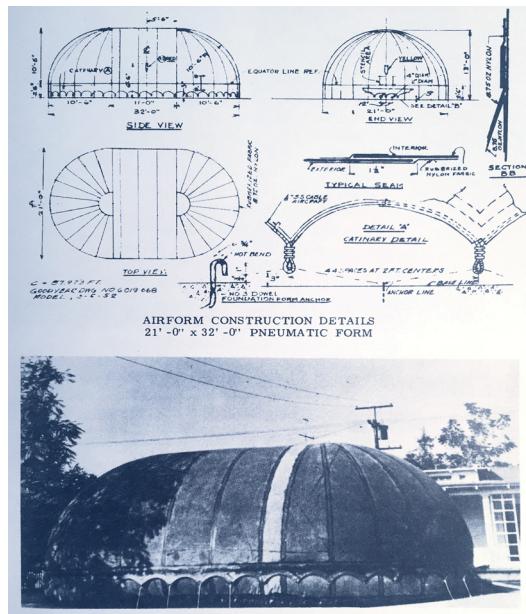


Figure 102. Plans and section of catenary vault for Airform Construction (Head, 2011).

In 1945, aiming to attract global investment, he converted the firm, Airform International Construction Company, into a corporation. Four years later, a glossy marketing brochure highlighted projects in Arizona, Virginia, Pakistan and Senegal (figure 102). The loss of a military contract in 1956 may have triggered the firm's demise and neither his patent nor making plans available could revive interest in the building system until the 1960s when entrepreneur

and philanthropist David South modified it into one without formwork — an energy-efficient reinforced concrete structure designed for homes, schools, churches and gymnasiums.

Curiously, while this low tech method proved cheap, durable and quick to build, it was overlooked by northern housing program administrators in the 1950s and 1960s and has yet to be implemented to this day.

Typology of Agglomerations of Seasonal Houses

In this section, I examine a typology of materials and agglomerations of seasonal houses from the Thule era (whalebone houses) to the self-built houses (from Old Clyde to Cape Christian and Sisimiut) that can serve as a prototype or spatial model for future community expansions. By juxtaposing representations of historical models with original Clyde River qarmat dwellings, self-built cabin culture in Cape Christian, coastal Greenlandic developments, and the current planning of New Clyde River, typologies point to different logics. Do these ephemeral self-built communities hold strategies or solutions about adjacencies, orientation, and land use that could improve the planning found in New Clyde River?

Additionally, by looking at different materials used in 'Original Space', important considerations should be included such as the fact that snow is "temperature limited", that is melts above 0 degree Centigrade and that sod, when frozen, reverts to the conductivity of ice, which is certainly not beneficial. When surveying past and present constructions and speculating about the future, these properties offer important constraints and characteristics for the layering and nesting of thermal zones and add to the narrative of seasonality.

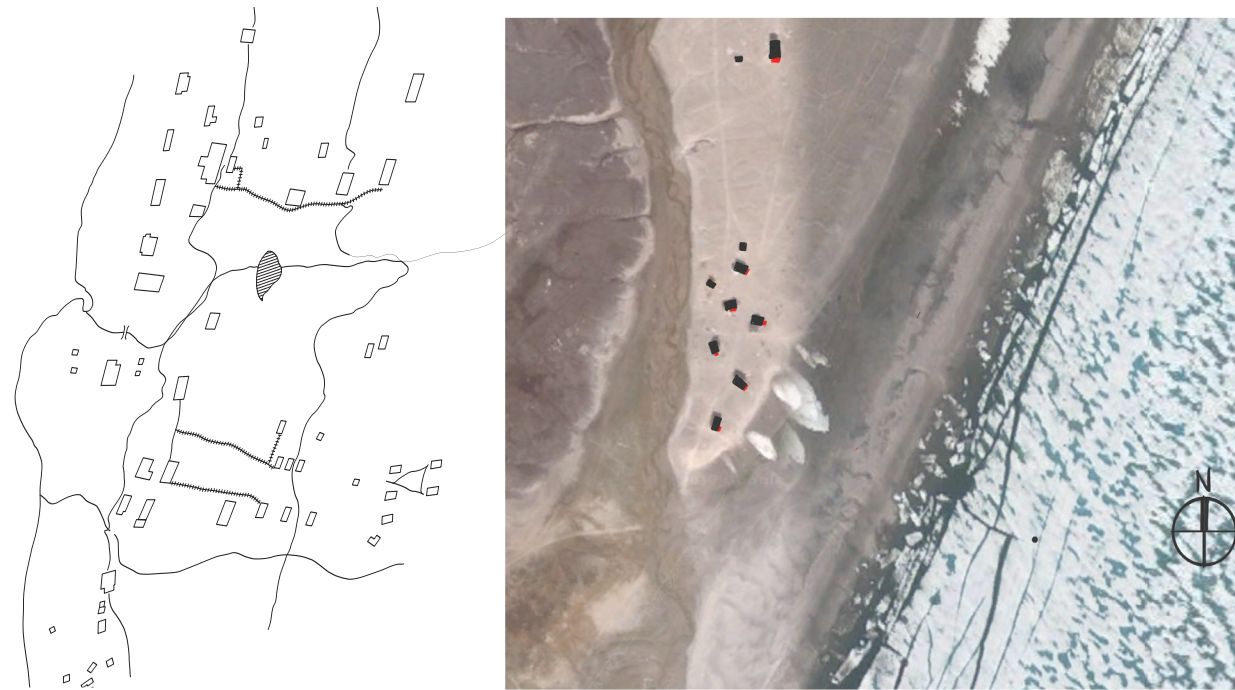


Figure 103. a) Map of part of Old Clyde. b) Aerial view of cabins at Cape Christian.

With the introduction of the basic house plans in the north came the planning of neighbourhoods with a concern for infrastructural efficiency and vehicular traffic as services. However, the noteworthy characteristic is the fact that the Old Clyde site, with its qarmats and the self-built cabin culture out at Cape Christian, follows a similar logic from which we can potentially learn. The entrances face south or east, they are built in clusters, and they all have a direct relationship to the coastline and to one another. In a typical self-built house agglomeration, there are long lists of specific contents. Interestingly, while these seasonal dwellings are movable, quick to build, they are becoming well established. A sense of permanence is settling in. Out houses, dog houses, essential building materials and survival kits fill the spaces in-between. At the same time, the exterior spaces are dynamic and change quickly to serve as social space, workspace, cooking space or just for temporary parking. Connecting paths inscribed in the sand or snow explain the relationships between houses by their delineation and positioning. Together these actions begin to define practices that are unique, small-scale yet functional strategies to another type of community living. In contrast to the formalization of urban planning, these

unofficial environments, are coming to their own. When confronted with a need to move, adjust an orientation, to fix or improve, or just on a creative whim, here they choose to do it themselves in total freedom so tools and other artifacts are strewn around the exterior, bones are left to dry, all simply as necessary supplies waiting to be incorporated into someone's next project.

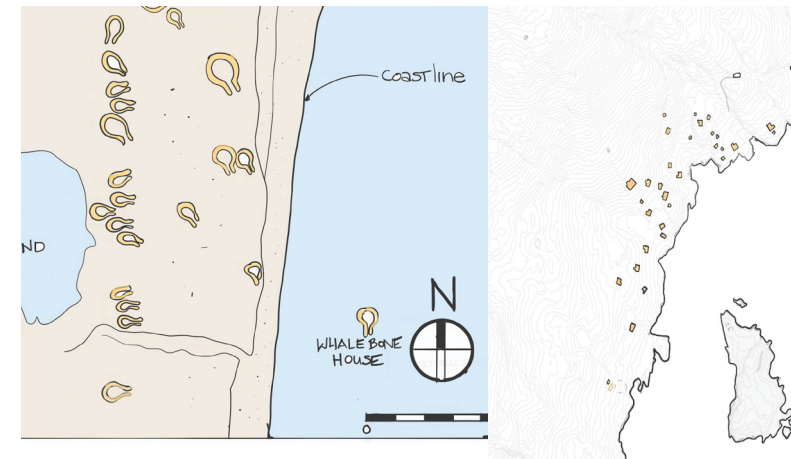


Figure 103. c) Whalebone houses on the coastline adjacent to Black Point. d) Map of Sisimiut, GL. e) Map of New Clyde River.

By contrast, the Canadian government housing, as seen in the Clyde River map (Figure 103 c), is developed following a convention of building parallel to the road on flat ground. Sisimiut, Greenland (Figure 103 b), like the old Thule sites and Cape Christian, follows a more organic planning methodology. The Old Clyde map provides another example of a less formal placement of qarmat clusters that could have informed government planning agencies before they moved Old Clyde to the other side of Patricia Bay. And although the qarmats or whale bone houses (Figure 103a), well-oriented modest dwellings, have no porch and only one entrance constructed at a slightly lower floor level, they managed to keep the cold air down. Inuit builders always knew how to orient their houses and entrances appropriately to avoid predominant winds and snow drifts.

None of these insights were considered in 1963, when a large-scale building program commenced in Clyde River. The current settlement was built on muskeg, over permafrost, and the lack of proper drainage as well as a steep slope provide limited building sites for future expansion according to the HBC. Therefore, a new town was conceived, and Old Clyde moved to the other side of the bay (figure 104).



View of Uummannaq, May 2016 – Photograph by Susan Vanek.

Figure 105. View of Uummannaq, Greenland where houses are self-built on bedrock.

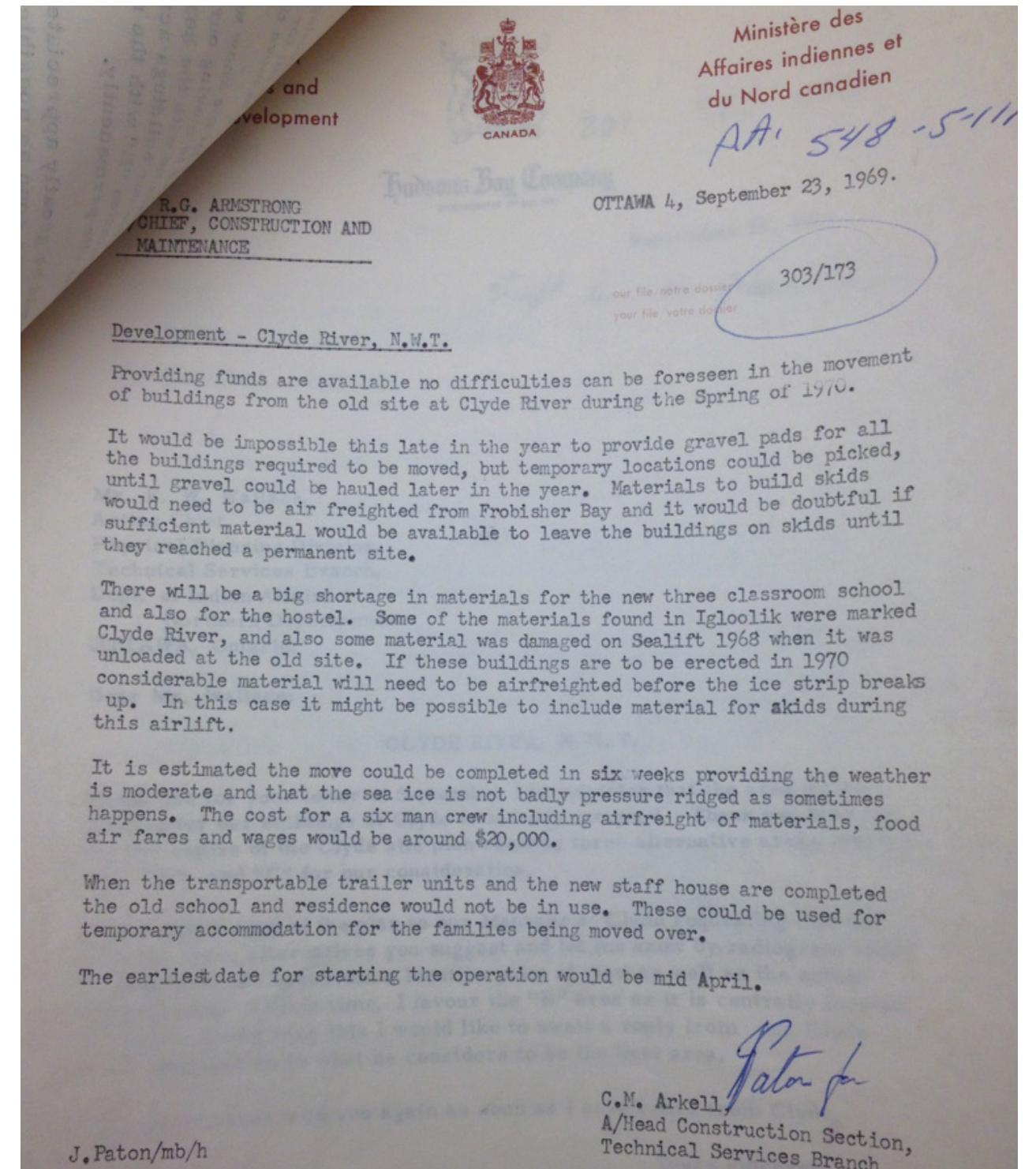


Figure 104. Letter from the Head of the Technical Services at Indian Affairs to the Chief Construction and Maintenance Officer, Mr. R.G. Armstrong.

In the Greenlandic example (Figure 105, 106), houses are built before the roadways. This allows homeowners the freedom to select the best sites for building on bedrock and the most advantageous orientation for the house. This fosters a more organic growth that allows individual home owners to control the size, the views and even the construction of their houses. When a road is planned at a distance, an informal path is naturally created.

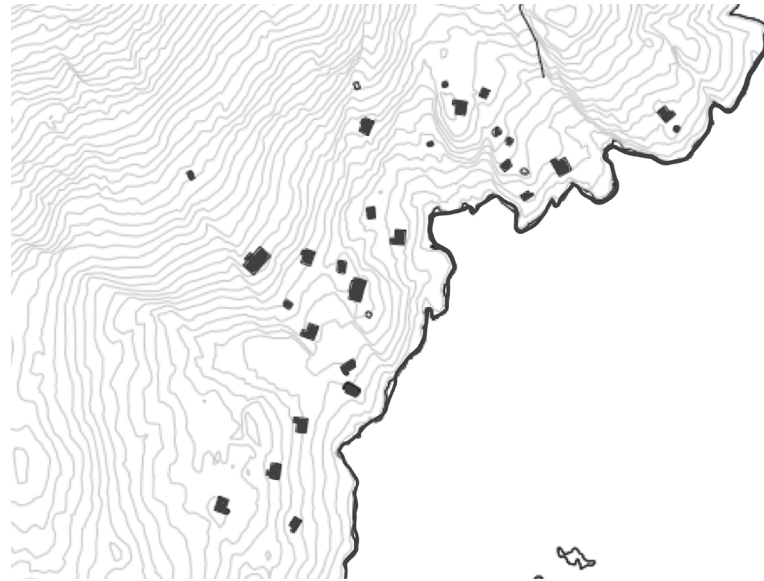


Figure 106. Plan of Naajaat, Greenland, where residents build their own houses.

The tendency of our Canadian government and regional planning agencies to favour suburban planning, a top-down, land-use planning strategy, not only disregards the network of informal paths and traditional Inuit patterns focusing on relationships and orientation but creates a linear style cul de sac development found in many southern Canadian towns where houses are parallel to the street for immediate access to services and to the roadways. In Clyde River, the abundant networks of foot and vehicular pathways supersede the official roads they intersect. In fact, travel by snow machine and ATV continue to favour informal paths. Even public vehicles such as the garbage, sewage, and water trucks use the paths because they are essentially the most convenient way between two points.

Self-Building Initiatives in Greenland

A resident of a house from the housing program in Ummannaq, Greenland, recalled the importance of the government aiding both financially and in the construction process of the self-building initiatives, giving each resident a maximum say in the design, orientation, and construction of the house:

The history of the Housing Program in Greenland goes back to the 1970s. The housing situation in Greenland was, at that time, not very good: I believe in many ways like the situation you have in Arctic Canada. The government decided to make a program where people could get financial help and support to build their own house. The houses were a kind of building-sets with drawings that people, with the help of an instructor, should build themselves. All materials were financed by the government as an interest-free loan. The owner of the house should pay back to the government the loan over 20–30 years. Only expenses for the owner would be for electrical installations and plumbing. The government set aside an amount of money every year for the program.

Over the last 35 years, hundreds of houses have been built in Greenland under this program. Most houses were built with great success and are still here after many years and in good condition. I am myself the owner of such a house. I bought it from the guy who built it, so I did not get it directly through the program.

In the beginning, the houses were built with kerosene stoves and without a water connection. This was normal in most houses up until the end of the 1990s. The last 15–20 years, the houses have been constructed with a

central-heating system and a water installation. Many of the first houses have been upgraded with these installations as well.

The problems with the self-construction is that not everyone has the skills required to build a house. Even with the help from an instructor, the project could turn out to be too big of a mouthful for some families.

The current program is partially financed by the government. The houses in the program today are much bigger, much more modern, and also much more difficult to build. As I understand the current program, all materials are still provided by the government as an interest-free loan. The owner needs to provide the money for the company who assists with the construction. This means that you will have to get a loan from the bank: \$50,000–\$100,000. The economy in Greenland has changed a lot over the last decade, and most families have more money and better lives than before. (Semi-structured interview)

The construction is made more complex by the short construction season. The design planning and implementation is lead by a family and supported by an expert building instructor. The houses are principally built on bedrock, but the extent of the construction is different for each iteration, as it depends on the geography. This flexibility is one of the advantages of self-build and place-based—a plan that can be adapted regardless of the shape of the terrain.

Summary

Glassie (2000) put it best when he wrote: “[D]esigners, divorced from consumers, plan houses that they would be unwilling to occupy themselves, and that do not fit the needs of

their users. We have the disaster of public housing projects. Then managers, lacking intimate knowledge of the work that must done, demand the impossible and arrange procedures in strict bureaucratic fashion, leaving little room for the workers to uphold their own standards, or find satisfaction in their daily labor by bridging projects to completion” (p. 47). Under those constraints, how do people adapt when their entire built world changes? The Canadian government experimentation in the Arctic after WWII recreated an environment that was understood perfectly by a different culture, non-Inuit-Canadians. These housing experiments were conceived around a nuclear family, the dominant family unit in southern Canada. But ilagiit or the extended family, as it were, was another familial form in Inuit society, a large family and the basis of its socio-economic structure.

Government housing and its various programs were a mismatched plan for a society trying to maintain traditional land-based pursuits, sharing among households. However, this housing became a platform from which Inuit have learned and upon which they have built parallel coastal communities that enabled them to construct their own version of housing, one that reflects and sustains their values and lifestyle. In other words, Dawson (1997) once argued that the government house, organized by dividing space, encourages movement between interior spaces, while decreasing movement and connectivity with the community. I argue that the government house has, in fact, due to its inability to respond to an Inuit way of life, increased movement back to ancestral land and cultural practices and promotes a sense of community.

Steady population growth (26% today) combined with ongoing migration between communities, has resulted in rapid urbanization. The problem has been twofold. It began with creating the need for continual production and ended with a standardized solution for the stereotypical southern family whose living requirements were thought to be fully understood. The plans were described as being of a “somewhat lower standard than normal CMHC designs.

These were plans for ‘Indian’ housing which were generally of a cost well below the houses covered by CMHC and the schemes of the territorial governments.” They were also prescriptive and meant to accommodate families that, no matter what, had to learn to live according to a foreigner’s precepts.

Meanwhile, the gap between the increasing cost of housing units and residents’ ability to pay requires huge government subsidies, which struggle to meet increasing demand. There existed a social conscience and awareness of the complexity of the problem, as well as a willingness to address it. However, little more than a rectangular space with defined rooms hovering above ground is what Inuit users have received (Tester, 2009).

This chapter has demonstrated a history of institutionalized disregard for the legitimate design tradition and the complex social and philosophical principles that anchor Inuit society. To understand how Inuit families adapted and transformed their houses (either with permission or as homeowners), one must study the ways in which government houses diverge with the traditional Inuit house (i.e., the qammaq or snow house). The next chapter explores some of these differences.

Chapter THREE

Living with Government Space

Introduction



Figure 107. Plan of Clyde River retrieved from Google Earth 2017.

Seen from an airplane, Clyde River’s site plan presents a straightforward southern-style planning strategy: build where it is flat and advantageously easy, link all roads to the main road, and insert the maximum number of dwelling units to minimize distances (figure 107). Yet, as one descends, between the rows of government houses, hints emerge of new paths chosen, of a tenuous snowy web that points to a different approach to urban planning and design. From this lower altitude, closer inspection reveals a network of tracks and foot paths linking a smattering of smaller buildings, informal structures sprouting amid the grid. What is this architecture?

On the ground, one encounters much activity between the houses. Dogs bark, tools whirl and grind, thrash metal music fills the air. People are building, working, talking. One can now clearly see the self-built cabins that arise in almost every backyard. “Shabby” and “drab” are the first descriptors that come to mind. There is not the slightest patina of redeeming charm one might find in their southerly ephemeral counterparts such as garden sheds or small houses. But an even closer look reveals notable details. Some cabins have small windows. We glimpse the shadows of people moving inside. What are they doing in there?

They are building prototypes for the Arctic architecture of the future. It is a hybrid architecture that blends modernism and traditional culture, contemporary technology and materials with ancient design principles. It is found within the walls of government houses, in-between their rows, and in a vast constellation of mobile hunting camps that reach out across the land. It is a resourceful response typical of a resourceful people.

In chapter one, I examined the collection of materials, objects, technologies, practices, and knowledge that people used while inhabiting the north. I noted all were influenced by past civilizations and habitations. With the advent of “government space,” bringing about a new approach to architecture and planning, Inuit roles as builders and planners continued. Two different cultural models with conflicting paradigms of space production have collided. One is mobile, temporal, and spontaneous—the other fixed, permanent, and official. How did these two worlds collide? How do Clyde River inhabitants live with this new government space? How can the formal space established by government interact and adjust to the more informal, self-built expression of individual transformation? Clyde River’s transformations range in scale—from the small wind deflectors added to existing houses to the construction of an entire parallel coastal community at Cape Christian some 15 km away. Why and under what conditions do some building technologies influence the lives of Inuit and others not? How do we explain this influence from the viewpoint of Clyde River residents and through the physical characteristics of these building technologies?

Dawson has opined that despite many attempts to restructure the routines of Inuit families through Canadian government-funded housing and home economics classes, in actuality many use their houses in traditional ways (Dawson, 1995). Furthermore, his field research has led him to contend that the southern design of northern houses does not reflect the lifestyle and values of Inuit families, using the theory and technique of space syntax to study how Inuit have used their government-subsidized homes (Dawson, 2003). He recognizes that Inuit want to preserve extended family unions and kinship relations by using large open spaces for group socialization, individual activity, and work related to harvesting. He documents concern about “the small size of rooms, lack of storage space, dislike of multi-story houses, and failure of houses to stand up to extreme climatic conditions. As housing designs in northern communities are still modeled on southern Canadian ideals of family spatial use, Inuit often modify their homes in ways that improve efficiency of heating and water use, improve safety, more closely approximate families’ traditional use of open domestic space” (Dawson, 2003b; see also Dawson, 2002). The transformed or renovated housing designs showcase a new approach to finding solutions from within the community.

Over the past 60 years, houses built in the north have become increasingly subdivided. This has meant more rooms but also a narrowing of viewing fields, limiting what can be seen from any given location. These changes in spatial configuration appear incompatible with the field observations of space use summarized above. Put another way, Inuit families and non-indigenous architecture are moving in opposite directions, with the former emphasizing social integration and the latter spatial segregation. The effect is that the spatial configurations of non-indigenous houses often make Inuit household activities difficult to organize, execute, and complete. Individuals interviewed for this study also commented on small room sizes, lack of adequate storage space, a dislike of two-story house designs and construction practices that do not stand up to the rigours of life in the Canadian Arctic.

This chapter examines Clyde River’s self-building tradition as a direct response to living with government housing. It highlights various typologies as case studies of an informal coping mechanism. It posits Inuit as producers of space and probes the mindset of a people who can find treasures at the town dump. It then reviews the establishment and evolution of camps, the elements of cabin construction, and their current size and location. It concludes with reflections on the lessons of the eastern Arctic’s emerging resident-built cultural landscape.

I examine five phenomena: first, government units with visible small-scale transformations such as porch additions or decks; second, workshops and outbuildings arbitrarily popping up in the block interiors, containers and/or sea cans serving as individual parking garages lined up in some vacant area or transformed into an off-grid homestead within the hamlet limits, and cabins as a proper part of new self-built coastal communities; third, the elaborate informal network of paths and tracks that intertwine with the roads; fourth, cabins on the coast in a former outpost camp, such as Cape Christian, or remote seasonal commuter and outpost camps on its periphery; and fifth, an array of other material cultures.

The “Gap Space”

The “gap space” or Akuningaa is an important concept in the eastern Arctic.⁵⁷ The gaps comprises all micro spaces that are part of the town proper but not the houses themselves. This includes tuqssuu (porches), sanavii (workshop), and ilugarlaa (outbuildings or storage sheds). After 50 years, one might expect the houses to differ from their original design.

⁵⁷ Gap space is a space with no assigned function. It is used in a similar way to Atelier Bow-Wow’s ethnographic approach to behaviorology, micro public space, pet architecture, and da-me architecture. I am also referring to the typological study of hybrid environments with extremely tiny buildings to illustrate a spatial practice specific to remote Inuit communities.



Figure 108. Seacans or containers, trailers new and old, sheds, old vehicles, dog houses, boats and fishnets added porches and outbuildings occupy the gap spaces.

In figure 108, the small brown houses on the right are NTRs and the two-story house in the distance is the RCMP residence. Windows have been blocked off, patios partially or entirely enclosed, porches roofed, and substantial windshields installed to deflect snow. Among the columns supporting the porches, children’s swings hang between stored items. Beyond the houses, a huge crop of outbuildings lends an atmosphere of disrepair and a trove of potential materials for building or creating an artifact. Besides an ordinary process of wear and tear, there is a conflict between what was built and what the users may have wanted.



Figure 109. Small cabin about to be hauled built in-between government houses.

Porches and Entryways (Tuuqsuu)



Figure 110. A 6'6" x 8' porch is added to this government house on piles, providing additional space for hanging coats and storing boots. It changes the entryway orientation from north to east and reduces snow accumulation at the front door. The stair is reused and sits on a new wood pad.

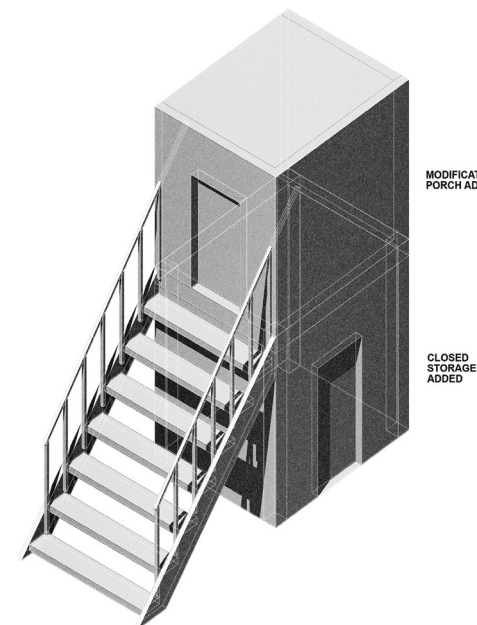
The first addition made to any government-supplied house is often a porch (figure 110). Sometimes entirely lacking in original government designs, those porches that exist often face into prevailing winds, where snowdrifts hinder access. While add-ons can help deflect these winds, a second porch is usually built for the secondary door. This door becomes the primary entryway in winter. These porches, built with leftover materials from earlier housing sites, display a patchwork of colours and styles and are most common among older dwellings. The newer multiplex units are built with a small entryway intended to act as a porch, but their limited width and length makes coat-hanging awkward. These spaces are typically used for little more than boot repositories.



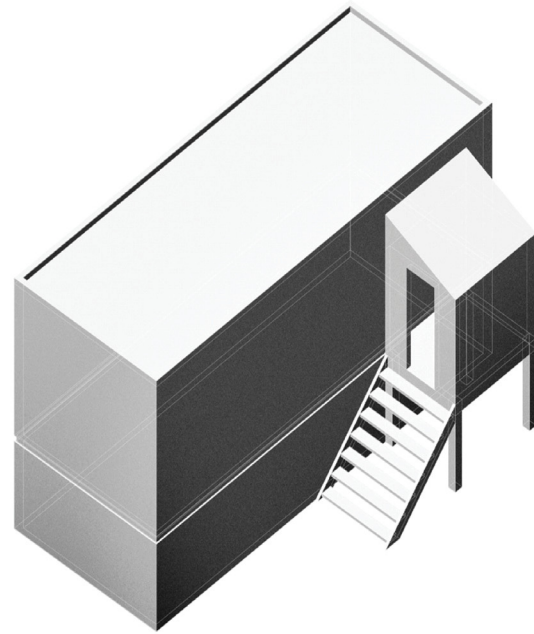
Figure 111. Added porch with its new door, shifting the entry orientation 90°. There is insufficient paint to match the original green colour for the stair handrail and trim.

There are many added tuuqsuu around the community. They are built for use as cold storage areas but mostly to change the orientation of the doorway relative to the predominant winds and accompanying snow drifts (figure 111).

The second-generation houses built beginning in the 1970s, the NTRs, had two porches on different sides of the house. This let residents choose the entry with the best orientation. Newer houses usually have a tiny entrance enclosure within the rectangular volume of the house (figure 112).



ere is a closed storage room below.



TRAILER FOR CONSTRUCTION (MODIFIED AND INHABITED), CLYDE RIVER, NUNAVUT

Figure 113. Adding a porch to change the entry door orientation (Giraldeau).

The original “matchbox” had a tiny, built-in entryway as part of the small rectangular volume. By adding a square volume outside the main body of the house, the doorway can then be turned 90 degrees to improve orientation and avoid snow accumulation. Many Tuuqsuu have also been added to government social houses as remediation. The local Housing Authority often assists in the construction of the ones found around Clyde River.

The Cold Porch: Tuuqsuuk

A cold porch provides a place to keep food from spoiling while protecting against drafts to minimize heating costs and to hang outside clothing and boots, keeping the rest of the house tidy. In a section titled “How you can improve your cold porch,” the booklet states: “Build in shelves for storage if none are provided. Ask the Housing Association Council if you may do this. Keep frozen meat and fish on one shelf. Keep covered so dirt from the air cannot settle on

the food. Keep fur pelts on another shelf. Put up hooks to hang dog harness and other things on.” Another section advises: “Keep like things together. Food should be all on one shelf, fur pelts on another. Equipment supplies should be kept in another part. Keep doorways cleared of ice and snow so doors can be kept closed. This will save on fuel oil.” And a section titled “Storage for children’s toys” states that “play space is important for small children. There will be more indoor play space for children in the new three-bedroom houses. Let children play in a safe warm place in the house. Teach children to put their toys away when they are finished playing with them. Get an orange crate or paper carton from the store for this purpose.” That is how the cold porches, originally built in the second generation of larger government houses, might have appeared to the person writing the booklet on *Living in the New Houses* (Department of Indian Affairs and Northern Development, 1968). These important spaces are so small, it is hardly conceivable that any of these suggestions are possible in most cases (figure 113b).



Figure 113b. If the original government house has a porch and entryway that is appropriately oriented, it is usually so small, people would leave the front door opened to facilitate access.

But to speak of housing failure when speaking to younger generations of Inuit residents who identify with these set-ups as their communities when they are attached to the towns and to the place where they have grown up is anything but productive. To speak of failure would be to assume that architecture is unchangeable or invariable or that government agencies satisfy these users’ requirements. Some needs differ from one household to the next. However, a study carried out in this well-defined area of the incentives which prompted many of these in-between spaces,

extensions, conversions or extra builds could enlighten certain aspects of Arctic everyday life and perhaps help formulate an exchange between agencies precepts and users reactions. Therefore I set out to not only examine the in-between spaces but to understand Inuit conception of space and their broader notion of Pivitujuq or place by interviewing as many people as possible, some of whom had either built a porch, cabin or out-building.

There are many types of porch additions, each with a specific function. Some are designed to be workshops, others for storing winter clothes and equipment. Some exist to reset the door's direction to avoid snowdrifts and others are built to reorient the staircase to facilitate vehicular parking (figure 114).



Figure 114. A skilled carpenter adds a deck to his NTR house. He moved the stair 90 degrees to park his vehicle along the front and minimize the distance to his house.



Figure 115. A compact, well-organized entry facing north is closed off for a craftsman/carver who spends all his free time working in a small 4.5'x6' space. Houses built in the 1970s offered two porches on two different sides of the house. This one faces north and is not practical in winter so it is only used for crafting.

A Carver's Tuqssuk

A carver shares his house with his daughter and two grandchildren. His workplace is the back part of his tiny, cold, and ill-lit entry porch (figure 115). He carves dancing walruses from whalebone, and he sells all he can produce. Sometimes, he gives his sculptures to his wife and children to sell for pocket money when traveling. Self-taught, he's been in business since the 1970s.

If he were to own the house, his first project would be to add insulation to the porch. But he said the housing authority rarely approves this type of project. He pointed to a window above the kitchen table. It looks straight into the house next door. He would have preferred seeing the water—something that changing only a few degrees of angle could have accomplished.

Added tuqssuk are essential to correct door orientation and to create in-between spaces. But this is not the case in many cabins. The cabins are mostly facing south or east to avoid cold winds or snow drift accumulations; therefore, one can enter directly into the living space with very little shoveling necessary. A small, uncovered deck extends across the width of the house. Railings are present but one newer cabin has a white picket fence—added protection against the polar bears perhaps.

Workshops and Outbuildings: Sanavii and Sirluaa

Isaac's Workshop or Sanavii is designed like an iglu (Fig. 117). This hexagon is just big enough to fit an ATV or snowmobile in need of repairs. It is 6.5' high, with a ventilation hole in the apex. Local resident Isaac built it from scratch, sourcing most material from sealift crates gathered at the dump. He acquired paint from friends and plywood from the Hunters

and Trappers Organization (HTO). He wanted to raise the floor and insulate but had to wait for summer. Isaac received a \$1,000 grant for craft tools from the NIT.

Isaac makes whalebone carvings, does wood working, and repairs his snowmobile. His younger brother owns the house, which is inhabited by five people. The close quarters mean that Isaac needed a space of his own to work. With a few pieces of plywood and a creative mind, Isaac set out to build himself a workshop that would resemble a traditional igluviak. He built a hexagonal-shaped space with a flat roof, pitched walls (figure 116), and a long tuqssuk or entrance tunnel for added storage and heat retention. Two large doors on the opposite side allow him to bring vehicles indoors for repairs.



Figure 116. The interior of the tuqssuk added for additional storage and keeping the cold air out of the workspace.

With an added layer of insulation and plywood on the floor, the entire space gets warmer and the now functioning snowmobile is ready. “The floor is done now and it’s a big improvement”, he says. “I can turn the Coleman stove down, because it warms quicker now.”



Figure 117. Workbench and tools inside Isaac's workshop.



Figure 118. New insulated floor in Isaac's workshop (Tassugat, 2015). He used 2x2s, insulation, and 1/2" plywood on 2x2s.

Isaac painted his interior space green (figure 117) and added an entryway to mitigate the cold and for added storage. He complains the roof should have been higher but with the ventilation right in the middle at the highest spot, the space heats up fast. The large doors are left open for summer work outdoors on marble or soapstone and for easy access. He works on antlers indoors because they make less dust.

Isaac Tassugat on insulating the floor: Since it has been colder this winter, the new floor insulation has really helped with the heat (figure 118). I only needed to use the small heater and turned the Coleman stove to warm the place. But I have to do some caulking near the porch corner. There is a draft when we have blowing snow. I can really work more in my workshop this winter than last year. (Excerpt from correspondence)

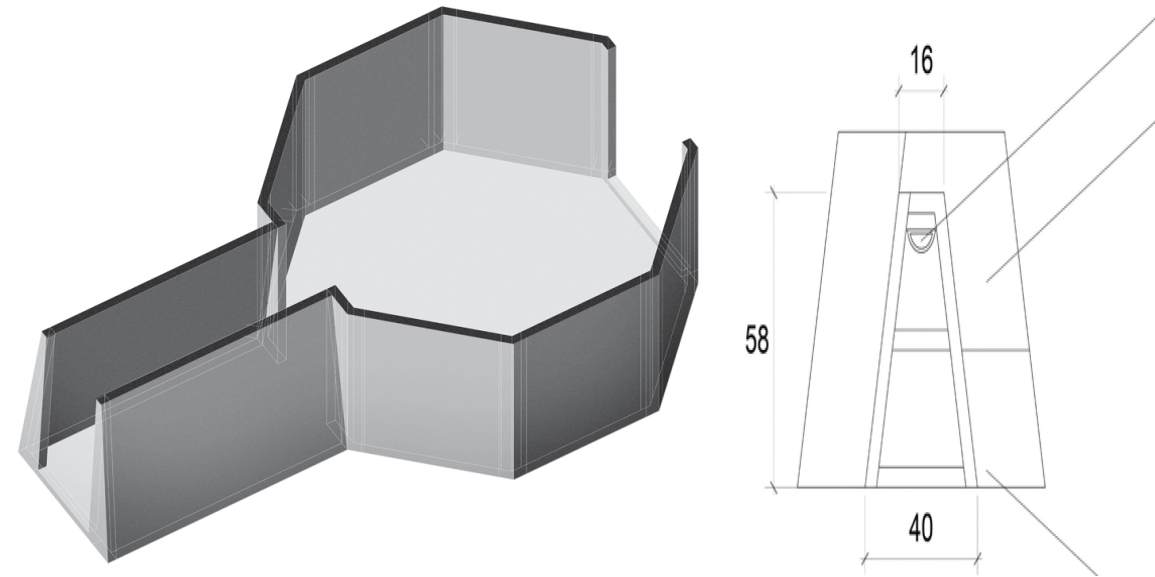


Figure 122. Axonometric of workshop and Interior door elevation to workshop (Giraldeau).

Paths to Elsewhere

While the mélange of building is always changing, the network of roads organize the terrain. In most Arctic communities, road infrastructure is minimal and unpaved. Land ownership does not exist and the outline of each land parcel is undefined.

Mobility is held at a premium. All spaces between the buildings and houses can be used for driving and moving about. Driving on the primary roads usually means a detour.

All sorts of vehicles—cars, pick-ups, vans, motorbikes, bicycles, jeeps, trucks, all-terrain vehicles and snow mobiles, a school bus, water truck and garbage truck—can be seen and heard throughout the community. Still, the ATV and the snowmobile, both perfectly adapted to the gravel roads and to the rugged terrain, are the vehicles of choice. Because they need no roads, they epitomize freedom and with the ability to tow heavy loads, they can carry an entire family to and from a camp or simply to the grocery store or nursing station. Inuit can attach a qamutiig and grub box to the back and set out on a hunting trip or hitch a cabin and haul it to a new

site. Only two or three dog teams remain active. Their slower speed and the energy required to maintain one, make them less attractive than in past times.

Depending on their means of travel and itinerary, Inuit create a secondary more local network of paths that reaches out to each house and cabin (figure 124). These links are used for many activities. Children play here, hunters butcher their harvest or prepare for their next hunt and pedestrians use them to get places in the most direct way possible. These intertwining pathways are even used by municipal trucks to access water and sewage lines. Some trails cross small streams over resident-built bridges constructed with old electrical posts.



Figure 124. Maps of informal networks of paths and tracks around Clyde River (Giraldeau, 2016)

Vehicles are a status symbol and their ownership a source of pride. All motorized vehicles are imported from the south by hamlet organizations or by individuals who have enough money saved up or have borrowed the necessary amount from family members. Ownership and use is often shared among family members and friends which makes this otherwise expensive mode of transport available to most Clyde River inhabitants. Without garages, vehicles are parked around each home's front stoop. When units are stacked or part of a multiplex, space is limited. Some porches are now being modified to accommodate more vehicles.

At Cape Christian

Cape Christian is part of Inuit geography but must also be considered at a psychical level. Most respondents consider this area to be out on the land because there they can do as they please. For some, the lack of services such as Internet or television is a positive attribute, making Cape Christian a place to rest and be “Inuit.” In the clusters of houses, there is a sense of community (figure 125). Some relish the activity; others seek quiet and tranquility. For those who feel Cape Christian is too busy and populated, there are other sites where cabins are distant or even isolated. Altogether, many respondents regard the coastline at Cape Christian as a satellite community where they spend extended periods of time. Those unable to afford a cabin can visit the cabin of another family member or grandparent or simply go for the day hunting, picking berries, or fishing.

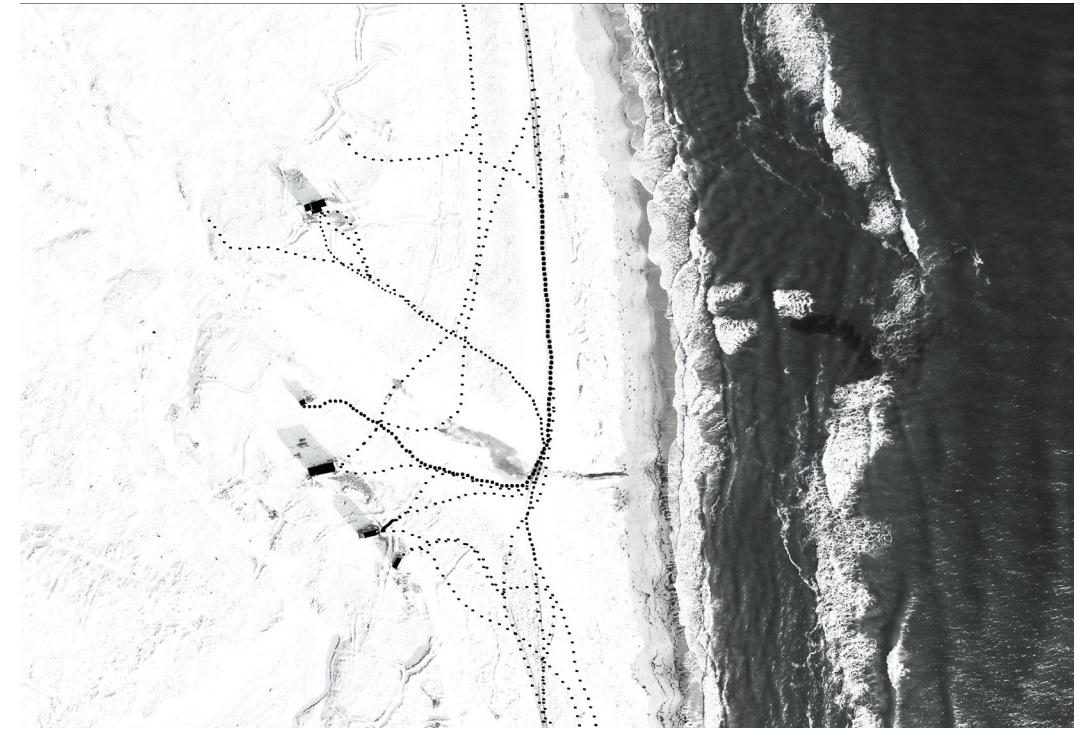


Figure 125. Map of informal networks of paths and tracks around a section of Cape Christian cabin

Cabins: Igluralaa



Figure 126. Campsite (Kautuq, 2015).

When the Canadian government established the settlement at Clyde River, Inuit quickly realized that their lives would revolve around this place for much longer than they were used to. People arrived and congregated around the HBC post, and families began to settle, seeking to improve their living conditions. Quickly, as multiple families lived together, some began constructing small cabins in traditional styles, using a mix of found wood, canvas, and skins—in

a traditional way of organizing space (figure 126). They also built small storage huts, some on skids ready to be moved. Slowly, the uniformity of the original matchbox and NTR units gave way to an assortment of living conditions based on economic possibilities, opportunity to work, distinct needs, and on the number of family members wanting to live together. This led to a culture of building cabins that could be transported to different camp grounds.



Figure 127. Painting (Hainnu) commissioned by First Air.

These new residential spaces are indicators of a strategy to cope with settlement life. Igah Hainnu’s artwork is the perfect representation of the phenomenon (Fig. 127). This duplex dweller described how his son learned to build a cabin. He said the hardest part was planning out the floor so that no plywood needed to be cut. With an appreciation for carpentry, his son learned his skills through observation. He believed the government realized long ago that Inuit were “great mechanics and could figure things out quickly. They are innovative, and if there’s no part for that, they can find something to replace it. Things then run, not exactly the way it was meant to be, but it runs” (semi-structured interview).

To maintain their hunting tradition throughout the 20th (now 21st) century, Clyde River dwellers, as well as many other Inuit settlement inhabitants, built cabins and re-established camps along the inlets and coastal regions. Located between Buchan Gulf and Home Bay, stretching 200 miles, the Clyde River cabin phenomena began around the community and now extends well into Clyde Inlet. The HTO has also built small emergency structures as safe havens

for hunters out on the land, protecting against winter storms or polar bear attacks. These small cabins mark the distant shores. Although Inuit mostly congregate in these places, informal grounds have become mini settlements, campsites with elaborate spring and summer houses; Inuit have understated their expertise as builders of Arctic architecture.



Figure 128 a). HTO cabin.

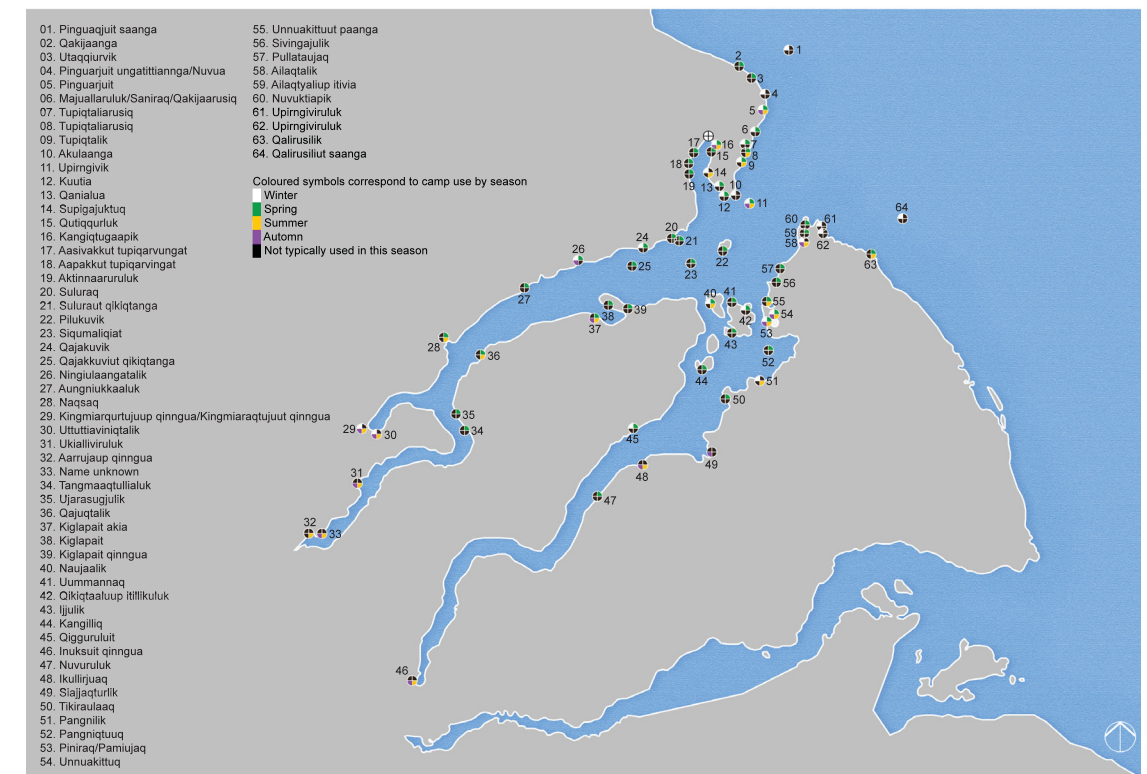


Figure 128 b). Cabin locations (Gearheard et al., 2013).

The source of much pride, these small houses are usually started in town then transported on qamutiiqs to distant hunting grounds where they are positioned, finished, decorated, and furnished (figure 131). Made almost entirely from government-building construction waste, these makeshift cabins have evolved to feature increasingly sophisticated architectural elements such as balconies, chimneys, broad window frames, reveals, and even bay windows. A side window or two allows for distant viewing. Plywood shutters protect against breakage by polar bears. Internet and other communications are enabled by satellite dish. Portable generators provide power.

While exteriors remain weathered, interior walls are painted (limited to government-approved hues, as paint is not sold in local stores) and adorned with wall art or locally made tapestries. Inside, one finds a small kitchen, a couch or comfortable chairs surrounding a coffee table, another table and extra guest chairs lining the walls, and a mattress and bed platform tucked away in a corner or alcove. The threat of polar bear attacks meant Inuit traditionally slept with their feet facing the outside wall. These days, secure in their wood huts, they sleep the opposite way. Small fishing nets, which hang from the ceiling, are repositories for drying mitts and boots. Strings also suspend sunglasses and pieces of dried meat. Stacks of cardboard boxes double as work areas and kitchen preparation surfaces.

Expressions of Inuit identity are embedded in design elements. Cabin clusters are well dispersed, giving each building an unobstructed ocean view, and if the location is compromised, repositioning is easy. When more sleeping places are needed, an *itaaq* (tent) is erected close by. Made of light-weight, impermeable canvas, these eight-sided structures are even more ephemeral. While no longer the dwelling of choice during hunting trips or weekend getaways, tent camps are still commonly erected during hunts. Customarily a community event, during a hunt at least one or two group members will remain awake through the night keeping a close eye out for polar bears. When used in winter, these tents are set up directly on a *qamutiiq*, which

creates a base above the snow. For economy of means, harpoons are sometimes used as tent poles (Gearheard et al., 2013).

By 2014, respondents to this research had established four comfortable cabins with separate sleeping rooms and kitchens. These shoreline campsites showcase Inuit self-building ability. The cabin layout reflects Inuit lifestyles. Despite limited resources, they can still express their creativity. They plan these properties independently of government agency. The design and placement reflect their independence and freedom. Joelle Sanguya's wood house and his mother-in-law's cabin next door on Arctic Bay's sandy raised dune are typical examples of an Inuit coastal development. Inuit entertain in their homes, so having a large central room is vital. Some cabins even have an additional bedroom or alcove for children, grandchildren, and guests. In addition, oriented toward the sea, rather than to each other, these cabins demonstrate their owners' detachment from the local community. This campsite at Cape Christian is one of at least 50 established around Clyde River since the mid-1990s. B. J. Hainnu located each one on the area map (Fig. 128 b).

Interview: A Cabin of One's Own

The following is excerpted from an exchange with Joatamie in September 2016:

Joatamie on Cabin Building: Some people have really good cabins, but this one is made for short people. This side is 6' and that side is seven. In the beginning, this was the whole cabin, and now we added the room and the porch. We are going to move the door and put it there. The door is southeast. So, we are going to put it south. [A small porch built on that side is used for the honey bucket.] These [pointing to his wall construction] are 2×4s and 2×6s. The top and the bottom are 1×2s running across. There is no plywood closing it; I ran out of plywood. The floor

is not as cold as it was without the insulation. I got this floor from my brother. This floor is really good when it's cold outside.[The plywood used on the exterior is outside is called Aspenite. Their plan is to finish the balcony and to finish the door. They will remove all the stairs that were made with old palettes.] I have new ones [referring to the stairs]. Maybe recycle some old SIPs [referring to Structural Insulated Panels]. The plywood inside I had to buy; the rest pretty much I got from my brother. (Semi-structured interview)



Figure 129. Cleaning up after the country food meal (Qillaq, 2013).

Some cabin entranceways open directly into the main room, others have porches for storing tools, boots and outerwear. Inside (Fig.129), one has just enough room to stand, keeping the volume of air to be heated at a minimum. A large kettle sits atop the fuel-burning stove positioned at the cabin's centre. A small sleeping space provides privacy. Canned goods, a clock, and traditional ornaments line the walls.



Figure 130. Joanna has kitchen duty cooking country food using naphtha cans for support (Qillaq, 2015).

Here, along the beach at Cape Christian, some food preparation and cooking can take place outdoors (Fig. 130). A small fire hisses between metal naphtha cans, and Joanna, the woman at work, brings a huge pot of food to share. A source of warmth and sustenance, this impromptu summer kitchen is near the buildings that make the home.



Figure 131. It takes a community to haul a small cabin during the summer (Gearheard, 2015). Hauling on the sand requires a four-wheel truck, a strong qamutiiq, and some quick thinking.

In cold weather, visitors are entertained in the main room. When the weather is warmer, people will be outside, often working together on a project (Fig. 131). Children run freely, stomping in the shallow waters that stand as tiny lakes and rivers on the wide sandy beaches.



Figure 132. An elder builds the largest and most impressive cabin at Cape Christian. He is planning a large bay window toward the ocean.

Each cabin exhibits a combination of architectural technologies. The walls might be constructed of 2×4 studs and posts made with two 2x4s like any wood frame construction (figure 132). Wool insulation is placed behind painted or veneered wood paneling. The ceilings are low and slightly pitched, following the slope of the roof. Shoes are removed at the door or inside a porch. There is always a window above or next to the door facing the coastline, and an occasional second window faces south or southwest.



Figure 133. Cozy interior and wall ornamentation made of baleen and the phrase “home sweet home.”

Modest shelters making use of available materials adjust to the surroundings. But people want options. Paint is a luxury. Those with better financial means add comfortable furnishings, a couch, and a real chimney (figure 133). Some bring a generator to power lights and an Internet connection.



Figure 134. Red cabin with a sideview entrance facing south and a wind-catcher to sweep snow from the front door.

Locally found materials (wood palettes, plywood, and 2x4s) remain the construction material norm (figure 134). It is curious that, surrounded by an abundance of sand and stone, wood-frame architecture persists. Such homogeneity suggests this is the best that can be done. Whether built from purchased materials or from refuse gathered from the dump, each cabin is independently oriented with plenty of room to expand. All have rooms with a view.



Figure 135. A small cluster of cabins on the coast.

The camp is a cluster of cabins, open to the sea (figure 135). Each building is raised above the flood plain on a sand plateau on its own small plinth (figure 136). But no house hovers above the land as is the norm in the settlement. The houses rest upon wooden beams or palettes (Figure 139). Each corner can be adjusted with a simple wedge. All are positioned with consideration given to wind direction, reducing snowdrifts.

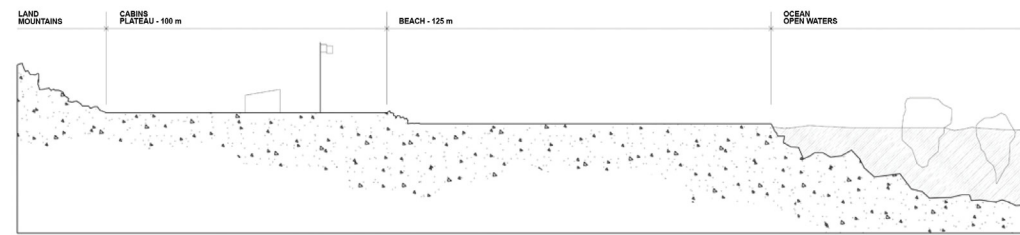


Figure 136. A section through the site at Cape Christian (Giraldeau, Havelka).

This family cabin at Cape Christian meets both the need for connection to the land and separation from the established community. The stove sends heat toward the table and floor where people gather to eat country food. Every window has a curtain. Beds line the back walls. And when exiting, one is always careful to close the inside porch door before opening the outside one, minimizing heat transfer. The porch is where the harvest may be kept cool (figure 138)—but not frozen—and traditional fur outerwear is kept cold. The porch may also be home to the honey bucket. Inuit cabins are usually a collection of repurposed materials.



Figure 137. Cabin in the middle of Patricia Bay, ready to be hauled in late April. The ice is still thick enough for hauling. Two snowmobiles and a family of six (with two small children) take this new cabin to the perfect site.



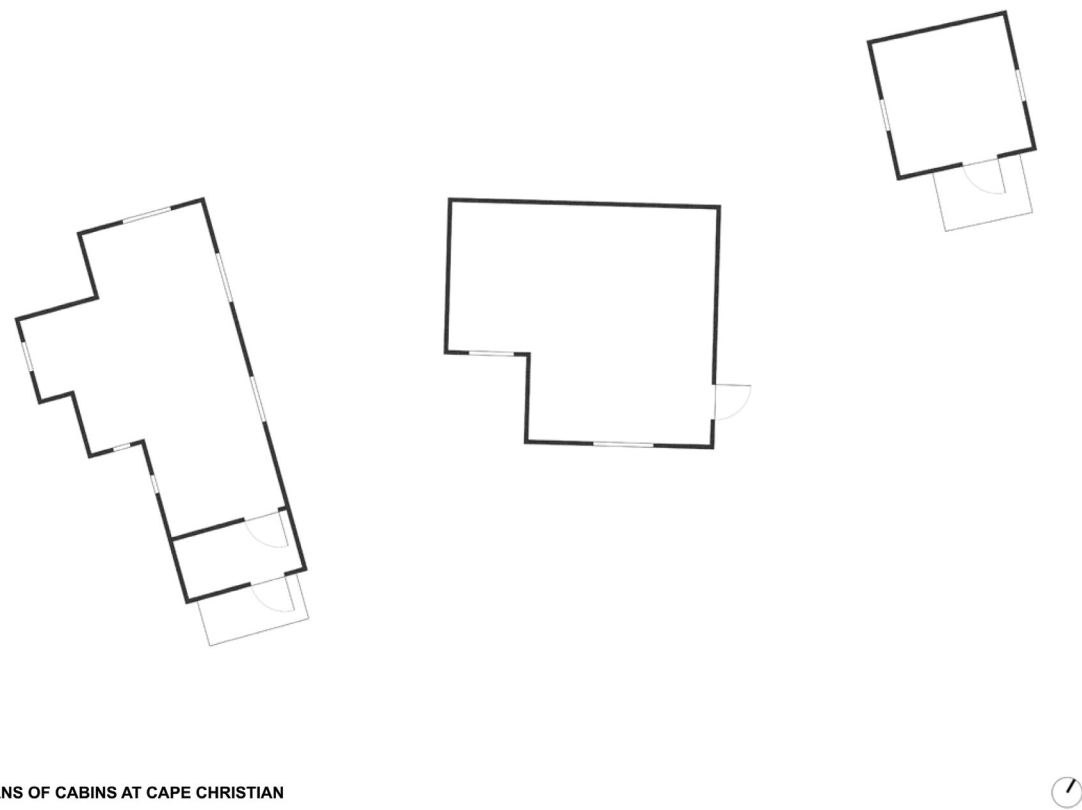
Figure 138. Entry porch at cabin with space for tools and other things.



Figure 139. Qamutiiq made to measure prepared to haul a cabin.



Figure 140. Man rebuilding a sigluaq that he took apart to bring it out on the land (Tassugat, 2016).



PLANS OF CABINS AT CAPE CHRISTIAN

Figure 141. Plans of three cabins at Cape Christian. It shows the relative siting and proximity, with a southeast view, entrance, and small porch.

At Cape Christian, these buildings are used for residential, holiday or hunting. Electricity is supplied by individual generators or simply heated with an oil lamp, and some have a diesel fuel

tank a heater. Water is brought in bottles or buckets. Latrines or honey buckets can be found in a small room adjacent to the cabin. Wastes are released into the environment.

Each cabin is constructed independently, and there is no construction history other than the knowledge of each individual owner. Exceptionally, the HTO officer is aware of most cabin locations because he authorizes them according to territorial lands; however, there is no real record, permit, or registration in a land registry. There is no written evidence of any additions, demolitions, or expansions of cabins. Only family members recall the era of construction, the time it took to build, and where building materials were found. Moreover, community members sometimes sell or trade cabins. These transactions are not registered. The process is spontaneous, and each builder or family will select their location according to their own set of rules, such as kinship relations or family ties, or the relationship to the land and sea. In some instances, clusters of cabins are more closely linked and have a more collaborative relationship, sharing services or equipment.

A Day at the Dump



Figure 141. Land fill, Land farm, Metal dump, Sewage lagoon of Clyde River Municipality.

The respondent “Charlie” noted: “We all complain of throwaway things. We throw away this and that. So, we’re trying to ‘recycle.’ We don’t get everything they get from Canadian Tire (Figure 141). When you look at the dump in different communities, you can redo the community. Lots of the machines and stuff they throw out here. All you need to be is a good mechanic and you can get it running again. Recycling is something we always do. Throw away is something we did not always do” (Semi-structured interview). Thus, Clyde River locals jokingly use “Canadian Tire” to designate what southerners call “the dump.” There are three distinct parts—for metals, combustibles, and sanitation. After a sealift, locals flock to the site not only to receive their pre-ordered goods but also to collect building materials ready for recycling or repurposing. Months or even years may pass before enough materials have accumulated to build a cabin. Apart from supplies obtained at the dump, the rest comes from the HTO or the Northern Store.

Interview: How to source material

The following is excerpted from “Charlie’s” response during an interview:

C. Kalluq on materials from the dump: I got everything from my older brother or from the dump. After a sealift, I got material from a box or crate. They throw them to the dump, so that’s why there are a lot of cabins down there. Or when they build new units, there are even more cabins. Some people do now buy new materials. The HTO has begun to sell 2×4s and some plywood. Next week’s sealift comes in, so we’ll be getting new material. The HTO brings material in to build the little cabins for hunters. They’re called “siguluaraa.” They used to use tents, but they tend to build more cabins now to protect themselves from bears. I’m hoping to make my window a little bigger, so I can see if someone comes. There is never

any plexi-glass at the store, so I get it from the dump, from the cars or snowmobiles, from the windshield.

While the dump is a sure place to find certain materials and parts, wood is more readily obtained around construction sites or after a sealift in the form of used containers and crates. The hamlet recently changed its policies regarding the dump. Three years ago, all disposed materials were burned. A few years ago, I was working to open up the pit for landfill. I would find beautiful pieces of wood that a person can use. I would use the radio for everybody to hear. I asked: “I like this wood; why are they throwing [out] this beautiful wood?” I even asked one of the counsellors why are they throwing [out] this wood and burning it. I had to urge them not to throw it away. Why burn that? Remove that wood and put it in a separate area. We don’t have trees, so don’t burn that like trash. It’s precious. (Semi-structured interview)

The Construction Process

Another respondent is a jovial young father and employee of the local hotel. He is rebuilding and hauling a cabin to be closer to his brothers’ cabin near Cape Christian. “It’s in Tupertalik, where Alan’s cabin is. It’s about a quarter mile from there; that’s a new location. This location is by Cape Christian because I wanted to be close to my older brother. I could visit him by walking, not by machine” (Semi-structured interview). He moved an existing cabin about one-quarter mile from its previous position to the new site and then proceeded to anchor it onto a new type of foundation. He explained the entire process from the building of its made-to-measure qamutiiq (sled) to the tools he used and the principal construction details. For the sled,

he used old electrical posts cut into 12×12 beams, beveled at an angle where the posts meet the sand. He then cut the beams into a curve following the shape of a sled.



Figure 142. Preparing a made to measure qamutiig for hauling a cabin.

He shared other details: “I would start to build a sled—a ‘T.’ They are all 12” thick, which I started to saw from old posts. I built my posts from the old trees. I was making a slight angle, so when it hits the sand, I make an angle. So, I cut the other front like the shape of the qamutiig” (Semi-structured interview). Then he spanned the two beams with three 2×6s affixed with 10” wood screws (Figure 142). Using a 12-ton hydraulic jack, he hoisted the structure about 18” and slid the qamutiig underneath using his quad. Sam then rented the municipal loader to haul it to its new site. Once in location, the jack was used once again, and pallets were placed beneath each corner to prop up the cabin—eight pallets per corner. The complete excerpt describing the construction process is on p. 298 entitled “A conversation with a respondent about the construction of his new cabin”(Figure 144).



Figure 144. Respondent’s cabin during construction. Pallets are used as stairs and provisional supports. The second door is a separate porch with a honey bucket.

Layered History, Layered Architecture of Kangitugaapik

There is no real line that distinguishes between traditional and modern.

Everything evolves and constantly changes (Koperqualuk, 2016).

This chapter has provided the principal findings of my research. While governments have tried to assimilate Inuit families into a Canadian socio-economic system through multiple housing, healthcare, and education initiatives as described in chapter two, the extended family structure and the need for mobility in foraging activities continues to underpin Inuit life. How is this expression manifest in architecture?

Observers have long recognized the existence of informal modifications and buildings in and around most Arctic settlements (Stern & Stevenson, 2006; Damas, 2002; Duffy, 1988). They have been referred to as shack-like, makeshift, unsanitary, make-do, temporary, throwaway, band-aid, or just temporary arrangements. While inadequate housing has been identified as a health and sustainability issue by Inuit planning agencies (McEwen, 1976) and by the federal government (Williamson, 1996), little attention has been paid to the rise of this hybrid architecture as a needed response to housing imposed on the Arctic for the past 60 years. In the

“old town” neighbourhood, amid the modest housing units that line broad unpaved roadways parallel to the shore, approximately 235 added outbuildings have been constructed, as well as 150 porches and 65 windcreens and snow-screens (figure 145).

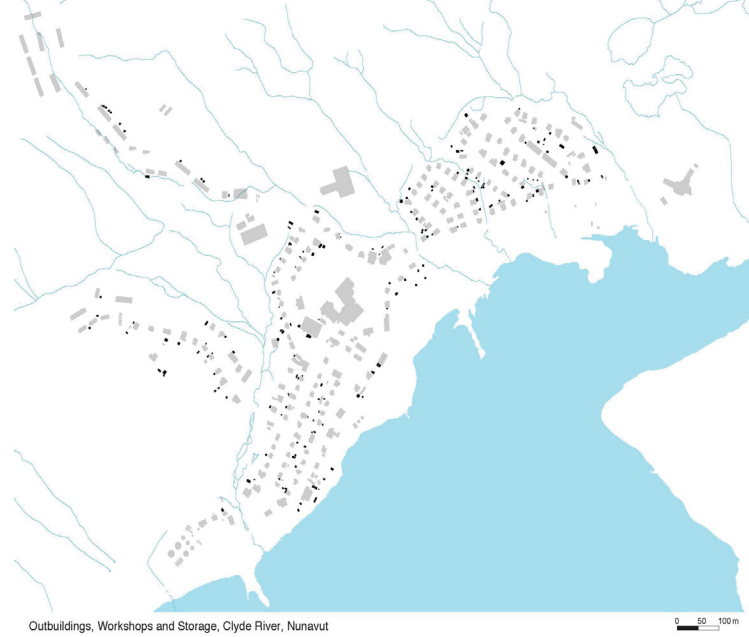


Figure 145. Outbuildings, trailers, and workshops scattered around the community (Giraldeau, 2016).

While many theorists contend that cultural landscapes are shaped by humans and by their specific cultural practices, the cultural landscape is in fact an image and “there are potentially as many ways of seeing as there are eyes to see” (Jackson, 2003, p.177). Any changes humans make to the environment—or the sum of the layers a resident population makes on that environment—shape a cultural landscape. In this chapter, I have demonstrated that government space is an incomplete portrayal of homesteads for Inuit everyday life. Consequently, it is essential to grasp the importance of the layers of built form that now overlay the environment, revealing design principles and codes that reflect the socio-economic conditions and characteristics of contemporary Inuit.

The latest generation of camps, those referred to in my study, appeared in the 1990s. Featuring layouts of activities more in line with “original space” and tradition, these camps reflect and reinforce a cultural identity that prizes being out on the land to learn Inuit hunting and

gathering skills (Figure 146). Many scholars assert Inuit identity remains tightly bound to the “hunter–gatherer”—hence, the vital importance of these camps (Searles, 2001; Searles, 2003; Stern, 2001).

Indeed, the Canadian government’s vision of basic Inuit housing units is the premise for the solution. In-between the rows of houses, clever residents have built around and beyond the inadequacies of government housing. The in-between spaces show evidence of a resourceful people who turn discarded snowmobile tracks into non-skid pathways, who scavenge garbage dumps for modern and exotic materials, then use age-old design principles to incorporate them into the construction of much-needed entryways, outbuildings, mobile hunting cabins, and other improvements.

As a Canadian architect, discovery of this vibrant kinetic public space, this abundant handiwork, both shocked and attracted me. Wandering through town, I met craftspeople and mechanics, artists and scientists, homeless geniuses, and dreamers. Beyond the government settlement, a mobile armada of sheds on sleds spread over the land, a cabin culture at once modern and ancient, dedicated and delinquent. There was a struggle going on here, and it seemed increasingly clear who was winning.



Figure 146. New cabin built in town and about to be hauled to a campsite at Clyde Inlet.

The Self-Sufficient Artisan/Builder Mindset: Iminik Aqqisurialik, Avatimik Kamattiarniq, or Qanuqtuurunnarniq

You have to put them together by yourself, do it yourself (Tassugat, 2016).

This chapter's first part describes some of the modifications and additions for living with government space—small additions to a house in the community (a primary residence usually built by the government), outbuildings or illuaraq, their sigluaraq (cabin), and their ittaq (tent). Much other significant material culture exists, such as special racks for drying fish, tables for sewing, frames for stretching furs, small boats, and various dog and bird houses.

When I first characterized this built work, I described it as “living with government space.” As my fieldwork progressed, the word “hybrid” came to mind as it reflects the array of Inuit-built works with a material accuracy. For the sake of this research, “hybrid” is the result of a collision between opposing elements. In a perfectly applicable way to Inuit building, designer/storyteller

Nathan Su (2012) defined hybrid as “the intersection between two ideas from which there are three possible outcomes.” The first, he said, is “displacement; one idea dislocates the other so that the two co-exist in tension. The second is reaction; the two ideas respond to each other and a symbiotic relationship emerges. The third is fusion; the two ideas merge so completely that what results is an entirely new idea, with different characteristics from either of its parent ideas.” The condition in Clyde River is about this third kind of hybridity, which occurs between a designed outcome and a spontaneous one (Figure 147). In the Clyde River case study, the concept relates to the spaces that provide the structure in which spontaneous modifications or interpretations by those who use the space can occur and the physical outcome.

The following section focuses on simple, resourceful, and clever technological and engineering solutions, such as applying frozen mud to sled rails. For example, Gabriel is a hunter. One day, while out on the land, his snow machine broke down. His repair solution reveals how a pragmatic and resourceful mindset frequently comes in handy, as explained by “Charlie”: “There were no pistons for that particular machine. Out there we have no electricity, no nothing. The piston had a hole in the middle. He managed to flatten the piston on the top and bottom and got it working again. His work is an example that I witnessed. He used a hammer; he was at it for a long time. By the time he got through, he knew how much force to apply to stretch the steel and fill the hole. Steel is difficult to work with; it snaps after a while. He got it running” (Semi-structured interview).



Figure 147. Teflon guards that replace mud guards on qamutiigs.

This experiential and pragmatic nature has always been present in the north. It is perhaps a reaction to the long waiting lists for housing, or the government's inability to plan affordable houses in ways that facilitate everyday Inuit cultural life. Perhaps it is about finding new ways to counter old southern-style planning techniques. No matter what the motivation, Inuit workmanship and resident built creations pushes the limits of technical *savoir-faire*. This creates new paradigms for more responsive and sustainable environments. The ephemerality and hybridity of these temporary arrangements and forms succeed at correcting design flaws and incorporate age-old construction knowledge.

These experiments test their own viability, their own capabilities to realize that Inuit are active and able participants in their own organization. As the recent proliferation of cabins, workshops, and outbuildings demonstrates, this viability is no longer in question. The creators of these structures have been moving housing beyond the basic wood-frame construction systems implemented to northern regions since WWII. In Clyde River, we have the roots of a new character of vernacular, one that is distinctly architectural, one which can combine gathered

traditional knowledge, modern housing needs, and alternate building systems to come up with new possibilities for Arctic architecture.

What Brings the Pragmatic and the Spontaneous Use of Materials?

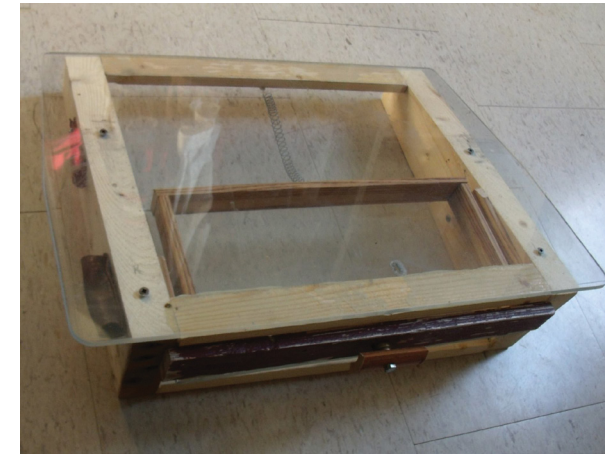


Figure 148. Isaac's table and drawer, on which women will prepare skins and sew (Tassugat, 2016).

The specific attitude, indigenous ingenuity, or "Inuit functionalism" (Nango, 2016) with a little humour is where this phenomenon is uncovered (Figure 148). It is easier to find collections of unusual objects around the houses where the people still venture onto the land (Figs. 164–193, after the appended "Interviews" section). James Houston (1995), for example, an artist and explorer who spent 14 years living in the Canadian Arctic, spoke of the small things in the every day that made his stay an experience of wonder:

The wonder of the Arctic is not its physical vastness, but rather in its smallness, in its intimacy. Persons, families living days travel between each other, still consider themselves intimate, a part of an extended family willing to share everything with those almost distant, yet near neighbours. I am not for a moment suggesting that these Inuit are superior people. I am only saying that I believe the situation that they have so long known has given them a greater compassion for each other and for all of us, and a ready willingness to share all they have in the name of survival. I felt

myself so fortunate to have lived with Inuit when life and death were still perceived in such a fearless, open-minded way, open to all mankind and to the animals as well. What other people will ever even consider a life so closely bound with nature? (p. 102)

J. B. Jackson (2000, 2009) devoted much of his career as a landscape writer attempting to convince us that everyday spaces—roads, yards, vacant lots, and shopping strips—are a meaningful part of the vernacular landscape. It is place, a permanent position in both the social and topographical sense, that gives us our identity. These places often allow people to assemble and generate feelings of belonging, identity, and rootedness. Robert, a Clyde River resident, remarked: “I don’t know what you see when you look at our community, but we really love our town. This is what we know and have grown attached to” (Semi-structured interview). And as Jackson’s writings brought an appreciation to how these ordinary places work and develop, they also generate an interest in how people get around, how they gather in them, how they occupy and use the space in their everyday lives. Not always attractive, these spaces nevertheless give identity to the environment and to its people.

The arrangement of spaces where Inuit build does not arise from a systematic set of straightforward elements but rather from a more organic set of circumstances. The scale and complexity depend on the individuals, their functional interests, and their access to materials, as well as the season and the siting. Instead of settling in their government houses (or rather than just adapting and living in them without resistance), many Clyde River inhabitants choose to expose or manifest what living Inuit really is.

Occupants create a space, an addition, a transformation, a change associated with their every day life to improve a basic function, or simply to find a place for repairs and storage for future land-based activity. By using government space as ground zero, Kangitugapimiut have learned from it, worked on it—sometimes converting it or adding to it creating features

(windscreens), ornamentation (animal skins stretched on frames), or new spaces (porches) that create differentiations.

Upon examination, complex patterns emerge. The modifications in government space suggest that only some needs are recognized by the basic housing apparatus. It also suggests that with simple solutions, basic needs derived from cultural practices can be otherwise considered or accommodated. For example, outdoor space around the house is as important as the house itself. Here, the plots are undifferentiated and systematically covered with sand or gravel. They serve as an essential extension to the house, a place to gather, to work, or just to smoke. Although the boundaries are fluid, each house has an assigned plot, and this plot is defined by the objects scattered on the ground, setting the stage for the movable workspaces, storage rooms and outbuildings, and perhaps even the site of a new cabin. These spaces generate paths and tracks throughout the town.



Figure 149. Formal and informal paths in Clyde River.

Clyde River residents find many reasons to use these in-between spaces: for their proximity to the house, for the parking of vehicles, for working on or repairing something outside, for storing defunct parts, or for building a workshop or eventually an outbuilding or cabin to be brought out onto the land. In terms of visual impact and usage, there is no other public place

in town that residents use and experience more than these in-between spaces. Because the in-between spaces, both in the informal paths and the built form (figure 149), have received almost no attention from northern community planners, the creativity, energy, and ingenuity that goes into their making demands attention.

Building Other Buildings

Building other buildings and modifying interior spaces have been fundamental to everyday Inuit life since the establishment of government housing in the 1960s. In the beginning, few outbuildings were seen between other structures or alongside the roads. Traditional sleds were already commonplace. Small grub boxes and shelters were built on top of these sleds for the transportation of goods or for protection against an unexpected winter storm. These artifacts

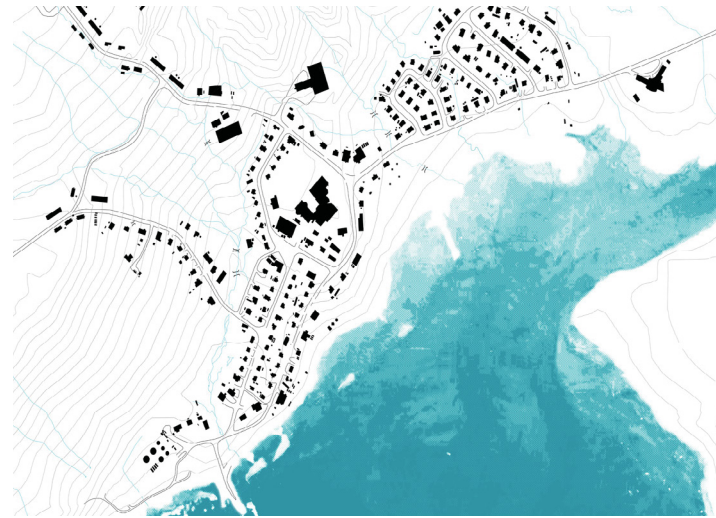


Figure 150. Clyde government houses with added outbuildings and porches (Giraldeau, 2016).

were already part of the material culture. Figure 150 shows the extent to which Inuit have built within the town proper.



Figure 151. Cabin on skids departing with two snowmobiles. This is for a family of five from the town, heading to a distant hunting camp.

According to Lias Koperqualuk (2016): “Our parents and ancestors grew up in family camps during the summers and winters. Families today go back to these places to go fishing or hunting. During the summer, the camps are more inland and in winter, they are on the coast.” The original NWT government supported outpost camps, aiming, in part, to ease settlement overcrowding. Providing subsidies and loans for building materials, fuel, and equipment such as two-way radios, the short-lived Out Post Camp Program drew Inuit to quiet coastal areas. Inhabited all year around, these camps were called *Nunaligalait* or “little towns.”

Outpost camp residents sold furs and carvings. About four families, 20 people, occupied a camp. In 1982, some 350 Baffin region Inuit lived in 25 outpost camps. While a small proportion of the population, the outpost camps were an important alternative to settlement living, where traditional culture and non-intrusive government assistance coexisted.

No one lives year-round in outpost camps anymore. Instead, seasonal camps such as Suluak, about 40 km from Clyde River, provide a place for hunters and trappers to stop over on their way farther down the inlet. There are two or three cabins in Suluak where 30 to 40 families would live all summer long. Until late June, when the ice breaks up, some of the men would

commute to town for work. Traveling on the sea ice was faster and more direct than trying to go over the rocky terrain.

With the new settlement of government dwellings, families had separate rooms for sleeping. Walls absorbed sound; Inuit lost both the connection to the land, to the sounds of nature through the walls, and the ability to gather in a room and to sense the mood at hand. They adapted to a new relationship to space. Therefore, constructing cabins and hauling them to distant camps became the norm. Using leftover and excess materials, families began improving living conditions, regaining a former freedom. And using their acquired building know-how, they translated their traditional design principles into a new hybrid architecture.

They began building small mobile houses not unlike the original HBC houses they had seen in the settlement. They were smart, creative, and sometimes beautiful adaptations that allow us to better understand the local way of life. Mr. Qillaq senior, born on the land, still moved around a lot and wanted to start an outpost camp on Baffin Island near Sam Fjord. A pattern of living occurred there for two to three weeks at a time. Wenzel (personal communications, 2015) noted that in the early 1970s, the town's only store closed in the summer because 2/3 of the population left for camps during the summer hunting season.

Inuit such as Qillaq were commonly referred to as *Inummariit*, meaning “purely Inuit.” They were raised prior to contact with qallunaat and are the subject of much of Hugh Brody's studies (e.g., 1975) of people in the north. Inuit who grew up in government-led settlements or towns were *qallunaamiut*. My research mostly engages the latter.

The camps built on ancestral lands, where Inuit choose the location, size, orientation and proximity to others allow qallunaamiut to live their way. For Nancy, a Clyde River resident, today's camps are more about recreation and weekend or summer getaways but do not necessarily contribute to her own Inuit identity (Semi-structured interview).

Under the 1993 Land Claims Agreement, an Assistance Program was established to promote Hunting and Trapping as an alternative to wage employment (Quigley, p.204). Another financial program was established to allow local hunter and trapper committees to play more active roles in the hunting and trapping economy while other programs assisted in the construction and maintenance of the outpost camps (Nunavut Tunngavik Incorporated, 2004). These programs were the onset of the cabin culture as we know it today.

Although we may all recognize that modifications and self-built designs are part of a new type of development in the Arctic, too often little consideration is given on how they are designed and built and their impact on the town. This cabin culture is a central part of the social and cultural life in Clyde River. It influences the way Inuit live, the destinations they choose, and the way they select a site when looking for a space to build. This self-built design tradition breeds a feeling of control and autonomy. They also provide a certain inherent adaptability that prompts spontaneous and planned public activities such as hosting the sharing of foods, an open-air work or repair shop, a carving station, or just a place to prepare for the next hunt.



Figure 152. Cabins (Havelka, 2017).

Modernization has changed the appearance of these traditional gathering places. According to Wenzel (personal communication, 2015), the turning point occurred around 1985 and was due to two factors: a more restrained area of summer camps, because of the fixed settlement of Clyde River, and new forms of non-kinship associations with resource providers. Inuit adopted the materials and the rectilinear shape of the HBC façades and government experiments but not the

interior layouts. Inuit cabins conceal Inuit cultural values, *IQ*. The interior's open plan is a feature found in all traditional and resident-built dwellings. This space can be used for gathering, living, working, sleeping, or cooking. It is antithetical to the compartmentalized government space reflective of Euro-Canadian family structure. While the cabin may aspire to the HBC exterior or façade, the communal interior and siting resembles the traditional *qarmat* and Thule whalebone house plan. Figures 153a) and b) illustrate the similarities in the coastal siting.

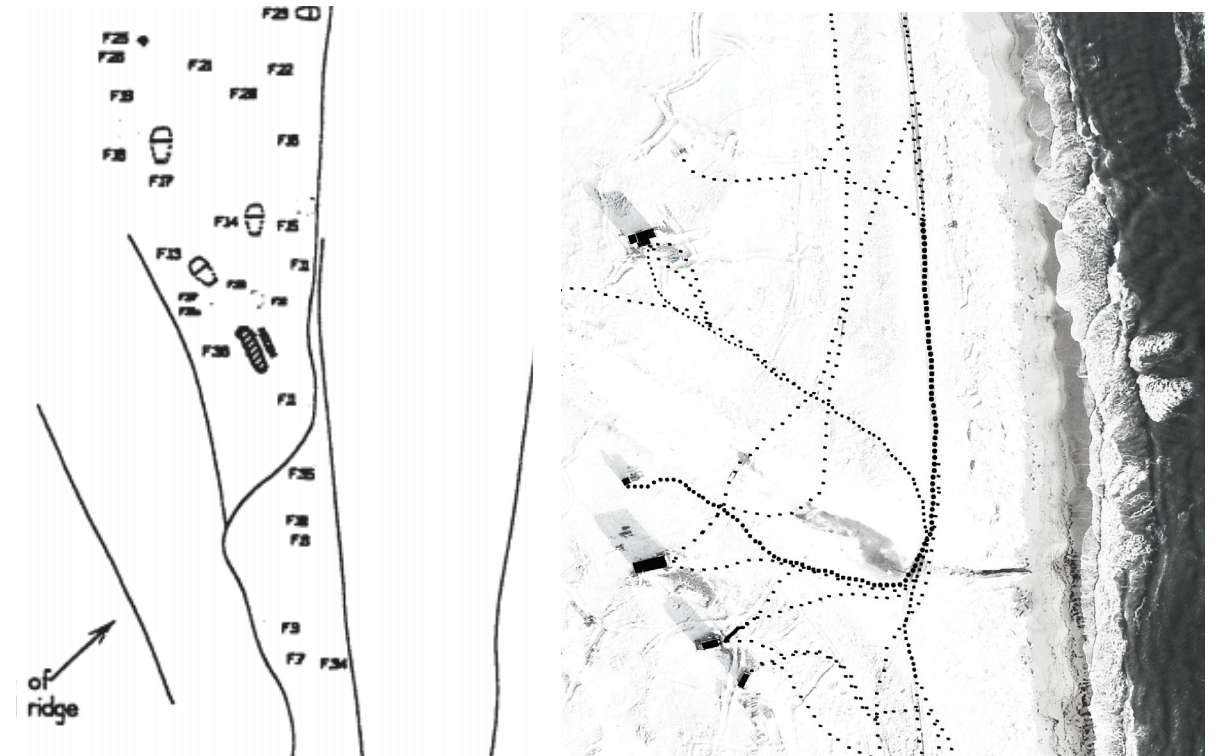


Figure 153. a) Traditional *qarmats* (the oblong shape with the narrower part being the entry point) on a stretch of beach campsite (Dawson, 1997). b) Self-built cabins on the coast of Arctic Bay (Havelka, 2017).

Cabins like *Qarmats* are positioned on the high plateau with entrances south or east facing where close proximity reveals kinship relations. Each unit has sufficient space around itself for clear views to potential harvests and easy access to primary circulation on compacted sand along the coast. Placement of both types of shelters are built on the lee side of a ridge or cliff for added wind cover.

Where Are These Camps in the Region?

To learn about the distinction between camps in the community and out on the land, speaking to key figures in Clyde River has been enlightening. During an interview, the wildlife and games officers at the HTO, BJ Hainnu, sat on the second floor of a small grey building almost at the end of the main street in town, in an office with a large corner window. He pointed to a land map of Baffin Island that covered the wall and, one by one, located every cabin built out on the land and its rightful owner (see map of cabins). He could pinpoint every cabin in a 100-mile radius: “There are 34 in Patricia Bay and two here along the coast.” And he went on to say that the sealskins are mostly going to North Bay, Ontario, to the auctions at \$15 per skin on average—a slight increase since the \$4/sealskin in 1962—and to Burns Island, Raven’s Craig down in Clyde Inlet. He continued: “Ninety percent of cabins were built in Clyde and then hauled out on the qamutiiq. One big one left two weeks ago, William Kautuq’s cabin, in April, the best month for transport” (Semi-structured interview). He also told me of another cabin (see Fig. 146) that was temporarily stationed on the bay and would leave at 4 pm on the Monday after the interview.

Summary

This chapter uncovered Clyde River’s layered scenery, exposing both a passage of time and a form of resistance manifested in the small additions and outbuildings along roads and in spaces between houses. Their shapes and forms do not conform to any particular style or pretension. These low cost customizations illustrate a broad range of unique ideas meant to correct inherent government housing problems. These structures show little consideration for appearance but demonstrate a sense of resourcefulness and give the place a hand-crafted appeal. Spreading beyond the town proper, these built works represent a new generation of self-built, mobile structures that incorporate both local and imported technologies and materials. Built with IQ,

this responsive architecture better reflects a contemporary Inuit hunting community’s needs and aspirations.

Conclusion

My conclusion begins with a summary of findings, demonstrating how the research questions have been answered. The second part outlines conclusions drawn from the analysis of evidence presented in the study. The third section presents the broader contributions and implications for policy development, aiming to accept informal architecture in the Arctic and elsewhere as a legitimate form of building. I then follow with a more detailed discussion on how these modifications can influence new designs, and I explore some specific lessons learned.

As an in-depth qualitative case study, this research explores Inuit built form within Clyde River and its surrounding campsites, determining that they represent both a resistance to and a hybridization of Canadian government intervention. Inuit, in fact, not only improve their government-designed housing but, free to build out on the land, their cabin culture has become a tool for maintaining traditional culture. While the essence of Thule and Dorset traditional houses have been reproduced with present-day materials, these cabins are evidence of a cultural resiliency and portray a more accurate picture of Inuit homesteads and social spaces.

Summary of Findings

Widely referred to as shacks, resident-built works are an important proving ground for many builders and, more significantly, a showcase for Inuit design and building principles. Simple transformations such as adding snow walls improve poor orientation. Likewise, creating larger porches provides an intermediate zone between the cold outdoors and warm interiors, or for coat and boot storage. They have also added automatic door closing devices (Fig. 153. c), and constructing outbuildings, workshops, and cabins connect Inuit to their own culture, allowing them to be more Inuktitut. While the government space has influenced construction

techniques and material selection, the cabin culture and other resident-built works offer a way of engaging cultural and social relations such as kinship, hunting, and food-gathering traditions. The cabin culture has recreated a cultural coherence and continuity with Thule house designs, and it embodies the way spaces are created, placed, and used, which influences the design solutions. Government environments break kinship groups by imposing a foreign interior layout and road planning, whereas Inuit residents' pragmatic modifications respond directly to the needs of the family.



Figure 153. c) Automatic door closing device at the local church made with bone.

Like all Arctic settlements, Clyde River presents a sharp clash of cultural landscapes. The disparity between the permanent and the ephemeral characterizes an era of “shared geographical life space” (Davidson & Milligan, 2004). This space between northern and southern traditions can no longer divide Canada. Twenty years after the Land Claims Agreement, increased economic and cultural cooperation is inevitable at a time of growing collaboration and interest in northern resources. A hybrid design tradition in the north is a consequence of combined Arctic and southern Canadian design principles. Recognizing, accepting, and developing this new vernacular is the best path forward.

Today, ephemeral Inuit productions of space based on traditional knowledge, IQ, with remnants of past and contemporary traditions, exist on Inuit terms. This practice is critical to the community's survival. It lets Inuit be Inuit, connecting to the land and their tradition. Therefore, I

have suggested that these aspects of Inuit culture can and should influence future Inuit settlement life. However, neither the current models of government houses presented in chapter two nor the informal Inuit structures in chapter three can suffice to support Inuit lives on their own terms. The hybrid forms of Inuit self-built architecture are only the beginning of a new constructive paradigm. So far, governments and architects have ignored this potentiality. While a few architects identify with the indigenous self-realization movement and are critical of government-led housing initiatives, they still design forms and buildings poorly adapted to an Arctic lifestyle.

We have forgotten the extensive work of Inuit, responsible for a significant portion of the building activity in and around northern communities. In *Understanding Ordinary Landscapes*, Hayden (2004) discussed the stories behind place-making, using a variety of verbs applicable to Inuit communities. These include “planned, designed, built, inhabited, appropriated, despoiled, and discarded (Hayden, 1997, p.111) She reminded us that “Indigenous residents as well as colonizers...are all active shaping the urban landscape”(p. 111). In Clyde River, Inuit are actively shaping their lives around mobility and Inuit culture. For example, the ongoing traditional hunting practices and seasonal camps demonstrate how a people can merge formal prescribed living with informal or seasonal living, the traditional with the contemporary, creating an interdependent alliance. This interconnection deepens the characteristics of Inuit domestic life without direct foreign involvement, contrary to subsidized housing in government-run settlements, which do not integrate Inuit traditional life. According to a community development officer (personal communication in September 2015), housing authorities consider Inuit modifications and usage patterns disorderly and unruly. While I contend that government housing played a positive role in inspiring a new hybridity, the development and implementation process remains ill-conceived.

Before WWII, Inuit seasonal settlements, which consisted of one or several families, were arranged in small purposely placed and positioned pods. Sustainable, portable, changeable, and transitory, these camps left few traces. Today, in the coastal camps, Inuit maintain a similar

philosophy toward the land. They recycle available materials, rely on hunting and fishing, move their houses from one site to another for appropriate adjacencies, incorporate their traditional art of living, and congregate and settle as they please.

The art of living Inuktitut⁵⁸ today honours ancient cultural patterns. Within circumpolar regions, the formal and the informal have merged into a hybrid form that allows for both to coexist. That said, Clyde River and its surrounding camps challenge Canadian government housing design. Is camp life the only way Inuit can live as a people and as a distinct society? How can governments help Inuit create imaginative hybrid forms and spatial compositions that sustain their cultural models?

For now, the settlements, dependent on government programs for their design and realization, do not reflect the true image of Arctic life. Outpost camps are far more representative. This self-made cabin culture dominates the cultural landscape and underlines the importance of the movement from village to camp. The temporal construction in and around government houses, along with self-built cabins in the far-flung camps, create a new image, through which the expression “living Inuktitut” is articulated and organized. Inuit hybrid and social living environments are not controlled by the government.

These relatively new environments are the result of a popular, yet ephemeral and transformative architecture. While they resemble self-built environments found in India, South America, and elsewhere around the world, the building style must be seen in relation to and in the context of Canadian government settlements and is probably incomprehensible outside that context.

American geographer Pierce F. Lewis (1979) referred to built environments as “human landscapes...our unwitting autobiographies, reflecting our tastes, our values, our aspirations, and even our fears” (p. 12). By looking at the forms and structures examined in this dissertation, we

⁵⁸ This is an Inuit term referring to “traditional” when speaking English to non-Inuit.

can see this material culture not only as a physical condition of settlements (or even as searching to be more permanent) but also as a reaction, an assemblage and disassembly of parts, a bricolage of elements responding to a need, a season, an opportunity, a resource, or even a whim. Its extent goes beyond the issues of material and technology because it is impossible not to conceptualize it as a new type of production. These built works support all sorts of temporal conditions.

Throughout history, when Inuit encountered ancient ancestral sites, technologies, and materials, they rapidly adopted them to become part of their new local or regional material culture. Not only did a greater abundance of materials and a continued practice of collaborative hunting prompt the construction of more spaces; in the last decades, a new influx of current materials and technologies have prompted a new type of building—a cabin culture, an unceasing amount of built structures and cabins positioned among various coastal places, away from the settlement, in pursuit of harvests and other resources. This cabin culture, supported by a network of tiny HTO cabins left out on the land for emergency shelter, has promoted and reinvigorated movement out of the settlement, and has resulted in a modernized framework of social and economic relations.

While the landscape remains the same, the introduction of southern Canadian housing stock, equipment, goods, and materials modified practices. Wood replaced bone as the material of choice in *qamutiiqs* and cabins. Plexi-glass is today's material of choice for cabin windows (bears find them harder to break). The *kayak* gave way to the whaleboat. The dog team surrendered to the snowmobile. Teflon replaced ivory or frozen mud on sled skids. Rebar replaced bone harpoon shafts, and the rifle replaced stone-tipped spears and harpoons.

More than five decades have passed since the first houses were moved to the new Clyde River site. In that time, its population has grown from 35 to over 1,200 people. Meanwhile, a constellation of campsites rings Clyde River proper. These camps were set up with the belief that reconnecting to the land and regaining traditional survival skills were essential to Inuit identity.

While the camps' temporary nature is evident in their construction and organization, they have recently assumed a quasi-permanence.

Despite their apparent consistency, camp dwellings reveal much about their individual builders. Conditions vary, based on access to materials, financial circumstances, taste, and design understanding. Thus, these privately-owned cabins, these small yet well-designed houses and their workspaces, are the domain of influence in which the individual dimension of self-realization and self-expression becomes clear. It emphasizes the notion that Inuit can control their built environment.

Besides providing a unique view of Clyde River and the surrounding region (one even Google Earth has failed to properly document), this study sheds light on the problems of standardization, social housing, and the study of architecture as markers of communication. Some 60 years after Clyde River relocated to its current site and the first government space was built, the questions then under consideration are still asked today.

Some visible features of Clyde River developments have been reinterpreted. First, the settlement proper is not a complete architectural failure. The resident modifications establish a positive consequence of the original governmental conception of space. While some designs facilitate modifications more than others do, Clyde River would only be considered a failure if it had not allowed residents to modify and add spaces to their housing. In fact, the situation often allowed occupants sufficient latitude to satisfy specific needs, and by doing so, it gives an indication of what these needs are. Because of the individuality of certain neighbourhoods and the number of external outbuildings and cabins built in the in-between spaces (where the most extensive work was carried out), these transformations contribute much to the community's character. However, houses in other parts of the community are far more impersonal and newer—multiplexes where there are no apparent fixes or modifications. Part of the answer is that these houses are newly built rentals where strict guidelines discourage transformations.

This thesis has detected and documented an architectural marker embedded in Clyde River's emergent cultural landscape. The empirical evidence is clear; houses have been built (decade after decade) that do not reflect the cultural models of Inuit. The historical evidence reviewed in the previous chapters suggests contemporary cabin culture reveals degrees of influence: a product of a sustained cultural know-how and the influence of modernization and government-built projects following the establishment of the settlements. Specifically, the cabin culture has evolved into an unofficial realm of a revitalized social organization from which traditional forces awaken a renewed sense of extended family and identity.

Acknowledging modern architecture's importance, what practical steps are needed for Inuit to become active agents going forward? How can we promote more of these self-built structures and encourage and embrace Inuit design talent?

We must escape paradigms that claim indigenous societies have built their environments as a reaction to dominant powers. Marshall David Sahlins (1999), an American anthropologist, and Nunavik scholar Koperqualuk (2016) have shared an understanding of the contemporary forms of culture and processes, believing in cultural continuity. When new resources become available through new contacts, Inuit are apt to accept or decline the change, based on their own traditions and worldview. Snowmobile transportation replacing sleds and dogs is but one of many good examples of this fully accepted model of technological change.

Anthropologists often assert that colonial powers have destroyed indigenous life and that resilience and adaptation to new environments is a matter of survival. While these arguments are valid, they do not consider that each indigenous group reacts differently to colonial powers, and few indigenous societies have disappeared under the influence of colonial rule. In Sahlins's view (1999), "no culture is sui generis, no people are the sole or even the principal author of their own existence." They adopt colonial rule to their own use. It can be seen as a way to indigenize

change and speaks to Sahlins's statement that we are witnessing "not so much the culture of resistance as the resistance of culture" (p. 399).

These facts make it difficult to speak about a unified tradition in a specific context. In Inuit building traditions, buildings connected to Inuit ways of life find an expression in plans and in planning. There are patterns of similarity and continuity with Thule houses and traditional winter houses. While constructed differently, they are arranged the same way, and this has social meaning. There is a cultural coherence inside and around all cabins.

These unique structures are true to Inuit ways of building. While their expression is overshadowed by the differentiation that exists with more traditional ways of building, their new creations also underscore the fact that the outside is influencing this building tradition. The development of Inuit vernacular architecture has now reached a point where it competes with the government building typologies, morphing the dual processes into a new hybridity that has developed as an inevitable part of the decolonizing process.

Regional building traditions define people, cultures, and nations, and they play an important part in identity, not only from a contemporary perspective but also for the future development of any community. According to the United Nations, "adequate housing" is a human right (Fact Sheet No.21, p.27). What does "adequate" mean? It must be affordable, habitable, and accessible; it must incorporate services and have a proper location and cultural adequacy. If contemporary government housing destined for the north found itself as a reflection of collective identity, one that truly expresses a culture to the outside world, it has certainly failed to address Inuit culture's complexity.

Most housing designs addressing the north today try to quickly fulfill a quota for a huge housing shortage by turning a blind eye to most local suggestions and the embedded cues in the local architecture. They have performance-driven building solutions. They efficiently reduce a building footprint with identical setbacks. They offer shared access to water and sewage lines

placed between units. But there is no political acknowledgment of an individual's concerns or needs. The planning method, where houses face the street, affords vehicular circulation and addresses accessibility to water and sewage but gives no importance to geographical placement, sufficient parking, views, snowdrifts, or wind direction. This approach has been so widely used that it has evolved into a well-accepted planning strategy, repeated in virtually every northern Canadian community.

A good example of a troublesome metaphor, and consequently a problematic planning configuration, would be the *Piqqusilirivik* Cultural School in Clyde River designed by Stantec Architecture, which is nonetheless an amazing asset and programmatically an inspiration for any community. The physical plan took the form of a traditional shaman's house, growing the scale exponentially; the final scheme mimics a boomerang shape. The building's site was chosen for its flatness and access to the airport road, being about half way between the airport and the town. The main doors are situated in the boom's recess, facing northwest, the predominant wind direction. This shape acts like a screen and prompts huge snowdrifts, which block both the road to the airport and the building's main doors. It took construction of a \$2,000,000 snow wall across the road to resolve this entirely avoidable design flaw—a flaw that would have been avoided had the builders let community elders help design the location and its integration into the community.

Implications and Considerations

I hope this research will prompt a thorough discussion of Inuit architecture's future. Inuit communities themselves should lead it. Inuit intervention and design traditions are not mass-produced. Instead, they are appropriated and produced without the interference of trained designers. A study of such built form is a good start: "Like a nouvelle cuisine chef creates new

dishes from locally sourced foods and creates a new kind of taste, these local solutions are a new kind of flavour framed through the perspective of indigenous inhabitants. What we need is an architecture able to see beyond the formal, the symbolic, the performative, the kitsch. We need an alternative and a more inclusive design that features closer dialogue between the designer and the community. We need a better dialogue between stakeholders" (Nango, 2016).

How Inuit everyday life plays out, and to an even greater extent continues into the future, is also marked by the need for more environmentally conscious, sustainable, and sensible resource uses. This is a distinguishing feature of tradition. While the design industry's assignment is to solve the needs and dilemmas of mass production and budget constraints, ingenuity or "indigenuity," as Nango (2016) called it, is at the other end of the spectrum. Does that make it worthy? Based on my research, I believe it does.

This approach might offer something new: to understand Inuit building traditions as a way of thinking. It is easy to identify a specific attitude about architecture. It brings forward the pragmatic, the composite, and hybrid vernacular architecture. The quintessential elements of recycling and spontaneous use of materials (e.g., plastic, cardboard, oil barrels, palettes, and shipping containers) clearly demonstrate an ability to adapt and improvise. Nango (2016) called this attitude or skill, an "Inuit competence or Arctic functionalism." The interstitial spacing between houses, or the "Inuit garden" (Nango, 2016), is where this phenomenon becomes visible. It is easy to detect, especially around people practicing activities out on the land, and as long as people in circumpolar regions continue to do so, they will build structures out of necessity. This practice is part of Inuit upcycling, and looking closer, one can identify design thinking. Any objects that appear at first glance as discarded material may be the future elements required for a great invention, an indispensable repair, or the key to a completely different object.

Based on interviews, field observations, and documentation of built form, this study was a collaborative project involving residents interested in designing and building their own cabins.

A “cabin culture” website became a vital communication instrument. Through this platform, I hope to raise awareness of a creative but underappreciated way of thinking, which manifests a different way of organizing space. The reuse of available materials is in fact a design tradition.

In indigenous ingenuity, the user and the designer are one and the same. It is about moving the control of the object closer to its user. This attitude has cultural and economic value. Thus, one must embrace and learn from the specific design examples in northern traditions rather than rejecting it. And thus, to define what design is, we must distinguish between good and bad design. This extends a pragmatic design tradition based on the ability to understand an environment to its very core, to improvise using what one has at hand, and to see the value in it. Stern and Stevenson (2006) wrote that there is “something to be said about the human condition by respectfully studying and experiencing a particular culture” (p. 3).

Is IQ a legitimate design tradition? Design ultimately depends on the designer. Is it an institution’s task to create a designer, or for the designer to be the intermediary between the problem and the end-user? In the case of northern housing, there is a gap between the architecture and the end-user.

Inuit design traditions are about resourcefulness and self-reliance, both culturally and financially. Designing with what one has is part of building with IQ, the frame for this pragmatic design tradition. Regional and vernacular architecture develops as a formal expression of a collective identity both in a historical and contemporary sense. By finding people’s self-presentation, one can discover both the contemporary expression of identity and its future aspirations. Most professional architecture attempting to incorporate indigenous culture and design relies on visual methods that embed various iconic shapes or materials in otherwise conventional designs. The *Whapmagoostui-Kuujuarapik* Science Centre is an example. Nango (2016) called it “indigenous exoticism.” A typology that merely characterizes architecture with a metaphor cannot replace existing IQ technologies. Local materials and planning strategies

already reflect culture. While southern architects struggle to incorporate Inuit archetypes, the elements remain conventional and uninspired, and the north is left with desperate attempts that are consistently scant and inadequate.

A Manifesto

Indigenous innovation or indigenuity (Nango, 2016) is rooted in resourcefulness and adaptability yet heedful of design and posture. It is an archive of small acts that serve as coping strategies. It is a response to a reality, not an intellectual exercise. It is a way of looking at things and finding potential usefulness. It inhabits the in-between world, the hybrid spaces between the inside and the outside, between the city and the land. It is good design made from bad design. After demonstrations and protests, temporary and mobile displays of ephemeral structures are set against a system of monumental Canadian architecture and remain a powerful tool for indigenous rights. The power of these spontaneous acts is not only political but also historical—as a history-making element, symbolically transcending time.

I have learned much about how people make history and impose their interpretations on others. A sustainable understanding of how we as architects conceive space can be learned through pragmatic design. Activist spaces are interesting not for the use of symbolism but for the fact that building sites are self-initiated collective spaces that represent a shared identity. We must build more of these spaces, sanctuaries where architecture is part of a larger gesture.

Sarah Leo (2016) summarized: “Between 1969 and 1975, our existence was ignored, our rights to self-determination were denied. We must find Inuit, find a partner and to begin designing and reflecting on the north in a sophisticated partnership. Housing is part of the lacking infrastructure. Now is time to build what the north is. We’re long overdue.” Here, Leo overstated the case. For example, the first building types, the matchbox and the “Rigid Digit,” were built

upon cribbing. These were stacked wooden beams alternately laid to create a small box-like structure to spread the load and allow for easy self-made adjustments if the ground settled. A simple wedge knocked into place would lift a corner or mid-point to ensure the house remained level. This is—by far—the most cost-effective functional foundation system available, and the one Inuit prefer in their own cabin designs. In fact, the simplicity of the matchbox construction, together with the traditional Thule house plan, the NTR, and many of the original house models brought in the 1960s and 1970s are the basis from which Inuit build their mobile cabins today.

Buildings that are easy to construct and simple to fix are buildings that endure. They have naturally deteriorated somewhat since the 1970s, but through scheduled maintenance or reconstruction, they are still inhabited. The more latitude the housing association gives to their residents, the more positive the outcome. People are more content. Because of the aggregate of individual qualities in the hamlet (considering the houses with the amplest modifications, additions, and/or in-between builds), Clyde River has acquired a particular cultural landscape. It is certainly a microcosm of a northern phenomenon, remote and representative at once, and infused with an energy and character.

Granted, there were areas and housing types in the hamlet seemingly untouched from the outside, which demonstrate that in certain situations a housing association is more apt to prevent personal interventions than to encourage them. Thus, the houses in Nunavik are less likely to be transformed than the Nunavut houses, and it is unlikely that the Nunavik houses will ever be changed unless policies regarding social housing are revamped.

How Can These Modifications Influence New Designs?

Inuit do not study their houses. They live in them, and they fix them. They complement the designs and use what they like as models for their transformations. Some designs are easier to modify. Perhaps the basic single-detached house is the best platform from which to start.

Furthermore, Philippe Boudon (1972) claimed that Le Corbusier constructed a framework, an architecture that lent itself to making “conversions,” as he called it in the English translation. In the case of Clyde River’s social and public housing, it is the standard building materials brought to the north for the construction of units and/or the surplus of these materials and/or their partial/complete recycling that determine to a certain extent the forms and sizes of the modifications. Therefore, the amount of available materials has a direct link to the variation in construction found in and around Clyde River.

The modifications are plentiful, which signifies that the rigidity of government space could not contain the abundance of potential configurations and orientations that warranted transformations both within and among the units of government space. In the end, my study has uncovered the importance of geographic location and geological characteristics, as evident in the importance of the foundation work, the adjustments thereof, and the different tactics for anchoring houses used in various Arctic regions.

Lessons Learned

Building, moving, transforming, and adapting have always characterized Inuit daily life. Their traditional housing in an extreme climate was a physical embodiment of their way of life, one that fosters IQ. Consequently, they have not perceived government houses as changeable. Instead, they have understood (and we must understand) these spaces as a work in progress, allowing for self-driven transformations over time.

Despite a scarcity of means, Inuit produce an impressive array of new building forms—either added to or set between their government houses, and ultimately out on the land. This new cultural landscape underlines a commitment and ability to be masters of their own destiny. This “architecture in action” challenges architects and planners to consider cultural needs and expectations. It brings forward a sense that architecture defines people, cultures, nations, and it plays an important part in past, present, and future identity. Supported by *IQ*, Inuit building today is resourceful, serves as a knowledge transfer, responds to the environment, and prepares for the future. For the sake of collective wellness, it is essential to harness these principles in the conception of the built environment.

While many housing variations have been posited as solutions to the north’s housing crisis, almost none have examined how Inuit have altered existing housing stock or build new space. I encourage architects and planners to comprehend Inuit abilities to resolve their housing issues through local initiatives, capacity building, self-determination, and the very essence of an Arctic lifestyle. To that end, I am convinced that improvements can begin with the close examination of existing transformations made by dwellers. This phenomenon is a perfect example of the complex layering of two cultural models and is therefore worthy of investigation. Although most studies of northern housing seek to upgrade the performance of the different independent systems, few have attempted to incorporate traditional design principles into design solutions. Therefore, positing the users as an inevitable part of the solution is necessary for future research.

As Douglas Cardinal (2011) opined: “You don’t bring answers to a community. The answers are already in the community” (Cook, 2012).

The Arctic, with its abundant natural resources, is currently the subject of intense international planning and resource development. Alan Teramura (2016), former president of the Royal Architectural Institute of Canada (RAIC), stated: “While interest in the north escalates, Inuit have grown accustomed to standardized housing, finding primary care at the nursing stations and more recently social media through the Internet. In only 65 years, Inuit have learned the ways of southern dwellers and the ways of the Canadian government. While they initially lost control of where their community would develop, and many policies that have directly affected their lives and livelihood, Inuit have also become well versed on how to counter certain decisions.” Thus, Clyde River’s housing experiments have lent themselves to conversion and frugal transformations. Rather than settling in their given government spaces and living in them indifferently, many individuals with the requisite skills and resources, already accomplished builders of traditional houses, have been living actively, as traditional Inuit. By doing so, they have shown what living Inuktitut really is: a continuous transformative building project. They took the houses sent to them, lived in them, corrected them, converted some of them, added to them, and built new ones to bring them back to the land. By combining their own practices with materials and technologies that were brought to them through government planning, they built their own distinctions and introduced personal and traditional qualities, ultimately prompting the rise of a hybrid design tradition in Canada’s eastern Arctic. The question of territoriality and identity in Inuit mobility and life, as discussed by Collignan (1993), suggests that combining references to both modernity and the old way of life makes possible the expression of a new cultural landscape.

Building with IQ

In 1999, the GN's Department of Sustainable Development created its own Sustainable Development IQ Working Group composed of Jaypeetee Arnakak, Peter Freuchen Ittinuar, and Joe Tigullaraq. They described IQ as “the past, present, and future experience, knowledge, and values of Nunavut society” (Arnakak, 2000, p. 3), and they created an IQ framework loosely based on tuqturausiit (kinship structures). According to Barnhardt and Kawagley (2005, p. 8-23), the principles, which describe the “interconnections among all aspects of life and place,” are as follows:

1. Piliriqatigiingniq (collaborative relationships or working together for a common purpose)
2. Avatimik Kamattiarniq (environmental stewardship and respecting all living things)
3. Pilimmaksarniq (skills and knowledge acquisition, building capacity in Inuit ways of knowing, and maintaining balance)
4. Qanuqtuurunnarniq (resourcefulness, to seek solutions through innovative and creative use of resources, demonstrating adaptability and flexibility to prepare for the future)
5. Aajiiqatigiingniq (consensus to resolve conflict)
6. Pijitsirniq (service)
7. Innuqatigutsiarniq (respect)
8. Tunnganarniq (welcoming, demonstrating good spirit by being open)

These IQ principles resemble those of *Jugaad* in India (Radjou, 2012), *Gambiarra* in Brazil (Fonseca, 2015), and *Zizhu changxin* in China (Cheung, 2011). To understand how Inuit

build, one must understand *IQ*. As a planning and organizational tool, *IQ* embodies a set of eight fundamental principles and life maligait (Inuit world views). The creators of this contextual architecture often treat the act of design and fabrication as a matter of fact, as the form-driven designers treat the notion of the site. These builders are hacking their urban environment. Rather than with algorithms or even architectonic interest, their constructs have everything to do with the cultural concepts that make up this resourceful and adaptable mindset.

Planning healthy sustainable indigenous communities requires understanding and promoting existing professional competencies. Inuit self-built realizations expose *IQ*—this entirely different way of building. Peter McCleary (1988, p. 4) wrote: “When no true engineering theory is available, the builder is controlled by regulations, such as standards, codes, etc., all based on the collective experience”. I argue that a similar agency must be encoded in building theory and design. Just like the practice of the sled or qamutiiq for Inuit has become a legitimate commodity for both local and international use, building with *IQ* must be reinforced by stakeholders to be awarded cultural value. Until then, we are bound to keep finding poor examples of sustainable housing models throughout the Arctic.

In *The Craftsman*, Richard Sennett quotes Shakespeare's Coriolanus: “I am my own maker”(p.1). As Inuit are their own makers, their pragmatism and self-sufficiency create a tradition that joins a philosophy of life to a concrete practice. Yet scholars and decision-makers have virtually ignored the rise of this new vernacular architecture obscured by decades of institutional momentum. Indeed, these ephemeral interventions, hybrid handiwork, or “hacks,” are easy to overlook. But they should not be disregarded. They embody a deep-rooted way of being and offer a civilization's worth of practical knowledge.

Recommendations

One of the biggest puzzles about the eastern Arctic's housing shortage is the resilience of traditional and accustomed building standards—practices and norms often inconsistent with southern Canadian standards and planning. Moreover, there is southern resistance to traditional systems and planning that could replace the bureaucratic mechanisms of formal housing. However, this case study of building with IQ finds the dominant system of governance interacts in complex ways that are both mutually strengthening and disruptive, depending on the composition of the institutions and the power of local agencies.

Postwar Canadian government housing has been linked with nation building (Teodorescu, 2012), with an emphasis on developing the institutional capacity of federal, territorial, and local governments to carry out the job of building houses effectively. The role of government housing is mostly about providing shelter at a minimal cost, but housing in Inuit culture was traditionally a domestic process. Current housing developments focus instead on delivery and technical aspects of house building as if greater technological breakthroughs would remedy deeper collective needs confronting this society.

House building has continued as a technocratic exercise geared toward extending the government's obligation for housing delivery according to southern standards. Therefore, an external process and an external architectural template has profoundly impacted the way the local system is perceived and has engaged in housing and resident-built adaptations. Initially, an informal mechanism, this rise of transformations and resident-built cabins has been viewed as problematic and discounted for being poorly built and part of an undesirable informal practice. If housing authorities accepted this informal practice, whereby increasing the number of self-built transformations and additions, government housing agencies could eventually find solutions from within the community to solve the housing crisis.

This study's interviews and observations showcase the benefits of a bottom-up approach that considers people's cultural needs and recognizes resident-built architecture as a complement to a formal government system. Those who recognize cabin culture's legitimacy do so not in complete opposition to the government housing system. Rather, it is an acknowledgment of the expensive housing infrastructure that justifies government housing and the fact that pressing needs remain—needs that existing bureaucracies cannot accommodate, even when delivering their solutions with optimal efficiency. Nevertheless, residents do acknowledge that certain cases are beyond the capacities of local builders and must rely on the formal government system. But if the formal governmental rule and its prescribed architecture excludes the informal system's legitimacy, if a top-down system prevents such internal procedures, or when the cost outweighs the potential benefit of waiting for government remediation, pursuing cabin culture and eventually community organization as an integral part of design in government settlements may be a viable option.

In any sequence of formal and informal practices (be the practices opposing or cooperative) it matters whether the government system can deliver transformable, accessible, affordable, and credible housing to local populations and whether standards match people's needs, priorities, and expectations. Yet such interaction between government agencies and norms is mediated by underlying power dynamics relating to community leadership and access to materials and resources. To date, options at Clyde River have been limited and waiting lists persist. These findings were drawn from fieldwork conducted over three years that included documentary evidence collection, observation, and in-depth interviews with a wide range of stakeholders, such as local and GN housing and hamlet officials, traditional authorities, and residents who request better housing options.



Figure 154. Cabin on pilotis, a hunter's cache (Paniloo, 2016).

The first self-built structures made with any material at hand (e.g., canvas, driftwood, and dismantled crates) were regarded as uninhabitable, unsanitary “shacks” (Damas 2002, p. 120). Today, with access to better quality materials, these “shacks” stand comparable to a cottage culture.

Urban sociologist Gordon C. C. Douglas has studied DIY urbanism in major American cities, including the motives and impact of civic hackers who seek to improve their neighbourhoods through what he called “unauthorized alterations” or tactical urbanism. “Together, these actions begin to define a group of practices that I call do-it-yourself urban design—small-scale and creative, unauthorized yet intentionally functional and civic-minded ‘contributions’ or ‘improvements’ to urban spaces in forms inspired by official infrastructure” (Douglas 2013, p. 20). Thus, “unauthorized alterations”⁵⁹ in cities have traditionally been regarded as unwanted. However, a new generation of DIY urbanists has initiated changes with practicality and cultural practices in mind. While Douglas’s definition is an activity analogous to formal and official efforts, the Clyde River phenomenon is not about challenging rules or challenging authority. It is a practice based on more pragmatic drivers: the need for fixes,

⁵⁹ “Unauthorized Alterations” is part of the title of the article by Gordon C.C. Douglas in the *City & Community section of the American Sociological Association*. The complete title is *Do-It-Yourself Design: The social Practice of Informal “Improvement” Through Unauthorized Alteration*.

improvements, or simply extra space for equipment, a home office, or to be independent of the public housing authority.

DIY interventions, whether built between the government houses, attached to them, or constructing independently, have wide-ranging implications for both local communities and broader urban policy, especially in communities with serious housing budget constraints. That such a panoply of modifications exists in northern communities comes as no news to Inuit who have long sought a way to contend with governmental forces in their communities. We need a way of working that combines ingenious form-making with low cost and the capability for rapid construction due to a short building season; Inuit offer clever urban critiques combined with local knowledge. Residents must generate more of these designs, these hacks, rapidly and without fear of critique.



Figure 155. Recessed space between two duplexes. This was partly closed off to shelter it from snowdrifts and to provide additional cold storage.



Figure 156. Northwest Territories Rental unit needing extra plastic cladding to windproof the north wall.



Figure 157. The windscreen built for \$2,000,000 to prevent snow from drifting across the main road to the airport and from blocking the main entrance to the cultural school in Clyde River.

Our present era of information abundance presents designers with endless possibilities. It is therefore critical to anchor the design process to a foundation composed of the right information. Good design correctly answers questions about site, use, and technical specs. Design is bad when it provides the wrong answers, or when it provides the right answers to the wrong questions. Either way, the success or failure of data selection and analysis is revealed after the fact of construction. The best laid plans remain just that—until experienced.

I am done with my water-tank boat, waiting for the paint to dry, and make a paddle and test it out, how it goes, hope its lighter. Everybody has an ability to create, to use, and to fetch their catch, as long as it floats and comes back before you sink. This shows that fishing will be better, and if you need wicks for your qulliq [oil lamp]. I only caught two [fish] last year, but I caught three already [this year], and they are getting fatter and better ones just around the corner, in a week or two. Two for the show—mother taught me about sigiatuk, but making pitsii is harder to do: flavour with red pepper and salt. I want to learn how to make dried fish, like in the

west, but it takes a lot of salt and washing; I should smoke some in heather (qijjuktaa) one day. (I. Tassugat, semi-structured interview)



Figure 158. Isaac checking his nets for Arctic char in his self-made boat.

This resident is a craftsman, artisan, and local radio program host. He has created a working boat from a recycled water tank, a broken hockey stick, an old wooden boat, some screw bolts, and rubber to seal the joints, plus a small seat. He will be using it every summer.

Summary

Contemporary informal Inuit architecture, ignored or disregarded by scholars, is slowly building legitimacy through tradition. While by no means the only ephemeral architecture to be discounted in cultural landscape studies, contemporary self-built structures are a significant representation of world vernacular architecture. Considering more than half a century of government intervention in a nation at the brink of modern living conditions, the ways in which Inuit-built form today incorporate modern amenities are fascinating and have become fully

embraced by the whole community. It has emerged though a hybridity of contemporary and traditional culture—from the fragments and the surplus materials of government intervention.



Figure 159. Plywood cabin resting comfortably on plywood crates, with an unobstructed view of the ocean.

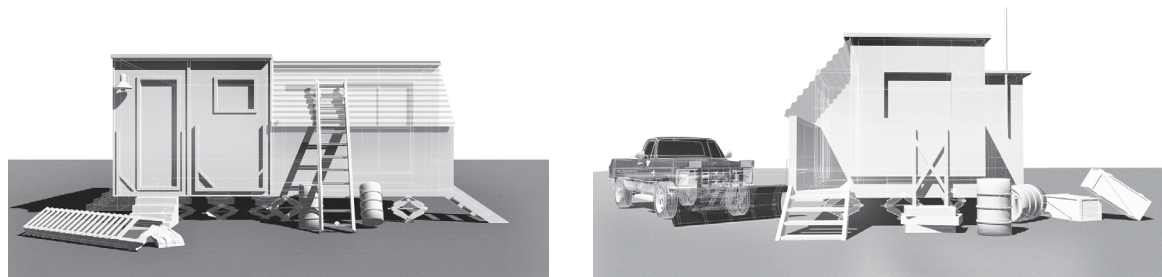
Exploiting their own cultural and technical know-how, Inuit have painted themselves a new national portrait. These remote communities of builders and survivors are indeed part of a new movement embodying a belief that small and modest realizations can play a major role in legitimating an existing construct. Looking at the contemporary Arctic landscape of settlements, towns, and camps, one might assume this type of development presents a constant negotiation between contrasting views. This comes from the growth or collection of housing and services essential to the infrastructure and initiated by government agencies, as demonstrable in most eastern Arctic settlements.

A housing shortage and capital investments produce a generic settlement or hamlet, one that is more or less repeated throughout the Arctic. In the context of Baffin Island, the house (as the basic unit of urbanity) and the inherent impatience for more housing generates a planning strategy obsessed with optimization, land allotment, and straight-road configurations as the paths of least resistance. The alternative to this idea comes from a more ephemeral and therefore more tenuous expression of an urban condition—the rise of another layer, an informal yet responsive hybrid and ephemeral construction pattern strewn across the communities, forming a secondary,

temporal urbanism, one rooted in the community and its everyday life. This completely different built form is in a state of movement, of transformation, and is, for the most part, mobile. This shift in the perception of a typical settlement occurs within its transformations, additions, and new stand-alone structures, and it is a three-dimensional accumulative development in constant flux.



Figure 160. Joanna and Joatamie Qillaq's cabin under construction (Giraldeau, 2016).



Figures 161–162. South and west elevations, respectively, of a two-bedroom self-built house off grid (Havelka, Giraldeau, 2016). Two brothers built this using two seismic containers and an array of found materials.

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Partial Transcripts based on Semi-Structured Interviews

The following partial transcripts are from semi-structured interviews as a form of qualitative data. The respondents are Clyde River and Iqaluit residents who were indirectly selected by an informant who acted as facilitator and translator when required, as well as several key municipal employees.

This first transcript is a conversation between David and myself in Iqaluit on September 2016 about his cabin by the beach:

You can sit right here. I miss the sun.

It's coming Monday, finally. Do you have a ventilation hole here?

It's the window.... Do you like it here? I've been living here 40 years. I don't get sick. I'm already 40. I've never been to the hospital. [He pumps the oil lamp, a dark-green 1960s-era kerosene lantern, for warmth and light]. It's lighting up! I like to stay in the cabin. It is quiet. Nobody is bothering me. I've been using this place for 20 years. In December, it's going to be 10 years that I'm here. The reason why I'm staying here is because I have no kids. You can sit here. Do you want some tea? Coffee?

No, thank you. I'm here because I'm documenting cabin buildings.

My late father built this cabin. I already miss him too much; sometimes I see him when, I mean sleeping. Sometimes I talk to him. Sometimes it's freaky.

What is this district called?

The beach. The reason why the door's facing this way, my father used to fix skidoos. The door used to be here [on the other side facing the bay]

and then he moved it. Some snow comes inside a little bit. This winter, I almost got stuck. I couldn't open the door. Luckily two people were walking this way, and they helped me open the door. Your door is facing north, but if it were facing south, it would be colder. I think that's why it got turned. I have Styrofoam; I used to work for a job site. I used to get leftovers. I also go to the dump, our "Canadian Tire."

I see you have an opening up there and a sagging door.

That's a window, there. That's where I vent. I wanted to put it on top. I just block it with a blanket, cover it with a blanket.

If you could improve something on your cabin, what would you do?

It's all done. I'd like to put a small window on the back. Sometimes it gets a bit dark. Here you have a piece of plexiglass. Outside it's plastic; yes, it's plexiglass.

Did your father use wood or crates from a sealift?

These are not palettes; they are just plywood, 2x4s, and insulation. That's the best insulation. It's 3" thick and hard.

Do you have the same on the walls?

Inside out: floor, walls, and roof. Same thing on the roof. Insulation.

I've got to find a little more plastic to put on top of the plywood. [As I interviewed him, three people who work in the community came over to buy some fresh fish.] It's a plastic sheet, insulation, and last piece of metal on top. And I've got to put another piece of metal on top.

When it gets very cold in winter, do you keep this light on all night?

During the winter, the door is closed, and the heat is staying inside; you can stay inside, that's the reason why I got that insulation. I like it. When I wake up, I just turn the light on. Just my water freezes. Freezes. When it freezes, I just heat it, put this on top of it, and it's melting. In winter we go to the lake to fish.

You are a full-time hunter/fisherman.

I could be a hunter, but I have no boat, no skidoos, so I only fish. I could be a hunter. My father used to build the boat for fishing.

[Then conversation turned around, and I was asked questions.]

How long you've been doing [your work]? Like it?

Yes, very much. You get to meet different people. I also like Inuit culture and the sense of community.

Your family is everywhere. That must be hard. How do you meet during Christmas?... Ah, we do the same thing. I could stay at my sister's, but I don't want to. Some people do that, but, like for TV, but I don't really like that—TV, I mean. My dad was repairing skidoos and motors. Now I'm just using it as a house. Some people use it as a place for TV. I have a radio, and I don't really care about TVs. [His nephew comes in to wash his hands before going home, washing them in the cabin with water in a bowl.] He's my uncle; he's my nephew, my older brother's son.

So, you will stay in this place. In one year, I can come to see you here.

I'd like it.

If you wanted to apply for housing?

I've been on the waiting list for housing for three years. Some people wait for 10 years.

If you got a unit, would you take it?

Yes, I would.

Do you know where you are on the waiting list?

I don't know really; it may take 10 years: no kids, no wife, freedom. I think I'm doing that on purpose. If I had kids, I would have a job.

But you do have a job; you're a fisherman.

It's 50/50. I cook a lot. But I do buy fast food and eat country food.

If you could speak to government officials, what would you tell them?

[He offers no answer.]

Do you think you would want government housing?

I could afford it; I've got no kids. I don't really need a house. If I had kids, I would have a house. I'm just enjoying my free time. Sometimes I drink. I used to be an alcoholic. Not anymore. Sometimes I wish to have a son. I could make babies. I just don't want to.

Did you ever make a boat?

Nope. I used to help him, my father, a little bit. I was too young; he passed away 15 or 20 years ago. My mom died one year after. They both died from lung cancer. I smoke too. I quit smoking; I want to.

If you find a window, where will you install it?

I'm looking for plastic windows? I don't want to use glass. They do sell them, but they are very expensive.

The cabin in which I interviewed this respondent had burned down one month after my interview. The respondent had since been housed with relatives and received some clothing and support from friends and family. He is trying to find enough material to build himself a new cabin, but it will not be the same.

Living with Government Space: Feelings and Findings through Interviews

According to Joseph Illaut (and certainly many of his contemporaries), the government took away many of his freedoms by telling him where to live, by imposing a certain kind of housing, not to mention foreign education, language, credit, taxes, and ultimately controls over hunting. These were among the most fundamental changes of the government-controlled period brought to Inuit by southern agency. However, surprisingly, during my interviews, the question of housing as an imposition was rarely mentioned; nor was the housing really criticized. One respondent, a stay-at-home mom of three children, was more willing to share her hunting stories than she was to speak about her house. This finding was revealing and attests to the ongoing importance of the hunting culture, still an important part of Inuit identity today.

In the course of the interviews, only one person, an elder, complained about several aspects of his newly provided unit. This man, a widow, had to leave his own house, selling it back to the housing association for lack of funds and then moving into a smaller unit in a multiplex. His place challenges the limits of his interior space. He is one of two inhabitants of this two-bedroom unit, and the unit is one of five in a row, all sharing a common wall. They have lived there for three years, although the building was constructed about 10 years ago. There are no changes

because it isn't allowed. They have no real problems, only one doorknob and a window opener need replacement. But for this, they have waited two years.

The first complaint is that the rooms are too small, and he would like one more window. The second complaint is that there is too much noise between units. His rent is reasonable, but he preferred his old house. He was obliged to let it go once his wife passed away. The secondary income, in his case, was absolutely essential for the house he lost. In the new unit, he would take out the kitchen island if he could to gain gathering space when his extended family. There is no outbuilding, and he is too frail to build one himself. He doesn't have a cabin and had no choice about the unit. But he did get his unit immediately, as he is elderly and in fragile health. His main complaint was that he could not slice up the carcass of a large mammal in the kitchen. His family couldn't camp together in the living room each night for lack of space. He faced restrictions on their right to modify their interior space—"we can't paint the walls" (Semi-structured interview), and he could not do all the other sorts of "unintended" things in their interior space that he would like to do. He would be considered an "unsympathetic user."

A Conversation with Isaac about His Workshop

It's easier to see in green. I can put my tools here.

You are really so handy.

I first made that so I can do some carvings—so the dust doesn't go into my face. Then I added the entry piece, and that was in 2004–2005. The roof should have been a bit higher. Roof is high enough.

You put the ventilation right into the middle.

It can be, or you can move it.

I was hoping to put in some insulation because it's cold in winter.

How will you do that?

Put 2×2s on top and lift the floor. I can put my skidoo here in the winter to work on repairs.

It's 126"×128".

I was hoping to put the pipe on the bottom of the furnace, all along the floors to heat the space. It would be tighter.

Will you do that this winter?

[He starts the Coleman stove to heat the space and to make tea. The space heats up instantly.]

So, from that piece [pointing to a piece of bone] I made...

When do you open the large doors?

If I were to do soapstone or marble [carving] and it's not too cold. So, I have to replace it; I have to work on that. I work with antlers because it makes less dust. We used to sell to the Northern Store.... There is a gallery in Vancouver, they had one of my carvings. There it was, a person sitting on top of an island.

I like the floor. I can put my tools here. I first made that so that I can do some carvings, and then I added a tuqssuk. It was 2004 and 2005. But now it is going to be a bit higher. The roof is high enough. You put the ventilation right in the middle. It can be there, but you can move it.

Does it have to be in the highest spot? Yes.

When you work, do you close both doors?

I was hoping to put some insulation on the floor, with 2×2s. I will raise the floor. I can put my skidoo here in the winter to make repairs.

It's 126"×128".

I was hoping to put the furnace, to put it here [pointing to the wall].

Will you do it this winter?

Guess not. I use an old Coleman stove now. I can use an old stove. [He demonstrates how to light it, using a lighter to ignite the wick. The stove is on, and in less than a minute, the tiny workshop is very warm.] There are two burners on this stove, and I heat and make tea. There is a small surface for the teapot. It is already hot in here.

Thank you for showing me all this.

From that piece, I made a whalebone whip.

When do you open this double door?

When I have to do a lot of grinding—if I were to do soapstone or marble—when I work during a winter storm, I had to work on that. If it is not too cold. Whale bones and antlers I can do indoors.

We can't sell here in Clyde River anymore. We used to sell to the Northern Store, but now we don't anymore. We sell to local teachers or people that want to buy some local art. I wouldn't mind going into a gallery. There is a gallery in Vancouver that had one of my carvings. And one of my

carvings, a person sitting on top of an island, in Toronto, I think; there is another guy who wrote a letter in French, so since I couldn't read it, I had it translated, and this man in France has my carving. Somewhere in Toronto or Ottawa as well. The Northern Store used to take carvings over there.

Why did they stop?

They had too many, and no one wanted to buy them. The local hotel might showcase some of the local works for purchase. There are lots of people passing there. I'm working at the radio station every day, so I don't have much time for carving.

Are there lots of young people who want to carve?

They don't seem to be too interested. I can concentrate on my work.

Can we measure your workshop?

Sure.

What are the materials and where did you get them?

I painted the plywood. I got the paint from people. There is hardly any paint at the store. I was hoping to paint the outside all white, like an iglu, but no paint. I wanted to paint the blocks too. I think there is some white paint from the surplus in town. My brother who works at the..., he told me "no"!

Do you have the necessary paint brushes and rollers?

I get those from the Northern [Store].

The ventilation duct in this workshop is made from tin cans, cut and screwed to make an elbow out through the roof.

A Conversation with Charlie in September 2015 about His Cabin

The following is an interview conducted inside the local hotel lounge and eating room.

What is the hardest thing in cabin building?

For my boy, it's working out the floor. If you have a solid foundation, everything will fit better. My boy has a friend who he grew up with, and this friend told my boy, "You can make or build without cutting." He worked at it on paper first—used plywood, and he had no cutting. My boy was amazed as he was putting it together without cutting. My son is a natural carpenter.

It makes sense not to cut, but how did everything fit together with no cutting?

He used all the wood in exact measurements. He learned by watching, seeing, not so much asking. I don't know why. It was not in our custom; if I'm a kid, it was not for me to openly question.

If people here could converse with southern planners and designers, could you imagine working together?

It's possible. When people speak about Internet they speak of hackers. I think Inuit are great hackers. In the old days, very quickly, the government realized that Inuit were good mechanics and could figure things out very quickly. They are innovative, and if there's no part for that, they can find something to replace it. Things then run, not exactly the way it was meant to be, but it runs. A little bit outside the box.

The case of Renée and her parent's cabin:

A respondent told me of the cabin her father built with her mother. They would go there to hunt and to fix sealskins when she was a child. But when she hunted a bear, she used someone else's cabin. There were five people on this hunt, two snowmobiles, and they caught a seal, a caribou, and a polar bear. "Its fun to go out on the land," she explained, "to be with family alone, it's very different. We go especially in spring and summer and seldom in winter." It was clear that her focus went beyond her house. So many of the important elements in her life have happened out on the land, but preparing for it happens just outside her front door. They do not go to the cabin anymore, but their father and mother both helped to build it in 2010. They purchased some of their material from friends, and they would fix sealskins as payment. Their cabin has a Coleman stove, three bunks, a table, a long shelf, and four windows.

A conversation with a respondent about the process of construction of his new cabin:

The following is excerpted from a longer exchange between Samiulie Iqaqrialu and myself in August 2016:

S. Iqaqrialu on building his new cabin at Cape Christian: I went to see the place and was ready to move. I pulled the sled with my quad. I made a long rope because it was a heavy load for my tiny quad. I couldn't move it at first, but when I used a longer rope, I was able to pull it with my four-wheeler. When I jacked up the cabin, I started to pull, and when I had enough space, I pulled the sled under the cabin. When it was put in place, I added another brace—a 2×6 under the cabin. Because my cabin is 12'×16', I need a brace from the center of the roof to the bottom because the sand is very soft. When I jacked it up, I put a pallet in each corner. I

was using two, four, six, eight palettes per corner, depending on the level. I've got an architect CD, so that I know everything I need. It's a nice CD. It tells me everything I need. I got it from a bookkeeper. He just left this morning. So, it tells me how much lumber I'm going to need. I then used the hydraulic jack to lower it again, and now the cabin is on my sled. It was moved from here to the school, say, so that's about 500'. So, I pulled the qamutiiq and cabin with the loader for \$285 an hour. It took two hours. My friend was the operator. The loader was there, so I didn't tell him how to position the cabin. I had already built the frame—a foundation, made with 2×6 bottom and top plates, just a regular frame. It's a rectangle—2×6, about 16" below ground, because that way the cabin won't move with strong winds. Besides, nobody ever did it before, so I wanted to try something different. Besides, this frame is filled with heather to keep us warm. My late parents used to do that. The bottom is just sand. I don't use fiberglass insulation. I just use heather. I'm not worried about the sides because there is sand. So, if I had Styrofoam, I would use that because it is good for permafrost. I didn't have enough, so I used heather. No, heather will not disintegrate because it's buried. It is dry all the time. My door is above grade, 2' above the floor. It is down there, for the porch I mean, another landing. Tonight, I'm going to bring more 2×4s to make another handrail and bring along some more floor vinyl: 2×6s down here. The floor is built on top of the top plate. It's a walkway. I also have four steps. It's not a porch but I forget how to call it. In winter time, it will be for solving the snow problem.

I must prepare for winter not just spring and summer. This part is all wide open. It's just 4×4s attached to the cabin with two screws. These 4×4s

also have a pallet of pressure-treated lumber. The 2×6s are staggered. Yes, pressure treated, because I know pressure treated will never dry. I have six inches of insulation. It will be enough for the inside of the cabin. Like I say, it's heather. All this is heather. The cabin sits on a base and the roof is flat right now. So, I'm going to build afterward because I didn't have enough lumber to make a pitch. It is flat right now, and it's not going to be like that. It's going to have one angle like that [angling with his arm]. It's going to be facing the north to the south, so this lower side will be facing the south because the wind comes from the north all the time.

It's going to be angled. When it's like that, when we build our cabin, we start to have something more like... I did something like that because we only use 2×6s for the roof, because we don't have the lumber. When you don't get what we want of lumber, if we can get 2×10s or 2×12s, it would be the best, but we don't have those kinds of lumbers that we need. We only use what comes from old construction or from traders. I'm going back and forth to the cape in the evening to that Christian site. I've got a quad; I've got a four-wheeler, so I'm going down this evening to go hunt for a seal.

The beach is quite far because we're on top of the hill. My brother's cabin is here because I'm trying to have less snow on the southside—like a snow deflector. The door is in the back. There was a door right there, but I changed it. When you know what you're doing, it won't collect anything. That's why I try to make it a little higher. If it were on the beach, it would be facing the north, so it's on top of the sand. But where there is no ditch, they will have no contact with the snow. I have a small bedroom now and I

plan to build two bedrooms. I have lots of lumber by my place. There will be enough. For the kitchen, it will be different from other kitchens.

The cabin is 7' high. The area where I'm going to build a bedroom is 5' high, my height, so I can save more heat. It's going to be a different one; it's going to look really nice because it won't be 45°. I'm going to use 22.5°. Half of 45, or 45 divided into two, is 22.5. My inspiration came out from my mind because I build lots of houses up here. Have you ever seen the grey four-plex up there? Did you walk up there? That came from my mind too. It came from the old school. We didn't use new lumber; we didn't use plans. Even the siding, steps, and the drywall wall weren't new.

Can you speak about ventilation.

I just made a hole with a naphtha can. Those are like 4×6s straight up.

I am wondering about the snow through the hole.

No. Never. We have wind all the time. It's always blowing. It's always windy. We don't live in the trees. I don't expect any snow. My other cabin in the fjord never collected any snow. It has two bedrooms. I have a nice cabin about there, one-hour drive from here to the west. I built that cabin because I want to prospect that area up there for gold, rubies, and diamonds. I haven't told anybody about this, but my late father told me that when he was younger, he saw something nice and shiny up there.

Can you speak about the most difficult part of building a cabin.

There's no hardest part. Even if you work alone, you can use a "dead pole." It's identical to my second hand. It is a 2×2 and on top of that, it's an angle. If I wanted to install a 4×8 sheet of plywood, I use my dead pole.

The piece is not like that. The piece has to be like this in the middle. If you know that pitch about your cabin, you have to follow the pitch with your dead pole. One way of doing a boarding on the ceiling, we use them a lot. We use a homemade pole. So, southern people, they use electric or hydraulic ones. Up here, we don't have that fancy stuff, so we use only a wooden pole.

Can you speak about how people share their ideas for building?

I have my own ideas, and they have their own ideas.

What would you teach people from the south about construction in the north?

It's hard to know because southern people don't like our ideas, because we are still old school, the old age, or the Stone Age. Old school is the best. It's never going to change here. It's going to be old school for building all the time—like in China; they use bamboo scaffolding. Just like a local guy here decided to make a bicycle and build it with the old snowmobile parts. He used the aluminum. The bicycle is about 12' long. It's built from old snowmobiles tracks, from the aluminum. He used the slides from the snowmobile or the tracks (see fig.192) [speaking about the importance of women's work in building cabins today]. My wife has been trying to help me. She's never happy when she helps me. She helped me with hammering the nails because, when I was working as a superintendent over there, she was my plastering painter.

Can you speak about the quality of construction?

I don't really like government houses because they are too fancy. They are all the same technique in the north. Government units and the private

owners, they're all the same. It might be different in the south. But in the north, it's all the same technique.

What is the biggest problem with government construction?

I really can't answer you because, when I was working for government, their work to me was the best.

I live in the 1970s houses [pointing to his house]. We call them HBC houses. They were built when the HBC was in the north. We have two porches. We keep both porches open in case there's an emergency. When you're used to working for the public units, you have to think of safety. The new 10-plexes only have one entrance but they didn't come from Housing. They came from a business. It didn't come from the government. It came from [GC-North Construction] a private company, and they are selling them to Housing. So, Housing doesn't have a choice to buy it. The government doesn't have a choice to buy because a lot of people need a place to stay. They also built two four-plexes up there and a duplex down there. GC-North has been using their own material; plus, all the salaries come from GC-North. When they finish a house, they hire an inspector, and when they pass the inspection, they can start selling it. The government housing is still the [general manager]. They should hire local contractors. It's supposed to be people from each community. They say they have no choice but to hire from the south. They built the five-plex first, then they built two 10-plexes. The GC owner is a good buddy. He's from Quebec.... This is a private company from Quebec. They're based in Iqaluit. They, the government, have no choice to buy. There are quite a few people that are doing that work for GC-North. About half are local.

GC, they're trying their best to always hire local people, not like other southern companies. When they built this hotel, it was another company from Quebec. Again, they didn't want to hire any local people. GC-North is always doing good with the local people.

Was the community consulted about building a 10-plex?

No, because this community needs so much housing. There are more than 30 people who need houses. They have a problem already with the different floors and the noise. The people have been complaining already. But these small units are big enough for single people. They are only 645 square foot per unit, but they are made for four. They're complaining about the noise, but I know Clyde River is always the last community to receive housing. Clyde River is always the last community from Nunavut.
(Semi-structured interview)

Regarding Cabins

Joanna and Joatamie had a cabin but traded it for a much-needed snow machine. It was 75 km northeast of Clyde River Umigujuaakia. The one was determined to build another cabin and started collecting materials, "buying stuff" and insulation. He spent his holidays at the site, building the cabin. He referred to it as a weekend getaway. He explained that the hunters and trappers had cabins before, and they were opened to anyone.

They needed permission from the HTO because the site was outside the municipality. They collected material from his brother, bought insulation, and built their new cabin every day after work and on weekends. It has become their weekend getaway. Many people now have cabins;

sometimes they are maneuvered in small clusters, other times isolated with a neighbour five or six km away.

The case of an elder on her 1970's rental

In this respondent's house, she and her husband have had five children. This is also one of the original NTRs. It was renovated numerous times, but still smells of mildew. Three bedrooms are continuously being used, and no changes have been made. This family is originally from another community. During the floor replacement, they had to move to a trailer for one month. They have no cabins.

The case of two respondents about their their self built kit house from 1993 and their cabin

These respondents have owned their kit house since 1993. They built it on 14 piles, which cost \$800 each. They now cost \$1,200 each. This 42'×40' construction houses four people, and it looks really good and well maintained. However, there are a few stress fissures, a few doors that don't close because of the way they are situated, and the entrance is positioned where they cannot exit in winter. They are always worrying after a storm. They even wrote to the government to have them build a snow fence because of the poor planning. The health center has one, and so does the school. They pay their taxes every year, and they selected a kit with a log siding. They would have liked to own their land but have to settle on a land lease with the hamlet.

A conversation with Gordon in August, 2015 about cabins:

What do people think about the mobile cabins?

In our tradition, we have to be out in a camp; we have to be out on the land. That's part of our culture. Maybe people have been building modern cabins near Cape Christian; there are probably more now due to what I think our tradition is. We have to be out on the land for our minds to be better. That's what we were taught. It's part of our culture.

Who builds the best ones?

There are a few guys, his brother and another guy. There is one over there; he added another bedroom. Some even have satellite TV. [Laughter.] My parents were invited for a weekend over there, and they said they had no problem using their iPads. [Laughter.] It's a lot easier now with the generators. More tend to be out because in older days they had to come out with seal blubber, the fat from the seal for heat. Today, it's just plug in. One time, we were camping over there [pointing to a cabin south of his own], and I saw an elder, and I visited his cabin. And he was charging his granddaughter's laptop. [Laughter.] That you couldn't do in the old days!

What are the variations that people build?

Probably based on financial issues. The people who have money tend to have better materials.

Do you think the cabins are more or less built the same way?

They are all built kind of the same. Yes, they are kind of the same in the north. Most houses, the roofs are that way [showing a slight pitch]. Like I was saying, most of the houses or the cabins here don't have flat roofs. They are pitched—don't know why. Most of Greenland roofs are more like this [making a steep angular shape with both his arms]. They must

have a very good reason; our roofs are flatter. Yes, they could experiment and more will be built that way.

If one is looking for materials with which to build, would one go to the city dump?

There are some organizations that have retail sales, like the HTO after a sealift. Last year DC North, they sold all their unused material to the hamlet, so the hamlet then sold locally. I saw people building after construction; local people use the wooden boxes, the crates. I saw people building garden sheds with those boxes. Yes, some have insulation. I had one neighbour, a carver, who got two of those, cut them in half, and put them together, and put a tarp on top of it so the water wouldn't get in. It was kind of neat: 6'×4' wide this way and 12' or 14' this way. He no longer lives here. It got torn out. I used to go and see him. I really like those kinds of little cabins—storage areas, for example. In Iqaluit, they have big buildings for storage, and you can lease a space. Up here we don't have those. We need a shack or a little storage area near our places. People will put their old stuff in there to store it.

What is the hardest part of building a cabin or shed?

They need to go through the hamlet. It has to go through the hamlet or the HTO for cabins on the land. The cabins cannot be built where people go camping. It cannot be built on campgrounds. Then the government imposes a small property tax. Inuit are not used to paying this kind of tax.

Some people now owe money. Other than that, once they are approved, that's it. They don't have to show a drawing then; they just have to take the materials to where they will build. Or they build a customized *qamutiiq* when the snow is not too soft, but when the snow is very soft,

they get stuck easily and they need more gas. Winter season will take them to a halfway point, a camp mid-way. My parents had a cabin on an island over there. I've seen people who put their cabin temporarily near the island, and maybe due to the ice or too much water or slush, they wait. No, they won't forget it.

Do people use the expression "*Iminiq Aqqisurialik*" or "DIY"?

Yes, people prefer to do it themselves; they prefer to do it their way!

How do people share their ideas?

Most will ask their relatives. I know some even have washrooms not with flushing but with buckets. Some even have multiple bedrooms.

Are all entrances in the same direction?

Most of the doors are facing the southern direction, mainly due to the predominant winds are north. They know that if their door is facing north, the snow will be coming in.

Regarding their additions and cabin:

Because of the strong northwest wind, they added a 6' addition and two porches to oppose the drifts. It took two years to build. They have two sheds for plain storage (e.g., camping gear, dog food, fuel, and man-stuff). They dismantled many crates to build the sheds. They were unhappy renting because rent went up over time, and they worked to purchase this kit, and 10% was extra. As homeowners, they must pay the tax to the GN as well as for water, electricity, sewage, and fuel. Their cabin is 20 minutes away from the hamlet.

Another respondent is self-employed and has a house and cabin. He was born and raised in an old matchbox but now lives in a five-plex unit with a modern thermostat, fresh-air intake, and an airflow, which makes him healthier. The matchbox only had a vent that could switch on or off. His current unit is larger and good for gatherings. There are six people sharing two bedrooms, a challenge according to him: "It would certainly be nice to have more bedrooms, but we would have to ask housing," and they rarely can get help. "We often run out of fuel, but we have learned how to do it ourselves. Electricity, fuel, and garbage pick up is quite expensive and not subsidized."

Welfare income support is \$60, and if one works casually, rent is \$770. If you don't fill out the tax form, rent is \$2,000. We must pay income tax. He continued by saying that one is "not allowed to build on camping grounds unless you have the approval from the HTO, if you need to build in the hamlet zone. We pay \$250 property tax per year." He added, concerning housing quality: "Houses that are built on piles even after a week or two have cracks. With cribs, there are no cracks." And concerning upgrades, he remarked: "It took 15 years to get on the list, since you are only eligible at 19 [years of age]." He was aged 38 years at the time of the interview.

He also has a cabin, the main entrance of which being on the south side, opposite prevailing winds. The window faces the main body of water. There is a little porch, and the doors are in line. He has a Coleman stove, an automated vent, and he puts a rock in it to keep it opened. "Even tents have vents," he noted. "You just un-sew the tent in the seam and place a little rock to allow the air to flow." He then noted that having "two windows is good to see the kids. There are lots of bears."

A Conversation with a female home owner

The case of this respondent regarding her house in Clyde River and homeownership in general:

Our houses are teeny-tiny, teeny-tiny. The furnaces and water boilers are too big for the size of the house, and it's too costly to operate. It's not cost-efficient. Its insulation is southern width. The houses in the south that have a foot of insulation is one thing; it makes no sense here. It becomes -64° c. in winter. We should have more insulation in our houses. Every month it's almost \$500 to heat our house, and that's too much! It could be better if it would be [a pause]...the answer is- it's not a little bit of insulation. It should be a foot;[another pause] it's just not right.

The chimney system up here, where they put the chimney on top of the roof...90% of houses have lost their chimneys. They've blown away.

Skirting, all the way around our house[referring to a screening made of plywood or mesh that surrounds the gap between the house and the ground]...the air intake where the chimney is located...and it goes right through the crawl space. It's not official skirting, but without the skirting, the snow blows up, and so I've put skirting around the house myself. It's not official skirting, I just gathered plywood...

Are there other issues?

The other issue is the porch—the land planners and Canada drill, who do the piles. The piles were \$1,000 each, that means \$18,000 for one house. But I have no say in how the house is going to be facing and where the house is going to be and where it's going to go. So, my front porch we never use because snow comes up to my roof. I can shovel all winter long. I can't shovel all the time.

So, no say with the orientation of the house, the view, the wind. Nothing. Even though I put in my word, it's not up to me. I drew the lot; I drew

my house. It would have been facing that way[*facing south to avoid snow drifts*]. It would have been tilted, compared to the other houses [*the other houses face the road and have a north east exposure*], and the wind would have blown through the side, but it's this way. The snow goes right up to the roof. Literally right to the side. You consider the angle to be important; it would have been crucial. It makes a difference. I put in my word, but it wasn't up to me.

House number..., its a tiny house on the road to the airport. How it's positioned relative to the wind, this is where the problem lies. It was going to be that way, it's that way. I won that!

This is my porch, this way [*facing the street*]. The wind comes from here [*North*], so I get snow up to the roof; my proposed one was this way. My proposal would have been this way [*sqewing the house toward the south*], so I would have come in and out here [*from the side yard on the south side*]. The snow buildup would have been here, and my property line is there [*the snow accumulation would have been entirely on her property*]...

So, you had plenty of space to turn the foot print.

Their argument was it's not up to the owner. Not up to the owner! I built my house in 1989. I was an exception because free houses were given away before that. I purchased a \$200,000 house by absorbing some of the cost because I negotiated it. It's not available any more, I don't think.

It was a three-bedroom house. I modified it to a two-bedroom to open up the third bedroom to extend the living room. What would have been a tiny bedroom turned into a dining area. I think "ownership," what's the word in English, "is imperative." You want members of a society to be active

members, give them something to own. I know the housing corporation gets tons and tons of money each year.

In 1962, my parents were living off the land, and suddenly they had to pay a land lease, pay rent, taxes, and for what? They don't have very much.

Our lots are not landscaped; we cannot buy gravel. We can maybe buy a load or two. But why? It's \$162 for a loader pail full of gravel, but it has to be crushed. It can't be the one from the airport because it is mud. That's the "guck" they give you for \$162.

The respondent found living in government-provided housing frustrating. She responded by being "unsympathetic" to the intended use of her domestic space and by applying an innate architectural wisdom to modify it to better reflect her culture and her family's needs. I spoke with her at another meeting. The following is a moderately edited transcript of what she told me:

I had no say, no: [not on which direction] the house would face or where it would be—even though I own it and had it built. [One consequence is] we never use my front porch because the wind blows snow up to my roof. I could shovel all winter long [and it still wouldn't help].

I put in my word. I drew [a picture of how I wanted] my house [oriented]. I wanted it facing [an optimal direction]. It would have been slightly tilted compared to the other houses, and the snow would have blown through the side..., and any build-up would have been within my property line. The angle is crucial. But they ignored my proposal. The argument was: "It is not up to the owner, not up to the owner, not up to the owner."

I built my house in 1989, and I was an exception because free houses were given away prior to this. I purchased a house by absorbing the cost because I negotiated it. It's not available any more. It was a three-bedroom plan, and I

modified it to a two-bedroom plan that extended the living room [which we turned into] a dining area.

Our houses are teeny-tiny. The furnaces and water boilers are too big for the size of the house. [That makes it] costly and certainly not efficient.

To understand seasonal camps in the region, I had a long discussion with another respondent, who for almost two years, starting in 1971, lived in *qarmaqs* and tents with a local family. This interview offered me much insight into the various types of camps and the way of life therein. It also contributed much on the significance of southern presence in the community and the roles of its people, especially their different standard of housing:

A place called *Nasaq* (the hat or hood) was closer to Pond Inlet than Clyde. It wasn't an outpost camp. It was supposed to be a year-round camp, and there they built a stone *qammaq*. I remember that was in 1973. They must have gone there in the summer of 1972, and it must have lasted into 1974. It was right down on the southwest side of Walker Arm, near Walker River.

Can you speak of summer camps?

There was one on the north side of Scott Inlet: *Atutsiuq*. Another outpost camp at *Pinuaq*, at Iluksiun Fjord, and that was open for about a year. Then there was one during the summer. In summer, other people lived in *Pinirak*, on the southeast side of Inuksiun Fjord. Then there is a place called *Ailuqtaluk*—a summer seasonal camp. There was one cabin there, but it was never really used. There was one at the end of Clyde Inlet, near Clyde River, where my friend would go. People would go in May and come back in September. These were places where people would stay for months, until sealifts, and they would take a boat out with them.

No one was in Isabella Bay; there would be a summer camp on the south side of Henry Cater Peninsula, called Nuvutiapik. People would camp on the west side of Inuksiun Fjord, near Pinirak, across Inuksiun Fjord. It was called Alpatuk. In the 1970s, families would spend the summer there and move around. I remember one time we moved 12 times. It depended on the animals. Then there were lots of places where you would camp on your way to another site. Appatiuk closed in 1968, and after the families lived in Clyde, they would go there in summer. Akauraitaq, on the north side of Eglington Fjord, was a permanent village before 1966. Those were all the named camps I knew of. If I say village, people were there separate from the government village.

The families would trade with Clyde, but they would stay nearby from September to May. It's where people used to live, and then they would start traveling in the summer.

Then, when I talk about the summer camps, that is where they had come from a couple years earlier, where there would be 15 or 20 people. Outpost camps were very few, and they were a government program. Travel camps or commuter camps were places where people waited for the ice to form. It was located on the west side of Clyde Inlet, 20 or so km away. People might be there for a couple of weeks, waiting for the ice to form. And then there were people that would spend the summer there and commute back to Clyde.

What type of dwelling were they using?

They were generally using the eight-sided tents.

Where were they getting the canvas?

HBC came to Clyde in 1923. I think canvas tents just came in the 1930s or 1940s—as well as wood boats, which came in the 1930s. I stayed there for weeks. There were about 20 tents.

In the permanent villages, there were between 20 and 45 people. I can tell you there was about 25 people.

How many more permanent structures?

There were at least five qarmaqs. I've been there. In Alpatu, there was a family that was about 40 to 50 people. That was big. At Scott Inlet, there were 20 to 25 people. There were about five people per construction. In 1923, when HBC first came, no one lived at Old Clyde except for the post servant.

When did houses begin to arrive?

In the early 1960s. There was a camp called Suluak, a travel camp. George lived there when they were traveling down Clyde Inlet. All the places I've named were used. Some were abandoned, but all the others were in use.

How many people were in Clyde when you first arrived?

There were 220 people when I got there in 1971. There were 42 houses. The school principal had a two-story suspended-basement-type house; the mechanic and his wife and two kids also had a two-story and suspended basement. There was a staff house, two apartments across what's now the game officer's building,

Next to the old garage, the house is now gone, there was a staff house with two teachers. Two nurses: one lived in half the staff house, the

other at the nurse's station. The Mountie [RCMP officer] was in Cape Christian. Across the bay [in Old Clyde] there were four MOT [Ministry of Transportation] guys. They stayed there till the 1980s. They had quite a supply. One of the guys was a cook.

Did they live in the old matchbox houses?

Oh no, they had their own infrastructure. They manned the weather station. They had a big staff house, then they had a building for filling the balloons. They had four or five buildings. If you walk around on the outwash plain, you can find old instrumentation packages. The weather station is now the airport building. I remember being surprised one year when the terminal building was built.

When was the terminal built? In the early 1980s?

1978, 1979, 1980.

How many southerners were there?

The settlement manager Herbert Hunt married an Inuk from Cape Dorset, and she became the first full-fledged female Mountie; and the HBC manager, his wife, and clerk were white. And they had their own house. There were approximately 15 or 16 white people when I came—the principal and his wife.

How many Inuit lived here?

There were 42 people, and none were buried in the new cemetery yet. There were four or five vehicles in town, a tractor, one for spare parts. And one day they would put the oil tank on it, and the other day it was the

water tank. Sewage was picked up by qamutiiq. A half track had wheels in front and a track on the back, and the whole thing was enclosed. Johnny drove the grader, and two mechanics that assisted the white guy, and Jacopie, the settlement manager, drove the Bombardier half truck. Isaac's mother was a maid, and she cleaned the principal's house and the staff house. There was a cook at the staff house. The school was two trailers, and the nursing station was one trailer. It was right across from the old store. The settlement manager's house was above.

I am sure that most women would not like to be without the services.

People were ecstatic about the first nursing station.

An Interview with a Local Planner in April 2014

The following is an interview between a local planner and myself:

If we have 10 units to build, for example, we first look at the soil condition map. We look for bedrock, to avoid permafrost as much as possible. We try to find a place for roads that are as close as possible to the existing community. If not, we find areas that require drainage works. Either we pay for drainage works or we pay for a road. It is always about money.

Then we look at the topography. We have to plan in a way that the house pad will require a minimum amount of gravel. We find a place that is either suitable for the road placement or for the units. We try to minimize the gravel because of the huge gravel shortage in the north. The cost of gravel is an issue, and there are no crushers in the communities.

How do you consult with the community stakeholders?

The only consultation we do with the community is where they want to place the units. However, the consultation is more of a politeness; the truth is, they don't really have their word to say.

When it's decided, we send a surveyor. We suggest several layouts, and the surveyor comes to validate the plan, and his report is sent to us. If the cost is too high, there can be arguments and negotiations of who is going to get their way.

We are looking for crushers (at least two) to share between communities. Just to go and come back 10 km away is a costly endeavour. Because of the lack of gravel, it may jeopardize the amount of housing we can build.

What is the reason for this battle between roadwork and housing?

The reason is that two separate organizations take care of housing and roadworks, each one with its own priorities. Then the municipality builds the roads and independent contractors build the housing. There are automatic conflicts between agencies.

Can you think of a way of solving this conflict?

Yes, I know firsthand of an example in Wemindji, where the same governing agency pays for the roads and infrastructure, but the village finances the housing program. At one time it was all social housing, but now it is all private housing. There is a big difference when people own their own houses. They are more prone to care for them as well.

People now just have very little say. They want outdoor aqueducts for sewage and water like in Greenland.

We have to think of the soil and the trucks for water delivery and sewage removal and the hookups are in the front of the house. The house is designed in order for the hook up to be on the façade facing the road.

What about the duplexes? Or the multiplex units?

The hookup is in the middle of the two units. The house faces the street; they have no basements, and therefore in a four-plex, there would be two hookups. Therefore, the house has to be as close as possible to the road and parallel to it. All this makes for horrible and inflexible planning.

An interview with a community-development officer responsible for housing in August 2016.

How are decisions taken relative to housing?

It is often summarized in how to lower costs! There are astronomical costs involved each year. You mentioned 10-plexes as the new formula for housing. We are trying to reinvent the wheel by trying to cut construction costs. But we have not found the solution because our costs are still very high. The idea is that if we build more, costs will go down, but this is still not the case. In the south, we could build 10 apartments for less than 10 individual units, but here in the north, it's not true. It's the logistics which are more complicated, and we can blame numerous individuals and organizations for that. We make many mistakes, which are very costly; we are not well organized.

What are your ideas about the piles for construction? People do not seem to like the piles; therefore, why are they being used?

There are urban legends about piles, and I wonder if this is not one of them that people do not like them; I am not certain of that. There are 10' piles as well.

They could be screw jacks like in Nunavik, so why do we use piles here in Nunavut?

If you are doing a study in Nunavut, and you say why they build with piles, I am very critical of the NHC—we take very bad decisions. There are places where the bedrock is difficult to get to, but there are areas where a gravel pad with screw jacks are a satisfactory solution. I am not convinced that piles are the best solution. For the piles, we must do case studies. We have spoken to numerous people, and piles vary between 10' and 45'.

Some people laugh at it and don't understand why they are being used.

About urban legends, it is a fact that people are afraid of climate change, but the houses that are built on screw jacks, I do not think that they crack. We have problems with piles. How to lower costs?

The units are now 745 square foot, and there are 10 at \$400/square foot. Workers arriving from far, how are decisions taken? Why are people from the communities not made aware of their future construction projects?

I don't know where to begin. I am very critical of Iqaluit. There are people hired that have never done construction. This is not my case, I was a contractor in the south before coming here. It's more or less me that will decide. I am a construction inspector, and I came here and met the people in planning. I go around and take photos, and then I submit this to Cape Dorset and to Iqaluit to the appropriate department. That's how it works.

The hamlets, Inuit, they complain, but, look, in the end, they have to learn to govern themselves.

We want to build there; the terrain is flat. We have the electrical connections, and we want it there.

We arrive, but nothing is prepared. It should be a local decision.

If we told the hamlets, we want to build you three units, if the sites are not prepared, we will not build, but everything is always last minute; we will build this year because we have the money...

But there are some simple decisions to be made. There are worse things than that. Last year there was a project submitted, five units in a five-plex that were so small. If we reduce the space by 30%, we think we will save 30%. We called it Noah's Ark, and we decided on the colours: floors mustard yellow and kitchen counters mustard yellow, with two tiny bedrooms. We only build two of those because it was so incredibly ridiculous. We were in a huge dispute with these people that have no experience—the new employees of Iqaluit—and with Inuit that do not take their space in the process. If the future residents do not take the trouble to come to the meetings, we are in a bad position.

You must visit the 33 units under construction in Iqaluit near the church by the lake. There is an 18 units, then the 33 units, and another 15 units not at all adapted to Inuit lifestyle. The insulation is on the exterior. If it were up to me, I would not change the basics. We are spending more than \$430,000 per unit, and these units are tiny.

What do you think of concrete in the north?

We do not have cement factories in the north, so I do not think this is possible.

“Now Meet Some of Today’s Clyde River and Nunavut Administrators!”

The senior administrative officer (SAO) is Herb Kakasuk. The mayor from 2010 to 2015 was Jerry Natanine—now it is James Qillak (2016–present). The local church is Pentecostal, within the Anglican church (1847–1930), started by Father Mary Rousselière, then Father Henri. Currently, the minister is.

The Bathurst Mandate encourages the government to incorporate Inuit knowledge, and the Clyde River Protocol makes the GN and NTI Land Claims Agreement partners. The protocol gives NTI a stake in territorial government but no responsibility toward the community.

Mary Simon heads Inuit Circumpolar Council (ICC). The father of Nunavut is John Amgualak. Nelly Cormier is director of COPE, the Committee for Inuit Entitlement. Graham White is the MLA, and there are 23 ridings in Nunavut.

The SAO John Ivey runs the show in Clyde River. However, he has stated that the GN makes the decisions regarding housing. He did not know how many lots would be required for the 10-plexes, and they would take 15 months to build with a \$3,100,000 budget.

A new hamlet office was planned and designed by Gregor McIntosh, and in August 2015, the building was fully occupied and functional. Luisa is the finance person. Joassie is the municipal land leasing officer; he said he would email the plans of the 10-plex. He believed they are 1,000 square foot units and have two bedrooms each (but I was told by the contractor that they were in fact only 745 square foot). He also believed they will use less fuel and less electricity since they will share one mechanical room.

Jeanni O’Donnell was the manager of the Clyde River Housing Association, in charge of public housing and maintenance. The board of directors comprised both elders and younger generations. She was replaced by John Ivey. Maryanne Corkett is the administrative finance assistant at the Clyde River Housing Association.

In an interview with that association, I got some important data about the housing costs and the rents.

There are 179 houses that belong to the government, and the rent scale goes from \$60 to \$1700/month. The rent is based on tax forms showing income. Only 30% of tenants pay rent and there are 75 families on the wait list who have to reapply every six months. If rent isn’t paid, the housing association will send a collection letter and eventually a second collection letter. If no one is held accountable and no one pays the water bills and rent, the power company will cut down on the electrical output.

The only recourse is getting the power company to cut down on the electrical output.

The biggest maintenance issues are freezing pipes and freezing sewers. House maintenance is rendered by one person and one apprentice plumber. A journeyman plumber will come from the south with the red seal.

What are the issues with training local residents to do the work?

The problem with training local people is the training is a six-week work program out of town at Arctic College, which is in the capital of Iqaluit, a two-hour flight away.

How long is the waiting list for housing?

There were 75 families on a waiting list for housing in 2014, and 89 families in 2015, although one five-plex was completed in 2014, and two 10-plexes were built this year. The population continues to grow, and the people on the waiting list have to reapply every six months to update their file.

How do you prioritize?

The priority goes by a point system, putting people with health issues and small children at the top of the list. If a tenant has no tax form, they will pay the highest rent scale. Income support assistance and welfare has an in-town office to help residents cope with requirements. There are arrears that have compounded over \$100,000, which affects their credit.

Summary of an interview

B. J. Hainu is the games officer at the HTO. This association builds basic shelters that serve as protection against polar bears. The HTO positions the shelters out on the land in areas that could be helpful to the local hunters. Hainu knows the land well, and since families must get his permission to build a cabin, he knows all their locations. When I asked him for the percentage of public housing in Clyde River, he replied: “Public housing represents 79% of all housing in Nunavut. As of April 2014, there were 179 public housing units in Clyde River proper. Most of the houses people live in are planned and built by numerous agencies and suppliers. The designs are a result of building codes, basic dwelling requirements, and minimum costs.”



Figure 164. Post serving as an antenna, electrical post, and signage to named places along the coast.



Figure 165. Small Hunters and Trappers Organization cabin built for emergency shelter.



Figure 166. Small inuksuk erected at the highest elevation above Clyde River (Turgeon, 2015).



Figure 180. Ulliq or seal oil lamp with a bone game



Figure 181. Teflon strips to minimize friction.



Figure 182. Fully electrified cabin on the coast, connected to a generator and satellite dish.



Figure 183. Fishing hooks and bate for jigging, hanging in front of a cabin's plexiglass window (Palluq, n.d.).



Figure 184. Walrus meat to be stored beneath a gravel beach until spring (Paniloo, n.d.).



Figure 185. Parts for Isaac's new boat. These include a white plastic water tank and the hull of a row boat.



Figure 186. Underside of Isaac's new boat. The plastic water container is waterproofed (Tassugat, 2016).

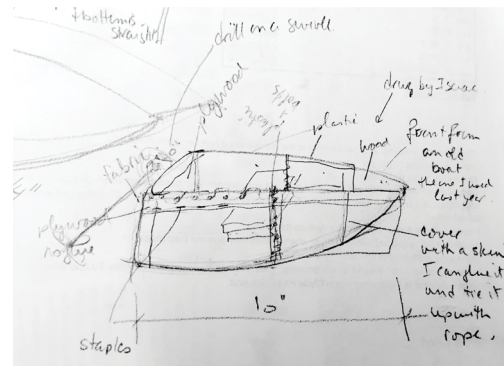


Figure 187. Isaac's design for a new boat made of recycled materials (Havelka & Tassugat, 2016).



Figure 188. Boat fabricated inside a workshop (Tassugat, 2016). Hockey sticks used as edge reinforcement.



Figure 189. Beached boat after checking nets.



Figure 190. Cargo tray added to the back of an ATV with plywood cut-out.



Figures 191-192. Qamutiiq with passenger seats.

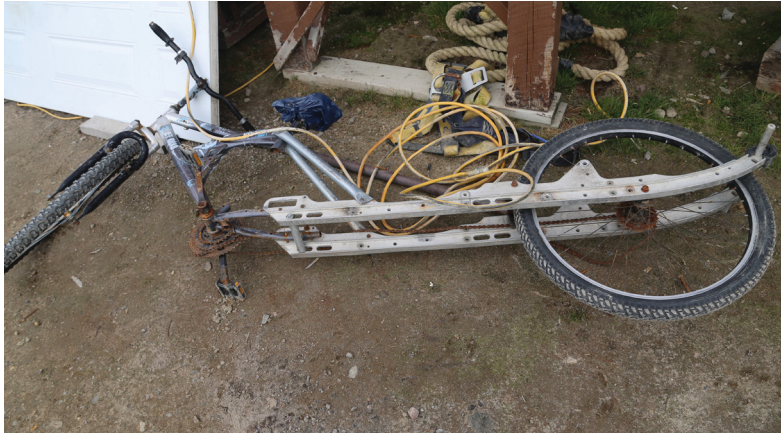


Figure 193. Bicycle made of ski parts of a snow machine.



Figure 194. A travelling dog house on a qamutiiq made for long trips (Gearheard, 2013).

Unlike dogs, snowmachines don't get tired. When technology impinges upon a community, a human response accomodates, transforms or rejects it. A resourceful nature can recognize the benefits and integrate them into daily life.