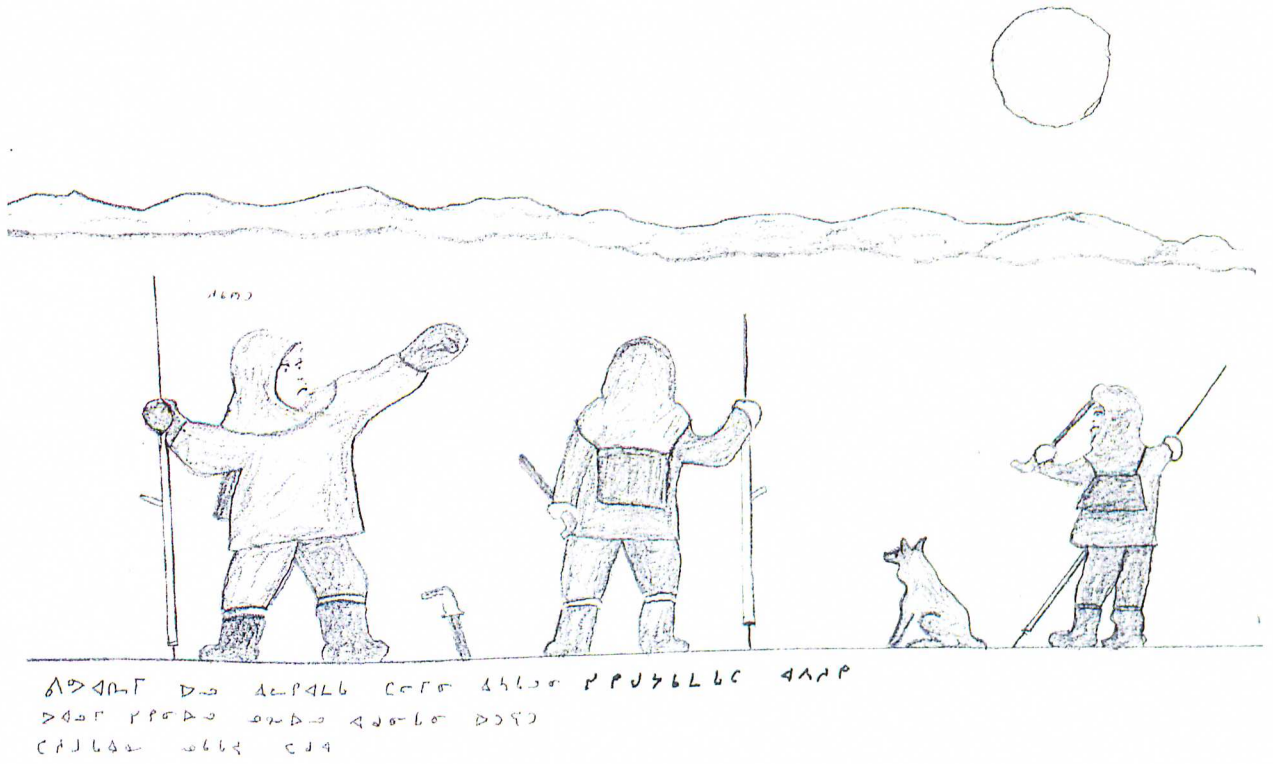


Inuit and Scientific Ways of Knowing and Seeing the Arctic Landscape



Scott Heyes
Master of Landscape Architecture by Research
May 2002

Adelaide University
School of Architecture, Landscape Architecture and Urban
Design

**DECLARATION RELATING TO DISPOSITION OF
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Name: Scott Alexander Heyes

Course: Master of Landscape Architecture by Research

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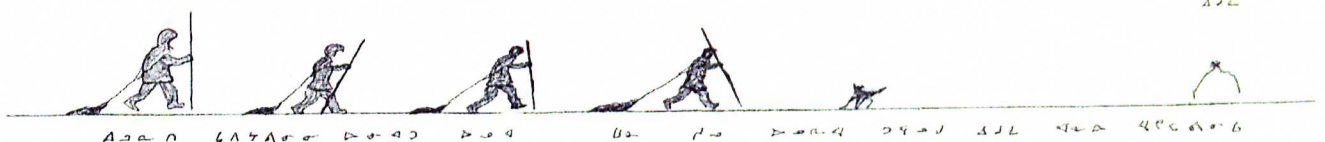
Inuit and Scientific Ways of Knowing and Seeing the Arctic Landscape

By

Scott Alexander Heyes
B.Des.St, B.L.Arch (Hon)

Thesis submitted in fulfilment
of the requirements for the degree of
Master of Landscape Architecture by Research in the
University of Adelaide

February 2002



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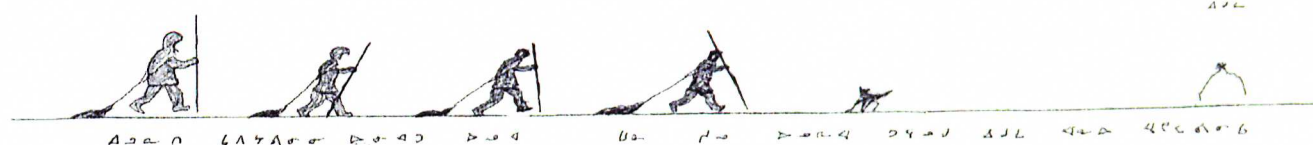
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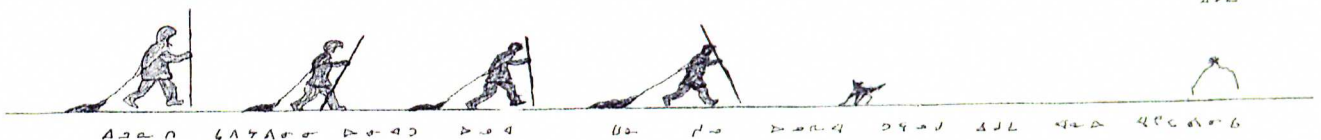
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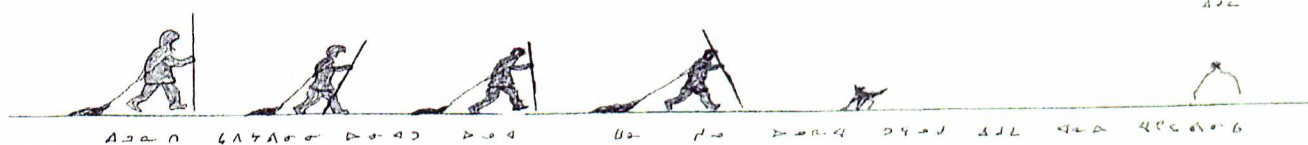
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Certificate of Originality

I certify that the substance of this thesis has not been and is not currently being submitted for any other degree or qualification at any other university or institution.

I certify that, to the best of my knowledge, any help received in preparing this thesis and all sources used have been acknowledged.

Scott Heyes



Abstract

This thesis explores traditional Inuit and Western scientific ways of knowing and seeing the Arctic through a number of cultural expressions of landscape. Inuit and Western perceptions of the Arctic are analysed by examining a series of thematic and cognitive 'maps', drawings and satellite imagery. The study focuses on how these forms of landscape representation and methods of navigation shape the way in which the Arctic is perceived. Centred on Inuit coastal villages in Nunavik, (Northern Quebec) Canada, the study illustrates different and converging ways of reading the landscape through maps.

The Inuit, as with many traditional semi-nomadic societies, developed a variety of ways in which to orientate and navigate through the vast landscape of the Arctic. Through apprenticeship learning and living on the land for 4000 - 5000 years, the Inuit developed acute perceptual and accurate mapping skills – an exceptional ability applauded, and at times, mimicked by early occidental explorers. Inuit systems of navigation are based upon natural features, celestial bodies, place names and landscape interventions. Similarly, early Western explorers observed the wind, moon, sun and star constellations as travel guides.

Contrastingly, modern Western navigation relies heavily on cartographic conventions and universal measuring tools. With increasing technologies influencing and informing Western means of navigation, the use of natural cues as way-finding aids has reduced significantly. Modern navigation aids and electronic devices have effectively replaced nature with science. Battery powered, pocket-sized devices now claim navigational supremacy whereas way-finding aids in nature have become supplementary.

The legacy of Inuit way-finding techniques will only prosper if traditional navigational knowledge is transferred to younger generations. The potential remains that nature may become further abstracted and removed for the Inuit. Perhaps the loss of traditional Inuit way-finding skills effectively spells the end of inherent connections with the land.

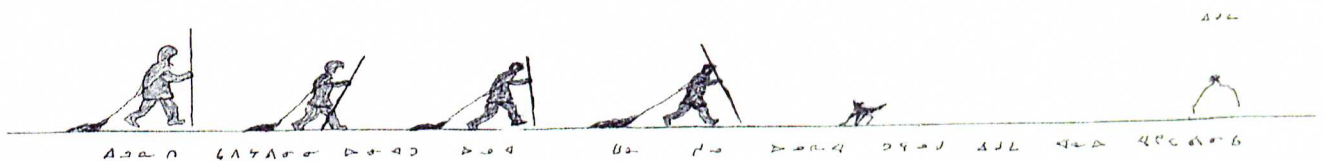
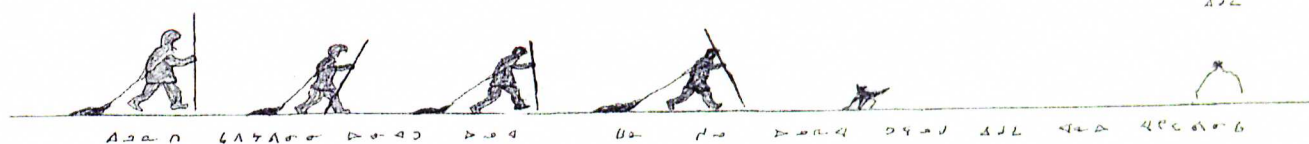
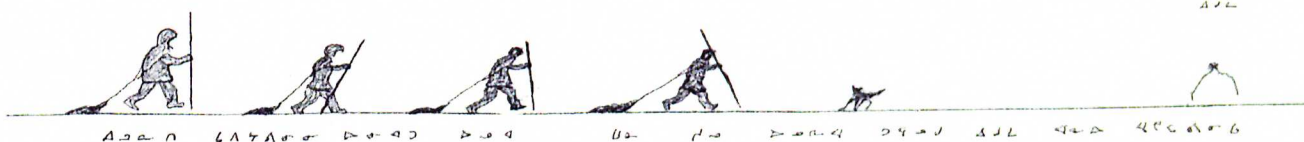


Table of Contents

| | Page |
|----------------------------|---|
| Acknowledgments | iv |
| Address for Correspondence | vi |
| Certificate of Originality | vi |
| Abstract | vii |
| List of Figures | x |
| List of Tables | xi |
| Chapter | |
| [1] | Introduction |
| 1.1 | Introduction 13 |
| 1.2 | Rationale 14 |
| 1.3 | Methodology 15 |
| [2] | The Inuit & The Arctic |
| 2.1 | The Arctic Environment: Physical Characteristics 19 |
| 2.2 | Characteristics of Nunavik & its People 20 |
| 2.3 | Character of the Inuit Village, Quaqtq 21 |
| 2.4 | Inuit Beliefs/Connections with the Land 22 |
| 2.5 | Traditional & Contemporary Methods of Travel 23 |
| [3] | Cognitive Maps & Perception |
| 3.1 | The Genesis of Inuit Navigation Skills 28 |
| 3.2 | Landscape as Nature, Habitat and System 29 |
| 3.3 | Cognitive Mapping & Inuit Perception 32 |
| [4] | Inuit Navigational Techniques |
| 4.1 | [Orientation & Landmarks] |
| 4.1.1 | Ephemeral Mapping: Maps on Sand and Snow 38 |
| 4.1.2 | Celestial Navigation 40 |
| 4.1.3 | Navigating with the Sun 45 |
| 4.1.4 | Navigation with the Wind 47 |
| 4.1.5 | Navigating with Sky Reflections & Natural Features 49 |
| 4.1.6 | Navigating with Inuksuit 52 |
| 4.1.7 | Some Authentic Inuksuit Types 55 |
| 4.1.8 | “Modified” Inuksuit forms 61 |
| 4.1.9 | Discussion: Preserving Inuksuit 63 |

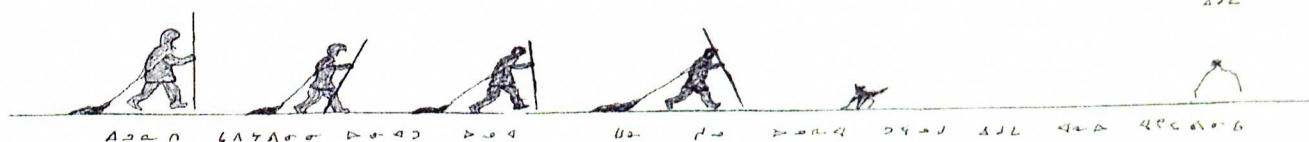


| | | |
|------------|--|-----|
| 4.2 | [Inuit Materialistic Maps] | |
| 4.2.1 | <i>Ammassalik</i> Wooden Carved Maps | 67 |
| 4.2.2 | Toa ‘way-finders’ of Lake Eyre, South Australia | 69 |
| 4.2.3 | Marshall Island Sailing Charts | 70 |
| 4.2.4 | Inuit Maps on Skins | 71 |
| 4.2.5 | Ivory Maps, Maps on Boxes | 73 |
| 4.2.6 | Inuit Maps on Paper | 74 |
| 4.3 | [Inuit Place Names as Maps] | |
| 4.3.1 | Place Names | 79 |
| [5] | Scientific Representations of Landscape | |
| 5.1 | [Navigational Devices: A Way of Seeing Landscape] | |
| 5.1.1 | Dead Reckoning/ Traverse Board | 86 |
| 5.1.2 | Nocturnal or “Sky Clock” | 87 |
| 5.1.3 | Seaman’s Quadrant/Astrolabe/Cross Staff | 89 |
| 5.1.4 | Sextant | 90 |
| 5.1.5 | Compass | 91 |
| 5.2 | [Scientific & Thematic Maps: A Way of Seeing Landscape] | |
| 5.2.1 | Aerial Representations of the Arctic | 93 |
| 5.2.2 | Ephemeral Representations of the Arctic | 99 |
| 5.2.3 | Symbolic Representations of the Arctic Landscape | 102 |
| 5.2.4 | Topographic Representations of the Arctic Landscape | 108 |
| 5.2.5 | Comparison of Navigational Techniques | 111 |
| [6] | Conclusion | 113 |
| | Bibliography | 116 |
| | Appendices | 129 |
| [1] | Field Trip Report | 130 |
| [2] | Selected Way-finding Drawings from Tuumasi Kudluk’s Encyclopaedia | 136 |
| [3] | Inuit Children Way-finding Drawing’s by Isummasaqvik School Students | 146 |
| [4] | Quaqtaq Map Study | 151 |
| [5] | Refereed Journal Articles: | 164 |
| 5.1 | “Preserving the Legacy of Inuksuit in Arctic Canada” | 165 |
| 5.2 | “Landscape Perception and Way-finding in the Arctic” | 179 |



List of Figures

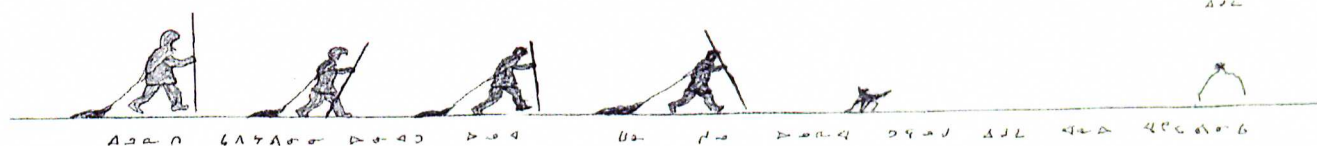
| | |
|---|----|
| 1. Map of the Arctic & Nunavik | 19 |
| 2. Skin-covered <i>Umiaq</i> Sail Boat | 24 |
| 3. Traditional Inuit <i>Qayaqs</i> (Kayaks) | 24 |
| 4. <i>Aivilik</i> Inuit Perceptions of the World | 36 |
| 5. Mental Compass of Polynesian Star Navigation | 40 |
| 6. Travelling with Stars | 43 |
| 7. Travelling with the Stars and Northern Lights | 44 |
| 8. Measuring the Time of day and Navigating using the Sun | 46 |
| 9. Navigating with Boulders, Drifted snow and Wind | 47 |
| 10. The effect of Wind on Cardinal Point Perception | 48 |
| 11. Navigating with Clouds & Rivers | 50 |
| 12. Navigating using Standing Clouds | 51 |
| 13. 'Sky Map' print by Pudlo Pudlat | 51 |
| 14. Large Inuksuit on Baffin Island, Nunavut c.1970 | 53 |
| 15. Inuksuit near Coastal Village, Quaqtaq | 54 |
| 16. <i>Hakamukatak</i> pointer marking direction to a Cache | 56 |
| 17. <i>Hakamukatak</i> Inuksuit in the area <i>Nunaturlik</i> | 56 |
| 18. (a) <i>Ikahimaluk</i> or <i>niungvaliruluit</i> Inuksuit windows | 57 |
| (b) Inuksuit windows marking a navigation route across the land | |
| 19. Navigating using <i>Tikotit</i> or <i>Tikkutik</i> pointers | 57 |
| 20. <i>Tukkutik</i> Pointers used for Fishing | 59 |
| 21. <i>Aulaqquat</i> 'bogeyman' Inuksuit | 59 |
| 22. Alert's cairn at Floeberg Beach | 60 |
| 23. Inuksuit poster by Neshail Weera | 61 |
| 24. Inuksuk constructed for the <i>Mosaiculture Internationales</i> Competition | 62 |
| 25. Inuksuk in Stanley Park, Vancouver | 62 |
| 26. <i>Innunguait</i> at the entry to Kuujjuaq, Nunavik | 63 |
| 27. An Inuit Identity, <i>Innunguait</i> | 63 |
| 28. Ammassalik Wooden Relief Maps | 67 |
| (a) The peninsula between Sermiligak and Kangerdluarsikajik | |
| (b) A sequence of offshore islands | |
| (c) The Islands between the Kangerdluarsikajik and Sieralik coast | |
| 29. Toas used by the <i>Diyari</i> people of Lake Eyre, South Australia | 70 |
| 30. Marshall Island Sailing Charts | 71 |
| 31. Inuit Map on Seal-skin | 72 |
| 32. Walrus Ivory Maps Decorated with Hunting scenes | 72 |
| 33. Intercultural Map Communication between Explorers and Inuit | 74 |
| 34. Map of Hudson Bay and Straits | 75 |
| 35. Inuit Maps of the Northwest Passage | 78 |
| 36. Topographic Map of Quaqtaq | 83 |
| 37. Nomenclature Map of the Quaqtaq district | 83 |
| 38. A Traverse board | 87 |
| 39. The Nocturnal Instrument | 88 |
| 40. The "sky clock" | 88 |
| 41. Seaman's Quadrant | 89 |
| 42. Seaman's Astrolabe | 89 |
| 43. Astronomers Astrolabe | 89 |



| | |
|--|-----|
| 44. How to use a cross-staff | 91 |
| 45. How to use a back-staff | 91 |
| 46. Hadley's Octant & Sextant | 92 |
| 47. Three Different Map Projections of North America | 95 |
| 48. Aerial Photograph of Quaqtaq Village | 97 |
| 49. Landsat 7 Satellite Imagery of Quaqtaq | 98 |
| 50. Oblique View of Ungava Bay & Hudson Straits from the Internet | 99 |
| 51. Inuit Map of Traditional Journeys from Kangirsuk to Akpatok Island | 100 |
| 52. Ephemeral Weather Maps of North America | 101 |
| 53. Enlarged section of a Geological Map (Including Legend) of Quaqtaq | 102 |
| 54. GIS map of Important Sites and Travel Routes of the Quaqtaq District | 105 |
| 55. GPS Coordinates of Quaqtaq | 107 |
| 56. Early Explorer Map of Hudson Bay & Straits | 108 |
| 57. Portion of a Map of the Labrador Peninsula, 1895 | 109 |
| 58. Contour Map of Quaqtaq | 110 |
| 59. Hydrographic Chart of Ungava Bay | 110 |

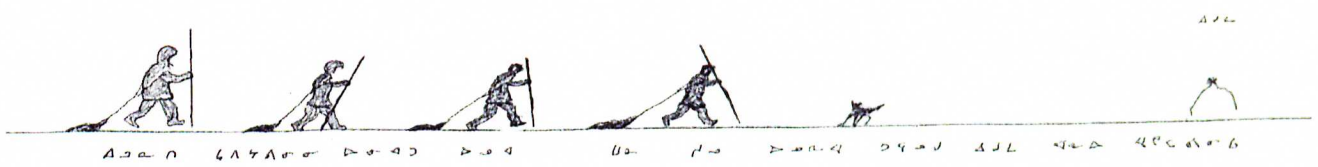
List of Tables

| | |
|---|-----|
| 1. Qualitative Research Method Employed | 17 |
| 2. The 10 Codes Behind the Meaning in Maps (Wood & Fels 1986) | 94 |
| 3. Comparison of Inuit & Scientific Navigation Techniques | 112 |



Chapter 1

Introduction & Methodology



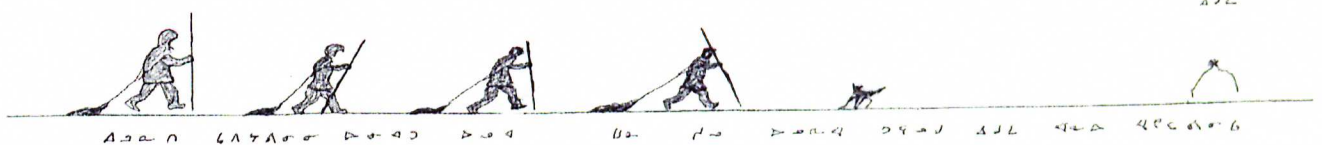
Introduction

“We need to employ a means of looking at the landscape from within, through the eyes and experiences of its inhabitants.” - Matthew Potteiger, 1987

This thesis examines ways in which the Inuit people of the Eastern Canadian Arctic perceive landscape and ways in which science, since the arrival of Europeans in the North, has looked upon the same landscape. Ways to examine landscape perception may be derived from songs, art, religion, dance, literature and cartography. For the purpose of this study, the acts of orientation and way-finding (an extension of mapping) forms the medium to analyse Inuit ways of knowing and seeing the Arctic landscape. Through a number of way-finding examples, it is possible to see how all those who have a stake in the Arctic, of which there are many, read slices of the same landscape in radically different ways. It is widely accepted that everyone has diverse views of the land based on personal experiences, religion, age and cultural upbringing. Yet the greatest impact on perception, for Inuit and non-Inuit alike, may however, stem from the “lenses” science has introduced into the cartographic world to aid navigation. Mechanised means of transport introduced to the Arctic in recent years such as snowmobiles, airplanes and motor-powered boats have also had a significant bearing on perception.

Traditionally, the Inuit navigated using a combination of natural features, celestial bodies and purpose-built markers. Tangible maps made from natural materials served little purpose to the travelling Inuit. Instead, they relied upon ingrained knowledge of their environment and well-developed mental maps. Nowadays however, navigation is performed much differently. Rather than relying on their own intuition and experiences, as they have done for countless generations, they are increasingly using satellite technology, through the aid of Global Positioning Systems to navigate. Although the Inuit now tend to travel across the snow-laden tundra equipped with GPS receivers, some hunters continue to use traditional navigational knowledge to ensure this information is passed on to future Inuit generations. It is imperative that younger Inuit learn how navigation was once performed using celestial features such as the sun, stars, moon, northern lights, clouds (sky reflections) and wind. Moreover, it is essential that they learn the various codes and messages inherent within the intriguing navigational stone formations known as Inuksuit. Built over the last 4000 years by Inuit from stones, snow, sticks or bones, Inuksuit form an integral part of the traditional Inuit navigational package. Entrenched with spiritual and geographical meaning, Inuksuit appear throughout the inland reaches of the Canadian Eastern Arctic, informing travelling Inuit of safe routes to follow, the location of food and dangerous areas to avoid. In order to maintain connections with the land indefinitely, young Inuit must learn the art of constructing Inuksuit beacons to contain messages.

Although science may provide the tools and devices to travel and navigate more effectively than using traditional Inuit systems, it lacks a connection with landscape to which indigenous people are accustomed. For example, the modern navigational ‘lens’, the GPS, is a departure from land. The GPS ‘sees’ the world from above in the profane sense of imaginary points, coordinates, grids and lines, whereas traditional Inuit hunters when travelling ‘see’ the land at ground level in terms landmarks, natural features, terrain and place names. To the travelling Inuit, the land is understood as a series of continually updated images based on sensory experiences, events and inborn knowledge of the environment – factors that GPS choose to ignore. Considering some indigenous hunting



and gathering societies are vested with traditional navigational techniques, it may be possible for them to therefore travel more effectively (and get more from the landscape) than non-hunting and gathering societies, using a combination of customary methods and modern electronic instruments. However, this may only be the case if traditional societies learn, to some degree, how modern navigational systems operate.

This thesis describes traditional methods of way-finding and orientation through a set of Inuit children drawings from the *Isummasaqvik* Community School in Quaqaq, Nunavik (Northern Quebec), Canada. In addition, a selection of illustrations drawn by late Inuit elder and hunter, Tuumasi Kudluk, provides valuable insights in regard to way-finding methods used by traditional Inuit living on the land.

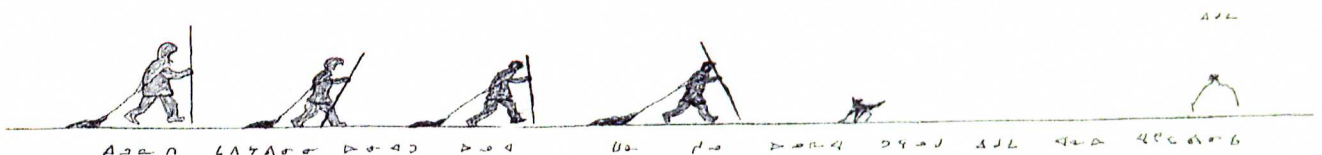
To better understand Inuit perception it is critical to understand who the Inuit are, the environment they inhabit, and how they used and still use the landscape. Through the lens of this cultural framework, it is possible to comprehend how Inuit perceive landscape and how way-finding systems emerged.

Rationale

This study is supported by the subjectivist (psychological) paradigm of landscape architecture which suggests that landscape can be analysed in terms of a phenomenological, cognitive and experiential approach. The opposing objectivist (physical) paradigm suggests that landscape can be analysed from an expert, ecological and formal aesthetic method.

The knowledge of how indigenous groups traditionally navigated has much to offer the design profession, particularly in the domains of landscape planning and environmental design. Indigenous way-finding systems - an integral component of traditional ecological knowledge (TEK), signify that prehistoric organisational systems were once in operation across the landscape. Furthermore, ancient navigation systems reveal the extent to which specific landscape features were feared, valued, revered and avoided by indigenous people. And, through constant travel, the landscape was afforded a variety of descriptive names – a lexicon reflective of events, actions and inherent landscape features and processes. The appropriation of names to places (particularly in remote and difficult to reach areas) indicates that indigenous people had far-ranging knowledge of the environment.

Indeed, the act of way-finding, and its associated properties provides planners and designers with a plethora of information about landscape narratives and indigenous connections to place. With this in mind, the Inuit children's drawings not only impart individual impressions of landscape, but also yield the significance afforded to the landscape fabric. Embedded within the drawings is a wealth of knowledge that speaks volumes of traditional Inuit way of life. Designers who learn to decipher the information contained within indigenous renderings of landscape, such as the Inuit children's drawings will undoubtedly be rewarded with a cornucopia of design ideas and opportunities. As designers expand upon their vocabulary of TEK, they will consequently become more equipped to judge the likely effect and impact of design interventions proposed within indigenous communities.



Qualitative Research and Ethnographic Method Used

An adaptation of the *observer as a participant* ethnographic research method, Table 1, was used to generate the thesis. According to Gold (1958), this method involves the researcher being involved in the same activities as his subjects, but only to a limited extent, leaving the researcher free to observe specific activities of interest. This method is commonly used in the social sciences, humanities, ethnography and cultural geography disciplines to obtain qualitative phenomenological and cognitive data. The thesis content stems from a combination of: oral and active ethnographic fieldwork, informal consultation with Inuit elders, a structured literature review, a comparison of indigenous and scientific maps/diagrams and by spending time at the case study site.

Initially, an extensive literature review of landscape perception, Inuit cartography and indigenous mapping was undertaken when studying in Australia, and thereafter, when studying in an exchange capacity at the University of Montreal, Canada. Maps of the Arctic, ranging from Inuit maps to Western early explorer and thematic/satellite maps were collected. Familiarisation of the Arctic environment, Inuit personalities and government organisations developed during the literature review process. To gain further background about the Arctic and its politics, relationships were developed with the *Avataq Cultural Institute*, the *Makivik* organisation in Montreal and Inuit Studies research institution, the *Université de Laval* in Quebec.

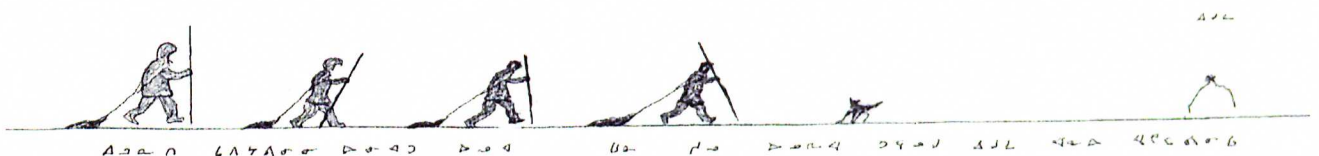
Flights to several Inuit villages across Nunavik were then arranged with the *Kativik Environment Quality Commission* in July 2000 (summer) as an observer. During these visits, discussions and informal interviews were conducted with Inuit identities and elders from many coastal villages. In an effort to arrange another fruitful field trip at a later date, much time was spent forging contacts and developing friendships with Inuit personalities. Quaqtac – an Inuit coastal village was chosen as the primary case study site. Upon returning to Quaqtac in November 2000 (autumn/winter), time was spent with particular Inuit elders on the land.

Video recordings and photographs of specific way-finding related features within the study site were taken and later compared to observations from July. Informal discussions about Inuit life and Inuit way finding occurred daily and for lengthy periods of time. A summary of the field trip report features in Appendix 1. Time was also spent indoors, discussing examples of Inuit maps, satellite/aerial photos and topographic maps with members of the Inuit community.

While in Quaqtac, lengthy discussions occurred with teachers of the local Kativik Regional School, (*Isummasaqvik*) to source information about way-finding. Subsequently, Inuit children drawings pertaining to navigation were obtained and used as data in the thesis – in support of Inuit use of natural features to aid navigation (Appendix 3 & 5). The data collated in the Arctic, in addition to the extensive map search and literature review formed the backbone of the thesis.

Research Ethics

As in most indigenous communities, response rates to research questions issued through correspondence are often slow and protracted. Formal interviews and questionnaires were



found to be an inappropriate method of obtaining information. In most cases, information was obtained through indirect conversations with the Inuit. For cultural and personal reasons, some interviewees were uneasy with interview sessions being recorded on tape. As an alternative, notes were taken during the course of interview and shortly thereafter. It is also worthwhile to note that some Inuit requested payment of money to be interviewed about traditional ecological knowledge. This is an ideal arrangement for both parties, as the researcher generally receives genuine responses and the interviewee is rewarded for their time and services. Moreover, payment of monies usually creates a positive interview mood. When working with indigenous people it is important to bear in mind the impact previous researchers have had on communities. The well-known adage among Arctic researchers that, "the typical Inuit family consists of two parents, two children and an anthropologist" remains as a legacy of by-gone research practices – a legacy modern day researchers working in the North need to take heed of. Damage done by anthropologists in the past means that researchers must be sensitive towards exploiting the Inuit purely as subjects.

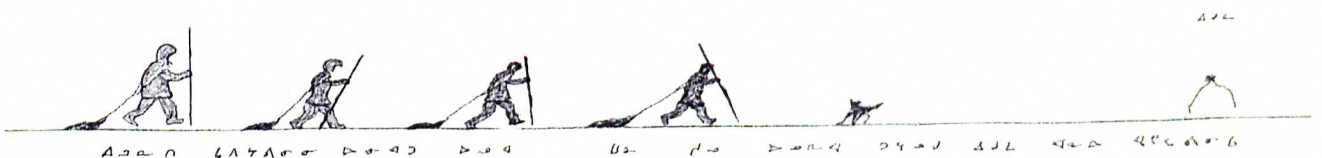
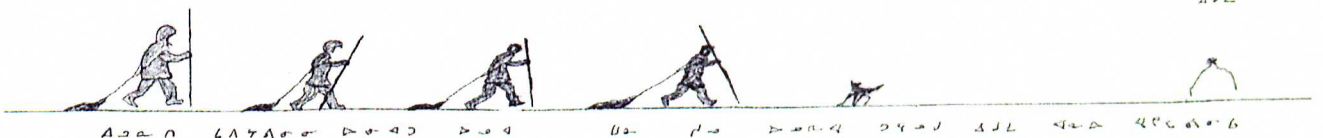
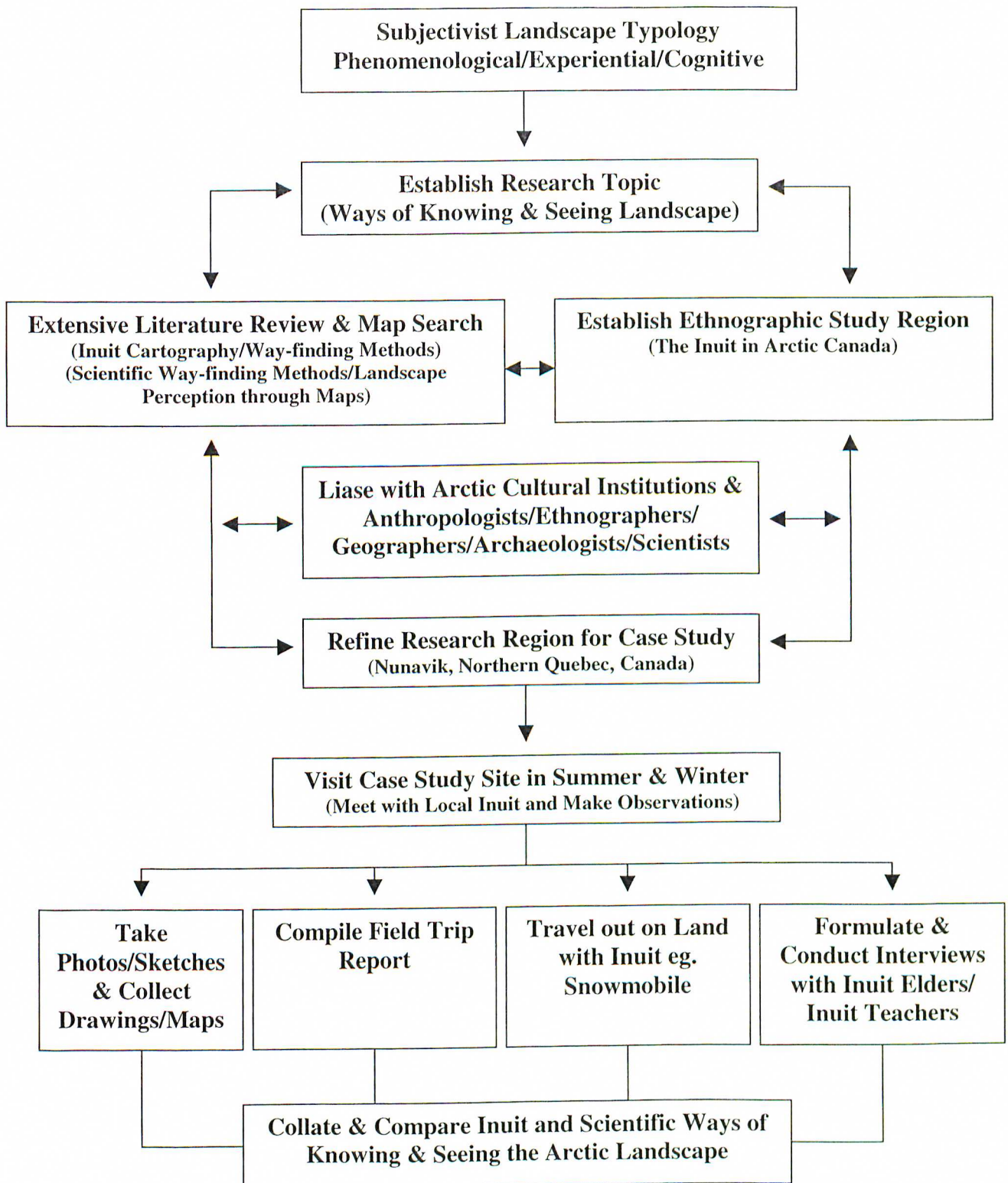
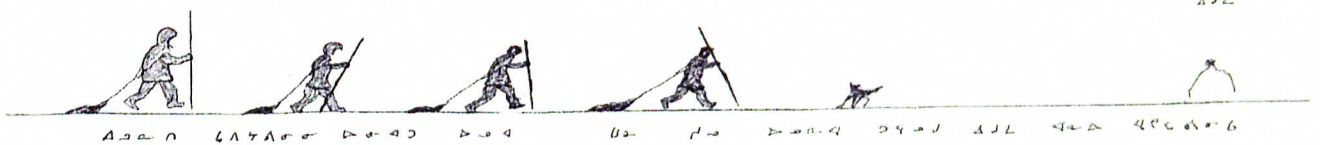


Table 1: Qualitative Research Method Employed
Observer as a Participant Model (Adapted from (Gold 1958))



Chapter 2

The Inuit and the Arctic



2.1 The Arctic Environment: Physical Characteristics

Arctic Canada stretches from the 55th parallel to the North Pole, encompassing the political regions of: the Yukon Territory, North West Territories (NWT), Nunavut, Nunavik, (Northern Quebec) and the Labrador Coast. The Eastern Canadian Arctic region of Nunavik, Figure 1, consists of myriad lakes, rivers and tributaries, which empty into Hudson, Ungava, Baffin and James Bays. Many islands, safe inlets and harbours fringe Hudson Bay - the most dominant natural feature in the Arctic, and one of the world's largest inland seas. The waters are treacherous and unforgiving for those not adequately equipped to negotiate the shallow, narrow and icy passages and straits. Seafaring in the area has proved difficult in the past because of large ice floes and strong rips generated by fluctuating tides of up to 10 metres.

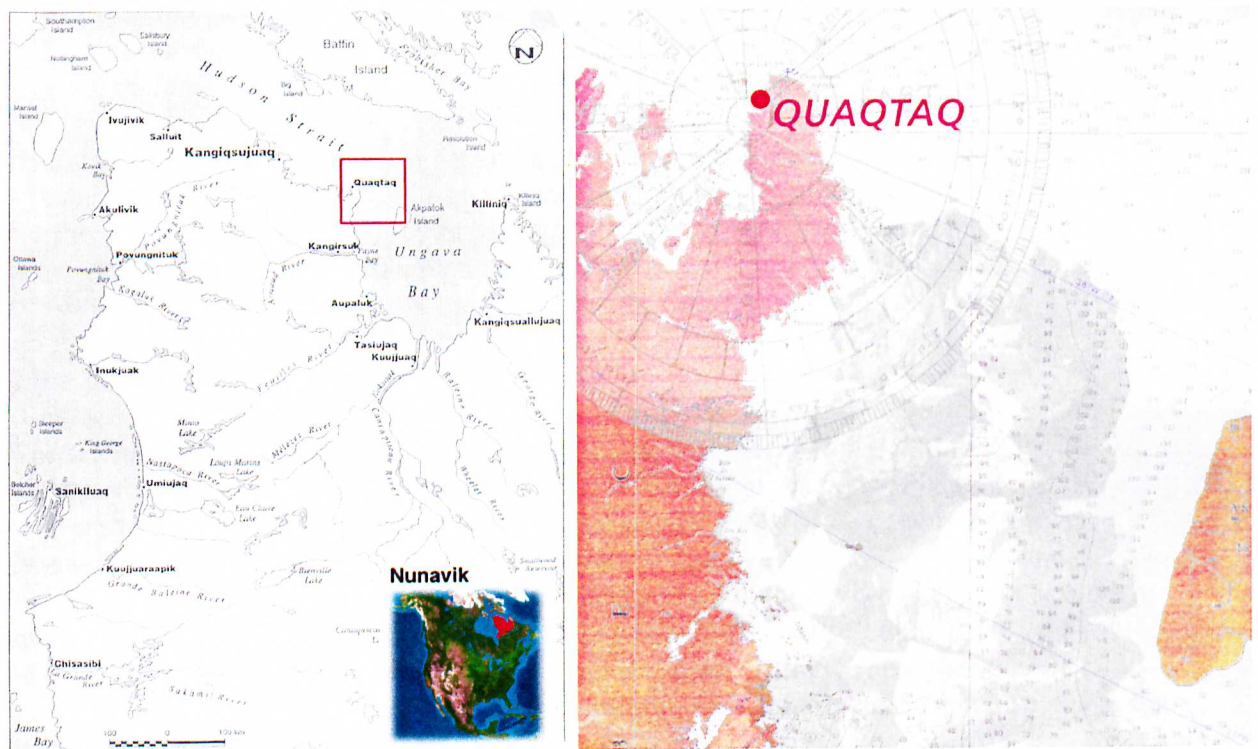
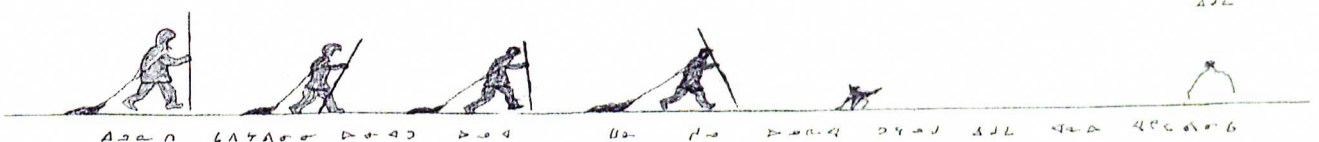


Figure 1: Map of Nunavik and Quaqtaq, Northern Quebec, Canada. Inset: location of Nunavik in North America.

(Source: Planimetric data compiled from EMR Canada 1:100000 Topographic series. Other data source: Makivik Corporation Data Base. Map on left by Orientation CGR. Map on right created by author from Hydrographic Chart of Ungava Bay 1977, Canadian Hydrographic Service, Original Scale: 1:500,000)

Landform varies immensely in the Arctic region, ranging from flat expanses of tundra devoid of trees, to mountainous ranges, fjords, cliffs, canyons and valleys carved by past and ongoing glacial action. Two natural features of notable interest in the Canadian Eastern Arctic include: the *Torgnat* mountain range in the Ungava district, which rises 1768 m above sea level at Mt Iberville, and the *Pingualuit Crater Lake* near Kangiqsujuaq in Nunavik, which was created by a meteorite striking the earth around 1.4 million years ago (Lanari & Smith 2000).

Winters in the Arctic are harsh, long and bitterly cold; summers are cool, yet colourful, as the bleak snow-laden terrain gives way to the vibrancy of berry producing groundcovers, orange lichens and wildflowers. Temperatures are extreme, ranging from -40°C in winter



(and even cooler with the wind chill) to 25°C in summer. Formidable winds and relentless blizzards are a common occurrence, often gusting between 100–200 km/hr. The ground is perpetually frozen (permafrost) and in some regions (especially on southern slopes), snow is prevalent throughout the year. During the warmer months, black flies and mosquitoes breed profusely, making use of the short growing season. The following observation by Carpenter (1973, p. 20) offers a picture of the extreme conditions prevalent in the Arctic:

“In winter, the horizon recedes into the immense distance and, except for when the sun hovers close to the horizon and orange rays briefly define the profile of the monotonous plain, there is no line dividing the earth from the sky. The two are the same substance. There is no middle difference, no perspective, no outline; nothing the eye can cling to except thousands of smoky plumes running along the ground before the wind- a land without bottom or edge. When winds rise and powdery snow fills the air, there is neither up nor down and the traveller is left white blind.”

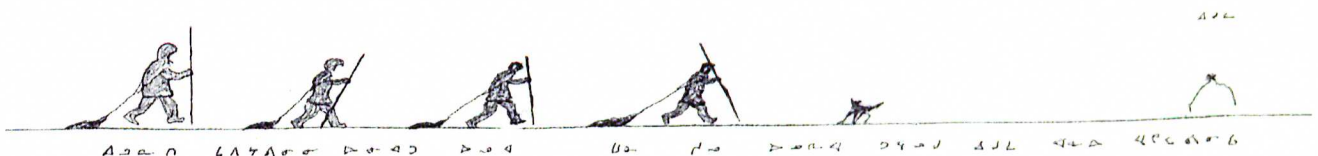
At the North Pole, six months of darkness is experienced between September 23 and March 21, and between March 21 and September 23 the sun returns for six months. Further south, at Quaqtaq, with latitude of 61° N, the seasons are remarkably different. In November, the sun rises at 10 am and sets at 3.30 pm, whereas in June the sun sets at 11.30 pm and rises again at 3.30 am (Environment Canada).

2.2 Characteristics of Nunavik and its People

The territory of Nunavik - formerly Rupert's Land, was incorporated within the boundaries of Canada in 1867. The population of 9,200 Inuit is housed in 15 coastal villages in the northern reaches of Quebec. The mother tongue language retention in Nunavik is 95% among Inuit. Nunavik expands over almost 500,000 sq km of land. Archaeological research speculates that the Inuit arrived in Nunavik 4000 years ago from two distinct directions. The initial migration came from the Baffin Lands across the Hudson Strait, where a community was established near Killiniq. Thereafter, another group came from the west coast of Hudson Strait, where they established themselves in the Iuvjivik region (McPhee 1984).

The modern day Inuktitut speaking inhabitants of Arctic Canada descend from the Thule Inuit, who migrated to the region around 1000 AD. They lived primarily in small kin groups scattered along parts of the coast. The Thule people however, were not the first to occupy the area, for the Dorset Inuit (*Tunit*) had already migrated to the northern regions from Alaska and Siberia around 2500 BC (McPhee 1984).

Prehistoric populations consisted of hunters who travelled across vast tracts of countryside fishing for marine mammals such as seals, walrus and whales. Caribou, ducks, ground dwelling birds and berries also formed the staple Inuit diet. They depended upon the resources of the landscape for survival, abode, religion and education. Most traditional Inuit lived semi-nomadic lifestyles, shifting with the seasons to seek shelter from extreme weather conditions or to follow animal migration patterns. They either lived in skin, sod or snow houses depending on the season and location. The majority of Inuit lived no further than 40 km from the coast, except in summer when some travelled further inland to hunt.



Before the arrival of Europeans in the late 19th and early 20th centuries, the Inuit lived in small kin-group camps. Many of these camps eventually grew into villages as Moravian missionaries, weather stations and trading posts took hold within communities (Hawkes 1916, p, 15). The Hudson Bay Company and Révillion Frères trading posts became focal points and meeting places across Nunavik between 1920-40 (Dorais 1997). Hunters travelled seasonally to these posts to trade furs, oils, skins, crafts and soapstone/ivory sculptures. Kuujjuaq - formerly Fort Chimo, situated approximately 50 km inland against the Koksoak River, was the largest trading post in the Ungava district. Inuit hunter Tuumasi Kudluk from Kangirsuk (a village 235 km north of Kuujjuaq flanking Payne Bay), traded regularly with the Hudson Bay Company based in Kuujjuaq. Tuumasi drew a number of maps describing the travel routes to the post in Kuujjuaq. Selections of these maps featured in Appendix 2 are housed at the *Avataq Cultural Institute* in Montreal. Drawing TK A-2 (App. 2) by Tuumasi describes the hive of activity associated with the ship-time season in Kuujjuaq. Indians from the south and Inuit from the Ungava coast would congregate and make camp at Kuujjuaq awaiting the arrival of the annual ship. Kuujjuaq remained a major trading port for many years and has consequently become Nunavik's major service centre.

When the price and demand for prized furs reduced dramatically in the 1980's, attention turned towards focusing on what lurked below Nunavik's crust. Although furs were still sought after, larger consortiums became increasingly interested in the lucrative precious gems, metals and oil markets. Subsequently, two major nickel and diamond mines began operation in the northern extremities of Nunavik. The Diamond Discoveries Corporation controls six kimberlite (diamond) sites on the eastern shores of Ungava Bay and the Torngat range, occupying a region of 470 sq km. And, the nickel mine at Raglan (a newly formed village), covers an area 55 km across and is situated 60 km west of the Inuit village Kangiqsujuaq and 100 km southeast of Salluit. Both ongoing mining operations employ a number of local Inuit – a clause stipulated under the James Bay Northern Quebec Agreement (JBNQA) of 1975.

2.3 Character of the Inuit Village, Quaqtaq

Quaqtaq, an Inuit village, borders Ungava Bay and Hudson Strait in Nunavik. Formally developed as a town to service the nearby and now defunct weather station at Cape Hopes Advance (*nuvuk*), the village now operates as a home and service centre for its 250 residents. Quaqtaq traditionally served as a fall and winter camping ground for the Inuit because of its sheltered position within a small valley and enveloping ridges (Puttayuk 1999, p. 29). Many migrating sea mammals passed by Quaqtaq's headland, making it an ideal place to hunt seals. In winter, the *Quaqtamiut* Inuit traditionally ventured south and inland towards Kangirsuk to go fishing (Qumaq 1997). Inuit traditions such as throat singing, hunting, soapstone making, sewing and print making still prevail in Quaqtaq, along with modern amenities such as satellite television, convenience stores, electricity, snowmobiles, an airport and the internet. *Quaqtamiut* Inuit continue to actively hunt around Quaqtaq, although, rather than venturing out on the land for several days, they generally conduct daily hunts on snowmobiles, preferring to return to the comforts of the home in the evening.

Quaqtaq's isolation from the two major Inuit centres and southern cities has helped in retaining its traditional character and ways of life, with a balance drawn between Inuit culture and Western cultural influences. The Inuktitut language and its syllabic writing



system are taught at the community school, in addition to local history, survival on the land and way-finding techniques.

The origin of the name Quaqtaq means ‘intestinal worm’ – aptly named because a local explorer visiting the village discovered strange parasites in his faeces. Early British maps of Canada show Quaqtaq spelt as Koartak, which was later transformed to Koartac (French version). Amusingly, in 1961, the Government of Quebec once again changed the name to Notre-Dame-de-Koartac, ‘our lady of Quaqtaq.’ However, when provincial bureaucrats realized it meant ‘our lady the intestinal worm’ it was rapidly shortened again to Koartac (Dorais 1977, pg 118). The historic ruling of The JBNQ Agreement in 1975 officially prescribed that the village would be spelt as Quaqtaq.

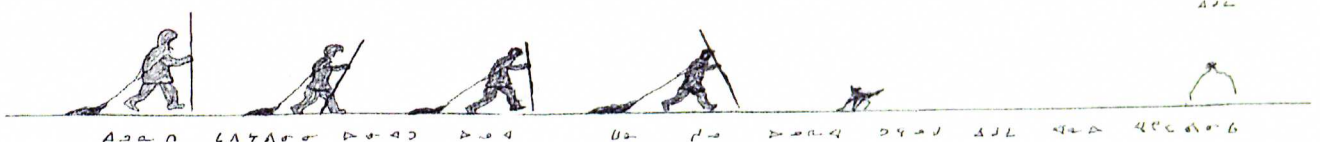
2.4 Inuit Beliefs/Connections with the Land

The Inuit structured their lives within the opportunities and constraints of the Arctic landscape, having utmost respect for the resources available in the environment. The Report of the Royal Commission on Aboriginal Peoples (RRCAP 1997, no. 19, sect. 5, p. 1) maintains that Aboriginal worldviews of life are a manifestation of spiritual reality. The Report claims that all Aboriginal perceptions are, “conditioned by spiritual forces” and that all “physical actions have repercussions in a spiritual reality.” Evidently, Amerindians and the Inuit share these fundamental spiritual views.

The Inuit believe that a spiritual counterpart, the *innua* – the genius or thinking spirit of the object or place, inhabits not only animals, but also prominent physiographical features such as rocks, points or mountains (Hawkes 1916, p.127). In fact, Inuit legend describes that man and animals were once the same being, and that communication between the two occurred frequently. Hawkes (1919, p. 152) recorded a particular version of this legend while studying the Labrador Eskimo:

“In the north lives Torngarsoak, the great Torngak; he made man from nothing. The man travelled a long way and found a woman. They married, and from them sprang all the Eskimo. One day Torngarsoak set some puppies adrift in a pair of old boots. The puppies drifted in all directions. Finally one returned as a man, bringing with it the Indians; very much later the other puppy returned as a man, bringing people with white skins in a big umiak. They were the white people. The man then turned back into a dog. There was a woman who married the dog. Her father was ashamed of her and took her in his umiak to a lonely island. When out to sea he threw her overboard. She seized hold of the side of the boat, but he cut her fingers with the knife. The thumb became the walrus, the first finger the seal, and the middle finger the white bear. The woman sank and now lives at the bottom of the sea.”

Another version of this myth described to me by Kuujjuaq Mayor, Michael Gordon contends that it was once possible for a man to transform himself into a wolf and vice-versa. Inuit man however, gradually grew apart from this bond. Many other interesting Inuit mythologies and narratives are noted by Boas (1974), Brody (2000), Carpenter (1973), Hall (1865), Hallendy (2000), MacDonald (2000), Vilhjalmur (1913) and Weyer (1962). Some stories describe minute details of nature, such as how seaweed developed a seam along it



folds from the stripes of a trout (Hawkes 1916, p.155), while other stories explain shamanism, spirits and the heavens. MacDonald (2000, p.38) for example, in his book *the Arctic Sky*, describes that the Inuit believe the twinkling appearance of stars are caused by the eyes of spirits looking down on them.

The Inuit, and similarly, the Australian Aborigines (through dreaming tracks and song-lines), can describe most aspects of nature through myths and legends – stories that have emerged and developed over countless generations of living on and with the land.

Inuit society, until recently, was structured around a semi-nomadic lifestyle based chiefly on hunting and gathering. These basic activities served as the medium in which information and knowledge about landscape was transferred from the elders to young apprentices. Whilst hunting and travelling, the Inuit learned about their surrounding environment, forging an understanding of its complexities, patterns and movements.

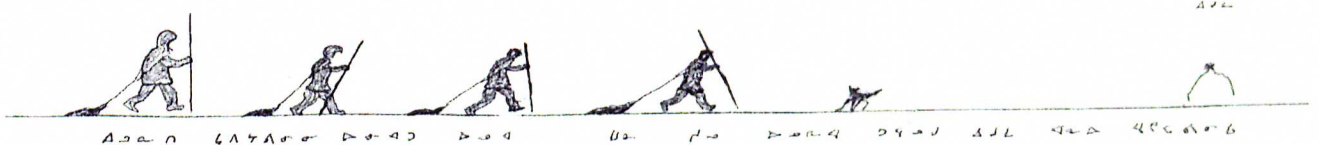
The Inuit considered themselves part of the Arctic landscape system and as such, developed an innate bond with it. It is within this bleak and subtly articulated environment that the Inuit developed acute perceptual and spatial skills. Even in a blizzard, ‘whiteout’ or fog, the Inuit were able to navigate using inconspicuous landmarks and elements of nature such as the wind or ice-crusted snow. The Inuit have superior spatial skills, comparable in richness to that of Western navigators and were not only capable of reading the seemingly featureless terrain, but also representing it in the form of maps.

2.5 *Traditional and Contemporary Methods of Travel*

Unlike the Australian Aborigines and American Indians who rarely travelled outside their territories and moiety boundaries, the Inuit roamed freely and unrestricted across land and sea. The Inuit believe that food belongs to everyone and that all Inuit are free to enjoy the benefits of the land (Hawkes 1916, p.25). Interestingly, a *Micmac* Indian who moved near a Hudson Bay Company post in Inuit lands tried to establish hunting divisions to which he was accustomed. However, the Inuit found this idea so repugnant that they drove him out of the district (Hawkes 1916, p.25).

The Inuit developed ingenious ways of travelling over difficult terrain with varying levels of success. Mathiassen (1928) noted that some Inuit were capable of safely travelling up to a thousand kilometres from home using dog teams. Seasonal changes dictated the nature and mode of travel. Depending on the time of year and location, travel was either by foot, dog teams, *umiaq* or by *Qayaq* (kayak). The skin covered *umiaq* sail boats, Figure 2, were generally made from the skins of *utjuuq* (bearded seals) and were powered by rowing or the wind (Puttayuk 1999, p. 28). According to Samwillie Annahatak (1997, p. 13), in summer, the Inuit people from Tasiujaq, Aupaluk, Kangirsuk and QuaqtAQ would sail 100-200 km across Ungava Bay to Akpatok Island in *umiaqs* to hunt walrus and polar bear.

Despite their size and seemingly frail appearance, kayaks, Figure 3, were also used to travel vast distances. In an interview with David Okpik he recalled that *Quaqtatimut* Inuit once travelled to Akpatok Island by canoe. But they discontinued this traditional journey when motor powered boats were introduced. Weyer (1962, p. 90) reports that the Alaskan Eskimos used kayaks extensively in summer to negotiate between bodies of water inland. Kayak travel however, was fraught with limitations. A kayak could generally accommodate



only one person, it did not provide the same amount of protection from the elements as an *umiaq* when turned on its side, and, it had to be carried between bodies of water – a demanding and tiring task in itself. The use of kayaks and *umiaq*'s was bound by the presence of ice and rough seas in winter. Motor powered fibreglass canoes and Peterhead boats have replaced the traditional function of the kayak and *umiaq*.



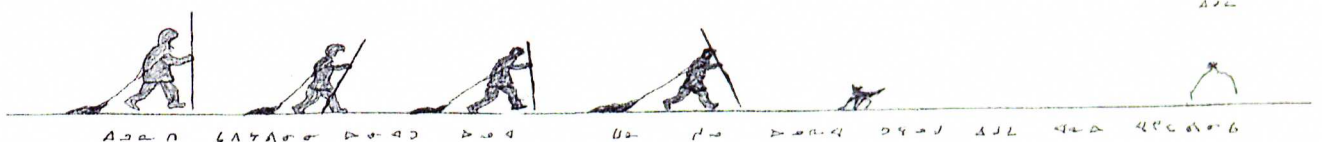
Figure 2: Umiaq's

(a) Skin-covered *Umiaq* Sail Boat, Quaqaq, 1950s. Source: *Père Jules Dion, o.m.i. Collection*, (IND DIO 146), Avataq Cultural Institute, Montreal. (b) *Umiaq* Construction Near R.C. Mission, Ivujivik, 1960. Lacing on the skin cover to the inner rail. L. To R.: Arnaitok, Charlie, Nauja, Usuarjuk, Saima Qitsualuk, Mangiok. *National Museum Of Civilizations*, Eugene Arima (A NMJ 16451)



Figure 3: Traditional Inuit *Qayaq*

An Inuk man wearing sealskin parka standing beside a kayak and harpoon, Nunatsiak, 1905. Source: Notman Photographic Archives, *Capt. Mack's Album* (Prints) (A NO CM 13), Avataq Cultural Institute.



Traditionally, the use of dog drawn sledges came into service as the primary means of transportation in October, remaining until the melting of snow and break up of ice around May or June (Weyer 1962, p. 87). The use of dog teams dramatically declined with the introduction of snowmobiles around the 1950's. Before this time, two methods of harnessing dog teams to a sledge were used: the tandem harness (attached to each other on either side of a single line) and the fan shaped harness, which as its name suggests, involved the dogs being arranged in a fan shape with each being on a separate lead (Weyer 1962, p. 89). Weyer (1962) reports that in the Hudson Strait region, between one and twenty dogs were harnessed to form a team. Dogs were not only used because of their adept pulling power, but because they were capable of memorising travel routes and landmarks with extraordinary precision. Moreover, Eskimo dogs informed the travelling hunter of particular nuances in the landscape and of approaching weather conditions and nearby animals. Historical accounts of the use of Eskimo dogs for way-finding in Nunavik feature in a special issue of *Tumivut* (2000). Paulusie Weetaluktuk (2000, p. 39-41) from Inukjuak recalls a number of events:

“Some dogs could detect a seal hole, with the help of the wind...They [dogs] could find them even deep beneath the snow.”

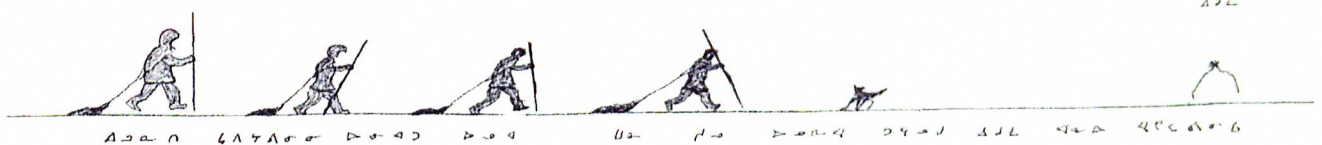
“There were times when almost all the dogs died of rabies...If he [the hunter] lost all his dogs, his livelihood would turn from better to worse. If he lost his dogs, he lost his ability to travel any distance, or to hunt caribou.”

“...We sometimes travelled in severe storms, as long as the dogs knew where they were going. You knew you would reach your destination if the dogs knew the way. Some dogs were very intelligent, especially those used as lead dogs.”

Paulusie Weetaluktuk (2000, p. 41) also suggests that the gender of the dog played a significant role in successful navigation:

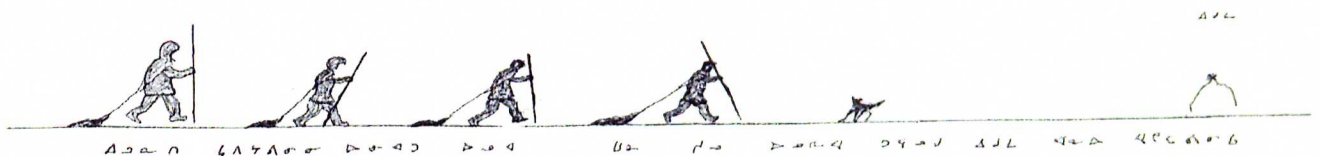
“A good male dog would never lose its way even in the worst blizzard. Males and females were both used as lead dogs, but given a choice, males were preferred. I was taught that if I wanted to travel in a blizzard, without ever getting lost, I should train a male lead dog. A female lead dog was likely to feel cold in the muzzle more than a male. When her nose got cold, she would tend to head wherever she thought was less cold. She would follow her own comfort instead of the correct route.”

An illustration by Tuumasi Kudluk (TK K-20) in Appendix 2 depicts a story about how a lead dog navigates by its sense of smell. Comparatively, in Australia, according to a Northern Territory Aboriginal corroboree it has been said that female dingoes (when aboard a travelling vessel) were the first to detect land ahead by twitching their noses (Reardon 1997, p. 117). Although Eskimo dogs had an innate understanding of direction, they were trained when puppies to perform to navigational commands. Another illustration by Tuumasi (TK C-098) housed in the Avataq Cultural Institute, reveals the methods he used when training the lead dog: “the puppy is put into the trainers sleeve, and lets it out slowly, saying ‘ayaya, aya, ayayayaya’ to teach him to turn left, and ‘auk, auk’ as the signal for the



puppy to turn right (Atagutsiaq 2000, p. 44). Other commands included: *uit* to start moving, *qauk* to turn right, *aja* to turn left and *uk taika* to stop, look and see (Qumaq 2000, p.48). David Ematuluk from Tasiujaq, when interviewed in 1985, reported a story about a particular dog that instinctively understood Inuktitut commands. With messages tied around its neck, the dog would travel from camp to camp, informing Inuit of ongoing events. Apparently, the dog would return home with messages written by those from distant camps (Ematuluk 2000, p. 68).

When travelling by dog teams, the Inuit measured space in terms of “sleeps”. Distance and speed traversed across the tundra was based on an amalgam of variables: snow conditions, terrain, hunting success and the strength of the dog team. The use of snowmobiles as a substitute for dog teams has created a marked shift in calculating the distance travelled. Snowmobiles use the Western conventions of Greenwich Mean Time and a metric scalar system to measure distance. Although snowmobiles are faster and can carry more load than their traditional counterparts, they do not afford the same opportunities of reading the nuances of the land. Dog team and kayak travel afforded the opportunity to ponder and reflect upon life and the land. In contrast, the sheer pace involved with snowmobile travel has somewhat removed the bond between the traveller and the environment. The velocity associated with modern modes of transport in the Arctic has distorted perception and the environmental image.



landscape systems. Their backyard is virtually infinite, a boundary only limited by the reaches they choose or need to explore.

In a southern rural context, Roger Hart (1974) studied play space environs of Wilmington, Vermont, examining children's behaviour and creativity. Hart postulated that the quality and characteristics of play-space environments (not just playgrounds) impacts the development of children's perceptive and creative skills. He observed that children preferred to play in unescorted environments, such as dirt driveways, between buildings and around the base of large trees, where they were found to be more creative in these unrestricted play spaces. Some children constructed large scale maps of parts of their neighbourhood in the dirt, others built "houses" and others constructed a complex system of canals containing water for rivers, falls and dams. In one instance, an eight year old was observed making a dirt map of his home in relation to New York, the nearby beach, a local candy store and New Hampshire (Hart 1974, p.360).

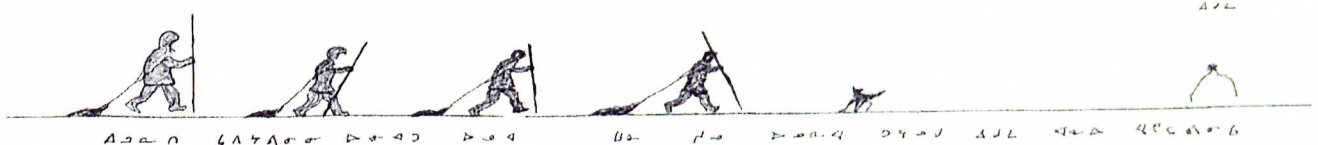
Hart suggested that children learn mental mapping skills from toy-play, especially in the form of dirt-mapping play. He adds further that, "...in order to actively represent, or 'mentally map' large scale environments lying beyond the immediate field of vision, and to understand processes in these environments, children must either actively explore them, or symbolically represent them in the dirt and thereby actively manipulate them with eyes and hands" (Hart 1974, p.358). With this in mind, it is possible to presume that the Inuit, based on such experiences gained from an early age, developed superior perceptual and cognitive skills.

3.2 *Landscape as Nature, Habitat and System*

A discussion about landscape perception would not be complete without considering the acclaimed *Beholding Eye* thesis by cultural geographer, Donald Meinig (1979). In an effort to provide a means of comprehending landscapes, Meinig developed an interpretive system based on ten versions of seeing the same landscape. *The Beholding Eye* accounts for those who see landscape as nature, as habitat, as artefact, as system, as problem, as wealth, as ideology, as history, as place and as aesthetic. Meinig (1979, p. 34) reasons through these ten versions of seeing landscape that, "landscapes are composed not only of what lies before our eyes, but what lies within our heads." Indeed, landscape perception is based upon cultural values, tastes, opinions, trends, education, customs, interests and ideas. Using Meinig's interpretative system as a guide, it is interesting to speculate the "lens" traditional Inuit used to visualise the landscape.

Undoubtedly, traditional Inuit saw landscape as nature, habitat and as a system – these facets were fundamental to Inuit ways of life. According to Tuan (1979) the Inuit saw nature as the environment in arena in which their quintessential virtues and skills could be displayed. A number of Inuit and Cree traditional knowledge essays, which feature in *Voices From the Bay*, underscore aboriginal preconceptions of the natural environment. In the words of Donald Saunders:

"We, as aboriginal people, are part of the land and water...we recognise and respect the delicate balance of nature for the total existence of all living things including those we see physically, and those we don't." (McDonald et al 1997, p. 5)



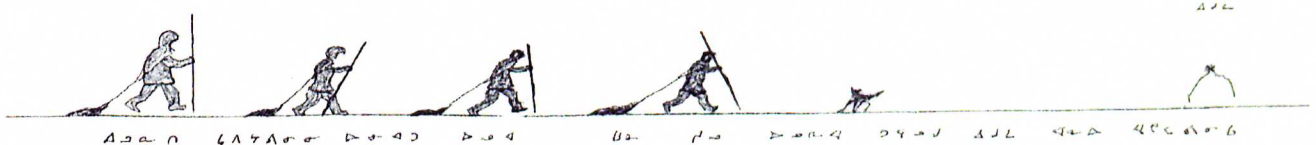
In terms of landscape as habitat, the Inuit relied upon the land for housing and shelter – they created resources such as igloos, boats and tools out of nature’s materials. Traditional Inuit considered themselves as the stewards and caretakers of the land and animals. Even today, with Western systems of land ownership and management plans in place, the Inuit and Cree maintain that hunters should not kill an animal unless it is to be consumed. John Petagumskum from Whapmaostui maintains that traditional custodianship values are still current:

“Since time immemorial, the natives were put here...to take care of the land. Our grandfathers did not abuse the land...our creator has given us the responsibility for taking very good care of what we have. What our grandfathers kept all this time is very precious. It’s now in our hands.”
(McDonald et al 1997, p. 7)

Inuit use of natural features to aid travel across expansive tracts of tundra suggests they perceived landscape as a system. Although the Inuit saw rivers and lakes as integral parts of nature, they also visualised these features as transport ‘highways’. Meandering rivers and tributaries formed passages and routes for travelling hunters, effectively permitting travel far inland that would have otherwise been impassable on foot or by dog teams. Moreover, rivers and mountains were a way of dissecting large amounts of land - of proportioning it into slices that could permit easier comprehension. The Inuit also used other unique and unusual landmarks to define space and fathom scale, such as a jumbled pile of sea ice, an upturned rock, a cut in a riverbank or a strange ice shaped feature. In terms of navigation, the Inuit most certainly construed landscape systems into way-finding aids and markers.

Meinig’s interpretative system of landscape, although complex and rigorous, forms only one medium of investigating the origins of perception. Researchers in the domains of architecture, landscape architecture, ethnography, cartography and anthropology have developed other influential theories about perception, and in particular, cognitive mapping.

Frank Cunningham in *The Human Eye and the Landscape* (1975) for example, postulates that individuals perceive the environment based on four constructs: the reaction of the brain to messages from the eyes; the operations of the eyes in reactions to a stimulus; the properties of light and ‘reality’ (that which is under observation). Cunningham argues that our optical lens first and foremost influence perception, although vision is also affected by experiences and sensory receptors. Cunningham explains that our eyes are far from satisfactory viewing instruments – our binocular vision impairs the ability to see ‘reality’. In fact, he states that all vision is an optical illusion. This lack of telescopic vision compounded by the fact that the human eye only sees about one-seventieth of the total spectrum implies that reality is distorted. Cunningham (1975, p. 15) alludes that as a consequence, humans view objects in perspective, that is, objects of a given size appear proportionally smaller the farther away they are. In terms of the effect of light on perception, Cunningham explains that atmospheric conditions dramatically hinder accurate appreciations of reality. For example, throughout any given day, dust particles, smoke and pollution in the atmosphere change the appearance of the sky and distant features in the landscape. It is for this reason that mountains appear a misty blue when seen from a distance, yet in reality, green trees cover them.



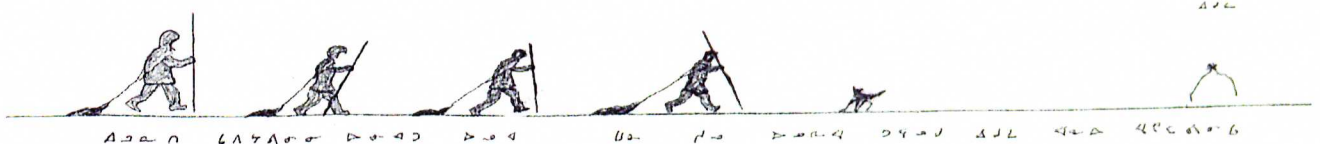
with preconceived ideas about what to expect and how to measure and record it. Ryan's appraisal particularly concentrates on the genesis of language, symbols and words used to describe landscape and environmental settings – not surprising given Ryan's English literature background. He explains that, "Almost everything seen for the first time has already been, in some way, anticipated" (1996, p. 10). For example, parts of Australia were considered to be void and barren from afar – a conclusion (despite its inaccuracy) deduced even before explorers had reached its shores. A number of extracts from explorer reports cited by Ryan reveal the difficulty they had in describing the land and its features. The Australian landscape proved linguistically challenging – its seemingly chaotic surface riddled with foreign features more often than not defied written comprehension.

Ryan proposes that early explorers viewed the landscape in terms of the 'picturesque' and 'panoramic'. He defines that the "explorers 'picturesque' works to delimit the continuity of the universe, to produce a frame which makes a text of the landscape so that it may be read and compared to the ideal" (1996, p. 60). Contrastingly, the 'panoramic' description supposes that, "Natural objects are not ordered according to a pre-existent aesthetic which was self-consciously artificial – panoramas are concerned with the establishment of topographical accuracy through a wide field of vision" (1996, p. 93). Ryan (1996, p.10) postulates that these ways of seeing and representing landscape form reality.

3.3 Cognitive Mapping and Inuit Perception

Cognitive mapping refers to the mental process of knowing spatial relationships as an image or series of accumulated images. Otherwise known as 'mental maps', it is based upon the aspects of knowledge, perception, reasoning, experience and intuition. *The Image of the City* by Kevin Lynch (1960) and *Maps in Minds: Reflections on Cognitive Mapping* by Roger Downs and David Stea (1977) are perhaps the most notable studies of cognition and environmental perception. Both texts use case studies in urban areas to describe the way people develop mental maps. Their research supports the view that mental maps develop from repeated experience and inhabitancy within an environment. Lynch (1973) writes that, "Way-finding is the original function of the environmental image, and the basis on which its emotional associations may have been founded." Lynch advocates that not only does the mode of travel through space impact perception, but also the frequency and manner in which it is performed. He identified a system of cognitive way-finding in the urban context that relied on one or more of five key components: paths, edges, districts, nodes and landmarks. Using these five ways to orient themselves within a city, at either a macro or micro scale, travellers are able to navigate with some precision and confidence. Moreover, Warner Brown (Tuan 1979), in an experimental study on the human ability to negotiate mazes, discovered that people who know city streets well (such as cab drivers) do not have precise mental maps of their neighbourhood, but rather know a succession of movements appropriate to recognised landmarks. Tuan (1979, p.72) supports this notion, remarking that precision is not required in the practical business of moving about. Instead, a person needs only to have a general sense of direction to the goal, and know what to do next on each segment of the journey. Downs and Stea (1977) agree with the views of Lynch and Tuan, asserting that people develop mental maps from repeated experiences in moving around an environment – an orientation system that was most likely used by the Inuit.

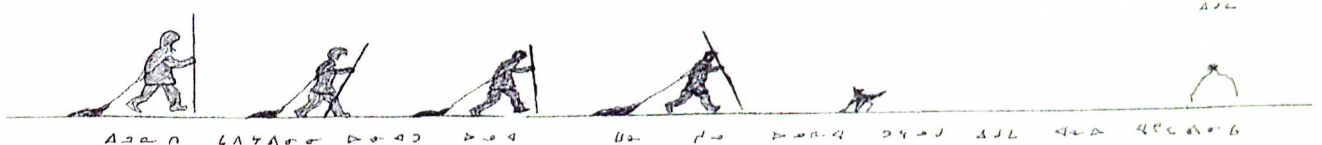
The result of experience, familiarity, travels and dependence on the land stimulated Inuit development of 'mental maps'. Those who have travelled over seemingly featureless terrain



with Inuit hunters are often amazed at the ease in which it is performed. As a rule, seasoned travellers and commuters, like the Inuit, remember particular features along common pathways with remarkable accuracy. First time travellers negotiating these same routes would typically not remember small and obscure landforms – especially in a monotonous setting such as the snow-laden tundra. Usually, unseasoned travellers recall large or unsightly features as landmarks - the rest of the journey otherwise remains a blur. Morantz (2000) and Tuan (1979) argue that the Inuit ability of memorizing the Arctic landscape can be compared to the spatial dexterity taxi drivers possess in large cities. Cab drivers, by virtue of their occupation, develop mental maps of their city based on the constant traversing of streets and major highways and the frequency of travel supports a developed understanding of spatial relationships. Recent research testing the spatial knowledge of London Cab drivers revealed that whilst several parts of the brain responded to topographical information it was the hippocampus part of the brain that placed landmarks in context (Morantz 2000, p. 20). When the cab drivers were asked to describe famous world landmarks the monitored hippocampus showed little activity. One possible conclusion from the study was that the serpentine streets of London registered in the hippocampus of cabbies because of familiar, direct and repeated experience with their surroundings. The spatial knowledge of foreign landmarks showed up as a weakness in the test because the cab drivers were not familiar with the contextual arrangement of these features. Warner Brown's experiential work on human subjects learning to negotiate mazes, refutes the notion that people who know street grids well (such as cab drivers) have precise mental maps of their neighbourhood. Rather, they know a succession of movements appropriate to seeking recognized landmarks.

Many similarities of cognitive way-finding exist in the animal kingdom. Insects, birds, turtles and sharks are known to follow particular migration routes – a subject of inquiry that continues to baffle researchers. For instance, the honeybee, *Apis mellifica*, uses a mental picture of their environment to return to the hive. A study on the homing mechanism of bees in *The Orientation of Animals: Kinesis, Taxes and Compass Directions* by Fraenkel & Gunn (1961) indicates that honeybees orientate themselves optically by means of conspicuous landmarks such as houses, trees and roads. Tests revealed that bees were able to return from six kilometres away using this method. When landmarks were absent, they reverted to using the sun as a means of determining direction and the distance from the hive (Fraenkel & Gunn 1961, p. 103). Similarly, arthropods use the sun to direct them along tracks. A small source of light stimulates a peculiar structure of the compound eye of arthropods, the ommatidium. Having taken up a certain angular position relative to the sun, an arthropod has then merely to retain the image of the sun on the same ommatidium in order to remain orientated (Fraenkel & Gunn 1961, p. 101). This kind of eye can be compared to a compass, with the sun behaving in the same manner as the north magnetic pole. Constant direction can be maintained by keeping the image of the sun on a particular ommatidium. For example, if the sun shines on the front of the left eye on the outward journey, then it must be kept on the rear of the right eye for the return journey to the nest.

Therkel Mathiassen (1928) describes in *The Report of the Fifth Thule Exhibition 1921-24* that Inuit cognitive knowledge of the tundra varied immensely between individuals. During his travels, Mathiassen met an Inuk at Ponds Inlet who had travelled to Piling, North Devon, Cornwallis Island, North Somerset and Prince of Wales Island. Consequently, this Inuit hunter knew the entire country between Chesterfield Inlet and Ponds Inlet. In contrast, Mathiassen met another Inuk who had spent his whole life in the Pond Inlet district,



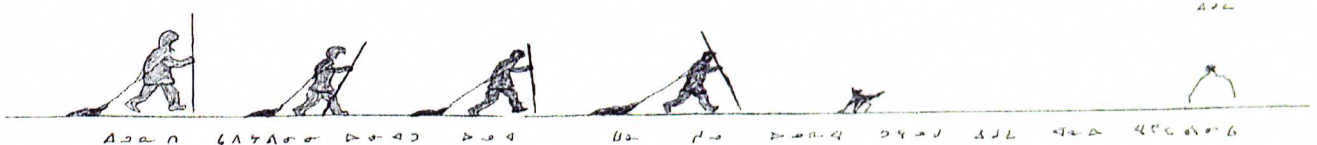
knowing only a limited area between Milne Inlet and Anaularealing. Mathiassen (1928, p. 97) was informed that if, "...a hunter planned to travel on a course he had never followed before, another describes it to him and in most cases, he can then find his way along it." Through apprenticeship tradition and oral transmission, the art of navigation was memorized. Nonetheless, the Inuit rely primarily on mental maps that are composed through personal experiences and travels. The hunter's image of the environment evolves in relation to his experience of it. According to Nelson (1969, p. 103), Inuit hunters negotiate images and understandings of the land through knowledge, personal attachments and memory.

Trowbridge (1913) in his article, *Imaginary Maps* argues that the Inuit perceive landscape using a combination of both the "egocentric" and "domi-centric" methods of orientation. The egocentric method involves an individual orientating themselves in relation to defined reference points, such as cardinal points, whereas the domi-centric model entails orientating oneself in relation to a starting point or home. Trowbridge uses this framework to establish that the Inuit, Indians and Australian Aborigines use a combination of both methods to orientate. It is quite likely that post-1950 Inuit hunters used, and continue to employ both methods, although erstwhile hunters probably only used the domi-centric approach to navigate. Clearly, the cardinal point system of the compass was a foreign concept to the Inuit before Western contact; however, evidence from Fortescue (1988) suggests that the Inuit developed their own cardinal system based on wind directions and speeds. This concept, in regard to Inuit use of natural features as navigational aids, is discussed further in Chapter 4. Comments from Inuit hunter, David Okpik for this paper further strengthens the case that landmarks were used in preference to compass points around Quaqtaq:

"To tell direction we use the land and the coast. The coastline of Ungava Bay is the edge between east and west. It is easy to know where you are this way. The coastal fringe is the reference point." (Appendix 1)

Raymond Gagné (1968) and Nelson Graburn (2000) argue that Inuit language underpins perception and development of cognitive maps. Their theories are based on the Sapir-Whorf hypothesis, which suggests that a particular view of the world is conditioned by and confined within the limits of the grammatical categories and structures of the mother tongue. They describe that the spatial world of the Inuit as consisting of three pairs of opposites: hereness/thereness, upness/downness and insiderness /outsiderness. The speaker is always at the centre of these localiser sets of words, with prefixes added to give more detail about a subject. For example, *kanna* "this non-slender object (in the speaker's downness) has the prefix *ta* added if a person, object or place is mentioned. Thus *kanna* becomes *takanna*, "that non-slender object (in the hereness of the person spoken to or about) down there (in the speaker's downness) (Gagné 1968, p.35). Gagné and Graburn contend that because of this system the Inuit are able to specify with more precision than is found in most languages, where things and places are located, how to reach them and their attributes in relation to settings.

David Pelly's (1991) research concludes that the Inuit possess a linear conceptualisation of territory based upon the nature of the barren grounds terrain. Pelly suggests that the Inuit instinctively think in perspective at ground level – they detach themselves from the landscape to imagine a seemingly barren tundra full of lines; consisting of rivers, eskers,



fjords and caribou paths. The lines are a way of articulating landscape – to give a sense of order to an otherwise never ending featureless plain.

Ronald Rundstrom (1990) implies that the extraordinary miming abilities of the Inuit shaped the way they perceived landscape. The Inuit are well known for being capable of replicating the sounds of many marine animals, caribou, polar bear and birds with extreme precision, including the art of decoying with natural materials or even themselves. According to Rundstrom (1990, p.163), “Mimicry was institutionalised not merely as an artistic ability; it was a practical tool in everyday life and was manifest in myriad pan-Inuit cultural institutions, including mapping”. He postulates that the Inuit were not only capable of impersonating animals, but perhaps also possessed the skills to mime aspects of landscape. Navigating over the tundra may have been possible by imitating, and thereby remembering many pertinent landscape features. Maybe an accumulation of imitation acts enabled the formation of stories or events that would describe navigational passages.

Edmund Carpenter (1973) suggests also that perhaps the Inuit perceive landscape from a spiritual perspective. The Report of the Royal Commission on Aboriginal Peoples (Sect. 5, Spirituality, p. 1) strongly supports this notion, reiterating that:

“Amerindians and Inuit perceived the universe as an intricate meshing of personalised powers great and small, beneficial and dangerous, whose equilibrium was based on reciprocity. While humans could not control the system, they could influence particular manifestations through alliances with spiritual powers, combined with their knowledge of how these powers worked.”

While working with *Aivilik* Inuit, Carpenter discovered that many Inuit men visualised the land through a spiritual lens. Some believed that the earth was merely several weeks journey from their home, and that the earth is both flat and circular, with Southampton Island at its centre. Others believed wholeheartedly that at the end of the earth stand four great pillars that support the sky dome, and it is from here that the stars burn so brightly in the heavens on clear nights (Carpenter 1973, p.13).

To gain a graphic picture of *Aivilik* perceptions of the world, Carpenter asked Karleaner and Agoolak to draw maps for him, Figure 4. Karleaner represented the world with a series of dots, illustrating trading posts and settlements known from experience and hearsay. Carpenter noted that Karleaner’s directions and estimates of distances were good, although distances were increasingly underestimated as one travelled from Southampton Island. Agoolak’s map delineated the coastline, although Winnipeg to the south was depicted inaccurately (1973, p.19). Carpenter reasons this inexactness was caused because the *Aivilik* Inuit were uninformed about lands to the south. In fact, when inquiring about the south, they were astonished to discover the lands were devoid of caribou, seals, walrus’ and bears – a realisation that was difficult to grasp.

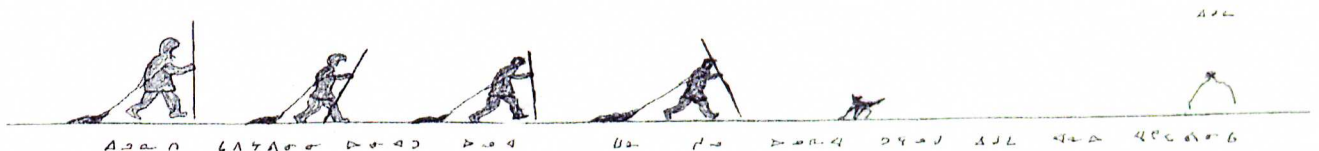




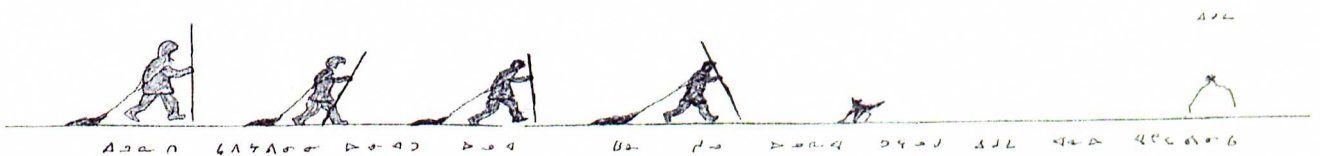
Figure 4: Selection of Aivilik Inuit maps

(a) Inuk, Karleaner’s representation of the world is given as a series of dots and names. The intensity of the dots indicates the places well known to him. (b) Map of the world drawn by Aivilik hunter, Agoolak. The placement of the villages are notably accurate, although the distance of Winnipeg from the Arctic is underestimated. Source: Carpenter (1973).

A conversation between an Inuit lady and myself that took place in Quaqtq revealed surprising disparities in geographical knowledge. When I indicated that I was from Australia she replied by saying, “Australia is near Alberta isn’t it”? I kindly explained where Australia was by showing her a map of the world. Interestingly, an account about the difficulty of teaching geography to adult Inuit recorded by Marvin Missionary, Miertsheing, in 1846 reveals that the Inuit have perhaps struggled with the concept of the world’s scale for some time. Using a globe, Miertsheing found that the Inuit people of the village Okkak (Okak) on the Labrador Coast had difficulty in grasping scale and reading map symbols:

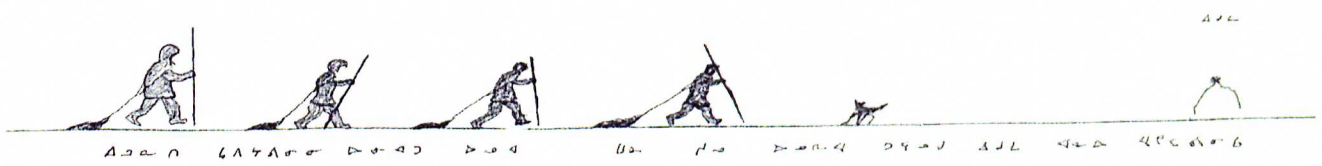
“...Much patience and pains is needful to make these...people understand these representations of the earth’s surface; for some of them think the (Occidental) maps very imperfect, because on the coast of Greenland, they observe no figures of houses, tents, kayaks, or seals; so also they are greatly disappointed to find London marked on the map with a simple “o,” though it contains such a number of people, houses and ships. It is not till after the matter has been long discussed, that we can get anything like clearness.”
 (Lewis & Woodward 1998, p. 159)

Regardless of the explanation or explanations retained, all researchers seek to understand the extraordinary ability of Inuit to move through a complex, and at times formidable landscape, with confidence. Inuit realize only too well that the continuity of their traditional culture depends on the transfer of orientation and way-finding skills from the older hunters to the young.



Chapter 4

Inuit Navigational Techniques



mountains were next shown by elevations of sand or stone, and the islands represented by heaps of pebbles, their proportions being duly attended to...When the mountains and islands were erected, the villages and fishing stations were marked by a number of sticks placed upright, in imitation of those, which are put up on the coast, wherever these people fix their abode."

Another account of ephemeral relief mapping performed by the Inuit of the Western Arctic recorded by Spencer (1955, p. 46-50) reveals that:

"...The narrator would pile snow or sand in ridges to indicate the surface features of the tundra, would hollow out sections for lakes, and would smooth out beach and ocean areas. Further, he would draw in the water courses and lakes and show some care in designating portages."

Anthropologist, Franz Boas, while conducting fieldwork in the Arctic, noted that if an Inuit intended on visiting country unknown to him, another, who was well acquainted with the area, would draw a map in the snow for him. Boas (1974, p. 643) observed and recorded the Central Eskimo ephemeral mapping process:

"Their way of drawing is first to mark some points of relative positions which are well known. They like to stand on a hill and to look around in order to place these correctly. The details are then inserted – so good that every point can be recognized."

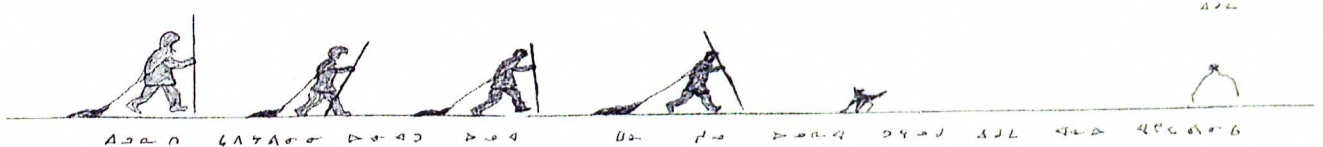
Evidence from Greenland Inuit hunter Utaaq (Pelly 1991, p. 62) suggests that 'air maps' (gesturing) often accompanied ephemeral maps drawn in the snow:

"He (Utaaq) traced the routes with his finger in the air while describing, years later, his attempts to reach the Pole with Robert Peary in 1909."

And, interestingly, in the Pacific Ocean, Dr. A.C. Haddon, during a visit to the island of Mer (Torres Strait) witnessed ephemeral maps incorporated within an initiation ceremony. Haddon found that stones were placed to form a topographical representation of the surrounding island groups, so that youths, who had been told the legend of the culture hero Malu, could then repeat his journey from island to island by moving from stone to stone in the ceremony (Lyon 1928, p.325).

Spink and Moodie's (1972) monograph, *Eskimo Maps from the Eastern Canadian Arctic*, is regarded as the guidebook of Inuit mapping studies by many Arctic researchers and anthropologists. Boasting a collection of Inuit maps, in addition to a substantial critique of Inuit mapping methods, the authors provide an excellent summation of ephemeral mapping:

"Representations of environmental knowledge of an area unknown to the observer, who presumably attempted to remember the image produced before him, and to assimilate its details and impact into his navigational skills." (Spink & Moodie 1972, p. 6)



Ephemeral maps formed a way of articulating landscape. It is interesting to speculate whether the ‘act’ of making the map together with the ‘mappers’ narration of the journey formed the most accurate and successful means of transferring cartographic information. The described ephemeral mapping examples clearly indicate that indigenous people conveyed geographic and way-finding knowledge to others with extraordinary success and similarity using this method. By observing and participating in the creation of ephemeral three-dimensional representations, scale, distance, time and places were not only imagined, but also visually conceived. A visual memory of landscape was borne. Moreover, the maps recorded by Beechey and Tindale exposes rare evidence that scale, measured by day journeys, was adhered to.

Elaborate ephemeral maps, like those described are no longer transcribed into the snow and sand, however, Inuit and non-Inuit, when giving directions, or describing geographic features, commonly make sketches in the sand or snow using a sharp stick, a finger or foot. Ephemeral mapping, unlike Western cartographic techniques that are concerned with the preservation of geographic and topographical knowledge, serve to engage and inform an active audience through an apprenticeship-based style of learning. The act and transfer of information was more important than the preservation of the product.

4.1.2 Celestial Navigation

Indigenous groups used stars to tell time and calculate direction long before the Western world had taken advantage of celestial bodies for navigation. Australian Aborigines, Amerindians, Polynesians, Micronesians and the Inuit all developed systems of travelling by the stars with varying success.

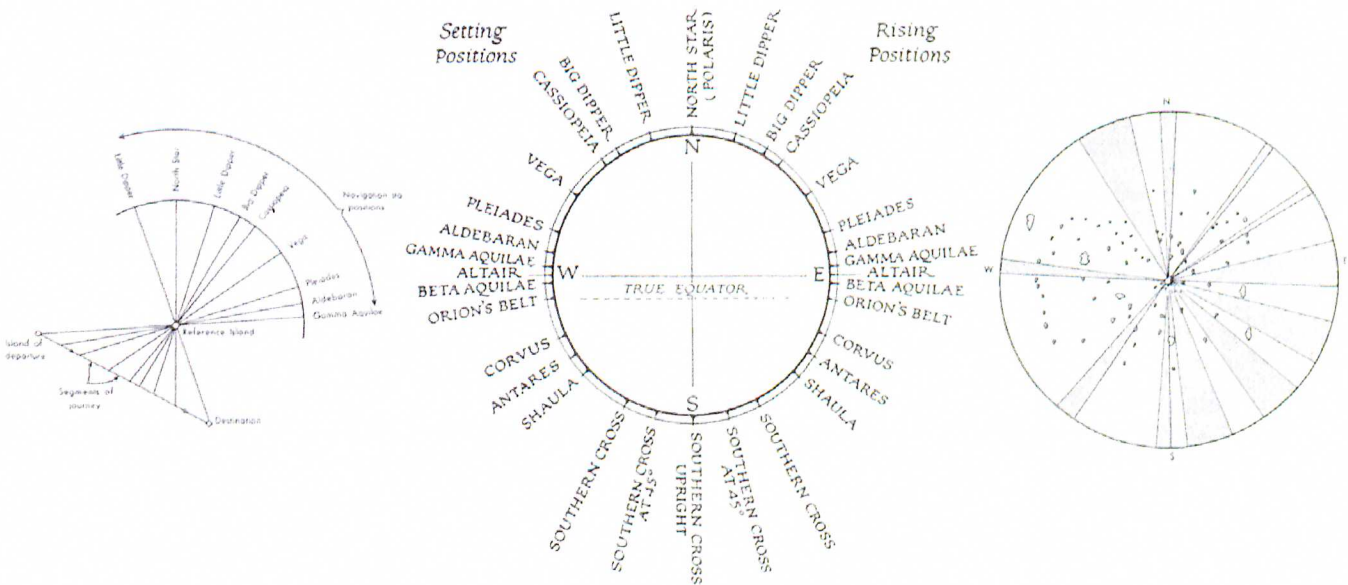
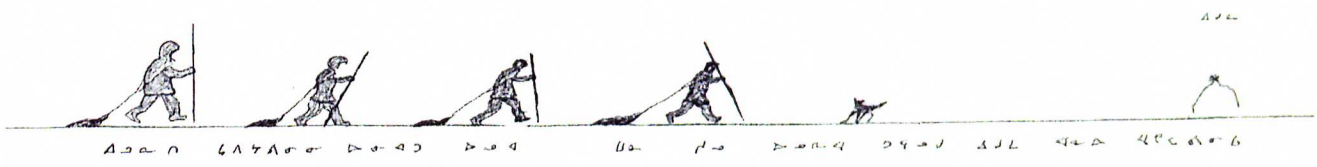


Figure 5: Mental compass of Polynesian Star Travel

The Pulwatan's of the Caroline Islands navigated using a mental compass of 32 star positions. These positions acted as steering aids that assisted inter-island travel across vast ocean expanses. Source: Downs & Stea (1977, p. 149) & Tuan (1979, pp. 83-84).



The Pulwatan's of the Caroline Islands developed one of the most refined systems of star travel. Without the aid of navigational instruments and charts, they sailed from Puluwat to Kapingamarangi, a distance of 750 sea kilometres using star courses (Downs & Stea 1977, p. 149). They selected stars low and near the horizon to maintain direction at sea. A mental compass, Figure 5, based on the rise and setting position of 16 stars emerged as a reference point system, with 32 star positions acting as steering aids. Navigators steered by the 'shape' of the sky and not toward a single point of light (Downs & Stea 1977, p. 150).

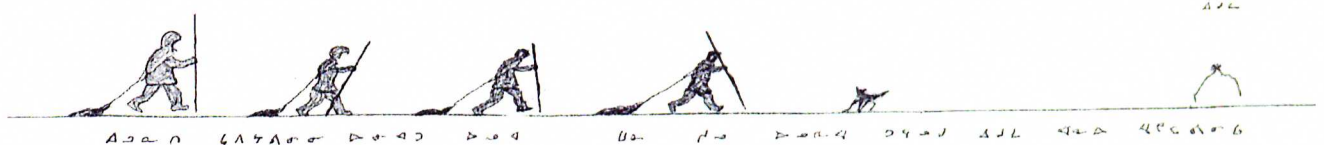
In *The Central Eskimo* (1974, p. 643), Boas identified that the Inuit recognised a number of constellations, the most important of these included: *Tuktuqjung* (the deer), our *Ursa Major*; the Pleiades, *Sakietaun*; and the belt of Orion, *Udleqdjun*. The extent and degree to which the Inuit used each star is difficult to ascertain from Boas' research, although Inuit elder, Tomassi Qumaq, from Nunavik, Arctic Canada, provides valuable insight:

"The Inuit knew about the stars (for finding their direction) before they found out about clocks. There is no relationship between the clock and stars. Only travelers use stars at night. They are useless during the day because you cannot see them. The most common names given to the stars are: Qutugjuuk, Tutturuit, Ullautut, Sakiatsiat and Nikisuittuq. There is one star that doesn't move. Stars are excellent direction finders for night travellers. They have not been praised, but have been considered very useful."
(Hallendy 1990, p. 3)

Qumaq's, 'star that never moves' appears as a discussion piece between Inuk elder, Oshutsiak and Arctic researcher Norman Hallendy in his book *Inuksuit: Silent Messengers of the Arctic*. Oshutsiak described to Hallendy that the stationary pole star, *Nikkisuitok* (Polaris), is located by connecting the seven dots of *Tuktujuak* (Big Caribou/ Big Dipper), with the seventh star, *Nikkisuitok*. Interestingly, Qumaq's comment about stars as excellent direction finders contradicts *Aivilik* Inuit use of stars for navigation. Carpenter (1972, p. 22) discovered that *Aivilik* Inuit rarely used stars as guides because some of their men were once misled when they used them. Similarly, in an Australian Aboriginal context, David Lewis, while conducting fieldwork in Central Australia discovered first hand that stars often disorientated nocturnal travellers. Lewis noted that the *Pintupi* people, when using the Southern Cross as a guide became hopelessly lost on a regular basis. Moreover, Lewis (1976, p. 273) recorded that the *Aranda* and *Loritja* clans were unable to find their way by night using stars as reference points, however, during the daytime they possessed the utmost skill in respect of location. Overly dogmatic conclusions suggesting that stars never assisted orientation may be tempered by an assertion by Aborigines from the *Antikarinya* and *Tjapaltjari* clans; that in a strange country at night they would follow the Orion and Venus (Lewis 1976, p. 274).

Inuit elder and hunter David Okpik of Quaqtaq, Nunavik, spoke about his use of star travel during an interview for this research paper (Appendix 1). He indicated that many Inuit from Quaqtaq use stars to travel at night:

"In January there is only three to four hours of daylight. We use the Big Dipper and other stars low in the horizon. Stars move across the night sky in a particular sequence. We use one star to fix a position and as that star begins to move out of alignment another star moves up into its place."

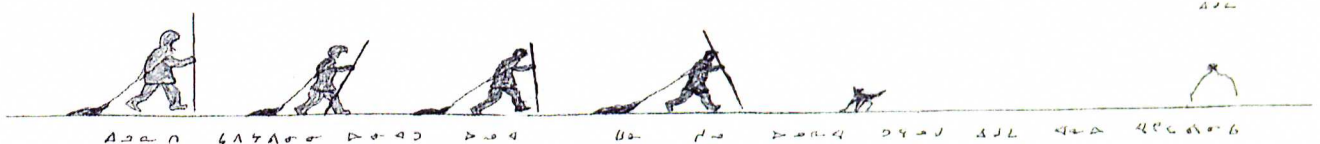


This system recalls the methods employed by the Polynesians. Richard Nelson (1969, p. 137) explains that the Big Dipper can also be used as an excellent compass, as the time of day can be calculated from it.

“By memorizing the angle of the constellation (i.e. the handle) to the horizon at various times of the day, and its position in the sky at certain times, a man can get his bearings from it. For example, if the ‘handle’ parallels the horizon at 6.00 p.m. and the constellation is known to be always in the west at that time, directions can be derived from this observation.”

Surprisingly, very little data has been recorded about Inuit star navigation. Although, notable inroads have been made by John MacDonald (2000) and Bernard d’Anglure (1993). MacDonald’s research of inquiry, aptly named *The Arctic Sky*, among other things, examines star travel by those living in the Nunavut village of Igloolik. Conversely, d’Anglure’s research describes the constellations used for navigation by the Inuit of Nunavik (Northern Quebec). At the request of d’Anglure, Mitiarjuk Nappaaluk, between 1965-1967, recorded several aspects pertaining to celestial bodies in an Encyclopaedia based on knowledge accumulated from Inuit living in the Kangirsujuaq district, Nunavik. The Encyclopaedia states that the grouping of stars known as *Sakiassiat* (Pleiades) were used as “wristwatches” insofar as late evening was realised when the stars were rising up in the sky, and daytime was realised when the stars were coming down. In terms of using stars as landmarks, the Inuit Encyclopaedia describes that the *Aajjuuk* formation (Altair, *Aquiliae alpha* and Tarazed, *Aquiliae gamma*), since it was visible in early morning, traditionally served as a travel beacon. Furthermore, the Inuit knew that the appearance of *Aajjuuk* in the night sky demarked Christmas was approaching - a seasonal sign indicating the hours of daylight in any given day would soon increase (Nappaaluk 1993, p. 17).

Further evidence that stars were used for navigation in Nunavik is supported by a number of Inuit student illustrations (Appendix 3 & 5) that were drawn to fulfill the requirements of a “survival” module. Customarily, information about the land was taught at home, however, in recent times, this act of transmitting information has been increasingly placed on school teachers. Consequently, the *Kativik Regional School Board*, which determines the curriculum taught at Nunavik’s schools, developed a landscape learning and appreciation subject (“survival”) based upon how Inuit elders once found their way across the tundra using natural features, celestial bodies and purpose built landmarks. The “survival” subject teacher, Pasha Puttayuk, of Quaqtqa’s Isummasaqvik Community School, described to me that her students were given the task to playfully represent aspects of way-finding and living on the land through the drawings. The students in the “survival” subject range from 11-17 years of age, most of who have been raised in Quaqtqa or a neighbouring Inuit village. It is worthwhile to note that Marlene Cox (1979), in a cross-cultural comparative study between Inuit and American mid-western children drawings concluded that, “A child’s art is reflective of his or her culture and perhaps Inuit children are indeed influenced by satellite television, common text books and teachers educated in southern culture.” Although this may be the case, the students in the ‘survival’ class are exposed to the Inuit perspective. Their teacher, Pasha Puttayuk, was raised in Quaqtqa and her father is a revered Inuit elder.



student artist has an obvious grasp of the scale of the *Aurora* and the extent that it occupies the night sky through its warped band forms. The accuracy of this representation may be due to the fact that the *Aurora* is such a common feature of the night sky around Quaqtaq, and thus has been witnessed regularly.



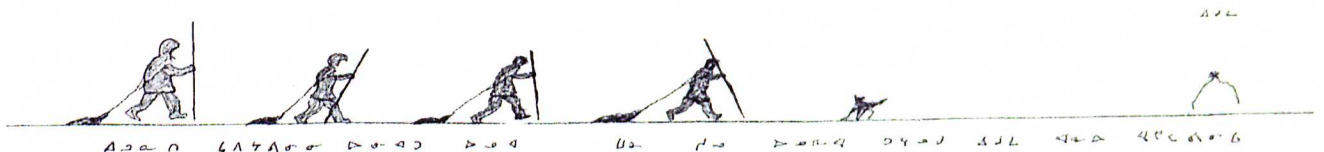
Figure 7: Travelling with the Stars and Northern Lights

This drawing describes how one can travel using the stars, Northern Lights, big hills, Inuksuit and the sun. The Northern Lights (*Aurora borealis*) light up the area when travelling at night. Drawn by Isummasaqvik Community School student, (Quaqtaq), Nunavik, March, 1999. Original size 8.5" x 11", colour pencil on bond paper. Published with permission from the Kativik Regional School Board.

An interesting passage from Hawkes (1916, p. 153) *The Labrador Eskimo* is testimony that the Northern lights were not only used for navigation, but were also entrenched within Inuit mythology:

“The ends of the land and seas are bounded by an immense abyss, over which a narrow and dangerous pathway leads to the heavenly regions. The sky is a great dome of hard material arched over the earth. There is a hole in it through which the spirits pass to the true heavens. Only the spirits of those who have died a voluntary or violent death, and the raven, have been over this pathway. The spirits who live there light torches to guide the feet of the new arrivals. This is the light of the aurora. They can be seen there feasting and playing football with a walrus skull.”

And, the crackling noises that sometimes accompany an aurora, according to Inuit mythology, are the spirits attempting to communicate with the people of the earth. Hawkes (1916, p 153) reports that Inuit children would dance to the Northern Lights, and the heavenly spirits, *sélamiut* (sky dwellers) would be responded to with a whispering voice. However, a radically contrasting picture of the beliefs associated with the Northern Lights (*Arsaniit*) is revealed in the Inuit Encyclopaedia describing the sky of Nunavik:



“...In the past, the Northern Lights were a thing much feared. When they [Aurora borealis] were large and frequent and could not be left behind by those who travelled at night in dogsleds, the travellers would cut their dog’s ears, for a bleeding ear was protection against future attacks. If they didn’t do that, the Inuit who travelled at night would be decapitated by the Northern Lights. It is said that the Northern Lights used human heads as a football; it is because they play football that they move at night as we see them do very well. Because they use human heads, it is said that Northern Lights have an odor. This is why people who did not want to be subject to such treatment used to cut a piece off their dogs’ ears.” (Nappaaluk, 1993 p. 17)

The lights of *Aurora borealis* have intrigued not only Arctic inhabitants, but also early explorers and scientists. From a scientific point of view, the lights from *Aurora borealis* are emitted when charged particles from the sun are guided by the magnetic field of the earth into the atmosphere near the poles. When the particles contact atmospheric molecules, primarily oxygen and nitrogen, at altitudes from 300 down to 100 kilometres, a part of the energy of the collisions transforms to visible light.

4.1.3 Navigating with the Sun

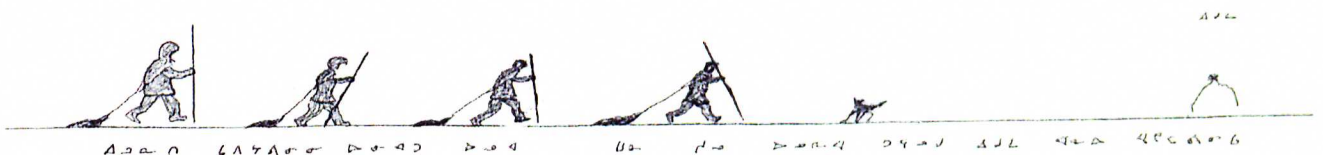
The sun is of paramount importance to navigators on the land. By learning how to use the sun as a tool, accurate information about time and direction can be obtained. As described in Chapter 2, many animals, birds and insects have learned to harness the sun’s light for navigation. Additionally, the Inuit and Australian Aborigines developed refined systems of navigating with the sun. In summer, the sun continuously circles the Arctic horizon. Richard Nelson (1969, p. 137), in the *Hunters of The Northern Ice*, describes how to use the sun as a reference point during summer when travelling by boat in the Arctic:

“If the sun is in the northwest during late evening then, in order to head toward the coast from out at sea (i.e. to travel east), the sun should be somewhere astern and toward the left of the boat.”

An excellent graphic description of how the sun was used for navigation is evident in the drawing, Figure 8, by late Inuit elder Tuumasi Kudluk from Kangirsuk, Nunavik (Northern Quebec). The English translation of the illustration from Inuktitut reads:

“These people of land-fast ice don’t know what a watch is. They are measuring the time. The man with his arm extended is measuring the distance between the sun and land using his mitten. February: measuring how much the days have become longer in February using his mitten; placing it between the sun and the land. That’s the only reason why they have stopped.”

The drawing quite clearly shows how the raised hand forms the instrument to measure the angle of the sun. David Okpik (Appendix 1) from Quaqtaq explains another method of using the sun for navigation when hunting in foggy and low light conditions:



“The sun always offers a shadow, even a slight shadow at night. We cannot put sticks in the snow and see the shadow, because there are no sticks (referring to the Quaqtaq region). By opening your left hand and placing your right hand index finger upright in the centre of your palm - a slight shadow will be cast. When weather conditions are bad we continue to repeat this method throughout the day, especially before sunset.”

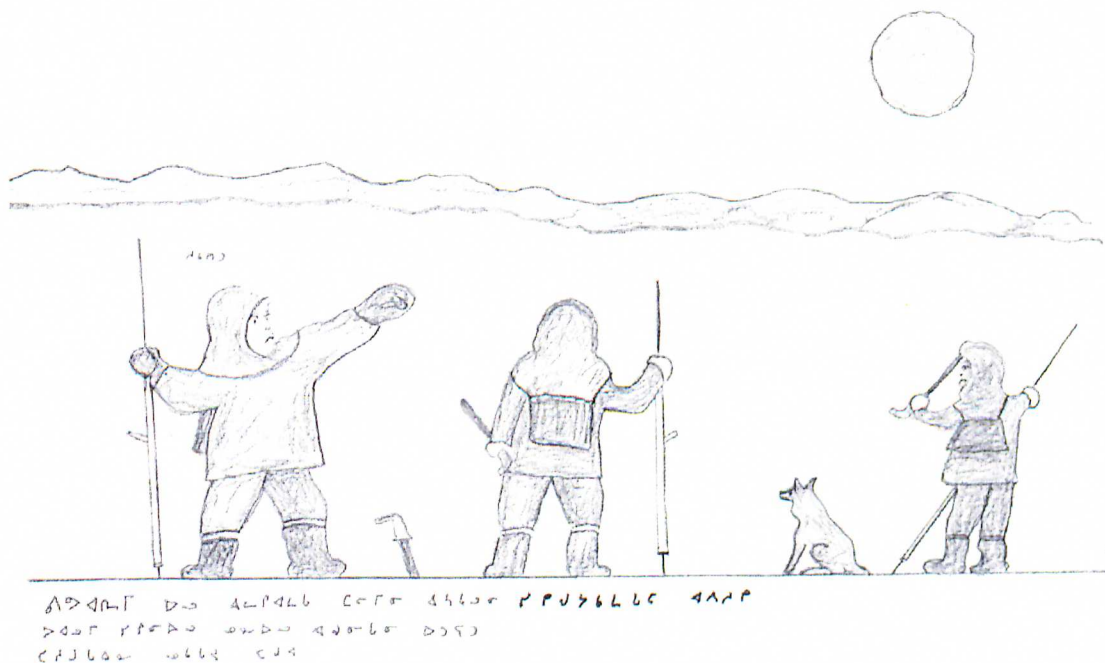
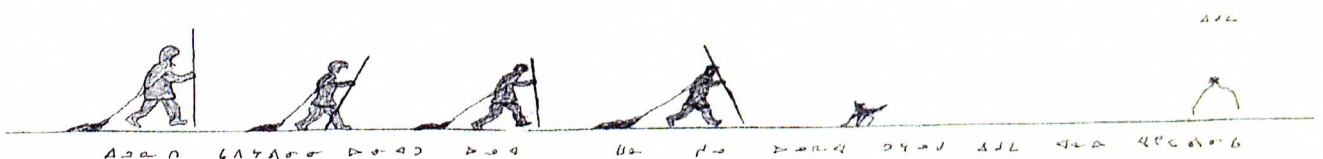


Figure 8: Measuring the Time of Day using the Sun

The man with his arm extended is measuring the distance between the sun and the land using his mitten. Source: *Tuumasi Kudluk Collection (TK D7)*, Avataq Cultural Institute.

It is unclear the extent to which the sun assisted traditional Australian Aboriginals when travelling. Lewis (1976, p. 275) noted that Aboriginal tracker, *Tjupurrula* (Big Peter), while travelling on an arduous cross-country journey from Black Hill Bore to the Gunbarrel ‘Highway’ in Central Australia, made ‘dead reckoning’ calculations using the sun. Through thick mulga (*Acacia* woodland) and over sandhills, *Tjupurrula* kept his course by using the sun and the direction of the shadows it cast. Moreover, Jim Lester, a blind Aboriginal belonging to the Pitjantajara clan, described to Lewis (1976) that he could determine landmarks on the horizon by observing shadow variations. Apparently, Lester, although partially blind, could navigate by lining up the sun with landmarks.

Contrastingly, Mick Stewart of the Antikarinya clan described to Lewis that he did not use the sun to find his way. Instead, he proclaimed that when travelling in strange country, one navigates by choosing landmarks like hills and looking back often to keep straight (Lewis 1976, p. 275).



4.1.4 Navigating with the Wind

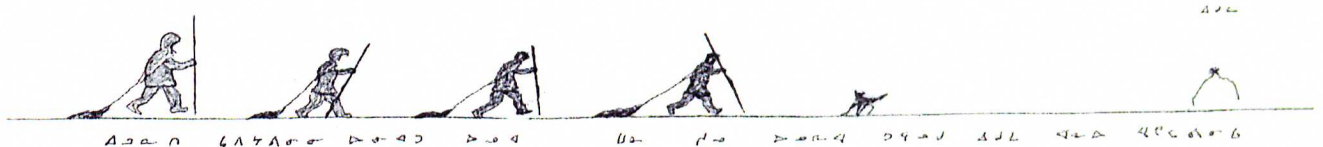
Wind was commonly used as a navigational device in the Arctic, of particular aid when trapped in blizzards, cloudy and foggy conditions. Carpenter (1973) reports that *Aivilik* Inuit travelled in extreme weather conditions when necessary; even when trails were lost and lead dogs were uncertain, by using *sastrugi* – the wind-carved patterns which form in the ice-crusting snow. According to Pelly (1961, p. 61) these small ridges of hard snow, which run parallel to prevailing winds, are the most accurate means of determining direction – even more reliable than a compass and needle for the traveller seeking direction. However, in order to interpret direction from snow ridges, the hunter must first possess a regional understanding of prevailing winds. Evidently, Inuit hunters in Western Greenland could calculate precise bearings from the *sastrugi* because of the predominant south-westerly winds that were predictably prevalent in the region (Spink & Moodie 1972, p. 24).

In an interview with Johnny Oovaut for this paper (Appendix 1), he described that cardinal points can be established by using snowdrifts as a guide. He reported that in the Quaqtaq district, snow is carved by the wind to form a point; the snow generally points in an east to west direction near the village, but out on the land it points in a north to south direction. Furthermore, Oovaut revealed that snow ridges generally point in the same direction wherever the countryside is rough. Inuit student drawing, Figure 9, by Stevie Pagé, among other things, shows a graphic description of how travellers navigate using the *sastrugi* in the Quaqtaq district.



Figure 9: Navigating with the Wind, Snow & Boulders

Inuksuit, drifted snow, wind and boulders are used to know your way around. Drawn by Isummasaqvik School Student (Quaqtaq), Stevie Pagé, January 2001. Colour pencil on bond paper: Original size 8.5" x 11". Published with permission from the Kativik Regional School Board.



The late Inuit hunter, Taamusi Qumaq of Hudson Bay, Nunavik, recorded a contemporary survival manual in *Tumivut*, 1991. The seven part series served as a testimony for young Inuit to learn about survival techniques in Arctic Canada. Qumaq noted winds as one of the ingredients to survival on the flat tundra during winter:

“In order not to get lost, one should be aware of the direction of the wind and check if the clouds show signs of wind...The direction of the snowdrifts is also useful. If you remember the direction of the wind during the last storm, you can relate it to the position of the sea and understand the direction of the snowdrifts. You can also tell what direction the wind was blowing in by looking at the sides of the rocks.”

Qumaq’s insightful observations suggest that one must have an instinctive memory of wind directions and a blueprint of the land to orient oneself. An interesting study of winds as cardinal points by Michael Fortescue (1988) supports the argument that traditional Inuit hunters were at times, guided by the wind. Fortescue’s industrious research concluded that regional cardinal variations are shaped and determined by prevailing winds, Figure 10.

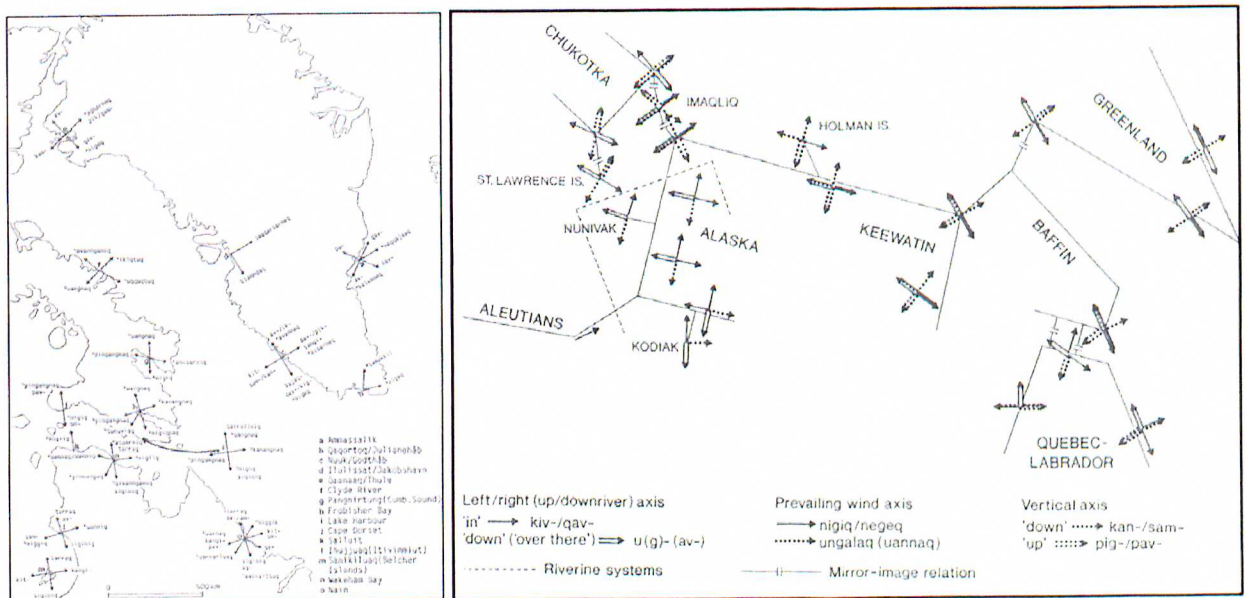
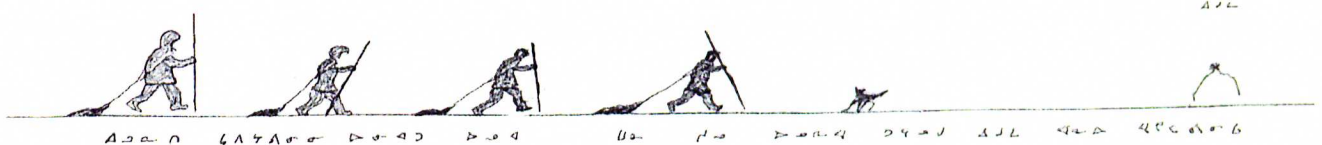


Figure 10: The Effect of Wind on Cardinal Point Perception

The wind roses demonstrate how the inhabitants of each Inuit village orientate themselves accordingly. Winds play a pivotal role in navigation on the land for the travelling hunter.

Fortescue noted that Inuit from each village perceive cardinal direction differently because of local wind variations. For example, Boas (1974, p. 643) identified that at Cumberland Sound, *uangnang* is west-northwest: *qaningnang* (snow wind) is east-northeast, *nigirn* is southeast and *aqsardnirn* is the fohn-like wind that blows from the fjords of the east coast. These names are the same at Nettilling, except that east-northeast is called *qanara* (snow). In Akudnirn *uangnang* is west-southwest, *ikirtsuq* (the wind of the open sea) is east-northeast, *oqurtsuq* (wind of the land of *Oqo* or the lee side) is southeast and *avanganinirn* (i.e. from the north side along the shore) refers to the northwestern gales. And, Mitiarjuk Nappaluuk states that the winds that blow in Kangirsujuaq are named *niggiq*, *qavannganiq*, *atuarniq* and *uanniq*. *Niggiq* comes from below and from the sea; *qavannganiq* comes from



far across the land; *unanniq* comes from the highlands, and *atuarniq* comes from far away (Nappaaluk 1993, p. 21).

In comparison, Australian Aboriginal, Wintinna Mick from Macumba near Lake Eyre, Upper South Australia, stated to Lewis (1976, p. 276) that prevailing winds offered him directional aid: “If I was a bit lost I would be guided by the cold south wind.” Wintinna also admitted that, “a ‘blind man’ would not only know how to find places by using his memory, but he would also know directions from the wind: wind from the north hot; west wind a bit cooler; east colder still; south proper cold”

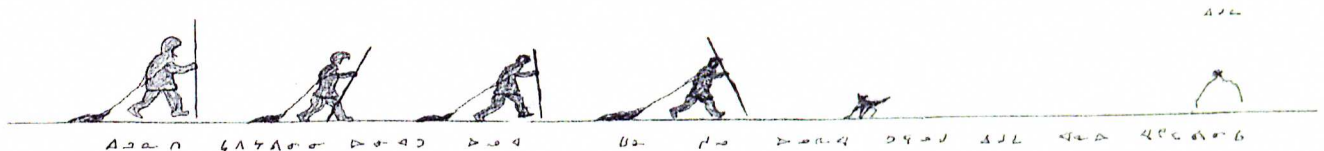
Carpenter (1973, p. 23) describes that travelling hunters were also able to discern variations in wind position whilst moving on sleds. The Inuit hunter usually sits on his sled facing to one side, away from the wind, with his parka hood closed except for the small hole through which he breathes and sees. By observing the slight changes in wind direction blowing on the fur around a hunter’s parka, they were able to check their position and correct it accordingly.

4.1.5 Navigating using Sky Reflections & Natural Features

Daniel Oovaut’s drawing, Figure 11, contains a mixture of information about travelling with clouds, Inuksuit, rivers and the sun. The message describing *Tunguniq* (the darkening of the clouds above seawater indicating that there is open water) was interestingly, a navigational measure used by early Arctic explorers such as Vilhjalmur Stefansson (Spink & Moodie 1972), Lieutenant de Haven (Gatty 1958) and Commandant de Gerlache (Gatty 1958). They described this phenomenon as a ‘water sky’ or ‘ice-blink’, which referred to the natural elements of the earth that were reflected onto the cloud canvas above. Most travellers over land and sea pursue long journeys under cloudy skies. Indigenous groups and early European seafarers learnt to read the subtle signs of clouds. During the ill-fated expedition in search of Sir John Franklin, Lieutenant de Haven looked for an open sea to the north and west using a ‘water sky’ (Gatty, 1958, p. 82). The phenomenon of the ‘water sky’ occurs when water vapour affects light in such a way that it produces a dark-cloud reflection. When travelling on land off surrounding ice-covered areas, one can detect the presence of open water, because it reflects less light than land or ice. Arctic explorer, Vilhjalmur Stefansson, learned from time spent with the Inuit that clouds reflect many elements from the earth:

“When clouds of a uniform colour hang low there is reflected in them a map of the earth below them. Snow-free land and open water are shown in black on the clouds; the pure white sea ice appears in white, and land covered with snow soiled by blown sand (and tiny pieces of plant matter) is reflected darker than the seas, but lighter than snow-less land. This snow map is of great use to sledge travellers always, and especially in crossing wide bays from headland to headland; where the landmarks themselves are below the horizon their position is accurately indicated by their reflection in the clouds.” (Spink & Moodie 1972, p.24).

In the Arctic, ‘ice-blinks’ appear as patches of brightness in an otherwise grey sky; a sign of water surrounding floe or shore ice. An extract from Arctic explorer, Commandant de



Gerlache's 1898 journal describes his observation of an iceblink formation (Gatty 1958, p.82):

“...The sky was uniformly covered with a thick layer of stratus (cloud) and just at the horizon a white line appeared like a longitudinal slit, detaching itself from the grey of the sky. It was discontinuous, a little undulated, not rising more than 10-25 feet above the horizon. At 8 p.m. the first iceberg was reported, which appeared like a dome rising sharply out of the sea at a distance of about 10 miles.”

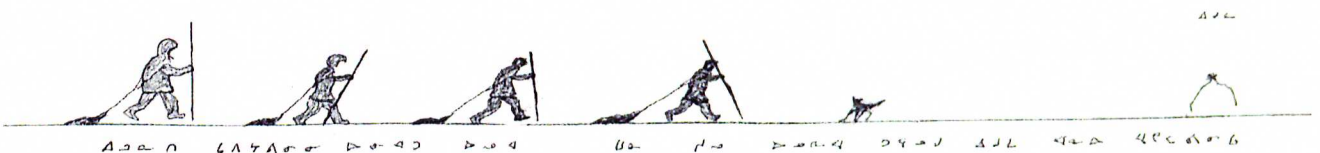


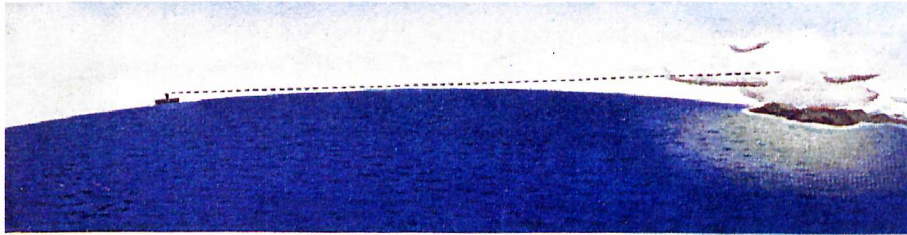
Figure 11: Navigating with Clouds & Rivers

Tunguniq: darkening of the clouds above seawater indicates that there is open water. Inuksuit, rivers and the sun let you know where to go. Drawn by Isummasaqvik School Student (Quaqtaq), Daniel Oovaut, February 1999. Colour pencil on bond paper: Original size 8.5" x 11". Published with permission from the Kativik Regional School Board.

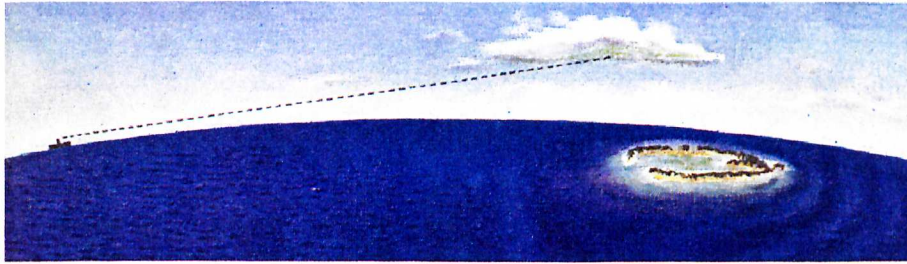
This example demonstrates that travellers, by using *Tunguniq*, were able to determine the nature of distant landscapes and its approximate distance. Records from early French explorer La Perouse, indicate that he watched for fixed clouds on the horizon in search of islands and landmasses in the Pacific (Gatty 1958, p.84). A fixed cloud develops when cool wind blowing off the sea meets rising warm air from a landmass. Figure 12 illustrates how this uplifting convection forms clouds. Particularly noticeable in tropical areas, 'standing clouds,' hover over islands, atolls and shallow shoals. Often the turquoise colour of the sea is reflected in the underside of the clouds. Many European navigators discovered new lands and voyaged across uncharted seas using clouds.

Robin McGrath's (1988) analysis of prints drawn by renowned Inuit artist, Pudlo Pudlat, supports the view that the Inuit mastered the extraordinary ability of reading and deciphering 'sky maps' reflected in the canvas above. According to McGrath, Pudlat's abstract print, Figure 13, represents a 'sky map' because the houses drawn in section not only feature on the horizontal land, but also appear reflected in clouds.





Fixed clouds around peaks with moving clouds passing by them, indicating land beyond the horizon



Colour of lagoon reflected from cloud indicating an atoll beyond the horizon

Figure 12: Navigating using Standing Clouds

Islands can be located by observing standing cloud formations. Standing clouds develop when cool air off the sea meets rising warm air off the land. Source: Gatty (1958, p. 85).

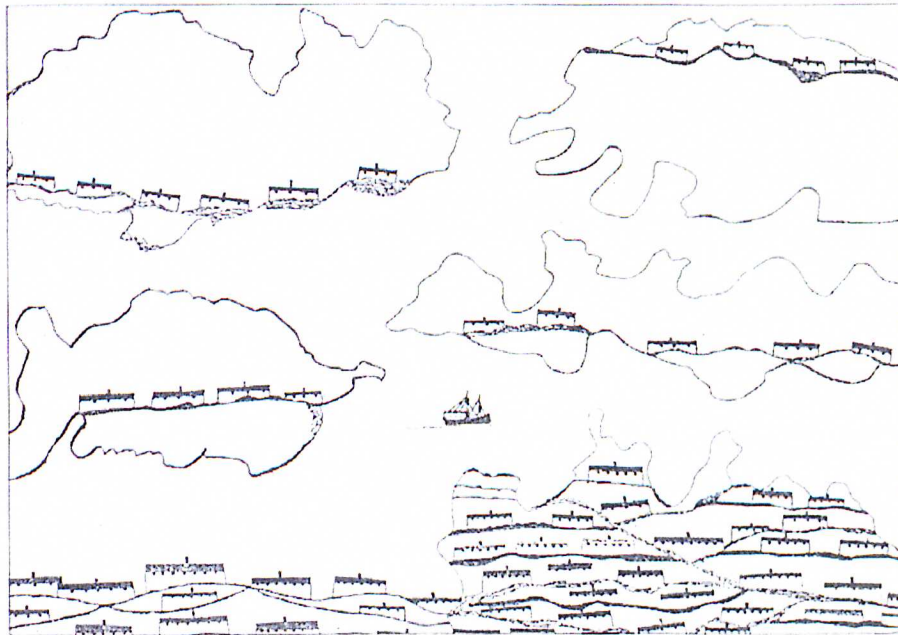
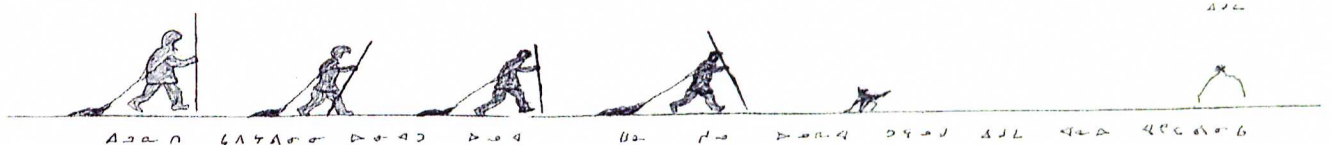


Figure 13: Sky Map print by Pudlo Pudlat

“The Settlement from a Distance” Cape Dorset, 1982. Robin McGrath (1988) claims that this print is an example of a sky map. What appears as houses on islands is in fact an image of houses being reflected on the cloud canvas above. Sky maps were useful in the Arctic, for they indicated surface terrain and distant landscapes. Source: McGrath (1988, p. 10).



Inuksuit appear throughout the Arctic in varying shapes and forms; constructed predominately from stones piled on top of one another to describe a particular place or convey a message. To the uninformed, Inuksuit, Figure 14 appear as just a pile of rocks adorning a featureless landscape, but to those who can decipher the rock formations, much more is revealed. To the Inuit, Inuksuit are objects of veneration – they are embedded in the roots of Inuit society within songs, shamanism, myths, legends and stories. Archaeological research speculates that some Inuksuit were built during the Dorset (Tunit) era, around 2000 BC (Hallendy 1997, p. 43). Inuksuit continue to be re-erected and new ones constructed, affirming their functional capacity as navigation beacons in the 21st century. They stand as an historical legacy and reminder of ancestral relationships with the land.



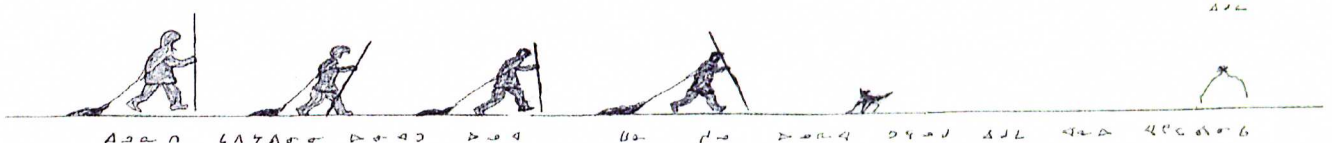
Figure 14: Large Inuksuk on Baffin Island, Nunavut c. 1970.

Photo: Prof. Peter Jacobs, Université de Montréal

In recent times, the Inuksuit has rapidly emerged as the unofficial symbol of the Arctic – the result of steady tourism marketing campaigns by Inuit and non-indigenous groups. The increased attention Inuksuit receives through marketing is not necessarily adverse, but the way Inuksuit are portrayed and displaced outside the Arctic context will soon impact their traditional function. And, the guidelines prescribed by the 1953 *Historic Sites and Monuments Board Act* will significantly impact the continuation of navigating with Inuksuit. The power and legacy Inuksuit exert over the landscape is also potentially at risk from mining and hydro-electricity developments that are planned to consume further areas of the Arctic. Additionally, particular marketed forms of Inuksuit threaten to taint and avert the original Inuksuit function. A case for preserving Inuksuit is indeed strong, and quite necessary considering they are one of the few remaining tangible fabrics of Inuit life that continues to function within an original setting.

Although Inuksuit appear as ancient artefacts of a by-gone era, they have survived well into the 21st century, withstanding the changes that have dramatically impacted other traditional facets of Inuit life. Inuksuit remain as solidified fingerprints on the landscape, marking ancient and modern navigation routes. They are signs in themselves and signs that converge to form maps.

The term Inuksuit is a derivative of the Inuktitut (Inuit language) words, *Inuk* (human being; singular) and *suit* (in likeness of) (Hallendy 1992). The combination of these words



forms Inuksuit (Baffin Island form: Nunavut), which means, “to act in the capacity of a human” (Lewis 1966). The spelling of Inuksuit varies slightly throughout the Arctic, such as the Nunavik (Arctic Quebec) version, *inutsuit* and the Igloolik version *inuksugaq* (plural inuksugait) (MacDonald, 2000, p.188). Mary Wallace (1999, p. 15) postulates that the reason Inuksuit are revered and charged with humanistic characteristics is because “an Inuksuk is a strong connection to the land: it is built on the land, it is made of the land and it tells of the land.” Similarly, Arctic researcher Norman Hallendy (1992, p. 9) suggests that, “...Whether they symbolised their makers, acted in their capacity, or were the objects of veneration, Inuksuit functioned as semoliths - messages created by the arrangements of stones. They were an integral part of the hunter’s language, and endure as indelible signatures on the Arctic landscape.” Inuksuit were reliable message centres. To the travelling hunter, Inuksuit were a welcome sight; some described the course to follow, others pointed to good hunting and fishing areas and some marked where food was cached. They provided purposeful information and assistance to those who knew how to read its forms.

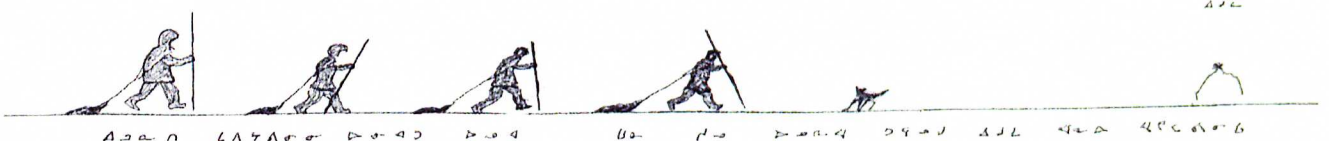
Inuksuit appear throughout the Arctic, ranging from 0.5 – 2 metres high to 2 metres across. Unusual concentrations of between 100-200 Inuksuit are located within a few hectares at Inuksualait in Southwest Baffin Island, Nunavut (Hallendy 1997). Many prominent Inuksuit also feature along the shores and interior between Hudson Bay and Ungava Bay in Nunavik. Upon a recent field trip to Nunavik for this paper, it was noted that upon most hilltops near Inuit villages stands an Inuksuk. Inuksuit are monoliths; they are signposts, landmarks, beacons and markers, yet at the same time they are iconic and symbolic figures – they often describe historical attributes of local settings. An Inuksuk, Figure 15, positioned on the ridge top of the Inuit coastal village Quaqtq for instance, tells of how the area was once an ideal place to camp throughout the year and especially for refuge in autumn.



Figure 15 : Inuksuit on ridge top of Quaqtq village, Nunavik, 2000.

Described to author by Inuit elder David Okpik as indicating a safe place to make camp. Authors photo.

Inuksuit were by no means the primary or sole navigational aid, yet they proved to be one of the most reliable navigational fixtures upon the landscape. Today, however, with navigation on the tundra performed much differently, the traditional role of Inuksuit has consequently been tainted. Moreover, customary techniques have succumbed to the use of modern navigation equipment such as the Global Positioning System (GPS), radar and topographic maps, and to some extent, communication towers, radio masts, community lights and weather stations have replaced the function of Inuksuit. Regardless of the nature



of erosion and pressures undermining the traditional use of Inuksuit, they are an integral component within the Inuit navigational package.

Arctic explorer, Therkel Mathiassen (1928, p. 97) on the *Fifth Thule Expedition 1921-24* discovered that Inuksuit were used to mark frequent routes between Cape Wilson, Usugarssuk, Iglulik and Repulse Bay. He reported that Inuit rarely went off course using the cairns as guides. Inuksuit were not only spaced out as markers across hilltops, riverbanks and valleys, but they were also grouped together to describe messages and stories of landscape. John MacDonald's (2000) insightful research of the Igloolik region (Melville Peninsula) revealed that inuksugait (Inuksuit) were built to mark the locations of caribou meat caches within gorges. The construction of a cache involved encasing food within a circular pile of rocks to prevent it from decomposition and attack from bears or wolves. Inuit hunter, Noah Piugaattuk described to McDonald (2000, p. 190) that, "an Inuksugait would be erected on a rise not far from the cache. A pointer would be set on top of the Inuksugaq pointing in the direction of the cache. In this way it would be known exactly where the cache was situated should it be buried under the snow when they returned to retrieve it in winter time." These markers, Figure 16, are known as *hakamuktak* pointers, and were built to stand as tall as human figures so they could be seen from great distances (Hallendy 1985). Ida Nassak's perspective drawing of a canvas tent against a lake, Figure 17, illustrates an example of a *hakamuktak* pointer. These pointers were generally placed on high ground to ensure maximum visibility during summer and winter. The stone rings in Nassak's illustration probably represent the backbone of five caches that were opened by the travelling party for consumption. Nassak's drawing encapsulates an ideal camping scene: a lake for freshwater, food readily available and shelter within a valley.

4.1.7 Some Authentic Inuksuit Types

According to Hallendy (1992), approximately 24 types and arrangements of Inuksuit exist. Hallendy groups the types into three categories: (1) distinct natural objects, (2) placed, shaped or constructed objects and (3) placement and arrangement of Inuksuit. Hamelin (1956, p.13) offers a condensed version of classification, suggesting 'the pebble monuments' fit into 8 types, although he argues only five types (A-E) conform to the real Inuksuk form:

- (A) A small pebble on a big pebble
- (B) Many rocks on a big one
- (C) A big rock and small rock
- (D) Pyramids of stone
- (E) Pyramids build by explorers
- (F) Monoliths that represent bears, seals and wild dogs
- (G) Complex stones, eg. a woman thinking
- (H) A wall of stone

The *ikahimaluk* and *niungvaliruluit* Inuksuit (Figure 18a & b) as described by Hallendy (1985, p.32) consisted of vertical and horizontal stones arranged to form a window. Travellers were guided along a route by looking through the window towards the next Inuksuit. One may speculate that the 'window' was a way of reducing the scale of the Arctic labyrinth – a porthole from which a system of navigation emerges.

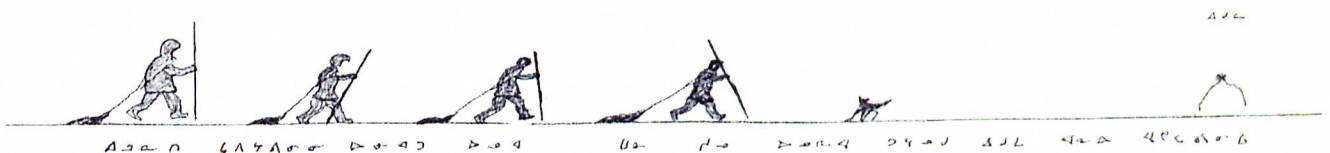




Figure 16: Hakamuktak pointer marking direction to the Cache
 Drawn by anonymous Isummasaqvik School Student (Quaqtaq) March 1999. Colour pencil on bond paper: Original size 8.5" x 11". Published with permission from the Kativik Regional School Board

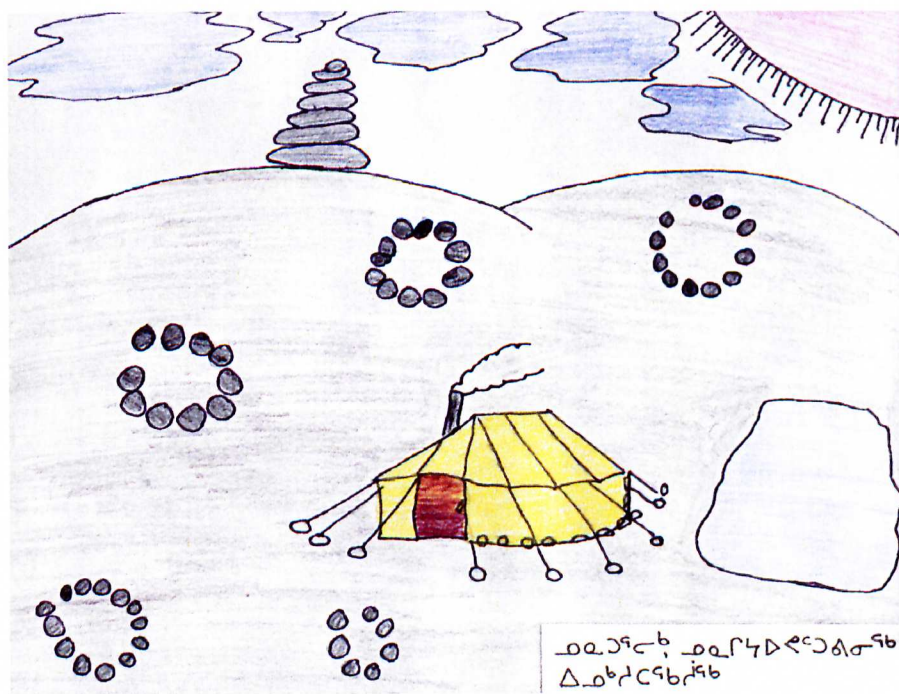
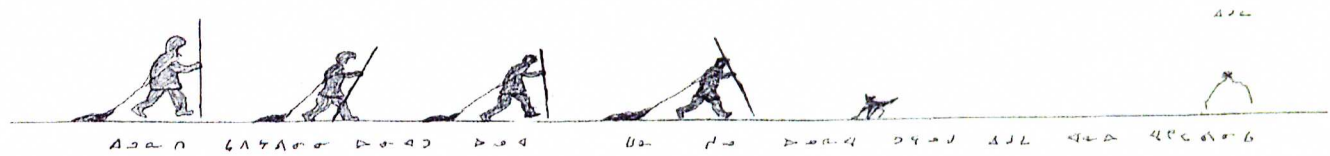


Figure 17: Hakamukatak Inuksuit
 An Inuksuk indicates that people had resided and camped in the area (Nunaturlik). Drawn by Isummasaqvik School Student (Quaqtaq), Ida Nassak, March 1999. Colour pencil on bond paper: Original size, 8.5" x 11". Published with permission from the Kativik Regional School Board.



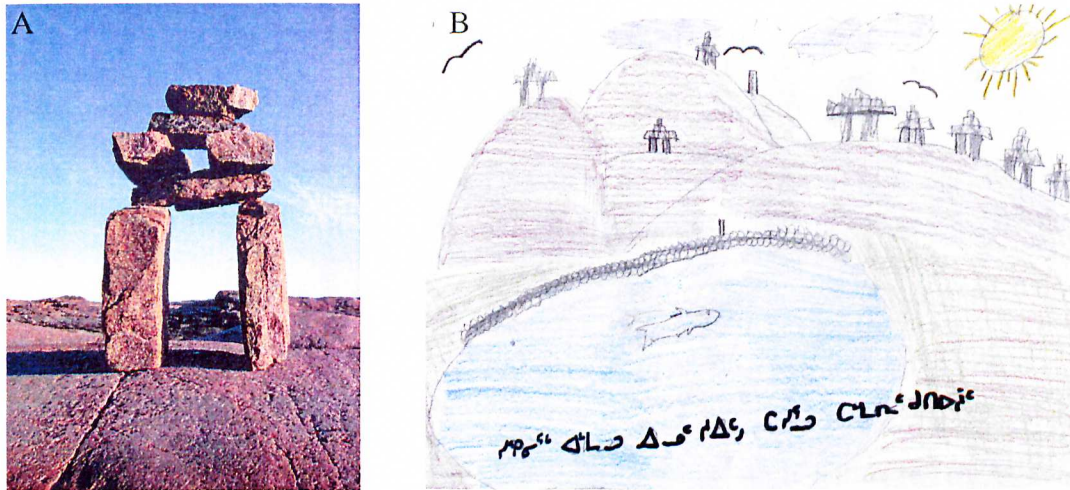


Figure 18: (a) *Ikahimaluk* or *niungvaliruluit* Inuksuit Window
 Source: (Hallendy 2000) (b) *Inuksuit Windows* marking a Navigation Route across the Land.
 Drawn by anonymous Isummasaqvik School Student (Quaqtaq), March 1999. Colour pencil on bond paper: Original size 8.5" x 11". Published with permission from the Kativik Regional School Board.

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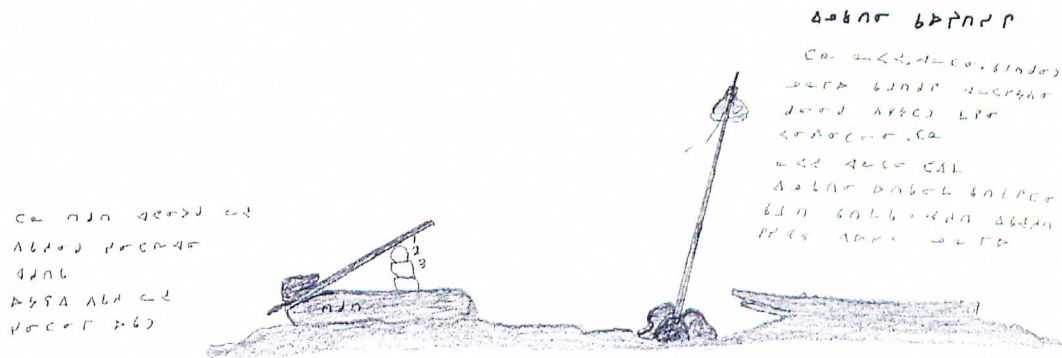
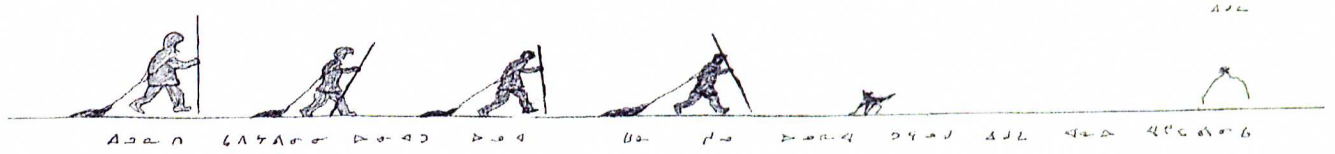


Figure 19: Navigating using *Tikotit* or *Tikkutik* pointers

The piles of rocks in the middle are pointers. The people who own the *qamutik* had left this message for the next traveller to inform him where they were staying and the direction to take to get there. The pointer has three rocks under it, which implies that it takes three nights to get there. A note is also tied to the top of the pole for further instruction. This is how the inland Inuit used to describe travel directions. *Tuumasi Kudluk Collection*, (TK D34), Avataq Cultural Institute, Montreal.



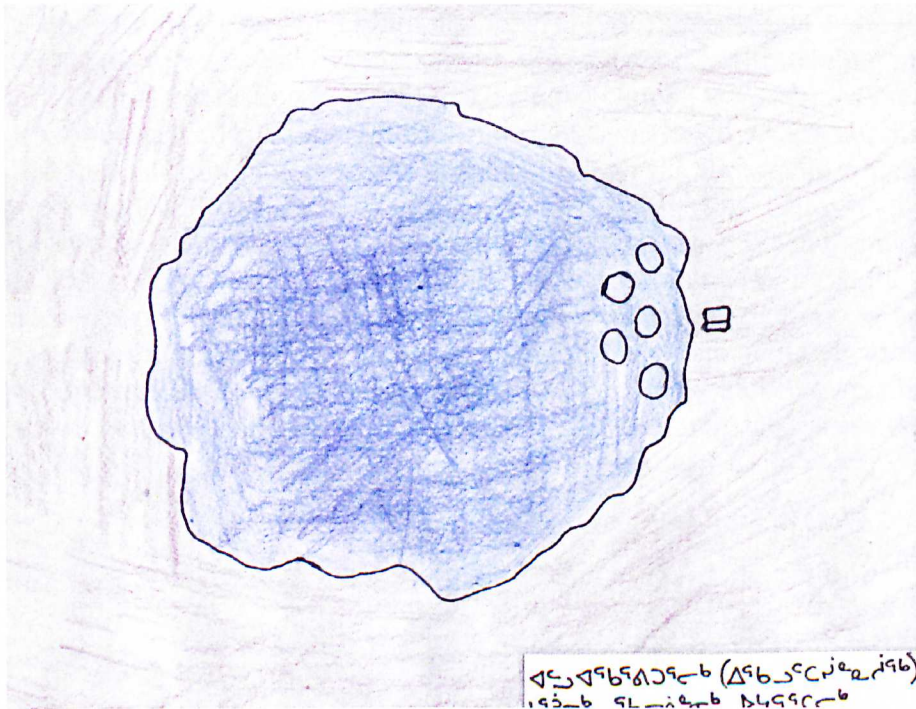


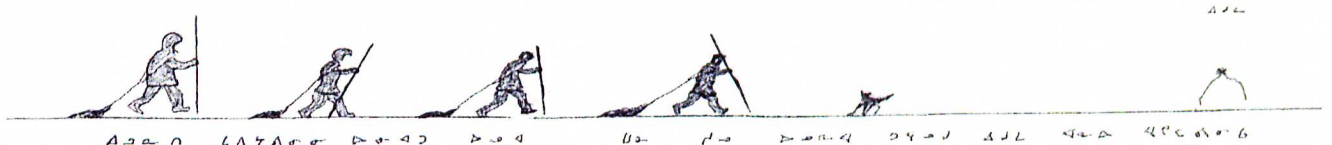
Figure 20: Tukkutik Pointers used for Fishing

Two rocks piled near a lake indicate that it is a good fishing spot. Drawn by Isummasaqvik School Student (Quaqtaq), Michael Tukkiapik, March 1999. Colour pencil on bond paper: Original size 8.5" x 11". Published with permission from the Kativik Regional School Board.



Figure 21: Aulagquat 'bogeyman' Inuksuit

During the September migration, the caribou have to cross the lakes and rivers they meet along their route. The crossing areas are called *nalluit* (singular-*nalluk*). The *nalluit* were traditionally used for hunting caribou. Lines of Inuksuit were erected to direct the flow of caribou toward the narrowest part of the lake, where the Inuit waited. While the caribou crossed, the Inuit in *Qayaqs* would shoot arrows at them, and also use the *ipuligaq* - a long spear. When the caribou set foot on the other side of the crossing, they encountered a series of Inuksuit, of which they had to follow. There again, hunters were waiting with bows and arrows. *Tuumasi Kudluk Collection, (TK D6), Avataq Cultural Institute, Montreal.*



Hallendy (2000), Hamelin (1956) and Lewis (1966) suggest that some Inuksuit possessed spiritual powers or were associated with shamanism. Notwithstanding the validity of these findings, it is interesting to reveal that Tomassi Qumaq from Nunavik replied to a questionnaire for Hallendy (1990) that he had never heard his grandfather or other elder's talk about Inuksuit having spirits in Quebec. However, the way in which the Chukchi people of the USSR reacted to foreigners constructing stone cairns on their shoreline supports the view that Inuksuit had spiritual connotations. When the crew of the icebreaker *Sibiriakov* built cairns for identification marks on the shore in 1932, they were soon destroyed by the Chukchi people because they believed such marks would scare away seals (Stefansson 1945, p. 497). Moreover, some Inuksuit were built to commemorate events, to consume time or mark special occasions. At Kamigluk, Inuksuit were built to house the souls of many Netsilik Eskimo women who drowned tragically at sea (Rasmussen 1967).

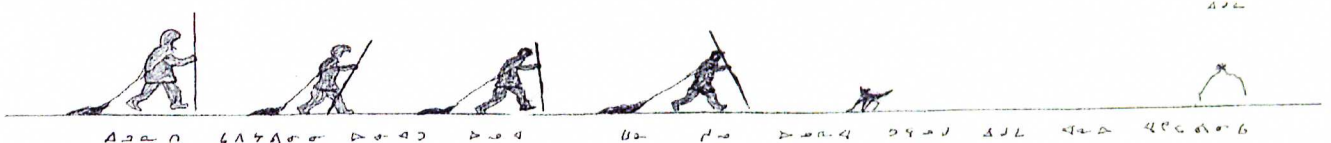


Figure 22: Alert's cairn at Floeberg Beach

Built around 1877 on the shores of Cape Sheridan by the crew aboard the British Admiralty Ship *Alert* as a navigation beacon. Source: Peary (1907, p. 56)

There is no doubt that Inuksuit were indispensable commodities for the travelling hunter. In fact, Western explorers also adopted the use of cairns for navigation and storage in the Arctic. Peary (1907) regularly describes that his travelling party built cairns on hilltops, leaving a report or message in a bottle nearby. One cairn frequently visited by Peary and Stefansson, Figure 22, was *Alert's* cairn – built around 1877 at Cape Sheridan and aptly named after the British Admiralty exploratory vessel, *Alert* (Peary 1907, p. 55). The form and shape of *Alert's* cairn could easily be mistaken as an Inuksuk built by Inuit. Stefansson even endorsed the building of Inuksuk in his *Arctic Manual*. He expounded that, “Where records are being deposited, the best way is...to erect, out of things of no value to the Eskimos, a beacon which will be seen from a distance (1945, p.497).” Antarctic explorer, Captain R.F. Scott (1913), on his last trip to the South Pole recorded in his journal that, “Had we been dependent on landmarks we should have feared ill. Evidently a good system of cairns is the best possible travelling arrangement on this great snow plain.” Another extract from Scott's (1913) journal reveals the level of excitement and relief when they rediscovered a series of cairns during their attempt to return from the Pole:

Thursday Feb. 23, 1912. The data was so meager that it seemed a great responsibility to march out and we were none of us happy about it. But just as we decided to have lunch, Bower's wonderful sharp eyes detected an old double lunch cairn [large snow cairn built on the outward trip], the theodolite confirmed it, and our spirits rose accordingly. This afternoon we marched on and picked up another cairn; then on and camped only 2.5



miles from the depot. We cannot see it, but given fine weather we cannot miss it. We are therefore extraordinarily relieved. Covered 8.2 miles in 7 hours showing we can do 10-12 miles on this surface. Things are again looking up, as we are on the regular line of cairns, with no gaps right home, I hope.

4.1.8 “Modified” Inuksuit Forms

Inuksuit are no longer just markers of the temporal landscape. In southern Canada, tourist shops and Inuit art galleries are overwhelmed with Inuksuit trinkets and other paraphernalia: mini- Inuksuit, Inuksuit mouse pads, fridge magnets, jewellery and soap-stone carvings of Inuksuit made by Inuit artists. In terms of the space ‘Inuksuit’ items occupy on these retail shelves, they are on par with other infamous icons that represent the Indian people of southern Canada, such as leather moccasins and the wooden totem poles of British Columbia.

Inspection of a series of posters drawn by young Canadians for a recent competition reveals the extent to which the Inuksuit has filtered into Canada’s mainstream culture as a symbol. The competition, under the auspice of Heritage Canada, invited people eighteen years and younger to draw posters that showed their pride of Canada. Out of the 13 finalists selected from each province and territory, five entries included an image of an Inuksuk. Interestingly, the winning poster of the 2000 competition, Figure 23, drawn by Neshali Weera from Alberta, features a mosaic of Canadian icons; the red maple leaf; snow capped mountains; pine forests; the CN tower; totems poles and an impressive rendering of an Inuksuk. Neshali Weera’s poster represents Canada through symbols – her Inuksuk image encapsulates the Arctic.

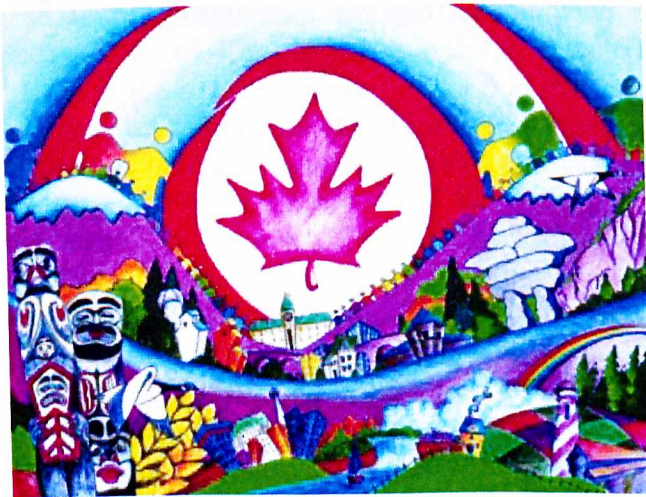
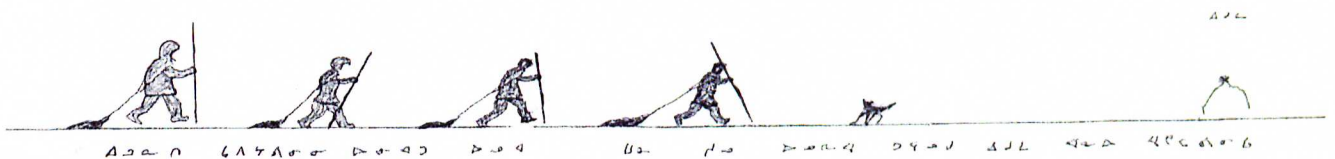


Figure 23: Neshali Weera’s winning poster of a national competition administered by Heritage Canada, 2000

The poster represents Canada through symbols and icons. The totem poles represent British Columbia; the Inuksuk represents the Arctic. Source: www.pch.gc.ca

A growing number of people in Southern Canada are also embracing the Inuksuk symbol. Intriguingly, adaptations of the Inuksuk form are occupying many front gardens of suburban residences in Quebec City, Ottawa and Montreal – replacing the garden gnome and pink flamingo folly. Moreover, the Inuksuit serves a growing global audience. For example, a gigantic topiary of an Inuksuk, Figure 24, featured prominently at the 2000 and 2001 *Mosaiculture Internationales* competition in Montreal. The topiary sculpture became a symbol of the competition, captivating local and international audiences. Similarly, an Inuksuk positioned in the forecourt of the McCord Museum in Montreal exposes tourists to a ‘piece of the Arctic’. Likewise, along a popular pedestrian path in Stanley Park,



Vancouver, stands a bold and dominant Inuksuk, Figure 25, that faces towards the waterfront. And, at Toronto Airport, an Inuksuk was built as a symbolic gesture – in recognition of its heritage value insofar as being one of the earliest navigation aids known to humankind (Lewis 1966, p. 85).



Figure 24: Giant Inuksuk constructed for the *Mosaiculture Internationales Competition in Montreal, 2000*, Authors photo



Figure 25: Inuksuk as a tourist attraction along a section of Stanley Park, Vancouver
Authors photo, 2001

The Inuit themselves have also joined the Inuksuit marketing campaign in the north. A large ‘Inuksuk’ with long legs and outstretched arms was erected at the entrance to the Inuit service town of Kuujjuaq, Nunavik, as a welcome sign to the Arctic. However, many visitors to the town are unaware that this stone arrangement, Figure 26, is not an Inuksuk, but rather an *Innunguait* (in likeness of a human) (Lewis 1966, p.86). This *Innunguait* in Kuujjuaq contains no hidden messages about landscape- its sole purpose is to convey a feeling of arrival to the Arctic and therefore does not act in the ‘capacity of a human’ like an Inuksuk does. Isummasaqvik School Student, Michael Tukkiapik depicts another example of an *Innunguait* in a drawing, Figure 27. His three dimensional drawing is depicted with remarkable attention to form and detail. Evidently, his drawing is more like a blueprint of how modern Inuksuit are constructed rather than a description about how they relate and fit into the landscape.

The modified Inuksuit forms are merely symbols that capture the essence of the Arctic. They do not describe landscape per se, but they provoke and stimulate the observer to enquire about how the stone formations relate to the land. The danger exists that many may perceive the modified Inuksuit forms purely as objects rather than a sequence of navigation networks that straddle the landscape. Inuksuit cannot be extracted from their setting, for to do so, would be to Westernise them. Western science cannot and should not attempt to codify Inuksuit – they are an intricate system of objects, sites and places that do not belong to a system of scientific structures. Much educational fallacy results when dislocating a feature such as an Inuksuk from its environment, as witnessed in Australia with the sales of boomerangs, dot-paintings and didgeridoos. Inuksuit are living entities, but they may soon become artefacts if marketing continues unchecked.

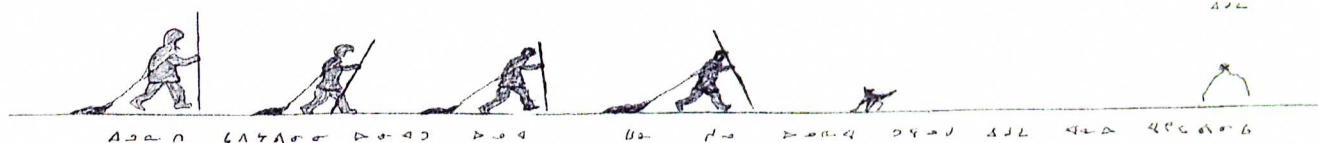




Figure 26: Innuqait at the entry to Kuujjuaq, Nunavik

Innuqait which means ‘in likeness of a human’ greets people as an entry sign to the Inuit town of Kuujjuaq, Nunavik, Authors photo, 2000



Figure 27: An Inuit Identity, Innuqait

Drawn by Isummasaqvik School Student (Quaqtaq), Michael Tukkiapik, March 1999. Colour pencil on bond paper: Original size, 8.5” x 11”. Published with permission from the Kativik Regional School Board.

4.1.9 Discussion: Preserving Inuksuit

The Historic Sites and Monuments Board of Canada (HSMBC) is the governing organisation charged with the mandate to recognise and preserve places, persons or events of significant heritage value. When the *Historic Sites and Monuments Act* was enacted in 1953, the Board focused primarily on built forms. It was not until much later that attention was paid to streetscapes, districts, gardens and urban and rural landscapes. Recently, the HSMBC shifted their focus to recognising, identifying and classifying Aboriginal cultural landscapes in Canada. In response to the ‘trend’ towards preserving Aboriginal cultural landscapes, Parks Canada generated a series of guidelines that expanded upon HSMBC’s vague concepts and definitions of cultural landscapes (Buggey 2000). Despite the rigour of Parks Canada’s guidelines, it remains difficult to ascertain (for the purpose of preservation) whether cultural landscape features such as Inuksuit should be defined as a place or event.

Under the HSMBC (1998) guidelines, a place may be designated national historic significance if it “illustrates or symbolises in whole or in part a cultural tradition.” Furthermore, a place must be in a “condition that respects the integrity of its design, materials, workmanship, function and/or setting.” Any Inuksuk could therefore be defined as a place, however its designation is somewhat constrained by the criteria stating, “the boundaries of the place must be clearly defined,” and that the “site must have been completed before 1975.” Perhaps tangible places with rigid edges such as buildings and parks can be subjected to these criteria, but Inuksuit, which span across vast regions of the



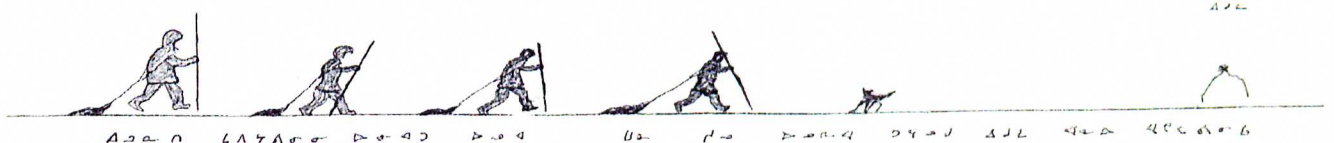
Arctic in linear formations, do not have definitive boundaries. This is analogous to the Australian Aboriginal concept of ‘dreaming tracks’ or ‘songlines’ – invisible mythical pathways that meander all over Australia describing the stories of Aboriginal creation and legendary totemic beings (Chatwin 1998, p.2). Dreaming tracks and Inuksuit relate and maintain a dialogue with the wider environmental setting such as rivers, mountains, the night sky and animals. These, and other external influences shape the nature of the dreaming and Inuksuit boundaries – lines that constantly evolve and morph as the environment endures natural and human modifications. Moreover, their boundaries also become skewed as new legends and myths emerge or are expanded upon in contemporary indigenous cultures. Traditional stories about mythical and natural boundaries have also atrophied with the passing of indigenous elders.

In South Australia, the southern Pitjantjatjara people of Maralinga recorded their Dreaming tracks on paper with the aid of researcher Kingsley Palmer. This information – based on stories, myths and legends was then overlaid on a topographic map of the area, providing a visual representation of the travels performed by ancestral beings (Turnbull 1989, p.60). In 1984, when land claims were being made for the Maralinga Lands, visiting parliamentarians were shown the map to illustrate Pitjantjatjara spiritual connections with the land. Consequently this map acquired the status of a title deed to the country. It is interesting that this map, which described intangible relationships with the land (and possibly consisted of vague boundaries), became a legal document within a western construct. Notwithstanding the self-ownership of Nunavut by the Inuit people, and Nunavik through the *1975 James Bay Northern Quebec Agreement*, the Pitjantjatjara example relays the message that indigenous people continue to maintain close and enduring ties with their country – a connection that exists through features and sites like Inuksuit.

With this in mind, the guideline that prescribes a ‘site must be built before 1975’ is a questionable one considering Inuksuit are constantly being repaired, modified and new ones constructed. It is a guideline that emphasises time rather than tradition – a guideline that ignores cultural hybridity as a heritage factor. The heritage value of Inuksuit should not be determined through individual assessments (a laborious exercise in itself), but rather based upon the traditional act of making them. Ranking the importance of each Inuksuit would prove difficult, especially those that work in unison or those that possess divergent meanings to different Inuit groups. All Inuksuit, regardless of age or characteristics, should be preserved as a mark of respect of the tradition, and this includes those Inuksuit that have been constructed since 1975 and those that will be built in the future. The Inuit themselves have long recognised the importance of preserving the Inuksuit fabric, as the following passage by Inuit elder, Tomassi (Hallendy 1990, p. 3) attests:

“We are so respectful of our ancestors that we can’t destroy what they made. We can’t even touch the Inuksuit they made, much less destroying them. This is how I am today, because I can’t destroy what my ancestors made. And I think all Inuit have the same feeling – not wanting to destroy or abuse or even joke and make fun of the Inuksuit that our elders made. Such is our respect for the elders and their “belongings”.”

The Inuksuit legacy can only grow stronger as Inuit culture continues to embrace the historical actions of their forefathers. They are precious entities and will remain indefinitely as signs on the landscape if they are collectively preserved.



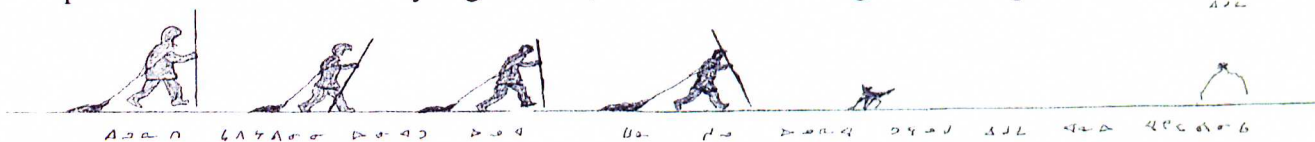
Another argument for the preservation of Inuksuit is to consider them as a series of events. As elucidated previously, the *aulaqquat* Inuksuit, which was used as a decoy for trapping caribou, encapsulates both a place and event. The *aulaqquat* Inuksuit remain stagnant for most of the year, becoming active when the caribou migrate into the region. They mark important caribou seasonal migrational paths and form the venue where a hive of hunting and trading activities occurred between groups. Mysteriously, in the early 1900's, the caribou in some areas did not return to follow their traditional paths, leaving many *aulaqquat* sites lingering on the land as "ghost towns". For scientists who track the caribou journey across the Arctic, these Inuksuit would reveal the passages caribou once followed in bygone eras. Other Inuksuit that marked events, were the *napariat* Inuksuit – beacons built at the mouths of lakes or rivers that described the site to make camp in summer for fishing. Built to be as high as a man's hip, string lines made from seal skin were strung between them and used to hang fish on to dry for the winter (Hallendy 1985).

It may be questionable whether Inuksuit need to be preserved when no immediate threat of their destruction or removal is apparent. Quite often nature is to blame for the demolition of Inuksuit because of strong winds and bears, however this damage is minute and localised compared to the impact large-scale mining operations and hydro-electricity plants have on modifying the landscape. These latter influences already loom over vast tracts of land, with provisions to occupy other areas in the Arctic.

The Cree people of the James Bay Region of Northern Quebec have witnessed first hand the destruction of their traditional hunting and camping grounds as a result of the hydroelectricity projects administered by Hydro-Quebec since 1971. By 1985, the La Grande, Eastmain and Caniapiscau rivers were dammed, effectively submersing and destroying 11,500 sq km of pristine caribou, migratory bird and marine mammal habitat. And, the second phase, known as the *Great Whale Project* which was completed in 1999 involved the diversion of four rivers and the subsequent flooding of 4400 sq km (Draffin 2001). Hydro-Quebec also has plans in place to develop the *Grande Baleine Complex* by 2019, which will engulf even more parcels of land.

As described in Chapter 2, two major nickel and diamond mining operations exist and continue to expand in the northern extremities of Nunavik. Both mining companies emphasise that local communities were consulted and environmental impact studies conducted before operations proceeded. Assuming this is the case, it is interesting to speculate what the fate of Inuksuit has been in these regions. Did the Inuit people emphasise the importance of Inuksuit? Did they make a case for their preservation, despite the fact that not all Inuksuit are used in a traditional manner? Have the mining operations significantly altered the environmental fabric that Inuksuit relate to? These questions begin to highlight the need to preserve aspects of aboriginal cultural landscapes before further developments emerge.

One recent example of large scale planning that has considered Inuit use of the land is evident in the development of the *Pingualuit Crater National Park* in Nunavik (due to be open as a provincial park in 2003). Researchers on the design team mapped out on geographic information systems the existing uses of the proposed area by canvassing Inuit hunters from villages in Nunavik. The study revealed that many hunters used this space as a meeting and camping area while on hunting journeys, for hunting caribou, fishing and for spiritual reasons. After analysing the data, the researchers designed the shape and



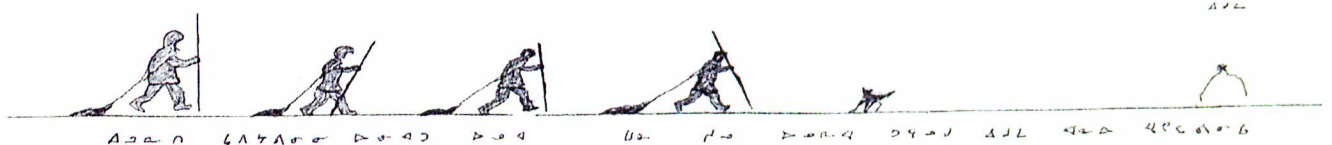
determined the extent of the national park around the paths and networks travelled upon by the Inuit.

The case for preserving Inuksuit should not be limited by the shortcomings apparent in the *1953 Historic Sites and Monuments Board Act*. Inuksuit are ingrained in Inuit tradition and culture; they are signs on the landscape that demark important sites, places and events. They are nationally significant, and should be considered for preservation before mining sites and hydroelectricity plants consume further reaches of the Arctic landscape. If Inuksuit are positioned within an area that is likely to undergo changes, then measures should be taken to ensure minimal disruption to the existing fabric of the place. Appropriate site planning and environmental impact statements will prove crucial in guaranteeing that Inuksuit will be remembered as temporal markers on the landscape.

Clearly, Inuksuit have shaped the way the Inuit people perceived the landscape and thereby traditionally traversed across it. Over time the Inuksuit shifted from the physical to the spiritual realm, where stories and legends were created to celebrate its qualities. Stories about Inuksuit will always be embedded in Inuit mythology, but their physical existence forms the integral chapter of the story.

Legislation cannot protect Inuksuit from ongoing tourism marketing campaigns, but public awareness of their importance to the Inuit may reduce its fate of becoming exclusively a garden folly or collectable trinket. With the increased attention paid to Inuksuit, it is interesting to speculate that the rebirth of Inuksuit stories and songs may be imminent.

Despite the technological advances in Inuit society, Inuksuit will always perform two synonymous roles – one that conveys messages about places and navigation and the other that reminds them of ancestral relationships with the land. Inuksuit are now revered as symbols of the Arctic, a symbol in their own right.



4.2 INUIT MATERIALISTIC MAPS

4.2.1 Ammassalik Wooden Carved Maps

Inuksuit were not the only form of tangible navigational aids developed by the Inuit. Cartographer, Leo Bagrow (1948) reports that Greenland Inuit engineered three-dimensional maps out of wood. In a short essay on Inuit maps, Bagrow concluded that most 'primitive' people possess some cartographic skill and can translate this information onto a planar surface, such as sand, bark or a piece of paper. Bagrow argues that the Greenland Inuit were not content with this, so in an effort to increase cartographic legibility, they attempted to record elevations and depressions of given areas on planar surfaces. Although Bagrow does not substantiate this claim for all Greenland Inuit, he does provide however, a solid foundation for his case using the examples of the *Ammassalik* bas-relief maps, Figure 28.

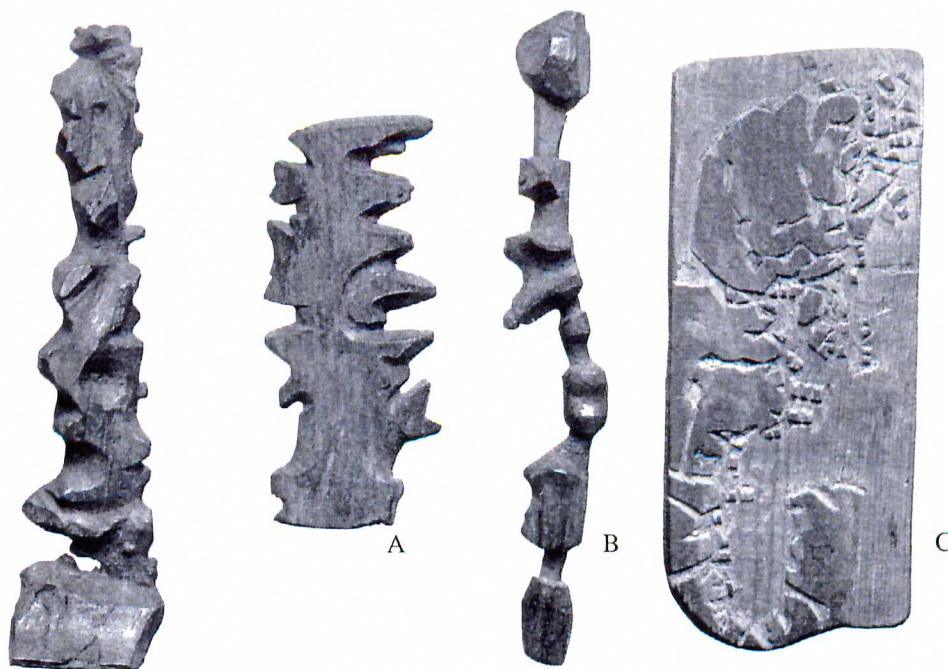
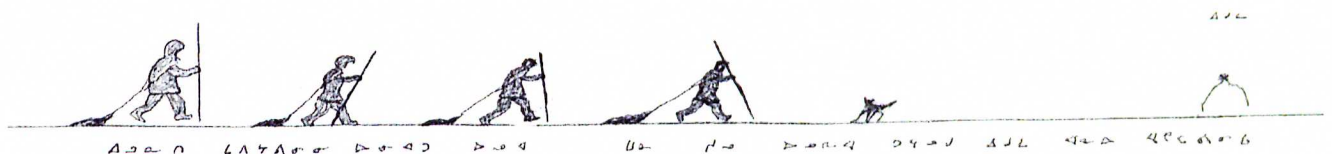


Figure 28: Ammassalik Wooden Relief Maps & Sticks collected by Gustov Holm during his 1884-1885 expedition to Greenland. The carvings represent the islands and coastline between Kangerdluarsikajik and Sieralik coast. The traveller used the carvings by manipulating and rotating the sticks in relation to islands depicted on the bas-relief board. (a) Represents the peninsula between Sermiligak and Kangerdluarsikajik. (b) The nodular form represents a sequence of offshore islands. (c) Represents the islands in plan between the Kangerdluarsikajik and Sieralik coast. Source: Bagrow (1948, p. 92).

The wooden carved maps of the Greenland Eskimo represent a section of the coast between Kangerdluarsikajik and Sieralik. These relief maps are unique because they impart information about landscape topography and offer an individual interpretation of the coastline terrain. Bagrow suggests that the relief maps were valuable in terms of providing a more accurate representation of the Inuit landscape - consisting of rugged fjords, nunataks and glaciers.

Bagrow (1948, p. 92) indicates that the short stick carving, Figure 28a represents the coastline between Sermiligak and Kangerdluarsikajik, and according to the studies



performed by Lewis & Woodward (1998, p. 168) the long nodular engraved stick, Figure 28b, represents a sequence of offshore islands. The wooden intervals in the carvings served no other purpose than to prevent the islands from falling apart. The carved sticks were complementary and by manipulating and rotating the sticks so that the islands appeared in relative position to the mainland, the traveller was able to communicate to others the route he had taken.

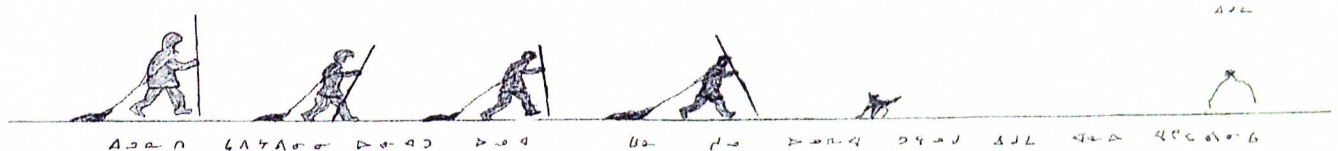
The engraved board, Figure 28c, represents the islands in plan between the Kangerdluarsikajik and Sieralik coast. Gustov Holm (1914) was reportedly the first to discover these carvings during an 1883-85 expedition to the *Ammassalik* region. Holm describes that the wooden board was grooved and bevelled to represent:

“Not only the contours of the country, but also its appearance and relief of the mountains. All the places where there are old ruins of houses (excellent boat beaching sites) are marked on the wood map; the map likewise indicates where a kayak can be carried over (the inter-valley ridge) between the bottom of two fjords, when the way round the naze (headland) between the fjords is blocked by the sea-ice.” (Lewis & Woodward 1998, p. 168)

The unique carvings were an innovative concept of depicting coastal topography, portages and headlands. Holm discovered that an Inuk hunter, *Kunit Fra Umivik*, crafted the maps to aid him while hunting and fishing. One could speculate whether the maps were crafted as pocket-sized pieces for use aboard a kayak. The wooden maps had the added advantage of being able to float if they were inadvertently dropped overboard.

Lewis and Woodward (1998) expand upon Bagrow's version of the wooden carved maps in some detail, although their discussions are limited to description rather than analysis. One can only hypothesise that the carvings represent the regions Umivik visited frequently or was most familiar with. Moreover, further pressing questions about the nature of creating such a mapping system remains. At what point did Umivik decide the carvings were complete in describing landscape? How was Umivik defining boundaries? Did Umivik develop a code of interpretation for the maps? Were other Inuit able to read and translate the information contained within the maps? As Umivik was the only known author of any such maps it is difficult to ascertain this information, although, we can propose various hypotheses related to Umivik's mapping system.

It is unlikely that other Inuit were trained to read and make use of Umivik's relief maps. As discussed earlier in this Chapter, the Inuit developed and refined other systems of navigating and remembering the countryside, with some methods common to all Inuit and some techniques limited to individual use. Umivik's maps were probably an extension of his experiences and knowledge of the land and not that of others. Interestingly, Arctic researchers or explorers discovered no other 3D bas-relief maps of this nature across the entire expanse of the Arctic. Perhaps Umivik's mapping system was one of a kind. Did the Inuit require the need to record geographic information in such a transferable media? Maybe Umivik had contact with early explorers, and as such, may have seen examples of their maps and charts. With this in mind, Umivik may have attempted to replicate Western cartographic techniques of recording landscape, which generally feature in plan. If Umivik had in fact generated this new approach to representing the landscape, then he was a real innovator. It is important to note that Umivik did not possess the modern navigational



equipment of his time such as a compass or sextant. The landscape existed within his mind, yet considering his maps are in plan and section it is conceivable that he learned to perceive the landscape from looking above.

Bagrow (1948, p. 92) claims that the wooden carved maps "...help the nomadic Eskimo more readily survey and identify a given locality." Regardless of whether or not the maps assisted surveying and identifying, it is unscrupulous and not convincing to suggest that all Inuit did this based upon the single wooden map example. Spink and Moodie (1972, p. 6) also comment on the carved maps. They suggest the carvings may have been useful in small boat navigation and perhaps are more beneficial than a drawn map because of its true three-dimensional nature. An accurately carved map had an added visual advantage – orientation could be achieved by following the engraved landmarks and routes. The wooden maps solved the navigational constraints of time and memory; which had long impaired the cognitive mapping approach. Furthermore, the expedient wooden maps were durable and robust. Materially advantageous, the carvings could withstand frost, ice and other harsh climatic conditions.

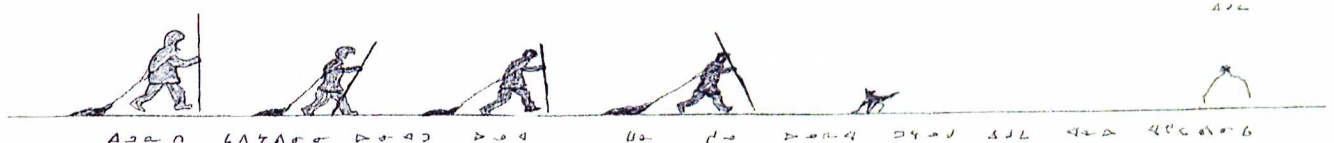
4.2.2 Toa 'way finders' of Lake Eyre (Northern South Australia)

The *Ammassalik* 'sculpture like' carvings' provide indelible evidence that some Inuit chose to represent and interpret landscape with remarkable abstraction. Intriguingly, one particular Australian Aboriginal clan, the *Diyari* people of Lake Eyre, South Australia also created three-dimensional objects as navigational devices, namely Toas. According to comprehensive studies performed by Paul Memmott (c.1996) and Peter Sutton (1988), Toa sculptures were made to symbolise specific places and countryside important to the *Diyari* people. According to anthropological reports, Toas were crafted to refer to natural features and historical events enacted by the Dreaming (creation stories of Aboriginal people of Australia) hero, *Muramura*.

Lutheran Missionary, Pastor Reuther, collected approximately four hundred Toas from the Lake Eyre district between 1890 and 1905 (Some of these Toas are now on public display in the latest interactive section on Aboriginal Cultures in the South Australian Museum). Most Toas were between 15-45 centimetres long and constructed out of lengths of wood, Figure 29. The lower end was sharpened for inserting in the ground and the top end was embellished with decoration. When leaving a particular campsite, the *Diyari* people, in order to describe to others the location of where they were moving to, placed Toas in front of their wurleys (aboriginal shelters), and made maps in the sand nearby. It is believed that The *Diyari* people had such a sound knowledge of Dreaming stories and the locations where these legends emanated, that they were able to determine direction by following the Toa signs.

A selection of Toas, Figure 29, analysed and categorized into three semiotic types by anthropologist Howard Morphy, postulates that painted motifs on Toas not only described places, but also polysemous signs:

"The meaning of a symbol such as a circle or a snake is not simply the object that it represents; it is also what the object itself stands for. The circle may represent a water hole, but the water hole is also a powerful symbol of life, a home destination, and frequently the focus of mythically



significant events...The snake may be a water python, but because of that it may also be a symbol of life giving water, an engorging mother, and a penis." (Memmott c. 1996, p. 92)

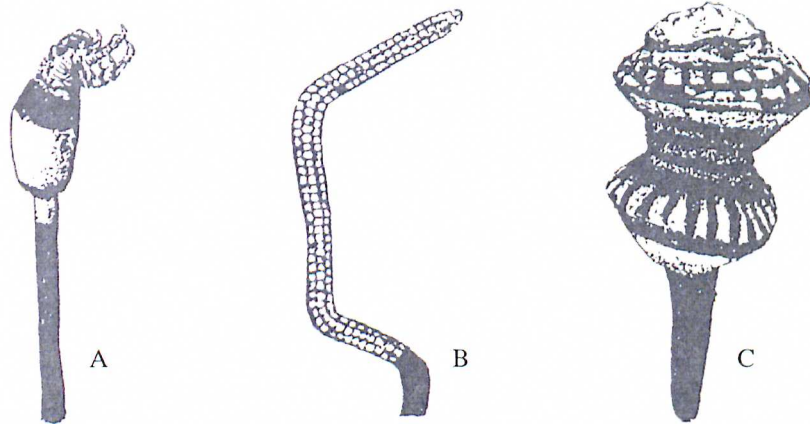


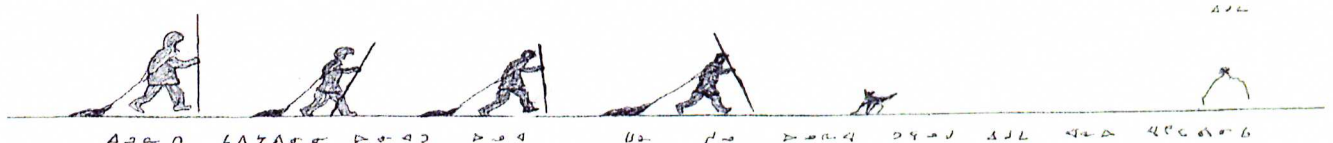
Figure 29: Toas or ‘way-finders’ used the Diyari People of Lake Eyre, South Australia

(a) Type 1: comprises of lizard claws attached to a bulbous knob. Refers to a place, Kadniterkanini where an ancestral lizard, Kandi, climbed to the top of a hill to see where it should go. (b) Type 2: Refers to a section of Coopers Creek, which an ancestral hero noticed on his travels. (c) Type 3: Refers to a place where two ancestral heroes saw the spirits of the dead arriving from around and climbing upwards towards the stars. The literal meaning of the place name Palkarakara is “to climb up onto something in the twilight.” Source: Memmott (c.1996, p. 90).

4.2.3 Marshall Island Sailing Charts

Tangible, way-finding maps were not only produced by the *Ammassalik* Inuit of Greenland and *Diyari* people of Central Australia, but also by inhabitants of the Marshall Islands (Micronesia) in the Pacific Ocean. The Marshall Islanders devised a technique of depicting open sea over several hundred kilometres by which palm sticks were tied together with coconut fibres to create an ocean grid. These sailing maps, Figure 30, are well known in cartographic circles, with the most complete account of them appearing in a study by A. Schück (Lyons 1928). According to Schück (Lyons 1928, p.325), the islanders navigated their canoes over long distances in the archipelago, using the charts to voyage as much as 600 miles. Schück in 1902 recorded 43 examples of the extant charts, of which 29 were in Germany, 6 in the United States, 3 in Honolulu, 2 in Sydney, 2 in Great Britain and 1 in Vienna. Captain Winkler, during a lengthy stay at the islands, discovered that three different types of charts existed: the chief kinds consisted of *Mattang*; a simple instruction charts for training, *Meddo*; which represented general charts of large areas and *Rebbelib*; which represented charts of local areas.

It is believed that the curved sticks represent prevailing wind fronts and swell patterns, shells show the relative location of islands, and threads indicate where islands come into view (Southworth & Southworth 1982, p. 111). Some small islands were shown disproportionately large, because of their sheer importance to the maker and users of the chart (Gatty 1958, p. 161). Short straight strips showed currents in the neighbourhood of islands, and long straight strips indicated the approximate direction of distant islands. Lyons suggests that the fragility of the charts would have restricted their use aboard canoe voyages. It is most likely that the charts were probably used for study ashore. Lyons (1928, p. 326-327) reports that the construction and use of the charts was kept highly secret –



navigational supremacy was a measure of wealth and prosperity amongst the islanders. In fact, the chiefs guarded the charts forcefully.

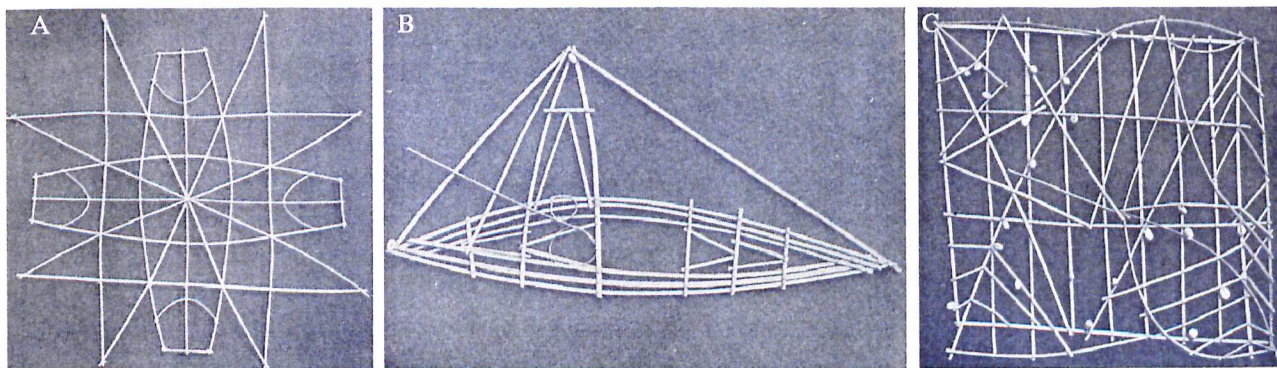


Figure 30: Marshall Island Stick Charts

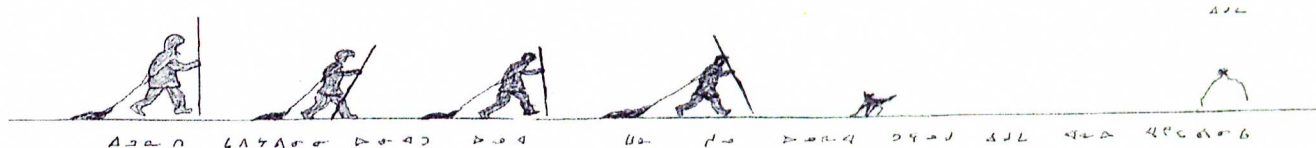
(a) Mattang Chart. This chart was used for instruction purposes only. The chart represents an island in the centre of the map, with curved swell fronts arranged in four quadrants. **(b) Meddo Chart.** Represents the entire island group or at least the eastern or western part of the Marshall Islands. **(c) Rebbelib Chart.** Represents a portion of the island archipelago. Usually four or more islands are indicated in such maps. Source: Lyons (1928, pp. 326-327).

Like that of the *Ammassalik* Inuit carved maps, the Micronesian charts were not made to ‘distance’ scale, but rather to a ‘time’ scale. Journeys were expressed in terms of the time taken to sail a catamaran from one place to another. This mode of scale, developed through sea travel, is an unfamiliar concept to us today. Instead, one relies on exact measurements and increments to describe space and distance. Western navigators have grown so accustomed to the use of the compass, sextant, chronometer, radio and modern day GPS, that most seafarers would become lost if they tried to navigate using natural features. It is interesting to note that the Micronesians, if by some chance missed the island they were steering toward, would reach a swell-line and simply sail down it to the island. Moreover, they could even find and use this swell-line at night, by following the luminescent organisms (plankton) that would surface along the swell line to form a kind of ‘flare-path’ (Gatty 1958, p.162).

Through frequent inter-island travel, the Micronesians were able to develop and fine tune their mental and physical notes about the sea floor, reefs, swells, tides, wave patterns and prevailing wind directions. In addition, they watched and learned how the sun, stars and flight of birds could also aid navigation. Gatty (1958, p. 159) argues that, “...to Micronesian eyes, wave formations became as useful as landmarks to the landsman.”

4.2.4 Inuit Maps on Skins

Based on intensive research about Inuit cartography, Spink and Moodie contend that the Inuit did not draw maps on skin, although other indigenous maps upon stretched sealskins giving a wider impression of spatial relationships subsist. However, one example of an Inuit skin map overlooked by Spink and Moodie appears in a short essay on Inuit maps by Bagrow (1948, p. 94). Evidently Salis Sandgreen, the map creator, used a tanned bearded seal as the surface plane to represent the ocean surrounding the Crown Prince Islands (Disko Bay Islands on the western coast of Greenland). Dyed skin was pasted on to represent individual islands. The skin map was displayed at a cartographical exhibition in Stockholm in 1947.



The size of the bearded-seal skin chosen by Sandgreen subsequently determined the limits of map information. The limits imposed subsequently affected the factors of scale, direction and orientation of the map. By examining certain attributes of the map, Figure 31, it is clear that Sandgreen strictly adhered to one scale and paid particular attention to detail. For instance, in the bottom left hand corner of the map, one particular island is partially rendered, with a portion of it not illustrated since it extends beyond the map edge. It appears that Sandgreen was not prepared to compromise the exact location of the island for the sake of squeezing it onto the map. The domination and focus on islands in the centre of the map suggest that Sandgreen was drawing the map from this core position. Furthermore, the portrait orientation of the skin against the horizontal and linear depiction of islands suggests that Sandgreen created the map with a sense of direction and orientation. Considering the skin map was generated without the assistance of an aerial photo, we can suppose that Sandgreen was drawing from an external position; a position that involved him imagining the Arctic landscape from looking above. Perceiving the environment in a contextual framework from an aerial perspective would have been a foreign concept to Sandgreen.



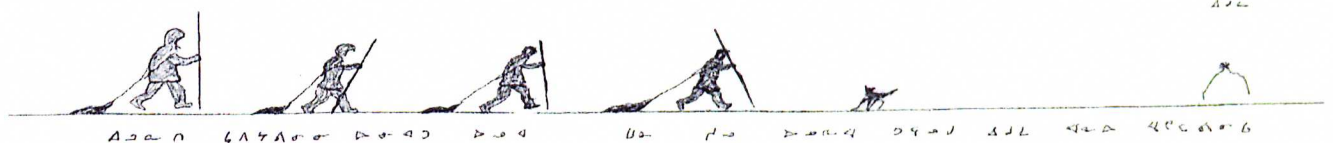
Figure 31: Inuit Map on Sealskin
Sealskin map of Crown Prince Islands made by Salis Sandgreen. It was displayed at a cartographic exhibition in Stockholm in 1947. Source: Bagrow (1948, p. 92).



Figure 32: Walrus Ivory Decorated with Hunting Scenes & Maps.

(a) Hunting scenes like this example of an Incised Walrus tusk (Davidee, Lake Harbour) were sold to supply the Western souvenir market. Source: Larmour (1968, p. 46). (b) Coastline maps. These two ivory tusks also served as cribbage boards with legs and supports. The hollow of the tusk was used to store pegs. Source: Lewis & Woodward (1988, p. 167).

It is worthwhile to note that both the skin map and the *Ammassalik* wooden carved maps represent a summertime Arctic landscape. Perhaps this is a common factor because during winter it is difficult to differentiate between land and sea. Moreover, it is hard to imagine a way of tangibly etching a map of the Arctic winter landscape. One would find it difficult representing a predominately featureless and monotonous environment for the ice and snow



covered times of the year. Possibly the maps were only seasonally accurate and were therefore only used during the warmer months.

Even though Sandgreen created this map of the Crown Prince Islands with utmost accuracy, it is unlikely that chart was used for navigation aboard a kayak. When David Okpik was shown a picture of this skin-map for this paper, he remarked that the skin was approximately 8" (2.4 metres) in length – an awkward piece to carry on a small craft. Interestingly, he also reiterated that during his lifetime at Quaqtaq, he had never seen such a skin map before.

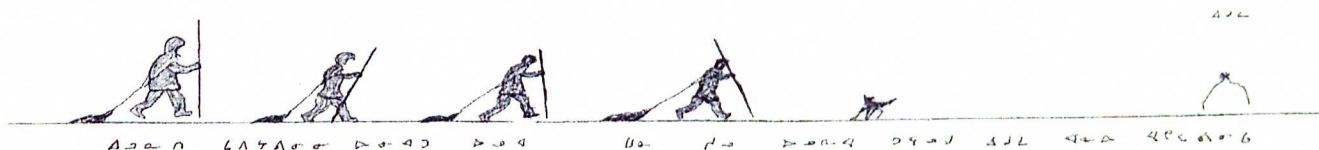
4.2.5 Ivory Maps, Maps on Boxes

Inuit have long carved walrus tusk ivory with decorative representations of humans, man-made objects and animals. As common in the art of soapstone carvings, the Inuit have a tradition of intricately recording events, hunting scenes and elements of Inuit life. The extent to which ivory maps were made for Inuit use appears limited according to the following account:

"...Men skilled at such cartography would carve a map of the local area as a decorative device on a piece of ivory or on the lid of a work box, or simply on a walrus tusk. This however, served no practical purposes beyond pure decoration, although they were accurate representations of the home area."
(Spink & Moodie 1972, p. 7)

Considering limited research pertaining to the production and use of ivory maps exists, it is difficult to comment on the subject. However, one can speculate on the content and style of ivory maps from the examples presented in Figure 32. Archaeological evidence from Alaska suggests that pictorial engravings of single subjects began in late prehistoric times and that ivory maps emerged when commercial trade in ivory objects began at Saint Michael. Furthermore, the Alaska Commercial Company provided an impetus for the specialized engraving market by supplying walrus ivory (Lewis & Woodward 1988, p. 166). It is of interest how the impact of Inuit exposure to Western printed graphics at the time was being translated as a particular style onto the engravings. The emergence of the Western souvenir market may have prompted this mode of illustration.

Lewis & Woodward (1988, p. 167) report that the Kakarook family at Saint Michael were some of the most renowned engravers. It appears that all known examples of ivory maps were carved in profile, contained toponyms and were of the coastline and offshore islands of the Norton Sound region, Seaward Peninsula, and Kotzebue Sound. The engraver had to straighten and distort the map profile to conform to the elongated nature of the curved tusks. Although some tusks were a decorative display of cartographic knowledge, some maps such as the one illustrated in Figure 32 were designed as cribbage boards with legs or supports. The hollow of the tusk was used to store pegs. Lewis notes that the coastline engraved on the hollow tusk derived from Western published maps. David Okpik from Quaqtaq confirmed that people from his village also decorated ivory tusks. Apparently the fine cracks in the tusk were filled with malleable copper to form artistic patterns.



4.2.6 Inuit Maps on Paper

The Inuit were not only proficient navigators using natural features, tools and instruments; they were also skilled in drawing maps on paper for the use and enlightenment of Westerners. Hydrographic charts were generally drawn at the insistence of Arctic explorers, ethnographers and anthropologists. It is important to remember that the Inuit readily drew maps in sand or snow for their own use, rather than drawing ‘sophisticated’ material maps. Even though it was a rare and foreign concept to draw on materials, the Inuit adapted quickly to the new medium of pen and paper introduced to them. One method commonly used by explorers seeking geographic information was to draw a map of the area as far as it was known, or to use an existing chart and then ask an Inuit to continue it (Lewis & Woodward 1998, p. 159). An account of intercultural map communication, Figure 33, from the Journal of Captain John Ross, illustrates *Netsilik* Inuit, Ikmallik, extending and completing a portion of a map drawn by Ross, showing the coast and waters to the south of Felix Harbour, Gulf of Boothia (Lewis & Woodward 1998).

It is most likely that Inuit were coached by European navigators to record toponyms, apply hachuring and write notes on maps to increase their utility (and appear like Occidental maps). Several examples of Inuit ‘Occidental-like’ maps appear in the journals of: Hall (1865), Lyon (1928), Parry (1824), Ross (1835), Stefansson (1922), and throughout the series of *The Report of the Fifth Thule Expedition*. Other examples feature in books by Carpenter (1973) and Boas (1974). A vast collection of Inuit and Indian maps were also collected by the Hudson Bay Company, with a number of these reproduced and catalogued between 1670-1870 (see Ruggles 1990). The *Lande* Collection at The University of McGill, Special Collection and Rare Books is well indexed by subject and contains journals from early exhibitions across Canada and the Arctic. Numerous maps and anecdotes on Inuit cartography are prevalent in the journals. The Wisconsin Museum has many original Inuit maps in its collection.

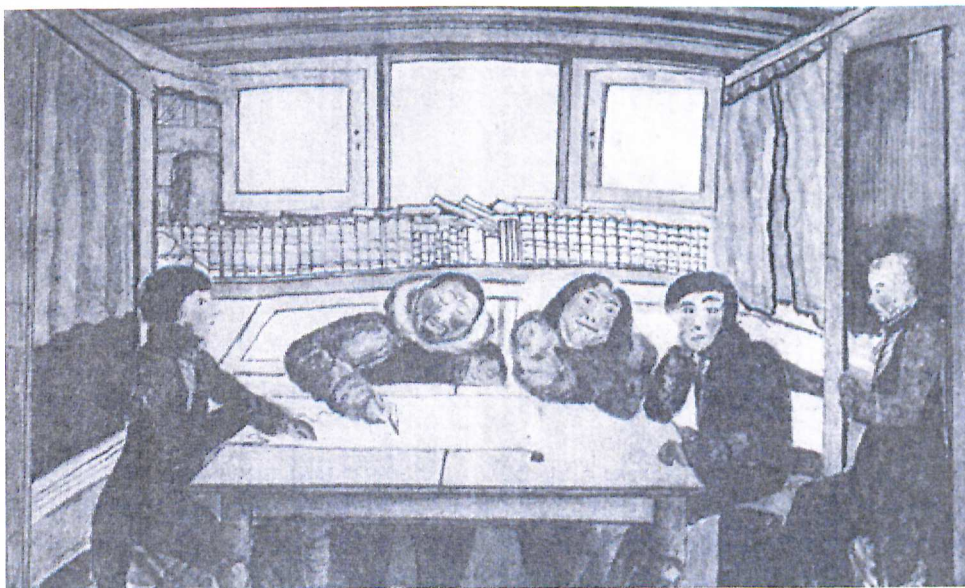
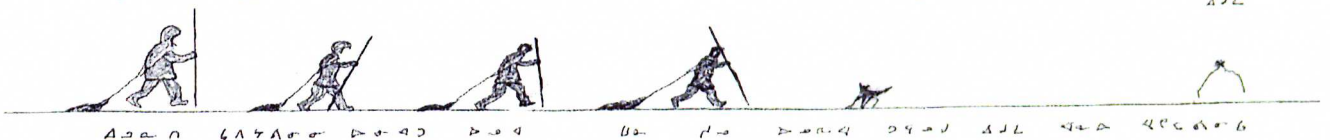


Figure 33: Intercultural Map Communication between Explorers & Inuit

Cartographic interaction between Ikmallik, accompanied by Tiagashu and Capt. John Ross. Ikmallik is extending the map – rendering in coastlines and water passages to the south of the Gulf of Boothia. Painting by John Ross using pen, ink and watercolour. Painted aboard the HMS *Victory*, at Felix Harbour on 12 January 1830. Original size, 13.5 x 21.5 cm. Source: Lewis & Woodward (1998, plate 8).



Spink and Moodie (1972) analysed fifty Inuit maps using the categories of media, scale and shape, content and style, and mapping proficiency by overlaying Inuit paper maps with modern day charts of the same area to discern similarities and differences. Their study identified the constraints and shortcomings inherent within Inuit maps, although they refrained from analysing the limitations contained within their own comparative map examples. Perhaps a comparison of Inuit paper maps to Occidental charts drawn during the same era would have provided a more substantiated method of measure. In the early eighteenth century for instance, Western explorers were not generally aware of Arctic landforms, nor did they have an intricate understanding of coastal topography and island locations. This is clearly illustrated in the map, Figure 34, showing Hudson Bay and its Straights drawn in 1709 by British cartographer, Samuel Thornton. When compared to modern day charts of the same area gross misrepresentations of landform and islands become apparent. Some irregularities of spatial layout include: the distortion of Baffin Island's shape, the absence of Akpatok Island and Cape Hopes Advance in Ungava Bay, and the Belcher Islands (Bakers Dozen) drawn considerable distance from shore. From the errors apparent on the maps, it is interesting to speculate whether the Inuit were far more adept in recording topography than early explorers.

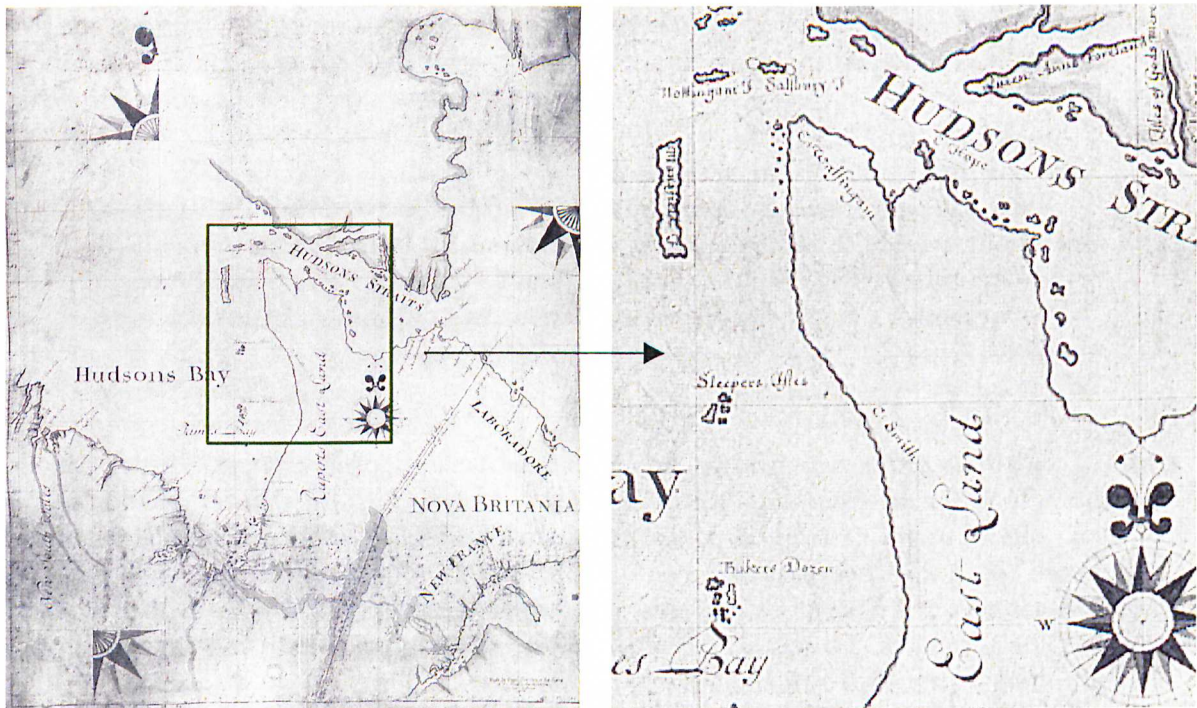
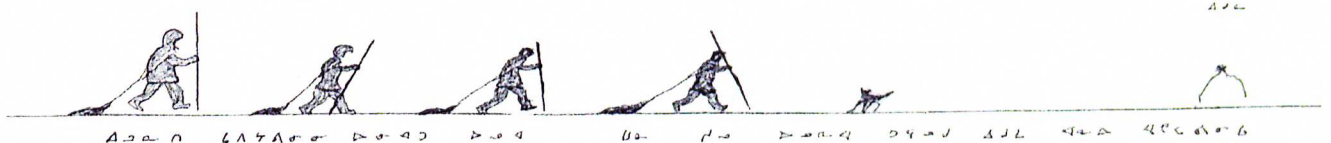


Figure 34: Map of Hudson Bay, James Bay & Hudson Straits

Drawn by Samuel Thornton, 1709. Note the absence of Akpatok Island in Ungava Bay and the exaggeration in scale of the offshore islands in Hudson Strait. Source: Ruggles (1991, p. 126).

Despite lack of experience with drawing paper charts and unfamiliarity with cartographic instruments such as the compass, astrolabe, chronometer and sextant, the Inuit executed profound paper maps. Moreover, the Inuit were not impaired by the alien concept of maps conforming to a 'magical orientation force' (magnetic north). Knud Rasmussen, (Pelly 1991, p. 62) leader of the 1921-24 *Fifth Thule Expedition* noted the skill of Inuit cartographers Pukerluk and Kijokut:



“These two men drew a large number of maps for me and, despite the fact that they were quite unaccustomed to the use of pencil and paper, it was astonishing to see their ability to reproduce the peculiarities of the landscape in a few strokes.”

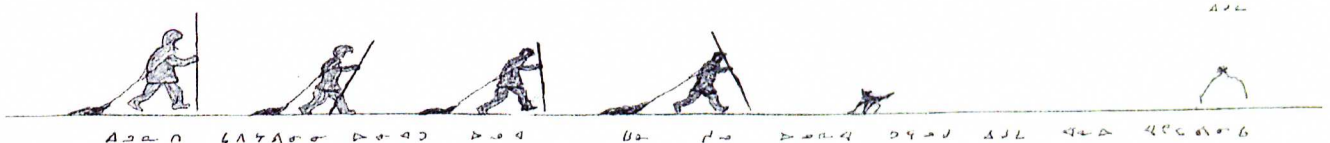
A recent visit to Quaqtatq’s *Isummasaqvik* School in Northern Quebec revealed that most students could graphically express their surrounding environment with particular detail. In a collection of drawings on ‘survival’, Appendix 3, the students demonstrate the control they have with pencils to represent Arctic features. Without formal training or coercion, the students playfully represent spaces with scrupulous attention to proportions, scale, perspective and colour. If anyone has attempted to draw the myriad shapes of the Arctic landscape they soon learn the difficulty in doing so. For example, illustrating snow ridges can be painstakingly difficult, yet through simple line-work and hachuring the students make it appear effortless. Perhaps interaction with their Arctic backyard permits the development of refined visual skills, which, like their cartographic forefathers, translates into an ‘accurate’ graphic depiction.

Arctic explorer, Diamond Jenness, however, disputes the claim that there was a propensity for accurate presentation. Jenness, like others who witnessed the Copper Inuit transcribe ephemeral sketches in the hard snow, noted that Inuit drawings were indifferent when provided with pen and paper:

“...With no more dexterity than we expect from a 2 or 3 year old child, and the results were not dissimilar. Their drawings of animals such as the caribou, every part of whose anatomy was as familiar to them as their own, were even cruder; and how a map could indicate the geographical features of a country seemed beyond comprehension. Evidently the sketching of scenes, like writing, was a totally new concept to them.” (Spink & Moodie 1972, p.22-23)

Considering European cartographers were apt in the art of map-making, why then did their maps show as many mistakes, or perhaps more errors, than Inuit paper maps of Arctic regions? Rundstrom (1990) suggests the answer lies in the Inuit ability to mimic - an adjunct of their acute perception skills. It is well noted that on many occasions the Inuit made a mockery of the habits and thoughts of visiting foreigners. In a few hours they could mimic the gestures and voice of a stranger with such precision that there was no doubting their intentions, despite a complete lack of oral communication. Perhaps the Inuit, through observation, were also able to mimic the Occidental map drawing style with ease. Rundstrom (1990, p. 166) reports that, “Inuit mapping was an imitative extension of the physical world. Drawing the land reified their attachment to it.”

It is easy to conclude that European explorers exploited Inuit knowledge of geography, but evidence suggests that the Inuit, perhaps willingly, communicated geographic information to them. Typically, other indigenous people guarded their knowledge of geography from Europeans. One possible reason the Inuit compiled maps for Westerners was because of the dangers inherent in the Arctic. Deception was not a trait of the friendly Inuit – transferring geographic knowledge reduced the risks associated with travelling into uncharted waters. Awareness of the hazards and routes to avoid reduced the possibility of death. Any seasoned Inuit hunter will attest that in the Arctic, knowledge and survival are synonymous.



Hall (1865, p. 103-105) was well aware of the risks involved in travelling without detailed maps, so he asked Inuk, Koojesse to draw a chart of the route to Nugummiuke, through Northumberland Inlet, Bear Sound and Frobisher Strait. When Hall pointed out his proposed route on the map toward Frobisher Strait, Koojesse stopped him and yelled, “*argi!*” (No! No!). Koojesse proceeded by moving Hall’s hand over the map at various locations to indicate a safer route. Hall later embarked on the journey described by Koojesse in 1860, confirming that a passage did not exist in that direction.

Hall and Parry (1824) were so overwhelmed and astonished with the remarkable skills and accuracy of Inuit maps that they immediately spread the news of Inuit cartographic ability with much praise. When Hall wrote to a Connecticut whaling company requesting support for another expedition to the Baffin Island region he received this reply:

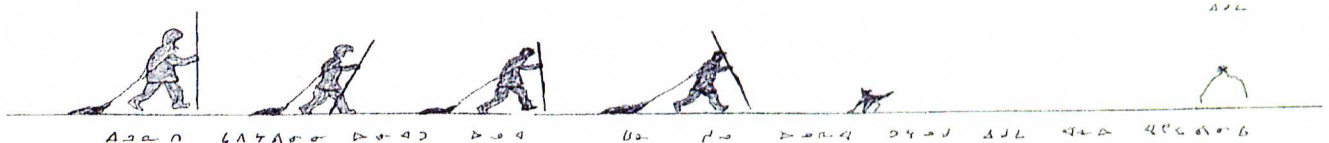
“In the prosecution of this business we need, very much, good charts. The best I have ever seen were drawn by some of the intelligent Eskimos, to whom the ships are often indebted for acts of humanity and kindness. The latest English charts and the reports of the Eskimos says that a new channel can be found leading from Baffin’s Bay to “Fox’s Furthest”; could this be proved by actual passage it would be of great use to our ships.” (Rundstrom 1990, p. 159)

Parry, during his 1882 expedition along the coast of Melville Peninsula in search of the Northwest Passage had maps similar to those featured in Figure 35 drawn for him by an Inuk women named Iligliuk. In response to the accuracy of Inuit maps Parry wrote, “I cannot delay any longer to remark how valuable the geographical information received from the Esquimaux had now proved to us (Pelly 1991, p. 62).” The map drawn by Iligliuk is a reminder that some Inuit women also had a vast understanding of the environment, despite the fact that they rarely engaged in hunting on the land. Perhaps women acquired acute spatial skills by watching and inquiring about the land while semi-nomadically transferring between camps. It is worth noting that the literature pertaining to Inuit cartographic skills fails to adequately discuss the commonalities and disparities between male and female mapping skills. Further investigation is required to determine whether Inuit mapping dexterity differed between genders.

Hall (1865, p.104) continued to applaud the geographic knowledge of the Inuit expressing that:

“...There is not a part of the coast but what they can well delineate, when once it has been visited by them, or information concerning it obtained by other. Their memory is remarkably good, and their intellectual powers, in all relating to their native land, its inhabitants, its coasts, and interior parts, is of surprisingly high order.”

Mathiassen (1928, p. 98-99) also reported that, “The Eskimos, at any rate the more intelligent among them, become familiar with a map in a short time, even if they have never seen one before. They are also able to draw a map of the areas with which they are familiar.” In addition, Mathiassen and Hall noted that Inuit maps were only useful if one was aware of their limitations:



“Distance and directions cannot be relied upon. A stretch of country that has been of importance to the drawer, or that he knows well and where he has lived for a long time, is involuntary drawn bigger and with more detail than areas which he only knows from fleeting visits. In the places they know well, all the details, points, bays islands and lakes are indicated and everything has a name.”

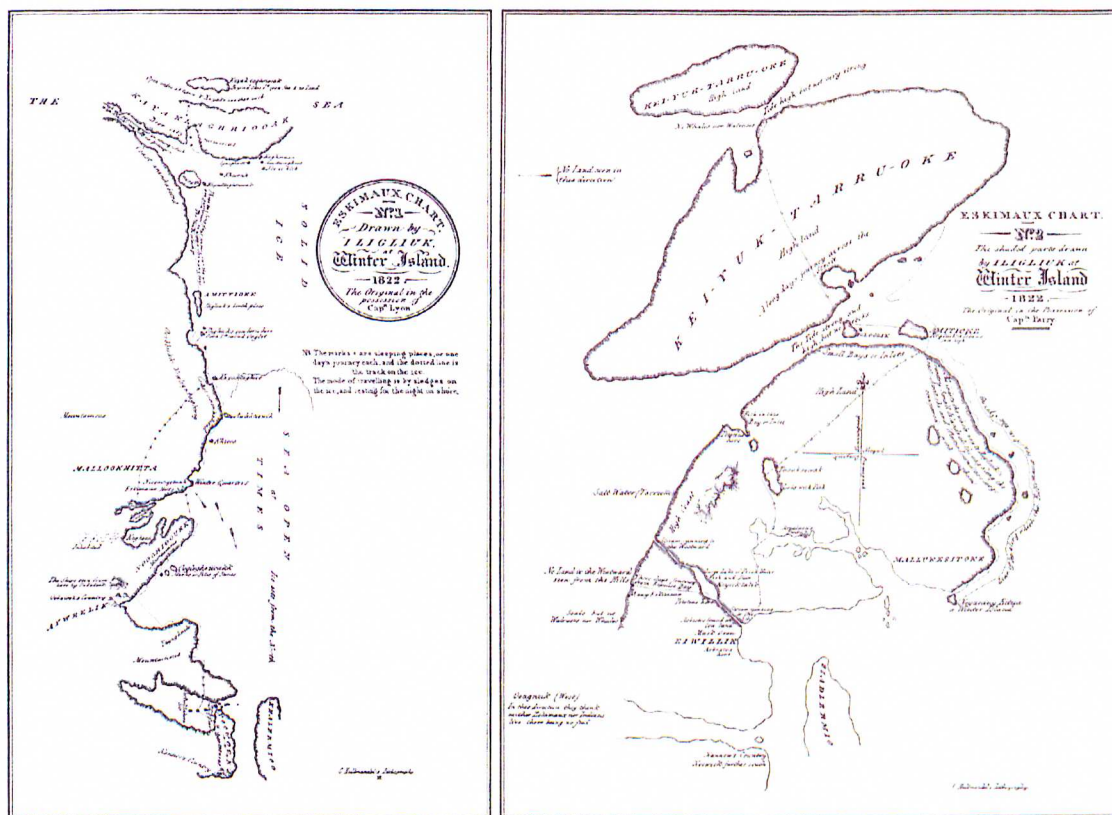
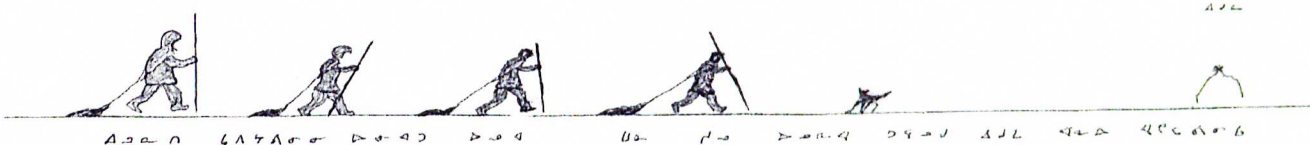


Figure 35: Inuit Maps of the Northwest Passage
Hydrographic charts drawn by Inuk, Iligliuk for Captain W.E. Parry during the 1822 expedition along the coast of Melville Peninsula. Source: Parry (1824, pp. 197-198).

Other explorers, however, had a reserved opinion of Inuit mapping ability. Diamond Jenness, while spending time with Copper Inuit between 1913-1916 reported that, “not a single native was encountered who had the slightest conception of a map, with the sole exception of Uloksak. Even he had only a vague comprehension” (Lewis & Woodward 1998, p.158). Parry also reported that Inuk Toolemak, “...though a sensible and intelligent man, we soon found to be no draughtsman, so that his performance in this way, if taken alone, was not a very intelligible delineation of the coast” (Spink & Moodie 1972, p. 23).

Perhaps the deficiencies inherent in Inuit maps were not limitations at all, but rather a response to the arduous task of drawing several hundred kilometres of topography on a single piece of paper. Some may argue that the features drawn on Inuit maps were disproportionately larger than other regions simply because the cartographer was constrained by the space available on the paper. It is more likely however, that distortion of scale arose because the Inuit cartographer was better acquainted with a particular territory than that of another. Places may have been emphasized to indicate safe navigational passages whilst scale may have varied to conform to the inconsistent nature of the terrain.



Moreover, scale may have been enlarged or reduced to indicate the time and energy required to travel across certain areas. In terms of sheet orientation, Pelly (1991, p. 63) remarks that most Inuit maps were drawn with north at the bottom. However, Western navigators probably influenced the Inuit cartographer's decision to draw in a particular projection and orientation.

It is not surprising that the Inuit drew maps of familiar geography to different scales. Many studies on drawing maps from memory have been carried out in the field of environmental perception and behaviour. In one instance, school children from various parts of the world were asked to draw a picture of the world. One student from China drew a detailed map of country and neighbouring Asian areas, whilst America, Australia and Africa were partly rendered. Furthermore, these continents were inaccurately depicted in terms of shape, form, scale and distance from China. Similarly, a student from Brazil drew an enlarged detailed map of his region and South America, yet Australia was omitted and the size of Asia was significantly reduced.

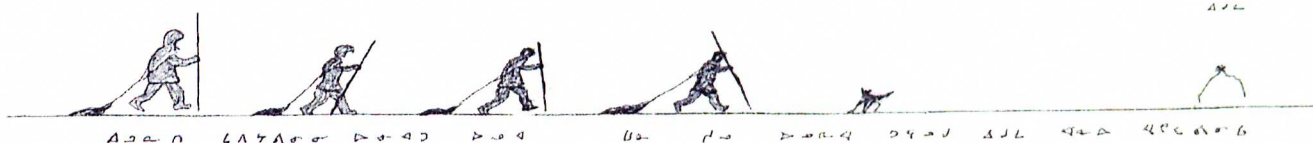
4.3 INUIT PLACE NAMES AS MAPS

4.3.1 Place Names

In oral traditions, place names were the quintessential symbols of 'mental maps'. Names contained information pertaining to: geographic orientation and distance, environmental conditions, location and accessibility of resources, historical information, cultural knowledge and heritage. Indigenous place names were generally a product of the human-environmental link; borne through myths, tales, stories and religion. According to Mark Nuttall (1992), this connection of place names to the land creates a 'memoryscape,' a discourse that reminds people how to use their territory and that evokes the mythical, historical or personal events that occurred at these places.

Johnny Oovaut, Appendix 1, tells of how the land around Quaqtq has many names. He contends that travelling hunters frequently use these names – in the same manner as street names are used in cities elsewhere. Evidently *Iqaluppilik* (where there are Arctic char) tells of good fishing spots; *Salliq* (the flat island) describes good travelling routes for sled; *Tasirjuakuluk* (the nice big lake) indicates ideal beluga and caribou hunting grounds and *natsituq* describes a place with many seals (Dorais 1997, p.89). Other places are named after events such as *arqvavik*, which is a place where someone killed a bowhead whale. Another location is *airalqtuuq* (lots of edible roots there); *siuraqtuuq* is a place with lots of brown sand and *amaluttuq* is the name given to round shaped lakes. A very small bay to the west of Quaqtq was given the name *tullirak*, which means something stepped on. The person at this place did not realize that he was actually stepping on the thing he was looking for. Apparently *tullirak* was named less than 20 years ago, suggesting that place names are constantly being created and are continuing to shape the perception of the Quaqtq landscape. In fact, Oovaut noted that travelling on the land would be easier if there were more names to describe further aspects of it.

Attempts to record Inuktitut names describing the lands and oceans of Nunavik were foreseen by Geographer Ludger Müller-Wille and the *Avataq Cultural Institute* in the 1980's. To avoid the loss of place names with the passing of Inuit elders, an intensive research of Inuit toponymy was undertaken over many years by the concerned parties. The



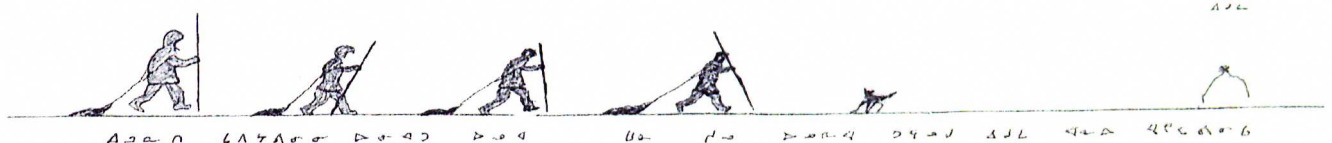
result was the publication of the *Gazetteer of Inuit place names in Nunavik*, which listed all Inuit geographical names collected and documented by the Inuit of Nunavik. Translated from Inuktitut into English and French, the gazetteer covers the regions of 17 Inuit villages, with map coordinates pin-pointing the location of each name, its geographic entity and its corresponding topographic map sheet number. The Geographic Information System analysts from the *Makivik Corporation* in Kuujuaq are currently negotiating with the *Avataq Cultural Institute* to document the *Nunavik Place Name* data digitally.

Influenced by the Nunavik toponymy study, Fair (1999) and Thornton (1999) have launched similar projects in Alaska. Both studies not only attempt to record knowledge of indigenous place names along the Saniq Coast and in Southeast Alaska respectively, but also argue the importance of place names in defining political and cultural boundaries. Moreover, their studies contend that names of the land, collectively, form a narrative text. These issues were initially brought to light by Keith Basso's (1986, p. 103) place name and narrative research on the Western Apache in the mid 1980's.

Basso worked with members of the Cibecue community, recording Western Apache place names and stories on maps. The study region encompassed an area spanning over 100 square miles. During Basso's time spent with the Cibecue, he learnt that names and stories about the land derived from four sets of narratives: myths, historical tales, sagas and gossip. Basso argued that if Western Apache place names and stories were lost, they would subsequently 'lose the land.' The names embedded in the geographical features of the Apache landscape symbolized their culture and way of living. Losing the meaning behind landscape features would be a grave loss to the Apache, since the landscape, "...served the people for centuries as indispensable mnemonic pegs on which to hang their moral teachings of their history (Basso, K.H., 1986, p. 114)." The demise of Apache place names not only brought about a 'spiritual' loss of landscape but a 'physical' departure as well. As with most indigenous American groups, land ownership in the profane European sense of buying, selling, taking, recording, taxing and inheriting was an alien concept. Amerindians considered land sacred and not 'ownable' and therefore never developed formal 'maps' containing boundaries, surveys or place names (Monmonier 1995, p. 107). Consequently, European settlers rapidly conquered the land and immediately went about surveying and dividing the landscape into portions for sale. Similarly, Australian Aborigines never generated a formal cartography, for they considered themselves as 'guardians' of the landscape. The Aborigines, although, developed an acute system of defining cultural boundaries amongst many clans through the use of place names. Geographically named features such as rivers, mountain ranges or vegetation types often marked the border and extent of range between groups. Fights often endured in some regions where particular Aborigines crossed into another clan's domain.

In Quaqtq, Nunavik, the named landscape contributes to setting territory apart from neighbouring areas. Inuit elders from Quaqtq were able to inform the Tuvaaluk Corporation (local landholding body) of the locations of camps, hunting sites and trapping grounds that were used by the Kangirsuk and Kangiqsujuaq people. Subsequently, this toponymy information specified Quaqtq's territory, which was later formalized in the James Bay Agreement (Dorais 1997, p.89).

The naming of places indicates geographical and environmental knowledge of the spaces used and occupied by people. Names attest to the integration and appropriation of space

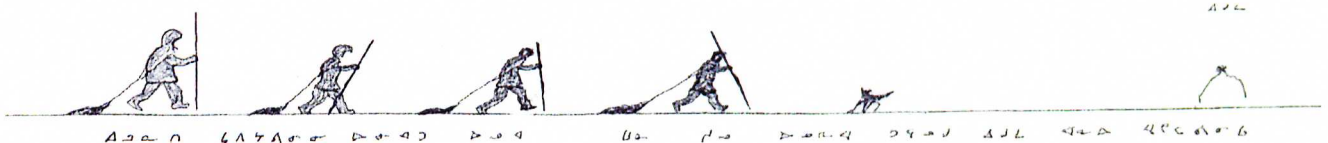


into the environmental perception of distinct cultures. Many First Nation groups in British Columbia, Canada, have recently embarked on toponymy inventories of their area. Like the Inuit elders from Quaqtaq, they recognized the political value of recording indigenous place names on maps to demonstrate and preserve the area they once roamed.

Notable contemporary writings on place names and narratives appear in Potteiger and Purinton's (1998) *Landscape Narratives: Design Practices for Telling Stories* and Anne Whiston Spirn's (1998), *The Language of Landscape*. These landscape architects voice how landscape engenders stories, and that design can emerge from concepts inherent in spoken and hidden narratives. Potteiger and Purinton advocate that the pleasure and power of stories lie in their ability to create coherent and believable worlds. They suggest this is achieved through the story unit of "narrativity" – frame, events, characters, plot, space and authority. The authors discuss narrative theory through art and landscapes, drawing from ephemeral aspects of nature such as the dynamic process of sandhill formation and even the experience of driving along Blues Highway 61. A number of practical landscape designs highlight their hypotheses about "stories and messages of place" such as the *New Jersey Meadow Wasteland and Restorative Project* and the *Korean and Vietnam War Memorials*. The authors consider whether landscape experiences can be read in a way that might construe a common language of landscape. Spirn argues that the 'language' of landscape can be spoken, written, read and imagined. According to Spirn, landscapes are vast libraries of literature, loud with dialogues and story lines that connect dwellers to their place. She suggests that loss of language and hence loss of knowledge limits the celebration of landscape as a partnership between people and place.

It was not until the advent of paper maps that the underlying principles behind the use and creation of place names were radically transformed. The act of stamping indigenous place names on maps abstracted them from their verbal realm and situated them into the tangible world of cartography. Place names went from 'cognitive maps' in their own right to providing the spatial language of paper maps. The shift of place names informing paper maps often ceased to carry with it the inherent meanings and stories behind the names. Most early Occidental maps did not provide scope for explanation of indigenous names, nor did the medium factor in the names that talked about the ethereal and sensory aspects of landscape. Place names went from being spaces and images in the landscape to virtual points on maps. The spaces indigenous names described varied immensely. Mathiassen (1928) noted during the *Fifth Thule Expedition 1921-24* that Inuit names of large geographical units such as Melville Peninsula, Fox Basin, Baffin Island and Bylot Island were lacking. Consequently Western explorers modified Inuit place names to describe large areas such as *Aivilik*, which refers to a point on the North coast of Repulse Bay. *Aivilik* is now used to describe the entire expanse of Repulse Bay. *Maluksitak*, which is a point at the northern entrance of Lyon Inlet, now refers to the whole of Lyon Inlet. *Tunumeq*, which is now used for the whole of Pond Inlet area, was originally a cliff in Milne Inlet. And, *Uvkusikssalik* was originally the name of a soapstone quarry in Wager Bay but is now used for the whole of the bay (Mathiassen 1928, p. 99).

Western seafarers in the Arctic were not only on a quest of discovery and exploration, but were also on the search for lands to expand empire territory and promote sovereignty. Place names were one way of driving this political agenda. Perhaps the region around Quaqtaq best illustrates how exogenous names (Western based names) were introduced to conquer the land and its resources. Within a short distance from Quaqtaq are places called Pointe

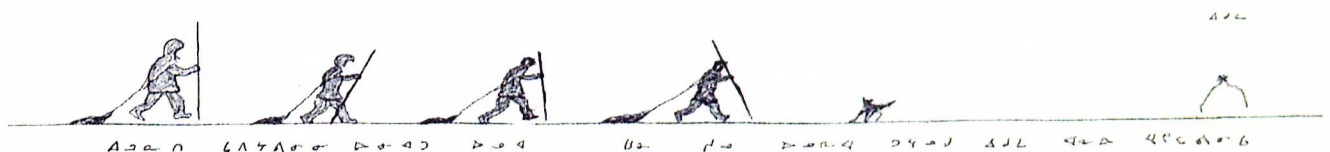


Jean-Talon, (French) Nuvugapik Point, (Inuktitut and English) Mary Island, (English) île Guindon and Diana Bay. These names seek to impregnate the landscape with national pride and supremacy, issuing a statement about ownership and authority. Typically, when *Qallunaat* (white man) visit the region Quaqtuaq, they tend to only use the exogenous names as evident on the topographic map, Figure 36. Whereas, the local Inuit tend to describe places in terms of the traditional names once given to the land. Evidently, exogenous names continue to have little currency in the region. The Quaqtuaq nomenclature map, Figure 37, drawn by Quaqtuaq historian and school teacher, Pasha Puttayuk shows the depth and detail of knowledge the Inuit possess of their country. These Inuit names describe the land far better than those extant on the topographic map. The Inuit toponymy is the ‘real’ language of the Quaqtuaq landscape, and it should appear on topographic maps accordingly – equipped with legends to decipher the stories behind the names.

Unlike Inuit cognitive place name maps, most modern day Western maps do not have words with strong spatial references. The true essence behind words in contemporary maps have been replaced by symbols and icons, such as the word ‘North,’ which is accompanied with an arrow pointing in the cardinal direction. Australian Aboriginal place name maps collected by renowned anthropologists, Ronald and Catherine Berndt (1989), indicate the strength that words themselves play as symbols of landscape. Various Aboriginal men from Ooldea, South Australia, recorded hundreds of place names from a region spanning across South Central Australia. The collective product has place names drawn on the map in such a manner that they render the approximate shape of the geography and nature of the trails (Sutton 1998, p.387). Place names on the map not only describe the landscape but provide an image of the terrain as well. The extensive list of names is indelible evidence that the Aborigines had exceptional knowledge of the landscape.

During a hunting journey across Baffin Island with the Inuit, Anthropologist, Hugh Brody (2000) noted the prolific use of place names that described the desired route of travel. Brody (2000, p. 35) remarked that, “...the whole landscape was ‘empty,’ a ‘wilderness’ but all of it had Inuktitut names, purposes and meanings. Inugu and Willie (Inuit hunters) knew the land well. Navigating over hundreds of square miles of ice they were able to name each bluff, headland, bay and fjord as we travelled by. They gave the names of every river, and told me the names of many lakes. To move around safely, to hunt with success, to make the land’s resources available and nourishing, the hunter works with a mass of details and the names of many, many places.” Rasmussen, (Spink & Moodie 1972, p. 27) during the *Fifth Thule Expedition* also described Inuit names as being “...as a rule characteristic and informative, the result being that to one who was familiar with these names it was not so difficult to find the way.” David Pelly (1991, p. 61) reports from time spent with the Inuit that, “place names to a large extent, define a trail.” He also suggests that place names are focal points in the mind of a hunter contemplating a route. The names themselves imply the nature of the terrain, and the relation of the place to its surroundings.

Okpik, an Inuit acquaintance of Pelly’s, drew a map of a portion of their 500-kilometre journey by dogsled along the Arctic coast. Okpik drew several large dots on a sheet of paper and proceeded by allocating these locations names and then drew a line connecting the dots. Pelly deduced from the map that no landmarks off the route were of any consequence, and that it was drawn to illustrate a trail rather than Okpik’s geographical knowledge of the area.



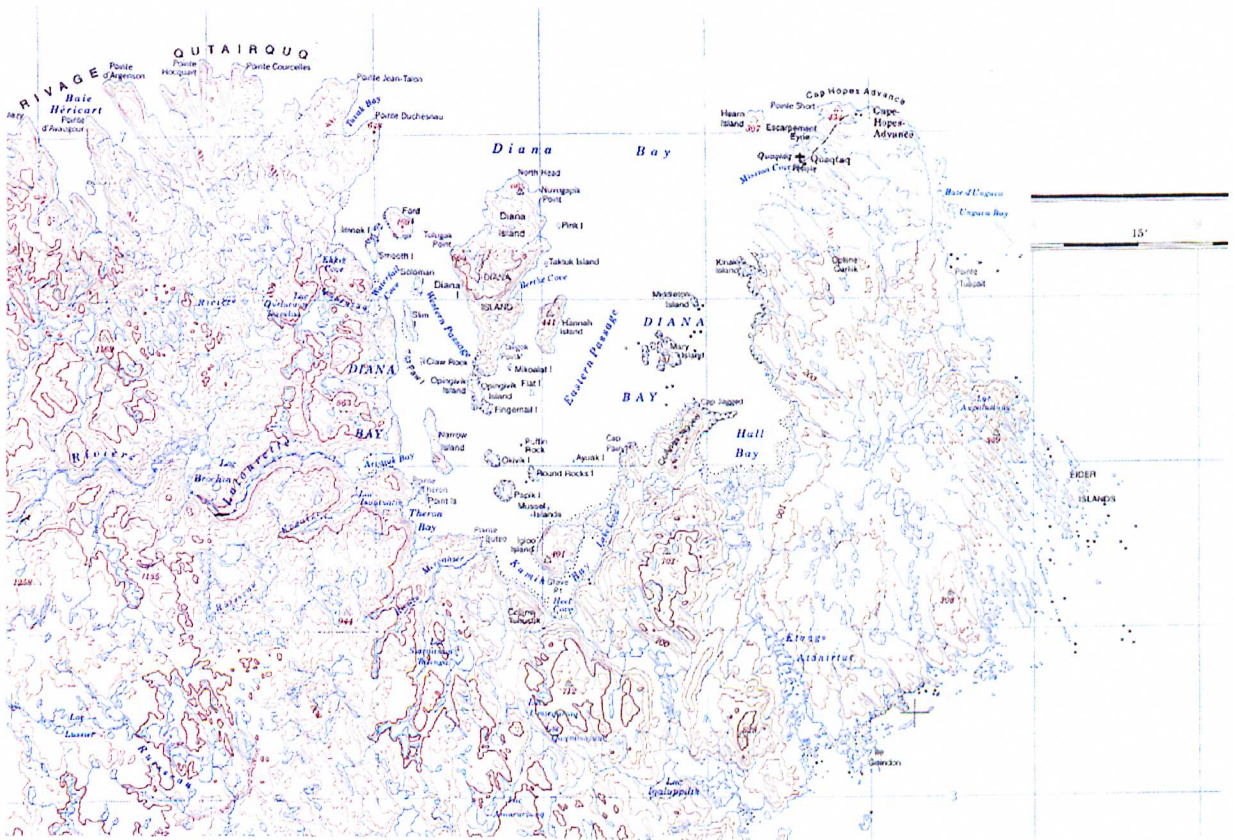


Figure 36: Topographic Map of Quaqtq
 Official place-names of the Quaqtq region. Source: National Topographic System of Canada, Natural Resources Canada, Geomatics Canada. Original Scale 1: 250,000. Maps E25, F 25, D 25 and C 25 were digitally merged to form this regional map of Quaqtq.

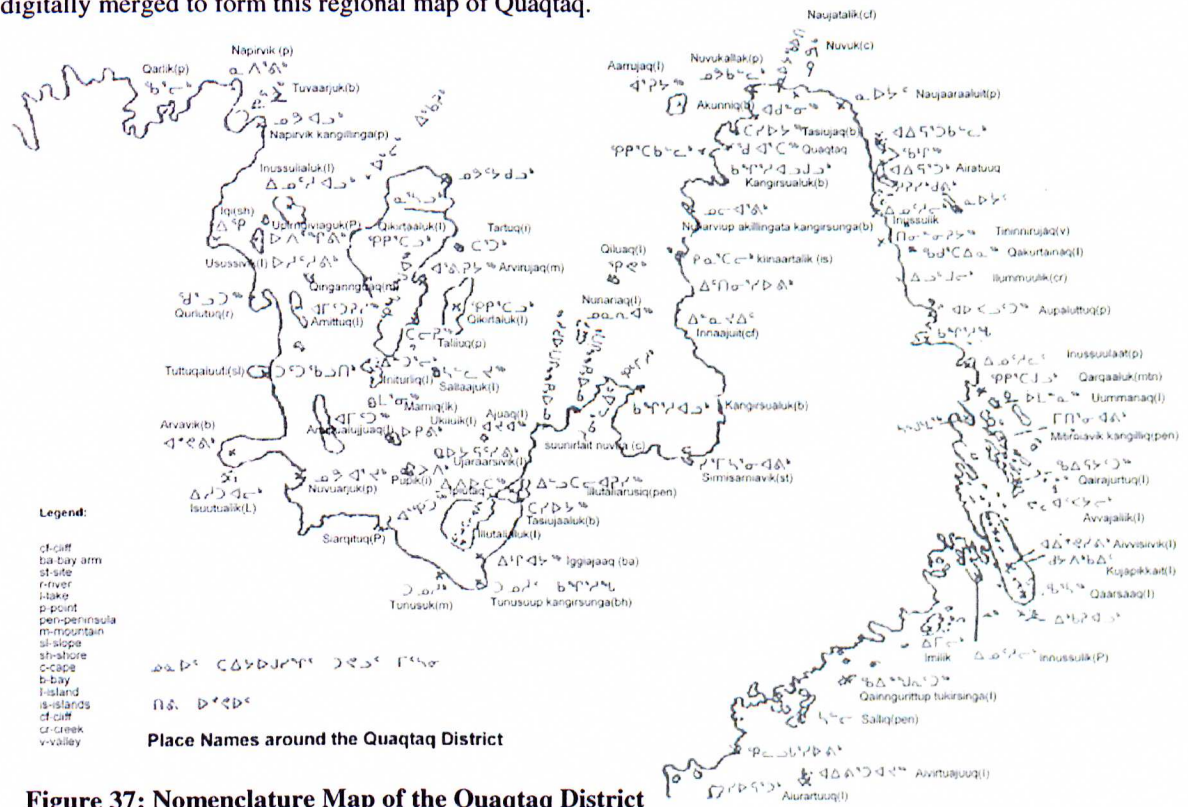
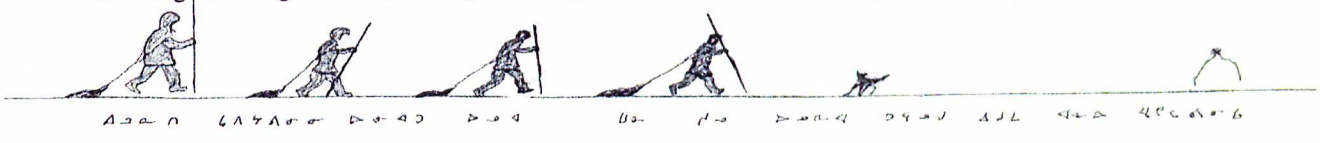
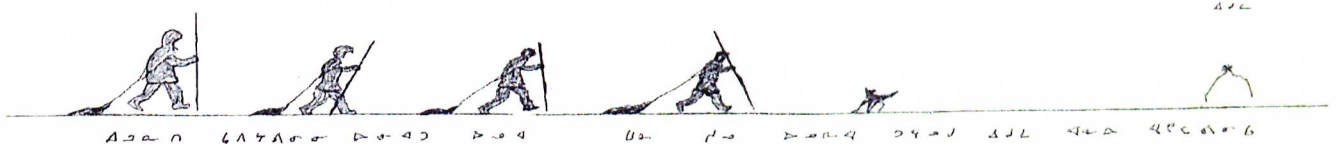


Figure 37: Nomenclature Map of the Quaqtq District
 Inuit toponymy of the Quaqtq district. The place-names on this map were recorded by Quaqtq Historian and School Teacher, Pasha Puttayuk, 2000. The Inuktitut place names were translated into English using *The Gazetteer of Inuit Place Names in Nunavik* (Müller-Wille 1987).

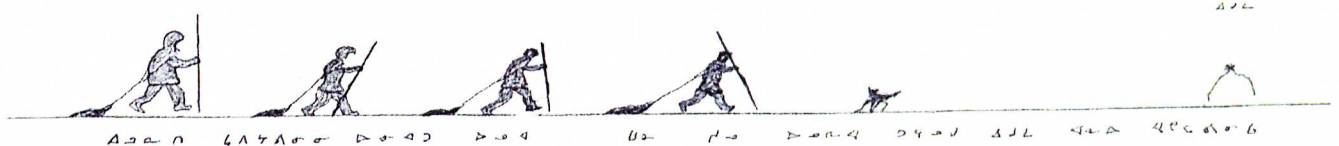


Brody, Rasmussen and Pelly's experiences reiterate that naming and navigational skills are the product of human response to environmental stimuli. Place names serve as mnemonic devices, providing a schema of reference points for orientation through the images and messages they wield about landscape. Perhaps the meanings behind indigenous place names will fade or be lost as they are dislocated from their verbal context and placed onto paper maps. Maybe the place names such as those around Quaqtaq will be subjected to scrutiny, manipulation, cleansing and hybridisation in the years to come for political or cultural objectives. The history of place names is not static but one that changes in time and space and is shaped and altered by the dynamic process of cultural change and contact. The fate of place names as directional devices rests on the success of transmitting this knowledge to younger Inuit populations.



Chapter 5

Scientific Representations of Landscape



5.1 NAVIGATIONAL DEVICES: A WAY OF SEEING LANDSCAPE

This paper has thus far provided evidence in support of Inuit use of natural features and celestial bodies as navigational devices. Conversely, this chapter describes Western systems of navigation and cartography ranging from primitive methods based on natural systems and the night sky, to the modern era of way-finding and mapping electronically.

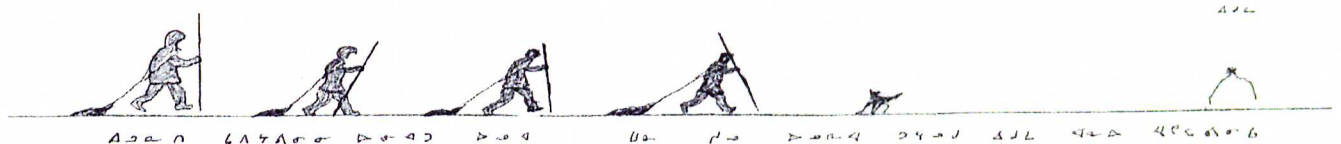
In comparison to traditional Indigenous hunters and travellers, Western navigators developed tangible tools and devices that were capable of measuring and recording aspects of the environment with remarkable precision. Not content with relying solely on experience and knowledge of the land, Occidental travellers reverted to the use of instruments, surveying equipment and paper maps. This shift from nature to scientific apparatus dramatically reduced the dangers associated with travelling, especially in regard to seafaring. Subsequently, from a Western perspective, the idea of landscape and spatial cognition changed forever. Scientific instruments formed one way of knowing and using the landscape. And, since some devices chose to accept and ignore features of the physical landscape they consequently offered a lens by which to picture fragments of the world. An examination of early scientific navigational instruments that were developed to harness elements of landscape, reveals, in some instances, surprising similarities with Inuit methods of using and deciphering landscape elements.

5.1.1 *Dead Reckoning/ Traverse Board*

Before the days of electronic devices to assist marine navigation, seafarers attempted to create their own maps of the sea using a technique known as ‘dead-reckoning.’ The term originates from ‘deduced reckoning’, which implies that the navigator determined the ship’s position from its speed and direction rather than from direct measurements. Dead reckoning is based on estimation and recording the way of the ship, taking into consideration the mean speed and course but also the effect of the wind and tide. In order to perform dead-reckoning calculations, the navigator used: dividers, log and line (measuring ocean depth), Dutchman’s log, traverse board, compass and tables (ocean currents, winds, sun etc). One notable instrument, the traverse board, Figure 38, came into use in the early sixteenth century. It consisted of a wind rose painted on a wooden board with eight holes marking the cardinal points of the compass and a table of holes indicating speed. Willem Mörzer Bruyns (1997) describes how the traverse board was used in conjunction with the Dutchman’s log before the 1740’s:

Each half hour a pin would be plugged in the hole corresponding with the logged speed. After four hours, course and speed could be ‘read’ from the traverse board. The Dutchman’s log was a method of determining the ship’s speed...a chip of wood was thrown overboard at the bow and the time the ship took to sail past the chip was measured, by counting. Knowing both time and the ship’s length, the speed could be calculated. The method became popular with Dutch seamen, hence the name.

Although the traverse board’s accuracy depended on estimation, it provides indelible evidence that early seafarers used wind to fathom course and bearing. The traverse board was the device that captured and revealed the journey, in the same manner that the *sastrugi*



(carved patterns of wind blown snow) as described in Chapter 4, was the natural indicator used by the Inuit to measure and determine direction.

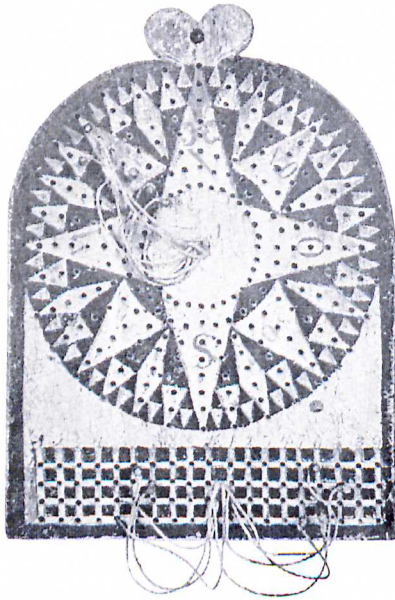


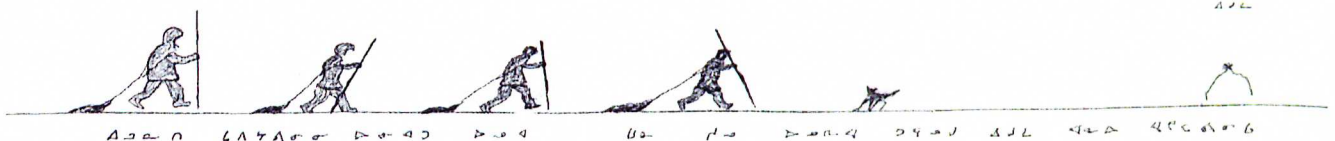
Figure 38: Traverse board

Used for dead reckoning. This board (found in the Isle of Barra, 1844) goes back to the 16th century, and was used by the helmsman to peg the half-hours run upon each rhumb of the wind. Source: Taylor (1957, p. 197).

5.1.2 Nocturnal or “Sky Clock”

Early mariners not only used the wind to navigate, but also exploited celestial bodies. The nocturnal, or night disc, Figure 39, was developed in the 16th century for calculating the time at night, by observing the rotation of stars around the celestial pole. It consisted of two concentric circles of different sizes, made of either wood or brass. The large circle was divided into twelve sections to represent the months or the year, whereas the smaller circle was divided into 24 sections to represent the hours of the day. On the smaller circle, a pointer (index) pivoted from the centre of the disc. To ascertain the time, the projecting tooth marked 12 o’clock on the inner plate was turned to coincide with the date on the outer plate. The instrument was then placed at arm’s length, with the *Polaris* star clearly visible through a central hole, and then the pointer was calibrated to rest on an imaginary line connecting two star groups: either the Great Bear (*Ursa Major*) or Lesser Bear (*Ursa Minor*). The time of night was then read off the scale of hours on the inner plate (Cotter 1968, p. 39). Geographer, E.G.R Taylor (1957) in his book *The Haven-Finding Art: A History of Navigation from Odysseus to Captain Cook*, describes how sailors, who possessed a basic understanding of star systems, used the nocturnal or “*Heavenlie Clocke*”:

“Because of the Earth’s revolution about its axis, the stars appear to circle around Polaris, the North/Pole star. The position and path of a star in relation to Polaris depended upon the time of year and hour of night. The observer had to know the midnight position of the Guards of the Lesser Bear for each month (or better, for each fortnight) of the year - this position shifting about an hour every two weeks. Supposing the Guards are approximately on the meridian beyond the Pole Star at midnight, then by the time the Guards are due west of the Pole Star it will be 6 p.m., and therefore at 6 a.m. the Guards would be due east.”



Taylor (1957, pp. 147-148) reports that to remember this concept, navigators imagined a masculine human figure up in the sky with the Pole Star at his breast height, Figure 40. His head was 'above it' (i.e. North); his feet 'below', his arms to right and left and the Guards were described as they stood in relation to his limbs. For example, the right arm represents midnight in mid-July, whereas the end of July is an hour below the right arm.

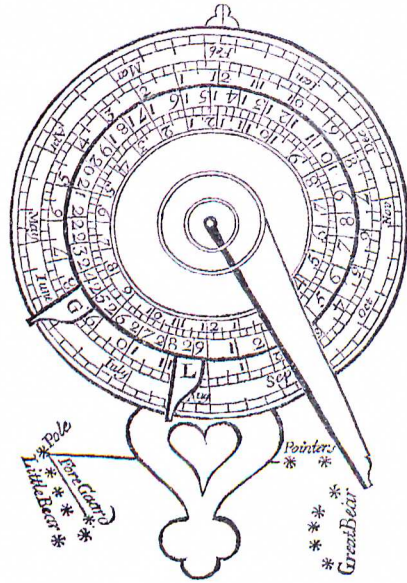


Figure 39: Nocturnal

A nocturnal with scales which was used with the Great and Lesser Bears to calculate time at night. Source: Taylor (1957, p. 147).

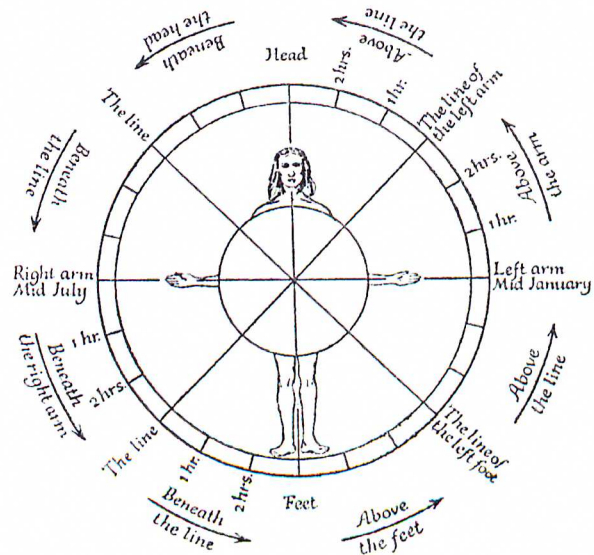


Figure 40: The sky clock

The midnight position of the Guards is memorized for each fortnight of the year and a comparison of their observed positions with this gives the time in hours before or after midnight. Source: Taylor (1957, p. 146).

A 1997 excavation of *H.M.S. Sapphire* that sunk in Bay Bulls Harbour, Newfoundland, 1696, uncovered a well-preserved Nocturnal (M.U. Newfoundland 2000). Considering a Nocturnal was used aboard this frigate during that period, we can speculate that other mariners also used such instruments to assist with Arctic expeditions in the 17th century. Recalling the methods used by the Inuit and Polynesians for star navigation, it is interesting to note the commonalities and disparities associated with the use of Nocturnal's by seafarers. One common thread was that both observed that every star had a celestial latitude, or declination. Moreover, each party knew that the declination of a star directly overhead translated to the same latitude on Earth. Through this knowledge, nautical navigators and their indigenous counterparts could travel successfully with the stars. The only difference was that sailors chose to use latitude information to develop maps. Considering the Inuit did not draw paper maps for themselves, they therefore had little need to acquire latitude readings from the stars. Perhaps the Inuit did not expand upon their star navigation techniques because they were already content with its success. The scientific world of navigation on the other hand, had another vision and agenda – to develop precise instruments and methods of navigation that could successfully record earth's continents, riches and myriad features. The scientific world chose to record this information through diagrammatic and pictorial forms, whereas the Inuit opted to transfer their knowledge of star navigation through myths, stories, songs and legends. The Nocturnal instrument provided a way of knowing landscape through stars.



5.1.3 Seaman's Quadrant/ Astrolabe/ Cross Staff

The portable seaman's quadrant, Figure 41, was the first precision altitude-measuring instrument used by navigators, with evidence supporting its use from 1460. According to Bruyns (1997, pp. 57-59) the quadrant, as its name suggests, was made from wood or brass into the shape of quadrant, with two sighting vanes along one edge. A plumb line suspended from the centre indicated the altitude along the 0° - 90° graduation of the arc. The seaman's quadrant required two observers, one to sight the Sun or star, and the other to note the position of the plumb line. It is believed that the names of important coastal features and islands were marked on the arc of the quadrant to correspond with the positions of the plumb line when the Pole Star was observed. During 14th and 15th century voyages along the West African Coast, Portuguese navigators used the engraved markings on the quadrant's arc to determine whether they were due west of coastal towns by observing the Pole Star through the sights. Upon the advent of astronomical tables that listed the Sun's declination, seafarers were then able to use the quadrant to find latitude in degrees north or south of the equator by meridian altitude observation of the Sun (Cotter 1968, pp. 58-60). The seaman's quadrant had many navigational shortcomings, for it was unusable in rough seas and its degree of accuracy in measuring altitude was coarse.

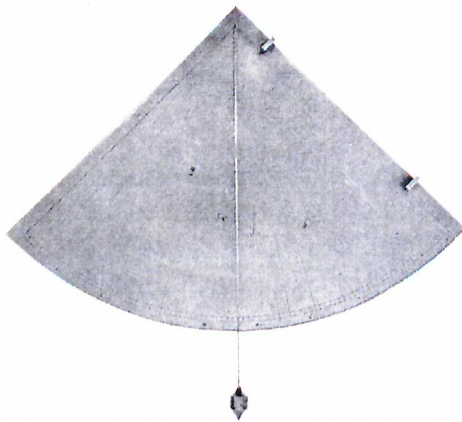


Figure 41: Seaman's Quadrant

The seaman's quadrant indicated the altitude of a heavenly body viewed through the sight holes by means of a plumb line. Source: Taylor (1957, p. 219).

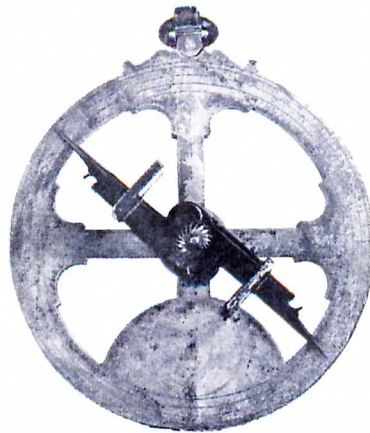


Figure 42: Seaman's Astrolabe

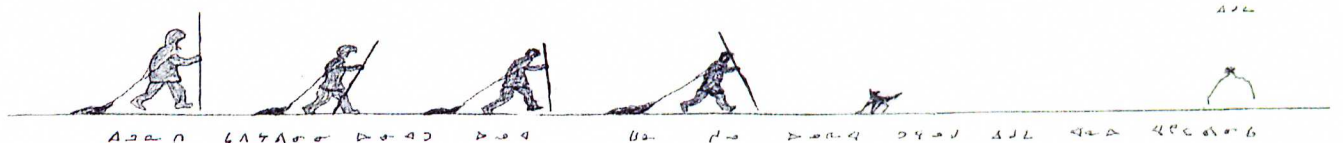
The mariner's astrolabe was a simple device that measured the altitude of the Sun or stars. It was a very cumbersome and heavy device. This pictured example was recovered from the sea in 1845, and is believed to have come from the wrecked vessel of the Spanish *Armada*. Source: Taylor (1957, p. 221).



Figure 43: Astronomers Astrolabe

On the lower plate, which is divided by lines of equal altitude and of equal bearing is the sky seen by an observer. The upper pierced plate, which rotates, shows the position of leading stars. Once the instrument is set, the altitudes and azimuths of the stars can thus be read. Source: Taylor (1957, p. 116).

With advances in navigational technology, the sea (mariner's) astrolabe, Figure 42, and the cross-staff, superseded the quadrant. The sea astrolabe was adapted from the ornamental astronomers astrolabe, Figure 43, which consisted of a heavy cast brass ring with a 0° - 90° - 0° graduation. Around a central pin of the instrument an *alidade* (a moving arm used as a sighting apparatus in angular measurement) with two sights revolved. When the imaginary line through the centre of the sights was directed at a celestial body, its altitude and zenith



distance could be read from the graduation at the end of the *alidade* (Bruyns 1997, p. 59-60). Cotter's (1968, p. 61) research into seafaring of yesteryear reveals that the mariner's astrolabe was a simple device that measured the altitude of the Sun or stars. Interestingly, Gunther's (1928, p. 342) studies of the Mariner's astrolabe expose a number of deficiencies about the apparatus - it lacked the ornamental *rete* of the astronomer's astrolabe and it was an expensive device because of its cumbersome weight in brass.

The earliest mention of the mariner's astrolabe use at sea is around 1481, during a Portuguese voyage down the west coast of Africa (Bruyns 1997, p. 57). And, by the 17th century they were employed on every ship to calculate latitude (Gunther 1928, p.342). Interestingly, William Baffin used a marine astrolabe aboard his ship the *Discovery* during the arduous *North-West Passage Expedition* in 1615. Some historians suggest that Baffin successfully travelled 300 miles closer to the North Pole than previous navigators because he had the aid of an astrolabe to obtain latitude readings (Gunther 1928, p. 343). Perhaps many of the 17th century Arctic charts were drawn with the assistance of the mariner's astrolabe. One may speculate that the inaccuracies inherent in many Occidental charts are a reflection of the imprecise astrolabe apparatuses themselves, along with other inexact navigational devices that were at their disposal. Bruyns (1997, p. 60) found that the use of marine astrolabes decreased after 1670, and were completely abandoned after about 1700. Their demise is largely attributed to its clumsy suspension design, for it was difficult to measure altitude of the Sun or stars as it swayed back and forth aboard a rolling, pitching ship.

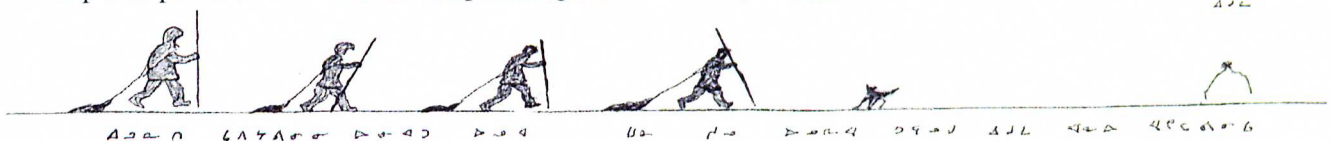
An improvement on the quadrant and astrolabe was the seaman's cross staff, Figure 44, known as *Baculus jacobii* or Jacob's Staff. The Portuguese and Spanish referred to the cross staff as *Balhestila*, meaning cross bow (Cotter, 1968, p. 64). Bruyns (1997, p. 57) describes the function and composition of the cross staff:

"Introduced by the Portuguese around 1515, it consisted of a 1.5 x 1.5 cm square wooden staff about 80 cm in length with graduations on each of the four sides. Four crosses, one for each side, would slide along the staff until the observer saw the horizon under the lower end of the cross and the sun or star above the upper end. Altitude and zenith distance could then be read from the staff."

In 1595, the back staff or Davis quadrant, Figure 45, was introduced at sea to measure the altitude of celestial bodies. In contrast to the cross-staff, it was used with the observers back to the sun – which solved the dilemma of the observer having to look directly into the sun to take readings. Later, a lens was added, enabling it also to be used when the sun was less bright through the clouds (Bruyns 1997, p. 60).

5.1.4 Sextant

Advancement in navigational ingenuity was the development of the sextant in 1730. This optical instrument enabled navigators to measure the angular elevation of the sun and other celestial bodies. Accordingly, this information permitted the navigator to calculate latitude and longitude. Developed by English and American mathematicians, John Hadley and Thomas Godfrey, the sextant used an optical system of a telescope and two mirrors to determine one's location. As described in Figure 46b, the images of two objects were superimposed, with their corresponding distance away measured off the sextant. Altitude



observations from ships were also calculated from sextants using an artificial horizon, which consisted of a pool of mercury that acted as a reflective surface. By observing both the star itself and the image of the star in the mercury, a sextant reading could be obtained that was equal to double the actual altitude of the star. A special type of sextant, a bubble sextant (octant), was later developed for use on aircraft's and ships to counteract for rough seas and undefined horizon lines. The octant resembled a sextant, but had an arc of 45° instead of a 60° arc. Spirit levels were incorporated in the octant's design - in place of the horizon.

5.1.5 The Compass

The compass allowed navigators to establish true north or magnetic north. There is not an appreciable difference between the two in Europe, but explorers discovered that the difference increased in other parts of the world. Europeans had known for a long time that the lodestone had magnetic qualities. Initially a piece of the stone was floated on wood in a pan of water. This was followed by a magnetized needle floating on a straw in water, and then by a needle resting on a pivot point - much like the modern compass. The compass provided mariners with a rough or coarse direction, which they could supplement by noting the direction of the North Star, and of the sun at noon (south), and at sunrise (east) and sunset (west).

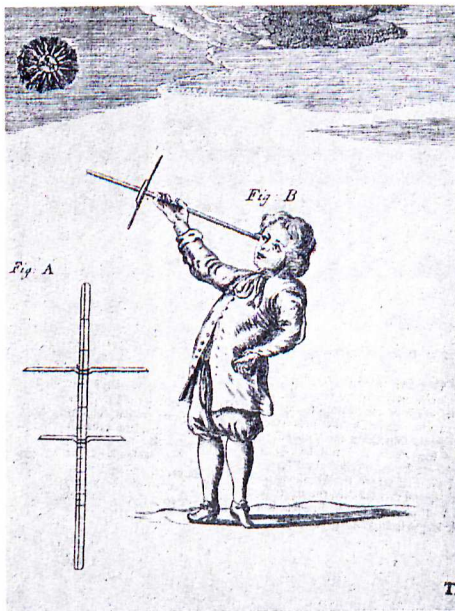


Figure 44: Cross-staff

The boy is illustrating how the cross-staff should be held (1681). It was used by sliding a cross along the staff until the horizon came into view on the lower end of the cross and the sun above the upper end. Altitude and zenith could then be read off the staff. Source: Taylor (1957, p. 196).



Figure 45: Back staff (Davis quadrant)

The boy is illustrating how the back-staff should be held (1681). Used in the same way of the cross-staff, however as its name suggests, the readings were taken from looking with the observers back to the sun to avoid blindness. Source: Taylor (1957, p. 196).



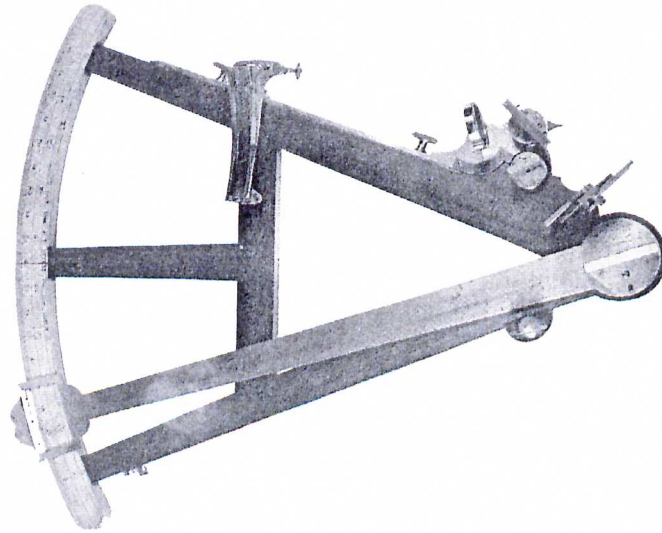


Figure 46: Hadley's Octant (Sextant)

Hadley's octant (later sextant) was used for bringing the reflection of the moon down to the horizon, or for finding a lunar distance from a star of known position. Source: Taylor (1957).

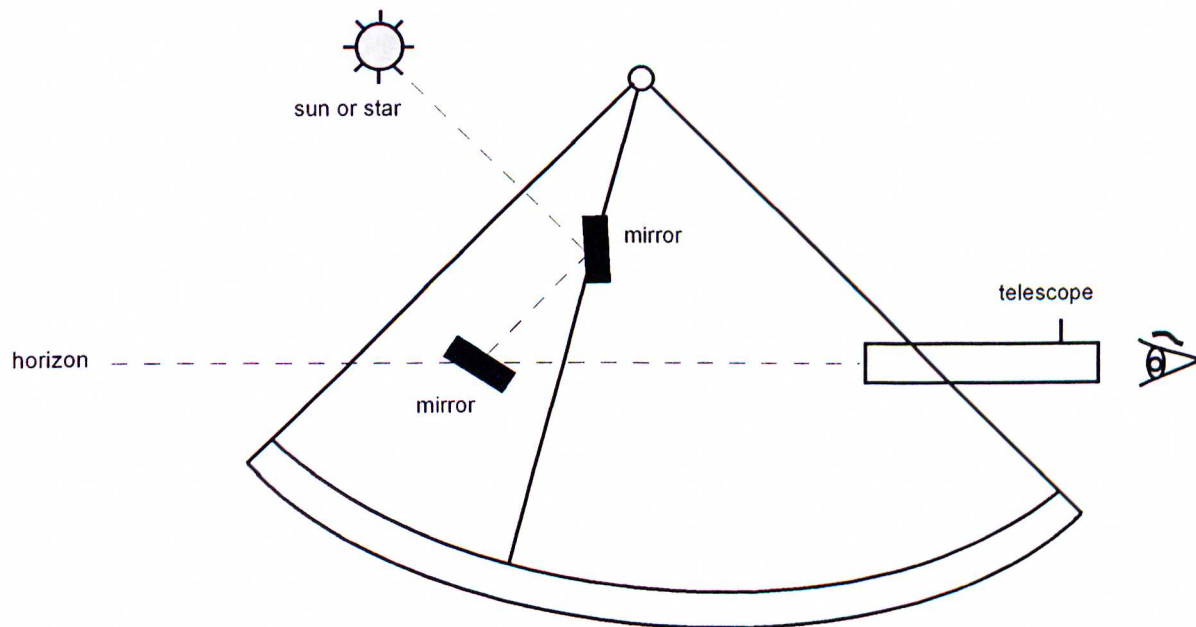
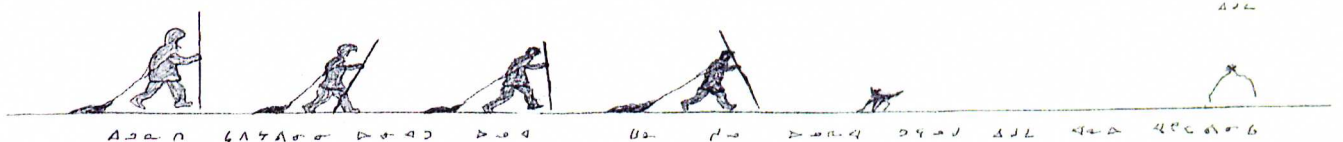


Figure 46b: How a Sextant works

A telescope mounted on the body of the instrument points toward the mirror, (top half of mirror is transparent and the bottom half is silvered) where a second mirror is angled above the first mirror. By looking through the telescope, one sees the horizon appear on the unsilvered portion of the mirror, while simultaneously seeing the image of the star or sun appear on the silvered portion of the first mirror (as reflected from the second mirror above). The image of the horizon appears as the lever is manipulated accordingly, permitting the angular distance between the star and the horizon to be read off the scale engraved on the sextant. Each degree on the scale of the sextant is equivalent to two degrees of angular distance between the objects actually observed because the light from Sun or stars is reflected off two mirrors.



5.2 SCIENTIFIC & THEMATIC “MAPS”: A WAY OF SEEING LANDSCAPE

Ultimately, navigational devices were used in the scientific world to develop maps for a variety of purposes. Maps are an interesting medium to examine landscape perception because they reflect and reinforce cultural values and beliefs of the people who make them. They provide a mechanism to move through space whilst imparting information about orientation, direction, scale and detail. According to James Corner (1996, p. 18) maps (or rather representations) provide a way and means of seeing and acting – a description of the world that is seen by different people in radically different ways:

“Description and projection entails taking a particular point of view - both spatial and rhetorical - that not only reflects a given reality, but is also a productive one. Furthermore, as scholars and critics have recognised, the inescapable assumption of a view point in representation is never neutral or without agency and effect; representation provides neither a mirror reflection of things, nor a simple and objective inventory. Instead, representations are projections, renderings of reality that are drawn and thrown onto the world.”

With this in mind, a map study of the Quaqtq region (Appendix 4) was performed to illustrate the variety of scientific representations and expressions of landscape that exist in the Arctic. Critiques of these maps were made possible using Wood and Fels (1986) cartographic analytical tools as a guide. These analytical factors, Table 2, comprise of five intra-significant codes: the iconic, linguistic, tectonic, temporal and presentational codes; and five extra-significant codes: the thematic, topic, historical, rhetorical and utilitarian codes. Wood’s and Fels argue that these codes not only drive the mapping process but also govern how maps are perceived. It is worthwhile to note that Spink and Moodie (1972) analyzed Inuit paper maps using a similar, but condensed version based on the factors of: media, scale and shape, content and style and mapping proficiency. However, for the purpose of the Quaqtq map study, it was decided that an amalgam of the two models would provide a more substantiated and straightforward method of analyzing scientific maps of the Arctic. These maps are subsequently analyzed through four categories: aerial representation, ephemeral representation, symbolic representation and topographic representation. In formulating these categories, consideration was given to the fact that maps are rarely analyzed under the one category since they are a hybrid of many inter-related factors. Moreover, as Wood’s and Fels (1986) attest, maps are never free of their cultural context or the motives of their makers – many factors and people govern the mapping process and map product.

5.2.1 Aerial Representations of the Arctic

Nearly all maps, with the exception of virtual maps, represent the land in some form and scale from a birds-eye perspective. Considering the Earth is a three-dimensional body, it cannot be depicted accurately on a two-dimensional surface. The two-dimensional map must distort one or more of its properties (representing area, shape, distance, scale and bearing) in order to reduce distortion in its other properties. This transformation from a 3-D surface to a two-dimensional map spawned the birth of many types of map projections to counteract problems with representing space. The Mercator projection, introduced in 1569,



Table 2: The 10 Codes Behind the Meaning in Maps (Wood & Fels 1986)

Intra significant codes govern the formation of the cartographic icon, the development of visible language, and the scheme of their joint presentation. These operate across several levels of integration, activating a repertoire of representational conventions and syntactical procedures extending from the symbolic principles of individual marks to elaborate frameworks of cartographic discourse.

1. The *iconic* is the code of inventory, of the world's fragmentation; into urban hierarchies; into hypsometric layers, into wet and dry. Govern the manner in which graphic expressions correspond with geographic items, concrete or abstract, and their attendant attributes.
2. The *linguistic* is the code of names, of classification, of ownership; identifying, naming, assigning. Regulates the equivalence of typographic expressions and via the norms of written language, a universe of terminology and nomenclature.
3. *Tectonic code*: relationship of the things in a space- the scalar – in the number of miles encoded in every inch and in the topological- in the planimetry of cities, the stereometry of mountain ranges, the projective geometry of continents, the simple topology of the sketch maps giving directions to a cocktail party. The tectonic is the code of finding, it is the code of getting there: it is the code of getting.
4. *Temporal code*: time. The durative establishes the scale. The durative reveals (or hides or is mute about) lapse in co-synchronicity. The tense says when; some maps are in the past tense, others in the future tense, but most maps plump for the present, or if they can get away with it-no duration at all, out of chronology; free of time. Configures the time of the map in relation to the stream of events and observations from which it derives.
5. *Presentational code*: title, legend box, map image, text, illustrations, inset map images, scale, instructions, charts, apologies, diagrams, photos, explanations, arrows, decorations, colour scheme, type faces are chosen, layered, structured to achieve speech; coherent, articulate discourse. Diversity of expressions that constitute the map are organised and orchestrated- fused into a cartographic discourse.

Extra significant codes govern the appropriation of entire maps as sign vehicles for social and political expression- of values, goals, aesthetics and status- as the means of modern myth. Maps signs, and maps as signs, depend fundamentally on conventions, signify only in relation to other signs, and are never free of their cultural context or the motives of their makers.

1. *Thematic code*: establishes its subject- on what shall the map discourse? What shall it argue?
2. *Topic code*: turns it from space to place, bounds it, gives it a name, sets it off from other space, asserts its existence; this place is.
3. *Historical code*: appropriates the map to an era, assigns it a name, incorporates it in a vision of history- secures a place and time
4. *Rhetorical code*: sets the tone, orientates the map in its culture (in its set of values) points the map to somewhere else (to the globe) to itself, to its maker, to the culture that produced it, to the place and time and omphalos of that culture. It is a code of jingoisms. The mere existence of the map is a sign of its higher culture, its sophistication. Appropriates to the map the style most advantageous to the myth it intends to propagate. Example of weather maps as rhetoric.
5. *Utilitarian code*: eg survey sheets-geological/topographic. "To catalogue, is not merely to ascertain, as it appears at first glance, but also to appropriate." How are survey sheets different from maps of military targets? "What is there in this richly endowed land of ours which may be dug, or gathered or harvested, and made part of the wealth of America and of the world, and how and where does it lie?" –an act of conspicuous consumption, a sign of contemporaneity as well as wealth and power, a symbolic manifestation of the rights of possession.

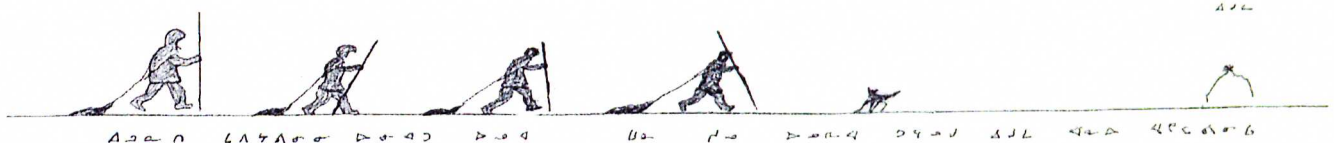




Figure 48: Portion of an Aerial Photograph of Quaqtak Village, Summer 1981

Original scale before reduction: 1: 10,000. Source - Government of Quebec, Minister of Energy & Resources: Cartography (Image from University of Montreal Cartographic Library, Department of Geography) 24 F4 E-1.

In addition to the aerial photos of Quaqtak (Appendix 4), a number of satellite images of the Ungava Bay district were obtained for this paper. The majority of the satellite images featured in Appendix 4 were taken by the Landsat 7 Spacecraft, the most current, detailed and accurate thematic mapping satellite to date. Launched by NASA in 1999, Landsat 7 circumnavigates the globe every 16 days, documenting the condition of the entire planet. Evidently, Landsat 7 is unique in that the images it collects are extremely detailed – it can “see” features on the planet as small as 30 meters, compared to the geo-stationary GOES satellites which can only resolve objects of 4 kilometers or greater (Landsat 7 Press Release Kit, NASA 1999). Aboard Landsat 7 is the Enhanced Thematic Mapper Plus (ETM+) – a remote sensing instrument that measures solar radiation reflected or emitted by the Earth. The instrument has eight bands sensitive to different wavelengths of visible and infrared radiation (Landsat 7 Press Release Kit, NASA 1999).

Environmental scientists and biologists working for the *Makivik* Corporation (Nunavik Research Centre) at Kuujuaq in Northern Quebec are currently using the thematic mapper provided by Landsat 7 to identify sensitive fish breeding areas. Since a correlation exists between fish breeding zones and specific water temperatures, scientists were able to establish the location of these areas by using a particular thematic band responsive to temperature. Subsequently, salmon and Arctic char breeding regions have been recorded on maps with remarkable precision, so much so, that management plans are currently proposed to preserve these sites. Scientists are also using Landsat 7 in the Arctic to monitor: natural processes, land use, deforestation, snow accumulation and ice floes. Since Landsat 7 continually takes images of earth, it has become an excellent tool for observing seasonal and global changes. Figure 49, for example, illustrates the benefits of Landsat 7 in exposing seasonal variations of ice accretion in the Ungava Bay region. The kaleidoscope of colours depicted in the satellite image however, are not accurate renderings of the surface terrain.



The colours are geographically conformal – they have been programmed through the satellite to appear as conventional cartographic metaphors. For example water generally appears as blue, trees symbolized as green and warm areas as red. Wood's and Fels (1986, p. 77) argue that this false colouration is hardly restricted to remotely sensed imagery taken by satellites; it is characteristic of all maps, which it dresses in the most reassuring tones. They contend that metaphoric colours ignore cultural interferences with the land such as drought, acid rain and pollution. Metaphors proclaim maps as ideal.

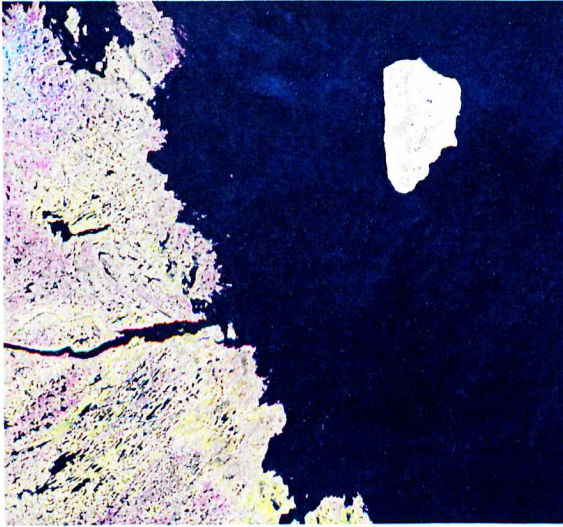


Figure 49a: Quaqtaq (Ungava Bay) district in Summer 2000.

Satellite image taken by Landsat_7: ETM -Path: 16 Row: 18 for Scene: 7016018000020350 N 61.11 S 59.05 W -71.35 E -66.99 taken on 2000/07/21. Source: Canadian Earth Observation Network - <http://ceonet.cgdi.gc.ca/>

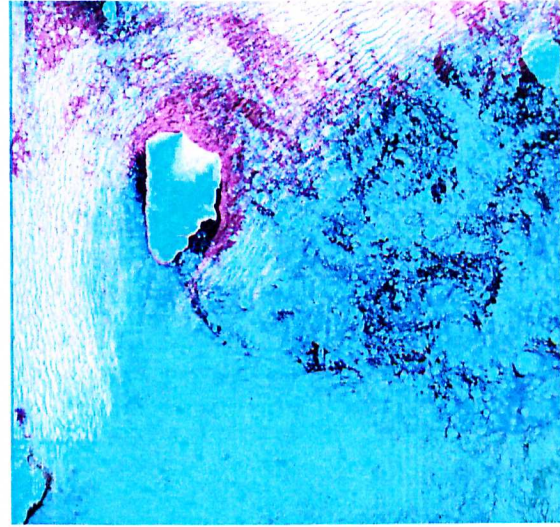


Figure 49b: Floe Ice around Akpatok Island (Ungava Bay in Spring 2000).

Satellite image taken by Landsat_7: ETM - Path: 15 Row: 18 for Scene: 7015018100014850 N 61.12 S 59.05 W -69.81 E 65.44 taken on 2000/05/27. Source: Canadian Earth Observation Network - <http://ceonet.cgdi.gc.ca/>

In recent times, many cartographic and imaging companies have capitalized on the Internet to provide maps of the world (including satellite images and aerial photographs) at little or no cost to the public. A search of three Internet sites, namely: GlobeXplorer.com, MapQuest.com and Space Imaging (<http://mapserver.esri.com/si/html/main.htm>) revealed surprising results. The web sites permit the user to navigate the globe, and in some instances, obtain detailed interactive street maps and aerial photographs of major cities and landmarks. In particular, GlobeXplorer, despite its cartographic content centering on the middle latitudes and populated areas, provides updated images of remote areas, such as the Arctic, Figure 50. The quality and detail of the image however, depends on how much the user is prepared to spend. Interestingly, the Space Imaging web site, which posted satellite pictures of the damaged World Trade Center in New York and the Pentagon in Washington D.C. after the September 11 attacks in 2001, was inundated with “hits” from across the world to its internet site. Undoubtedly, maps, satellite images and aerial photos, which feature on the Internet, form another medium of knowing and seeing landscape.

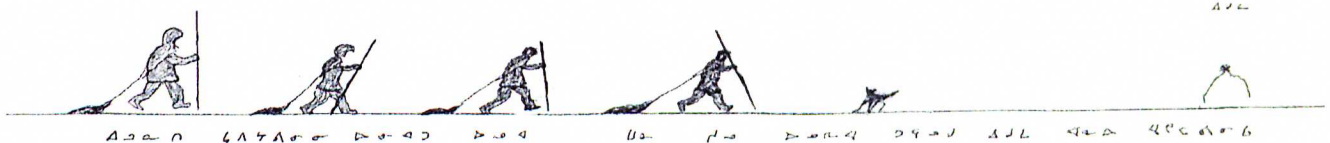




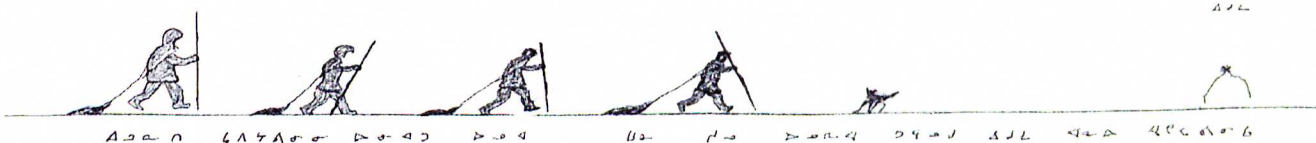
Figure 50: Oblique View of Ungava Bay & Hudson Straits from the Internet

This oblique image, Quaqtaq centred, was taken from the Internet site operated by GlobeXplorer, Inc. The site offers the user to navigate and discover any image of the world from any perspective. Depending on availability, aerial photographs of parts of the world can be obtained. Source: <http://www.globexplorer.com/imgallery/index.htm>

5.2.2 Ephemeral Representations of the Arctic

All maps are ephemeral. Every map and photograph is out of date before it is printed, however, this does not imply that they are obsolete. Wood's and Fels (1986, p. 73) suggest that maps employ a "code of tense" - a temporal topology, a code of duration and a temporal scale. Furthermore, Wood's and Fels assert that maps are drawn to refer to the past tense, future tense or, if some maps can get away with it, no duration at all. Three maps selected from the Quaqtaq Map Study (Appendix 4) exemplify these temporal codes: Map of Traditional Travel Routes to Akpatok Island from Kangirsuk, Figure 51 (past-tense); Meteorological Map of North America, Figure 52 (future tense); and the Geological Map of the Quaqtaq District, Figure 53 (no tense).

The Inuit drawn map, Figure 51, showing traditional journeys across Ungava Bay to Akpatok Island, is a graphic recollection of stories told to Inuk, Samwillie Annahatak by his father and grandfather. Samwillie drew this particular map to communicate to the Inuit people of Nunavik and the Canadian Government, traditional ways of life in the Kangirsuk district - a lifestyle entrenched with travel. Supplemented with an essay of the region, the map represents a bygone era - it was drawn in the present tense to refer to actions of the past. One may speculate that early explorer maps of the Arctic, such as the *Map of the Labrador Peninsula, 1895* (Appendix 4), should also be classified as a map that represents a past tense. However, it is important to bear in mind that these maps are a representation of the knowledge of the land and seas at that time, that is 100 years ago. These maps did not profess to point toward the past or future, they represented the present. A map of the past and a map drawn to refer to the past must not be confused.



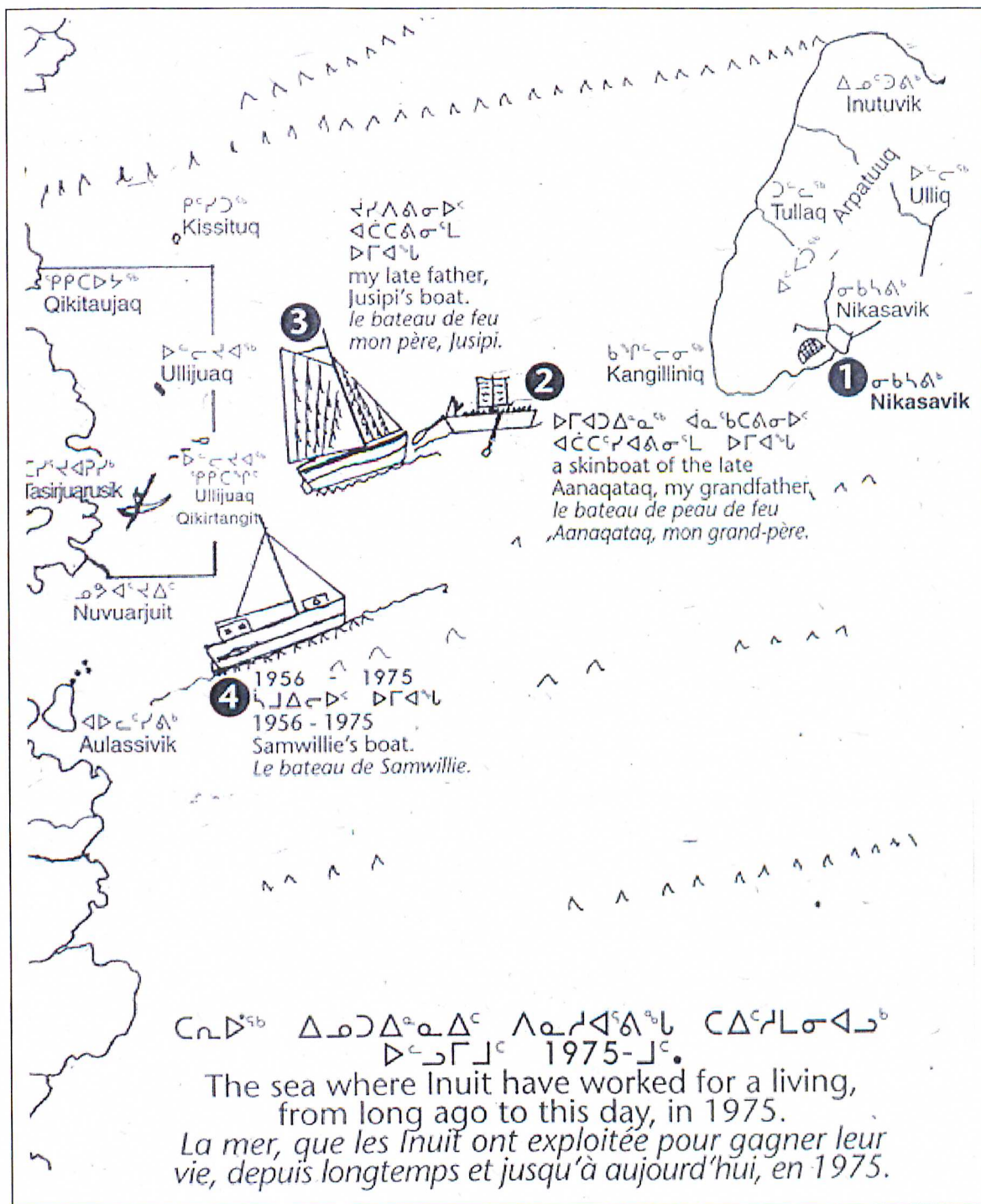


Figure 51: Inuit Map of Traditional Journeys from Kangirsuk to Akpotak Island (Ungava Bay)
 This map was recently drawn by Samwillie Annahatak to represent the traditional Inuit lifestyle of the Kangirsuk people. Source: Annahatak, S. 1997, 'A Letter from Samwillie', *Tumivut*, Autumn, no. 9, p. 15.



Maps containing information that attempt to predict the future are undoubtedly subjected to more ridicule than maps that remain seemingly static. For example, a map that pinpoints the proposed location of a nuclear waste dump or military maps that indicate the points of target for an imminent attack are not made lightly. The subsequent actions and consequences associated with the information depicted on these maps can, and usually do, impact human lifestyle and dramatically alter the environment. On a less dramatic scale, weather maps, which are highly ephemeral by nature, often shape and inhibit day-to-day actions. A cereal farmer may listen attentively to the weather forecast on the evening news in order to make decisions for the proceeding day – too wet, cannot reap; too windy, cannot spray weeds. Moreover, a pilot may avert flying if thunderstorms and cyclone conditions are predicted. According to Wood and Fels (1986) a weather map is a rhetorical gesture – it orientates the map in its culture, it points the map to somewhere else (to the globe), to itself, to its maker, to the culture that produced it, to the place and time and omphalos of that culture. Regardless of the codes that underscore weather maps, they provide a way of describing natural systems in such a manner that the proceeding day can be visually conceived. An example of weather maps of North America from the Internet (**The Weather Network**), Figure 52, illustrates the correlation between isobars (which denotes areas of equal air pressure) and warm and cold fronts. Laden with symbols, the weather map indicates areas that are likely to experience rain and snowy conditions with symbolic white star flakes and oblique dashes. Unfortunately this weather map is the only map available to residents in the Arctic on a 24-hour basis. It lacks detailed coverage of specific regions and ignores the influence of the northern extremities. Because it is Central American centred, it offers little information to the inhabitants and travelling hunters of the high Arctic.

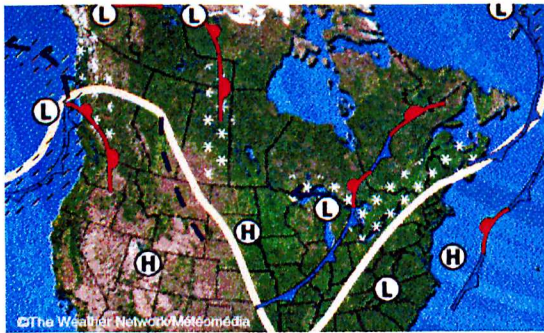


Figure 52a: Future Maps are highly ephemeral: Isobaric Chart: System's and Weather Today for North America – Pressure Systems
Prediction for February 1st, 2001. Source: <http://www.theweathernetwork.com/>

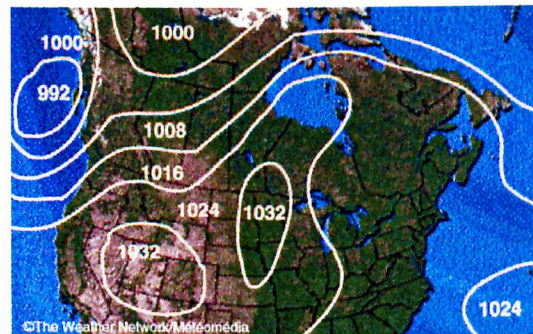
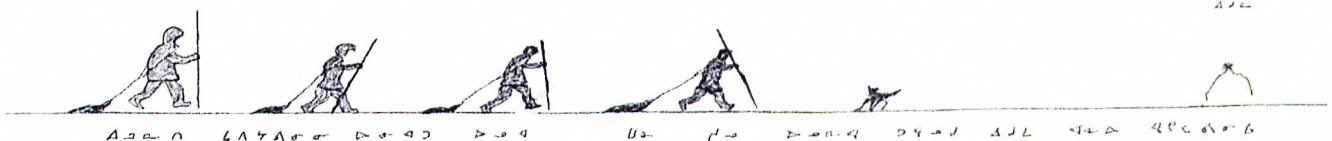


Figure 52b: System's and Weather Today for North America: Isobaric Chart
Prediction for February 1st, 2001. Source: <http://www.theweathernetwork.com/>

Other such ephemeral maps of the Arctic (which encompass the Quaqtaq region) that were sourced for this paper include: Salinity Levels and Current Flow for Hudson Strait, Gravity Map of Wakeham Bay, Magnetic Anomaly Map of the Soper River region and NOAA Satellite Images of Upper Canada (Appendix 4). Despite the fact that these maps reveal important data to those who know how to translate the information, they tend to atrophy and become disregarded more often than other forms of maps. By virtue of being ephemeral and predicting the future, these maps, like the information they exude, only exist for a short time span.



The Geological Map of the Quaqtak District, Figure 53, is a fine example of a map that claims to remain accurate and static almost indefinitely. Other maps in Appendix 4 that attest to have “no tense” include: *The Mineral Deposits of Canada*, *The Principle Mineral Areas of Canada* and *The Tectonic Map of Canada*. It is unlikely that these maps will date quickly considering they describe landform and rock-formations that have taken millions of years to develop.

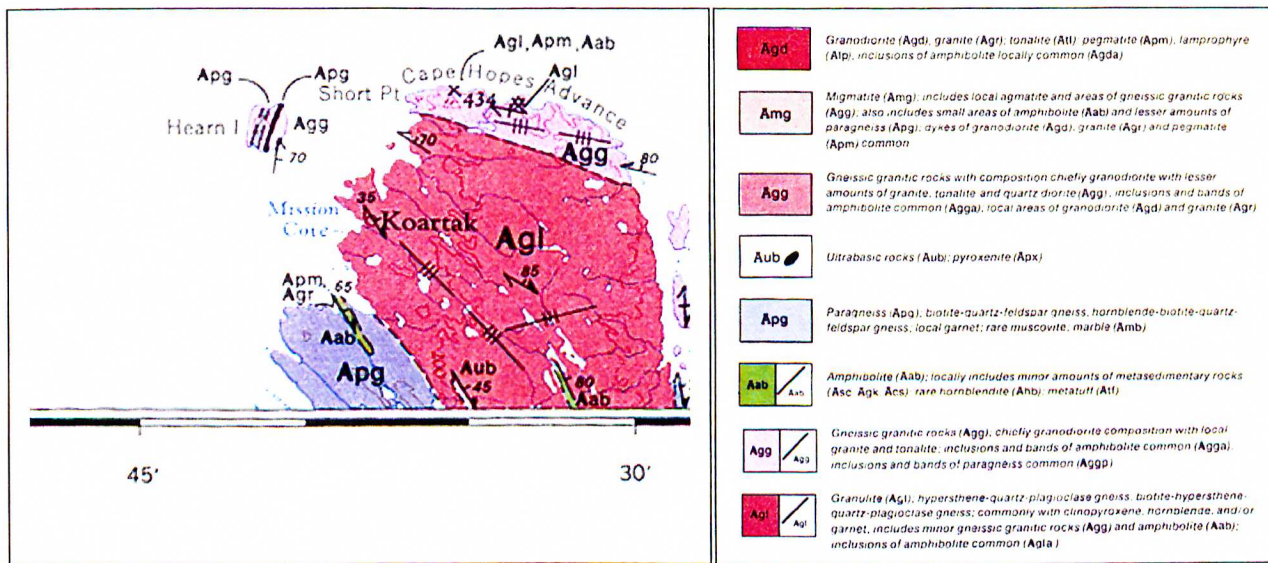


Figure 53: A Timeless Map: Enlarged section of a Geological Map (Including Legend) of Quaqtak
 Quaqtak District (Wakeham Bay) Map 1538A, Geological Survey of Canada, 1973. Original Scale: 1:250,000
 Source: Cartographic Library in the Geography Department, McGill University, Canada

5.2.3 Symbolic Representations of the Arctic Landscape

While the content within *The Geological Map of Quaqtak*, Figure 53 may remain stagnant, the codes, colours and symbols that represent aspects of geology may change subtly and evolve over time. However, graphic and cartographic conventions and metaphors instilled since childhood over countless generations, such as blue for rivers and green for trees will presumably remain unchanged. Symbols are a way of representing landscape - a way of seeing, a way of knowing. To the uneducated, the symbols featured in the Geological Map are nothing more than mere markings and dashes. Yet to the geologist, this lexicon provides enough information to picture the nature of the terrain, its age, colour of the landscape and rock strata, without even visiting the area. For the map user, colour has been assigned in order to improve the legibility of comprehending the location of various rock types. Wood and Fels (1986) contend that all maps contain signs, symbols, icons, fragments and inventories to describe landscape – expressions of landscape that are highly abstract and removed. Further inspection of the Geological Map reveals a number of these ‘presentational codes’ that are fused into a cartographic discourse. For instance, the typeface (font) and size of lettering conforms to cartographic conventions; dominant areas of rock are classified with a larger font, small areas with a lesser font size. The scale bar, typically black and white with even graduations of measurement, appears as such. And, the legend box, with its accompanied text is consistent with cartographic standards. Accordingly, the Geological Map of the Quaqtak District embodies many symbols –



symbols which only one adherent of the landscape can envisage with distinction, geologists.

However, with the advent of Geographic Information Systems (GIS) and Global Positioning Systems (GPS), the landscape is increasingly being viewed through a common cartographic language – a lens of seeing the land through a uniform set of symbols and signs. Before elaborating on the implications of using GIS and GPS as alternatives to paper maps, it is necessary to define and describe both systems.

Geographic Information Systems (GIS): Revolutionising 'Looking' at Landscape

Geographic Information Systems were initially developed by landscape architects to make informed landscape planning decisions. Renowned landscape architect, Ian McHarg, has received much credit for providing the mechanisms upon which GIS is founded. Acclaimed landscape architecture textbook, *Design With Nature* (McHarg 1969) proposed that the features which constitute landscape: soils, vegetation, climate, topography, ecological systems and hydrology, to name a few, when critiqued separately and then superimposed as 'layers', provide an excellent means of analysing and interpreting the land. Although McHarg refined the process of overlaying landscape characteristics to establish relationships and patterns, he was not however, the first to do so. The earliest evidence of data overlays as an analytical technique was performed for the town of Billerica, Massachusetts, in 1912 by landscape architect, Warren Manning. Working with town residents, four different data maps and plans of the town were drawn to the same scale in order to illustrate recommendations for changes to the town's circulation routes and land use (Steinitz et al 1976). Also in 1912, five plans depicting the development of the township Dusseldorf between the years 1874-1912 were created to gain an insight of areas that were responding more readily to development pressures. And, in 1922, using the overlay method and maps drawn to the same scale, a regional planning scheme was prepared for Doncaster, England, to interpret accessibility options (Steinitz et al 1976).

In recent times Geographic Information Systems have essentially replaced the overlay method, so much so, that paper maps will soon become obsolete. According to Landscape Architect, E. B. MacDougall (1983) a geographic information system is, "A collection of spatial data about several variables (maps) for a relatively large area, together with the programs that are required to process, access and maintain it." The Environmental Systems Research Institute (ESRI), proponents of the GIS software packages ArcView and ArcInfo, offer another description: "A GIS is mapping software that links information about where things are with information about what things are like. Unlike with a paper map, where 'what you see is what you get,' a GIS map can combine many layers of information." Each piece of information in the map sits on a layer, and the users turn on or off the layers according to their needs. One layer may consist of the rivers and lakes of an area, while another layer may represent native vegetation and yet another may represent urban areas.

Basic forms of Geographic Information Systems were first used 30 years ago in the United States by the military for the purpose of concealing intelligence sites from civilian view. The forestry department in the US also saw the benefits of such a mapping program, and thus implemented it to monitor growth rates of trees and to locate potential forest sites. The computer hardware required to run the GIS mapping software at that time was very expensive and consequently, not readily accessible to the public domain. However,



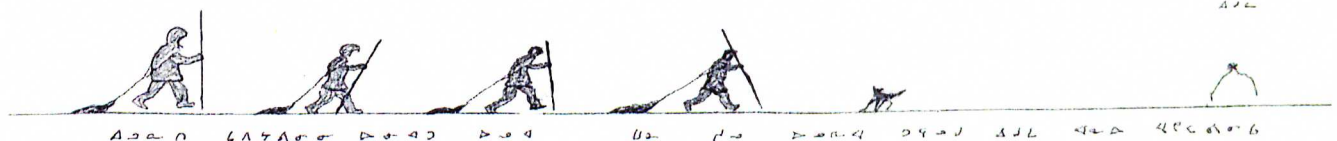
increased computer technologies and improvements in GIS useability have ensured that even the novice user can purchase the software and thus manipulate maps on their own personal computer.

GIS operate in two formats, vector and raster. Vector based GIS programs such as ArcView and ArcInfo use lines, points and polygons to represent landscape features, whereas raster based GIS programs such as GRASS (Developed by the Corps of Engineers) and IDRISI (Clark University Graduate School of Geography) use pixels (at a particular resolution) to represent data. Photographs, satellite images and scanned paper maps are examples of raster data. Unlike paper maps, GIS programs are better equipped to manage attribute data. For example, by clicking on a line representing a road, the user can be informed of its length, width and intensity of use, providing this data has been previously entered into the database. Not only can the user enquire about a feature on the map, the user can also amend and tailor attribute data with little effort. Moreover, the user can add more layers of information to any given map from a range of external programs that are compatible with GIS. Such programs include: AutoCAD (Autodesk), which permits the transfer of 2-D drawings across both vector and raster platforms, and Adobe Photoshop, which allows photographs to be linked with symbolic elements on a map. In addition, data from GPS receivers can be accurately transferred digitally and Digital-Ortho photographs (DOP) can be geo-referenced to form a backdrop layer to any GIS map.

A recent addition to vector based GIS programs called 'hotlink', when activated, connects maps with elements of the world in real time. This is made possible by supplementing GIS maps with video cameras and microphones. Once a video camera is linked with GIS software, the user can remotely click on the map where a camera is present to inspect the surroundings. This application has been extremely useful at busy highway intersections and shopping malls. Recreationally, some surfers and beachgoers in Australia navigate through maps of the coastline provided on the Internet (eg. www.wavewatch.com.au) to make informed decisions about the best location to embark. By clicking on the button that corresponds to a particular surf location, they are able to observe up-to-the-minute surf images via 'SurfTV' from over 20 'surf-cams'.

GIS programs integrated with GPS are increasingly being used to record and track human and animal activity in a real-time capacity. One recent example is that of a White Pointer shark that was tagged with a tracking device in the waters off the East Coast of Australia. Over a period of one year, researchers were able to watch the shark's journey by simply viewing the dynamic map. When combined with multimedia such as GPS, video and sound, GIS maps offer a unique and surreal perspective of seeing the world.

Cartographers have recently adopted the use of GIS software to record a wealth of information about the land and people of the Arctic region, Nunavik. Known as the *Makivik Land-use Database*, it was complete in 1998 with the aid of archaeologists, anthropologist, historians and the local Inuit community. The study not only pinpoints the various lakes and rivers that constitute most of Nunavik, but also incorporates data in regard to Inuit interaction with the land. There is no doubt that the database will become a legal and historic document of Inuit life. Of pivotal importance to the mapping study are the Inuit land use interviews, which were carried out in the early 1980's by Arctic researchers. Extracted from these interviews was information pertaining to: traditional campsites, birthplaces, travel routes, hunting grounds, religious sites and the location of important



Inuksuit. These facets of Inuit life are represented in the GIS map as separate themes (layers). With this mind, a map of the Quaqtāq region, Figure 54, was generated from the *Makivik* Land-use Database using ArcView Ver. 3.1, to illustrate important sites and traditional journeys. The map reveals the extent to which the Inuit travel across the region, including a surprising correlation between the routes used for traditional dog-team and modern snowmobile travel.

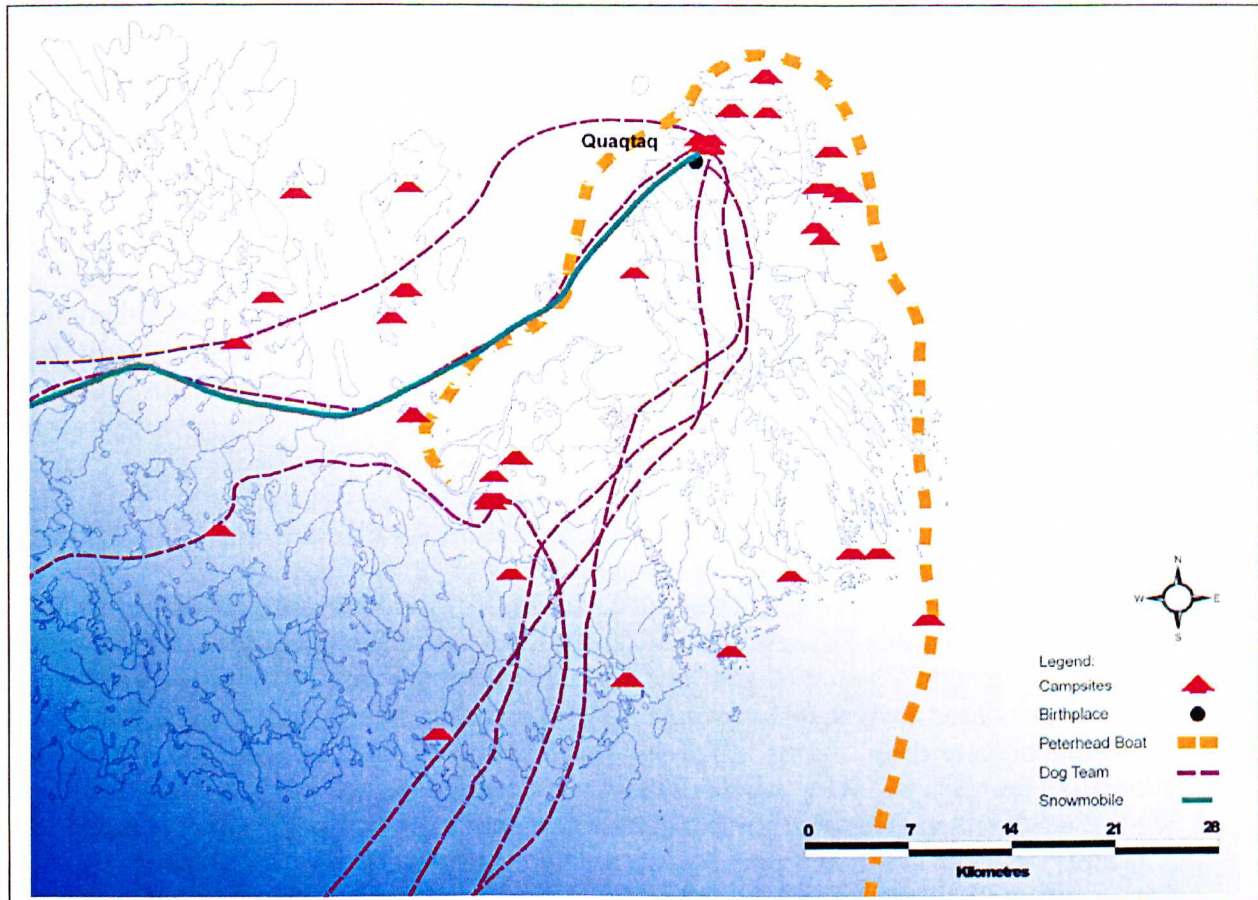


Figure 54: Map of Important Sites and Travel Routes of the Quaqtāq District from GIS

GIS map generated by querying particular themes from the *Makivik* land-use Database (1998) of Nunavik. Map created in ArcView Ver. 3.1 and exported into Adobe Photoshop Ver. 5.5 for editing by author.

Despite obvious advantages over other mapping techniques, it is important to consider the implications GIS have on how landscape is perceived. The way in which GIS dissects and dissolves layers provides a new way of looking at the land, especially in regard to valuing resources. Although GIS attempts to remove chaos from maps, it sometimes removes the connections in the landscape that cause it. With GIS, the land is no longer an integrated whole – systems on earth are divided into components and layers. Layers may inhibit contextual information - they control what's being seen and what elements are exposed. The viewer sees only fragments of the map unit.

Furthermore, the way in which maps are presented to the user through the GIS program on the computer screen also impacts perception. The monitor size demarks the frame of view; it defines the boundary and edge. To attain the best view port and resolution, one must use the pan and zoom tool to scan across and within the map. GIS also provides tools to amend



scale and projection with relative ease. And to change colours and map symbols, which are admittedly homogeneous (unless map graphics are altered in image manipulation programs), one must use the tools offered by the program. Unlike paper maps, GIS maps are not portable, unless of course, they are viewed from a laptop computer.

The dynamic nature of GIS has dramatically shaped the way many professions and businesses view their environment. Real estate agents, farmers, fisherman, census bureaus, geologists, meteorologists, police, entomologists and many others have recently joined the ever-increasing GIS user list. The use of GIS will continue to prosper as more programs are geared to be compatible and integrated with it.

Global Positioning Systems (GPS): The Modern Lens

To those Inuit who roam the Arctic landscape, Global Positioning Systems are considered the modern equivalent of Inuksuit. Although both methods can describe locations with remarkable accuracy, they perform markedly different functions in terms how they impart way-finding information. GPS sees the world from above; Inuksuit sees the world from ground level. They offer two fundamentally different ways of knowing and seeing the landscape.

Sorvig (1995, p. 29) describes GPS units as, "Portable surveying devices that pinpoint the user's position anywhere on the earth's surface." According to Garmin, the manufacturers of GPS devices and receivers, a global positioning system is a satellite based navigation system consisting of a network of 24 orbiting satellites that are eleven thousand nautical miles in space and in six different orbital paths. The satellites are constantly moving, making two complete orbits around the Earth in less than 24 hours. Although the satellites circulate the globe between latitudes 60 degrees North and 60 degrees South, signals can still be received beyond these latitudes. Therefore in the Arctic, satellites are not directly overhead – a factor that may subsequently affect the accuracy of GPS at times. Essentially, GPS uses satellite signals to determine the exact location of elements on the surface of the earth. The accuracy of the fix depends on the mode of reception of the receiver. Typical civilian GPS receivers (which range from \$200-\$1500 AUD) provide 10-20 metre accuracy, depending on the satellites in view and the altitude of these satellites in the sky. GPS units equipped to recognise the process known as Differential GPS (DGPS) may gain between 1- 5 metre accuracy. DGPS works by using a second GPS receiver to compute corrections to the GPS satellite measurements (Garmin 2000). In order to establish precise geographic position (regardless of the GPS unit) the GPS receiver must recognise at least 4 satellites simultaneously. If the GPS receiver recognises only 3 satellites, it can only obtain a 2D position fix: latitude and longitude. Alternatively, four satellites enable the GPS receiver to determine latitude, longitude and altitude through triangulation. Moreover, triangulation enables the GPS receiver to calculate the speed one is travelling across the ground, the route travelled and the estimated time of arrival to a particular destination.

GPS receivers are very portable (pocket-sized) and reliable, they operate throughout the world, they are rarely affected by terrain and atmospheric conditions and they operate during the day and night. However, GPS ignores the physical landscape; it reduces the world to a series of imaginary coordinates, grids, lines and points. The satellite is the lens. During a visit to Nunavik for this paper, a GPS was used in the Quaqtq district to demonstrate this point. Figure 55 illustrates the geographic location of Quaqtq in terms of



coordinates. By pressing the 'man-overboard' (MOB) function on the GPS receiver, the exact location or 'waypoint' was instantly registered in the GPS receiver database. The GPS receiver pictured in Figure 1 is capable of storing up to 200 waypoints. Each waypoint can be named, assigned a symbol (such as the house symbol given to represent Quaqtuaq as a village) and labelled with extra information if required. The GPS unit can also plot the movements from or toward a particular waypoint. And if the user wishes to travel from one waypoint to another, the user simply follows a 3-D navigational screen as a guide. The person in possession of the GPS navigates by watching their course in relation to the destination point. In fact, if the navigator drifts from a particular range to either the left or right of the desired course, then an alarm beeps to warn the navigator to correct their course. Alarms also activate when the navigator reaches the destination – it reassures the navigator that the journey has been successful. The benefits of using GPS in remote areas like the Arctic are enormous. Landmarks are no longer needed as reference points. Fuel costs can be minimised by following direct 'as the crow flies' routes. And, dangerous areas, when programmed into GPS receivers, can be easily avoided.

Many Inuit now use hand-held GPS units (they fix them to their snowmobiles for greater stability) to travel on the land. **The ramifications of this shift from cognitive to computer/satellite mapping based systems could be quite detrimental to Inuit traditions.** The cognitive system is not based on scientific structures or systems of expression, whereas the GPS relies heavily on a uniform set of codes, symbols and cardinal points. This transition, from one mode of knowing landscape in a traditional sense to a 'westernized' structured system (GPS) is profoundly impacting Inuit perception of landscape. GPS disconnects the user from the land – the navigator watches the 'highway' screen on the GPS unit instead of attentively observing the surroundings. Inuit travelers using GPS see the landscape as fixtures in space, rather than a sequence of images. GPS has revolutionised a way of seeing landscape for all cultures, but perhaps it has had the most impact on the way traditional indigenous hunting and gathering societies interact with the land. **Perhaps the days of constructing stone cairn Inuksuit beacons on hill tops and valleys are numbered, and maybe the stories and legends attached to these features upon the landscape may also begin to erode as mapping technology continues to invade.**



Figure 55: Using GPS to determine the location of Quaqtuaq

According to the Garmin, GPS 12 channel receiver, the village Quaqtuaq is not a point in the Arctic; it is point on Earth with the coordinates:

N 61° 02' 44.6\"
W 069° 37' 48.8\"

One must be cautious of relying completely on GPS for navigation for two reasons. Firstly, GPS uses a satellite system owned by the US Department of Defence – they control, maintain and may also therefore inhibit the use of GPS at any time (Dana 1994). Moreover, they are also vested with the powers to change the accuracy of GPS and to switch it off.



Secondly, as with any electronic device, batteries may fail or mechanical problems may occur. Inuit who use GPS for navigation must, at times, continue to use traditional way-finding techniques – not only as a precaution in case GPS is made redundant, but also to ensure this traditional knowledge is transferred to future generations.

5.2.4 Topographic Representations of the Arctic Landscape

Since the founding of paper maps, cartographers have struggled with the concept of representing three-dimensional landform on a two dimensional surface. As discussed in Chapter 4, the Inuit represented mountains, houses and rivers by constructing small-scale models on the ground from rocks, sticks and snow. In addition, Greenland Inuit made bas-relief maps from pieces of wood to overcome difficulties with comprehending topography. Conversely, Western navigators developed ingenious methods of depicting landform on paper maps – techniques that rely primarily on symbols to represent topography. An examination of four Western scientific maps of the Arctic, some of which were drawn over 200 years ago, reveals the various techniques employed.

The *Early Explorer Map of Hudson Bay and Straits* (c.1700), Figure 56, is filled with imaginary mountain ranges, coastlines, rivers, forests and lakes. Its place names and topographical assumptions derive from European cultural conventions unrelated to the landscape depicted – a landscape which the Inuit, Indian's and Innu had already mapped in minute and reliable detail. The coastline, inlets, harbours, rivers and lakes are distinguished by fine horizontal hachuring. Mountains are drawn in oblique view; forested areas are portrayed with small clumps of trees drawn in perspective view and marshlands appear as small vertical/horizontal dashes.

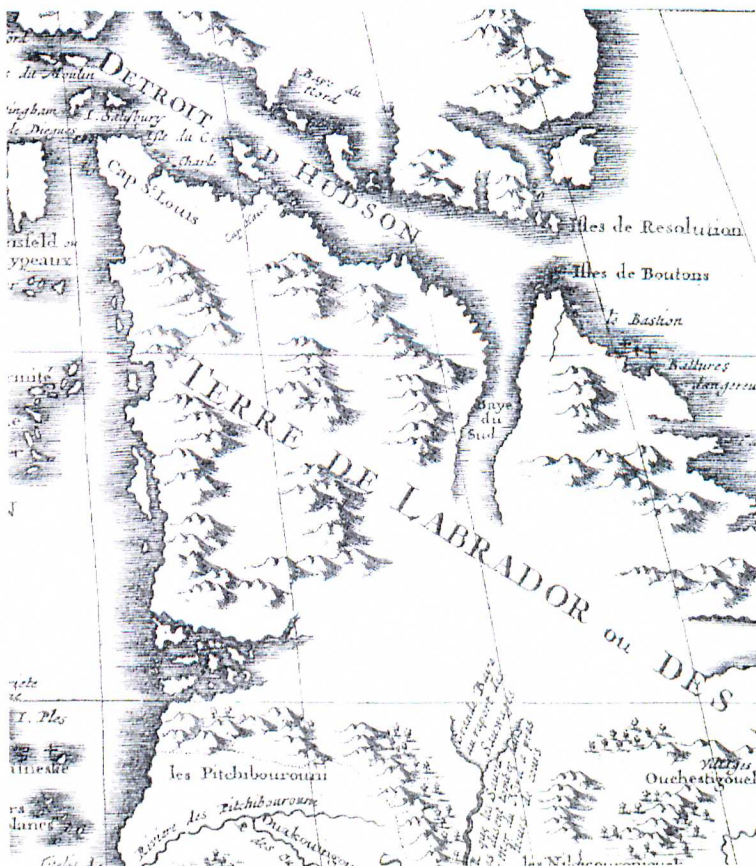


Figure 56: Early Explorer Map of Hudson Bay & Straits
Enlarged portion of an early explorer map of the Arctic. Titled, "Nouveau France," the map states that Guillaume Baffin Angloi discovered the area between the years of 1622-1624. Note the hachuring used to highlight coastal features and mountain ranges. Source – Cartographic Library, Geography Department, McGill University (unclassified map section)



As an alternative to extensive hachuring, the coloured *Map of The Labrador Peninsula* (1895), Figure 57, represents coastlines and lakes in shades of blue. An airbrush was used to create such soft edges. Likewise, the fringes of mountain ranges have been airbrushed a shade of red/brown to make them appear conspicuous. The map also uses colours to illustrate the chief geological formations of the area. And, red pointed arrows are used to symbolise the direction of glacial *striae* at specific localities. A variety of continuous dashed and dotted blue lines denote the limits of numerous trees species. For ease of reference, the names of these tree species are written against the edge of the dotted/dashed lines accordingly. In addition, elevation is represented by a continuous dashed and dotted line and labelled, “height of approximate land.” Words, in place of symbols, are also used in the map to describe geographical settings, such as “low shore” or “mostly level”. It is quite evident from Figure 57 that cartographers knew much about the nature of the coastline, but very little about the interior of the Labrador Peninsula. Because of the gross misrepresentations and misplacement of lakes, harbours and rivers, one may speculate that the cartographers relied on intuition, Inuit knowledge or perhaps even conjured landscapes.

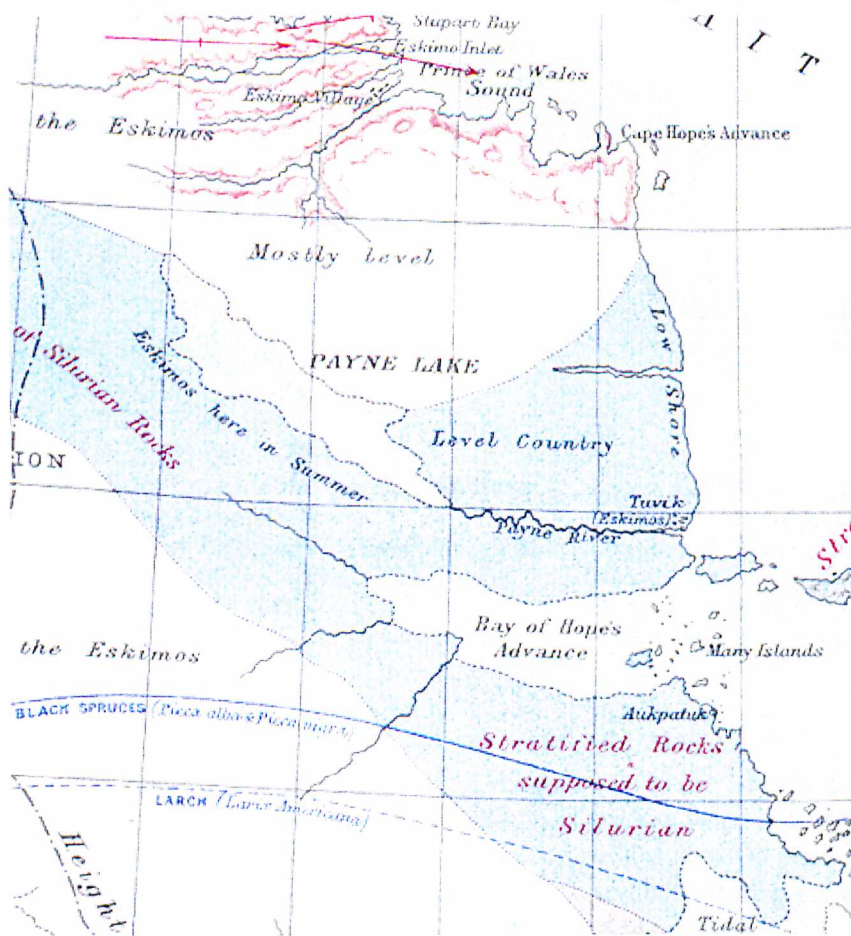
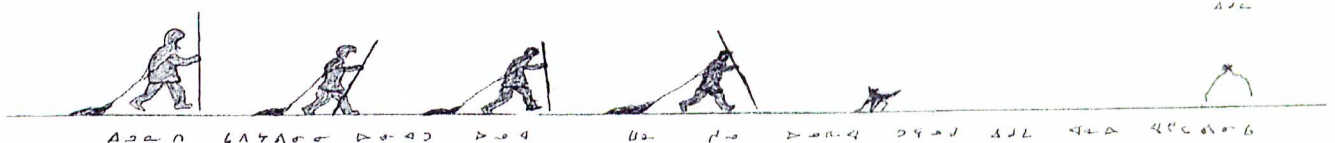


Figure 57: Portion of a Map of the Labrador Peninsula, 1895

Note the use of words, colours and dashed lines to represent topography and landform. Mountains are depicted in shades of red/brown.

The most commonly used maps for hunting, exploration and travel (for Inuit and Non-Inuit) in the Arctic are the *National Topographic Maps Series* (1:250,000). Close examination of a portion of the Topographic Map of Quaqtq, Figure 58, reveals the current methods used to symbolise natural features and elevation. Thin, curvaceous and continuous brown lines known as contours are used to represent the elevation of the earth's surface at regular intervals of 200 feet. Contour lines depict areas of equal height based on the height above mean sea level. The closer the contour lines are together, the steeper the slope. Whereas, the



further apart the contour lines appear, the shallower the gradient will be. And, to determine the highest point on ridge tops, spot height numbers are assigned (indicated by a dot and a number). The coastline edge, outline of lakes and tributaries of rivers are all demarked with a thin blue line. Unlike the Explorer maps of the Arctic, this map does not emphasise coastal topography and water bodies. However, along the coastline, black asterisks and 'rev-clouds' (curved semi-circular hatches) highlight dangerous rocks and reefs to avoid.

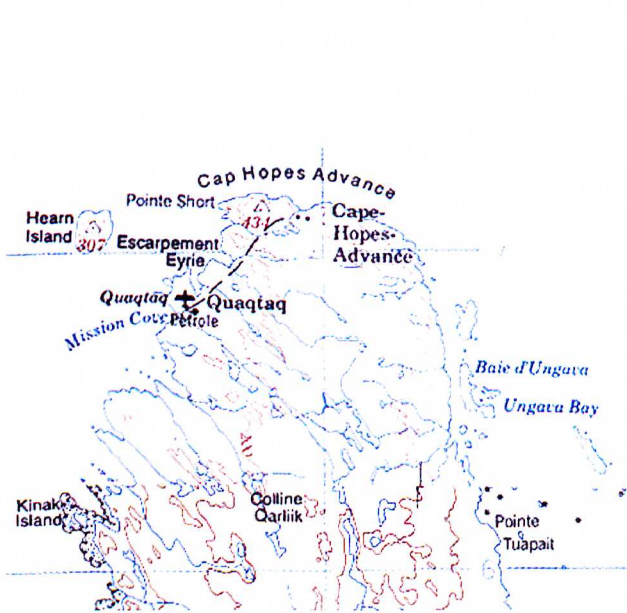


Figure 58: Elevation of the Quaqtq landform is represented as contour lines

Source: National Topographic System of Canada, Natural Resources Canada, Geomatics Canada. Original Scale: 1:250,000

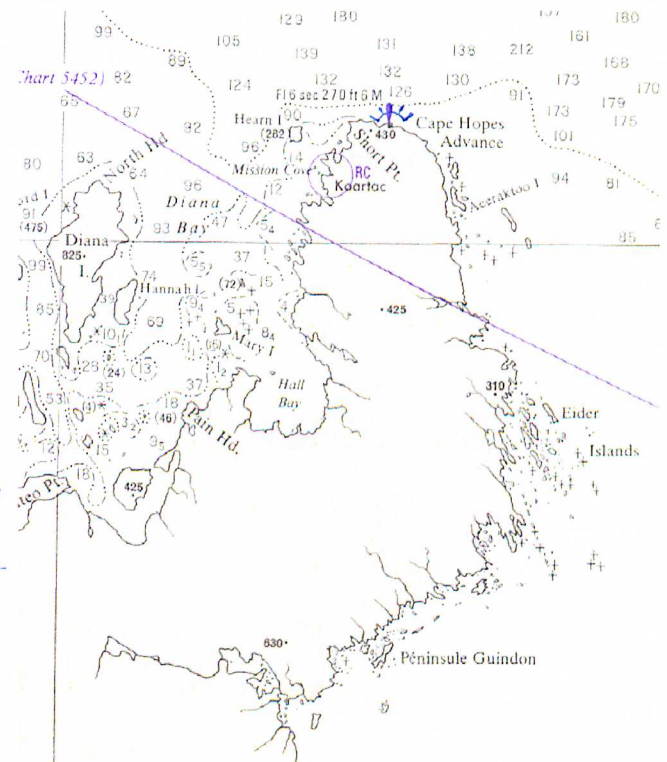


Figure 59: Hydrographic Chart of Ungava Bay

Enlarged section of a hydrographic chart of Hudson Strait, Ungava Bay, 1977 (with revised errors corrected for 2000). Note that this chart represents the depth of the sea floor (underwater topography) in fathoms. Original Scale: 1:500,000. Source: Canadian Hydrographic Service, Department of Fisheries and the Environment, Ottawa.

Another form of a topographic map, the *Hydrographic Chart of Ungava Bay & Hudson Strait*, Figure 59, represents the landform of the sea floor with numbers instead of contour lines. Based on soundings (measured in fathoms) that have been, and continue to be recorded by the Government of Canada, the numbers symbolise the depth of the ocean floor within a particular range. The registration and identification of most of the islands, submerged reefs and ocean depths within Canada has ensured that seafarers can negotiate unfamiliar waters with confidence. With the aid of detailed hydrographic charts and electronic echo sounders, seafarers 'see' an underwater landscape - they know the ocean topography in terms of the relationship of numbers. Subsequently, seafarers generally chart their courses to follow particular depths, knowing specific routes in great detail, yet possessing limited knowledge of the sea floor beyond common waterways.



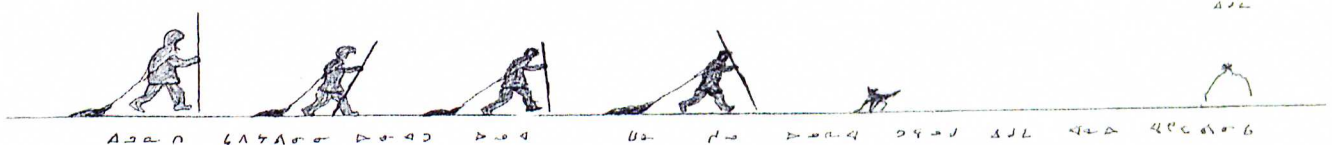
CONCLUSION

It has been shown in this thesis that traditional hunter-gathering societies that frequently moved about, such as the Inuit of Arctic Canada, developed a number of ways in which to successfully and safely traverse vast tracts of snow-laden tundra. The traditional Inuit developed a supreme spatial understanding of the Arctic landscape through repeated hunting trips and seasonal travelling on the land. Being dependant on the land for survival, over a period of several thousand years, the Inuit developed innovative and extraordinary methods of navigation that revolved around natural systems, the night sky and geographic features. The Polynesians in the Pacific, Amerindians and Australian Aborigines also navigated using similar systems based on the rising and setting of star constellations, the position of the sun and the direction of the wind. Evidence also suggests that these three groups commonly drew 'mud maps' (ephemeral maps) in the mud, sand or snow to convey way-finding information to other travelers. The Inuit were particularly proficient in the use of this method insofar as travelling distances of up to a thousand kilometres on routes previously unknown to them by recalling the image of maps drawn on the ground by Inuit hunters who knew of the correct paths to follow.

It appears however, that the Inuit possessed a much broader navigational package (than other traditional hunter-gatherer societies), which included the use of: observing the fluorescent bands emitted by the Northern Lights (*Aurora borealis*), deciphering sky reflections in the clouds, remembering large boulders and unique landforms as landmarks, travelling inland using rivers and valleys as 'highways' and recalling those lakes which 'release' steam as landmarks. Notwithstanding these methods used to way-find and orientate, the Inuit primarily navigated using 'mental' maps – a library of accumulated images formed through constant interaction with the land and from commuter travel across it.

Although the Inuit possessed no formal cartography, they did however, build interventions upon the landscape for their own personal gain. Not content with relying solely on natural elements and features within the land, the Inuit generated their own unique system of navigation using Inuksuit – purpose built markers made from stones, snow or bones. Some Inuksuit were built to stand as tall as a man so they could be seen from great distances while others, such as those placed against the edge of a lake to mark fishing locations, were less noticeable. Perhaps the most interesting aspect about Inuksuit is the extent to which the Inuit people revere them. With evidence supporting Inuksuit construction from almost 4000 years ago, it is not surprising that songs and stories have been created to celebrate them. According to Inuit beliefs, some Inuksuit are known to possess spiritual powers, emit noises and are haunted. It is for this reason that only shamans can visit particular Inuksuit sites. Perhaps this veneration of Inuksuit stems from the role they play in the Arctic – they have indeed contributed toward saving Inuit lives by indicating dangerous areas to avoid and by identifying the location of food caches.

Although the Inuit relied mostly on intangible and cognitive methods to navigate, it is important to note that some Inuit were also superb cartographers. Evidently, some Inuit created accurate maps of coastlines and offshore islands from sealskins, driftwood and walrus ivory. And, when Europeans traveled to the Arctic in search of a Northwest Passage, they soon realized (partly through accident and insistence) that some Inuit were most dexterous in the ability to draw accurate maps and charts on paper. It is alleged that



knowledge. Transmission of culture and superior perceptual skills will continue to prevail and prosper based on learning modules such as that described in this thesis assuming the *Kativik School Board* maintains the “survival” focus on way-finding in the Arctic and that Inuit children continue to be given the freedom to explore their Arctic homeland.

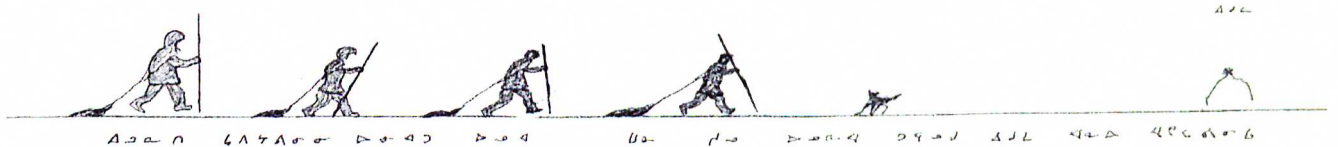
The obvious differences in the way in which Western and Inuit children interact with landscape should not limit the development of ‘landscape modules’ being incorporated into other junior and middle western-schooling programs. Rather than a focus on ‘survival’, the subject matter could focus on understanding how simple landscape systems operate, such as: tide flows, moon phases and the weather. Not only would Western children acquire perceptual skills in the learning process, but they would also begin to value and become more attuned to systems inherent in the landscape.

The examples provided throughout this paper support way-finding as an adjunct to traditional Inuit life – a part of Inuit lifestyle that some may argue is being significantly eroded by the infiltration of contemporary methods of navigation. Modern systems of navigation provide new ways of knowing and seeing landscape, selectively ignoring features in the physical landscape that the Inuit once relied upon for navigation and other ways of life. Moreover, contemporary navigation systems are not spiritually attached to the land nor do they reveal various messages about facets of the land. These devices and instruments also restrict communication of environmental knowledge among Inuit.

In terms of way-finding, it is important for designers and researchers working in the Arctic to realize that some Inuit continue to ‘see’ the land in a traditional sense, while other Inuit ‘see’ the land from a traditional and contemporary perspective, and some individuals ‘see’ the land only in terms of the ‘lens’ provided by modern navigation systems. Ways of knowing and seeing landscape pivot way-finding. Orientation and way-finding is more than mapping – it is an idea of landscape.



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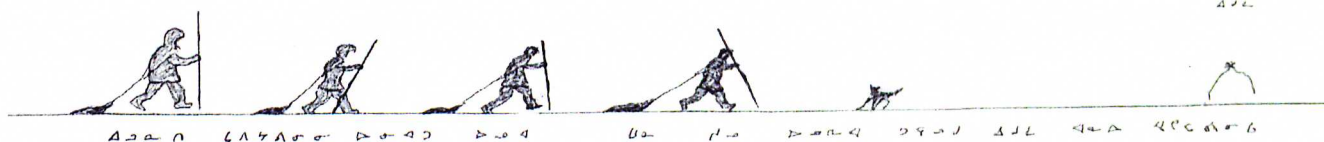
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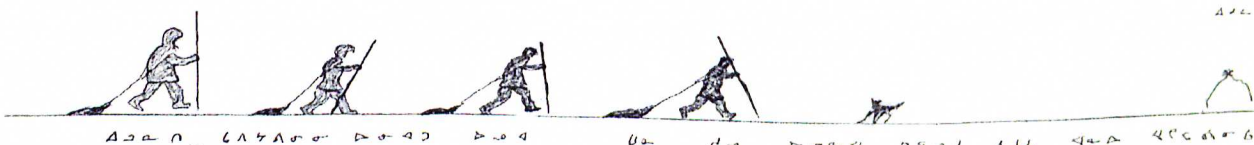
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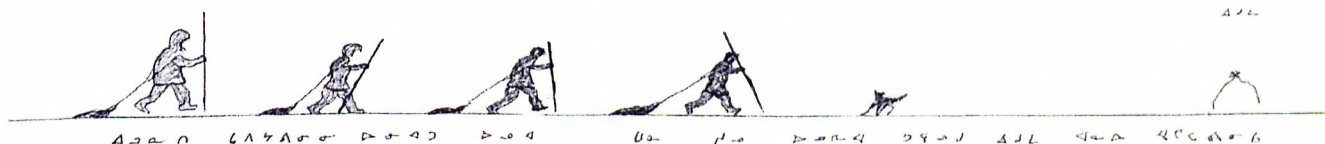
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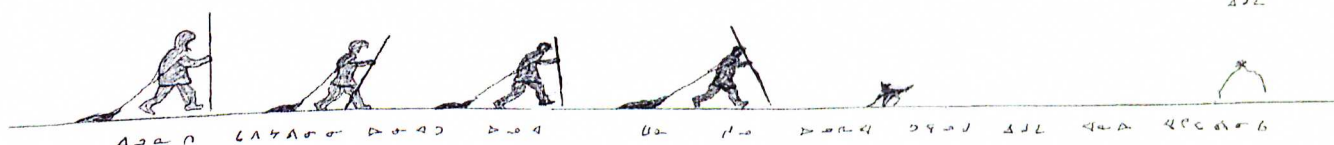
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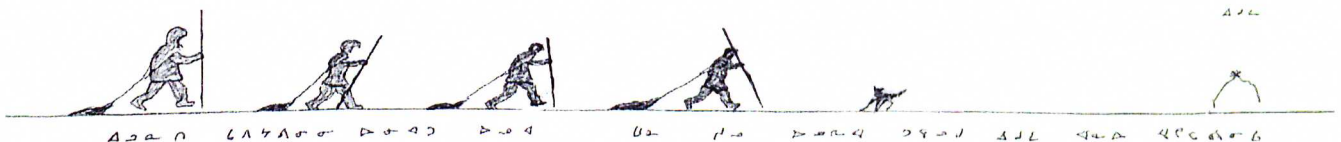


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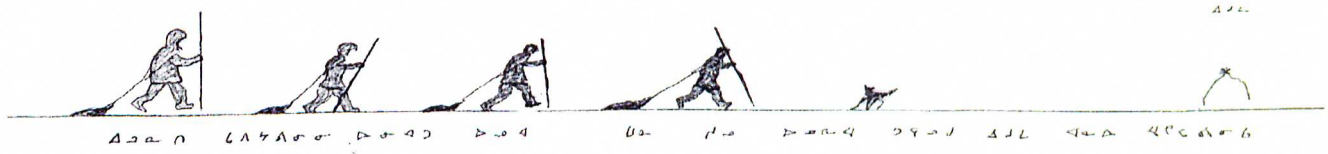
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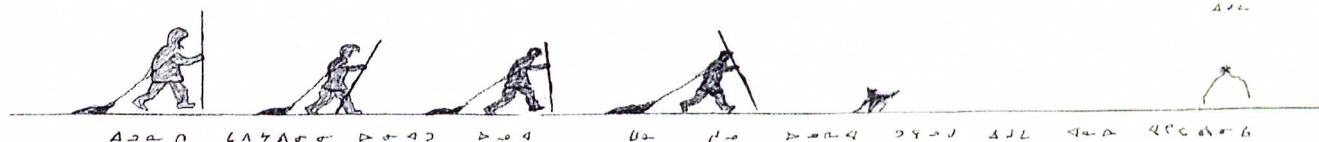
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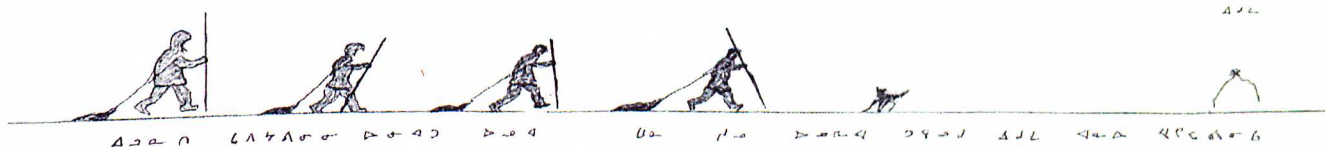
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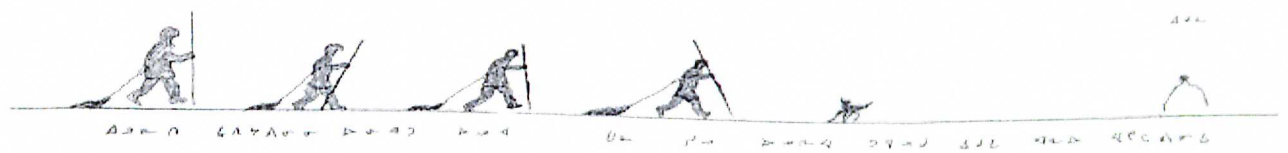
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Appendix 1

Field Trip Report (2000)



Interview with David Okpik – Inuit Elder from Quaqtaq, Nunavik

Meeting at Quebec City, September 20th, 2000

Interview duration: 1.5 hrs



Foreword

I met David at his hotel room in Quebec City while he was in town for a meeting with the Kativik Environment Quality Commission. It was a very amicable, informal discussion. The interview began by showing David the range of maps that I had collected from Quaqtaq and other Arctic areas. I asked the following questions to David as we browsed through my collection of maps. David showed particular interest in the coloured satellite images. David was able to visualize the landscape from the range of maps, and he often offered his opinion on what the elements shown in colour on the satellite maps were. The comments from the questions are a condensed version of our discussions.

1. *How do you remember where hunting and fishing grounds are?*

I have been there so often. It comes naturally to me. I do not use Inuksuit to get me there. I went with my father and he showed me. I learnt by watching. I remember by using my head. (David points to his brain and laughs). I didn't spend hours with my Dad many years ago for nothing (laughs again)

2. *If a young Inuk wanted to go to where you returned from hunting whales, caribou or polar bears, how would you describe this journey to them?*

The lands are full of names-lakes, mountains and valleys. Everyone knows these names. We can tell them where to go with these names. We hunt mainly Caribou and seals at Quaqtaq, there are names that describe these places. Some of the names have been around so long that we do not know who created them.

3. *Do you know of any maps being made by Inuk from Quaqtaq?*

I do not know of any maps being made by people from Quaqtaq. We did not need to draw them. Sometimes though, when I am unsure, I draw a map for myself on how the journey will be to get home. I often do this. Sometimes maps are drawn on the ground. I have not seen any wooden maps (referring to the Greenland maps that I am showing him) like these ones. They probably made maps like that because it is different country there. It is hillier there. The seal map (referring to the Crown Prince Island seal map) is probably made from a bearded seal, around 8 (I confirm with David that he means 8 feet). I have seen walrus ivory decorated before (we are looking at the ivory map examples that I am showing David) but not as maps. I know that people collected copper and hammered it and then put it into the vertical cracks of walrus ivory as decorations.

4. *How did the Inuit do maps for themselves?*

I do not know of any maps from Nunavik. Maybe in N.W.T they use maps.



8. How do you tell direction? (winds)

To tell direction we use the land and the coast. The coastline of Ungava Bay is the edge between east and west. It is easy to know where you are this way. I do carry a compass but I do not use it. The young ones sometimes carry a GPS to tell them where to go.

9. Have you heard of Inuit using stars to travel at night?

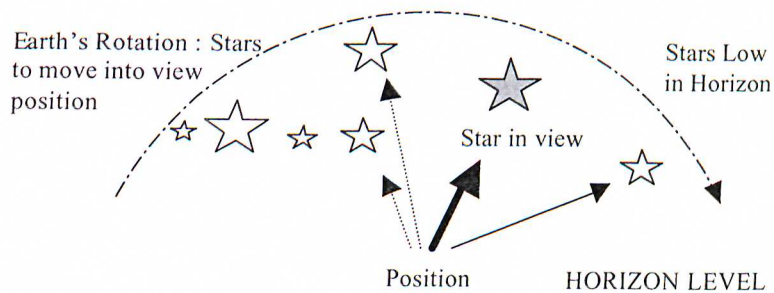
We often use the stars to travel at night. In January there is sometimes only 3–4 hours of daylight. We use the 'Big Dipper' and other stars low in the horizon. We do not use stars high in the horizon because they are hard to fix a position from. During the night the stars move across in a sequence. We use one star to fix a position and as that star begins to move out of alignment, another star moves up into its place (see figure below). We continue doing this with stars to guide us. We do not use the northern lights (*Aurora borealis*) to travel at night, but it does light up the ground for us to see.

10. How often do you use Inuit place names to describe locations around Quaqtaq?

Place names are used very often. I do not learn by words, I learn by watching. (In addition, we look at a map near Quaqtaq with Inuit place names on it and David recognizes these places without any difficulty, and begins to describe features of some of these places)

11. Do Inuit of Quaqtaq sing the travelling Aya-yait songs anymore?

No one sings these songs anymore. Maybe some elders in N.W.T do.



Star Maps: Example of the method described by David Opik, showing how stars move into position for navigation.



Interview with Johnny Oovaut 'Big Johnny' (38 Years Old)

Meeting at Quaqtaq, Nunavik, November 17th 2000

Interview duration: 1.5 hrs

Foreword

I met Johnny in Quaqtaq, Nunavik while I was staying in the Inuit village in November 2000. He agreed for me to interview him at his workplace in the warm comforts of the Quaqtaq Municipal Council Office. Johnny's father is a well-respected Inuit elder in the town, with much knowledge about how the Inuit traditionally travelled on the land. Unfortunately Johnny's father was ill when I was visiting Quaqtaq, so I missed the opportunity to discuss my research with him. The following way-finding related questions were asked to Johnny informally.

1. How did the Inuit create maps for themselves?

I don't know of any maps

2. Do you know of any maps made by Inuit from your area?

No

3. Do you use conventional maps or charts?

- Do you have other ways to help you travel?

Yes, GPS and modern charts

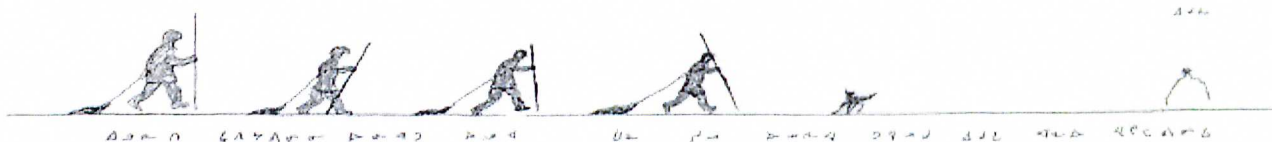
4. How often do you use Inuit place names to describe locations around your area?

All the time, they are like street names of the south (referring to Montreal)

5. Are there any geographic features around your region that are landmarks?

Why are these places/objects regarded as landmarks?

Mountains, rivers and lakes are landmarks. Some are landmarks because of their height, odd shape or because they can be seen from many directions. Many geographic features around Quaqtaq resemble particular things. For example, there are two hills called 'amamak' that resemble women's breasts. There is a tip of a mountain shaped like the head of a person and a big mountain shaped like an igloo. An area might be named after animals. For example a place is called *natsituq*, which describes a place of many seals. Or places are remembered because of an event that happened there, eg, 'arqvavik' is a place where someone got a bowhead whale. A very small bay on the West side of Quaqtaq was given the name 'tullirak' which means something being stepped on. The person was looking for something - until he realised he was already stepping on it. This place was named less than 20 years ago. We need more names-things would be a lot faster then. Another place is 'airalqtuuq' which means lots of edible roots there. *Siuraqtuuq* is a place with lots of



brown sand. 'Amaluttuq' is the name given to round shaped lakes. There is a place called 'atanialuk' which means one great big lord. I do not know how this place got its name, but I do not believe it refers to God.

6. *Describe how Inuksuit are used?*

- *Are Inuksuit used to mark fishing and hunting grounds around your region?*

I do not know how they were used. They are good landmarks. Sometimes I try to make some to remember trails.

7. *Do bird or animal movements assist you in determining location and/or direction while travelling?*

No

8. *Describe how the sun is used to convey time and direction?*

I don't know how

9. *What stars were used to travel at night?*

- *How were stars used in the past?*
- *Do you think star navigation is accurate?*

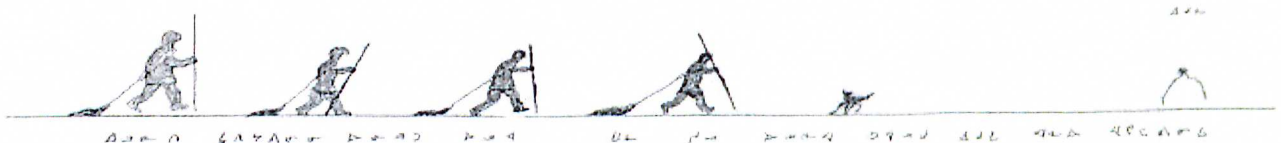
I think they used Mars to travel because it is red. Star travel is very accurate using the Big and Small Dipper. Because the Earth is moving, you have to focus on one star and keep your eye on it.

10. *How do winds and wind patterns indicate direction?*

I use wind all the time. I find out the direction it is blowing before I go hunting, and then use it like a compass. However it is not very windy here in Quaqtaq during winter. The weather has changed a lot in the last five years. I use the wind as the primary means of navigation, because when it is cloudy you cannot see the sun, moon, etc. I check with my compass to stay on course when I am not sure. I might do this every 1-2 hours. Snow drifts form when it is windy. The snow is carved by the wind to form a point. To use the snow, you have to remember which way the wind was blowing that created it. The snow points generally in an east to west direction in and around the town, and on the land it points in a north to west direction. Sometimes they point in the same direction where the country is rough.

11. *By examining cloud formations, can you determine the shape and type of distant landforms?*

Water is reflected in the clouds –dark spots (like the top of hills) might form dark spots in the clouds. Clouds are a curse when travelling. They create whiteout (where the land and horizon becomes one).



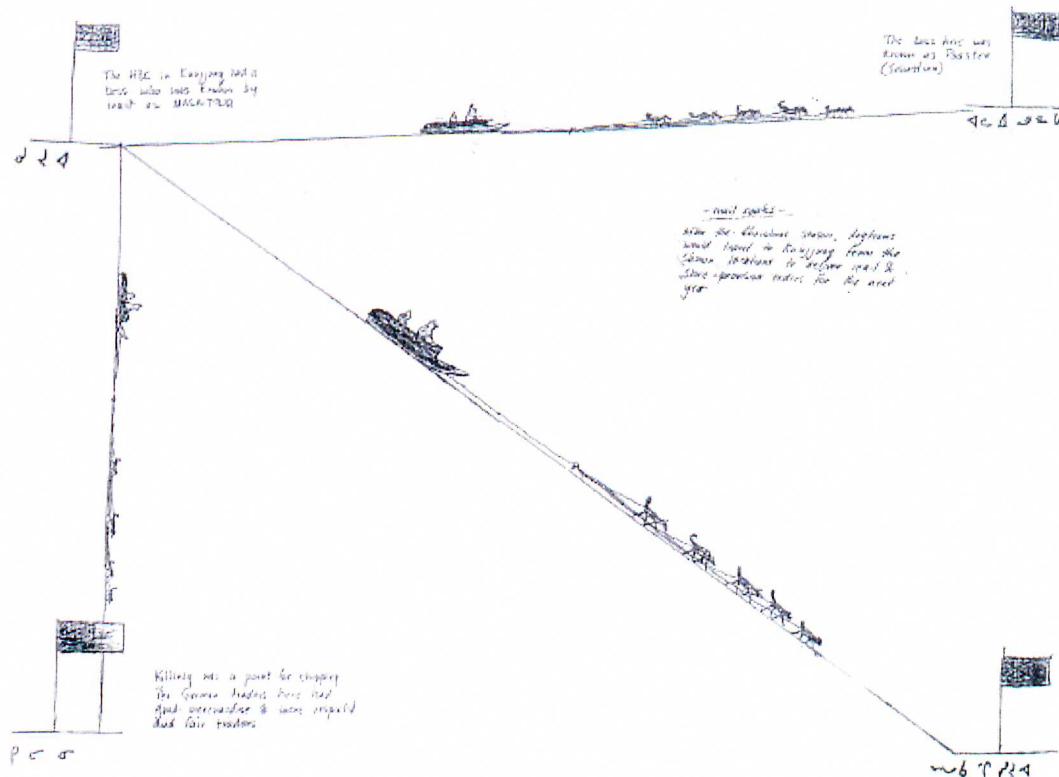
Appendix 2

Inuit Drawings & Maps - *Tuumasi Kudluk* *Collection*



Tuumasi Kudluk Collection, Avataq Cultural Institute

Tuumasi Kudluk was born in 1902 in the region of Kangirsuk, Nunavik. He has written extensively about the history of Nunavik, based upon on his experiences and ingrained knowledge about the land. In addition to writing about how to survive on the land, *Tuumasi* also had a fondness for sketching aspects of Inuit traditions and ways of life. Before he passed away in 1989, he gave the *Avataq Cultural Institute* in Montreal 1200 of his drawings that depicted scenes about hunting, travelling and stories about the Arctic. His illustrations are whimsical; yet descriptive- they remain as one of the most important tangible documents that describe Inuit traditions and perceptions of the land. The following illustrations are a selection of *Tuumasi's* drawings that relate to Inuit navigation. These illustrations are reproduced with the kind permission of *Tuumasi's* son, Willie Thomassie and the *Avataq Cultural Institute*. The existing Inuktitut translations to English were verified and modified by Johnny Oovaut of Quaqtuq.

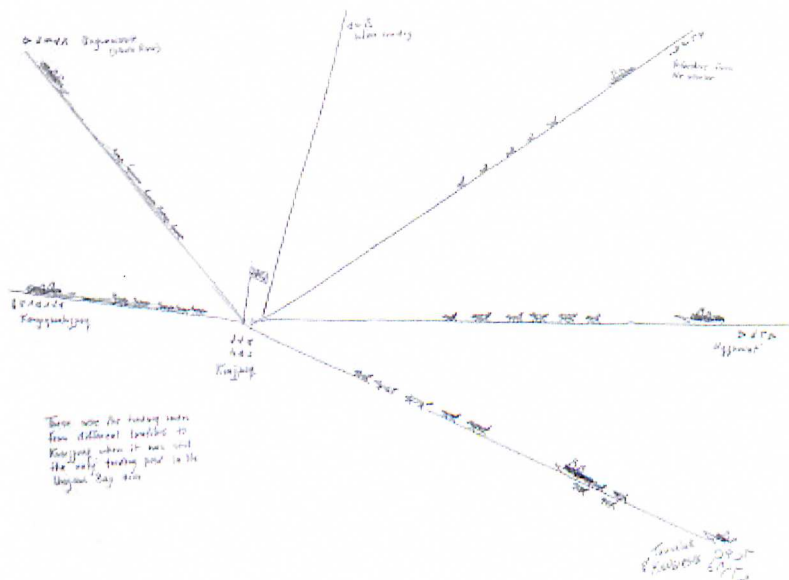


Map of the Hudson Bay Company (HBC) trading routes

The map indicates the mail routes that were used from Kuujuaq to other posts. After the Christmas season, dog teams would travel to Kuujuaq from the shown locations to deliver mail and collect store provision orders for the next year.

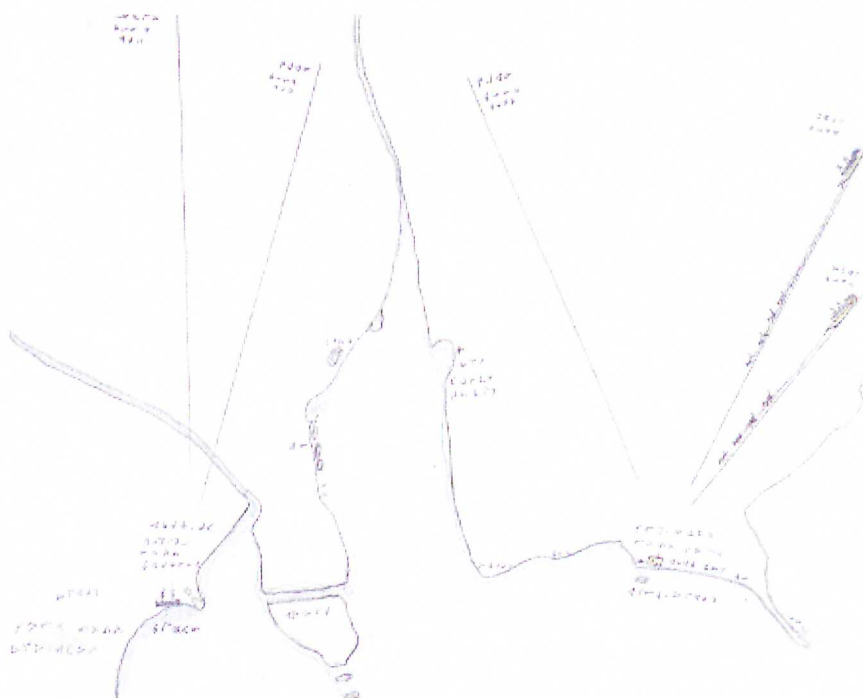
Tuumasi Kudluk Collection, Avataq Cultural Institute, A-1





Trade Routes

Trade routes to different locations from Kuujuuaq (Fort Chimo) - when it was the only trading post in the Ungava Bay area.
 Tuumasi Kudluk
 Collection, Avataq
 Cultural Institute, A-5



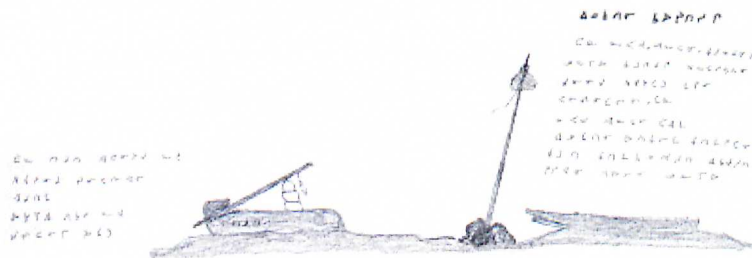
Trade Routes

Detailed map showing the location of posts and inland trade routes of the Kangirsuk region. The upper part of the drawing shows trade routes used by the Nunamiut (inhabitants of the interior), Qinguiani (two routes Tuvaaluk and Ungava)
 Tuumasi Kudluk
 Collection, Avataq
 Cultural Institute, A-8



2000

(11)



Inuksuk

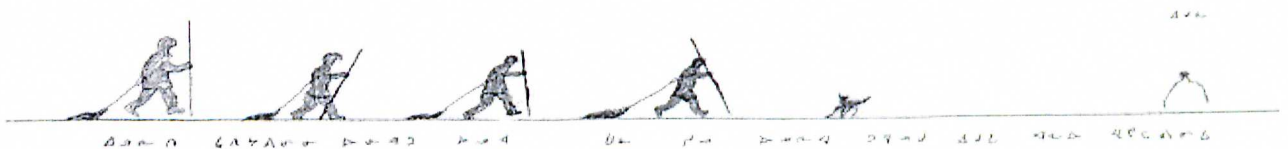
The pile of rocks in the middle are tikkutik (pointers). The people who own the qamutik had left this message for the next traveler to inform him where they were staying and the direction to take to get there. The pointer has three rocks under it, which implies that it takes three nights to get there. A note is also tied to the top of the pole for further instruction. This is how the inland Inuit used to describe travel directions.

Tuumasi Kudluk Collection, Avataq Cultural Institute, D-34



Caribou Migration

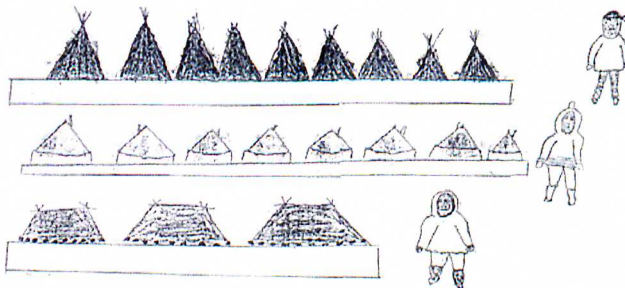
During the September migration, the caribou have to cross the lakes and rivers they meet along their route. The crossing areas are called nalluit (singular- nalluk). The nalluit were traditionally used for hunting the caribou. Lines of Inuksuit were erected to direct the flow of caribou toward the narrowest part of the lake, where the Inuit waited. While the caribou crossed, the Inuit in qajaqs would shoot arrows at them, and also use the ipuligaq- a long spear. When the caribou set foot on the other side of the crossing, they encountered a series of Inuksuit and had to follow the direction of the Inuksuit. There again, hunters were waiting with bows and arrows. This is how the hunters ensured a whole winter supply of meat. Source - *Tumivit 1, p. 19. Tuumasi Kudluk Collection, Avataq Cultural Institute D-6.*





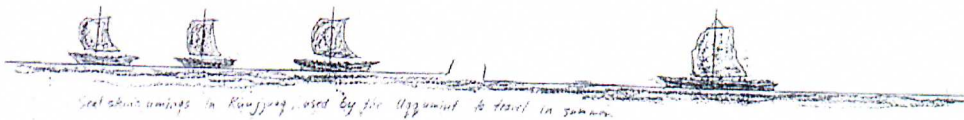
**Map of Tuvaluk
(Near Quaqtuq)**

The land selected for the location of the weather station was named Iggiajaq by the proprietor. *Tuumasi Kudluk Collection, Avataq Cultural Institute, A-11*



Ship time season in Kuujjuaq.

During the summer, people from many locations would congregate in Kuujjuaq to wait for the annual ship. Above: teepees used by Indians; in the centre are canvas tents from Kuujjuaq and vicinity; Below are seal skin tents belonging to the Inuit from further up the Ungava Coast. Note the traditional dress of each group.

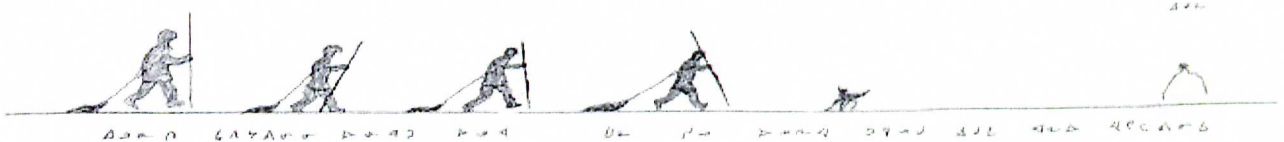


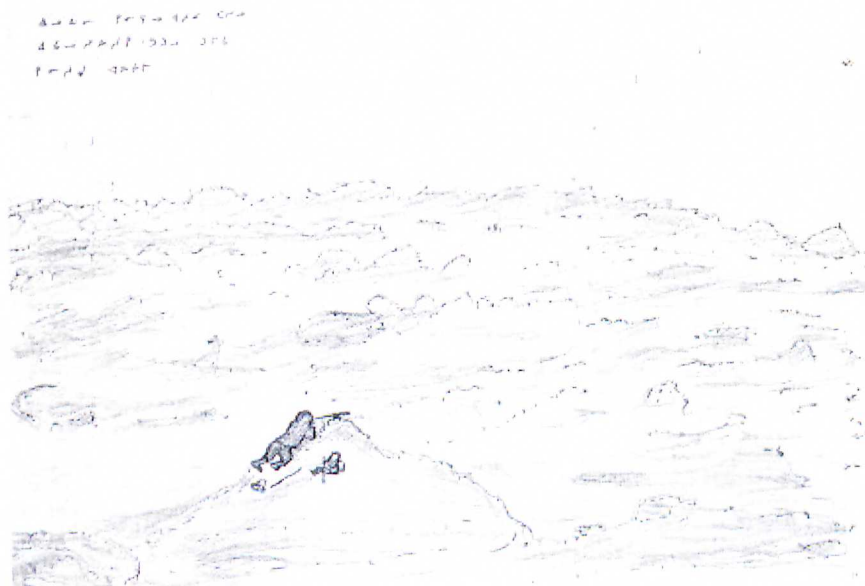
Seal skin umiaqs in Kuujjuaq, used by the Uqqumut to travel in summer.

Ship time season in Kuujjuaq.

During the summer, people from many locations would congregate in Kuujjuaq to wait for the annual ship. Above: teepees used by Indians; in the centre are canvas tents from Kuujjuaq and vicinity; Below are seal skin tents belonging to the Inuit from further up the Ungava Coast. Note the traditional dress of each group. Seal skin umiaqs (kayaks) were used by the Uqqumut to travel in summer.

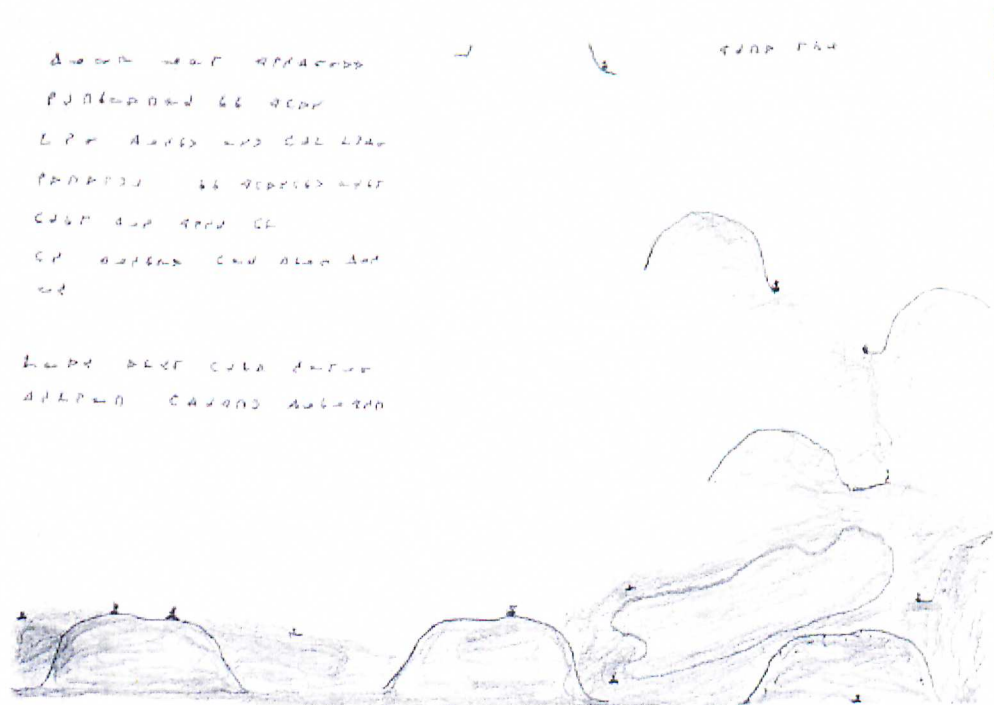
Tuumasi Kudluk Collection, Avataq Cultural Institute, A-2





Observing the Land

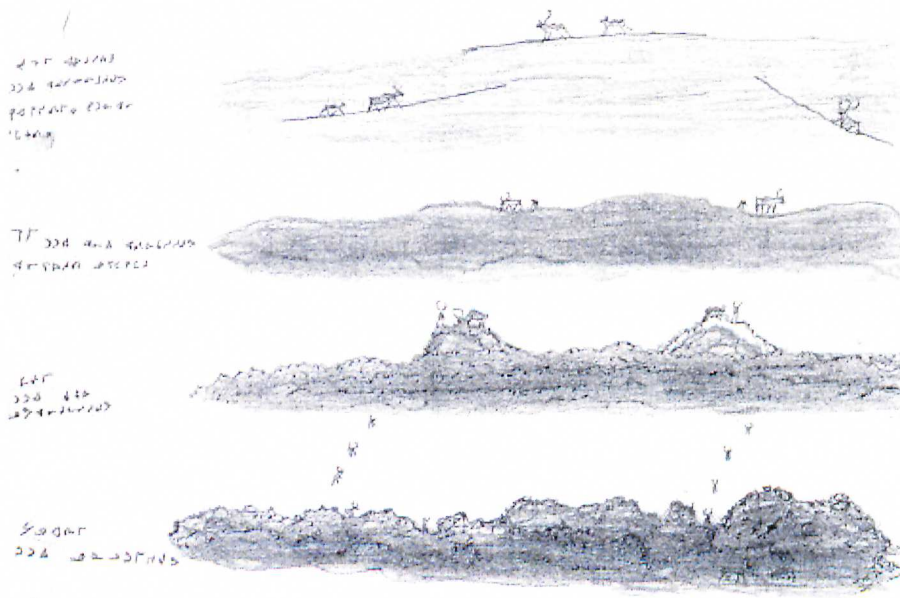
Man is observing terrain with a telescope with someone beside him. In summer, the land is enormous. You can look for animals even where there are none. Check the lakes for fish and at the same time, look for caribou tracks. *Tuumasi Kudluk Collection, Avataq Cultural Institute, I-11*



Inuksuit

A real Inuk has made two Inuksuit on one hill before anyone ever did. An explorer sees a hill in the distance, and puts an Inuksuk on it - making a trail guide. There is also an Inuksuk near the lake, which indicates that there are fish in the lake. Today when you see an animal, you don't think of killing it, even when you are a descendant. In the winter, the land markers (Inuksuit) are there to indicate the dog team routes. *Tuumasi Kudluk Collection, Avataq Cultural Institute, I-12*





Caribou Migration

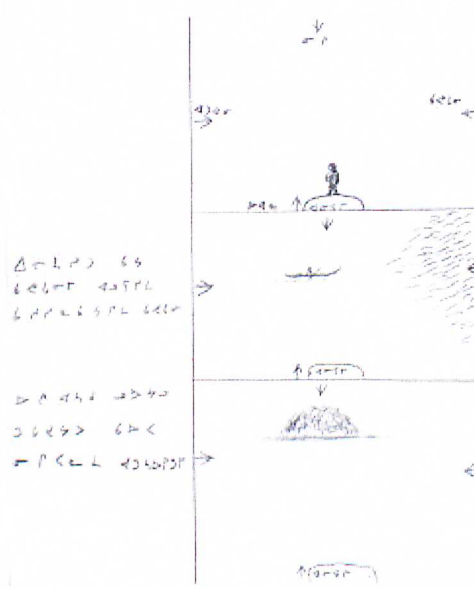
The four pattern movements of the caribou. From July through August, caribou start to migrate because they try to escape swarms mosquitoes. In the month of May, female caribou start dividing up to have their young. In the month of March, it is time to go on hilltops, and in the month of January, the caribou venture into rocky areas. *Tuumasi Kudluk Collection, Avataq Cultural Institute, I-23*



Travelling

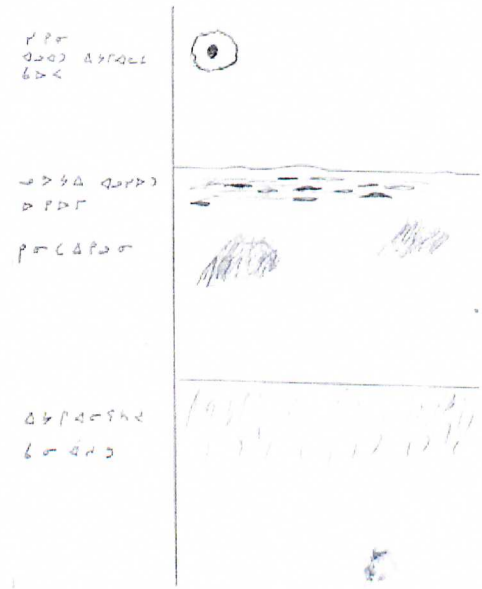
Inuit men are instructing other Inuit men to go around Qutairquq (headlands by the sea) to go to a particular place, "like seagulls." Note the way in which the drawing is impressively rendered in plan, section and perspective view. The coastline topography is clearly demarked with a thick single line and the seagulls and small canoes further highlight the distinction between land and sea. The mountain ranges are clearly distinguishable in the way they are marked with dotted lines and shaded to give depth. *Tuumasi Kudluk Collection, Avataq Cultural Institute, Montreal, I-73*





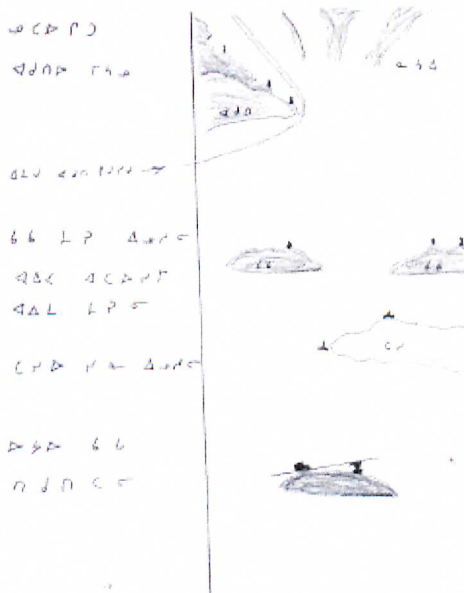
Directions from the Wind

The man is suspicious because the wind is blowing from a different direction. The north wind will not sneak up on you, but the south wind will. *Tuumasi Kudluk Collection, Avataq Cultural Institute K-18*



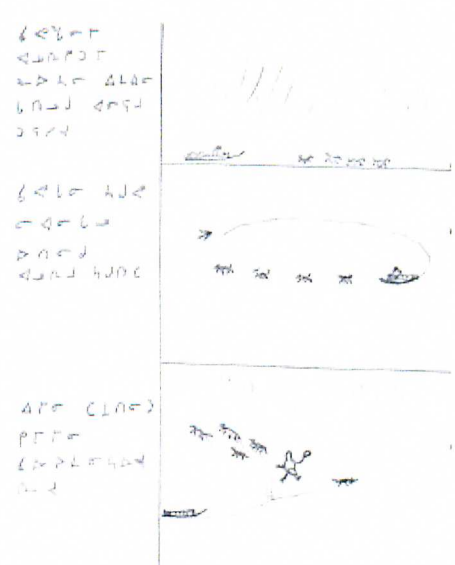
Weather Conditions

Describing different weather conditions. Top to bottom – sunshine, cloudy and snowing. *Tuumasi Kudluk Collection, Avataq Cultural Institute K-19*



Old knowledge of trails

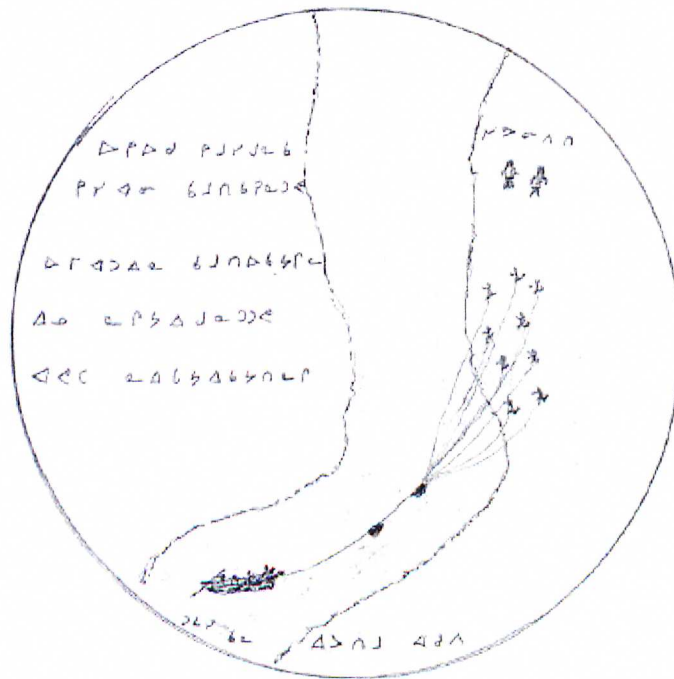
The best way to travel is where there are a lot of hills. On the hills and even on islands there are Inuksuit - these markers highlight travel routes. *Tuumasi Kudluk Collection, Avataq Cultural Institute K-27*



Winds & Dogs

Top: Small wind blowing from the east. Using the slight easterly breeze as a guide - the person is heading towards home. Middle: Since the easterly wind is shifting, they are turning back. Bottom: This man is making himself lost because he thinks he knows more than his dogs. The dogs always know where they are going through their sense of smell. *Tuumasi Kudluk Collection, Avataq Cultural Institute K-20*





River Travel

Travelling up a river by boat. The dogs are pulling them along. The two black objects in the river are seal skin buoys, which were used to un-snag the rope from rocks. *Tuumasi Kudluk Collection, Avataq Cultural Institute L-33.*



Caribou Crossing

A man tried to go to his relatives place, but they told him to leave because of his loud weapon - for it would scare the caribou. The man left angry. The old man from the community is holding a bow. He lives near the caribou crossing area (nalluk). The objects near the river are tents. The objects shaped in a semi-circle curve are piles of rocks known as 'hunting blind'. *Tuumasi Kudluk Collection, Avataq Cultural Institute R-20.*



Appendix 3

Inuit Children Drawings - *Isummasaqvik* School, Quaqtuq



Selection of Inuit Children Drawings about Way-finding in the Arctic

At the Isummasaqvik School (Kativik Regional School Board) in Quaqtaq, Nunavik, Inuit children are taught how to navigate across the tundra through an innovative ‘survival’ module. The primary/secondary school students, through their Inuit born teacher, Pasha Puttayuk, created a number of navigation related illustrations based upon their experiences of travelling on the land and traditional knowledge passed down over generations. The following set of illustrations, were drawn between 1999-2001. They describe many traditional Inuit systems of way finding – systems that shaped the way the Inuit perceived the land. Original drawings were colour pencil on 8.5”x 11” bond paper. Student age ranges from eleven to seventeen. See Appendix 5 for further descriptions and analysis of other Inuit children drawings. Note that the Inuktitut spelling of Inuksuit (singular: Inuksuk) is spelt as inutsuit (inutsuk) in Quaqtaq.

Way-Finding with Natural Features, Celestial Bodies and Inutsuk



Navigating with big hills, dark clouds and Inuksuit



Way finding landmarks: inutsuk, sun, rivers
February 2001



Hunters look at the Northern Lights, stars, moon and lakes to know their way when traveling. March 1999.



Navigating with the Northern Lights, moon and stars



Way-Finding with Natural Features, Celestial Bodies and Inutsuk



Stars, moon, big hills, Inutsuk and lakes are what hunters and travelers look at to know where to go. March 1999.



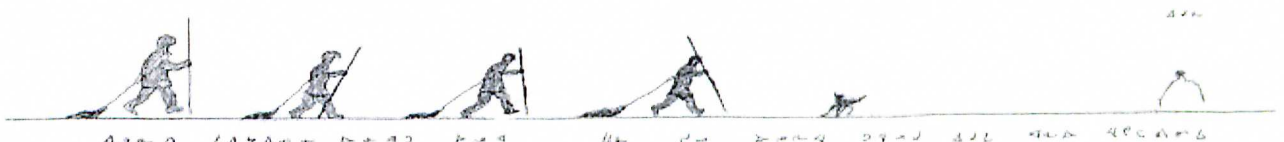
Way finding landmarks: sun, stars, northern lights, moon, inutsuks, big rivers, hills and lakes. February 2001.



You can find your way by using inutsuk and the lakes that give off steam as landmarks.



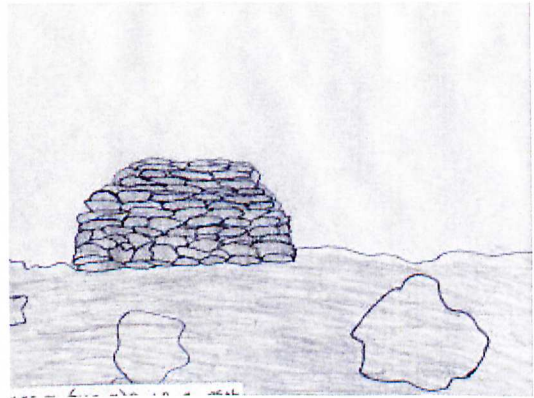
Way finding using big rivers as landmarks



Way-Finding with Inutsuk



Inutsuk as landmarks



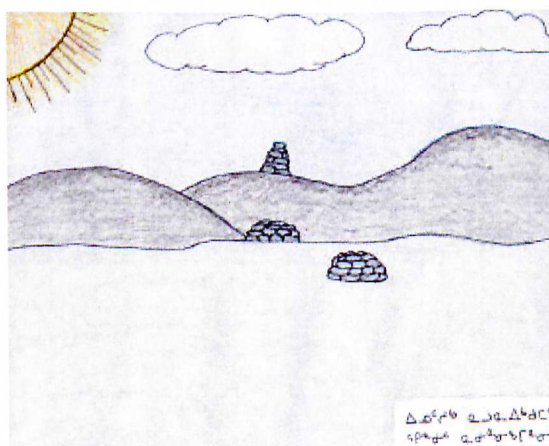
Inutsuk cache can also act as a landmark



Inutsuk helps you know where to go. March 1999.



Inspecting the land from an inutsuk



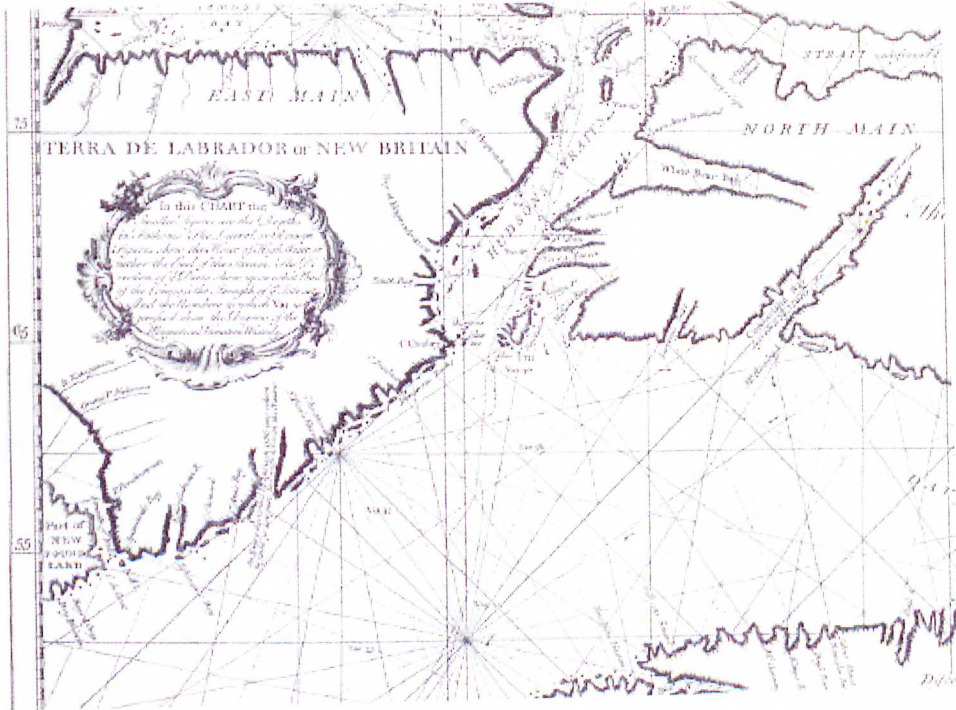
Inutsuk made to know where meat was cached. March 1999.



Appendix 4

Quaqtaq Map Study – Scientific & Thematic Maps



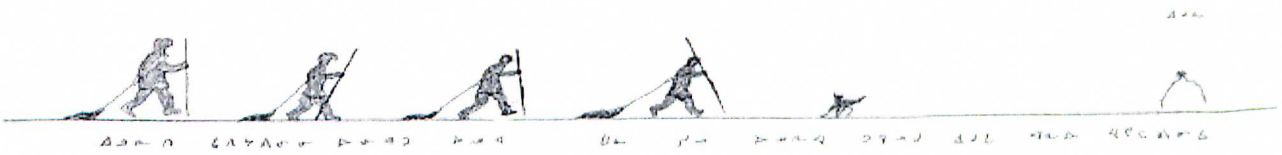


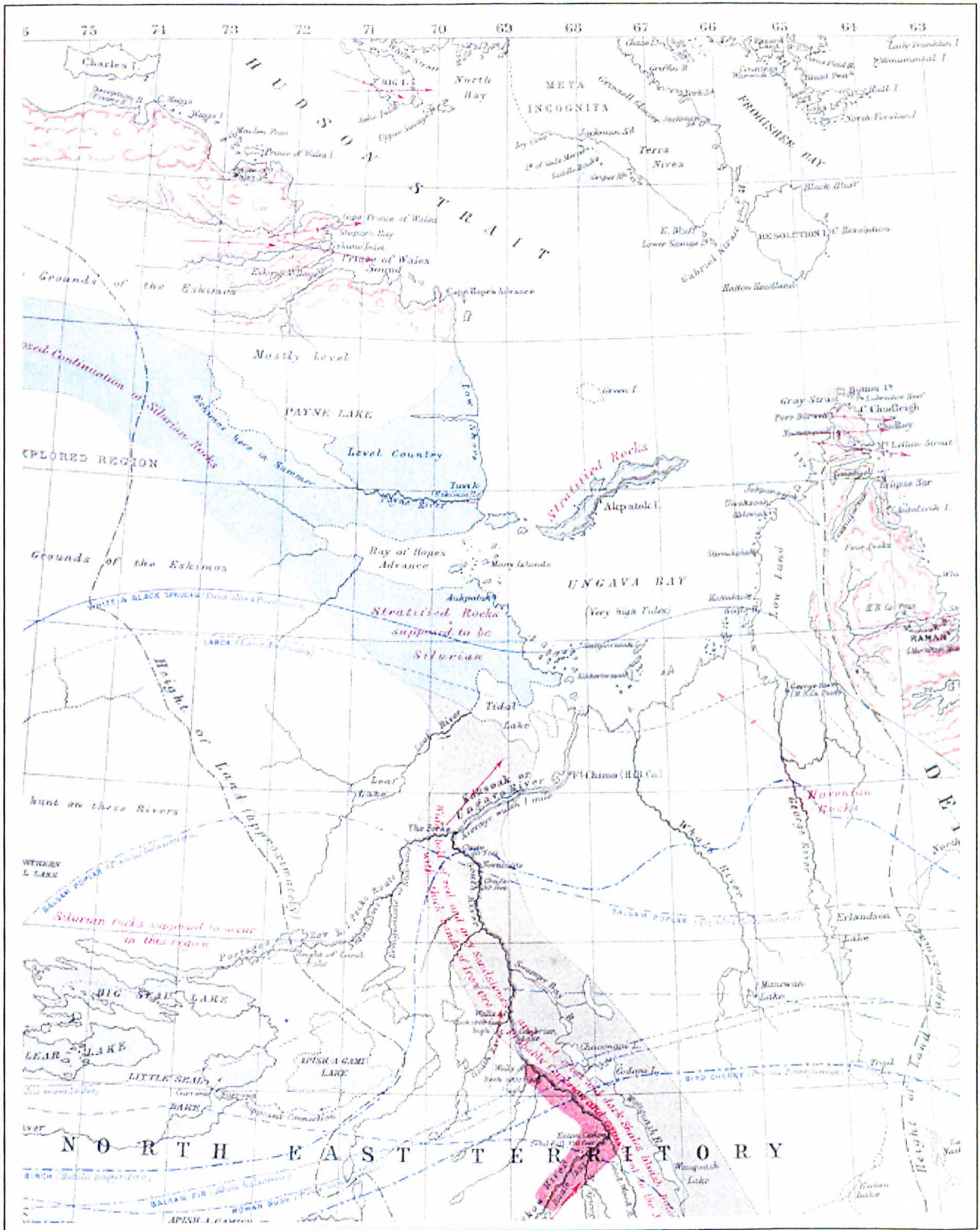
Explorer Rhumb-line Map

Portion of a map of Hudson Bay and Straits based on rhumb lines by C. Middleton, 1743, London. Drawn for the King of England. This map illustrates how navigators perceived the Arctic landscape through winds and ocean depths. Navigators used dead reckoning techniques based on 'log and line' and traverse board readings. Original size: 480 x 668 mm. Source - National Map Collection, Public Archives of Canada, Ottawa, Ontario.



North America Showing Hudson's Bay & Straits, 1748
 Engraved by Richard Seale. Source: (Ruggles 1991, p. 127)

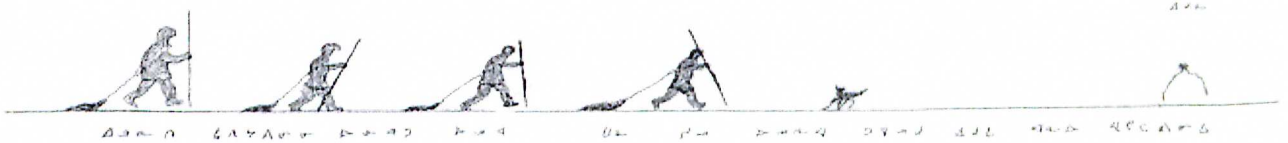


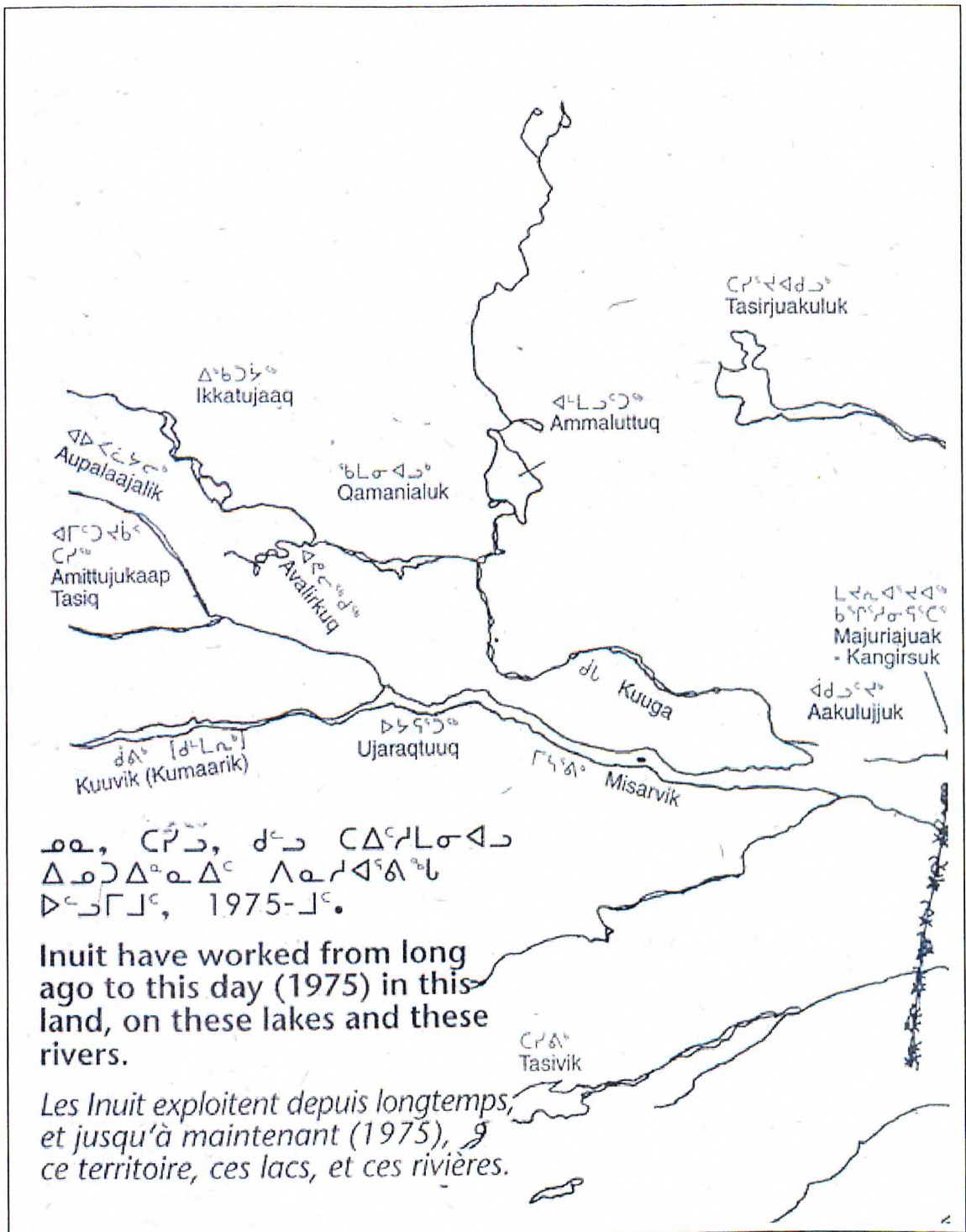


Portion of a Map of the Labrador Peninsula, 1895

Map compiled from explorations to the region.

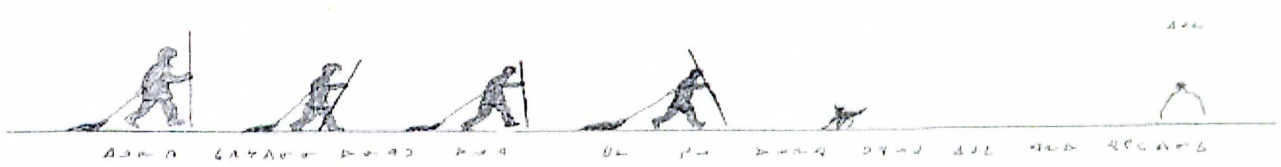
Source: Inuit Studies Library, Université de Laval, Quebec

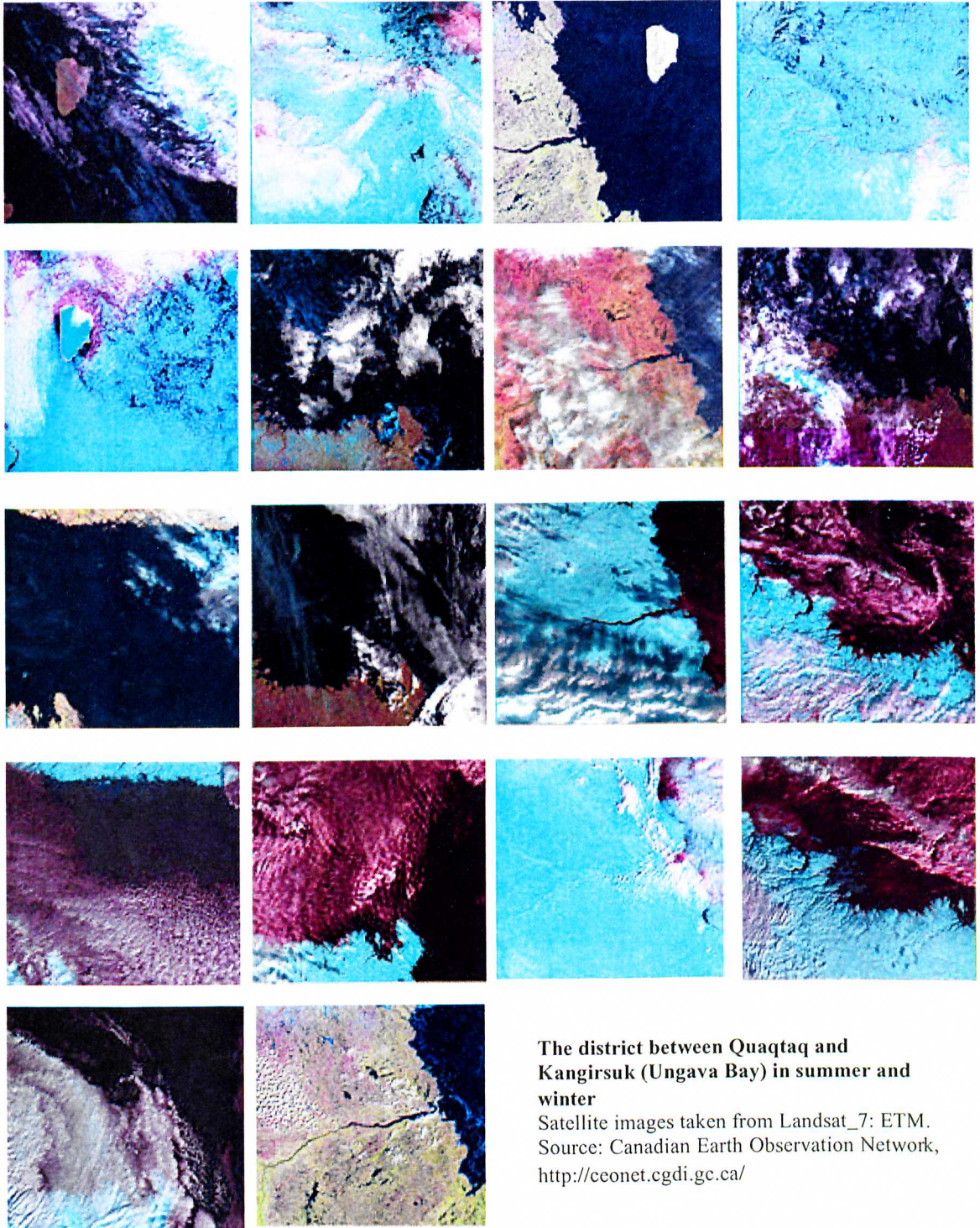




Inuit Map of Traditional Journeys from Kangirsuk to Akpatok Island (Ungava Bay)

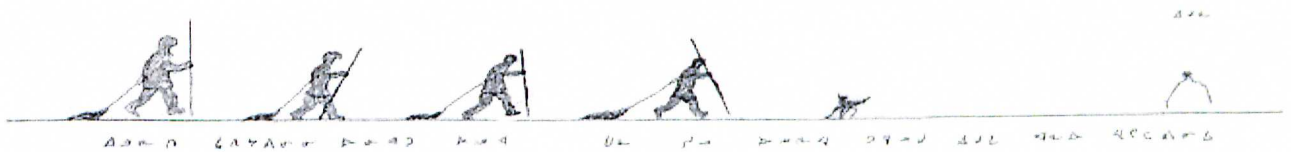
This map was recently drawn by Samwillie Annahatak to represent the traditional Inuit lifestyle of the Kangirsuk people. Source: Annahatak, S.1997, 'A Letter from Samwillie', *Tumivut*, Autumn, no. 9, p. 14.

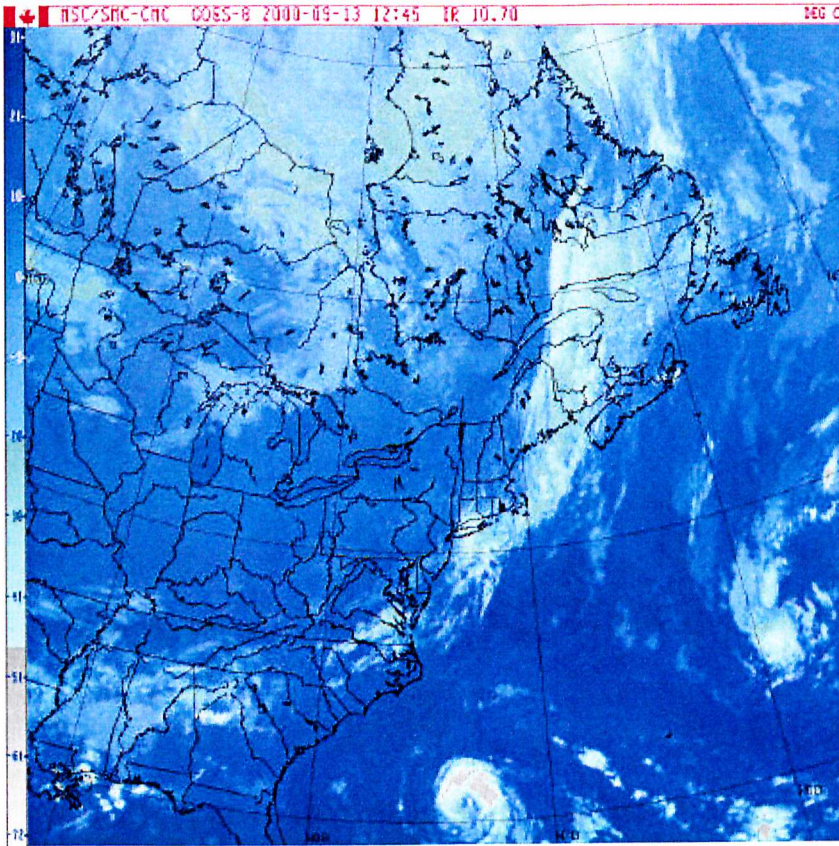




The district between Quaqtaq and Kangirsuk (Ungava Bay) in summer and winter

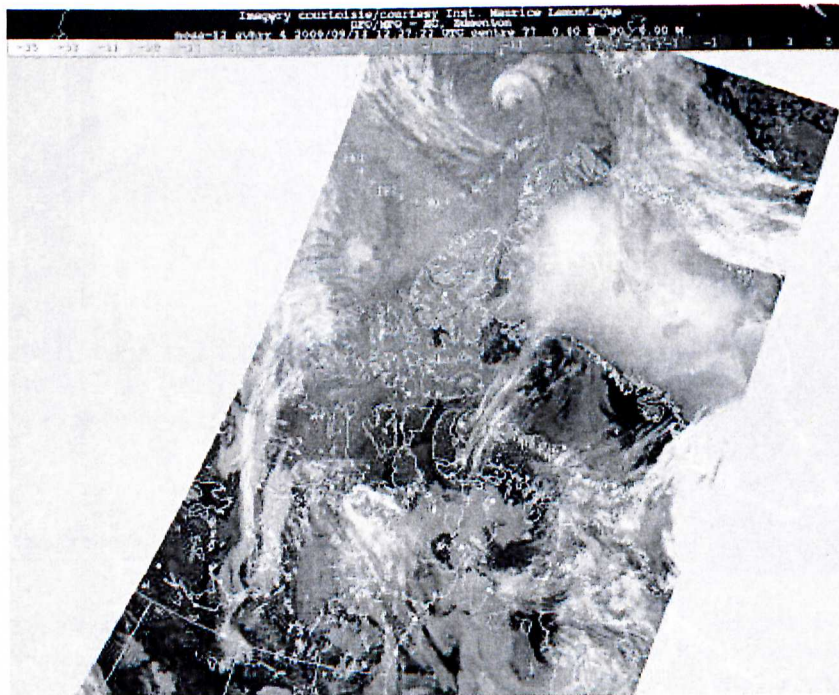
Satellite images taken from Landsat_7: ETM.
 Source: Canadian Earth Observation Network,
<http://ceonet.cgdi.gc.ca/>





GOES Satellite

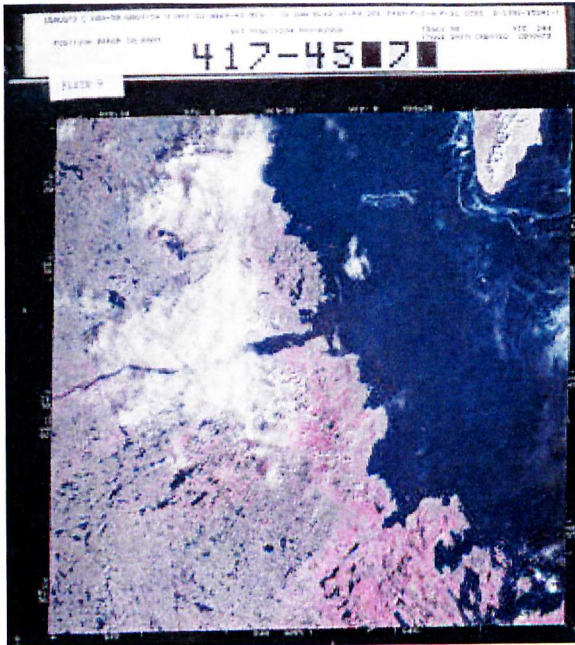
Satellite image of Eastern Canada taken on 13th August 2000 at 2:45pm. Note the coloured bar on the left hand side of the image – this describes the temperature of the various coloured areas on the map in degrees centigrade.



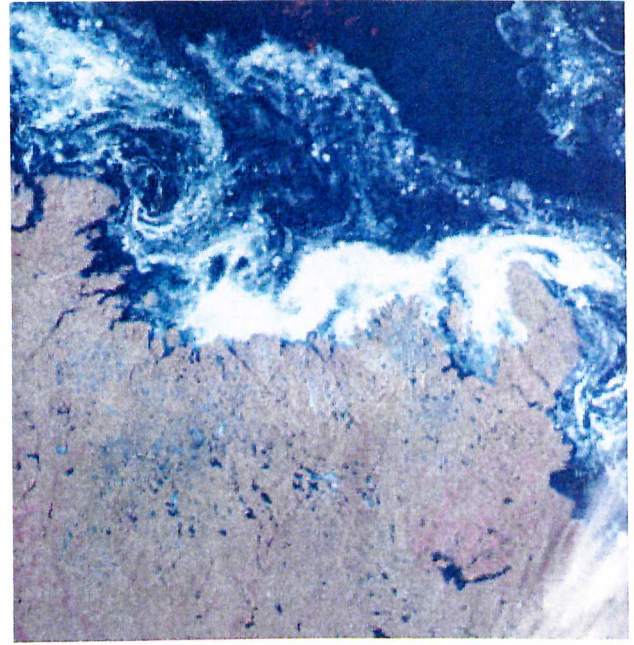
Typical NOAA Satellite Image of Northern Canada

Satellite images taken twice daily to assist with the prediction of weather in Canada

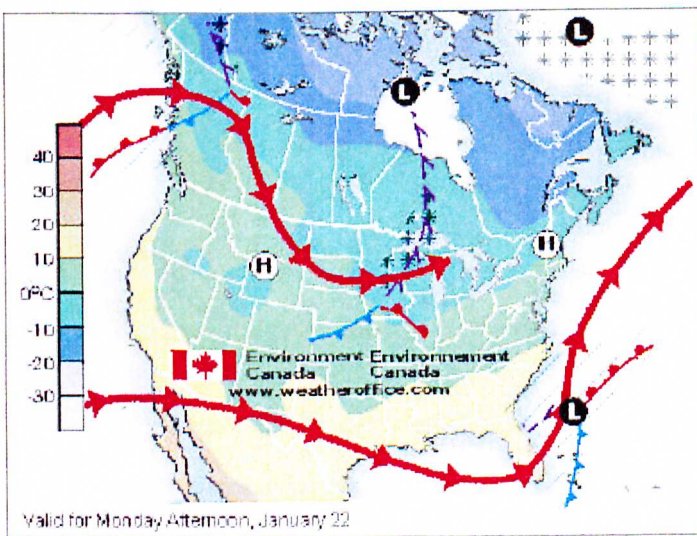




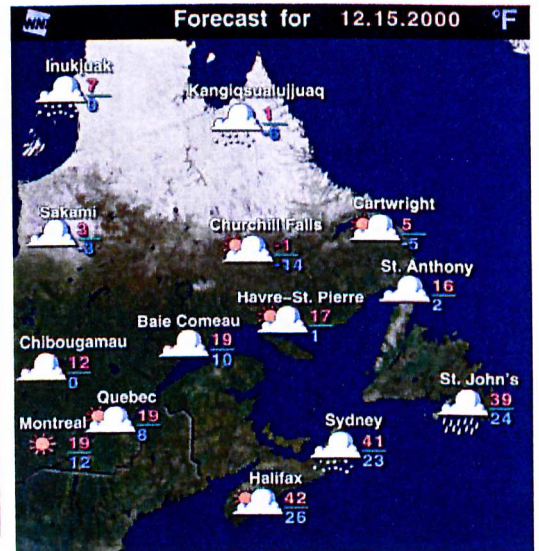
Satellite Image of the Kangirsuk & Ungava Region
Image taken from primitive Landsat satellites, 1973
Source: Cartographic Library, Geography Department, The University of Montreal



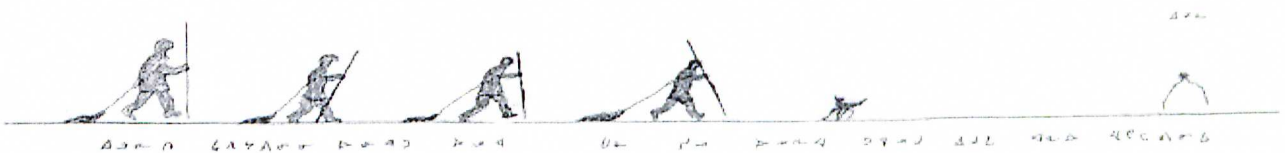
Satellite Image of Quaqtaq & Wakeham Bay
Image taken from primitive Landsat satellites, 13 October 1976
Source: Cartographic Library, Geography Department, McGill University

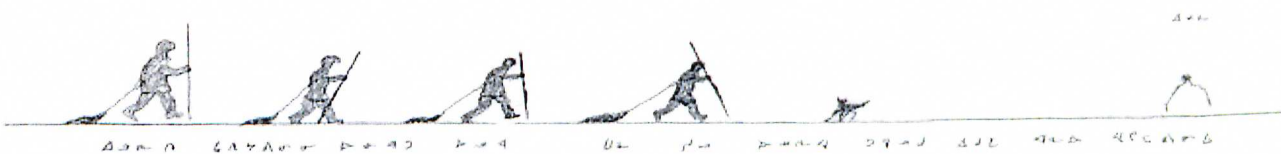
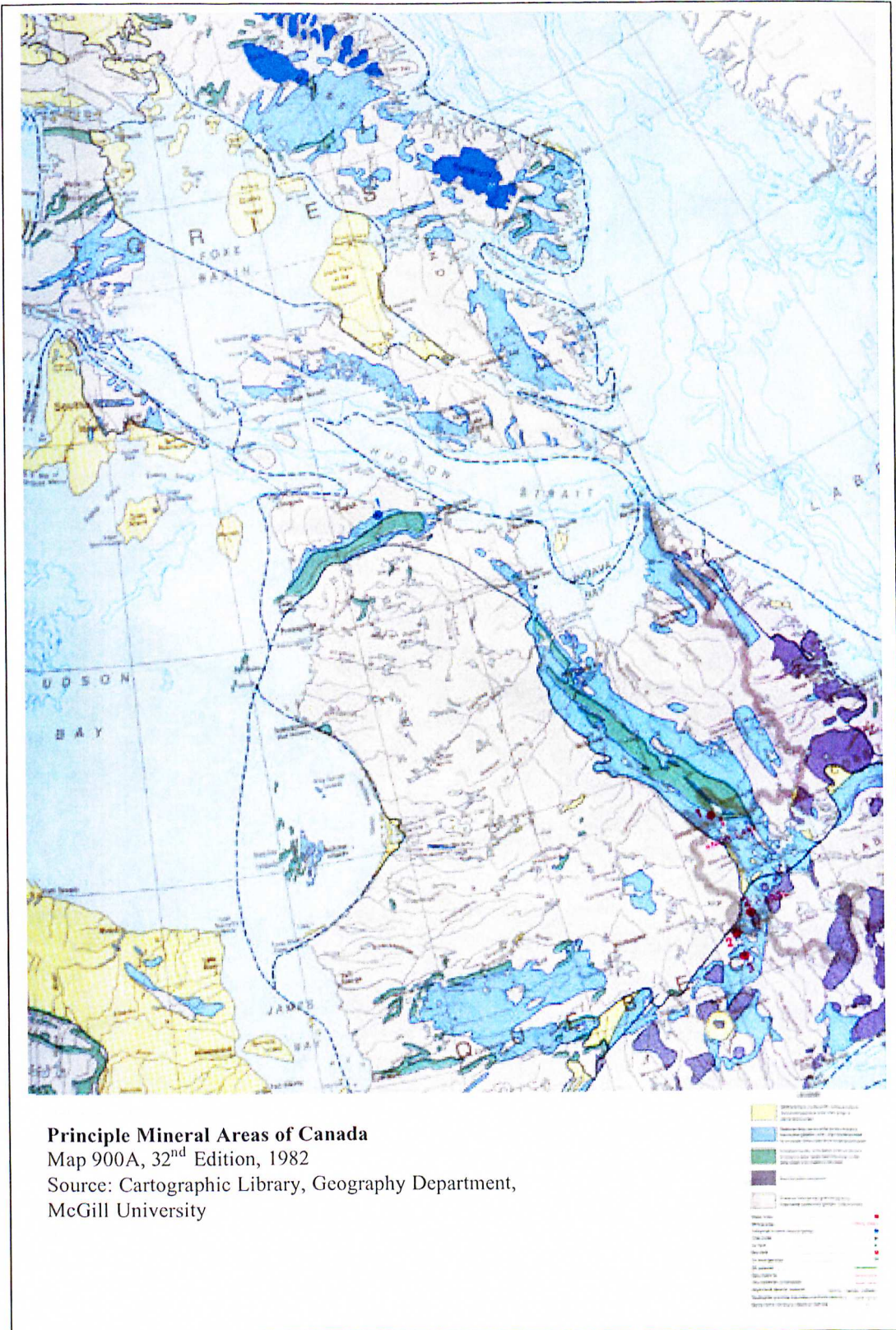


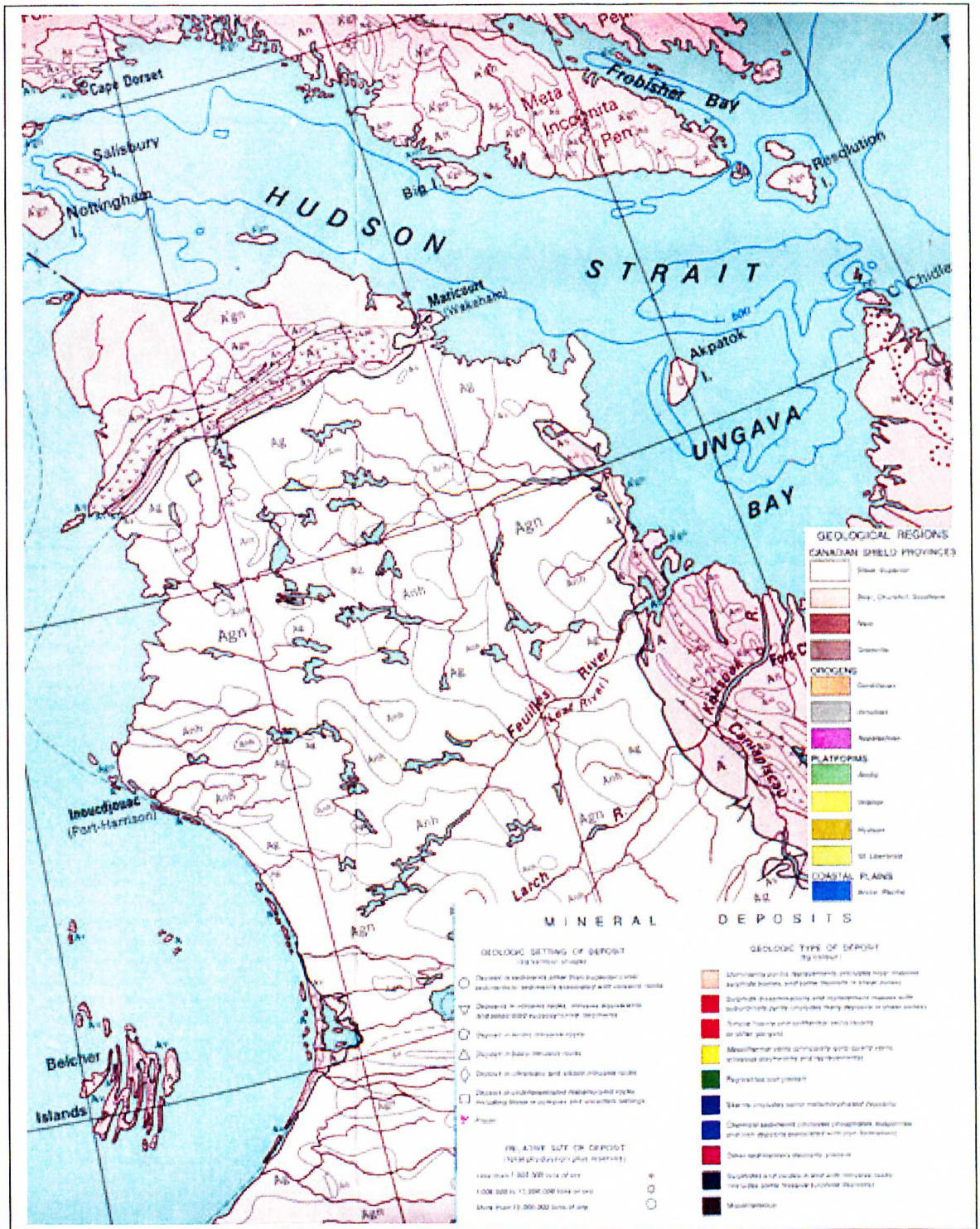
Temperature Map of North America for January 22, 2001
Source: Environment Canada, www.weatheroffice.com



Forecast for Quebec, 15 December 2000
Source: Environment Canada, www.weatheroffice.com





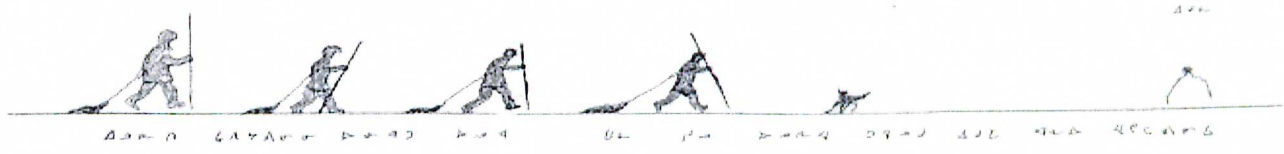


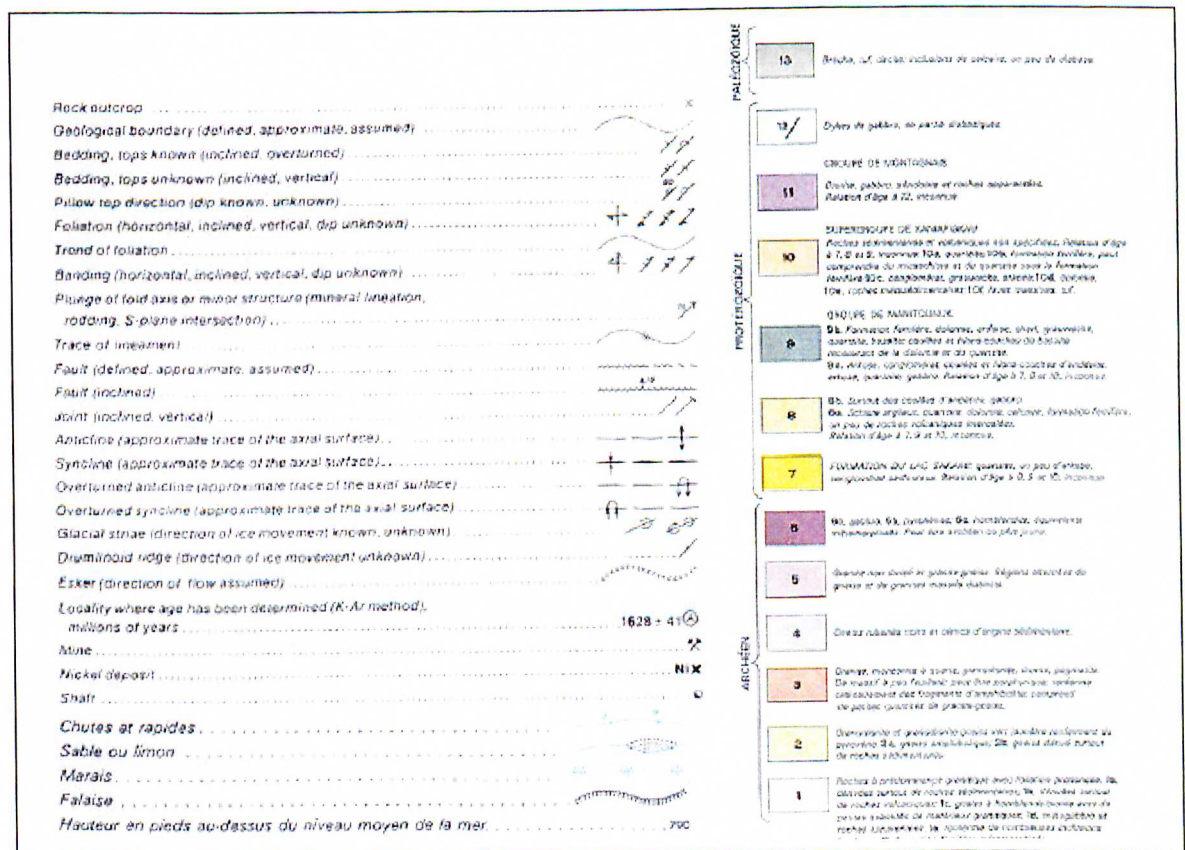
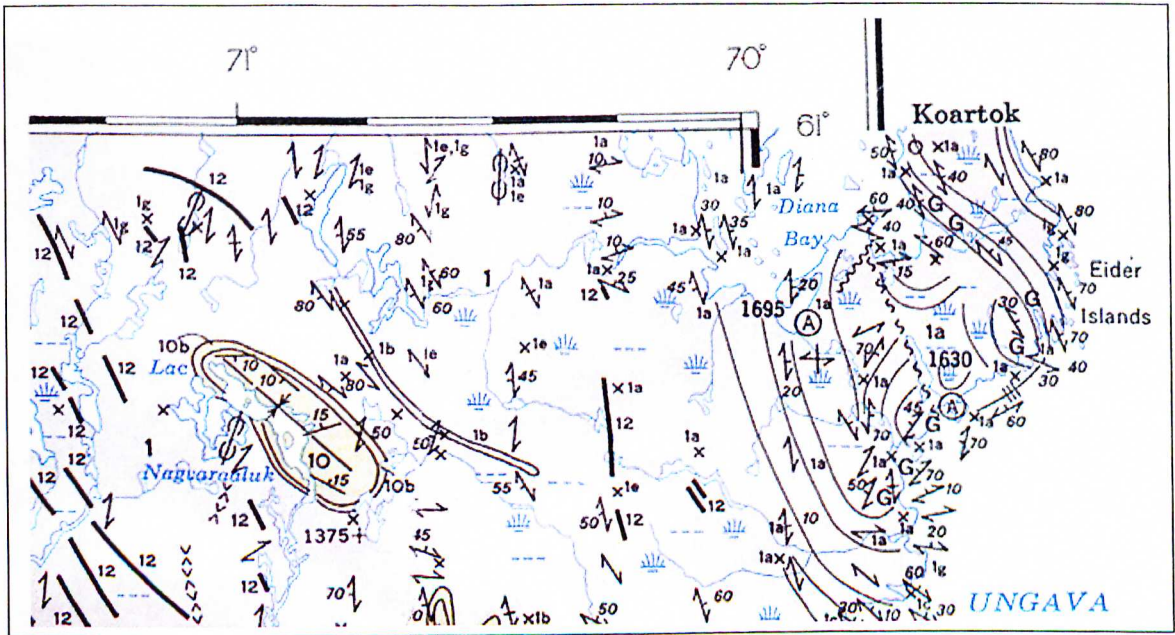
Mineral Deposits of Canada

Original Scale before reduction 1:500,000

Geological Survey of Canada, 1969

Source: Cartographic Library, Geography Department, McGill University



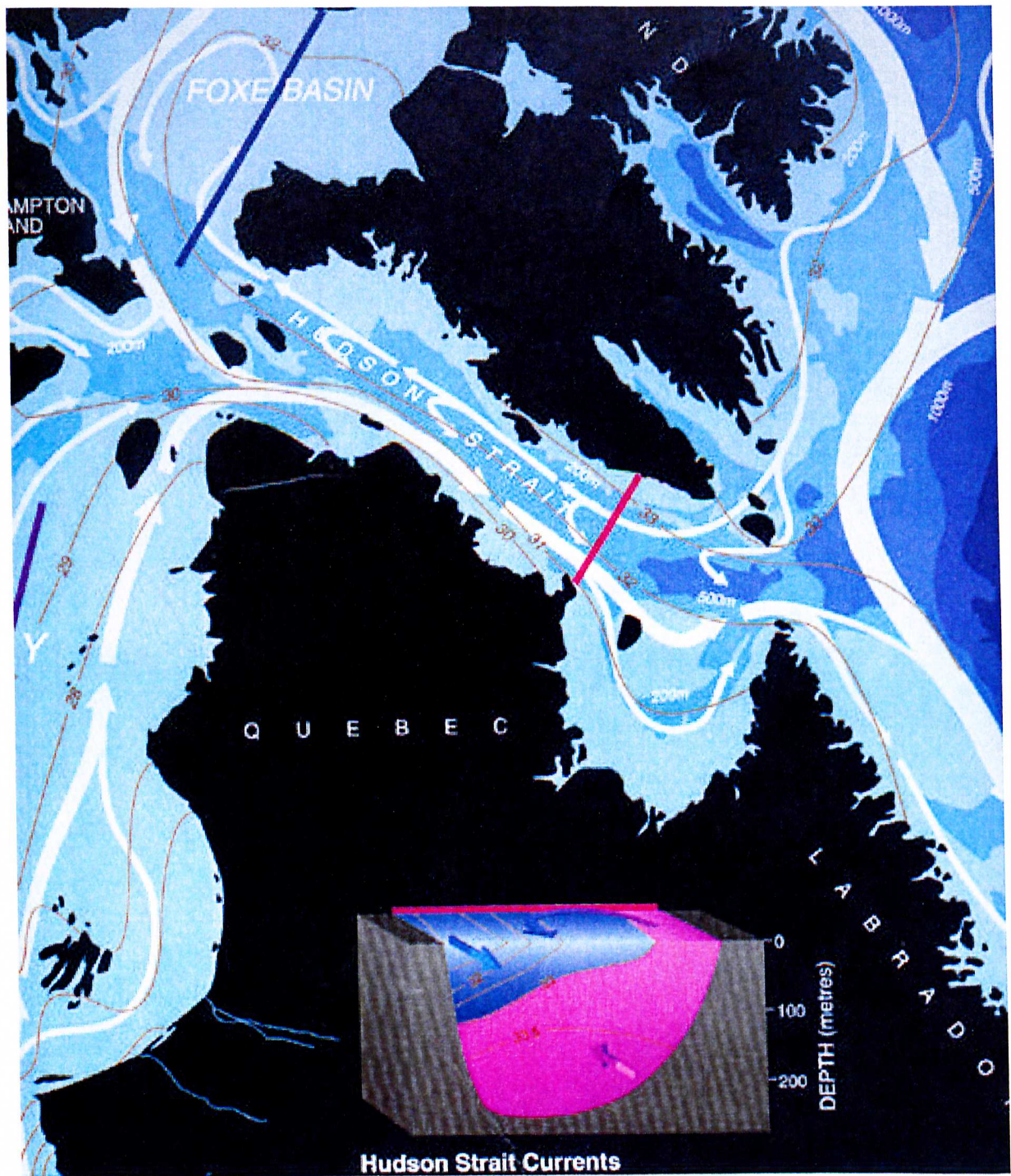


Enlarged section of a Geology Map

Quaqtaq District (Leaf River Map) Map 1229A, Geological Survey of Canada, 1960. Original Scale: 1:100,000.

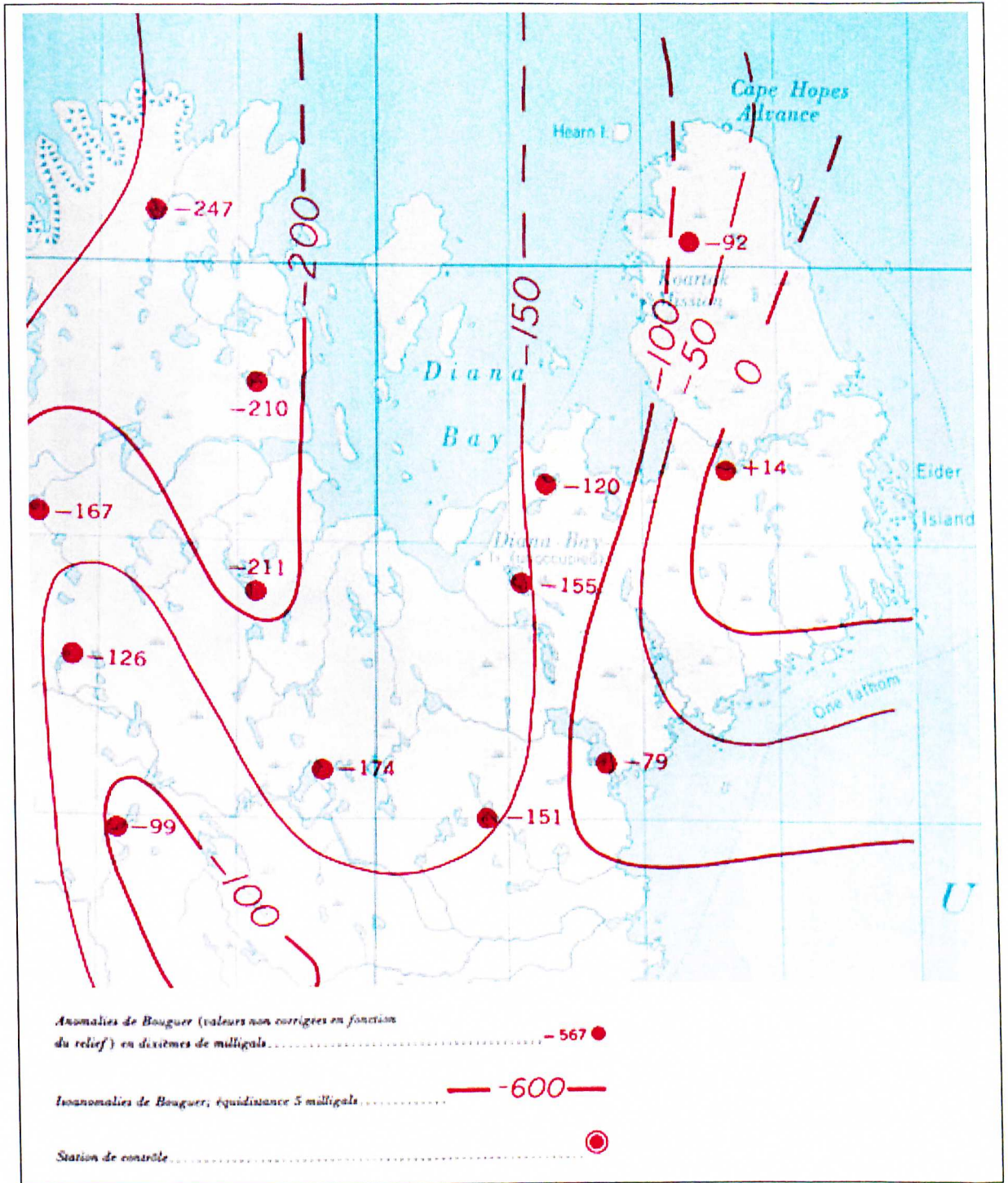
Source: Cartographic Library, Geography Department, McGill University





Salinity Levels and Currents of the Canadian Eastern Arctic
 Colour Poster No. 8, Fisheries & Oceans, The Government of Canada
 Source: Cartographic Library, Geography Department, McGill University



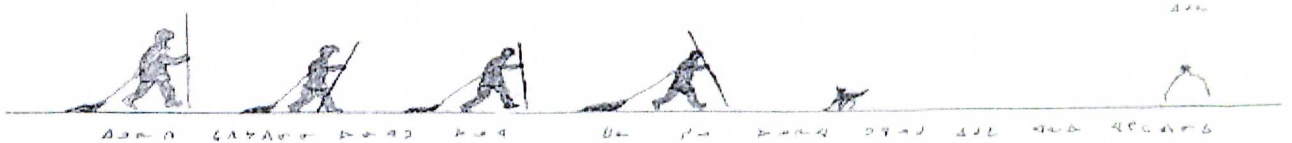


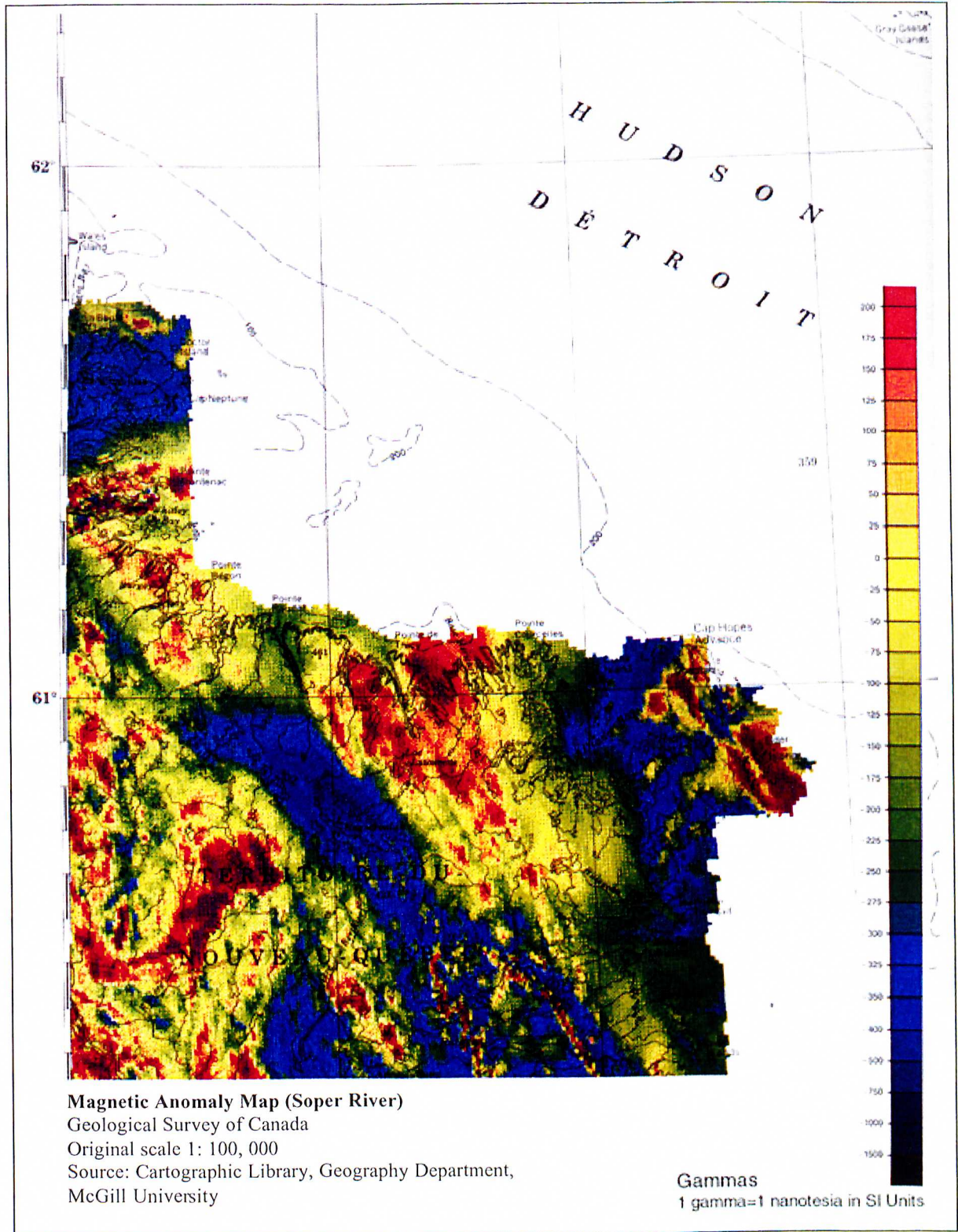
Gravity Map of Eastern Canada

Gravity Map Series, No. 6, Wakeham Bay, Quebec

Original Scale 1: 500,000 1962

Source: Cartographic Library, Geography Department, McGill University

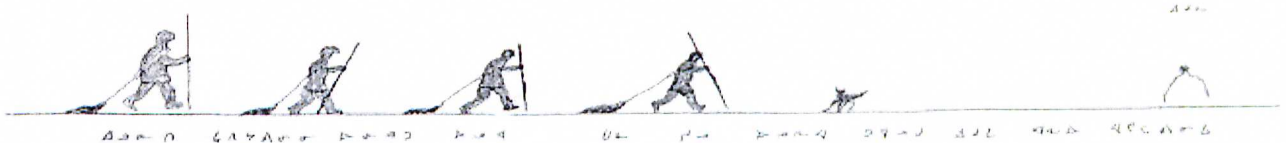




Appendix 5

Refereed Journal Articles

1. Preserving the Legacy of Inuksuit in Arctic Canada
2. Landscape Perception & Way-finding in the Arctic



Scott Heyes

Refereed paper presented at the Australian ICOMOS National Conference, Adelaide, South Australia, 30 November 2001. Conference proceedings will feature in a special issue of *Landscape and Urban Planning* in early 2002.

Preserving the Legacy of Inuksuit in Arctic Canada

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Abstract

This paper explores the legacy of the stone cairn beacons known as Inuksuit – intriguing stone formations built by the Inuit for the last 4000 years that describe messages about landscape, convey messages about way-finding and communicate stories about place.

Although Inuksuit appear as ancient artefacts of a by-gone era, they have survived well into the 21st century, withstanding the changes that have dramatically impacted other traditional facets of Inuit life. Inuksuit remain as solidified fingerprints on the landscape, marking ancient and modern navigation routes. They are signs in themselves and signs that converge to form maps.

The power and legacy Inuksuit exert over the landscape is however potentially at risk from mining and hydro-electricity developments that are planned to consume further areas of the Arctic. Additionally, particular marketed forms of Inuksuit threaten to taint and avert the original Inuksuit function. A case for preserving Inuksuit is indeed strong, and quite necessary considering they are one of the few remaining tangible fabrics of Inuit life that continues to function within an original setting.

Keywords

Inuksuit, *Inuit Navigation, Aboriginal Cultural Landscapes*



Introduction:

Canadian Inuit have inhabited the inland and coastal regions of the Arctic for the last 4000 years, scattered from the shores of Hudson and Ungava Bay to the Western edge of Greenland and Alaska (McGhee 1984). The physical geography of these areas ranges immensely, from fjords, glaciers, lakes, rivers and mountains to slightly undulating terrain devoid of distinguishable features. Winters are harsh, long and bitterly cold; summers are cool, yet colourful, as the bleak snow-laden terrain gives way to the vibrancy of berry producing groundcovers, orange lichens and wildflowers.

It is upon this landscape that the foraging Inuit learned to interpret and embody the environment around them in the forms of customs, religion, law and education. Through adaptation, perseverance and acquired knowledge about the land, the Inuit successfully travelled vast distances across it using a combination of tangible and intangible navigation techniques. Depending on the weather, season or time of day, the Inuit were able to way-find using cognitive maps, celestial bodies, natural features and modified landscape forms. One such form made by the Inuit to convey navigation messages is known as Inuksuk or *inukshuk* (plural Inuksuit) – purpose built markers made from dry stacked stones, driftwood or bones. To the uninformed, Inuksuit (Fig 1) appear as just a pile of rocks adorning a featureless landscape, but to those who can decipher the rock formations, much more is revealed. To the Inuit, Inuksuit are objects of veneration – they are embedded in the roots of Inuit society within songs, shamanism, myths, legends and stories. Archaeological research speculates that some Inuksuit were built during the Dorset (Tunit) era, around 2000 BC (Hallendy 1997, p. 43). Inuksuit continue to be re-erected and new ones constructed, affirming their functional capacity as navigation beacons in the 21st century. They stand as an historical legacy and reminder of ancestral relationships with the land.

In recent times, the Inuksuit has rapidly emerged as the unofficial symbol of the Arctic – the result of steady tourism marketing campaigns by Inuit and non-indigenous groups. The increased attention Inuksuit receives through marketing is not necessarily adverse, but the way Inuksuit are portrayed and displaced outside the Arctic context may distort their traditional function. This paper examines the authentic and marketed forms of the Inuksuit, and questions the guidelines for preserving Inuksuit under the 1953 *Historic Sites and Monuments Board Act*.

Inuksuit

The term Inuksuit is a derivative of the Inuktitut (Inuit language) words, *Inuk* (human being; singular) and *suit* (in likeness of) (Hallendy 1992). The combination of these words forms Inuksuit (Baffin Island form: Nunavut), which means, “to act in the capacity of a human (Lewis 1966).” The spelling of Inuksuit varies slightly throughout the Arctic, such as the Nunavik (Arctic Quebec) version, *inutsuit* and the Igloolik version *inuksugaq* (plural inuksugait) (MacDonald, 2000, p.188). Mary Wallace (1999, p. 15) postulates that the reason Inuksuit are revered and charged with humanistic characteristics is because “an Inuksuk is a strong connection to the land: it is built on the land, it is made of the land and it tells of the land.” Similarly, Arctic researcher Norman Hallendy (1992, p. 9) suggests that, “...Whether they symbolised their makers, acted in their capacity, or were the objects of veneration, Inuksuit functioned as semaliths - messages created by the arrangements of stones. They were an integral part of the hunter’s language, and endure as indelible



signatures on the Arctic landscape.” Inuksuit were reliable message centres. To the travelling hunter, Inuksuit were a welcome sight; some described the course to follow, others pointed to good hunting and fishing areas and some marked where food was cached. They provided purposeful information and assistance to those who knew how to read its forms.

Inuksuit appear throughout the Arctic in varying shapes and forms, ranging from 0.5 – 2 metres high to 2 metres across. Unusual concentrations of between 100-200 Inuksuit are located within a few hectares at Inuksualait, Southwest Baffin Island, Nunavut (Hallendy 1997). Many prominent Inuksuit also feature along the shores and interior between Hudson Bay and Ungava Bay in Nunavik. Upon a recent field trip to Nunavik for this paper, it was noted that upon most hilltops near Inuit villages stands an Inuksuk. Inuksuit are monoliths; they are signposts, landmarks, beacons and markers, yet at the same time they are iconic and symbolic figures— they often describe historical attributes of local settings. An Inuksuk positioned on the ridge top of the Inuit coastal village Quaqtaq (Fig 2) for instance, tells of how the area was once an ideal place to camp throughout the year and especially for refuge in autumn.

Navigating with Inuksuit

Inuksuit were by no means the primary or sole navigational aid. Other traditional techniques relied upon include: the shape of the wind driven snow (*sastrugi*; small ridges of hard snow) and prevailing winds, the fluorescent bands of the Northern Lights (*Aurora borealis*), the position of the sun and moon, the relationship and arrangement of stars (the Pleiades; *Ursa Major*, Orion), and landscape features such as boulders, rivers, fjords, beaches and mountains (MacDonald 2000; Fortesque 1988; Pelly 1991; Spink & Moodie 1972). The travelling Inuit frequently used “cognitive maps” – a library of accumulated images and events forged through repetitive travel, experience and interaction with the land (Tuan 1979; Lynch 1960).

Today however, navigation on the tundra is performed much differently. Customary techniques have succumbed to the use of modern navigation equipment such as the Global Positioning System (GPS), radar and topographic maps, and to some extent, communication towers, radio masts, community lights and weather stations have replaced the function of Inuksuit. Regardless of the nature of erosion and pressures undermining the traditional use of Inuksuit, they are an integral component within the Inuit navigational package.

Arctic explorer, Therkel Mathiassen (1928, p. 97) on the *Fifth Thule Expedition 1921-24* discovered that Inuksuit were used to mark frequent routes between Cape Wilson, Usugarssuk, Iglulik and Repulse Bay. He reported that Inuit rarely went off course using the cairns as guides. Inuksuit were not only spaced out as markers across hilltops, riverbanks and valleys, but they were also grouped together to describe messages and stories of landscape. John MacDonald’s (2000) insightful research of the Igloodik region (Melville Peninsula) revealed that inuksugait (Inuksuit) were built to mark the locations of caribou meat caches within gorges. Inuit hunter, Noah Piugaattuk described to McDonald (2000, p. 190) that, “an Inuksugait would be erected on a rise not far from the cache. A pointer would be set on top of the Inuksugaq pointing in the direction of the cache. In this way it would be known exactly where the cache was situated should it be buried under the



snow when they returned to retrieve it in winter time.” These markers (Fig 3), are known as *hakamuktak* pointers, and were built to stand as tall as human figures so they could be seen from great distances (Hallendy 1985).

Some Authentic Inuksuit Types

According to Hallendy (1992), approximately 24 types and arrangements of Inuksuit exist. Hallendy groups the types into three categories: (1) distinct natural objects, (2) placed, shaped or constructed objects and (3) placement and arrangement of Inuksuit. Hamelin (1956, p.13) offers a condensed version of classification, suggesting ‘the pebble monuments’ fit into 8 types, although he argues only five types (A-E) conform to the real Inuksuk form:

- (A) A small pebble on a big pebble
- (B) Many rocks on a big one
- (C) A big rock and small rock
- (D) Pyramids of stone
- (E) Pyramids build by explorers
- (F) Monoliths that represent bears, seals and wild dogs
- (G) Complex stones, eg. A woman thinking
- (H) A wall of stone

The *ikahimaluk* and *niungvaliruluit* Inuksuit (Fig 4a&b) as described by Hallendy (1985, p.32) consisted of vertical and horizontal stones arranged to form a window. Travellers were guided along a route by looking through the window towards the next Inuksuit. One may speculate that the ‘window’ was a way of reducing the scale of the Arctic labyrinth – a porthole from which a system of navigation emerges. Another directional Inuksuk called *tikotit* (Fig 5), built of tall rocks or sticks was erected by travelling hunters to describe to others the correct route to follow or to indicate dangerous areas to avoid. Respected hunter and late Inuit elder, Tomassi Qumaq described to Hallendy how *tikkutik* pointers were built alongside lakes to mark fishing grounds:

“...Our ancestors used to put pointers [near lakes] for us to know whether there are fish in any lakes... You may find two rocks pointing exactly where to make your fishing hole on the lake. That is where the fishing is good... The elders not only made these pointers for themselves, but also for their children and others who may come to the lake to go fishing... If you can find those pointers on the shores of lakes, then you will know exactly where to make your fishing hole.” (Hallendy 1990, p.2)

Qaujiharialik Inuksuit were erected to mark dangerous crossing places, rough terrain or shallow water (Hallendy 1992, p 17). For example, a cairn may be placed on an island if the ice between the island and the mainland gets thin in early spring. Lewis (1966, p.86) reports that his Inuit travelling companion, Kiakshuk, erected such an Inuksuit in the Cape Dorset area to describe the arduous and dangerous journey across Hudson Strait to Ivuyivik.

Inuksuit were also used for hunting caribou where river systems and lakes narrow. A caribou fence, known as *aulaqquat* (scarecrow/bogeyman/flag) was erected to frighten and confuse them. (Hallendy 2000, p.116). An illustration of *aulaqquat* (Fig 6) by *Tuumasi*



Kudluk from Kangirsuk describes how the hunt was performed. As the caribou swam through the channel, hunters would harpoon them from their kayaks and as the caribou proceeded onto land, hunters would leap out from behind the stones and spear them (Stefansson 1922, p. 401-402).

Inuksuit were held in such high regard as a navigation saviour that, after a period of time, songs were created to celebrate them. Hallendy (1992) reports that some old Inuksuit were described in *aya-yait* songs – songs that acted as spoken maps. Efforts to find primary evidence of these songs for this paper has proven unfruitful, although Wallace (1999) and Hallendy (2000) both make an unsubstantiated claim that an Inuit hunter travelled a distance of 2000 kilometres guided by a song his father taught him. The song described the Inuksuit to look out for that would mark his way.

Hallendy (2000), Hamelin (1956) and Lewis (1966) suggest that some Inuksuit possessed spiritual powers or were associated with shamanism. Notwithstanding the validity of these findings, it is interesting to reveal that Tomassi Qumaq from Nunavik replied to a questionnaire for Hallendy (1990) that he had never heard his grandfather or other elder's talk about Inuksuit having spirits in Quebec. The way in which the Chukchi people of the USSR reacted to foreigners constructing stone cairns on their shoreline supports the view that Inuksuit had spiritual connotations. When the crew of the icebreaker *Sibiriakov* built cairns for identification marks on the shore in 1932, they were soon destroyed by the Chukchi people because they believed such marks would scare away seals (Stefansson 1945, p. 497). Moreover, some Inuksuit were built to commemorate events, to consume time or mark special occasions. At Kamigluk, Inuksuit were built to house the souls of many Netsilik Eskimo women who drowned tragically at sea (Rasmussen 1967).

There is no doubt that Inuksuit were indispensable commodities for the travelling hunter. In fact, Western explorers also adopted the use of cairns for navigation and storage in the Arctic. Peary (1907) regularly describes that his travelling party built cairns on hilltops, leaving a report or message in a bottle nearby. One cairn frequently visited by Peary and Stefansson (Fig 7) was *Alerts* cairn – built around 1877 at Cape Sheridan and aptly named after the British Admiralty exploratory vessel, *Alert* (Peary 1907, p. 55). The form and shape of *Alerts* cairn could easily be mistaken as an Inuksuk built by Inuit. Stefansson even endorsed the building of Inuksuk in his *Arctic Manual*. He expounded that, “Where records are being deposited, the best way is...to erect, out of things of no value to the Eskimos, a beacon which will be seen from a distance (1945, p.497).”

“Modified” Inuksuit Forms

Inuksuit are no longer just markers of the temporal landscape. In Southern Canada, tourist shops and Inuit art galleries are overwhelmed with Inuksuit trinkets and other paraphernalia: mini- Inuksuit, Inuksuit mouse pads, fridge magnets, jewellery and soap-stone carvings of Inuksuit made by Inuit artists. In terms of the space ‘Inuksuit’ items occupy on these retail shelves, they are on par with other infamous icons that represent the Indian people of southern Canada, such as leather moccasins and the wooden totem poles of British Columbia.

Inspection of a series of posters drawn by young Canadians for a recent competition reveals the extent to which the Inuksuit has filtered into Canada's mainstream culture as a symbol.



The competition, under the auspice of Heritage Canada, invited people eighteen years and younger to draw posters that showed their pride of Canada. Out of the 13 finalists selected from each province and territory, five entries included an image of an Inuksuk. Interestingly, the winning poster (Fig 8) of the 2000 competition drawn by Neshali Weera from Alberta, features a mosaic of Canadian icons; the red maple leaf; snow capped mountains; pine forests; the CN tower; totems poles and an impressive rendering of an Inuksuk. Neshali Weera's poster represents Canada through symbols – her Inuksuk image encapsulates the Arctic.

A growing number of people in Southern Canada are also embracing the Inuksuk symbol. Intriguingly, adaptations of the Inuksuk form are occupying many front gardens of suburban residences in Quebec City, Ottawa and Montreal – replacing the garden gnome and pink flamingo folly. Moreover, the Inuksuk serves a growing global audience. For example, a gigantic topiary of an Inuksuk featured prominently at the 2000 and 2001 *Mosaiculture Internationales* competition in Montreal (Fig 9). The topiary sculpture became a symbol of the competition, captivating local and international audiences. Similarly, an Inuksuk positioned in the forecourt of the McCord Museum in Montreal exposes tourists to a 'piece of the Arctic'. Likewise, along a popular pedestrian path in Stanley Park, Vancouver, stands a bold and dominant Inuksuk that faces towards the waterfront (Fig 10). And, at Toronto Airport, an Inuksuk was built as a symbolic gesture – in recognition of its heritage value insofar as being one of the earliest navigation aids known to humankind (Lewis 1966, p. 85).

The Inuit themselves have also joined the Inuksuk marketing campaign in the north. A large 'Inuksuk' with long legs and outstretched arms was erected at the entrance to the Inuit service town of Kuujuaq, Nunavik, as a welcome sign to the Arctic. However, many visitors to the town are unaware that this stone arrangement (Fig 11) is not an Inuksuk, but rather an *Innunguait* (in likeness of a human) (Lewis 1966, p.86). This *Innunguait* in Kuujuaq contains no hidden messages about landscape- its sole purpose is to convey a feeling of arrival to the Arctic and therefore does not act in the 'capacity of a human' like an Inuksuk does.

The modified Inuksuk forms are merely symbols that capture the essence of the Arctic. They do not describe landscape per se, but they provoke and stimulate the observer to enquire about how the stone formations relate to the land. The danger exists that many may perceive the modified Inuksuk forms purely as objects rather than a sequence of navigation networks that straddle the landscape. Inuksuk cannot be extracted from their setting, for to do so, would be to Westernise them. Western science cannot and should not attempt to codify Inuksuk – they are an intricate system of objects, sites and places that do not belong to a system of scientific structures. Much educational fallacy results when dislocating a feature such as an Inuksuk from its environment, as witnessed in Australia with the sales of boomerangs, dot-paintings and didgeridoos. Inuksuk are living entities, but they may soon become artefacts if marketing continues unchecked.

Discussion: Preserving Inuksuk

The Historic Sites and Monuments Board of Canada (HSMBC) is the governing organisation charged with the mandate to recognise and preserve places, persons or events of significant heritage value. When the *Historic Sites and Monuments Act* was enacted in



1953, the Board focused primarily on built forms. It was not until much later that attention was paid to streetscapes, districts, gardens and urban and rural landscapes. Recently, the HSMBC shifted their focus to recognising, identifying and classifying Aboriginal cultural landscapes in Canada. In response to the ‘trend’ towards preserving Aboriginal cultural landscapes, Parks Canada generated a series of guidelines that expanded upon HSMBC’s vague concepts and definitions of cultural landscapes (Buggey 2000). Despite the rigour of Parks Canada’s guidelines, it remains difficult to ascertain (for the purpose of preservation) whether cultural landscape features such as Inuksuit should be defined as a place or event.

Under the HSMBC (1998) guidelines, a place may be designated national historic significance if it “illustrates or symbolises in whole or in part a cultural tradition.” Furthermore, a place must be in a “condition that respects the integrity of its design, materials, workmanship, function and/or setting.” Any Inuksuk could therefore be defined as a place, however its designation is somewhat constrained by the criteria stating, “the boundaries of the place must be clearly defined,” and that the “site must have been completed before 1975.” Perhaps tangible places with rigid edges such as buildings and parks can be subjected to these criteria, but Inuksuit, which span across vast regions of the Arctic in linear formations, do not have definitive boundaries. This is analogous to the Australian Aboriginal concept of ‘dreaming tracks’ or ‘songlines’ – invisible mythical pathways that meander all over Australia describing the stories of Aboriginal creation and legendary totemic beings (Chatwin 1998, p.2). Dreaming tracks and Inuksuit relate and maintain a dialogue with the wider environmental setting such as rivers, mountains, the night sky and animals. These, and other external influences shape the nature of the dreaming and Inuksuit boundaries – lines that constantly evolve and morph as the environment endures natural and human modifications. Moreover, their boundaries also become skewed as new legends and myths emerge or are expanded upon in contemporary indigenous cultures. Traditional stories about mythical and natural boundaries have also atrophied with the passing of indigenous elders.

In South Australia, the Southern Pitjantjatjara people of Maralinga recorded their Dreaming tracks on paper with the aid of researcher Kingsley Palmer. This information – based on stories, myths and legends was then overlaid on a topographic map of the area, providing a visual representation of the travels performed by ancestral beings (Turnbull 1989, p.60). In 1984, when land claims were being made for the Maralinga Lands, visiting parliamentarians were shown the map to illustrate Pitjantjatjara spiritual connections with the land. Consequently this map acquired the status of a title deed to the country. It is interesting that this map, which described intangible relationships with the land (and possibly consisted of vague boundaries), become a legal document within a western construct. Notwithstanding the self-ownership of Nunavut by the Inuit people, and Nunavik through the 1975 *James Bay Northern Quebec Agreement*, the Pitjantjatjara example relays the message that indigenous people continue to maintain close and enduring ties with their country – a connection that exists through features and sites like Inuksuit.

With this in mind, the guideline that prescribes a site must be built before 1975 is a questionable one, considering Inuksuit are constantly being repaired, modified and new ones constructed. It is a guideline that emphasises time rather than tradition – a guideline that ignores cultural hybridity as a heritage factor. The heritage value of Inuksuit should not be determined through individual assessments (a laborious exercise in itself), but rather based upon the traditional act of making them. Ranking the importance of each Inuksuit



would prove difficult, especially those that work in unison or those that possess divergent meanings to different Inuit groups. All Inuksuit, regardless of age or characteristics, should be preserved as a mark of respect of the tradition, and this includes those Inuksuit that have been constructed since 1975 and those that will be built in the future. The Inuit themselves have long recognised the importance of preserving the Inuksuit fabric, as the following passage by Inuit elder, Tomassi (Hallendy 1990) attests:

"We are so respectful of our ancestors that we can't destroy what they made. We can't even touch the Inuksuit they made, much less destroying them. This is how I am today, because I can't destroy what my ancestors made. And I think all Inuit have the same feeling – not wanting to destroy or abuse or even joke and make fun of the Inuksuit that our elders made. Such is our respect for the elders and their "belongings"."

The Inuksuit legacy can only grow stronger as Inuit culture continues to embrace the historical actions of their forefathers. They are precious entities and will remain indefinitely as signs on the landscape if they are collectively preserved.

Another argument for the preservation of Inuksuit is to consider them as a series of events. As elucidated previously, the *aulaqquat* Inuksuit, which was used as a decoy for trapping caribou, encapsulates both a place and event. The *aulaqquat* Inuksuit remain stagnant for most of the year, becoming active when the caribou migrate into the region. They mark important caribou seasonal migrational paths and form the venue where a hive of hunting and trading activities occurred between groups. Mysteriously, in the early 1900's, the caribou in some areas did not return to follow their traditional paths, leaving many *aulaqquat* sites lingering on the land as "ghost towns". For scientists who track the caribou journey across the Arctic, these Inuksuit would reveal the passages caribou once followed in bygone eras. Other Inuksuit that marked events, were the *napariat* Inuksuit – beacons built at the mouths of lakes or rivers that described the site to make camp in summer for fishing. Built to be as high as a man's hip, string lines made from seal skin were strung between them and used to hang fish on to dry for the winter (Hallendy 1985).

It may be questionable whether Inuksuit need to be preserved when no immediate threat of their destruction or removal is apparent. Quite often nature is to blame for the demolition of Inuksuit because of strong winds and bears, however this damage is minute and localised compared to the impact large-scale mining operations and hydro-electricity plants have on modifying the landscape. These latter influences already loom over vast tracts of land, with provisions to occupy other areas in the Arctic.

The Cree people of the James Bay Region of Northern Quebec have witnessed first hand the destruction of their traditional hunting and camping grounds as a result of the hydroelectricity projects administered by Hydro-Quebec since 1971. By 1985, the La Grande, Eastmain and Caniapiscaw rivers were dammed, effectively submersing and destroying 11,500 sq km of pristine caribou, migratory bird and marine mammal habitat. And, the second phase, known as the *Great Whale Project* which was completed in 1999 involved the diversion of four rivers and the subsequent flooding of 4400 sq km (Draffin 2001). Hydro-Quebec also has plans in place to develop the *Grande Baleine Complex* by 2019, which will engulf even more parcels of land.



In the northern extremities of Nunavik, two major nickel and diamond mining operations exist and continue to expand. The Diamond Discoveries Corporation controls six kimberlite (diamond) sites on the eastern shores of Ungava Bay and the Torngat range, occupying a region of 470 sq km (DDC 2001). And, the nickel mine at Raglan, covers an area 55 km across and is situated 60 km west of the Inuit village Kangiqsujuaq and 100 km southeast of Salluit (Falconbridge 2000). Both mining companies emphasise that local communities were consulted and environmental impact studies conducted before operations proceeded. Assuming this is the case, it is interesting to speculate what the fate of Inuksuit has been in these regions. Did the Inuit people emphasise the importance of Inuksuit? Did they make a case for their preservation, despite the fact that not all Inuksuit are used in a traditional manner? Have the mining operations significantly altered the environmental fabric which Inuksuit relate to? These questions begin to highlight the need to preserve aspects of aboriginal cultural landscapes before further developments emerge.

One recent example of large scale planning that has considered Inuit use of the land is evident in the development of the *Pingualuit Crater National Park* in Nunavik (due to be open as a provincial park in 2003). Researchers on the design team mapped out on geographic information systems the existing uses of the proposed area by canvassing Inuit hunters from villages in Nunavik. The study revealed that many hunters used this space as a meeting and camping area while on hunting journeys, for hunting caribou, fishing and for spiritual reasons. After analysing the data, the researchers designed the shape and determined the extent of the national park around the paths and networks travelled upon by the Inuit.

Conclusion

The case for preserving Inuksuit should not be limited by the shortcomings apparent in the *1953 Historic Sites and Monuments Board Act*. Inuksuit are ingrained in Inuit tradition and culture; they are signs on the landscape that demark important sites, places and events. They are nationally significant, and need to be considered for preservation before mining sites and hydroelectricity plants erode further reaches of the Arctic landscape. If Inuksuit are positioned within an area that is likely to undergo changes, then measures should be taken to ensure minimal disruption to the existing fabric of the place. Appropriate site planning and environmental impact statements will prove crucial in guaranteeing that Inuksuit will be remembered as temporal markers on the landscape.

Clearly, Inuksuit have shaped the way the Inuit people perceived the landscape and thereby traditionally traversed across it. Over time the Inuksuit shifted from the physical to the spiritual realm, where stories and legends were created to celebrate its qualities. Stories about Inuksuit will always be embedded in Inuit mythology, but their physical existence forms the integral chapter of the story.

Legislation cannot protect Inuksuit from ongoing tourism marketing campaigns, but public awareness of their importance to the Inuit may reduce its fate of becoming exclusively a garden folly or collectable trinket. With the increased attention paid to Inuksuit, it is interesting to speculate that the rebirth of Inuksuit stories and songs may be imminent.

Despite the technological advances in Inuit society, Inuksuit will always perform two synonymous roles – one that conveys messages about places and navigation and the other



that reminds them of ancestral relationships with the land. Inuksuit are now revered as symbols of the Arctic, a symbol in their own right.

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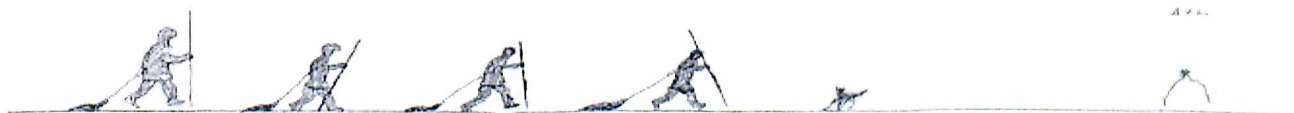




Figure 1: Large Inuksuit on Baffin Island, Nunavut c. 1970
Photo: Prof. Peter Jacobs, Université de Montréal



Figure 2: Inuksuit on ridge top of Quaqtq village, Nunavik, 2000.

Described to author by Inuit elder David Okpik as indicating a safe place to make camp. Authors photo.



Figure 3: Hakamuktak pointer marking direction to the Cache

Drawn by anonymous Isummasaqvik School Student (Quaqtq) March 1999. Colour pencil on bond paper: Original size – 8.5” x 11”



Figure 4a: Ikahimaluk or niungvaliruluit Inuksuit window

Source: (Hallendy 2000)



Figure 4b: Inuksuit windows mark a navigation route across the landscape

Drawn by anonymous Isummasaqvik School Student (Quaqtq), March 1999. Colour pencil on bond paper: Original size – 8.5” x 11”



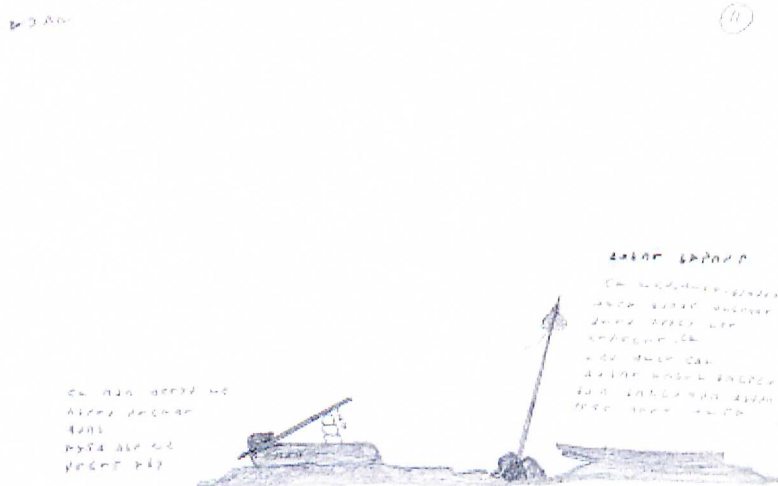


Figure 5: Tikotit or Tikkutik 'pointer'

The pile of rocks in the middle are pointers. The people who own the qamutik had left this message for the next traveller to inform him where they were staying and the direction to take to get there. The pointer has three rocks under it, which implies that it takes three nights to get there. A note is also tied to the top of the pole for further instruction. This is how the inland Inuit used to describe travel directions.

Tuumasi Kudluk Collection, D-34, Avataq Cultural Institute, Montreal



Figure 6: Aulaaquat 'bogeyman' Inuksuit

During the September migration, the caribou have to cross the lakes and rivers they meet along their route. The crossing areas are called nalluit (singular-nalluk). The nalluit were traditionally used for hunting caribou. Lines of Inuksuit were erected to direct the flow of caribou toward the narrowest part of the lake, where the Inuit waited. While the caribou crossed, the Inuit in qayaqs would shoot arrows at them, and also use the ipuligaq- a long spear. When the caribou set foot on the other side of the crossing, they encountered a series of Inuksuit, of which they had to follow. There again, hunters were waiting with bows and arrows.

Tuumasi Kudluk Collection, D-6, Avataq Cultural Institute, Montreal





Figure 7: Alert's cairn at Floeberg Beach

Built around 1877 on the shores of Cape Sheridan by the crew aboard the British Admiralty Ship *Alert* as a navigation beacon. Source: (Peary 1907, p. 56)



Figure 8: Neshail Weera's winning poster of a national competition administered by Heritage Canada, 2000

The poster represents Canada through symbols and icons. The totem poles represent British Columbia; the Inuksuk represents the Arctic. Source: www.pch.gc.ca



Figure 9: Giant Inuksuk constructed for the *Mosaiculture Internationales* Competition in Montreal, 2000.

Authors photo



Figure 10: Inuksuk as a tourist attraction along a section of Stanley Park, Vancouver

Authors photo, 2001



Figure 11: Innunguit 'in likeness of a human' greets people as an entry sign to the Inuit town of Kuujuaq, Nunavik

Authors photo, 2000



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Landscape Perception and Way-finding in the Arctic

Abstract

This paper explores a set of drawings produced by Inuit children in Nunavik. The territory of Nunavik – formerly Rupert's land, was incorporated within the Boundaries of Canada in 1867. The population of 9,200 Inuit is housed in 15 coastal villages in the northern reaches of Quebec, Canada. The drawings describe their systems of way-finding in a landscape that is difficult to decipher for those who do not live there.

The Inuit, as with many traditional semi-nomadic societies, have developed a variety of ways in which to orientate and navigate through the vast landscape of the Arctic. Students in the Kativik School Board are taught Inuktitut until the third grade after which they learn a second language. The mother tongue language retention in Nunavik is 95% among Inuit. The School Board has developed an educational module on "survival". One component asks students to draw orientation and navigational elements of the Arctic.

These drawings indicate the way in which Inuit children observe and translate the navigational features around them. They illustrate that they are adept at rendering scale, form, distance, perspective and colour – an ability that perhaps stems from their unrestricted interaction within an infinite backyard – a playground that is a perfect breeding ground for developing acute perception skills.



Introduction

Quaqtaq, an Inuit village, borders Ungava Bay and Hudson Strait in Nunavik, Northern Quebec, Canada. Formally developed as a town to service the nearby and now defunct weather station at Cape Hopes Advance (*nuvuk*), the village now operates as home and as a service centre for its 250 residents. Quaqtaq traditionally served as a winter camping ground for the Inuit because of its sheltered position within a small valley and enveloping ridges. Many migrating sea mammals passed by Quaqtaq's headland, making it an ideal place to hunt seals (Qumaq 1997). Inuit traditions such as throat singing, hunting, soapstone making, sewing and print making still prevail in Quaqtaq, along with modern amenities such as satellite television, convenience stores, electricity, snowmobiles and the internet.

Quaqtaq's isolation from the two major Inuit centres and southern cities has helped in retaining its traditional character and ways of life, with a balance drawn between Inuit culture and Western cultural influences. A visit to the Isummasaqvik Community School in Quaqtaq demonstrated just how much the transfer of Inuit knowledge and culture is active within the town. The Inuktitut language and its syllabic writing system are taught at the school, in addition to local Inuit history, survival on the land and way-finding techniques.

Customarily, information about the land was taught at home. In recent times this act of transmitting information has been increasingly transferred to school teachers. Consequently, the *Kativik Regional School Board*, which determines the curriculum taught at Nunavik's Schools, has developed a landscape learning and appreciation subject based upon how Inuit elders used to find their way across the tundra using natural features, celestial bodies and purposely built landmarks. Students from various age levels participate in the 'survival' module, generating drawings that describe how particular features of landscape are used for orientation and navigation. By examining a selection of these drawings, produced by Quaqtaq Isummasaqvik School students, we can begin to appreciate how Inuit children perceive the Arctic environment.

To better understand Inuit children's perception it is critical to understand who the Inuit are, the environment they inhabit, and how they used and still use the landscape. Through the lens of this cultural framework, we can begin to comprehend how Inuit perceived landscape and how way-finding systems emerged.

Inuit and the Arctic Environment

The modern day Inuktitut speaking inhabitants of Arctic Canada descend from the Thule Inuit, who migrated to the region around 1000 AD. They lived primarily in small kin groups scattered along parts of the coast. The Thule people however, were not the first to occupy the area, for the Dorset Inuit (*Tunit*) had already migrated to the Northern regions from Alaska and Siberia around 2500 BC (McGhee 1984).

Prehistoric populations consisted of hunters who travelled across vast tracts of tundra fishing for marine mammals such as seals, walrus and whales. They depended upon the resources of the landscape for survival, abode, religion and education. They generally migrated with the seasons to seek shelter from extreme weather or to follow animal migrations, living in either skin, sod or snow houses.



Inuit society, until recently, was structured around a semi-nomadic lifestyle based chiefly on hunting and gathering. These two basic activities served as the medium in which information and knowledge about landscape was transferred from the elders to young apprentices. Whilst hunting and travelling, the Inuit learned about their surrounding environment, forging an understanding of its complexities, patterns and movements. Depending on the season and location, travel was either by foot, dog teams or by qayaq (kayak). The distance ventured from home using dog teams varied immensely, ranging from a few kilometres, to more than a thousand (Mathiassen 1928). Quaqtamiut Inuit continue to actively hunt around Quaqtqaq, although, rather than venturing out on the land for several days, they generally conduct daily hunts on snowmobiles, preferring to return to the comforts of home in the evening.

During summer, the Arctic landscape is covered with a uniform grey-brown tone from the moss and lichen, while the winter scene varies from grey to white shades of snow and ice. Temperatures range from -40 degrees Celsius in winter to 25 degrees Celsius in summer. The following observation of the Arctic environment described by Edmund Carpenter (1973, p.20) offers a picture of the conditions Inuit hunters faced when travelling across the tundra:

“In winter, the horizon recedes into the immense distance and, except for when the sun hovers close to the horizon and orange rays briefly define the profile of the monotonous plain, there is no line dividing earth from the sky. The two are the same substance. There is no middle difference, no perspective, no outline; nothing the eye can cling to except thousands of smoky plumes running along the ground before the wind – a land without bottom or edge. When winds rise and powdery snow fills the air, there is neither up nor down and the traveller is left white blind.”

Despite the severity of weather, Inuit successfully trekked across vast expanses of countryside, orientating themselves with the help of conspicuous and inconspicuous landmarks, celestial bodies and well-developed mental maps. It is within this bleak and subtly articulated environment that the Inuit developed acute perceptual and spatial skills. The Inuit often navigated using a combination of intangible and tangible mapping techniques – systems that they construed and generated from landscape features. The exceptional cartographic abilities of the Inuit did not pass unnoticed by early Western explorers who applauded the accuracy of Inuit navigation and maps (Hall 1865; Parry 1824; Ross 1835).

Inuit Perception of the Arctic Landscape

The manner in which we choose to measure, interact and travel through a space greatly influences the way we perceive it. Western technical man for instance, uses the conventions of Greenwich Mean Time and a metric scalar system to measure distance, whereas the Inuit traditionally described space in terms of “how many sleeps”. Distance and the speed traversed across the tundra were based on an amalgam of variables; snow conditions, terrain, hunting success and the strength of the dog team.

It is not only the mode of travel through space that impacts perception, but also the frequency and manner in which it is performed. Kevin Lynch, for example, studied



cognitive way-finding in the urban context, identifying a system of navigation that relied on one or more of five key components: paths, edges, districts, nodes and landmarks (Lynch 1960). Using these five ways to orient themselves within a city, at either a macro or micro scale, travellers are able to navigate with some precision and confidence. Moreover, Warner Brown (Tuan 1979), in an experimental study on the human ability to negotiate mazes, discovered that people who know city streets well (such as cab drivers) do not have precise mental maps of their neighbourhood, but rather know a succession of movements appropriate to recognised landmarks. Cultural geographer, Yi-Fu Tuan supports this notion, remarking that precision is not required in the practical business of moving about. Instead, a person needs only to have a general sense of direction to the goal, and know what to do next on each segment of the journey (Tuan 1979, p.72). Cognitive mapping research by Roger Downs and David Stea (1977) confirm the views of Lynch and Tuan, asserting that people develop mental maps from repeated experiences in moving around an environment – an orientation system that was most likely used by the Inuit.

Many Arctic researchers in the fields of anthropology, cartography and ethnography have attempted to establish how the Inuit perceive landscape. Trowbridge (1913) suggested that the Inuit perceive landscape using a combination of both the “egocentric” and “domicentric” methods of orientation. The egocentric method involves an individual orientating themselves in relation to defined reference points, such as cardinal (compass) points, whereas the domicentric model entails orientating oneself in relation to a starting point or home.

Raymond Gagné (1968) and Nelson Graburn (2000) argue that Inuit language underpins perception. Their theories are based on the Sapir-Whorf hypothesis, which suggests that a particular view of the world is conditioned by and confined within the limits of the grammatical categories and structures of the mother tongue. They describe that the spatial world of the Inuit as consisting of three pairs of opposites: hereness / thereeness, upness / downness and insiderness / outsiderness. The speaker is always at the centre of these localiser sets of words, with prefixes added to give more detail about a subject. Gagné and Graburn contend that because of this system the Inuit are able to specify with more precision than is found in most languages, where things and places are located, how to reach them and their attributes in relation to settings.

David Pelly’s (1991) research concludes that the Inuit possess a linear conceptualisation of territory based upon the nature of the barren grounds terrain. Pelly suggests that the Inuit instinctively think in perspective at ground level – they detach themselves from the landscape to imagine a seemingly barren tundra full of lines; consisting of rivers, eskers, fjords and caribou paths. The lines are a way of articulating landscape – to give a sense of order to an otherwise never ending featureless plain.

Ronald Rundstrom (1990) implies that the extraordinary miming abilities of the Inuit shaped the way they perceived landscape. The Inuit are well known for being capable of replicating the sounds of many marine animals, caribou, polar bear and birds with extreme precision, including the art of decoying with natural materials or even themselves. According to Rundstrom (1990, p.163), “Mimicry was institutionalised not merely as an artistic ability; it was a practical tool in everyday life and was manifest in myriad pan-Inuit cultural institutions, including mapping”. He postulates that the Inuit were not only capable of impersonating animals, but perhaps also possessed the skills to mime aspects of



landscape. Navigating over the tundra may have been possible by imitating, and thereby remembering many pertinent landscape features. Maybe an accumulation of imitation acts enabled the formation of stories or events that would describe navigational passages.

And, Edmund Carpenter (1973) suggests that perhaps the Inuit perceive landscape from a spiritual perspective. While working with Aivilik Inuit, Carpenter discovered that many Inuit men believed the earth was merely several weeks journey from their home, and that the earth is both flat and circular, with Southampton Island at its centre. They believed that at the end of the earth stand four great pillars that support the sky dome, and it is from here that the stars burn so brightly in the heavens on clear nights (Carpenter 1973, p.13).

Regardless of the explanation or explanations retained, all researchers seek to understand the extraordinary ability of Inuit to move through a complex, and at times formidable landscape, with confidence. Inuit realize only too well that the continuity of their traditional culture depends on the transfer of orientation and way-finding skills from the older hunters to the young. And this is an important part of the mission of the “survival” module developed by the Kativik School Board, and the drawings that result from classroom discussions on way-finding in the Arctic.

Inuit Children Drawings

Ways to examine landscape perception may be derived from songs, art, religion, dance, literature or mapping. The Inuit children drawings are not exclusive to anyone of these categories, but rather incorporate a combination of art and way-finding content. The question arises therefore as to whether the drawings should be analysed from an art critic’s perspective, a child psychologist’s viewpoint, or categorised on the basis of the navigational messages inherent in the drawings. After sifting through the drawings of 25 Inuit children it was decided to focus on way-finding systems illustrated by the drawings - although a complete analysis would require content about child behaviour and the children’s drawing skills. Three distinct way-finding systems emerged from the drawing set: celestial navigation (sun, moons, stars), Inuksuit navigation and navigating with natural features.

The children in the “survival” subject range from 11-17 years of age, most of who have been raised in Quaqtaq or a neighbouring Inuit village. Their teacher, Ms Pasha Puttayuk, indicates that the students were not required to draw particular navigational elements, but rather given the scope to playfully represent and explore the subject. The following nine illustrations illustrate the way in which Inuit children observe and translate the navigational features around them.

Celestial Navigation

Kim Tukkiapik’s star formations drawing, Figure 1, focuses on the identification of stars used for navigation. Tukkiapik’s illustration of three star groups: *Sakiatsiat* (Small Dipper/Ursa Major; the Pleiades) *Tuttujuit* (Big dipper/Big Caribou) and *Ullautut* (3 stars that are running after each other), is significant as it is one of the few recordings available that suggests that Inuit did use stars for navigation in Nunavik. The only other recordings stem from fieldwork of the neighbouring villages of Igloodik and Inukjuak in Nunavut, by John MacDonald (2000) and Bernard d’Anglure (1993) respectively. Yet, comments from



Aivilik Inuit contradict the premise that stars were used as reliable direction finders, as many of their men were misled when they used them (Carpenter 1973, p.22). Nevertheless, during an interview with Inuit elder and hunter David Okpik from Quaqtan he revealed that many Inuit from Quaqtan once used stars to travel at night:

"In January there is only three to four hours of daylight. We use the Big Dipper and other stars low in the horizon. Stars move across the night sky in a particular sequence. We use one star to fix a position and as that star begins to move out of alignment another moves up into its place."

This system recalls similar methods employed by the Polynesians, Australian Aborigines and American Indians, whereby they steered by the shape of the sky and not towards a single point of light.

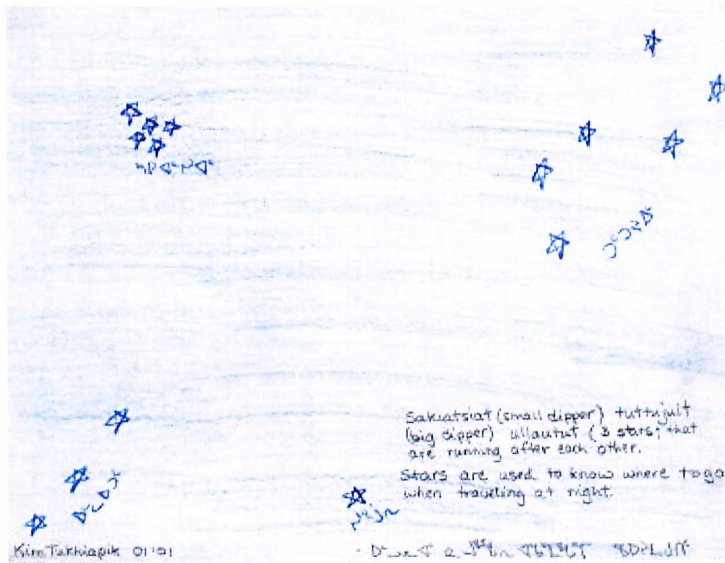


Figure 1: Travelling with Stars

Sakiatsiat (small dipper) Tuttujuit (big dipper) and Ullautut (3 stars that are running after each other). Drawn by Isummasaqvik School Student, Kim Tukkiapik (Quaqtan), January, 2001. Colour pencil on bond paper: Original size, 8.5" x 11"



Figure 2: Travelling with the Stars and Northern Lights

Stars are used to indicate where to go as well as ski-doo tracks and Inuksuk. The Northern Lights (*Aurora borealis*), light up the area when travelling at night. Drawn by Isummasaqvik School Student (Quaqtan), March, 1999. Colour pencil on bond paper: Original size, 8.5" x 11"



Figure 2, an elevation/perspective drawing, highlights nocturnal navigation using the Northern Lights (*Aurora borealis*), stars and the moon; whereas, during the day, navigators find their way using Inuksuit and ski-doo tracks. The drawing does not describe the way in which the *Aurora* is used for navigation, although Arctic explorer Richard Nelson reports that the lights are always orientated in bands running from east to west across the sky and that the ends of the curvature bands bend toward the north (Nelson 1969, p.163). Conversely, David Okpik remarks that "...we (the Inuit) do not use the *Aurora* to travel at night, but it does light up the ground for us to see." Perhaps the Northern Lights act as a giant spotlight, bringing other navigational aids into focus.

The student artist has an obvious grasp of the scale of the *Aurora* and the extent that it occupies the night sky through its warped band forms. The accuracy of this representation may be due to the fact that the *Aurora* is such a common feature of night sky around Quaqtaq, and thus has been witnessed regularly.

The small black speck on the horizon represents an Inuksuk (plural: Inuksuit), a purpose built landmark that consists of many stones piled on top of one another. Inuksuk were placed on hilltops so that they could be seen from great distances, normally standing some 1-2 metres high and across. The scale of the Inuksuk depicted in this drawing suggests that the student drew this illustration as if he was standing on a ridge top, looking over and beyond a valley. From this vantage point he is able to picture the linear tracks left behind from a snowmobile and also see the Inuksuk lit up by the moon, stars and Aurora lights. This student has undoubtedly seen similar scenes while travelling with elders around Quaqtaq.

Inuksuit Navigation

Unlike the celestial navigation drawings, which are rendered from a distance, Michael Tukkiapik's drawing, Figure 3, is a close-up of one type of Inuksuk. The three dimensional drawing is depicted with remarkable attention to form and detail. Tukkiapik's Inuksuk appears like a human with outstretched arms – a modern Inuksuit claimed by Arctic researcher Norman Hallendy that is not an Inuksuit at all, but rather an *Innuguit*, which means "in likeness of an *Inuk*" (human being) (Hallendy 2000, p.86). An overwhelming *Innuguit* welcomes visitors and tourists entering the service town of Kuujjuaq in Nunavik, and in Southern Canada, *Innuguit* are located in the forecourt of the McCord Museum in Montreal and in Stanley Park, Vancouver. In recent years the *Innuguit* has been marketed by the Inuit and Canadian Government organisations as a totemic icon that captures the essence of the 'north'.

Inuksuit are scattered throughout Nunavik, particularly around Quaqtaq, in various shapes and forms, with some as old as 5000 years. Many are located on ridge tops nearby the village itself, making it easy for children to access them and help create others. Tukkiapik's drawing is more like a blueprint of how Inuksuit are constructed than a description about how they relate and fit into the landscape. Tukkiapik's Inuksuk stands proud over the horizon – a masculine, bold figure that dominates the landscape.

The drawing sheet is organized in a manner that suggests he is well adept at representing scale, proportions, texture and perspective. One may be led to believe that the drawing is



This 'matisse' like depiction of an Inuksuk by Monica Ezekiel, Figure 4, is markedly different from the rest of the drawings in the set. Stripped of detail, the illustration shows an unadorned, whimsical and caricatured Inuksuk. It shows the raw constituents of an Inuksuk in terms of its construction, massing, placement and size in addition to making a clear statement about the Inuksuk as a bold and overarching symbol of the Arctic. The translation of the drawing claims that "Inuksuit and boulders are used to know your way around," yet the drawing does not demonstrate this graphically. One must have prior knowledge of the different forms of Inuksuit and the messages they convey about way-finding. In this instance, since the Inuksuk does not appear in a contextual framework, we have to use the imagery depicted in other student drawings about Inuksuit to understand how they are used and why they are venerated.

Ida Nassak's perspective drawing of a canvas tent against a lake, describes how the Inuksuit on the ridge was used to locate this particular camping site, Figure 5. Known as *hakamuktak*, these Inuksuit can be seen from great distances and were generally placed on high ground to ensure maximum visibility during summer and winter. *Hakamuktak* were also important for travellers, because they marked where caribou or seal meat had been cached (Hallendy 1985, p.32).

The construction of a cache involved encasing food within a circular pile of rocks to prevent it from decomposition and attack from bears or wolves. The stone rings in Nassak's illustration probably represent the backbone of five caches that were opened by the travelling party for consumption. Nassak's drawing encapsulates an ideal camping scene: a lake for freshwater, food readily available and shelter within a valley.

Alec Oovaut's illustration, Figure 6, depicts a caribou decoy system that is sometimes constructed where river systems and lakes narrow (*nalluit*). The eight stone formations are aligned in an arc to form a 'caribou fence,' known as *aulaqqut* (scarecrow/bogeyman/flag). As the caribou cross *nalluit*, they become frightened and confused by *aulaqqut*, mistaking the stone forms for many men. Traditionally, hunters hid behind the stones and then speared the caribou as they ran between them. Although *nalluit* is not strictly a navigation system, it is however, recognisable as a signpost for trapping caribou.

Oovaut's picture has a sense of depth and perspective. The foreground is delimited by the edge of the lake, the centre describes the story of the caribou trap, and the mountainous background positions the decoy's within a framework. An isolated Inuksuk is featured in the distance, suggesting that it was followed along the ridge top to locate the caribou-hunting place.

In another Inuksuk drawing by Michael Tukkiapik, Figure 7, we see how a unique signpost known as a *tikkutik* pointer describes where to fish against a frozen lake. There are many lakes across Nunavik that do not yield fish, so in an effort to inform travelling Inuit about the lakes which are plentiful, *tikkutik* were built along their edges (Hallendy 1990). Lakes, when covered in snow during winter, are difficult to distinguish from surrounding land, and hence *tikkutik* pointers clearly mark their locations.



The small circles in the plan drawing represent the holes cut in the ice for fishing and the two rectangular shaped polygons represent the *tikkutik* stone configuration. *Tikkutik* consist of two small rocks placed side by side that are also built to point towards the location of good fishing.

Once the nature of the *tikkutik* fishing marker system is known one can begin to read the simple message within Tukkiapik's illustration. It describes an event (locating the marker), action (ice-fishing) and appreciation of an otherwise 'invisible' landscape navigational aid.

Navigation using Natural Features

Daniel Oovaut's drawing, Figure 8, contains a mixture of information about travelling with clouds, Inuksuit, rivers and the sun. The message describing *Tunguniq* (the darkening of the clouds above seawater indicating that there is open water) was interestingly, a navigational measure used by early Arctic explorers such as Vihjlamur Stefansson, (Spink & Moodie 1972) Lieutenant de Haven (Gatty 1958) and Commandant de Gerlache (Gatty 1958). They described this phenomenon as a 'water sky' or 'ice-blink', which referred to the natural elements of the earth that were reflected onto the cloud canvas above. It is believed that from *Tunguniq*, they were able to determine the nature of distant landscapes and its approximate distance. Snow free land and open water showed as black on the clouds; pure white sea ice appeared as white and land covered snow soiled by blown sand was reflected darker than the seas (Spink & Moodie, 1972). The small blue patches that appear close to the horizon in Oovaut's drawing represent the distant sea and its reflection.

On first inspection, the drawing yields no information on how 'rivers' assist with navigation. The river is not illustrated because it is frozen over. The hunter on his ski-doo is following the meandering frozen river through the valley, using it like a highway. He is returning home using the same pathway, with the linear ribbon carved out in the snow by the ski-doo as a guide. The passer-by probably located the river initially by using the Inuksuk on the ridge top as the prime landmark.

Oovaut's drawing is similar to the drawing depicting travelling with the stars and *Aurora* in Figure 2. Both drawings are proportioned equally: a third for the foreground, horizon and sky respectively. Each shows a ski-doo track weaving across the countryside and a lone Inuksuk on the undulating horizon line.

Finally, Stevie Pagé's drawing of boulders, snow and wind as direction finders, Figure 9, highlight the most commonly used navigational measures employed by the Inuit. Boulders were used as natural landmarks, with some memorised because of their unique shapes and forms. Wind, on the other hand, was a more intangible navigational aid. In times of severe storms, fog or blizzards, the only aid available was *sastrugi* (small ridges of hard snow running parallel to the prevailing winds), although to navigate successfully, the traveller must possess a regional understanding of the winds and know approximately which way the wind was blowing from the last storm that created it.





Figure 8: Navigating with Clouds & Rivers

Tungunig: Darkening of the clouds above seawater indicates that there is open water. Inuksuit, rivers and the sun let you know where to go. Drawn by Isummasaqvik School Student (Quaqtaq), Daniel Oovaut, February, 1999. Colour pencil on bond paper: Original size, 8.5" x 11"



Figure 9: Navigating with Boulders, Drifted snow and Wind

Boulders, drifted snow constructed by wind and inuksuit are things to look for to know your way around. Drawn by Isummasaqvik School Student (Quaqtaq), Stevie Pagé, January 2001. Colour pencil on bond paper: Original size, 8.5" x 11"



Another striking element depicted in Pagé's drawing is big hills. Quaqtqaq town manager, Johnny Oovaut, when interviewed, reiterated that some high and odd shaped mountains were used as landmarks. Oovaut described how there are two hills in the greater Quaqtqaq region called *amamak* (resemble women's breasts) in addition to another mountain that resembles the head of a person, and one that is shaped like an igloo.

Pagé's drawing represents a typical winter/spring scene, with the boulders rendered in black to show the contrast they make against the bleak white background. The blue sky forms the edge and backdrop from which all elements on the tundra surface are read and the man with his snowmobile give a sense of scale to the features on the landscape.

Discussion

The selection of drawings analysed in this paper are a small but representative sample of Inuit children artistic skills. The nine drawings illustrated are representations of landscape beacons – depictions of a seemingly hidden and complex system of navigation. The drawings are not maps or artefacts; they are a product of frequent interaction and stimulation within the setting of the Arctic landscape. They are a response to landscape and the lens through which Inuit children perceive it.

Marlene Cox (1979), in a cross-cultural comparative study between Inuit and American mid-western children drawings concluded that "A child's art is reflective of his or her culture and perhaps Inuit children are indeed influenced by satellite television, common text books and teachers educated in southern culture." Although this may be the case, the students in the 'survival' class are exposed to the Inuit perspective. Their teacher, Pasha Puttuyak, was raised in Quaqtqaq and her father is a revered Inuit elder.

Interestingly, John Berry (1966) performed a cross-cultural study between the Temne of Sierra Leone and Inuit of Baffin Island, to discover whether occupational differences and or living conditions impacted perception. Berry reported that, "the nature of the relationship between perception and culture is merely part of the larger problem of psychological differences between groups of people who are living under varying geographic, economic, social and cultural conditions" (Berry 1966, p. 207). He concluded that the Temne, by virtue of their occupation as rice farmers, were less equipped with the perception skills that Inuit hunters possessed. Berry also noted that affection towards children in the Temne community weaned after their second birthday and that after this age discipline was harsh, with frequent beatings and strict control. In contrast, Inuit children were treated lovingly and were welcomed and treated with great kindness and consideration; punishment was rarely seen and much freedom was allowed (Berry 1966, p.209). With this in mind, Berry suggested that the way in which children were treated and the role they played in each community had a direct bearing on their perceptual development.

A 1962 study by Witkin and Associates (Berry 1966) highlighted that perceptual abilities are affected by the method of child rearing chosen. They coined the terms "field dependent," which referred to ones difficulty in separating an object/item from its context, and "field independent," which referred to one who could easily differentiate the objects. Subsequently, Berry's research suggested that the Temne children, through severe discipline and conformity within the home, were "field dependent" and thus less perceptive, whereas Inuit children were "field independent," since they were fostered by home



encouragement, responsibilities and parental stimulation of their curiosities and interests. Witkin (Berry 1966) concluded that the freedom and liberal direction given to Inuit children (field independent) implied that they would have a higher level of perceptual development than their “field dependent” counterparts (Berry 1966, pp.214-215).

It is worthwhile noting that Inuit children around Quaqtaq maintain a field-independent lifestyle even today. In summer, with its extended hours of sunlight, Inuit children play unescorted well into the early hours of the morning; roaming free around the town on ski-doo’s and four-wheeled motorbikes. The snow-covered arena is their playground – an environment in which they acquire information and knowledge about landscape and landscape systems. Their backyard is virtually infinite, a boundary only limited by the reaches they choose or need to explore.

In a southern rural context, Roger Hart (1974) studied play space environs of Wilmington, Vermont, examining children’s behaviour and creativity. Hart postulated that the quality and characteristics of play-space environments (not just playgrounds) impacts the development of children’s perceptive and creative skills. He observed that children preferred to play in unescorted environments, such as dirt driveways, between buildings and around the base of large trees, where they were found to be more creative in these unrestricted play spaces. Some children constructed large scale maps of parts of their neighbourhood in the dirt, others built “houses” and others constructed a complex system of canals containing water for rivers, falls and dams. In one instance, an eight year old was observed making a dirt map of his home in relation to New York, the nearby beach, a local candy store and New Hampshire (Hart 1974, p.360).

Hart suggested that children learn mental mapping skills from toy-play, especially in the form of dirt-mapping play. He adds further that, “...in order to actively represent, or ‘mentally map’ large scale environments lying beyond the immediate field of vision, and to understand processes in these environments, children must either actively explore them, or symbolically represent them in the dirt and thereby actively manipulate them with eyes and hands” (Hart 1974, p.358).

The Benefits of TEK to Design

The knowledge of how indigenous groups traditionally navigated has much to offer the design profession, particularly in the domains of landscape planning and environmental design. Indigenous way-finding systems - an integral component of traditional ecological knowledge (TEK), signify that prehistoric organisational systems were once in operation across the landscape. Furthermore, ancient navigation systems reveal the extent to which specific landscape features were feared, valued, revered and avoided by indigenous people. And, through constant travel, the landscape was afforded a variety of descriptive names – a lexicon reflective of events, actions and inherent landscape features and processes. The appropriation of names to places (particularly in remote and difficult to reach areas) indicates that indigenous people had far-ranging knowledge of the environment.

Indeed, the act of way-finding, and its associated properties provides planners and designers with a plethora of information about landscape narratives and indigenous connections to place. With this in mind, the Inuit children’s drawings not only impart individual impressions of landscape, but also yield the significance afforded to the



landscape fabric. Embedded within the drawings is a wealth of knowledge that speaks volumes of traditional Inuit way of life. Designers who learn to decipher the information contained within indigenous renderings of landscape, such as the Inuit children's drawings will undoubtedly be rewarded with a cornucopia of design ideas and opportunities. As designers expand upon their vocabulary of TEK, they will consequently become more equipped to judge the likely effect and impact of design interventions proposed within indigenous communities.

Conclusion

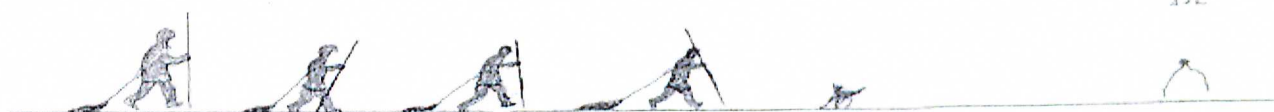
The Inuit considered themselves as 'participants within' landscape, while contemporary western cultures tend to be 'consumers of' landscape. The Inuit children drawings are an extension of their interaction with landscape; they reveal systems of traditional Inuit knowledge (not subject to scientific structures and systems of expression) and impart information about a variety of navigational aids.

Although the Inuit now travel over short distances with ski-doo's equipped with global positioning systems instead of dog teams, they continue to incorporate traditional way-finding skills. Clearly, a complimentary synergy exists with scientific navigational knowledge. Transmission of culture and superior perceptual skills will continue to prevail and prosper based on learning modules such as that described in this article assuming the Kativik School Board maintains the "survival" focus on way-finding in the Arctic and that Inuit children continue to be given the freedom to explore their Arctic homeland.

The obvious differences in the way in which Western and Inuit children interact with landscape should not limit the development of 'landscape modules' being incorporated into other junior and middle schooling programs. Rather than a focus on 'survival', the subject matter could focus on understanding how simple landscape systems operate, such as; tide flows, moon phases and the weather. Not only would Western children acquire perceptual skills in the learning process, but they would also begin to value and become more attuned to systems inherent in the landscape.

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