
COLD
SNAP

# COLD SNAP

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*"There's no such thing as bad weather, only bad clothes."*

— Norwegian lore

Cold environments are everywhere.

They are found not only at the extreme poles, and higher elevations, but also in climate controlled buildings, grocery stores, and around the globe in the form of refrigerated trucks.

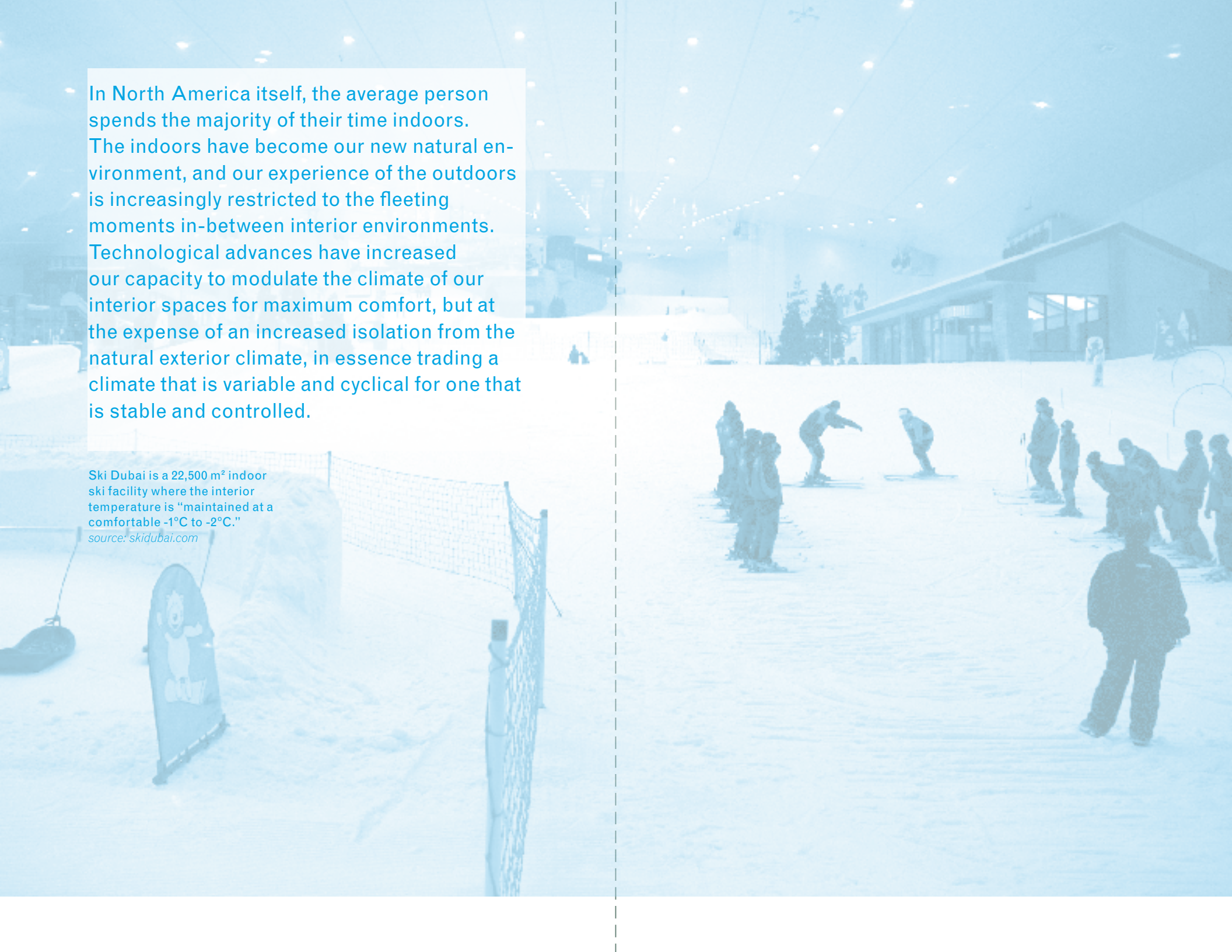
Global statistics indicate that the number of people living in cities is on the rise: more than half of the world's population now lives in urban centres(1). With the rapid urbanization of the planet and our increasing preference for interior habitation(2), in general, our environment is getting colder.

1. We are past the point where 50% of the world's population lives in cities. By 2050 the figure will be about 75% of the global population of some 8.5 billion people. *source: Atlas of Shrinking Cities (Ostfildern : Hatje Cantz, 2006)*
2. North Americans generally spend 87% of their time indoors and an additional 6% in cars. *source: the Handbook of Environmental Chemistry (New York: Springer Books, 2004),p90.*

*photo: ©Gauthier Deblonde*

In North America itself, the average person spends the majority of their time indoors. The indoors have become our new natural environment, and our experience of the outdoors is increasingly restricted to the fleeting moments in-between interior environments. Technological advances have increased our capacity to modulate the climate of our interior spaces for maximum comfort, but at the expense of an increased isolation from the natural exterior climate, in essence trading a climate that is variable and cyclical for one that is stable and controlled.

Ski Dubai is a 22,500 m² indoor ski facility where the interior temperature is "maintained at a comfortable -1°C to -2°C."
*source: skidubai.com*



Cities are not designed to embrace cold.

Whether through expensive snow-removal programs or increased heating bills, most North American cities view winter as a season to be temporarily endured. Our activities and thus our architecture and landscaping have been focused on spring, summer, and fall as if cold were incapable of imparting practical design considerations from which we can learn. Instead, we wait for winter to be over, hoping that the environments we create for the rest of the year will perform sufficiently well during the cold season.

The almost identical skylines of Houston, Texas (top) and Calgary, Alberta (bottom).
*source: William Rogers C. and Jeanne K. Hanson, The Winter City Book: A Survival Guide for the Frost Belt (Edina, Minn: Dorn Books, 1980).*

Cold is a culturally relative phenomenon.

To be cold is to feel somehow uncomfortable. The same conditions, however, can result in different experiences and reactions in different individuals. While in some countries the cold is tolerable, in others it cannot be ignored. Given this condition of being cold, how can we learn to live with it in a way that makes it survivable, even fun?

We could generally classify our resistance to cold in three ways: genetic, cultural, and behavioural. Over thousands of years, humans have evolved unique physical traits reflecting our specific exterior environment: height, build, hair colour, eye colour, and body hair all reflect genetic predispositions to certain environments. Larger people tend to be less cold because of a decrease in surface area to volume ratio, the same effect that accounts for why small dogs sometimes have to wear sweaters.

One's physical and cultural acceptance of interior climate can greatly affect how exterior climates are experienced. In general, we could say that people from cold environments tend to feel less cold outside, while people from temperate climates tend to feel less cold inside.

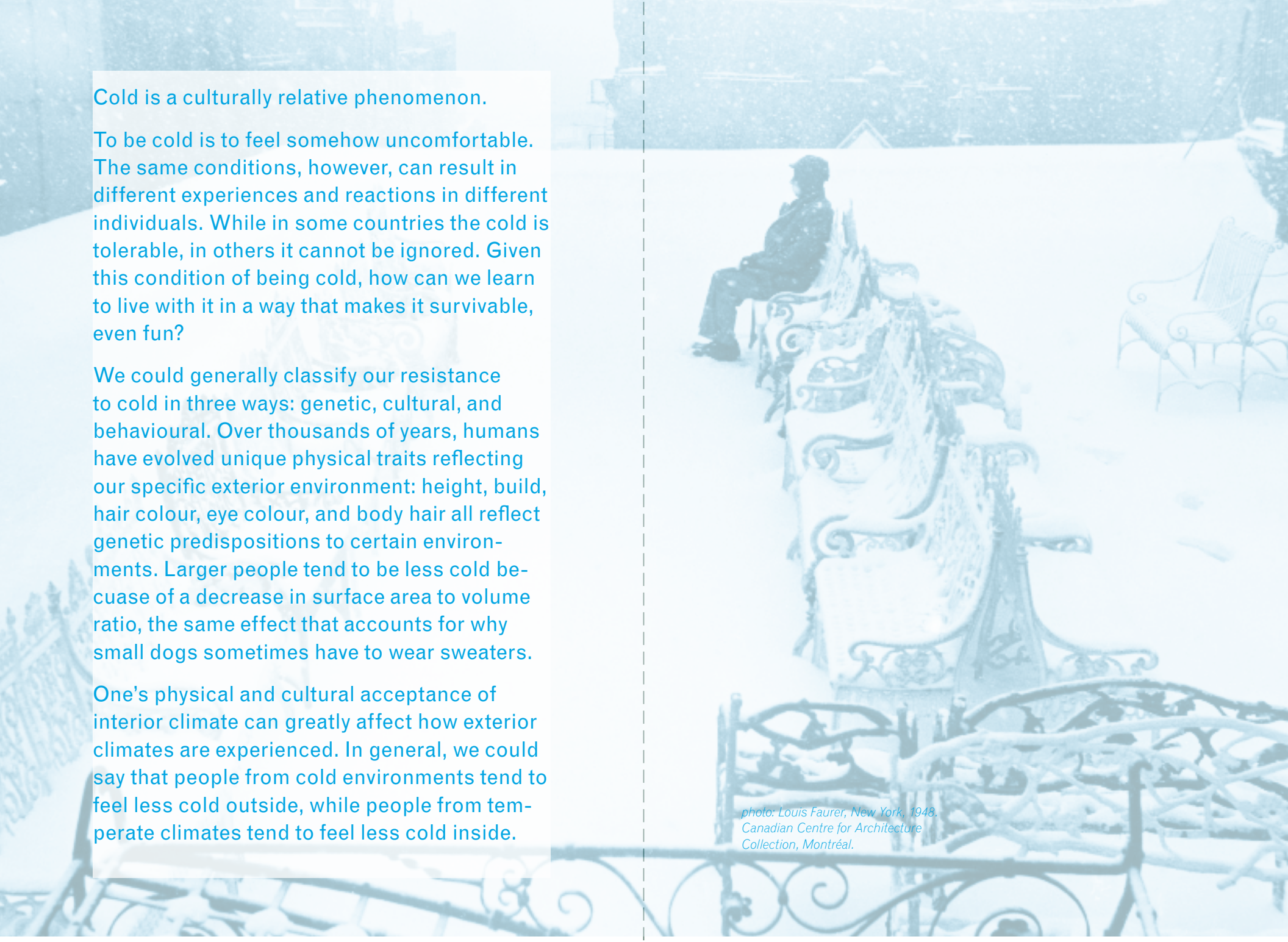


*photo: Louis Faurer, New York, 1948.*
*Canadian Centre for Architecture*
*Collection, Montréal.*

Cold is an experience we have in common.

While we may react to cold in our own cultural and individually specific ways, we cannot ignore the fact that fundamentally, cold is a common experience to all – no matter what climate we may inhabit.

Cold is a relative phenomenon – experienced by individuals in relation to their surroundings. Cold is a sensation that is at once unique and universal. Cold is a connection, a common thread that we share and can relate to – even if sometimes it just makes for small talk. Cold is a way for people from different countries to share similarities and elaborate on differences. Cold is common ground to speak about, and upon which to develop parallel traditions.
Or rivalries.

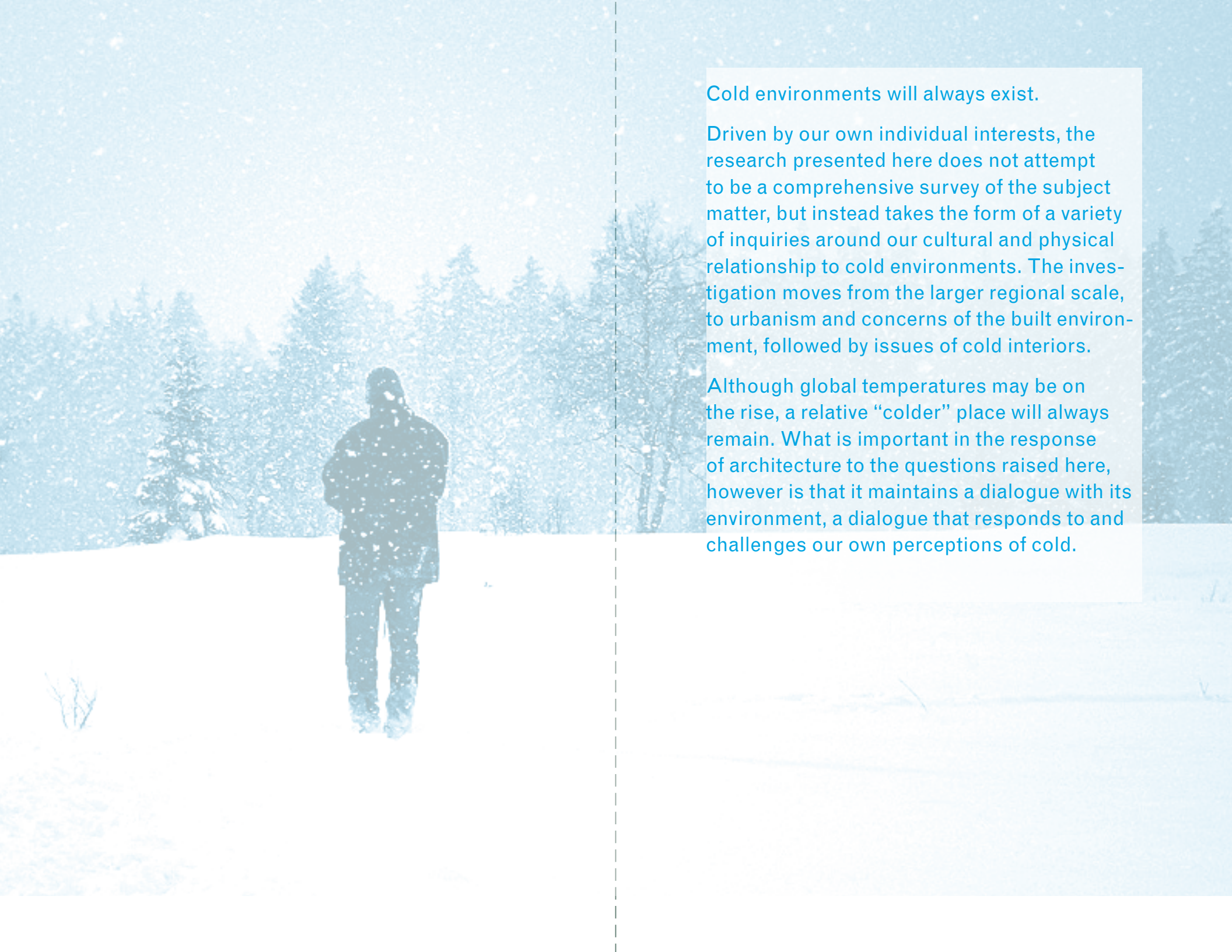
*photo: Ildar Sagdejev*

In the face of climate change, why study cold environments?

Some of the most dramatic consequences of global warming are being felt first in the polar regions and are sounding the alarm of impending climate change.

In the near future, melting polar ice will make large areas of the Arctic accessible to shipping, resource extraction, and tourism. As the growing season of the north and extreme south is extended, and access improved, development is sure to follow. If sea levels rise as predicted, a move inland will produce an attendant move northward, and the necessity to sustainably address issues of this shifting environment will be paramount.

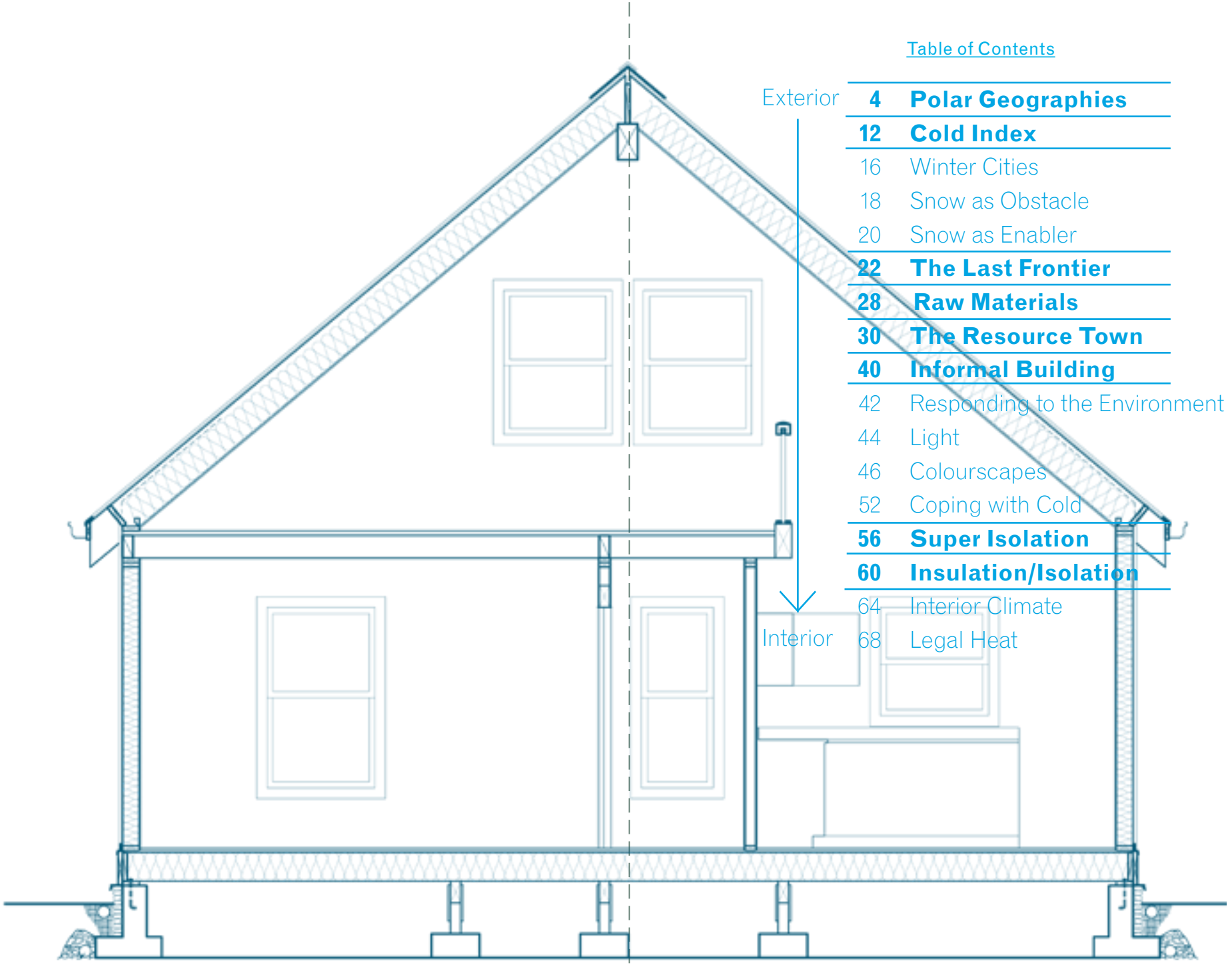
On a global scale, the constant conditioning of our indoor environment is cause for concern. A heightened awareness of cultural tolerance to cold could lead to significant energy savings, efficiency, and even increased comfort in future architecture.



Cold environments will always exist.

Driven by our own individual interests, the research presented here does not attempt to be a comprehensive survey of the subject matter, but instead takes the form of a variety of inquiries around our cultural and physical relationship to cold environments. The investigation moves from the larger regional scale, to urbanism and concerns of the built environment, followed by issues of cold interiors.

Although global temperatures may be on the rise, a relative “colder” place will always remain. What is important in the response of architecture to the questions raised here, however is that it maintains a dialogue with its environment, a dialogue that responds to and challenges our own perceptions of cold.

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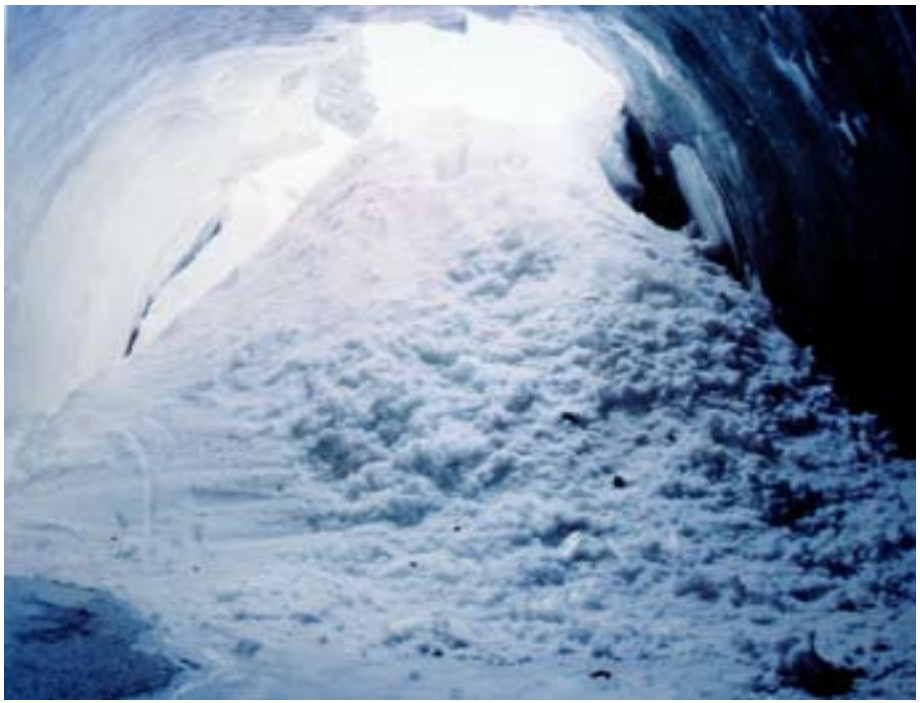


*"Winter is the true season of the north.*

*Spring is only a promise that something great is about to happen;*

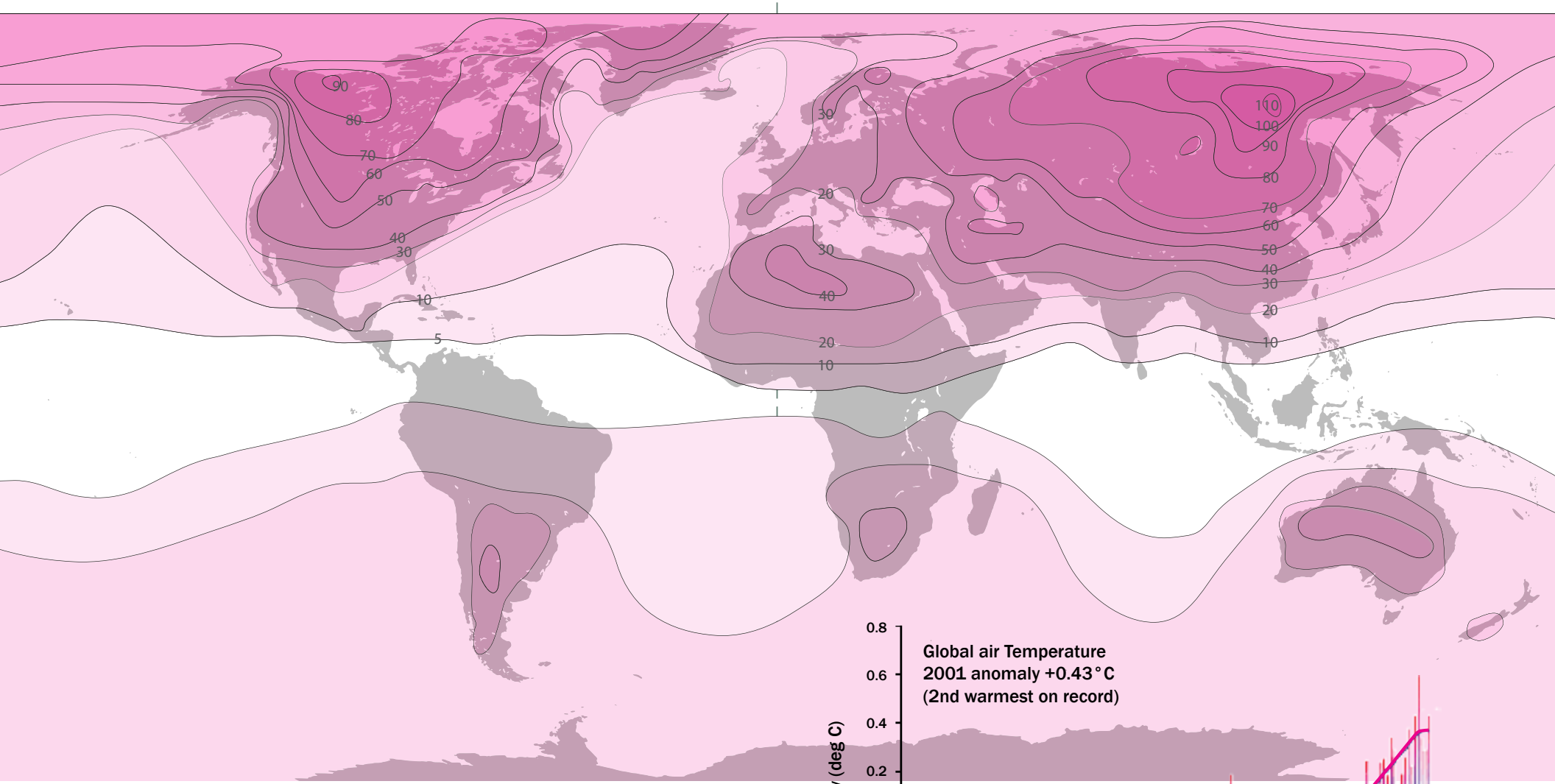
*Summer is only an illusion of what people, during some hot days or weeks, at the most, believe to be true;*

*Autumn means death, it is the dark grave of the promises of the Spring and of the illusions of the Summer. But winter is something that really exists.*

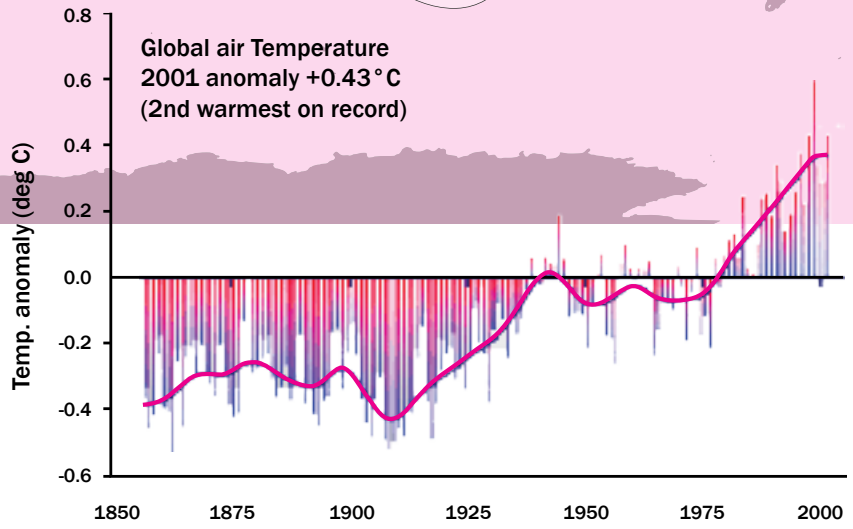
*Winter – it never deceives. It always comes back."*

— Toivo Pekkanen, Finnish novelist

Polar Geographies




above; Differences between average minimum and average maximum temperature in degrees Celsius throughout the year.
*source: Victor Olgyay, Design with Climate (Princeton: Princeton University Press, 1963).*




at right: Over the past 200 years, a marked increase is shown from the baseline average. Temperature values are also becoming increasingly erratic. In the future we can expect to see much hotter days, but also a variation that includes temperatures that are relatively very cool.
*source: East Anglia University, UK. http://www.cru.uea.ac.uk.cru/info/warming*

## Definitions of Arctic/Antarctic



high arctic

low arctic

sub arctic

arctic circle

10°C July isotherm



## Climate Outlook 2090


treeline

projected treeline

permafrost boundary

projected boundary

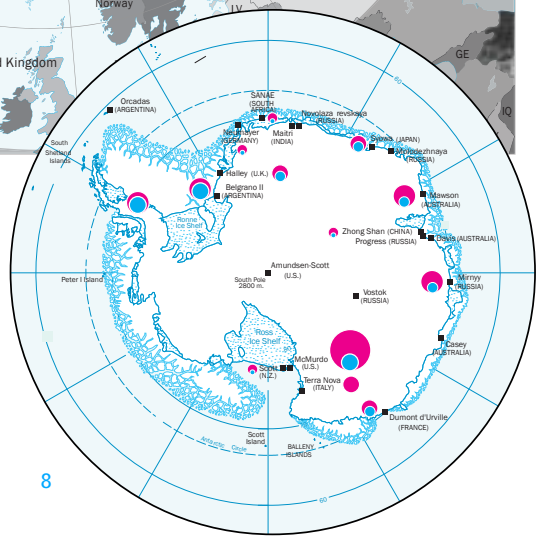
sea ice 2002

## Population


400,000
100,000
20,000

200,000
50,000

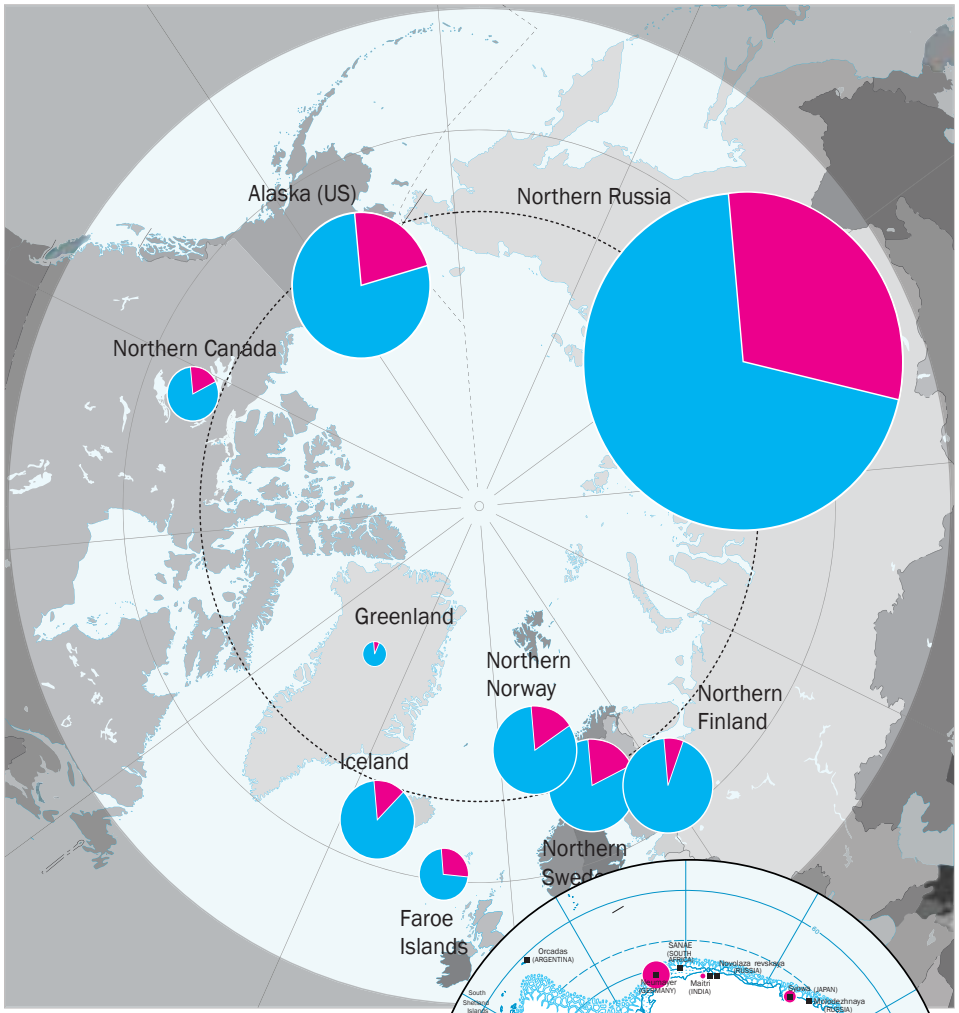
· small dots represent villages with less than 20,000 inhabitants




400 100 1500 200 20



## Arctic GDP / Antarctic Research Budgets

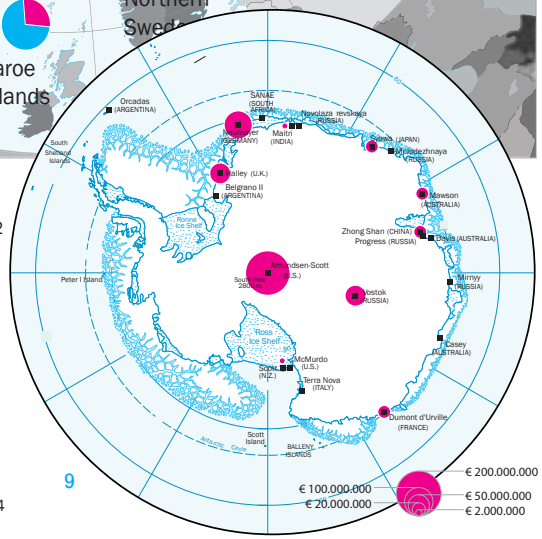



50,000
10,000
1000

Gross Product
(Millions of USD-PPP, 2002

Distribution of Gross Product
Primary sector:
fisheries, oil, mining, agriculture

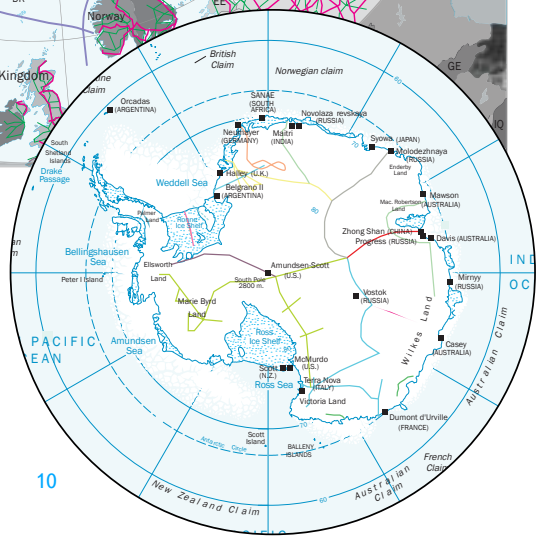
Other sectors, or not specified:
e.g. public services, manufacturing
Source: Stefansson Arctic Institute, 2004




€ 100.000.000
€ 20.000.000

€ 200.000.000
€ 50.000.000
€ 2.000.000

## Transportation

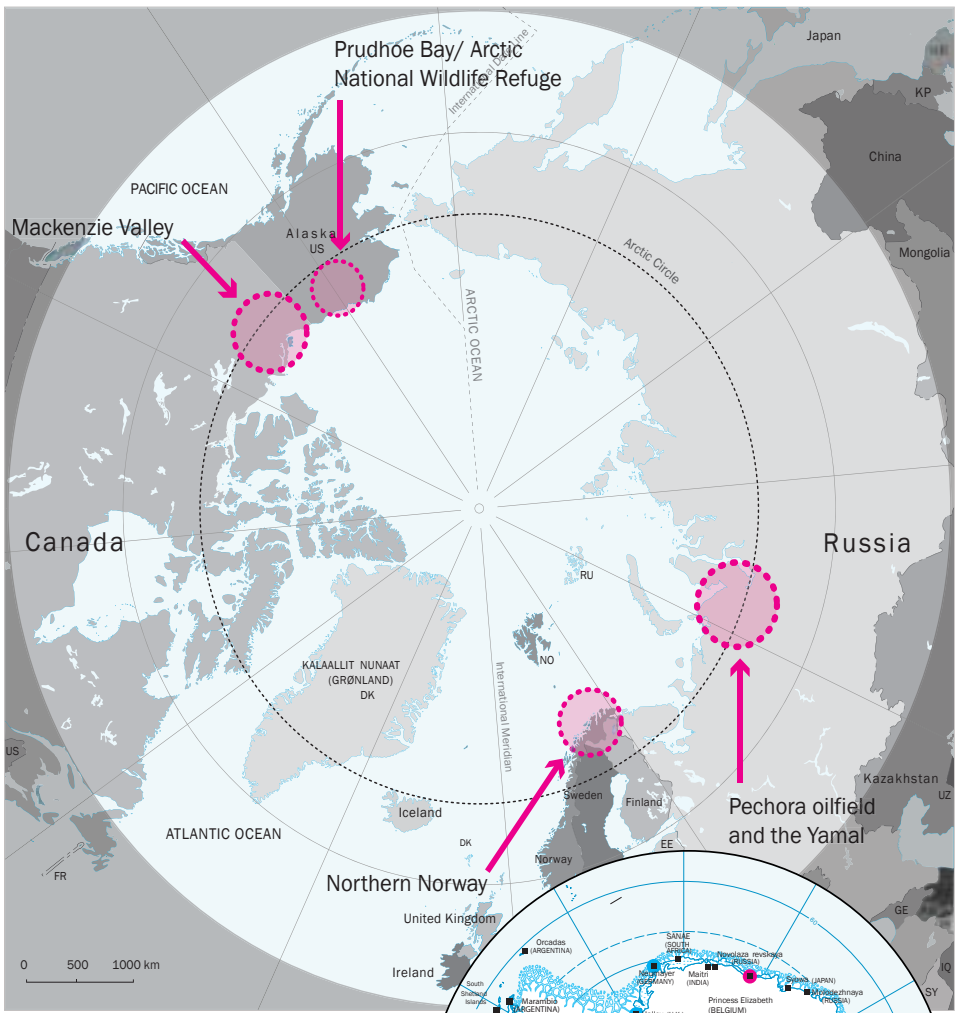



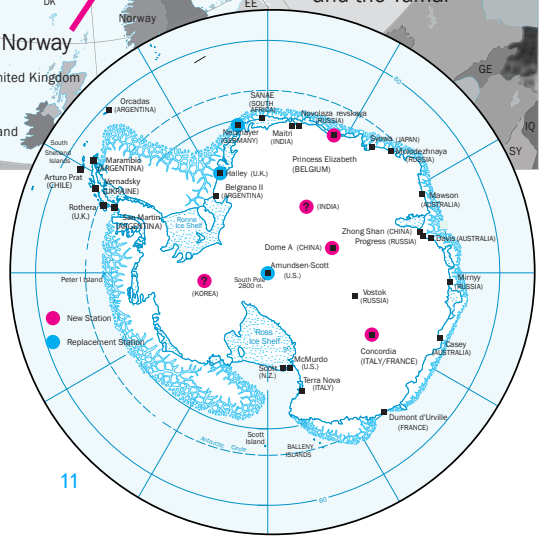

shipping lanes
oil pipe line
rail infrastructure
road infrastructure

Australia
Chile
China
France/Italy
Japan
Norway
Russia
Sweden
United Kingdom
United States
New Zealeand



## Development Hotspots



## Cold Index

Size in square km of the Antarctic continent: 14,400,000

Size in square km of Canada: 9,093,507

Percentage of the world's population living north of the 55th parallel: 3

Percentage of Canadians who live within 160 km of the US border: 90

Amount in feet that global sea level would rise if the Arctic ice cap melted: 0

Amount that it would rise if the Antarctic icecap did: 200

Percentage of the world's fresh water this represents: 80

Number of medals won by Norwegian athletes at 2002 Salt Lake City Olympics: 25

World ranking based on total Olympic gold medals during those games: 1

Population of Norway: 4,773,000

World ranking based on population: 114

Number of condoms shipped to Antarctica's McMurdo Station in January, just before winter began: 16,488

Maximum average population of McMurdo Station during winter: 125

Number of condoms per person per day: 1

Number of children born in the Antarctic since its discovery: 3

Year in which Werner Herzog's documentary film about Antarctica "Encounters at the End of the World" was released: 2007

Length in km of the South Pole Highway, joining two US research bases: 1450

Number of times each year the highway is used by vehicle convoys: 3

Projected capital cost in dollars of this highway: 350,000,000

Percentage of time average Canadians spend in their cars: 6

Percentage of time they spend indoors: 87

Maximum weight in grams of marijuana you can legally keep in your home in the state of Alaska: 115

Size in football fields of Dubai's year-round indoor ski facility: 3

Interior temperature of that facility in degrees Celsius: -2

Average maximum exterior temperature in Dubai in August: 41.3

# A winter city is loosely defined as one in which the average January temperature is 0°C or less.

Albany, New York
Albertville, France
Alert, Nunavut
Anchorage. Alaska
Basel, Switzerland
Belgrade, Serbia
Berlin, Germany
Billlings, Montana
Boston, Massachusetts
Buffalo, New York
Burlington, Vermont
Calgary, Alberta
Cheyenne, Wyoming
Chicago, Illinois
Churchill, Manitoba
Cincinnati, Ohio
Copenhagen, Denmark
Cortina d'Ampezzo, Italy
Des Moines, Iowa
Dresden, Germany
Duluth, Minnesota
Edmonton, Alberta
Fairbanks, Alaska
Fargo, North Dakota
Godthaab, Greenland
Graz, Austria
Grenoble, France
Hammerfest, Norway
Haparando, Sweden
Harbin, China
Helsinki, Finland
Indianapolis, Indiana
Innsbruck, Austria
Iqaluit, Nunavut
Kabul, Afghanistan
Kathmandu, Nepal
Kiev, Ukraine
Kuopio, Finland
Lake Placid, New York
Lapland, Finland
Lhasa, Tibet
Lillehammer, Norway
Lima, Peru
Longyearbyen, Norway
Milwaukee, Minnesota
Minneapolis-St.Paul, Minnesota
Montréal, Quebec
Moscow, Russia
Murmansk, Russia
Nagano, Japan
Nemuro, Japan
New York, New York
Newark, New Jersey
Nizhny Novgorod, Russia
Hokkaido, Japan
Oslo, Norway
Ottawa, Ontario
Philadelphia, Pennsylvania
Pittsburgh, Pennsylvania





Portland, Maine
Prince George, BC
Providence, Rhode Island
Quebec City, Quebec
Reykjavik, Iceland
Rochester, New York
Roros, Norway
Salt Lake City, Utah
Sapporo, Japan
Sarajevo, Yugoslavia
Saratov, Russia
Sioux Falls, South Dakota
Sochi, Russia
Spokane, Washington
St. John's, Newfoundland
St. Moritz, Switzerland
St. Louis, Illinois
St. Petersburg, Russia
Stockholm, Sweden
Sverdlovsk, Russia
Syracuse, New York
Thule, Greenland
Tihua, China
Toledo, Ohio
Tomsk, Russia
Toronto, Ontario
Turin, Italy
Ulaan Baatar, Mongolia
Vardo, Norway
Vladivostok, Russia
Whistler, BC
Whitehorse, Yukon
Wichita, Kansas
Winnipeg, Manitoba
Yellowknife, Northwest Territories
Zurich, Switzerland

*source: William Rogers C. and Jeanne K. Hanson, The Winter City Book: A Survival Guide for the Frost Belt (Edina, Minn: Dorn Books, 1980).*

## Snow as Obstacle

In Montréal, the snowfall is estimated at 225 cm of snow per year, and the budget for snow removal is approximately $128 million. Toronto, with about 50 percent more population and 28 percent more road surface, gets only 125 cm of snow a year, and spends closer to $60 million. The higher cost in Montréal is due to the need to perform "snow removal" as opposed to "snow clearing" necessitated by both the high snowfall amounts and fewer melting days. Shown here are the Tucot Yards in Montréal, a city snow-dumping grounds, after an exceptionally snowy 2007–2008 winter season. — S.H.

*source: Wikipedia photo: Vittoria DiPalma*

## Snow as Enabler

Ice roads are roads that exist only when temperatures permit. In some cases they act as a shortcut between towns, or for some remote communities, a lifeline and short-lived link to the outside world.

In some cities winter is the easiest time to get around: there is no dust, and snowmobiles, skis, and snowshoes become the most practical means of transportation.
— S.H

*photo: Martin at eclecticblogs.ca*

1. In the Arctic, the number of tourists has increased from 1 million in the early 1990s to 1.5 million in 2007. See "Melting ice will affect hundreds of millions globally, new UN report says." *http://www.un.org/apps/news/story.asp?NewsID=22773&Cr=environment&Cr1=# June 2007. Accessed 03/26/08.*
2. See Allen Sarkin, "Before It Disappears," New York Times, 16 December, 2007.
3. Abercrombie & Kent offers "mission trips" to environmentally sensitive locales. For the Antarctica mission in 2007, the twenty-two participants, who paid $6,190 each for a thirteen-day tour, gave an additional $500 to help buy a high-def video camera for the Palmer Station where it will be used to film the behaviour of krill. Each tourist also receives a certificate of participation and a Climate Change Challenge Mission patch, intended for their Mission Parka *(source: Allen Sarkin, "Before It Disappears," New York Times, 16 December, 2007).*
4. Emission from tourism represents 5% of global $CO_2$ emissions (this includes transport, accommodation, and activities). *Source: Michael C Hall, Landscape, Leisure and Climate Change: Greetings from Europe, 010 Publishers. 2008.*
5. As outlined by Alan Grenier, département d'études urbaines et touristiques (DEUT). Université du Québec à Montréal, in his article "Tourisme Polaire en Antarctique". Espaces, October 2007. p 48.
6. Christine LeScanff, Les Aventuriers de l'extrême (Paris: Calmann Lévy, 2000).

above: Tents at Aberdeen Bay
*source: Lisa Rochon, Up North, (Toronto: Key Porter Books, 2005).*



## The Last Frontier: Polar Tourism

Recent scientific evidence of melting polar ice caps has brought the Arctic to global attention. Correspondingly, polar tourism is booming(1). The appeal of the cold environment of the north is on the rise, and seemingly in the form of a modern-day version of an old human impulse: to be the first to experience an unspoiled wilderness landscape. The real difference today, however, is that the quest is now to be the *last* to see it before it disappears.

From the tropics to the ice fields, "doom tourism," driven by a desire to experience things that are disappearing, is big business(2). In 2008, Quark Expeditions, a leader in Arctic travel, doubled its capacity for trips to the northern and southern limits of the earth. Travel agents report clients are increasingly requesting trips to see the melting glaciers of Patagonia, the threatened coral of the Great Barrier Reef, and the eroding atolls of the Maldives. Climate-watch excursions and "climate-missions"(3) are being developed to satisfy the demand. Climate change affects both leisure behaviour and resources, while leisure behaviour in itself is a significant contributor to the climate change that is drawing tourists to these remote locations(4).

There are many aspects of polar tourism that seem to make it especially appealing to the modern traveller with expendable income(5). Firstly, because of the high costs and large distances involved, there is an element of exclusivity. Second, the recent effects of pollution and climate change are not necessarily visible to a visitor who travels to the region for the first time, and the landscape is able to maintain the illusion of being a pristine environment.

Certain fears and unknowns are present in this seemingly pristine landscape, one of which is the search for the mythical final frontier. Rather than an affection for a natural environment, this is more often a need to position oneself against it and to overcome its barriers. This aspect of adventure and the potential of death are notions that are usually not part of contemporary society(6), but are used in

marketing travel to the polar extremes. Most trips to the Arctic are still highly controlled, however, and offer little contact with the ice and landscape. The majority of trips to the Arctic and Antarctica still take place on medium-capacity ships and icebreakers, with a few programmed stops to disembark. Quark Expeditions offers a trip called the "Amudsen," which takes you on a journey mimicking that of the first explorers, and "that still yields a gratifying sense of achievement."(7) This journey combines comfortable travel by air and icebreaker, a once-in-a-lifetime Arctic barbecue and, if you dare, a very brief plunge into the Arctic Ocean. First hand accounts of Arctic discovery are provided on-board by modernday explorers and scientific researchers, further highlighting the potential dangers and scientific interest of the region in a nicely controlled and entertaining way.

In contrast to this now common breed of Arctic or Antarctic tourist, a new kind of experience seeker has emerged in recent years. These tourists might see themselves more as real descendents of the first explorers as they seek risks and unique experiences beyond the comforts of an ocean liner or guided snowmobile tour(8).

In northern Sweden, "Silence tourism"(9) offers an escape from the sounds of the city and confrontation with the sounds of nature. Also emerging along this vein is a kind of Temperature Tourism, where people seek to put themselves in direct confrontation, alone, with the sensation of cold and vastness of the landscape. Marketed as an extreme adventure, one can rent a tent and camp out on the ice. In northern Norway shacks on a frozen lake become overnight accommodations, isolated but within snowmobile distance from a basecamp. Overnight accommodations come with a free light show courtesy of the aurora borealis, and room service consisting of a cup of hot tea delivered in the morning (10). Ice hotels, usually located in less remote locations, offer the experience of sleeping on a bed of ice covered with hay or animal fur. Vodka is available to help you get through



7. See: http://www.windowsonthewild.com/Pole/quark_arctic-amundsen.htm
8. Samuel Étienne, "Tourisme et environnement polaire. Enjeux et perspectives", in *Le monde polaire.* edited by Marie-Françoise André (Éllipes, 2006), pp. 83-96.
9. Alan Grenier, "The diversity of polar tourism," *Polar Geography.* Vol 30, March-June 2007.

*photo: Pherrier Photos*

the night and a morning hot tub is provided to help you get ready for the day as a means of being eased into a comfortable confrontation with the cold.

Recent increases in temperature have been the most obvious in high latitudes, affecting natural and cultural landscapes alike. Long-term processes of weather and climate change are affecting not just the demand for leisure, but also its supply. Silence and Temperature tourism could represent a sustainable trend of "eco" or adventure tourism in the future. But will the polar environments maintain their silence or their temperatures for much longer? Or will the predicted erratic weather patterns of the future be a significant factor in our shifting to substitute indoor activities in a controlled climatic environment for outdoor experiences?

As the ice caps melt, and as new points of access are opened to increased ship traffic, we could see a significant drop in costs associated with travel to the North, but also an increased visual reminder of the increasing resource extraction occurring in that landscape(11). Proper management will be required, and conflicts are bound to arise. Hopefully both industries can develop in a way that is not just aware of their impact on each other, but that also shows a heightened awareness of their impact on the fragile and rapidly changing conditions of the extremes of the planet.

Shannon Harvey

10 Located in northern Sweden, the Abisko Ark Hotel is a series of ice-fishing shacks on a frozen lake. (http://www.abisko.nu/vinter/englishpages/index.asp)

11. See Arctic data from the United Nations Environmental Programme, http://www.grida.no/

opposite page: Quark Expeditions claims a variety of polar "firsts."
*source: quarkexpeditions.com*




Our passion.

Our passion is infectious. As Miss Hall from the UK wrote, "The whole expedition team were marvelous, with interesting lectures and as many Zodiac cruises and landings as possible. The catering staff were incredible… fantastic food, beautifully presented and with such variety… no meal was repeated during the 18 days on board."

Quark firsts.

Quark Expeditions has set many firsts for expedition travel by passenger vessel. Here are a few of them:

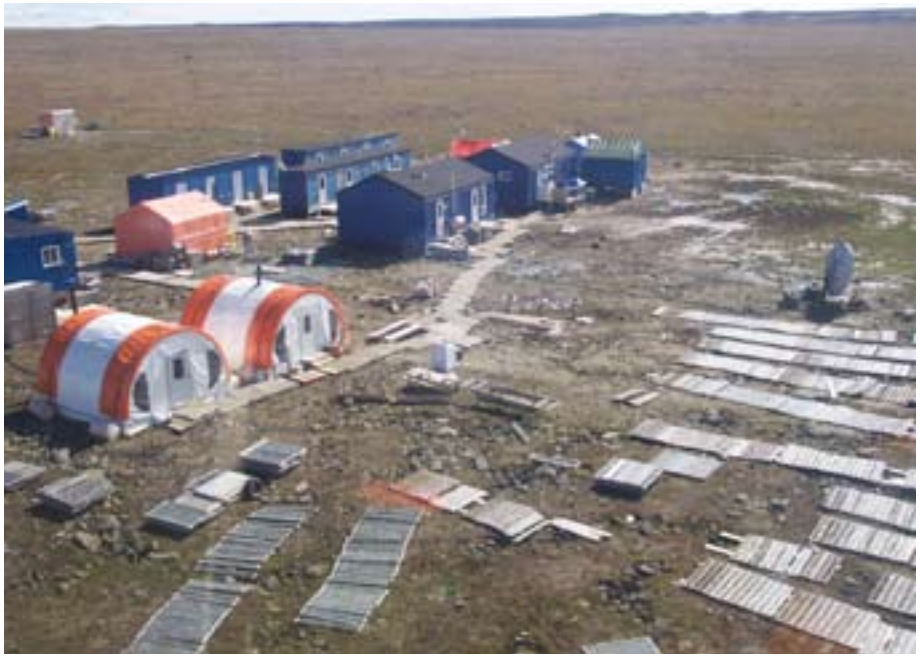
- August 1991: First-ever transit of the Northeast Passage, the historic route across the Russian Arctic.
- November 1992: First expedition to the Far Side of Antarctica. First to visit an Emperor Penguin rookery.
- August 1993: First landing at Cape Morris Jesup, the northernmost land in the world.
- November 1993: First retracing of Shackleton's extraordinary rescue of the men of *Endurance*.
- November 1996: First circumnavigation of the Antarctic continent.
- July 1999: First circumnavigation of the Arctic.
- November 2004: Located the most northerly known Emperor Penguin colony, near Snow Hill Island in the Weddell Sea.
- January 2006: Broke Roald Amundsen's record, set nearly 100 years ago, attaining the furthest southern point of any surface vessel.

## Raw Materials

Once home to over a thousand people, Pyramiden, an abandoned Soviet coal mining settlement now belongs to the polar bears, reindeer, and sea gulls of Norway's Arctic. Pyramiden, one of four mining settlements on the Svalbard archipelago, was established in 1910 by Sweden and named after the pyramid-shaped mountain rising above it.

Over 9 million tonnes of coal were extracted from these hills during the life of Pyramiden which ended abruptly on January 10, 1998. The Soviet ghost town is currently being redeveloped by the Russians, to accommodate tourists. Five to six people are currently stationed there to upgrade the facilities. Today, you can visit Pyramiden via ten hour boat ride from mainland Norway. — P.K.

*inset: Viewing platform over the open-pit Jeffrey mine, Asbestos, Quebec. photo: Andrew Emond www.worksongs.com*



Mineral exploration camp in summer, Ungava peninsula, Quebec.
*photo: Mike Hall*

Nodwell Huron village, Ontario.
*source: 41˚to 66˚: Regional Responses to Sustainable Architecture in Canada (Cambridge, Ont: Cambridge Galleries, Design at Riverside, 2005).*



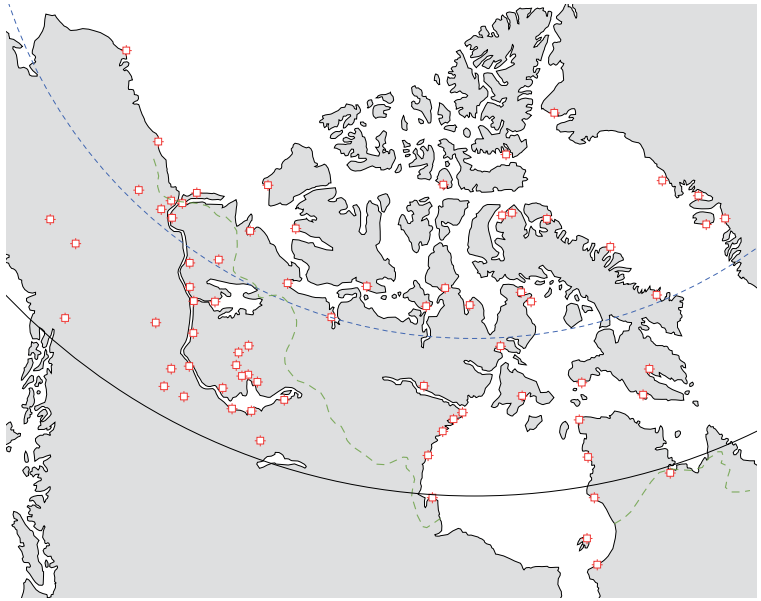
## The Resource Town

The exploration of natural resources in isolated areas such as the sub-Arctic regions of Canada inevitably entails the development of entirely new settlements. Their primary function is to provide the physical setting of family and community life for the imported workers and managers. The resource town is not unique to North America, yet the isolated and often extreme conditions of the landscape continue to force settlers to adopt unique measures for responding to cold environments.

For the experienced worker, high-latitude building is an exercise in extended service. The typical resource town employs a number of individuals from all over the world for an indefinite period of time. Since service to the exhaustion of a given resource means the inevitable collapse and dispersal of your social and material network, to this end, and until very recently, building in the North meant the development of tools for the dismantling and transportation of entire settlements. In some early versions, crude tools of bone, or later iron, would situate and extend the ability to exploit certain natural resources beyond their seasonal capacity to return.

Generations of sub-arctic settlement prototypes(1):

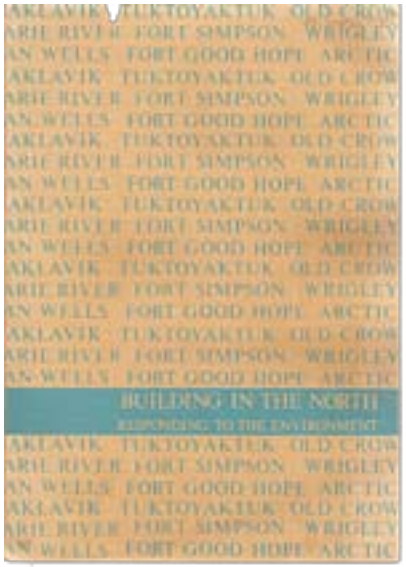
1. Temporary settlements inhabited by indigenous people with a hunting and food-gathering economic base.
2. Haphazard and make-shift settlements built by the pioneers of natural resource developments.
3. “New towns” built by large mining companies for their employees; modelled on typical suburbs built in temperate regions and inherently loose and expanded land-use patterns.
4. Dispersed institutional buildings and the open-air linear shopping centre replaced with a compact town centre consisting of an agglomeration of buildings clustered around a climate-controlled mall, and no residential component with the exception of a hotel.



(above) Some communities in northern North America.

(at right) "Building in the North," prepared by Van Ginkel Associates Ltd. for Canadian Arctic Gas Study Limited, 1976.

(following page) from "Building in the North", a series of resource town masterplans.






5. Continuous and pluri-use structures interspersed with detached housing with the intention of establishing favourable private and social interaction. Compact walking distances recognizing the situation within immense natural landscapes.

The inhabitants are directly linked to the land through the existence of certain deposits. Without resources there is no town. The scale of a settlement depends on the procurement and continued refinement of minerals. When the resource runs out, so does the town, often relocating individuals to adjacent sites or vanishing all together.

Resource development has long been recognized as a significant factor in shaping patterns of Canadian development. In general, the construction of towns in northern Canada has been directly connected with mining and processing of mineral culture. With the majority of workers coming from developed regions, attracting and keeping workers in these isolated territories has always been a problem for mining companies. In desolate landscapes the main urban design challenge involves issues of privacy and social interaction. Recurring fluctuations generate feelings of insecurity and impermanence in the community, feelings accentuated in mining towns by the knowledge that the resource base will eventually be exhausted.

The relative dearth of building materials and the ability of certain cultures to thrive within high-latitude environments tells of a cold comfort that eludes contemporary design practice. Native cultures stem from a conception of cold based on development and continued orientation within sub-arctic environments. For the Inuit, the land, sky, sun, and seas represent a way of life linked to the seasons and embedded in their material culture. The idea of exploitation does not exist, at least not as a remote industrial concept.

The 1976 Van Ginkel report, "Building in the North," proposed a set of criteria for architectural consideration in extreme climates. Part of this study, which stems from the

Fort McMurray, Alberta
lat: 56.717772
petroleum

Inuvik, Nunavut
lat: 68.365168
petroleum

Leaf Rapids, Manitoba
lat: 56.462974
copper and zinc

Pickle Lake, Ontario
lat: 51.466211
gold and silver

Resolute Bay, Nunavut
lat: 74.698030
airfield exploration support

Radisson, Quebec
lat: 53.794172
hydroelectric

top left: Townsite of Fermont, Quebec.
above: the five-storey windscreen building affects the microclimate of almost two-thirds of the townsite area.



implementation of resource towns, is the concept of thermal insulation as an ensemble of buildings rather than the condensed, singular envelope of modern building science. While resolution of each building ultimately depends on intentional thermal isolation, "Building in the North" reminds us of the potential for building based on the establishment of microclimates.

microclimate, n. *(OED)*:
*The climate of a small or restricted area, or of the immediate surroundings of an organism or object of interest, esp. where this differs from the climate generally.*

Microclimates exist naturally on south-facing slopes or by virtue of tree-line and prevailing wind patterns. In either case, the creation of favourable living and working conditions can benefit greatly from careful siting within a landscape(2). A microclimate always presupposes a series of landscape elements working in tandem to produce unique local environmental conditions and is read as the effect of the resultant space between.

Architecturally, this concept has been explored on separate occasions by architects Ralph Erskine and Norbert Schoenauer. Both employ the concept of the windscreen at the scale of settlement through long, linear community buildings meant to harbour detached residential buildings in the south, leeward side. This, together with a compact urban plan, became the showpiece for the Quebec Cartier Mining Company town of Fermont, Quebec in 1976.

Per Kefgen

1. William O'Mahony, "Fermont: A design for sub-arctic living." Canada's changing North, edited by William C. Wonders. (Montreal : McGill-Queen's University Press, 2003).
2. "At Nuuk, West Greenland, a few such sunny spots have been built purely by accident. One spot consists of the flat roof of a one-story wing abutting the high south-facing side wall of an office building. For those teenagers willing to make the three-metre climb up to the roof (the majority), this sunny "balcony" provides a place to loaf while looking down on the busiest part of the downtown. Shielded from the wind, exposed to the sun, this roof has become an important hangout, a palpable influence on the way people grow up in this capital city." Harold Strub,"Bare Poles" (Ottawa: Carleton University Press, 1996). p66.

*. . . The idea is to build a community "congruous with its natural environment, featuring outdoor spaces with favorable microclimatic conditions facilitating recreation in the open."*

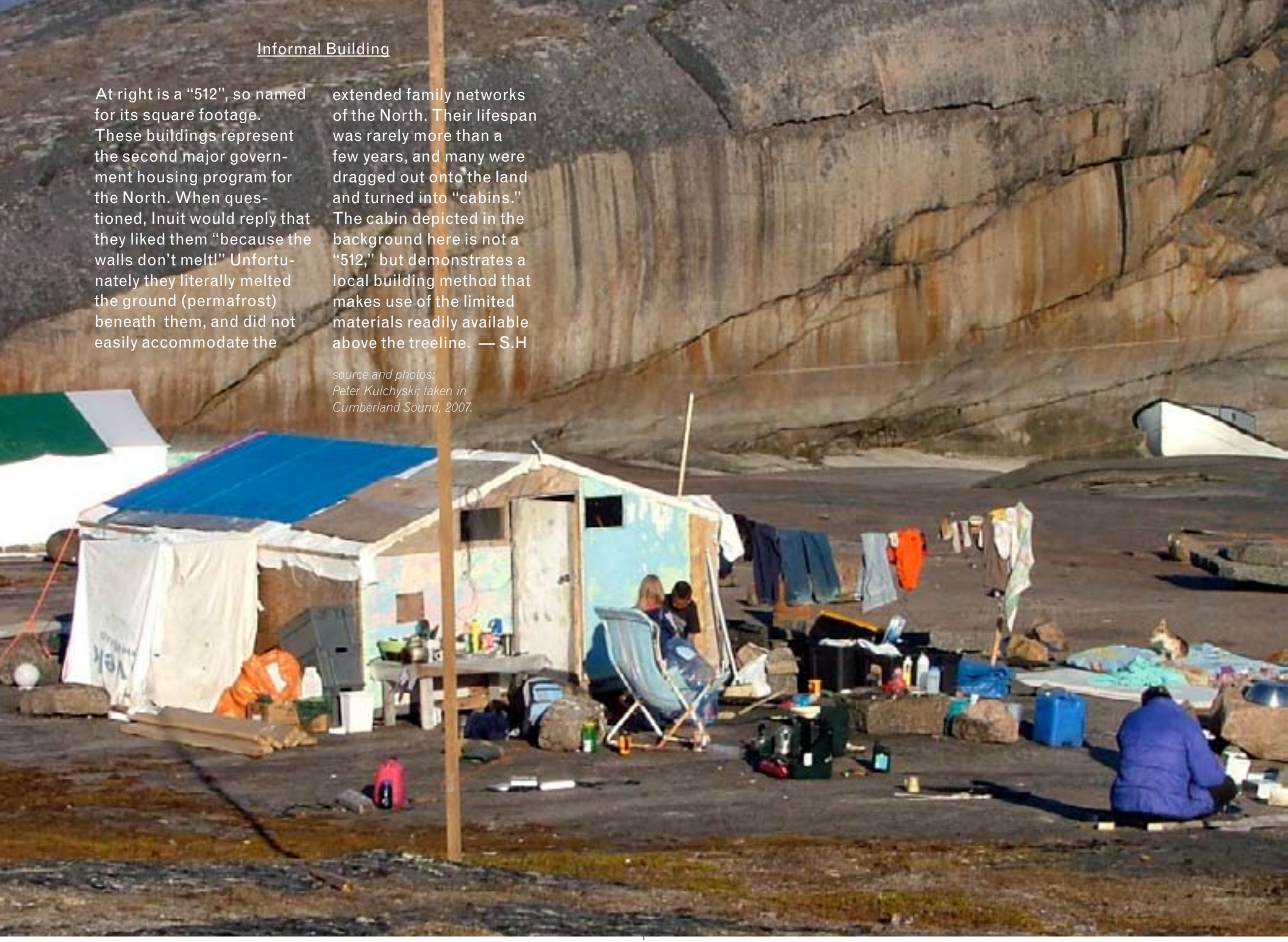
— Ralph Erskine Architect

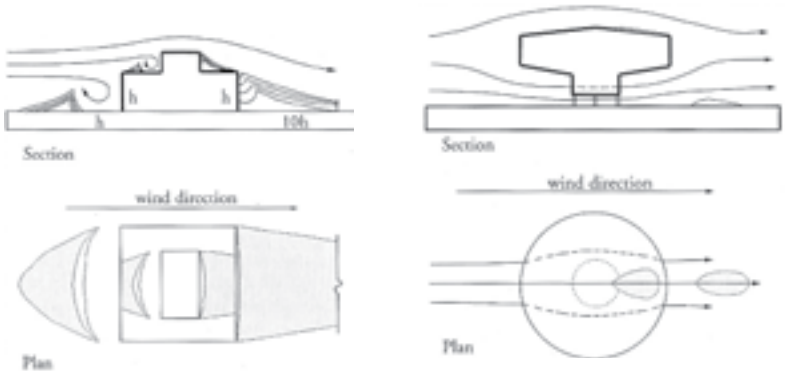
*"Ralph Erskine, Living Legacy." A + U, 2005:03 No. 414 A + U = Kenchiku to toshi. (Tokyo, A & U Publishing Co.)*

## Informal Building

At right is a “512”, so named for its square footage. These buildings represent the second major government housing program for the North. When questioned, Inuit would reply that they liked them “because the walls don’t melt!” Unfortunately they literally melted the ground (permafrost) beneath them, and did not easily accommodate the extended family networks of the North. Their lifespan was rarely more than a few years, and many were dragged out onto the land and turned into “cabins.” The cabin depicted in the background here is not a “512,” but demonstrates a local building method that makes use of the limited materials readily available above the treeline. — S.H

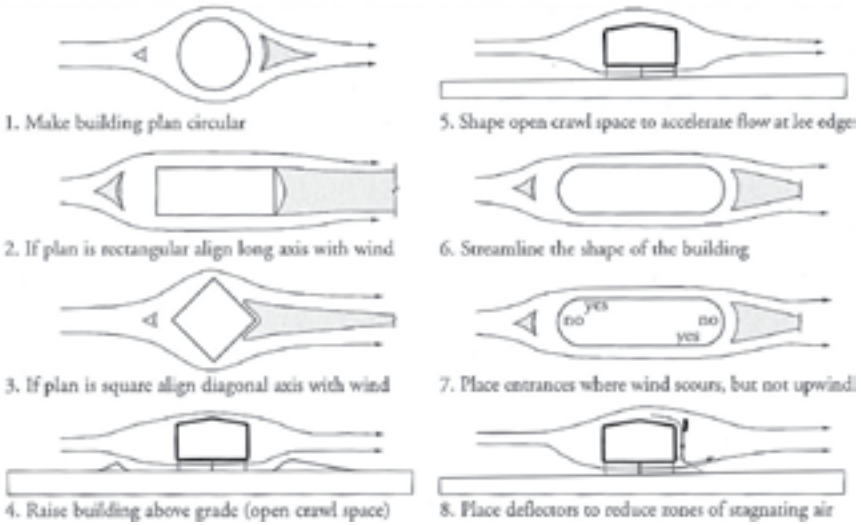
*source and photos: Peter Kulchyski, taken in Cumberland Sound, 2007.*






Closed crawl space; estimated drift pattern due to blowing snow.

Building shaped to minimize air turbulence; estimated drift pattern due to blowing snow.

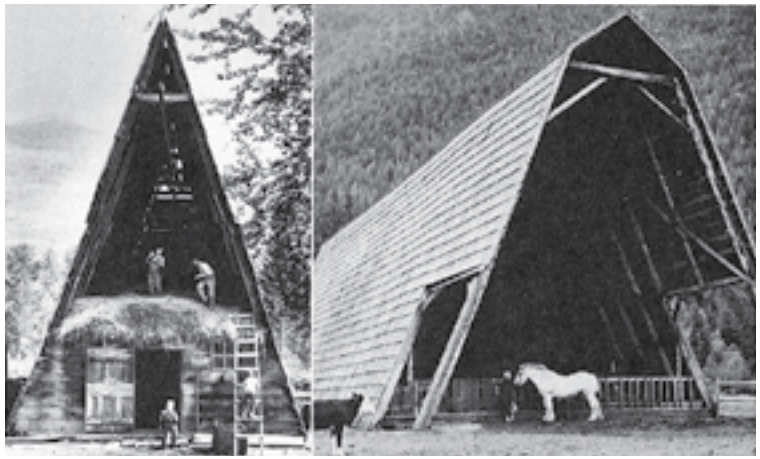



Eight rules of thumb for controlling the snow drift around buildings.


The scale of shelter: the greater the difference between outside and inside conditions, the smaller the shelter.



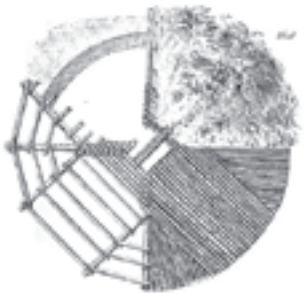


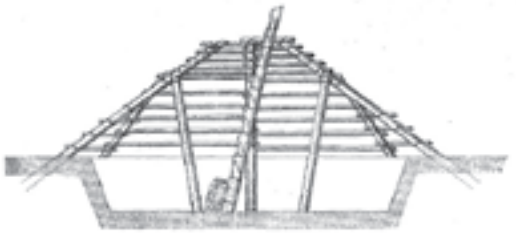


Barns built in response to heavy snow loads, Revelstoke, BC

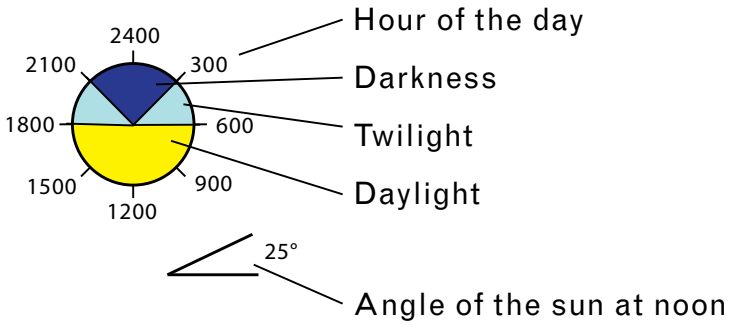
*". . . Not used to the land, mid altitude city dwellers wear wind breakers and live in climate controlled space-modules. Inuit used to living continuously on the land wear climate controlled space suits and live in windbreaks."*

— Harold Strub *source: "Bare Poles" (Ottawa: Carleton University Press, 1996). p.66*





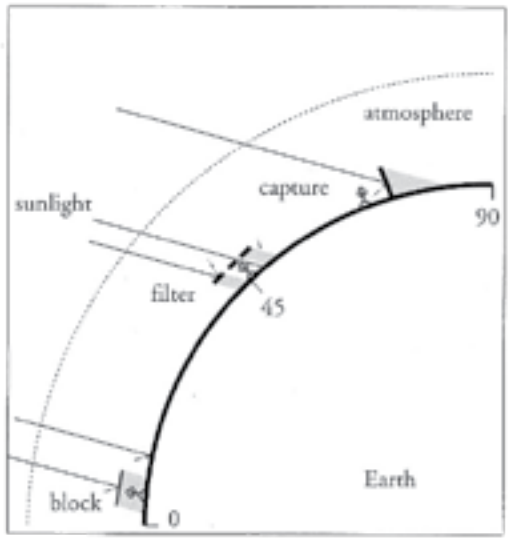
A pit house with various stages of construction




*". . . It is precisely light that defines the Nordic world. Light gives all things their presence."*

— Christian Norberg-Schulz

*source: Christian Norberg-Shultz*

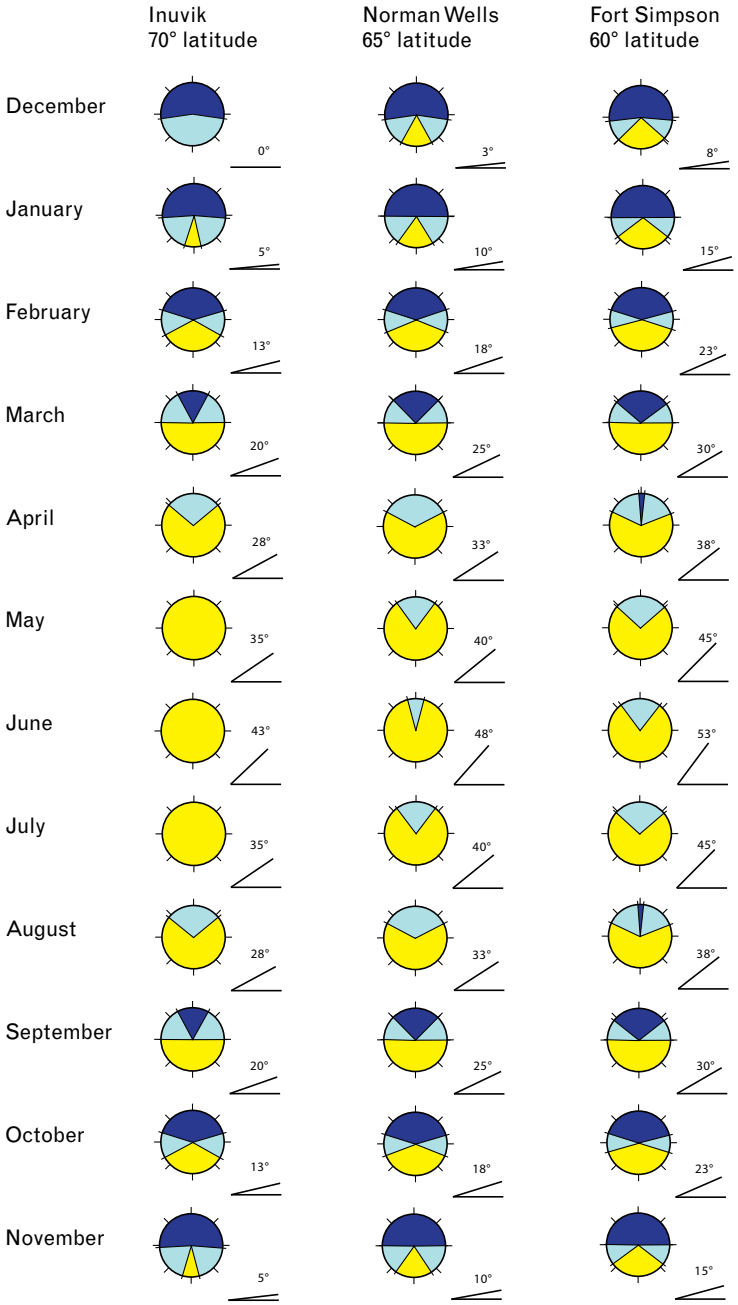



**left: Solar shading strategies vary with latitude.** *source: Harold Strub, "Bare Poles," (Ottawa: Carleton University Press, 1996).*

*opposite page source: "Building in the North," prepared by Van Ginkel Associates Ltd. for Canadian Arctic Gas Study Limited, 1976.*









## Colourscapes

The colour of cold environments is white. Blankness. Ice and snow. Absence of colour. Absence of life. Embedded in this whiteness is a fantasy of infinity, with white connoting an endless untouched wilderness, renewed every year, covered in its hygienic blanket of frozen water.

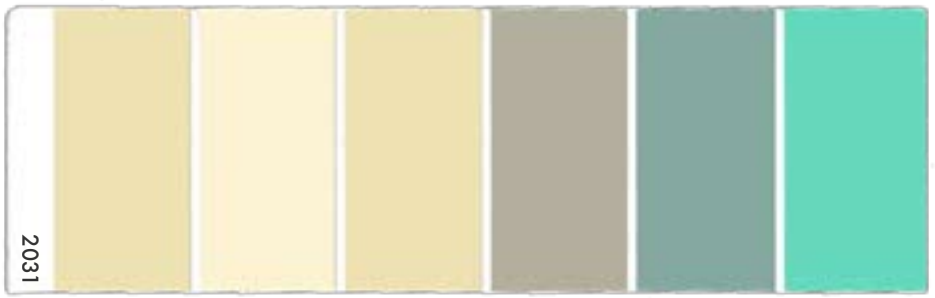
Despite this illusion, it is not an uninhabited wilderness. Inuit have lived in the extreme North for thousands of years in a landscape that largely consists of snow, ice, water, and rock (1). A colourless landscape.

When displayed on this "inhuman" expanse, the colourscape of settlements in cold environments is striking. Set on a backdrop of white, the colour of buildings accentuates the whiteness and expanse around them, just as the white of a canvas might help separate and intensify colours positioned on its surface.

Colour is one of the most visible materials of building. This revelation of material through a study of colour is closely linked to the inability to find colour in pure form, in a pure state (2). Without a support, volume, or surface it does not have a proper existence; its hue and saturation are forced to take on the physical qualities of the particular material supporting it. By isolating the hue and tone from the shape that it adorns, it can reveal a specific history, culture, and economy, taste, time and fashion. Colour can be used intentionally for identification in a whiteout or for symbolic reasons, but just as likely the specific tonality might be a reflection of local taste, industry, or a sign of dependence on other regional economies and areas.

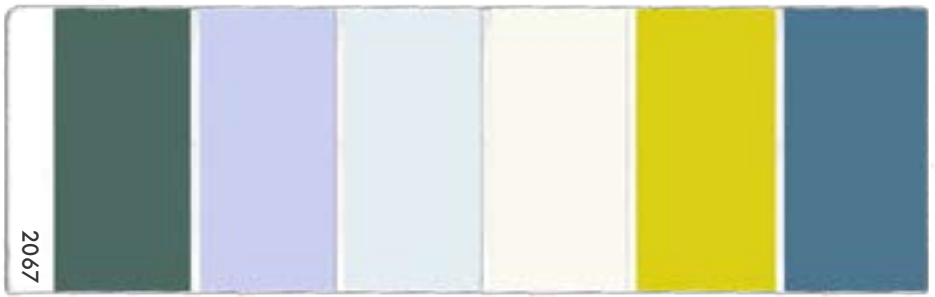
In Suzdal, Russia, the homes outside of the centre are made of wood, and are therefore either preserved with paint, or are left to take on a natural weathered grey. A unique local

at left: The landscape of Longyearbyen, Norway, in winter, and bloom. *source: Larissa Noury, La couleur de la ville. (Paris : Le Moniteur, 2008).*




Iqaluit, Nunavut, Canada
63° 44 55 N 68° 31 11 W


Longyearbyen, Svalbard, Norway
78° 13 0 N, 15° 33 0 E




Suzdal, Vladimir Oblast, Russia
56° 25 0 N, 40° 27 0 E


Falun, Dalarma, Sweden
60° 36 0 N, 15° 38 0 E

palette has developed alongside and in contrast to the predominant white of the many churches and stone houses that dominate the centre of the city. There is a strong lineage of regional building here, and it is the decorations and colouration of homes that sets them apart from one another(3).

In Longyearbyen, in Svalbard, Norway, a specific palette was developed relatively recently in an attempt to harmonize built form within a specific local landscape. The intention of Grete Smendal, the colourist behind the project, was to show the importance of colour both as a means of identification and as a tool for improving the quality of life of the inhabitants. A series of intensive analyses of the surrounding natural environment and light conditions were undertaken, in which special consideration was given to the fact that for three consecutive months Longyearbyen is in a state of darkness. Twilight can exist for weeks near the poles, affecting visibility and perception of colour, space, and distance. Distinction and visibility can be crucial in these conditions, as well as provide a sense of warmth and relief through variation from the endless days or nights. The colours that resulted from the investigations at Longyearbyen were nuanced and chosen for their high level of visibility and integration with the thawed landscape, as well as ability to be distinguished in the winter months.

Falun Red is a paint made from the waste products of what was once the world's largest copper mine at Falun, Sweden. The first evidence of use of the red leads back to the 1500s, and since then it has been found in rural houses. It acts much like a stain, which instead of creating a moisture barrier as traditional paint would, allows the timber to breathe. Timber houses painted red were once a symbol of wealth and status, emulating the red-brick of urban and upper-class homes. In addition to copper, red mull contains a rare composition of iron ochre, silicon dioxide, and zinc, which together have a protective effect on timber. The paint has an incredibly matte finish that in turn helps create an overall unmistakable regionalism and continuity in design.



In Iqaluit, a city located above the Arctic treeline, the lack of building materials and a move away from traditional Inuit forms of housing has resulted in a predominance of prefabricated homes imported from the South. The regional colours of Iqaluit recall the pastel palettes of vinyl siding companies. Although prefabricated homes were recently banned in Iqaluit in an effort to encourage local building, the necessity of importing materials and expertise has limited the development of a regional building culture.

Mapping colour attempts to pinpoint a feeling and impression of a place. Pinpointing a colourscape is nearly impossible, however. Photography attempts to document, but its subsequent printing and viewing creates merely a digital interpretation. Historically, attempts have been made to create colour masterplans(4), but these instances are rare. Unique colour palettes can therefore often be read as being of local taste, developed in isolation, and reflecting a uniqueness that is under increasing pressure from our expanding global attitudes and influences.

Shannon Harvey

1. Waldo Bodfish. *Kusiq: An Eskimo Life History from the Arctic Coast of Alaska.* (University of Alaska Press, 1991).
2. Michael Lancaster, *Britain in view: Colour and the Landscape.*( London: Quiller Press. 1984).
3. Jean-Phillipe and Dominique Lenclos. *Couleurs du monde: Geographie de la Couleur.* (Paris: Moniteur. 1999).
4. Apart from smaller scale, more recent plans such as the one for Longyearbyen, a plan was enacted in Turin in 1800 (revived in 1978) and another in Magdeburg, Germany by Bruno Taut in 1921. source: Michael Lancaster, *Britain in view: Colour and the Landscape.* (London: Quiller Press. 1984). p.68.

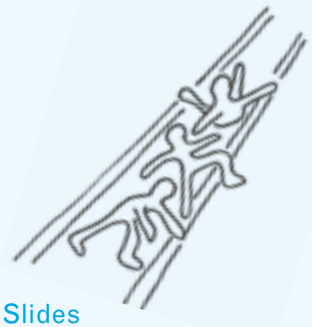
Urban Skiing (Tucson)

Ice Sculptures (Quebec)

Snowbank Jump (Minneapolis)

Winter Camping

Winter Swimming Championships (Finland)



Ice Slides

Ditchball (Winnipeg)

Glögg (Sweden)





Street Saunas (Helsinki)

Baltic Sea skating (Stockholm)

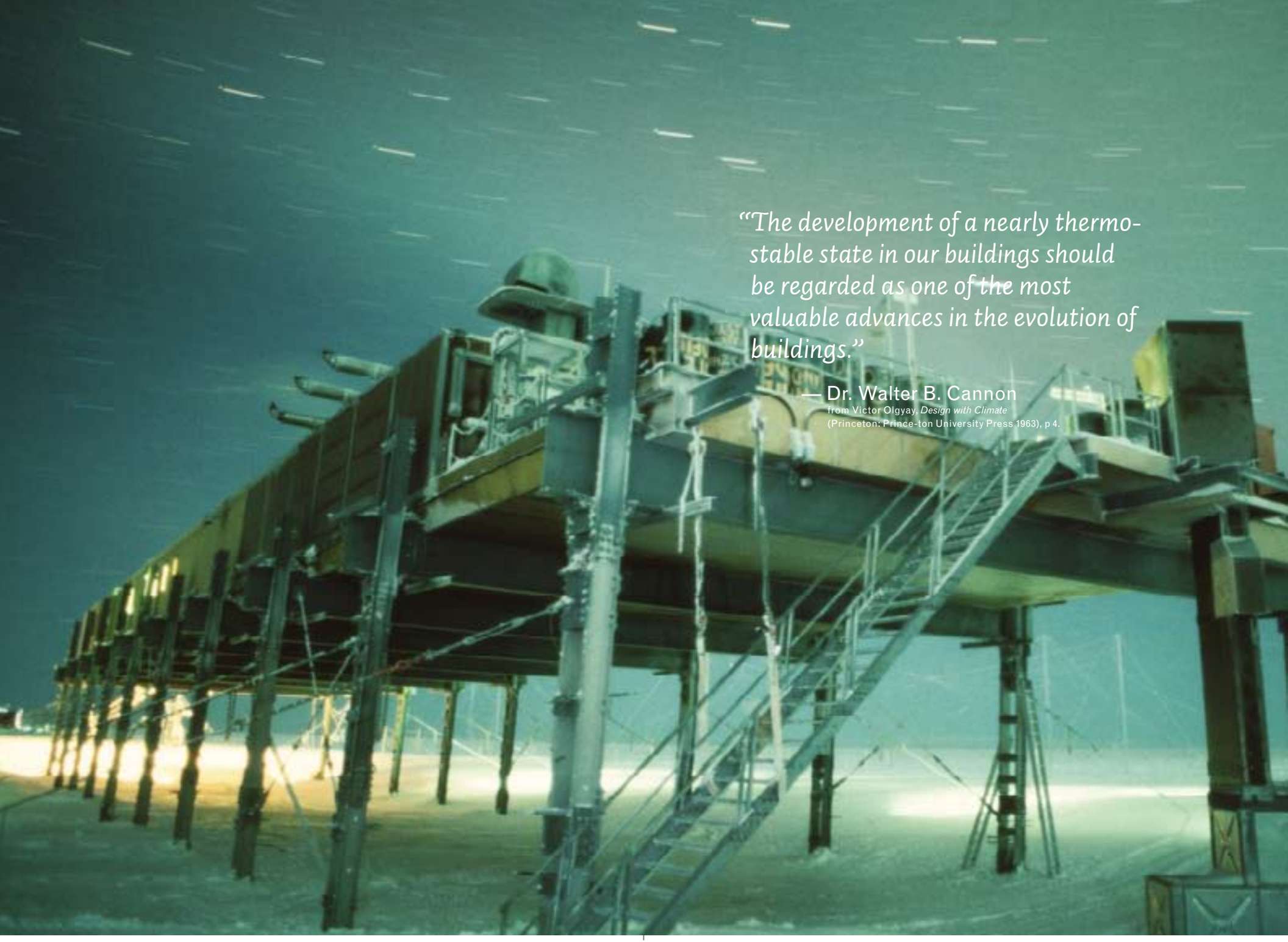
Snowshoe/ski to work (Finland)

AirSki (Finland)

Flagpole Licking

Maple Snow Cones (Quebec)

Snowplow Rodeo (Burlington, Vermont)



*"The development of a nearly thermo-stable state in our buildings should be regarded as one of the most valuable advances in the evolution of buildings."*

— Dr. Walter B. Cannon
from Victor Olgyay, *Design with Climate*
(Princeton: Prince-ton University Press 1963), p 4.

## Super*Isolation*

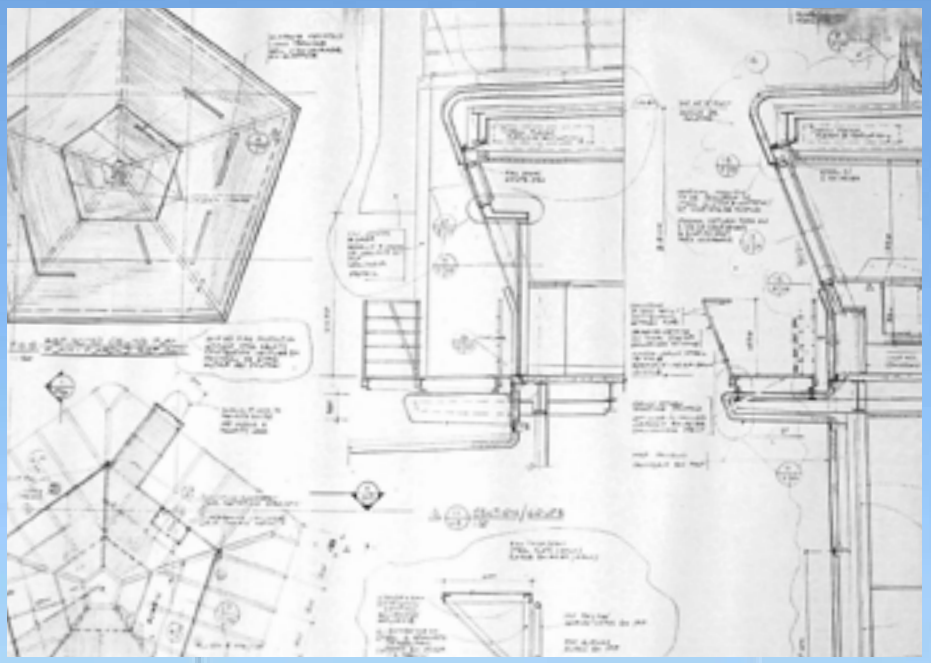
The first of several generations of research stations were preoccupied more with containerization, transport, and assembly than comfort or climate of the extreme south. They were made to be modular and had little specific relation to their environment. The latest generation of research bases has taken into account the experience gained from those previous stations, incorporating better insulation, addressing issues of sustainability, and occupant comfort – both physical and psychological.

Halley V research station (overleaf) was the first British station specifically designed to sit above the ice. The platform on which the buildings sit has hydraulically activated legs that allow the base to rise each year as blowing snow attempts to bury it. Shown here is Halley VI, the new British Antarctic Survey Station. Halley VI is designed to be both modular and reconfigurable.

*photo: Hugh Broughton Architects*
**atleft: Arctic science research base.** *source: Guy Gerin-Lajoie archive, CCA Collections.*

A close northern cousin of the Antarctic research stations is the Iqaluit International Airport. Like the Antarctic bases, it uses a skin of prefabricated Fiber-Reinforced Plastic (FRP). The design of the airport benefited from the longer construction season and a relative proximity to civilization, which accounts for its more elaborate articulation.

The proper placement of entrances and exits that take into account the prevailing winds, combined with the use of FRP panels, differentiates these buildings from their relatives in more temperate climates. Moreover, they start to suggest the beginning of a truly unique architecture designed for an extreme environment. —T.B



*inset photo source: Guy Gerin-Lajoie archive, CCA Collections.*

*"Insulation does not stop the flow of heat from inside to outside, it just slows it down. The thicker the insulation, the slower the outward heat flow, the lesser the amount of heat that has to be generated inside the building to compensate for the loss."*

— Harold Strub

from *Bare Poles* (Ottawa: Carleton University Press, 1996), p 66.

(above) Galleria Vittorio Emanuele Shopping Arcade, Milan, Italy



## Insulation/Isolation

The original motivation behind our ancestors' search for shelter was to mediate the external environment and create a place we could turn to for refuge. From weather, from danger. Today we spend more than 90 percent of our time indoors, and the interiors of our buildings extend beyond the simple purpose of shelter, towards becoming their own microclimates. Architecture, (interior as climate), has caused a fundamental reversal from the natural condition in which we have evolved over millennia, and the interior condition has become the rule rather than the exception.

Philippe Rahm's "Form and function follow climate"(1) treats the subject of interior climates with high relevance to contemporary architectural practice because it points out logical inconsistencies between our aims as human beings and the goals of sustainable practice. Our struggle for sustainable design is creating ideas about housing that increasingly divorce us from our exterior environment, leaving us often with only a sealed picture-window to monitor the outside.

Architecture has always sought to create interior climates, though not in a strictly literal way. Atmosphere, or climate, for a long time was the feeling a building inspired as you entered it. Ancient structures strove to draw out an emotion from their users, whether of wonder, awe or spirituality. Today those climates are in best-practice examples, completely separated from the exterior. We speak more about climate control than we do about climate: the best way to draw air out of the building, the most efficient way to cool it.

This fundamental shift towards the inhabitation of interior is not insignificant. As conditioned beings, everything we experience is incorporated into our identity, our self-understanding. The present discourse on sustainable buildings marks the culmination of a gradual turning point in history. It is now the case that the interior is our natural environment. The exterior is an environment that has to be tolerated–an intermediary, linking our workplaces to our modes of transport, and our modes of transport to our homes.

Essentially, we are human because we live on earth and engage in activities that bring out our humanity. Hannah Arendt argues that if we were raised on any other planet, we would not be human, but Martian, or a unique species by some other name. Simply, it is the Earth and our interactions with others of our species in our environment that teach us how to be human. Any turning away, or seclusion from that idea, however insignificant and conceptual, is a turning away from our humanness.

Rahm implicitly assured a very naïve position regarding our environment: the Earth is a virgin landscape that is sensitive and must be protected from humans. Though not an architect himself, he seems to take the idea of the present , plotted course of sustainable design as a given, rather than an idea to be explored, an issue to be developed.

Nature is no longer pristine and untouched. The idea of totally wild nature does not exist – at least not within our collective experience, nor in the way we may romantically imagine it. Given the present evidence showing fundamental and measurable effects of climate change, our impact verges on the catastrophic, and is, like our economy, completely global.

It may be true that by removing ourselves from our environment, we will lessen our impact upon the planet, but on the other hand, that gesture fails to recognize the fact that we have irrevocably altered our natural environment and therefore are bound with it in a common fate.

But perhaps there is a third way of coping with this situation, one that not only applies to the way we deal with dwelling, but also the way we treat our position in the world. Our fate is inextricably linked to that of our planet, and rather than turn away, or explore other planets for possible places of inhabitation, we need to reappropriate the Earth as it is... as we have altered it. We must strive to renew our relationship with it. We are no longer noble savages at home in our



natural environment, nor can we still see ourselves as being completely outside and independent of that environment.

Perhaps the most sustainable buildings are ones that completely remove us from the environment–but they are not the most human ones. And if these sustainable buildings are to be judged truly successful, they will need human inhabitants. Architects are much better at ignoring their personal intuitions because of a bigger idea, a greater cause. The inhabitants wish to have an environment in which they feel comfortable–all talk of sustainability aside. Sealing ourselves off from that environment is then less about letting nature be free, and more about breaking a bond that has been hundreds of thousands of years in the making – the breaking of which may result in unintended effects on us.

We are natural creatures and whatever we create is natural however it may modify our biosphere. Rather than turn away from our environment, sustainable building must seek to embrace it, to bring the outside into buildings rather the closing itself off. Some practitioners are already recognizing the need for human empowerment in architecture. Replacing the sealed windows of the last generation with operable ones allows individuals to have some say in what they find to be a comfortable temperature, and when they might want fresh air. This kind of approach seeks ways of imagining sustainable architecture, ones that do not  come at the expense of our sense of humanness. We fundamentally know what we find pleasing and comfortable, and that atmosphere is what buildings should seek to create. Not constant climate, but comfortable climate.

Tomek Bartczak

1. Phillipe Rahm *"Form and Function Follow Climate"* in Environ(ne)ment Edited by Giovanna Borasi. (Milano: Skira, 2006), p 152.


The *Airguide* "Relative Comfort Indicator" passively monitors the felt conditions of temperature against relative humidity. For greatest comfort, the atmospheric moisture content should decrease with a rise in temperature. If, for any reason uncomfortable conditions arise, *Airguide* will be the first to let you know.

The golden buttons of this thermometer/hygrometer function only as ornament, yet their visual similarity to the slender indicator arms suggests the advent of mechanical conditioning devices and a future of endlessly controlled interiors.
—P.K

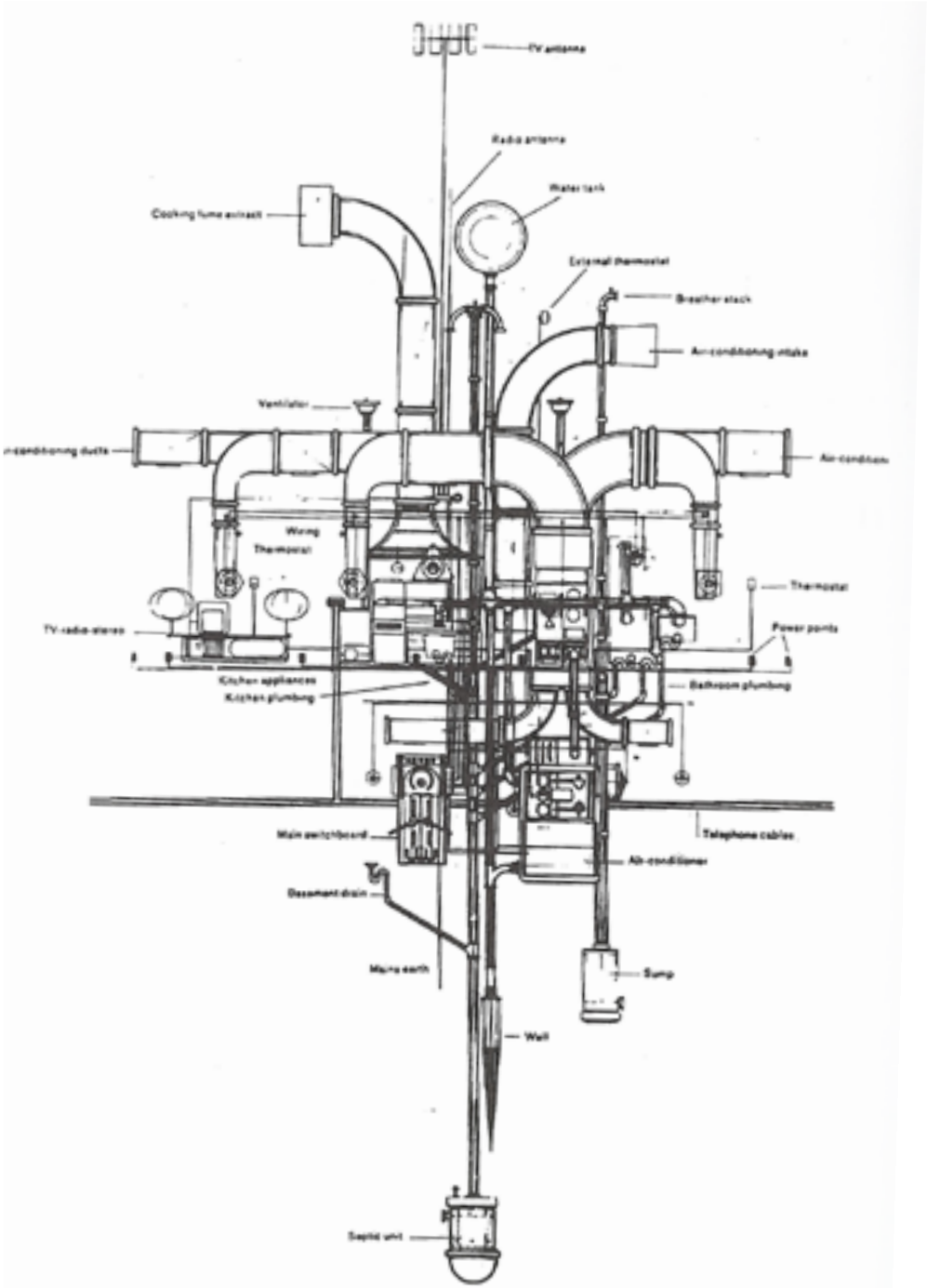
*inset photo: Shannon Harvey*
*background photo: Marc Pimlott*

*"Every nation builds houses for its own climate. At this time of international interpenetration of scientific techniques, I propose: one single building for all nations and climates, the house with 'respiration exacte'. I draw these floors, and I install the plant for 'respiration exacte'. I make air at 18°C and at a humidity related to the state of the weather."*

— Le Corbusier

*Précisions sur un état présent de l'architecture et de l'urbanisme. (Paris: G. Crès, 1930), p 64.*

opposite page: House reduced to installations. Illustration by Francois Dallegret. *source: Reyner Banham "A Home is not a House," Art in America. No. 2, (April 1965).*



## Certain cities will dictate, through regulations, the acceptable level of comfort for their region.

| City | Season | required daytime temp/ evening temp |
|---|---|---|
| New York City [1] | OCT 1 to MAY 1 | 20°C/13°C |
| Toronto, Ontario[2] | SEP 1 to JUNE 15 | 20°C/20°C |
| Rome, Italy[3] | NOV 1 to MAR 15 | 20°C/20°C |
| Berlin, Germany[4] | starting OCT 1 | 20°C/16°C |
| Warsaw, Poland[5] | approx* OCT to MAR | 20°C/16°C |
| Sortavala, Russia[6] | APR 15 to SEP 15 | none |
| Sao Paolo, Brazil[7] | none | none |
| Vancouver, BC[8] | year-round | 20°C/20°C |

*In Poland the heating season is announced after one week of consecutive days below 15°C and ends after one consecutive week above 15°C.

*sources: 1. TenantNet NY 2. Toronto Health Commission 3. Expats Italy 4. Berlin Tenants Association. http:|www.bmgev.de|mieterecho|300|25.htm 5. Katarzyna Skoskiewicz 6. Lena & Galina Bratishenko 7. Izabel Amaral 8. Tenant Resource and Avisory Centre BC*



14 SUNDAY, JUNE 29, 2008

**Jobs**

The New York Times

CAREER COUCH

PHYLLIS KORKKI

# When the Office Gives You Chills




**Q.** *Now that the air-conditioning is running in your office, you and some co-workers think it's too cold. But others say they feel just fine. What's going on?*

**A.** The problem is that the way people experience temperature depends on a range of factors, including body type, clothing, activity level and proximity to other people and to vents, computers and windows — as well as individual preferences and expectations.

At the same time, most modern office buildings have a one-size-fits-all design that can't possibly accommodate all these variables. "You're almost set up to fail when you put a lot of people in a building and give them one temperature," said Gail S. Brager, a building science professor in the architecture department at the University of California, Berkeley.

Think of how much more control you have over your comfort at home, she said. You can open windows, turn on fans, heaters or air-conditioners, change clothes or move to a different room. At most offices, you lose that control. "Somebody else is pushing the button," said Professor Brager, who is also associate director of the Center for the Built Environment at Berkeley.

Rather than creating optimal working conditions for everyone, she added, the goal in many offices "is to minimize the number of people who might complain."

**Q.** *It seems as if women complain about feeling cold more than men do. Is there a gender disparity when it comes to temperature's effects?*

**A.** Women do tend to feel colder in air-conditioned offices — for reasons of physiology and fashion, said Alan Hedge, an ergonomics professor at Cornell University.

The muscles of the body generate about a third of its heat, he explained, and women tend to have less muscle mass than men. In addition, women are often freer to wear clothing that leaves their arms, legs and the neck area exposed. (The ankles, he said, are particularly vulnerable to cold.)

Traditionally, women in offices have held more sedentary positions than men, he added, and the less you move around, the less heat you generate.

**Q.** *Can temperature affect productivity?*

**A.** Employees who are cold tend to work less efficiently, according to research by Professor Hedge. He measured computer keystrokes performed by office workers, at their actual workstations, in temperatures ranging from 68 to 85 degrees Fahrenheit. "At 85, they're typing twice as much in a minute as they are at 68," he said. The colder workers also made a greater percentage of mistakes, he said.

Temperatures in most buildings are usually set between 70 and 74 degrees, depending on the time of year, he said. But his studies have shown that a temperature between 72 and 79 is optimal for worker productivity and comfort, assuming a reasonably flexible dress code. (Above 79, some workers may start to wilt.)

**If your workplace has 100 workers, there may be 100 opinions about its temperature.**

**Q.** *Why, then, are offices kept so cold in the summer, when keeping them warmer would save energy, too?*

**A.** For one thing, the workers who are required to wear suits and socks or nylons would probably be miserable — especially the active, well-muscled ones. And even with a relaxed dress code, there is a limit to how much you can take off, whereas you can always add layers of clothing.

In addition, most buildings are "over-designed," with the makers of the ventilation system assuming 100 percent occupancy, Professor Hedge said. Occupancy affects temperature, because heat is generated by the people around you, he explained. In reality, a building is almost never fully occupied.

**Q.** *Do other factors in the air beside temperature affect comfort level?*

**A.** Experiencing a variety of temperatures and air velocities is stimulating, said Professor Brager. This can be hard to achieve in most modern office buildings, which are essentially sealed envelopes cut off from the outside, she said.

She is a proponent of having office windows that open and maintaining other features that keep workers more connected to the outside.

Studies have shown that a condition called "thermal boredom" can lead to fatigue and reduce productivity, she said, noting the refreshing effect of a gentle spring breeze.

She has conducted field studies on workers around the world, and when people who are indoors have a closer tie to the outdoors, they accept — and in fact prefer — a greater range of temperatures, she has found.

High humidity is also an air comfort factor: It is much more draining than heat, and air-conditioning systems can be set higher and yet dryer to accommodate that, Professor Hedge said.

**Q.** *Are modern building designers trying to incorporate some of the new findings on office temperatures?*

**A.** Yes, with the added incentive of achieving considerable energy savings. Building designers, long behind the times, are starting to catch up with features like temperature and ventilation systems for individual workstations, Professor Brager said.

Although these features may be expensive upfront, they can pay off in the long run, she said: "If we give people control over the environment, we can let the temperature in buildings float over a wider range, which can simultaneously save energy and give people greater comfort." □

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*The British comfort zone lies between 14°C and 21°C ... In the United States [it] lies between 20.5°C and 27°C; and in the tropics it is between 23°C and 29°C.*

— Victor Olgyay *Design with Climate (Princeton: Princeton University Press, 1963) p 4.*

**space suit with air conditioners for use on ground.** *source: Reyner Banham, The Architecture of the Well-Tempered Environment (London: The Architectural Press, 1969).*

The Washington Times



Wednesday, July 30, 2008

# U.N. thermostat to be set higher

Betsy Pisik (Contact)

UNITED NATIONS | Everyone complains about climate change, and the United Nations is finally doing something about it - on Friday, the temperature inside U.N. headquarters in New York will rise by 5 degrees.

Ban Ki-moon, the United Nations' self-professed environmental secretary-general, ordered the "In-House Climate Change Initiative" to save energy, cut carbon emissions and try to mitigate climate change.

Officials said the monthlong experiment - dubbed "Cool U.N." - also will allow engineers to test energy consumption and utility costs in the notoriously antiquated building.

It also will stretch the comfort and good will of about 4,500 staffers, who work in the glass-walled Secretariat, a veritable 39-story terrarium planted in full sun on the East River.

"It will be like Addis Ababa," said one crestfallen staff member, referring to the tropical capital of Ethiopia. "The air conditioning didn't work too well there, either."

Anwarul Chowdhury, a former U.N. ambassador from Bangladesh, said Tuesday that the Cool U.N. initiative sounds like "tokenism."

Nevertheless, he said, the extra 5 degrees of heat might give diplomats some compassion for the developing world.

"Some of us grow up in a natural environment," said Mr. Chowdhury, whose home country is infamous for its heat and humidity. "We do not have the benefits of air conditioning. It is important to understand the realities of living in various parts of the world."

To make the adjustment easier, Mr. Ban will encourage diplomats and bureaucrats inside headquarters to wear their national dress, which was once the norm.

"The secretary-general is doing everything he can to mobilize unprecedented international action on climate change," said Robert Orr, an adviser to Mr. Ban. "Successful negotiations are necessary, but individual and institutional behavior must also change all over the world if we are to address the climate crisis, and the secretary-general felt that this was one way the U.N. could lead by example."

The effort "isn't about symbolic sweating," he added. "If adopted on a large scale, these types of policies could have a major global impact and will definitely help the participating institutions' bottom line."

*"When British troops in Aden were lately accused of subtly torturing Arab detainees under interrogation by 'deliberately running the air-conditioning at "full cool" it may well have been the case that the setting of the air-conditioner dial at 'full cool' was deliberate, and that the Arabs, as a result, felt subtly tortured, but the motives of the British troops may have been simply to make themselves feel comfortable, without possessing the necessary cultural and environmental insight to realize what this might do to persons raised in the local culture."*

— Reyner Banham *The Architecture of the Well-Tempered Environment, (London: Architectural Press, 1969), p 276.*

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