Winter Cities

VOLUME 18 • NUMBER 1 • WINTER 1999

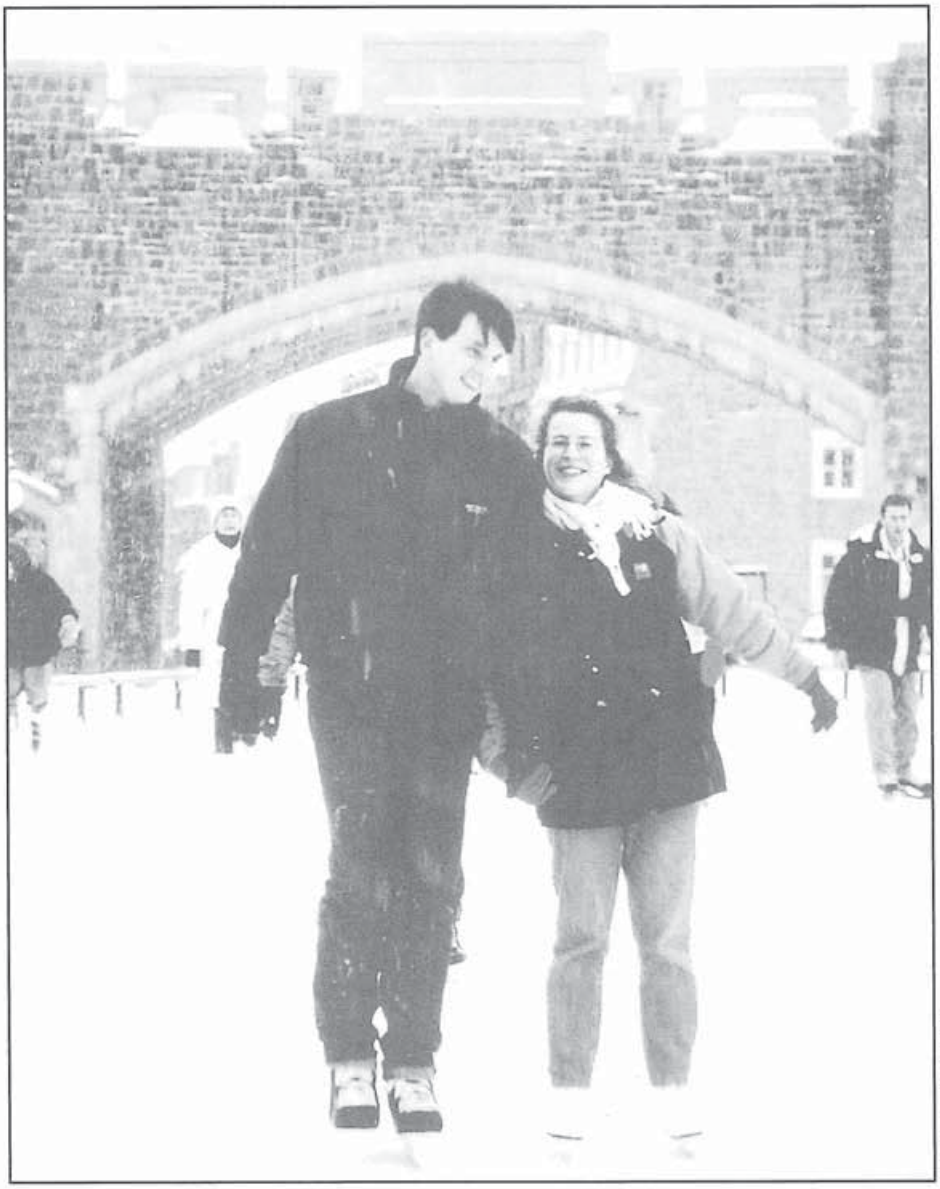

Photo: Luc - Antoine Couturier

Ice-skating in historic Quebec City

Message from the President

Welcome to the world of Livable Winter Cities. Through the publications and events sponsored by the Winter Cities Association, including the Prince George Winter Cities Forum '99 and this magazine, one can learn what other communities are doing to improve quality of life in the north. This is our mission and purpose.

We already know, of course, that the four season climate offers diversity. We know that the geographic locations of many northern cities offer beautiful natural surroundings with exciting recreational opportunities.

We are also aware that the winter can make life difficult; that the image of a city in winter is most often negative. This image is reinforced daily by biased media messages, inappropriate design standards and negative thinking. This image is reflected in the attitudes of many northern residents. Winter is not a recognized part of the culture of most North American cities.

Through the world of winter cities, we find that some places have overcome the challenges of winter to become vibrant communities with a high quality of life; that some cities have defied the negative image of the "rustbelt/frostbelt" stereotype through appropriate economic development. Some cities plan, design, and manage facilities and places that bring joy during the winter season and enhance northern living.

This issue of *Winter Cities* is devoted to wind. When combined with cold, wind creates great discomfort and even dangerous situations for city dwellers. We cannot control the wind, but we can consider it in design and implement interventions which can mitigate and even take advantage of wind and its effects.

The Winter Cities Association serves as a conduit for sharing information, research and successful implementation of projects targeted at winter issues which challenge life in the north. Please let us know what is happening in your community. I look forward to seeing you at the Winter Cities Forum, '99 in Prince George, BC.

Pat Coleman,
President,
Winter Cities Association

Winter Cities

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The Winter Cities Association is dedicated to realizing the unique potential of all northern communities. Through publishing, networking, organizing conferences, facilitating research and other means, the Association seeks to make available solutions and to promote awareness of opportunties associated with the winter season.

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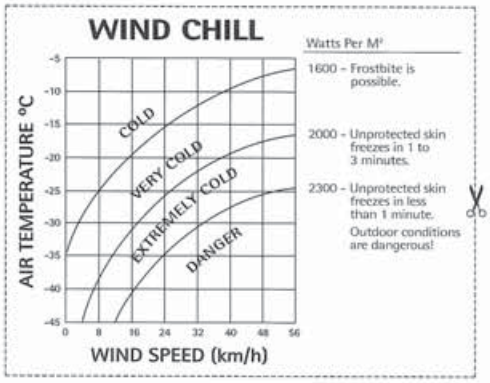
Windchill's wicked bite

When is -10 degrees Celsius not -10 degrees Celsius? When it's accompanied by fierce winds that drive the temperature down. Way, way down. Wind increases winter's bite for several reasons. First, wind blows away the layer of warm air that your body produces on its own. Second, it draws away heat by evaporating any moisture that forms on your skin. In this way, the wind can strongly decrease your body temperature and make the air feel colder than it would on a calm day. And as anyone who's walked across a prairie or waited for a bus on a windy winter day knows, it can also hasten the freezing of tissue.



The technique for measuring windchill was developed in Antarctica during WWII. Researchers measured the time required to freeze water in plastic vials when they were exposed to wind. A formula was then developed to relate heat loss to wind speed and air temperature. For example, if the temperature is -10 Celsius, but the wind is howling at 60 km/hr, the windchill factor brings the windchill equivalent temperature down to -31C. And on a "mild" Arctic day of -25C, a 30 km/hr wind puts the windchill equivalent temperature at -44C.

Windchill is measured in watts per meter squared. This "factor" rises with the increase in wind speed and decrease in temperature. The formula to calculate a Celsius wind chill (wc) using V as the wind speed (in km/h) and T as temperature in degrees Celsius is:

$$T(wc) = 0.045(5.27V^{**}0.5 + 10.45 - 0.28V)(T - 33) + 33$$

According to Environment Canada, the coldest windchill in Canada occurred at Pelly Bay, NWT, when the actual temperature was -51C, but blustering winds combined to produce an equivalent windchill temperature of -92 C.

What's the best way to protect yourself from windchill? Obviously, stay out of the wind. Ideally, inside by a roaring fire. Otherwise, walk in the shelter of trees or buildings. If you know you'll be in the wind, wear something made of Gortex, a windproof material.

ICICLES

What's up this winter?

Brrrr...

Before most of us complain about winter temperatures, we should think about those who are truly gripped in the coldest clutches each winter. Verkhoyansk, a town in Russia's Sakha Republic, boasts the distinction of being the negative temperature pole of the Northern Hemisphere. The average daily maximum between November and March is a nippy -39.2 Celsius and the average daily minimum is -46C, with a January mean temperature of below –67.7C, making it one of the two coldest places outside Antarctica. The other town to bottom out at the same temperature is Oymyakon, another Sakkha freezer roughly 800 km to the southeast.

Courtesy Up Here's Winter Living

Kemi, Finland is building a reputation for carving mind-boggling castles out of snow.

Icy attraction

Lumi Linna, an extravagant castle made entirely of snow and ice, opens its chilly gates for the fourth year in a row this February in Kemi, Finland. But it will only be around until mid-April, weather permitting, so get there early and enjoy the mid-winter marvel. Builders this year are creating a pyramid-like facade, reminiscent of the Aztec and Mayan temples – a rare sight in the Arctic landscape.

Within the castle's icy walls is a three-story Snow Chapel for weddings and ceremonies, a Snow Hotel with single and double rooms, an art gallery, a restaurant with tables made of ice, an ice slide, stage and skating rink. Since its inception in the winter of 1995, the SnowCastle has attracted over 900,000 visitors and hundreds of reporters from around the world. Outside the castle is a cross-country ski track and a dog sled trail, a popular ice-fishing spot and an igloo village. For information on the SnowCastle, call 358-16-259-502, or check their web site at www.snowcastle.net.

A half-century of snow sculpting

February 5-11, 1999 marks the fiftieth anniversary of the Sapporo Snow Festival. Initiated in 1950, the yearly celebration on Japan's northern island has exploded into a world-renowned event that annually attracts over two million people from Japan and abroad. The Festival has evolved from very humble beginnings. In its first year, six snow statues, each around two metres high, were built in downtown Sapporo by high school students.

Last year's festival saw over 325 statues and ice sculptures, and brought 29 billion yen into the local economy.

A bone rattling sport

Skeleton, a winter sport that involves sliding belly down and head first, down a bobsled track of ice, may seem like an insane way to spend a winter day. But for adults and teens who visit Calgary's Canada Olympic Park, it's a great way to get the adrenaline pumping. "Skeletoners" can reach speeds of about 60 km/hr on

Canada Olympic Park

a track originally built for the 1988 Winter Olympic Games. The single-person sled is made of steel welded into a frame with a saddle, runners and padding. There are bumpers around the outside – larger in the front – and an area cut out for the head. The athlete grasps handles at the rear of the sled, careens down the narrow track of twists and turns, and steers by touching or dragging a toe on the ice. A helmet is a must; the head is a like a bullet, leading the way for the human projectile.

A two-hour skeleton session, including two runs, rentals, coaching and an information video, costs $30. COP also offers public trials and lessons for those interested in bobsled and luge, on parts of the courses actually used by Olympians during the 1988 Winter Games.

Luge (above), bobsled and skeleton rides are offered to winter thrill-seekers at Canada Olympic Park in Calgary.

Icelandic Art

The selection of Reykjavik, Iceland as one of the European Cities of Culture for the year 2000 probably comes as no surprise to those who have already visited. Reykjavik is a hub of cultural events; a sophisticated blend of Nordic heritage, winter charm and European style. As part of the celebration, the Association of Reykjavik Sculptors is continuing a project aimed at bringing a fresh, artistic perspective to natural surroundings. Last spring, they organized an exhibition of 25 works of art along about five km of the capital's southern shore, all integrated into the natural landscape. Additional works will be added over the next year, as well as new pieces throughout the city. For more information on Reykjavik and the arts' scene in that winter city, visit their web site at www.rvk.is.

No seasickness for these sailors

When the wind whips up in Toronto, Ontario, most people tighten their scarves and seek shelter. Mitch Fenton pooh-poohs that idea, and enjoys his blustery January days sailing the frozen "high seas". An art instructor, inventor, sculptor and new father, Mitch and his friend Andy Taylor are skate-sailors. They've built their own sails, (and a few for some of their neighbours) based on on traditional European designs, and enjoy high speed wind-assisted skating on the glassy ice of Toronto's Inner Harbour.

Made of canvas, with leather straps and spruce for the frame and boom, Mitch's sail is a work of art as well as a mode of transportation. "It's the beauty of low-tech materials," he says. The modern sails made of kevlar and nylon travel up to 80 miles per hour - as demonstrated several years ago when the World Skate-Sailing Championships were held in the Muskoka area. The low-friction, smooth ice surface allows sailors to travel up to three times as fast as the wind itself. Even still, Mitch says with their vintage-style sails, "we go way too fast," says Mitch. "Maybe 30 miles per hour."

The Harbour is perfect for skate sailing, with smooth ice conditions for much of the winter. "Toronto is in the northern part of the ëmelt belt'," says Mitch. Very little snow on the ice surface makes it ideal for skating or ice boating. However, Mitch admits there are sometimes patches of open water, but at over six feet tall with his skates on, he says he can usually avoid these danger spots.

Courtesy M. Fenton

Mitch Fenton of Toronto's Wards Island skate sails on the harbour, in front of the city skyline.

Wind Power
IN WINTER CITIES

BY JIM SALMON

Wind power and winter cities seem to be a natural match. Requirements for electric power increase during the colder months, and so does the wind speed. Because of the physical relationship between wind speed and the power in the wind (wind power is related to the cube of wind speed) the power available increases dramatically during the winter months. Modern wind turbines harvest this power and deliver it to the electricity-hungry cities.

Ancient History

Wind-generated energy has been used for millennia to pump water, grind grains, power agricultural and industrial machinery, and for a multitude of other uses. In North America, during the earlier half of the twentieth century, wind mills were used to generate electricity for farms. This changed during the mid 1900s with the arrival of rural electrification programs.

Modern History

The modern era of wind power began in the early 1970s with the so-called 'oil crisis' that occurred when OPEC countries limited the supply of petroleum products to the world. Many governments initiated programs to reduce their countries' dependence on oil. Wind power had a place in a number of these nations, with particularly ambitious programs in the US and Denmark.

Photo: J. Salmon

Large 600kw Tacke wind turbine near Kincardine, Ontario.

Today

Based on a tested and mature technology developed during the 1970s and 80s, wind power today is seeing rapid growth in many countries. There are a number of reasons for this, including reductions in cost, mitigation of global climate change, pollution reduction, fuel diversity and security.

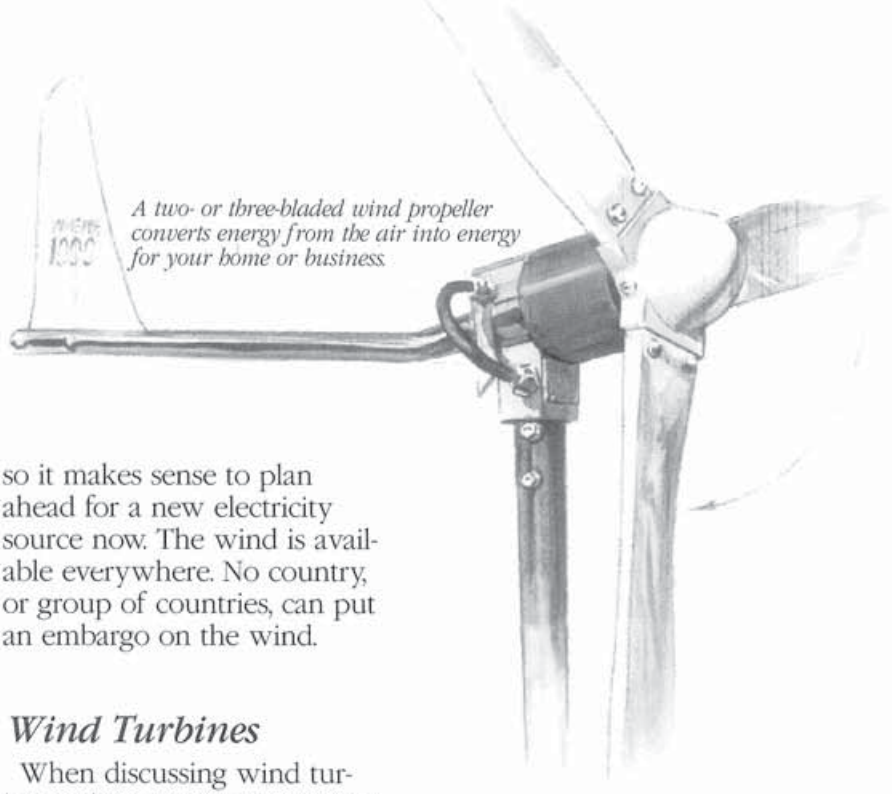
The cost of wind-generated electricity is falling each year. In the United Kingdom, where there is open competition for renewable energy within a program called the Non-Fossil Fuel Obligation, the latest round of bids has resulted in prices in the 6.4 cents (Canadian) per kilowatt-hour range, which is comparable to the price of new generation by the least expensive technology (gas generation) in that country. In the US, prices for some of the latest projects in the mid-west have been quoted at 4.9 cents (Canadian) per kilowatt-hour. (Note that there is a 2.2 cent federal tax credit.)

Many countries that signed the Kyoto Protocol are now faced with the task of reducing their output of carbon dioxide. One way to achieve this is through electricity generation

using wind turbines. Every thousand kilowatt-hours of wind-generated electricity which displaces, for instance, coal-generated electricity, results in a reduction of one tonne of carbon dioxide emitted to the atmosphere.

Wind-generated electricity is also very clean in other respects. There are no emissions of sulfur dioxide (a precursor to acid rain), nitrogen oxides (pre-cursors to smog), particulates (implicated in lung and heart disease) or toxic metals (such as mercury). In addition, there is no toxic or radioactive fuel or waste products to deal with as with nuclear electricity generation.

Aside from the reasons listed above, countries such as Denmark and Germany are trying to reduce their dependence on imported fossil fuels, so that they won't be vulnerable to another 'oil crisis' in the future. Predictions are that the world will begin to see a decline in the availability of oil starting in about 10 years time, so it makes sense to plan ahead for a new electricity source now. The wind is available everywhere. No country, or group of countries, can put an embargo on the wind.



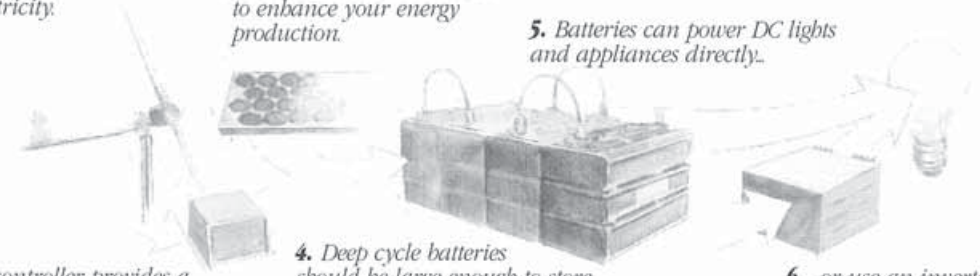
A two- or three-bladed wind propeller converts energy from the air into energy for your home or business.

Wind Turbines

When discussing wind turbines, there are two basic sizes. There are small wind turbines, up to 50 kW peak generation capability, that can be used by individuals, farms or small businesses. At the other end of the scale, there are large wind turbines, up to 1.6 MW generation capability, that are used to generate electricity for supply to the electricity grid.

Turbines for Home Use

Many urban or suburban home owners imagine that it would be advantageous to own and operate a small wind turbine for domestic power generation. Unfortunately, the crowded urban landscape is often not ideal for these installations due to the difficulty of installing a high tower in the city and the reduction in wind



1. *The wind generator transforms wind energy into three phase alternating current (AC) electricity.*

2. *A controller provides a wind generator shut-off and changes AC toDC for storage in the batteries.*

3. *Solar panels can be used to enhance your energy production.*

4. *Deep cycle batteries should be large enough to store several days of energy for windless periods.*

5. *Batteries can power DC lights and appliances directly..*

6. *..or use an inverter to provide 120 volt or 230 volt alternating current (AC) for common household appliances. All world voltages and frequencies available.*

speed and increase in turbulence due to the urban surface roughness. Nevertheless, there are a few locations that might be amenable to small wind generation. For example, a site down-wind of a large urban lake or reasonably uncluttered field would perhaps be usable. There are a number of factors that must be considered before installing a small wind turbine. Just a few of these are: the logistics of installation of a tall tower in a confined area, building codes, noise regulations, service requirements, permitting by the local utility (if applicable), and so forth. If there are limitations that cannot be overcome, the winter city dweller almost always has recourse to another renewable energy solution: solar energy.

In contrast, rural landscapes are almost always ideal (except in heavily forested areas) for small wind generation and many of the problems referred to above either do not occur or are greatly diminished.

Large Wind Turbines

Large wind turbines are defined in this context as those turbines erected for the purpose of supplying electricity to the existing electrical grid. They may be installed and owned by utility companies, co-ops and individuals. This type of installation is not common in Canada and is becoming more common in the US. It is very common in a number of European countries such as Denmark, Germany, Holland and the UK.

The co-op-owned turbine presents an interesting case.

The Mariner H500 can be mounted on a rooftop.

It provides an opportunity for anyone (including frustrated urban dwellers) to become involved with wind energy. In many co-ops, individuals can invest any level that is affordable to them, and can reap the benefits of ownership in a healthy, non-polluting, sustainable energy source. Such arrangements are very common in Europe but not well known in North America. The Toronto Renewable Energy Co-op, however, is one group that is attempting to set up a co-op to share the output from a 660 kW wind turbine to be installed on the shore of Lake Ontario within the confines of the urban environment.

In general, large-scale wind turbines, either individually or in multiple-unit 'wind farms', are installed in rural or rangeland areas, or even 'off-shore' where the wind is often more powerful and suffers from fewer disturbances than the urban wind. This makes good planning sense. However, as in the case of small wind turbines, there are some urban locations that are suitable for installations of large wind turbines. There are three wind farms in Copenhagen, Denmark, for example, and a number of wind turbines within the city of Hamburg, Germany.

Wind Energy: The Future

The World Watch Institute of Washington has declared that wind energy is presently the world's fastest growing energy source. The United Nations has stated, "Wind generation has been recognized world-wide as a technologically mature energy source which can supply clean, sustainable, reliable and cost-effective power." The Shell Oil group has predicted that renewable energy will supply 50% of the world's energy requirements by the year 2050.

Often, one of the biggest problems in cities is the poor quality of the air due to automobile, industrial and power plant emissions. In summer, chemical smog can be generated by the interaction of pollutants with the sun. In winter, strong atmospheric inversions can trap and concentrate the pollutants near the ground. Just imagine the improvements that could be made if there were very low-emission vehicles, effective industrial pollutant regulations and power generation by healthy, clean, sustainable, renewable energy sources such as wind energy.

Jim Salmon is a Burlington, Ontario consultant whose company, Zephyr North, specializes in meteorological monitoring, computer modelling of wind flow and the assessment of wind resources for wind energy projects. He is also the president of the Canadian Wind Energy Association.

The Canadian Wind Energy Association's mission is to represent the wind energy community, comprised of organizations and individuals who are directly involved in the development and application of wind energy technology, products and services, and to support the appropriate development and application of all aspects of wind energy including the promotion of a suitable policy environment. Learn more about wind energy at the Canadian Wind Energy Association's website, www.canwea.ca.

UPCOMING EVENTS:

The **European Wind Energy Association** is holding a conference and forum March 1-5, 1999 in Nice, France. Topics include financing wind energy projects, wind energy as power for the new millennium, business, markets, policies and technology. For details, visit EWEA's website at www.eanwea.org.

The **American Wind Energy Association** (at www.awea.com) is holding Windpower '99 in Burlington, Vermont, June 20-23 1999. This conference, which marks the 25th anniversary of the American Wind Energy Association, will feature panels and workshops on such themes as: wind turbine operations and maintenance, hybrid systems, utility issues, aerodynamics, computer modeling, technological advancements and environmental issues.

Quick Facts

- The global wind energy potential, even excluding environmentally sensitive areas, is roughly five times current global electricity use.
- Worldwide wind power capacity increased by 32% to 4,912 megawatts during 1995 and grew by an additional 1,200 megawatts during 1996. This 6,100 MW total represents in excess of $1,400,000,000 in direct investment and creates approximately 5,000 jobs.
- In the last decade costs for wind-generated electricity have dropped from 30¢ per kilowatt-hour to 7¢ per kilowatt-hour.
- Canada has far more wind energy potential than its current total use of electricity (about 485,000,000,000 kilowatt-hours used in 1995). While wind energy will never supply all of Canada's electrical requirements, it is not unreasonable to expect this clean, non-polluting, renewable energy source to supply up to 20%.
- Canada has about 22 megawatts of wind generation plant installed producing about 64,000,000 kilowatt-hours of electricity per year - enough to supply about 7,900 typical Canadian homes. This capacity results in about 1.5 installed watts per capita average for the country. This can be compared with Denmark, for example, which has 122 watts per capita of installed wind generation capacity.
- In Canada, the 18.9 megawatt wind generating plant on Cowley Ridge, Alberta produces more than 55,000,000 kilowatt-hours of electricity per year - enough for 6,800 typical Canadian homes. If this electricity is used to displace coal-generated electricity, it avoids discharging about 55,000 tonnes of carbon dioxide into the atmosphere annually.
- Ontario Hydro's single 600 kilowatt demonstration turbine near Tiverton, Ontario produced 1,218,000 kilowatt-hours of electricity in its first year of operation - enough for 152 Canadian homes.
- Echoing the Québec government's new energy policy of a strong commitment to develop that province's wind resource, Hydro-Québec has announced its intention to bring 250 megawatts of installed wind capacity on line starting around the year 2000 at a rate of 25 megawatts per year for a ten year period.

(Reprinted with permission from CanWEA's website)

FIRE & ICE

BY COOPER LANGFORD

It was mid-morning on January 12, 1994, about three weeks into what would become a devastating eight-week cold wave that lay over the city of Yellowknife, NWT like an Arctic blanket. The temperature would not budge above -40C until the end of February. But at that moment, the grim predictions of the winter forecasters couldn't have been further from Darcy Hernblad's mind.

A veteran Yellowknife firefighter, Hernblad was leading a small crew across the smoldering roof of a low commercial building about a block off the main street of this small northern city. The building, which housed a corner store and a bar known as The Right Spot, had erupted in flames a short time earlier. Battling air temperatures of -45C and a fog of ice, steam and smoke, Hernblad and his crew had gone up to cut a trench in the roof of the building, an escape hatch for the flames and an opening through which crews could fight the fire. Armed with axes and chainsaws - engines whining in protest of the cold - the firefighters accomplished their task. Hernblad then bent down to get a look inside the building and assess the position of the fire. Expecting flames, he saw nothing but smoke.

Then the roof went spongy. Crossing its once firm surface had suddenly become like walking on a trampoline. Hernblad's crew knew what it meant. The fire had taken hold of the roof's internal structure, which was about to collapse. They simply abandoned some of their equipment and hustled back down the ladder to the safety of the street. The roof caved in a moment later, taking a ladder, a hose line and some tools with it.

The Yellowknife fire department, by now, had realized how difficult the task would be. The building was laced with false walls and false ceilings through which the fire could spread and hide. The crews on the street settled in for a long day. It would be 12 hours before their job was done. The thick ice-and-steam cloud enveloped the area. Water flooded the streets and sewers, freezing fire trucks into place and eventually turning the roads into a slushy skating rink that covered several blocks. Firefighters, caked in ice, found equipment like axes hard to handle as their grips lost their strength. Nothing would remain of the building, other than a soon-to-be-vacant lot full of charred debris.

Perhaps surprisingly, Hernblad today says fighting the Right Spot fire wouldn't have been significantly different or easier had it occurred in summer, when Yellowknife temperatures rest comfortably in the mid-20s. The challenge of the fire stemmed from the building itself and its maze of walls and ceilings. Regardless of the season, the flames would have had ample opportunity to take a hard bite.

Yet the Right Spot bore the hallmarks of a winter fire. Hoses froze into solid, impervious blocks. The threat of ice building up like a dam in their nozzles was ever-present. Face masks fogged. Equipment became less reliable or simply broke. Firefighters got tired faster. Fighting fire may be essentially the same in winter and summer, but they're not quite the same animal. "It's the million little bites," Hernblad says, summing up the difference.

You'll hear that type of comment frequently when you talk to firefighters from cold communities. It may be awesome to see billowing clouds of hot steam pouring into the cold air, but the rules and equipment for battling the flames remain basically the same in all seasons. "Put the

wet stuff on the red stuff," says Mike Lowing, the deputy chief of Yellowknife's fire department.

Ultimately, he says, firefighting is hard no matter where or when you have to do it. The difference between warm and cold weather firefighting, he says, is this: "The simple things you take for granted aren't so simple anymore."

In the dark hours of a cold Minneapolis, Minn. night in January of 1998, the temperature hung around -30C, with a wind chill pushing that to below -40. The quiet of the night was broken by a 911 call reporting a large fire in an older apartment building in the downtown area. Ulie Seal, then the deputy chief of operations for the Minneapolis fire department (now the assistant fire chief) was on duty when the call came in. When he arrived at the scene, he saw an orange glow radiating from above the building's flat roof. Flames licked through the second floor. Smoke billowed out from all over.

More important were the people who lived in the building's 20 or so units. They shouted from the windows; smoke and flames on one side of them, the freezing night air on the other. Firefighters went immediately to work lifting people from windows with ladders or leading them from inside the building out onto the frozen street. Other crews battled the blaze itself.

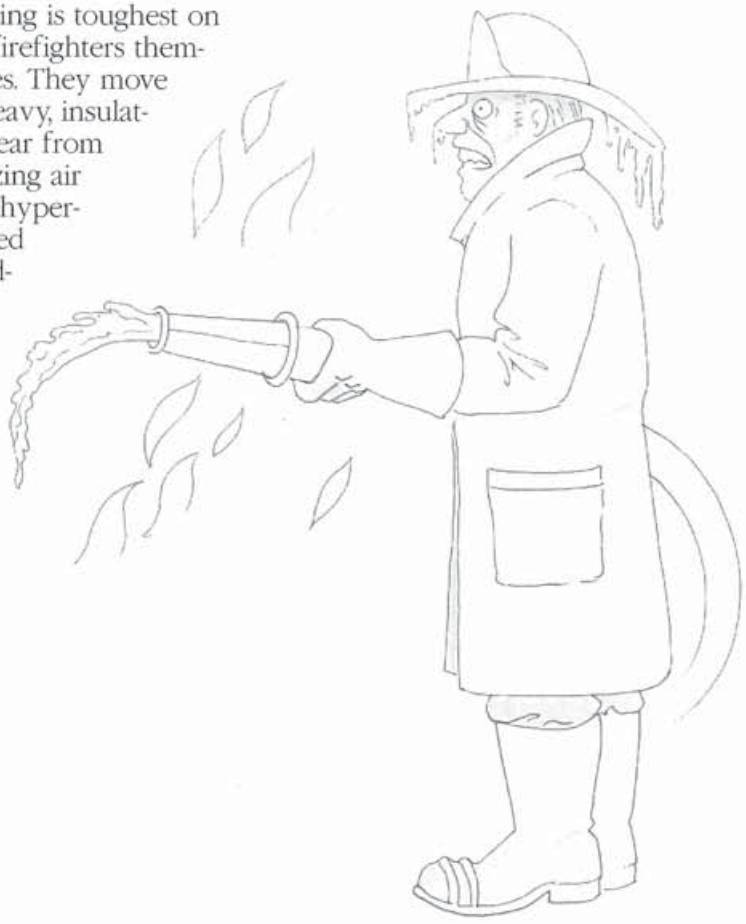
But there was a problem. No one had a chance to prepare for outdoors and the people who had been rescued were on the icy streets in their pajamas or underwear. "I went instantly from people who were at risk of dying of smoke or effects, to people who were at risk of becoming hypothermic," Seal recalls. "They were out there with arms folded together dancing."

Fortunately, the Minneapolis fire department had anticipated this type of event and had a plan to deal with it. The city's transportation authority was called, and some buses arrived on the scene so people could keep warm inside during the emergency. While waiting for the buses, firefighters loaded people into the cabs of the fire trucks.

Dealing with scared, cold people and freezing equipment is one thing, but winter firefighting is toughest on the firefighters themselves. They move in heavy, insulated gear from freezing air into hyperheated buildings and then back again. They work with water, which freezes quickly, and they are exposed to chilling conditions that simply slow them down and make it difficult to move.

Tom Biggane, fire chief in North Pole, Alaska says "It's a frustration factor." He recalls a winter fire where firefighters used their axes to chip ice from their waists during rest periods so they could bend over to get into heated vehicles. "You have to learn to overcome that. Firefighters go into buildings. They get hot and wet. When they come out they are like human popsicles."

Adapted from an article in Up Here's Winter Living



WORLD SUMMIT ON NORDICITY
CONFERENCES AND EXHIBITION

A Warm Gathering for
COLD-DWELLERS

From February 2-5, 1999, several hundred participants from at least 15 countries concerned with cold weather living will gather in Quebec City, Canada for the first-ever World Summit on Nordicity. This unique event will include conferences, workshops and an accompanying exhibition on the theme "adapting to the cold."

The World Summit on Nordicity will provide an opportunity for all involved to share their experiences and learn about new technologies with delegates from around the world. Participants are expected from Canada, Sweden, Norway, Finland, Russia, Japan, the United States and more. Summit Chairman Bernard Paquet says he hopes the gathering will act as a catalyst for commercial and scientific networking, and that many useful strategic alliances and contacts can be made.

Below are the themes and topics for workshops and presentations during the conference:

TRANSPORTATION

- Winter Road Management
- Use of Technology in Winter Road Serviceability
- Integrating the Environment into Winter Road Management
- Technological Innovations in Waste Snow Management
- Frost Effects on Road Pavement

COMMUNICATIONS

- The North: Virtual Pole of Humanity
- The Importance of Communications in the Winter Cities Association
- Laws of the North
- A Virtual Circumpolar University Network
- The Importance of New Technologies Adapted to Cold and Remoteness
- Engineering and Use

SOCIAL ORGANIZATION

- Habitat and Social Organization
- Hokkaido: A Large Island in Northern Japan and Nordicity Actor
- Museum Exhibitions on the Northern Peoples
- St. Petersburg's Membership in the Northern Forum
- When China Goes to Market
- Internationalization of Northern Peoples
- Russian-American Relations in Alaska and Siberia
- Toward a Vision of Northern Development
- The Council of Northern Quebec: A Northern Cohabitation Experiment

HABITAT

- Habitat and Social Organization
- Adapting Our Cities to Winter to Make Them More Livable
- Problems of Urban Planning in the North
- Research and Innovation in the Northern Habitat: My Evolutionary House
- The Traditional Quebec House: Adapting to Climatic Conditions

URBAN LIGHTING IN NORTHERN COMMUNITIES

Light as a Tool for Urban Development

A Creative Approach to Northern Urban Planning

Buildings as an Element of the Night-time Cityscape

Contextual Lighting in Northern European Cities: Cambridge, Coventry and Liverpool

Human Behaviour and Night-time Perception of the City

Technical Development, Products and Needs of Cold Regions Lighting Fixtures

Conceptual Frameworks for Urban Lighting

Photometrics and Calculations of Custom-made Lighting Fixtures

Urban Lighting in Northern Communities

TOURISM

Environment and Tourism

Iceland: A Major Challenge for Tourism

The Grands-Jardins Park: a Northern Islet near Quebec City

Winter Tourism: the Case of Ice Cruising

Psychological Impact on Consumption

International Tourism Products

The Future of Winter Tourism

ENVIRONMENT

Environment and Tourism

A Respectable Development

Winter Development in all its Complexity

Sustainable Development of the Great Rivers of the North

Mining Exploration and Development in a Northern Environment

Environmental Problems in Northern Russian Regions

Ground Decontamination: Global Issues

Long-term Planning for a Sustainable Boreal Forest

Winter Cities Association Board Members Pat Coleman and Norman Pressman are both scheduled speakers at the Summit. Coleman, current WCA President from Marquette, Michigan, will discuss The Importance of Communications in the Winter Cities Association on Wednesday, Feb. 3. Pressman, WCA Founding President and frequent *Winter Cities Magazine* contributor, will discuss Adapting our Cities to Winter to Make Them More Livable on Thursday, Feb. 4.

The second Nordicity Summit, scheduled for January 29 - February 2, 2001 will feature the following themes: health, law, fashion, agri-food, transportation, habitat and more.

For more information on Nordicity, visit their website at www.nordicite.org or call (416) 684-0689.

Photo: Bernard Dufour

Nordicity participants will have the opportunity to meet Bonhomme Carnaval, the Quebec Winter Festival mascot. The festival and the conference both take place the first week of February.

Cities in Winter: SOLUTIONS TO COLD-CLIMATE LIVING

BY NORMAN PRESSMAN

Introductioin

Harsh and foreboding climate such as that embodied by northern winters has worked its way into the national psyche of cold nations. Canada, for example, has been imaged by others - and images itself - as a product of climate, to a large degree. Winter has, to a considerable extent, shaped its history, helped to develop its customs and traditions, and has repeatedly been a central theme in both Québécois and Anglo-Canadian poetry, literature, art and other forms of cultural expression.

This also tends to be the case in other northern societies such as the American mid-west, Sweden (particularly its northern regions), Finland, Norway, Iceland, Japan's Hokkaido region, and much of the former Soviet Union. The northern bleakness, with its cover of ice and snow and its blustery, bone-chilling winds, is deeply embedded in the hearts and souls of those who inhabit the north. On the whole, these cultures work hard at attempting to resist and deny this hostile season. However, at times, they also delight in the snow-reflected light, the visual beauty and the outdoor sports, carnivals and festivities made possible by

Photo: Lulea Komman

Ice sculpture in the town park, Lulen, Sweden.

the snow-covered landscape.

The attempts to generate "climate-responsive" northern urban form are part of a relatively recent phenomenon and field of investigation. These attempts - and the international winter cities movement - have established the need for explicit, systematic inquiry which analyzes national and local strategic action directed at improving the comfort and lifestyles of northern dwellers.

A Visionary Approach to Planning for Winter

A broad range of winter-induced problems is experienced on a daily basis for roughly five months each year; during the late autumn, winter, and early spring periods. Very few solutions have emerged to alleviate these problems and there are hardly any "ideal" cities that function in an exemplary manner during winter. In fact, present experience, in most cities throughout the "winter city" world, has tried to create "summer city" conditions throughout the year, instead of highlighting those characteristics unique to northern communities - which reduce nuisances and celebrate winter's beauty.

A "northern" urban design and planning approach is most effective to achieve optimum results for humanizing the urban environment and minimizing human discomfort. Some of the issues that must be urgently addressed, if our cities are to function more efficiently in winter, include the following:

1. Recognize prevailing winds and solar conditions in site planning, orientation of buildings, and configuration of streets (in new subdivisions). Passive solar principles should be incorporated into the designs.

2. Formulate sensitive design and policy guidelines with respect to optimizing relationships to sun, shade, wind, precipitation, and climatic elements such as snow drifting, wind

tunnel effects and their impacts upon urban form.

3. Utilize landscape and design principles that can enhance the microclimate of any given site or development area. For example, the judicious planting of trees can absorb and minimize unpleasant effects of wind, and reduce the wind chill factor.

4. Re-evaluate existing by-law frameworks so that they will guarantee protection for the pedestrian network - such as continuous canopies over sidewalks, covered arcades and galleries linking parallel streets at mid-block locations. Superb examples are found throughout major European cities such as Brussels, Berne, and Bologna.

5. Organize redevelopment plans in a way that both open-air and climate-controlled (enclosed) spaces are interconnected offering a greater degree of choice to users in the way in which they elect to move about the city. One must strive to create a balance between "open" and "closed" public spaces that can be used in different ways throughout the seasonal variations.

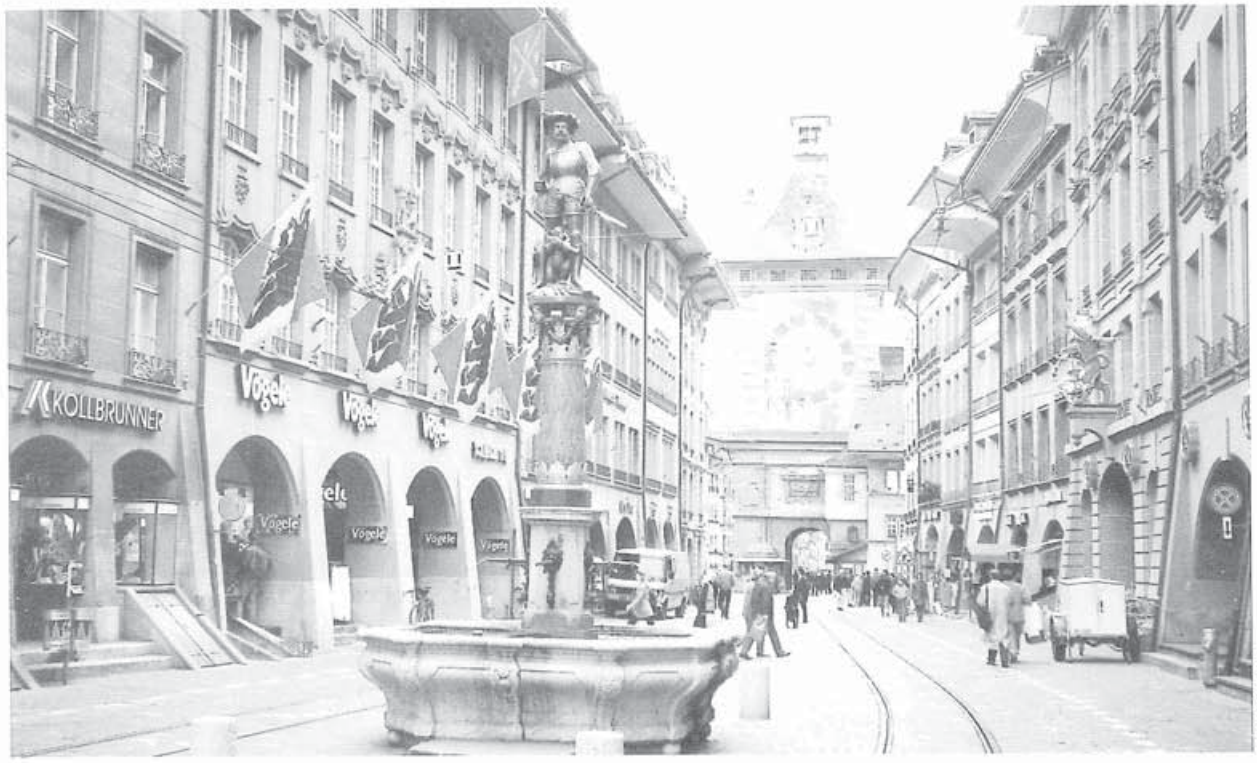
6. Improve the overall quality of urban environment using solutions that will ideally reduce energy costs. The environment must at all times remain humane and many of the high-technology solutions such as "domed cities" or "subterranean building" which cut people off from the natural elements are not always desirable from a psycho-biological point of view.

7. Devise management policies for existing transit systems that are seasonally adjusted in order to minimize adverse conditions created by harsh climate. (To wait 20 minutes for a bus in January is surely more debilitating than waiting for the same period during July.) Thus, organize more frequent service in winter, and provide heated bus shelters at frequently used stops.

8. Re-organize development policies so as to reduce dependency on the automobile, emphasizing not only transit but also walking as a major mode of movement within areas of population concentration. This also reduces atmospheric pollution.

9. Encourage mixed-use activities and incorporate the climate-protection principle in the designs, thus bringing people closer to entertainment, shopping, places of work and recreation - trapping the sun whenever possible.

10. Create "winter gardens" and "indoor parks" at strategic



More than 8 km of weather-protected arcades improve pedestrian-level street life in Marktgasse, Berne, Switzerland.

urban locations. Calgary's Devonian Gardens is a very good example.

11. Organize better winter-use of summer playgrounds and build special purpose "piruvik-type" play areas that emphasize and recognize the beauty of ice and snow and their play characteristics.

12. Selectively "roof-over" existing streets in urban centres. The St. Roch Mall in Quebec's lower town is a good example.

13. Consider the adoption of legislative measures calling for "wind impact statements" and "sun and shadow impact statements" especially with regard to new developments injected into the urban fabric.

14. Increase development densities in areas surrounding or adjacent to shopping malls so as to maintain and encourage a strong heat island while keeping street level temperatures as high as feasible.

15. Employ a range of colours in the built environment to enhance and counteract the monotonous visual dimension of winter's stark-white. A special "colour palette" of hues appropriate in northern regions is worth considering.

16. Utilize ice and snow as art forms such as illuminated fountains, floodlighting of frozen waterfalls, umbrella sprays left from fountains during freezing periods, ice sculpture and other decorative features.

17. Apply creative illumination for the "dark" periods. This will improve both public safety and aesthetic quality. The famous "Bahnhofstrasse" (main shopping street) in Zurich is a superb example of downtown illumination on a high artistic level.

Photo: N Pressman

The main street (Storgatan) in Lulen, Sweden, has log-burning fireplaces for warmth and light. Sidewalks are heated, creating a non-slip surface.

18. Heat sidewalks and ramps where cost-efficiency permits and where recycled heat from refuse combustion or district heating plants can be harnessed.

19. Program and sustain winter carnivals and festivals (Ottawa's "Winterlude/Bal de Neige", Québec's "Carnaval", and Sapporo's "Snow Festival" are grand celebrations of winter promoting positive images of the season.)

20. Incorporate cross-country ski trail networks within the urban fabric. In Norway, Oslo's ski trail system includes more than 200 km. of paths, many of them illuminated for night-skiing and for handicapped persons.

There is a large spectrum of urban sector interventions that can help to decrease some of the deleterious effects of winter on urban inhabitants. Most of these strategic interventions or measures are of the type which attempt to manipulate physical and spatial components of the environment and the ways in which they are both perceived and utilized.

However, there is another dimension to the user side of what is referred to a "quality of life". This deals with rules and codes of behaviour from socially desirable and legally acceptable frameworks. How we are trained and educated to use the environment within which we dwell and the actual manner in which it is used can also seriously affect the quality of "winter living". Several examples should suffice to indicate the nature of these considerations.

Winter Driving

One of the most stressful situations arising from the winter season is that of hazardous driving conditions. With snow-covered, icy roads often subjected to "white-outs" during snowstorms, traffic fatalities tend to soar with the accelerated accident rate that accompanies winter's arrival. What can be done to deal more effectively with such a phenome-

non? A partial answer would appear obvious - better driver education suited to extreme weather conditions! Why not encourage - indeed require - the driver population to enroll in skid control schools so that they may better respond to and control potentially fatal accidents caused by winter conditions. The Nordic nations all require skid-control driving courses to be taken. Surely, the communication of winter driving techniques would contribute to the support of human life. Why are driving tests administered to first-time permit applicants not administered during winter? Perhaps, there ought to be two tests: a summer as well as a winter one, without which no driving permits would be issued.

Inequitable Use and Distribution of Resources

Opportunities and choices with respect to the benefits of winter-related recreation are not available on an equal basis to all economic strata. Even though, quite frequently, activities such as ice-skating - on Ottawa's Rideau canal system - appear to be "free" since there is no actual fee that is charged to users, the economically disadvantaged must make choices if they are to benefit from such facilities. Transportation to the site is essential, as is equipment and warm clothing. The Ottawa-Carleton transit authority operates an exemplary "free-bus" service during Winterlude days, but this cannot be sustained on a continuous basis. Hence, what might appear to be free necessitates choice making within a broader context of priority setting. Winter has the potential of creating difficulties - essentially of a financial nature - for "limited means households". The design and management of such facilities need to be carefully analyzed in the light of such considerations.

Conclusion

For northern cities to function more satisfactorily, the negative impacts of winter must be reduced while its beneficial characteristics are enhanced. While not all summer activities can or should be abandoned during winter, proper microclimatic control is essential if human life is to be retained outside. The outdoor season should be extended since so much indoor isolation occurs. The main principles to be incorporated in exemplary "winter city" design should be contact with nature, year-round usability, user participation, cultural continuity, and the creation of comfortable microclimatic conditions throughout most of the city's open spaces. Adopting a climate-sensitive approach to planning policy and urban design can render everyday life less stressful, especially during the lengthy winter periods found in many northern latitude and high altitude settings.

Planners, designers and policy-makers must encourage and promote application of climatological know-how in land use and urban design concepts, while keeping abreast of newly developing information. Builders should be provided incentives to demonstrate advantages of climate-adapted projects on particular sites. Local governments must embrace climatically-sensitive development as part of their policies through the adoption of new design guidelines, revision of official plans and zoning by-laws, and inclusion of climate-oriented performance standards. Approvals for building and site planning projects should be subjected to rigorous review of how well designs are adapted to the local conditions in conformity with explicitly stated "winter livability" plans and criteria.

Coordination of worldwide information and experience in the design, planning and management of winter cities is needed. We possess a great deal of knowledge about designing with climate but most of this information tends to be limited to the hotter, more arid regions of the world. The lion's share of existing data rarely makes mention of cold-climate planning. It is in this realm that both the literature and transfer of knowledge is deficient. Greater efforts must be developed in order to more meaningfully understand and apply key concepts and planning principles with the aim of building, redeveloping and managing cities and environments situated in cold regions. More than this, innovative experimentation and thinking will be essential if our urban settings are to be made more livable, not only in winter but also year-round.

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His recent book Northern Cityscape: Linking Design to Climate *received an Award for Planning Excellence by the Canadian Institute of Planners.*

A DRIFT IN *Rankin Inlet*

PHOTOS AND TEXT BY PAGE BURT

Located at the same latitude as Yellowknife, NWT, Rankin Inlet in Nunavut is truly "arctic", with short cool summers and long harsh winters with strong winds and blowing snow. Three-to-four day blizzards are not uncommon. During a blizzard, strong surface winds whip the snow into a blinding whiteness. You may be able to see the moon overhead, yet cannot see 10 meters on the ground. Although the total quantity of snow that falls is small, the winds sculpt it into hard drifts in the lee of any obstruction. Out on the open tundra, it simply blows for miles, but where buildings interrupt the wind, deep drifts develop during storms.

Our midwinter snow is not the cozy fluffy stuff of the south; it is tiny ice crystals that can creep into the smallest opening, helped by the incessant winds of winter. Drifts quickly become packed so hard that one can walk right over them. You do not shovel a path to your door, you cut steps in the snow and climb over the drifts!

Sault Ste. Marie's
SNOW TRAIN

Ride the rails to a winter wonderland

BY J. SUSAN MYERS

Sault Ste. Marie's marketing slogan – naturally gifted – aptly describes the winter paradise surrounding this Ontario city; a great place to enjoy winter living. The Sault Ste. Marie area has mountains of snow that come early and stay late. Environment Canada's weather office reports on average, a snowfall of 305 cm (11 feet) which results from its location at the heart of the Great Lakes and adjacent to the giant snow-making influence of Lake Superior.

All this powder makes for terrific snowmobiling, one of the most popular winter activities in the area. Sault Ste. Marie, the largest city in the district of Algoma, is a launch pad for snowmobiling throughout Algoma Country. The city's staging area, located within the city limits, is a short distance from all major accommodations, providing convenient access to over 2000 km (1200 mi) of beautifully groomed trails through the breathtaking winter wilderness in the very heart of Northern Ontario.

A popular winter attraction unique to the Sault Ste. Marie area is the Algoma Central Railway Snow Train. The Snow Train operates on weekends from the end of December to mid March and carries passengers 190 km (114 mi) north into the heart of Algoma Country. This one-day rail adventure departs from Sault Ste. Marie at 8 am and returns at 4 pm Saturdays and Sundays. Snowmobilers can enjoy a train ride to some of the best trails in North America. Riders can load their machines onto an enclosed baggage car giving them the option of riding the forest trails and visiting a northern resort or cabin at one of the communities along the line. When they are ready to go back to the city, riders simply make their way back to the train track and climb aboard for the return trip.

Over 20,000 passengers ride the Snow Train each year and enjoy a breathtaking journey.

Photo: SSMEDC

The Algoma Central Railway Snow Train - a popular excursion.

For those in the festival mood, Sault Ste. Marie's Winter Carnival - Bon Soo in now in its 37th year of operation.

The ten-day carnival schedule is a coordination of 150 events embracing all kinds of outdoor events with highlights such as the winter ice park, providing hours of fun on snow sculpted slides featuring a different park theme every year. The festival takes place at the end of January

continued on next page

and kicks off with outdoor opening ceremonies including a concert and fireworks.

Northeast of Sault Ste. Marie, lies the village of Searchmont which hugs the banks of the Goulais River and winds through one of the world's oldest mountain ranges on its journey to Lake Superior. Winter in this area brings many opportunities for outdoor fun; downhill, telemark and cross-country skiing, ice climbing, snowshoeing and ice fishing.

Winter tourism is extremely important to the economy of the area. The city of Sault Ste. Marie recognizes this through a marketing partnership created over recent years with local accommodations, restaurants and attractions. The Marketshare program pools marketing money in order to access provincial cooperative marketing programs specifically designed to support northern Ontario winter tourism. Over half a million dollars is invested in two such programs with assistance from the City of Sault Ste. Marie, Economic Development Corporation and other private stakeholders who receive matched funding from the Northern Ontario Heritage Fund Corporation. This assistance unquestionably creates jobs in the winter tourism sector for the region.

Winnipeg

IN WINTER

BY ERIC TURNER

Photo: Mike Grandmaison

Snow sculptures adorn Winnipeg's winter landscape.

The first snowfall in Winnipeg is always a magical time. With the rooftops and trees of Winnipeg dusted in white, children rush outside to build the first snowman of the year while squirrels, birds and other wildlife leave their first set of winter footprints. Dressed in its winter white, the city is pristine and peaceful. Houses and businesses snuggle under the white blanket, while Winnipeggers don hats and mittens and head out to play, work, and enjoy.

For those interested in sports, Winnipeg's winter brings new opportunities. You can travel through parks, down rivers, and explore the unbeaten path from a pair of cross-country skis, snowshoes or skates. Winter team sports like hockey, ringette and curling can be enjoyed both indoor and outside. Walking through one of Winnipeg's dozens of parks and green spaces is a particular pleasure in winter, as tree branches glitter in the winter sunshine or fluffy snowflakes fall lightly.

There are really only a handful of days a year that are truly cold and even then, it's nothing a pair of long johns can't remedy. Even the corner of Portage and Main, famous as one of Canada's windiest intersections, isn't so bad if you bundle up well. But, for those more inclined to stay indoors, a Winnipeg winter doesn't mean hibernation. With an elaborate series of skywalks and linked-mall, businesses and parking facilities, it's entirely possible to spend a day in downtown Winnipeg without even stepping outside. Heated bus shelters and under- and over-ground crosswalks are all signs of Winnipeggers' adaptation to the climate.

Night falls early in this part of the world in winter, but it's never really dark. Winnipeg lights up in winter, as hundreds of thousands of bulbs

brighten up the night. Every year, one of Winnipeg's main routes, Portage Avenue, is draped with colourful ribbons of light, the majestic trees of Broadway are adorned with twinkling bulbs, and downtown department stores illuminate their windows with festive lights. The Manitoba Legislature puts on its winter best with the addition of lights to its stately classical architecture, as do many homes, apartments, and businesses. Even the zoo gets into the act, as it mounts huge animal light sculptures each winter, measuring 30 to 40 feet high.

As the Christmas Capital of Canada, Winnipeg is one of the few cities in the world that can virtually guarantee a white Christmas. In December, there are special events ranging from carolling and Christmas concerts, traditional sleigh rides and tobogganing, craft shows, and more. Winnipeggers ring in the new year with a fantastic fireworks show at the city's historic meeting place the forks of the Red and Assiniboine Rivers.

In February, one of Winnipeg's most well-known and beloved festivals chases the chills away. The Festival du Voyageur, Feb. 12 - 21 a celebration of French-Canadian culture warms the hearts and toes of Winnipeggers with a week of music, dance, traditional cuisine, snow sculpture, dog sled races, and much more.

With so much to do, see and experience, Winnipeg during the winter months is a city like no other. And, with smiles on their rosy faces, and an extra pair of socks on their feet, Winnipeggers celebrate winter as a season of warmth, activity, and goodwill.

Photo: Tourism Winnipeg

Winnipeggers enjoy a sunny winter day on The Riverwalk, along the shore of The Assiniboine River.

The **TRANSITION** *Season*

This year it was still summer, (more or less), when the kids went back to school. This rather pleasant situation lasted right through the autumnal equinox. Then, all of a sudden it cooled off and the wind blew all the leaves off the birch trees.

In Whitehorse, (as in other circumpolar towns at this latitude), the transition period from summer to winter is awkward. On the one hand, there is a sense of renewal or return. This is the natural and cyclical order of things. In more enlightened eras, the autumnal equinox was celebrated as the start of a new cycle, and indeed, for many ancient civilizations it marked the beginning of a new year. It has always been a curiosity to me why the beginning of a new year should be celebrated in the middle of winter. My maternal grandmother refused to acknowledge this situation, and instead had her own little ritual around the time of equinox; which I remember very well. In this respect she was half a century ahead of the New Age Pagans, who are at least celebrating the beginning of the cycle at a more appropriate time again.

In the Whitehorse area, members of Yukon Athletics participate in a Last Gasp run at the very beginning of October. This is followed by a soak in the hot springs and a barbecue. For runners in the hereabouts, this marks the end of one season and the expectation of the next.

The fall season is usually a few weeks of variable conditions. Snow flies but doesn't settle on the ground. Halloween and similar events are ones that predate the Christian era by a few millennia! It was around this time of year that access to the spirit world was possible. It is still called the "Season of the Dead" in countries such as Italy, for example. Perhaps by acknowledging Halloween, we too are preparing for the "dormant" season.

Other noticeable precursors of the winter season in the Yukon include: a big increase in the activities of the dog-mushing community; the start of the hockey and skating season; ski-swap events; pre-season fitness programmes (for skiers etc.); and a variety of activities around the house, (yard clearing, wood piling, door scaling and so on.)

This year, your scribe is going to join the Canadian Ski Patrol. In order to do this, the prospective member has to pass a series of First Aid tests which are very comprehensive. An examination must be passed by each patroller each year so that assistance may be offered with confidence to the injured, or to those in trouble on the slopes or trails. To me, this seemed like a good way to gain effective knowledge of the area, whilst also becoming obliged to get out there in a regular basis.

Have a safe winter season,

Michael L. Barton

First Vice-President, Winter Cities Association