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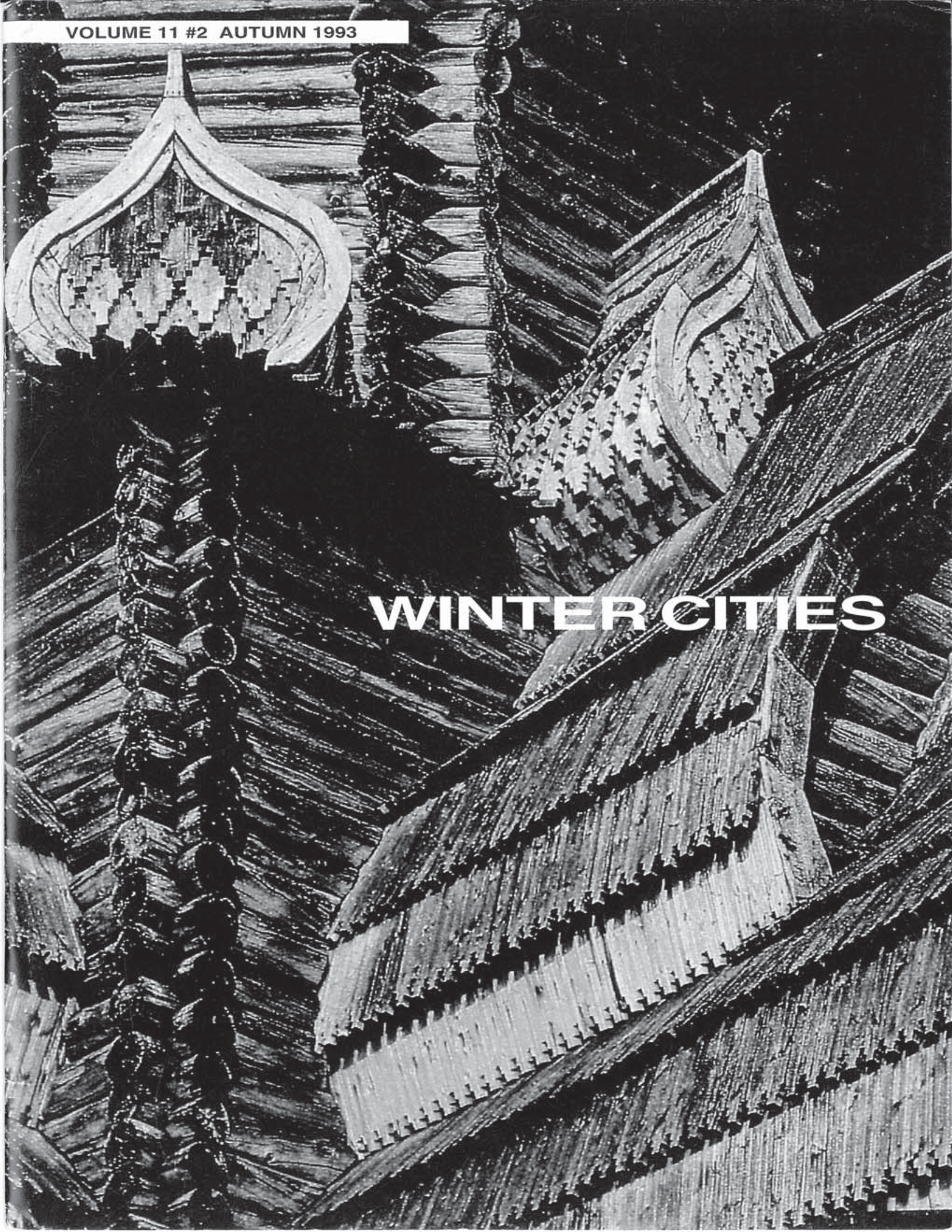

WINTER CITIES

FEATURE
Preparing for Winter

DEPARTMENTS

On the Cover: The autumnal splendor of this traditional wooden structure represents the rich Russian tradition of multi-seasonal architecture

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Winter Cities News editorial office
is located at, 1933-5th St. S.W.
Calgary, Alberta, Canada T2S 2B2
Phone: (403) 229-0696
Fax: (403) 245-9701

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is dedicated to realizing the unique potentials 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 opportunities associated with the winter season.

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editoriale

Hockey Night in Florida

It is time we proudly took ownership of our cold climate heritage

Hockey is a genuine cold climate sport. True you can build an indoor ice rink pretty well anywhere, but the only place you get more or less universal access to hockey is where the water turns to ice. In Canada the sport is a special part of the national identity, which is no small feet in a nation that often seems faceless and divided.

"Expect the season's biggest hits to be clothing and accessories bearing the logos of two new expansion teams, the Mighty Ducks of Anaheim, California and Florida's Panthers," Steve Ryan, president of NHL Enterprises Inc.

Wherever there is an outdoor rink, kids will strap on skates and push around a puck in temperatures that you would not leave your car unplugged in. More often than not, a young Canadian's first exposure to organized sport is through hockey. On a grand scale, the game is afforded more spectator attention than less indigenous games such as football or baseball. Although lacrosse is the Official Sport of Canada, ask anyone what sport they associate with the maple leaf and the answer will always be the same.

Hockey represents embracing and mastering the natural condition. Instead of avoiding the ice, we put up two nets and play till we can't see the puck. We naturally celebrate the sport, yet in the end someone else stands to profit from it.

In terms of marketing, this years biggest successes will most likely be from Florida and California. This could be attributed to the novelty of new teams. Yet the LA Kings have been tops at moving merchendise for the last few years. Meanwhile Wayne Gretzky's alma mater team, the Edmonton Oilers, is in serious jeopardy.

The point here is not to examine the state of the hockey world, but to expose a trend. The southern world is quite adept at capitalizing on the north. They take our traditions and image, wrap it in a fancy package and sell it back to us. Look at the popularity of hockey or figure skating and then look at the venues where it takes place.

The blame, however, lies within ourselves. If we do not use our resources to the fullest, then someone else will. The globe is shrinking and those who adapt, survive. There are many companies based in the south who specialize in providing cold product goods and services. We must address our situation and use it as a position of power.

We learn so much from existing in challenging circumstances that we should be the ones giving lessons to the rest of the world.

If we take what we are given then we will become just another exploited resource and the next thing you know the Winter Olympics will be held in Dallas, Texas.

news

CITY OF YELLOWKNIFE SOLID WASTE MANAGEMENT INITIATIVE

Yellowknife experienced unprecedented growth through the 1980s. Its present municipal waste disposal site, is approximately 1.5 kilometres north of the City core. Approximately 17,000 tonnes of waste per year is now landfilled at the 8.91 acre site.

Under the present system it is fast reaching its capacity. In 1989, the City studied future waste management options.

The objective was to identify and implement a long–term solution to Yellowknife's garbage disposal problem in a cost–effective manner. Solid waste disposal in arctic conditions – and the geology surrounding Yellowknife – posses unique challenges which are different from those in other centres. Some of these are:

a) lack of cover material;
b) large number of birds scavenging at a landfill site;
c) uncontrolled burning of waste;
d) limited capacity of sites;
e) winter conditions with frozen waste and cover material make normal sanitary landfill operations difficult; and
f) scavenging at a landfill site has health and liability risks.

Economic factors considered included the municipal debt load, and the overall property tax burden being shouldered by municipal taxpayers.

The option chosen was a baling, (or compaction) facility, in conjunction with a recycling and salvaging component. The dense solid waste bales will be utilized to fill an exhausted gravel quarry within the municipality's boundaries, with a view to its long term development as a sport playfield. The baling facility can also be used to bale recyclable materials for shipment to southern markets.

The project will be implemented in 1993 without incurring municipal debt; it will be fully financed from money collected from citizens, and accumulated in a special purpose reserve. The $10 monthly household solid waste levy was introduced in January 1991 with broad–based community support. Minimal administration was required as the special levy was billed and paid for along with municipal water and sewer utility charges.

CITY OF YELLOWKNIFE WINTER STREET MAINTAINANCE

In Yellowknife, where yearly snowfall ranges from 135 to 200 cm, traction on City streets is achieved by means of crushed gravel, in lieu of salt. To conserve resources they have developed a means of reusing crushed gravel following a fresh snowfall.

In previous years, the Public Works' crews applied street sand after every snowfall only to remove it with the packed snow at the first opportunity. This needless waste of time and resources has been lessened considerably through the utilization of a motor grader equipped with a scarifier blade. Once the crushed gravel has been covered up with freshly fallen snow, instead of applying fresh gravel to the street surface, the grader scarifies the snow surface bringing up the gravel previously applied.

This procedure can be carried out several times and has proven very effective in conserving the crush gravel supply, without compromising street traction. Once the packed snow has built up to a depth of approximately 6", men and equipment attend to the complete removal of the packed snow and gravel, and the procedure is repeated.

The material which is moved from City streets is taken to a snowdump site where a considerable proportion of the street sand can be salvaged following the summer thaw.

The City of Yellowknife has found this procedure to be very effective in maintaining their streets in a reasonable and cost–effective manner.

Cold Weather Seems to Grow Duffers

Question:
What state has the most golfers per capita?

Florida?
South Carolina?
Maybe California?

Nope.

It's Minnesota.

Well, to be fair, it was Minnesota. After four years at the top of the heap, Minnesota has dropped to No. 3, according to the annual survey of the National Golf Foundation. But don't jump to any conclusions. The two states that edged it out were North Dakota and Wisconsin.

It seems that when it comes to golf, the colder the climate, the more popular the game. Rounding out the top nine are such golfing hotbeds as Utah, Iowa, Montana, Nebraska, Michigan, and Illinois. You have to drop to No. 10 Arizona before a warm–weather state pops up. California is 30th, just ahead of Florida and South Carolina. Only 11.3 per cent of South Carolinians play the game. In Minnesota, it's 19 percent; in No. 1 North Dakota, it's 20.2 percent.

Why is golf so popular here? "We only have six months to play golf", says Don Kortus, who's just finished whacking away on the driving range of a suburban St. Paul, Minn., course. Minnesotans – especially senior citizens – take every opportunity to play, he adds. "You will see those guys playing out there when it's really cold."

Uh, how cold is "really cold"?

"Forty–five degrees. If it's sixty degrees, like today, it's perfect."

"In Minnesota, golf is almost the forbidden fruit," says Bev Vanstrum, who has won 17 state titles and four state senior titles. The winters are so long that people just chomp at the bit to get outdoors at the first hint of spring.

Mrs. Vanstrum has played tournaments in Duluth, Minn., where it was sunny on one side of the course, and snowing on the other. She's very adept at plucking golf balls out of the snow drifts. Like any other experienced Minnesota golfer, she always packs mittens, a stocking cap, and other foul–weather gear, just in case the weather changes.

"Do you know who created golf? The Scots," she says. "I don't think they intended it to be fun."

Accessibility is another factor, says Brian Delgado, spokesman for the Minnesota Golf Association. Eighty–one percent of Minnesota's golf course are public rather than private. The national average is only 62 percent.

Don't forget culture, adds John Rooney, author of the new "Atlas of American Sport." "The Upper Midwest ... is a sports–for–sports–sake region." Unlike other parts of the United States, which stress winning or teamwork, Minnesota emphasizes participation. That's a big reason why more Minnesotans play golf, while Mississippi and Texas turn out 10 times as many professional and top–flight college players per capita, he says knowingly.

In November, three-time state senior player of the year, Mr. Magnuson heads out to suburban St. Paul to play the "Diehard" tournament. His worst golfing experience was at the Diehard four years ago.

"The sleet was coming sideways," he recalls. "We played anyhow."

When Will the Ice Melt? Waiting for Spring in Nayoro

When will the frozen rivers which run through the city melt and begin to flow? An event modeled after an event in Nenana, a city along a branch of the Yukon River in Alaska, was held for the first time in Nayoro, in one of Hokkaido's coldest regions.

In Alaska the event has been held for 75 years. It was began in 1917 as a contest authorized by the city. People buy $2 tickets and guess the time and date at which the ice will melt. The person who guesses closest to the exact date and time collects a cash prize.

In Nayoro city officials formed the "Nayoro Ice Classic," and held their first contest to guess the thawing time. They erected a pole on the ice of the Nayoro River and attached a device to cut off the power supply and stop a clock when the pole falls through the thawed ice.

Voters guessed at which time the clock would stop. Five tickets were distributed to each person who bought a set of four photographs depicting various scenes of the Nayoro River in winter. The person who guessed closest to the exact date and time was presented Y100,000. About 500 sets of photographs were sold, and 1,928 votes were cast in 387 sheets.

The river ice melted a day later than last year, as 11:43 a.m. on April 1, at which time the pole fell through the ice. The committee will continue to hold this event in the coming years in order to enjoy winter and the late arrival of spring.

Banking North of the Arctic Circle

As of this summer the people of Inuvik, NWT and surrounding communities have access to automated banking for the first time. "Mail and courier bags can sometimes take days to arrive, so technology is really important," says Carol Palmer, manager of the most remote Bank of Montreal. "Part of my job is explaining life up here to the bank offices in the south, and adjusting the way we do business to provide the services people need. We are probably one of the few branches that has approved loans to buy feed for dog teams," she adds. "When ou help a customer here, you can usually see the benefits immediately."

As treasurer of the local Chamber of Commerce, Carol is concerned about the high drop out rate among students in the North. She is involved in a program with the local high school that provides much needed work experience in the Inuvik branch for students interested in a banking career.

innovations

Microbeads for Lane Markers and Rumble Strips

A Danish road marking innovation spotted on a recent asphalt technology study tour improves visibility under all driving conditions.

The "Spotflex" glass microbeads, installed by compressed air in intermittent strips along a layer of titanium dioxide paint, reflect most of light towards the driver, provide effective drainage and make noise to catch the driver's attention when the vehicle strays over the line.

Experience has shown that the Spotflex markings are not affected by snow removal equipment – the lines of beads set into acrylic resin are only 3 mm (1 in) high.

Another function of the impressive technique in use in the Scandinavian countries is to delineate bike and walking paths from adjacent traffic lanes. This application could be important given the worldwide increase in non-automobile roadways. Even sight–impaired persons find the strips of great help, since their characteristic pattern is easily detected while walking, whether with a cane of a shopping cart.

A Rally for All Seasons

In any year when the market is a disappointment, you can hear talk of a summer rally. Parameters for this "rally" were defined by the late Ralph Rotnem (Smith Barney) as the lowest close in the Dow industrial average in May or June to the highest close in July, August or September. Such a big deal is made of the "summer rally" that one might get the impression of the market puts on its best razzle–dazzle performance in the summertime. Nothing could be further from the truth! Not only does the market "rally" in every season of the year, but it does so with more gusto in the winter, spring, and fall than in the summer.

Winters in 29 years have seen an average 13.8% gain as measured from the low in November or December to the first quarter closing high. The 10.3% gain in fall ranked second followed by the 10.1% spring gain. Last and least was the average 9.6% "summer rally". Nevertheless, no matter how thick the gloom or grim the outlook, never despair! There's always a rally for all seasons.

Solar Filling Station

Germany's first 'solar filling station', installed in Kassel (pop. 215,000) as a demonstration project, has become a tourist attraction. More than that, it is pointing – in a tentative way to be sure – towards an energy–efficient future, while serving research groups and solar activists as a study objective.

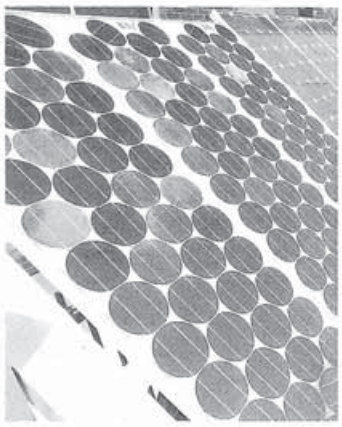
The "filling station" with its hundred square feet of solar cell panels, is located next to two parking spaces for solar vehicles. Owners who find the space unoccupied can park and "tank" their cars at the same time – without charge. Of course, the free energy is of the trickle down variety. Drivers have to park and connect their batteries to the filling station cable for two hours to get enough energy to travel just 10 kilometres. When there are no customers, the station feeds its 640W of electricity into the local grid – as long as the sun shines. In case of inclement weather – not rare in Kassel – the station draws its free power from the local utility.

New Mortar Cement

Lafarge Canada Inc. is pleased to announce the introduction of a newly developed Mortar Cement for the Western Canadian market. This new product meets all applicable CSA (Canadian Standards Association) and ASTM (American Society for Testing and Materials) standards, as well as the UBC (Uniform Building Code) standards for mortar used in seismic zones.

Over four years of research and testing went into the development of this new product, which is believed will establish new industry standards.

Manufactured under rigid quality control programs, Mortar Cement contributes significantly to the uniformity of mortar used on the jobsite. It eliminates the proportioning requirements associated with the traditional portland cement/lime mortars, is less caustic, and hence more desirable in today's environmentally conscious society.

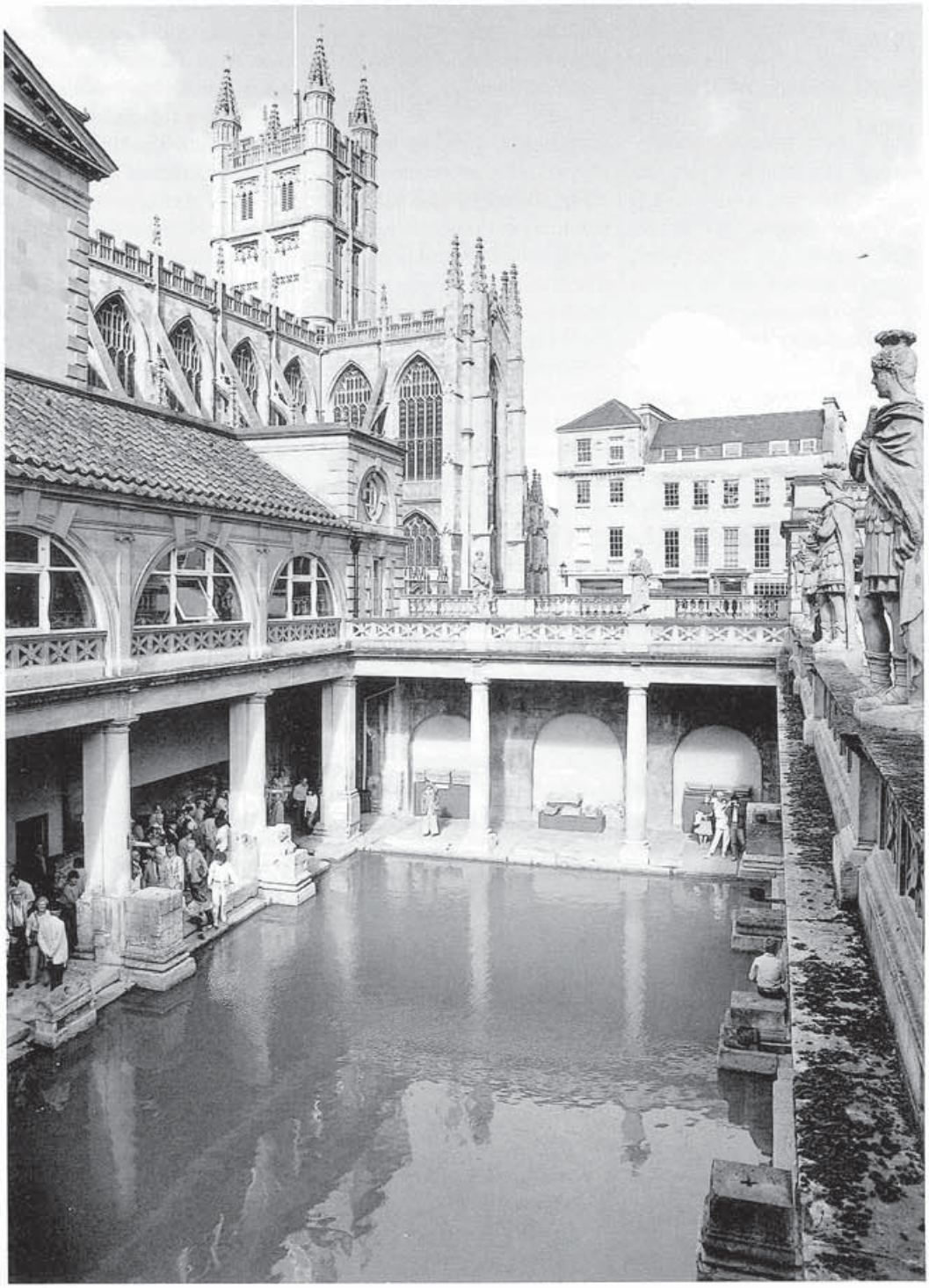


essays

Britons at Leisure

The Historical Influence of Climate on Recreation

Philip Sayers



Some 2,000 years ago, the Romans had to adjust to winter cities. It was a new experience and they conquered it in a most innovative way.

As the Roman empire expanded, so the Romans came into contact with different people and increasingly different climates. This was particularly true in their northern most outpost; Britain.

A rough wooded land, the Romans never established complete control over the whole country. The Scottish clans (or tribes) saw to that. In the rest of the country, the Romans integrated well, and provided a sound foundation of law and order.

To this day, roads and towns dating from the roman times are still in place and flourishing.

THE ROMANS

BEFORE THE ROMANS, THE network of roads wound their way around fields and through the roughest of woodlands, linking village to village. This did not suit the Romans. With miliary precision, they engineered straight roads, taking the shortest route from town to town. This allowed soldiers to march the maximum distance in the minimum time. The well constructed roads allowed foot soldiers quick marching, regardless of the weather.

Today, these roads, now tarmacked, remain a small yet vital element of the British road network. And the Roman names remain too. The Fosse Way for example, provided easy access (or at least easy for those days) across hundreds of miles in the West of the country. And here, in a town in the south west of England, they established a place for leisure and recreation; a warm refuge from winter.

BATH

IT WAS IN THE APTLY named town of Bath that the Romans sought respite from the harsh climate of Britain, and from their labours of colonization.

Now Bath has the great attribute of natural and constant supply of hot water from underground springs. Each and every day, over quarter of a million gallons of hot water lavishly supply those who care to harness this ample resource.

Quick to exploit a natural resource, the Romans made good use of the hot water springs. To soothe their aches and pains and to mitigate the effects of the winter climate, the romans built beautiful baths in which to relax and recuperate.

At a regular temperature of 120 Fahrenheit, or Centigrade, there was little need to build their normal heating chambers. Elsewhere in the Roman Empire, the water was heated by fires under the floors of the baths.

Even today, the hot waters supply the conserved remains of the Roman Baths. The town was a refuge in more recent times as well. Drawn by the spa waters, many wealthy people settled here in the last century.

And so, fashionable nineteenth century architecture was added to the historic city of Bath. Even in mid winter, the warmth of the architecture permeates the whole environment.

Not that the town of Bath can be thought of as a winter city nowadays. Since the retreat of the mini–Ice Age of the last century, southern Britain has enjoyed a mostly temperate climate.

SCOTLAND

HOWEVER, WHERE WINTER does bite in Britain is many miles north of the Roman Baths. These towns are located where the Romans had least impact – Scotland. This northern land, a mountainous region famous for its unrivalled malt whisky, was peopled by strong family clans. Their ruggedest independence ensured that the Romans were never very likely to penetrate far north of the English border.

In fact, they stopped trying. Instead, their Emperor Hadrian built a wall right across the country to keep the Scots in Scotland.

THE HIGHLANDS

BUT IT IS EVEN FURTHER north than this, that the real grip of winter is to be found in Britain (around latitude 57). The north eastern parts of Scotland have the coldest climate in Britain lying, as they do, furthest away from the moderating westerly influence of the warming drift of the Atlantic Ocean. More important, this area is the most mountainous of the whole of Britain.

The Scottish Highlands are renowned for their summer games and rugged outdoor life.

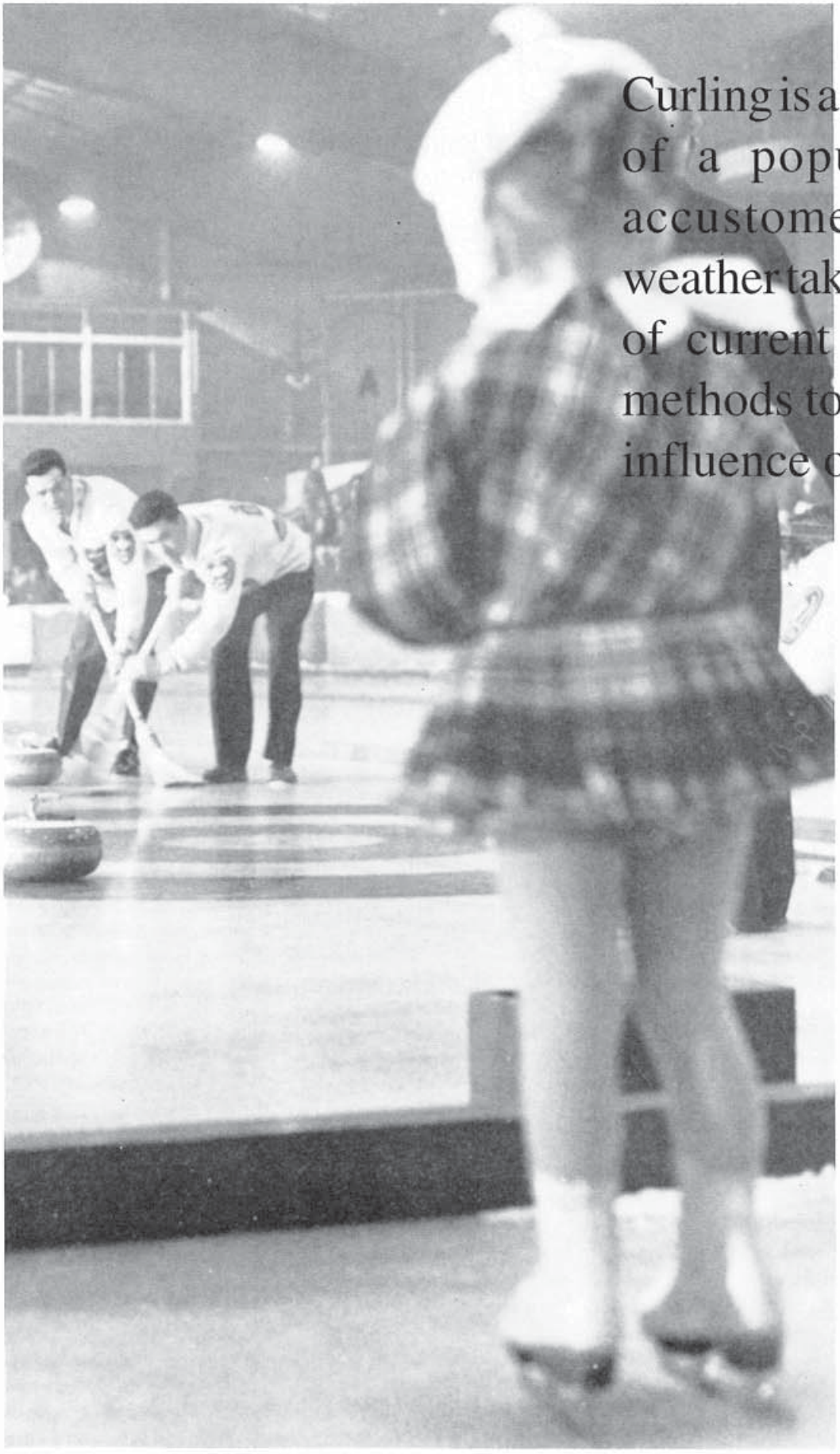
The Scots are a hardy race, and have learnt to endure their climate. However, recent decades have allowed an expansion of winter leisure activities indoors.

Perth and Pitlochry are just two of the towns in this area. Ancient settlements in their own right, their inhabitants endure the adversity of the winter climate with fortitude. Like the Romans, they relieve the effect of living in such climes, winter and summer, with relaxation and recreation in warm water. But nowadays of course, their baths are swimming pools with flumes and fun features. And in winter, there is curling.

CURLING

CURLING, A TYPE OF BOWLS on ice, has historically been an outdoor winter game. Skilled, fast and very competitive, the game has now migrated to an indoor environment.

Inside, the climate and consistence of the ice can be guaranteed. It is a good example of a population well accustomed to



Curling is a good example of a population well accustomed to severe weather taking advantage of current day building methods to moderate the influence of winter

severe weather taking advantage of current day building methods to moderate the influence of winter.

The indoor Atholl Curling Rink in Pitlochry still only opens for the winter months in keeping with tradition, and more importantly in keeping with the nature of the game and the players. It provides for a wide range of competitions for men, women mixed and juniors. In addition to winter and work, sport and leisure are essential ingredients of life today.

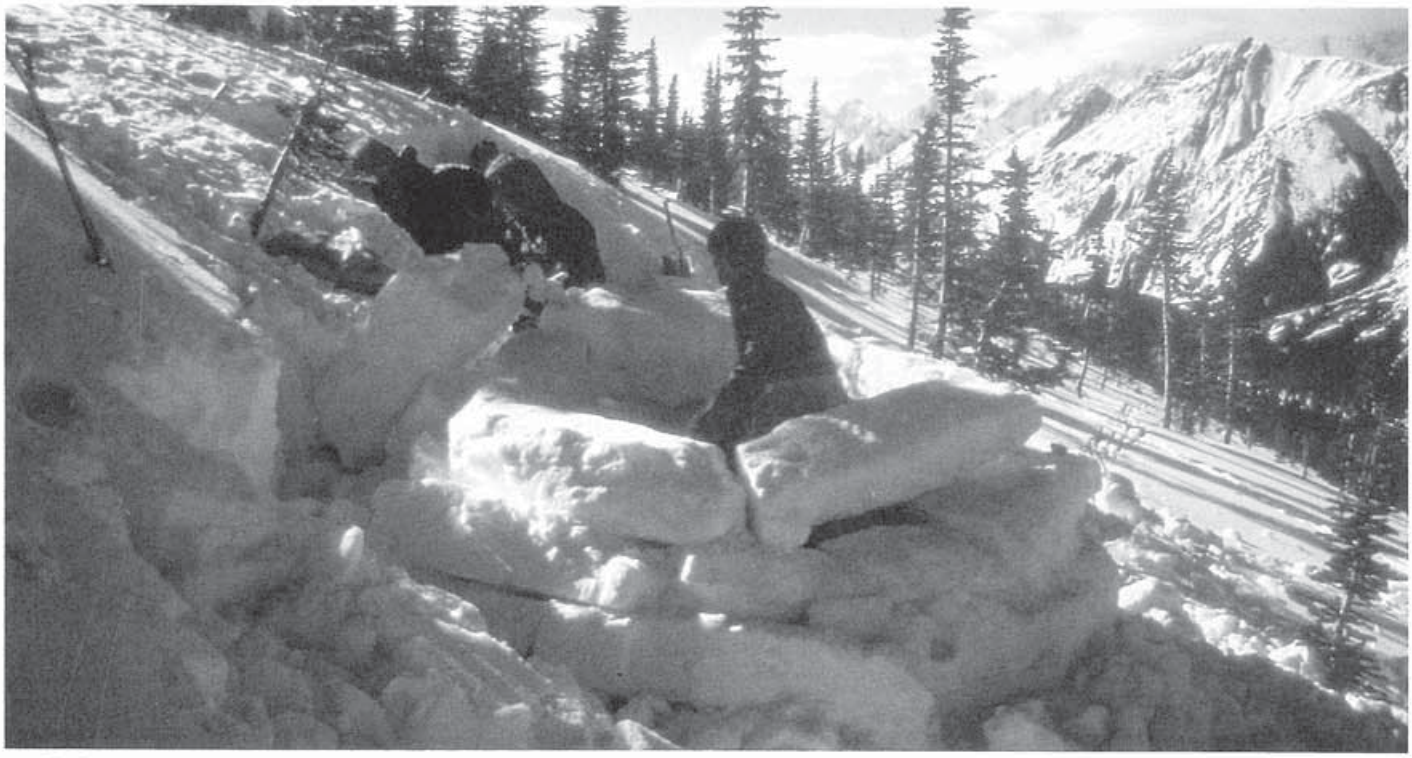
Centuries ago, the Romans benefitted in winter from natural warm springs and the application of their own inherent ingenuity. Today similarly, Britons at leisure benefit from indoor facilities and the application of competitive management.

Philip Sayers is a Fellow Member of the British Institute of Leisure and Amenity Management; Vice Chair of the Panel for Sport and Recreation, and an author of leisure management books, published by Chapman and Hall .

Winter Camping

A Primer

Deborah Etsten



Given a choice of being cold and wet or warm and dry, most people would have no difficulty stating a preference. The need, desire and thought of warmth propels people to linger by fireplaces, snuggle down into cozy comforters and buy all manner of fur and fake fur coats. Despite this yearning for warmth, some people choose to go winter camping ... willingly. And, if smart, they stay warm and dry, while having the time of their lives!

ALTHOUGH A KNOWLEDGEABLE person could winter camp solo or with just one other person, groups can be more fun and benefit each camper because all can share the sometimes heavy load – the setting up of camp and the cooking.

Most organized winter camping today is done in groups. For years, Harry Godau of Burlington, Ontario has been organizing winter camping trips for his scout troops. The older boys, aged 14 to 18, pack their supplies into back packs, cross–country ski into a spot, set up camp and ski out the next day.

Before his scouts venture into the woods, Godau lectures them on what to expect and what to bring. Unlike some winter camping practitioners, Godau does not believe that specialized equipment is necessary. "All you really need is a good winter sleeping bag or two summer bags, a mattress which will insulated from the bottom up, some sort of shelter to protect you from the wind, a small shovel with which to dig trenches, food which will not spoil and carefully chosen socks and footwear."

Godau's camping excursions might be considered an orientation to the winter Outward Bound school whose courses run throughout the winter. At the school, just northeast of Thunder Bay, Ontario, participants travel on cross–country skis or snowshoes and with dog teams. They learn to mush and care for the huskies, as well as other outdoor skills.

Outward Bound director Ian Yolles explains the school's philosophy: "We're not emphasizing the teaching of technical skills; we're interested in the educational experience and personal development."

For Yolles, the wilderness environment is just a means to get at the learning. "The person who takes the winter course is very special," he says. "It's an adventurous step in their lives and an opening in their own personal growth." The minimum age for the course is 17 years, but people up to 60 from all different backgrounds sign up.

On an Outward Bound trip, all specialized gear is supplied. Each group has 10 participants and two instructors. Weather conditions govern the type of night dwelling, whether it be igloos, quinzhees (more about them later) or tarpaulins.

The renowned "solo experience' is also part of the course. This need not be an intimidating experience, since the participant is ready and skilled to be on his or her own for a short duration. "It's not necessarily a time of survival," says Yolles. "It's an opportunity for reflection, for solitude and to feel the rhythms of the winter wilderness in a more intimate manner."

INDOOR LEARNING FIRST

THOSE SEEKING CERTIFICATION gravitate to a Tour leader Program. Housed under the umbrella of Cross Country Canada, a division of the Canadian Ski Association, the Tour Leader Program is administered locally in each province. For example, the Ontario Ski Council contracts out the program to Ski Telemark in the Toronto area. The first part of the program consists of an indoor weekend with lectures and some "hands–on" experience, followed later by an outdoor weekend.

The course aims to provide a knowledge of winter ski equipment and gear, navigation by map and compass, search and rescue techniques, leadership development and responsibility, weather forecasting, winter first–aid and low impact winter camping. (Low–impact means leaving the environment as you found it.) Each participant is tested and evaluated by examiners in the third part of the program, after having led an expedition.

Tour leader Holly Blafgen states that her groups usually consist of above–average skiers who want to learn about survival in the wilderness; they are not necessarily ski instructors. Holly insists that they have a lot of fun while developing their skills.

Steve Kahn is one of Holly's examiners at Ski Telemark. Kahn is acutely aware of regional differences that make winter camping so different from province to province. In the West, one's overnight domicile is likely to be a snow cave. The depth of the western snowfall enables campers to simply hollowout the snow, preferably into the side of a mountain. Kahn advises anyone contemplating western winter camping to enroll first in an avalanche safety program and to plan a route carefully. The British Columbia Institute of Technology, a community college, offers five–to–six day courses to prepare campers for the idiosyncrasies of winter in the West.

WARM, WARM SNOW

IN THE EAST, CAMPERS generally build either an igloo or a quinzhee. For the igloo, snow is make into blocks, which are then piled on top of one another. The quinzhee is simply an outdoor hut, make by piling snow up, then digging it out. Westerners digging out their caves don't have the extra step of first collecting the snow. Those who go winter camping and find little or no snow must rely on outdoor tents or tarps which offer the least warmth or insulation. "There's no such thing as cold," says Kahn. "Only under–insulated."

Once he's tucked into his igloo or quinzhee at night, Kahn likes to burrow a little hole in the wall with his mitten and punch through a couple of fingers to provide a private air hole. He favours igloos for their bright, airy, warm, snug feeling.

Kahn favours ski touring as a way to travel – unrestricted by tracks or a trail. "You go where you feel like," he says. Some of his most exciting ski touring was done near Cornerbrook, Newfoundland. The Gaspe and the northern shore of the St. Lawrence, past Quebec City, are also favourites. Parry Sound and the Laurentian shield area in Ontario are nearby treasured options. "I am only limited by my imagination," he says. "I can get into terrain that I could never explore in summer. And all the bugs have gone to bed!"

After all the tasks of winter camping have been accomplished – dinner cooked and clean–up finished – Kahn goes for a five kilometre ski jaunt to get his blood running. "It's easier to go to bed warm," he insists.

But given wise preparation, there's no reason to freeze – which is not to say that it can't happen. Harry Godau cautions that one should never underestimate the dangers of winter camping. "Above all, go out with an experienced person or group ... it's not like going out in mid–July."

Jim Ongena has a list of do's and don'ts for would–be winter campers. "Don't get lost, don't get hypothermia, don't skimp on equipment, learn about frost bite and layer–up your clothing. If you're not used to the region, stay in the popular areas."

One of the attractions of winter camping in provincial parks is that although giving the illusion of being remote, they are under the watchful eye of the parks, – officially sanctioned for winter camping. Algonquin Park and Quetico in Ontario are two provincial parks which are open year–round.

RESERVE AHEAD

MOST OTHER PARKS ARE

There's no such thing as cold

Only

under-insulated

open for day use, even though their closed gates seem to indicate otherwise. To be on the safe side, winter campers are advised to make reservations in advance, because the campgrounds may be full. Ontario's provincial parks operate on an April to April schedule and publish a guide indicating which campgrounds are open year–round. Other provinces have similar publications for the asking.

The next thing to find is a good group – resources in any area of Canada should be abundant. Check with local ski clubs, associations or shops, look on bulletin boards of local colleges and universities, find out if there are courses given at schools or learning centres. At least one of these courses should provide quite a few leads.

Finally, it's time to get to the chosen destination. Some campers like the idea of taking the train, because they can start their trip in one place and ski back from a point further down the route. Often it affords them the opportunity to go to locales where there are no roads anyway.

If you are travelling by car with a group of people, make sure that each driver has emergency winter driving supplies such as jumper cables, flares and candles. But you might be reluctant to leave your car in an abandoned area or one not too close to service centres. It is also prudent to leave an itinerary with someone back home.

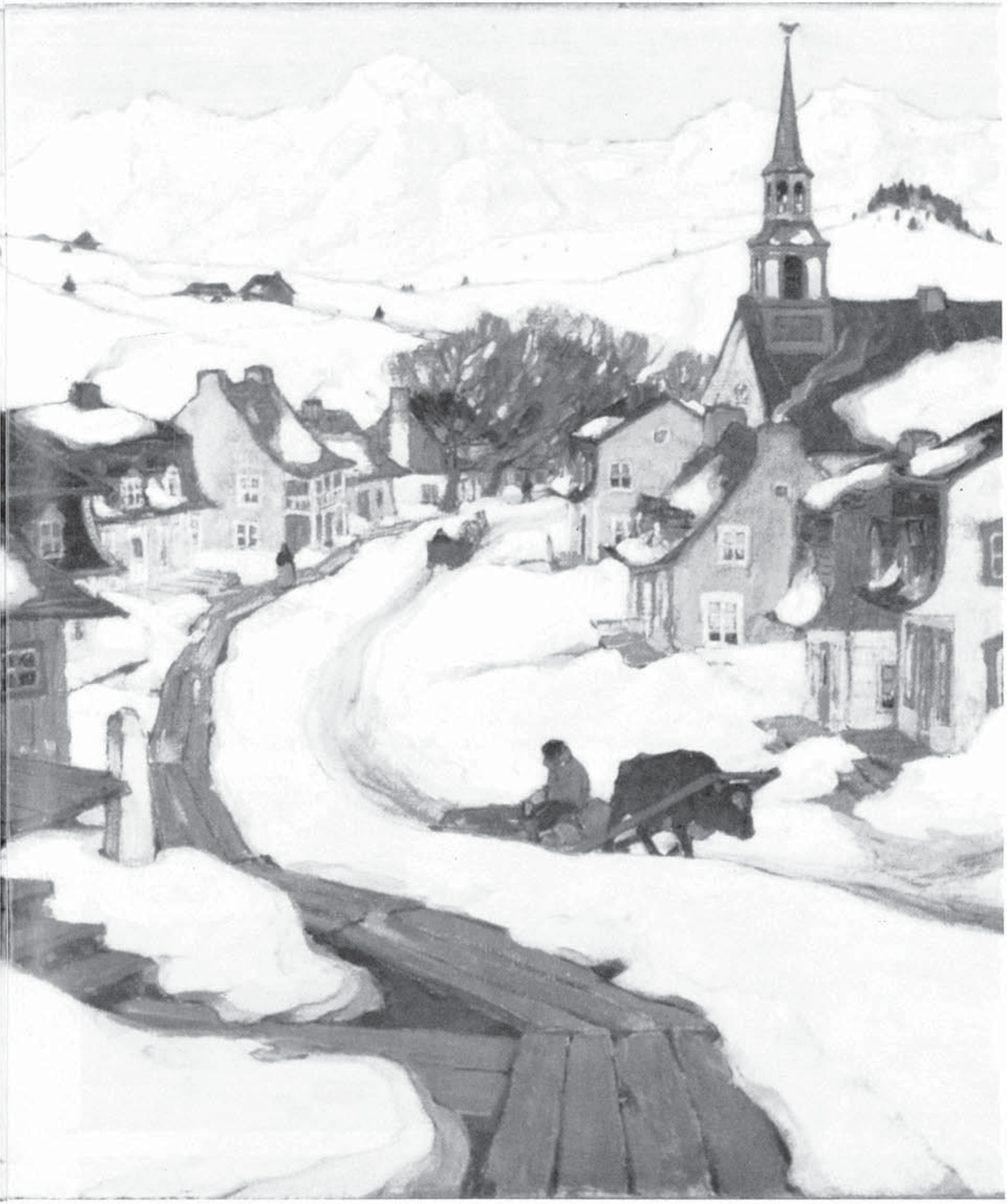
Your personal preparation should be some winter activity such as skiing. If you are not used to much activity, start walking up those stairs and working out. The warm, outdoor world of winter eagerly awaits you.

Deborah Etsten writes for Directions magazine

feature

Preparing For Winter

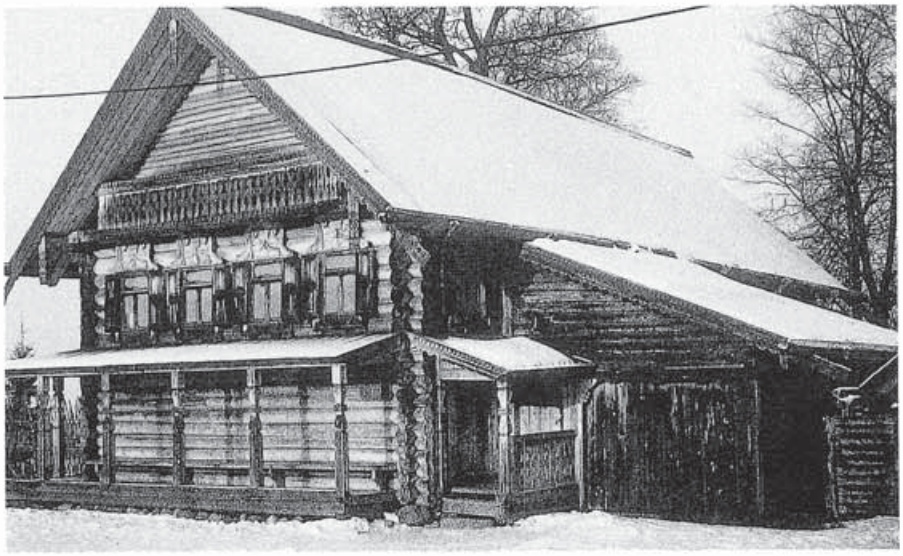
It comes every year, yet it incomprehensibly always seems to surprise. Dealing with winter is too often a reactionary affair especially when careful planning, which pays respect to our changing seasonal environmental realities, is in our best interest; on both individual and societal levels. This feature delves into how different sectors of our winter world prepare for the cold, dark and icy months. Exposure to different problems, solutions and ideas provides the raw material for change. Conclusions are arrived at and suggestions put forth, but in the true spirit of the north each of us has to answer to the revelance and application to our individual communities.



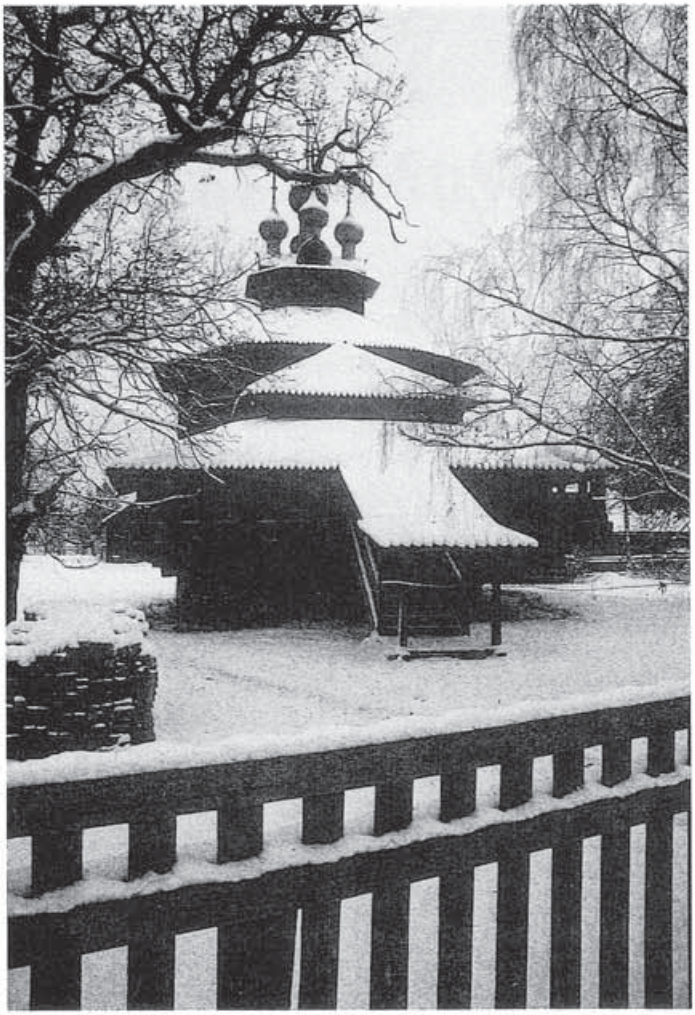
Traditional Wooden Architecture of

Russia

Russia has traditionally been a nation of turmoil. The current upheaval in the C.I.S illustrates that it is next to impossible to predict, let alone plan for changes in the socio-political landscape. Yet, through the countless procession of leaders and ideologies, the nation's people have been amazingly adept at dealing with the constants - like Winter. This traditional wooden architecture personifies the culture, strength and spirit of the Russian citizens.



Wood - plentilful, warm, colourful was crafted into art as sophisticated as with any material .



The uniqueness of the Great Russian culture that gradually emerged after the eclipse of Kiev is exemplified by the tent roof and the onion dome: two striking shape, which by the early 16th century dominated the skyline of the Russian North.

Jaime Wright
Tacoma,
Washington

Russian architecture is derived not from engineering or cosmetics but form, light and rhythm.

Be Prepared

Harold Hanen & Greg Liburd

BE PREPARED. THESE words of wisdom often fall on deaf ears dulled to the advice of cliches. Why should we heed the motto of the Boyscouts or in fact 'do onto others' or eat our vegetables? These generalities seem to have little application to the intricacies and seriousness of our professional lives. Indeed, in dealing with winter cities it appears to be immaturely stating the obvious.

However, if you live in a seasonal climate this scenario should be quite familiar to you; the first snow fall. The weather forecaster has been issuing warnings for a week, but when it hits - chaos. Scores of fender benders are reported as people turn the automobiles into bumper cars on slick summer tires. Commuters at transit stops shiver in disbelief as their light clothing is pierced by wind and sleet. Leaf covered lawns and unready gardens are smothered by snow, leaving a considerable mess come spring. In short, a significant sector of the population acts as if they never expected winter to come, especially not the day it does.

This denial of seasonal reality fits squarely in with a perception that winter is a dark period and if we act like it won't come, maybe it won't. Of course, this is based on a bias that the warm existence is the preferred one. In fact, the bulk of many peoples preparation for winter is putting away enough money so that they can temporarily escape it once it comes.

"The art of anticipation is the art of living." This phrase could well be the motto of the winter city. In order to be truly prepared, you have to know what you are preparing for. This requires a knowledge of our surroundings and how we interact with them. It also demands that we look at worst case scenarios straight in the eye and develop contingencies to meet them. In short, in order to deal with the future we need to custom design our plans to effectively deal with the realities of our specific situations. The application of temperate climate blanket solutions is bad planning and inevitably proves to be inadequate.

By looking at cold climate living on an individual level we can get an idea of the types of measures it would take to increase the quality of life in winter cities. What would it take for your winter to be an enjoyable one? You would probably want your home to be comfortable, efficient and inviting. The commute to work would be one without icy streets, slippery sidewalks or long exposure to harsh weather. The municipal surroundings would be safe, inviting and alive with seasonal activity. For the weekends there would be ample recreation opportunities, special winter events and social gatherings.

Now what if you were handicapped or elderly or a child? What would make your winter better?

The questions and answers seem straightforward, yet accross the board, common sense planning for winter is the exception. The reason is that it is far easier to do what has already been done. Need to build a house, a prefabricated unit from California is readily available. Designing a sewer system, why not just base it on a southern model that has been used thousands of times before.

Providing for the intricacies of multi-seasonality makes all planning, from car upkeep to city maintenance, infinitely more challenging. However, this is a challenge we must strive to meet if we wish to live our northern lives to their fullest.

Success takes far more effort than mediocracy. Do something right and people expect you to be effective at more things, and then there is the matter of sustaining what you have done in the first place.

Successful planning will superficially mean more work, but take into account rectifying the mistakes of the past and in the long run it is the only route to follow.

Harold Hanen and Greg Liburd are editors of Winter Cities

Winter Poses Real Headache

Mark Lowey

FEELING UNDER THE weather? You may be "weather sensitive."

Between 20 to 30 per cent of the population may be significantly affected by short–term weather shifts, seasonal changes and other climatic conditions, latest research on weather and health indicates.

Women appear more affected by weather in general than men. And if you suffer migraine headaches, weather gives you more of a pain in the start of the work week than on the weekend. Hangovers excluded.

Those are a few highlights of more than 200 scientific papers and posters, presented at the 18th International Congress of Biometeorology in Calgary. About 260 delegates attended the recent conference

The event was held under the auspices of the International Society of Biometeorology, formed in 1956 to bridge the gap between meteorology (study of weather and climate) and all fields of biology.

More awareness about the weather's impact on health could save Canada a half–billion dollars a year in health–care costs, says Environment Canada meteorologist Denis Bourque.

That's the saving if "weather–wise" doctors, realizing their patients' symptoms are weather–related, wrote just one fewer $20 drug prescription or ordered one fewer blood test for each Canadian per year, he said.

"There is great gain to be achieved simply by introducing the concept into medical schools," said Bourque, head of the director general's office in Environment Canada's atmospheric research section in Ottawa.

But few Canadian doctors area aware of some 50 years' of scientific research on weather's contribution to health problems such as heart attacks and kidney ailments. Bourque said in a joint presentation with physician Dr. John Bart.

Bourque said there's a need for a physician–awareness program, to educate family doctors about weather's impact on health.

The chinook, whose warm wind 'eats' the winter's snow, may play havoc with some women's lives, a study by the University of Calgary's community health sciences department found.

Co–researchers Marja Verhoef and Sarah Rose examined responses by 6,252 women who answered a questionnaire on health status as part of a 2985–86 study. They compared responses with chinooks over 12 consecutive months.

For chinooks in the winter (November through February), more women said they were unable to carry out their usual daily activities on the day preceding the chinook, the day of the chinook and the day after, compared with non–chinook days.

On chinook days, 16 per cent reported being unable to carry out daily activities, compared with only 7.4 per cent on non–chinook days. No significant differences were found with chinooks in the spring and fall.

More women also reported visiting a health professional, and experiencing illness, on pre–chinook days.

Also, more women took prescription drugs on chinook days, compared with non–chinook days.

A group of women under age 35, and who reported experiencing chronic health problems, suffered the most from chinooks.

But – in a finding contradicting that in some other studies – the U of C study found the chinook appears to have a beneficial effect on women with recurring migraine headaches.

"The link between weather and headache is very, very old in science," going back to reports by Hippocrates in 400 B.C. in ancient Greece. Environment Canada researcher Abdel Maarouf said in a separate presentation.

In a recent study in Ontario, Maarouf looked at 11 years of emergency admissions due to migraine serious enough to keep the patient in hospital at least a day.

Seasons appear to influence migraine, with the highest rate of hospital admissions occurring in August, September, and October. The lowest rate occurs in December.

But – in a finding that doesn't appear weather related – migraine admissions are highest on Monday, Tuesday and Wednesday, and lowest on the weekend.

People suffered migraines during all kinds of weather, although women were more affected than men, Maarouf found.

An Austrian study of 18 elementary school children also found the girls felt weather–related symptoms more intensely than the boys.

However, a study by the University of Calgary geography professor Lawrence Mkemdirim found suicides and attempted suicides were significantly higher for males than females during a chinook.

Mark Lowey writes for the Calgary Herald

Meteorologists

say that weather smarts could reduce health costs by

a half–billion dollars

PREPARING FOR WINTER

Getting Calgary Ready

Patricia Anne Reid

HIBERNATION IS NOT an option for the human race, consequently, most of us are forced to look winter squarely in the eye and prepare accordingly. High on the list of things that need doing before the cold weather comes, is the car; its well–being after all, is closely linked to our own. We might simply try and winterise it ourselves, or ship it off to a mechanic to do the job for us. We also attend to our personal needs by digging out toques, gloves, ski jackets and thermal underwear and check our home furnace and filters to make sure that all is as it should be. We prepare the garden for its annual period of rest and replace the screen doors with something a bit more substantive.

Plan ahead and organize that is what we do. Especially if we are responsible for looking after our family's winter comfort, safety and entertainment. On a grander scale, imagine for a moment having to make winter preparations for an extended family - of nearly a million relatives. We would naturally have to be highly organized, efficient and definitely plan ahead. That is, in effect, what municipalities must do every year. They have to ensure that the countless gears of the city machine remain well oiled and in perfect running order once the snow starts to fly. If not they will have a very unhappy family to deal with.

Calgary, Alberta in Canada is a winter city and has to prepare accordingly. By examining two areas, transit and the zoo, we can gain a greater understanding of what it involves to ready an entire municipality for winter.

City Transit have everything down to a fine art. They understand the importance of winter preparedness. They have to. They are responsible for lives, not to mention schedules and Calgary with its fluctuating winter temperatures, quick thaws and unexpected snow storms, provides a special challenge. Winter preparedness for City Transit is in fact an industry all on its own. Much of that industry focuses around the City Transit Department, which includes the Light Rail Transit (LRT), buses and roads. LRT maintenance alone, involves the checking of track turnout switches, track and track–beds, platform and signals. Then there are buses to winterise, roads and sidewalks to clear, sanding materials to organize and manpower to rain and coordinate.

But back to the LRT. As well as the ins and outs of track care, the track right–of–way electrical functioning must be monitored and check–ups arranged to ensure that metal wheels do in fact hit metal rails. Frost heaves in the track bed are evened out on a continual basis and flange–ways (recessions alongside the rail) must be cleared after every snow fall. Other important winter safety features that requires monitoring are 60 built–in gas fired hot air blowers placed at points where automated switches moves the tracks to allow trains to change direction.

Track maintenance vehicles are another aspect of track care. Amongst these are large ploughing trucks which run on the track to clear away heavy snowfalls and a street grader used on the in–road track system as well as a "track groover" which cleans the track flange–ways after they are graded. "Track maintenance is done at night," points out City Track Systems Manager. Tim Ogle, "while the city sleeps."

Equally important but less harrowing is bus maintenance. Rudy Witt, of The City of Calgary's bus maintenance department says preparations for winter starts in October with a "campaign to thoroughly check out each bus to ensure heater, engine, hoses etc. are in great shape." and that each vehicle is thoroughly winterised.

Then there is the manpower that operates the system. A winter contingent of around 300 people trained in operating equipment for snow and ice control is available on an 'on call basis'. On call, because, as City of Calgary Road Engineer, Peter Enns says, "We don't want staff to sit and wait for snow in Calgary because we don't get much." Unlike Toronto where, according to Peter, maintenance crew actually sit in camps 24 hours a day waiting for the snow to come. Peter adds, "we have minimum manpower. If we need it we bring it in." Peter says the pre–winter season activity road schedule begins as early as June with an equipment check. Later, in September and October, quantities of sand are bought and mix of sand/salt made.

The sand used on Calgary streets is manufactured from crushed rock and reduced to sand size. This type of sand is preferred to real sand because it is less porous therefore safer. While real sand is porous enough to absorb and retain six or seven percent moisture, rock sand retains only about one percent. Using the real thing, Peter says, "Would be like throwing ball bearings on the ground because it would be moist and frozen."

Rock sand also has an angular shape, gives better traction and is manufactured in Calgary. The sand is then mixed with five percent salt which ensures it staying around on the road longer than it would be if used alone. Using sand alone would be waste says Peter. He quotes a recent Swedish study which showed that a full seventy percent would be blow off with the first pass of a vehicle travelling at 60 km an hour. Five passing vehicles would remove all the sand. He adds that if sand alone were put on Deerfoot trail (a major six lane highway), the cost of continually replacing it would be in the hundred million dollar range. Safety is a major concern when it comes to looking after Deerfoot Trail. Calcium chloride treated sand is used in this case because it is more effective at low temperatures. Yet there is a price for safety. Rock sand

is about $12.00 a ton while real sand is around the $5.00 mark. But a price worth paying when it comes to helping Calgarians commute safely.

One place Calgarians and visitors can commute to, courtesy of City Transit, is the Calgary Zoo Botanical Garden and Prehistoric Park. There, staff are just as concerned about being prepared for winter season as City Transit. Objectives are different at the zoo of course, but with numerous animals and indoor gardens to care for as well as winter visitors to entering advance preparations are part of their game plan also.

Although the zoo does not close for winter, it swings into its winter mood fully aware that many people think it does. The zoo does its best in advance of winter to let people know that is anything but closed and that the animals are just as interesting in winter, if not more. The indoor botanical gardens, nurtured throughout the year are equally worth a visit, not to mention theactivities. "We plan events and activities for throughout the shoulder season and into winter." says Patty Richards, the Calgary Zoo Advertising & Promotions Coordinator. The zoo makes a big effort to convey this through as the zoo's own "Dinny's Digest" a quarterly publication available to members. Through these channels, the zoo stresses what happens at the zoo at all times of the year and how fascinating the animals are in winter time. Animals such as the snow leopards, tigers and polar bears become a lot more active in winter time. Gardening enthusiasts will find that the zoo's indoor gardens well worth visiting. The gardens are attended to by a full time gardening staff who plan well in advance so that seasonal plants are always in bloom. Poinsettias of course are part of the zoo's Christmas scene as are lilies at Easter.

Fall is the time when the office staff organizes such winter events as the two day Halloween event on october 30 and 31st and a "Don't Bungle The Jungle" event for January which celebrates the rainforest, underscoring the message that all life systems are dependent on one another. With one exception, the Calgary's zoo's Dinosaur park. The zoo is busy broadcasting the news that they have now paved the majority of the park so that the dinosaur and reptilian gang can be seen in the winter covered in frost. Something that is now believed to have actually happened as the weather cooled 50 million years ago. Too bad the dinosaurs could not plan ahead so that they might survive those ice age years.

Patricia Anne Reid is a Calgary based freelance writer

Designing for Cold Climate

Erik Hedegaard

AS ENGINEERS, WE HAVE a responsibility to always ensure the maximum benefit and safety to the public, but when taking on the responsibility for design and construction for small remote settlements in the north, we have a very special responsibility to understand and take into consideration the unique circumstances prevailing. The safety, effectiveness, well being and comfort of people depends on that we do a good job. Failure on our part may have very dire consequences on people.

Nature is very unforgiving in the north and what may amount only to a small inconvenience in the south may mean total disaster in the north. This really came home to me many years ago when I travelled in a rental car from Edzo to Yellowknife – a distance of about 80 km. It was at night, the temperature was about 40°C below and not another car on the road. I started having gasoline problems and was dressed in an ordinary winter coat and shoes, no hat. Fortunately for me there was an arctic sleeping bag and a can of gasoline de–icer in the car and I make it back to Yellowknife safely. I will never forget that episode, because somebody had the foresight to provide these simple provisions may have saved my life. Ever since, I have felt a special responsibility to carefully consider the little things that may go wrong and have serious consequences to it, in particular in the remote north.

The severe cold is not the only problem to overcome in the north. The sun shining at a low angle 24 hours/day may not be a life threatening situation, but it can make it very uncomfortable occupying a building where this has not been taken into consideration in the design. Besides climatic problems of the north, there are many problems related to permafrost, utilities, communications and availability of supplies and expert services. Not the least of the problems relate to lack of people with experience to operate and maintain mechanical and electrical systems.

Settlements with modern conveniences have breakdowns and when they occur, individuals and communities may have problems they cannot easily cope with. Schools, hospitals and community related buildings may have to be used for emergencies of the community. There are people related problems in the way facilities are used.

I hope I have alerted you to problems and perils of the north which you will keep in mind as you design and construct in that area.

The nature of permafrost and the problems related to building foundations and the delivery of utilities is not within my expertise, but if you do mechanical engineering for buildings in the north you cannot afford to be ignorant of the problems encountered as it relates to these issues.

A typical building on permafrost will be constructed on piles anchored into the permafrost supporting a building elevated 1 to 1.3m above ground. This allows air to circulate freely under the building and the ground to freeze during winter. There is a crawl space below the main floor where ducts and pipes may be installed.

Some buildings are self–contained in that there is no piped heating, water or sewer utilities available and water is hauled in and sewer and waste is hauled away. In many cases, utilities such as sewer and water is available and sometimes also a source of heating supply is available. Each situation has its own unique problem and solutions with which you must become familiar. There are two primary methods of delivering piped utilities to individual buildings:

. above ground utilidors

. buried pipelines

Several variations of these exist such as frost boxes and shallowpipes within the active layer or deep pipes below the active layer. The active layer is the upper layer of the ground that will thaw during the summer.

In the case of utilidors, it is a fairly simple situation of connecting the utilidor to the building crawl space and ensure that circulation is maintained in the piping or otherwise kept warm. Where piped utilities are buried in the ground, complications relate to the manner in which you connect the buried pipe to the crawl space, maintain circulation, prevent water from doing damage and make allowance for expansion, contraction and building settlement. As the active layer consists mostly of water, this can be a real problem to contend with.

If you provide a vertical shaft, how do you prevent it from filling with water? How do you support the shaft from the building or from deep in the permafrost? How do you prevent heat from the shaft melting the permafrost deep into the ground?

Permafrost of this nature is not everywhere and where the ground is solid and dry, you have less problems. However, it is common to have recirculation lines on water supply lines to buildings in the north.

To maintain circulation you probably will require pumps and you have to consider what to do if there is a power interruption or pump failure. How long will it be before the pipes will freeze? How long could a failure last? Should an alarm be provided? Other things can happen – we had a operator accidentally shut off the pump when leaving at night and did we ever have a problem the next day – this is about 6 years ago and still in litigation.

For ordinary houses, it is common to use oil–fired furnaces or hot water heating where, in some cases, the primary source is from a central heating plant. Houses being built in the north today generally are well insulated and very airtight. As a result, special considerations must be given to the provision of

outside air. It is expensive to heat outside air and special energy conserving devices have been employed from time to time, not all have been totally successful so if you use them make sure the product and the application is right.

Special attention must be paid to the dangers associated with fuel oil and carbon monoxide generated by the boiler or furnace. Combustion air supply and venting is important to consider carefully. As houses are built by very light materials, they cool off quickly if there is interruption to the operation of heating systems. Make sure that systems can be drained or otherwise protected against severe damage due to freeze–up.

Plumbing – there are many options depending on the availability of water and disposal systems. There is everything from bucket type toilets, incinerating, chemical and freezing toilets to holding tanks and vacuum systems to consider.

Fire Protection is a serious issue not to take lightly.

While maintenance is a problem, the minimum is to provide effective smoke detectors and fire extinguishers.

Everything I have mentioned here also applies to commercial and institutional installations.

If you are heating outside air, give serious consideration to the use of glycol in your heating system. Make sure it is non–toxic and, in any event, do not have any connection to your portable water system. Do not have fixed air connections from the controls compressed air system to your expansion tank–one day you will have a flooded control system. Do not use rooftop air handling systems unless you have a score to settle with the operator.

Remember that trickle circulation wastes a lot of water and may cause sewer freeze–up. Plastic pipe has a high expansion coefficient, is not suitable for electric resistance thawing and could develop toxic fumes in case of fire.

You need to keep your designs very simple, easy to understand, easy to operate, easy to maintain, easy to obtain parts and service and easy to improvise if necessary. Make your control systems very simple if you can and make sure you have provisions for manual back–up. Where it can be justified, provide equipment backup such as dual boilers and pumps to at least maintain partial service. Many people in the north are very practical and very innovative, but lack experience with sophisticated and complex mechanical and electrical installations. Also fuel, parts and services are expensive and sometimes difficult to obtain in an emergency.

Finally, I want to address the issue of quality construction.

It is difficult to achieve quality construction in our own backyard and to get deficiencies corrected is an ordeal. In the north, this can be a very real problem that may not be easy to overcome. Surely the solution starts with well designed systems, clear and precise drawings and specifications and fair and frequent inspections. Unfortunately, when you deal with government agencies, it is difficult to get the recognition that normal engineering terms and fees and the normal tendering conditions are inadequate to ensure quality completion.

It may cost considerably more to hold the engineers and specialist contractors at the site up to the time every last deficiency is cleaned up and systems operation fully proven, but to allow key personnel to leave the job earlier has a different penalty to it that may prove to be even more costly.

Engineers have much to offer the owners and contractors to ensure maximum quality and effectiveness on a win–win basis. However, the standard terms, conditions and fees for engagement of engineers are such that these advantages cannot be utilized.

I have only been able to scratch the surface of some problems you may encounter and solutions you may consider. I have stressed the seriousness with which you should approach design and construction for the north and how you should make it your business to really understand the circumstances under which systems are installed, operated and used.

I do not profess to know everything about mechanical systems for cold climates. There are many people in the design and the construction industry with experiences and knowledge to share.

Commercial & Institutional Concerns

1. Buildings such as schools, community buildings and hospitals may function as emergency shelters and we should do what we can to ensure these facilities will operate when everything else fails.

2. The low sun angle and long days of summer can cause a higher cooling load in the buildings than experienced in the south and if no cooling is provided, the facility may be very inefficient for several months in the summer. However, you may find people thinking it is a joke when you suggest refrigerated cooling. It is not a joke; it is a serious necessity in many buildings in the north.

3. Watch out for points of exhaust from buildings, in particular, where moist air is being exhausted. Condensation will occur in ducts and fan housings and, in the winter, ice maybuild up in equipment if shut down for the night and unable to start in the morning. Ice may accumulate on roofs and adjacent walls – we coated one building with 4" of ice from the ground the roof of a 3–storey building on one occasion.

The Traditional Rural House

Cold Region Building in Northern China

Teng Yunjiu

The provinces of North-East China and Innermongolia are located at 42–56 northern latitudes and their heating period (when the mean temperature is lower than –5°C) lasts up to six months. In order to guard against cold attack, many measures have been historically taken in rural house construction. These lessons are significant in energy conservation for heating houses, especially today while the energy crises exists all over the world. Significant economic benefits will be realised if these ideas can be applied to architectural design today.

SOUTH FACING VILLAGE AND CLOSED YARD

IT IS VERY IMPORTANT to choose a suitable location for a village in cold northern areas. In general, villages are facing south or southeast, which is about the same direction of meridian line of geomagnifism for plain, hilly and mountain areas to get more ultraviolet rays from 8 AM to 10 AM. Since it is warmer on south facing hillsides (temperature differential versus a north facing slope can reach 10°C) and cold winds attack from Siberia; antiwind forests are arranged arround communities so that warmer microclimate conditions can be obtained during cold winter.

It is extremely cold in January in northern part of China, (i.e. mean temperatures in Harbin are below –20c and in Hai–lar–er below -24°C) so measures besides village orientation have to be implemented. Closed and semi–closed yards are formed naturally on a relative small bases (about 250–350m sq.) which are fenced by clay brick, adobe, rubble.

CENTRAL FORE WALL AND FIRE BED

THE SHAPE OF THE TRADITIONAL rural house in China is simple. The essential unit forming a house is called "JIAN" about 3.6m wide, 5.4m deep and 2.4–2.7m high. There are houses with two, three, four or more "JIAN's" according to it's scale. In semi–closed yard composition there are three houses. The one seated on the higher base is facing south while the houses facing east and west are often used as workshops or warehouses.

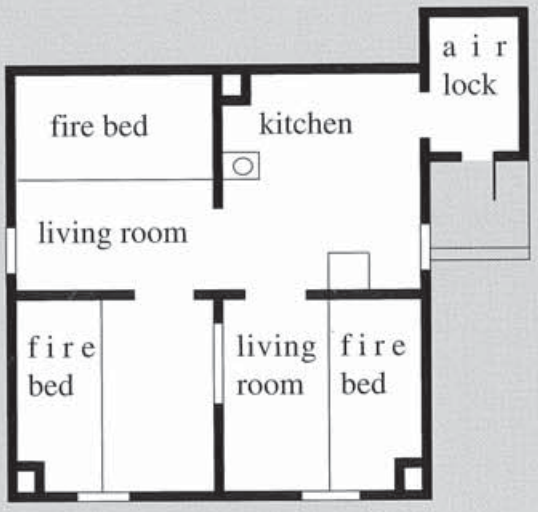
The Ffre wall and fire bed are two special traditional equipments for heating the house by smoke flow. They are hollowed wall structures formed by standard red clay brick. Fire beds fall into various categories: longitudinal tunnel fire beds, perpendicular tunnel fire beds and some other mixed types. The mixed type fire bed, often used by Koreans living in North–East China, has the advantages of even temperature distribution and little temperature difference between both ends.

Investigations have indicated that it is best to put the fire walls and fire beds at the middle of a house to even the room temperature. The figure shows some examples of house heated by fire wall and beds. Fire beds are always arranged at the south side and middle of a room, while the north fire bed are seldom today.

SOUTH FACING BIG WINDOWS

IT HAS BEEN A TRADITION that the window facing south is always large while the north facing one is small. This approach is not only to save electricity for illumination but also mainly to absorb more sunlight. This kind of direct gain solar system has higher thermal efficiency and lower capital costs than indirect gain passive solar systems such as conservatories, Trome walls, roof space collector and others. Eighty five pecent of the solar energy is converted into heat as it is absorbed by walls, floor and ceilings in daytime and released by surfaces within the room space at night to regulate the room temperature.

The bigger the window area the more release of heat at night, so people often use shutters,



Floor plan of Mongorin minority house in Hu luen pen er

Floor plan of minority "Man" in Hei-He region

grass mat blinds, plastic films, etc. to enclose windows outside at night. It has been measured that 15951 kj of heat will be obtained per every square metre of window.

COLD PROOFING CORRIDORS AND AIRLOCKS

FOR PREVENTING COLD WIND attacks a cold proofing corridor adjacent the inside northern wall and airlock just outside the northern entrance is provided for traditional rural house.

The floor space of each airlock is different from each other. The entrance door is often east facing. In general, an airlock contains 3–10m sq. floor space which functions as a traffic space and provides an area for the storage of shoes, suits, umbrellas, etc. In addition, it is used as sometimes used a hall.

A cold proofing corridor is a popular design approach to ensure that all the main rooms can be oriented south. In fact, north facing corridors can be an insulating air layer between living rooms and the outside. A 1.3–1.5m wide corridor gives the north wall of living rooms additional thermal resistance. Investigation shows that the living room temperature is higher than that of cold proofing corridor by about 2–3°C.

The corridor functions commonly as a storage area for grains and vegetables as well as providing drying space. It is also constructed so that the space can be used as a staircase when the house continues to be built.

WALL INSULATING DETAIL USING INDIGENOUS BUILDING MATERIALS

THE SURFACE AREAS OF the enclosed structure of a one or two storey traditional rural house are proportioned approximately as follows: Walls–50%, roof–22%, groundfloor–18%, doors and windows–10%. Heat loss of walls is greater than that of other elements. Calculation has been carried out that heat loss of external walls is between 51.8–68%. The main reason is because brick walls, with thicknesses of 270mm, have low thermal resistance values. It is necessary to improve insulating performance of walls in order to save fuel. It was proposed by Heilongjiang Environment and Hygiene control station that the indoor temperature in rural house can be 16°C, which is 2°C lower than that of urban house.

In order to save brick fuels and energy for heating, it is recommended that some improved wall types like brick with air layers, composite, volcano ask brick, brick with kaoliang stalk, adobe with brick on outer surface and other energy saving walls should be introduced into practical constructions.

Teng Yunjiu is an Associate Professor at the Harbin Architectural and Civil Engineering Institute.

Mineral Fibre Insulations

Recent tests show that it is the poorer rebound characteristics of low–density U.S. batts that can affect their performance

John W. Archer

Architects are sometimes asked if it would be acceptable to substitute lower–cost, lower–density mineral fibre insulation (MFI) batts for those they have specified. Although equivalent R–values for the batts may be stated on the packaging, many architects question whether they will perform. The concern is that lower–density batts are susceptible to convective heat losses.

Convective heat loss occurs when air moved around insulation from the warm to the cold side and back again. This "loop" of performance of an insulated wall. It is like leaving a window open on the ground and second floors of your house in winter. it doesn't much matter if you have a R60 wall.

Can these convective loops occur inside mineral fibre insulation (MFI) when the temperature differences across the batt are high enough and the density of the glass fibre is low enough? What effect can small gaps in the insulation have? Recent work at the National Research Council's institute for Research in Construction (IRC) sheds a light on these questions. The results were published this year in an IRC/NRC research paper. "Measured Thermal Resistance of Frame Walls and Defects in the Installation of Mineral Fibre Insulation," by W.C. Brown, M.T. Bomberg, J.M. Ullett and J. Rasmussen.

"Friction fit" MFI products became available in Canada in the 1970s and quickly replaced the paper–backed batts then in use. These batts were made in sizes to fill the cavity, but slightly oversized so as to be held in place by friction.

Advances in the manufacturing process soon reduced the size of their fibres. Batts with densities of almost half those of the early 1970s are now being made.

These new products retain almost the same thermal performance when measured by standard laboratory tests. However, density batts would not perform as well in actual use. The fear was they would be prone to convective heat losses. Anecdotal evidence supporting this came from a variety of sources showing poor field performance of low–density MFI batts.

In response to the early concerns, Canadian manufacturers modified their product to make it less prone to convective effects. Basically, the structure of the batt was changed to decrease air permeability. The Canadian standard for loose–fill MFI was also amended to require a minimum level of thermal resistivity. The effect of these two actions as that a minimum density for MFI products was set in Canada. American manufacturers and standards did not follow suit and continue to produce lower–density MFI batts.

The building industry in Canada has access to both Canadian and U.S. products, as well as higher density batts made from rock wool. The density difference between the three is quite noticeable. But is the difference important? Do they deliver their rated thermal performance when installed in a "real life" environment?

To find out, the IRC research began by examining MFI insulated cavity walls built according to good practice. A series of stud cavities were built, each with different densities of MFI. One was a low–density American product, one was a standard Canadian product, and the third was a higher density rock–wood

product. After being closed in, the walls were subjected to temperature regimes typical of the difference between the inside and the outside of a building on mild and on more severe winter days.

The results indicated that the wall assemblies perform as their ratings and as standard calculation theory predict. No convective heat loops were detected, even in the lowest–density MFI at the lowest temperature (–35C). Architects can, therefore, have reasonable confidence in the stated R values for the different MFI densities.

If density is not an issue, when else might be affecting low–density batts and causing the reports of poorer thermal performance in the field? The researchers hypothesizes that it might be installation defects, in part because of the difficulty they had experienced in installing the low density MFI batts. These batts did not have good rebound characteristics and it was difficult to make sure that the batt was completely in contact with the sheathing before the cavity was closed.

The impact of major installation defects on the thermal performance of MFI batts is well known. If, however, you can ensure that one side of the batt is flush with an air barrier, thermal performance is dramatically improved. It is this effect that is reflected in the National Building Code requirement that batt insulation products he installed so that at least one full face is in full and continuous contact with the cladding, sheathing or other air–impermeable membrane.

Canadian MFI manufacturers have developed their product to achieve this full contact by giving a strong rebound characteristic to the batts. But there are other challenges to using this material on site. Installers must deal with non–standard cavity sizes, warped studs, blocking, pipes and electrical boxes. Each cut made in the insulation to accommodate these irregularities creates the chance of a gap occurring between the batt and the air barrier.

Studies of gap size and location show that it takes about a 4–5 mm horizontal gap (less than the thickness of a pencil) to initiate convective air flow from one side of the cavity to the other. But it only takes a 1 mm gap to start convective air flow if the gap runs vertically. These kinds of gaps can occur if the MFI batt has been tucked in along the edge of the wall stud and has not fully rebounded.

The IRC researchers rebuilt the test cavities to look at this type of defect. A small triangular–shaped gap was created to run up and down along the stud on both sides of the cavity. In the first series of tests the gap made up about 3% of the total volume of the cavity. A second series tested a gap of about 6%. Each series was repeated with the three different density MFI products. The results showed that the thermal resistance of the cavity was reduced in all the cases studied. Small gaps of 3%, with a temperature difference typical of a mild winter day (+20 C inside and –5 C outside) showed a total thermal resistance drop ranging from 2% to 5%. When the gap was 6% of the cavity and the temperature difference was high, typical of a cold Canadian winter day (+20 C inside, –35 C outside)k the loss of thermal resistance ranged from 20% to 36%. The lower–density batts performed the worst.

In the cold Canadian climate, therefore, installation defects, particularly when combined with lower–density batts, can be a large contributor to poor wall thermal performance. Architects need to be aware of the importance of good workmanship in batt installation and factors that may have affected the rebound characteristics of the batt.

John W. Archer is a senior advisor in the Industry Liaison Branch of the National Research Council's Institute for Research In Construction.

Batting Practice

A few tips to maximize insulation's efficiency

• Has the batt been stored in a compressed condition for a longer period of time? This can also affect rebound characteristics.

• Has the batt become wet or been exposed to high humidity levels (such as can happen if the bag has been punctured)? This can also affect rebound characteristics.

• Do the wood studs used in the cavity walls conform to the National Building Code requirement for moisture content (19% at the time of installation)? If not they can warp and cup, affecting the fit of the batts.

• Does the insulation product meet Canadian standards? Products manufactured for the American climate and needs may not serve as well.

• Has care gone into fitting the batts to irregular conditions? Gaps can significantly reduce thermal performance.

• Remember the National Building Code requirement that batt insulation has at least one side in full contact with an air barrier.

Equal and Different

Alaska's Native Peoples

Alaska Natives view their situation as somewhat different from Aboriginal peoples of the "lower 48" states and see themselves as sharing many common concerns with other indigenous minorities in the circumpolar north. They participated in the process that led in 1971 to the adoption by the United States Congress of the Alaska Native Claims Settlement Act (ANCSA) which may regard to be the first "modern–day treaty" anywhere in the circumpolar north between a national government and Aboriginal inhabitants. Today, however, there is considerable concern that many ANCSA benefits could disappear.

Alaska Natives (defined in official records as Aleut, Eskimo and Indians) are dispersed across Alaska occupying geographically and climatically distinct regions. The 1990 census enumerated 85,698 Native residents – a significant increase from 64,103 in 1980. The percentage of natives in the overall population, however, decreased from 16.0 percent in 1980 to 15.6 percent in 1990 due to the migration into the State of non–Natives.

The United States acquired Alaska from Imperial Russian in 1867. Commercial fishing, the discovery of gold around the turn of the century and U.S. homestead laws subsequently brought many settlers to Alaska. With World War II, Alaska acquired a strategic defense position for the Pacific and later the Arctic; several military bAses were built. Many of Alaska's Native peoples moved to urban centres for employment.

In adopting the Alaska Statehood Act in 1958, the United States Congress authorized Alaska to select and obtain title to some 103 million acres from "public lands of the United States which are vacant, unappropriated, and unreserved"; the question of Aboriginal land title was largely ignored. As the state began to select its lands, it was challenged by various Alaska Native groups as to what constituted "vacant lands". The discovery of oil in Trudhoe Bay and a proposal to build a trans–Alaska pipeline further stimulated the impetus for settling Native land claims.

ANCSA was, in 1971, an unprecedented initiative to provide Alaska Natives with opportunities to establish themselves within modern American society. It was vastly different from earlier Indian treaties concluded by the United States government and preceded comprehensive claims agreements in Canada.

ANCSA extinguished all claims of Aboriginal title by the Indians, Aleut and Inuit living in Alaska who received a total cash settlement of $962.5 million and title, including both surface and subsurface, to 40 million acres of land (almost 1/9th of the total acreage of Alaska). The ANCSA legislation provided for the creation of 12 state–chartered, profit–oriented regional corporations and of more than 200 Native village corporations as the main mechanisms for implementing ANCSA. All Alaska Natives living at the time of the enactment could be enroled. Each would receive 100 shares in a regional corporation and, if a village resident, an additional 100 shares in a village corpora-

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tion. It is these corporations that administer the lands that were conveyed to Native groups. Today, many who are recognized as Alaska Natives own no shares in ANCSA corporations. Only ANCSA shareholders can exercise control of ANCSA corporations.

ANCSA created a number of potentially serious problems. One issue that unites the many diverse Native peoples of Alaska is their desire to protect Aboriginal harvesting rights – what Alaskans term "subsistence harvesting". The original ANCSA legislation extinguished all Aboriginal harvesting rights in Alaska. More than 20 years later there is no new subsistence harvesting administrative regime in place acceptable to Alaska's Natives. Subsistence harvesting has been the subject of court challenges as well as today being a major source of aggravation in relations between the federal government and the state of Alaska.

Another major issue is the impact of the trading of stock in ANCSA corporations. Studies indicate that many Alaska Native shareholders are prepared to sell their stock when the trading restrictions expire. (The United States Congress has extended the moratorium on the trading of ANCSA shares until July 1993). After this date, ANCSA corporations are, presumably, vulnerable to takeovers by outside interests.

Socio–economic data compiled by the University of Alaska indicates that the Native peoples of Alaska have generally profited from ANCSA. Yet, despite the improvements to their situation, Natives continue to trail non–Natives by every measure of socio–economic status. Concern has also been expressed that many of the 20 identified Native languages of Alaska could soon disappear as a result of policies based on assimilation and neglect extending back over generations.