SAGATAGAN SEASONS
Saint John's OUTDOOR UNIVERSITY

Ice Harvest: A Frozen Heart Worth Mining

Ella Grote '18

From the frigid depths of Minnesota's most acclaimed season arose one crop that never seemed to fail—ice. For three to four days typically during the second week in January, a group of employed workmen armed with saws and steel tongs descended upon the frozen Lake Sagatagan to cut ice blocks that were to be stored for year-round use on the Saint John's campus. The ice was needed to keep meat and produce chilled in the nineteenth and early twentieth centuries before mechanical refrigeration became widespread.

When the Saint John's ice harvesting crew—monks and community members—gathered in January they faced a complex and sometimes dangerous challenge. First, the ice had to be scraped clear of snow and, when the surface was too rough to be cut, planed smooth. The workers drilled holes to measure the thickness of the ice, and then used a marker or groover to etch a grid of rectangles across the ice field. Next, the rectangular blocks of ice, often called "cakes," were chipped off and loaded onto wagons or sleighs for direct delivery to the bed of sawdust in the ice-house located on campus.

Saint John's harvested over 230 tons of ice during some of their more productive seasons. Each ice block averaged eighteen to twenty inches in thickness and the ice-house could hold around 1,400 blocks. George Klein, a lifelong Collegeville resident who lived to be over 100, was a hired handyman at Saint John' s for over sixty years. One of his many odd jobs in the community was helping with the ice harvest. He recalled how for three days they would do nothing but put up ice. It all had to be cut and packed by hand and was a major operation.

At that time Saint John's University also maintained a beef herd, which fluctuated from 50 to 150 animals depending on the intuition's needs. All of the beef raised was for the institution's own use and was slaughtered and stored in their own facilities. The cows and steers, known as "canners," were fattened and then processed in the local butcher shop, thus creating the demand for a facility on campus that could refrigerate the slaughtered meat. Before the luxury of machine refrigeration, ice was the usual preservation.

For much larger productions across the United States, harvesters broke off large sections of the grooved ice field using saws and other hand tools. Saw or plow followed these lines, cutting about two-thirds of the way into the ice. Workers guided these rafts of ice through a channel, where men broke the sheets into individual cakes and fed them up an elevator conveyor into an ice-house. There, workers arranged the ice cakes into layers for storage and later delivery. If the ice-house was located along the railway, as many were, blocks of

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February 1889. In the early days buildings had to be heated with wood burning stoves. Here huge quantities of cord wood are being sledded across a frozen Lake Sagatagan to provide heat for the campus community. Saint John's Abbey Archives.

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ice could be loaded directly into refrigerated rail cars.

The ice harvesting trade was developed by a New England businessman in 1806. For decades after the trade began to take off, rural communities in colder regions of the country harvested ice to keep certain foods from spoiling during the summer months. However large scale ice harvesting, which involved transport and sale of natural ice for domestic consumption and commercial purposes, didn't become popular until the 1830s. As American cities swelled in the nineteenth century, so did the demand for fresh meat, dairy products, fruits and vegetables and even beer. Before long, the local small-scale ice harvest grew into a major industry. Wherever ice on a pond, canal, lake or reservoir was thick enough, companies deployed teams of men, horses, and machines to harvest it for distribution across the United States.

Improved ice harvesting and storage techniques revolutionized the production methods and diets of the community at Saint John's and the rest of the United States. For the first time, meatpackers, dairies and produce growers could store goods during warmer months and ship their products across great distances. Brewers could regulate the temperature of their facilities to produce beer year-round. And restaurant owners, shopkeepers and home cooks could keep a variety of fresh ingredients on hand. Natural ice harvesting, storage and shipping processes became more efficient as innovative entrepreneurs and workers improvised new tools, machinery and systems.

Eventually the invention of the artificial ice machine put ice harvesting companies out of business. Today mechanical refrigeration has all but replaced natural ice – in our kitchens, at shops and restaurants and on ships, trains and trucks. We can expect fresh food and cool beverages year-round. But machines didn't shape those expectations. Americans grew dependent on refrigeration because of the nationwide network of natural ice distribution made possible through the hard work of ice harvesters.

ELLA GROTE is a sophomore psychology major and student naturalist at Outdoor U. Ella's favorite frozen treat is raspberry ice cream. Special thanks to Peggy Roske, CSB/SJU Archivist, for sharing stories and images.

Remember these ice safety guidelines from the Minnesota Department of Natural Resources:

2" or less - STAY OFF
4" - Activities on foot
5" - Snowmobile or ATV
8" - 12" - Car or small pickup
12" - 15" - Medium truck

Above: 1890s. Skating on Lake Sagatagan with the original Stella Maris Chapel in the background. Below: Date unknown. Ice Sailing. An early form of recreation on Lake Sagatagan. Students took hikes and enjoyed the woods, but it was the lake that fascinated them. SAINT JOHN'S ABBEY ARCHIVES.

An ice fisherman tests his patience on a frozen Lake Sagatagan. LEAH WALL.

The Cold Never Bothered Me Anyway

DANIEL BEYER '19

As the cold of winter approaches a plentiful amount of snow and ice inundate the land. Every patch of green in the Abbey Arboretum is transformed by a blanket of snow and cloaked in ice. Lake Sagatagan turns from an aquatic haven for summer recreation into the epicenter for many winter recreation opportunities centered upon the ice.

This will be my first winter at Saint John's and I am more than ready.

The natural surroundings of Lake Sagatagan are a picturesque setting to appreciate the beauty of winter. Taking a walk on the flat expanse of the lake ice allows one to witness a large portion of the Abbey Arboretum and Saint John's University. From the ice you may view the majestic Abbey Bell Banner and towering university buildings nestled among the rolling hills of the Abbey Arboretum. From the lofty hardwood forests to the low lying wetland communities around Lake Sagatagan, the onset of winter converts each setting into a new world.

New ice upon Lake Sagatagan allows individuals to ice skate in the crisp winter air. The rare opportunity to enjoy this layer of pure ice before snow cover is a celebration in and of itself. Gliding along the ice with finesse and ease, you may flow over the lake. With a little practice, the act of skating will become an art, a special tradition enjoyed each year when the lake encrusts with ice.

Folks may transform the familiar woodland walk to the Stella Maris Chapel into a unique, winter adventure by taking a shortcut across the ice by foot, skate, ski or snowshoe. You may witness the stunning beauty of the chapel against the backdrop of winter. The beautiful stained-glass windows and the stucco of the chapel gain a new pristine aura.

For the sportsman the ice creates a new opportunity to attempt to land the big catch. The challenge of ice fishing doesn't require the skill of angling so much as the skill of patience. The thrill of waiting until the fish appears through the hole in the ice invigorates the spirits of fishermen on cold winter days. Lake Sagatagan is home to bass, bullheads, pikes and pan fish. If the fish are not cooperating and you go home empty handed after a long day on the ice, a day on Lake Sagatagan is still a day well spent (even in winter).

Above the ice a fresh layer of snow offers alternative options for winter recreation. Recall the childhood joys that came with building a snowman: cautiously rolling each snowball, careful to craft the perfect shape and size; stacking the pieces together to form the essence of the figure. Afterwards, the precise finishing touches bringing the snowman to life.

Ice and snow invite you to walk the Boardwalk Loop in winter. EMILY FRANKLIN.

A snowball fight is bound to erupt during any outdoor winter adventure. Avoiding snowballs traveling through the air, while simultaneously sending back some of your own are the only goals. Often there is no clear victor, but all participants enjoy their time and depart with fond winter memories. In other words, everybody wins.

A winter landscape alters our perception of the surrounding environment. Yet the true beauty of winter manifests itself at night. A clear and moonless winter sky is brighter than any others. The stars are brilliant and the night sky seems to dip towards the Earth. The planets jump off the canvas of night and all the heavens appear to be within reach.

When a winter night displays a bright and brilliant moon the entire ground glimmers in its glow. The lake and rolling hills light up as if bathed in sunlight, presenting an eerie yet oddly calming sensation to all who venture out into the night. Few will take advantage of the magic of the moon in this coldest of seasons.

Many may dread the onset of winter each year. You can fear or otherwise try to hide from the magic of snow and ice. Or you can let it go and be at home with the chill. Besides, the cold never bothered me anyway.

DANIEL BEYER is a first year environmental studies major and student office assistant at Outdoor U. While others may spend this winter dreaming of spring, you will find Dan out in the Abbey Arboretum, exploring the magic of our winter world.

Frozen Fractals: A Lesson in Winter Limnology

Natalie Stoneburner '16

Frozen fractals of ice begin to form in moving water. Outdoor U Staff.

As we prepare for the ice cover and cold with our yearly traditions, the lakes we so treasure in Minnesota are preparing in their own ways. Under their surface, lakes undergo dramatic but predictable changes between fall and the winter freeze, changes that are often missed while we are busy with our own winter preparations.

Summer

Lakes that are deep enough spend their summers stratified, or in layers. When lakes are stratified during the summer and early fall, this temperature gradient is stable because of the density of the different temperatures of water. Water is at its maximum density at 4ºC. Any warmer than 4ºC and the H_2O molecules are moving more quickly, spreading themselves out and becoming progressively less dense until the boiling point—100ºC. Water in the deepest parts of the lake is coldest and densest and warmer, less dense water sits on top. The deepest, coldest, densest part of the lake is called the *hypolimnion*. The warmer, less dense water sitting on top is the *epilimnion*. Sandwiched between the two is the *thermocline*, which represents the depth where the temperature change is the steepest, separating the hypolimnion from the epilimnion.

Within a lake mixing occurs in two main ways. The first is as an effect of wind. As wind blows across the surface it pushes and pulls water with it, mixing the epilimnion on a small scale. The second way water can be mixed, on a much larger scale, is through *lake turnover*. Lake turnover occurs when the temperature of the hypolimnion and the epilimnion become close enough that the different densities of the two are no longer large enough to keep them separated. Without the harsh stratification that exists in summer, the water in the epilimnion and hypolimnion are able to mix completely.

Autumn

In the fall as the days shorten and the air gets colder, the water on the surface of the lake cools. Fall winds mix the new cold water throughout the epilimnion, cooling the entire upper portion of the lake. As the epilimnion gets colder it also thickens, pushing the thermocline deeper. Eventually, the epilimnion will be so cool that the temperature (and thus density) difference between the epilimnion and hypolimnion will no longer be strong enough to resist mixing.

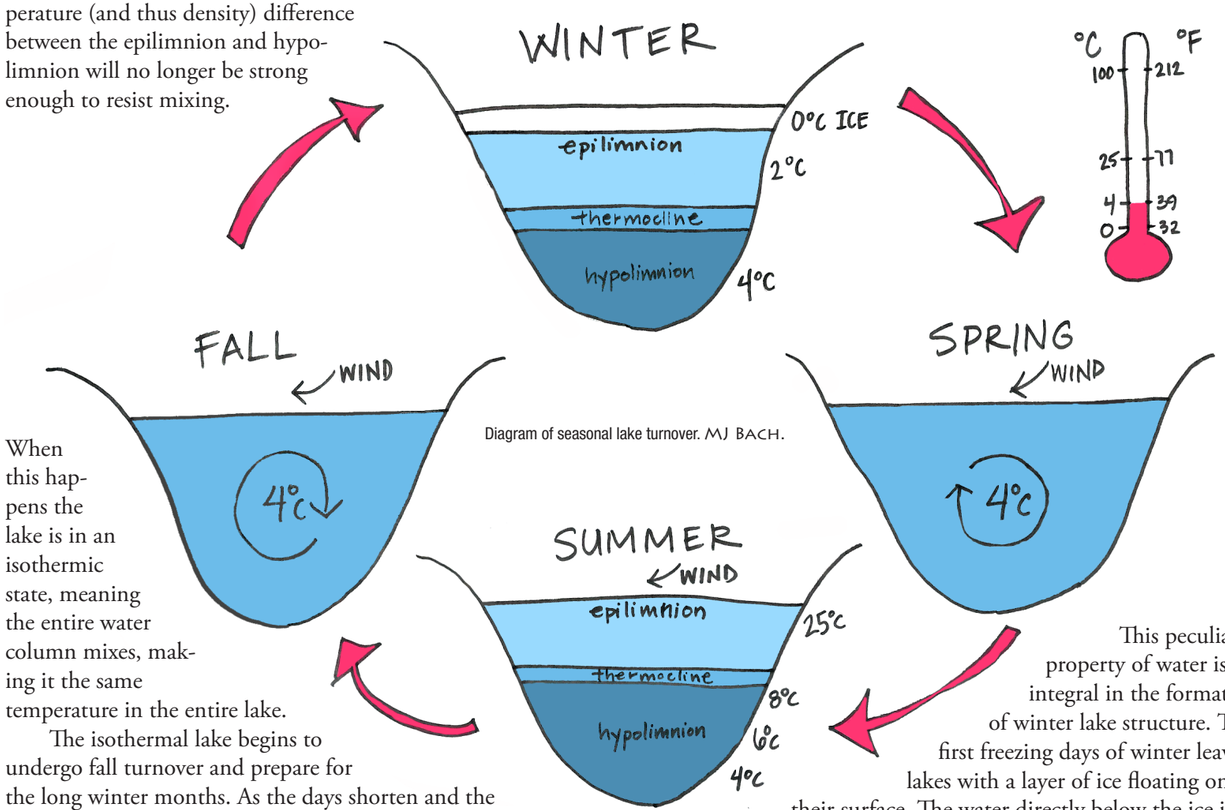

Diagram of seasonal lake turnover. MJ Bach.

When this happens the lake is in an isothermic state, meaning the entire water column mixes, making it the same temperature in the entire lake.

The isothermal lake begins to undergo fall turnover and prepare for the long winter months. As the days shorten and the air becomes cold, the surface water of the isothermic lake becomes cold too. Because there is no resistance to mixing, the surface water is immediately mixed into the lake and replaced with new water from below. Slowly, this process lowers the temperature of the entire lake. As the surface water is mixed, it also distributes dissolved oxygen to the entire water column.

Winter

When fall turns to winter lakes begin to settle into their subtle yet stable winter stratification.During this time a seemingly-small property of water becomes incredibly important. As mentioned earlier, water reaches its maximum density at 4ºC and freezes at 0ºC. Any colder than 4ºC, and the molecules begin arranging themselves in a way that allows for ice formation. Water is unique in this way; most substances will continue to become more dense as they cool, but due to the nature of hydrogen bonds, water forms a lattice structure that is less dense as a solid than a liquid. To put it simply: ice floats.

This peculiar property of water is integral in the formation of winter lake structure. The first freezing days of winter leave lakes with a layer of ice floating on their surface. The water directly below the ice is almost always 1ºC. Any colder and it would freeze, any warmer and it would become less dense and sink to the bottom of the lake. At the lake bottom, the water is almost uniformly 4ºC. Away from the sun it has no opportunity to warm, but if it became colder than four degrees it would become less dense, rise and mix. Because of this, water under frozen-over lakes is in another state of stratification, though only separated between 1ºC and 4ºC. Again, the hypolimnion is the most dense water at 4ºC and above the small thermocline in the epilimnion, the less dense water that sits on top is warmer than 1ºC but cooler than 4ºC.

Spring

Since winter stratification is not nearly as dramatic as it is during the summer—the condition on its own is not as stable—the resistance to mixing is not incredibly strong. However due to the ice on top of the lake, the wind does not contribute to any mixing. Without the wind this subtle stratification stays in place all winter long until spring ice-out and warming temperatures bring a new season of turnover.

Perhaps we can find comfort in knowing that as we settle in to the long winter months, our beloved lakes around us are doing the same.

Natalie Stoneburner is a senior environmental studies major and Outdoor U student naturalist. She's a true Minnesota girl who wouldn't pass up an opportunity to enjoy our lakes, no matter the season.

Vocabulary

Epilimnion: Layer of water on the surface of a lake. "epi-" *upon*; "-limnion" *lake*

Hypolimnion: Layer of water at the bottom of a lake. "hypo-" *under*; "-limnion" *lake*

Lake Turnover: Seasonal mixing of the top (epilimnion) and bottom (hypolimnion) of a lake.

Limnology: study of inland waters, including lakes, wetlands, streams and groundwater.

Thermocline: Thin but distinct layer in a large body of water, separating the epilimnion and hypolimnion. "thermo-" *temperature;* "-cline" *gradation.*

Do You Wanna Build a Snowman?

MJ Bach '10

A big yellow school bus pulls up to the entrance of the New Science Center and delivers sixty local preschool students, bundled up in layers like perfectly wrapped holiday packages. While many of our gradeschool students are returning for their first, second or fourth time on an Outdoor U field trip with fond memories and (mostly) accurate stories, these tiny, wide-eyed kiddos are here for their inaugural visit. And winter is in full swing.

We start inside with a story in which the characters build snow buddies, decorated with birdseed and carrots. Woodland animals visit and leave their tracks and signs behind. Then it is time for us to head outside and do the same. We bundle the kiddos back up and head out into the Abbey Arboretum. We build our own snow buddies and investigate to see which wild friends have visited other snow buddies. Though we don't go far from the building or parking lot, our students are transported to a small world where they feel as though we're deep in the woods, wild nature explorers on a big, big adventure.

The creativity, enthusiasm and investment these young people bring into caring for our White-tailed deer and Black-capped chickadees through construction of their snow buddies is incredible. The excitement for spotting a deer track or scat pile is unrivaled. Intermingled with our exploring, the learning just happens.

All of our K-12 curricula are directly aligned with the Minnesota Department of Education academic standards. Our instructors are well-versed in natural history, and we practice research-based theories and methods in education. Overall we provide a high-quality educational experience for all who visit—students, teachers and parent chaperones. Teaching preschool offers a unique opportunity to design a lesson without a fixed boundary to guide us, as there are no set graduation standards for preK. So we go out and play, building snow buddies and letting our concrete observations guide our learning. And research supports this method.

Author and educator David Sobel has developed seven design principles that may be used when developing educational programs. Sobel's research is based on observing children in free-play settings in safe, wooded areas, without others telling them what they can or should do—an observation of their "natural" behaviors and tendencies. Through these observations, Sobel notes that regardless of cultural or socieoeconomic backgrounds or age, children universally will engage in these activities: (1) making forts and special places; (2) playing hunting and gathering games; (3) shaping small worlds; (4) developing friendships with animals; (5) constructing adventures; (6) descending into fantasies; and (7) following paths and figuring out shortcuts.

Outdoor U student naturalists Tyler Dick ('16) and Teresa Gonia ('14) lead a pre-k winter field trip. Outdoor U Staff.

Our preschool lesson directly addresses at least three of Sobel's principles. Free-play requires imagination and allows for an emotional connection that motivates us to invest in learning. This concern and sense of wonder leads us to ask questions, make discoveries and ask more questions. For field biologists, ramblings and curiosities are the start of scientific questions and discoveries. This special, unstructured time to just play and explore leads to excitement and wonder, followed by devotion and concern—no matter whether we're three or ninety-three.

As adults we often forget the importance of play, not just for the children in our lives, but for ourselves. For kids, having a grown-up to ensure safety and to encourage inquiry is necessary. For adults, having a kid to share his or her infectious sense of wonder is inspiring. Consider this as you delve into another Minnesota winter: play is productive, promotes learning and is frankly, just plain fun.

MJ Bach is the 2015-2016 environmental education fellow at Outdoor U. A proud aunt of four beautiful nieces, she is lucky to have special children in her life to remind her of the importance of play.

Get Involved

Saint John's Outdoor University

Langlauf Nordic Ski Race

Sunday, Jan. 17

$15 - Outdoor U Members
$25 - Nonmembers (through Jan 4); $40 Nonmembers (Jan 5-15)
$80 - ALL Day-Of registration
FREE - CSB/SJU students; other college and high school students $5
DISCOUNTS for Nordic Ski Club of Central MN members and 2016 City of Lakes Loppet participants

Skate 25K or 9K OR Classic 16K or 7K
Collegiate and Citizen Races

The Langlauf @ Saint John's starts and ends in Clemens Football stadium and skis through the hills of Saint John's Abbey Arboretum. This is a naturally challenging hilly and wooded course. Collegiate racers can choose between skate 25K and classic 16K; citizen racers can choose technique as well as the shorter distances. Electronic chip timing provided by Pickle Events.

Living in the Avon Hills Conference

Saturday, Jan. 30

$20 - Adults (ages 16 & up)
$10 - Kids (ages 5-15)
$35 - Adults registered after Jan. 27

9:00 a.m. - 4:00 p.m.
Registration brochures mailed in January
Online registration available now

After a year off, help us welcome back this popular event with a keynote presentation by community favorite Stan Tekiela. His presentation is based on his new book *Feathers: A beautiful look at a bird's most unique feature*. Stan Tekiela is a photographer, naturalist and writer. The conference price includes the keynote presentation, your choice of a variety of sessions, lunch, refreshments and access to the Exhibit Hall. Bring the kids for sessions designed specifically for them - a conference for the whole family!

Minnesota Natural History Lecture Series

Monthly
Sept. - Nov., Feb. - Apr.
6:30 - 8:00 p.m.

Free - Students (any age) & Outdoor U members
$5 - Nonmembers, nonstudents

Monday, Feb. 15 17th Annual Owl Hoot - *Sarah Gainey, Outdoor U staff*
Monday, Mar. 14 Historic Naturalists in Collegeville - *MJ Bach, Outdoor U staff*
Monday, Apr. 18 Geography of Old Growth Forests - *Kyle Rauch, Outdoor U staff*

Interested in learning more about Minnesota's natural world? Join us each month during the school year for a lecture and discussion on a variety of natural history topics. This spring, enjoy a full slate of topicsfrom our education staff. Check our website to see past topics or for updates to the 2015-16 lecture schedule.

Ski & Spirituality Retreat

Friday - Sunday, Feb. 26-28

Fri-Sun, single room: $229
Fri-Sun, double room: $399 (price for 2 people)
Sat-Sun, single room: $159
Sat-Sun, double room: $299 (price for 2 people)

Prices include lodging, meals, spirituality classes, ski guides, ski equipment and ski lessons.

Join Saint John's Abbey and Outdoor U for a weekend of skiing and reflection. Begin with an optional Friday afternoon ski at 1 p.m. followed by a weekend of learning, walking, meditating, reading, relaxing and of course, more skiing. Ski the Abbey Arboretum trails on your own, with a monastic guide or have lessons targeted to your interest and ability. Led by Steve and Terree Lindvall (former owners of Fitzharris Ski & Sport) and Joseph Federers, OSB with help from Abbey Arboretum ski trail guides Nick Kleespie, OSB and Lew Grobe, OSB.

Maple Syrup Festivals

Saturdays, April 2 & 9

$5—Adult Outdoor U members, ages 17 & under FREE
$10—Adult nonmembers
$5—Child nonmembers

1:00 - 4:00 p.m.
$1 off per person if you preregister by the Friday before the festival you attend (up to $10, does not apply to scouts)

Join us for what has become our most popular event of the year! Sap collecting, syrup cooking, horse-drawn rides, demonstrations, and hot maple syrup sundaes await the whole family during this fun-filled event! Preregistration for families is preferred but not required.

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SAGATAGAN SEASONS

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Saint John's OUTDOOR UNIVERSITY

The Program

Saint John's Outdoor University provides environmental and outdoor education through classes, events and initiatives with the Abbey Arboretum, Saint John's University and the College of Saint Benedict.

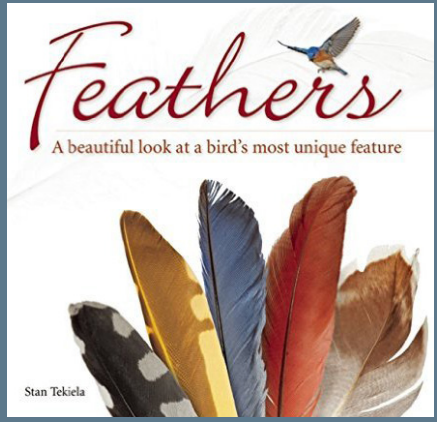
The Place

Saint John's Abbey Arboretum is more than 2,500 acres of lakes, prairie, oak savanna and forest owned by Saint John's Abbey and surrounding Saint John's University.

In This Issue...

Living in the Avon Hills Conference

Saturday, January 30, 2016



Keynote speaker
Stan Tekiela
back by popular demand!

Enjoy photos and stories from his new book, Feathers.

Conference schedule and registration online and in mailboxes in January

Enliven your Spirit Feed your Mind Awaken your Senses