June 16, 2015

Welcome to Oslo!

The View

Oslo is a fantastic city to explore and although we are tired from traveling, once checked into the hotel, everyone is eager to join the tour of the city that has been arranged for us. The city is easy to get around by bus, train or trolley, and there is plenty to enjoy by walking too.

The first native bird I spotted was right outside our hotel...the white wagtail - a Scandinavian bird that is constantly in motion bobbing its tail. I also went to the fish market to see the variety available - including minke whale (!).

The Tour

Everyone was overwhelmed by Norway’s sailing history exhibits at the Viking ship and FRAM museums. Visitors can climb throughout Nansen’s famous polar research vessel (and even get to ring the ship’s bell!).
Passenger Reaction

Our dive master practices nautical skills.

Not to be missed

...while I strike a heroic pose with Fridtjof Nansen.

Local birds like the black-headed gull.

Searching for a lost passenger

...while I strike a heroic pose with Fridtjof Nansen.

And of course, ringing the ship’s bell for good luck on our voyage!
Latitude is measured as the distance away from the Equator (0° Latitude) and Longitude is essentially the difference in time between your location and the Prime Meridian in Greenwich, England (0° Longitude).

Oslo’s location is: Lat. 59° 95’ N, Long. 10° 75’ E (“North of the Equator and East of Greenwich”). In class, we calculate: “What is your hometown’s Latitude and Longitude, and what is your distance from the Equator and Greenwich?”

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June 17, 2015 Airport

Svalbard!

Ever since reading about Spitsbergen in two books - *Nansen* and *Four Against The Arctic* - and learning of the *Grosvenor Teacher Fellowship* opportunity, my goal has been to get here - and the long journey has been worth it. My first thought upon setting foot on the tarmac at the airport is “I will need more camera disc space this week.” After pressing our faces to the airplane window for glimpses of the snow-capped mountains of Norway and Bear Island - the halfway point across the sea - it is hard to imagine any more dramatic scenery. But the view here is even more awesome than what we just flew over!

A surprise was waiting for us at the terminal...three departing GTF’s from our Washington DC planning session! So we were able to do some bonding again and get plenty of reassurance from them that we are heading out on a grand adventure.

The view:
What strikes me most is the barren but beautiful treeless landscape. Add to that the assortment of blue water and sky, clouds, fog and mist at different elevations and I really feel like an explorer.

The Svalbard Museum:
I have been lucky enough be involved in some museums, and although small and located in a former pig barn (!), this one ranks as one of the great ones. It features both the natural and 400-year-old cultural history of the islands, and the displays are top-notch. The geology, WWII and mining exhibits were my first stops and answered most of the basic questions that had puzzled me about the islands and human impacts. The wildlife exhibits are extraordinary, and the bird mounts are fantastic and feature all of the unusual Arctic species I hope to add to my list - especially the legendary Arctic tern.
**The Tour:**
Our tour guides are a scream. Lively, informative and full of energy, they are a wealth of information and happy to volunteer curious anecdotes about living and working here. I got some great pictures of different structures here and the raised foundation designs that keep the buildings from shifting because of the permafrost they are built on.

**Passenger reaction:**
We are excited to tour the area and already have new friends after our night in Oslo and flights here. And there has been plenty of serious *camera talk*, “Home-town” geography and chit-chat on the plane and bus tours with other enthusiastic National Geographic and Lindblad “explorers” from a score of states and countries. But we’re a bit weary and looking forward to boarding the ship, finding our cabins and relaxing.

**Time for my “big tip” to the guides and drivers and say “Good-bye.”**

**Not to be missed:**
It has been a long day exploring Longyearbyen and we are tired and ready to eat. They say “Hunger makes the best sauce” but the chocolates at the Arctic Galleri here are incredible, and should not be overlooked. I wish I’d picked up more!
Elevated shops and homes in town.

Student Geographic Activity Idea:
At home, we already do a “micro-climates” and “building on permafrost” activity with students using ice cubes, small house models and heat lamps. My images and anecdotes from Svalbard will greatly enhance this lesson for the students since the foundations of all of the buildings are specially designed to keep the ground beneath them cold and frozen.

In class we will compare Svalbard with our home - the longitude and latitude, yearly temperature and precipitation data, maps of the Northern Hemisphere’s tundra and permafrost ranges, and glaciers of the world.

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June 18, 2015

Gnålnodden - the singing cliffs

The View

I am surprised at the number and variety of vessels in the waters here. It is a much busier waterway than I anticipated and there are commercial and private boats in the harbor, along with several other eco-tourism craft. The navigation chart indicates that we will sail into Hornsund (Sund means “sound”) and pass be able to view mile-high Hornsundtind - said to be the tallest mountain in Spitsbergen.

The Tour

A fox snatches a kittiwake under the watchful eyes of a glaucous gull

Today we came ashore at Gnålnodden - the singing cliffs - on an inlet with a glacier, small out-wash area and a prominent limestone headland supporting a huge colony of nesting
kittiwakes. I tried to discern the onomatopoetic *kitti-wake* voice of individuals “singing” that gives the bird its name, but the colonial cacophony of thousands of pairs squabbling over their cramped nesting territories and mates drowned out even the conversation between fellow hikers.

Kittiwakes are the only true sea-gull - spending most of their time out at sea, ducking underwater to catch fishes, sleeping on the ocean surface, and even drinking saltwater; so the short Arctic summer during the breeding season is one of the few times to observe them intimately on land. Nesting on steep cliffs, the chicks must hold their ground on narrow ledges or they will tumble below to be dragged away by an Arctic fox patrolling at the base, or snatched in mid-air by voracious glaucous gulls.

Kittiwakes are discernible from other larger gulls by their buoyant flight, smaller size and distinctive and well-defined triangular black patch on the wing-tips. This is the place to really appreciate these birds, on their home turf, where their plumage is perfect and their behaviors are exaggerated.

**Passenger Reactions**
To fellow passengers, fulmars are entertaining and our most graceful shipmates.

Except for a short run across the water’s surface and a few flaps to launch themselves before the ship’s approach, their wing-beat is stiff and shallow and they seemed to always be gliding more than fluttering; using the wind or the bulge of air from the moving ship to soar around us. They have little reason to stay with us and simply make a quick check of our wake, presumably for food tossed overboard or churned to the surface by the propellers, before soaring out over ice and open water. I am fascinated watching them circle around throughout the day and find their effortless passage the highlight of my evenings and a cheerful spectacle each morning.

**Not to be missed:**

Still standing is Ivar Rund’s hunting cabin - occupied as late as 1971, just before bear hunting was outlawed. Fertilized by the kittiwakes’ guano, the surroundings are a miniature rock garden of Saxifrage and lichens.

**Student Geography Activity Idea:**

I retrieved some clear glacier ice that stranded on the shoreline. Small chips of it pressed between polarizing filters shows a variety of colors related to the crystal shape and stress points in the ice.
At home we do the same to study the structure of icicles and snow and call it “Capturing A Rainbow.”

We also look at navigation charts to find the limits of Arctic sea ice in the summer and winter; as well as the limits of icebergs in the Atlantic Ocean.

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June 19, 2015

Edgeøya: The Russians were here... and the bears

The View

Our Tour

Overnight we sailed to the southern tip of Spitsbergen to Russebukta - the bay where Russian hunters settled. My group hiked a loop across a stretch of thawing tundra and what we were warned would be “boot-sucking” mud, then along a sandy beach and back to our landing site. The view across a wide plain to the mountains is vast and overwhelming, and was punctuated by a few distant reindeer that were simply white dots on an intimidating landscape.

(Regrettably, to lighten the load for this hike, I substituted my binoculars for camera gear!)

We scattered a few birds, including noisy brant and eiders, pure white glaucous gulls and a jaeger, but the most interesting finds were many bones, antlers, and the tracks of polar bears in the snow and some hair (!).

Passenger Reaction

We were surprised and disappointed to find litter on the beach. Not surprising however...it is mostly plastic and fishing gear - a good example of the persistence of our pollutants and the primary industry of these waters. We were all overwhelmed by the wide expanse of tundra and peaceful atmosphere of such a wild place.

Not to be missed

I lingered by the zodiacs to get some close-up pictures of the snow and was treated to some courtship behavior of phalaropes and purple sandpipers. The sandpiper is a regular winter visitor to jetties and breakwaters in New Jersey, but the phalaropes spend their winters bobbing in the ocean - a most peculiar adaptation for a “shore” bird. Both wintering birds are gray and white when I see them in New Jersey, but here they are outstanding in their breeding plumage - especially the rich red of the phalaropes (One of
the few birds with females that are more colorful than males!)

The red phalarope on land and sea.

There are the remains of many creatures here, including birds and reindeer.

We use close-up images like this with students to analyze layers of snow, and try to determine the weather conditions that create them. And we will look over maps to catalogue mountain glaciers and their changes over the centuries and rapid retreat recently.

Micrographs of snow

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June 20, 2015

Ice Bay and Isostasy

The View
Storfjorden separates Spitsbergen and Edgeøya (Edge Island) and after pushing our way through some beautiful ice flows (This area is called Isbukta - Ice Bay, afterall) we explored Diskobukta. This is another impressive and noisy kittiwake colony; and apparently - like all the others, has a resident arctic fox that was slinking around the base of the cliff, watching us with suspicion.

Student Geographic Activity Idea
There were lingering patches of snow on the ground so I set up to make some micrographs of it. It is snow and sleet that has been partially melted, then refrozen, so contains large, rounded crystals. (Not unlike the “corn” crystals on groomed ski slopes back home.
Our “deer” trip leader!

We hiked across a wide flat area that appears to be a combination of marine terraces and glacial moraine deposits. The series of terraces is punctuated by old beach berms and is dry, firm and easy to hike across. These “steps” across the plain are a result of isostasy - the rebounding of ground after the weight of melting glacial ice is removed - and clues about fairly recent climate warming.

What appears to be glacial deposits higher up are loose, steep and harder to negotiate.

Passenger Reaction
This is another fascinating spot, and a stark but beautiful landscape. The view of the kittiwake colony is even better here and the photographers and birders were delighted.

Not to be missed
There is another hunter’s cabin here with some interesting artwork(!).

Abandoned hunter’s cabin

Arctic fox on the prowl
In the classroom we examine images of different shorelines, beach-faces, glacial deposits and exposed debris from avalanches to compare the alignment of materials. We also look at topographic maps of recently exposed and eroded part of the coasts of NJ and other places to look for marine terraces (N.C. and California) and glacial moraines (Alaska and New England).

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June 21, 2015

Whale Ho!

The View
Going “Blue Water” - The open ocean east of Svalbard.

The Tour
This afternoon we steamed offshore and north through a sea of dovekies and other seabirds, to a break in the shelf where there is upwelling of deeper water. We were informed that this encourages plankton growth and concentrates creatures that feed on it - fishes, birds and ultimately, whales - and we were rewarded with
four species: sei, fin, blue, and best of all bubble-feeding humpbacks, which put on a spectacular show. The water was very calm and clear - perfect for spotting spouts and mobs of kittiwakes over the whales. The kittiwakes were gathering up fishes that spilled from the whale’s mouth.

Passenger Reaction
“Mesmerizing...and worth missing supper for!”
“This was my first view these leviathans and they really do look blue!”

It was a very full sight-seeing day for everyone with calm conditions, thousands of birds and some seals (Ringed and bearded). And the Western coast of Spitsbergen is dramatic, with distinct layering of ancient ocean bottoms exposed on cliff faces. In the wheelhouse we were treated to an underwater view of Svalbard’s coast.

Soundings from the Bridge: Underwater profile of a flooded glacial valley.

Not to be missed
One of the best parts of the trip is watching other passengers enjoying the sights. And especially, the little auk (Dovekies) scurrying across the water to avoid us. Some say they don’t fly because they are too heavy from gorging themselves on fish and shrimp. Others speculate that they see ships so infrequently that they are confused as to whether we are a real threat. Watching them in such huge concentrations, it is easy to understand why ornithologists count them as one of the most abundant birds on Earth.

Also: never miss supper (The chocolate desserts are fantastic!)
Student Geographic Activity Idea
In class, we do several activities relating to whales and other marine creatures. **Blubber Gloves** involves dipping rubber-gloved hands into ice-water. The hand insulated with “blubber” (Crisco®) is noticeably warmer. We also use kitchen utensils, including strainers and chopsticks to model feeding strategies in seabirds and marine mammals.

In the classroom we will compare modern Svalbard charts with the earliest chart of ocean winds and currents (1847) by “America’s First Oceanographer” Matthew Fontaine Maury. His charts feature data from whalers and drawings of whale concentrations.

During the Summer Solstice we launched kayaks in a beautiful sheltered spot near Hamburgbukta (Hamburg Bay) on the northwest corner of Spitsbergen. In the early 1800’s there were still Russian hunters in the area, and before that, Danes from the port of Hamburg who had driven out French whalers who set up base in 1633.

*Not a commercial endorsement*
Curious harbor seal

The conditions for kayaking were perfect - sunny and no wind, so as I drifted slowly among curious harbor seals, I tried to approach and photograph a guillemot - a sharp little diving bird one passenger from Maine calls a sea pigeon. Guillemots are alcids (auks), and are the plain-Jane cousins of puffins. Although their striking black-and-white plumage and bright red legs complement the polar scenery, their deep-diving forays make them challenging targets for photographers.

Passenger Reaction

Wildlife here is up-close and personal. Birds and seals are tame, presumably because they are not hunted or encounter many humans.

As often happens while chasing birds, my success finding Arctic terns was unexpected and sudden after I heard a familiar call - not unlike the te-arrr and kik-kik-kik of common terns back home. And the bird introduced itself by landing on the bow of my kayak!

**Not to be missed**

Later that night I researched the birds in the ship’s fantastic library where the Arctic tern is described as “One of the most remarkable birds of the world. It nests at least as far north as the most northern Eskimos live, while in winter its tireless pinions beat along the distant shores of unexplored lands of the Antarctic continent. It sees more hours of daylight and of sunlight than any other creature on earth.”

Guillemot or “sea pigeon”

Tern food: Inch-long scud shrimp
Tern courtship. Male feeding female

A geologist has a unique view of the beach.

The size, shape and sorting of sediment particles; and slope of the beach, are clues to the wave energy throughout the season, rate of movement of materials, and their source. At this shoreline, the largest stones high on the beach are only moved by storm waves, and the beach slope is steep because it is comprised of pebbles, not sand.

Student Geographic Activity Idea

In class we survey the profile of local beaches and sort and compare sediment types and slopes of the beach face to determine the history of these dynamic systems. We also compare maps, images and sediment samples from different geographic areas with steep, “cobble” beaches (Maine), medium sloped sandy beaches (New Jersey), and flat fine-sand beaches (Florida).

June 23, 2015

Geology and Nature: “In-your-face”

The View
I awoke to an amazing sight this morning. The ship was sitting still in the water and I was startled by my first view as I stepped out on deck. The bow was nearly touching Kapp Fanshawe, a sea-cliff at the northeast corner of Spitsbergen Island. Although the misty air was a challenge for photographers, I felt I could almost reach out and touch the cliff, or grab one of the thousands of Brunnich’s (thick-billed) murres. There were no young birds to be seen, so adults were either sitting on an egg, or just staking out a nesting site since several times two fighting birds would splash down into the water, refereed by a hopeful glaucous gull waiting to pounce on the loser. This is heaven for bird-watchers.

Although I began to think it couldn’t get better than this, birdwatchers AND bear-watchers had a treat waiting for us in the afternoon - close-up views of a curious bear.

Brunnich’s murres

The Tour
Birds and bears were the order of the day! It was a very pleasant day weather-wise and on the ship everyone is in great spirits. We had a BBQ off the stern with reindeer sausage - and of course a tasty vegetarian option on the menu too. It was a great time to catch up with everyone and compare notes and photographs.
Passenger Reaction
Morning: It was a bit disconcerting to be that close to a cliff in a ship - even in calm weather, but we have confidence in the crew, and the charts and captain reassure us that the steep, glacier-scoured coastline has “plenty of water under the hull.”

A weather note: According to the crew...the barometer has been steady and this stability in the atmosphere is part of the reason we have so much fog. And as we head north towards 80° North we will see more of it at the edge of the ice pack.

Not to be missed
Fog at sea: If there is lemonade to be made from lemons today...it is the bird sounds and crackling ice that you focus on when your vision is limited. I was told that a Scandinavian word for murre is
aalge and to me this sounds imitative of the hoarse calls we heard from the cliffs. “In Newfoundland we call those birds turres and tickle-dees.”

We saw fog-bows too and I was able to capture some hoarfrost on the railings!

Hoarfrost on the ship’s railing.

**Student Geographical Activity Idea**

On our hike yesterday, our naturalist identified some bear hair so I took a micrograph of it pressed between polarizing camera filters (Along with a strand of blonde hair donated by a Scandinavian passenger). Polar bear hair is said to be hollow for insulation, and indeed the specimen on the left looks like a tube. This will be a good model for students to analyze their own hair back at school; and an introduction to geographical ranges (Biogeography) of animal populations (and native people) and how that affects skin color and other genetic traits.

Hair examined under polarized light. Polar bear (Left); Human (Right)

**Reflections and Colors**

**The View**

Last night we sailed past Moffen, a flat island that is a major haul-out for walrus. Although we are required to stay offshore, as usual, the skipper got us close enough for great views of their herding behavior and efforts dragging their magnificent bodies up on land.

Today we landed in another beautiful spot - Bockfjorden - for hikes along the beach and to examine tundra plants. I was able to get a plankton sample too which consisted primarily of copepods - tiny shrimp that are also important food for filter-feeders like bowhead whales.

**Our Tour**

There are carpets of tiny flowers and lichens along the hillside to photograph and I made micrographs of some of the patches of snow that were lingering in the summer “heat” here.
There is an assortment of birds here too, including terns and long-tailed ducks.

A “belly botanist”

Passenger Reaction

After our hikes, passengers conducted another spontaneous beach clean-up of mostly discarded fishing equipment. My most interesting find was a large halibut fish hook. The sediments here are flat polished stones called shingles, and while waiting for the zodiacs to return us to the ship, I competed in a pick-up game of skipping stones.

Waiting for the Zodiaks

Possible new Svalbard Shingle Skipping record!

Not to be missed

Most of the passengers and staff participated in the Polar Plunge in this remarkable clear (and COLD!) water; and this spot has some of the most beautiful ice we have encountered.

Ice micrograph from the snow field

Student Geographic Activity Idea

One of the topics we study in class is Albedo - the amount of sunlight reflected off surfaces like sidewalks and roofs. This is particularly important in polar weather and climate since it is also a factor of how much heat is absorbed by the ocean. To demonstrate Albedo (And coincidentally, why Arctic ice is so beautiful) I brought some software along to analyze ice images.
Analyzing Albedo and Ice Colors
When plotted by the software for light intensity and color (Yellow line) the cross-section shows:

1) **Left side of the graph: High Albedo.** Most light at all wave-lengths (and heat) is reflected back to the sky (and our eyes) so the ice appears white.

2) **Right side of the graph: Low Albedo.** Most light (and heat) is absorbed by the water, therefore warming the Arctic Sea where ice is not present.

3) **Middle part of the graph:** The longer wave-length light (red) is absorbed more strongly in the sub-surface ice and water, and more of the green and blue is reflected back to our eyes, helping to account for the beautiful color.

In the classroom we can use a globe and flashlight to demonstrate the angle of sunlight at different latitudes throughout the year. And with a light meter, we can also model reflected light (Albedo) from different surfaces to determine which surfaces reflect the most light (and heat) from the sun and which absorb the most.

June 25, 2015

Dog Tired in Dog Town

The View
Today is a bit gloomy - not because of the weather but because we are departing the ship and all our new acquaintances. It has been a spectacular week, and as expected, we are being taken on another great tour of the town.
The Tour
There are plenty of birds around and our first stop is at the edge of town to meet the sledge dogs. Some are on a working vacation and pulling wheeled carts with tourists, which is quite a sight. Others are half-grown pups that are shy around strangers but full of enthusiasm.

Passenger Reaction
Everyone liked the puppies, and we were treated to a visit up the hill to the famous Global Seed Vault and NASA satellite receiving station, but most of us were content to stretch our legs in town visiting the surprising number of shops.

Hmm...How do I fit this in my luggage?

Not to be missed
More entertainment from the local tour guides in town. This fellow is from Russia, and like everyone here, is very welcoming...while explaining his liquor ration card.
Student Geographic Activity Idea
Although we do not have a sextant to determine Latitude, we can use the length of shadows at Noon and Midnight to measure the sun’s elevation to calculate it; and will use some Algebra on these measurements back at school.

Note: Special thanks to the Grosvenor Teacher Fellowship program and Gilbert M. Grosvenor, National Geographic Education, Lindblad Expeditions and the crew of the Explorer for making this opportunity available to educators.