THE HALIFAX FIELD NATURALIST

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HFN REVIEWS, ARTICLES, AND TIDBITS

BOOK REVIEW

– Ron Arsenault

A new publication, ***Mammals of Prince Edward Island and Adjacent Marine Waters*** was produced last year. Its authors' aim was to provide a complete inventory of all the wild mammals which have occurred on PEI since the end of the last ice age about 10,000 years ago.

It begins with the English, Scientific, French, and Mi'kmaq names for each species, then the sections Description, Measurements, Global Range, Status on PEI, History on PEI, Ecology, Diet, Reproduction, and Behaviour. Also included are species illustrations, a range map, tracks and track patterns (where relevant), detailed skull sketches, and an extensive list of references. There is a brief introduction to each mammalian order and family, and several sidebars on relevant topics such as White-nose Syndrome, along with a special section on seal exploitation in the Gulf of St Lawrence. Because of its time range, the species list is exhaustive, including even the Groundhog *Marmota monax,* with only two known occurrences on the Island.

Overall, the book is well organised and clearly written, and the species illustrations, while a bit soft, are very good.

However, it is not without its issues. There are a number of typos, especially in the French common names, and a few examples of awkwardly worded sentences but – overall, these are quite minor. However, the track and skull illustrations, while very well done, appear to have been included within the species accounts simply because they were available to the authors. This impression is reinforced by the retention of several species in the track pattern legend when only one of them is treated in the book (i.e. the track illustration on page 173 includes the Least Weasel and the Long-tailed Weasel despite the fact these two species do not occur on PEI nor are listed in the book). An explanation as to why the track patterns and skull illustrations were included, and how to use them, would have gone a long way towards eliminating this impression.

While overall the maps are very good, and the fact that they include the global range of the species is a big plus, the inconsistent use of some of the symbols is irritating. For example, extralimital records were indicated with a red circle on some maps (page 149) and by the use of a red asterisk on others (page 153); the red asterisk was also used to indicate areas where a species has been introduced (page 168). A more consistent use of symbols would have been more useful and accurate.

Despite all this, this publication is the most complete and up-to-date reference on the mammal fauna of PEI; thus, it belongs on the bookshelf of anyone with an interest in PEI mammals.

For the Nova Scotia-based naturalist, one needs to keep the following in mind given the intended scope of the book:

1. A number of species found in Nova Scotia are not found on PEI and thus are outside its scope. Scott and Hebda (2004) list 91 mammal species for Nova Scotia while only 57 species are found on PEI.

2. The status and history of a number of species, especially the larger terrestrial species, often differs substantially between the two provinces.

Providing one keeps the above limitations in mind, the book will also be very nice addition to any Nova Scotia-based naturalist's bookshelf, particularly if it is paired with the *Annotated List of the Mammals of Nova Scotia* by Fred W. Scott and Andrew Hebda, (2004), Proc. N.S. Inst. Sci. Volume 42, Part 2, pp189-208. This can be downloaded free of charge at: **https://ojs.library.dal.ca/nsis/article/view/NSIS42-2scotthebda/3313**.

Mammals of Prince Edward Island and Adjacent Marine Waters, 2019, by Rosemary Curley, Donald F. McAlpine, Dan McAskill, Kim Riehl, and Pierre-Yves Daoust, published by Island Studies Press (354 pages at $49.95 CAD in paperback) is also available in pdf directly from the publisher for the same price.

NOTES FROM ALBANY NEW

– Lesley Jane Butters

Hurricane Dorian did much damage in the Albany New area and beyond. Sadly, many trees got weakened and/or were whipped around so violently they succumbed to death this past summer. On that note, I felt it best to fell some mature trees around my cabin before any more incidents with ferocious weather and weakened trees.

Finding help to fell them in that neck of the woods was a challenge; most other locals were busy attending to their own damaged trees. Commercial tree cutting services were an option, but extremely expensive. Finally, in mid-October, I was able to flag down an individual in Caladonia who occasionally does a 'little tree work'. Ladders, ropes, and the noisy sound of the chainsaw were all I saw and heard as I peered out my window, trusting there would be no damage to my cottage during the process.

At one point, I saw the tree cutter hugging and blessing a large Blue Spruce tree – beautiful!. Apparently, he hugs and blesses all trees before felling them. Eventually, all sounds did stop, except for the startup of his diesel truck. The job was done. Before he drove off, I asked if he was coming back to remove some of the enormous branches which lay like giant pick-up sticks on the gardens. A succinct "No" was his answer. I wondered who I could find to help me sort and cart the branches after sawing out the good wood. What a mess!

I trudged back and forth, back and forth, wheel-barrelling chunks of firewood to the shed on the other side of the property. Strength was a welcome attribute at that point. Then came the nasty task of branch work. I needed help but there was no one around to ask, so I persevered until it was time to go back to Halifax.

Two weeks later I returned to finish the task, but something looked out of place. Where were my stacks of hardwood branches? I combed the property for signs of grooved boot prints, tire marks, even boat marks, in the diatomaceous earth near the river. Not one trace of human thievery. However, looking closer, I saw Beaver chew-marks on some Hemlock branches stacked alongside my potential hardwood firewood branches – the Beavers – they had come to volunteer! Amazingly, there was not a hardwood branch left behind, leaves included, and, there was no damage to the surrounding undergrowth where they had dragged my branches through the forest to the river. Unfortunately, they were not interested in carting off the conifer branches – that chore they had left for me! Burning the

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colossal piles of them was not an option, mainly due to the still very dry conditions in our southwest forests, so – stacking them for future wildlife habitat seemed right. Finding a suitable area, I noticed a couple of young, recently Beaver-felled oak trees, one of which was caught in the crotch of a large Aspen. With all my strength, and a rope, I yanked at the small oak to try to free it, but had to admit to total failure. The next morning, I took a wrench out with me, but the tree was gone, no sign of it anywhere! Totally amazing, the strength of Beavers, and it would have been fascinating to have observed it all in action. How did it/they do it? There were absolutely no wood chips on the ground either, except for those from the initial chain-saw felling.

In the end, I did get the 'help' I needed, despite losing a good size stack of smaller branches which would have been good for starting fires in the woodstove.

CORMORANTS IN DISTRESS

– Pat Leader

On September 6th, while taking a walk along Bedford Bay, opposite the condominiums I noticed a small group of people peering down at the rocks. There, very close to the water's edge, was a Double-crested Cormorant, locally known as a Shag, sitting on a rock in its characteristically erect way. Around its neck there was the glint of metal – part of a fishing lure. Bad enough, but also, the metal was attached to three hooks imbedded in the bird's foot. Hope for Wildlife (HFW) had already been contacted and the bird was finally rescued by Liz McMahan (one of their many volunteers) and a canoeist. While this was happening, Liz spotted another Cormorant similarly in distress, and they managed to rescue it as well. Once at HFW, their team, including Stephanie Abraham, removed the hardwear. The wounds were checked, injury was minimal, and they were released the same day. 'Same-day release' is the best practice, as Cormorants become notoriously highly stressed when in captivity. Kudos to HFW and its volunteers. It's founder, Hope Swinimer, was presented with HFN's Colin Steward award in 2013. Hope's work in conservation and rehabilitation is widely known throughout the world due to her TV programme "Hope For Wildlife".

Over the past few years, the North and South Piers of De Wolfe Park in Bedford have become increasingly popular sites for fishing. There's even a fishing 'club' for young people. Up until now I have never seen birds injured by fishing tackle in this area but it's well to remember that when lines break they should be taken home. Like plastic rings and bags, they cause immeasurable injury to our wildlife.

HFN FIELD TRIPS

SHUBENACADIE WILDLIFE PARK

– Stephanie Robertson

Date: Saturday, September 19th
Place: Shubenacadie Wildlife Park, Hants Co.
Weather: Sunny; cooler as it became dark.
Leaders: Park staff Tabitha and Breagh
Participants: 12 including Park staff

Only forty minutes from Halifax, this beautiful wildlife park presently houses about 60 species of animals. Following is this field trip's write-up continuation from 2020's Summer/Fall Issue 179/180.

Swift Fox - From out west, these two foxes were small and grey, with black-tipped tails and a small black muzzle patch on either side of their pointy noses. They are the result of a successful conservation project into which they were born. Omnivores, Swift Foxes eat primarily rabbits, mice, squirrels, birds, insects, lizards, carrion, grasses, and fruits. Their diet changes with the seasons.

Turkey Vultures - Due to global warming, they are now here in Nova Scotia. Their heads were comically small and red, with few to no feathers and a short, hooked beak. They like raw meat, road kill, and carcasses. Their feathers were brownish-black, with the flight feathers on the wings appearing to be silvery-grey beneath. Turkey Vultures have very strong stomach acids; this prevents them becoming ill with their fermenting and rotted foods. They also have a very strong sense of smell, no voice box, and very strong, sharp talons.

Arctic Fox - There were three Grey-coated individuals which will turn white when snow comes. In the Arctic wild, they can survive -50˚C! They are shy, and have thick, furry footpads which act as snowshoies for them. Like dogs, they can pant to cool themselves. They are fed raw meats, and in the wild they take hares, lemmings, voles, other rodents, and birds' eggs. All three are adults from between three to six years of age. Despite the cold of their natural habitat, they do not hibernate, but live in large underground communal dens.

Canada Geese and Ducks - As we followed Tabitha and Breagh, many were present in various small lakes and pools in the Park. More about them later, when it became dark.

Goats - There are now two non-native goats at the Park; an all-black female Alpine and a light-brown Pygmy; they are the Park's newest acquisitions, rescued from the Cherrybrook Zoo in New Brunswick, which had to close down this past April. The Alpine originates in France; the Pygmy in Africa. Both are domesticated goats.

All the mammals have substantially large, well-maintained fenced areas in which to freely move around, feed, play, and socialise.

Bighorn Sheep - From the Rocky Mountains; there was one male, one female, and three grown 'babies', with a younger one born on Mother's day this year. Mature males can sport horns which weigh up to 30 pounds; females are also horned, but theirs are smaller. Bighorns are the larger of the two mountain sheep found in Canada. Colour can range from grey-tan to brown, always with with paler fleece on rump, belly, and muzzle. To imitate their natural habitat, there were large, man-made rocky installations for them to climb on with their specially adapted hooves – hard at the edges and soft in the centre.

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Dall Sheep - The other native Canadian mountain sheep., these were from the Yukon – smaller, and all white. They are not sheared at the Park because they themselves will use trees and rocks to get rid of their shedding wool. They keep their horns for their lifetime so are easy to age by the yearly growth rings. Prized for their meat and fleece, in the past they were almost hunted to extinction; conservation has reversed this, and they are now no longer at risk.

Lynx - Canadian Lynx are larger than Bobcats and are designated 'Endangered'. Therefore the animals here are the Eurasian Lynx. Taller and heavier than their Canadian cousins, they typically weigh from 33 to 64 pounds. In Canada, the Canadian Lynx diet is 80% Snowshoe Hare. In Europe, Siberia, and Asia, they typically go for Red Deer, as well as wild pigs, birds, rabbits, and other rodents. They can kill prey three to four times their own size and have far more stamina than Canadian Lynx when chasing prey. Like them however, (and unlike the Bobcat), Eurasian Lynx also have longer hind legs than their front ones, giving its back that same 'sloping' outline as previously mentioned.

Moose - The largest member of the Deer family, the Park has one female, an orphan from Newfoundland. Moose are browsers of food near their mouths (they don't bend their heads to 'graze'); they eat twigs, shrubs, willow, cattails, and they especially love seasonal water plants. Moose, like Deer, don't have a thick undercoat; instead, their hairs are hollow, and it is this trait which provides enough insulation to keep them warm.

Marten - By now, it was turning to dusk, but with the help of our flashlights, we got glimpses of the one male in a very bushy conifer in its enclosure. Our presence caused it to change its position so we were able to observe it on the ground for awhile in its beautiful dark brown coat. They sport a yellow-orange throat patch and darker rump and tail, the latter making up one-third to one-half of their body length. Nocturnal, they like to eat birds' eggs and small mammals such as squirrels, chipmunks, and voles, and also frogs, salamanders, insects, fruit, carrion, and mice. Martens will also hunt Snowshoe Hare and game birds such as Grouse. Often seen in trees, they do much of their hunting and foraging on the ground. They will even hunt under the snow in tunnels created by squirrels and mice. Like all weasels, they mark their territory with musk glands.

Red Fox - These are smaller and more delicate than their Coyote cousins, and here at Shubenacadie there are three perky little brothers (litter mates) who, like the goats and a few others, trotted up happily to inspect us. The unpleasant smell of their area was quite strong due to their very pungent-smelling urine, which is almost skunk-like. Their coat colour also occurs in plain brown and sometimes black with silver streaks; they have pointed noses, ears, and that characteristic fluffy, white-tipped tail, no matter what colour the coat. Found in all Canadian provinces, globally they have one of the largest ranges of all land mammals. They are even seen in uban areas. With excellent hearing, they are opportunistic omnivores, consuming whatever they can forage – large amounts of rodents, insects, birds, eggs, reptiles, amphibians, berries and other plants; they will bury leftovers and come back to them later. They are active all winter.

Waterbirds - Now it was very, very dark. We passed by another water area which was now intermittently lit up by programmed on/off extremely bright lights to keep predators away from the Australian Black Swans, Geese, Ducks, and other waterbirds here.

Wolves - When we reached the wolf inclosure, we were greeted by two Grey Wolf brothers (also called Timber Wolves). They are termed 'grey', but they can vary from black, through grey, to brown. A sure ID, though, is a small black patch which they all have on the upper area of their tails, regardless of coat colour. There was also one elderly Arctic Wolf (they are always white) of which there used to be two, but his sister died a while ago. Arctics and Greys are 'first cousins'. The average Grey Wolf pack numbers seven to eight individuals containing one dominant pair. These wolves make lots of varied noises. They howl when local trains roll by, and it is the dominant male which starts it off. They are able to eat a few pounds of meat at one sitting, and in the wild they hunt in packs cooperatively. However, only one in ten of their hunting forays is successful. At the Park the wolves are fed every day, but in much smaller amounts than they would consume from one rarely successful hunt. They love rabbits so that's what they get, fur and all, to experience, as is natural, tearing off the fur themselves. They also love bones, and sniffing different smells, so Park staff provides these for them too.

At this point, we looked up to the dark sky and could easily see Saturn and Jupiter, part of astonomy's lovely 'summer triangle'.

Mink - Native to NS, they resemble little weasels. We could see feathers in their encloure's hollow log, the remains of their feathered-chicken meal that day.

Snowshoe Hare - These Lagomorphs boast a species-specific dot on their foreheads. Hares don't hide by digging holes or burrows as rabbits do. With their larger heart, long and strong rear legs - they run when predated. They are safer to eat in winter because then they carry less parasites, ticks, and other diseases. Unlike rabbits, they are born fully-furred, open eyed, and can hop about right away.

Raccoons - These very successful mammals have an extremely sensitive sense of touch in their 'hands and fingers'. They were very fat and healthy looking, waddling around in their enclosure. Park staff have used these opportunistic and wiley animals for testing out the vulnerability of green bins and other human containers in order to find a design that is racoon-proof and bear-proof as well.

Beaver - This is North America's largest rodent. There were two, both orphans, in a very large rectangular pool with rocks, and lots of branches for chewing and pulling around. It was here that my grand daughter dropped her little flashlight right into the water, trying to see them with more illumination! Beavers are able to cut down 200 trees per year, and can hold their breath for 15 minutes underwater.

Skunk - Their were two 'descented' little skunks. Skunks are born furless and it takes only 13 days to get their fur coats. When born, their skin colour reveals their future striped fur pattern, which can vary quite a lot. When they spray, it's a range of 30 to 40 metres. Like Martens they are nocturnal, eating insects, grubs, blueberries, and other berries and fruit.

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Porcupine - Adult Porcupines have 30,000 quills! Contrary to popular belief, the quills cannot be 'shot out'; they have to be touched and then the Porky will move its body back and forth to lodge them into their predator. They have very short legs with which to waddle from tree to tree. Strict herbivores, their diet changes with the seasons. In winter, they feed on the inner bark of trees such as fir, cedar, and hemlock. In spring, their favorite is maple bark as well as the catkins and leaves of willow, poplar, and alder. Nocturnal, they make little grunting sounds. All of the Shubenacadie Porkys are orphans.

River Otters - We met a female about 16 or 17 years old and another about 14 years. They have 'retired' together in this safe place. Otters are very social, but it took these two a bit of time to finally get used to one another; they have the same aquatic adaptations as Beavers. They are given live minnows for interest and stimulation but are fed other items as well. Their wonderful fur is of course waterproof.

Bald Eagles - There were two females, which are larger than males. Bald Eagles need four to five years before they are fully mature. They don't migrate, but move to farms in winter, where farmers are likely to feed them chicken carcasses. They love to hang around fish farms as well and they will go for road kill too. Bald Eagles live for 30 to 50 years.

All of the birds resident at the Park have some kind of injury which prevents them from being able to be released to the wild.

Owls - There were two Great Horned and two Barred Owls. We noticed that the Barred had smaller talons – that is because they go for smaller prey.

Barn Owls - These are even smaller owls, and these were from Southern Ontario. They like tree cavities and wooden barns. Unfortunately, modern barns are mostly steel, so now, some savy and accomodating farmers are adding wooden additions, ensuring these Owls can benefit the farmers, and themselves, by predating the high populations of mice.

Red-tailed Hawks - One female had a torn retina, and the other had only one wing (the injured wing could not be saved). These hawks are very common in Nova Scotia, and can live up to 18 years.

This was a wonderful 'first field trip' after COVID; I highly recommend this wonderful wildlife facility to everyone.

NOEL SHORE GEOLOGY

– Gillian Webster

Date: Saturday, September 26th
Place: Avondale to Walton, West Hants
Weather: Sunny; cooler as it becan
Leaders: Rob Fensome
Participants: 20

This field trip was a five-stop event led by Geological Survey of Canada's geologist Rob Fensome. The various sites we were to visit included Rainy Cove, one of the most important and exciting geological field stops in Canada. We were promised an all day trip and it truly was, with marvellous summer-like weather. Since most of the stops involved easy to moderate beach walks, participants were able to navigate them with relative ease. (Still, by five o'clock, I, for one, was pretty tired out!)

The Noel shore boasts the greatest tidal range in the world, so it had been arranged we arrive there just as the tide started to recede in order to walk most of the time dry-footed.

Beach at Bramber – *Rob Fensome*

The beauty of this Fundy Basin shore can't be overstated. I had been only once or twice before, and as I'd often found this past summer, having a 'stay-cation' in one of Canada's most lovely spots was not a hardship, but rather a chance to explore and appreciate places within a two-hour drive from Halifax. Nova Scotia is full of opportunities for wonderful day trips, such as this one along highway 215.

As someone pointed out later on, we really had three trips in one; the first – physically crossing the province from Halifax to the Noel Shore; the second – geologic time-travelling millions of years from the Cambrian Period half a billion years ago to the present; and the third – moving historically with the earth's land masses from the South Pole to here, 45 degrees latitude (Nova Scotia's southern sedimentary rocks were formed near the South Pole). Everyone laughed! It was that kind of wonderful, light-hearted day from beginning to end.

Perhaps the most difficult part of this journey was its lead up – three years and three frustrating cancellations! The original trip had been scheduled in and for 2018, but continuous downpours postponed that one; Hurricane Dorian negated the consequent 2019 spring slot; and then COVID-19 put a hold on it *again* earlier this year, when HFN had to cancel all their activities. But this time, with 'members only', and 'limited numbers' to ensure enough room for everybody to stay at a safe distance, coordinator Richard Beazley asked the Board if it would be OK to offer it with new guidelines. The Board agreed, with these stipulations – pre-registration was required, and the 18 (only) HFN member participants had to declare they were free of COVID-related symptoms, had not been in contact with anyone diagnosed with COVID, and had not travelled outside the Atlantic Bubble within the previous 14 days. That understood, most of the original HFN applicants eagerly signed up again. I hope there will be a repeat next year for those who could not be accommodated this time around.

So, after a three-year wait, it was with true delight that our masked group finally gathered at 10:00 a.m. at our first stop – Newport Landing at Avondale (about one hour from metro Halifax) – to meet with Rob Fensome. Thanks to Richard's pre-scouting (and probably Grace Beazley's navigation!) precise route and meeting place visuals were sent out to us (more than once) and people did not get confused by two almost identical-name places – Newport Landing and Newport Station – which are miles apart. Newport Landing is the wharf area of Avondale, famous now for its Avondale Sky Winery housed in a church pysically moved from Walton.

Car-pooling was then arranged for those who felt it was safe, and off we set for Cheverie, our second stop. For those not familiar, Cheverie Salt Marsh Restoration Trail parking lot is just opposite Cheverie Beach, where we parked. Looking across the water to the Blomidon shore, we could clearly see the outline of its cliffs. Right away Bob McDonald spotted a Sharp-shinned Hawk and an immature, mottled Bald Eagle. Then with binoculars out he also co-mented on the Common Eiders floating in the bay nearby.

Several participants had a hard time hearing Rob speak over the beautiful buzzing of bees in the purple clover – even with the microphone! There were giant rosehips too, and as soon as we got out of our cars, we were surrounded by nature. For those of us stuck at home for months, it's hard not to emphasise how restorative this field trip was, right from the get-go.

Back to the geology. Rob was the Project Coordinator for, and one of the co-editors and co-authors of, *The Last Billion Years: A Geological History of the Maritime Provinces of Canada* (a new edition is pending). He was also the lead editor/author of the more recently published *Four Billion Years and Counting: Canada's Geological Heritage*. He had prepared a geological account of all our trip's sites which Richard had sent each of us beforehand. Its useful, colour-coded maps showed our five stops' main geological features, with photos. In the field, Rob 'gathered us round' frequently, using his own laminated Avon River/western Noel Shore geological maps which exactly matched those we had been sent. While we didn't walk out on the Newport Landing marsh due to limited time and high tide, Rob noted it *was* worth a hike at low tide (in waterproof footwear) to see its unique sinkholes and Carboniferous reef-like deposits, or coquina, formed mainly of fossil brachiopods and bryozoans. Here also can be found fossil shells of gastropods (snails).

In a nutshell, Rob's introduction at tiny Newport Landing brought the whole of the Fundy area's geology to life in a very straightforward way. Nova Scotia's Bay of Fundy Shore, all the way from Joggins on Chignecto Bay to Blue Beach at the mouth of the Avon river, is the very best place in Canada to see the Carboniferous Period. Joggins Cliffs' fossil rocks were originally formed on the equator, and are famous for their fossil trees, the earliest-known reptile, and the earliest-known land snail (mentioned in Darwin's *Origin of Species*). Our famous Fundy cliffs, now a UNESCO Global Geopark, span 165 k of scenic shoreline, with 40 designated sites from Debert to the Three Sisters Cliffs past Eatonville, right out to Isle Haute – the Parrsboro shore. This area is the only place on Earth where geologists can see both the assembly of supercontinent Pangea 300 million years ago and its breakup 100 million years later.

Rob talked briefly about the different Carboniferous and Triassic rock groups (geological not musical) around the Bay of Fundy. We would be focusing on the Carboniferous Horton and Windsor Groups, predominant on the Noel Shore, but not confined to it. The Horton Group rocks are clearly evident at Blue Beach for example, where the rock appears to be grey, and the Windsor Group, noted for its white gypsum deposits, is also widely found across Nova Scotia.

We then got an overview and diagram of the earth's plate tectonics. I remember best that crustal movement is always occurring somewhere, causing frequent earthquakes. Rock goes through various changes, in eons-long geological cycles which see both creation and transformation. So due to natural forces – what wells up from beneath the earth's surface might become part of one of many different landscapes and other types of rock. Some rocks record the direction and inclination of the Earth's magnetic field, from which geologists can determine the latitudes at which they formed. Back in the Cambrian Period, 500 million years ago, Halifax's tectonic plate was at the South Pole. Since then, it has moved very slowly northward. By the time the Windsor gypsum at Cheverie (and elsewhere) formed, Nova Scotia had reached the tropics; since that time, it has slowly moved to its present position around 45 degrees latitude north.

Rob likened our Halifax to Cheverie trip segment to time travel, starting at the South Pole (Halifax) at 9:00 a.m., then driving through St.Croix (back then, just south of the equator, also where Joggins was, and now up to modern Cheverie (45 degrees north). Plate tectonics also explain how the Atlantic Ocean started to form about 180 million years ago and has been widening ever since by a few centimetres a year – at the same rate at which fingernails grow!

About 335 million years ago, a shallow Windsor Sea invaded low-lying parts of Atlantic Canada. The present exposed Cheverie rocks belong to this Windsor Group, a succession of sedimentary rocks deposited in and around that Windsor Sea. Back then, the region lay a few degrees south of the Equator. At times conditions were so hot and dry that sea waterwould evaporate, leaving deposits known as evaporites, such as the gypsum deposits there at Cheverie; those at St. Croix on Highway 101; the salt deposit at Malagash; and the potash deposit at Sussex, New Brunswick. Barite is another mineral associated with the Windsor Sea – there is a disused barite mine in the Walton area.

Sinkholes and caves are features created by chemical weathering and dissolution of the evaporite minerals and limestone by water. In 1991, it was a sinkhole in a gypsum quarry in which the remains of the 75,000-year-old Mastodon were discovered near Milford, resulting in Mastodon Ridge and its mastodon replica on Hwy 102 near Stewiacke. This ridge overlooks the Stewiacke and Shubenacadie Rivers, two rivers of great beauty that flow into the Bay of Fundy.

After Rob's introduction, We got out and walked along Cheverie Beach, crunching over lumps of white, soft gypsum. Interesting shapes of eroded pieces falling off the low cliffs are created by the tides there. Gypsum within the earth's crust behaves a bit like toothpaste and will squeeze up into younger rocks, forming structures known as diapirs. Cheverie Beach has one associated with a fault running through its shoreline. This is marked by a belt of ground-up rock containing gypsum veins. Along this fault, the gypsum is all ground up and looks like grainy white toothpaste. Standing there and looking up at the cliff, we noticed the slight dome at one particlular place – grey above and white below; the gypsum is still pushing up here, due to the weight of overlying strata.

I like that different types of gypsum have different names – there is an opaque type known as satin spar, as it is soft and smooth; in fact, bits of it look and feel like worn down bars of white soap. Another kind we saw exhibited some recrystalisation and these pieces were shiny and sparkly. Gypsum originally formed in the sea and here, at Cheverie, it is being dissolved and returned back to its origins.

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Another type of gypsum is called 'tapioca' rock, made up of recrystallised gypsum, and these granular gypsum crystals resembled chalk. Cheverie's gypsum is interlayered with dark, nubbly layers of mudstone. Mudstone is very organic (the reason it is dark) due to the degraded remains of algae that lived in the Windsor Sea. This is the kind of material that gives rise to oil and natural gas, and if you break off a piece, it smells like a gas station! A late colleague of Rob's used to demonstrate the oil-rich nature of the mudstone in the field with Bunsen Burner, test tube, and a fragment of mudstone. When heated in the test tube, the rock generated oil. Another rock, mylonite, is found here; it looks like powdery grey rock. It was formed as a result of more conventional rocks grinding up along an active fault.

From Cheverie Beach, Cape Blomidon can be seen in the distance, capped by the latest Triassic basalt of the Fundy Group. When Pangea broke apart it created a series of rift valleys; one of them is the Fundy Basin. Another developed into the Atlantic Ocean; in this sense Rob noted the Fundy Basin could be considered a failed ocean!

With the area's geological history clearly explained, after Cheverie, we drove to our third stop along Hwy 215 – Walton (the furthest field trip site), where we lunched at Walton Lighthouse Park. This little park overlooked both the river mouth and the sea, now ebbing fast. Now one could see that the seemingly narrow river mouth where it emptied into the sea was in fact very wide and deep. The picnic area was a very scenic spot and people had lots of space to distance themselves from one another. I didn't mind queuing for the one outdoor toilet; there was a restaurant nearby, but most of us were happier to eat outdoors.

A plaque in the Museum Lighthouse describes the history of the Walton barite mine. It operated between 1941 and 1978, and had the world's largest source of this mineral, an ingredient for a special type of plaster. From the Lighthouse one can look southwest to see Blomidon and the view across the Fundy flats is incredible. The Park's exposed tidal flats and channels held many shorebirds, and the view seemed to go on for miles before the basin's water appeared in the distance. As Rob had described in the Field Guide, we were standing not far from Burntcoat Head, which is the world's largest tidal range record holder.

The story goes of how Avondale church, originally here at Walton, was moved from a steep nearby hilltop down to a waiting barge. The church did eventually make its journey along the coast, but it was tricky, since timing was crucial because of having to move it onto the barge at exactly the right tide level.

It wasn't always easy to tell where we were going next so it was good that when turned around from Walton and drove back from where we had come it was in a small convoy. Our fourth stop, Rainy Cove near Pembroke, was a mere cluster of a few houses. Pembroke is closer to Rainy Cove than Walton, but if I'd been by myself, I don't think I'd have found the correct Hwy 215 turn-off to it.

The bedrock here was again of the Horton Group – Horton Bluff. Strolling along the beach, Wendy McDonald found what looked to the both of us to be a piece of fossilised wood. Along the first part of the beach are mudstones and sandstones, deposited in rivers and lakes before the Windsor gypsum was. Marion Senson asked Rob to explain the colourful swirls on the surface of some of these; he said they were Liesegang Rings, and were due to modern chemical weathering ('rotting' of the rock). Their scattered, orange- and black-striped surfaces made for interesting souvenirs, and many small pieces were admired. I brought one home about the size and shape of a liquorice lozenge and it now lives alongside my bathroom sink.

Even further along the this beach is a major feature known as an unconformity, where rocks of a much younger age lie discordantly over older ones: here, Triassic Fundy Group Wolfville Formation rocks overlie Horton Group rocks. Unconformities are important to geologists' understanding of geological time. Late eighteenth century Scottish geologist James Hutton was first to recognise the importance of unconformities in understanding the Earth as extremely ancient; he is recognised today as the discoverer of 'Deep Time'. This same unconformity we saw here at Rainy Cove can also be glimpsed from the estuary at Walton, but not so clearly or closely. Once again, the layer on top (Wolfville) is younger than the layer beneath (Horton) by about 130 million years. Walking further along the beach, we saw many Dagger Moth caterpillars crawling around looking for food, having been blown off the cliffs by the very strong winds the day before. Unfortunately, they would starve to death as a result.

Leaving Rainy Cove, we passed about 40 people on ATVs getting ready to race along the low tide shoreline. They were already covered with mud from helmet to toe, and I expect this rich goo just gets washed back into the ocean!

Our fifth and last stop was at Mutton Cove to see the Horton Group rocks near Bramber. (On the west side of the Avon River the Horton Bluff Formation is better known in the Blue Beach area for its rich fossils, including footprints of tetrapods – four-footed creatures). Here on the Noel Shore it is seen in the strata of shoreline exposures, and the Horton dark mudstones are predominant. These sediments originated from isolated lakes and rivers flowing down into the Minas sub-basin between the highland areas. There is a wonderful view here of Five Islands across the Minas Basin. There were impressions of water-current ripples and Lycopsids (clubmosses or 'ground pine') along the beach. Lesley Jane Butters was among the few to get far enough along the beach to see an anticline, and the active erosion along the coast was very much in evidence.

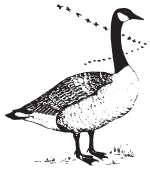
Bob McDonald kept a bird tally. Among the birds were Sanderlings, many Semi-palmated Plovers, and Semi-palmated Sandpipers – all fattening up before migrating south.

This was the first HFN field trip in quite awhile. There was lots of catching up to do up with old friends, and we had time to make some new acquaintances too. For those of you familiar with the Noel Shore in summer, you will know its beautiful shoreline, and while the countryside there is fertile and full of farms, there are still many charming parks and marshes. On this lovely September day, it was wonderful to see green and golden fields; it reminded me of Dylan Thomas' famous poem, "Fern Hill", which I had to learn by heart in my seventies-era Dublin high school. I know I speak on behalf of all participants to say we learned a lot and fell in love with our fossilised province (to use one of Rob's expressions) all over again.

NOEL SHORE BIRD SPECIES

– Bob McDonald

Canada Goose *Branta canadensis*
Fairly large number, not countable, Avondale Rd.
Mallard, 20 *Anas platyrhynchos*
American Black Duck, 40 *A. rubripes*
Rock Pigeon, 4 *Columba livia*
- a couple near the town
Mourning Dove, 12 *Zenaida macroura*
Semipalmated Plover, 20 *Charadrius semipalmatus*
Sanderling, 15 *Calidris alba*
Semipalmated Sandpiper, 20 *C. pusilla*
Ring-billed Gull, 20 *Larus delawarensis*
Herring Gull, 40 *L. argentatus*
Great Black-backed Gull, 4 *L. marinus*
Double-crested Cormorant, 6 *Phalacrocorax auritus*
Great Blue Heron,1 *Ardea herodias*
Turkey Vulture, 1 *Cathartes aura*
Sharp-shinned Hawk, 2 *Accipiter striatus*
Bald Eagle, 2 *Haliæetus leucocephalus*
- 1 adult, Walton lighthouse; 1 immature near Cheverie
Red-tailed Hawk, 1 *Buteo jamaicensis*
- circling overhead at Rainy Cove
Northern Flicker, 3 *Colaptes auratus*
Blue Jay *Cyanocitta cristata*
American Crow *Corvus brachyrhynchos*
Common Raven,1 *Corvus corax*
- scolding the Red-tailed Hawk
European Starling *Sturnus vulgaris*
American Robin *Turdus migratorius*
American Goldfinch *Spinus tristis*
Song Sparrow *Melospiza melodia*
Common Grackle, 150
- several fairly large groups near Cheverie.


2020 GLOBAL BIRD COUNT

– Kerrie Wilcox, Canadian Coordinaltor

Take Part! Not only have birds kept us entertained during this world-wide pandemic, but they have also made us feel happier and less stressed. **The Great Backyard Bird Count** – this year from Feb. 12th to the 15th – is a 4-day annual event which will provide both a snapshot of where birds are around the world and a welcome break from daily worries.

Last year, there were 6,942 species recorded and 268,674 checklists submitted! You count birds for at least 15 minutes on one or more days of the count, at anywhere you choose (even from inside), then enter your sightings at **BirdCount.org**. Tens of thousands of volunteers gather the results; this helps track changes in bird populations on a massive scale. Partners in the Count are Birds Canada, the Cornell Ornithology Lab, and the National Audubon Society. Our website **www.birdcount.org** will help you quickly find resources to make your count a success! Please share this with anyone else who may enjoy participating.

Contact Kerrie at Birds Canada, **1-888-448-2473, ext. 134.**

NATURE NOTES

OCTOBER

Judy Keating noted as she was walking in the woods near her home she saw an egg lying on the grass. It was a speckled egg about one inch in size. She wondered if anyone knew what type of egg it was?? It was not in a nest, just sitting on the grass.

Regine Maass held up a small branch with several leaves from her **Umbrella Magnolia, *Magnolia tripetala*.** This particlular species produces very large, white, 'upside-down' flowers which Regine said attract a plethora of bees. Under the leaves of her proffered branch was a good-sized red pod full of seeds. She noted that as summer progresses, flocks of birds are attracted to come and eat them. She wanted to show us this interesting seed pod, as many of them had burst into her garden under their parent tree, producing lots of **small Magnolia seedlings**. (Some of us asked if she would share some of them) If you go to the Public Gardens (where we met for this October's meeting) and watch the birds in the little fountain there, looking up from that location you will see this magnolia, which has been dedicated to a Halifax Counsellor.

Wendy mentioned that all her **Monarch Butterflies** had hatched; she had kept these chrysalises on **Milkweed** in her home. She wonders if anyone else had Milkweed on their property.

Shirley McIntyre mentioned an item by a gardener she knows, Donna Evans, about turning part of her property into a wildlife meadow, and all the trials and tribulations with neighbours and HRM that went along with it. She mentioned also that **Monarchs** are attracted to all **milkweed species**; this summer there were many **Monarch caterpillars and their chrysalyses** which had hatched successfully in Kingswood Subdivision.

Stephanie Robertson mentioned that Blomidon Naturalists have published a new, pocket-sized wildflower guide – *Nova Scotia Native Wildflowers and Shrubs*. Later on, she told of sightings of **owls, Pheasants, and Bald Eagles** at Whynacht's Point, Tantallon.

On the evening of September 20th, at Bishop's Landing, Grace Beazley observed **Cormorants** drying out their wings by spreading them out for the longest time, waiting for them to fully dry. She wondered if it wouldn't tire them out; Richard commented "Not if you're a Cormorant!"

Milly MacCormack reminded us that this evening, October 1st, was an evening with a **Harvest Moon**. She also highly recommended the book *What's It Like To Be A Bird,* By David Sibling.

Janet Chapman recommended an excellent book about water plants – *Underwater Plants,* which she discovered after trying to ID some pond weeds.

Judy Keating informed us about a new group called Transition Bay, which is organising a seed-saving and seed-sharing bank in St. Margaret's Bay; go to **transitionbay.ca**.

– Janet Dalton & Stephanie Robertson

NEW AND RETURNING

Geoffrey Grantham
Ann-Noreen Norton

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ALMANAC

This almanac is for the dates of events which are not found in our HFN programme: for field trips or lectures which members might like to attend, or natural happenings to watch for, such as eclipses, comets, average migration dates, expected blooming seasons, etc. Please suggest other suitable items.

> "Canadians are fond of a good disaster, especially if it has ice, water, or snow in it. You thought the national flag was about a leaf, didn't you? Look harder. It's where someone got axed in the snow."
> ***– Margaret Atwood, in "Strange Things: The Malevolent North in Canadian Literature", 1995***

NATURAL EVENTS

7-11 Dec. Earliest Sunset of the year at 16:33 AST.
7 Dec. Daily average temperature goes below 0˚C.
13/14 Dec. Geminid Meteor Shower.
14 Dec. -5 Jan. Audubon Christmas Bird Count Period.
21 Dec. Winter Solstice at 06:02 AST. Winter begins in the Northern Hemisphere; though the temperature drops, the days begin to lengthen.
29-31 Dec. Latest Sunrise of the Year at 07:51 AST.
29 Dec. Full Moon. Moonrise at 16:14 AST.
9 Jan. Mercury is very close to Saturn just after sunset.
10 Jan. Mercury, Saturn. and Jupiter will form a 'planetary triangle' in the night sky.
11 Jan. Mercury is very close to Jupiter after sunset.
28 Jan. Full Moon. Moonrise at 17:04 AST.
30 Jan.- 31 Jan. Eagle Watch Weekend 1 in Sheffield Mills.
6 Feb.- 7 Feb. Eagle Watch Weekend 2 in Sheffield Mills.
27 Feb. Full Moon. Moonrise at 18:26 AST.
19 Feb. Anniversary of 'White Juan', the huge blizzard of 2004.
14 Mar. Daylight Saving Time starts on Sunday, March 14th at 02:00 a.m.
20 Mar. Vernal Equinox at 06:37 ADT.
28 Mar. Full Moon. Moonrise at 19:35 ADT.

– Sources: Atmospheric Environment Service, Climate Normals 1951-80 Halifax (Shearwater A) N.S.; Blomidon Naturalists Society; 2020 and 2021 Calendars; https://www.timeanddate.com/

SUNRISE AND SUNSET ON FALL AND EARLY WINTER SATURDAYS FOR HALIFAX: 44 39 N, 063 36 W

5	**Dec.**	07:35	16:34	**2**	**Jan.**	07:51	16:45
12	**Dec.**	07:42	16:34	**9**	**Jan.**	07:50	16:53
19	**Dec.**	07:47	16:36	**16**	**Jan.**	07:47	17:01
26	**Dec.**	07:50	16:40	**23**	**Jan.**	07:41	17:10
				30	**Jan.**	07:35	17:20
6	**Feb.**	07:26	17:30	**6**	**Mar.**	06:42	18:09
13	**Feb.**	07:17	17:40	**13**	**Mar.**	06:29	18:18
20	**Feb.**	07:06	17:50	**20**	**Mar.**	07:17	19:27
27	**Feb.**	06:54	17.59	**27**	**Mar.**	07:04	19:35

ORGANISATIONAL EVENTS

Halifax Field Naturalists: Due to ongoing COVID-19 safety criteria, all future hikes will be organised based on the whatever Covid restrictions are in place at the time, and members will receive notifications via email about upcoming events. For more information, go to **http://www.halifaxfieldnaturalists.ca/**.

Nova Scotia Bird Society:

14 Dec.- 5 Jan. Christmas Bird Counts at many places. For contacts and more info go to **http://www.nsbirdsociety.ca/**.

– compiled by Patricia Chalmers

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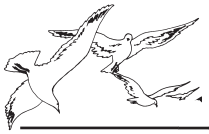
HALIFAX TIDE TABLE



January-janvier

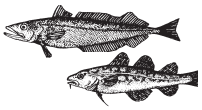
Day	Time	Metres	Feet	jour	heure	mètres	pieds
1	0320	**0.6**	2.0	**16**	0436	**0.5**	1.6
	0911	**1.8**	5.9		1006	**1.8**	5.9
FR	1557	**0.2**	0.7	SA	1654	**0.3**	1.0
VE	2158	**1.7**	5.6	SA	2244	**1.8**	5.9
2	0407	**0.6**	2.0	**17**	0526	**0.6**	2.0
	0953	**1.8**	5.9		1051	**1.8**	5.9
SA	1641	**0.2**	0.7	SU	1736	**0.4**	1.3
SA	2239	**1.7**	5.6	DI	2325	**1.8**	5.9
3	0459	**0.6**	2.0	**18**	0617	**0.6**	2.0
	1036	**1.8**	5.9		1135	**1.7**	5.6
SU	1729	**0.2**	0.7	MO	1818	**0.5**	1.6
DI	2322	**1.7**	5.6	LU			
4	0557	**0.6**	2.0	**19**	0008	**1.7**	5.6
	1122	**1.7**	5.6		0708	**0.6**	2.0
MO	1819	**0.3**	1.0	TU	1221	**1.6**	5.2
LU				MA	1900	**0.5**	1.6
5	0007	**1.7**	5.6	**20**	0052	**1.7**	5.6
	0657	**0.5**	1.6		0759	**0.6**	2.0
TU	1213	**1.7**	5.6	WE	1310	**1.5**	4.9
MA	1911	**0.3**	1.0	ME	1946	**0.6**	2.0
6	0055	**1.7**	5.6	**21**	0141	**1.6**	5.2
	0757	**0.5**	1.6		0849	**0.6**	2.0
WE	1310	**1.6**	5.2	TH	1406	**1.4**	4.6
ME	2006	**0.4**	1.3	JE	2035	**0.7**	2.3
7	0149	**1.7**	5.6	**22**	0235	**1.6**	5.2
	0857	**0.4**	1.3		0937	**0.6**	2.0
TH	1416	**1.6**	5.2	FR	1512	**1.4**	4.6
JE	2104	**0.4**	1.3	VE	2129	**0.7**	2.3
8	0249	**1.8**	5.9	**23**	0331	**1.6**	5.2
	0956	**0.3**	1.0		1025	**0.6**	2.0
FR	1529	**1.5**	4.9	SA	1620	**1.4**	4.6
VE	2204	**0.4**	1.3	SA	2224	**0.7**	2.3
9	0352	**1.8**	5.9	**24**	0425	**1.6**	5.2
	1056	**0.2**	0.7		1111	**0.5**	1.6
SA	1641	**1.6**	5.2	SU	1720	**1.4**	4.6
SA	2307	**0.4**	1.3	DI	2317	**0.7**	2.3
10	0454	**1.8**	5.9	**25**	0515	**1.6**	5.2
	1156	**0.2**	0.7		1158	**0.4**	1.3
SU	1745	**1.6**	5.2	MO	1810	**1.5**	4.9
DI				LU			
11	0009	**0.4**	1.3	**26**	0006	**0.7**	2.3
	0553	**1.9**	6.2		0601	**1.7**	5.6
MO	1252	**0.1**	0.3	TU	1243	**0.3**	1.0
LU	1843	**1.7**	5.6	MA	1854	**1.5**	4.9
12	0108	**0.4**	1.3	**27**	0050	**0.6**	2.0
	0649	**1.9**	6.2		0645	**1.7**	5.6
TU	1346	**0.1**	0.3	WE	1327	**0.2**	0.7
MA	1937	**1.8**	5.9	ME	1935	**1.6**	5.2
13	0203	**0.4**	1.3	**28**	0133	**0.5**	1.6
	0742	**1.9**	6.2		0728	**1.8**	5.9
WE	1436	**0.1**	0.3	TH	1410	**0.2**	0.7
ME	2028	**1.8**	5.9	JE	2016	**1.6**	5.2
14	0256	**0.4**	1.3	**29**	0216	**0.5**	1.6
	0832	**1.9**	6.2		0811	**1.9**	6.2
TH	1524	**0.1**	0.3	FR	1453	**0.1**	0.3
JE	2116	**1.8**	5.9	VE	2056	**1.7**	5.6
15	0346	**0.5**	1.6	**30**	0301	**0.4**	1.3
	0920	**1.9**	6.2		0854	**1.9**	6.2
FR	1610	**0.2**	0.7	SA	1535	**0.1**	0.3
VE	2201	**1.8**	5.9	SA	2137	**1.7**	5.6
				31	0350	**0.4**	1.3
					0937	**1.9**	6.2
				SU	1618	**0.1**	0.3
				DI	2218	**1.8**	5.9

February-février

Day	Time	Metres	Feet	jour	heure	mètres	pieds
1	0442	**0.4**	1.3	**16**	0528	**0.5**	1.6
	1022	**1.8**	5.9		1104	**1.7**	5.6
MO	1704	**0.1**	0.3	TU	1723	**0.5**	1.6
LU	2259	**1.8**	5.9	MA	2327	**1.7**	5.6
2	0539	**0.4**	1.3	**17**	0613	**0.6**	2.0
	1108	**1.8**	5.9		1145	**1.6**	5.2
TU	1755	**0.2**	0.7	WE	1759	**0.6**	2.0
MA	2343	**1.8**	5.9	ME			
3	0639	**0.4**	1.3	**18**	0006	**1.7**	5.6
	1158	**1.7**	5.6		0700	**0.6**	2.0
WE	1850	**0.3**	1.0	TH	1228	**1.5**	4.9
ME				JE	1845	**0.7**	2.3
4	0029	**1.8**	5.9	**19**	0048	**1.6**	5.2
	0739	**0.3**	1.0		0749	**0.6**	2.0
TH	1253	**1.6**	5.2	FR	1316	**1.4**	4.6
JE	1950	**0.4**	1.3	VE	1940	**0.7**	2.3
5	0121	**1.7**	5.6	**20**	0135	**1.6**	5.2
	0839	**0.3**	1.0		0840	**0.6**	2.0
FR	1355	**1.5**	4.9	SA	1416	**1.4**	4.6
VE	2052	**0.5**	1.6	SA	2041	**0.8**	2.6
6	0220	**1.7**	5.6	**21**	0230	**1.5**	4.9
	0941	**0.3**	1.0		0932	**0.6**	2.0
SA	1508	**1.5**	4.9	SU	1530	**1.4**	4.6
SA	2156	**0.5**	1.6	DI	2142	**0.8**	2.6
7	0329	**1.7**	5.6	**22**	0334	**1.5**	4.9
	1042	**0.3**	1.0		1025	**0.5**	1.6
SU	1627	**1.5**	4.9	MO	1643	**1.4**	4.6
DI	2300	**0.5**	1.6	LU	2239	**0.7**	2.3
8	0439	**1.7**	5.6	**23**	0437	**1.6**	5.2
	1142	**0.2**	0.7		1119	**0.4**	1.3
MO	1737	**1.6**	5.2	TU	1739	**1.5**	4.9
LU				MA	2331	**0.7**	2.3
9	0002	**0.5**	1.6	**24**	0531	**1.7**	5.6
	0544	**1.8**	5.9		1210	**0.3**	1.0
TU	1239	**0.2**	0.7	WE	1825	**1.6**	5.2
MA	1835	**1.7**	5.6	ME			
10	0059	**0.5**	1.6	**25**	0019	**0.6**	2.0
	0640	**1.8**	5.9		0620	**1.8**	5.9
WE	1331	**0.2**	0.7	TH	1257	**0.2**	0.7
ME	1926	**1.7**	5.6	JE	1907	**1.6**	5.2
11	0151	**0.4**	1.3	**26**	0106	**0.5**	1.6
	0730	**1.9**	6.2		0705	**1.8**	5.9
TH	1419	**0.2**	0.7	FR	1342	**0.1**	0.3
JE	2012	**1.8**	5.9	VE	1947	**1.7**	5.6
12	0238	**0.4**	1.3	**27**	0154	**0.4**	1.3
	0817	**1.9**	6.2		0749	**1.9**	6.2
FR	1502	**0.2**	0.7	SA	1424	**0.0**	0.0
VE	2054	**1.8**	5.9	SA	2028	**1.8**	5.9
13	0323	**0.4**	1.3	**28**	0242	**0.3**	1.0
	0901	**1.9**	6.2		0834	**1.9**	6.2
SA	1541	**0.2**	0.7	SU	1506	**0.0**	0.0
SA	2134	**1.8**	5.9	DI	2109	**1.9**	6.2
14	0404	**0.5**	1.6				
	0943	**1.8**	5.9				
SU	1617	**0.3**	1.0				
DI	2212	**1.8**	5.9				
15	0446	**0.5**	1.6				
	1024	**1.7**	5.6				
MO	1651	**0.4**	1.3				
LU	2250	**1.8**	5.9				

March-mars

Day	Time	Metres	Feet	jour	heure	mètres	pieds
1	0332	**0.2**	0.7	**16**	0405	**0.4**	1.3
	0920	**1.9**	6.2		0957	**1.7**	5.6
MO	1550	**0.0**	0.0	TU	1606	**0.5**	1.6
LU	2151	**1.9**	6.2	MA	2211	**1.8**	5.9
2	0425	**0.2**	0.7	**17**	0440	**0.5**	1.6
	1006	**1.8**	5.9		1035	**1.6**	5.2
TU	1638	**0.1**	0.3	WE	1633	**0.6**	2.0
MA	2234	**1.9**	6.2	ME	2246	**1.7**	5.6
3	0521	**0.2**	0.7	**18**	0518	**0.5**	1.6
	1054	**1.8**	5.9		1113	**1.6**	5.2
WE	1733	**0.2**	0.7	TH	1707	**0.6**	2.0
ME	2318	**1.9**	6.2	JE	2321	**1.7**	5.6
4	0620	**0.2**	0.7	**19**	0602	**0.6**	2.0
	1143	**1.7**	5.6		1152	**1.5**	4.9
TH	1834	**0.3**	1.0	FR	1754	**0.7**	2.3
JE				VE	2359	**1.6**	5.2
5	0005	**1.8**	5.9	**20**	0653	**0.6**	2.0
	0721	**0.3**	1.0		1235	**1.5**	4.9
FR	1236	**1.6**	5.2	SA	1858	**0.8**	2.6
VE	1940	**0.4**	1.3	SA			
6	0057	**1.7**	5.6	**21**	0041	**1.6**	5.2
	0824	**0.3**	1.0		0748	**0.6**	2.0
SA	1338	**1.5**	4.9	SU	1327	**1.4**	4.6
SA	2045	**0.5**	1.6	DI	2005	**0.8**	2.6
7	0158	**1.6**	5.2	**22**	0133	**1.5**	4.9
	0926	**0.3**	1.0		0845	**0.6**	2.0
SU	1454	**1.5**	4.9	MO	1437	**1.4**	4.6
DI	2150	**0.5**	1.6	LU	2107	**0.8**	2.6
8	0312	**1.6**	5.2	**23**	0240	**1.5**	4.9
	1028	**0.3**	1.0		0942	**0.5**	1.6
MO	1623	**1.5**	4.9	TU	1559	**1.4**	4.6
LU	2254	**0.5**	1.6	MA	2204	**0.8**	2.6
9	0432	**1.6**	5.2	**24**	0354	**1.6**	5.2
	1128	**0.3**	1.0		1039	**0.5**	1.6
TU	1732	**1.6**	5.2	WE	1703	**1.5**	4.9
MA	2353	**0.5**	1.6	ME	2258	**0.7**	2.3
10	0538	**1.7**	5.6	**25**	0458	**1.7**	5.6
	1223	**0.3**	1.0		1132	**0.3**	1.0
WE	1824	**1.7**	5.6	TH	1750	**1.6**	5.2
ME				JE	2351	**0.5**	1.6
11	0047	**0.5**	1.6	**26**	0551	**1.8**	5.9
	0630	**1.8**	5.9		1221	**0.2**	0.7
TH	1313	**0.2**	0.7	FR	1833	**1.7**	5.6
JE	1908	**1.7**	5.6	VE			
12	0135	**0.4**	1.3	**27**	0042	**0.4**	1.3
	0716	**1.8**	5.9		0639	**1.8**	5.9
FR	1357	**0.2**	0.7	SA	1307	**0.1**	0.3
VE	1948	**1.8**	5.9	SA	1914	**1.8**	5.9
13	0218	**0.4**	1.3	**28**	0133	**0.2**	0.7
	0758	**1.8**	5.9		0726	**1.9**	6.2
SA	1436	**0.2**	0.7	SU	1351	**0.0**	0.0
SA	2026	**1.8**	5.9	DI	1956	**1.9**	6.2
14	0256	**0.4**	1.3	**29**	0223	**0.1**	0.3
	0839	**1.8**	5.9		0813	**1.9**	6.2
SU	1510	**0.3**	1.0	MO	1436	**0.0**	0.0
DI	2102	**1.8**	5.9	LU	2039	**2.0**	6.6
15	0331	**0.4**	1.3	**30**	0314	**0.1**	0.3
	0918	**1.8**	5.9		0901	**1.8**	5.9
MO	1540	**0.4**	1.3	TU	1524	**0.1**	0.3
LU	2137	**1.8**	5.9	MA	2123	**2.0**	6.6
				31	0407	**0.0**	0.0
					0950	**1.8**	5.9
				WE	1616	**0.2**	0.7
				ME	2208	**2.0**	6.6



ALL TIMES ARE AST

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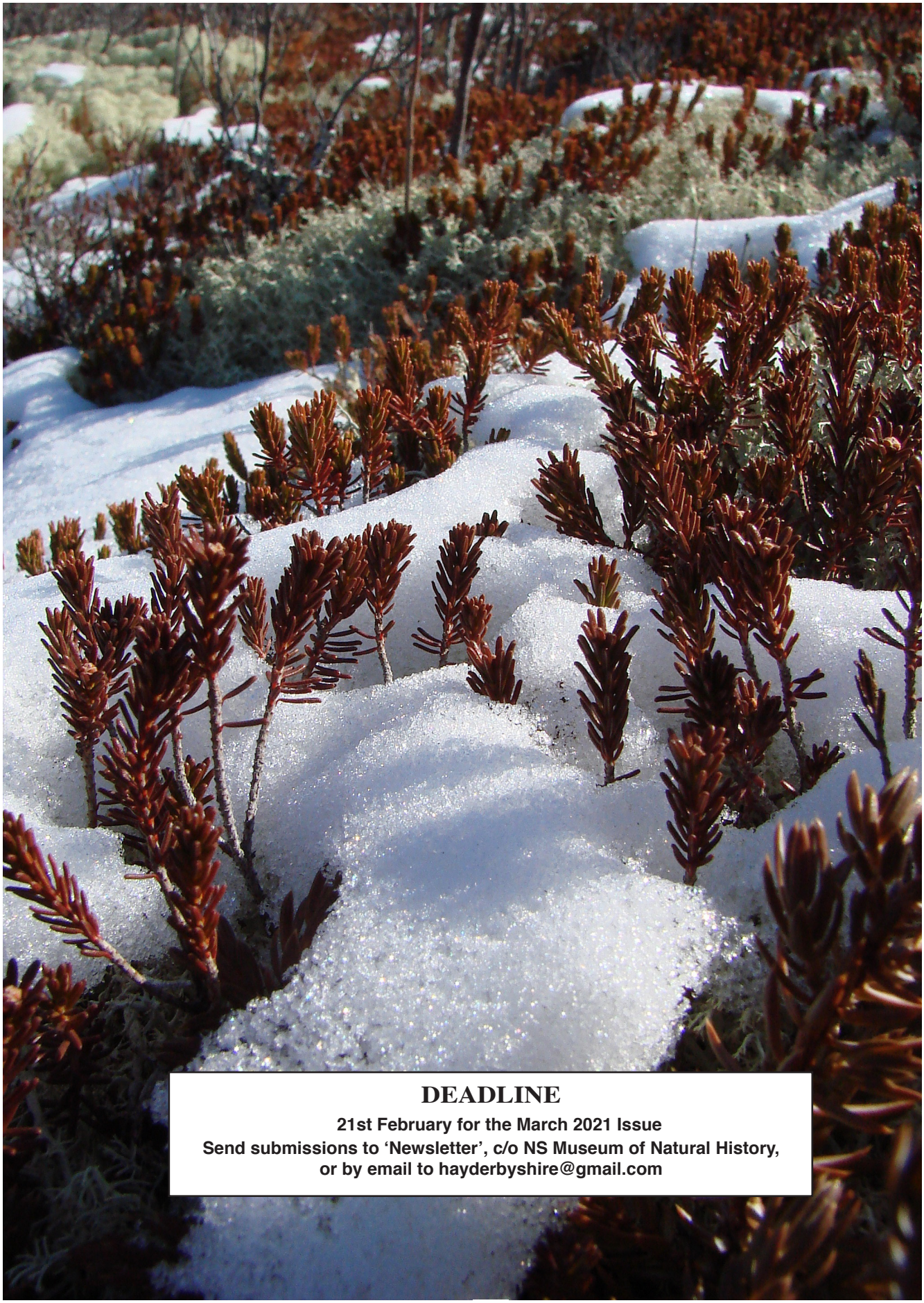

DEADLINE

21st February for the March 2021 Issue
Send submissions to 'Newsletter', c/o NS Museum of Natural History,
or by email to hayderbyshire@gmail.com