

THE HALIFAX FIELD NATURALIST



No. 174
March to May 2019



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Return address: HFN, c/o NS Museum of Natural History, 1747 Summer Street, Halifax, NS, B3H 3A6

HFN is incorporated under the Nova Scotia Societies Act and holds Registered Charity status with the Canada Revenue Agency. Tax-creditable receipts will be issued for individual and corporate gifts. **HFN** is an affiliate of Nature Canada and an organisational member of Nature Nova Scotia, the provincial umbrella association for naturalist groups. **Objectives** are to encourage a greater appreciation and understanding of Nova Scotia's natural history, both within the membership of HFN and in the public at large, and to represent the interests of naturalists by encouraging the conservation of Nova Scotia's natural resources. **Meetings** are held, except for July and August, on the first Thursday of every month at 7:30 p.m. in the auditorium of the Nova Scotia Museum of Natural History, 1747 Summer Street, Halifax; they are open to the public. **Field Trips** are held at least once a month; it is appreciated if those travelling in someone else's car share the cost of the gas. **Participants** in HFN activities are responsible for their own safety. Everyone, member or not, is welcome to take part in field trips. **Memberships** are open to anyone interested in the natural history of Nova Scotia. Forms are available at any meeting of the society, or by writing to: Membership Secretary, Halifax Field Naturalists, c/o N.S. Museum of Natural History. Members receive **The Halifax Field Naturalist**, along with its included **Programme**, quarterly. Our membership year is from January 1st to December 31st, and new memberships received from September 1st to December 31st of any year are valid until the end of the following membership year.



Halifax Field Naturalists, c/o N.S. Museum of Natural History, 1747 Summer St., Hfx, N.S., B3H 3A6 **Email:** hfninfo@yahoo.ca
Website: halifaxfieldnaturalists.ca **Facebook** – enter **Halifax Field Naturalists** or **HFN**.

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COMMITTEES	2018
Membership	Ron Arsenault 410-6868
Programme	
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Talks/Trips	Denyse Contrasty 478-1706
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	Molly LeBlanc (Chair)..... 403-1339
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	Lesley Jane Butters
	Janet Dalton.....
	L. Paris.....
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	Diane Birch
Conservation	Richard Beazley..... 429-6626
	Bob McDonald 443-5051
	David Patriquin..... 423-5716
	Clare Robinson 446-6603
NNS Rep.	Ron Arsenault 410-6868
YNC Rep.	David Patriquin..... 423-5716
Website	David Patriquin..... 423-5716
	Burkhard Plache 475-1129
CSC Award	Elliott Hayes 835-9819
	Doug Linzey 1-902-582-7176
	David Patriquin..... 423-5716
	Allan Robertson 422-6326
HFN Book Club	Brian Bartlett 420-0315
FEES	2019
Student	\$15.00 per year
Individual	\$20.00 per year
Family	\$25.00 per year
Supporting	\$30.00 per year
Institutional	\$30.00 per year
NNS (opt.)	\$5.00 per year

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GRAPHICS All uncredited illustrations are by H. Derbyshire or from copyright-free sources. **Front Cover** - Woodland trail, Richard Beazley; p.4 - Yellow-bellied sapsucker, Pinterest; **Back Cover** - Winter waterfall, Richard Beazley; **Winter 2018 Tide Table** - Canadian Hydrographic Service, Fisheries & Oceans Canada.

HFN NEWS AND ANNOUNCEMENTS

OUR PROVINCIAL LICHEN

LichenNS, a group of like-minded lichen enthusiasts, recently held a public poll to vote and to choose an official Nova Scotia Provincial Lichen Species. Over 565 people responded, and at our February monthly meeting Bob McDonald announced the winner – the Blue Felt Lichen *Pecteneae Plumbea*. This species turns a beautiful deep blue when wet, and sports a thick, grey, scalloped body (thallus) topped with red-brown fruiting bodies which rest on a thick, blue-black fungal mat. It's the only species of the genus known in North America, and its main population is found here in Nova Scotia, recorded from over 425 sites. Blue Felt Lichen prefers humid low-lying areas with mature Red Maples, swamps, near rivers or lakes, or upland hardwood stands not far from the coast. It's also found on mature Sugar Maples, ash, Yellow Birch, poplar, or Eastern Cedar.

New Brunswick chose the Beard Lichen *Usnea longissima*, and Newfoundland chose the Newfoundland Reindeer Lichen *Cladonia terra-novae*. Each province will submit its choice to the Ottawa Museum of Nature who will publish a paper on each one of them.



NATURE CHALLENGE!

WHAT – The City Nature Challenge (CNC) is a global bioblitz event which celebrates citizen scientists, biodiversity, and our environment. It will provide valuable information to scientists about our natural world. Over four days, world cities will compete for the most nature observations, the most species, and the most participants. Started in 2016 as a competition between San Francisco and Los Angeles, it has grown exponentially to now include some 170+ cities, as far flung as Port Harcourt, Nigeria; Rome, Italy; and Lima, Peru. Three Canadian cities are registered this year – Richmond, British Columbia; Calgary, Alberta; and Halifax, Nova Scotia.

Because of our size and our many diverse habitats, including our wonderful coastal shorelines, HRM has a chance to maximize our place in this big picture.

WHEN – **April 26th to April 29th** - taking pictures of wild animals, plants, and all other life. **April 30th to May 4th** - identifying what was found. **May 6th** - winners announced!

HOW – Participants in the CNC are strongly encouraged to download and use the online platform iNaturalist to record observations. To register, go to [iNaturalist.ca](https://www.inaturalist.ca) and sign in. Pull down the menu under 'Community', click on 'Projects' and look for City Nature Challenge 2019, where you can register.

Using your mobile device or camera and desktop computer, simply snap a picture of any plant, insect, animal, fungi, slime mold, or any other evidence of life (scat, fur, tracks, shells, carcasses!) and upload the photo to iNat. And/or upload the free iNaturalist app onto your smart phone to upload observations directly from the field (if you have a data plan) or to upload later wherever you receive good Wi-Fi. It's important that your image is clear and identifiable. If your photo includes two species, that's OK; just re-enter with the second species named or unidentified.

A global group of curators and experts will help identify

what you saw and verify the data for use by scientists.

WHERE – Throughout the entirety of Halifax Regional Municipality. Any nature observations within this boundary uploaded to iNaturalist will be included.

WHO – EVERYONE!! You can participate individually, with your family, or as part of a nature club or team. One event that is planned is a mini-bioblitz of the Purcell's Cove Lands area. Contact Bob McDonald at bobathome@gmail.com.

NB! - The CNC Halifax committee will be hosting several iNaturalist **training workshops** in advance of the event including two with CNC Halifax Chair David Ireland:

April 6th, 10:30 a.m. to 2:30 p.m. at the Fairbanks Centre, Shubie Park, Dartmouth; and **April 7th, 2:30 p.m.**, at the Keshen Goodman Library. For more details go to **Facebook Page: @CityNatureChallengeHFX**.

CONTACT – For more info - Dave Ireland, iNaturalist Canada, CNC Halifax Chair, davehiredland@yahoo.ca, or Mary Kennedy, COINAtlantic (Coastal and Ocean Information Network Atlantic - the official organiser of the City Nature Challenge project for Halifax), within the iNaturalist CNC website itself.

Long term, the CNC will encourage new users to ID and add to a species inventory here in HRM and beyond, as nature is catalogued and celebrated. Decision makers will be encouraged to save more green spaces when they learn that a rare or uncommon species has been identified; developers may be requested to avoid wetlands; and students will be encouraged to do some green time instead of screen time. Families can explore together, and those who are involved with Trails or Wilderness Parks will be able to manage data better with your species input.



LEGAL ACTION - NS SPECIES AT RISK ACT

By the end of February 130 people had donated \$10,120 for the \$10,000 goal to cover legal costs of suing the provincial government for not protecting species at risk under the Endangered Species Act, as they had been mandated to do. (Any funds left over from further donations will be ear-marked for Species at Risk in Nova Scotia research. (Go to <https://www.gofundme.com/legal-action-nova-scotia-species-at-risk-act> to donate.)

Wildlife biologist Bob Bancroft with Nature Nova Scotia (representing seven Nova Scotia naturalist societies) along with the Blomidon Naturalists' Society and the Halifax Field Naturalists, have launched legal action for Nova Scotia's Species at Risk. It is time to ask the courts to intervene on behalf of Nova Scotia's most-at-risk wildlife and plants.

"The Department of Lands and Forestry has mandatory legal obligations under the Endangered Species Act that have not been fulfilled," explained retired Acadia University biology professor Dr. Soren Bondrup-Nielsen, president of the Blomidon Naturalists Society, one of the parties to the legal proceedings. "We're simply asking the Court to tell our government to do what it is already required to do by law."

In filed court documents the applicants allege that the Department of Lands and Forestry (formerly the Department of

Natural Resources) has failed to meet its legal obligations for 34 species, including mainland Moose, Wood Turtle, Bank Swallow, and a host of others designated at risk.

"The Department has not yet identified core habitat for our mainland Moose, a requirement that is now overdue by more than a decade," says wildlife biologist and Nature Nova Scotia's President Bob Bancroft.

It is alleged the Department of Lands and Forestry has not yet identified a single acre of core habitat of threatened and endangered species, despite their legal requirement to do so under the Endangered Species Act. Other shortcomings noted include failure to appoint recovery teams and create recovery plans within the time-frames required under the Act.

"This is a rule of law case," notes Jamie Simpson, lawyer for the applicants (and author of *Journeys Through Eastern Old-growth Forests* and *Restoring the Acadian Forest*). "The Act requires the Minister of Lands and Forestry to do certain things towards the recovery of species at risk in Nova Scotia. We are asking the Court to uphold the rule of law and require the Department to abide by the Act."

The Department's species-at-risk shortcomings have been reported several times. In 2015, the East Coast Environmental Law Association published a report calling on the Department to address the alleged violations of the Species at Risk Act. In 2016, the Auditor General of Nova Scotia's Office published a review of the Department's track-record on species at risk, noting the alleged failure to fulfill mandatory requirements under the Act.



CONGRATULATIONS

In 2013, wildlife champion Hope Swinimer was the eighth recipient of our HFN's Colin Stewart Conservation Award. Recently we have learned, much to our delight, that in the fall of 2019, for all her persistent hard work and success, Hope will receive a Doctor of Science, honoris causa from St. Mary's University.

Born in Argyle, Nova Scotia, Hope spent most of her time outdoors enjoying everything about the natural world. She wanted to work with nature in some capacity, and after missing life by the sea while attending college in Truro, she knew she had to stay near the ocean.

While working at Dartmouth Veterinary Hospital, Hope took in her first rehab animal in 1995 – a Robin which had been attacked by a cat. Researching how to care for it inspired her to learn more about injured wildlife. Colleagues began sending wildlife-related calls her way. Later that year, she became certified in Basic Wildlife Rehabilitation from the International Wildlife Rehabilitation Association, and was offered work as a wildlife rehabilitator in Ontario. But – she just couldn't leave behind the place she called home.

With just a few cages in her backyard and a room in her house as a nursery, Hope rehabilitated about 40 animals in her first year. By 1996 word about her work had spread and the Department of Natural Resources (DNR) became involved, determining that a permit was required. Hope worked with them to establish a licensing process. She received the needed document in 1997, and moved to Winnie's Way in Seaforth on the Eastern Shore.

Hope's private Wildlife Rescue and Rehabilitation Centre was a first for Nova Scotia, taking in about 200 animals per

year. It was in such demand it soon outgrew its property. So, in 2001, Hope relocated within Seaforth to 'the farm', a larger property which could better accommodate immediate needs and, more importantly, would leave plenty of room for it to grow.

The Centre now accepts over 4,500 wild animals per year, with over 20,000 callers being assisted through its helpline! Thousands of visitors are welcomed for guided tours. In December 2015, a new, custom-built facility replaced the 100-year-old barn previously in use; in 2017, they opened an onsite Country Clinic – a fully functioning wildlife hospital; and in 2019, Hope for Wildlife will install 109 solar panels to reduce their ecological footprint, lower electricity costs, and move the farm from fossil fuels to green energy.

Hope and her team share the highs and lows of wildlife rehabilitation through their globally-syndicated television show, which follows them as they nurse thousands of injured and orphaned wildlife back to health and back to the wild. (For those of you with Bell Aliant, it is the BBC Earth Channel 477, and it's on every afternoon).

Congratulations and kudos to Hope!



HFN NEWSLETTER ISSN

Our President Burkhard Plache has recently discovered that because a copy of every one of our newsletters has been sent to The National Archives of Canada, our publication has its own ISSN (International Standard Serial Number) – 1485-709X.

But there is an interesting twist. We also have another, previous ISSN, because with Issue #86, Spring 1997, our publication's title changed from *Halifax Field Naturalists' Newsletter* to *The Halifax Field Naturalist*. This change was made during our application for charitable status. Bernice Moores discovered when researching the cost of postage that if the word 'newsletter' was in our title, we would not be able to take advantage of special postal rates. Thus the title had to be changed. Therefore, for purposes of research, Issues #1 to #85, titled *Halifax Field Naturalist's Newsletter*, have the ISSN 0715-3627.



DISTRIBUTION

Since the 2013 Spring Issue #110, Bernice Moores has been smoothly, dependably, and economically as possible distributing *The Halifax Field Naturalist* for us. Throughout her 16-year tenure she's saved postage by distributing issues at meetings and also on foot, and she has constantly made sure, that no matter what, the newsletter would get delivered.

Bernice has been fun and a pleasure to work with, always calm, kindly, and humorous even under those inevitable times when unexpected emergencies arise as they do with any type of complicated production. But, she has decided to step away from this role. On behalf of all of us, I would like to extend a heartfelt thank you to Bernice for her years of stalwart dependability, hard work, and dedication. I look forward to working with our new distributors – Bernie and Heather McKenna, along with Lesley Jane Butters, Janet Dalton, and L. Paris.

SPECIAL REPORTS

YEAR END REPORTS

FROM THE PRESIDENT

As president of the Halifax Field Naturalists, I will take the opportunity to look back over the events of last year, and also try to anticipate what lies ahead for us. While attempting to speak for all members of the society, and also for the board, my choice of topics is certainly coloured through my own lens.

The last year has been a time of some change, with the long time newsletter distributor, Bernice Moores, stepping down from her post. After sending out a call for new volunteers, it was very encouraging to quickly receive an offer. This kind of response to a new need is exactly what a society as ours needs to exist, and I am grateful for this and any other support that allows us to operate.

Another topic that is often forgotten, but also quite important is feedback in the form of constructive criticism. Not all of our events proceed as planned or intended, and rather than letting it go, any helpful advice is greatly appreciated. By learning from our mistakes, and improving how things are run, we will all benefit.

Looking into the future, there is the species-at-risk lawsuit ahead of us. We have not been involved in such a manner before, and will certainly learn from that experience. The board will keep you informed about any development there.

Let me end this report on a brief note on how everybody can make the Halifax Field Naturalists a place for people to like and enjoy – participate in our events (walks & talks), and offer feedback to leaders and organisers. Also, consider contributing to the newsletter, by writing a report on either a talk or a walk, or by writing on a topic that is dear to you. We are always interested to publishing a wide range of perspectives.

I am looking forward to another year meeting other naturalists at our meetings and appreciating nature in the outdoors.

*Respectfully submitted,
– Burkhard Plache*

CONSERVATION

The Conservation Committee's members for the past year have been Bob McDonald, David Patriquin, Clare Robinson, and Richard Beazley.

Bob McDonald, and Wendy too, have stepped away from the Blue Mountain Birch Cove Lakes area advocacy group since there is now a Friends group advocating for the Regional Park to expand the Provincial Wilderness Area to 4000 acres. Focus has been on meeting with HRM staff and councillors to accelerate the acquisition of private land within the Regional Plan concept boundary. As well, the Friends group wants to ensure that the stewardship and appropriate use of the area is maintained. To join this group and receive their Newsletter, go to <https://www.bluemountainfriends.ca/>.

David Patriquin, working with proponents of the Sandy

Lake Conservation Area in West Bedford, focused on making the ecological case for establishing a Sandy Lake Regional Park (view <http://www.versicolor.ca/sandylakebedford>). He led several groups, including one for members of HFN, on field trips into the area, and he made presentations about his research. David not only continued his quest to learn more about forestry issues in Nova Scotia, he posted valuable information and insights on his personal blog for all to see (view www.nsforestnotes.ca). He served for another year as HFN representative to the Young Naturalist Club of Nova Scotia.

All four members of the Conservation Committee this year were active members of the Healthy Forest Coalition (HFC). They were involved in one or more of the following activities: communicating with Mr. William Lahy regarding his independent review of forest management in Nova Scotia; attending rallies to stop an effluent pipe being extended from the Northern Pulp Mill into the Northumberland Strait; commenting on document drafts, attending meetings; emceeing a meeting; serving on HFC's Working Group; selling 'No Forest - No Future Buttons'; and compiling 26 report to members of HFC.

Finally, committee members acknowledge a major advance made in 2018: The Halifax Green Network Plan, with which HFN has been involved since 2014, was adopted by Halifax Regional Council on August 14th. To learn more, view the Halifax Green Network Plan.

*– Respectfully submitted,
Richard Beazley*

PROGRAMME

Talks Since the 2018 AGM, the Programme Committee has hosted nine talks. Talks brought in approximately 530 people, averaging about 58 people per event. The high points in 2018 included John Crabtree's Mushroom Talk, which was attended by 115 people; the Harnessing the Energy of the Tides talk with Carys Burgess, which was attended by 70 people; and the annual Holiday Social, which was attended by around 62 people and which boasted a performance of the Mindshift Youth Group.

Other topics we have learned about this year include: the Shubie Canal Restoration, Old Growth Forests of HRM, Abandoned Gold Mines, McNab's island, and Unique Habitats of our Province.

WALKS - We also organised 14 walks, including the annual overnight Mermerby Beach Weekend kindly hosted by the Robertsons, along with one public meeting and one partnership event with the EAC. However, three of our walks were cancelled as a result of the sporadic NS weather. About 140 people attended our walks, with an average of 13 people per event. Our hikes took us to many beautiful locations around Nova Scotia, including bogs, old growth forests, Bell Brook Trail, Avondale Trail, and to places where we learned about butterflies and mushroom species. We have also visited some beautiful and interesting buildings, includ-

**Halifax Field Naturalists
Balance Sheet
December 31st, 2018**

Assets

Bank Account	1,527	
Accounts Receivable: HST Rebate	165	
Investments	8,665	
Pins	519	
Butterfly & Dragonfly Lists	124	
	<u>11,000</u>	<u>11,000</u>

Liabilities and Surplus

Liabilities

Accounts Payable: Nature Nova Scotia	<u>250</u>	250
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Surplus

Restricted: Endangered Species and Spaces	2,665	
Unrestricted (beginning of year)		7,922
Net Income	<u>163</u>	
	<u>10,750</u>	<u>10,750</u>
		<u>11,000</u>

**Halifax Field Naturalists
Statement of Income and Expenses
January 1st to December 31st, 2018**

	2018 Actual	2018 Budget	2019 Budget
Revenues			
Membership Funds	2,680	3,050	2,810
Interest	48	48	51
Donations	12	0	50
Sales (Pin, Lists)	23	20	25
	<u>2,763</u>	<u>3,118</u>	<u>2,936</u>
Expenses			
Meetings	273	376	353
Field Trips	0	0	0
Newsletter Production	1,088	1,250	1,150
Newsletter Distribution	606	725	650
Memberships & Fees	205	236	267
Socials	0	0	10
Grants, Donations	0	100	100
Special Projects	0	0	0
Insurance	225	225	225
Internet Service	167	166	135
General Supplies & Expenses	0	10	10
Bank Fees	36	30	36
	<u>2,600</u>	<u>3,118</u>	<u>2,936</u>
Net Income	163		
Unrestricted Surplus, beginning of year	7,922		
Unrestricted Surplus, end of year	8,085		

*– Respectfully submitted,
Ingrid Plache, Treasurer*

ing the new DiscoveryCentre, the Museum of Natural History, Saint Mary's University, and the Recycling Plant.

Overall, we've had approximately 670 people attend our events since our last AGM!

A huge thank you to all of the Programme Committee's members, it is their dependable dedication which keeps these events coming – Carol Klar, Denyse Contrasty, Susan Moxon, and Mille MacCormack. And thank you for help and guidance from Burkhard Plache, Richard and Grace Beazley, Stephanie Robertson, and all other executive committee members; and – to everyone who participates as members of HFN, and keeps these events going!

As always, if you have an idea for a talk or walk, or if you would like to volunteer with the Programme Committee, please let us know!

– *Respectfully submitted,*
Molly LeBlanc

MEMBERSHIP

In 2018 our membership figures indicate that we collected dues for 69 Individual, 31 Family, 18 Supporting, and four Institutional memberships. Adding these to one Life membership results in a total of 123 memberships. It should be noted that family memberships are counted as 'one' and thus the 123 does not equal to the total number of members as no multiplier is applied to family memberships.

Twenty-one of these memberships were new. Forty-five of these memberships included a Nature Nova Scotia membership. No complimentary memberships were given during 2018.

A special thanks to Doug Linzey for maintaining the membership database and printing newsletter labels, and to Bernice Moores for her keen eyes in spotting errors.

Total Memberships by Year

2009	/10	/11	/12	/13	/14	/15	/16	/17	/18
121	119	107	109	114	129	146	146	115*	123*

*Based upon memberships received. Years prior to 2017 were reported as membership numbers at the end of December.

NOTE: This report does not include our Facebook Group members (1,418), nor our Twitter followers (?).

– *Respectfully submitted,*
Ron Arsenaault

NEWSLETTER

Newsletter production, printing, and distribution went smoothly – except for the winter issue. Four extreme events, including the explosion of soot into every room of our home, prevented the newsletter being produced in time for distribution at January's meeting. This increased postal costs for that issue.

Spring's #170 to Winter's #173 contained 68 pages of natural history reports, articles, nature notes, HFN talk

and field trip write-ups, the phenomena and events Almanac, and the Halifax Tide Table. Once again I extend a truly sincere thank you to everyone who took the time and trouble to record, write-up, edit, and submit them all. Here are a few highlights, some from reports of our wonderful and informative programmes:

Sadly, in our Spring Issue, we noted the passing of legendary William Lishmore of 'Father Goose' fame; also Arthur Morris, world-wide sailor, naturalist, and staunch HFNer. Also, after HFN articles and research into what was once considered the world's last wild horse, the Przewalski, we learned that later scientific work revealed that it was not wild, but feral, having descended from the world's first known domesticated horses, the Botai. And, from biologist Lydia Stevens we also learned all the details we never knew about the secret lives of eels!

Summer's newsletter happily reported the inauguration of the Sandy Lake Regional Park Coalition (comprised of 14 groups and still growing) with a forest walk on Earth Day, April 22nd. Another well-loved longtime HFN member died – Norma Gregg, avid canoist and naturalist along with her late husband Milton. We reported on Peter Duinker's detailed and important HFN presentation and later, his hike, about the irreplaceable value and significance of old-growth trees (as usual, the Department of Lands and Forestry is still not acting on this knowledge).

Fall's newsletter announced HFN webmaster David Patriquin had successfully scanned and placed all past issues of The Halifax Field Naturalist on our website. Many kudos to David for this daunting task. From our Programme Committee's Molly LeBlanc, we learned about the toxic heritage of Nova Scotia's old gold mines, with their terrible legacy of mercury and arsenic pollution. Three field trips – Drysdale Bog, Butterflies, and Melmerby Beach recorded the identification of 145 species, a valuable addition to our now researchable species lists in our website-archived HFN newsletters.

Winter's issue seemed to be all 'mushrooms'! We had a wonderful and extremely popular (standing room only) talk, and later a walk, by mycologist John Crabtree, talking about many, many mushrooms/fungi and their morphology, colours, habits, deliciousness, and – in a few cases – toxicity!

My thanks to Patricia Chalmers for our useful Almanac; to Allan Robertson, Patricia Chalmers, Bob McDonald and many others for much appreciated proofing; to UPS Queen St. for reliable and skilled colour-cover production, and to DalPrint for our reduced rates.

If you have any comments/topics pertinent to HFN and the Natural History of Nova Scotia, please send them to the editor, sdhaythorn@ns.sympatico.ca.

– *Respectfully submitted,*
Stephanie Robertson

SPECIAL ARTICLES

BOLIVIA AND BEYOND

– Patricia Leader

Having planned a holiday to Bolivia, it seemed worthwhile to add two side trips while I was somewhat 'in the area'. One was to the Polynesian Island of Easter Island and the second to the Nazca Lines in Peru.

EASTER ISLAND

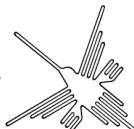
On May 5th, 2016, Barbara O'Shea gave HFN a comprehensive slide talk on her trip to the mysterious Easter island also known as Napu Nui (see p. 6, 2016 Summer Issue #163). More recently, on January 16th of this year, St. Mary's also presented a talk on the Island with additional information about unfinished work of a medical team which travelled there from Halifax in 1964. The team had examined all the islanders of this isolated community, an island furthest from any other land. The results had never been gathered together, let alone published. Speaker Jacalyn Duffin of Queen's University decided to follow up this expedition which is outlined in her soon to be released book, *Stanley's Dream*. Several HFN members were in attendance and surprisingly some of the original members of the medical team as well! Easter Island's unique physical isolation makes it a great subject for various disciplines, being the furthest land mass from any other. Unfortunately for HFN members, the expedition's biologists did not get to identify the flora and fauna in any great detail.

From my own perspective, and apart from flowering bushes and a few palms, I did not feel I was on a tropical island. The original people of Easter Island denuded the landscape, and that may have contributed to, along with introduced diseases brought from other shores, the extinction of the island's first peoples. I could easily imagine myself in either Newfoundland or Scotland as the coastal scenery was spectacularly rugged and the atmosphere beautifully clear.

Skilled Polynesian sailors later settled the island. As evidence, when Captain Cook arrived, he noted a few of his Tahitian sailors could understand the local language. They also noted that the islanders' tools were ones they knew from their own lands. Today, the faces of the inhabitants reflect both European (especially Spanish) and Polynesian features.

The island's historical value, is of course, the giant head statues, or moai, which were carved many centuries ago from the living rock. My guide confirmed that there have been many theories as to why these were constructed. A likely explanation is that they were part of ancestry worship. Most of the statues face inland on a ceremonial platform, or ahu, perhaps looking over the land and its people. Others are fallen, having been pushed over in past tribal quarrels, and I saw one still prone in the rock quarry of the Rano Raraku Volcano.

At the base of each statue there is a dome-like area which scientists believe, along with poles, was used to rock these giants back and forth into their selected rest-



ing place. Their eyes of white coral were only inserted into their faces after upright placement, an indication that life had come to the ancestor.

While on the island, I attended the only Roman Catholic Church there, because I was told the services had a distinct Polynesian flavour. The second service was as well attended as the earlier one and the music was boisterous and indeed of 'a distinctive flavour'. Walking from the hotel, I arrived early to see some people watching. Along with them, I enjoyed the variety of Sunday outfits – from shorts to beautiful dresses and the large Polynesian floral headdresses worn by women of all ages. The best headdress belonged to the priest – a large crown of feathers and a scarlet lei over his vestments. In preparation for the central part of communion, two parishioners removed both headdress and lei, added the chasuble over the alb, then replaced the lei and head-dress. At first, I thought it was a special day as many of the congregation wanted a photo of themselves with the priest. I never found an explanation for this, but was reminded of my guide's history lesson. After the period of ancestry worship, before the missionaries arrived, there was a 'warrior period', where young men competed for the title of the 'bird man' by doing extraordinary physical feats, culminating in the climbing of dizzying rocky pinnacles to retrieve a complete tern egg. Stephanie describes this in her account of Barbara's 2016 talk. The winner then became 'the leader', his face painted with red and white dyes, then secluded from his people for a year; through his priest, he communicated his wishes and laws. My guide was also eager to point out that with the arrival of the missionaries, the whole island had been Christianised in under four years.



THE PERU NAZCA LINES

It is worthwhile reading the Wikipedia description of the UNESCO Nazca lines as, like Easter Island, scientists have proposed many explanations for these geoglyphs created somewhere between 500 BCE and 500 CE. Theories include a system of waterways, astronomical indicators, and/or communicators to or from a god or gods. Best seen from the air, the Nazca Lines occupy a 502 km area in the Nazca desert on the western coast of Southern Peru.

I approached them from the country's capital, Lima. From there the road journey takes about three and a half hours by private bus or car. Before embarking, I was warned not to eat much breakfast – cautionary news for one with years of travel sickness! The journey to Paracas was uneventful as we drove along on a busy, dusty highway, where many buildings seemed to be in a state of unfinished construction. I wondered if a finished building garnered more taxes. We eventually arrived at the little town of Ica with a small but modern airport, which was soon filled with a motley of overseas visitors.

We produced passports, and then we were weighed, in order safely be assigned to our respective airplanes – 12-seater Cessnas. Photography was bound to be satisfactory as, with only one line of seats on each side of the plane, we all had our very own window.

The longest part of the 90-minute flight was the long approach to the Nazca Lines, mostly travelling over very dry, hilly land. Here and there were small towns or isolated business parks and what looked like squatters. As it was a bright day, I began to wonder if I had missed the Lines, but then somebody's GPS confirmed that we were nearly over the site. Soon the pilots were broadcasting the names of the various diagrams such as 'Astronaut', 'The Hummingbird' and 'The Whale' while they banked the plane first to the right, came around, then banked to the left so that both sides of the plane could enjoy a great view and use their cameras effectively. These figures had been drawn into the pampas by removing the top layer of reddish-brown iron-oxide pebbles to reveal the yellow-grey soil below. Several lines are of stylized plants and animals in an enormous labyrinth of straight lines, trapezoids, triangles and spirals, and the lines are 10-5 cm deep and from 33 cm to 1.8 metre wide. At one point I found myself looking down the wing which appeared to be at a vertical angle hovering over the next figure. I soon lost sight of the horizon – and my meagre breakfast – and was glad to find a large plastic bag in front of me! The woman behind was like-minded. I was amused that her husband across the way was completely without any emotional reaction to our unattractive but necessary behaviour. Unfortunately, I had to give up trying to use the camera, but left I Peru somewhat satisfied because I had seen for myself these mysterious and perhaps not fully understood creations.

BOLIVIA

The next afternoon I was on my way to Bolivia, landing in La Paz and then connecting to Santa Cruz. Prior to leaving Canada, there had been some discussion about requiring a yellow fever shot but the latest thinking is that one shot will last for a life time. I was not stopped at immigration, and admission to Bolivia was welcoming. Set in the foothills of the Andes and on the flat plains which extend into Brazil and Paraguay, Santa Cruz was hot – and windy. It is a culturally diverse community with Mennonites; a large Bolivian-Japanese population; immigrants from the altiplano (high plain); as well as Santa Cruz locals. The 400-year old San Lorenzo Cathedral dominates the city's main square, bustling with stalls. Nearby, the Museum gives a history of Bolivia's indigenous peoples.

I arrived in Santa Cruz at 2.30 a.m. and was driven to my hotel where our group was housed. In the dead of night and travel weary, I always think that new countries with their shadowy, narrow streets and empty sidewalks look somewhat foreboding. However, the guide was reassuring until we arrived at the hotel where he made a copy of my passport because the "police often stop

foreigners to check papers and may want to keep the original and generally make life difficult." I'm glad to report that nothing like that occurred, even when I was not with the group.

Bolivia is a country of geographical contrasts, with the magnificent Andes, deserts, savanna, tropical areas in which you can find giant ferns and bromeliads, a vast salt pan, and the world's highest navigable lake, Titicaca, which shares its shores with Peru and Uruguay. Ivar Mendez, a long time Haligonian, has produced a beautifully illustrated book of his native country with its diversity landscapes, *Bolivia*. Together with Paraguay, Bolivia is landlocked and perhaps for many years, neither has been the main country of choice for overseas visitors. Indeed, many South American travel books often omit both countries. For the naturalist, the country's diversity offers much of interest.

This year, Bolivia's population has reached over 11 million people and the average life span is 68.2 years. As might be expected, 60% of the population are younger than 25 years of age. Like the scenery, the languages are also varied. Given the history of its former conquerors between 1532-1809, Spanish is widespread, and along with 35 indigenous languages, make up the official list. Imagine reading all these languages on your cornflake box!

Sucre is the administrative capital while La Paz is the seat of the government. From the altiplano, at an altitude of 4,000 metres the road from La Paz airport plunges some 600 metres into the depths of the city, the highest capital in the world. At the bottom there are the usual collection of highrise buildings. For me it was unlike any other city, as it is situated in a 10km wide crater-like depression edged by the Andean mountains. There are two ways to explore but by far the most exciting and perhaps safer, is via the complex system of Swiss-made cable cars which criss-cross the city at staggering heights. It enables one to have a peep into the lives of both the poor and the rich. Each colour-coded 'line' has an endless chain of cars, and takes about ten passengers. Waiting time is hardly noticeable and the lines connect with each other efficiently. The alternative is to drive on the winding and busy streets.

In the heart of the bustling city are rabbit warrens of narrow lanes and small stalls where rotund, brightly-clothed women sell a huge variety of fruit, vegetables, and beans. Beans in all colours come in giant round canvas bags which are delivered at night, the only time to get through the stalls and crowds. Due in part to the Inca civilization, Bolivia boasts at least 300 types of potatoes, with the favourite being a small black variety usually served in soup. Strangely, it is grown above ground and therefore subject to frost. Peppers can be found in a variety of pyrotechnic colors with various levels of 'hotness'. Columbus is credited with sharing these hot delights with the rest of the culinary world. However, even at hotels, we never experienced many of the fresh green vegetables seen at the market, nor my favourite – the huge avocados.

Bolivia grows some of the world's best quinoa. Along



the roadside I was attracted to a field of red, one of the many colours of quinoa leaves. In Canada this has become increasingly popular as a health food. The predominant crops for farmers seem to be corn, wheat, and potatoes. Historically, the country for many years focused on single commodities like silver, tin, and coca. The latter is still the most lucrative and the country is its third largest producer along with its derivative, cocaine. Coca is readily available in the markets and the leaves are commonly chewed on the streets. Served as a tea, it is recommended for altitude sickness.

One of the additional city tours we took was named for the shoeshine boys who cover the city. Our 'boy' was actually a mother who preferred this lifestyle because she could walk her children to school at the same time. Each 'boy' has his or her own territory and is willing to take tourists on their route. Greetings were abundant as we passed the stalls.

Apart from the food markets we toured the famous 'witches market' with its assortment of good luck charms, salves, spells, potions, and dried llama embryos. We also visited the large central cemetery, and shops which sold traditional dresses of the Cholas (indigenous Aymara), and the Quechua women in their brightly coloured shawls, thick skirts over multi-layered petticoats, and black bowler hats perched on their heads – all photographers' delights. Tied over the shoulder the shawls carry everything from babies to produce. Smaller shops sold the traditional bowler hats. These originated from England in the 1800s when they were shipped out to English workers. For some reason they were too small and they were given away. A legend spread that those who wore the hat had no problems with fertility; a fashion took hold, and the hats, still too small, are held on with pins. My La Paz guide said for special events the hats are decorated with golden ornaments and according to tradition one has to come up with a new set for each social occasion. The men do not have a specific costume but do wear black clothes. The extensive cemetery is like a village in itself as it has a great many rows of walls into which coffins are inserted horizontally and small niches provide room for flowers or religious ornaments. The government does not charge for the burial site but after a given number of years, perhaps twelve, relatives must pay or else relocate their loved ones. It was a sad sight to see a family in black gathered around a wall while their relative's remains were removed.

Outside La Paz we explored other areas of Bolivia by jeep, plane, and bus. The bus station was crowded but efficient and we saw buses arriving full of passengers, some nursing small animals. Armed with bottles of water and snacks we boarded the bus and found our numbered seats. As in Canada, there was some elbowing over them, but eventually our group along with the locals armed with shawls, cushions, bags of food, cell phones, and young children, settled down for the long, hot ride. Non-verbal communication worked well. Occasionally, I saw overseas visitors along the desert highway riding cycles and of necessity, carrying more water than clothing. One couple, on their honeymoon, had travelled

from Canada and were on their way to Ushuaia, the very south of South America. This certainly would have been a good first test of their marriage! Long stretches of empty road were only broken by the sight of the occasional llama or wandering cows. Having learned that milk was imported, I was told nobody came to milk the cows because poor farmers could not cover the large distances in order to locate them.

On the drive from the desert town of Uyuni to Salt Lake, we stopped at a huge graveyard of rusting steam locomotives and railway cars; Uyuni was once a thriving centre for the mining industry. At the next stop we explored the one-street village of Colchani. Besides selling local crafts, there were small souvenir bags of local salt, produced by a co-operative of salt workers. Piles of salt are left outdoors for the winds to blow off the impurities, then they heated and iodine is added. Some 25,000 tons of salt are collected annually; the salt is used locally and also exported to Brazil.

Further along the route we had several distant sightings of what appeared to be long-necked grazing deer. They were actually Vicuna, *Vicugna vicugna*, related to the camel family, and like a similar animal, the Alpaca, it is known for its soft wool. Given the diverse geography, Bolivia has a fascinating range of animals including the tapir, sloth, armadillo, chinchilla, and ant-eater – and – in the Andes, many of the larger birds of prey. There are some 1,400 species of birds and 3,000 butterflies. The Condor is the national bird of some five South American countries, including Bolivia. The Andean Condor, *Vultur gryphus* – by wingspan (3.3 meters) and weight – is the world's largest flying bird. Like so many other birds, its numbers are decreasing with loss of habitat and also by the apparent poisoning of their main food, deer and/or cattle. The James's Flamingo, *Phoenicoparrus jamesi*, on the altiplano is another bird of note.

We eventually arrived at the 10,500 square km of the Salar de Uyuni, a vast salt pan at an elevation of 3,795 metres. The glare plus the heat was stressful but the area is now one of Bolivia's major tourist attractions, confirmed by the number of four-by-four vehicles and, perhaps brave, cyclists crossing the pan. Many years ago, I had visited Botswana's large salt pan, southeast of the Okavango Delta at Makgadikgadi. Although only a system of smaller lakes, it also claims to be the largest, but is more famous for the annual migration of the wildebeest and zebra. I found the glare less unbearable at Uyuni. We headed out to visit one of the many islands and saw the tall cacti which grow there plus various species of birds. After a long drive on the pan, and while still kilometres from nowhere, our guide announced we were to stop for lunch. Given this exposed area I must have looked at him with an open mouth. Nevertheless, the drivers efficiently set up folding chairs and tables and produced a hefty, hot picnic under umbrellas. While it was being set up, the guide showed us how to lie flat on the pan and take cute photographs using a short lens while looking across the great expanse; other groups were similarly engaged. We had photos of the group 'standing on somebody's hand' and one of me 'balanced on a coke bottle'. Tourists who stay overnight

in one of several hotels built on the lake can take incredible photographs. Not for nothing has the area been declared the world's largest mirror, for its mirror-like surface reflects the sun's rays when rain remains on the surface. Some hotels were still under construction, and the finished ones, popular with Japanese tourists, were modern and airy with panoramic bedroom views of the pan.

Before leaving Bolivia, we took a short bus ride from the city of Sucre to visit the Franesa Cement Company high above the city. This is the site of the Cretaceous Park and Museum and from there, donning a helmet, one can scramble (or slip) down to the Cal Orck, an incredible limestone wall one km long by 100 metres high. The park sports life-sized replicas of prehistoric animals complete with sounds the animals might have made. This area was once part of a lake where ancient animals walked and drank. As evidence of the land being uplifted, the wall stretches up at an angle of 70 degrees and has some 5,055 footprints of 15 different prehistoric animals. Many are still buried in some seven layers of limestone, waiting to be revealed as the wall crumbles. Discovered here in 1985, the world's largest dinosaur footprint is one metre long, while the longest dinosaur trail of 347 metres was left by a young *Tyrannosaurus Rex* with the nickname Johnny Walker...

Another visit took us to the pre-Inca UNESCO site of El Fuerte, with its outstanding views of the surrounding countryside. There we walked on a 100 metre-long rock slab covered with a variety of petroglyphs such as snakes, pumas, and geometric shapes. Archeologists are still excavating the area which was occupied from as early as 300 AD. Nearby is Amboro National Park with its three diverse ecosystems, ferns reaching to some 13 metres, and 800 bird species such as toucans and White-bellied Hummingbirds. The diminutive Spectacled or Andean Bear, *Tremarctos ornatus*, (which I didn't see) keeps a safe distance from visitors.

I hope this has provided some insights into a South American country that has much to offer both photographers and naturalists. I believe, as a tourist destination, it will eventually become as popular as countries like Chile, Argentina, and Brazil.

HFN TALKS

NSNT

7 FEB.
– *Burkhard Plache*

Nova Scotia Nature Trust's Volunteer Coordinator Ryan MacLean treated us to a lively and engaging presentation.

Before introducing the Nature Trust, Ryan traced the route that led to her current role. Its seeds were laid early in life – her parents were outdoor enthusiasts and avid campers who introduced their children from an early age to canoeing and hiking. After high school, Ryan built an academic base with the Foundation Year at King's College before earning an English degree. The question "What next?" received an answer after listening to the CBS Radio show "Hidden City" and learning about the Urban Forest of Halifax. The result, after a number of years of hard work, was a degree in both Environmental Planning and Sustainability. One influence during Ryan's studies was a Summer course on the "Flora of Nova Scotia", which made her want to learn about all the plants, and especially the threatened ones, growing in our province.

After finishing her degree, a natural continuation seemed to be a job at a government agency. However, while digesting 90 rejection letters, Ryan kept herself afloat by serving patrons in the restaurant industry, and feeding her mind with books about nature.

Finally, and even though opposed to the industry, a contract at an oil refining company opened a way for her into a job more aligned to her educational background.

At the same time, Ryan continued both her education and her attempts to find work she considered more fulfilling. And in 2018, her dream came true when she was hired as Volunteer Coordinator by the Nova Scotia Nature Trust (NSNT). Here, she found a place which gave her a sense of purpose, while utilising all the skills she acquired along the way.

A brief look into the history of NSNT provided context for the remainder of the presentation. Founded in 1994 as a registered charity and a land trust, which is sometimes also called a land conservancy, the NSNT is not an advocacy group. Its focus is the conservation of Nova Scotia privately owned lands with ecological significance. The trust envisions a future where Nova Scotia's native species, unique habitats, and natural landscapes are protected in perpetuity.

The NSNT is an important vehicle for conservation in Nova Scotia, where 70% of all land is in private hands. These lands are rarely considered for protection by governments, but are the focus of the Nature Trust. Many of the most treasured places, like those containing old growth forest or providing habitat for endangered species, are found on privately owned lands. At this time, the Nature Trust owns or manages over 11,000 acres all over Nova Scotia.

The important work of the Nature Trust extends beyond land acquisition. Before a land parcel is acquired, its ecological importance needs to be assessed, and strategies and stewardship plans need to be put in place, to make sure the conservation effort has a long

lasting effect. Lands can be either donated to the Nature Trust, or sometimes they are purchased. Another conservation option works via conservation easements, where the lands stay in the hands of the owner, while the easement restricts the activities and developments that will be possible in the future.

Given the constraint of limited financial means, the Nature Trust must be very selective in which land parcels to protect. Protecting a piece of land requires not only the initial acquisition cost (even a donated property generates legal and administrative costs), but also the annual costs in looking after the property. Therefore, land acquisitions follow a number of strategic considerations.

These constraints have let the Nature Trust to focus on six particular areas – **Coastal Treasures** are the first of these. Examples include Partridge Island (near Parrsboro), Troop Island (St. Margaret's Bay), Rogue's Roost (near Prospect), and Bon Portage Island (Barrington area). The 100 Wild Islands Legacy Campaign along the Eastern Shore is an ongoing project, where a significant part of the envisioned lands are now protected; however, the work there is not yet complete.

A second area of great concern are our **Last Great Forests**. These are of special importance due to their rarity, and even if protected, many of those may become isolated islands in a clearcut wasteland, unless forest practices within Nova Scotia change significantly.

The **Freshwater Legacy** addresses the ongoing loss of natural lakeshores due to developments by cottages. This is of particular concern in southwestern Nova Scotia, where many of our rare Atlantic Coastal Plains Flora species are concentrated along lake shores.

Another focus is on **Endangered Species**. This concern intersects with many of the previous focus areas. For example, the rarity of old growth forests is the reason that species depending on such habitat become less and less common, pushed to smaller and smaller areas, until the populations become too small to be viable.

Given the frightening decline in bird populations, it is not surprising that **Critical Habitat for Birds** are of concern to the Nature Trust. A number of their properties are located in IBAs (Important Bird and Biodiversity Areas in Canada). IBAs, www.ibacanada.com, are areas which are identified under coordination with BirdLife International as ecologically highly important.

A fairly recent perspective has been to add **Urban Wilderness** areas to the portfolio of protected lands. For these high-use places, new management principles need to be developed. Whereas vandalism and garbage are rarely a problem in remote areas, they are encountered where access is easy.

Property and land acquisition is only a beginning. The sustaining work of the Nature Trust is the ongoing effort of guarding and looking after them; for this task the Nature Trust depends on the work of many volunteers. As Volunteer Coordinator, this is where Ryan's work kicks in. She connects with potential volunteers who tend to be outdoor-oriented, enthusiastic, and conservation-minded. There are individuals, families, or groups who find enjoyment and purpose in working with the Nature

Trust, often as property guardians. Their activities involve regular visits to their chosen property, to report any exciting observations, and also to alert the Nature Trust if there are any concerns. Some people may choose to frequently visit a property which is easily accessible, others may decide to visit a remote location maybe only once per year.

Another volunteer program, called **Bird's Eye View**, focuses on birding; it takes advantage of birders' enthusiasm, and only asks that they share their observations with the Nature Trust via eBird. This mutually beneficial relationship provides valuable information to the Trust.

On a personal note, I would like to share that over the last summer, Ingrid and I have been visiting two Nature Trust properties in the role of property guardians. For us, the effort is not really noticeable, since we are out in nature anyway. Looking for possible traces of unwanted activities (we saw none), and taking a handful of photos at prescribed locations (easy with digital cameras) were our major duties. Visiting special places and finding rare or unusual plants is for us a pleasant occupation, and not a burden. Hence, we highly recommend considering volunteering in this role.

Let me finish by thanking Ryan for being such an engaging speaker, and providing us with a better understanding of the impact the Nova Scotia Nature Trust has on conservation in our province.

AGM/MEMBERS' NIGHT 7 MAR. – Allan Robertson

Our Photo Night MC this year was Peter Webster (who kept people to their schedules by discreetly standing near to them as their time became close to finished – very effective, and our presenters didn't seem to feel too stressed).

Shirley McIntyre treated us to a series of pictures of the Century Plant in the Public Gardens, *Agave americana*, a very large member of the asparagus family which typically lives from 25 to 30 years. She visited the Gardens regularly last year from early summer to the end of October, during the plant's last season. The Agave is monocarpic (it only flowers once in its lifetime!), and 2018 was the year! Near the end of it sends out a tall stalk to a height of roughly nine m (25 ft), and its flowers produce over a hundred seeds.

It, and other tropical plants like it in the Gardens, are kept in greenhouses over the winter, and typically are replanted in the Garden at the start of the hotter months. The Agave Americana grew more quickly than expected, and by early July it was higher than the greenhouse ceiling; this required earlier-than-expected transplanting in mid-July.

Shirley displayed pictures of its growth starting on July 16th. At this time the umbelliferous flowers were just budding, with the stalk quite high. In early August's pictures bloom was evident on some of the lower branches. By mid-August the blooms really 'out'. They were so evident, in fact, that visitors were standing too close and treading on small succulents planted nearby, hence a fence was required. This Agave was so large, however, that even standing a few feet away, its exotic beauty was easily perceived.

Near the end of August the blooms near the top of the plant were very colourful, whereas those lower down were starting to brown. Seed pods were evident by mid-September, and by the end of October were well-formed. As a treat to visitors, 158 seeds were collected by Garden staff and given to the public at the end of January. This was very popular, and there were line-ups at 10:00 a.m. for a noon-time distribution.

John Crabtree, a recognised mushroom expert, delighted us with his description of a Shiitake, *Lentinula edodes*, Mushroom-growing venture. For this project, he cut trees of about eight inches in diameter into 40 four-foot-long logs, then drilled 50 ½-inch holes in each log at precisely-measured intervals – 2,000 drilled holes of various species such as Yellow Birch, beech, alder, maple, plus others. He cut the logs in March when trees are dormant and sugar content is high (food for the mushrooms), and did the drilling in early May. It was very labour intensive!

Each of the holes was inoculated with a sawdust 'spawn plug' which consisted of a mycelium and sawdust mixture, capped with a Styrofoam top. A plug (available in commercially in 600-plug sheets) was inserted into each hole in the logs in the May-June period. The inoculated logs were then stacked horizontally until the mycelium started to show at the ends of the logs. This occurred around the mid-to-end of July.

The logs were then 'shocked' into fruiting by immersion in a barrel of cold water for 24 hours. After this they were stacked vertically to avoid dirt and contamination and to await the mushrooms' appearance on the logs. After harvesting, (a bit more than one pound per log), it was off to a food retailer for ultimate consumption. John said the labour intensive nature of the venture led him to conclude that it would be feasible only at much higher volumes of production.

Ron Arsenault treated us to a series of pictures of very unusual flora and fauna. He first showed us a beautiful picture of a perfect line of Green Frogs on top of one another. He had found them in a pond which had recently been short of water, but then deluged with two days of rain. He thought the frogs were in the process of rearranging their territories after grouping together unnaturally during the dry spell.

Then we saw many Garter Snakes in a mating ball which he came upon in a marshy area in April – usually too early for snakes to leave hibernation. Since the marsh was water-logged, he concluded that they had hibernated under water – he subsequently confirmed that this occurs. It drove the point home when he showed us a picture of a snake clearly visible just under the ice in

a pond in late December. Again, subsequent research showed that they sometimes do hibernate under ice!

He then showed a picture of a ??bird – hardly worth mentioning?? Oct 10. A northern wet-deer??

He also had taken a picture of many oriental Bittersweet vines, along with a dusky cockroach. These southern-oriented insects were reportedly observed in New Hampshire in 1984, in PEI in 1991, and since 2004 have been observed all over the Maritimes.

There was a picture of the giant slug, *Limax Maximus*, reportedly introduced to Halifax in 1930 when it escaped from a biology laboratory and is now essentially endemic.

See other slides – I can't do much with them...

Lesley-Jane Butters had two sets of slides – one from Arthur Morris, a long-time HFN member who passed away a bit more than a year ago, and one set from among her distinctive and artistic nature photos.

Arthur and his wife Dorothy were avid HFN'ers who were very venturesome. They decided to take a year to go sailing to explore a few intriguing sites 'overseas'. They didn't return until 13 years later (!), full of stories and pictures which they shared with us. They planned to take a few more trips – one to Mount Kilimanjaro and one to game parks in Kenya. Unfortunately, time ran out for Dorothy and they never got to take these trips together.

So Arthur went on safari alone in November of 2017, and Lesley-Jane showed us many of his pictures lent to her by Arthur and Dorothy's family. They included elephants, hippos, geese, ibexes, warthogs, zebras, cranes, herons, water buffalos, deer, giraffes, and lions. They were very good pictures – Arthur was a good photographer.

Lesley-Jane's beautiful and sometimes whimsical pictures ran the gamut – birds, nests, mosses, bumblebees at flowers, kick-sleds on icy lakes, lakes, the North West Arm, deer, mushrooms, Hascap Berries, a frozen field of pumpkins, sunsets, lupins, orchids, spiders, snakes, ice-crystals, pussy willows milkweed, and seaweed.

Thanks to Shirley, John, Ron, and Lesley for great photos and the stories about them.

HFN FIELD TRIPS

MILL COVE TREATMENT FACILITY

– Susan Moxon

Date: Tuesday, January 15th

Place: Bedford

Weather: Sunny but cold

Leader: Nigel Crouse

Participants: 12

Supervisor of Wastewater Treatment Nigel Crouse led a group of 12 very keen participants on a two-hour tour of the Mill Cove wastewater treatment plant in Bedford.

During the introduction we learned that the facility treats domestic wastewater from Beaverbank Road in Sackville; Hammonds Plains Road to Kearney Lake Road; and Bedford. This area includes about 55,000 homes. We then watched a video produced by the American Water Environment Federation which gave an overview of how a wastewater treatment plant works.

There are 14 water treatment plants in Halifax Regional Municipality and the Mill Cove facility is the largest secondary treatment one. It opened in 1969 with an average dry weather flow capacity of 9,500 cubic metres/day. Upgraded in 1980, that increased to 19,000 cubic metres/day. Another 'increased capacity' upgrade was made in 1996 – to 30,000 cubic metres/day, it's current capacity, with an instantaneous ability to treat 60,000 cubic metres for short durations; this occurs at times of the day when water usage is high or during heavy rainfall.

Also in 1996, an anaerobic digester was added. The main expense of this whole operation is the oxygen used in the anaerobic process. Methane produced during this procedure is used to heat the facility and the excess is burned.

In 2018, \$800,000 was invested in 'scrubbers' which remove odours before being emitted to the outside. Another upgrade which will be undertaken in three to five years at a cost of \$55 million will further increase treatment capacity while also improving treatment efficiency and discharge characteristics.

The final step in the water's treatment consists of ultraviolet disinfection before it is released into the Bedford Basin. In the winter, the wastewater temperature is six to eight degrees Celsius when it flows into the Basin, which, when compared to the Basin's relative winter water temperature, attracts waterfowl to the outflow area.

Shawn Taylor, the facility's lab analyst, gave an overview of the water-testing procedures done in order to measure the levels of E. coli bacteria. He showed us samples of wastewater at various stages of testing. The Department of the Environment ensures that effluent samples are collected and tested weekly by an outside agency to ensure it meets the regulated effluent discharge standards.

Next, Nigel led the group through the 'headworks' building. In this area, preliminary treatment removes large particles such as garbage, plastics, and sticks, etc. through a bar screen – a metal rack with bars $\frac{3}{4}$ inches

apart. An upgrade to this system is going to replace the bar screen with one which has perforated plate openings of only one to three millimetres in size, allowing the process to remove even smaller particles. Only 0.1% of wastewater is comprised of solid materials. Each year, at the Mill Cove facility alone, approximately \$50,000 is spent on labour to remove all of the non-flushable items. Dental floss, baby wipes touted as flushable, and 3-ply toilet paper are some of the more surprising items which cause problems.

After going through preliminary treatment, the wastewater next goes through a secondary clarification system which removes solids that settle to the bottom and also skims off materials such as fat, oil, and grease which float to the surface. From here, the wastewater goes through to an aeration tank where microorganisms feed off any remaining organic material. Oxygen needed by these microorganisms is mixed into the water through the aeration process.

The final treatment is ultraviolet disinfection. This alters the DNA and RNA of the microorganisms, rendering them unable to perform vital cellular functions, such as reproduction, and this causes the cells to become inactive.

In 2016, the Nova Scotia Department of the Environment lowered the discharge requirement from 2,000 fecal colony forming units/100mL sample to just 200 E.Coli colony forming units/100mL sample. Because the existing system could not treat to this lower standard, a new system was designed and eventually installed in May, 2017. With the installation of the new ultraviolet system, power usage was reduced by 65% and the disinfection ability increased by 50%.

When asked, Nigel said that the facility is unable to remove pharmaceuticals from the wastewater, and that a technology has not been developed to do this. Wastewater in plants throughout the country, including those in Halifax, are being tested for drugs and cannabis's THC content as part of an eight-month study being conducted by Statistics Canada. Initial results have shown that Halifax has a high per capita concentration of THC although these results show significant variability which makes interpretation challenging considering the relatively small data set.

Leftover sludge from the plant is sent to a facility in Aerotech Park, where a process which uses an alkaline stabiliser removes pathogens to produce a Class "A" soil amendment which is used in agriculture and sod production.

MUSEUM OF NATURAL HISTORY

– Susan Moxon

Date: Monday, February 25th

Place: NSMNH, summer St., Halifax

Weather: ??????????

Leader: David Carter, Corey Mullins, Andrew Hebda

Participants: 15

On Monday, February 25th, 15 people took a behind the scenes tour of the Nova Scotia Museum of Natural History conducted by David Carter, Communication Designer; Andrew Hebda, Curator of Zoology; and Corey Mullins, Senior Preparator for the Maritime Museum of the Atlantic and the Nova Scotia Museum of Natural History.

The tour, which focussed on Sable Island and The Gully, began in the auditorium.

David Carter gave a slide presentation of his trip to Sable Island in 1987 to study its cultural and natural history. His slides certainly depicted the island's beauty and the dynamic changes produced by the constant wind and sand storms which play an integral part of the island's life. While he was there, a major storm occurred and he was able to capture its effects through before-and-after photos. He discussed Sable's diverse wildlife, including the horses and the many seals on the beaches. His photos of Marram Grass illustrated its deep rooting system which allows it to survive the island's constant weather-caused morphological changes. This grass is an important part of the island's ecology, particularly for the horses and other wildlife. While there, he collected many specimens which had to be carefully packed to survive the journey back to the Museum.

Corey Mullins' presentation was about The Gully, a 3,000 metre deep underwater ravine off the tip of Sable Island. Corey maintains the Museum's displays, including the temporary exhibits. As Exhibit Creator, it was his responsibility to develop an exhibit which would give an overview of The Gully and the ecosystem within it, and he explained the steps involved in creating this and other exhibits. Corey and his team constructed the partial-model exhibit of the Canyon Explorer, a ship designed to portray the story "Mission to The Gully", and his talk showed many photos of the design and construction process.

Andrew Hebda reviewed for us the process of developing the Marine Gallery for the Museum starting off with the process of telling the story about The Gully. He then showed us specimens which had been collected on Sable, and which he used for his presentation. A Walrus skull indicated a natural story; walruses were once harvested there, and then eventually eliminated. A cow skull depicted a cultural story; cattle were in the past taken to Sable Island as a food source (there are none there now of course). He had a Sable Island Horse skull as well. There are various theories about how horses got to the island, but it is not known definitely how they arrived. There was also a skull of a Loggerhead marine Turtle which had for some unknown reason arrived on the island via the ocean. Loggerheads are warm water creatures; they die when they come in contact

with cold water because they are not adapted to it. He also showed the bones of an Orca which had washed ashore.

Following the presentations, Corey took participants on a tour of the Museum's workshop, where we saw all their equipment and the different displays being worked on. He emphasised that all the work which goes into an exhibit's design and construction is a team effort. One of the objects in the shop included a 300 million year old tree stump which was found in Joggins. A casting is going to be made of this stump before it is sent to the Royal Ontario Museum in Toronto as part of a Canadian display. It will eventually be returned.

We then toured the Marine Gallery, where there is an open exhibit of a room in Sable's Field Station which contains a worker's desk, including a view from the window overlooking the island which boasts a realistic video of blue sky and blowing green grasses, and many papers, instruments, and Sable Island beach finds such as skulls, dried plants, nets, and floats. We also saw a cross section of a dune revealing the Marram Grass and the skeleton of a Sable Island horse. We saw the final product which Corey had discussed during his presentation – a reproduction of part of the interior of the Canyon Explorer. The architectural plans which show the construction of the various parts of the ship were part of the display as well. It includes a biology lab, with a microscope through which visitors can see organisms which live in the Gully; a recording of sounds of the Gully; a game they named 'Sink-O' which allows children to learn about the Gully itself; and a section called the remote operated vehicle command centre shows how to explore the Gully with a robot. This partial model is accessible and gives visitors the experience of being on the ship itself.

At the end of the tour, we returned to the auditorium, where David had planned to show the video "Chasing Wild Horses". However, he wasn't able to find it on the computer so he sent it later by email!

The 48-minute video is of photographer Roberto Dutesco's visit to Sable Island, and it can be viewed at <https://vimeo.com/59503365>.

NATURE NOTES

FEBRUARY

– *Stephanie Robertson & Janet Dalton*

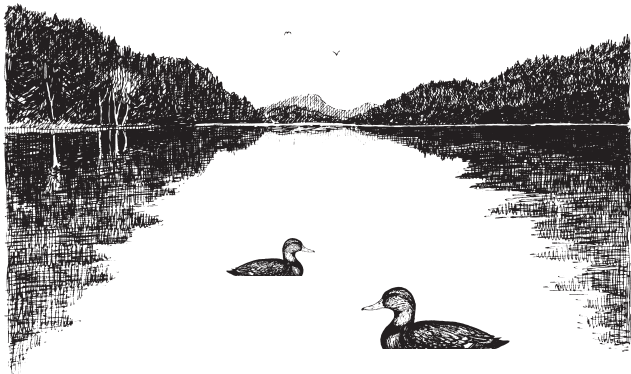
Ron Arseneault had a **pair of Cardinals** in his back yard on Joseph Street in Halifax. Raymond Provencher observed **12 Deer** between Sackville and Peticodiac in New Brunswick.

John Crabtree observed **Red-tailed Hawks** hunting gulls; the gulls, and crows as well, were making quite a racket about it. Judy Davis heard what sounded like the first of spring birdsong in Dartmouth; she observed **many Goldfinch** as well.

While ‘kick-sledding’ on William’s Lake, Leslie Jane Butters reported seeing survey pickets at its south end; she thought it might be the indication of some kind of development there in the future. She also ‘felt something’ watching her; then six ears appear from behind some rocks and up popped the heads of **three Deer**. Also, on Lumsden Pond in King’s County on a very calm and cold sunny day, out of no where a gust of snow formed, slowly swirling around and around; it got bigger, moved faster, and started travelling around the surface of the lake. This ‘**snow tower**’ was about forty feet high. By the time she got out her camera to take a picture it had petered out and everything was calm again with no evidence that anything had happened (*google ‘snow-devils’ to see some of these - ed.*).

Looking westward a few days ago Richard Beazley saw a rare phenomenon – a ‘**sun pillar**’, “a vertical shaft of light extending upward or downward from the sun.” (From Wikipaedia – More common in fall or winter, and typically seen during sunrise or sunset, sun pillars form when sunlight reflects off the surfaces of falling ice crystals associated with thin, high-level cirrostratus clouds.) Richard said it looked as if there was a light in the middle of the pillar; this one was red like a spot light. He also spotted one at Christmas but its light appeared yellow.

On the way back from the Eagle Watch Weekend, Bob McDonald was in Windsor and saw **about fifty Bohemian Waxwings**. A few days ago, Ron Arseneault saw **about thirty Bohemian Waxwings**.



NEW AND RETURNING

Rebecca Betts
David Hodd
Sean Haughian
Lynda Robertson

SPRING POEMS

– *Susan Moxon,
Rock, Sea and Sky*

HARBINGER OF SPRING

Earth is crusty, not frozen.
Air is crisp, not bitter.
Iced shoreline still, not snow-capped.
But aahhh the joy and delight
When I spot that first pussy-willow!



THE BABBLING BROOK

A brook in spring
Is a playful thing.
It hurries and chatters
As it slides over roots
And tumbles over rocks.
It somersaults and splatters
Creating miniature waterfalls
And swirling whirlpools.
Leaves surf on the current
And bubbles sail by.
It's a vein of life
Flowing down the hill.
With its water sounds
It's the focus of the forest.



A brook in spring
Is water in a hurry.

THE DANDELION HILL

My hill is painted with brilliant yellow.
Little round suns sprouted all over
With help from reddish milky stems.
This multitude of golden discs stand out.
All are reaching skyward to the sun.



When I return, my hill is a pale green.
Gone are the yellow suns and I find
Grey, dusty spaceships orbiting the field.
Little transparent spheres, anxious to catapult
Toward that beckoning solar force overhead.

Now my hill has become a celestial heaven
Dozens of wispy parachutes fill the air.
Clusters of lint-grey puffs are now in motion
Carried upwards on drafts of spring breeze,
They start their journey toward the daystar.



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.

Should illusion of permanence beset you some late spring day while
they're setting out the bedding plants, looking
forward, a few steps to the shore will remind you
how brief, fugitive, the spell of weather here.

– Anne Compton, from the poem “Plotted”, in *Opening the Island: Poetry (2002)*

NATURAL EVENTS

- 10 Mar.** Daylight Saving Time begins.
- 20 Mar.** Full Moon. Moonrise at 19:02 ADT.
- 20 Mar.** Vernal Equinox at 18:58 ADT. Spring begins in the Northern Hemisphere.
- 192 Apr.** Full Moon. Moonrise at 20:23 ADT.
- 28 May** The date of last spring frost in Halifax; Env. Can. says there is only a 1:10 chance a spring frost will occur after this date; look forward to 155 frost-free days.
- 18 May** Full Moon. Moonrise at 20:26 ADT.
- 8 Jun.** World Oceans Day.
- 10 Jun. -21 Jun.** The earliest mornings of the year: sun rises at 5:28 ADT.
- 17 Jun.** Full Moon. Moonrise at 21:24 ADT.
- 21 Jun.** Summer Solstice at 12:54 ADT. Summer begins in the Northern hemisphere. The longest day of the year, with 15 hours and 34 minutes of daylight at Halifax.
- 21 Jun. -30 Jun.** The latest evenings of the year: sun sets at 21:03 ADT.

– Sources: *Atmospheric Environment Service, Climate Normals 1951-80 Halifax (Shearwater A) N.S.; Blomidon Naturalists Society's 2018 & 2019 Calendars; United States Naval Observatory Data Services.*

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



2 Mar.	06:51	18:03	6 Apr.	06:46	19:48
9 Mar.	06:38	18:12	13 Apr.	06:34	19:56
16 Mar.	07:25	19:21	20 Apr.	06:22	20:05
23 Mar.	07:12	19:30	27 Apr.	06:10	20:14
30 Mar.	07:00	19:39			
4 May	06:00	20:22	1 Jun.	05:32	20:52
11 May	05:51	20:30	8 Jun.	05:29	20:57
18 May	05:43	20:38	15 Jun.	05:28	21:01
25 May	05:45	20:45	22 Jun.	05:29	21:03
			29 Jun.	05:31	21:03

ORGANISATIONAL EVENTS

Blomidon Naturalists Society: Blomidon Naturalists Society: Indoor meetings are held on the 3rd Monday of the month, in Room BAC241 in the Beveridge Arts Centre, Acadia University, 7:30 p.m. Field trips usually depart from the Wolfville Waterfront, Front St., Wolfville. For more information go to <http://www.blomidonnaturalists.ca/>.

18 Mar. “Species at Risk”, with speaker Tom Herman.

26 Apr. -29 Apr. “HRM City Nature Challenge”, a fun competition across the world! 65 cities, 17 countries, and 5 continents — to document the most species. Help us take observations (photos with your phone or camera) of as many species as possible to record nature in the HRM. All species count!

Burke-Gaffney Observatory: Free Public Open Houses are scheduled on at least one weekend each month. On the scheduled weekend, the open house will take place on the first clear evening of Friday, Saturday, or Sunday. Tickets must be reserved online. At the times of year when it gets dark early enough, two events are scheduled per evening - refer to the schedule. For more information phone 496-8257 (and press1), or go to <http://www.ap.smu.ca/pr/bgo-visit/public-open-houses>.

Nova Scotia Bird Society: Indoor meetings usually take place on the 4th Thursday of the month, September to April, at the Nova Scotia Museum of Natural History, 7:30 p.m. For more information phone Kate Steele, 476-2883, fieldtripcoordinator@nsbirdsociety.ca, or email the trip leader.

28 Mar. "Australia, a Long Way from Home" with speaker Mark Dennis.

4 May "Hartlen Point Birding, Clean-up, & BBQ", Contact David_currie@ns.sympatico.ca, or 902-476-6616.

21 Jun. "Out of Town Weekend in Yarmouth/Shelburne Counties", **Pre-Registration required!**

Nova Scotia Department of Natural Resources: Many outings which will take place in Provincial Parks are listed in the "Parks are for People" Programme, available at museums, parks, and tourist bureaus, and on the web at <http://www.novascotiaparks.ca/>.

Nova Scotia Museum of Natural History: For more information phone 424-6099 or 424-7353, or go to <http://naturalhistory.novascotia.ca/>.

24 Jan. - 28 April "Dinosaurs Unearthed", a hands-on exhibit with realistic, moving models and sound effects.

Nova Scotia Wild Flora Society: Meets the fourth Monday of the month, September to May, at the Nova Scotia Museum of Natural History, 7:30 p.m. For more information email nswildflora@yahoo.ca or go to <http://www.nswildflora.ca/>.

25 Mar. "Roots of the Nova Scotia Nature Trust: 25 years of Preserving Places for Special Plants". with Jessica Bradford, Conservation Project Coordinator.

Nova Scotian Institute of Science: Meets the first Monday of the month, September to April, usually at the Nova Scotia Museum of Natural History, 7:30 p.m. For more information <http://nsis.chebucto.org/>.

1 Apr. "Unama'ki Institute of Natural Resources: Science & 2-Eyed Seeing to Address Aquatic Issues in Cape Breton", with speaker Shelley Denny, Director, Aquatic Research & Stewardship, Unama'ki Institute Natural Resources.

6 May "Ecosystem Research in the Bras d'Or Lakes", with speaker Dr. Bruce Hatcher, Chair in Marine Ecosystem Research, CBU.

Royal Astronomical Society of Canada (Halifax Chapter): Meets the THE FIRST SATURDAY of the month in the AFTERNOON. The meeting will run from 1:00 p.m. to 4:00 p.m. in Room AT101 of the Atrium Building at Saint Mary's University, 8:00 p.m. For more information go to <http://halifax.rasc.ca/>.

Young Naturalists' Club: A fun, free nature club for children seven to 12 years. Meetings take place every third Saturday of the month (excepting July and August), at the Museum of Natural History, 1747 Summer St., from 10:30 to 11:30 a.m. Field trips take place every fourth Sunday, at 1:00 p.m. For more information, Karen McKendry, 404-9902, yunchalifax@yahoo.ca; or <http://yncns.ca/>.

24 Mar. "Signs of Spring in Urban Environments", Birch Cove Park Beach, Dartmouth

24 May -26 May. "Nova Scotia Celebration of Nature", at Liscombe Lodge. There is a Children's Programme for this event. For details and registration, go to **Nature Scotia Celebration of Nature 2019**.

– compiled by Patricia L. Chalmers



HALIFAX TIDE TABLE



April-avril					May-mai					June-juin				
Day	Time	Metres	Feet		jour	heure	mètres	pieds		Day	Time	Metres	Feet	
1	0529	1.6	5.2		16	0458	1.8	5.9		1	0028	0.3	1.0	
	1158	0.4	1.3			1136	0.2	0.7			0630	1.6	5.2	
MO	1806	1.6	5.2		TU	1740	1.8	5.9		SA	1230	0.5	1.6	
LU					MA					SA	1832	1.8	5.9	
2	0024	0.6	2.0		17	0011	0.3	1.0		2	0111	0.2	0.7	
	0613	1.6	5.2			0559	1.8	5.9			0712	1.6	5.2	
TU	1239	0.4	1.3		WE	1231	0.1	0.3		SU	1314	0.4	1.3	
MA	1843	1.7	5.6		ME	1830	1.9	6.2		DI	1911	1.8	5.9	
3	0059	0.5	1.6		18	0107	0.2	0.7		3	0154	0.1	0.3	
	0652	1.7	5.6			0653	1.9	6.2			0754	1.7	5.6	
WE	1314	0.3	1.0		TH	1324	0.1	0.3		MO	1358	0.4	1.3	
ME	1917	1.7	5.6		JE	1917	2.0	6.6		LU	1952	1.9	6.2	
4	0133	0.4	1.3		19	0200	0.1	0.3		4	0239	0.1	0.3	
	0730	1.7	5.6			0743	1.9	6.2			0837	1.7	5.6	
TH	1347	0.3	1.0		FR	1413	0.1	0.3		TU	1445	0.4	1.3	
JE	1950	1.7	5.6		VE	2003	2.0	6.6		MA	2036	1.9	6.2	
5	0206	0.3	1.0		20	0250	0.1	0.3		5	0326	0.1	0.3	
	0806	1.7	5.6			0832	1.9	6.2			0922	1.7	5.6	
FR	1418	0.3	1.0		SA	1502	0.2	0.7		WE	1536	0.5	1.6	
VE	2022	1.7	5.6		SA	2047	2.0	6.6		ME	2122	1.9	6.2	
6	0241	0.3	1.0		21	0338	0.1	0.3		6	0417	0.1	0.3	
	0843	1.7	5.6			0919	1.8	5.9			1009	1.7	5.6	
SA	1450	0.3	1.0		SU	1550	0.3	1.0		TH	1634	0.5	1.6	
SA	2054	1.8	5.9		DI	2130	1.9	6.2		JE	2210	1.9	6.2	
7	0318	0.3	1.0		22	0426	0.2	0.7		7	0511	0.1	0.3	
	0919	1.7	5.6			1005	1.8	5.9			1057	1.7	5.6	
SU	1524	0.4	1.3		MO	1640	0.4	1.3		FR	1738	0.5	1.6	
DI	2128	1.8	5.9		LU	2213	1.9	6.2		VE	2300	1.8	5.9	
8	0358	0.3	1.0		23	0515	0.2	0.7		8	0609	0.2	0.7	
	0957	1.7	5.6			1050	1.7	5.6			1149	1.7	5.6	
MO	1603	0.4	1.3		TU	1733	0.6	2.0		SA	1844	0.5	1.6	
LU	2204	1.8	5.9		MA	2257	1.8	5.9		SA	2354	1.8	5.9	
9	0443	0.3	1.0		24	0605	0.4	1.3		9	0708	0.2	0.7	
	1035	1.7	5.6			1136	1.6	5.2			1244	1.7	5.6	
TU	1648	0.5	1.6		WE	1831	0.7	2.3		SU	1947	0.5	1.6	
MA	2242	1.8	5.9		ME	2343	1.7	5.6		DI				
10	0534	0.4	1.3		25	0657	0.5	1.6		10	0053	1.7	5.6	
	1117	1.6	5.2			1224	1.6	5.2			0806	0.3	1.0	
WE	1746	0.6	2.0		TH	1930	0.7	2.3		MO	1345	1.7	5.6	
ME	2325	1.7	5.6		JE					LU	2049	0.5	1.6	
11	0633	0.4	1.3		26	0034	1.6	5.2		11	0159	1.6	5.2	
	1204	1.6	5.2			0750	0.5	1.6			0904	0.3	1.0	
TH	1853	0.7	2.3		FR	1320	1.5	4.9		TU	1451	1.7	5.6	
JE					VE	2029	0.8	2.6		MA	2149	0.4	1.3	
12	0014	1.7	5.6		27	0133	1.5	4.9		12	0315	1.6	5.2	
	0735	0.4	1.3			0842	0.6	2.0			1002	0.3	1.0	
FR	1259	1.6	5.2		SA	1429	1.5	4.9		WE	1554	1.7	5.6	
VE	2000	0.7	2.3		SA	2125	0.7	2.3		ME	2247	0.3	1.0	
13	0112	1.7	5.6		28	0244	1.5	4.9		13	0426	1.6	5.2	
	0838	0.4	1.3			0932	0.6	2.0			1059	0.4	1.3	
SA	1409	1.5	4.9		SU	1542	1.5	4.9		TH	1650	1.8	5.9	
SA	2105	0.6	2.0		DI	2217	0.7	2.3		JE	2343	0.2	0.7	
14	0223	1.7	5.6		29	0356	1.5	4.9		14	0527	1.6	5.2	
	0939	0.3	1.0			1022	0.6	2.0			1156	0.4	1.3	
SU	1530	1.6	5.2		MO	1641	1.6	5.2		FR	1740	1.8	5.9	
DI	2209	0.5	1.6		LU	2304	0.7	2.3		VE				
15	0344	1.7	5.6		30	0453	1.5	4.9		15	0035	0.2	0.7	
	1038	0.3	1.0			1108	0.5	1.6			0621	1.7	5.6	
MO	1643	1.7	5.6		TU	1726	1.6	5.2		SA	1250	0.4	1.3	
LU	2311	0.4	1.3		MA	2346	0.6	2.0		SA	1828	1.8	5.9	
1	0539	1.6	5.2		1	0544	1.7	5.6		16	0124	0.1	0.3	
	1151	0.5	1.6			1212	0.3	1.0			0710	1.7	5.6	
WE	1803	1.7	5.6		TH	1805	1.9	6.2		SU	1340	0.4	1.3	
ME					JE					DI	1913	1.9	6.2	
2	0024	0.5	1.6		2	0024	0.5	1.6		2	0111	0.2	0.7	
	0621	1.6	5.2			0621	1.6	5.2			0712	1.6	5.2	
TH	1231	0.4	1.3		FR	1305	0.3	1.0		SU	1314	0.4	1.3	
JE	1838	1.7	5.6		VE	1851	2.0	6.6		DI	1911	1.8	5.9	
3	0101	0.4	1.3		3	0101	0.4	1.3		3	0154	0.1	0.3	
	0701	1.6	5.2			0701	1.6	5.2			0754	1.7	5.6	
FR	1308	0.4	1.3		FR	1308	0.4	1.3		MO	1358	0.4	1.3	
VE	1911	1.8	5.9		VE	1911	1.8	5.9		LU	1952	1.9	6.2	
4	0139	0.3	1.0		4	0139	0.3	1.0		4	0239	0.1	0.3	
	0740	1.7	5.6			0740	1.7	5.6			0837	1.7	5.6	
SA	1345	0.4	1.3		SA	1345	0.4	1.3		TU	1445	0.4	1.3	
SA	1945	1.8	5.9		SA	1945	1.8	5.9		MA	2036	1.9	6.2	
5	0217	0.2	0.7		5	0217	0.2	0.7		5	0326	0.1	0.3	
	0818	1.7	5.6			0818	1.7	5.6			0922	1.7	5.6	
SU	1422	0.4	1.3		SU	1422	0.4	1.3		WE	1536	0.5	1.6	
DI	2020	1.8	5.9		DI	2020	1.8	5.9		ME	2122	1.9	6.2	
6	0258	0.2	0.7		6	0258	0.2	0.7		6	0417	0.1	0.3	
	0858	1.7	5.6			0858	1.7	5.6			1009	1.7	5.6	
MO	1502	0.4	1.3		MO	1502	0.4	1.3		TH	1634	0.5	1.6	
LU	2058	1.8	5.9		LU	2058	1.8	5.9		JE	2210	1.9	6.2	
7	0341	0.2	0.7		7	0341	0.2	0.7		7	0511	0.1	0.3	
	0938	1.7	5.6			0938	1.7	5.6			1057	1.7	5.6	
TU	1547	0.5	1.6		TU	1547	0.5	1.6		FR	1738	0.5	1.6	
MA	2139	1.8	5.9		MA	2139	1.8	5.9		VE	2300	1.8	5.9	
8	0429	0.2	0.7		8	0429	0.2	0.7		8	0609	0.2	0.7	
	1020	1.7	5.6			1020	1.7	5.6			1149	1.7	5.6	
WE	1640	0.5	1.6		WE	1640	0.5	1.6		SA	1844	0.5	1.6	
ME	2222	1.8	5.9		ME	2222	1.8	5.9		SA	2354	1.8	5.9	
9	0522	0.3	1.0		9	0522	0.3	1.0		9	0708	0.2	0.7	
	1105	1.7	5.6			1105	1.7	5.6			1244	1.7	5.6	
TH	1743	0.6	2.0		TH	1743	0.6	2.0		SU	1947	0.5	1.6	
JE	2309	1.8	5.9		JE	2309	1.8	5.9		DI				
10	0621	0.3	1.0		10	0621	0.3	1.0		10	0053	1.7	5.6	
	1155	1.6	5.2			115								



NEXT DEADLINE

21st of May for the June 2019 Issue

**Send submissions to 'Newsletter', c/o NS Museum of Natural History,
or by email to sdhaythorn@ns.sympatico.ca**