

Alberta

*Palaeontological
Society
Bulletin*

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THE SOCIETY WAS INCORPORATED IN 1986

as a non-profit organization formed to:

1. Promote the science of palaeontology through study and education.
2. Make contributions to the science by: discovery; responsible collection; curation and display; education of the general public; preservation of palaeontological material for study and future generations.
3. Work with the professional and academic communities to aid in the preservation and understanding of Alberta's heritage.

MEMBERSHIP: Any person with a sincere interest in palaeontology is eligible to present their application for membership in the Society. Please enclose membership dues with your request for application.

Single membership \$20.00 annually

Family or Institution \$25.00 annually

SOCIETY MAILING ADDRESS:

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Requests for missing *Bulletin* issues should be directed to the Editor.
Send changes of contact information to the Membership Director.

NOTICE: Readers are advised that opinions expressed in the articles are those of the authors and do not necessarily reflect the viewpoint of the Society. Except for articles marked "Copyright ©," reprinting of articles by exchange newsletters is permitted, as long as credit is given.

Upcoming APS Meetings

Meetings take place at 7:30 P.M. in Room B108,
Mount Royal University, 4825 Mount Royal Gate SW, Calgary, Alberta.

Friday, April 17, 2020—CANCELLED. See notice, Page 3.

Friday, May 8, 2020—CANCELLED. See notice, Page 3. AGM rescheduled, see Page 4.

June, July, August 2020—No meetings. See Field Trips schedule, Page 5.

Watch the APS website for updates!

ON THE COVER: Skull of the osteolepiform fish, *Eusthenopteron foordi*, Devonian, Miguasha National Park, Gaspé, Quebec. Photo by APS member **Pete Truch**. See story on Page 7.

NOTICE TO MEMBERS

The ongoing COVID-19 pandemic has necessitated cancellation of a number of APS events. The March annual symposium, Paleo 2020, was cancelled. The April and May 2020 General Meetings have also been cancelled. We hope to reschedule the speakers for later dates. **The Annual General Meeting (Page 4) is rescheduled for Friday, September 18.** It is possible that some of the summer field trips (Page 5) will also have to be cancelled or rescheduled.

Watch the APS website **www.albertapaleo.org** and the June *Bulletin* for updates and late-breaking announcements.

The APS Board wish our membership the best during these uncertain and distressing circumstances. Please keep safe and we hope to see everyone in good health when we are able to resume normal operations.

In Memoriam



Photo: NUTV

We were shocked to hear of the unexpected passing of APS member, **Michèle Mallinson** on Tuesday, March 10, 2020. Michèle died at the young age of 60 years from ongoing heart problems. She is survived by one brother and was pleased to have become a great-aunt.

Michèle joined APS in 2012. She had chaired the APS Social Committee since September 2016 and brought cookies and prepared coffee for APS General Meetings. She also helped staff the APS sales table at the APS symposiums every year, starting in March

2016. Michèle volunteered at several APS microfossil sorting sessions. She shared news stories on palaeontological subjects at APS meetings.

Michèle was a geological technologist and petro-production accountant, a member of the Canadian Society of Petroleum Geologists (CSPG). She enjoyed crafts such as making jewellery, soft toys and postcards. She was fond of animals, especially cats. She loved ice cream and Chinese food. She attended her Anglican Church faithfully, and liked watching movies and the Food Network (hence her extensive knowledge of spices and herbs). Michèle enjoyed going out for coffee with the folks from the Mustard Seed. She was a member of NUTV, the University of Calgary television station, where she made the YouTube video, *How to Make Natural Laundry Soap*, Michèle's DIY Laboratory (<https://www.youtube.com/watch?v=oiQuExvCMkc>).

Michèle was quiet, kind, approachable, soft spoken, thoughtful, generous and always eager to help. We will miss her.

—Mona Trick

Notice of Annual General Meeting of Members

To the Members of the Alberta Palaeontological Society:

Take notice that the Annual General Meeting (AGM) of the Members of the Alberta Palaeontological Society (hereinafter called "The Society") will be held at Mount Royal University, Room B108, on the RESCHEDULED date of **Friday the 18th day of September**, 2020, at the hour of 7:30 o'clock in the evening, local time, to deal with the following business to be brought before the Meeting:

1. Adoption of agenda.
2. Minutes of 2019 AGM.

Members will be asked to adopt the minutes of last year's (2019) AGM, which may be reviewed at the APS website: <http://www.albertapaleo.org/agm.html>

3. Treasurer's presentation of the audited statement of the financial position of The Society.
4. Appointment of the auditors.
5. Election of Officers and Directors to the Board of The Society.

All APS members 18 years and older are entitled to vote. Executive positions are 1 year terms and directorships are 2 year terms. Nominations are being solicited for the following positions:

Officers	Directors
President	Editor
Vice-President	Membership
Secretary	
Treasurer	

Continuing directorships are Program Coordinator (**Harold Whittaker**) and Field Trips Coordinator (**Keith Mychaluk**). Both positions are entering the 2nd year of a 2 year term.

In addition to the elected positions the APS has a number of committee chairs which are appointed by the board:

Committee	Current Chairperson	Term
Fossil Collection	Howard Allen	Unlimited
Library	Georgia Hoffman	Unlimited
Public Outreach	Cory Gross	Unlimited
Social	(vacant)	Unlimited
Website	Vaclav Marosovsky	Unlimited

Terms for positions begin September 1. If you would like more information about Board positions or are interested in chairing or participating on a committee, please contact Past President **Wayne Braunberger** at (403) 278-5154 or by e-mail, pastpres@albertapaleo.org. All inquiries will be kept confidential if requested.

6. New Business.

If you have any items of New Business to be brought forward contact Society President, **Cory Gross** at (403) 617-2079 or by e-mail, president1@albertapaleo.org.

A document detailing the motions to be voted on will accompany the June issue of the *Bulletin*. □

A Letter to the Organizers of Paleo 2020

Friday, March 13, 2020

Re: APS Paleo 2020 Cancelled

Hello Harold and Mona,

Thank you for your message about the conference cancellation. It's a disappointment, but I'm confident it is the right decision for the time and situation.

Please also accept my most sincere thanks for all of the work you and your team have done toward organizing the conference, and for your dedication toward maintaining the high quality of the event. You have already made a significant and lasting contribution to palaeontology, not only for Albertans but for people over a much wider area. I'm certain that when the symposium series returns it will continue this path of excellence, bringing together avocational and professional palaeontologists and linking them with members of the general public—including children.

Over sixty years ago I was one of those wide-eyed kids in Calgary, mad about fossils—especially dinosaurs and mammoths. But what I read in books somehow convinced me that in order to become a professional palaeontologist I needed to be living in eastern Canada or the US! I collected bits and pieces of fossils anyway, and haunted the Fossil Houses at the Calgary Zoo. It was in 1963, when I was 15, that

a large group of vertebrate palaeontologists came to Calgary as part of a conference and field tour; and the great **Alfred Sherwood Romer** gave a presentation at the old Allied Arts Centre Theatre on 9th Avenue near 8th Street SW, and open to the general public. There in the theatre lobby I met in person several of the conference participants, including **Loris Russell** and **Hope Johnson**, and at last realized that I, too, could actually become a vertebrate palaeontologist. Loris, like me, had arrived in Calgary at the age of four—but in 1908—and as a teen had also collected fossils from the local sandstones! They took time to talk to me, to learn of my interests, to introduce me to other participants, and to encourage me. I treasure the memory of that conference presentation, and carry the memory with me whenever I participate in the APS.

We will all be back together before long. In the meantime, I wish you the best of health and success, and again my deep gratitude for all you have done on our behalf.

Please carry these wishes to others of your team.

All the best,

Michael C. Wilson, Ph.D., Coquitlam, BC

Emeritus Faculty, Dept. of Earth & Environmental Sciences,

Douglas College, New Westminster, BC.

Adjunct Professor of Archaeology, Simon Fraser University,
Burnaby, BC.

2020 Field Trips

By Keith Mychaluk

Planning is underway for this year's trips. We hope the current COVID-19 pandemic will subside prior to the summer field trip season and we are planning the trips in the hope they will proceed—including the Wyoming trip in June. However, the situation is rapidly evolving so please refer to our website for updates. Refunds will be issued if trips are cancelled so please sign up if you intend to participate. For more information please contact **Keith Mychaluk** at **(403) 809-3211** or by email at **fieldtrips@albertapaleo.org**. A field trip registration form is included with this issue of the *Bulletin* and is available on the APS website (**www.albertapaleo.org/fieldtrips.html**). Information will also be available at the monthly meetings. All fees are due at the time of registration. APS fees are \$10.00 per person

for members older than 12 years; children 12 and younger are free. Extra site fees apply for some trips.

This year you will be able to pay field trip fees by Interac E-transfer (Canada only). Follow directions on your bank's online banking site or mobile app. Bank fees may apply. Payee is **giftshop@albertapaleo.org**. Please state in the message field: "Field Trip Fees for 2020". Email a scan or photo of your completed signup form to **fieldtrips@albertapaleo.org**.

Non-members and unaccompanied minors will not be allowed to attend field trips. All participants are required to have their membership in good standing. Any membership applications received after April 27, 2020 will not be reviewed and voted on by the Board of Directors until September, 2020. Therefore, if you are a non-member and would like to join be sure your application is received prior to April 27, 2020. All participants will be required to read and sign a release form (waiver). Detailed information will be provided to all those registered shortly after the registration deadline. After the registration deadline no refunds will be given; however, you will receive the guide for the trip. No late registrations will be accepted. Registrations are accepted on a first come first served basis. Sign up early to avoid disappointment.

For the 2020 field trips I will be sending you the waiver and medical forms along with the trip information. This information will be sent to you via email or Canada Post. Please ensure that your addresses are correct and legible when sending in registration forms. When you arrive at the meeting place please have the forms completed. All participants are required to have fully completed all waiver and medical forms in order to attend the trip. There will be no exceptions. All personal information is held in confidence and ultimately destroyed.

Trip Participant Responsibilities

It is understood that risk is inherent to some degree in outdoor activities. Before registering for a trip please ensure you understand the risks involved and are prepared to accept them.

- As a participant you are responsible for your own safety and equipment at all times.
- Inform the trip leader of any medical conditions they should be aware of in an emergency.
- Ensure that your previous experience, ability and fitness level are adequate for the trip.

(Continues next page)

Trip 2020-1, June 27 & 28, 2020
Green River fossil fish, Kemmerer, Wyoming

The Green River Formation is world famous for its well-preserved fossil plants and vertebrates (fish, turtles, rays, birds and even horses!). The shale deposits were laid down in several lakes during the Eocene. The scale is impressive and several commercial quarries, museums and fossil shops cater to the education value and collection of these fossils centred on the town of Kemmerer.

Once participants make their own way to Kemmerer, we will start our journey at Fossil Butte National Monument followed by quarrying at one or more of the commercial operations over the two days. The commercial operators charge a fee (typically US\$65 to \$125 per day per adult—charged in addition to our regular field trip fee). For this fee they provide all the guidance, equipment and tools necessary to dig and split the shale and allow you to keep most common fossils with restrictions on rarer finds. In the words of one operator “It’s been my experience that a person can find all they wish to carry home in 3 to 4 hours of digging,” then it will take time to cut, trim and pack your specimens for traveling home.

The operators have agreed to provide us with receipts that will act as a value and a certificate of proof that the fossils were legally obtained from a private quarry for border customs declaration. Of course, they can ship your treasures for a fee, too. This trip is great for people of any age, including children (please see www.fossilsafari.com to give yourself an idea of what you are getting into!). Plan on two full days at Kemmerer, but clearly additional travel time is necessary (Google estimates 13.5 hours drive time from Calgary to Kemmerer) so plan your commitment accordingly. Within a few hours of Kemmerer are Yellowstone and Grand Teton National Parks which may entice you to make side trips. After the deadline —once total attendance is known—registrants will receive greater details on accommodations, campsites, extra fees, tools and other instructions.
Registration deadline is May 31, 2020.

Trip 2020-2, July 11, 2020
Devil's Coulee dino egg site, Warner, Alberta

Participants will enjoy a guided tour of the Devil’s Coulee Dinosaur Heritage Museum (located in Warner, Alberta). In the afternoon we will have an extended field tour of the site where dinosaur eggs were first discovered in Canada. We will have time to

search for Late Cretaceous (Campanian) fossils (such as dinosaur eggshell); however, personal collecting is not allowed at this protected site. A \$20 fee (in addition to the regular field trip fee) includes admission to the museum and the guided tour of the egg site. We will car pool from the museum to the egg site, due to the restricted size and challenging parking (in a pasture) at the egg site. The access to the egg site is via a good gravel road for several kilometres from the museum (about half an hour drive). This field trip is just one day in length (10:00 A.M. – 4:00 P.M., July 11) and will be led by **Mona Trick** at **giftshop@albertapaleo.org** or (587) 578-4579. Please contact Mona for a list of nearby campgrounds and hotels and for ideas on other activities in the area. Note Warner is a 3 hour drive from Calgary. **Registration deadline is June 27, 2020.**

Trip 2019-3, August 15 & 16, 2020
Bull River and Fernie area, southeastern BC

Our friend **Chris Jenkins** has once again been incredibly gracious and has agreed to guide us to yet another one (or two) of his newly discovered trilobite localities in the Bull River valley near Fort Steele, BC. Chris has been also been allowing access to **Dr. Brian Chatterton** of the University of Alberta who has been at the forefront of describing the incredible finds coming from the Upper Cambrian McKay Group. There will be opportunities to collect on private claims but we are guests and must be respectful of scientifically-valuable specimens we may encounter. On the second day of our trip we will make the pilgrimage to the largest known ammonite in North America (140 cm diameter! See cover photo of the December 2019 *Bulletin*) which lies on a mountainside just outside of Fernie, BC. We have its exact coordinates and plan a rugged hike through the forest to see this incredible giant. Note most of this trip is in rough terrain and in bear country, where 4x4 or high clearance vehicles are a must (pray for dry road conditions!). Fort Steele is approximately a 4 hour drive from Calgary and has an excellent campground. Nearby Cranbrook has many hotels and services. Fernie will be visited on the return trip and is about 3 hours from Calgary. **Registration deadline is July 1, 2020.** □

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Visiting the Gaspé Peninsula Will Leave You Gaspining!

Photo essay by Pete Truch, APS Member. Photos by the author unless otherwise noted.

Ok, Dad, I don't know where in the world you were planning to be, but Ron and I are getting married. By the way, it will be in North Rustico (Prince Edward Island), because Joyce (Ron's mother) can't travel . . ." So our daughter informed us.

"Congratulations! Wow, after living together for nineteen years . . . when is this super-happy-shocking event happening?"

"June 28 (2014)."

"Good thing you told us today, 'cause I was just about to book the plane for Jordan!"

As an archaeologist volunteer, I had been working with **Dr. Julie Cormack** of MRU on her site in Jordan, called Tall al-'Umayri (Madaba Plains Project), and was about to go over to excavate. The time spent would also include a trip to the fabled land of Petra (think Indiana Jones). Of course, June 28 fell right in the middle of the excavation time, so . . . Petra . . . wedding . . . almost no contest.

Like many unexpected occasions that arise in life, there are often new opportunities that come with it. Since my wife Doreen and I had driven across Canada three times by this point in our lives, we decided to take a longer way and tour the Gaspé, that less-travelled, long stretch of coastline that forms the south bank of the fabled St. Lawrence River. We had never been there—except vicariously, through an old picture in one of my school textbooks featuring Percé Rock.

Thinking of all the places to visit along the journey, we allowed five weeks to get to PEI. We also decided that, after the wedding, we would do the "Baseball Tour #2" down the east coast of the USA, so added another two months. For that, we would see a major league baseball game (one of my wife's passions) and visit many other archaeological, palaeontological and other interesting sites in the immediate areas (for example, the space shuttle *Discovery* in the Washington, DC area).

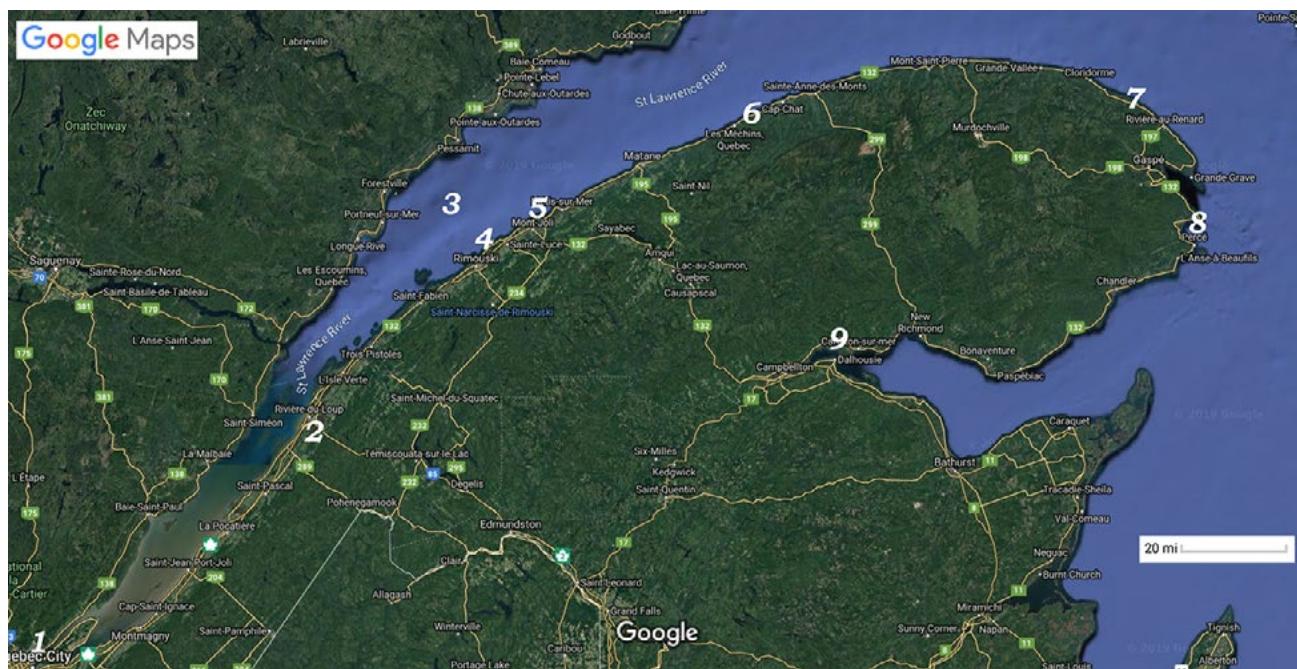


Figure 1a. All nine stops are numbered on this map of the Gaspé. Map from Google Maps, imagery ©2020 TerraMetrics, reproduced under terms of use.

For APS members who were able to attend my 15-minute presentation titled “Ashfall Fossil Beds State Historic Park & National Natural Landmark, Nebraska” on October 19, 2018 (*Bulletin*, September 2018, pp. 3–4), this palaeo site was one such planned stop on one of many trips.

And so this journey through the less-travelled Gaspé begins. Although this trip was made in 2014, the geology and sites will not have changed much and if you went today would likely see what you are about to read.

One of my favorite cities to visit in the world is Québec City (Stop 1), which I would now consider the gateway to the Gaspé, with its iconic symbol, the Château Frontenac (Figure 1b). Québec City is like visiting a European city, except this one is in North America. Of course, like anywhere else, there



Figure 1b. Château Frontenac and statue of Champlain, city founder in 1608. When he died in 1635 the population was a mere 300. He instigated “The Order of Good Cheer” which we tried to emulate in the Château’s bar, until we got the bill.

are sites that are recognizable (Figures 1c, 1d and 1e) and many that might be new, such as the church L’Eglise Saint-Roch’s beautiful stained glass works (Figure 1f) or an artistic rendering (Figure 1g) of Québec wildlife!?

Most visitors get caught up in all the wonders and ambience of this mesmerizing City. For those of us with a geology/palaeontology bent, just outside Québec City lies a bit of geological wonder, in Parc de la Chute-Montmorency. The first very noticeable item (unless you are legally blind and deaf) is the falls themselves (Figure 1h), which top out at 83 m

Figure 1e. Funicular, transporting people from Lower to Upper Québec City, and of course the reverse (St. Lawrence River in the background). The city with the most funiculars I’ve ever seen is Valparaiso, Chile (had to be a dozen in one area). Sure wouldn’t want to be on one when an earthquake struck!



Figure 1c. Caleche (carriage) ride. The longer one will take in the Plains of Abraham, where, all Canadian school children learned, Wolfe fought Montcalm in 1759. Other prominent people who played lesser-known roles were Captain James Cook and Louis Antoine de Bougainville, but that is a story for another time.



Figure 1d. Translation: “I will remember.” This slogan appeared for years on Québec license plates. I think it refers to participating in Champlain’s original Order of Good Cheer.





Figure 1f. Stained glass window in church L'Eglise Saint-Roch, Québec City.



Figure 1h. An iconic view of Chute-Montmorency, an 83-m plunge, overlooked by a pedestrian bridge.



Figure 1g. Work of a Québécois artist who likely failed an anatomy class or participated too often in the Order of Good Cheer. How would a palaeontologist describe this apparent bizarre descendant of the dinosaurs?

(272 ft.), a full 30 m taller than Niagara.

The falls, along a major fault separating Precambrian gneiss and Ordovician Utica Shale and along a continental margin, are bordered by a stairway to heaven (for a geologist; Figure 1i), where the face of Trenton limestone and shale (approx 6 m thick) is overlain by 240 m of Utica shale dipping at 45 degrees to the southeast. A number of Middle Ordovician fossils are present, including graptolites (St.-Julien *et al.*, 1972).

We found this intriguing geology continued all along the Gaspé, a remnant of the Appalachian mountain chain extending from Alabama to the ends of the Gaspé Peninsula, reappearing in

Newfoundland, and then to “... the Caledonide Mountains on the other side of the Atlantic, where they are found in the British Isles, the Scottish Highlands, Norway, Sweden, and along the eastern margin of Greenland. On the western edge of the African continent, the Mauritanides were also part of this mountain building event.” The appearance on both sides of the Atlantic was a result of tectonic plate separation of Pangea (Miguasha N.P., 2007).

Our next stop (2 on Figure 1a) was at the small city of Riviere du Loop, founded in 1673. Those who know a bit of French will realize this translates to Wolf’s River (it does sound better when you say it in French!). The Gaspé is/was the home of Québec separatism—even the hotel we stayed in was named in honour of René: Hotel Lévesque. At least our room was non-smoking.



Figure 1i. Geologists’ “Stairway to Heaven” along the exposure of Ordovician Utica Shale, Parc de la Chute-Montmorency.



Figure 2. Powerhouse built in Riviere du Loop in 1905. Rocks exposed in the cliff opposite the powerhouse are folded schists, a metamorphic rock formed from sediments deposited some 500 mya in a trench in the bottom of what we now call the Atlantic. This trench was thrust up to form the Appalachians. (Source: geology interpretative plaque located at the powerhouse.)

Stop 3 (Figure 1a) was a whale watching exercise, off the coast of Rimouski. The St. Lawrence is a deep basin and the tides are fairly strong even this far upstream. The waters must still be reasonably salty for the belugas and humpbacks that we got to see.



Figure 3a. The catamaran is an ideal way to watch whales.



Figure 3b. Humpback whale raising its peduncle (that long muscular back bone to which the tail fin is attached) and taking a deep (feeding) dive in the St. Lawrence.

If your interests are strictly palaeontology or geology, skip over the next two stops so you don't fall asleep reading and thereby curse the author and editor for including them. If I had been giving this in a 15-minute presentation, due to low lighting you would already have been asleep and not even realized I had snuck them in!

Rimouski (Stop 4) also contains two museums of note, the *Empress of Ireland* and the *Onondaga*, adjacent to it. The former is a tribute to the ship that was rammed by a coal freighter, the SS *Storstad*, on May 29, 1914 in heavy fog. The *Empress* went down in 14 minutes, taking 1,012 lives of the 1,477 passengers and crew aboard. It lies on the bottom at about 40 m depth. The *Storstad* in the meantime completed its journey to Montreal and unloaded its coal, before being seized for an inquiry.



Figure 4a. Exterior of the *Empress of Ireland* and *Onondaga* museum at Rimouski.

Because of the quick sinking and despite having watertight compartments and plenty of lifeboats, the *Empress* became Canada's worst peacetime maritime disaster. Coincidentally, we happened to be there on the 100th anniversary of the sinking. Canada Post paid tribute to the tragedy by issuing a stamp commemorating the centennial of this tragic loss of life.



Figure 4b. *Empress of Ireland* display inside the museum.

Somehow, we collectively seem to know more about events other than in our own country. I guess it's all due to media or simply lack of interest on our own part. Contrast the *Empress* tragedy with the sinking of the much more famous *Titanic*. It was the sole ship involved and met its fate by ramming an iceberg on April 15, 1912. It took over 3 hours to sink with a loss of approximately 1,200 lives. As a Canadian connection, Halifax has the largest cemetery for *Titanic* victims in Canada. There were 700 survivors. We had been to several museums dedicated solely to the *Titanic*, and perhaps the most memorable one we've seen is in Branson, Missouri, founded and owned by James Cameron. When one enters the museum, you are given a person's name and by the end of the museum tour, you will have found out that person's fate. They have yet to apply such an interesting approach to the *Empress of Ireland* Museum.



Figure 4c. The submarine *Onondaga* on display outside the museum.

If you have never been in a submarine, then the *Onondaga* is well worth the visit. Built in the 1960s it was decommissioned in 2000 and it takes a bit of time to tour all 90 m (295 ft) of it. The submarine and its development history is a whole new ball of wax. The last sub we had been in was a WWII survivor—a Russian-built one in Vladivostok, Russia. Even though it was much older, it was actually bigger than the *Onondaga*.

Stop 5, the second of the non-geological/palaeontological sites, is a typical street art town, Mt. Joli. The first town in Canada (as the townsfolk claim) to significantly use murals to a large extent for tourism purposes was Chemainus, British Columbia, on Vancouver Island. In the early 1980s in a forest industry downturn, the town was attempting to diversify its economy, so a number of artists were commissioned to paint large murals on the sides of various

downtown buildings. We had the pleasure of viewing all of the approximate 34 eye-candy artistic impressions in the mid 1980s. It was very effective in revitalizing the town, as today there are 53 murals.



Figure 5a. Guillame Gagnon Sainte-Flavie, 2005: *Respirez cette brise de fraicheur* ("Breathe this breath of fresh air").

So it was with an artistic curiosity that we wanted to view the murals of Mt. Joli, almost a continent-width away. We were not disappointed. Many local scenes unfolded with a typical Québécois flavour (Figure 5a). In addition, Mt. Joli took a new twist by adding reproductions of more famous artists such as the Group of Seven's Arthur Lismer with his 1921 "Georgian Bay" (Figure 5b). I was hoping to find something containing fossils, but alas, the only one to be seen was a self-reflection in one of the store windows.



Figure 5b. *Interpretation d'apres l'oeuvre de Lismer Bourrasque en Septembre baie Georgienne*, 1921 ("Interpretation of the works of Lismer (Bourrasque) in Sept. 1921 in Georgian Bay."

Stop 6 features Jardins de Métis. Many of us in the Society have a strong interest in plant fossils. Although this plant example is actually growing in Parc National de Migusha, it connects the Gaspé to



Figure 6a. Living *Ginkgo biloba* leaves at Miguasha.



Figure 6b. Fossil *Ginkgo* sp. leaf, Lower Cretaceous Gates Formation, Cadomin, Alberta. Photo by Howard Allen.

our interests. Described as living fossils, *Ginkgo* sp. (Figures 6a, 6b) are found in the fossil record as far back as 270 million years ago in the Permian, so have



Figure 6c. A unique floral display greets the visitor at the entrance to Jardins de Métis..

survived mass extinctions and likely all of the plant-eating dinosaurs that munched on them. Its modern survival is credited to Buddhist monks in Japan and China who cultivated them as sacred trees and utilized extracts in their medicinal practices.

The Jardins de Métis owe their existence to Elsie Reford who developed them between 1926 and 1958. Not as famous or spectacular as Butchart Gardens on Vancouver Island, there are nonetheless several interesting sectors growing a large variety of plants to explore. A large number of rock art and steel and rock sculptures are sprinkled throughout the grounds, lending an additional dimension to the view.



Figure 6d. Red *Sempervivum* sp. ("Hen-and-chicks") in a rock garden display.

Stop 7 contains several interesting folds and faults in the life history of the Appalachians. The coastal highway (Figure 7a) follows several hairpin turns and roller coaster verticals that are a bit reminiscent of driving around the Cabot Trail, Cape Breton, but a very miniature version in comparison. The geological features found literally around every corner were amazing, as can been seen in Figure 7b.

Stop 8 was, as seen in Figure 7c, a 17% grade approach. Good thing we had brakes that actually worked! Perce Rock (Figures 7d, 8a, b) is an iconic image that was embedded in my brain



Figure 7a. The Gaspé coastal highway to Percé Rock. Photo by Doreen Truch.

since early school days as it decorated the cover of one of my texts. Since I don't remember ever opening the book, it is no wonder the rock image was embedded. The rock is, of course, a remnant of marine erosion.

Thanks to fellow APS member **Harvey Negrich's** kind generosity, I have a very good set of references to use in describing the local geology (refer to source cited in Figure 8a). I am only sorry I didn't possess these most excellent reference books when I actually drove the trip.

In Figure 7d, besides Percé Rock, most of Bonaventure Island can be seen on the right horizon. The island itself is formed by the "non-marine red conglomerate and sandstone of the Carboniferous Bonaventure Formation" (Poole and Rodgers, 1972, pg. 144). Fossils found include species of brachiopods and trilobites which, hidden in the various formations, extend all the way to their more famous locale, Anticosti Island.

The Rock and Island are a fully protected area under the name "Parc National de l'Île-Bonaventure-et-du-Rocher-Percé" (*i.e.* no collecting!). The Park is home to much wildlife including seals (Figure 8c) and other marine creatures, but especially



Figure 7d. The approach to Percé Rock townsite and Bonaventure Island. Photo by Doreen Truch.

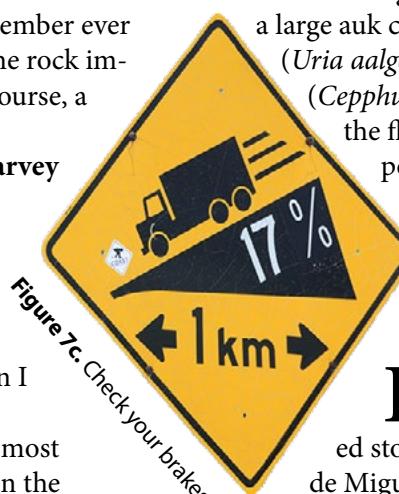


Figure 7c. Check your brakes!

to northern gannet (*Morus bassanus*, Figure 8e); a large auk called a guillemot, or common murre (*Uria aalge*, Figure 8f); black guillemots or tystie (*Cephus grille*) and some 214 other species of the flying variety. Of course, such a large bird population is a result of very favorable conditions for rising chicks. The sights, sounds, and smells from this excursion will remain locked in my memory forever—or at least until I forget.

Last Stop in the Gaspé—Stop 9 and the most palaeontologically-oriented stop of the whole Gaspé—Parc National de Miguasha. Note: Sources for all the following are either display plaques in the Museum or from the website, miguasha.ca. Again, it was just



Figure 7b. Spectacular box folds in thinly bedded sedimentary rocks (turbidites?) seen along the Gaspé coastal highway to Percé Rock.



Figure 8a. Classic shore view of Percé Rock, a hard, finely crystalline, siliceous, silty limestone of the Lower Devonian Murailles Formation: "Its colour ranges from grey through yellow to reddish, the latter colours perhaps due to iron staining from the Bonaventure strata which must at one time have overlain the rock" (Poole and Rodgers, 1972).



Figure 8b. At a certain angle from a boat on the way to Bonaventure Island, the iconic rock drops its geologic stance and assumes a living critter pose, that of a horse taking a drink—perhaps again too much of my participation in "The Order of Good Cheer."



Figure 8e. Northern gannet, *Morus bassanus*.



Figure 8c. Spotted seals, *Phoca largha*.

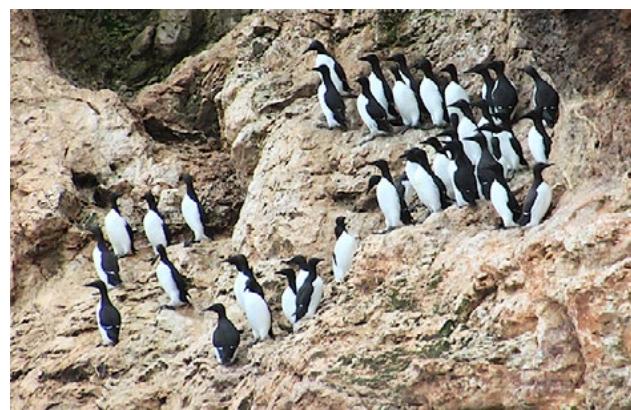


Figure 8f. Guillemots, or common murres, *Uria aalge*.



Figure 8d. Shameless self-promotion. The author, Pete Truch and his wife Doreen Truch with Percé Rock in the background. We have been married for 48 years (2019). She was snuggled up just because she was cold.



Figure 9a. Celebrating the fossil in a media presentation.

dumb luck on our part that we got to visit this place on the same day there was a big media release about the “King (*Le Roi*) of Miguasha” (Figures 9a, 9l), *Elpistostege watsoni*. Admission was free.

Of course this is Québec, so every Provincial Park is called a National Park—don’t get confused. Miguasha is also a World Heritage Site (1999), even though it only became a government-owned area in 1985. Its written history dates back to an early fos-



Figure 9b. Abraham Gesner’s error.

sil collector named Abraham Gesner, who in 1842 found a large number of specimens, some of which ended up in the British Museum. I love the caption that went with Figure 9b. “What Abraham Gesner took to be a fossilized tortoise in 1842 is actually the fossil of a fish. The bony plates of *Bothriolepis canadensis* do look very much like a shell, after all.” Glad to read that I am not alone in misidentifying just about everything!

Some of the fossils on display were very familiar, such as stromatolites (Figure 9c) those primitive algae-formed structures that date back to 3.5 billion years. Although Québec has some very old rock, the oldest stromatolite found there, at Lake Mistassini, dates back only 1.8 billion years. We also saw various species of trilobites, rugose corals and gastropods.

From a plant perspective, Miguasha has several rare and ancient plant species including trees, and



Figure 9c. A nice stromatolite displayed in the museum.

some unique fossils of them (Figure 9d) found in the layers of the Escuminac Formation. And many strange critters that inhabited undergrowth along the Devonian-age Miguasha estuary such as the terrestrial *Zancloidesmus willetti* (like today’s millipedes), shown in Figure 9e.

But the show-stealers in Miguasha are of course the fish themselves. Many striking fossils representing the Age of the Fish (Devonian, approximately 417 to 360 mya) were on display, with many, many more stored in the vaults. Miguasha has at least 9,000 fos-



Figure 9d. Foliage of the trees *Archaeopteris halliana* and *Archaeopteris obtrusa*.



Figure 9e. *Zanclodesmus willetti*, a millipede-like arthropod.

sil specimens, many of which are unique in the world, but especially of fishes.

The Devonian (named in 1839 for the Devonshire, UK area by Adam Sedgwick and Roderick Murchison) lasted some 57 million years. Plenty of time to create diversity, but all fish species fit into two categories—gnathostomes, or jawed fish, and



Figure 9f. Fish scales of *Quebecius quebecensis*.

Quebecius quebecensis (WHITEAVES 1889)

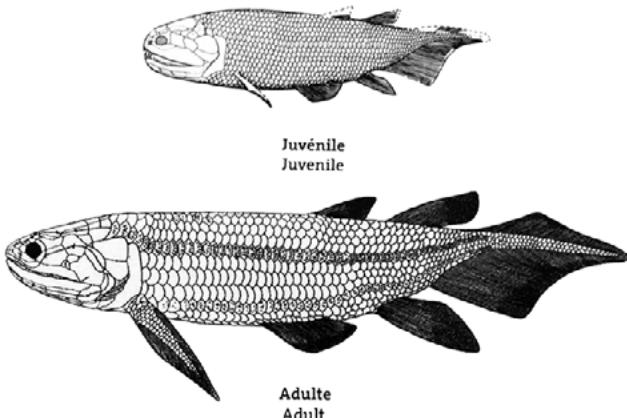


Figure 9g. Artistic rendering of *Quebecius quebecensis*, in a museum display.

agnathans, the ones without jaws. In the Devonian there were six groups of jawless fish, but four groups suffered mass extinction at the end of the Period. Modern descendants of this surviving group include lampreys and hagfish.

Within gnathostomes, two groups disappeared in the mass extinction: the acanthodians and the placoderms. Three groups survived: the actinopterygians (modern ray-finned fish); the chondrichthyans (especially sharks) and the sarcopterygians (coelacanths and lungfish) and modern descendants of the first tetrapods with lineage tracing back to this group.



Figure 9h. *Bothriolepis canadensis*.

I was struck by the beautiful fossilized scales of *Quebecius quebecensis* (Figures 9f, 9g). I thought I would start with this fish, given it was named in honour of where we were. Since I know nothing of fish except that some taste better than others, I discovered that *Quebecius* differs from its brethren in the “porolepiforms group and most sarcopterygians in that it bears only one lobed fin, the pectoral fin, and its other fins sport rays that penetrate deeply into its body.” It also sports a pelvic fin with an unusually large base not found in any other porolepiforms. It also has unusually small operculars, the plate-like bones that cover the gills of a fish. (Source: migausha.ca)

Figure 9h shows the bony plates covering the head, thorax and pectoral fins of *Bothriolepis canadensis*, a fish living in the local waters some 380 million years ago. Specimens of the same species have shown a fossil rarity—traces of blood vessels on the ventral side and on the opposite, traces of nerves. Migausha must have had some very special conditions taking place for such fossilization!

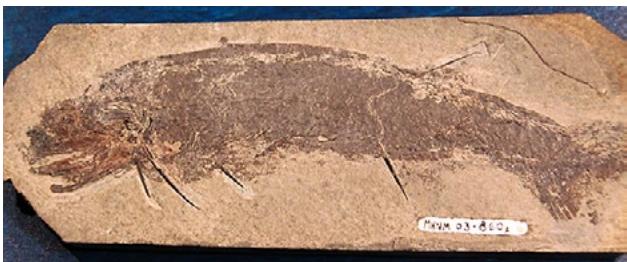


Figure 9i. *Homalacanthus concinnus*.



Figure 9j. *Cheirolepis canadensis*.

Figure 9i shows the super-spiny *Homalacanthus concinnus*, the largest of its group at 30 cm in length. Figure 9j displays the fossil of *Cheirolepis canadensis*, a very modern looking fish according to the display board caption.



And now for the “Prince of Miguasha,” the much studied osteolepiform, *Eusthenopteron foordi* (Figure 9k). According to the display plaque, in July 2004, the front portion was found *in situ*. The front portion shows the external features “including fully articulated skull bone, preserved scales and pectoral fin with fleshy lobe and rays.” The back portion was thought nonexistent, but as with many large collections, was found in the vaults in 2007. It had actually been collected on the beach in April of 2000! It took six months of prep time to match the two portions, with the back half showing the internal features (by removing the scales), resulting in quite an unusual combination.

Further, the plaque states:

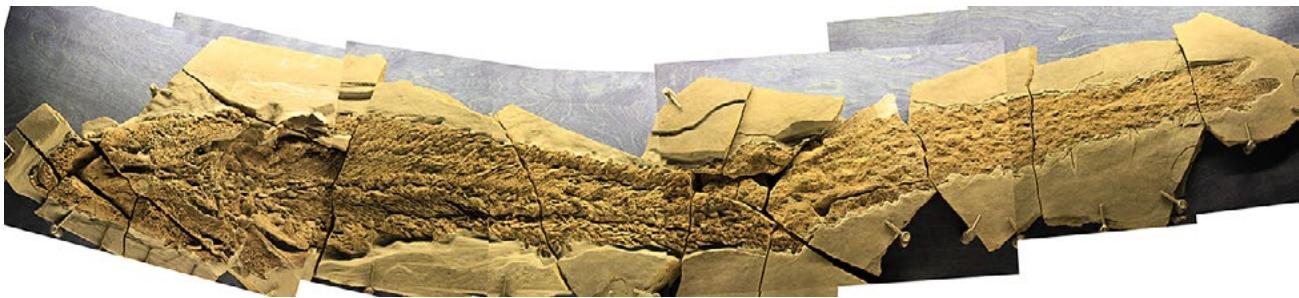
“This large and hydrodynamically shaped fish was a powerful predator. It had lungs, a strong vertebral column and a bone structure in its paired fins that was a forerunner of the leg bones of terrestrial vertebrates. Indeed it was long thought to be the ‘missing link’ between fishes and tetrapods until the discovery of an even more evolved tetrapodomorph at Miguasha.”

Before the Park was bought and created by the Provincial Government, apparently an even better specimen was found by Allan Parent and sold to the Cleveland Museum of Natural History. A replica of it is on display at Miguasha.



Figure 9k. The “Prince of Miguasha,” *Eusthenopteron foordi*. Composite photo-mosaic of four images. Detail below, showing the exquisite preservation of the fine bones.

The whole reason for the media attention on the day of our visit was for that previously noted “more evolved specimen” (Figure 9l), the newly crowned “King of Miguasha.” Rather than shortening the story (that has some similarities to the tale of the “Prince”), I herein quote the captions in full as displayed in the Museum:



Figures 9I. The “King of Miguasha,” *Elpistostege watsoni*. Composite photo-mosaic of seven images. Detail of skull area, below.

An intriguing discovery . . .

In front of you is the only complete specimen of *Elpistostege watsoni* known in the world. This is the story of how it was discovered.

The first fragment of this fossil—the only one of its kind in the world – was found on August 4, 2010. A patrolling park warden spotted a piece of fossil still in place in a layer of sedimentary rock emerging from the sand on the beach. He picked it up and noticed that the fragment extended into the layer. Due to the fossil’s unusual appearance, however, the park warden could not identify it. Intrigued, he brought the fragment back to the lab to consult his colleagues.

The next day, a team excavated the entire specimen on the beach. Removing one piece of rock after another, the team saw with mounting excitement that the fossil extended further and further into the sedimentary layer. It took three hours to extract the whole specimen and bring it back to the laboratory where it was put together like an enormous puzzle.

The entire park team was elated—a very large fossil fish had been found, doubtless the largest ever discovered in Miguasha in 130 years of research. The only disappointment was the fossil was missing the end of its tail fin. Because of the specimen’s positioning in the sedimentary layer, the tail was closest to the water, so the team feared it may have been washed away by the tide and lost forever.

Shortly after the fossil was found, one of the members of the team noticed that the first fragment found by the park warden was very similar to another specimen brought back from the beach a few days earlier. When they checked, everyone was surprised to see that a matching piece for the first fragment had already been found.

But the tip of the tail fin was still missing and the chances of finding it were slim. There was still hope that the missing fragment would be among those collected during a preventive harvest—conducted before the August 4th find—of fossils that had fallen from the cliff through erosion.



An initial search of the fossil cabinets proved unsuccessful, so the team then turned to the boxes where very incomplete fossils are stored, going through them with a fine tooth comb.

And then—what a celebration! Two fragments that fit together were found and they were a perfect fit for the tail of the fish fossil! Amazingly, these two fragments were collected in 2007 and one of them was found some 400 m from where the main fossil was discovered. The specimen was finally completed.

Now the team just had to identify it . . .

To begin the process of identifying this intriguing fossil, the technician—or fossil preparator—began the mechanical preparation as soon as the fossil was discovered, carefully removing the overlying sediments.

The dorsally placed orbits and the diamond shaped scales just behind the skull were quickly revealed. These clues soon led to a formal identification: the enormous 1.6 metre fossil was the first complete specimen of *Elpistostege watsoni*! This species is key to understanding the origin of the tetrapods—the four-limbed terrestrial vertebrates. Palaeontologists had been hoping for this find since 1937, when the first fragment of the species was discovered.

Because of its scientific importance, this unique specimen’s existence was kept secret for more than three years, allowing the fossil preparatory to devote 2,700 hours of meticulous work.”

Great story—I quoted it in full, so you who are reading this would get the whole picture that I did



Figure 9m. Cliffside view of Devonian rocks at Miguasha that are slowly yielding their fossilized remains.

in the actual Museum visit. However, when I see numbers quoted like that, it reminds me of my civil service days, so I always check them. Let's assume a 35 hour work week and 3 weeks of paid vacation, so $35 \times 49 = 1,715$ hours/year $\times 3$ years = 5,145 hours. The writer states that 2,700 hours were needed to work it, so what did they do with the remaining $(5,145 - 2,700) = 2,445$ hours?

To complete our visit to Miguasha, we took the opportunity to walk to the accessible beach in the Park where all the fossils are being extracted. Figure 9m shows a cliffside and beach view.

I would like to end this article with a quotation from Pierre Beland in 1984, just before the Park was created:

For all who revere the Earth, Miguasha is like one of those sacred sites where primitive people set up a shrine to their beliefs, a shrine they did not dare destroy lest the grand order of things be overturned. It is our duty to preserve it for all humanity.”

Thank you, Pierre, and the primitive people you are referring to!

Postscript

The wedding went well as did the Baseball Tour #2. And no, I haven't been to Jordan/Petra as yet!

References

- Miguasha National Park. 2007. Paleogeography. <https://www.miguasha.ca/mig-en/paleogeography.php>
St.-Julien, P., Hubert, C., Skidmore, W.B. and Beland, J. 1972. Appalachian structure and stratigraphy Québec. Field Excursion A56-C56 guidebook, 24th International Geological Congress, pp. 15–17.
Poole, W.H. and Rodgers, J. 1972. Appalachian geotectonic elements of the Atlantic provinces and southern Québec. Field Excursion A63-C63 guidebook, 24th International Geological Congress, pp. 139, 144. □

CSVP Conference Cancelled

The annual Canadian Society of Vertebrate Palaeontology (CSVP) conference, which was to be held at the Royal BC Museum in downtown Victoria, BC on June 6–8, 2020, has been cancelled due to the COVID-19 pandemic.

See csvp.ca for details. □

APS Revenue & Expenses for 2019 For January 1, 2019 to December 31, 2019

Revenues		Expenses	
US\$ Exchange	6.33	Bulletin Printing	96.28
2019 Single + Family Memberships	1715.00	Bulletin Postage	101.48
2020 Single + Family Memberships	590.00	Meeting Speaker expenses	252.91
Bank interest + GICs cashed	5259.36	Membership expenses	32.63
T-shirts (member + non-member)	155.00	Field Trip Expenses	50.00
Book: Common Vert Fossils (mem+non)	1865.00	Symposium Workshop	90.33
Book: Hope Johnson (mem + non)	845.00	Symposium Speaker	989.64
Handling fees: Book Common Vert Fossil	270.86	Symposium Abstract Printing	276.97
Handling fees: Book Hope Johnson	96.00	Book: Common Vert Fossils	1310.14
APS Guides (field trip + old abstracts)	30.00	Book: Hope Johnson print	2379.04
Other books (China-Canada)	16.00	Postage: Common Vert Fossils	224.75
Refreshment donations	44.35	Postage: Hope Johnson	90.31
Field trip fees	440.00	Website domain and hosting fees	0.00
Donations (General to APS)	30.00	Refreshments	54.46
Symposium 2019 Abstract sales	336.00	Bank Charges+GIC purchase	5004.00
Symposium Donations	511.90	Postbox rental	177.45
Symposium workshop fees	260.00	Insurance	1875.00
Library income	20.00	Hope Johnson award	0.00
Public Outreach income	0.00	Public Outreach expenses	12.59
Hope Johnson award income	0.00	Library expenses	0.00
Subtotal Revenues	12490.80	Subtotal Expenses	13017.98
Plus Revenue Received in 2018 for 2019		Plus Expenses paid in 2018 for 2019	
2019 Membership Fees	545.00	Website domain and hosting fees	224.25
Savings for 2019 Symposium	2892.00		
Symposium 2019 Workshop Fees	130.00		
Savings for Library	705.25	Minus Expenses paid for 2020	
Savings for Public Outreach	718.82	2020 Insurance	1875.00
Savings for Hope Johnson award	1855.23		
Savings for Insurance	1690.54		
Savings for T-shirt purchase	573.05		
Subtract Revenue Received in 2019 for 2020			
2020 Memberships Fees	590.00		
Savings for 2020 Symposium	2725.00		
2020 Symposium Workshop Fees	40.00		
Savings for 2020 Library	725.25		
Savings for 2020 Public Outreach	706.23		
Savings for 2020 Hope Johnson Award	1855.23		
Savings for Liability Insurance	2080.54		
Savings for future T-shirts	573.05		
Total Revenues	12305.39	Total Expenses	11367.23
Excess of Revenues over Expenses	938.16	GICs	16,421.86
Inventory Cost	\$2,767.47	Dec. 31, 2019 Bank Account:	12,687.96
Audited by APS Members (Bylaws):		Values Current to Date:	2-Jan-20
Printed Name: <u>Sulnara Machitova</u>		Signature: <u>Mary</u>	Date: <u>Feb 14/20</u>
Printed Name: <u>Anita Reilander</u>		Signature: <u>A. Reilander</u>	Date: <u>FEB 21/20</u>