Alberta Palæontological 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. Contribute 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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THE BULLETIN IS PUBLISHED QUARTERLY: March, June, September and December. Deadline for submissions is the 15th of the month prior to publication. Material for the *Bulletin* should be sent to:

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Requests for missing *Bulletin* issues should be directed to the Editor. Back issues are available at **albertapaleo.org/resources/bulletinarchives/** Send changes of contact information to the Membership Director.

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 19, 2024—Dr. Jason Anderson, University of Calgary.
An update on the "Romer Gap" in the fossil record.

Friday, May 10, 2024—Dr. Gavin Bradley, University of Alberta.
Topic to be announced.

No meetings in June, July and August. See Field Trips on Page 8.

Check the APS website for updates! albertapaleo.org/events/monthlymeetings

ON THE COVER: A spectacularly preserved specimen of the receptaculitid *Fisherites*, a putative calcareous algae in Ordovician Tyndall Stone of a Calgary building. Finger tip for scale. Photo by Tako Koning. See story on Page 16.

In Memoriam

Mike Clark in his office at MRU. Photo by James May, from Mount Royal University.

Friend of the Society
Mike Clark

1954 – 2023

With sadness, we must report the passing of Mike Clark, a Friend of the Society and long-time Instructional Assistant in the Department of Earth Sciences at Mount Royal University. Mike was instrumental in securing APS's presence at MRU and arranging for our use of the geology lab and microscopes in B213 for our microfossil sorting sessions and symposium workshops. He coordinated the poster board displays and theatre booking for the symposium and helped us set up every year.

Mike also donated specimens to the APS fossil collection and donated books to our library. He was awarded Friend of the Society membership in May, 2006. Mike retired from MRU in 2020 (*Bulletin*, June 2020, p. 4).

We learned of Mike's mid-November 2023 passing only recently. A Facebook notice can be seen here: **https://www.facebook.com/photo/?fbid=6785792110308 04&set=pb.100066361942796.-2207520000**. We found no newspaper obituary, but an entertaining and fitting article about Mike was published in the MRU online newsletter *Summit* in 2015: **https://www.mtroyal.ca/Summit/mikeclark.htm#** ❑

K-Pg boundary in Alberta: new publication available

APS Member and Geologist **Jacques LeBlanc** is offering his new publication, *Review of the surface Cretaceous-Paleogene (K-Pg) boundary localities in Alberta, Canada*, as a free download from any of three links:

https://sites.google.com/site/leblancjacques
https://www.researchgate.net/publication/377002283
https://www.academia.edu/112676060 ❑

Upcoming Events

April

Dr Jason Anderson
University of Calgary

An update on the "Romer Gap" in the fossil record

Friday, April 19, 2024, 7:30 P.M.
Mount Royal University, Room B108.

May

Dr Gavin Bradley
University of Alberta

Topic to be announced—see the APS website for updates.

Friday, May 10, 2024, 7:30 P.M.
Mount Royal University, Room B108.

Visit our website for talk abstracts and updates when they are made available.

albertapaleo.org

Harold Whittaker honoured with 2024 Hope Johnson Award

By Mona Trick

The APS is pleased to present Harold Whittaker with the 2023 Hope Johnson Award for Non-Professionals. APS President **Cory Gross** presented a cheque for $250.00 and a framed certificate to Harold during the APS symposium Paleo 2024 on March 16.

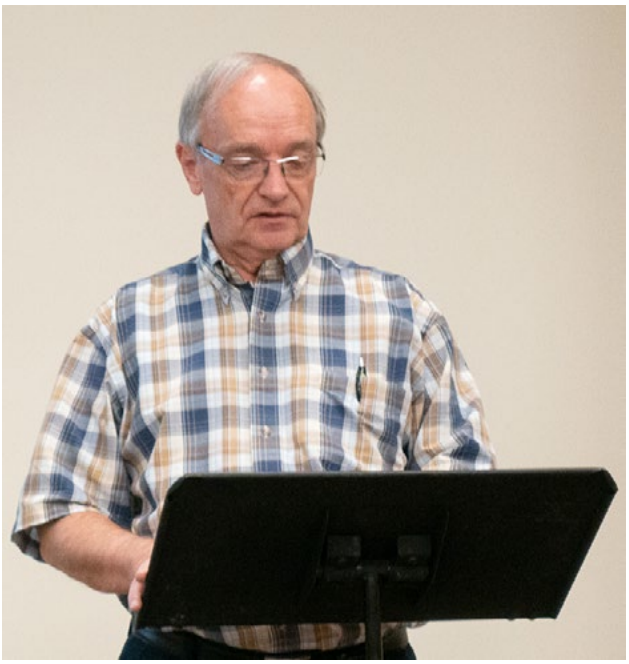
The Hope Johnson Award for Non-Professionals recognizes significant contributions by those not professionally employed in palaeontology. Candidates must be nominated by at least one APS member who provides a completed nomination form, a short citation outlining the individual's accomplishments and one or more letters of support. Applications received before December 31 of each year will be considered by the APS Executive for presentation at the next year's APS symposium. One award is allowed per year.

The nominee must not be currently sitting on the APS Board and must meet at least one of the following criteria:

a) Compilation of fossil collections from an area or geological formation at a public institution.
b) Curation and conservation of collections at a public institution.
c) Volunteer work at a museum or research institute (long term, more than 5 years).
d) Published studies (author, co-author) in recognized journals.
e) Outreach activities bringing palaeontology to the public (e.g. school and public presentations) for more than 5 years.

Harold Whittaker's contributions to palaeontology include:

1. APS public outreach activities from 2009 to 2023, including:
   - Presentations at elementary schools.
   - Volunteering for APS at many outreach events.
2. Donation of fossils to the Royal Tyrrell Museum of Palaeontology (namely Paleocene leaves from the Calgary area).



Harold introducing speakers at Paleo 2019. Photo by Don Murchison.

3. Facilitating the donation of insect fossils in amber (Late Cretaceous), from his brother's property in southeastern Alberta, to the Royal Saskatchewan Museum for study by **Dr. Ryan McKellar**.
4. Volunteering as the APS Program Director from September 2011 to September 2023. Harold organized the eight monthly speakers from September to May of each year, plus the speakers for our annual symposium and workshops. During his tenure, Harold was instrumental in expanding the APS relationship with Mount Royal University and Canadian Society of Petroleum Geologists (CSPG) (now Canadian Energy Geoscience Association, CEGA). During the COVID pandemic, Harold arranged for APS to broadcast its monthly meetings on the CSPG's webinar platform. Harold joined the APS Board of Directors in 2009, retiring in 2023 after 14 years of service.

In summary, Harold Whittaker is very well qualified to receive this award. Thank you and Congratulations, Harold! ❑

VanPS Zoom Talks

The Vancouver Paleontological Society is inviting interested people to join their special guest lectures online, via Zoom. **Dr. Jean-Bernard Caron** (Cambrian faunas) speaks on May 4, **Dr. Brian Chatterton** (trilobites) speaks on June 12. For details and Zoom links, visit their website:

https://vanps.vcn.bc.ca/calendar/ ❑

Microfossil sorting sessions get big turnouts

By Mona Trick

Attendance was amazingly high during our eight microfossil sorting sessions from November 5, 2023 to March 10, 2024 at Mount Royal University. **Dr. Jessica Theodor** and **Dr. Alex Dutchak** of the University of Calgary provided the bulk matrix samples which we searched through, using microscopes to recover tiny teeth and bone fossils from the Cypress Hills Formation (middle Eocene) of the Swift Current Creek area of Saskatchewan. This area is particularly important because it is the northernmost known mammal locality of its age, namely the Uintan North American Land Mammal Age, 42 million years old.

A lagomorph (rabbits, hares, etc.) molar under the microscope. Photo by Atharva Roy.

Attendance varied from nine to twenty-seven volunteers attending each session, averaging sixteen people per session. During the session on November 26, we ran out of microscopes (including all the microscopes in the lab B213 and three additional microscopes from APS), such that two of the twenty-seven volunteers had to share. This year we had visitors from Japan, Saskatchewan and Edmonton, who, while in Calgary on other business, decided to spend an afternoon with us searching for fossils. We also had many new volunteers, including new APS members and non-members, who attended after seeing the description of our sorting sessions on the APS website.

Lizard jaw fragment with teeth. Photo by Atharva Roy.

We found many mammal teeth, mostly rodent teeth, but also teeth from insectivores, marsupials, multituberculates and lagomorphs (rabbits and hares). Further investigation will show whether the specimens we found included primate, artiodactyl and condylarth teeth. In addition, we recovered nice lizard jaws and scutes, snake vertebrae, crocodile scutes, reptile teeth, tiny limb bones and many small bone fragments. We found numerous fossils from fish including scales, teeth, a ray tooth plate, spines and skull bones.

We are very grateful to Mount Royal University for allowing us to use their microscopes and lab, which allow us to offer these sessions at no cost and to open these sessions to the general public.

Check the September 2024 *Bulletin* for the dates and location of next autumn's microfossil sorting sessions, when once again we will search for tiny fossils to aid research into the Eocene of Saskatchewan. ❑

Standing room only at the November 26 microfossil sorting session! We ran out of microscopes—and seats—and some had to share. Photo by Bev Ulmer.

Changes to Control List in Alberta fossil regulation

By Howard Allen

The Government of Alberta, after consultation with interest groups (APS among them), has made a change to the Dispositions (Ministerial) Regulation of the Historical Resources Act, as announced in December 2023 by **Dan Spivak**, Head of the Royal Tyrrell Museum's Resource Management Program.

For most APS members the change will have little or no impact. Under the previous version of the Regulation a "Control List" was included, which named certain types of fossils that could be legally owned, traded or sold with written permission of the Government. The old Control List included "ammonite shell, oyster shell, petrified wood and fossil leaf impressions."

In the newly amended *Alberta Regulation 101/1998 with amendments up to and including Alberta Regulation 134/2023 current as of November 15, 2023* the Control List now includes "(a) invertebrate fossils, including (i) all evidence of invertebrate fossils, including tracks, traces, molds and casts, (ii) ammonite shell, and (iii) oyster shell; (c) petrified wood; (d) fossil leaf impressions." All other parts of the Regulation remain unchanged and there is no change to the way fossils can be collected in Alberta: as before, loose fossils may be legally collected from surface exposures on Crown or private land with permission of the owner—no fossils can be excavated without a government permit, which is granted only to qualified researchers.

The change will be seen as positive for people wanting to sell Alberta fossils and it's likely we'll start seeing invertebrate fossils of all sorts showing up in rock shops and on show tables. The full Regulation can be downloaded from the Alberta King's Printer: **https://kings-printer.alberta.ca/570.cfm?frm_isbn=9780779844791&search_by=link** ❑

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** after the main guest presentation on **Friday the 10th day of May**, 2024, at the hour of 7:30 o'clock in the evening, local time, to deal with business to be brought before the Meeting:

1. **Adoption of agenda.**
2. **Minutes of 2023 AGM.**

Members will be asked to adopt the minutes of the 2023 AGM, which may be reviewed at the APS website: **https://albertapaleo.org/agm/2024/agmminutes2023.pdf**.

3. **Treasurer's presentation of the audited statement of the financial position of The Society.**
4. **Appointment of the auditors.**

Auditors nominated by the Treasurer for appointment are **Lorraine Stratkotter** and **Matthew Rhodes**.

5. **Election of Officers to the Board of The Society.**

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

Officers	President
	Vice-President
	Secretary
	Treasurer

In addition to the elected positions The Society has a number of committee chairs which are appointed by the board. Terms for these chairs are unlimited:

Committee	**Current Chairperson**
Fossil Collection	Howard Allen
Library	Georgia Hoffman
Public Outreach	Cory Gross
Social	Virginia Goodman
Website	Eric Campbell

Terms for all 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**. ❑

Mary Anning stamps issued by UK Post Office

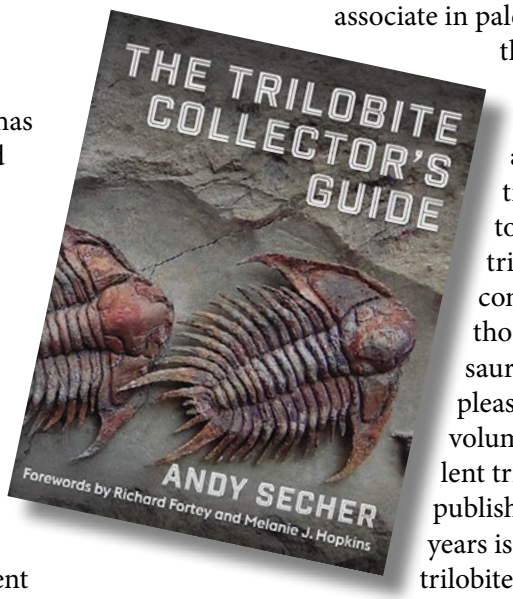
APS member **Ian Kirkland** has asked us to alert palaeophilatelists (fossil-loving stamp collectors!) that the British Royal Mail is releasing a series of postage stamps commemorating the pioneering British palaeontologist, Mary Anning, famous for her discoveries of Jurassic fossils on the south coast of England. Details can be had at the BBC website: **https://www.bbc.com/** (search "Mary Anning stamps"). ❑

Book Review

By Wayne Braunberger

***The Trilobite Collector's Guide*, by Andy Secher, 2024. Columbia University Press, New York, 472 pp. (Hardcover US$59.95, ISBN 9780231213806 and E-book US$58.99, ISBN 97802315600047).**

This book is a follow-up volume to the author's *Travels With Trilobites* (see Hoffman, 2022 for a review). Authored by Andy Secher, a field associate in paleontology at the American Museum of Natural History and an avid trilobite collector. Books about trilobites are not common (unlike those on dinosaurs) so I was quite pleased to see this volume. Two excellent trilobite books published within two years is real treat for trilobite enthusiasts.



Rather than chapters based on geologic periods or trilobite orders, the book is divided into fifty-two chapters, each a top-ten list covering everything from classic localities to collecting, preparation and curation as well as spotting fakes. Interested in predation? Trilobite eyes? Or big trilobites? There is a top ten list illustrated with excellent specimens. The outstanding feature of the volume is the high resolution, full-colour photographs of museum quality specimens, most from the author's personal collection. Printed on high quality paper, the photographs are very clear and detailed. In the introduction the author notes that 90% of the trilobite photographs in the book have never been published before.

Packed full of trilobite facts, this book is very informative and would be enjoyed by anyone. An excellent addition to your library. ❑

Hoffman, G. 2022. Book Review—Travels with trilobites: Adventures in the Paleozoic. Alberta Palaeontological Society Bulletin, 37(4), p. 8.

2024 Field Trips

By Keith Mychaluk

Each year we try to offer a diverse array of field experiences for our membership, catering to different member interests, abilities and ages. Fortunately, Alberta and surrounding areas have a seemingly endless bounty of sites to visit. We hope you like this year's line-up! We will visit new territory both close to home (near Dorothy, Alberta) and further afield (near Jordan, Montana) for a variety of Upper Cretaceous fossils and geologic sites. We will also revisit the amazing dinosaur trackway site near Grande Cache, AB and visit the Phillip J. Currie Museum (and nearby dinosaur bone beds) close to Grande Prairie, AB in August. Once again, we will explore the Cretaceous-Paleogene boundary site at Knudsen's Farm and see Ordovician-aged fossils within building stone at some Calgary city landmarks. This year's line-up would not have been possible without the help of fellow APS members **Mona Trick**, **Dr. Emily Bamforth** and **Tako Koning**. Thank you Mona, Emily and Tako! Let us dive into the details below!

Please watch the *Bulletin* and website for further updates as these plans may change. **Remember, you must be a member to participate in a Society field trip.**

Trip 2024-1. Saturday, June 22, 2024
Upper Cretaceous of the Dorothy area, AB

Leader: Steve Kary

Palaeontologist Steve Kary will lead us to several interesting Upper Cretaceous sites along the Red Deer River valley near Dorothy, Alberta. Steve has been doing active research in this area for the past few seasons. He has a number of sites for us to visit, possibly including a lower Horseshoe Canyon Formation dinosaur bonebed (slumped into two separate outcrops); an invertebrate site; *Ophiomorpha* ichnofossils; and rippled sandstone beds. Expect to hike in rugged badlands terrain with long slopes heading in and out of the main valley. There is a fee of $40 per member for this trip to help offset expected costs. Further, due to restricted private access, we can only accommodate 20 members so if you are interested please register early to avoid disappointment. This field trip is just one day in length and Dorothy is about a 2-hour drive east of Calgary. **The registration deadline is June 1.** More details to follow in the next *Bulletin*.

Trip 2024-2. Saturday, July 6, 2024
K/Pg Boundary, Knudsen's Farm, Huxley, AB

Leader: Tako Koning

If you missed this tour previously, Tako will again lead us to the famous Cretaceous-Paleogene boundary (formerly the "K/T boundary") site on Knudsen's farm near Huxley, AB. This boundary marks the end of the dinosaurs and this particular site has contributed materially to our knowledge of what happened to the world at that time. Huxley is about a 2-hour drive from Calgary. This is a single-day trip. The fee is $10 and the **registration deadline is July 1.**

K-Pg boundary exposure at Knudsen's Farm. 2022 photo by Henrietta Koning.

Trip 2024-3. Thursday–Monday, July 25–29, 2024
Phipps Ranch, near Jordan, Montana, USA

Leader: Keith Mychaluk

The Upper Cretaceous Hell Creek Formation in Montana is world-famous for its cache of

iconic dinosaur remains such as *Tyrannosaurus rex*, *Nanotyrannus* and *Triceratops*. However, gaining access to sites to hunt for vertebrate fossils in the "Treasure State" are extremely limited. Through its contacts, the APS has secured access to a private ranch within rich Hell Creek fossil beds south of Jordan, Montana. Jason Phipps, the older brother of Clayton Phipps (from the TV Show *Dino Hunters*), has recently been allowing groups to collect on his land for a fee.

Upper Cretaceous theropod dinosaur teeth. APS collection 1986-42. 1 cm scale bar. File photo.

We expect to excavate at an extremely rich microvertebrate fossil site on the ranch that regularly yields theropod, herbivore and mammal teeth. We will be allowed to keep what we collect—with the exception of very valuable fossils (Jason uses these funds to supplement his family income on his small cattle ranch). We are hoping to add an additional site (possibly an invertebrate locality) and/or a facility tour (such as a museum or preparation lab) to this trip. Again, watch the *Bulletin* for updates.

Here is the proposed itinerary

Thursday, July 25: Travel to Jordan, MT.

Friday, July 26 and Saturday, July 27: Caravan (40 minutes) each day to and from Jason Phipps Ranch; Expect long, hot days with lunch in the field with no facilities.

Sunday, July 28: TBD: Explore nearby Bearpaw Formation invertebrate sites and/or museum tour.

Monday, July 29: Return to Calgary.

Jordan is a 9-hour drive from Calgary (excluding the time required to cross the USA-Canada border, which can be quite variable). Participants will have to find their own way to and from Jordan.

NOTE! There are very limited basic accommodations in Jordan (Garfield Motel, K&K RV Park, Old Dorm RV Park and Motel 200) with camping likely the best option (Contact Keith for more information). Participants will have to make their own sleeping and travel arrangements to and from Jordan. **The fee for collecting on Jason's ranch is US$125 cash per person, PER DAY (total US$250 for two days**—payable to Jason directly on July 26). There may be additional fees so watch for updates in future issues of the *Bulletin*. There are no restrictions for attendance but motel space could be a limiting factor. **The registration deadline is July 1.**

Trip 2024-4, August 24–26, 2024
Grande Prairie & Grande Cache, AB

Leaders: Dr. Emily Bamforth and Mona Trick

Two trips in one! This extended three-day trip is organized into two parts, namely:

Part 1—Grande Prairie. You can either choose to be a "Digger" or a "Fossil Preparator." Both groups will tour the museum and collections of the Philip J. Currie Dinosaur Museum near Wembley (west of Grande Prairie) at a special museum entrance price kindly offered by the museum. The Philip J. Currie Dinosaur Museum features a wide array of fossils, specializing in those from the nearby Pipestone Creek bone bed.

"**Diggers**" will tour the museum starting at 1:00 P.M. on the afternoon of Saturday August 24. Then on Sunday, August, 25, the "Diggers" will excavate dinosaur bones at the nearby Pipestone Creek Bone Bed, for the full day (9:00 A.M. to 4:00 P.M.). Lunch will be provided. Maximum of 10 people. Minimum age is 12 years old. **Each** minor child must be accompanied by one adult. The fossils from at least 27 individuals of *Pachyrhinosaurus lakustai* were excavated from the Pipestone Creek bone bed of the Wapiti Formation (approximately 72.6 million years old, Campanian Age of the Late Cretaceous). This is one of the densest bone beds in North America. It extends at least 1 km into the hill and contains fossils from hundreds of individuals.

"**Fossil Preparators**" will tour the museum starting at 9:00 A.M. on the morning of Sunday, August 25. Lunch will not be provided. Prepare fossils for the afternoon in the museum's lab. At 2:30 P.M. you can join an optional outing to hike to the Pipestone Creek Bone Bed to watch the "Diggers" in action. Maximum of 5 people. Minimum age is 12 years old. **Each** minor child must be accompanied by one adult.

Part 2—Grande Cache. On the morning of Monday, August 26, 2024, we will tour the extensive dinosaur trackways near the CST Coal mine

outside of Grande Cache. Gather at 8:00 A.M. at the Grande Cache Tourism and Interpretive Centre (9701 Highway 40, Grande Cache) for the safety orientation and then we will board the provided bus, passing through the CST Coal Mine to see the tracks. We then return to the Grande Cache Tourism and Interpretive Centre at about 1:00 P.M. For the afternoon, we will visit couple of nearby sites and enjoy our lunches in the field.

The tracks are in the Grande Cache Member of the Gates Formation (middle Albian of the Early Cretaceous). There are a variety of different tracks, including those from quadrupedal dinosaurs (nodosaurid ankylosaurs?), bipedal dinosaurs (theropods and ornithopods?) and invertebrate burrows. Most tracks are on nearly vertical rock faces, tilted upwards by mountain-building processes. Bring your binoculars to better view the tracks.

Maximum 20 people. Minimum age is 12. **TWO** adults are required for **EACH** child aged 12 to 16 years. **ONE** adult per **EACH** child aged 17 to 18. **CSA certified safety glasses and work boots** are **MANDATORY**. **Hard hat and high visibility vests** are also **MANDATORY**. Hard hats and high visibility vests can be borrowed from the CST Coal mine if you notify **Mona Trick** (**giftshop@albertapaleo.org**) when you register.

You can select both parts or just a single part of this trip (for example only the Grand Cache tracks). Note the maximum numbers for each part and requirements for number of adults for each minor. **For this field trip, you MUST send the completed waiver, Grande Cache Tracksite Tour Agreement and emergency contact form to Mona Trick (giftshop@albertapaleo.org or phone 587-578-4579) BEFORE August 13, 2024.**

You can drive (7.5 hours from Calgary) or fly to Grande Prairie Airport and rent a car (several car rental places are available). In any case, you will need your own transportation for the 20 minute drive from Grande Prairie to the Philip J. Currie Dinosaur Museum near Wembley and for the 10 minute drive from the Museum to the Pipestone Creek Day Use Area on the next day. Several hotels in Grande Prairie offer discounts for those registered with this museum program. Contact Mona Trick for details.

Grande Cache is a 7 hour drive from Calgary. Grande Cache and Grande Prairie are 2 hours apart via Highway 40. Arrange your accommodation in Grande Cache early because it has only four motels, and some may already be booked. Grande Cache also has several nearby Provincial Parks with camping. Contact Mona Trick for details.

Registration deadline is July 19, 2024.

FEES

Part 1—Grande Prairie.

"Diggers"—Tour Philip J. Currie Dinosaur Museum and dig in Pipestone Creek Bone Bed (maximum 10.)

Adult:	$212.00
Child (12–17):	$174.00

OR

"Fossil Preparators"—Tour Philip J. Currie Dinosaur Museum and prepare fossils in the lab (maximum 5).

Adult:	$12.00
Child (12–17):	$6.00

Part 2—Grande Cache.

Tour Dinosaur Tracks (maximum 20)

Adult or child (12–17): $40.00

Young palaeontologist gets up close to Tyndall Stone fossils on Tako's 2022 walking tour. Photo by Beatriz LeBlanc.

Trip 2024-5, September 14, 2024
Tyndall building stone walking tour, Calgary

Leader: Tako Koning

Once again, Tako Koning has agreed to conduct his popular tour of Calgary structures adorned in Ordovician-aged Red River Formation limestone originally quarried in Tyndall, Manitoba. See impressively preserved fossils of corals, gastropods,

orthocones and receptaculitids at Calgary landmarks like the historic Bank of Montreal building. This will be a walking tour of several buildings in downtown Calgary, the community of Kensington and the SAIT campus and is suitable for all ages. The fee is $10 and **the registration deadline is September 1**.

For more information on any of the field trips 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 (**https://albertapaleo.org/events/fieldtrips**). **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 applications received after May 1, 2024 will not be reviewed and voted on by the Board of Directors until September, 2024. Therefore, **if you are a non-member and would like to join be sure your application is received prior to May 1, 2024**.

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. Registrations are accepted on a first-come-first-served basis so sign up early to avoid disappointment. For the 2024 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 all 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. ❑

Fossils in the News

Livescience

Mummified skin from creature that lived 290 million years ago is older than the dinosaurs

Skin impressions from a Permian-age reptile have been found in claystone from the "Richards Spur limestone cave system in Oklahoma." Researchers say it's 130 million years older than the previous, Jurassic record-holder. **www.livescience.com** [search "mummified skin"].

Livescience

Woolly [mammoth] female's steps retraced based on chemistry of 14k-year-old tusk

Isotope concentrations measured in a fossil mammoth tusk have allowed researchers to piece together the movements of a female animal around the northern Canadian and Alaskan tundra. Results suggest the animal wandered some 1000 km in less than three years. **www.livescience.com** [search "mammoth movement"].

CBC News online

Young tyrannosaur found with baby dinosaurs in its stomach

APS Life Member **Darren Tanke**, Senior Technician at the Royal Tyrrell Museum, was preparing the skeleton of a young *Gorgosaurus*, when he found a lot of extra small bones in the stomach region. These turned out to be from two juvenile dinosaurs, *Citipes elegans*, the *Gorgosaurus*' last meal. **www.cbc.ca/news/science/tyrannosaur-with-prey-1.7051950**

CBC News online

Palaeontologists discover rare fossils of a lizard near Grande Prairie

A Cretaceous vertebrate microsite on the Wapiti River near Grande Prairie has produced a wide variety of fossils, including bones of a newly discovered lizard, a relative of the modern Gila monster of the US southwest. **www.cbc.ca** [search "lizard grande prairie"].

[*Thanks to Georgia Hoffman, Vaclav Marsovsky and Dan Quinsey – ed.*] ❑

John Tyndall

19th Century Irish physicist and co-discoverer of climate change, whose name lives on in the village of Tyndall, Manitoba, home of Canada's Tyndall Stone

By Tako Koning*

Tyndall Stone is quarried at the Garson Quarry, also known as the Gillis Quarry, near the village of Tyndall, population 1,225, approximately 30 km northeast of Winnipeg, Manitoba. The publication "Geographic Names of Manitoba" mentions that in 1877 the town of Tyndall was a point along the Canadian Pacific National Railroad named after the Irish physicist Professor John Tyndall. He was a prominent 19th century physicist born in Ireland in 1820. He passed away in 1893 at age 73.

This article is a review of the extensive literature written about John Tyndall. He has been described as a "renaissance man," a man ahead of his time and a pioneer in advancing the knowledge of climate change.

John Tyndall—An amazing story

John Tyndall was a man of sciences—draftsman, surveyor, mountaineer, physics professor, mathematician, geologist, atmospheric scientist, highly active public lecturer, and author of fourteen books (Graham, 1999).

Tyndall was born in Leighlinbridge, Ireland in 1820 and was educated in a one-room school at Ballinabranagh. There he learned English, logic, book-keeping, drawing, surveying, and associated mathematics. Tyndall joined the local Ordinance Survey office at age 19 and then at age 22 moved to Lancashire in England. Beginning in 1847 at the age of 27 at Queenwood College in Hampshire he developed a keen interest in physics and engineering education. In 1848 he moved to Germany to attend Marburg University and studied chemistry under Robert Bunsen, inventor of the Bunsen burner. He then focused his attention on physics to produce

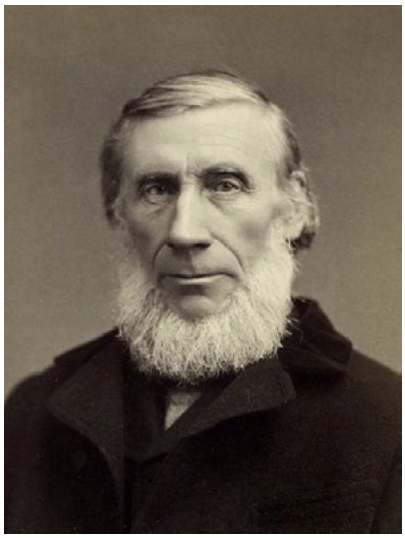


Figure 1. Physicist and professor John Tyndall, FRS. Tucker Collection—New York Public Library Archives, Public Domain, https://commons.wikimedia.org/w/index.php?curid=16242657

his first paper on diamagnetism and then returned to Britain in 1851. Two years later, in 1853 Tyndall was elected chair of natural philosophy at the Royal Institution of Great Britain in London.

Tyndall's initial scientific fame arose in the early 1850s with his experiments on magnetism and diamagnetic polarity. He published his experimental work on the scattering of light by very small particles suspended in a medium. This became known as the "Tyndall effect." Very soon Tyndall became one of the leading scientists of the day. He was elected a Fellow of the Royal Society in 1852. From 1853 to 1887 he was Professor of physics at the Royal Institution.

Tyndall visited the Alps in 1856 and quickly became a pioneering mountain climber. Physically tough, he was a daring mountaineer. He also studied the structures of glaciers and the flow of glacial tributaries. He consequently published on the variations in ice flowage related to semi-fluid motion (Tyndall, 1896). Work on glaciers alerted Tyndall to the concept that heat from the sun penetrates the atmosphere more easily than what he termed "obscure heat and terrestrial radiation" emanating from

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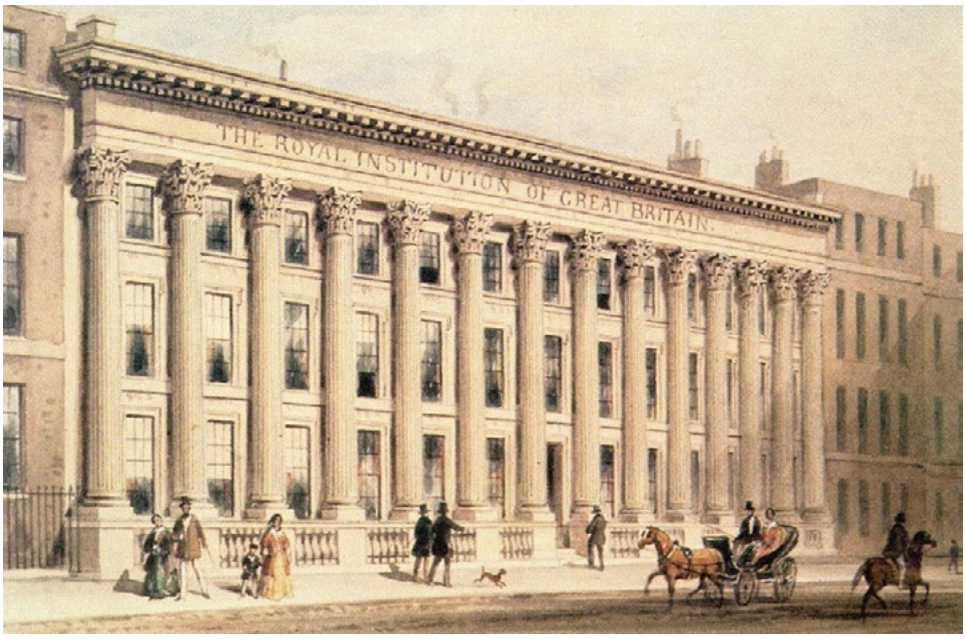

Figure 2. The Royal Institution of Great Britain on Albemarle Street, London, about 1838. Painting by Thomas Hosmer Shepherd (1793-1864). Public Domain, https://commons.wikimedia.org/w/index.php?curid=4203159

freedom back into space. Thus, the atmosphere admits the entrance of solar heat but checks its exit and the result is a tendency to accumulate heat at the surface of the planet" (Tyndall, 1861).

Tyndall described how there were vast differences in the abilities of "perfectly colourless and invisible gases and vapours" to absorb and transmit radiant heat. He noted that oxygen, nitrogen and hydrogen are almost transparent to radiant heat while other gases, including carbon dioxide, are quite opaque. the warmed Earth, causing what we now call "The Greenhouse Effect."

Among his many interests, he began intensive experiments leading to differential absorption spectroscopy using an electro-magnetic thermopile devised by Macedonio Melloni. In 1859 he demonstrated the research in a Royal Society lecture, noting that gases including coal gas, ether, water vapour and carbonic acid (now known as carbon dioxide) strongly absorbed (infrared) radiant heat and this led to confirmation of the Greenhouse Effect (Mulvihill, 2011). The heat source for his experimental work was not the sun, but radiation from a copper cube containing boiling water. He wrote that solar heat crosses an atmosphere but "when heat is absorbed by the planet, it is so changed in quality that the rays emanating from the planet cannot get with the same

Eunice Foote—Discoverer of Climate Change

John Tyndall was not, however, the first to make the climate link. That prize goes to the American researcher, Eunice Foote, who authored a paper in

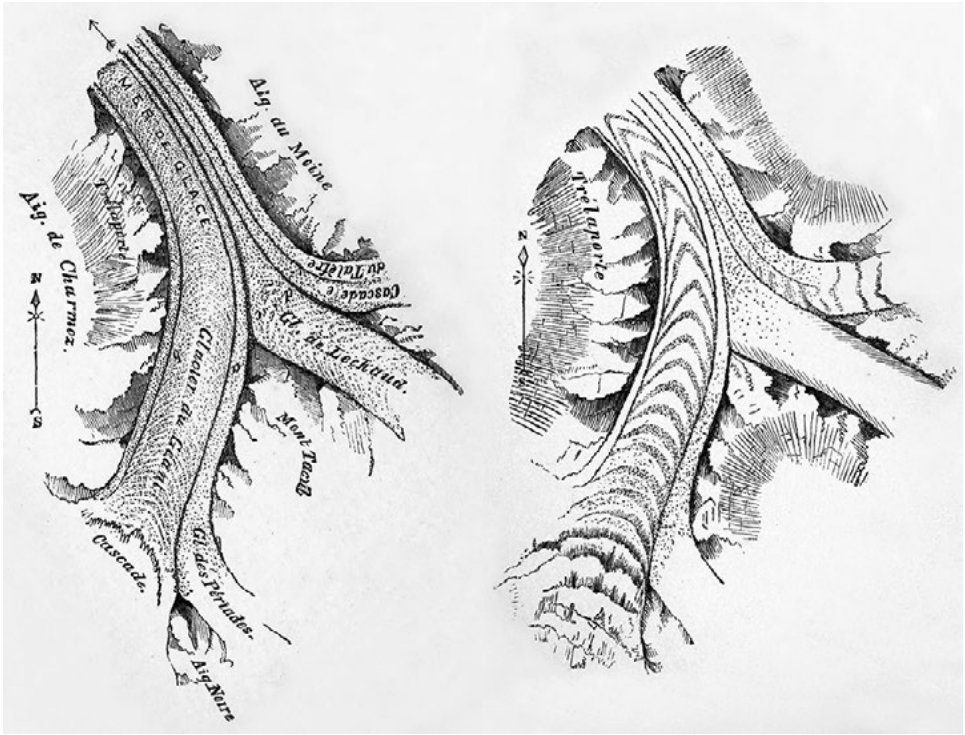

Figure 3. Sketch map by Tyndall of his exploration of the tributaries feeding Mar de Glace in 1857. General topology (left) and dirt bands in ice (right). Published in 1896 by Longmans, Green and Co., London. https://archive.org/details/glaciersalpsbeing00tyndrich, Public Domain, https://commons.wikimedia.org/w/index.php?curid=9810869.

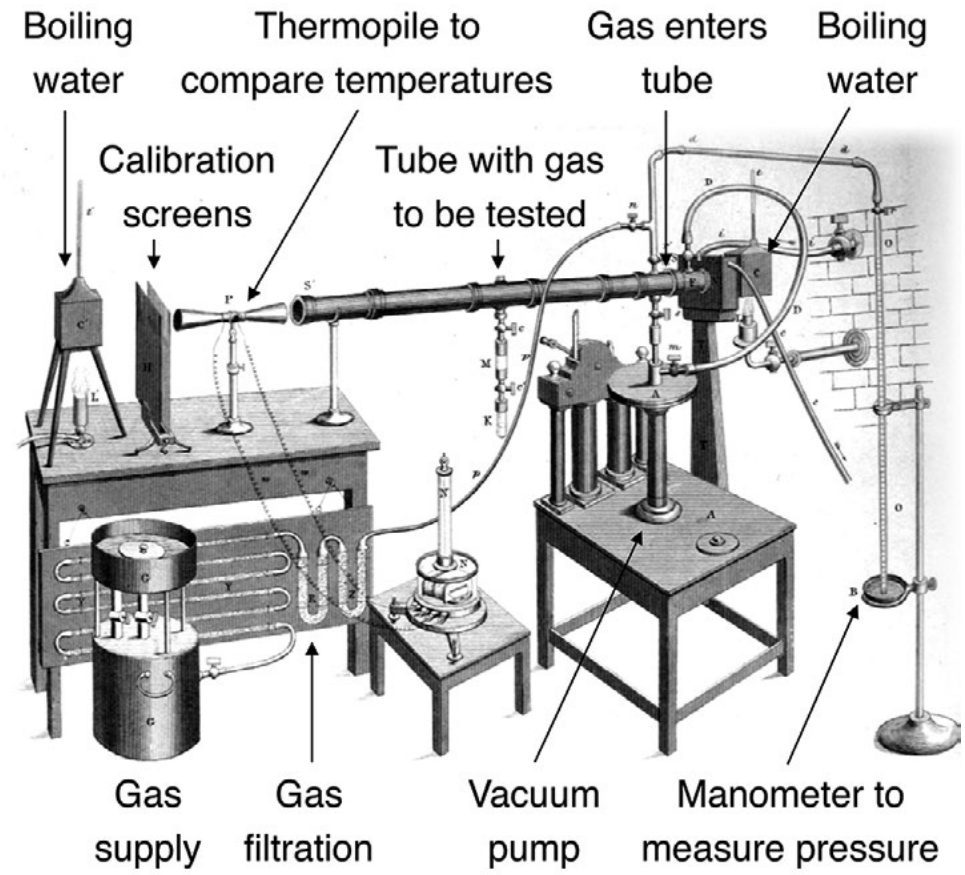

Figure 4. Tyndall's sensitive radio spectrophotometer (drawing published in 1861) measured the extent to which infrared radiation was absorbed and emitted by various gases filling its central tube. From John Tyndall: The Bakerian Lecture.—On the absorption and radiation of heat by gases and vapours, and on the physical connexion of radiation, absorption, and conduction. Philosophical Transactions. Subsequently annotated., Public Domain, https://commons.wikimedia.org/w/index.php?curid=93445778

Although Eunice Foote's discovery was truly remarkable, she faded into obscurity and there is not even a known photograph of her today. Only very recently has her pioneering work been recognized. The lack of recognition of her leading-edge work is probably because the academic community in those times relegated her to the status of an amateur. Also, she was an American when the most important work in the field at that time was performed in Europe, so the European researchers likely deigned to recognize work being done in America. Moreover, the world at that time was disinclined to welcome the contribution of a woman.

1856, *Circumstances affecting the heat of the sun's rays* which was presented at the annual meeting of the American Association for the Advancement of Science. Her experimental work using glass jars and sunlight showed that carbon dioxide could absorb heat. She wrote: "If, as some suppose, at one period of its history the Earth's air had mixed with it a larger proportion of carbon dioxide, then an increased temperature must necessarily have resulted." Research shows that Tyndall was not aware of her work since at that time there was limited flow of scientific information between England and America (Jackson, 2019).

To his discredit, Tyndall viewed women as having a lesser ability than men in creative scientific research. However, he was also an admirer of the well-known mathematician and scientific author, Mary Sommerville and often asked the wives of his scientific colleagues to read and comment on his writing, if possible (Russett, 1989; Watts, 2007).

Tyndallization and Tyndall Blue

When undertaking experiments in 1871 with the French biologist Louis Pasteur, Tyndall also discovered "Tyndallization"—a bacteriological technique of sterilization to support the theory that germs can cause disease. The line of research led to the invention of a respirator for firefighters although Tyndall never took out a patent on the device. He committed himself to fundamental research, confident that others would generate useful applications.

Tyndall also used his knowledge of absorptive capacity of water vapour to explain meteorological conditions in the desert. He turned to shorter wavelengths and found that these rays of ultraviolet light caused photochemical reactions. The resulting clouds of small particles scattered visible light to produce colours including the blue of the sky, now known as "Tyndall blue."

The X-Club

After the publication in 1859 of Charles Darwin's *On the Origin of Species*, nine London-based evolutionists were organized by John Tyndall and Edward Frankland for the defense of the "great hypothesis." As described by McCarthy (2018) they became known as the "X-Club" because of the nine members plus their always absent "Xth" member, Charles Darwin. The members adopted nicknames: Tyndall's was "Xcentric" and Frankland was "Xpert"; each defended different aspects of the theory of evolution.

Figure 5. John Tyndall (right, standing) with (L–R) Michael Faraday, Thomas Henry Huxley, Charles Wheatstone and David Brewster. 1876 image scanned by user: APPER, Public Domain, https://commons.wikimedia.org/w/index.php?curid=27488

Tyndall played a central role in founding the evolutionist journal *Nature*. He formally broke with religion in aiding Thomas Henry Huxley to formulate a new worldview of materialistic "Humanism." Tyndall joked that he had been an agnostic long before his friend invented the word (McCarthy, 2018).

Private Life and Death

Tyndall did not marry until age 55. His bride, Louisa Hamilton, was the 30-year-old daughter of a member of Parliament (Lord Claud Hamilton, M.P.). The marriage was a happy one and without children. Sadly, his later years were plagued by ill health and insomnia. He retired from the Royal Institution at age 66 due to poor health. On the evening of December 4, 1893, his wife was mixing up his medicines and gave him an accidental overdose of a sleeping draught. "My darling" said Tyndall when he realized what had happened, "you have killed your John." Despite emetics and stomach pumps, the great Irish-born scientist died that evening (Dry, 2018).

Tyndall Remembered

With the passage of time, John Tyndall's fame gradually faded away. Today, Tyndall is not a household name despite his pioneering work. He is not known at the same level as Albert Einstein, Charles Darwin, Madame Marie Curie, Isaac Newton, Leonardo da Vinci, Nicolaus Copernicus or Galileo Galilei. However, with the current concerns about the dangers of global warming, Tyndall's name may perhaps become again more prominent.

In his home country of Ireland, he remains well-known with the Tyndall National Institute at the University College Cork named after him. The Tyndall Centre for Climate Change Research has been active for the past two decades at the University of East Anglia, Norwich, UK. In the Swiss Alps, there is a "Pic Tyndall" at the summit of the Matterhorn, of which he was one of the first climbers during his time in Switzerland. Tyndall's name is also on craters on the Moon and Mars. His name lives on in two glaciers—Tyndall Glacier, located in Chile and Tyndall Glacier in Colorado. Two mountains, Mount Tyndall in California and Mount Tyndall in Tasmania are named after him. And as mentioned earlier, his name lives on in the village of Tyndall, Manitoba and his name will also be forever associated with the famous, iconic Ordovician-age limestone called Tyndall Stone.

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❑

Two more locations of Tyndall Stone fossils in Calgary

By Tako Koning

Recently a Calgary petroleum geologist told me about a well-exposed fossil in Tyndall Stone on the 47th floor of Bankers Hall on Stephen Avenue in downtown Calgary. I checked it out and indeed, there it was between two elevators near the entrance to Paramount Resources, a Calgary-based oil and gas company.

For the past three summers I have been leading Saturday field trips taking participants to sites of beautifully preserved fossils in Tyndall Stone, an Ordovician age limestone. We begin in downtown Calgary to view the Tyndall which clads various buildings. Then we head over to the Kensington Safeway where large square blocks of cut Tyndall stone serve as benches. Shoppers don't realize they are sitting on ancient sea creatures embedded in 450-million-year-old limestone. The field trip ends up the hill at SAIT where we study a wide variety of fossils in the Tyndall that extensively clads the Senator Patrick Burns building.

Each summer I lead this afternoon field trip for the Alberta Palaeontological Society as well as for the Canadian Energy Geoscience Association, and the Alberta Wilderness Association. I really enjoy leading these field trips. They are "family friendly"—kids are welcome. Looking for fossils in Tyndall can be infectious and a benefit of leading these "Tyndall Tours" is that I often hear back from participants who have spotted interesting fossils in Tyndall Stone throughout the city.

I encourage anyone who has spotted interesting fossils in Tyndall Stone to let me know about them. You can email me at **tako.koning@gmail.com**. If your discoveries are especially interesting, I promise you that I will write about them in subsequent issues of the *Bulletin*.

Bankers Hall, downtown Calgary

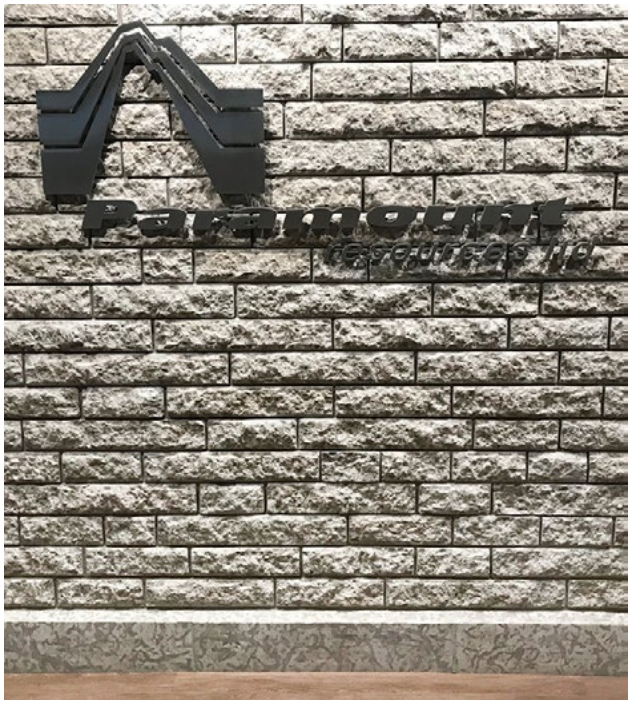

Figure 1. Rough cut Tyndall Stone clads the entrance to Paramount Resources corporate office on the 47th floor of Bankers Hall.

This coral has been identified as a *Catenipora* single-chain coral (Figure 3). As shown in the photo, the way the Tyndall was cut resulted in the coral

Figure 2. Location (circle) of the *Catenipora* tabulate single-chain coral on the 47th floor between two south-facing elevator shafts.

Figure 4. Legacy Bank of Nova Scotia building on the southeast corner of 17th Ave and 14th St. SW. Receptaculitid fossil (figs. 5, 6 and front cover) is circled on rightmost arched window frame.

Figure 3. *Catenipora* tabulate single-chain coral. Scale indicates that the coral has a diameter of approximately 20 cm.

being exposed in the front and in the top giving a 3-dimensional view. As a bonus, one can walk to the west side of the reception area and see a breathtaking view of the city and the distant mountains.

Legacy Bank of Nova Scotia building, 17th Avenue and 14th Street SW

APS member **Howard Allen** kindly told me about a spectacular receptaculitid calcareous algae fossil in the old Bank of Nova Scotia building on the corner of 17 Avenue and 14 Street SW. Records in the archives of the City of Calgary reveal that this building is almost a century old. Construction started in 1927, during the Development Era of 1919–1929 (Post-WWI until the stock market crash).

The Tyndall Stone was exposed to almost one hundred years of heavy traffic. The exhaust fumes emitted from vehicles were likely slightly acidic and that has etched out the internal structures of the fossils. This etching has led to the remarkable highlighting of the internal structures within the fossils.

Figure 5. Receptaculitid algae, the misnamed "sunflower coral." The darker mottles in the limy matrix, so characteristic of the Tyndall Stone, are burrow traces known as *Thalassinoides*.

Figure 6. Expanded view of the receptaculitid, probably *Fisherites*, as described in Figure 5.

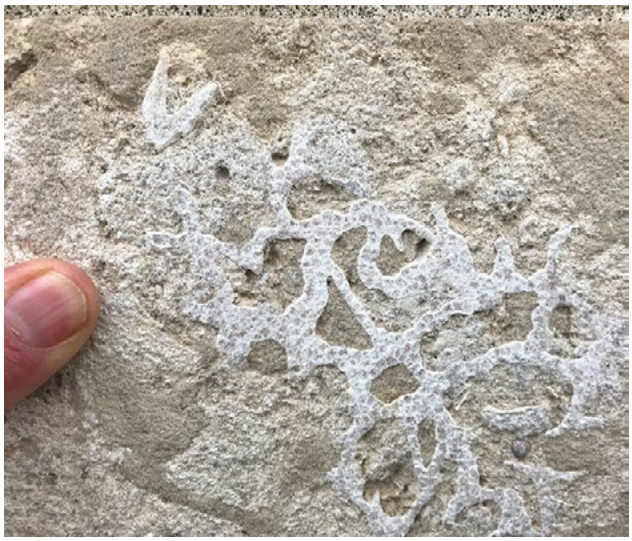

Figure 7. This is a tabulate chain coral, *Manipora*, which is distinguished from *Catenipora* (Figures 3 & 4) by the common double or triple-width "chains" of coralites.

Figure 8. A medium size orthocone nautiloid with the internal structures etched out.

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2024 Single + Family Memberships	930.00		Meeting Speaker expenses	319.68
Bank interest + GICs cashed	216.87		Membership expenses	204.60
2015 T-shirts (member + non-member)	185.00		Field Trip Expenses	600.00
Book: Common Vert Fossils (mem+non)	3845.00		Symposium Workshop	0.00
Book: Hope Johnson (mem + non)	605.15		Symposium Speaker	2239.34
Handling fees: Book Common Vert Fossil	528.00		Symposium Abstract Printing	248.31
Handling fee: Book Hope Johnson + Tshir	34.00		Book: Common Vert Fossils	2556.21
APS Guides (field trip + old abstracts)	6.00		Book: Hope Johnson print	0.00
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Public Outreach income	15.00		Public Outreach expenses	0.00
Hope Johnson award income	0.00		Library expenses	132.58
			T-shirt purchase	693.00
Subtotal Revenues	**11632.97**		**Subtotal Expenses**	**12440.40**
Plus Revenue Received in 2022 for 2023			**Plus Expenses paid in 2022 for 2023**	
2023 Membership Fees	355.00		2023 Insurance	0.00
Savings for 2023 Symposium	2590.00		Website for 2023	0.00
Savings for Library	725.25		**Minus Expenses paid for 2024**	
Savings for Public Outreach	634.23		Website for 2024 and 2025	531.57
Savings for Hope Johnson award	1605.23		2024 Insurance	1675.00
Savings for Insurance	5801.37		PO Box rental	191.10
Savings for T-shirt purchase	980.30			
Subtract Revenue Received in 2023 for 2024				
2024 Memberships Fees	930.00			
Savings for 2024 Symposium	1009.00			
2024 Symposium Workshop Fees	0.00			
Savings for 2024 Library	592.67			
Savings for 2024 Public Outreach	649.23			
Savings for 2024 Hope Johnson Award	1605.23			
Savings for Liability Insurance	5801.37			
Savings for future T-shirts	287.30			
Total Revenues	**13449.55**		**Total Expenses**	**10042.73**
Excess of Revenues over Expenses	**3406.82**		**GICs**	**16,400.00**
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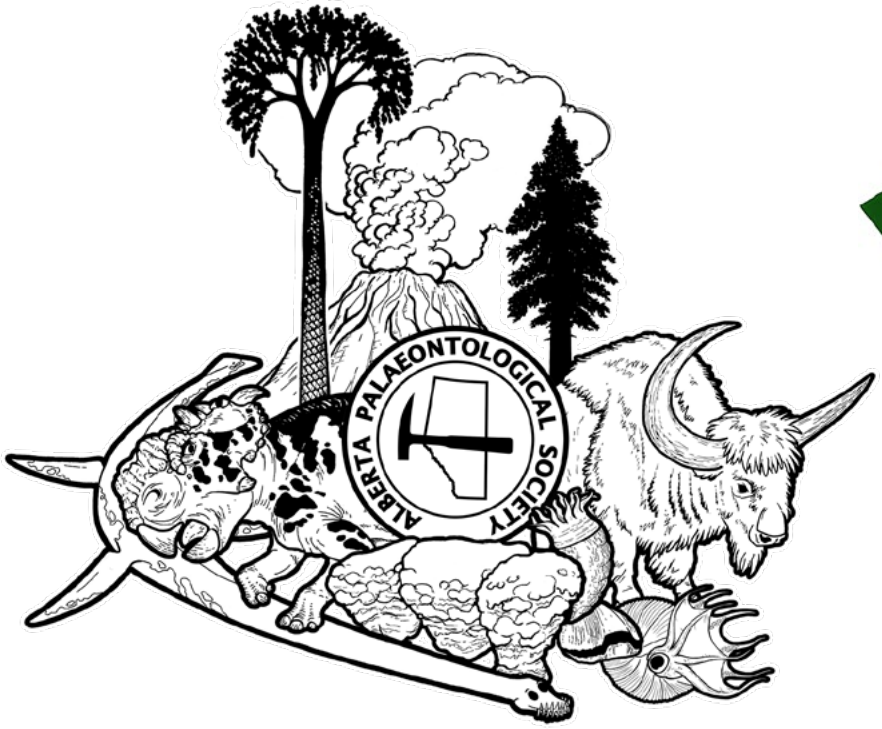

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