Palæontological
# Alberta
Society
Bulletin

VOLUME 30 • NUMBER 3 www.albertapaleo.org SEPTEMBER 2015

**THE SOCIETY WAS INCORPORATED IN 1986 as a non-profit organization formed to:**

a. Promote the science of palaeontology through study and education.
b. Make contributions to the science by: 1) Discovery. 2) Collection. 3) Description. 4) Education of the general public. 5) Preservation of material for study and the future.
c. Provide information and expertise to other collectors.
d. Work with professionals at museums and universities to add to the palaeontological collections of the province (preserve 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**
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**SOCIETY MAILING ADDRESS:**

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**THE BULLETIN WILL BE 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. 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, September 18, 2015**—Gavin Bradley, University of Alberta.
***Gregariousness in a Juvenile* Gorgosaurus libratus*? Solving a Problem Like Matilda . . .***

**Friday, October 16, 2015**—Lisa Budney, University of Alberta.
***Soldiers, Scientists, and Specimens: 95 Years of Invertebrate Palaeontology Research at the University of Alberta.***

**Friday, November 20, 2015**—James Campbell, University of Calgary.
***A Re-evaluation of the Horned Dinosaurs* Chasmosaurus *and* Vagaceratops *(Ornithischia: Ceratopsidae) from the Upper Cretaceous (Campanian) Dinosaur Park Formation of Western Canada.***

**Watch the APS website for updates on upcoming programs.**

**ON THE COVER:** Alberta fossils! Brackish-water bivalves, *Corbula perangulata*, St. Mary River Formation, Upper Cretaceous. Catalogue no. APS.1987.14. Width of largest specimen is 4 cm. APS file photo. **See story, Page 11**.

# Upcoming Events

## September

### Gavin Bradley

University of Alberta

### *Gregariousness in a juvenile* Gorgosaurus libratus*? Solving a problem like Matilda…*

**Friday, September 18, 2015 7:30 P.M.**
Mount Royal University, Room B108

Most evidence for social behaviour in juvenile dinosaurs comes from multi-individual bone beds or parent dinosaurs preserved while brooding on eggs or young. A desire for alternative methods of assessing social behaviour in the Cretaceous tyrannosaurid *Gorgosaurus libratus*, leads to two key questions: 1) can inferences about social behaviour be made using isolated specimens and 2) does gregariousness change with ontogeny in *Gorgosaurus*?

A multidisciplinary study using isolated specimens of *Gorgosaurus libratus*, including a newly described juvenile specimen from Dinosaur Provincial Park in southern Alberta, was carried out in the hopes of answering these two questions. This multidisciplinary analysis shows that substantial ontogenetic change occurred in *Gorgosaurus*, and demonstrates that social behaviour may be inferred from isolated specimens. As well, a description of a juvenile *Gorgosaurus libratus*, UALVP 49500, presents the first examination of postcranial material in such a specimen, and supports a genus-level distinction between *Albertosaurus sarcophagus* and *Gorgosaurus libratus*.

**Biography**

After receiving his BSc in Archaeology and Palaeoecology from Queen's University Belfast in Northern Ireland, Gavin relocated to Edmonton to work on his Masters in Systematics and Evolution under **Dr. Philip Currie**. While at the University of Alberta, Gavin developed research interests in theropod growth and social behaviour, as well as body mass estimation and dental pathologies in tyrannosaurids. Having successfully completed his MSc, he is currently working as a Course Editor for new palaeontology courses at the University of Alberta, and continuing his research.

## October

### Lisa Budney

University of Alberta

### *Soldiers, Scientists, and Specimens: 95 years of Invertebrate Palaeontology Research at the University of Alberta*

**Friday, October 16, 2015 7:30 P.M.**
Mount Royal University, Room B108

For nearly 100 years, University of Alberta professors have greatly contributed to the knowledge of the palaeontology of western and northern Canada. They have trained generations of Earth scientists to identify fossils to assist in dating rocks and interpreting depositional environments. With over one million specimens, the teaching, research and permanent collections rank among the finest in Canada. University of Alberta alumni have gone on to become highly respected geologists and palaeontologists in the oil and gas sector, government, academia, and museums.

In this historical presentation you'll travel through time. Starting in the 1920s we'll meet **Dr. Percival S. Warren** and **Dr. Ralph L. Rutherford**, and in the 1940s, we'll meet **Dr. Charles R. Stelck**, arguably three of the most significant contributors to the understanding of Alberta's geology, and that of the north. We'll learn of the more recent research by Drs. **Brian Jones**, **Brian Chatterton**, **George Pemberton**, and **Lindsey Leighton** as they follow in their predecessors' footsteps. Brachiopods, protists, corals, bivalves, forams, echinoids, trilobites, and ammonoids, large and small—they've studied them all.

**Biography:**

Lisa Budney is the current Collections and Museums Administrator for the Department of Earth and Atmospheric Sciences collections at the University of Alberta, Edmonton. She received her B.Sc. in Honours Palaeontology in 2001 and M.Sc. Biological Sciences in Systematics and Evolution in 2004 at the University of Alberta. After spending time working on the evolution of fish fins at Dalhousie University, Halifax, she returned home to work for the City of Edmonton as the educational program coordina-

tor for the Valley Zoo, John Janzen Nature Centre, and Muttart Conservatory. From 2008 to May, 2015, she was the lab coordinator for the invertebrate palaeontology and soft-rock EAS courses, and a collections assistant, at the University of Alberta.

## November

### James Campbell

University of Calgary

*A re-evaluation of the horned dinosaurs* Chasmosaurus *and* Vagaceratops *(Ornithischia: Ceratopsidae) from the Upper Cretaceous (Campanian) Dinosaur Park Formation of western Canada*

**Friday, November 20, 2015 7:30 P.M.**
Mount Royal University, Room B108

Ceratopsids, or horned dinosaurs, have skulls characterized by nasal and postorbital horn cores of variable size, and an extensive shield-like frill projecting over the neck. The ceratopsid *Chasmosaurus* is known from the Upper Cretaceous Dinosaur Park Formation (DPF) of southern Alberta and Saskatchewan. The two valid species, *Chasmosaurus belli* and *Chasmosaurus russelli*, have been distinguished by differences in cranial ornamentation, and their purported temporal separation in the DPF, with *C. russelli* replaced by *C. belli* over time. In the DPF, *Chasmosaurus* is replaced by another ceratopsid, *Vagaceratops irvinensis*.

A phylogenetic analysis of skulls previously referred to *Chasmosaurus* revealed no distinction between *C. belli* and *C. russelli*. However, these two species can be distinguished statistically by the shape of the posterior margin of the frill. Skulls of *C. belli* and *C. russelli* were also arranged into a growth series, which revealed overlapping ontogenetic ranges consistent with two taxa. However, the purported temporal separation of these taxa in the DPF is unsupported here, suggesting the presence of only one species. Morphological differences amongst *Chasmosaurus* skulls are interpreted as representing individual variation within one species, *C. belli*.

The reassignment of two previously referred *Chasmosaurus* skulls to *Vagaceratops* indicates that these taxa are more closely related than previously thought. The reassignment of these specimens to *V. irvinensis* also extends the temporal range of this taxon in the DPF by approximately 300,000 years, overlapping with *C. belli*.

**Biography**

James is originally from Ottawa, where he completed his B.Sc. (2011) and M.Sc. (2014) in Earth Sciences at Carleton University. For his B.Sc. with **Dr. Claudia Schröder-Adams**, James examined a fossilized assemblage of foraminifera, which served to better constrain the age of a Cretaceous marine basin (Eagle Plain Basin, Yukon Territory)—part of the northern end of the Western Interior Seaway. During his fieldwork in the Yukon, he also discovered a fossil vertebra of a marine reptile, which turned out to be the first plesiosaur fossil from that territory.

For his M.Sc. with Drs. Schröder-Adams and **Michael Ryan**, he conducted a systematic re-evaluation of the horned dinosaurs *Chasmosaurus* and *Vagaceratops* from the Late Cretaceous of Alberta. For his doctoral work with **Dr. Jason Anderson** at the University of Calgary, James is re-visiting plesiosaurs and will study their palaeobiogeographic distribution and latitudinal variation therein throughout the Western Interior Seaway during the Cretaceous. On the side, James enjoys camping, marathon running, and playing the bagpipes. ❑

# DRI Annual Fundraising Dinner

## November 7, 2015

By Mona Marsovsky

Join the Dinosaur Research Institute (DRI) for their annual fundraising dinner on November 7, 2015 at the Earl Grey Golf Club at 6540 20th Street SW, Calgary. In addition to the key note presentation by **Dr. David Evans** of the Royal Ontario Museum, this year's event will feature a three course sit-down dinner, silent auction, displays and presentations by students and palaeontologists.

All of the proceeds go to fund dinosaur research in western Canada. DRI's purpose is to coordinate, facilitate, support, direct and fund dinosaur and palaeontological research in Canada or with Canadian palaeo-scientists at important sites worldwide. In addition, graduate student palaeo research projects are supported. The Dinosaur Research Institute was

registered as a charity in 1997.

Individual tickets are $150.00 per person and a tax receipt will be provided for a significant portion of the ticket price. For more information or tickets, e-mail **info@dinosaurresearch.com** or phone **Al Rasmuson** at **(403) 861-0532** or mail to:

Dinosaur Research Institute
P.O. Box 6353 Stn. "D"
Calgary, AB, Canada T2P 2C9

I hope to see you there! ❑

# Sort Microfossils in November and December, 2015

By Mona Marsovsky

Join fellow APS members and use microscopes to find tiny fossils in the matrix provided by **Dr. Jessica Theodor** and **Dr. Alex Dutchak** of the University of Calgary on the following ***Saturdays***:

November 7
November 14
December 5
December 12

Sessions will take place in room B213 at Mount Royal University from 1:00 to 3:30 p.m. We are very grateful to Mount Royal University (especially **Mike Clark**) for letting us use their microscopes and lab.

All of the fossils we find will aid research on the Eocene of Saskatchewan. The matrix comes from the Cypress Hills Formation (Middle Eocene) and provides important insight into the northern fauna of this epoch.

Registration is not required, but if you contact **Mona Marsovsky**, **(403) 547-0182** or **giftshop@albertapaleo.org** and let me know that you are planning to attend, then I can inform you if we need to cancel a session. No experience is required. Bring tweezers to pick the tiny fossils from the matrix and a pen to label your finds.

See the December *Bulletin* for dates of the January and February, 2016 sorting sessions. ❑

# Harold Whittaker Awarded APS Life Membership

**Harold Whittaker** (right) receives the Life Membership award plaque, presented by President Cory Gross at the May 2015 general meeting. Photo by Howard Allen.

Harold Whittaker's nomination for Life Membership at the December 3, 2014 Executive Meeting passed unanimously.

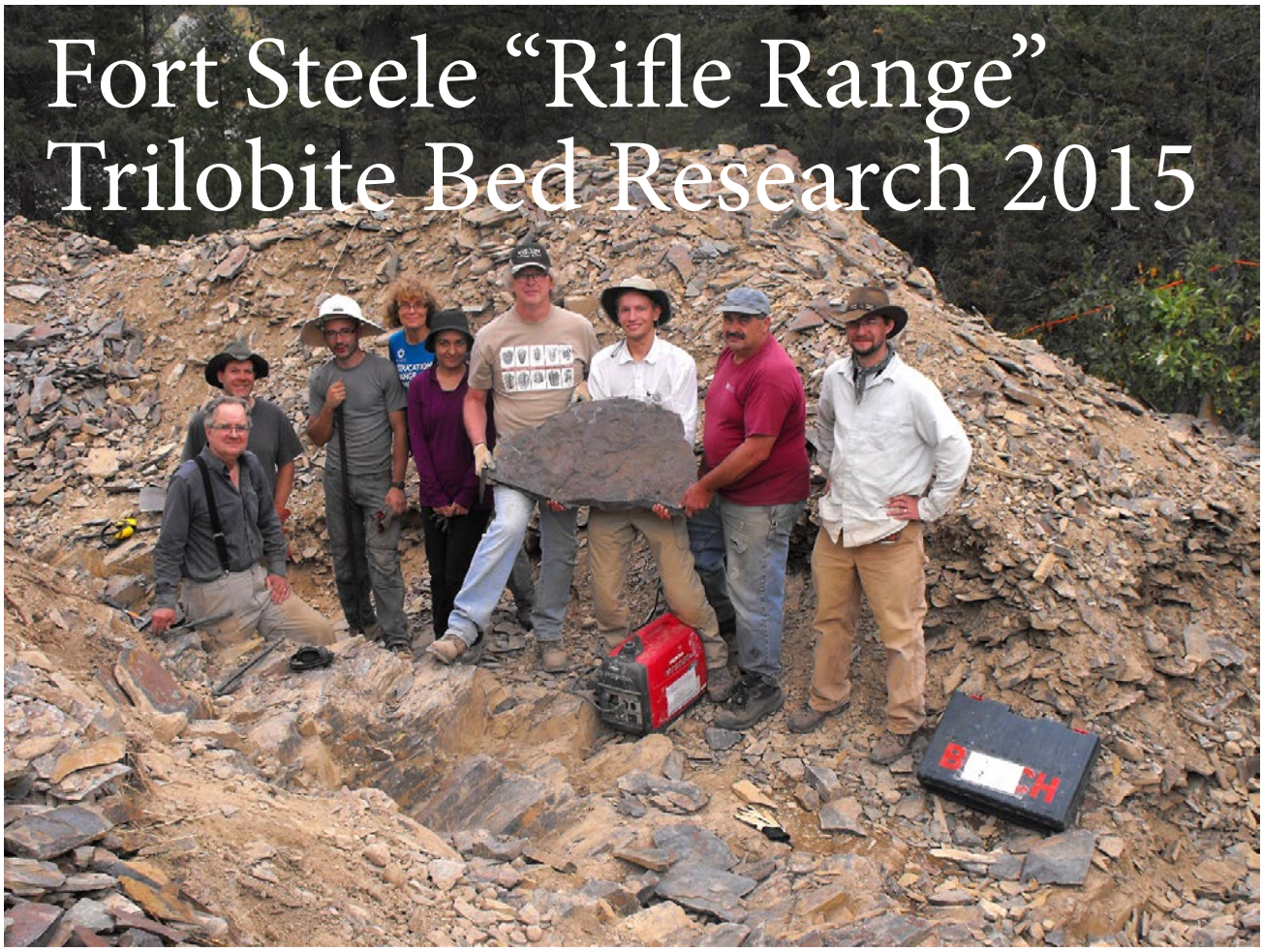
Harold joined our Society in June, 1998. He served as Secretary in 1999, only a year after joining. He was Vice President from 2009 to 2012. Most recently, he has served as our Program Director since 2011, with outstanding performance—to which we can all attest.

Harold has assisted with our annual symposium since 2009. As Program Director, he has been a primary force in the success of the symposia. He contributed a display of Calgary fossils at the 2000 symposium. He has volunteered at the microfossil sorting sessions since their inception and is a regular participant on field trips (note his participation in the Fort Steele trilobite field research, reported elsewhere in this *Bulletin*). He has audited the APS books, contributed to the *Bulletin*, and volunteered as a proofreader for our book project in 2009.

Harold manned the APS booth at the CRLC show for several years and is a fixture at countless other APS events. Last but not least, he has regularly assisted and provided transportation to one of our senior members—without complaint!

In summary, Harold Whittaker more than fulfills our expections for Life Membership and offering him this recognition signifies in a small way the gratitude our Society has for his many contributions. ❑

# Fort Steele "Rifle Range" Trilobite Bed Research 2015



**The research team and assistants** holding a large slab containing at least 112 individual trilobites (mostly cephalons). Left to Right: David George (in front; APS), Dr. Bob Gaines (Pomona College), Dr. Jean-Bernard Caron (ROM), Dr. Gabriela Mangano (University of Saskatchewan), Maryam Akrami (ROM), Darrell Nordby (APS), Joe Moysiuk (University of Toronto), Guy Santucci (APS and project field co-ordinator), and Dr. Mark Webster (University of Chicago). Photo by Char Murray.

By Guy Santucci

On July 21 to 31, 2015, the Royal Ontario Museum (ROM), under the direction of **Dr. Jean-Bernard Caron** carried out a palaeontological dig at an exposure of the Eager Formation at Fort Steele, British Columbia, at the location familiarly known as the Rifle Range site. This site has been known for a long time and in the past, many amateurs and members of the Alberta Palaeontological Society and have dug there with varying degrees of success, mostly recovering species of *Olenellus* and *Wanneria* trilobites and possibly other unidentified fauna.

Dr. Caron had visited the site the previous summer and determined it was of interest for a number of reasons, most important of which was that it is approximately 513 million years old, making it about 8 million years older than the Burgess Shale. Since there was an overlap of a couple of species—specifically *Anomalocaris*—Dr. Caron felt there was a definite correlation between this site and the Burgess.

Dubbed the "Burgess Shale Expedition 2015" the research team consisted of Dr. Caron (ROM, curator of invertebrate palaeontology), **Dr. Robert Gaines**, (Pomona College, Los Angeles and also Dr. Caron's Burgess Shale research partner), **Dr. Mark Webster** (University of Chicago; a trilobite expert) and **Dr. Gabriela Mangano** (University of Saskatchewan, a trace fossil expert). Assisting them was **Maryam Akrami** (ROM fossil preparator) and **Joe Moysiuk**, (Student, University of Toronto). **Dr. Adam Maloof** (Princeton University, rock strata expert) came for one day. A few members of the APS were kind enough to offer their assistance in moving and splitting rock in the dusty and hot conditions, so a special thanks from the research team goes to **Darrell Nordby**, **David George**, **Harold Whittaker**, **Arnold Ingleson** and **Guy Santucci**; local resident **Curtis Bell** was also able to assist for two days.

The actual dig began with a backhoe removing all the overburden and loose, weathered shale that covered the south end of the site. Dr. Caron was able to start splitting fresh rock at a depth of 1.5 m and that formed his baseline at "Level Zero" (0 cm depth). Dr. Caron maintained a section of roughly 1 by 2 m wide and by the end of the dig the depth was 215 cm.

A large number of trilobites* were removed, though complete specimens were rare, and the majority of them were *Olenellus ricei*. The second largest grouping was *Wanneria dunnae*, and there were a few of the rarer genus *Mesonacis*. As well, we found a number of well-preserved *Tuzoia,* showing slight differences from the Burgess fauna. Other species included a sponge, *Anomalocaris*, *Morania* (a cyanobacterial growth), and a hyolithid similar to the Burgess *Haplophrentis*.

A full study will be done of all the specimens recovered and according to Dr. Webster, there may be a couple of new species as well. Dr. Mangano was quite thrilled at the number of trace fossils found, including a 30 cm. long trilobite track, probably made by a large *Wanneria*.

As a side trip, Drs. Webster, Gaines, Mangano and Maloof and the author unsuccessfully tried to find the Eager Formation outcropping near Canal Flats. The section in question apparently exposes the whole Eager with the Cranbrook Fm. at the bottom and the Jubilee Fm. at the top with all the intervening layers. A smaller portion of the section was found further north than the main recorded site coordinates and produced a hash of trilobites and mollusc shells in hard limestone. The distorted shale underlying the carbonates showed numerous trace fossils. Although it proved interesting, it was not what Dr. Maloof was hoping for. The author will make another attempt to find the section at some point, to try to determine the exact coordinates that are apparently misreported in the original literature.

All in all the research team was very pleased with the results of the dig and depending on their findings would like to come back and work on another portion of the site in the future. The team will collaborate to rewrite the geology and palaeontology of the site including new descriptions of the species. (Some of the faunal names are subject to change as there has been no previous formal publication of the site.) The paper is scheduled to be finished in about a year. ❑

*Images of the trilobites can be seen at **www.westerntrilobites.com/Formations/Eager.htm**. For the other organisms, see **burgess-shale.rom.on.ca/en/fossil-gallery/list-species.php**

# 2015 Field Trip Reviews

**Field Trip 2015-1, May 9–10.**
***Edmonton, Alberta***

By Mona Marsovsky

Twenty APS members visited the Danek dinosaur bonebed (which is located within the Edmonton city limits) on Saturday, May 9, under the guidance of **Dr. Philip Currie** and **Dr. Eva Koppelhus** of the University of Alberta.

Even though it had snowed about 10 cm on the previous Wednesday, the quarry was dry when we arrived on Saturday afternoon. Due to space restrictions in the quarry, attendance on the field trip was limited to twenty. Our group was divided into two parts; half excavated while the other half explored the dumps from an abandoned coal mine. An hour later, the two groups switched places. In five groups of two each, we helped the 3rd-and 4th-year University students excavate hadrosaur fossils (*Edmontosaurus*). We dug in soft clay to expose the fossils. Some of us also helped make burlap and plaster jackets to protect the fossils for their trip back to the University. The abandoned coal mine yielded small pieces of fossilized wood and one small dinosaur bone. We were blessed with excellent weather.

**The Marsovskys** (Vaclav, middle; Mona, right) get hands-on experience in excavating and jacketing dinosaur fossils at the University of Alberta's Danek quarry. Photo by Don Murchison.

On Sunday we braved the traffic chaos (major road closures due to construction and a triathlon) to meet at the University of Alberta. Once again the group was divided into two due to space limitations.

**Clive Coy** showed half of the group the university's fossil preparation lab, the student preparation lab and one of the special fossil showcases in the Biology Building. Meanwhile, the other participants were led by Dr. Philip Currie to the University of Alberta Palaeontology Museum, which **Lisa Budney** graciously opened especially for us (the museum is normally closed on weekends). Lisa also opened

**Lisa Budney** introduces the University of Alberta Palaeontology Museum. Photo by Don Murchison.

the Mineralogy and Petrology Museum, located just down the hall from the Palaeontology Museum for us to view. After some introductory remarks from Lisa and Dr. Currie, we were free to see the exhibits, which included not only their important dinosaur collection (*e.g.* the *Stegoceras*), but also included Triassic fish fossils from MOTH (the Man on the Hill Devonian fish locality in the Yukon), a flying reptile collected from Kansas by George Sternberg, and many other fossils.

The trip to the Royal Alberta Museum for the afternoon was equally traumatic, due to road construction (everywhere!), but we all eventually found our way. **Dr. Chris Jass** took half of the group to see the backroom collection at the Royal Alberta Museum, while the rest of the group enjoyed the museum exhibits. I was amazed at the number and variety of fossils (mainly Pleistocene and Holocene) in their collection. Then an hour later, the two groups swapped places.

We would like to thank Dr. Philip Currie, Dr. Eva Koppelhus, Clive Coy, Lisa Budney and Dr. Chris Jass for taking time out of their weekend to show us their palaeo-treasures. I think I can safely say that all of the participants really enjoyed our visit and learned something new about the fossils in our neighboring city.

## Field Trip 2015-2, June 20. *Eastend, Saskatchewan*

By Mona Marsovsky

Nineteen APS members met at 8:30 A.M. Saturday morning at the T. Rex Discovery Centre in Eastend Saskatchewan. Even though rain was forecast and it had rained the previous days, we were blessed with excellent sunny weather and dry roads and quarries. **Tim Tokaryk** and **Dr. Emily Bamforth**, curators of the T. Rex Discovery Centre, a part of the Royal Saskatchewan Museum, provided a tour of the galleries and the lab.

**Our hosts** for the Eastend field trip. L–R: Richard Boulding, U. of Regina grad student and Museum collections assistant; Tim Tokaryk, Curator of Vertebrate Paleontology; "Scotty"; and Dr. Emily Bamforth, Curatorial Assistant. Photo by Keith Mychaluk.

Then at 9:30, we organized into car pools and followed Tim to our first stop, the Southfork Quarry, which had yielded important late Eocene fossils in the Cypress Hills Formation (37 million years old, immediately before the Eocene-Oligocene extinction) including *Megacerops* (rhino-sized brontothere, a plant eater), *Mesohippus* (early horse), *Leptomeryx* (deer-like), *Hyracodon* (rhino-like), *Colodon* (tapir-like), *Hyaenodon* (mammal carnivore), fish and amphibians. This quarry was first discovered as a road cut in 1960, and has been excavated repeatedly since then.

After allowing some time to check out the quarry, we headed to the second stop, the "Irish Springs" locality. When first discovered, the prairie nearby was overlain with cow manure, which caused the discoverer to name it for the only thing capable of removing the smell: Irish Spring soap. This road cut was a microsite which featured Cenozoic mammals about 200,000 years older (late Eocene) than the Southfork Quarry. As directed by Emily and Tim,

**On the hunt** for Eocene mammal fossils at the "Irish Springs" locality in southwestern Saskatchewan. Photo by Vaclav Marsovsky.

APS members then scoured the area and collected (for the Royal Saskatchewan Museum) a range of microfossils, including fish vertebrae, *Leptomeryx* teeth, brontothere teeth and trace fossils (Table 1).

At the next stop, we enjoyed our lunch (catered by Jake's Cafe, Eastend) with a view of the Chambery Coulee. While we ate, we sat on the Ravenscrag Formation (early Paleocene) with a view of the K-T boundary coal (or more properly, K-Pg boundary between the Cretaceous and the Paleogene) with the Late Cretaceous Frenchman Formation underneath.

A cross-country hike down to the bottom of Chambery Coulee brought us to the quarry from which "Scotty," the *Tyrannosaurus rex*, was excavated. It took four years and about ten people to remove "Scotty," which is one of the most complete (65%) and largest *T. rex* specimens discovered in Canada.

**Chambery Coulee,** final resting place of "Scotty" the *T. rex*, whose remains were excavated from the low-lying, vegetated area to the right of the field trippers. Photo by Vaclav Marsovsky.

**"IRISH SPRINGS" LOCALITY (CHADRONIAN NALMA—OLIGOCENE)**

| Species | Class | Common Name | Element(s) Found |
|---|---|---|---|
| | Osteichthyes | Catfish | Fin spines |
| | Osteichthyes | Mooneye-like fish | Centra |
| | Osteichthyes | Teleost fish | Centra |
| *Lepisosteus* sp. | Osteichthyes | Garfish | Scales, head plates |
| | Osteichthyes | Fish, sp. indet. | Spines, ribs, scales |
| | Aves | Bird, sp. indet. | Limb bone |
| *Leptomeryx* sp. | Mammalia | Deer-like mammal | Teeth, bone fragments |
| *Megacerops* sp. | Mammalia | Brontothere | Teeth, bone fragments |
| *Cypretherium* sp. (?) | Mammalia | Entelodont | Tooth |
| | Mammalia | Rodent | Dentary |
| | Mammalia | Insectivore | Incisor tooth |
| *Trionyx leucopotamicus* | Reptilia | Soft-shelled turtle | Carapace fragments |
| | Reptilia | Land tortoise | Shell fragments |
| | Reptilia | Pond turtle | Shell fragments |
| | Reptilia | Crocodile | Dermal scute |
| | Crustacea | Ghost crab (?) | Trace fossils |
| | | Worm Indet. | Trace fossil |

**"BINGO" MICROSITE (MAASTRICHTIAN—LATE CRETACEOUS)**

| Species | Class | Common Name | Element(s) Found |
|---|---|---|---|
| *Lepisosteus* sp. | Osteichthyes | Garfish | Scales, head plates, centra |
| | Osteichthyes | Teleost fishes | Centra |
| | Osteichthyes | Mooneye-like fish | Centrum |
| *Acipenser* sp. | Osteichthyes | Sturgeon fish | Head plate |
| *Amia* sp. | Osteichthyes | Bowfin fish | Dentary |
| | Osteichthyes | Fish, sp. indet. | Bone fragments, coprolite |
| *Myledaphus bipartitus* | Chondrichthyes | Mollusc-eating ray | Teeth |
| *Scapherpeton* sp. | Amphibia | Salamander | Vertebra |
| *Opisthotriton* sp. | Amphibia | Salamander | Vertebra |
| | Amphibia | Salamander sp indet. | Dentary |
| | Amphibia | Frog sp. inset. | Cranial fragment |
| *Palaeosaniwa* sp. (?) | Reptilia | Varanid lizard | Vertebrae |
| *Aspideretoides* sp. | Reptilia | Soft-shelled turtle | Carapace fragments |
| Trionychid sp. indet. | Reptilia | Soft-shelled turtle | Carapace fragments |
| | Reptilia | Snapping turtle | Carapace fragments |
| *Compsemys* sp. | Reptilia | Extinct pond turtle | Carapace fragments |
| Baenid sp. indet. 1 | Reptilia | Extinct pond turtle | Carapace fragments |
| Baenid sp. indet. 2 | Reptilia | Extinct pond turtle | Carapace fragments |
| | Reptilia | Turtle sp. indet. | Ungual |
| | Reptilia | Crocodile | Caudal vertebra, teeth, scutes, bone fragments |
| *Champsosaurus* sp. | Reptilia | Crocodile-like reptile | Vertebra, limb fragments |
| *Paronychodon* sp. | Reptilia | Small Theropod | Tooth |
| | Reptilia | Small Theropod | Phalanges (fragment) |
| | Reptilia | Small Theropod sp. indet. | Bone fragments |
| *Triceratops* sp. (?) | Reptilia | Ceratopsian | Teeth, bone fragments |
| *Edmontosaurus* sp. (?) | Reptilia | Hadrosaur | Teeth, bone fragments |
| | Aves | Bird, sp. indet. | Phalanges, bone fragments |
| | Mammalia | Small mammal | Partial dentary |

**Table 1.** Fossils collected by APS members for the Royal Saskatchewan Museum during the June 20, 2015 field trip. Table compiled by and courtesy of Dr. Emily Bamforth.

Then we walked to the "Bingo" microsite, also of the Late Cretaceous, just underneath the K-Pg boundary. Once again we were given an opportunity to collect microfossils for the museum. The site did not disappoint: we were able to add to their collection fish teeth, gar scales, a crocodile tooth, ceratopsian teeth, turtle shell, turtle phalanx and salamander vertebrae, among other things (Table 1).

The final stop of the day was the Highway 37 K-Pg Boundary Site, located south of Shaunavon. This is where palaeo excavations, conducted prior to the straightening of Highway 37, had yielded an important *Champsosaurus* skeleton in the Paleocene rocks, as well as numerous microfossils within 50,000 years of the K-Pg extinction event. This is one of the most accessible sites (a road cut on a paved highway) exposing the K-Pg boundary. The site is very significant because there are no major unconformities (erosion-

**Dr. Bamforth** points out the K-Pg boundary (a white/yellow band within the coal seam) at the Highway 37 K-Pg Boundary site. Photo by Vaclav Marsovsky.

al gaps) between the Cretaceous and the Paleocene.

We returned to Eastend for supper. At the T. Rex Discovery Centre, at 7:30 P.M., Dr. Bamforth gave us a half-hour presentation, "The Cretaceous-Paleogene (K-Pg) Boundary and the History of Fossil Collecting in Southwest Saskatchewan". Tim Tokaryk then described the history of palaeontology in Saskatchewan and their current work, an excellent summary of the information presented over the field trip.

We would like to thank Dr. Emily Bamforth and Tim Tokaryk of the Royal Saskatchewan Museum for leading, organizing and sponsoring this field trip, including preparing the excellent field trip guide, and the special lectures on Saturday night. We would also like to thank the Eastend Chamber of Commerce for donating the carry bags, maps and brochures and for arranging breakfast, lunch and supper for us.

## Field Trip 2015-4, August 15. *Waterton Dam, Alberta*

Review and photos by Howard Allen

Saturday morning looked bad for our trip to this locality southeast of Pincher Creek. The weather in Calgary was grim, with rain pelting down as we headed south. The rain continued at least as far down Highway 2 as Nanton before finally letting up, to be replaced by a heavy pall of forest fire smoke that turned the sky a grimy brown, the sun a red orb, and made the whole world smell like a campfire. Meanwhile, those who had camped at Waterton Dam or hoteled in Pincher Creek Friday night were treated to what by all accounts was a terrific thunderstorm.

Luckily, conditions began to improve as we gathered at the appointed time and made our way to the outcrop section below the dam on the Waterton River. We actually saw some sunshine as the smoke cleared, thanks to a good breeze—this *is* southwestern Alberta, after all!

The riverbank exposes a heavily faulted and folded interval of Upper Cretaceous rocks assigned to the Bearpaw (marine shale), Blood Reserve (shoreface/beach sandstone), St. Mary River (back-beach/lagoon/coastal plain shale) and Belly River (river-laid sandstone and shale) formations, in stratigraphic order. A bonus for those of us who are distracted by such things is a mixture of exotic cobbles and boulders of all rock types, left by glaciers from the nearby mountains as well as the Canadian Shield, nicely washed and sorted by the river for our viewing pleasure.

But we were here to see fossils, so our attention was focused on the St. Mary River Formation, which contains a well-preserved fauna of fresh-to-brackish water molluscs. By far the commonest species is the

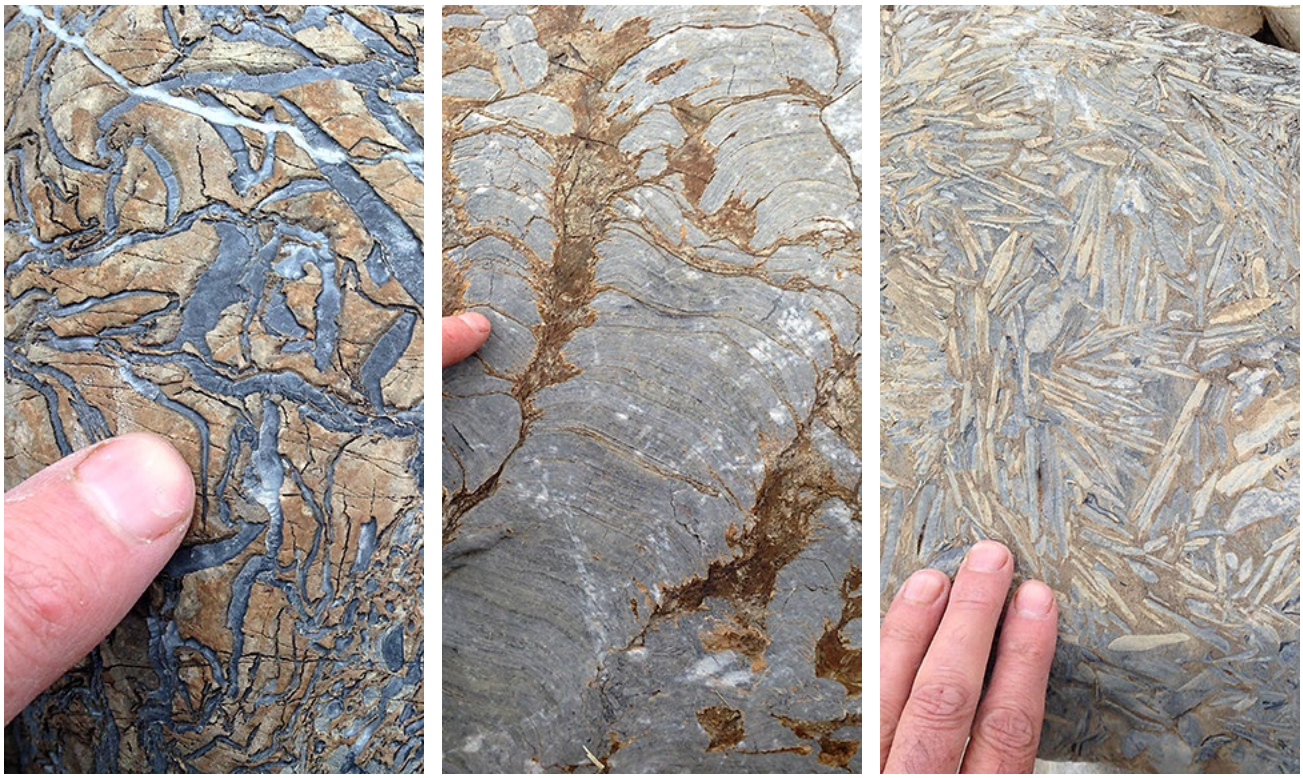

**Coquina** of *Corbula perangulata* clam shells, St. Mary River Formation.

***"Melania" wyomingensis*** gastropods from the St. Mary River Formation. Scale bar = 1 cm.

small clam, *Corbula perangulata*, which abounds to the point of forming coquinas (shelly limestones). The attractively ornamented, high-spired gastropod "*Melania*" *wyomingensis* occurs sporadically and many good specimens were found, as they tend to weather out of their soft, organic shale matrix and tumble down to the foot of the scree slope—or right into the river: some of our company specialized in picking them out of the water. Veterans of earlier trips to this locality remarked how much vegetation had grown over the slopes, adding to the challenge of spotting specimens. Other fossils were much less common. Small oysters, clams (*Corbicula occidentalis* and one or two unidentified types) and unornamented, low-spired snails were rare enough to produce a buzz of attention whenever one was spotted.

By mid-afternoon the wind had shifted to the north and grew a chilly edge, bringing a few dark clouds with it that prompted us to slowly make our way back to our rendezvous point. A proposed visit to the Hillspring oyster quarry, a few kilometres away, failed to materialize due to difficulty in making contact with the operator. Later in the afternoon, those who opted to stay on gathered at the Waterton Reservoir campground and socialized. Fortunately the weather had more bark than bite and never got worse than overcast and a little blustery.

Hardcore rock-fanciers who happen to find themselves in the area are strongly advised to visit the Waterton Dam. On Saturday evening the author, accompanied by member **Barry Rogers**, took a rock-gazing hike along the reservoir beach and the nearby dam, which is faced on the reservoir side by a riprap of boulders placed to prevent wave erosion. The riprap offers a breathtaking gallery of rock specimens, many from the Mesoproterozoic (± 1.5 *billion* years old) Purcell Supergroup of the Waterton Park region. Gorgeous sedimentary structures and



**Molar-tooth structures! Stromatolites! And intraclasts!** Oh my! The geological goodness in Mesoproterozoic Purcell Supergroup erratics on display at the Waterton Dam.

textures abound, including textbook examples of stromatolites[1], molar-tooth structures[2], intraclasts[3], oolites[4], ripples, mud cracks, etc. And thrown into the mix are igneous rocks—rare in Alberta—from the Purcell and from the Cretaceous Crowsnest Formation volcanics.

Thanks to field trip leader **Wayne Braunberger** for yet another fine outing! ❑

***Corbula perangulata*** clams are by far the most abundant fossils in the St. Mary River Formation. Scale bar = 1 cm.

# Fossils in the News

113 m.y.o. four-legged snake ancestor dug burrows.
**www.bbc.com/news/science-environment-33621491**

Fossil blood-filled mosquito found in Montana.
**www.smithsonianmag.com/science-nature/a-fossilized-blood-engorged-mosquito-is-found-for-the-first-time-ever-1749788/?no-ist**

Crowd-source fossil hunting in Africa from the comfort of your own home: help scientists look for fossils on high-res air photos with *Zooniverse Fossil Finder*.
**https://www.zooniverse.org/projects/adrianevans/fossil-finder**

[*Thanks to Georgia Hoffman and Phil Benham.*] ❑

1. **https://en.wikipedia.org/wiki/Stromatolite**
2. **www.academia.edu/4769307/Pratt_1998_Molar-tooth_structure_in_Proterozoic_carbonate_rocks_Origin_from_synsedimentary_earthquakes_and_implications_for_the_nature_and_evolution_of_basins_and_marine_sediment**
3. **https://wwwf.imperial.ac.uk/earthscienceandengineering/rocklibrary/viewglossrecord.php?gID=00000000257**
4. **https://en.wikipedia.org/wiki/Oolite**

# JVP for Sale

Once again we are able to offer for sale copies of the *Journal of Vertebrate Paleontology*, thanks to a very generous donation made to the Society by consulting palaeontologist **Paul McNeil** of **Steppe Consulting Inc**, to whom we extend our gratitude and thanks. The donation includes two runs of journals and a few duplicates. As the collection is too large for storage in the APS library, the Board has decided that the collection should be sold with all proceeds going to the Society.

We are entertaining offers to purchase all or parts of the collection. The copies are mostly in excellent used condition, with some minor shelf wear and small dog-ears. Many are "as new". An inventory is listed in the following table. Digits indicate the number of copies available, greyed-out cells indicate no copies available. Preference will be given to those wishing to purchase larger sets, but all offers will be considered. There is a reserve price of $1.00 per copy. **Deadline for offers is midnight, October 31, 2015**. Unsold material will be disposed of by other means (silent auctions at General Meetings, etc.). Contact **Howard Allen** at **editor2@albertapaleo.org**. ❑

| ***Journal of Vertebrate Paleontology*** | | | | | | | |
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| Note: "s" = supplement | | | | | | | |

# Four Fossils

By Howard Allen, APS Collection Curator

Before jumping into the four specimens featured for this issue, a few remarks regarding the June 2015 discussion. I'm thrilled to say that it generated some interesting mail!

Member **Guy Santucci**, of Cranbrook, BC, emailed me regarding specimen APS.2004.08 (a plant fossil from a mystery locality "2 mi E of Sparwood BC"). Guy led the field trip on which the fossil was collected, so he was of course able to pinpoint the locality with precision; even better, he was able to identify the fossil. Guy writes: ". . . the fossil from Sparwood on Page 9 is a '*Ginkgo nana* (Dawson)' and from the Kootenay Formation. . .[he gives GPS coordinates] and is 8.1 km. east from the Highway 3/43 junction near beautiful downtown Sparwood. The specimen is a pretty good one. . . I haven't found this *Ginkgo* in any other exposure of the Kootenay around there."

Thanks for this, Guy. I've updated the collection records with your information.

In the same email message, Guy writes that the "*Metasequoia*" specimen (APS.2008.39, also of unknown provenance), "looks remarkably (or suspiciously) similar to specimens from the Coalspur Fm. in Alexo [Alberta]." He adds that the matrix "also looks like it could be from Kaleden, BC or Republic, WA." Member **Wito (Jake) Jakielaszek** of Morinville, Alberta, also wrote regarding this specimen. Jake opines that "it looks exactly like the material you find on the McLeod River near Edson, right down to the little freshwater gastropod." Thanks, Jake! So—four more potential localities for this specimen. It pretty much confirms my contention that it could have come from just about anywhere—which is why recording locality data is of primary importance.

Regarding the box of ray teeth from Morocco (APS.1995.26), Devon Alberta member **David Patmore**—who is lucky enough to have actually collected in Morocco (Wow!)—gave us some very useful information. He sent along a scan of some pages from a 1952 French monograph on vertebrate fossils from the phosphatic rocks of north Africa. Dave suggests that the teeth may belong to the species *Myliobatis raouxi* Arambourg, and that they could have come from Oued Zem, in north-central Morocco, between Casablanca and the Middle Atlas mountains. A big thanks to Dave and our other out-of-town members for their valuable input!

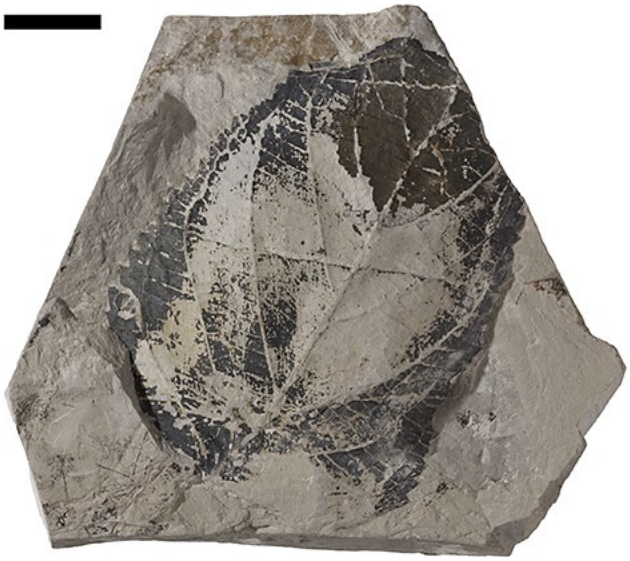
**APS.1985.26** (scale bar = 1 cm)

Dinosaur teeth generally qualify as "microvertebrate" fossils, in spite of the fact that many are big enough to spot from a standing position while hiking through the badlands. The APS collection includes a representative assortment of the sort of teeth that amateur fossil hunters are likely to find in such circumstances, including this one, a hadrosaur (duck-billed dinosaur) tooth donated by Life Member **Don Sabo**. The locality is listed as "west of Iddesleigh," which probably equates to Wolf (or Wolfe) Coulee, an area that was later rendered out-of-bounds for collecting by an expansion of the Dinosaur Provincial Park boundary in 2001 (see *Bulletin*, Dec. 2001, p. 2).

The specimen is in the middle of the range of sizes for hadrosaur teeth and is very well preserved, in spite of missing its root. Hadrosaur teeth are fairly common fossils and many show wear facets created by the teeth gnashing together, but this one is in relatively pristine condition.

It is a well known fact that hadrosaur jaws were set with batteries of hundreds of teeth that were routinely shed during life. It is also a well-known fact that hadrosaurs were among the most abundant dinosaurs in Late Cretaceous Alberta. Given these facts, it is perhaps surprising that their teeth are not more common than they are. In the writer's limited experience, isolated hadrosaur teeth are not much more common than those of the predatory theropod dinosaurs. Whether this observation reflects reality or just a collecting bias is open to speculation. The APS book, *Guide to Common Vertebrate Fossils from the Cretaceous of Alberta* discusses and illustrates these teeth in more detail.

**APS.2008.37** (scale bar = 1 cm)



One might legitimately question the value of keeping so many leaf fossils whose locality data is meagre or missing altogether. The APS collection was meant to be an educational resource more than anything else. It is unlikely to contribute very much to the direct advancement of science, but as an outreach tool, it may indirectly influence the progress of knowledge by inspiring young people and interested amateurs with a glimpse of the variety of our palaeontological resources. If even one of these people is inspired enough by these fossils to pursue an academic career studying fossils or geology—or even to recognize and report an important find—then our collection has done something worthwhile.

Yes, this is yet another of those leaf fossils that was donated anonymously and is an orphan with no history of its origins. Its clearly serrated margin is its outstanding feature, giving it a look of familiarity to those who know the modern Alberta flora. It brings to mind the alders, birches, poplars, elms and cherries of our own environment, though it may be related to none of them. At the very least this resemblance to the mundane helps to remind us that the deep and distant past has very real ties to the present, through the medium of fossils.

**APS.1990.24** (scale bar = 1 cm)

To any student of ammonite fossils this small fragment practically shouts out "Jurassic!" with its two beautifully sculpted orders of ribs, perhaps recalling a pleasant, misty day of fossiling in the sea air near Lyme Regis on the southern coast of England. If so, that student would be right about the age but wrong about the locality. This is a Canadian specimen, collected in the wilds of northwestern British Columbia, far from any bucolic sheep pastures or rustic country pubs.

The specimen was collected and donated by former APS member **Jill Fryling**, from a locality listed as "Copper River, about 50 km E of Terrace, BC, at end of a logging road. Left fork at Clore River, road washed out here 1978."

Doesn't that description make you want to run to Google Earth (GE) and start clicking? I did, and once again it took a bit of interpretation to figure out where this locality might actually be.

Copper River is a locality on the Yellowhead Highway just east of Terrace, near the junction of the Skeena and Zymoetz rivers. Now it's little more than a bend in the highway; according to a BC geographical names search, a post office existed there from 1909 to 1956. But Copper River is right on the outskirts of Terrace, not "50 km east" so right away we have to start thinking. There is no actual *river* named "Copper" anywhere nearby. (Could "Copper River" be an old name for the Zymoetz River? The topo map shows a Copper Mountain looming over the site of the old Copper River post office; and a few miles to the north is the Bornite Range and Bornite Mountain: bornite is an ore of copper. Hmm.)

A GE name search turned up "Copper River Road" which is on the north side of the westward flowing Zymoetz River and runs eastward, upstream. But it fizzles out in a logging area, well short of the Clore River region, so that was a dead end.

There is also a logging road (called "Haaland Ave" on GE, but we'll call it the Zymoetz River road) on the south side of the Zymoetz River. This road starts on the Yellowhead Highway at the old "Cop-

per River" locality, and it *does* continue east to the Clore River and beyond. Aha! The road forks just before the Clore River bridge, and again just after the bridge. In both cases the right forks peter out in logging areas and the left forks continue up the Zymoetz River. So far, so good. But now another puzzler: "Road washed out here 1978." Where is *here*? The fork at Clore River? Further along, near the fossil site? Presumably a washed out road would thwart further travel by the fossil hunters, at least for any significant distance, so it seems logical that the fossil site would have been close to the washout.

At this point I turned to geology. Online I found old Geological Survey of Canada maps showing bedrock geology of the Terrace and Smithers map areas. Bedrock around the Clore River bridge and forks is mapped as Jurassic, but *volcanic* rocks—not sedimentary—so not a likely place to find ammonites.

The specimen record says the fossil was collected from the Smithers Formation of the Hazelton Group. The Smithers area map shows Smithers Formation bedrock, but a long way to the northeast and not close to the Zymoetz River road. However, the map legend shows another Jurassic unit, the Ashman Formation, comprising "dark grey to black shale, quartzose sandstone, greywacke . . ." —much more likely rock for finding fossils, and only a little younger than the Smithers Formation. And the map shows an outcrop area of Ashman Formation right along the Zymoetz River road, where it crosses the Kitnayakwa River (a likely place for a washout?). The distance measures out to 47 km by road from Terrace, which is "about 50 km." Bingo! Is this the place? That's a definite maybe.

It occurred to me that the locality was probably a previously recorded site that was targeted for collecting. Why else would fossil hunters drive 50 km on sketchy roads to the middle of nowhere? Was it just luck that they found fossils there? Unlikely, I think.

Knowing this is a Jurassic locality, I checked the literature for papers by **Dr. Hans Frebold**[1], the late master of Jurassic ammonite studies in Canada. Sure enough, this line of inquiry quickly turned up GSC Bulletin 307, on an ammonite fauna in the Smithers map area. One of the two localities listed is a cutbank on the Zymoetz River, "a mile north of the mouth of Nilah Creek" (actually the Kitnayakwa River): right where my speculated route ended up.

The fossil itself, one of four collected at this locality, is identified as *Arctocephalites*. Its companions include fragments identified as *Epizigzagiceras*, *Phylloceras* and *Kepplerites*. If the IDs are correct (I don't know), their published biostratigraphic ranges are consistent with their having come from Middle Jurassic rocks, like the Ashman Formation.

1. **http://2dgf.dk/xpdf/bull32-03-04-181-185.pdf**

**APS.2006.43** (scale bar = 1 cm)

This time our fourth specimen probably has more sentimental than scientific or even educational value. It is a small dinosaur bone fragment from the Dinosaur Park Formation (Late Cretaceous) of southeastern Alberta. It's one of a number of specimens donated to the Society collection in 2006 by the renowned Alberta naturalist and APS Life Member, **Hope Johnson**, who passed away in 2010 at the age of 94 (*Bulletin*, September 2010).

Hope was, of course, a mentor and role model for amateur palaeontologists in Alberta, whose knowledge and the respect she earned allowed her to bridge the gap between professionals and amateurs. Many of our more senior members knew her personally. The 2009 APS book, *Guide to Common Vertebrate Fossils from the Cretaceous of Alberta* was published in part to showcase her skills as an artist and fossil expert. The book continues to sell well. RTMP Technician and amateur historian **Darren Tanke** continues work on a book-length biography of Hope, which the Society hopes to publish.

What more can be said about the specimen itself? Not much. Alas, this writer is not a dinosaur anatomist. As a guess, it might be part of the dorsal superstructure of a small vertebra. If you recognize it, send me a message! **editor2@albertapaleo.org** ❑