

Alberta

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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).

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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, October 21, 2011—Philip Benham, Alberta Palaeontological Society:
Living with Fire: Cultural Adaptations in the South Pacific to Geological Processes.

Friday, November 18, 2011—Dan Quinsey, Alberta Palaeontological Society:
Moose Mountain Alberta—Exploring the Natural History of Canyon Creek and Area.

Friday, December 9, 2011—Christmas Social and Fossil Sharing.

ON THE COVER: Upper Cretaceous badlands on the Pinhorn Grazing Reserve, southern Alberta, venue for the APS June 2011 field trip. Photo by Dan Quinsey ©2011. See field trip review, Page 6.

Rock 'n' Fossil Road Show rolls October 22

This popular event organized by the Geological Survey of Canada with assistance from the Alberta Palaeontological Society is being hosted this fall by the Signal Hill Branch of the Calgary Public Library, 5994 Signal Hill Centre sw. The date is Saturday, October 22. All members of the public are invited to drop in any time between 11:00 A.M. and 3:00 P.M. to have your rock, mineral or fossil specimens identified by experts, and to view educational displays. □

DRI Annual Dinner October 29, 2011

By Mona Marsovsky

While enjoying a gourmet meal, marvel at the beauty of the polar landscape and cringe at the hardships involved in excavating a dinosaur from the Antarctic at the Dinosaur Research Institute's annual fundraising dinner on Saturday, October 29, 2011. **Dr. Philip Currie** of the University of Alberta will present his team's work to extract an important theropod skeleton from the hard rock at an elevation of 4000 m on the slopes of Mount Kirkpatrick, Antarctica, in December 2010 and January 2011.

The dinner will be held Saturday evening, October 29 at the Earl Grey Golf Club, near the Glenmore Reservoir in southwest Calgary.

The Dinosaur Research Institute's annual dinner raises funds

to support dinosaur research in Alberta. DRI provides grants to graduate students and researchers and funds the annual Vandervelde Award, supporting graduate student travel to the Society of Vertebrate Paleontology's annual conference, to present his/her research.

Tickets cost \$150 per person, a portion of which is tax deductible. To get your ticket, contact **Al Rasmuson** at (403) 861-0532, email **info@DinosaurResearch.com** or visit their website: **www.DinosaurResearch.com**. Last year's event was sold out, so reserve your ticket now. Deadline for ticket sales is October, 15, 2011.

Sort Microfossils November 26

By Mona Marsovsky

Join us on Saturday, November, 26, 2011, as we sort through the matrix provided by **Emily Frampton** to find teeth, gar scales, fish vertebrae and other fossils using the microscopes provided by Mount Royal University. All of the fossils we find will be used to aid research into the environment of the Late Cretaceous of southern Alberta. This sorting session will take place in room B213 at Mount Royal University from 1:00 until 3:30 P.M. Registration is not required, but if you contact me (**Mona Marsovsky**, phone



Excavating dinosaur bones in Antarctica. Photo courtesy of Dr. Eva Koppelhus.

(403) 547-0182, giftshop@albertapaleo.org) to let me know that you are planning to attend, I can inform you if we need to cancel this session. No experience is required. Bring tweezers to pick the tiny fossils

from the soil and a pen to label your finds. Stay tuned to the December *Bulletin* for the dates of the microfossil sorting sessions to be held in January and February, 2012. □

A comment on the status of ammolite as (not) Alberta's "official gemstone"

By Alwynne B. Beaudoin
Royal Alberta Museum, 12845 102 Avenue,
Edmonton, Alberta T5N 0M6

In the June 2011 issue of the Alberta Palaeontological Society *Bulletin*, author **Darren Tanke** provides an entertaining and informative look at *Albertosaurus*, one of the more dramatic and iconic dinosaurs, in popular culture (Tanke, 2011). As always with his contributions, his article is wide-ranging and enlightening and I enjoyed reading it very much.

I do, however, want to raise an issue with respect to the last sentence in the article because it highlights a popular perception regarding the status of ammolite. In his Text Note 5 (page 27) Darren correctly identifies petrified wood as Alberta's provincial stone. In the next sentence, he states that "Alberta's official gemstone is ammolite." Although this is a common perception, a look at the Emblems of Alberta Act (Government of Alberta, 2000) reveals that this is not the case; Alberta does *not* have an official gemstone.

The official emblems of Alberta identified under the Emblems of Alberta Act (Government of Alberta, 2000) are listed on the Alberta Government's Emblems of Alberta web page (Government of Alberta, 2011a). There are twelve emblems defined under this act, including the flag and the tartan. Alberta has three animal emblems: namely, a fish (the bull trout), a mammal (bighorn sheep), and a bird (great horned owl). Alberta also has four environmental emblems: as well as the provincial stone, these are a tree (lodgepole pine), a flower (wild rose), and a grass (rough fescue) (Government of Alberta, 2011b). However, there is no gemstone emblem listed.

Nevertheless, the belief is widespread that ammolite is Alberta's official or provincial gemstone. Enquiries about this have crossed my desk several times in recent years, so I thought it would be useful to pull together the information I have gathered about this

matter and make it more generally available. In fact, the belief is so pervasive that it has almost reached the status of an "urban legend." A statement concerning ammolite's official gemstone status appears on the Wikimedia Commons page about Alberta (Wikipedia, 2011a) and the Wikipedia pages on ammolite (Wikipedia, 2011b) and Canadian Provincial and Territorial Symbols (Wikipedia, 2011c). The statement has been picked up and is repeated extensively in many other websites. It also appears in various more authoritative sources, including publications such as Beaton (2008, p. 9) and Kavakonis (2007, p. 69). The compilers of the Wikipedia page are quite explicit in stating that ammolite was "designated the official gemstone of the Province of Alberta in 2004" (Wikipedia, 2011b).

So where does this statement come from? Why are the Wikipedia contributors so certain about 2004?

In order to become "official" for a particular purpose, an emblem has to be declared so by a recognized authority. For example, in 2007 Lethbridge City Council declared ammolite to be "the official gemstone of Lethbridge" (City of Lethbridge, 2007; Legislative Assembly of Alberta, 2007). At the provincial level, official emblems need to be legislated by the Provincial Government. Alberta Hansard records that on March 8, 2004, Mrs Mary O'Neill (MLA for St Albert) introduced Bill 208 into the House, a "bill that seeks to adopt ammolite as the official gemstone of Alberta" (Legislative Assembly of Alberta, 2004a). The Bill sought to amend the Emblems of Alberta Act by adding an extra clause identifying ammolite as the official gemstone (Legislative Assembly of Alberta, 2004a). This Private Member's Bill passed first reading on that occasion (Legislative Assembly of Alberta, 2004b).

However, in order to become law (and thereby official), a bill must receive three readings in the House during the same Legislature, and pass through a Committee or discussion stage, before receiving Royal Assent. The Bill was introduced in the 4th Ses-

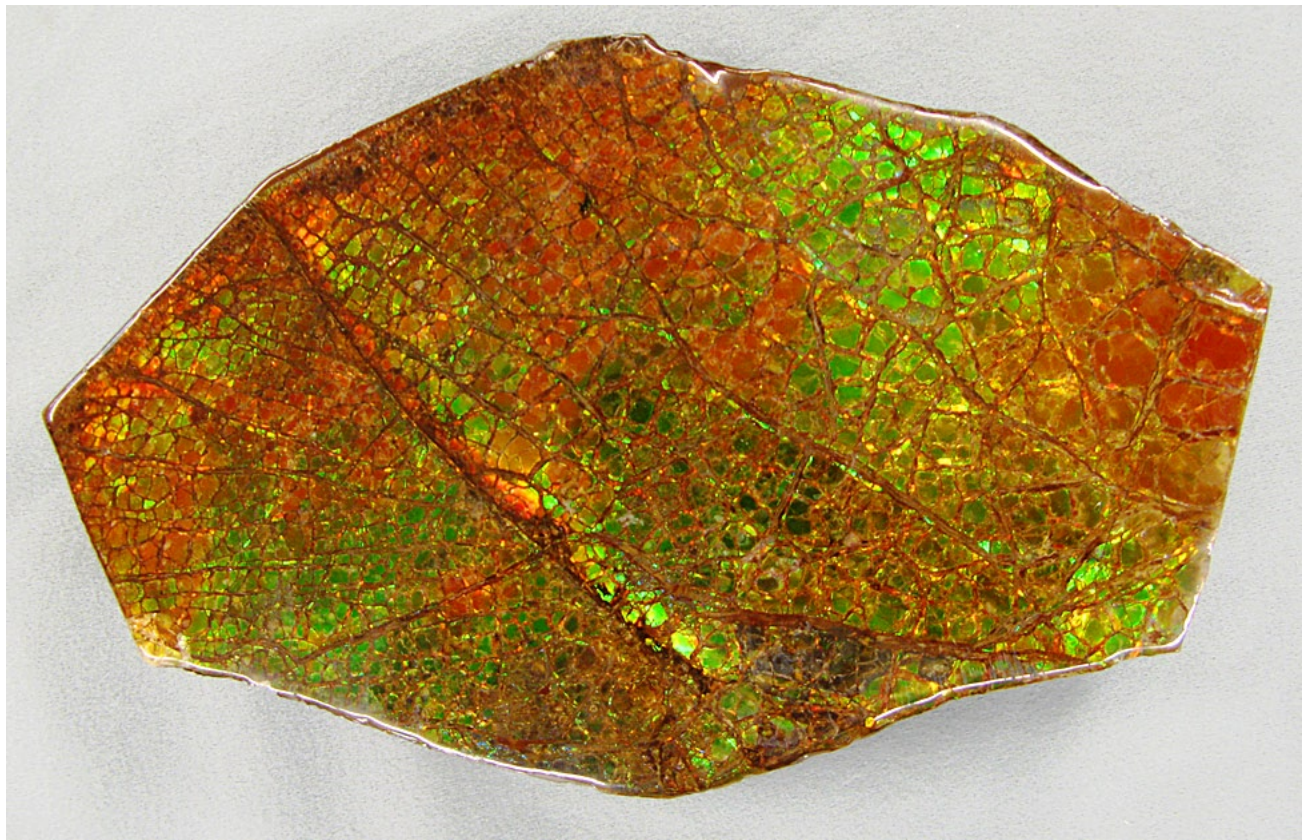


Figure 1. An eye-catching ammolite specimen, with red and green colours especially prominent. Specimen is about 30 cm in length. G87.22.7, geology collection, Royal Alberta Museum, Edmonton. Photo courtesy of Dr. Beaudoin.

sion of the 25th Legislature. Before it could receive second and third readings and complete its transit of the legislative process, an election was called and held on November 22. With the termination of the 25th Legislature, Bill 208 died on the Order Paper.

When the House resumed sitting on March 1, 2005, it was the 26th Legislature and the legislative agenda started anew. Mrs. O'Neill was no longer an MLA and the Bill was not reintroduced to start its transit again. A search of Alberta Hansard confirms that no similar bill has been introduced by any other MLA subsequently. So the process to declare ammolite a "provincial gemstone" for Alberta was started but never completed. I suspect, therefore, that the statement that ammolite was "designated the official gemstone" probably arises from a misunderstanding of the legislative process.

Although it may not have "official" status as a provincial emblem, ammolite certainly has popular standing as a distinctively Albertan product. Ammolite is "a trade name for the iridescent, nacreous layer of the shell of specific fossil ammonites" (Mychaluk *et al.*, 2001). Ammonites are widespread, especially in the Upper Cretaceous Bearpaw Formation (Tsujita and Westermann, 1998), but gem-quality ammolite

has a very restricted distribution and is found in southern Alberta, notably in the Lethbridge area (Mychaluk *et al.*, 2001; Mychaluk, 2009). In this regard, ammolite appears "to be unique to Alberta" (Hitchon, 2006). Recovery of ammolite is controlled under the Ammolite Shell Regulation and other legislation (Government of Alberta, 2004). Ammolite is used especially to make striking and distinctive jewellery (Kavakonis, 2007; Baker, 2006). With its gleaming green, blue, orange and red iridescence, ammolite is indeed beautiful and attractive (Fig. 1).

In conclusion, although it is certainly fair to describe ammolite as "Alberta's gemstone" (Mussieux and Nelson, 1998), it is not (yet?) accurate to describe it as "Alberta's *official* gemstone."

References

- Baker, K. 2006. Ammolite: The definitive guide to the newest rare and exotic gem. Korite International. 13 pp. Available from <http://www.galtmuseum.com/museumstore-images/AmmoliteDefinitiveGuideS.pdf>
- Beaton, A. (compiler). 2008. 2008 Alberta exploration highlights and industrial minerals production update. Energy Resources Conservation Board, Alberta Geological Survey, p. 9. Available from http://www.ags.gov.ab.ca/publications/pdf_downloads/Alberta_Overview_2008_Exploration.pdf

- City of Lethbridge. 2007. Annual Report, City of Lethbridge, Alberta, Canada, p. 40. Available from <http://www.lethbridge.ca/City-Government/Financial-Documents/Documents/Reporting/2007%20Annual%20Report.pdf>
- Government of Alberta. 2000. Emblems of Alberta Act. Queen's Printer, Alberta. Available from <http://www.qp.alberta.ca/documents/Acts/E06.pdf>
- Government of Alberta. 2004. Ammonite Shell Regulation, 152/2004. Available from http://www.qp.alberta.ca/documents/Regs/2004_152.pdf. [For more details of the Acts and Regulations pertaining to ammonite, see the Ammonite Shell Tool Kit page provided by Alberta Energy at <http://www.energy.alberta.ca/minerals/707.asp>]
- Government of Alberta. 2011a. Emblems of Alberta. Available from <http://culture.alberta.ca/about/emblems/default.aspx>
- Government of Alberta. 2011b. Environmental Emblems. Available from <http://culture.alberta.ca/about/emblems/environmental.aspx>
- Hitchon, B. 2006. Gemstones: Stones of endearment, p. 151, and Ammolite: The organic gemstone, p. 152. In *Alberta beneath our feet: The story of our rocks and fossils*. Geoscience Publishing, Sherwood Park, Alberta. vii + 248 pp.
- Kavakonis, N. 2007. Ammolite: Only in Canada, you say? *Jewellery Business* 3(3):68–72.
- Legislative Assembly of Alberta. 2004a. Bill 208: Emblems of Alberta (Official Gemstone) Amendment Act, 2004. Available from http://www.assembly.ab.ca/ISYS/LADDAR_files/docs/bills/bill/legislature_25/session_4/20040217_bill-208.pdf
- Legislative Assembly of Alberta. 2004b. Alberta Hansard, 25th Legislature, 4th Session, p. 345. Available from http://www.assembly.ab.ca/ISYS/LADDAR_files/docs/hansards/han/legislature_25/session_4/20040308_1330_01_han.pdf
- Legislative Assembly of Alberta. 2007. Alberta Hansard, 26th Legislature, 3rd Session, page 924. Available from http://www.assembly.ab.ca/ISYS/LADDAR_files/indexes/hansards/han/legislature_26/session_3/20070307_1200_01_hansubj.pdf
- Mussieux, R. and Nelson, M. 1998. A traveller's guide to geological wonders in Alberta. Provincial Museum of Alberta, Federation of Alberta Naturalists, and Canadian Society of Petroleum Geologists, Edmonton, Alberta, pp. 240–241.
- Mychaluk, K.A. 2009. Update on ammonite production from southern Alberta, Canada. *Gems & Gemology*, 45(3):192–196.
- Mychaluk, K.A., Levinson, A.A. and Hall, R.L. 2001. Ammolite: Iridescent fossilized ammonite from southern Alberta, Canada. *Gems & Gemology*, 37(1):4–25.
- Tanke, D.H. 2011. A history of *Albertosaurus*-related popular culture events and activities in Canada. *Alberta Palaeontological Society Bulletin*, 26(2):12–30.
- Tsujita, C.J. and Westermann, G.E.G. 1998. Ammonoid habitats and habits in the Western Interior Seaway: A case study from the Upper Cretaceous Bearpaw Formation of southern Alberta, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology*, 144(1–2):135–160.
- Wikipedia. 2011a. Alberta. Online at <http://commons.wikimedia.org/wiki/Alberta>
- Wikipedia. 2011b. Ammolite. Online at <http://en.wikipedia.org/wiki/Ammolite>
- Wikipedia. 2011c. List of Canadian provincial and territorial symbols. Online at http://en.wikipedia.org/wiki/List_of_Canadian_provincial_and_territorial_symbols □

Field Trip Review

Field Trip 2011-1
June 25–26, 2011
Southeastern Alberta

By Mona Marsovsky and Dan Quinsey

Eighteen APS members assembled in the bright sunshine at the Manyberries Hotel in southeastern Alberta, the morning of June 25. Over that Saturday and the following Sunday, we would explore outcrops from three formations of the Belly River Group of Late Cretaceous (mid to late Campanian) age: namely, the Foremost (oldest), the Oldman and the Dinosaur Park Formation (youngest).

The first destination for Saturday was the Pinhorn Grazing Reserve, to explore the Foremost Formation. We left the hotel at 10:00 A.M. and caravanned for about one hour across the dusty gravel roads to the first stop at the upper portion of the lower succession and the middle succession of the Foremost Formation (below the Taber coal zone).

The unusually heavy rains of June had resulted in green, lush grasslands, roadside wetlands and lots of friendly mosquitoes.



Shark tooth (circled) and gastropod shell amid clam shell fragments, Pinhorn Ranch. Photo by Keith Mychaluk.



Vanishing point is the target of the convoy of field trip vehicles headed across the Sage Creek prairie in search of badlands. Photo by Keith Mychaluk.

We climbed the small hill to explore outcrops amid the patchy vegetation cover. The area was formed by deposition of sand and mud eroded from the rising Rocky Mountains into the Western Interior Seaway. The eroded surfaces yielded shark teeth, gastropods, oyster shell, *Myledaphus* (ray) teeth, fish scales and vertebrae, turtle shell, and tiny broken bone fragments. A frog hopped amongst the fossilized shark teeth, probably grateful that the shark had died over 80 million years before.



A rattlesnake (*Crotalus viridis*) skulks under a clump of sagebrush at the Pinhorn Ranch. Photo by Dan Quinsey.

On the way back to the cars, we encountered a rattlesnake, who made repeated attempts to use our vehicles for cover. We had to keep herding it away and alert other field trip participants of its presence. The rattler finally resorted to hiding under a sagebrush, uncomfortable with its new-found fame amid the eager photographers of our group.

After comparing our finds at lunch, we drove to our next stop. The antelope in the adjacent pastures watched us practice our U-turn skills (only four times!) as we took the “scenic” route to our destination. Once we arrived at the parking area, we explored a coulee in the Oldman Formation. APS members found petrified log fragments and some dinosaur bone fragments. This area had much more sandstone and ironstone fragments than the first stop. A light breeze kept the temperatures comfortable and swept away the mosquitoes. Upon returning to the vehicles at the end of the day, one member realized he had accidentally locked his keys in his vehicle. After attempts by several members, finally an officer of the Alberta Conservation Association, who happened to be passing by, drove to retrieve a coat hanger from his nearby office and then returned to open the locked vehicle.

After spending the night in nearby Medicine Hat, seventeen APS members in a total of ten vehicles gathered at 9:00 A.M. Sunday, near the gate to the Sage Creek Grazing Reserve. Our objective was the uppermost 20 m of the Dinosaur Park Formation, which overlies the Oldman Formation. Recent rains made driving along the faint track exciting and allowed us to try out our 4-wheel-drive skills. The leaders frequently stopped to assess the wetness of the road to make sure it was passable. **Keith Mychaluk** coached drivers on how to manoeuvre their vehicles through a particularly tricky area. Only one vehicle, which strayed into a big hole right beside the path, needed to be winched out by **Wayne Braunberger's** truck.

Four of the group (including the authors) were discouraged by the rough terrain and looming rain

clouds and turned back. The rest proceeded to a site which yielded shark teeth, champsosaur vertebrae, and bone fragments. Several members left early due to the threatening rain. Of those who turned back before reaching the site, two (**Dan Quinsey** and **Geoff Barrett**) drove to the Manyberries area to explore exposures of the marine Bearpaw Formation. Unfortunately, the deteriorating weather conditions drove them away from there as well.

We would like to thank Wayne Braunberger for organizing this field trip, creating the comprehensive field trip guide and for doing an excellent job of leading the group. We also appreciated Wayne's skill at pulling out stuck vehicles! □



Petrified wood, Oldman Formation at Pinhorn Ranch, author Mona Marsovsky for scale. Photo by Vaclav Marsovsky.

Review

By Les Adler

South Africa's fossils at Malapa

By Josh Fischman, Photos by Brent Stirton, Art by John Gurche. *National Geographic*, August 2011, Vol. 220, No. 2, pages 120–135

This report concerns the current situation regarding four fossil pre-humans located at Malapa, about 40 km northwest of Johannesburg, South Africa. The material is certainly outstanding and noteworthy, but it appears to me that some statements are being made too early.

Across east Africa, from north to south over 500 km, there are five sets of deposits providing ape or human fossils over about a 4.5 million year period from the Pliocene Epoch to the present. These are:

- Hadar, Ethiopia
- Lake Turkana, Kenya
- Olduvai Gorge, Tanzania
- Lake Malawi, Malawi
- South Africa

A few genera have been proposed for the time period 4.5 to 1.25 million years ago, mostly australopithecines with possibly six species; from 1.8 million years ago there are possibly six species of *Homo* with some coexisting.

At Malapa, four individuals are being designated *Australopithecus sediba*. Two have been excavated, studied and reported upon. Two others are being excavated. The important feature at this level of about two million years ago is that the other sites have produced very small samples, which in total would fit into a shoe box. The material at Malapa, on the other hand, is ranging from forty to seventy times the number of identifiable bones for each individual. The preservation is also outstanding: some skin appears to be preserved; in some cases there may be evidence of scalp and facial hair and a high density of sweat glands.

Death trap caves in limestone litter this region. Bodies of individuals that fell into the caves were quickly covered by sediments, preserving them, sometimes in exquisite detail. Josh Fischman and Lee Berger of the University of Witwatersrand state: "These skeletons from the Malapa site rank among the most complete finds in a science mostly defined

by scattered bones. [An] adult female and young male [found in one cave] may have been closely related. The remarkably well preserved hand of the female shows the capacity to bring thumb and fingers together. With this precision grip she could have used and made tools.”

A table compares features of *Australopithecus sediba* with those of related genera:

Similarities with *Australopithecus* sp.

- 1) Small brain size
- 2) Long, high cheek bones
- 3) Primitive molar cusps
- 4) Long upper limbs.
- 5) Primitive heel bone

Similarities with *Homo* sp.

- 1) Front of the brain reorganized
- 2) Projecting nose
- 3) Smaller teeth and chewing muscles
- 4) Hips less flared, similar to humans
- 5) Longer legs
- 6) Hand with precision grip

The author concludes that *Australopithecus sediba*'s greatest promise may lie in its power to illuminate the origins of our own genus, *Homo*. There are many more bones to come and more individuals to be revealed. When they arrive, these additional fossils will validate the conclusions being stated today. □

Fossils in the News

Edited by Howard Allen

Calgary Herald online, August 5, 2011

Czech hikers try to flee with Burgess Shale fossils

YOHO PARK, BC—Here's a story that fairly cries out for an ill-informed editorial rant, and illustrates the seriousness with which Parks Canada treats the theft of fossils from a treasured World Heritage Site.

It seems that a pair of tourists from the Czech Republic set off motion-sensor alarms while allegedly plundering fossils from the Walcott Quarry—world-famous for being one of the most important fossil sites on Earth. The pair were intercepted by a Park Warden at the trailhead and told to stay put while the

warden attended to “a more pressing matter.” Surprisingly, the suspects did not stay put. So much for the honour system.

Rather than making a clean getaway, the culprits imprudently had made their way to Field, where they were spotted near the Visitor Centre. At this point the story takes an animated turn: approached by an officer, the pair bolted and threw themselves into the Kickinghorse River (yes, the same ice-cold Kickinghorse River that plays host to whitewater rafting adventures) weighed down by their backpacks, still full of fossil booty.

One of the miscreants was collared immediately by RCMP while the other bobbed downstream for an hour before being fished out—remarkably no worse for wear—and arrested. Police recovered six slabs of fossiliferous Burgess shale.

Randle Robertson of the Burgess Shale Geoscience Foundation is quoted as saying “it would have been a huge loss to science and society if the slabs were not retrieved. . . What they took. . . were slabs that had fossils in them that they were looking to excavate, display or sell. But they are priceless. . . An entire collection would be missing forever . . . it's a loss of a story of half a billion years ago.”

So—illegal trespass; theft of “priceless” fossils; evading arrest; occupying park wardens and police for much of a day; risking the lives of rescuers. Pretty serious stuff. And the consequences? Each man was fined \$115. Yes, *one hundred fifteen*. Dollars. Canadian dollars. (We don't know if the fines were actually paid; it seems unlikely that the Czech Republic would extradite its citizens over an unpaid \$115 fine.)

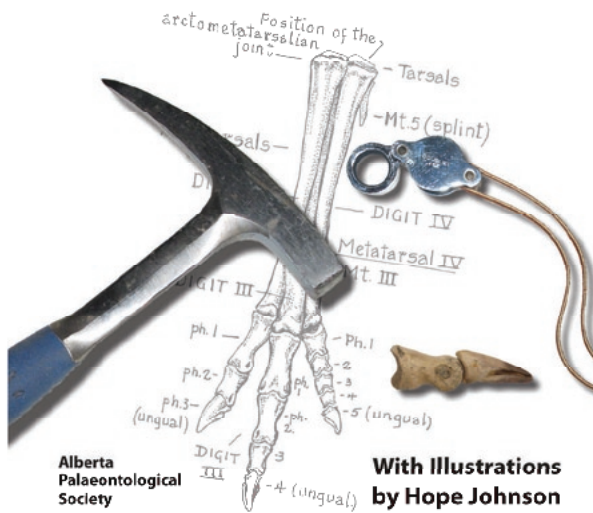
The irony of all this will not be lost on anyone who has paid the \$120 fee to take the legally sanctioned Walcott Quarry hike (www.burgess-shale.bc.ca/guided-hikes). Yes, it's actually cheaper to hike illegally to the Walcott Quarry, steal “priceless” fossils, lead Park staff and police on an hours-long chase and pay the fine. And, hey, if you're only slightly smarter than the pair in this story, you could come away with some nice and potentially lucrative fossils in the bargain! And here's some more perspective: at the same time these culprits were being assessed their \$115 debt to society, the very same Parks Canada was handing out instant \$400 fines (to a maximum of \$25,000) for *simply walking on a hiking trail* without bear spray. (See www.calgaryherald.com/travel/Minnewanka+Trail+users+follow+rules+over+long+weekend/5198311/story.html and www.calgaryherald.com/travel/Bear+spray+mandatory+popular+Banff+hiking+trail/5172899/story.html). □

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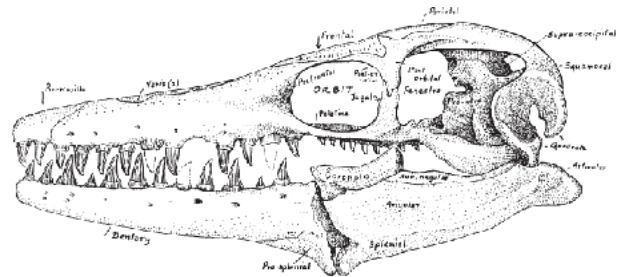
A Guide to Common Vertebrate Fossils from the Cretaceous of Alberta. Assembled by the Alberta Palaeontological Society (APS) with illustrations by naturalist Hope Johnson; Foreword by Dr. Donald Brinkman, Director of Preservation and Research, Royal Tyrrell Museum of Palaeontology.

Contents include: Geology of the Vertebrate Fossil Bearing Formations in Alberta; Collecting Regulations; Curation; Skeleton Terminology; Fishes; Amphibians; Turtles; Champsosaurs; Crocodiles; Lizards; Mosasaurs; Plesiosaurs; Tyrannosaurids; Ornithomimids; Hadrosaurs; Ceratopsians; Ankylosaurs; Pachycephalosaurs; Mammals; Index; and much more.

Guide to Common Vertebrate Fossils from the Cretaceous of Alberta



Hope Johnson's illustrations are the inspiration for this publication. Her passion for nature and contributions to the science of palaeontology have brought Alberta's natural history to life.



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