CSVP BONESHAKER

The Official Newsletter of the Canadian Society of Vertebrate Palaeontology

Winter 2015
Table of Contents

Message from the President
About Our New Logo
Welcome home, Tiktaalik!
Feature Article: Dimetrodon of the North
Dinosaurs in Kananaskis
1st Annual Western Canadian Palaeo Piggy
CSVP Member News
Off the Shelves.
Job Opportunities
Scientific Contributions From Members 2015
Grow the Society!
Upcoming Meetings

About the Newsletter

This is the first edition of the annual newsletter of the Canadian Society of Vertebrate Palaeontology. We hope it will provide a forum for members to share their research and related stories, and learn about what our Canadian colleagues have been doing. The name of the newsletter, CSVP Boneshaker, is a metaphorical reference to the somewhat anachronistic nature of the medium, particulary in this time of fast-paced social media. As defined in the Merriam-Webster dictionary, a boneshaker is a dilapidated or outmoded vehicle. It's also reminiscent of many of our field vehicles, which become alight with chatter after a good day of fossil hunting on the rocks. The inaugural cover is a large tyrannosaur footprint from the Wapiti Formation, to honor the opening of the P. J. Currie Dinosaur Museum in the Grande Prairie Area (Photo: D. Evans).

We hope that you enjoy it, and we encourage contributions from all of the CSVP membership.

David Evans (ROM/Univ of Toronto) & Hillary Maddin (Carleton University)
Co-editors
Message from the President

Welcome to the first edition of the CSVP newsletter! Thanks go to David Evans and Hillary Maddin for making it happen. All great ideas are slow to get started, but once up and running, much harder to stop. I am sure the newsletter, like the now three year old CSVP, will continue on as a venue for all of us to share what it is we have done and are doing as vertebrate palaeontologists working at home and abroad, furthering knowledge and understanding of the evolution of vertebrates from around the world and through time. I am pleased to see, as founding President, that we are alive and well as a society, and have an organized face and presence that we can share with the world. I do not know what our next steps will be, but as my term comes to an end and I look forward to being an active member in the society, I know that whatever we will do will be as excellent as the things we did that brought us to this point. See you all in Mississauga in May!

Michael

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About Our New Logo

The Canadian Society of Vertebrate Palaeontology has a new logo! The logo was designed by artist Danielle Dufault from the Royal Ontario Museum. Its elements are meant to reference the vertebrate fossil record through the Eras of the Phanerozoic with iconic fossils of clades that are found in Canada. It includes the sarcopterygian *Eusthenopteron foordi* (Devonian, Quebec), the basal synapsid *Dimetrodon borealis* (Permian, PEI), the duck-billed dinosaur *Parasaurolophus walkeri* (Cretaceous, Alberta) and the woolly mammoth *Mammuthus primigenius* (Pleistocene, Canada).
Welcome home, *Tiktaalik*!

In June of 2015, the Canadian Museum of Nature welcomed home a series of remarkably well-preserved fossils found in Canada's High Arctic that show the evolutionary transition from finned to limbed animals. Dr. Neil Shubin (University of Chicago) and Dr. Ted Daeschler (Drexel University, Philadelphia) are returning the fossils to Canada after a decade of study in their American laboratories. The star of the group is *Tiktaalik roseae*, a limbed-fish about 375 million years old. Its discovery in 2004 on Ellesmere Island, and resulting studies on it, garnered worldwide headlines for what the fossil reveals about the early evolution of vertebrates when the first fish ventured onto land. The fossils will be curated in the collections of the Canadian Museum of Nature on behalf of the Government of Nunavut, where they will be available for further study by visiting researchers.
Call for submissions! See: https://ejournals.library.ualberta.ca/index.php/VAMP

Volume 1:

Holmes, R.B. 2014. The postcranial skeleton of Vagaceratops irvinensis (Dinosauria, Ceratopsidae).

Murray, A. M. and S. L. Cumbaa. 2015. New information on two Late Cretaceous (Turonian) fishes from Lac des Bois, Northwest Territories, Canada.


Vavrek, M., A.M. Murray and P.R. Bell. 2016. Xiphiactus audax Leidy 1870 from the Puskwaskau Formation (Santonian to Campanian) of northwestern Alberta, Canada and the distribution of Xiphiactus in North America.

Murray, A.M. 2016. Mid-Cretaceous acanthomorph fishes with the description of a new species from the Turonian of Lac des Bois, Northwest Territories, Canada.
Feature Article: *Dimetrodon* of the North

*By Kirstin Brink*

*University of British Columbia*

*Bathygnathus borealis* is one of the most momentous fossil finds in the history of Canadian palaeontology. Since its discovery, the specimen has had an extraordinary history, being described by several of the most pre-eminent palaeontologists of the 19th and 20th centuries. Modern analysis now suggests that the specimen should be known as *Dimetrodon borealis* (Fig. 1), Canada’s first and very own species of *Dimetrodon*.

Figure 1: *Dimetrodon borealis* and a *Walchia* tree on Prince Edward Island, Courtesy Danielle Dufault
The fossil of *Bathygnathus borealis*, a partial snout with teeth, was collected in 1845 when a farmer, Mr. Don McLeod, was digging out a well on his property near French River, Prince Edward Island (PEI), Canada. At the time of the fossil’s discovery, J.W. Dawson was doing fieldwork on PEI, researching the geology and palaeobotany of the Island. McLeod contacted Dawson about his fossil find, who offered to sell it for McLeod¹. Coincidentally, Lyell was visiting Nova Scotia and PEI for the third time for his own geological research, and advised Dawson to send the specimen to Leidy in Philadelphia rather than sending it to Sir Richard Owen overseas. Although Owen was a likely choice to study the fossil due to his expertise on the subject matter, there is evidence that Lyell was upset with Owen at the time², hence the suggestion to keep the specimen in North America. Lyell sent drawings of the fossil to Leidy³, and the fossil was eventually bought and donated to the Academy of Natural Sciences in Philadelphia from McLeod for £10-£12⁴ (worth about $2500–3000 CAD today).

Leidy proposed the name *Bathygnathus borealis* for the specimen in 1853⁵, and formally described and illustrated the specimen in 1854 (Fig. 2)³. The name *Bathygnathus* (meaning deep jaw) *borealis* (of the north) was chosen because Leidy mistook the specimen as the lower jaw of a “bipedal saurian”, similar to the large animals that were being recovered and described by Buckland⁶ and Owen⁷ in Europe in the early 1800s. Due to this association, the age of the outcrop of PEI was thought to be Triassic in age.

Figure 2: Original plate of *Bathygnathus borealis* (From Leidy, 1884)
Bathygnathus is the second vertebrate fossil named from Canada. Dendrerpeton, a temnospondyl from Nova Scotia, was named by Owen (with the help of Lyell, Wyman, and Dawson) two months earlier. The description of *Bathygnathus* was also the second formal report of a vertebrate fossil from the “New Red Sandstones” of the Americas.

After the initial description, *Bathygnathus* was mentioned in several publications by Cope, Owen, and Marsh as a bipedal saurian, an early archosaur or phytosaur, or a dinosaur, respectively. The realization that the fossil was actually an upper jaw was first made by Owen in 1876, who suggested that the fossil was more similar to the theriodonts of Africa than the saurians of Europe. Owen's suspicions were confirmed in two separate publications in 1905 by von Huene and Case that asserted that *Bathygnathus* was likely a sphenacodontid, thus placing the age of the red sandstones of PEI in the Permian.

**Bathygnathus in popular culture**

The discovery of *Bathygnathus* in the 1800s spurred the imaginations of Canadians, especially Islanders, to this day. The interest in the natural history of PEI was perpetuated with the weekly newspaper column “Notes of a Naturalist” by author and scientist Sir Francis Bain in the *Charlottetown Daily Examiner*. Here, Bain imagined the nature of the Island and how *Bathygnathus* lived:

“ A very Tamerlane in blood-thirst and cruelty must this reptile have walked forth in the history of the past. Even the scaled crocodiles and megalosaurus must have found their thick armature but poor defense against the onset of this deep jawed monster. Its entire length was about ten feet; and with a bound of sixteen or eighteen feet it leaped upon its prey, bearing it to the ground with its great weight, while the powerful claws prevented its escape, and the sabre-armed jaws completed the sanguinary work of destruction” (February 28, 1883).

Much more recently, the Royal Canadian Mint commissioned a collector coin series featuring prehistoric animals of Canada. *Bathygnathus* was the first in the series, featured on a $20 coin, reconstructed to look like *Dimetrodon* (Fig. 3).
Probably the most creative artwork inspired by *Bathygnathus* is that by Dave Hudson, who illustrates what the animal might have looked like given the economic importance and cultural significance of potatoes (and potato chips) on PEI (Fig. 4).
Modern analysis

The most-well known sphenacodontid is *Dimetrodon*, whose most recognizable feature is an elongate dorsal sail. Fossils of *Dimetrodon* are found mainly in Texas, USA, and Germany. Other closely related sphenacodontids with very similar cranial morphology to *Dimetrodon* include *Sphenacodon* and *Ctenospondylus*, which have dorsal sails of varying heights. Due to the similarity in cranial morphology between large-bodied sphenacodontids, the relationship between *Bathygnathus* and other sphenacodontids has never been properly understood. The most recent study by Brink, Maddin, Evans, and Reisz, puts *Bathygnathus* in a modern phylogenetic context for the first time\(^{15}\).

The dentition of sphenacodontids is highly variable\(^ {16,17}\). One species of *Dimetrodon*, *D. grandis*, is unique in being the first terrestrial animal to have ziphodont teeth. These teeth are blade-like with tiny serrations along the front and back of the teeth, similar to a steak knife. The roots of *D. grandis* teeth are also very long, around double the length of the crowns. The dental anatomy of *Bathygnathus* (Fig. 5), revealed in part through CT scans, shows that *Bathygnathus* has teeth identical to those of *D. grandis*. These dental characters unite *Bathygnathus borealis* and *D. grandis* as sister taxa\(^ {15}\).

The results of this study suggest that *Bathygnathus* and *Dimetrodon* should be synonymized. However, given that *Bathygnathus* was named 25 years before *Dimetrodon*, the former has name priority. A case has been submitted to the ICZN (Case 3695)\(^ {18}\) requesting that the priority of the names be reversed to preserve the
name *Dimetrodon*. Comments on this case are currently being accepted by the ICZN. If the case is accepted, *Bathygnathus borealis* will be known as *Dimetrodon borealis*.

**The future of palaeontology on PEI**

The preservation of the natural history of PEI has been a subject of discussion since the first discovery of fossils on the Island. After *Bathygnathus* was sent to Philadelphia, Leidy's 1854\(^3\) description was reprinted in a Charlottetown newspaper, *Haszard's Gazette*. The reprint spurred an editorial comment from the newspaper, stating that more care should be taken of the natural resources of PEI:

"And this brings to our recollection, that there are several specimens of the mineralogy and geology of the Island, lying on the mantel shelves of the Legislative Library. Now as these are all we have to show for an expenditure of £200, we think that some better care ought to be taken of them, and we would take the liberty of suggesting to the committee, that a glass case in which to place them, would not cost a very large sum, and might form the nucleus of a museum of natural history—Large institutions have has as humble beginnings—at all events, there would be something to shew the intelligent and scientific stranger, who enquires after the productions of the country, natural or artificial, and much information of a practical and useful nature, might be obtained in return" July 15, 1854\(^4\).

The article goes on to say that more exploration should be done on the Island, as coal and water would lead to "our most sanguine anticipations of the future prosperity of Prince Edward Island realized\(^4\)."

Several significant finds have been described from the Island since the 1850s. The most dedicated expedition was undertaken by Langston in the 1960s\(^{19}\), revealing a paucity of specimens reflecting a typical Early Permian ecosystem. The ichnological record of the Island is good, with several sets of trackways described\(^{20-22}\). Probably the most complete fossil found to date is the small parareptile *Erpetonyx*\(^{23}\), which demonstrates that more amazing fossils will be found on the Island, with a little bit of hard work. These fossils are now housed in several different museums around Eastern Canada.

Although a natural history museum has not been established on PEI to date, small steps are being taken towards the realization of this goal. The Archaeology Act of PEI (2015) states that all palaeontological items found on the Island must be housed by
the provincial museum, and may not be bought or sold. Recently, a small footprint block was repatriated to PEI and will be displayed at the Beaconsfield Historic Site in Charlottetown. A documentary about the fossils of PEI is currently in production, which will highlight the importance of a natural history museum for the Island.

References

5. Leidy, J. Proceedings of the Academy of Natural Sciences of Philadelphia. 6, 404 (1853).
15. Brink, K. S., Maddin, H. C., Evans, D. C. & Reisz, R. R. Re-evaluation of the historic Canadian fossil Bathygnathus borealis from the Early Permian of Prince Edward


24 CBC. in *CBC News PEI*, Fossils found 3 decades ago on P.E.I. are returning to the Island: (PEI, 2015).

Dinosaurs in Kananaskis

An ankylosaur from the Early Cretaceous Cadomin Formation

*By Matthew J. Vavrek (Royal Ontario Museum)*

*Photos by Ramon Nagesan (Univ of Calgary)*

During early July, 2015, my group began work in foothills of southwestern Alberta to search several promising sites that had high potential to produce some of the oldest dinosaur remains from western Canada. These sites were brought to our attention by the well-travelled Dr. Don Brinkman of the Royal Tyrrell Museum, who visited most of them during the mid-1990's.

The Highwood Pass area, in southern Kananaskis Country, has a number of well-worn hiking trails, and it was originally hikers that found some of the first vertebrate fossils along Grizzly Ridge. On the first day out – July 1st – Jason Pardo and I drove out of Calgary to Highwood Pass parking lot, which was already buzzing with hikers out to enjoy Canada Day in the mountains. We took an alternate path up to the ridge, avoiding the majority of the foot traffic, prospecting as we went and collecting leaf impressions from the underlying Elk Formation (Kooteney Group). When we finally reached the top of Grizzly Ridge, it didn't take long before we were finding large pieces of dark grey fossils scattered about. Within a few minutes of searching, we also found
more fossils still in situ, poking out of a large boulder of Cadomin Formation (Pocaterra Member) rocks, which was definitely a good sign. With our bags already mostly full with all the plant fossils, and facing an hour long hike just to return to our vehicle, we were only able to collect a few small bags of bone fragments, leaving the rest until we returned in 2 days.

During our “rest” day, Jason and I took a long drive further south along the Forestry Trunk Road, through the Livingstone Range. We ended up hiking around 12 km again, but luckily, through much flatter trails. On the morning of July 3rd, we packed our bags again for the Highwood Pass, although this time we were bringing along some extra human pack mules, namely Ramon Nagesan and James Campbell. Before we headed out, we joked about just calling up a helicopter to ferry us and our things in and out of the site, though with the thought in the back of our head that the joke might not be so far off the mark. Although we took an easier route up to the site than the first day, the top of the hill was nonetheless much higher than I had remembered it. We spent most of the day picking up fossils that had weathered out and scattered across the slope below the site, as well as slowly chipping out the fossils we could see still embedded in tough siltstone of the Cadomin Formation. Most of the material was still well embedded in the rock, although one piece, a large osteoderm, popped loose from the matrix, allowing us to see that we likely had a large ankylosaur on our hands. The amount of material we were finding was quickly adding up, and we quickly used up all the plaster bandages we brought with us, resorting to duct tape and plastic bags to keep everything together. By the late afternoon, we saw we had more fossils than we could possibly carry down, including some individual pieces that were hard to pick up, let alone haul any distance. It was time to call in air support.
Luckily for us, I had noticed a helicopter company – Rockies Heli Canada – advertising mountain tours only about 40 km back up the highway. Even though there was no cell phone reception where we had parked our cars, the fossil site was close to the top of the ridge, and my phone had no problem connecting to a tower. The helicopter company's owner, Ralph Sliger, took the whole phone call in stride, which made me wonder if he often gets people calling him from the tops of mountains asking for help carrying out dinosaurs. It seemed a distinct possibility, as I gave him my credit card number over the phone while staring at the surrounding peaks. As we waited for Ralph, Jason and James rushed down to the parking lot to help with unloading, while Ramon and I finished packing up and getting ready for the helo lift. Within an hour and a half, we were loading up the full sling load back on the helicopter as it carried everything down to the waiting cars. The Dinosaur Research Institute has since been gracious enough to cover the helicopter costs, and the fossil is currently at the University of Alberta, where it is slowly being pieced back together and extracted from the remainder of the matrix by Susan Kagan. Hopefully we'll know before too long what exactly we have on our hands, but regardless of how complete – or even what – it is, it's Barremian age and foothills location will make it an undoubtedly unique occurrence. As well, its presence has definitely motivated us to keep searching those same rocks for more fossils which, though apparently scarce, are lying in wait for us out there somewhere.
The flames sprayed five metres into the air, briefly lighting the circle of faces like it was day. It wasn't intentional, but it just happened, and rather suddenly. We should have been perhaps a little worried, given the close proximity of all the trees and people. Both were pretty flammable, one dry from the lack of rain, and other covered in a sheen of pig grease. How did it come to this?

A few months earlier Tim and I decided it would be fun to have a pig roast. The conversation actually started in late August 2014 after we had wrapped up our field season and crashed at the T. rex Discovery Centre for an evening. We thought it would be fun to close out a field season with a bang. With some scheduling compromises, we had landed on making this a mid season bash to coincide with Dave Evan's season end in southern Alberta, my season beginning in southern Saskatchewan, and Tim and Emily's midish season. The date was picked, people committed, and Tim's backyard the place. Not sure if Tim's wife was entirely aware of these arrangements. And a spit was included in the field gear driving out from Montreal.

There was some degree of panic on my part though. My crew arrived a day later than planned (aircraft and vehicle issues), and I had less than two days to come up with the pork. The place I had planned to get a tasty piggy just north of Swift Current seemed closed – abandoned really. I did not want to get a mere piece of pig, that was too easy didn't seem appropriate. I had in my mind, “Go big or go home.”

By luck, while cruising through the second of two butcher plants in Swift Current (did you know that one of the main original industries in Swift Current was horse packing?) I met a young woman who knew a guy who worked part time as a butcher for another guy who had a farm at Rush Lake (20 mins drive east down the T-Can). I left messages on this last guy's cell, he called me up the next day when we were in the field – the day before we were to descend on Tim's place. He had pigs (and all the other normal livestock) and said no problem, “How big do you want it?”

I probably should have been more specific. I said, “Pretty medium sized. Big enough for a 4 foot spit and about 30 people. Maybe 50-60 pounds.”
“OK, come by tomorrow morning around 8:00 and I'll have it ready for you.”

The next morning, most of my crew left for Tim's via the beer store and I took a pickup with three other students (one Calgarian carnivorian, one Ontarian vegetarian, and one Thai omnivarian). Luckily, none were egalitarian – perhaps something I should vet in future years. We arrived and the guy of the guy of the girl zipped up in his quad with a cooler of beer and ice sloshing strapped to the front rack. “Come on, follow me.”

We drove to the back of the barns and parked where he stopped. We looked into the nearest pen and I tried to spot a pig that might be small enough to fit into the box of our pickup! The guy of the girl drove up soon after in a three-wheeled car (it had four tires, technically, but looked like most parts were missing). He slid out with a rifle and he and the guy of the guy of the girl shared beers. I thought I was there to pick up a dressed pig. Maybe this was normal on a Saturday morning. My suspicions were squashed when the guy asked, “Which one do you want?”

OK, go with it, right? This will probably be fun anyway. I tried to estimate how four feet measured up on the milling animals, but even the smallest seemed way too long – by at least two feet!. “That one,” I said pointing to the smallest beast in the pen. The two hopped over the fence, showed out the other pigs to another pen, and blew a hole in the remaining piggy's forehead. The speed of things after is hard to explain. A bobcat appeared from nowhere, hoisted up the wiggling piggy by the Achilles tendons, was driven to a pit, disembowled, washed with a garden hose, and dropped into the back our our truck on a tarp, and a couple buckets of ice spread over. The students and I were impressed by the efficiency of it all. The vegetarian was excited to see the process, the carnivorian a little less so, and the omnivarian had first dibs on the ears. I paid the guy (whole pig per pound costs less than broccoli – one more reason pig should be represented at all tiers of the food pyramid). The beast weighed in at 180 pounds and measured out six feet. I was too excited to start worrying about it.

We pulled into Tim's place soon after. The piggy was still warm, like body warm. We hauled it out on the tarp, which tore under the mass. What followed after was Tim and I dragging piggy by the ankles and students pulling/pushing arms and head to Tim's backyard and his fire pit. The pit was a modest three foot diameter pit. That needed fixing. Then came the binding and spit fun. After a few kilos of sea salt and bourbon, the spit went in the butt, but didn't reach the neck. OK, cut off the head. This was easy – had some experience with human cadavers doing this in my grad school days. The trick is to go over the odontoid process on the back and over the hyoids on the front.
We re-spitted and the tip of the spit emerged like a frightened cryptodire turtle's head. Just enough to rest on the spit poles. Fire was roaring, piggy was bound up, and hoisted onto the poles, plugged in the spit motor, and there was barely a fraction of a turn. Too heavy.

No problem. Let's cut him in half. This is the part I will never forget. In my haste, I didn't want to spend time dissecting the mid back. I slit each side of intercostal
muscles, grabbed an axe and hacked. It took a couple swings and it wasn't pretty. Meat, some blood, and bits of bone were clouding around me, some landing on a hilarious Tim cackling and leaning back in his relaxed lawn chair balancing his beer (not sure if I've seem Tim laugh before). When the dead was done, the front half went back on the spit, but the surprised motor still couldn't turn it. Off with the arms and legs. This also took an axe to get through the stylopodia. Now we were left with a delightfully spinning torso, and four huge Flintstone's drumsticks on a makeshift grill over the same fire. The next several hours involved the arduous chore of hosing piggy parts with an olive oil – lemon cocktail and keeping a steady flow of beer to mouth.

As evening fell, folks starting appearing, about twenty-four in all (Fig. 1). Some came from near – Ray, Emily, Jackie, a couple of Tim's neighbours – and others from far – Dave, Ian, and Kentaro from Toronto and my group from Montreal. My mom even arrived with my two oldest kids (they are continuing early training in palaeobiology). We managed to consume most of the pig – although the last butt half did get wrapped in plastic and Dave and I heaved it into the back of my truck. Of course the usual large gathering stuff took place. But, there emerged something greater. Just before writing this, I was at the opening of the Pompeii exhibit at the Montreal Museum of Fine Art and stood before a large vase excavated from Stabia (turns out my wife's family's backyard), depicting a symposion honouring the god Bacchas (the culture in that region and time was rather impressed with Greek traditions). Symposia were drinking parties were people would debate, discuss, and revel. Some were associated with a hunt of wild boar. We have since co-opted the term for focused academic meetings, although as anyone how has attended an SVP meeting knows, the co-option goes further than discussing and debating.

Conversation revolved around extant snake ranges with Ray, Eastend art culture with Tim's neighbours, and lots of dinosaurs and museology with Tim, Dave, Emily, and Ian. Many an idea of where we are, in terms of western Canadian palaeo, and where we might go were spilled on the grass. As a healthy piggy skeleton emerged on Tim's rebounding folding table, so did some great ideas on what we should do as a team. The value to my students witnessing and participate in all this was immeasurable. I hesitate to call it anything, like a Western Canadian paleo pig (WCPP) or a paleo oink research congress (PORK), or something like that, but there is great value beyond an immediate full stomach and almost as immediate next-day headache. Gathering over-educated folks around a large carcass can only lead to inspiring ideas. This coming season's piggy will continue this discovery, and all are invited. Time and place TBA.
CSVP Member News

Currie Dino Lab, University of Alberta
Current Graduate students in the Currie lab are: Katherine Bramble, Greg Funston, Tetsuto Miyashita, Sydney Mohr, Walter Scott Persons IV, and Brennan Stettner. Lisa Buckley has successfully finished her doctoral defense. We also have a very active cadre of undergraduates working on various projects; notably Aaron van der Reest who recently published on an ornithomimid with feathers. The 2015 field season was highly productive and the lab is overwhelmed with new and exciting specimens. In addition to the Paleo 400 course conducted each year at the Danek *Edmontosaurus* Bonebed, our teams worked at a new locality near Duchess, Alberta, where a beautiful *Styracosaurus* skull was recovered; and in Dinosaur Provincial Park where we continued work on a ceratopsian bonebed, a quarry with two ceratopsian skeletons, and a hadrosaur quarry high in section. In addition to our usual field locations, work was conducted by Greg Funston, Katherine Bramble and other participants on the Bud Nelson hadrosaur bonebed near the Tolman Bridge. Katherine has begun her ontogeny of the hadrosaur dental battery project. An NSERC Michael Smith Scholarship allowed Tetsuto to spend summer at California Institute of Technology, working on gene expression in lamprey embryos. Tetsuto spent four months living in Paris as a Mitacs Globalink visiting scholar at Muséum national d'Histoire naturelle, under the mentorship of Philippe Janvier. In his spare time he went to Tunisia with Federico Fanti (University of Bologna) to work on the new teleosaurid, now published and named as *Machimosaurus rex*. Needless to say, we saw little of Tetsuto in 2015. In the prep lab we are working on a backlog of materials from various locations, significantly: a *Gorgosaurus* found by Phil Bell, a *Daspletosaurus* skull collected in 2010, the *Styracosaurus* skull collected in 2015, and a spectacular skeleton with skull of *Sauropterygiformes* collected in 2014. A new professorship has been established at the university on behalf of the Philip J. Currie Dinosaur Museum in the Grande Prairie Region and we hope to see the position filled by the summer.

Canadian Museum of Nature
Times are busy at the Canadian Museum of Nature. The Museum is in the midst of acquiring the invertebrate and plant fossil collections of the Geological Survey of Canada, which is being overseen by Kieran Shepherd and Kathy Stewart. We are also preparing for the arrival of the Ultimate Dinosaurs traveling exhibit, which will be showcased between June and September of this year. One of our research assistants, Scott Rufolo, just returned from East Africa, where he was collecting data on Pliocene...
fossil fishes on behalf of Kathy (and in collaboration with Alison Murray of the University of Alberta). Xiao-Chun Wu is tirelessly working with collaborators on a heavily armoured Triassic marine archosauriform, a series of skulls from the crocodylid *Tomistoma petrolica*, and a new Middle Jurassic theropod dinosaur—all from China. Natalia Rybczynski is advising on the new Arctic Gallery to be unveiled at the Museum next year. Jordan Mallon just submitted a paper describing a new species of horned dinosaur, recently acquired by the Museum. He is now turning his attention to a long overdue book chapter. Steve Cumbaa is working in collaboration with Hans-Peter Schultze (University of Kansas) on the description and palaeoenvironment of a new Early Devonian arthrodire from the Northwest Territories, and with several colleagues on the Late Cretaceous (Cenomanian) marine bird and fish fauna of deposits in the Manitoba Escarpment. Dick Harington is working on a paper with Xiaoming Wang, Natalia Rybczynski and others about a Pliocene bear from the Beaver Pond site on Ellesmere Island; and another with archaeologists Steve and Kathe Holen on human-broken mammoth bones from Yukon, some of which have radiocarbon ages of greater than 40,000 years ago. Our dedicated preparators—Alan McDonald, Susan Swann, and Shyong en Pan—are working on a possible new species of *Basilemys* from the Horseshoe Canyon Formation, a thalattosaur on loan from the ROM, and two ceratopsid skulls, among other things.

**Royal Ontario Museum**

David Evans' research group is coming off its most productive field season yet. ROM crews, including techs Ian Morrison, Shino Sugimoto, and Ian Macdonald, collected an excellent *Triceratops* specimen in South Dakota (June), and worked a rich multi-taxic bonebed in the Judith River Formation near Malta, MT (July). But it was Alberta that really stood out. The Southern Alberta Dinosaur Project, co-led by David and Michael Ryan (Cleveland Museum of Natural History) had its best field season in over a decade. We found four good duck-billed dinosaur skeletons, two of which are new species. Another of the hadrosaurs is an almost complete skeleton, but we had to stop at the base of the neck so we will be chasing it to find the skull at the beginning of next season. The last hadrosaur is an amazing 3D 'mummy', with skin impressions all over it. All the duck-bills were found by none other than Wendy Sloboda. We also began excavation of an excellent large tyrannosaurid (*Daspletosaurus*), with a largely complete skull. We were only able to excavate about half of this skeleton, so there is half a tyrannosaur that we will dig up next year, and we are still hoping to get the lower jaws- which we predict will be there. We are also working on a site of another new species of horned dinosaur on the Lost River Ranch. So everyone is looking forward to this summer.
David accepted one new student this year, Ashley Reynolds, who is working on bone histology and growth curve reconstruction in fossil felids. David's PhD students Thomas Cullen, Kentaro Chiba, and Mateusz Wosik, all passed their PhD Appraisal examinations at the University of Toronto with flying colors and are now focused on completing their first chapters and preparing them for publication. Derek Larson is finishing up his PhD, and moving on to take a job as Assistant Curator at the Philip Currie Dinosaur Museum in Grand Prairie- congrats Derek!

Linda Tsuji and Kevin Seymour continue to develop the Dawn of Life Gallery, which is envisaged to be a modern look at the Palaeozoic Era. A preview display opened in September 2015. Kevin and David are also working on a new vertebrate palaeontology course at the U of T, which started in January, and is the first to be offered at the St. George campus in well over a decade.

Palaeoartist and research assistant Danielle Dufault has been busy working on figures for two chapters of the upcoming Dinosauria III for David, and more recently has been working on several new pachycephalosaurus projects.

**Royal Tyrrell Museum of Palaeontology**

Dave Eberth is awaiting U-Pb TIMS ages from MIT for a suite of tuffs from southern Alberta, including all the previously dated bentonites from Dinosaur Provincial Park. He is currently drafting sections for the Jurassic age Junggar Basin Project conducted with Jim Clark and Xu Xing in preparation for a manuscript describing the strat and seds of Shishugou Formation at Wucaiwan.

Donald Henderson is almost finished a study of theropod dinosaur bones strengths as a function of body size, has just started a new project studying tooth and jaw form and function in crocodilians and dinosaurs with, Quentin Monfroy, a masters student from France, and is looking forward to studying exceptional sets of Upper Cretaceous dinosaur trackways that were discovered and moulded last summer from the southwest of the province.

François Therrien has a paper nearing completion on carnivoran mandibular properties and bite forces. He is also starting a project on dinosaur eggshells from the Willow Creek Formation with Darla Zelenitsky of the University of Calgary and another manuscript inferring dinosaur incubation behaviours with Kohei Tanaka (University of Calgary) and Darla.
Craig Scott’s research is focused on the paleontology of Calgary and Cochrane and the earliest record of primates. Recently he has also been spending lots of time working with designers on the revisions to the gallery.

Jim Gardner is wrapping up his co-editorial work on a Festschrift for the Czech herpetologist Zbyněk Roček, scheduled for publication as a Special Issue of Palaeobiodiversity and Palaeoenvironments in early 2016. That will be his fifth co-edited volume in six years. He looks forward to refocusing on his backlog of fossil amphibian research projects and manuscripts.

Following the description of the new horned dinosaur Regaliceratops peterhewsi in 2015, Caleb Brown is continuing to work on ceratopsian dinosaur projects including the description of new material, as well as quantifying growth, variation and evolution in this clade. For fieldwork, he is largely working in Dinosaur Provincial Park and Maastrichtian rocks in the foothills. He is collaborating with a team to develop new methods for mapping bonebeds and quarries using high-resolution GPS, photogrammetry and aerial LiDAR, and combining these with taphonomic data using GIS.

Don Brinkman is currently engaged in a number of projects involving turtles from North America and China and fish from vertebrate microfossil localities of the Cretaceous and Paleocene. A paper describing a small smooth-shelled kinosternoid from Northern Mexico, and arguing that it is a stem kinosternid, is nearing completion. Julien Divay is working on fish remains from vertebrate microfossil sites of the Late Cretaceous Dinosaur Park Formation. He has been able to identify goniorhynchiform elements by comparing with recent taxa as well as specimens of Notogoneus from the Green River Formation.

Andrew Neuman, continues to be involved in research on fossil fish. His research interest is in the area of Mesozoic fishes from western North America, with a focus on Lower Triassic marine actinopterygians and Cretaceous freshwater actinopterygians. Some of his current work focuses on: Triassic fishes from Alberta and British Columbia; Cretaceous teleosts from an Upper Cretaceous site in the Red Deer River Valley; and Microvertebrates from various localities in western North America

**Murray/Holmes Lab Update**
The lab is small at the moment, with PhD student Oksana Vernygora on campus, and PhD student Juan Liu living in New York and working at the American Museum of Natural History. Juan continues her studies on catostomid fishes and Oksana.
completed her MSc on ellimmichthiform fishes and is now studying the sistergroup, Clupeiformes for her PhD project. Julien Divay successfully defended his PhD and graduated last January; he is now working at the Royal Tyrrell Museum. Rob Holmes is busy on a number of projects, from dinosaurs to Palaeozoic amphibians. Alison Murray is also busy with a number of fish projects ranging in time and geography from the Pliocene of Ethiopia to the Cretaceous of Alberta.

**Maddin Lab Update**

September 1st, 2015, marked the launch of Hillary Maddin’s Vertebrate Paleontology Lab in the Department of Earth Sciences at Carleton University, Ottawa. Founding Lab personnel include PhD students Jade Atkins and Arjan Mann, MSc student Ryan Paterson, Honours thesis students Mark Bujaki and Matthew Brenning, and Honours project student Alex Johnston. Although we are still waiting for the completion of the construction of the physical lab, the team has initiated a series of exciting projects ranging from various amphibian systematics and evo-devo projects to stem-pinniped research (in collaboration with Natalia Rybczynski) to champsosaur braincase projects (in collaboration with David Evans).

The Maddin Lab conducted its first of what will become annual field expeditions to the Carboniferous and Permian strata of Nova Scotia, with a focus on reinitiating vertebrate-focused fieldwork at the historical sites of Joggins (UNESCO World Heritage Site) and Cape Breton Island. The first season gave us a taste for the challenges to come, dealing with the highest tides in the world, the continually eroding cliffs (hardhats hardly seem helpful!), and the highly secretive nature of the fossils. Despite these challenges, history has shown us that when fossils are finally revealed, they are spectacular and highly significant. This dedicated annual effort, paired with partnering with locals, will undoubtedly produce new important discoveries for Canada.

**Victoria Arbour:** I am continuing my sojourn in the south as a postdoc in Lindsay Zanno’s lab at the North Carolina Museum of Natural Sciences until at least this summer. I’m working on understanding the evolution of tail weapons in tetrapods, and enjoyed a month of fieldwork in the Cenomanian of Utah last summer and some fieldwork in Colorado earlier in the spring. We will hopefully be heading out to the Turonian of New Mexico this April! I was also recently elected as the Communications Coordinator for the Jurassic Foundation. The museum has been a excellent place to work, and its focus on citizen science has been a great way to blend my interests in research and public engagement in new ways. If you haven’t had a chance to visit the NC Museum, I recommend stopping by sometime!
Danielle Fraser successfully defended her PhD dissertation on May 28, 2015 and graduated from Carleton University. She started as a Peter Buck Postdoctoral Fellow at the Smithsonian National Museum of Natural History in September 2015.

Tanya Samman (PhD 2006, University of Calgary, with Dr. Phil Currie) moved to Ottawa in June of 2014 for a job with Canadian Science Publishing (CSP), publisher of the Canadian Journal of Earth Sciences. Tanya is the Journal Coordinator for FACETS, CSP’s new multidisciplinary open access online science journal. Ask her about the journal at the CSVP conference! Or check out www.facetsjournal.com.

Philip J. Currie Dinosaur Museum Opens

The Philip J. Currie Dinosaur Museum celebrated its grand opening on September 26, 2015 with famous actors, scientists, museum professionals, and musicians attending the Amber Ball Gala opening weekend event. Actor Dan Aykroyd kick-started the day at 10:30 am with a Harley Davidson Ride from Mighty Peace Harley Davidson Dealership in Grande Prairie to the Museum in Wembley. The museum honours University of Alberta professor Dr. Philip J. Currie, whose major contributions to paleontology have broadened knowledge of the Cretaceous Period in Alberta and globally, and signaled potential for future discoveries in the Grande Prairie vicinity.

The Philip J. Currie Dinosaur Museum is an international institute for experiential learning dedicated to the palaeontological heritage of Alberta through research, collection, preservation, exhibition, public programming, publications and innovative outreach. For more information visit: http://dinomuseum.ca. (Photo Credit: D. Evans)
Off the Shelves

By Tim Tokaryk
Royal Saskatchewan Museum, and University of Regina

The plan for this book review section will be two fold. Obviously, the culmination of new titles made from recent months or years will be listed. The journal *Science* most effectively did this, which I personally found most useful. Sadly, this has most recently stopped on their online site [*In an effort to better serve our readers, Science tells us, we're working on some exciting new offerings for 2016. These projects have necessitated a shift in resources that precludes the continued curation of our weekly list of books received. We thank you for understanding, and look forward to continuing to serve as your go-to source for smart commentary on scientific books and media in the coming year.*]. In addition one or two reviews will be delivered. Secondly, and something that would be somewhat unique, is that I will endeavor to discuss rare titles from previous decades or centuries. Reminding ourselves of those who wanted to express in book length their ideas prior to contemporary understanding. This is not to ridicule past efforts we may find erroneous or quirky today, but to explain in part the milieu these ideas were born and expressed. I hope this might find some enjoyment with our readers today. This will commence in later issues. But to begin here:


Not to be confused with Jablonski and Shubin's 2015 commentary by almost the same title, though it would be interesting to examine in detail perceptions made in 1997 and 2015 about the 21st century. Fossils and the Future is an extraordinarily broad approach to the paleontological life, and life of paleontology. Dissecting our approaches to doing the science, four main themes emerge, from the “Pan Paleontological” approach in paleontological studies, the organizations that create, govern, nurture paleontological studies, central themes in paleontology (from astropaleobiology to systematics) and the infrastructures of creating relevant information (from advances in quantification of data, publications, public outreach, mass media (though social media was still relatively primitive then), and the roles of government. Each contribution is not lengthy, at times only a few pages long, but at least expresses its standing amongst all the others as a vital consideration.
Fossils and the Future is the result of a workshop at Senckenberg Museum, Frankfurt Germany in 1997. The practice of paleontological studies was fast evolving at this time. The opportunities were coming faster. The expedient globalization of paleontology, like that of any endeavor at the time, injected the call of where do we go from here. This volume is odd and interesting, and the consideration, their references, presents a framework for all paleontologists to ruminate.


The practical applications of the paleontological approach can be found in this volume. These are almost encyclopedic nuggets of where paleontology has entered scientific practices. Divided into two sections, the sections cover the paleontological facets that merge with earth and life history, where the second section highlights specific applications of paleontology with industry. This moves paleontological prospects beyond the traditional museum/university, cloistered models that we are more familiar with. The first section may be instructive to young professionals, outlining major events, trends, and paleontological resources, much of which one could find in some other text. It's in the second section where in Applications of Palaeontology, the real possibilities emerge. Where paleontology contributes to petroleum geology, mineral resources, but specifically coal structure and mining. It becomes a further stretch, however, with applications in engineering geology, and environmental science, though, correlative examination with contemporary and recently extant ecosystems are relevant in the latter (found in more detail in Louys (ed.) (2012) volume).

There is a slow, growing trend where the applications and methodology of practicing paleontology are seen in the form of collected, or singular volumes. I’m also thinking for example of Padian and Lamm’s (2013) contribution on bone structure in fossils, or Sutton et als. (2014) for visualizing fossils. Hopefully this trend continues, for at least it illustrates advancing imaginative approaches to the science of paleontology.

References

Job Opportunities

Carleton University
Earth Sciences (Economic Geology) - Assistant or Associate Professor - Closing Date for Applications: July 15, 2016 or until the position is filled

The Department of Earth Sciences at Carleton University invites applications from qualified candidates for a preliminary (tenure-track) appointment in economic geology at the rank of Assistant or Associate Professor beginning on January 1, 2017.

Applicants must have a Ph.D. in Earth Sciences, have demonstrated excellence in teaching, possess a strong commitment to research and scholarship, as reflected in peer-reviewed publications, have strong connections with industry, and be engaged in a research area that has a strong field component. The successful candidate will develop a vigorous, externally-funded, high-quality research program; will be committed to effective teaching at the undergraduate and graduate levels; and will contribute effectively to the academic life of the Department and Ottawa-Carleton Geoscience Centre joint institute. Preference will be given to candidates with expertise in Resource Evaluation and business management related to economic geology. Proficiency in English is a requirement.

Candidates must have demonstrated expertise, experience and research interests in the field of economic or resource geology and resource evaluation. S/he must be able to teach core courses in mineral deposits, resources of the earth, field geology and engineering geoscience, and supervise Honours research theses in our Earth Sciences B. Sc. Honours with Concentration in Resource Valuation, a program that is offered in partnership with the Sprott School of Business and the Department of Economics.

The undergraduate offering of the Department of Earth Sciences, which features a strong fieldwork component, includes B.Sc. programs (Honours, Major and General), as well as a Concentration in Vertebrate Paleontology and Paleoecology (Honours), a Concentration in Resource Economics (Honours) and a concentration in Resource Valuation (Honours). The Honours programs meet the academic requirements for the Professional Geoscientist (P.Geo.) accreditation. Other programs include combined Honours with Biology, Chemistry or Physical Geography. At the graduate level, the Department offers M.Sc. and Ph.D. programs. Together with the Department of Earth Sciences at the nearby University of Ottawa, we form the core of the...
Ottawa-Geoscience Centre (OCGC), a collaborative research and graduate institution. Available research facilities within the OCGC include stable and radiogenic isotope (TIMS) laboratories and associated clean labs; micro computed tomography, XRF, XRD, SEM and electron microprobe laboratories, ICP-OES, as well as fluid inclusion, cathodoluminescence, and fluorescence microscopy. In addition, the main headquarters of the Geological Survey of Canada, the Canadian Museum of Nature, and several other federal, science-based agencies with whom we collaborate, are also located in the city. Further information on the Department can be obtained at www.earthsci.carleton.ca and http://iggrc.carleton.ca.

Please send application by email in one single PDF document to the attention of: Chair, Department of Earth Sciences, Carleton University, 1125 Colonel By Drive, and Ottawa, Ontario, K1S 5B6 c/o Mrs. Sheila Thayer (SheilaThayer@Cunet.carleton.ca). Applications should include curriculum vitae, a cover letter, and a teaching dossier including teaching experience, a statement outlining current and future research interests, and the names and addresses {including e-mail addresses} of three referees. The deadline for applications is July 15, 2016. Applications will be accepted until the position is filled.

Please indicate in your application if you are a Canadian citizen or permanent resident of Canada.

All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority. All positions are subject to budgetary approval.
Scientific Contributions from Members 2015


32. Evans, D. C., M. Vavrek, and H. C. E. Larsson. 2015. Pachycephalosaurid (Dinosauria: Ornithischia) cranial remains from the latest Cretaceous (Maastrichtian) Scollard Formation of Alberta, Canada. Palaeobiodiversity and Palaeoenvironments. DOI: 10.1007/s12549-015-0188-x

33. Evans, D. C., P. M. Barrett, K. Brink, and M. Carrano. 2015. Osteology and bone microstructure of new, small theropod dinosaur material from the early Late Cretaceous of Morocco. Gondwana Research 27 (3):1034-1041. DOI: 10.1016/j.gr.2014.03.01


Grow the Society!

Annual CSVP membership dues for 2016 are due at the end of December/beginning of January. Please renew your membership for 2016 if you have not yet done so.

The membership classes and fees are as follows:
● Voting professional membership – $100
● Voting postdoctoral membership – $50
● Voting student membership – $25
● Non-voting membership – $25

Membership information can be found here: http://csvp.ca/membership/

*Spread the word* If you know anyone who might be interested in joining the society, forward this newsletter to them and direct them to the Society webpage to learn more: https://csvp.ca/.

For new memberships and renewals, please pay by cheque, made out to “Canadian Society of Vertebrate Palaeontology” mailed to Alison Murray at the address below:

Alison Murray (CSVP treasurer)
CW 405, Biological Sciences Building
Department of Biological Sciences, University of Alberta
Edmonton, AB T6G 2E9

Attendees of the first annual meeting of the Society (Credit: D.Evans)
Announcing the CSVP Student Travel Award

Starting in 2016, CSVP will offer a student travel award of $500 to a graduate student doing research on a vertebrate group other than non-avian dinosaurs.

To be eligible for this award you must be:

- a registered student member of CSVP
- registered to give a talk at the annual conference
- the primary author on the presentation

The award will be adjudicated by the host committee, and will be judged based on the following criteria:

- relevance of research to the broader vertebrate palaeontology community
- distance from location of study to conference host city

Students may only receive the award once. To apply, please send a short cover letter, no more than 1 double-spaced page, along with your abstract submission. The letter should describe how the research in your presentation fits within your thesis and broader research goals, as well as how your research is contributing to vertebrate palaeontology, both in Canada and internationally. Please also indicate your present location and graduate supervisor in the letter. Award deadline is the same date as the abstract deadline.
Upcoming Meetings

CSVP 2016 will be hosted by the University of Toronto Mississauga Department of Biology in Mississauga, Ontario, from May 19th to 21st. A copy of the first circular can be found at https://csvp.ca/meetings/