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

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

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

Single membership **$20.00 annually**
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SOCIETY MAILING ADDRESS:
Alberta Palaeontological Society
P.O. Box 35111, Sarcee Postal Outlet
Calgary, AB, Canada T3E 7C7
www.albertapaleo.org

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:

Howard Allen, Editor, APS
7828 Hunterslea Crescent, NW
Calgary, AB, Canada T2K 4M2
editor2@albertapaleo.org

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, October 13, 2016—Chelsey Zurowski, University of Calgary.
Morphology and function of the toothrow in a rodent knockout model and implications for mammalian tooth evolution. See June *Bulletin*, Page 3.

Friday, November 18, 2016—Georgia Hoffman, Aeon Paleontological Consulting Limited
Exploring for fossils in a basement: My misadventures in the University of Alberta Palaeobotany Collection. See Page 4.

Friday, December 9, 2016—Christmas Social.

Watch the APS website for updates.

ON THE COVER: Alberta fossils! Blastoid thecas, *Cryptoblastus* sp., upper Banff Formation (Carboniferous). APS collection, donated by Dan Quinsey, catalogue numbers APS.2016.3 and APS.2016.4. Width of specimen at centre left is 10 mm. APS file photos, photo montage by Howard Allen. See story, Page 6.

Find Microfossils in November and December, 2016

By Mona Marsovsky

Help **Dr. Jessica Theodor** and **Dr. Alex Dutchak** of the University of Calgary sort through matrix (soil) from the Cypress Hills Formation (middle Eocene) of Saskatchewan to find tiny fossils. All of the fossils found will be used to aid their research into this northern fauna. We will be using microscopes in Room B213 at Mount Royal University from 1:00 until 3:30 p.m. on the following Saturdays:

November 5, 2016
November 12, 2016
November 26, 2016
December 3, 2016

We are very grateful to Mount Royal University (especially **Mike Clark**) for allowing us to use their microscopes and lab.

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

Watch the December *Bulletin* for dates of fossil sorting sessions in January and February, 2017. ❑

AAPG Bulletins

A collection of *American Association of Petroleum Geologists, Bulletin*, dated 1949 to 2016 is available "free to a good home." Some numbers are missing.

For information, contact **Wayne Braunberger**, (403) 278-5154, **w3braunb@telus.net** ❑

Correction

Both photos accompanying the June, 2016 article, *Fall and Winter Microfossil Sorting Summary* (pages 8–9) were taken by **Vaclav Marsovsky**, *not* Caitlin Collins. Apologies and thanks to Vaclav! ❑

Support Dinosaur Research at the DRI Gala Dinner November 5, 2016

By Mona Marsovsky

This is your chance to support dinosaur research AND learn about the latest dinosaur discoveries at the Dinosaur Research Institute (DRI) gala dinner on Saturday November 5, 2016 at the Earl Grey Golf Club at 6540 20th Street SW, Calgary. **Dr. Philip Currie** of the University of Alberta will speak about recent dinosaur discoveries. In addition to the keynote presentation by Dr. Currie, this year's event will feature a three course sit-down dinner, silent auction and displays and presentations by Ph.D. and Master's students from the University of Calgary and University of Alberta.

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. DRI was registered as a charity in 1997.

Individual tickets are $175.00 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**, phone **Al Rasmuson** at (403) 861-0532 or send postal mail to

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

I hope to see you there! ❑

Upcoming Events

November

Georgia Hoffman

Aeon Paleontological Consulting Limited

Exploring for fossils in a basement: My misadventures in the University of Alberta Palaeobotany Collection

Friday, November 18, 2016, 7:30 P.M.
Mount Royal University, Room B108

Palaeontologists like nothing better than to spend the summer in the field collecting fossils. Then during the winter we clean them up, get them into cabinets, and study them. Time tends to run out during that last phase, however; too many fossils, not enough time. Spring comes, field-fever hits, and we're off to the field again, leaving some excellent material to languish in cabinets, unidentified and unstudied. It happens every year, and it happened to me when I was working on my M.Sc. thesis a few decades ago. So recently, when I found myself with some time on my hands, I decided to get back to some of those neglected specimens. But there are more than 64,000 specimens in the University of Alberta Palaeobotany Collection. They're stored in many different places in the basement of the beautiful Biological Sciences Building—there's no fresh air, no sunshine, no cell phone reception, and no one can hear you scream…

Biography

Georgia Hoffman received her Bachelor's degree in geology from the University of Pennsylvania in 1970, then came to western Canada where she has worked in exploration for coal and oil sand, as well as base and precious metals. She became interested in plant fossils while working in the coal industry and she decided to return to university in the early 1990s to study palaeobotany. In 1995 she earned an M.Sc. from the University of Alberta for her work on a late Paleocene fossil flora from the Paskapoo Formation. She continues to work on palaeobotanical projects as time permits. ❑

APS marks 30 years

The May 2016 Annual General Meeting was the occasion for a little merriment as we celebrated our thirtieth anniversary with a decorated cake. Cutting honours went to founding members and past-presidents **Wayne Braunberger** (right) and **Les Adler**. Thanks to **Dan Quinsey** for arranging the cake. Photos by Howard Allen. ❑

Field trip photos from the August trip to southeastern Alberta. Left: a rattlesnake finds some shade under a boulder. Right: John Boddy with a dinosaur bone found exposed on a slope in the South Saskatchewan River badlands. Photos by Guy Santucci, who thanks and apologizes to the people who set out to find him after he wandered away from the main group.

Four Fossils

By Howard Allen, APS Collection Curator

This installment of Four Fossils is a little different, as it highlights a recent generous donation of specimens from long-time APS member and Past-President, **Dan Quinsey**, for which I extend the thanks of his fellow members! This time all four fossils are part of Dan's donation, collected from the Canyon Creek-Moose Mountain area of the foothills, west of Bragg Creek, Alberta. Some are the actual specimens figured in his 2011 self-published book, *Moose Mountain, Alberta: Exploring the natural history of Canyon Creek and area*.

APS.2016.12 (scale bar = 2 cm)

This item includes four individual chips of shale (numbered 2016.12a…2016.12d) bearing shiny, black bumps that at first glance could be almost anything, or nothing. But the fact that they occur in profusion in the organic, black shale that comprises the Poker Chip Shale Member of the Jurassic Fernie Formation, arouses suspicion that they are more than just random bits of "stuff".

They are identified as brachiopods, of the "inarticulate" variety, of which the still extant *Lingula* is the best known example. On closer inspection, the

Discinisca? close-up, detail of APS.2016.12a. Field of view is 6.4 mm wide.

"bumps" are short, subcircular cones with concentric growth lines, and appear to be composed of calcium phosphate, which typically preserves as shiny, black or bluish-black material. This is consistent with their identification as inarticulate brachiopods, which may have shells of phosphate or calcium carbonate.

Dan Quinsey assigned them to the genus *Discinisca*, a long-ranging genus that has existed from the Jurassic (possibly Triassic) right up to the present (Rowell, 1965). The reader may have noticed I was a little cagey in stating that these fossils were "identified as" brachiopods. The reason for my slight reservation is based on my examination of them under a microscope. Brachiopods have two valves: a brachial valve and a pedicle valve, the latter named for its attachment to the pedicle, a flexible stem that attaches many brachiopods to their substrate. The genus *Discinisca* is characterized by having a distinct slot in the pedicle valve to allow passage of the pedicle. None of our specimens (there are actually five visible on all sides of the four shale chips) show any evidence of structures other than the concentric growth lines, suggesting they must be brachial valves.

By simple probability, there should be a 50:50 chance that any randomly collected valve would be a pedicle valve. So what are the odds that all five specimens in our collection would be brachial valves? It's like flipping a coin and getting "heads" five times in a row. Hmmm. Obviously, a bigger sample would be more convincing: five brachial valves is within the realm of credibility; five hundred would be very suspicious indeed! What else—other than dumb luck—could be going on, then? There's certainly room for speculation:

1) Maybe they aren't really brachiopods. What else could they be? Calcium phosphate (assuming that's what it really is—it appears to be, but I haven't tested it) is also used to construct vertebrate bones and scales: could these be some sort of peculiar fish scales? If the "shell" material isn't really phosphatic, but rather calcareous, that would open up another whole realm of possibility, such as tiny limpet-like gastropods.
2) Maybe we're seeing a preservational bias: if the pedicle valves were thinner, weaker, or decayed quickly they might not be preserved. This idea seems unlikely. If brachiopod shells are built for protection, then logically the animal would want both valves to be equally strong. Also, modern (and fossil) species seem to have equally strong shells, judging from illustrations in the literature.
3) Maybe the pedicle valves stayed firmly attached to the pedicle—and the substrate—after death; if the brachial valves became detached (due to weak hinges), they might be carried away by currents, to be deposited separately in the black mud—now shale—while the pedicle valves were left behind. This idea would be hard to test unless someone found a preserved bunch of fossils with their pedicles and pedicle valves still attached, and missing their brachial valves. One could also do experiments on modern forms to see if the idea holds water, so to speak.
4) Maybe there was a collecting bias: perhaps our brachial valves—lacking holes or slots that might cause them to break or deform during preservation—just looked more appealing to the collector's eye, while the less attractive pedicle valves were ignored or discarded as inferior specimens. This possibility would be easy enough to test by going back and consciously collecting a larger sample of fossils regardless of their condition.

APS.2016.4 (scale bar = 1 cm)

These little guys—there are twelve assigned to this accession number, and a number of others in our collection—are nice examples of one of my favourite fossils. I suppose it's their geometric symmetry and finely preserved microstructure that appeals to me. They're blastoids, or to be more precise, they're blastoid thecas (also known as "crowns," or "calyxes").

Blastoids were one of the groups of stemmed echinoderms (collectively referred to as "pelmatozoans") that were common in seas of the middle and latter part of the Palaeozoic Era. But they went extinct at the end of the Permian Period, along with the trilobites, tabulate corals and other iconic groups. Like most crinoids ("sea lilies") that survive in today's oceans, the blastoids had slender, flexible stems of calcite ossicles attached to the substrate and feathery

arms (brachioles) to capture planktonic organisms. They have distinctive internal and external features that make them quite different from their crinoid relatives. These features are key to their identification.

The upper Banff Formation in the Canyon Creek/ Moose Mountain area is one of the few areas in western Canada where blastoid fossils are abundant and well preserved. Indeed, they are often common in the exposures where they are found weathered loose from the shaly limestone, like so many petrified peas.

Surprisingly—considering their abundance in these beds and their generally good state of preservation—almost nothing has been published on them in the scientific literature. Beach (1943) included an extensive faunal list for the Banff Formation in the Canyon Creek area, but failed to mention any blastoids.* Due to this academic neglect, the identity of these critters has been a subject of much confusion.

Several years ago I made an effort to study the Banff Fm. blastoids in some detail. This included microscopic examination of their external anatomy, plotting measurements of many specimens on graphs, and grinding thin sections to see their internal structures. I came to the conclusion that there are only two genera (and probably two species) of blastoids in the upper Banff Formation: *Strongyloblastus petalus* Fay (Macurda and Breimer, 1977) and *Cryptoblastus* sp. (or perhaps "*Tanaoblastus*," a taxonomic point of contention that I won't pursue here). Those in our collection can be assigned with confidence to *Cryptoblastus*.

Over the years these have been misidentified by various people (probably mostly through word-of-mouth) as "Orbitremites," among other things. However, true *Orbitremites*—a British genus—has external features that are distinct enough from our Banff Fm. specimens to dismiss that genus as a possible identity, a finding confirmed by its different internal structure.

Any collection of specimens displays a bewildering range of variation. But taken together their differences overlap so much and grade together so smoothly, it seems unlikely that there is more than one species represented.

APS.2016.1 (scale bar = 2 cm)

Syringopora is one of the stereotypical Carboniferous fossils in the Canadian Rockies, and this specimen is a fine example. It is the largest of seven specimens donated to the APS collection over the years (potential future donors, we have enough now—thank you very much!)

It is, of course, a coral fossil, one of the tabulate corals, so-named because their tube-shaped skeletons are divided by horizontal partitions (tabulae) that served as temporary floors for the coral polyps as they grew upward through life. Each tube (corallite) was home to one polyp. The tabulate corals were exclusively colonial animals (one way they differed from their contemporaries, the rugose corals, which often lived solitary lives). A colony of *Syringopora* corallites, shaped like crooked soda straws, were joined together by thin, horizontal tubules, to form a rigid, roughly dome-shaped structure, the corallum ("coral head").

Examples up to about a metre in diameter are occasionally seen by hikers in the Rocky Mountain Front Ranges west of Calgary, though most are much smaller. They are found in most of our Carboniferous marine limestone formations, from the Banff up

Syringopora close-up, detail of APS.2016.1, showing lateral tubules connecting corallites. Field of view is 41.5 mm wide.

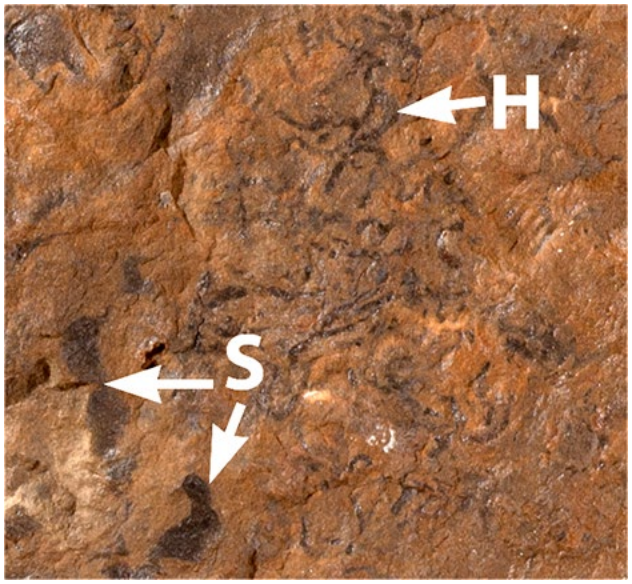
* Beach (1943, pp. 28–29) listed several genera of blastoids ("Pentremites," "Orbitremites" and "Metablastus") in a collection from "about 600 feet above the base of the [Rundle] formation" collected "from the Canyon Creek section." In modern stratigraphic terms, 600 feet (183 m) above the base of the Rundle, using local thickness figures from Mundy *et al.*, 1997, would place this collection near the top of the Shunda Formation as currently recognized.

through the Mount Head and Etherington formations. If you see *Syringopora* anywhere in the Rockies, it's usually a good bet that you're looking at Carboniferous rocks, though the genus also occurs in some of our Devonian rocks and is long ranging, having existed from the Late Ordovician to perhaps as late as the Early Permian (Hill, 1981). This particular specimen is from the Banff Formation and was figured in Dan Quinsey's book.

APS.2016.7 (scale bar = 5 cm)

We don't often think of trace fossils as being distinctive enough to identify rocks from a particular formation; they're usually dismissed by amateurs as "worm burrows" and generally ignored. But this specimen shows why it's worthwhile learning to recognize a few trace fossils, and that's why it was chosen for our collection.

The combination of the buff to rusty orange colour of the weathered rock surface, the type of rock, and the two types of "worm burrows" is diagnostic of the lowermost Carboniferous Exshaw Formation, and amateur palaeontologists in Alberta would do well to recognize it, as the Exshaw Formation is a widespread and important stratigraphic marker in the Rocky Mountains.



Exshaw Fm. sandstone close-up, detail of APS.2016.7, *Helminthopsis* (H) and "*Scalarituba*" (S) traces. Field of view is 60 mm wide.

The rock type is a limy and dolomitic, silty sandstone; its typical buff to rusty orange colour is caused by the weathering of iron-rich dolomite, which results in an accumulation of iron oxide minerals on the rock surfaces (Mundy, *et al.*, 1997, p. 46). The dark grey trace fossil burrows are of two types. One forms coarse, 5 mm to 10 mm wide, meandering tracks that often appear "segmented" like earthworms—these are known as "*Scalarituba*" (but may actually be *Nereites*: see Mundy *et al.*, 1997, p. 46). The second type occurs in swarms of much thinner (1 mm or 2 mm) "squiggles" called *Helminthopsis* (white circle in the photograph at left). ❑

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Rowell, A.J. 1965. Inarticulata. *In*: Treatise on invertebrate paleontology, Part H, Brachiopoda, Volume 1, pp. H260–H296. Edited by R.C. Moore. The Geological Society of America and the University of Kansas.

Fossils in the News

BC researcher finds 250K year-old blood on axe.
www.cbc.ca/radio/asithappens/as-it-happens-wednesday-edition-1.3715106/b-c-researcher-amazed-to-find-blood-on-250-000-year-old-axe-1.3715111

Alberta ice-free corridor hypothesis challenged.
www.cbc.ca/news/technology/ice-free-corridor-north-americans-1.3715397

[*Thanks to Phil Benham for sending links*] ❑