Alberta Palæontological Society Bulletin

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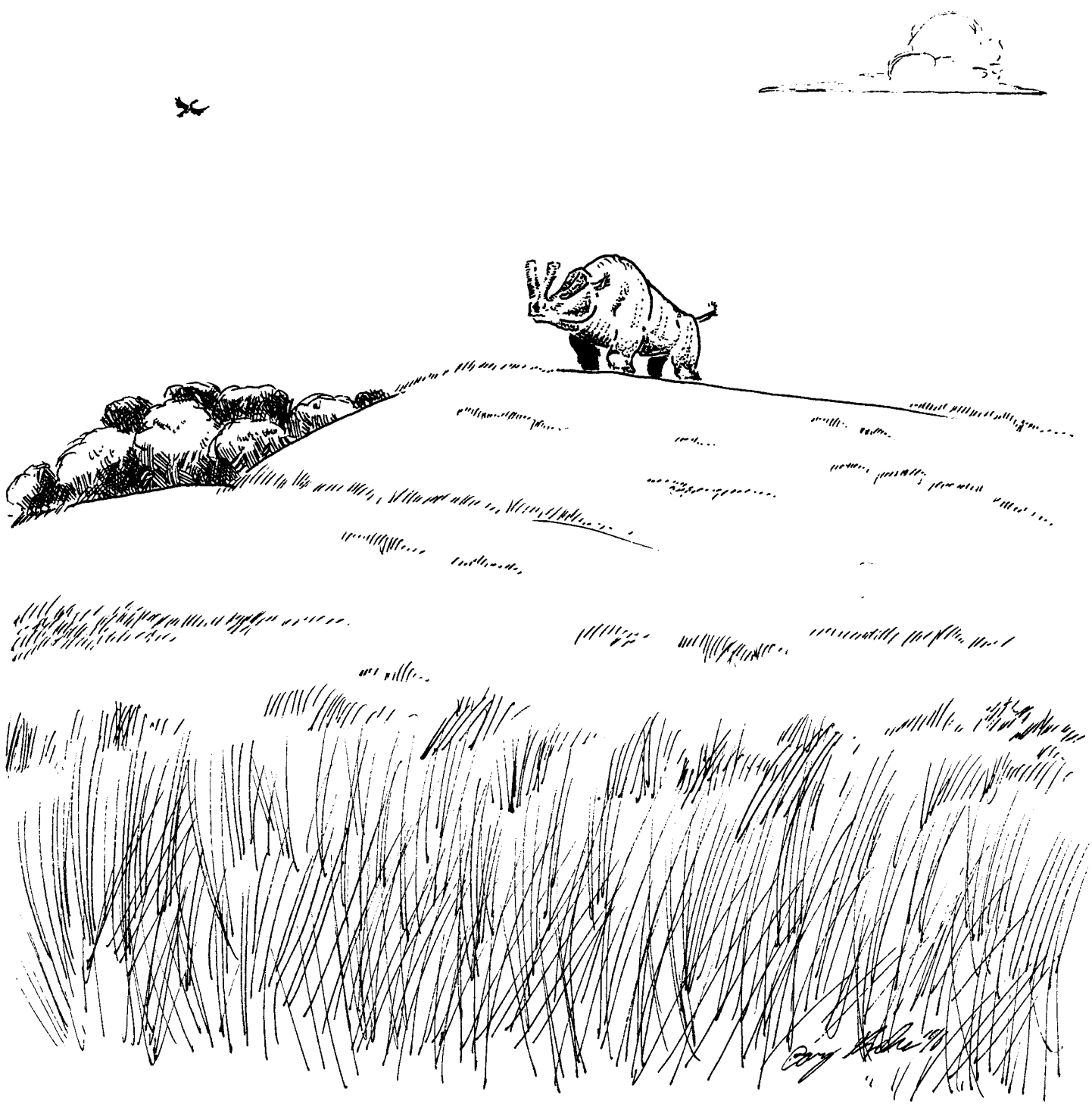

ALBERTA PALÆONTOLOGICAL SOCIETY

The Society was incorporated in 1986, as a non-profit organization formed to:

a. Promote the science of palaeontology through study and education.
b. Make contributions to the science by:
   1) discovery
   2) collection
   3) description
   4) education of the general public
   5) preservation of material for study and the future
c. Provide information and expertise to other collectors.
d. Work with professionals at museums and universities to add to the palaeontological collections of the province (preserve Alberta's heritage).

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

Single membership	$15.00 annually
Family or Institution	$20.00 annually

THE *BULLETIN* WILL BE PUBLISHED QUARTERLY: March, June, September and December.
Deadline for submitting material for publication is the 15th of the month prior to publication.

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UPCOMING APS MEETINGS

Meetings take place at **7:30** p.m., in Room **B108**,
Mount Royal College: 4825 Richard Way SW, Calgary, Alberta

September 18, 1998—Annual "Show-and-Tell" session: bring your finds and photos from the summer!
October 16, 1998—Dr. Betsy Nicholls, Royal Tyrrell Museum of Palaeontology:
Triassic marine reptiles from the mountains of British Columbia.
November 20, 1998—Dr. M.V.H. Wilson, University of Alberta: *An Eocene lake and its fossil fishes.*
December 18, 1998—(Tentative) Dr. Ann Katzenberg, University of Calgary: *Physical Anthropology*

ON THE COVER: Extinct mammal, *Brontotherium* sp., Tertiary (Oligocene), North America. Art by APS Member Cory Gross © 1998.

President's Message

by Wayne F. Braunberger

Once again I think that the Society had a good summer. Three well-attended field trips visited localities in the Rocky Mountains near Blairmore and the badlands near Manyberries and along the Milk River. The trip to the Milk River, led by Dr. Len Hills of the Department of Geology and Geophysics at the University of Calgary, concentrated on the geology, palaeontology, natural history, and archaeology of the area. Our field trips continue to be quite popular and over the next few months we will be working on ways to improve them. Any suggestions would be appreciated.

As I mentioned in June, **Keith Mychaluk** was elected to the position of events director. Keith takes over from **Les Fazekas** who was in the position for several years. Over the years Les worked very hard to arrange field trips for the Society and was able to secure access to a number of sites not available to individuals. On behalf of the executive and directors as well as all of us who attended field trips over the years I would like to thank Les very much for his efforts.

Seminars will again be held this year, provided a meeting area and instructors can be secured. With the number of new members increasing it may be timely to repeat past seminars that were held on Curation and Field Methods. If there is interest the seminar on Vertebrate Microsites may be held again. If anyone has a particular topic they think would make a good seminar please contact me. It would also be very helpful if someone would volunteer to coordinate seminars.

This year promises to be very exciting. A number of interesting guest speakers will be at our meetings over the course of the year. As well, some special events are planned. I hope to see you out at the meetings. ❑

Mark your calendar now!

Here are the scheduled dates for General and Executive meetings and Field Trips, for the next year. Program topics, some of which are tentative, are listed on Page 1.

General Meetings
September 18, 1998
October 16
November 20
December 18
January 15, 1999
February 19
March 19
April 16
May 28*
June, July, August (no meetings)
September 17
October 15
November 19
December 17

Field Trips
June 19 & 20, 1999
July 17 & 18
August 21 & 22

Executive Meetings
September 9, 1998
October 7
November 18
December 9
January 6, 1999
February 10
March 10
April 7
May 19*
September 8
October 6
November 10
December 8

***Please note that the May meetings are the third Wednesday and fourth Friday.**

1998 Field Trip Reports

Grassy Mountain, Alberta (June 20)

We enjoyed a good turnout and variable conditions for our first trip of the season, to the site of an abandoned open-pit coal mine north of Blairmore, Alberta, in the Crowsnest Pass region of the Rocky Mountains.

Our goal—the furthest of a number of abandoned coal pits—was approached by a long, switchbacking uphill climb across open slopes, affording fine views to the south, east and west (unfortunately, the view of Frank Slide, directly south, is totally obscured by a tall hill).

After a hike of about 2–3 hours in mainly sunny weather, we arrived at our destination just in time to be drenched by a sudden, intense hail-and-rainstorm that blew in across the ridge. Our leader, Vaclav Marsovsky, who initially garnered looks of envy for his cleverness in packing an aluminum-shafted umbrella, instantly became as popular as a leper when a terrific bolt of thunder crashed above, sending us crouching into the wet boulders. Within fifteen minutes, the sun was once again with us, and the little drifts of pea-sized hail were shrinking into history.

The pit we visited exposes the mined-out "No. 2" coal seam, comprising the base of the Mutz Member of the Mist Mountain Formation (Kootenay Group, latest Jurassic in age). The overlying rocks, a series of interbedded shales, siltstones and sandstones were deposited on a coastal alluvial plain, where ferns, cycads and other plants grew in profusion. Excellently preserved plant fossils, occurring as carbon films and impressions on the surfaces of slabs were found in abundance, and participants spread out across the quarry to investigate the diversity of the flora. The most common species at this locality is probably the large, broad-needled gymnosperm *Podozamites lanceolatus,* followed by ferns, such as *Coniopteris, Cladophlebis* and *Sphenopteris*, and cycads, including *Nilssonia, Ptilophyllum* and *Pterophyllum.* Other, less common plants included *Ginkgo, Equisitites* (horsetail) and some other gymnosperms. Little or no angiosperm (flowering plant) material was found, which was not surprising, as the age of the rocks coincided with the earlier stages in angiosperm evolution.

Glimpses of mountain bluebirds and a soaring bald eagle highlighted the climb back down the mountain, ending a successful day of exploration.

– Howard Allen

Manyberries area, Alberta (July 18)

On July 18, 1998, over 20 APS members explored the microsites in the upper Dinosaur Park Formation near Manyberries, Alberta. The microsites contained a wide variety of fossils, such as sturgeon scutes; turtle, champsosaur, crocodile, frog and salamander remains; garpike scales, fish vertebrae, and *Myledaphus* (ray) teeth.

Hadrosaur, ceratopsian, ankylosaur, albertosaur and troödontid teeth were also found. Members also saw badly weathered, fragmentary remains of hadrosaur and theropod bones. An unusual find of the day was an angiosperm leaf impression. A large oyster, clam and gastropod bed indicated the presence of brackish water at one spot on the site.

At about 3:00, part of the group left to explore the Bearpaw Formation, across the valley. They found ammonites, baculites and bivalves. Everyone enjoyed the sun, heat (30°C), and (especially) the occasional breezes. Luckily, the only encounter with snakes was the shed snake skin that Wayne Braunberger found.

– Mona Marsovsky

Milk River Valley/Pinhorn Ranch, Alberta (August 22 & 23)

Dr. Len Hills, semi-retired professor of geology and palaeontology at the University of Calgary was our guide for this very informative field trip to the badlands of southeastern Alberta.

On Saturday, after an introductory talk at the university, we made our way in a convoy to the Pinhorn Ranch via Highway 2, Lethbridge and Foremost, stopping at several roadside points of interest to observe glacial landforms, bedrock features, and some structural geology (Monarch fault zone). The weather was for the most part clear and warm, with scattered thundershowers around Foremost.

Arriving at the ranch in the Milk River Valley, we set up camp among the cottonwoods and willows on the floodplain of the river. The younger members of our contingent were soon scrambling up and down the valley walls, returning with handfuls of fossil oysters. That evening, as the coyotes were tuning-up, Dr. Hills delivered an informal lecture from the tailgate of Don Sabo's truck. He discussed the geology, palaeogeography and palaeontology of the Upper Cretaceous Judith River Group.

Sunday morning we struck the tents and headed to the first of three sites where the rocks record a

transition from offshore marine conditions, through a low-lying onshore environment to a fluvial (river deposited) sequence of beds that forms the highest formation in the area.

The lowermost formation, the Pakowki, is a shale-dominated marine deposit that appeared just above the present river level. Though no fossils were found at our location, the Pakowki contains typical Cretaceous marine fossils—pelecypods, ammonites, and shark teeth. As mountain-building occurred in the west, the Pakowki sea receded to the east, and the area was covered by shoreline deposits of the Foremost Formation.

The sea continued to influence deposition for a long time, as the shoreline moved eastward in pulses: the Foremost contains a range of brackish-water lagoon, beach, backswamp, barrier bar and estuary deposits, and occasional thin beds of nearly marine sediments. Fossils reflect the variations in the depositional setting. Oysters and other brackish water molluscs are common in the lagoon and estuary deposits, as are shark teeth. Dr. Hills showed us one excavation about one metre by two metres by about 0.25 metre deep which, when carefully screened at the University of Calgary, produced some 5000 teeth from 22 different species of sharks and rays! Several members found teeth weathering loose on the surface. Such rich concentrations are thought to represent the tidal channels formed between offshore barrier bars, where currents washed over and concentrated the teeth. Other beds exposed on the valley wall contained freshwater clams (*Unio*) and thin, shaly coal seams (favourite haunt of modern-day scorpions!), representing fresher water conditions.

The youngest unit in the area is the Oldman Formation, which occurs on the upper slopes of the valley. This formation is dominated by sandstones that were deposited in upper estuaries and braided river channels, and their adjacent floodplain areas. Deeply cut channels containing high-angle cross-bedding, pebbles and rip-up clasts are evidence of strong currents that cut through and reworked the sediments below as river channels shifted their courses. Fossils occurring in the Oldman Formation included an abundance of dinosaur bones and teeth, turtle shell fragments and champsosaur remains. A few rarer fossil fragments turned up, including bits of dinosaur egg shell, and possible mammal bones.

The Society was privileged to have an expert like Dr. Hills donate two full days of his time to the education of our members, and we deeply appreciate his generosity.

–Howard Allen ❑

Miocene treasure trove in Maryland

by Robin Sweeten

In May of 1997, my husband and I embarked on a new lifestyle. We sold our home in St. Louis, Missouri and bought a large RV. My husband's company frequently moves him around and living in a RV means we are totally mobile. For me, it means fossiling and rock hunting wherever we roam. I have collected extensively in Missouri, Georgia, Virginia, West Virginia and Maryland.

In December 1997 we pulled into the Maryland coastline. Locating the beach was easy but nothing prepared me for the vast array of treasures waiting there. Right off the bat I found five shark teeth and a number of fossilized bone fragments. Excitedly, I began gathering hundreds of specimens and sought to learn all I could. I had stumbled onto the rich Miocene deposits of the world-renowned Calvert Cliffs. These formations are prolific suppliers of fossilized marine, land, and air creatures. Hunting shark teeth is a favorite pastime of many locals.

My collection quickly grew and cataloging became a full-time undertaking. Needing identification assistance, I turned to the Calvert Marine Museum in Solomons, Maryland. They were and still are a tremendous help.

As expected, most of my collection derives from the Calvert Formation, which accumulated during the middle of the Miocene Epoch. The people at the museum were amazed at the volume, quality and diversity of my collection. They became increasingly excited as we went through my specimens. At the time, I had only been collecting there for three months.

It seems I have discovered a site where I am able to obtain specimens associated with the Fairhaven Formation. Fairhaven specimens are generally very rare because they lie well below the surface, underwater. The museum wanted to know how I had located so many Fairhaven specimens. That was easy. There had been quite a bit of dredging going on and a local showed me where the dredging deposits where located. The rest is history.

Among my finds are *Squatina* sp. These angel shark teeth are quite rare in this area. One lady has

been collecting for 60 years here and has found only one. I have a handful of them! The museum was very interested in obtaining a few of these teeth and I quickly donated some for their permanent collection. They were very pleased indeed.

The museum also has a "Children's Discovery Room," which contains a large sandbox where children dig for shark teeth. The volunteers identify the teeth and tape them to a card with all the information on it. Proudly, I donated over 200 small teeth for the sandbox. This is just one of my ongoing projects and as a new member (thanks to **Cory Gross**) I have added the APS to my list. In the months to come I will tell you about the others.

In the meantime, I have sent a number of Miocene specimens to the APS for our permanent collection. **Howard Allen** has been kind enough to supply me with a list of Miocene specimens APS already has. Hopefully I have been able to fill in the gaps and there are more to come.

In closing, I would like to mention that I have an abundance of traders. Anyone interested can contact me at my mail forwarding address: **Robin Sweeten, 3590 Roundbottom Road, Suite 226539, Cincinnati, Ohio, 45244-3026** or through e-mail at: **willies@commtech.com.**

Until then, happy hunting!

Reference:

Ashby, Wallace L. 1995. The Fossils of Calvert Cliffs. Calvert Marine Museum, Solomons, Maryland. ❑

Your Society Collection

by Howard Allen

One of our newest members, **Robin Sweeten**, of the United States, has been eager to contribute to the Society's fossil collection (see article, above). Her specimens from the Miocene of Maryland are a fine addition to the collection, and a complement to some related fossils, donated a number of years ago by **Don Sabo**. On behalf of the Society, I extend sincere thanks to Robin for her generosity.

New additions to the APS collection

All specimens are from the Middle Miocene Calvert Formation, Breezy Point Beach, Maryland, USA.

1. Six shark teeth, *Carcharias* sp. (sand tiger shark)
2. Two dolphin teeth (Class Mammalia, gen. et sp. indet.)
3. Five shark teeth (unidentified), showing wear from feeding.
4. One shark tooth, *Squatina* sp. (angel shark), very rare in the Calvert Formation.
5. One dental plate of *Aetobatis* sp. (duckbill ray).
6. One six-pointed tooth of *Hexanchus* sp. or *Notorhynchus* sp. (cow shark, or seven-gill shark).
7. Eight pieces of ray dental plate (several types, unidentified).
8. One shark tooth, *Isurus* sp. (mako shark).
9. Two fragments of ray caudal spines (stingray tail spines; *Myliobatis* or *Trygon* sp.).
10. One fish tooth, *Sphyraena* sp. (barracuda).
11. One package of miscellaneous beach-rounded bone fragments, typical of the Calvert Formation at Breezy Point beach. ❑

Fossils in the News

The Calgary Sun, April 20, 1998

Old bones have new meaning

OTTAWA (CP)—Workers at the Canadian Museum of Nature in Ottawa have discovered a new dinosaur species…in their warehouse. Bones excavated from Alberta in 1958 languished in the museum's "dinosaur graveyard" until 1992, when they were unwrapped and examined. It turns out that the bones belong to an undescribed type of ceratopsian which hasn't yet been described or named. According to the article, this "one-horned beast…unlike its relatives…sports an unusual frill that curls back over itself like a potato chip."

Calgary Herald, June 11, 1998

Oil firm helps bring fossils to Tyrrell

DRUMHELLER—The Tyrrell Museum's new Burgess Shale exhibit has been partly financed by a large donation from PanCanadian Petroleum Ltd. of Calgary. The company supplied $128,500 of the exhibit's $900,000 total cost.

The exhibit, which opened June 20, features a 12-times-life size diorama of 46 swimming and scuttling Burgess species that took model-makers three years to complete. Other parts of the exhibit include actual specimens mounted in display cases with diagrams and verbal explanations. Most of the specimens are on long-term loan from the Geological Survey of Canada and the Royal Ontario Museum.

[*Editorial comment—this is a very worthwhile exhibit to see, but I recommend packing a pocket flashlight, as much of the diorama, like some of the other museum exhibits, is shrouded in darkness.*]

Calgary Herald, June 18, 1998

Dinosaur dung sheds light on T-rex's dining habits

EASTEND, Saskatchewan (Reuters)—An enormous coprolite dug up in southwestern Saskatchewan has added to our understanding of large theropod feeding behaviour. The coprolite, measuring some 44 by 16 centimetres has been assigned to *Tyrannosaurus rex* by a process of elimination [*no pun intended –ed.*]: *T. rex* is the only known carnivorous dinosaur from that age (65 million years ago) that was big enough to produce such a prodigious coprolite.

Examination of the coprolite has shown it to contain a large quantity of finely crushed bone fragments, indicating that the predator must have chewed its food—bones and all—rather than swallowing it in chunks, as was formerly supposed. The good condition of the bone fragments was also a surprise, suggesting an inefficient digestive system.

In a supplementary article, stupidly (but predictably) titled: "Jurassic spark ignites new research centre" it is reported that construction of the Eastend dinosaur research centre is to begin this September. The centre is to be built into the valley wall, overlooking the town.

Calgary Herald, June 28, 1998

Book shows scientists can be all too human

WASHINGTON (AP)—This short item describes a new book, *Great Feuds in Science: Ten of the Liveliest Disputes Ever*, by historian Hal Hellman, that deals with some of history's most rancorous scientific disputes, including the great E.D. Cope-O.C. Marsh dinosaur battle in the 19th-century United States; the Charles Darwin uproar; and the story of Alfred Wegener, who first advanced the theory of continental drift, but was lambasted and ridiculed by his contemporaries.

Calgary Herald, July 2, 1998

"Creature from Black Lagoon's" fossils found

NEW YORK (AP)—British researchers, writing in the journal *Nature* announced the discovery of the skeleton of a primitive tetrapod (4-legged vertebrate) uncovered near Edinburgh, Scotland. The fossil, dubbed *Eucritta melanolimnetes* ("creature from black lagoon") by Cambridge researcher Jennifer Clack, comprises a 20-centimetre skeleton missing only the tail. The animal resembled a salamander, with large head and feet, and lived some 333 million years ago (Early Carboniferous). Anatomical study shows *Eucritta* to combine traits of the two main groups of tetrapods, one including mammals, birds, turtles and lizards, and another group that includes the amphibians. This suggests that the two groups split apart at about the time *Eucritta* was inhabiting its lakeshore environment.

Calgary Herald, August 2, 1998

Discovery is small step for dino, giant leap for mankind

LA PAZ, Bolivia (Reuters)—[*Don't those headline writers just crack you right up? Part of this article belongs in the "Dinosaur Boners" section, but the main thread is newsworthy. – ed.*]

A team of palaeontologists led by Swiss researcher Christian Meyer has announced the discovery of a huge dinosaur track site, in a limestone quarry in the Andes near Sucre, Bolivia. The tracks occur over an area of 242,190 square metres, and appear to represent the footprints of several dinosaur species. "There is no comparable site in world," says Meyer. The trackway is in danger, since it occurs on slabs inclined at up to 70°, and is suffering from the effects of weather.

[*Now for the "Dinosaur Boner" stuff: the article states that "the size of the area has meant several species have been identified, including a* Tyrannosaurus rex.*" This, of course, is pure hogwash, as nobody can identify a dinosaur species purely from footprints, and though the article doesn't mention the age of the beds,* Tyrannosaurus rex *did not—to this editor's knowledge—live in South America.*]

Calgary Herald, April 9, 1998

Road closing faces major opposition

CALGARY—The planned closure of the Canyon Creek Road [*APS Bulletin, December 1997, p. 6*] has stirred up a hornet's nest of protest, and the idea is now on indefinite hold. The area is popular with APS members, and the road closure would have restricted access to those with mountain bikes, or those willing to hike in for 5.5 kilometres. Kananaskis Country officials spent $35,000 digging up part of the Ing's Mine parking lot, removing outhouses and picnic tables, and building a new parking lot near the junction with Highway 66 before work was halted by Alberta Transportation in the face of a public outcry. Operations engineer Todd Kruszewski says Transportation won't approve closure of the road "until K-Country managers prove it's needed for safety reasons, and public concerns are fully addressed." Shell Canada, which operates gas facilities in the area, was also opposed to the road closure. ❑

[*Thanks to Les Adler and Trudy Martin for clippings –ed.*]

Speculations in Natural History

The Burgess Shale Exhibit and Criticizing Contingency

By Cory Gross

I had the opportunity recently to visit the Royal Tyrrell Museum of Palaeontology's new Burgess Shale exhibit, and I must extend my congratulations on an overall job well done. The effect of the 12-times life size Cambrian sea, especially with the glass floor on which visitors walk over a portion of sea floor, was amazing. Though I'm sure the glass floor wasn't as readily appreciated by the parents attempting to coax their children across it. The following room, made to resemble a 19th-century naturalist's office, certainly appealed to my interest in the period. Unfortunately, I did have one slight complaint with the tone of the exhibit.

Previously, I was able to applaud the Tyrrell Museum for not wading into the murky depths of theological statements by staying strictly to science and the fossils themselves. This is no longer the case. Admittedly, there isn't a whole lot of it there: just one quotation by Stephen Jay Gould, and a bit of beating to death in the introductory video by "Acorn the Nature Nut" (the video being a treat, die-hard Acorn fan that I am). However, it is there, and the Tyrrell has now thrown its hat into the theological ring, landing squarely on the side of that great religious theory: Contingency.

Contingency "Theory," as proposed by Stephen Jay Gould, suggests that human evolution is little more than a great cosmic fluke; a byproduct of time and circumstance. He cites fossil evidence of our rather fortuitous existence in the face of the Punctuated Equilibrium model of evolution in support of this view. He even goes so far as to suggest a thought experiment in which the "tape of time is rewound, erasing as it goes, and played again," suggesting that human beings would not evolve again. This may seem a "logical" conclusion based on the evidence of such things as the Burgess Shale; however, Contingency is unrecognizable as a scientific theory and certainly smacks of being a philosophy—no more, no less.

A quick review of the Scientific Method reveals that, to be considered a theory, a hypothesis must be published and tested rigorously enough that it is accepted by the majority of the scientific community in that field. Now, what right has Contingency to be considered a theory, let alone the law that Gould claims it to be in the quotation used at the Museum? (I should note here that I have a great amount of respect for Dr. Gould, as the title of my occasional column, an homage to the sub-titles of his volumes of collected essays, will attest.)

It seems that, testability being the key, Contingency Theory is not and never could be considered a scientific theory because it cannot be tested. One simply cannot erase time and start over! Granted, this thought experiment may seem "logical," but an experiment where the experimenter creates the outcome in a world of imagination can hardly be considered iron-clad proof, no matter how many science-fiction authors have toyed with the idea of parallel universes. The fault of this, aside from it being in no way an actual experiment, is that it does not draw from objective logic. Instead, the results are created firmly on the basis of the experimenter's preexisting beliefs. That human beings are the product of an accident may be the logical outcome for a particular Atheist or Agnostic, but if one does not share those theologies, then the logic falls apart. To word the thought experiment more carefully: if the tape of time is rewound, erasing as it goes, and played again, human beings will not evolve, *barring any other factors*. Such a factor could be God, or any other deity or force one subscribes to. That conclusion could and is also being denounced on the basis of pure science as well, such as those stating that evolution unfolded according to defined and relatively predictable laws.

Contingency Theory is not and never could be considered a scientific theory because it cannot be tested.

Of course, now we begin to delve into the realm of theology. I offer this up only to make my point that how one interprets the evidence and creates the outcome of the thought experiment, and therefore the very framework Contingency Theory rests upon, is a matter of perspective and belief. One particular atheistic or agnostic perspective might be that "human existence is a fortuitous outcome of a series of purposeless accidents." A different perspective may be that "human existence is a fortuitous outcome of a series of deliberate choices and actions on the part of (insert name of deity or force here)." Both perspectives may be looking at

the same evidence, going to the same museums, reading the same textbooks, using the same pure science-speak at the same conferences, and both have the right to exist as beliefs. However, neither can be proven scientifically, and even the word "fortuitous" is a value-laden term. All pure science can say is that we are here, and that our evolution may have followed path A or path B or whatever. Whichever way one cuts it, one still cannot erase time and start over. Contingency Theory cannot be tested and must therefore resign itself to being a statement of belief and not a scientific law.

This finally brings us back to the Royal Tyrrell Museum. What were they hoping to accomplish by having their hat land where it did? While admittedly not being privy to their purposes, my guess would be that they were attempting to give the exhibit and the Burgess Shale itself "social relevance" and to "put in perspective" (this being the same kind of ridiculous justification formula that lists "thinking skills" as the objective of my chemistry course this semester). Never mind that this is one perspective that is most certainly not shared universally, even by the palaeontological community itself. ❑

ALBERTA PALÆONTOLOGICAL SOCIETY

CALGARY, ALBERTA

Operating Statement for Twelve Months (unaudited)

PERIOD: JANUARY 1, 1997 – DECEMBER 31, 1997

Revenues		**Expenditures**	
Memberships	$1313.00	Printing	$1035.42
Raffle revenues	$108.75	Trophies	$95.20
Pins (3)	$9.00	Subscriptions	$28.00
Coffee receipts	$89.10	Bank service charges	$60.00
Donations	$20.00	Depreciation	$60.00
U.S. Exchange	$54.89	Coffee expenses	$84.98
	$1594.74	Post office box rental	$69.55
		Postage	$23.10
Excess of		Supplies	$65.20
expenditures		Raffle expenses	$28.00
over revenues	$46.33	Field trip expenses	$91.62
	$1641.07		**$1641.07**

As of mid-August 1998, Members' equity is approximately $2,300, consisting of $1,700 in cash, $500 in pins and T-shirts, $100 other.

—Leslie Adler, Acting Treasurer

Reviews

by Les Adler

Life Grows Up by Richard Monastersky, photos by O. Louis Mazzatenta. *National Geographic*, April 1998, p. 100–115.

This article features a set of beautiful photographs of Ediacaran fossils, 600 to 540 million years old, from South Australia and Namibia. The South Australian fossils are in two dimensions, while the Namibian fossils for the most part are in three dimensions.

Most of these fossils do not appear to be related to later forms of life although some of these seem to be similar to fossil worms of the Cambrian Period. These fossils show that complex mobile animals evolved before the Cambrian explosion. Large sized life forms outnumbered the small ones.

On pages 106 and 107 are an artist's impressions of the following ten genera: *Swartpuntia, Phyllozoon, Tribrachidium, Kimberella, Charnia, Spriggina, Rangea, Pteridinium, Dickinsonia* and *Ernietta.*

When in Adelaide, South Australia, enquire at the Educational Centre of the South Australian Museum, North Terrace, and you will be able to handle many of these fossils.

Voracious Evolution. Art by Ray Troll, notes by John G. Maisey. *Natural History*, June 1998, p. 38–41.

"Swimming with the Sharks" is a three-page spread with the artist swimming amongst some thirty genera of living and extinct cartilaginous fishes from various localities around the world.

The notes based on finds of fossil shark's teeth provide an overview of shark evolution from the Carboniferous Period to the present. Sharks, rays and chimaeras or ratfishes (chondrichthyans), have skeletons composed of cartilage rather than the solid bone of the bony fishes (osteichthyans). Carboniferous sharks were plentiful and diverse.

There were two post-Cretaceous quantum leaps in shark tooth production—one was during the Eocene Epoch (56 to 35 million years ago) when essentially modern shark faunas became established, and the second during the Miocene Epoch (23 to 5 million years ago) with *Carcharodon*

megalodon and its 15 cm. tooth blades. Miocene sharks replaced each tooth every few weeks, processing and discarding thousands in a lifetime: voracious evolution.

Dinosaurs Take Wing: the Origin of Birds
by Jennifer Ackerman, report by P.J. Currie. *National Geographic*, July 1998, p. 74–99.

This is a spectacular production of photographs (by O. Louis Mazzatenta), models (Brian Cooley), diagrams (Portice Rollings) and notes brought about by recent discoveries in northeast China.

Volcanic ash coated China's Liaoning Province during the Early Cretaceous, creating a fossil-laced formation of an archaic lake bed at Sihetun. This deposit is thirty metres thick, covers fifty square kilometres and contains conchostrachans (tiny freshwater crustaceans), birds, dinosaurs, plant life, millions of insects, frogs, lizards, crocodiles, mammals and multitudes of fish.

The Chinese government has taken over the deposit but many specimens are reaching the black market, bringing very high prices. Rocks here have produced more specimens relating to the origin of birds than all the world's other sites combined.

This article provides notes on *Sinosauropteryx, Velociraptor, Unenlagia, Caudipteryx, Protoarchaeopteryx, Archaeopteryx, Eoalulavis* and *Corvus.* Problems arise because the authors are not certain how birds and dinosaurs should be defined. There are over 9,000 species of birds alive today, but there may have been over 100,000 species of birds during the Jurassic and Cretaceous Periods and the Cenozoic Era. There is nothing neat about bird evolution—many shapes, different traits, different rates and possibly several simultaneous groups of evolutionary paths occurred with very few complete specimens to work with.

In "*Caudipteryx* revealed" Dr. Philip Currie discusses four creatures: *Caudipteryx, Protoarchaeopteryx, Sinosauropteryx* and *Confuciusornis*, from Sihetun. These finds make the dividing line between birds and dinosaurs indistinct and strengthen the theory that birds evolved from small, carnivorous, ground-dwelling dinosaurs. The photograph on page 87 shows Kevin Aulenback of the Royal Tyrrell Museum of Palaeontology preparing a specimen of *Caudipteryx zoui*. The model by Brian Cooley of Calgary shows a dinosaur with feathers at the end of the tail, along the back, and under the arm.

Sinosauropteryx prima was found by a farmer, Li Yin Fung, before the find of *Caudipteryx* and appears to be a dinosaur with a long line of filaments on the neck and a layer of fibres on the back and tail. One specimen shows the toothed jawbone of a mammal in its gut, the only dinosaur ever to be found to show this. Another specimen may be showing eggs and the feathers may indicate that this dinosaur may have been warm-blooded. Another set of diagrams shows the possible evolution of the wings of birds:

"Dinosaurs"
Sinosauropteryx—typical theropod arm.
Velociraptor—flexible wrist.
Unenlagia—flapping ability.
"Birds"
Archaeopteryx—flight feathers.
Eoalulavis—first alula
Corvus—(crow) modern wing.

"There's a Dinosaur in Your Backyard," pages 96 and 97, compares two very different creatures with a skeleton and a silhouette of *Velociraptor* against that of a crow (*Corvus*):

1. Wishbone and breastbone—many theropod dinosaurs have two clavicle bones fused into a furcula or wishbone as well as a sternum or breast bone, both seen in modern birds.
2. Shoulder blade—both have long, thin scapulae.
3. Birds and birdlike dinosaurs have thin-walled bones.
4. Swivelling wrists enable the hands to fold against the lower arm and body.
5. Hand design—both birds and advanced theropods have lost two fingers and the middle of the three that remain is the longest.
6. Pubis—forward in most dinosaurs, backward in birds and some theropod dinosaurs.
7. Legs—both move on two hind limbs.
8. Feet—both birds and theropods have three forward-pointing toes and a hallux. In dinosaurs the hallux is not fully rotated to the rear, as it is in most perching birds.

Some palaeontologists have defined dinosaurs in such a way that birds *are* dinosaurs and the dinosaur group is divided into avian dinosaurs (birds) and non-avian dinosaurs.

Further research is under way to study the layers of rock using X-rays, CT scans and other high-tech equipment; other teams are examining the details of the bones, eggs, beaks and feathers of these unique creatures, which offer a rare perspective of creatures that have fluttered across the sky for more than a hundred million years, to members of another group that has been walking on the surface for little more than four million years. ❑

Alberta Palaeontological Society—Exchange Bulletins

as of September 14, 1998

Alberta Federation of Rock Clubs	*Fossil Trails*	Sherwood Park	AB	Canada
Austin Paleontological Society	*Paleo Newsletter*	Temple	TX	USA
British Columbia Paleontological Alliance	*BCPA Newsletter*	Courtenay	BC	Canada
Calgary Rock and Lapidary Club	*Calgary Lapidary Journal*	Calgary	AB	Canada
Division of Geology & Earth Resources	*Washington Geology*	Olympia	WA	USA
Earth Science Club of Northern Illinois	*The Earth Science News*	River Grove	IL	USA
Royal Tyrrell Museum of Palaeontology*		Drumheller	AB	Canada
The Roamin Club	*The Pterodactyl*	Livonia	MI	USA
Western Interior Paleontological Society	*Trilobite Tales*	Boulder	CO	USA

*Complimentary copy delivered (no material received in exchange)

Exchange bulletins are kept in the Society library.

Government website provides compass declination data

by Howard Allen

Finally! Something *useful* on the World Wide Web! Those of us who still rely on the map and compass to pinpoint fossil locations will be happy to learn about the Natural Resources Canada (NRC) Magnetic Declination web page. Until now, it's always been a pain to figure out the correct angle (declination) between grid north and magnetic north on topographic maps, for setting your compass. The information printed on the map margin is invariably out of date by several decades, and it takes a bit of figuring to work out the current declination, based on the annual change in position of the magnetic pole.

To use the service, log on to the National Geomagnetism Program page at **www.geolab.nrcan.gc.ca/geomag/**. Navigate to the "Magnetic Declination—Calculation" page, and you'll see a form where you enter the year and the latitude and longitude of the area of interest. Click the "Submit" button, and *voilà!* The magnetic declination is calculated. Note that this figure is the angle between magnetic north and *true* north. To get the more useful angle between magnetic north and *grid* north, just subtract the angle between grid and true north that's provided on the map margin (this angle never changes). ❑

Submissions for the Bulletin

The Editor welcomes members' submissions for the *Bulletin*. Material may be submitted in almost any form, including the following (in order of preference):

1) Email, unformatted text in body of message.
2) Email, attached file (pref.) or text-encoded file.
3) 3.5" floppy disc, Macintosh (preferred) or DOS/Windows format. I can read almost any word processor or text (ASCII) file.
4) ZIP disc, Macintosh (preferred) or Windows.
5) Fax (use "better" or "fine" setting).
6) Typewritten.
7) Handwritten.

• Sorry, no 5.25" floppy discs.

• Material submitted on discs should be accompanied by a printed hardcopy. Discs will be returned on request.

• Pictures may be submitted either digitally or on paper (call me to discuss digital formats).

• All news clippings or other material from third-party sources must include the source and date of publication. No third-party art will be published without the written consent of the artist.

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92 Active and Institutional Members—dues paid as of September 14, 1998

Names and contact information removed
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Is your address correct? If not, please call or write the Membership Director (see Page 1)