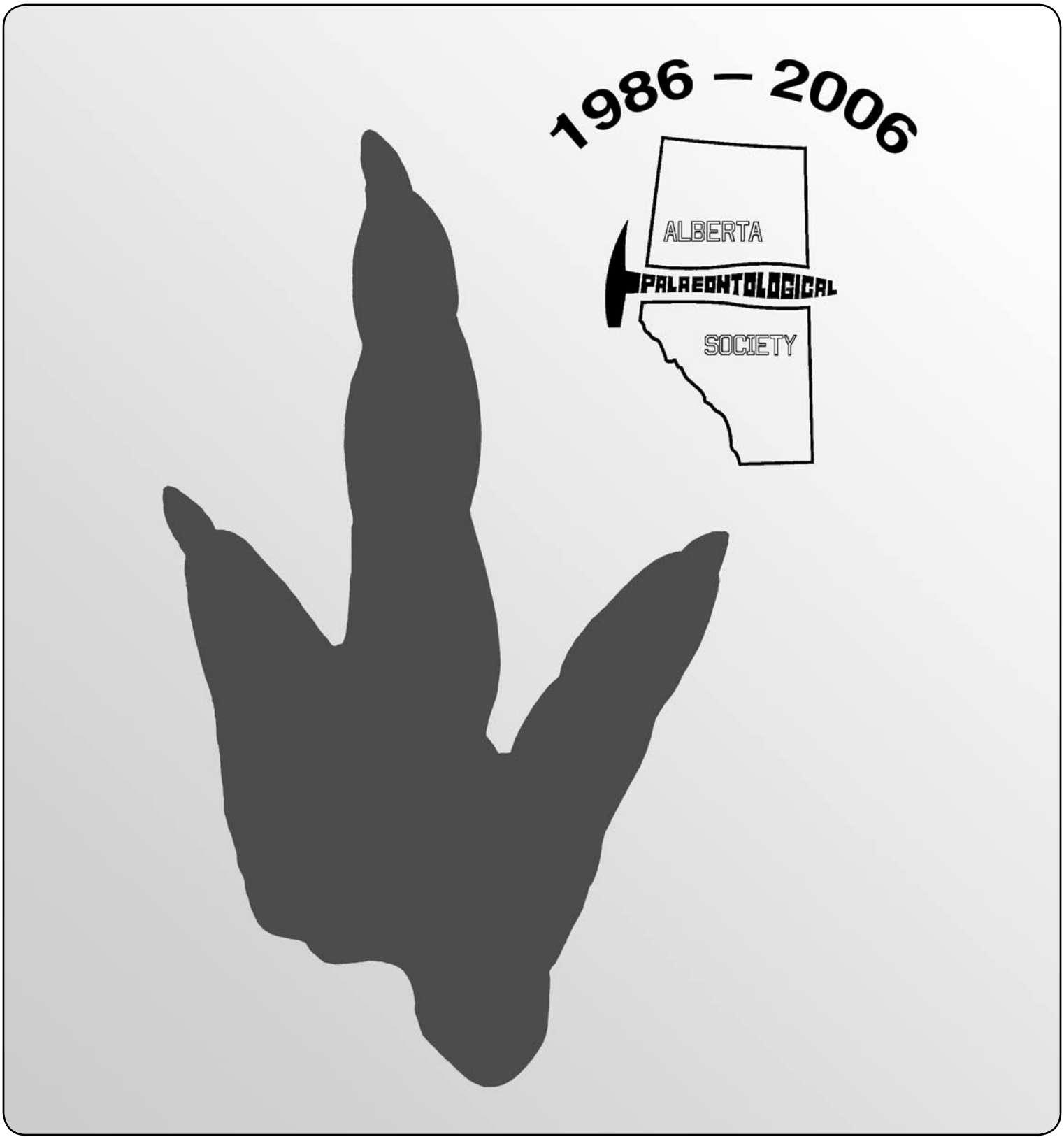
Alberta Palæontological Society Bulletin

VOLUME 20 • NUMBER 1 www.albertapaleo.org MARCH 2005



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 $20.00 annually
Family or Institution $25.00 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.

Society Mailing Address:

Alberta Palaeontological Society
P.O. Box 35111, Sarcee Postal Outlet
Calgary, Alberta, Canada T3E 7C7
(Web: www.albertapaleo.org)

Material for the Bulletin:

Howard Allen, Editor, APS
7828 Hunterslea Crescent, N.W.
Calgary, Alberta, Canada T2K 4M2
(E-mail: editor@albertapaleo.org)

UPCOMING APS MEETINGS

Meetings take place at 7:30 p.m., in Room **B108** (or **B101**, across the hall).
Mount Royal College: 4825 Richard Road SW, Calgary, Alberta.

Saturday and Sunday, March 19 & 20, 2005—APS Ninth Annual Symposium, lower level of Mount Royal College: activities start at 9:15 A.M. Saturday—Don't miss it! (No March General Meeting)

Friday, April 15, 2005—Dr. Kerrie L. Bann, University of Alberta: ***"Ichnology and palaeoenvironments of a glacially influenced, marine and estuarine deposit: The Early Permian southern Sydney Basin, Australia."***

Friday, May 27, 2005 (Fourth Friday!)—Annual General Meeting: Elections and Notice of Motion regarding APS Bylaws; Wayne Braunberger, APS Events Coordinator: "***Field trip preparation and safety***".

ON THE COVER: The design for our new T-shirt, celebrating the upcoming 20th Anniversary of the Alberta Palaeontological Society. T-shirts will be available soon: watch for details in upcoming issues of the *Bulletin*. Original design by **Amanda Donald** (see Page 6).

Letter to the Editor

January 7, 2005

I was pleased to receive the December issue of the Alberta Palaeontological Society [*Bulletin*]. Congratulations on producing such a high quality bulletin. The *Bulletin* is informative and up-to-date and aptly demonstrates how professional and amateur palaeontologists can work together. As a way of introduction please see the following.

I retired 3 years ago after spending 37 years as an educator. My last position was teaching Science Methods courses at Brandon University. I am an amateur fossil collector.

I have been collecting fossils since the 1960s. My collection is catalogued as to name, formation, locality, collector and date. I have collected in South Dakota, Alberta, British Columbia, Manitoba, Ontario and Nova Scotia.

Recently I have focused on the Ordovician at Stony Mountain and the Devonian around Dawson Bay. My book, *Fossil Trails of Manitoba*, recording 35 sites presently producing fossils in Manitoba, is in draft form. I also speak to schools about fossils and wrote the unit on fossils for a textbook which reflected the last science curriculum used in Manitoba.

I am interested in contributing to the APS in any way I can. As well, I hope to attend the Symposium in March scheduled for Calgary.

—Murray R. Smith, Ph.D. (APS member)
Brandon, MB

BC Government moves to protect fossils

News release, February 18, 2005

VICTORIA—The Province of British Columbia is undertaking an ambitious plan to manage fossils as a heritage resource through development of a Fossil Management Framework for B.C., Sustainable Resource Management Minister George Abbott announced today.

"We recognize the scientific and education value of fossils and aim to manage and protect them in the interest of British Columbians," said Abbott. "Fossils are already protected within B.C. parks and other protected areas. Now, the Province is on a path to extend clear guidelines to the rest of B.C."

Input gathered from the palaeontological and academic communities, First Nations and other levels of government, the mining and oil and gas sectors and other interested stakeholders until the end of May will help form the basis of a framework. The chief goal of managing fossils as a heritage resource, as opposed to a mineral, will guide the process.

"I am encouraged that the Province is taking steps to recognize the heritage value of fossils," said Jim Haggart, chairperson of the B.C. Paleontological Alliance. "The professional and amateur palaeontological community in B.C. is looking forward to participating in development of this framework."

As a first step, a regulation took effect Jan. 12, 2005 that prescribes fossils as "not a mineral" under the Mineral Tenure Act. This regulation recognizes the unique status of fossils and prevents rights to fossils being acquired through new mineral claims. The new regulation will not affect the province's mining, oil and gas operations.

B.C. has rich and diverse fossil deposits including dinosaur bones and tracks, marine animals, plants, mammoth elephants, giant bison and other extinct life forms.

Fossils help determine the age of rocks and sediments and the environment in which they formed —important tools for the oil and gas and mining industries for exploration and development and in understanding the origin and history of British Columbia's landscape.

For further information or to provide input on the development of the Fossil Management Framework, visit **http://srmwww.gov.bc.ca/clrg/psirb/fossil.html** online. Media contact: Mike Long, Communications Director, Ministry of Sustainable Resource Management (250) 387-4965. ❑

[*Editor's note—The BC Government website listed above has a link to an excellent, downloadable 68-page report outlining fossil collecting legislation in all of Canada's provinces and territories, as well as a few US states and China.*]

Program Summary

Friday, February 25, 2005

Mega-mining for ancient marine reptiles: Plesiosaurs and ichthyosaurs from the Athabasca Oil Sands area of northeastern Alberta

Speaker: **Patrick Druckenmiller, University of Calgary**

Between 1991 and 2000, nine specimens of marine reptiles have been serendipitously discovered near Fort McMurray, Alberta in an enormous, open pit oil sands mine operated by Syncrude Canada, Ltd. The new finds, including seven plesiosaurs and two ichthyosaurs, were recovered from the Early Cretaceous (approximately 110 Ma) Wabiskaw Member of the Clearwater Formation, which is removed as overburden at the mine. The Wabiskaw Member was deposited during the first major marine transgression of the Boreal Sea southward into the Western Interior Basin of North America during the Albian.

Three of the seven plesiosaurs are long-necked forms, two are short-necked, and two are fragmentary and taxonomically indeterminate. One of the short-necked plesiosaurs is remarkably well-preserved and constitutes one of the most complete plesiosaurs from North America. Both ichthyosaurs are referable to the only genus of Cretaceous ichthyosaur, *Platypterygius*.

The specimens are significant in many regards. Several of the plesiosaur specimens represent new taxa, helping to bridge a 40 million year gap between the much greater diversity of plesiosaurs known from the Late Jurassic of Eurasia and the Late Cretaceous of North America. Collectively, the specimens represent the oldest Cretaceous plesiosaur and ichthyosaur remains known from the Western Interior Basin, prior to the establishment of the Western Interior Seaway.

Biography:

Patrick is currently working toward the completion of his Ph.D. in the Department of Biological Sciences at University of Calgary. ❑

Upcoming Talk

Friday, April 15, 2005, 7:30 p.m., Room B108

Ichnology and palaeoenvironments of a glacially influenced, marine and estuarine deposit: the Early Permian southern Sydney Basin, Australia.

Speaker: **Dr. Kerrie L. Bann, University of Alberta**

The Lower Permian Pebbley Beach Formation of the Sydney Basin, Australia, records sediment accumulation in shallow marine to coastal environments at the close of the late Palaeozoic Gondwanan Ice Age. This succession is spectacularly exposed in clean, wave-washed coastal outcrops and contains an abundant ichnological data set.

Previous interpretations have suggested an inner to outer shelf and slope environment of deposition. Detailed trace fossil and sedimentological analysis displays, however, characteristics that contradict a fully marine interpretation. Instead, the interval reflects the vertical superposition and lateral juxtaposition of brackish-water and fully marine units.

Two facies associations are recognized. Facies association A consists of various marine deposits ranging from lower offshore, upwards through lower, to middle shoreface. The marine deposits contain evidence of wave domination and local fluvial influence, suggesting deposition in proximity to a contemporaneous delta. Facies association B consists of heterolithic estuarine channel fill deposits, estuarine basin fills and estuarine abandonment deposits colloquially known as "billabong" deposits.

Biography

Kerrie received her Ph.D. in ichnology, sedimentology and sequence stratigraphy from the University of Wollongong in 1999. She undertook a post-doctoral research fellowship at the University of Queensland in 2000, where she completed a SANTOS & Oil Company of Australia sponsored research project focusing on the ichno-sedimentological re-evaluation of the Permian facies scheme of the reservoir intervals in the Bowen Basin, Queensland.

Kerrie is currently employed as a Post Doctoral Research Fellow in the Ichnology Research Group at the University of Alberta and is involved in several projects focussing on the application of ichnology to detailed palaeoenvironmental analysis, sequence stratigraphy and its use in petroleum exploration. ❑

Field Trips 2005

Several field trips are planned for this summer. A wide variety of trips is offered so there should be something for everyone. For more information please contact **Wayne Braunberger** at **(403) 278-5154** or by email at **events@albertapaleo.org**. Information will also be available in the June 2005 *Bulletin*, on the Society's website **www.albertapaleo.org** and at the monthly meetings.

Please note that all fees are due at the time of registration. Non-members and unaccompanied minors will not be allowed to attend field trips. All participants will be required to read and sign a release form.

Field Trip Participant Responsibilities

It is understood that risk is inherent to some degree in outdoor activities. Before registering for a trip please ensure you understand the risks involved and are prepared to accept them.

- **As a participant you are responsible for your own safety and equipment at all times.**
- **Inform the trip leader of any medical conditions they should be aware of in an emergency.**
- **Ensure that your previous experience, ability and fitness level are adequate for the trip.**

• Trip 2005–1

Saturday and Sunday, June 25 & 26, 2005
Manyberries area, southeastern Alberta.
Registration deadline is June 17, 2005.

On this trip we will be visiting Cretaceous invertebrate and vertebrate sites in the vicinity of the town of Manyberries.

Accommodations—As with all APS trips accommodations are the responsibility of trip participants. Numerous motels/hotels and campgrounds are available in the Medicine Hat area.

Driving Conditions—Allow at least 4+ hours driving time from the Calgary city limits to Manyberries. Travel will be on pavement with short stretches on gravel and prairie trails.

Potential Hazards—Steep slopes, sinkholes, falling rocks, ticks, rattlesnakes, mosquitoes.

Cost—$5.00 per field guide. There is no attendance limit.

• Trip 2005–2

Saturday and Sunday, July 16 & 17, 2005
Crowsnest Pass area, Alberta
Registration deadline is July 8, 2005.

Two days of activity are planned in the area. On Saturday we will visit Jurassic and Cretaceous sites along the Carbondale River and Lynx Creek as well as visit an old strip mine. On Sunday the plan is to visit the abandoned Grassy Mountain or Tent Mountain coal mines and scout the areas for Jurassic/Cretaceous plant fossils.

Accommodations—Motel and campground accommodations are available in the Crowsnest Pass area in the communities of Blairmore and Coleman.

Driving Conditions—Allow at least 2 hours to drive to Blairmore. Travel will be on paved and gravel roads.

Potential Hazards—Steep slopes, falling rocks, bears, swift flowing water, mosquitoes.

Cost—$5.00 per field guide. There is no attendance limit.

• Trip 2005-3

Saturday and Sunday, August 13 & 14, 2005
Ghost River, Alberta
Registration deadline is August 5, 2005.

This is planned as a two day trip to the Ghost River area to examine the Devonian Yahatinda Formation on "End Mountain". This will be a continuation of the trip that was made in September of 2000. Due to the distances involved we will hike in and camp overnight near the site and hike out the next day. The access hike is approximately 15 km (or more), plus a difficult vertical hike to the site is anticipated. The rewards may be outstanding as this is one of the few Devonian plant and fish localities known in the Front Ranges.

Accomodations—Wilderness camping.

Driving Conditions—Meeting place and driving time will be announced in the June *Bulletin*.

Potential Hazards—Steep slopes, falling rocks, bears, mosquitoes.

Cost—$5.00 per field guide. There is no attendance limit. ❑

Children's Field Trip set for July

Saturday, July 23, 2005
Canyon Creek, Alberta

Dan Quinsey, assisted by **Ron Fortier**, will be leading a trip for children and their parents/guardians to the Canyon Creek area (west of Bragg Creek). If you are interested in this trip contact Dan at **(403) 247-3022** or by email, **president@albertapaleo.org** Please signify your interest early. ❑

Dinotour August 5–8, 2005

Discover Alberta's palaeontological treasures with **Dr. Philip Currie** and **Dr. Eva Koppelhus** of the Royal Tyrrell Museum, August 5–8, 2005. Highlights of this 4 day, family-oriented tour:

- Unique opportunity to learn about the dinosaurs of Alberta with Philip and Eva.
- Experience a dinosaur dig with Philip and Eva in the *Albertosaurus* bonebed in Dry Island Provincial Park.
- Tour the Royal Tyrrell Museum.
- Hike in Dinosaur Provincial Park.

Tour includes:

- Guided tour including bus transportation to and from Calgary.
- 3 nights accommodation (double occupancy) and all meals.
- Admission to the Royal Tyrrell Museum and Dinosaur Provincial Park Field Station.
- Guidebook, T-shirt and goodie bag.
- Charitable tax donation receipt for a portion of the fees.

This program supports the work of the Dinosaur Research Institute, a non-profit charitable organization that finances dinosaur research in Alberta.

To register or to learn more contact **Corliss Moore**, telephone (403) 271-2350 or email: **corliss.moore@inglewoodgrove.com** or website **www.dinosaurresearch.com**.

The cost is CAN $995 for adults and CAN $795 for children (17 years or younger), including GST. A charitable tax receipt is issued for a portion of the fees.

Deadline for registration is July 1, 2005, but the tour is limited to 25 participants, so be sure to register early. ❑

Dinosaurs of the Gobi: 2005 Trip

by Mona Marsovsky

Frustrated that you missed the ultimate dinosaur adventure in the Gobi Desert of Mongolia in 2004?

You have another chance from August 28 to September 12, 2005 to excavate and prospect for dinosaurs with Dr. Philip Currie and Dr. Eva Koppelhus of the Royal Tyrrell Museum in conjunction with the Dr. Badamgarav of the Mongolian Academy of Sciences.

After enjoying a private behind-the-scenes tour of the palaeontological laboratory of the Academy of Sciences in Ulaanbaatar, fly to the Gobi Desert and drive by jeep to the field camp. Spend 8 days prospecting and excavating Cretaceous dinosaurs in the unbelievably rich Nemegt Basin. Spend a day prospecting for dinosaurs at Tugrigiin Shiree, the source of the "Fighting Dinosaurs," a remarkable discovery of a *Protoceratops* and *Velociraptor* that died together locked in combat. Visit Ukhaa Tolgod, Altan Ula and the "Flaming Cliffs," the site where the first nest of dinosaur eggs was found in 1922.

Participants in previous Dinosaurs of the Gobi expeditions have made scientifically significant finds such as a juvenile *Tarbosaurus* skeleton, dinosaur eggs, partial skeletons of *Velociraptor*, an ankylosaur skull and the first of many dinosaur footprints in the Nemegt Basin. Scientific papers have already been published on some of these finds. Please feel free to ask for PDF files if you are interested.

Prices start at US$3,645 per person. Visit **www.nomadicexpeditions.com**, select Adventures, and Dinosaurs of the Gobi to see a detailed itinerary and to register for this adventure. Alternatively, contact myself (tel: (403) 547-0182), Dr. Philip Currie or Dr. Eva Koppelhus for more details. ❑

Dinosaurs in the Deep: Follow-up

by Philip Benham

As many of you know, Tyrrell Museum staffer and APS member Darren Tanke has been interested in the 1916 sinking of the *SS Mount Temple* and her Alberta dinosaur cargo. She was sunk by the German surface raider *Möwe*, later renamed *Oldenburg*. *Oldenburg* was sunk in an air attack in April 1945 in Vadheim, Norway.

Darren and several other Canadian divers have travelled to Norway to explore this ship with dark ties to Alberta's palaeontological human history. As part of the expedition, Darren posted an illustrated daily diary online. Interested parties should check out the *SS Mount Temple* website (**www.ssmount-temple.com**) and follow the links to the updates. ❑

World of Elephants Congress II

South Dakota, September 2005

A great deal of the Congress will focus on mastodons and mammoths, including the woolly mammoth.

September 22–25, 2005
World of Elephants Congress II
Hot Springs, South Dakota, USA.
Abstracts due March 31, 2005
Early registration July 15, 2005
Information: **larry4mammoth@mammothsite.com**

Charles E. Schweger, Organizing Committee
Department of Anthropology
University of Alberta
13-15 Tory Bldg.
Edmonton, AB, Canada T6G 2H4
charles.schweger@ualberta.ca ❑

www.albertapaleo.org

APS member Amanda Donald with her winning entry in the new T-shirt design contest. Watch for details of T-shirt availablilty in upcoming issues of the *Bulletin*. Photo by Ron Fortier.

Library Notes

by Mona Marsovsky, APS Librarian

Identify Your Plant Fossils

The following publications in the APS library include plates and photos of identified plant specimens:

Uppermost Cretaceous and Paleocene floras of western Alberta by W.A. Bell, Geological Survey of Canada, Bulletin No. 13, 1949.

Lower Cretaceous floras of western Canada by W.A. Bell, Geological Survey of Canada, Memoir 285, 1956.

Paleocene flora of the Rocky Mountains and Great Plains, by Roland W. Brown, U.S. Geological Survey, Professional Paper 375, 1962.

Lower Cretaceous floras of western Canada by W.A. Bell, Geological Survey of Canada, Paper 65-5, 1965.

Upper Cretaceous and Paleocene plants of western Canada by W.A. Bell, Geological Survey of Canada, Paper 65-35, 1965

Common fossil plants of western North America by William D. Tidwell, Brigham Young University Press, 1975. *Also includes a description of each plant group and the ages that they lived in.*

Stratigraphy and paleobotany of the Golden Valley Formation (Early Tertiary) of western North Dakota by Leo J. Hickey, Geological Society of America, Memoir 150, 1977.

Upper Carboniferous fossil flora of Nova Scotia in the collections of the Nova Scotia Museum, with special reference to the Sydney Coalfield by E.L. Zodrow and K. McCandlish, published by The Nova Scotia Museum, 1980.

Paleobotany and the evolution of plants by Wilson N. Stewart, Cambridge University Press, 1983. *Traces the origin and evolution of plant groups.*

Field trip guide, Second International Organization of Paleobotany Conference, August 19–22, 1984 by Thomas N. Taylor and Ruth A. Stockey. *Pictures of plant species and their localities from the field trip that traveled to sites in Dinosaur Provincial Park, Horseshoe Canyon, Joffre Bridge, Burbank-Blindman, Saskatchewan Crossing, Jasper and Genesee.*

Stromatolites in the Denault Formation, Marion Lake, coast of Labrador, Newfoundland, Geological Survey of Canada, Bulletin 102 by J.A. Donaldson, 1963. *This includes plates of identified stromatolites.*

Manual of leaf architecture, from field to exhibit: A conservator's eye on plant fossils by Dena Marshall, Denver Museum of Natural History, Sept. 1999. *The manual provides a guide for describing leaves of angiosperms in a systematic way. Both the printed manuals (2 copies) and a CD are available.* ❑

Sue Marsland makes major donation to APS library

by Mona Marsovsky, APS Librarian

The APS would like to thank Sue Marsland for her generous donation of numerous books and articles. The books and articles added to the library are too numerous to list here, but a summary of the types of literature is given below. A complete list of the Sue Marsland donation has been compiled—please contact the Librarian. The balance of the donation went to the APS silent auction.

Summary of items donated by Sue Marsland

- Eight field trip guidebooks for various localities across Alberta.
- A field trip guidebook for southern Manitoba.
- Three references dealing with petroleum geology, the North American Stratigraphic Code and lithological symbols and abbreviations.
- Twelve books and papers on invertebrate fossils.
- Six publications on dinosaurs.
- Nine books and papers on non-dinosaurian vertebrate animals (turtles, crocodiles, mammals, etc.)
- Four loose-leaf binders of compiled identification guides to dinosaur and reptile fossils.
- Two books on plant fossils.
- A publication on trace fossils.
- Three publications on regional geology of Alberta.
- Twelve books, papers and reports on geology outside of Alberta (mainly western Canada).
- Fourteen articles and publications on various geological and palaeontological topics.
- Ten various maps (including geological maps) of Alberta.
- Eleven geological maps and charts of other parts of western Canada.
- Nine maps of areas of the western USA and one of Ireland! ❑

The 2004 Alexo Field Trip

By Les Adler

This trip, held July 17 and 18, 2004, was a follow-up to the July 2003 expedition to Alexo, near the former Saunders Creek townsite and coal mine between Nordegg and Rocky Mountain House, Alberta. The main purpose of the trip was to collect Paleocene fossil leaves for **Georgia Hoffman**'s research, aided by **Dr. Arthur Sweet** of the Geological Survey of Canada (Calgary). Georgia has a Permit to Collect and is investigating the plant diversity and palaeoclimate just a few hundred thousand years after the possible catastrophe that may have caused the demise of the dinosaurs. Dr. Sweet took pollen samples to confirm ages of the sedimentary rocks at Alexo.

Alexo outcrop examined for leaf fossils. Photo by Ron Fortier.

Prior to this trip I attended two workshops on palaeobotany conducted by Georgia and **Mike Riley**, M.Sc. student at the University of Alberta. I had also attended the Mount Royal College program to qualify for an Amateur Palaeontologist Certificate.

At the Saunders Creek campsite, a park warden took the $10 camping fee and warned us of a heavy infestation of bears and a lack of potable water.

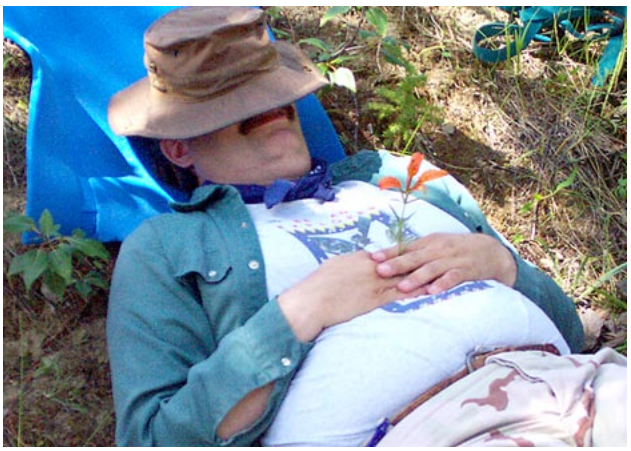
I rode a mountain bike to the fossil site which saved half my normal walking time. The distance from the parking lot to the site is one to two kilometres going downhill, with some bumpy sections and periodic stretches of water up to 5 cm deep, across the abandoned railroad grade. There was evidence that a bear had been at the collecting site within the previous few hours.

The collecting area is about 170 m long with a continuous cliff section, a considerable amount of fallen rock at the west end and some rich sections of shale and sandstone. I observed the whole length of the outcrop and watched most of the other fifteen APS members working hard at the east end, extracting some complete angiosperm leaves on large blocks of sandstone with much effort. The stratigraphic level is close to the Cretaceous-Tertiary boundary, about 64 or 65 million years old.

I returned to the west end where I was allowed to keep the loose material that I scavenged, subject to examination by Mike Riley, Dr. Sweet or Georgia. A large proportion of the ninety pieces that I collected contain specimens from the Taxodiaceae family of gymnosperms: mostly *Metasequoia* or *Glyptostrobus,* which the study didn't require. Two of the pieces that I collected turned out to be quite rare and they have been deposited with the Geological Survey in Calgary, where the Alexo material awaits further examination.

David Frenette of the Alexo Children's Camp transported a large slab of a fossil tree trunk to my truck, which I later transported back to Calgary. APS members **Peter Meyer** and **Sam Richter** advised me that the fossil insect tracks visible when light shone on it in a certain direction were from bark beetles. **Dr. Mary Reed**, an entomologist at the University of Calgary, later identified the tracks as having been made by two possible genera of the Order Coleoptera, Family Curculoniidae (weevils), Subfamily Scolytina (bark beetles).

My two hours of collecting also produced a worthwhile specimen of a water-lily leaf. A few members stayed on through Sunday, collecting more angiosperm leaves, including *Platanus* (sycamore). ❑



Bed sores: another field trip safety hazard. Photo: Ron Fortier.

The SVP 64th Annual Meeting in Denver, CO

by Les Adler

Two pre-conference field trips were offered the day before the Society of Vertebrate Paleontology's November 3–6, 2004 meetings. Seventy participants left the Adam's Mark Hotel in Denver to attend two one-day field trips, held simultaneously.

One trip was led by **Kirk Johnson** and **Richard Barclay** of the Department of Earth Sciences, Denver Museum of Nature and Science. The route took us reasonably close to the West Bijou Creek High Plains Escarpment valley, about 64 km east of Denver, to consider a section relevant to the Cretaceous-Tertiary boundary.

Antarctica? No—Eastern Colorado in early November. This bleak panorama greeted attendees of the SVP pre-conference field trip to K-T boundary localities near Denver. Photo by Les Adler.

The road had been closed off the day before due to very cold temperatures, slippery ice and strong winds. **Dr. Dave Eberth** asked leading questions when required. An exposure found in 2000 contains iridium and shocked quartz in ash layers with Paleocene Epoch fossil plants above and Cretaceous Period fossil vertebrates below.

The trip proceeded to Golden where a natural amphitheatre contains a similar Cretaceous-Tertiary boundary arrangement. We then passed quickly over Dinosaur Ridge—the west side contains Jurassic Period dinosaurs and the east side contains a variety of Cretaceous Period dinosaur footprints. There is an education centre at the north end.

The alternate field trip, led by **Joanna Wright** from the University of Colorado at Boulder was titled: "Walking with Dinosaurs along Colorado's Front Range". Participants visited classic fossil bone and footprint localities and passed over Precambrian, Palaeozoic and Mesozoic formations, structures and faults. No collecting was allowed.

More than 1100 participants observed four days of lectures and poster displays, viewed books and sculptures for sale and discussed the latest vertebrate fossil discoveries. A strong contingent came from Alberta including the University of Alberta at Edmonton, the University of Calgary, the Royal Tyrrell Museum and the Alberta Palaeontological Society. Dr. Dave Eberth gave a eulogy for **Dr. Betsy Nicholls** at the beginning of a symposium on fossil marine vertebrates.

The book of abstracts contains 570 entries relating to the lectures and posters. A reception was held at the Denver Museum featuring "A Prehistoric Journey"—an award-winning exhibit on the history of life with more than forty full mounts of vertebrate fossils. The exhibit featured Mesozoic specimens, with a giant *Tyrannosaurus rex* skeleton at the front entrance. The DMNS is noted for its extensive volunteer program in palaeontology and for its palaeontological certification program.

The University of Colorado Museum at Boulder, about 50 km northwest, allowed photographs to be taken as did the School of Geology, with a *Stegosaurus* copy on their library wall. Awards, grants, prizes and scholarships were awarded at a banquet.

Our group, returning from Denver, was unable to land at Calgary due to fog: we were bused home from Edmonton, arriving late at night. The 2005 SVP meeting will be held at Mesa, Arizona and the 2006 meeting will be held at Ottawa, Ontario. ❑

Early Naturalists

by Dan Quinsey

One particularly interesting naturalist is Georgius Everhardus Rumphius, 1628–1702. Rumphius, also known as the "Indian Pliny", was one of the most important pre-Linnaean naturalists of the seventeenth century.

Born in Germany, he spent most of his life in the employ of the Dutch East Indies Company stationed on the island of Ambon in eastern Indonesia. One of his two major works was *D'Amboninsche Rariteitkamer* or "The Ambonese Curiosity Cabinet" published posthumously in Dutch in 1705.

The descriptions in *D'Amboninsche Rariteitkamer* cover the gamut of organisms found in the seas surrounding Ambon—crabs, shrimp, sea urchins, mussels—as well as minerals and rare concretions containing animal and plant fossils.

It's fascinating to curl up in a big cozy chair and experience an old publication such as this one. The beliefs and theories of the time are very interesting and stimulate the imagination of young and old.

In the third book of *D'Amboninsche Rariteitkamer*, "Minerals, Stones and Other Rare Things", Rumphius describes the crabs *Cancri Lapidescentes* in Chapter 84. He placed them in his mineral book because they "…are hard, dense, stones, that kept the shape of an ordinary Crab…" a curiosity at the time.

Dr. Andreas Cleijer sent Rumphius the crabs in the late 1600s which had been brought from Sina [China] and which, as Cleijer wrote, were alive under water but now changed to stone. P. Martinus in his *Sines. Atlas*, p. 138, says the crabs live on the bottom of the sea and are alive as long as they are under water. But when they come into the air, they are changed into hard stone retaining their former shape, although those that are transported always have some legs broken off.

Merchants believed the crabs had healing powers:

> "Good for all swelling when ground with vinegar.
> For bloody flux when ground with water.
>
> For any kind of stool when ground with wine, but if that does not help, grind it in water and drink it.
>
> If a fever begins with some swelling, then grind it with water and apply it where it occurs.
>
> For pain in the head, ground with vinegar, also stroked on the temples.
>
> For all shortness of breath from asthma, ground with water.
>
> For some tumors that have embedded themselves in the back or shoulder, ground with vinegar and applied thereon."

"They are generally used to extinguish burning fevers," as P. Martinus also writes, "ground with water and drunk."

Georgius Everhardus Rumphius' *D'Amboninsche Rariteitkamer* is a very important and distinguished work and is worth every minute you put into it. ❑

Fossils in the News

Calgary Herald, March 10, 2005

Top dinosaur hunter leaves Royal Tyrrell Museum

DRUMHELLER—This announcement confirms well-placed rumours that Dr. Philip Currie, the Royal Tyrrell Museum's iconic head of dinosaur research, has accepted a post as Professor of Vertebrate Palaeontology at the University of Alberta, commencing October 1. Currie had been at the RTMP since its creation twenty-two years ago. The museum is working on a replacement. Dr. Currie's wife, palaeobotanist Dr. Eva Koppelhus will continue her research in Edmonton.

CNN.com, February 24, 2005

Ancient crocodile skulls found

AUSTRALIA—Researchers from Monash University have dug up two nearly complete skulls and other remains of a new species of crocodile, found by miners in Queensland. The new material helps fill a gap in the fossil record of crocodiles between 60 and 30 million years ago. The new skulls, 40 million years old, are very similar to modern fresh-water crocodiles, showing that the crocs' evolution has been very conservative: says researcher Lucas Buchanan, "[crocodiles] found something that works and stuck with it all through history."

(More Fossils in the News—See Page 12)

Geological notes on the "Coombs Quarry" site, Gaspé, Quebec

by Steven Coombs

Over the summertime last year, I was looking for scientific papers on the geology of the Gaspé area, and I was very lucky to find some.

After looking through one of them I had a couple of questions for one of the authors. I got in communication with geologist Pierre Jutras. I asked many questions concerning the fossil site that I have worked so much on [*Bulletin*, Dec. 2003; Dec. 2002; Sept. 2001]. We talked back and forth via email for a number of weeks and I was very surprised at what I was being told.

It turns out that the fossil site is in the Bonaventure Formation, which is composed of Carboniferous continental clastic rocks with coalified plant fragments as the only contemporaneous fossils (although I have not found any yet). The clasts of older rocks found embedded in the Bonaventure Formation are fossiliferous (from the Silurian Chaleurs Group and Upper Devonian Gaspé limestones). These clasts are the source of the fossils that I have found there.

We also talked a bit on some strange rock features that I had found within the conglomerate. Stromatoporoids were discussed, but it turned out that what I saw in the rocks was another thing entirely. It turns out these strange features are formed when ground water becomes saturated with calcium carbonate, which concentrates into what is called "calcrete" (Figure 1).

The environment of the Bonaventure Formation is similar to that of the Basin and Range of the southwestern USA, with alluvial fans shedding from active fault scarps in a desert setting. With low vegetation cover and high evaporation rates, it was very easy to imagine this. ❑

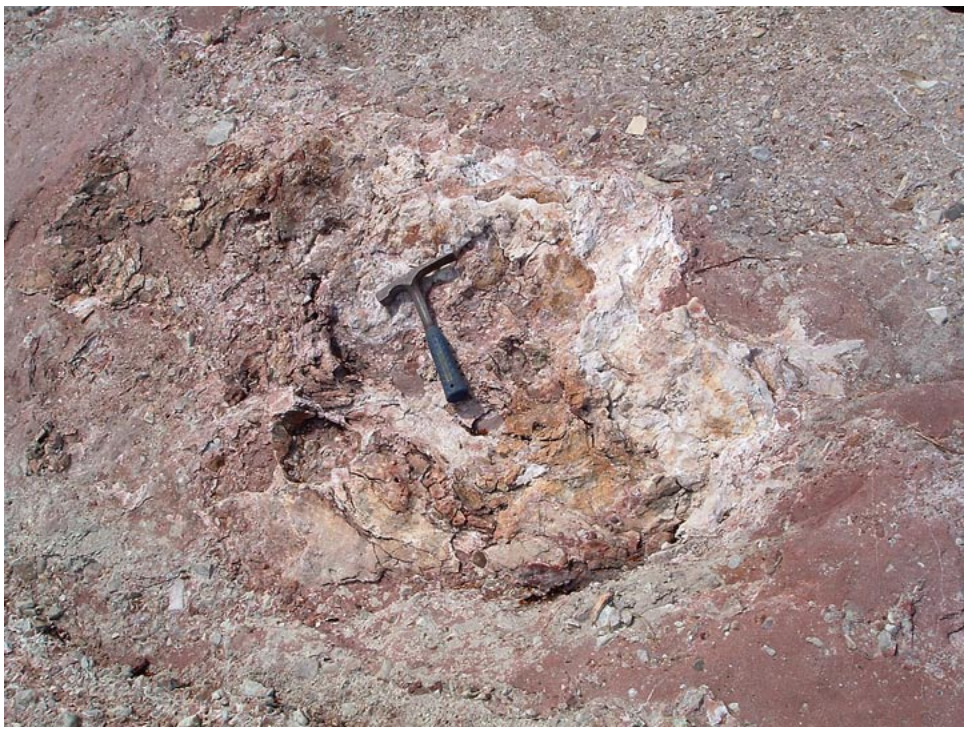


Figure 1. Calcrete deposit exposed at the "Coombs Quarry" site, Bonaventure Formation, near Barachois, Quebec. Calcrete is a calcite-cemented conglomerate formed when calcium carbonate laden groundwater evaporates in an arid environment. Photo by Steven Coombs.

Reviews

by Les Adler

The Dinosaurs of Arctic Alaska
by Anthony R. Fiorillo. *Scientific American*, December 2004, p. 84–91.

During the Cretaceous Period, some 75 million years ago, continental landmasses occasionally included a bridge of land or isthmus across what is today the Bering Strait. Dinosaurs probably walked across this stretch of land from Asia to North America, some moving north and some moving south.

Over the past 44 years palaeontologists have discovered fossil sites. For example, in 1961 the late Robert L. Liscomb, a geologist for Shell Oil, found some extraordinarily well-preserved bones of a duck-billed dinosaur, *Edmontosaurus*, but wrongly identified them. Liscomb died the next year in a rock fall and the specimens languished in storage. In the mid-1980s USGS

geologists reported dinosaur skin impressions from northwestern Alaska and took over Liscomb's material and quarry. Fiorillo joined in 1998.

A map shows the Liscomb Quarry and the Kikak-Tegoseak Quarry on the Colville River and dinosaur footprints on the Kaolak River north of the Brooks Range, above the Arctic Circle.

Fiorillo completed a Ph.D. in vertebrate palaeontology in 1989. Since 1995 he has been the Curator of Earth Sciences at the Dallas Museum of Natural History and also Adjunct Professor at Southern Methodist University. In the summer of 2002 with colleagues from Dallas and the University of Alaska he started to excavate eight *Pachyrhinosaurus* skeletons at the Colville River.

Altogether eight types of dinosaurs have been identified from partial skeletons, isolated bones, teeth and footprints, mostly from 75 to 70 million years ago, some five million years before the demise of the non-avian dinosaurs. The four plant-eaters were *Edmontosaurus*, *Pachyrhinosaurus*, a pachycephalosaur and *Thescelosaurus*. The four meat-eaters were *Albertosaurus*, *Dromaeosaurus*, *Saurornitholestes* and *Troödon*.

Relative to Calgary during the Cretaceous Period, northern Alaska was further north than it is today, so the dinosaurs that lived there would have needed mechanisms to cope with both the cold and the dark. *Troödon* had enlarged eyes and the size of arctic *Troödon*s is larger than *Troödon*s found to the south. There may have been skin coverings and reduced metabolic rates.

Fiorillo has been comparing herbivorous dinosaur diets with the diets of present-day mammals such as caribou and mountain sheep. One of the reasons for continuing with these endeavours is to find specimens which may shed light on whether the extinction of the non-avian dinosaurs hereabouts was gradual or abrupt.

Dinosaurs of the Antarctic
by Patricia Vickers-Rich and Thomas Hewitt Rich, *Scientific American,* Special Edition, June 2004, p. 40–47.

The authors received their doctorates in geology from Columbia University, New York. They lecture and curate vertebrate fossils at Melbourne, Australia.

In 1903 William Ferguson found the tooth of a fossil lung fish and the claw of a carnivorous dinosaur. This led to the discovery 75 years later, by two graduate students at Monash University, Tim Flannery and John H. Long, of a trove of dinosaur bones about two hours drive from Melbourne.

From 1980 to 1990 and then onwards the Riches, with Earthwatch, other volunteers, the National Geographic Society, the Australian Research Council and Atlas Copco, spent three months of each year excavating about 8,000 bones from the Dinosaur Cove and Flat Rocks sites. Only about 10% of the bones are assignable to a given genus or species but they are all of scientific interest.

Using $^{18}O/^{16}O$ ratios from specimens in concretions a mean annual temperature range of 0°C to 8°C is obtained. Fossil structures in rocks indicate the presence of permafrost (a range of -3°C to +3°C). This is the first recorded occurrence of permafrost in association with living dinosaurs. The main group of dinosaurs found here are the Hypsilophodontidae with large optical lobes for seeing in the dark. Sauropods appear to be absent. Also found are an ornithomimid, a protoceratopsid and an ankylosaur, each no bigger than a sheep, and a claw from a carnivore similar to *Baryonyx* from England.

The reasons for the extinction of the non-avian dinosaurs at this location is unclear because of the great distance from the possible Mexican impact crater (Chixulub). Polar Gondwana may be a place to look for evidence of dinosaur extinction. ❑

Fossils in the News

(Continued from Page 10)

CNN.com, January 24, 2005

Study suggests whales may be related to hippos

WASHINGTON—a team of scientists, citing genetic studies and fossils, believes that hippos may be the whales' closest living cousins. Spokesman Jean-Renaud Bosserie, of the team from the University of California (Berkeley), the University of Poitiers, France, and the University of N'djamena, Chad, proposes that hippos and whales had a common ancestor some 50–60 million years ago. That ancestor's descendents diverged into two groups: the cetaceans (whales) and a diverse group called the anthracotheres, whose only remaining descendent is the hippo. The common ancestor would place the whales and hippos in the group that includes cloven-hoofed mammals. The research was published in the *Proceedings of the National Academy of Sciences.*

CNN.com, February 24, 2005

New organism raises Mars questions

ALABAMA—Dr. Richard Hoover of NASA's Marshall Space Flight Center thinks that his discovery of viable bacteria surviving in 30,000 year-old permafrost in Alaska may increase the likelihood of life on Mars. In what looks to this reader like a rather optimistic stretch of logic, Hoover suggests that, since subsurface ice has now been confirmed on Mars, and since this Martian ice forms wedge-shaped structures similar to those in Alaska, and since living bacteria have been found in the Alaskan ice wedges, therefore there could be living bacteria on Mars. [*Hmm… there are rocks on Mars and rocks on Earth. Critters live under rocks on Earth: does this fact increase the likelihood that there are critters living under rocks on Mars? –ed.*]

CBC News online, January 20, 2005

Did ducks share swamp with *T. rex*?

RALEIGH, North Carolina—Dr. Julia Clarke of North Carolina State University thinks ducks may have been paddling around in ponds alongside dinosaurs. Fossils of *Vegavis iaai*, found in Antarctica, appear to be related to the Anatidae, the true ducks, according to Clarke. The implication is that modern birds evolved prior to the extinction of the dinosaurs at the end of the Cretaceous Period. This bolsters the camp of scientists who maintain that modern bird lineages came into being as early as 100 million years ago; their opponents have opined that modern bird groups developed in an evolutionary "explosion" from a handful of survivors of the K/T extinction.

CBC News online, January 21, 2005

Global warming caused mass extinction, studies suggest

SEATTLE—Two independent lines of research are pointing toward a slow deterioration of the Earth's Permian atmosphere—rather than a sudden extraterrestrial impact—as the cause of the huge Permian/Triassic extinction of the majority of life forms some 250 million years ago. Dr. Peter Ward, of the University of Washington, and colleagues have found that vertebrate faunas in South Africa declined gradually over a period of about 10 million years, then completely expired in a final 10,000-year-long event. Ward's team suggests that continued volcanic eruptions in Siberia pumped greenhouse gases and ash into the atmosphere, trapping heat and raising temperatures. This temperature increase, in turn, would have caused the release of volumes of methane trapped as hydrates in the world's seafloor sediments, spurring even more global warming.

A second study, led by Kliti Grice of Curtin University of Technology, Perth Australia, examined sediment core chemistry from Australian and Chinese borehole samples. Her team found evidence that hydrogen sulphide-loving bacteria became very abundant in the Late Permian seas, which would indicate stagnant water with low oxygen levels—a toxic environment for most higher marine organisms. Again, sulphur-laden volcanic gas emissions could have triggered the deterioration of the global environment, leading to the mass extinction. Both studies were published in the January 20 issue of *Science*.

CBC News online, January 12, 2005

Fossil shows early mammal ate dinos

CHINA—Recent discoveries in China's Liaoning province are putting the lie to the idea that Mesozoic mammals were timid pipsqueaks scurrying in the shadows of their dinosaur contemporaries. A skeleton of the raccoon-sized *Repenomamus robustus* was found by Chinese and American palaeontologists to have bones of a young psittacosaur in the region of its presumed stomach. Another, larger species of the same genus, dubbed *R. giganticus* was also found, this one about the size of a modern dog. [*The article doesn't say if the comparable "modern dog" is a Chihuahua or a Saint Bernard –ed.*] Findings appeared in the January 13 edition of *Nature*.

Science, July 30, 2004

A new period for the geologic time scale

AUSTRALIA—It's official: there's a new geologic time period, the first in 120 years. It's the Ediacaran Period, and its position was formally approved by the International Union of Geological Sciences in March, 2004, to the annoyance of Russian geologists, who were lobbying for the name "Vendian" after their proposed Russian type locality. The "Global Stratotype Section and Point" (GSSP) of the base of the Ediacaran is at Enorama Creek, Australia, and is 620 million years old. The top is the intitial GSSP of the Cambrian Period, 543 million years old, in Newfoundland. ❑

[*Thanks to Phil B., Dan Q. and Vaclav M.*]