

Alberta *Palaeontological Society* Bulletin

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ALBERTA PALÆONTOLOGICAL SOCIETY

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Membership	Howard Allen		†APAC Representative	Vaclav Marsovsky	547-0182

* This position is currently unfilled. Person listed is acting officer on an interim basis only.

†APAC is the Alberta Palæontological Advisory Committee

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

- a. Promote the science of palæontology 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 palæontological collections of the province (preserve Alberta's heritage).

MEMBERSHIP: Any person with a sincere interest in palæontology 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 Road SW, Calgary, Alberta

October 20, 2000—Dr. Robert B. MacNaughton, Geological Survey of Canada:
Unravelling the Ecologic and Evolutionary Signals Contained in the Trace Fossil Record Across the Precambrian–Cambrian Boundary.

November 17, 2000—Dr. David Eberth, Royal Tyrrell Museum of Palæontology:
The Dinosaur Bonebed Project, Southern Alberta.

December 15, 2000—Potluck dinner and Palæo Photo Contest (see Page 6, this issue).

ON THE COVER: Your editor being chronically out-of-town working, and panic being the mother of invention (to coin a phrase), a nostalgic reprise of the old, sentimental favourite.

President's Message

by Vaclav Marsovsky

I would like to welcome all of you to another season. I trust that those of you who attended enjoyed our summer field trips. A summary of the trips is included elsewhere in this *Bulletin*.

Our elections took place in May. I welcome **Wendy Morrison** as our new Social Director, **Philip Benham** as our new Program Coordinator, **Dan Quinsey** as our new Secretary and **Mark Farmer** as our new Education Coordinator. The remainder of the Executive has not changed.

I want to thank **Harold Whittaker** who served the past year as our Secretary, documenting our meetings and events and **Kris Vasudevan** who served the past four years as the Program Coordinator. Not only did Kris line up some high-powered speakers like **Dr. Paul Sereno** and great lectures for our Society over his two terms, but he also nearly single-handedly organized the annual APS workshops. As a result our Society is receiving higher profile and recognition. Our membership continues to grow, with over 100 members.

Last year I had set some initiatives for the Society for the year:

1. Launch our own web page.
2. Go through and identify ways of improving the Society fossil collection.
3. Produce an APS *Bulletin* index.
4. Education through permanent or temporary displays at various venues and participation at exhibits and shows; possibly seminars.
5. Put together a fund raising strategy for the APS.
6. Evolution and growth of the APS annual workshop.

I am pleased to report that we have met most of these objectives.

Mark Farmer and I put together the web page. (Mark is the brains behind this operation).

Howard Allen prepared the *Bulletin* index. If you would like a copy, contact our librarian, **Mona Marsovsky**, or contact Howard.

We have participated at shows like the *Night of the Flying Dinosaurs* organized by the Canadian Society of Petroleum Geologists at the Jubilee Auditorium. We made presentations to a group of cubs and preschoolers. Our education will now receive further impetus with Mark Farmer coming on as the Education Coordinator.

The APS annual workshop has grown. This year it ran a full day, and included both a poster session and lectures. There were more presenters than ever before and a comprehensive abstract of the proceedings was issued.

Ron Fortier and **Wayne Braunberger** are still planning on tackling the Society's fossil collection.

For the coming year we will continue to pursue these same initiatives. I hope you will continue to support them and benefit from them.

We would appreciate if someone could come forward and quarterback either fund raising or the annual workshop.

If someone has ideas for the website, please send your ideas to me. We will also gladly accept photos from the APS field trips, especially if they are already scanned. We want to post them on the website and possibly put some on the front cover of the *Bulletin*.

If you have any suggestions about improvements to the Society or would like to become involved in the affairs of the Society, please contact me at 547-0182. I would like to hear from you. □

Commentary

Paranoia in the Park

Shame on Parks Canada

by Keith Mychaluk

Along with three other APS members, I participated in a guided hike up to the Mount Stephen trilobite beds above Field, British Columbia. The hikes are provided through the private Yoho-Burgess Shale Foundation (YBSF), which is a not-for-profit society based in Field. The Foundation is currently trying to raise money for a new Burgess Shale interpretive centre to be based in Field.

The Mount Stephen trilobite beds (and the famous Burgess Shale site, nearby) are located within Yoho National Park and are, therefore, under the protection of Parks Canada—absolutely no collecting allowed. Thus, for the YBSF to conduct their guided hikes to the fossil beds, they must strictly adhere to guidelines laid out by Parks Canada. For example, group sizes are rarely larger than fifteen people, so that the guides can keep an eye out for “trilobite poachers.” The only trail leading to the trilobite beds is also clearly marked NO ACCESS EXCEPT BY PERMIT. Parks Canada has even gone to the trouble of installing a solar-

powered video camera at the trilobite beds to watch for illicit activities. As both a native Western Canadian and a scientist, I can understand why Parks Canada might go to such extremes to protect a resource as unique as that found in the Field area.

However, I am appalled at the way Parks Canada conducted themselves on our August 20 excursion to Mount Stephen. We had a typical group size of fifteen, including our four APS members along with an assortment of tourists. What we did not know was that Parks Canada had planted an undercover warden in our midst. (In fact, our guide from the YBSF didn't even know.)

The warden, a man in his twenties, was quite friendly and frequently initiated conversations with myself and other APS members during the hike. On several occasions he mocked the "no collecting" signs and the video camera. He was clearly trying to gain our confidence. Of course, at no time did any of us suspect that he was a warden.

On at least two occasions, our new "friend" actually tried to tempt me into taking a fossil. He would do this by picking up a trilobite and saying "this sure is a nice one, what do you think?" while holding it over my open pack. I was unaware that Parks Canada went to the effort to train its people in the art of entrapment. Luckily I was smart enough to pass on this "opportunity" and went about taking photographs instead.

During our descent from the mountain, the warden finally identified himself to me—in front of our stunned guide—but only after the rest of our group had disappeared down the trail ahead of us. He displayed a park warden's badge and asked to see the contents of my pack and pockets since he claimed to have seen me put "something" in my pocket (probably my Cambrian-aged sunglasses). After I agreed to the search (it was either him or perhaps the RCMP later down in Field), he proceeded to rummage through every inch of my pack and attire, including camera case and lunch bag. He did manage to find a fossil, but luckily for me it was from a previous collecting trip and obviously not from Mount Stephen. (You should have seen our poor guide turn white as a ghost when he pulled that fossil out of my pack!) Once he completed his fruitless search he apologized, albeit in a dry, professional manner, then took off down the

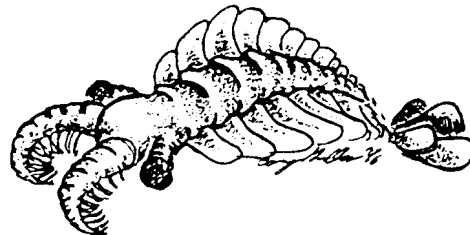
*We did not
know that
Parks Canada
had planted an
undercover
warden in our
midst...*

trail, presumably looking for new prey. After that he no longer seemed terribly interested in the topics we had discussed during our ascent—his covert duties were over and he no longer needed to gain my trust.

For this, I say shame on you, Parks Canada. Your job should be to PREVENT damage and theft of our natural treasures, not to encourage them and then charge people caught in the snare.

Apparently, four individuals have been caught—on video—collecting fossils at Mount Stephen this year. These idiots actually ignored the warning signs at the bottom of the mountain and collected material in plain view of the camera. Although these four people deserve punishment, I find it very curious that the warning sign *does not* mention the use of video surveillance on the mountain. If this were clearly stated, then perhaps these four individuals would never have made an attempt to collect there. Furthermore, if Parks Canada wishes to place "undercover agents" in YBSF guided hikes, then they should actually make a point of mentioning it PRIOR to the hike departing. Since the hikes consist of a mix of strangers, no one would know who the undercover warden was. I would suggest that this would be a strong deterrent for unethical fossil collectors.

As I mentioned before, Parks Canada should be actively trying to PREVENT illicit activities. My suggestions would go a long way to achieving this end and would eliminate the need for searches of private citizens. Although I do not fault the YBSF for Parks Canada's stupidity, I must admit that my experience in the beautiful mountains of Yoho was tainted and it is the Foundation that will feel the pinch when they ask me for either a testimonial or a donation. Surely the Yoho-Burgess Shale Foundation and Parks Canada can work together to achieve their double objective: providing public access and education while preventing disruption of the world-class fossils of Mount Stephen and the Burgess Shale. □



Membership Update

Member **Robin Sweeten** has moved to California, and has a new email address:
gsussaves@altavista.com

2000 Field Trip Reports

Hell Creek and Glendive, Montana (June 21 – 25)

by Wendy Morrison

On the morning of June 21 (Wednesday), twelve APS members (including members from Indiana and Edmonton) met at the Southcentre Mall parking lot, in Calgary. It was a tight squeeze into the two mini-vans. After almost leaving one member behind, we were off.

We crossed the U.S.A. border around noon and stopped in Shelby, Montana. After lunch we stopped at a collecting site south of Power, called Cone Hill. This hill is part of the Mosby Sandstone Member (Colorado Shale). The collecting from this site included gastropods, bivalves and rare ammonite impressions.

Thursday we left Great Falls and drove to the Vortex sapphire mine in Yogo Gulch, south of Utica. The rocks that lie in Yogo Gulch are very old, and the sapphire-bearing igneous dikes intrude into limestone of the Mission Canyon Formation and shales of the Kibbey and Otter Formations (all Carboniferous/Mississippian). **Lanny Perry** and **Pete Ecker** (owner/partners of Vortex Mining) graciously showed us how the mine operates, and how they retrieve the sapphires from the rock. We were also shown some rough gems in a gold pan (they are just as beautiful uncut). While showing us the piles of rock that were to be processed, Pete Ecker spotted a sapphire on top of the pile. I was lucky to receive another sapphire that was found but was much too flat to cut.

From the sapphire mine we headed off to the Roundup area, where we collected fossils along roadcuts of US Route 87. These road cuts show exposures of the Cretaceous Colorado Shales, including the Mosby Sandstone Member. The only fossils that were found were gastropods and turtle shell.

We stayed overnight in Jordan, Montana. The next morning we proceeded to the Bug Creek area, south of Fort Peck. Bug Creek exposes both the Tullock (Tertiary) and Hell Creek (Latest Cretaceous) Formations. Unfortunately there was no collecting allowed on this site, only observation. **Keith Mychaluk** found a partially complete crocodile: five or six vertebrae, a partial jaw and a few teeth including one with a root attached. Someone else found a badly eroded *Triceratops* frill. **Darrell Nordby**, **Herb Treslove** and **Les Adler** found arrowheads and hand tools.

We arrived in Glendive late Friday afternoon. After supper most of us went directly to the collecting site in Cedar Creek for a quick look. Cedar Creek anticline exposes an outcrop of fossiliferous Pierre Shale, which is rich in clams (*Inoceramus*), ammonites (*Hoploscaphites* and *Baculites*) and gastropods. It had rained earlier that day so collecting was impossible because of too much mud.

In the morning we visited Makoshika State Park for a group photo and for information on the park, which has exposures of the Hell Creek Formation. There is a very nice visitor centre with many fossils on display and Park employees eager to help with any questions. After leaving the park we headed off to Cedar Creek again for a full day of fossil collecting. The day turned out to be the hottest of our trip—in the high thirties. Some of us suffered heat and sun stroke. It's a good thing Keith broke this day up between two sites because it gave us a chance to recover a little. The fossil collecting was great for ammonites, gastropods and bivalves. Some people were lucky enough to find rare fossils: Darrell was the only one to find a nautiloid (*Eutrephoceras*); **Marilyn Francis** found a mosasaur vertebra and Keith found a shark tooth (unidentified). **Harry Gluth** and Les Adler found exceptional ammonites and I found the largest gastropod.

Sunday—the last day—was a mad rush back to Calgary, and we made it in exactly 12 hours. Overall the trip was great—or as Les Adler put it, “stupidously terrific.” Keith put in a lot of hard work to make it enjoyable.

If you would like more information on this trip please see our field guide; also, Keith has written a great article on the Yogo sapphire mine, for those interested:

Mychaluk, K.A. 1995. The Yogo Sapphire Deposit. Gems and Gemology, Vol. 31, No. 1, p. 28-41.

Onefour area, Alberta (July 15 and 16)

by Mona Marsovsky

Thirty-two APS members explored the Dinosaur Park and Oldman Formations near Onefour in the far southeastern corner of Alberta. Once again, we had members attend from outside of southern Alberta, including **Guy** and **Aaron Santucci** from Cranbrook, B.C., **Steven** and **Kris Moskowitz** from La Palma, CA, and **Dave** and **Elsie Patmore** from Devon, AB.

The first day was spent prospecting the Upper Cretaceous (Campanian) outcrops of the Dinosaur Park Formation (formerly known as the upper part

of the Oldman Formation) within the Sage Creek Grazing Reserve. The weather cooperated with strong winds, which kept the temperatures bearable (i.e. not too hot). Most members found fish scales, fish vertebrae, champsosaur vertebrae, crocodile scutes, turtle shell and dinosaur teeth (*Albertosaurus*, small theropod and hadrosaur) in isolated microsites.

The second day, on the Onefour Experimental Farm, was spent exploring badlands of the Oldman Formation, which lies below the Dinosaur Park Formation, where similar fossil material was found. Notable discoveries included several rare ankylosaur teeth, aboriginal teepee rings and quicksand. (Just ask **Keith** at the next meeting!) Hot, sunny conditions lasted the whole day.

Many thanks are extended to **Alberta Agriculture, Food & Rural Development** for allowing access to the Sage Creek Grazing Reserve. Also, thanks to **Agriculture and Agri-Food Canada** for allowing access to the Onefour Experimental Farm. **Ian Walker**, the Ranch Manager for the Onefour Farm, went out of his way to show us access and open and close gates for our group; thanks—and we hope you enjoy your new APS T-shirt!

Jura Creek, Alberta (August 19)

by Mona Marsovsky

Sixteen APS members hiked along Jura Creek near Exshaw, Alberta to see the fossils of the Upper Devonian Palliser and Exshaw Formations. The hike into the area was a worthwhile experience in itself as the trail wound its way through a narrow, twisty canyon eroded into the Palliser limestone (great photo opportunities).

Members made their way to the Exshaw Formation type-section, where the Exshaw shales contained numerous trace fossils (mainly burrows of worms) as well as rare brachiopods and goniatite impressions. At the same location members observed the imprints of straight-cone cephalopods in the underlying Palliser Formation.

Hiking further upstream gave us the opportunity to go back in time by walking east (to the Devonian) or to go forward in time by travelling to the west (to the Carboniferous/Mississippian), due to the tilted nature of the rock layers exposed in this part of the Rocky Mountains. Typical Devonian and Mississippian-aged fossils were common along the stream-bed, including corals such as Mississippian *Syringopora* and the Devonian stromatoporeoid *Amphipora*.

The cloudy weather was pleasantly warm and rain showers held off until all APS members had made it back to their vehicles.

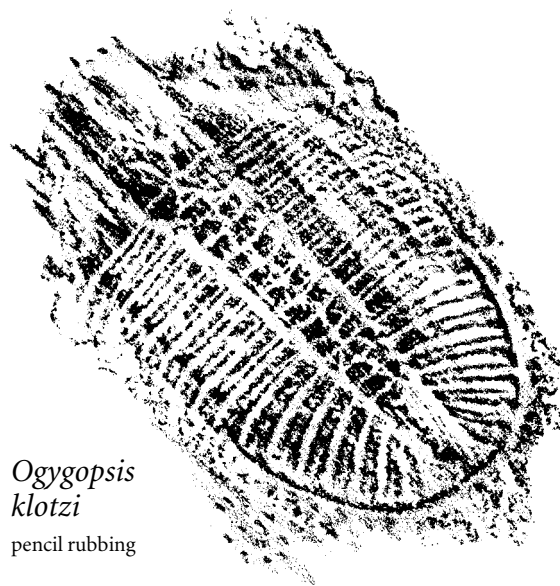
Mount Stephen Trilobite Beds, Yoho National Park, British Columbia (August 20)

by Mark Farmer

August 20 saw four intrepid Society members make the ascent up Mount Stephen to its famed trilobite beds. Our group of four joined a guided hike conducted by the Yoho-Burgess Shale Foundation, a private not-for-profit society. The Foundation provides the hikes under strict guidelines set by Parks Canada.

Mt. Stephen looms directly over the town of Field in Yoho National Park, B.C. Members who took part in last year's Burgess Shale hike will be familiar with the terrain, but the Mt. Stephen hike is much shorter (6 km round-trip vs. 20 km for the Burgess) and much steeper (a 500 m elevation gain over 3 km vs. only 750 m over 10 km for the Burgess).

After a rainy night, clouds and fog made for a cool ascent, with a little rain and snow near the beds making things interesting. Equally interesting was our guide who got the group temporarily lost before even leaving the townsite.



Ogygopsis klotzi

pencil rubbing

The top part of the ascent is particularly difficult because it's the steepest section and is covered with loose shale; at one point a group member's backpack went for a considerable tumble. There are two trilobite beds: the "lower" and "upper," the upper having the vast majority of specimens. Both beds

are within the Cambrian-aged Stephen Formation.

The trilobites are almost exclusively from two species: *Ogygopsis klotzi* and *Olenoides serratus*. Neither one reaches much more than 10 cm in length (unlike the 72 cm monster recently found near Hudson Bay—see “Fossils in the News,” page 9 of this issue). Many of the remains are moults, which has been determined partly from the disarticulation of specimens and partly from those which have lost their free cheeks, the outer part of the cephalon (head). Specimens are equally distributed between impressions and casts, and the difference is instantly recognizable because of colour: impressions retain the colour of the surrounding shale (tan) while the casts are a dark black. We also saw a surprising number of *Anomalocaris* claws—*Anomalocaris* is believed to have been the main predator of Mt. Stephen trilobites).

Since it is a protected site collecting is strictly prohibited, but our guide did provide tracing paper and pencils with which to make rubbings. Access to the site is strictly monitored, with an actual solar-powered video camera at the upper trilobites bed itself!

Unbeknownst to the group (including our guide), a Parks Canada warden had covertly inserted himself for the hike, pretending to be a tourist. During the descent, a member who will remain unnamed (**Keith Mychaluk**) had his pack searched by the warden for trilobite contraband. Fortunately this member was smart enough to respect the no-collecting rules and the search proved fruitless. Reports of a subsequent cavity search have turned out to be unfounded. However, it is obvious that Parks Canada is serious about protecting the fossils of Mount Stephen, so please respect their guidelines when visiting the area. □

[Reports were edited by Keith Mychaluk for geological accuracy –ed.]



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APS Christmas Social and Palæo Photo Contest

Our December 15th session will consist of a pot-luck dinner at 7:30 P.M. sharp, followed by a palæo slide show contest with prizes for the winners.

The contest categories are:

- 1) Prepared specimens
- 2) Fossils in the field
- 3) Scenic shots
- 4) palæo-humour

As each slide comes up the contributor may stand and give a brief comment on their photo with the understanding that the palæo-humour may take slightly longer to set the stage.

We would like to express a strong desire for pictures to be in slide format for ease of group viewing. Conversion from print negative to a slide costs about a dollar. Prints will be accepted as part of the contest but may not be part of the “standup description” depending on the number of entries.

Please label each slide or print with the following information:

- 1) Your name
- 2) Contest Category
- 3) Slide Title
- 4) Photo location (if relevant)
- 5) Geological information (such as formation or age of fossil)

Photos without the first three items labelled will not be eligible for the contest. Entries will be limited to a maximum of 3 per category and no more than 10 per member in any case (i.e. don't bring your whole photo album). The APS requests the privilege of using the winning entries to generate a fund raising product for the club.

We are also looking for volunteers for a panel of “celebrity judges.” Please contact me by the October general meeting or I will be volunteering some people. Judges will be allowed to enter photos in the contest but not to judge their own.

APS Social Director **Wendy Morrison** will be coordinating the potluck portion of the evening. Any questions regarding the contest can be directed to me by phone or email. □

APS Program Director
Philip Benham
Phone 403-691-3343
benhamp@cadvision.com

Fossils in the News

Calgary Herald, March 17, 2000

The National Post, March 21, 2000

Raptor fossil may be link to birds

DANIA BEACH, Florida—The skeleton of a juvenile raptor, discovered by an 11-year-old boy (or 14-year-old, if you prefer the *Post*) in Montana, and presently on display at a museum in (of all places) Dania Beach, Florida, adds support to the dinosaur-bird link. *Bambiraptor feinbergi*, as the specimen has been named, has its arms placed off to the side, “as if they’d been preadapted for flight, and for the flight stroke of a bird,” says Dr. Phil Currie, of the Tyrrell Museum. “We’d noticed this in some of our previous specimens but never before have we had a complete package like this.”

The *Post* article notes in passing that *Bambiraptor* had “hair-like-feathers,” but no further information is offered in this regard. Dr. John Ostrom, of Yale University notes that the animal also had a wishbone rather than a full breastbone, another very birdlike trait. Over 95% of the skeleton of the metre-long animal was recovered from Upper Cretaceous (75 million-year-old) rocks near Glacier National Park in northwestern Montana.

Calgary Herald, July 27, 2000

Stinky bubble killed most life

OXFORD, U.K.—The latest theory to explain a massive extinction event implicates methane hydrates: subsea deposits of a frozen, methane-water complex that releases gaseous methane when heated. Writing in the July 27 issue of *Nature*, lead author Stephen Hesselbo, of Oxford University, postulates that global warming caused by extensive volcanic eruptions in the Jurassic Period, some 183 million years ago, triggered a world-wide release of methane from hydrate deposits on the ancient continental shelves.

The scenario, according to the Oxford researchers, has the volcanoes spewing carbon dioxide, which warms the atmosphere by the greenhouse effect. This in turn warms the oceans, releasing methane from the hydrate deposits along the ocean margins. The freed methane then would react with oceanic and/or atmospheric oxygen, forming yet more carbon dioxide, accelerating the greenhouse effect, and driving up to 80% of deep sea species to extinction.

The first clue for the researchers was a relatively high proportion of a light carbon isotope discov-

ered during analysis of a fossil wood deposit. In attempting to explain the origin of the light carbon isotopes, the researchers arrived at methane, and constructed the global warming scenario.

National Post, May 2, 2000

Baltic fossil collection might hold missing link

TALLINN, Estonia—The lifting of the iron curtain in post-Soviet times has begun to pay dividends to palaeontology. Estonian researcher Elga Mark-Kurik had collected a 375 million-year-old jawbone in 1953, which had languished in a Soviet collection throughout the years that contact with western scientists had been strictly controlled, and research published in Russian-language journals was not widely circulated. Recent relaxation of the rules (plus a NATO grant) allowed Dr. Mark-Kurik and her colleagues to collaborate with western scientists in comparing rocks and fossils from the Baltic region and Scotland.

The jawbone in question created a stir when Swedish palaeontologist Per Ahlberg examined it. *Livonia multidentata* possessed a number of features that placed it in an anatomically intermediate position between the jaws of highly evolved fishes and jaws of the earliest known land vertebrates. Its age is also just right to make it a “missing link.”

The living animal probably looked like a small crocodile with gills and a fish-like tail; however, the question of whether it had fins or legs is still unresolved and will require more fossil discoveries.

Calgary Herald, April 21, 2000

Dinosaur heart causes experts to think again

RALEIGH, North Carolina—Computerized X-ray analysis of a grapefruit-sized, reddish brown lump found in the chest cavity of a Cretaceous thescelosaur has created excitement among dinosaur researchers.

The analysis has shown that the structure is probably a four-chambered heart, which would point strongly to a warm-blooded metabolism in this group of dinosaurs.

Nicknamed “Willo,” the exceptionally well preserved skeleton was discovered in 66 million-year-old (Maastrichtian) rocks in South Dakota by professional fossil hunter Michael Hammer. The specimen is being studied by a team from North Carolina State University and the North Carolina Museum of Natural Sciences. According to team member Dr. Dale Russell, the 3-D images “strongly suggest that it is a four-chambered, double-pump

heart with a single systemic aorta, more like the heart of a mammal or bird than a reptile.” Modern reptiles have two aortas and a simpler heart structure. Thescelosaurus were herbivorous, bipedal, ornithischian (“bird-hipped”) dinosaurs; “Willo” is three metres long and would have weighed about 276 kilograms. Vague images from the rest of the body hint that more organs may be preserved inside.

Calgary Herald, May 3, 2000

US Scientists given green light to excavate Arctic fossil forest

AXEL HEIBERG ISLAND, Nunavut—A controversy involving well-funded US researchers excavating a Canadian fossil forest (see *Bulletin*, Sept. 1999, p. 6) continues as the American team, from the University of Pennsylvania, have received the OK to continue their work. Canadian government officials were tight-lipped about the recent development. University of Saskatchewan palaeobotanist Dr. James Basinger, who had been researching the Eocene age (45 million-year-old) fossil forest on Axel Heiberg Island, was disturbed to find the American team excavating trenches at the site, which at one point was considered for UN World Heritage status. However, chronically under-funded Canadian research bodies, such as the Heritage Ministry’s Canadian Conservation Institute have been unable to make any moves to monitor work or take steps to protect the area. Meanwhile, both the federal and Nunavut governments have been dragging their feet, with no apparent plans to address the issue.

Calgary Sun, May 26, 2000

Ancient fish discovered

DRUMHELLER—Mollusc-crushing teeth of the ubiquitous Late Cretaceous ray fish *Myledaphus bipartitus* are well-known to APS members. And until recently, the teeth were about the only thing this animal left to science. But in 1998, Royal Tyrrell Museum curator Don Brinkman discovered the remarkably preserved remains of a metre-long by half-metre wide specimen in Dinosaur Provincial Park. This constitutes first known complete skeleton and skin of the freshwater ray. The skeleton of this specimen was calcified, which is why it was preserved.

Most ray and shark skeletons disintegrate soon after death, due to the softness of their cartilaginous bones. Vertebrae are well preserved in this specimen, as is an outline of the body, preserved in tiny dermal denticles—toothlike skin armour. The

Myledaphus specimen is expected to go on display at the museum in about a year.

The National Post, June 8, 2000

Giant rodent was as big as a kangaroo

CARACAS, Venezuela—*Phoberomys pattersonii* was a three metre-long, 1.3 metre tall rodent built along the lines of a kangaroo, and weighing half a tonne. It apparently lived along the banks of an ancient great river running northward, parallel to the Andes mountains, and draining into the Caribbean Sea.

The nearly complete remains of this monster rodent were recovered from 8 million-year-old rocks near Urumaco, in Falcon state, some 400 kilometres west of Caracas. The remains are similar to fragmentary material from western Brazil, tying together evidence of a major continental river system. Other fossils included skeletal remains of crocodiles, gavials and fishes, and a giant, two-metre tortoise.

Calgary Herald, June 1, 2000

Dinosaurs died in wall of fire

WASHINGTON—A statistical study of fossil numbers and distribution in uppermost Cretaceous rocks of Montana and North Dakota suggest that the dinosaurs were snuffed out in a nearly instantaneous catastrophe caused by the now popularly known Cretaceous-Tertiary asteroid impact.

Peter Sheehan of the Milwaukee Public Museum, lead author of a paper in the journal *Geology*, says that dinosaurs were “thriving...doing extremely well” during the years leading up to the impact event. A competing theory suggests that the dinosaurs had been gradually dying out prior to the end of the Cretaceous Period, and that the asteroid impact was merely the last straw in an eventual, slow extinction. According to Sheehan’s study, “the asteroid impact brought a sudden and very abrupt demise to species that were healthy and doing well.”

Calgary Herald, June 23, 2000

Newsweek, July 3, 2000

Oldest feathered animal debated

WASHINGTON—A 220 million-year-old lizard-like reptile fossil from Russia is causing a small group of scientists to rejoice, and a much larger group to roll their eyes. *Longisquama insignis*, a 10-centimetre long creature with bizarrely-elongated spines sprouting from each side of its backbone has created a stir because the spines bear

structures that resemble feathers. This, according to Oregon State University palaeobiologist John Ruben and his student, Terry Jones, is strong evidence that birds evolved independently, and are not descended from dinosaurs, contrary to the prevailing opinion of the vast majority of researchers.

The specimen was spotted by Ruben and Jones (Ruben is a well-known opponent of the bird/dinosaur camp) in an exhibition of Russian fossils on display at a shopping mall in Kansas City, Missouri. Its feather-like spines project well beyond the animal's leg span, giving the appearance of feathered wings; *Longisquama* may have used the structures to glide between trees, like a modern flying squirrel.

Mainstream researchers dismiss *Longisquama* and its feather-like structures as an interesting but irrelevant novelty. They point out that no bird has feathers attached directly to its backbone, and that, even without feathers, the other anatomical similarities between birds and dinosaurs (few if any of which are shared by *Longisquama*) are far too overwhelming to deny. Dr. Philip Currie of the Tyrrell Museum agrees. "This is silly. It's a big controversy that has raged for years and years but there is so much evidence to the contrary that it's convinced 99 percent of the scientists."

The National Post, May 27, 2000

Quirks and Quarks interview, CBC Radio
@Discovery.ca interview, Discovery Channel
"Mother of all trilobites" found in northern Manitoba

WINNIPEG—Palaeontologists searching the shores of Hudson Bay, near Churchill, Manitoba, have discovered the biggest trilobite known to science: a 0.72-metre monster recovered as a nearly complete specimen. The fossil was discovered by Royal Ontario Museum palaeontologist David Rudkin, in 1998. Dr. Rudkin, working with Dr. Robert Elias of the University of Manitoba and Dr. Graham Young of the Manitoba Museum of Man and Nature, worked frantically to excavate the specimen from bedrock at low-tide. It was removed in pieces, and reassembled in the lab.

The 445 million-year-old (Late Ordovician) fossil was in very good condition, considering it had been exposed to the weather and tides. "Usually, we end up with what I call 'trilo-trash'—just a bunch of broken up little pieces," said Dr. Elias. "But here, we have the whole body of the beast." The giant trilobite was one of the last of its kind, living just prior to a mass extinction that occurred

at the end of the Ordovician Period. The original specimen is on display at the Museum of Man and Nature in Winnipeg; casts have been made, and will be displayed in Churchill and the Royal Ontario Museum.

Calgary Herald, July 15, 2000

The dinosaur formerly known as *T. rex*

SOUTH DAKOTA—First *Brontosaurus*, now *T. rex*? A dinosaur skeleton excavated in the South Dakota badlands by commercial fossil hunter Peter Larson (of "Sue" the *T. rex* fame) is casting a shadow on the name "Tyrannosaurus rex."

Larson is convinced that a skeleton he has been excavating is the same one that a team working for Edward Drinker Cope had partially excavated back in 1892. Based on the few bones that Cope examined, he had named the dinosaur *Manospondylus gigas* ("giant, thin vertebrae"). However, the skimpy recovery meant that a decent description of the animal could not be made, and the name fell into obscurity. When, in 1902, Henry Fairfield Osborn described and named a more complete specimen from Montana, the name *Tyrannosaurus rex* became established in the scientific literature, and eventually as an icon of modern culture.

But if Larson can prove that his skeleton is the same one partially recovered and studied by Cope, and can be more fully described, the rules of taxonomic priority could be applied, causing the name *Tyrannosaurus rex* to be declared a "junior synonym," and thus losing its scientific legitimacy in favour of *Manospondylus gigas*.

Some workers, however, doubt that the name *T. rex* is in any real danger. Says Christopher Brochu, of the Field Museum of Natural History, "Larson would have to demonstrate that he's got the original animal. I doubt that this can be done. If it can, I'll eat my words. But I'm skeptical." And Dallas Evans, of the Children's Museum of Indianapolis remarks, "...I'm sure the rules of paleontology will have to bend with this one. *T. rex* is ingrained in our culture. It's a definite icon."

National Post, July 11, 2000

Hominid older than Lucy found

ADDIS ABABA, Ethiopia—Palaeontologists have uncovered the remains of another hominid, similar to, but older than the famous "Lucy," an *Australopithecus afarensis* found 40 years ago in Tanzania. Further work will be required to determine whether the newly found fossils belong to Lucy's species, or to a new species or subspecies. The fossils, which were found with bones of other animals,

have been dated to “at least 3.4 million years.” This is the latest in a series of important finds from Ethiopia. Last December, a partial skull of *Australopithecus*, the same age as Lucy, plus other hominid remains were found, and in April 1999, remains of a tool-using *Australopithecus* were uncovered. □

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

Volunteer Opportunity with Geological Survey of Canada

Dr. Barry Richards works for the Geological Survey of Canada in Calgary. In recent years he has been mapping the Mississippian carbonate system in the southern and central Alberta foothills and has run a number of field trips in the region.

“I am looking for one or more volunteers to help me with some field work in Kananaskis Country and the Nordegg area this fall and next spring. Basically I am measuring some Mississippian and Pennsylvanian sections at the locations listed below and need someone to help collect and carry rock samples, corals, and carbonates for conodont extraction. The volunteers would be needed mainly for day trips on week days (Monday to Friday), but there may be one or more longer trips.”

Sections to measure: 1) type section of Opal Member of Mount Head at Ptarmigan Cirque in Highwood Pass; 2) type section of Etherington Formation at the confluence of the Highwood River and Cataract Creek; 3) a section of the Shunda Formation along Canyon Creek at Moose Mountain; 4) a section of the Turner Valley Formation on Moose Mountain; 5) a section of the Todhunter Member of the Etherington Formation at Chester Lake in northwestern Peter Lougheed Park; 6) a section of the Pennsylvanian Spray Lakes Group along Cougar Creek at Canmore; and 7) the type section of the Shunda Formation at Nordegg.

Thanks,
Barry C. Richards

For more information or to volunteer, Dr. Richards can be reached by phone at (403) 292-7153 or by email at: BRichard@NRCan.gc.ca □

Palæo Internet Sites

Part 3

by Philip Benham

This instalment is all over the map—from arachnid origins to the extinction of the dinosaurs. I have tried to provide a selection of the best sites that are likely to last and some that I hope will last. If the address changes try a keyword search. If you have some suggestions for interesting websites you can email me at benhamp@cadvision.com

<http://www.pacificcoast.net/~beg/sw/sw.html>
Stewart Wright's Paleo Page

Contains information on Alberta fossils and links to other sites.

<http://members.tripod.com/~DrJasonDunlop/index.html>
Arachnid Origins and Evolution

Dr Jason Dunlop, Curator at the Institut für Systematische Zoologie in the Museum für Naturkunde, Berlin, Germany, studies all things arachnid. Site has some good palæo and entomological links. Includes photos of 400 million-year-old arachnids.

<http://www.extinctions.com>
<http://www.extinctions.com/bbs/>
Extinctions Fossil Company

This is a commercial outlet with a wide variety of fossils for sale. They have a good picture catalogue of fossils they are marketing, show schedules, fossil news and links to other websites. The second site is a fossil chat bulletin-board service.

<http://www.unimuenster.de/GeoPalaeontologie/Palaeo/Palbot/erhynie.html>
The Rhynie Chert and Its Flora

The University of Muenster Palæobotanical Research has set up a web page explaining the importance of this Scottish early Devonian hot spring deposit that contains arthropods, very early vascular land plants and fungi preserved in chert.

<http://depts.washington.edu/vertp/>
*Fossil Vertebrates in the Burke Museum,
Washington State*

Contains a catalogue of vertebrate fossils (fish, dinosaurs and mammals) at the museum, plus images of some of the specimens. Eocene lake strata with similar flora and fauna to those found in BC.

<http://www.emory.edu/COLLEGE/ENVS/research/ichnology/>
Introduction to Ichnology

This web page has an extensive photo catalogue of trace fossils (burrows, tracks, trails, borings, coprolites, etc.) glossary of terms, descriptions of what made the marks in the sediments and applications of ichnology.

<http://www.users.ticnet.com/jdmcleod/>
John McLeods's Virtual Geologist Home Page

Contains exquisite images of ammonites, trilobites, plants and other fossils plus links to other paleo-sites.

http://www.nrcan.gc.ca/gsc/index_e.html

http://collections.ic.gc.ca/geoscience/gemsrocks_fossils_1_e.html
Geological Survey of Canada

GSC homepage with links to library, bookstore and list of GSC employees (with email addresses). Online geological education sources. Second link is to a page with fossil photos (primarily trilobites and ammonites).

http://filebox.vt.edu/artsci/geology/mclean/Dinosaur_Volcano_Extinction/
Dinosaur Extinction: The Volcano-Greenhouse theory

Extensive writings by Dewey McLean, Professor Emeritus of Geology in the Department of Geological Sciences, Virginia Polytechnic Institute. He disagrees that an extraterrestrial body impacting earth wiped out the dinosaurs. Read his well researched and illustrated article for a thought-provoking alternative to Chicxulub.

<http://www.cspg.org/>
Canadian Society of Petroleum Geologists

The CSPG is the largest geological organization in the country. Besides information on membership, conferences, publications and the Calgary office/bookstore there are links to other geology related sites.

<http://www.pma.edmonton.ab.ca/>
Provincial Museum of Alberta

The Natural History section has a page on Quaternary vertebrate studies.

<http://www.uic.edu/orgs/paleo/homepage.html>
Paleontological Society homepage

<http://www.wipsppc.com/>
Western Interior Paleontological Society

Good discussion of Colorado geology. This very active club lists the details of the trips they have run in 2000. Members' homepages are also listed.

<http://www.uic.edu/orgs/paleo/paleobio.htm>
Paleobiology

Abstracts focussing on palaeobiology

<http://museum.state.il.us/svp/>
Society of Vertebrate Paleontology

<http://www.fossilauction.com/>
FossilAuction.com

The Online Fossil Auction

<http://www.ucmp.berkeley.edu/clad/clad1.html>
Introduction to cladistics

Ever wonder how phylogenetic systematics is applied? Then this page is for you.

<http://www.dinosaurmovie.com/>

<http://disney.go.com/disneypictures/dinosaur/dinomain.html>

Pages related to Disney's *Dinosaur* movie. □

Reviews

by Les Adler

News and Analysis: Paleontology—Dinosaurs; “A New Rex” by Eric Niiler, *Scientific American*, May 2000, p. 30.

Rodolfo Coria is the director of the Carmen Funes Municipal Museum, Plaza Huincul, northern Patagonia, Argentina. Coria and his colleagues have found at least ten new dinosaur species in the past decade within a two-hour drive of the museum, which is located on the outskirts of a former oil boom-town. With Dr. Phil Currie, Coria announced on March 10, 2000 that they had found the remains of six individuals of a new

theropod that could be the biggest meat-eater ever. It was larger than the 14 metre long *Giganotosaurus carolinii* from Argentina, currently on show at the Royal Tyrrell Museum in Drumheller, where it is compared with a Canadian *Tyrannosaurus rex*.

Other finds include several thousand fossilized eggs from a giant sauropod, 190 kilometres to the north. Some eggs contain fossilized dinosaur skin on embryos. In 1996 a colleague discovered—within sight of the museum—a 9 metre long hunter with a 33 centimetre slashing claw, called *Megaraptor*.

The latest theropod finds include one large adult, two smaller ones, two juveniles, and one quarter-size “baby” dinosaur, possibly a family that may have perished in a flood. This theropod was most likely 10% larger than *Giganotosaurus* and was more primitive, with a narrower and shorter skull and differences in the sinus openings.

A 30 metre long *Argentinosaurus* sauropod was discovered close by.

Dr. Phil Currie is readying for publication a paper on a group of ten *Albertosaurus* found along the Red Deer River in Alberta. The Argentinean find appears to provide the best evidence for family life in large theropods. Still, palaeontologists have to be careful in postulating behaviours from anatomically similar skeletons.

Profile: Dinosaur Hunter—Paul C. Sereno, Paleontology’s Indiana Jones by Kate Wong, *Scientific American*, June 2000, p. 36, 37.

This report is accompanied by photos of Dr. Sereno with a Niger theropod skeleton and *Jobaria*, a newly named sauropod.

Paul continues on with his prolific career as dinosaur hunter, scholar and popularizer (he spoke to the APS in Calgary in 1999). He has explored remote regions of South America and Africa recovering numerous dinosaur skeletons, of which about a dozen represent new species—discoveries which broaden palaeontologists’ concepts of the origins of dinosaurs and the effects of continental drift on their evolution.

Paul was brought up in Naperville, a western suburb of Chicago and studied painting at Northern Illinois University, favouring the style of 17th century Dutch still-life artists. After a visit to the American Museum of Natural History, in New York City, he decided to become a palaeontologist combining his interests in art, science, travel and adventure. In 1979 Sereno entered Columbia University embarking on a career to understand the evolutionary relationships or phylogeny of the di-

nosaurus. In 1988 he chanced on a skeleton in a remote Argentinean valley—a 228 million-year-old theropod, *Herrerasaurus*, which led to the discovery of a more primitive beast, *Eoraptor*.

Sereno has led at least four expeditions into Africa since 1990, partly financed by the National Geographic Society, into politically awkward areas. He continues with his remarkable finds.

He has appeared in *People* magazine, *Newsweek* and *Esquire*. However, his scientific findings are consistently published in prestigious journals. He is in the forefront of reviewing dinosaur theories and assists in the education of troubled children in Chicago schools.

Inner Beauty—Science and Art. Photographs by Giraud Foster and Norman Barker. *Natural History*, June 2000, p. 48–53.

This six-page photographic essay consists of nine examples of magnified fossil structures which produce aesthetic effects on one’s optic nerves:

- 1) Petrified wood—Triassic, Chinle Formation, Arizona. A solution of silica seeped into a fallen log and permeated its cells, crystallizing into quartz and eventually producing petrified wood. Minerals limonite and hematite provide a purplish hue.
- 2) Tree-fern stem—Jurassic, Lune River, Tasmania, Australia. Bundles of wood cells, circular leaf bases and rounded root shapes with orange iron oxides and blue chalcedony.
- 3) Precambrian stromatolite, Bristol, England. In this 2.5 billion-year-old specimen, sand was entrapped between cyanobacterial blue-green mats buried by carbonate sediments.
- 4) *Chancelloria*—Middle Cambrian, Wheeler Shale Formation, Utah. Brown, many-armed, 500 million-year-old iron oxide stars in an azure matrix of slate.
- 5) *Pentoxylon*—Jurassic, Miles, Australia. Chert coloured by iron oxide.
- 6) *Placenticerias meeki*—Bearpaw Formation, Upper Cretaceous, Alberta, Canada. Diffracted light produces shell iridescence.
- 7) Gomphotheriid tooth cross-section—Oligocene, Montana. Tooth-crown vivianite, an iron phosphate.
- 8) Coral cross-section—Lower Pleistocene, Florida. Aesthetic structures.
- 9) Dinosaur bone—Jurassic, Morrison Formation, Colorado. Chambers filled with blue-grey agate.

Death in the Dunes by Lowell Dingus and David Loope, *Natural History*, July/August 2000, p. 50–55.

At Ukhaa Tolgod, a small site in the Gobi of central-south Mongolia, more than one thousand fossils of some twenty species of mammals and reptiles have been unearthed, dating 75 to 71 million years old, the richest assemblage of Cretaceous vertebrate fossils found anywhere in the world.

The bones are in excellent condition and include dinosaur nests, eggs and embryos, indicating that many of these animals were killed quickly and buried quickly in a catastrophic event.

Some of the sandstones at Ukhaa Tolgod represent the solidified remnants of ancient sand dunes with cross-bedded rocks leaning 25° toward the northeast, indicating that during the Late Cretaceous Period the dunes migrated in that direction, driven by the winds coming from the southwest.

Many factors argue against sandstorms as an explanation for the burial of the Gobi animals. The two authors present a case against this theory as the cause of death.

At Ukhaa Tolgod none of the fossil bones were collected from layered sandstone generated by Cretaceous dunes. The authors have been studying a modern site in Nebraska's Sand Hills which might be a modern analogue of how the Gobi sandstones may have formed. The Nebraska hills rise to 120 metres and are stabilized by vegetation.

Most of the rain infiltrates the permeable sediments, seeps downward and slowly leaves the groundwater reservoir through springs. Heavy rains during summer thunderstorms can trigger sudden avalanches of wet sand called debris flows. It is suggested that the ancient dune fields of the Gobi were subject to occasional drenchings whose magnitude would dwarf any that hit western Nebraska today. Caliche (calcium carbonate-cemented soil) found in Mongolia blocked the infiltration of rain water through the dunes, causing a steeply sloping slab of wet sand above setting the scene for giant debris flows engulfing all types of living things in the way.

Thus, the cross-bedded sandstones represent dunes from dry intervals while the large, structureless, fossil-rich sandstones were formed by debris flows from huge, non-migrating dunes. Clear diagrams accompany this report.

The Dawn of Humans: New Finds in South Africa by André W. Keyser, photographs by Kenneth Garrett, art by Mauricio Anton. *National Geographic*, May 2000, p. 76–83.

The National Geographic Society is presenting a series of research reports from expeditions which it partly finances. "The Continuing Search for Our Origins" is divided into 7 sections:

- a) First hominids, 4.4 to 1 million years ago.
- b) *Australopithecus robustus*, 2 million to 1 million years ago.
- c) Early genus *Homo*, 2.5 to 1.6 million years ago.
- d) *Homo erectus* 1.8 million to 100,000 years ago.
- e) Archaic *Homo sapiens*, 700,000 to 100,000 years ago.
- f) Neanderthals, 250,000 to 50,000 years ago.
- g) *Homo sapiens sapiens*, 150,000 years ago to the present.

(All dates are approximate.)

In 1992 André Keyser, a geologist, while looking for fossil deposits northwest of Johannesburg, located a rich cave site at Drimolen, now a 1,900 square metre site, 5% excavated. Eighty specimens of *Australopithecus robustus* (= *Paranthropus robustus*, meaning "beside man," and "strongly and stoutly built.")

The body was small like that of a chimpanzee, but the jaws, premolars and molars were massive; much larger than those of a modern chimpanzee or human. *A. robustus* lived successfully for a million years, eight times the reign so far of modern humans, and coexisted with early species of the human genus. The male and female skulls of *A. robustus* are quite different and both have been found at this location. Also many *Homo* teeth have been found, but no skulls so far. Currently there are difficulties in separating *Australopithecus* bones from *Homo* bones. The various other animal bones allow the hominid bones to be dated.

A diagram is provided to show how bones accumulate in a debris cone in a cave chamber and then become fossilized by chemical drippings.

Many questions remain to be answered from this project. □

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