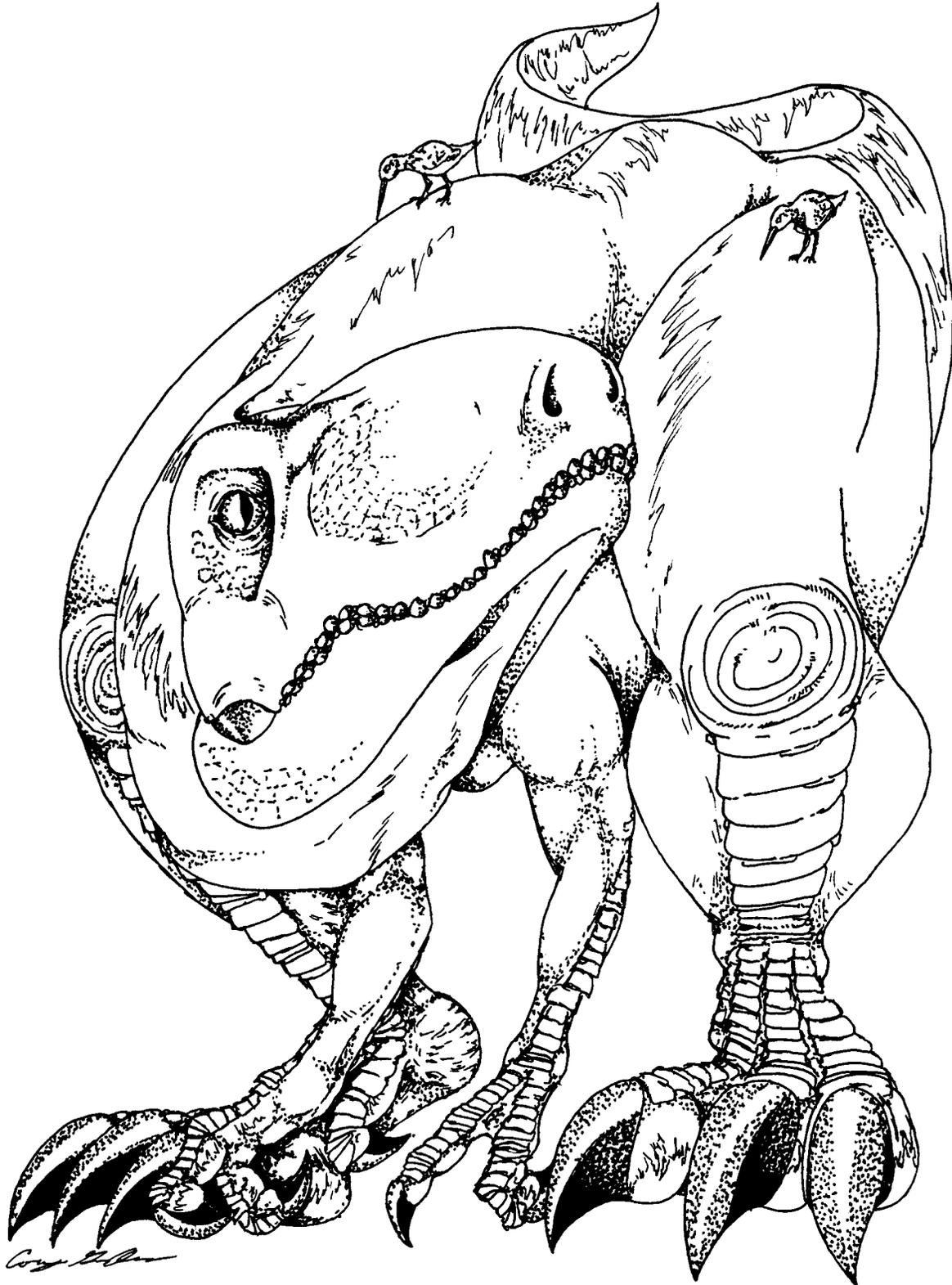


# BULLETIN

VOLUME 10 NUMBER 3

SEPTEMBER 1995



## ALBERTA PALAEOLOGICAL SOCIETY

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†APAC is the Alberta Palaeontological Advisory Committee

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	\$10.00 annually
Family or Institution	\$15.00 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**

Material for *Bulletin*:  
**Howard Allen, Editor, APS**  
**7828 Hunterslea Crescent, N.W.**  
**Calgary, Alberta, Canada T2K 4M2**  
**(E-mail 75272.1316@compuserve.com)**

Requests for missing issues of the *Bulletin* should be addressed to the editor.

**NOTICE:** Readers are advised that opinions expressed in the articles are those of the author and do not necessarily reflect the viewpoint of the Society. Except for articles marked "Copyright ©," reprinting of articles by exchange bulletins is permitted, as long as appropriate credit is given.

## UPCOMING APS MEETINGS

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

**Friday, September 15**—"Show and Tell"—bring in your summer finds and other interesting items

**Friday, October 20**—Les Adler—Fossil update & overview

**Friday, November 17**—Dr. White, Geological Survey of Canada: Palynology

**Friday, December 15**—Two mini-talks by APS members: Don Sabo on dinosaur palaeopathology and Joe LeBlanc on fossil corals.

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**ON THE COVER:** Art by APS member Cory Gross. ©1995. Reproduced by permission.

## From the President & Editor

by Wayne Braunberger and Howard Allen

Welcome back! Due to the unprecedented volume of material submitted for this issue, we decided to use this space for more articles! Hope you enjoy the issue. □

[Yeah, yeah, ok...feeble excuse—actually, Wayne goofed up and missed the deadline, and I can't think of anything intelligent to say in a full-page editorial. Count your blessings! —ed.]

## APS members support *Dinomania Unhatched!*

by Vaclav Marsovsky

The APS participated for three Saturdays this summer at the *Dinomania Unhatched!* show, which ran at the Alberta Science Centre (Calgary Planetarium). Displays were manned by Vaclav and Mona Marsovsky, Les Adler, Roslyn Osztian and Wayne Braunberger.

The APS set up a table of fossils for display and for the public to handle. Les Adler gave a presentation, "From the Big Bang to Dinosaurs."

At each fossil specimen, we included a card with a question about the fossil on display and multiple-choice answers. The right answer was on the back of the card. The fossils on display were made up from the Society's collection and private collections. The public was thrilled to be able to handle real fossils rather than models. They also had fun guessing at the right answers and probably learned something doing it.

We would like to thank Dr. Robert Berdan for inviting us to participate in the show and the Alberta Science Centre volunteers who helped us to get set up. □

## Welcome New Members!

Doug Andrews, Calgary, AB

Todd Cook, Edmonton, AB

Barb Fisher, Calgary, AB

Tracy L. Ford, Poway, CA

*(Tracy was a member back in the early days of the Society—welcome back!)*

Carrie Giles, Cochrane, AB

Andrew Godard, Calgary, AB

Jesse R. Rivard, Calgary, AB

Marc Rivard, Calgary, AB

Manabu Shiobara, Calgary, AB

William Tattie, Kamloops, BC

Dai Hue Tran, Calgary, AB

## Palaeontology dead at the USGS

by Jim Kirkland, Dinamation Inc.

[This item was posted to CompuServe's Dinosaur Forum by US palaeontologist Jim Kirkland, on Sunday, August 13, 1995. Reprinted with permission —ed.]

It is sad to report that on Monday all the macropalaeontologists at the US Geological Survey will get their 60-day notice. This includes all invertebrate and vertebrate palaeontologists coast to coast. Many other geologists will be laid off as well. This ends a great era of over 100 years of palaeontological research by what was the premier geological research organization in the world. In addition to losing some great palaeontologists (several have told me they will be giving up palaeontology), one of the most extensive palaeontological collections in the world is in real danger.

These collections, include those made by the great surveys of the west during the last century (Hayden Survey, Wheeler Survey, King Surveys, etc.) and all those collections made up to this current summer. The Cretaceous ammonite collections outside of Dr. Bill Cobban's office fill more than 100 cabinets. Researchers come from all over the world to study this collection alone. There seems to be no provision to transfer these collections to other institutions. The Smithsonian does not have the room or personnel to deal with these collections, and transferred all the Survey collections stored there to Denver, where it has been warehoused for the last decade. □

## Upcoming events

**September 29–October 2 1995**

**Fifth Canadian Palaeontology Conference and International Symposium on the Paleobiology and Evolution of the Bivalvia, Joint Meeting,**

**Drumheller.** A professional conference at the Royal Tyrrell Museum; includes field trips, oral and poster presentations and round-table discussions. Registration fee: \$30, field trips \$20–\$25. Contact Paul A. Johnston, Royal Tyrrell Museum of Palaeontology, P.O. Box 7500, Drumheller, AB, Canada T0J 0Y0, phone (403) 823-7707, fax (403) 823-7131.

**October 24, 1995**

**Tracking Dinosaurs in Alberta's Badlands.**

Lecture by Dr. Philip J. Currie, Head of Dinosaur Research, Royal Tyrrell Museum of Palaeontology. Provincial Museum Auditorium, Edmonton, AB. 8:00PM. Free admission. □

# 1995 Field Trip Reports

## Manyberries area, Alberta (June 17-18)

by Vaclav and Mona Marsovsky

Seventeen APS members met at the Manyberries Hotel at 11:00 on Saturday, June 17. Our collective thanks go to **Harvey Negrich** who provided excellent field notes on short notice. Our convoy of eleven vehicles made its way to the badlands southeast of Manyberries and combed the hills in the lower to middle Bearpaw Formation near a wellhead in Lsd. 10-4-5-4 W4M. There were many fragments of the ammonites *Baculites reesidei*(?) and *Placenticerias meeki*. **Sharon** found crayfish parts and **Roger Arthurs** found three mosasaur vertebrae. Harvey Negrich collected a tick for all to see. At 3:00 PM we did a scenic tour of the countryside on above-average oil lease roads and got a chance to try out our “turning-vehicles-around-in-small-areas” skills before finally finding a suitable site an hour later. The new site yielded more ammonites and baculites during the next three hours. **Andy Goddard** found a squid pen. Some of the group camped in Foremost, while the rest stayed at the motel in Foremost. The next morning we were greeted by a gentle rain. Several members visited **Ron Steim**'s residence in Medicine Hat, where Ron showed off his impressive fossil collection.

## Bassano, Alberta (July 15)

by Howard Allen

Our second field trip was attended by 22 members, who gathered at the Bassano Dam parking area, under a partly cloudy sky. The cool west wind would become welcome later in the day when the sun came out in earnest, making for some hot slogging.

Prior to departing for our first destination, we were given a short talk by **Mr. Allan Wolf Leg**, a tribal administrator for the Siksika Nation, whose property we were given a permit to enter. The group then proceeded across the dam and onto Siksika land, where we parked and hiked south to explore an area of badlands adjacent to the Bow River. Members had to walk gingerly to avoid stepping into too many prickly pear cacti, which grow here in profusion.

We spent about four hours exploring the Siksika badlands, which exposed the basal beds of the Cretaceous Horseshoe Canyon Formation (non-marine) and the uppermost beds of the underlying, marine Bearpaw Formation. Fossil wood fragments and plant debris (including a few *Metasequoia* cones) were very common over much of the area, and a few members found small

fragments of dinosaur bone. **Peter Meyer** collected the tip of a tyrannosaurid tooth.

The locality was the site of a small, abandoned coal mining operation. A few weathered timbers and iron fittings were in evidence. Much of the badlands area is remarkable for its bright orange coloration, a result of coal seams having caught fire and burned underground, oxidizing the surrounding rock. Many of the baked outcrops display collapse features, due to the underlying coal seams having been reduced to soft, white ash.

Unfortunately, the Bearpaw beds in this area are pretty much unfossiliferous, and very little material was found. The only definite Bearpaw fossil collected was a small fragment of *Baculites* sp. found by **Marc Rivard**. The writer followed one ravine with good Bearpaw exposure all the way east to the Bow River, and found only one small, weathered fragment of fibrous calcite, possibly part of an *Inoceramus* shell.

We regrouped under a blazing sun, with a couple of tiny thunder clouds scudding by, snapping and snarling out of all proportion to their size. We drove back across the dam, then south to our second locality, a large exposure of cliffs on the east bank of the Bow River.

Earlier, a few people had remarked how, despite all the rain and warm weather this season, Alberta had been surprisingly free of mosquitoes. We soon learned why: they were all attending a rally at our second locality. The air was fairly singing with the ravenous multitude, and bottles of DEET were quickly drained of their contents.

The Bearpaw Formation proved much more productive at this locality. Marine fossils—ammonite fragments (*Baculites compressus*, *Placenticerias meeki*) and clams (*Arctica ovata*)—were found almost as soon as we left our vehicles. About three hours were spent exploring this site.

Thunder clouds, this time more substantial, were again threatening when our group finally broke up and headed for home, leaving the mosquitoes fat and happy.

The field trip was conducted entirely on private property, which is becoming increasingly difficult of access. Special thanks are due to Mr. Wolf Leg and the Siksika Nation (first stop) and **Mr. Herb Heggs** (second stop) for granting permission to explore and collect on their land; to **Bob Styles** for securing the permission of Mr. Heggs and guiding us to the site; and to trip leader **Les Fazekas** for all the time, diplomacy, leg-work, mileage and hoop-jumping required to make the trip happen.

Wayne Braunberger and the writer are preparing a report on our finds for the Siksika Nation. A copy will be placed in the APS library.

## McAbee, British Columbia (August 19–20) by Peter Meyer

Twelve members met at noon on Saturday at Monte Creek and proceeded west to the truck scales near the Coquihalla interchange to meet our host, **Bill Tattrie**.

Members tended to settle in at one of the five or six excavations according to what they perceived to be the best pickings. The better angiosperm site on the far eastern portion of the southern exposure, has been completely broken down. Good specimens can still be found by digging through the scree and exposing leavings from the earlier excavations. We visited a new site about two kilometres to the northeast, which is a commercial zeolite test cut. This site produced numerous whole fish skeletons of good quality, better *Glyptostrobus* sp., and fair to good angiosperms. It was here that our indefatigable past-president was heard to exclaim something to the effect: "Oh, I'm content to just pick through others' leavings," all the while excavating madly in the hole he'd staked out. *Homo surfacetus scrabblis* makes the quantum geographical leap to become *Homo stratumus excavatis*.

Due to the sheer quantity of material collected, I'm sure that the species list of 20 to 30 will be considerably expanded. Identification of the large number of insects and fishes collected will result in a good understanding of the ecology of the assemblage.

It is my hope that members will list their common specimens, and sketch or photograph their unusual specimens, and submit them to me or Les Fazekas so that we can compile and publish a revised species list. It should be noted that most of this is unique and original research for this area. The turnout was very encouraging for a long, two-day trip. Most members who pre-registered turned out. Of course, it was sunny—does it ever rain in Kamloops?

## Some geological notes on the McAbee, B.C. fossil plant occurrence by Howard Allen

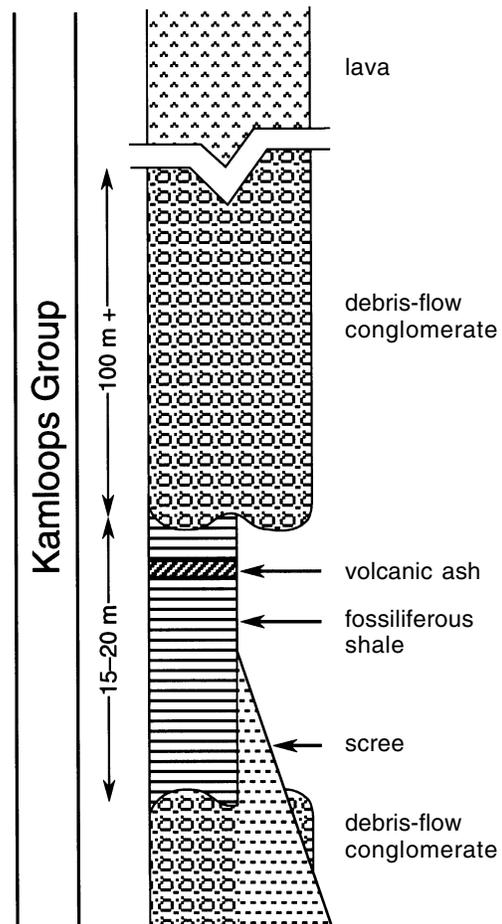
During the recent APS field trip to the McAbee site, the author made some brief observations on the geological setting of the locality, which may be of interest to members.

The host rocks for the McAbee fossils consist of white to light brown, thinly laminated, and locally silicified shales and silts that represent a lacustrine (lake) deposit of Middle Eocene age. Although time constraints prevented any more than a cursory measurement of the strata, the fossil-bearing shales at the Dave Langevin claim (the primary site explored by our group) were

estimated to be about 15 to 20 metres thick. The shales are abruptly overlain by 100 m or more of massive, cliff-forming, poorly sorted conglomerate, with clasts of lava spanning all sizes up to and including boulder size.

This conglomerate bed is interpreted to represent a volcanic debris flow of mud and rocks that buried the fossiliferous lake deposits in a probably catastrophic event. Evidence that the lake sediments were still soft at the time of the conglomerate deposition can be clearly seen at the contact between the two beds, which is very uneven, and displays soft-sediment deformation structures, where soft lake muds were "squished" up between lobes of the conglomerate base.

Although not observed by the writer, Bill Tattrie (pers. comm.) reports that lava beds overlie the debris-flow conglomerates at the top of the ridge.



Simplified stratigraphy, McAbee fossil occurrence, Langevin claim (not to scale)

The lower lake deposits are mostly covered by scree, but protruding knobs of more friable, non-cliff-forming conglomerate at the base suggest that this lithology underlies the shales.

An important marker horizon within the fossil beds is a light, greyish buff, bentonitic, volcanic ash layer that is exposed in excavations about five metres below the base of the overlying conglomerate. This ash bed seems to vary in thickness, but was 35 cm. thick in one excavation, and is presumably the bed that Hills and Baadsgaard (1967) used to obtain a radioactive date of 48–50 ma. Most of the better specimens at the Langevin claim were collected from within about 2.5 to 4 metres below this ash bed, and from the scree below. The scientific value of specimens collected at this site in the future can be increased if collectors are able to locate their finds in relation to this ash bed (for example, “*Ginkgo biloba*, collected 3.5 metres below ash bed”).

When cataloguing their finds, members should probably refer to the fossil beds as “McAbee shale (informal member), Kamloops Group, Middle Eocene.”

The author and other members of the APS wish to express their sincere thanks to **Dave Langevin** for granting permission to collect, and to **Bill Tattrie** of the **Thompson Valley Rock Club** for acting as our friendly and able guide to this remarkable locality.

#### Reference:

Hills, L.V. and Baadsgaard, N. 1967. Potassium-argon dating of some Lower Tertiary strata in British Columbia. *Bulletin of Canadian Petroleum Geology*, Vol. 15, No. 2, p. 138–149.

## Are your specimens scientifically significant?

[This item is taken from: *The Vertebrate Paleontology Community discussion list VRTPALEO@USCVM.BITNET*, 2 April 1995. Republished with permission of the Science Committee, Western Interior Paleontological Society, Denver, CO. —Heather Whitehead]

The following was prepared by the Science Committee of the Western Interior Paleontological Society (WIPS), based in Denver, Colorado. It was prepared by the amateurs in the Society with some limited input from professionals. The article was published to invite comments from the Society membership as to the feasibility of implementing and using these as a guideline for palaeontological work:

## GUIDELINES FOR DETERMINING THE SCIENTIFIC SIGNIFICANCE OF SPECIMENS RECOVERED BY WIPS MEMBERS

These guidelines are presented for use by members on WIPS sponsored activities, but are recommended for all members at all times.

Scientific significance may refer to the occurrence of a specimen rather than the specimen itself. This makes it important to document all taxa recovered from all localities. However, the specimen represents the scientific significance. Therefore, we define a scientifically significant specimen as one that:

1. represents a new taxon; or
2. represents a rare, seldom found taxon; or
3. is especially well preserved; or
4. is useful to ongoing paleontological research; or
5. represents a rare geographical or stratigraphical location; or
6. were preserved under rare conditions or in such a way as to preserve an unusual happening, i.e., a common taxon in a previously unknown geographic or time/rock location, a common specimen smashed in a dinosaur track, or an ammonite with mosasaur teeth marks; or
7. may be specific to a particular region (possibility should be emphasized in pre-trip meeting); or
8. is a vertebrate specimen (vertebrates are usually considered to be scientifically significant unless demonstrated not to be; invertebrates (this includes plants) are usually considered not to be scientifically significant unless demonstrated to be.); or
9. is collected before it has been determined that no additional specimens are significant to the attributes under study.

Should you recover what you think is a scientifically significant specimen we recommend that you:

1. notify the field trip leader, if you are on a WIPS field trip;
2. get a second opinion, if you are not on a WIPS field trip (contact a professional or highly qualified amateur paleontologist, take the specimen to an educational or scientific institution, or bring it to a WIPS meeting);
3. Place it in a proper repository (Keep in mind current collecting regulations; perhaps the specimen legally belongs in such a repository).

[Comments from APS members are invited — does this seem like a practical set of guidelines? Write me a note with your comments —ed.] □

# A Dinophile's Summer Holiday

by Tracy L. Ford

[Long-lost and newly rejoined APS member Tracy Ford originally uploaded this account of her adventures to the CompuServe Dinosaur Forum. This edited version is printed with permission.]

Hi Kiddeos and Kiddetts, I'm BACK!

Well, here's what I did in August, on my "Dino Hunter's Dino Tour 1995":

My first stop was to see the concrete *Tyrannosaurus* and *Apatosaurus* at Cabazon. I'd always wanted to see them and decided to finally have a look. They were OK. Then I stopped at Wild Bill's huge roller coaster at the Nevada/California State line. It was great—fast, and fun (OK, I know it has nothing to do with dinosaurs, but I love roller coasters). I hoped to stop and stay the night in Provo, but I only made it to Filmore, Utah. The next day I went to Provo to visit the library, but since it was Sunday, the library was closed. Then I went to the College of Eastern Utah's Prehistoric Museum in Price, Utah. It's a little museum but well worth the trip to see. They have *Allosaurus*, *Stegosaurus*, *Camarasaurus* (which had the sacrum backwards, and I pointed it out to them), *Chasmosaurus*, footprints, *Utahraptor* and the new Polocanthid ankylosaur *Gastonia* that Jim Kirkland is working on. The *Gastonia* is a wall mount with just the dermal spines. I took a whole roll of film on it! Then I went to Fruita to see the Dinamation museum. The robots are terrible (Jim, [Kirkland] if you ever want to take a sledge hammer to them, I'd gladly pay for a swing or two). But they have things for the kids to do, which makes it very interesting for them; for that reason it's worth the stop.

I stayed the night in Grand Junction, then went to the Dinosaur Valley Museum. What Brooks Britt has done in a year is remarkable. He's really changing the museum and it's worth the stop. I stayed and talked to him for about 2 hours. Then I went to the Mygatt-Moore quarry, off the freeway, where Jim Kirkland had a crew working. I stayed with them for a few hours. Then Werner Stunkel [a regular on the Dino Forum] and his pilot son came by. After Jim closed the quarry for the night we all went back to the Fruita Museum where Jim showed us the fully prepared, almost totally complete, beautiful skull of *Gastonia*. I'm sure

when Jim has the skull published he'll tell all about it. Then we all went to dinner (which Werner paid for—THANKS again!). Jim took us to his office and showed us the Morrison snake jaws, *Eohadrosaurus*, and more ankylosaurids. Then he showed us casts of many small teeth, some only a few millimetres long! Most were from the Early Cretaceous and many were from some animals from the late Cretaceous.

I spent the night in Grand Junction again, then went to Dinosaur National Monument. (Paleontologist Dan Chure was at the Mesozoic Ecosystems Symposium in China.) I only stayed a little while, then stopped at a small museum in Vernal. It has some dinosaur statues and a diplodocid in the small main hall. That night I stayed in Salt Lake City. The next day I went to the museum at the University of Utah. It's OK. I then tried for a few hours to find Jim Madsen's studio where he makes full skeletons of fossil animals. (I don't like Salt Lake City because I always get lost there!) I went to Jim Madsen's house and talked to him for a while. He told me to check out a small park with about 30 dinosaur statues. They're not very good, but worth seeing once. I stayed the night in Bozeman, Montana.

The next day I went to Matt Smith's studio in Livingston. It's worth stopping by. Then I went to the museum in Bozeman, also worth seeing. I asked if there was a crew working at Choteau; they said yes, and I stopped by, but there was only one person left—and he was taking the place down!

**OK, I know it has nothing to do with dinosaurs, but I love roller coasters!**

We talked for a few hours and then I stayed at a campsite in Choteau. Every two hours, from 11 PM to 3 AM, a thunderstorm blew overhead! In the

morning I went to a very small museum in Choteau. Then it was off to Canada. The border patrol didn't take as long as it has in the past. I stopped in Milk River to see the little Devil's Coulee museum, but didn't have time to visit the egg discovery site. I continued on to Dinosaur Provincial Park.

I stayed at the park the next two nights. Saturday we went to "Centrosaur Bone Bed 91." The bone bed is *packed* with bones! I was working next to a vertebral centrum. I found a rib fragment, under that was a maxilla, next to that a dorsal vertebra, cervical rib, limb bone(?) and various fragments. Next to me were some nice ribs, and a dorsal vertebra. Next to that was a scapula, and under that a right dentary. We went back Sunday, but it was raining, (a cold, fall-type rain which is very unusual) so we didn't go back to the site. I

went to Drumheller, first to a small museum [*the Drumheller Fossil Museum* —ed.] where, I was told, one of my drawings was on display. Then I went to the Royal Tyrrell Museum of Palaeontology.

This Museum is a MUST SEE! It is great! I've seen it off-and-on for the last 10 years! The new mount of an *Euoplocephalus* is remarkable! Ankylosaurs are very wide animals. (In the new *Dinosaur Report*, Greg Paul has a short article about Ankylosaurs and how wide they are).

I stayed the night with my friend Darren Tanke, his wife Karen and their two children. The next day I went back to the museum and photocopied 2 reams of paper (which wasn't enough!). Phil Currie walked by. He had just returned from China, and we talked a little: he told me there was a new find of about 13 *Oviraptor* skeletons! Then I went back to the Park for the night.

I decided the next day to stop in Eastend, Saskatchewan to see Tim Tokaryk. He was busy most of the day but I hung around until he had some time. I saw what they had of Scotty, the Saskatchewan *T. rex*, and the 14 cm. coprolite with bone fragments. They also have an Elasmosaurid from around there. It's a skull and nearly complete skeleton. Tim told me about the late Cretaceous birds that he's working on. I left later than I thought and stayed the night in Billings, Montana.

The next day I went to the museum in Thermopolis, Wyoming. It's a new museum, similar to the Black Hills Institute, but owned by a European group. They have many specimens, from invertebrates to vertebrates, from the Palaeozoic and Mesozoic, and some from the Cenozoic. They have a *Monolophosaurus* (with the ischia and pubes reversed), *Bellusaurus* (with the ischia reversed), and a *Toujiangosaurus*. There are three Santana Formation Pterosaurs, a *Triceratops* skeleton, a *Triceratops* skull, and a Russian late Jurassic large Pliosaur skull and skeleton (I don't know what genus it is). They also have what they're calling a juvenile *Brachiosaurus* skeleton that is fairly complete. I'm not so sure about the identification, though. I then stopped in Medicine Bow to see if Bakker was there. He wasn't, so I went to Laramie for the night.

The next day I went to the Geology museum at the University in Laramie. They have an *Apatosaurus* skeleton, and a few others. It's worth seeing if you're in the area. Brent Breithaupt is doing a very good job with the museum. I then thought I'd hurry down to Denver and see if Ken Carpenter was there. When I got there I asked for him at the information booth. They said "who?" I said "Ken Carpenter—he's a paleontologist here". They said they'd never heard of him (he really has to do something about that!). They told me to go to

security. I did, and left a message on his phone. But I thought I'd check out the museum anyway, as it was 4PM. I went up to the third floor and hung out near the new paleo hall to see if I'd spot anyone I knew. I snuck in to see the new exhibit, and to see if I could find anyone, but no one was there. The new exhibit is going to be great, and definitely worth seeing!

I spent the night a few miles away, then went back to the museum. I found out that Ken was in Grand Junction. I decided to head that way and try to find him (also, I had lost some lenses for my video camera and I wanted to see if I left them there). When I got there I found out that Ken had been there a few days before but was working in Castle-something-or-other (I passed it on the way to Grand Junction). I asked Brooks Britt about the lenses, but he hadn't seen them. We called around, and came up empty: I just simply lost them. I left for Provo.

I went to the library at BYU, and to the small museum there, then headed for Las Vegas. I stayed the night at the RV park at Circus Circus (It was hot and bright, but luckily it rained and became cool enough to sleep). I stayed in Las Vegas for most of Sunday. Then, after riding the roller-coaster again (they sped it up!), I went home. I got in at 9PM. □

## Dinotour Fall Reunion set for September 28

The *Dinotour* group's annual fall reunion has been slated for **Thursday, September 28 1995 at 7:00 PM**. The venue this year is the **Uplands Recreational Centre** in the community of Hawkwood, NW Calgary. Newcomers and *Dinotour* alumni are invited (alumni are encouraged to bring photos, slides and videos).

**Dr. Phil Currie**, recently back from China, will be attending, and will review his China trip, as well as this summer's work in southern Alberta. Phil will also participate in a review on the status of the 1996 *Dinotour* trip to China and Mongolia, now well into the planning phase.

Refreshments and snacks will be served. A **\$5.00** admission fee will be collected at the door to help defray costs.

**Those wishing to attend are asked to call Bill Carson at (403) 239-6454 by September 22** (ask Bill for directions to the Uplands Community Centre). □

# Fossils in the News

*Calgary Herald*, July 18, 1995:

## **Bone discovery reveals tylosaur lived later**

HERBERT, Saskatchewan (CP)—Palaeontologists at the Royal Saskatchewan Museum in Regina have announced the discovery and excavation of a tylosaur skeleton that is the youngest ever found, demonstrating that this group of marine reptiles survived extinction longer than previously thought.

The bones, discovered by hunters near the shore of Diefenbaker Lake in 1993, were recovered from the Upper Cretaceous Bearpaw Formation, and are 73 million years old. Museum staff are presently preparing the skeleton, which may be up to 12 metres long. “We didn’t know what we had until we started excavating the site because there was little indication on the surface as to how much of the skeleton was intact,” said Dr. John Storer, provincial palaeontologist. Five metres of soil were removed in excavating the almost complete skeleton.

The museum has set up a temporary display showing part of the tylosaur’s backbone, and photographs of the excavation site.

*Calgary Herald*, June 17, 1995:

## **Old roots: “Michelin man” ginger fossils unearthed**

DRUMHELLER, Alberta—This feature article, by palaeobotany technician Kevin Aulenback, is one of a series written by staff of the Royal Tyrrell Museum.

Technicians working on the excavation of a hadrosaur skeleton in Dinosaur Provincial Park dug up what looked like toy-sized models of the Michelin tire company’s mascot—the corpulent man built of car tires. The bizarre-looking objects were identified by Aulenback as fossil ginger-roots which, at 75 million years old, are the oldest ever found, by some 60 million years. The fossil roots are somewhat different from modern ginger roots in the angle of branching and the number of segments between branching nodes.

The fossils tend to confirm the hypothesis that the climate of the Dinosaur Park area in Late Cretaceous time was warm-temperate and seasonally dry. Other plant fossils found at the site included horsetails, ginkgo leaves and the bulbs of a reed closely related to the “water chestnuts” popular in Chinese cookery.

*The Calgary Sun*, July 20, 1995:

## **Dino whale fossil found in oilsands**

*Calgary Herald*, July 21, 1995:

## **110-million-year-old “Nessie” uncovered**

EDMONTON—Notwithstanding the oxymoronic (or perhaps just plain moronic) headline of the *Sun* article, these two items document the discovery of neither a dinosaur nor a whale, but of a short-necked plesiosaur.

This is the latest of three marine reptiles to be found in the Syncrude oil sands open-pit quarries at Fort McMurray in northeastern Alberta. In the past four years, an ichthyosaur and another plesiosaur have been removed from the site. “As far as marine reptiles go, it’s turning into one of the world’s more important localities,” says Dr. Betsy Nicholls, marine reptiles curator at the Royal Tyrrell Museum.

The present specimen consists of a ten-metre skeleton, minus the skull. It was discovered by backhoe operator Owen Staudinger, who dug into a layer of marine shells while excavating a drainage ditch. Staudinger noticed bones protruding from a rock he had just turned over.

Nicholls considers the find to be important. “It fills in a gap in the fossil record for us. There are not very many plesiosaurs from the Lower Cretaceous age.” Preparation of the skeleton is expected to take several years.

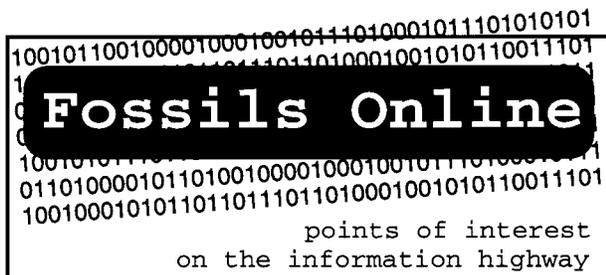
*Calgary Herald*, July 19, 1995:

## **Ostrich-like fossil find fully intact**

DINOSAUR PROVINCIAL PARK, Alberta—Serendipity has once again played a major role in the discovery of a spectacular dinosaur fossil. Palaeontologists using a jackhammer to get at some plant fossils accidentally hit the bone of a small dinosaur. It turned out to be part of a complete ornithomimid (ostrich-like dinosaur) skeleton, including the “beautifully preserved” skull, which the jackhammer missed by centimetres.

The two-metre tall dinosaur was found in “the classic death pose,” with neck and tail strongly curved. The fact that the skeleton is in such excellent shape indicates that it was buried shortly after death. “Obviously it didn’t get eaten,” says Dr. Philip Currie of the Tyrrell Museum. Currie hopes the specimen will shed light on the status of two of three Alberta ornithomimid species, which Currie and some others suspect are one in the same. □

[Thanks to Trudy Martin, Elsie Young, and Brian Allen for handing over clippings –ed.]



### CompuServe:

#### Herbivorous crocodile discovered (August 23)

A recent UPI item reports that a team of Chinese and Canadian palaeontologists have identified a bizarre, Chinese fossil animal as a "herbivorous crocodile." Details of the team's findings are reported in the journal *Nature*.

Bones and teeth of this weird creature were first discovered thirty years ago by petroleum geologists working near Yichang, central China, in 120 million-year-old (Lower Cretaceous) rocks. The flat-surfaced, molar-like teeth, and the jaw structure are like those of herbivorous mammals, so the animal was originally classified as a "mammal of uncertain type."

The Canadian/Chinese team, studying the bones, concluded that the animal probably belongs to a group of crocodiles with representatives known mainly from Africa and South America. The critter has been dubbed *Chimaerasuchus paradoxus*. All other known crocodiles, both living and extinct, are carnivorous.

#### Oldest bee & wasp nests found (June 1)

An AP wire story dated May 29 reports that over 100 bee and wasp nests have been discovered in the 220 million-year-old (Triassic) Petrified Forest National Park, in Arizona. The find is 140 million years older than previously known evidence of social, pollinating insects. The discovery was announced at a geological society meeting in Montana. There is some doubt about the exact kind of insects that produced the nests, since no insect fossils were found in them.

#### Making tracks (July)

Australian and British scientists working in western Australia have found what they believe are the oldest known terrestrial trackways. The tracks, found at a site 600 km north of Perth, are believed to have been made by large eurypterids and/or centipedes that ventured onto dry land along an ancient river course, around 420 million years ago (Silurian). The findings seem to fly in the face of traditional theory, which has plants as the first colonizers of the land. These trackways suggest just the opposite. The large arthropods are thought to have preyed on smaller organisms that in turn fed on bacteria and primitive plants in the water.

#### Wollemi scholars have green thumbs (July)

Within a year of the discovery of the "living fossil" tree, dubbed "Wollemi pine," in a remote location in eastern Australia (see "Jurassic Park Trees Found," *APS Bulletin*, March 1995), botanists at the Royal Botanical Gardens in Sydney have succeeded in getting the tree to reproduce. Seedlings may be available for sale in a year or two. The New South Wales state

government has trademarked the tree, to prevent unauthorized distribution of seeds. The exact location of the original discovery trees remains top-secret.

### The Internet:

This item was taken from the Vertebrate Paleontology Community discussion list of April 2. (VRTPALEO@USCVM.BITNET) Thanks to Heather Whitehead.

The following are statistics relevant to fossil collections stored in repositories in the United States. These statistics are based on a 1991 survey of 33 institutions that was conducted by the Denver Museum of Natural History. The original survey results are now in the Archives of the Association of Systematic Collections, Washington, D.C.

**Vertebrates:** 1,847,000 catalogued specimens  
48.3 % from US Public Lands (Forest Service, BLM, Park Service)

94.0 % collected by professional scientists  
5.7 % donated by amateur paleontologists  
0.3 % purchased from or donated by commercial paleontologists

**Plants:** 128,000 catalogued specimens  
47.0 % from US Public Lands  
87.6 % collected by professional scientists  
11.5 % donated by amateur paleontologists  
0.9 % from commercial collectors

**Invertebrates:** 4,258,000 catalogued specimens  
9.4 % from US Public Lands  
89.0 % collected by professional paleontologists  
8.4 % donated by amateurs  
2.6 % from commercial collectors

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# *DINOTOUR 5* 1995: The Triassic dinosaurs of Texas

by Les Adler

The official tour ran from April 21 to 29, starting from Lubbock, Texas, and finishing at Dallas. Five members joined the bus at Calgary on April 17, four of whom stayed on the bus until May 2, completing a round trip back to Calgary of 8800 kilometres. Twenty passengers from Canada, the United States and Denmark enjoyed the Texas adventure. Forty five percent of the participants are members of the Alberta Palaeontological Society.

Each of the five *Dinotours* has emphasized a different set of dinosaurs, depending on the geological periods represented, past environments and the causes of death of the dinosaurs. In Montana, Alberta and Saskatchewan we encountered Late Cretaceous hadrosaurs, tyrannosaurs and ceratopsians. In Utah and Colorado the Jurassic dinosaurs included stegosaurs, allosaurs and large sauropods. In New Mexico and in northwestern Texas on this trip the dinosaurs were Triassic.

Dinosaur footprint remains have been encountered on most of the trips; *Dinotour 5* encountering several Texas sets. The dinosaurs featured on this trip were *Acrocanthosaurus*, a theropod; *Pleurocoelus*, a sauropod; and *Tenontosaurus*, a dinosaur close to the iguanodontosaurs. Other vertebrates encountered included *Quetzalcoatlus*, a giant pterosaur; mosasaurs (marine fossil reptiles), and Pleistocene fossil elephants. Another feature of this trip was encountering the evidence of the possibility of violence in this part of the United States. I didn't personally experience any violence but I visited the Alamo at San Antonio, The University of Texas at Austin, where a student shot and killed 16 others, the John F. Kennedy assassination site at Dallas, and we skirted Oklahoma City eleven days after the bombing.

Dr. Tom Lehman of Texas Tech University conducted us around Lubbock and accompanied us around the Big Bend National Park. We also toured the Lubbock Lake Landmark Archaeological Site which contains probably the most complete North American palaeo-Indian sequence. This site includes an impressive

museum, demonstrations of archaeological techniques and sculptures of Recent mammals which are now extinct. Dr. Lehman provided each participant with an excellent handout on Triassic strata and vertebrates. A visit was made to the Odessa Meteorite Crater, possibly the second largest crater of its type in the United States. Barbara Standhardt, a science guide, took one group across hot desert country at the Big Bend to the original *Quetzalcoatlus* site while Dr. Lehman drove another group out to inspect fossil deposits and showed us dramatic volcanic outcrops and the Saint Elena Canyon of the Rio Grande at the Mexican border. We also visited a private dinosaur museum, alligator farm and mosasaur excavation in progress, where I collected fossil Cretaceous pelecypods.

Near Segovia we transferred to pickups to visit a dinosaur track site and to sample locally grown pecan nuts. At San Antonio the Alamo, more dinosaur tracks and a museum were visited. It was also Fiesta time here. We visited a museum and the Lyndon Baines Library area at Austin, a Texas

## At Glen Rose we assisted in the extraction of three *Pleurocoelus* skeletons

Bureau publishing centre, and drill-core centre. We also visited a major track site at Glen Rose. Dr. Lou Jacobs, author of *The African Dinosaurs* joined us, arranged a tour of the Fossil Rim Animal Preserve, which features many present-day African mammals, provided us with the experience of assisting in the

extraction of portions of three *Pleurocoelus* skeletons near Glen Rose, led us to the Fort Worth and Dallas natural history museums and took us to another set of *Acrocanthosaurus* footprints at Grapevine Lake.

Dr. Phil Currie was scientific leader for the trips and commented on several of the speakers' contributions. Guest speakers and guides to the various museums and scientific establishments included Chris Brochu, Dawn Adams, Bill Baker, Vicki Yarbrough, Wann Langston, Eva Koppelhus and Fred Lewis. The guidebook was prepared by Bill Carson, Mike Skrepnick and Corliss Moore.

Dr. Phil Currie has recently been in China. The prospects look promising for *Dinotour 6* to travel over portions of southern and northern China during September of 1996. □

# The Eocene fossil plant localities at Republic, WA

by Michael Sternberg  
Northwest Paleontological Association

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[*This article, with special relevance to our Society's McAbee, B.C. field trip, was first posted to the CompuServe Dinosaur Forum on July 29, 1995. Thanks to Michael Sternberg for granting permission to reprint the article. –ed.*]

I am pleased to report on a recent field trip and seminar conducted by Wes Wehr, curator of palaeobotany (Burke Museum, Seattle WA) under the auspices of the Stonerose Interpretive Center located in Republic, WA.

The field trip was attended by eight members of the Northwest Paleontological Association and took place July 15-17th, consisting of both field work and informative discussion.

Wes Wehr is curator of palaeobotany at the Thomas Burke Memorial Museum on the University of Washington campus in Seattle. He has been curator since the late 1970s and has published with a number of co-authors over the years. Importantly, for us amateurs to note, Wes is not a degreed paleontologist; he is an artist by trade. However, he has been the true guiding force behind the development and study of the Republic sites.

The Stonerose Center manages, curates and protects five sites in eastern Washington. It works with scientific institutions and paleontologists on a regular and constant basis. One of these sites is open to the public for a very nominal fee (US\$2 per person; \$3 per family) and collecting is allowed. **ALL** specimens must be shown to the curator (Lisa Barksdale) for determination of significance. Collectors are allowed to keep up to 3 non-significant specimens per day. If a specimen is deemed significant, the finder's name, address and phone number are recorded and kept with the fossil. Upon further examination by palaeobotanists or palaeoentomologists, the finder is notified of the disposition of the fossil, where it will be curated, whether it is published, etc.

The Republic sites are all lacustrine deposits of the Klondike Mountain Formation. The Klondike unconformably overlies Sanpoil volcanics which have been dated at about 52 to 51 Ma. The

Klondike is overlain by volcanics dated between 42 and 50 Ma. The lower Klondike, 300 m below the overlying volcanics is suggested to be approximately 49 Ma or Middle Eocene. [*The McAbee, B.C. locality has been dated to 48–50 Ma –ed.*]

The sites are internationally recognized as some of the finest sources of Eocene plant (leaf, flower and fruit) and insect fossils. Over 250 species of plants have been identified at Republic and an additional 200+ new taxa likely to represent new species or genera have been collected. This provides an unprecedented look at diversity in a floral community during the Eocene. As of 1992, the Republic area had provided over 546 insect fossils representing 13 orders and 27 families. In addition, a significant number of leaf fossils have been collected that show damage due to insects such as leaf borers, leaf-cutter ants, and caterpillars.

Some of the “firsts”:

- Oldest documented apple (*Malus*), cherry (*Prunus*), and red raspberry (*Rubus*).
- First major appearance of the Rosaceae, with genera of all four of its subfamilies present
- A *Paleorosa* blossom in chert provides the oldest known example of fossil rosaceous pollen in association with a preserved fossil rosaceous flower.
- Earliest Eocene record of North American mayflies and earwigs.
- First record of beetle eggs deposited on leaves.

Our first stop was at the public “Boot Hill” site, where a fresh exposure had been cleared the previous day for our visit. We spent about two hours clearing off overburden and nearby talus to reveal a section 4 metres long and 1.2 metres thick. The section dips at about 40 degrees, so we had a fairly easy go of it. Once the site was cleaned up, we divided into diggers and splitters. As fresh 1 to 2 cm thick slabs were chiselled and pried out, they went to the splitters who worked patiently with hammers and chisels to reveal many of the specimens collected. In all, about 1/2 tonne of material was handled and over 210 fossiliferous plates were collected.

We travelled to another site on Mount Elizabeth, north of Republic, the next day to collect in strata that has been rich in fossil leaves and fruits with some insects also reported. The section consisted of finely varved clays that split into wafers often less than 3 mm thick. Several insect wings and a few larvae were collected and some of the rarer plant species were found as well.

Later the second day, we went to a little-studied site on private land that had been the source of a fossil moth. The section exposure was tiny (about 0.6 m high by 1.2 m wide) after removing a lot of forest soil overburden to even see it. It produced some very nice specimens of very small flowers (4–6 mm dia.) and a few insect fragments.

All specimens collected during the weekend were examined by both Wes and Lisa, with all important fossils taken either for the Burke or Stonerose collections and possible description in papers. All other specimens were ours to keep.

Unfortunately, Jan and I were not able to stay through Monday, when Wes was going to identify everyone's specimens. However, he had provided each of us with a 4 cm thick binder with copies of papers on the Republic Flora, replete with plates of specimens. I will be photographing all of our specimens, which include 2 exquisite *Florissantia* flowers, a 1.5 cm insect wing (leafhopper?), several ginkgoes, and *Metasequoia*. If they turn out, I'll upload them to the CompuServe dinosaur forum library.

### Postscript

By the way, *Florissantia* is a fairly common fossil flower in the Republic area. It looks sorta like a morning-glory blossom. After seeing the flowers in Republic strata, we were really astounded; for it was several years ago when a young friend of ours was with us on a fossil collecting trip in the Chuckanut Formation, often described as being Late Cretaceous to Early Eocene in age (the age is currently disputed—it may be entirely Eocene and contemporary with the Republic sites). He found a fossil flower and graciously allowed us to keep it in our collection.

There is very little published information on the Chuckanut and its flora, and nowhere had I found any flower having been described. So it remained a mystery fossil for us, until this trip. We mentioned our flower to Wes during the weekend and offered to photocopy it and send him the image to compare with *Florissantia*. We did, he did, and here's what he had to say: "It certainly does look like *Florissantia*! That, or **any** fossil flower from this (Chuckanut) area would be a grand (and publishable) find!" Needless to say, we and Travis, the finder, are very excited. □

**Wes Wehr works with Jack A. Wolfe, of the USGS. A flower with pollen attached was found in the Princeton chert locality and was named... *Wehrwolfea*.**

## Your Society Collection

by Joseph LeBlanc

Our Society's fossil collection has received a good workout in the last few months. Specimens were on view at the Calgary Rock & Lapidary Show and at the Science Centre's *Dinomania Unhatched!* Some members viewed the collection first hand at my residence and all agreed that selected specimens should be brought to every meeting for the benefit of those in attendance.

I'm pleased to report that members have responded favourably to the request for new fossil specimens. A special thanks goes out to you "out of province" donors. Now that summer collecting trips have yielded new fossil treasures, please consider donating a specimen or two to your APS collection. Donations can be brought to our monthly meetings, sent to the APS address or, if reasonable, picked up by your curator, Harvey Negrich (tel. 249-4497) or myself (tel. 246-7601).

### New additions to the APS collection

1. Horseshoe Canyon Formation: Upper Cretaceous. Red Deer River, Alberta. Donor: Roslyn Osztian  
*Metasequoia* cone (conifer)
2. Chickamauga Group. Ordovician. Anderson County, Alabama. Donor: Dewey Foulk (of Knoxville, Tennessee)  
*Dinorthis holdeni* (brachiopod)
3. Waccamaw Formation: Upper Pliocene. Horry County, S. Carolina. Donor: Rita McDaniel (of Surfside Beach, S. Carolina)  
*Chione latilirata* (clam)  
*Chione cancellata* (clam)
4. Canepatch Formation: Middle Pleistocene. Horry County, S. Carolina. Donor: Rita McDaniel  
*Argopecten eboreus* (scallop)  
*Terebra dislocata* (snail)
5. Castle Hayne Formation: Eocene. New Hanover County, N. Carolina. Donor: Rita McDaniel  
*Plicatoria wilmingtonensis* (brachiopod)
6. Thanks to Vaclav & Mona Marsovsky for the donation of a piece of Cretaceous ammonite, *Placenticerias meeki* from the recent APS field trip to Manyberries, Alberta and for the donation of a fossil plant specimen from Grassy Mountain, Alberta. □

# A Trip to see Scotty the *T. rex*

by Vaclav Marsovsky

All of Scotty is expected to be out of the ground by mid-September '95. It took two summer field seasons to get him out.

The site is located about 45 minutes southeast of Eastend, Saskatchewan, on private land. A local tour operator conducts trips to the quarry in vans. It is believed to be the only *T. rex* excavation ever opened to the public. Until now, only 12 *T. rex* skeletons, including Scotty, have ever been found. The quarry is in a offshoot valley of the main Frenchman River valley.

It is fortunate that we are here in the correct erosional time frame. The *T. rex* rests at the bottom of a gully at the base of the badlands. Had it been a couple of metres lower it would be below the valley floor. We would have had to wait a few thousand years for the valley floor to erode to that level and expose the fossil.

The fossil remains were first discovered by a local school teacher and a couple of palaeontologists prospecting in the badlands in 1991. The significance of the find was not apparent to them and the fossil remained *in situ* until the spring of 1994. The excavation has been ongoing ever since, with a crew made up mainly of volunteers. A base camp for the workers has been set up about half a kilometre away. The area still holds many surprises: remains of the "common" *Triceratops* were found just a few metres from the camp.

By the 1995 Labour day long weekend Scotty had been dissected into five blocks at the site, with more of him back at the lab in Eastend. Two blocks sitting outside of the quarry were in plaster jackets ready to be shipped out. The first was larger, about the size of a VW beetle weighing several tons. The second block was smaller and apparently contained the skull. A team of horses was used to flip the blocks over to coat the undersides with plaster. Still in place in the quarry, the last remaining bit of the pedestal is being cut into three smaller, more manageable blocks by trenching. Fossils were visible on top of the blocks covered in preservative. The three mini blocks were each about half a cubic metre in volume. A 10-pound sledge hammer and a good-size chisel were in use to cut the trenches. The temperature in the quarry was 36°C and there was no shade on this particular day.

The lower portion of the excavation cross section consisted mainly of sandstone—possibly a sand bar—representing a slowing of the current in a stream channel, where the sand and carcass had been dumped. The bones were mixed up, indicating tumbling of the body parts along the stream bed until it came to rest here about 65 or 66 million years ago. No articulation was visible on the blocks still *in situ* although, back at the lab in Eastend, a half-metre section of the sacral vertebral column was being prepared, and it was articulated. Although estimates are very preliminary, it is thought that the skeleton is 70% complete. As for size, Scotty comes in at "medium."

The matrix holding the fossilized bone is hard ironstone. One technician explained it will be

difficult to get the matrix removed from the fossil. They expect to take two to three years to prepare Scotty. A copy will be produced and erected for local display. Funds are being raised to construct a proper facility for the exhibit. Preparation of the fossil has started at the lab in Eastend. A small admission is charged to the

**Had the skeleton been a couple of metres lower, we would have had to wait a few thousand years for the valley floor to erode to that level...**

lab. Inside there are a few fossils on display, a possible *T. rex* coprolite (dung), and a writeup about the discovery. The public can also watch technicians prepare Scotty and other fossils found in the Frenchman Valley. The working lab is behind glass much like at the Royal Tyrrell Museum. What sets this small museum/lab apart is that all fossils on display are *real* instead of the usual copies. The real fossils have not been put in cabinet drawers—not yet anyway. Three teeth, about five inches long, are on display. They are beautifully preserved, with serrations like those on the edge of a quarter coin clearly visible along both edges. One nine-inch tooth—the size of a banana—was being prepared for a mould to make future replicas. About half its length was smooth and would have projected from the jaw; the other half would have been anchored in the jaw bone and was rough. All these teeth were found loose when the blocks were flipped. It makes one wonder how complete the skull is, having all these teeth shaken out of it.

I am sure we will be hearing more about Scotty in the coming years. □

## A Visit to the American Museum of Natural History Dinosaur Halls

by Heather Whitehead

I recently paid a long-postponed visit to New York City, to see friends and to experience the newly reopened Dinosaur Halls at the American Museum of Natural History. The exhibits have had several major changes—remounts of old favorites such as *T. rex*, regroupings of dinosaur displays into the Hall of Ornithischian Dinosaurs and the Hall of Saurischian Dinosaurs, updating of information panels, and of course the dramatic rearing *Barosaurus* with an attacking *Allosaurus* displayed in the main entrance hall.

Despite it being a weekday, the Museum was busy, and the dinosaur halls were packed wall to wall with families and groups of children. I decided against trying to read most of the information panels, and gave up early on the CD-ROM displays (just TOO crowded!) Instead, I studied the bones, the overall display effects, and picked out special items to bring me back sometime in the future.

My favorites (not all are original material) included: the wonderful *Apatosaurus* skeleton (jauntily portrayed on a great t-shirt from the Dino-Store); the Paluxy River tracksite slab; a two-sided panel mount of a *Corythosaurus* skeleton, showing skin impressions on both sides; a papier-mâché reconstruction of the head of *Pachycephalosaurus*, with a very intelligent-alien look about it; the giant arms of *Deinocoelurus*; and the familiar baby shape of *Hypacrosaurus*, from Devil's Coulee, Alberta. This last item is just one example of the wealth of Alberta dinosaurs at the AMNH—it seemed half of the dinosaurs on display came from the banks of the Red Deer River. I had an interesting discussion with another visitor about crested duckbills and possible uses for the crests—he was an engineer, and thought the crests were (“obviously,” he said!) primarily temperature regulators/heat exchangers, with other functions arising incidental to this.

It isn't fair to judge the AMNH against the Royal Tyrrell, which I know much better, but my initial reaction is still a preference for the RTMP. The habitat groupings and the dramatic murals at the RTMP convey a stronger feeling of dinosaurs as living animals rather than museum specimens. But, since I am much closer geographically to the AMNH than to the RTMP these days, I look forward to returning many times to its Dinosaur Halls. □

## Reviews

**Dinosaurs in the Halls** by Corey S. Powell, *Scientific American*, June 1995, pg. 26.

The new dinosaur halls at the American Museum of Natural History at New York City were opened in June with reconstructed skeletons, renovated rooms and sleek glass-panelled displays. Visitors stroll along a bushy evolutionary tree. *Apatosaurus* has a new head, four additional neck vertebrae and a tail-in-the-air pose. *Tyrannosaurus rex* is now in a stalking pose. Eighty five percent of the material on view is real, not casts or replicas. The purpose is to bring you into contact with the cladistics going on behind the scenes.

—Les Adler

**This View of Life: Of Tongue Worms, Velvet Worms and Water Bears** by Stephen Jay Gould, *Natural History*, January 1995, pp. 6–15.

Most of us are conscious of only a few zoological phyla during our lifetime as we stay out of water, keep close to a city or are not involved with fossils. As palaeontologists we gradually extend our range of acquaintance with some of the many other phyla.

In this essay Stephen looks at phyla rarely encountered by anyone, yet their existence during a brief portion of the Cambrian explosion, 535 to 530 million years ago is worthy of a palaeontologist's attention. The Cambrian explosion is more extensive in scope and exclusive in effect than heretofore recognized, even by its partisans. Data have been published in 1994 by two German palaeontologists, Dieter Walossek and Klaus J. Muller of Bonn.

Three minor phyla, the Onychophora or velvet worms, the Tardigrada or water bears and Pentastomida or tongue worms are placed near the arthropods. These three phyla provide an excellent case for testing the hypotheses that phyla continued to originate through time and that the Cambrian explosion is not as exclusive as the fossil record might suggest. Onychophora have been found in the Burgess Shale. Walossek and Muller have discovered Cambrian fossils of tardigrades and pentastomes in Swedish and Siberian Cambrian deposits, so all three phyla go back to the diversification of multicellular life in the Cambrian explosion. Until this paper, neither tardigrades nor pentastomes had any recognized fossil record at all. Long discussions follow on the structures of these phyla. Gould discusses findings from changes in RNA patterns over about 530 million years which suggest that the basic

anatomies that arose during the Cambrian explosion have dominated life ever since with no major additions except the Bryozoa in the Ordovician Period. —Les Adler

**Raptor Red** by Robert T. Bakker. Bantam Books, US\$21.95 (about CDN\$30).

Bakker's first novel should be in bookstores now. It describes the "real-life drama of a young dinosaur." The book was reviewed in a full page article in *Entertainment Weekly*, no. 289/290, August 25/September 1, 1995, p. 103-104. *EW* calls it "a pure delight," describing a world that "is both beautiful and enchanting, eerie as anything you'll find in the best science fiction," and "the coolest time machine on the lot." I can't resist their description of the book as a Lost World soap opera—I will be looking for a copy on my next bookstore trip!

**P.S.** Bought it. Read it. Loved it! Started the book on the bus on the way home from the bookstore. Finished it at one sitting, with a smile on my face throughout. I hope there will be a live-animated or CD-ROM version of the story someday!

—Heather Whitehead

**Fossils of the Flaming Cliffs** by Michael J. Novacek, Mark Norell, Malcolm C. McKenna and James Clark. *Scientific American*, December 1994, pp. 60–69.

McKenna is a professor of geology at Columbia University; Clark is an assistant professor of biology at George Washington University; Novacek, Norell and McKenna are curators of vertebrate fossils at the American Museum of Natural History, and explore the Gobi Desert during the summer for dinosaurs, fossil lizards and small mammals. The specimens are often complete and beautifully preserved. The animals died during dust storms and have re-emerged 80 million years later almost undisturbed.

In 1922, Roy Chapman Andrews of the American Museum of Natural History accidentally came across a fantasy of red cliffs and fossils on a vast plain north of the Gurvan Sarchen Mountains. He returned to these cliffs several times to find dinosaur eggs. Western expeditions did not return for 60 years. In the meantime Russian, Mongolian, Polish and Norwegian groups collected fossil vertebrates. Since 1990 Japanese, German and American parties have collected in Mongolia.

In the 1993 season the American team found 100 dinosaur skeletons in the "Brown Hills," including 25 theropods such as *Tyrannosaurus*,

*Allosaurus*, and *Velociraptor*, as well as *Estesia*, as very large lizard. The Gobi material represents the world's reference collection for Late Cretaceous mammals. The skulls of *Velociraptor* contain a braincase similar to that of modern birds. *Mononychus* bird skeletons also occur here. Accumulations of *Protoceratops* specimens including juveniles occur here. Specimens occur in large isolated areas and it is not possible to determine the age of the strata due to a lack of volcanic activity in these areas. Dating is done by comparison with reference faunas from other continents. The Cretaceous-Tertiary boundary is absent. Sandstorms still have to be endured and traveling is difficult, but satellite communications are now available. Once a sandstorm clears, the field crews can continue to look for the secrets of the rise and fall of dinosaurs and other biological empires amongst the square miles of fossil-rich badlands. —Les Adler

**The Collector** by Liz Brosius, *Earth*, February 1995, pp. 50–57.

This article is accompanied by seven colour photos of fossil insects plus a colour chart showing the evolution of insects in four stages, involving several insect orders and twenty-five different families. The four stages are:

- (i) appearance of wingless species
- (ii) development of wings
- (iii) evolution of wing folding
- (iv) evolution of complete metamorphosis.

The main article is a biography of Frank Carpenter who spent 70 years collecting fossil insects and is the sole author of the volume on fossil insects in the *Treatise on Invertebrate Palaeontology*, the definitive series on invertebrate fossils.

Carpenter was fortunate in that he made contact with two experts very early in life. One through a photograph of a fossil insect in a book and the other because his postman happened to be a collector and noticed the mail that he was delivering. Then a professor donated books to Carpenter. Carpenter personally studied diligently and was able to gain university entrance and then later was appointed curator to the Harvard University fossil insect collection, one of the world's greatest. Through perseverance he made a great collection of fossil Permian insects at Elmo. He taught biology and the evolution of insects from 1936 to 1973. If you read the full article after this short review and look at the photographs of the specimens then you too might want to follow in the footsteps of Carpenter and collect and write on fossil insects. —Les Adler □