

# Alberta *Palaeontological Society* Bulletin

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# ALBERTA PALAEOLOGICAL SOCIETY

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\* These positions are currently unfilled. Persons listed are acting Officers or Directors on an interim basis only.

†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	\$15.00 annually
Family or Institution	\$20.00 annually

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## UPCOMING APS MEETINGS

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

**Friday, October 17**—Dr. Terry Poulton, Geological Survey of Canada:  
"Mechanisms for professional and amateur interaction in palaeontology."

**Friday, November 21**—Dr. Len Hills, University of Calgary:  
"The discovery of a frozen ancient bison in the Rocky Mountains" (tentative)

**Friday, December 19**—Wayne Braunberger, APS President: (topic to be announced)

**ON THE COVER:** The giant fusulinid foraminiferan *Yabeina columbiana* (Dawson) in Permian Marble Canyon Limestone, Marble Canyon, British Columbia. Photographed from an acetate peel, magnified 15 times. Collected and photographed by Howard Allen.

# President's Message

by Wayne Braunberger

Well, once again another summer is over. Three successful field trips were held, although there were some organizational problems with the Medicine Hat trip which were overcome. At our September meeting I look forward to seeing some of the specimens collected on the various trips and hearing about your adventures over the summer. The meetings are a great way to learn more about the specimens you have found. Someone present may know about the area or have some experience with identifying the types of specimens that you have.

Elections were held in May and some new faces will be on the Board for the coming year. **Vaclav Marsovsky** is the new Vice-President and **Cory Gross** has taken on the position of Social Director. The positions of Treasurer and Membership Director are currently vacant. **Les Adler** (Past-President) is currently filling in as treasurer and Vaclav is still keeping up with the memberships. As well we still need volunteers to help out each of the directors. Hopefully the revised by-laws will be completed this fall. Among other things we are proposing to revise the makeup of the board to better reflect our activities. When the final version is complete copies will be made available for critiques.

Last year we did not hold any seminars. I think seminars and educational classes should be an integral part of our winter activities and this is one area where we could do some great things. Unfortunately we have not found a suitable place to hold them. Once again I would ask if anyone has any ideas about where we could meet please let me know. In particular we would like to hold seminars on preparation and casting. If someone is interested in coordinating the seminars that would be very helpful as well.

For the coming year I hope we can continue to build on our successes. **Kris Vasudevan** is doing an excellent job as Program Director and he has some interesting talks and activities lined up for us again this year. **Les Fazekas** will be looking for new field trip ideas. One of the problems we face is that there are only so many locations within a reasonable distance from Calgary for one and two day trips. If you have ideas for new trips or would like to revisit old sites please let Les know. I think last year was very good and very much look forward to this coming year. □

# From the Editor

## The Moron Factor

by Howard Allen

I just read something very interesting—and disturbing. The following item appeared in the Summer 1997 edition (Issue 11) of *Trackways*, a publication of the Royal Tyrrell Museum Cooperating Society, with no byline; I've reprinted it here in full:

### It's The Law

Some people may feel the laws governing collection and ownership of fossils in Alberta are too restrictive. Here's a good example of why such laws exist:

In October 1996, an important site in Horsethief Canyon just outside Drumheller was brought to the attention of the Museum by Frank Hadfield, a local collector working under permit in the area. Permits of this nature are given only to professionals collecting for public institutions such as universities and museums. Over the years, Hadfield has brought many important specimens to the Museum's attention and is trained in proper excavation techniques and procedures.

Fossils from the site indicate the specimen was a small *Albertosaurus*. Still in place at the site were the maxilla (upper jaw) with teeth, another possible skull bone, ribs, gastralia and a limb bone. This indicated the possibility of a skeleton. The specimen was located in a spot where Dr. Philip Currie, Dinosaur Curator at the Museum, thought it would escape notice and be safe until it could be properly excavated in the spring. The bones were jacketed with plaster to survive the winter.

It was a harsh winter and spring was late. It was April 16 when the Tyrrell crew was finally able to get back to the site. One of the plaster jackets had pulled or washed off, but no other changes were evident.

On May 3, Currie visited the site again and discovered the specimen vandalized. Both plaster jackets were down the hill. The maxilla, some teeth and at least one other bone had been taken. The exposed limb bone was smashed. The two holes where the bones had been taken were mudded over, indicating that the deed had been done before the last rain on Monday, April 21. It appears someone had found and recognized the bones and claimed them for themselves.

The theft and vandalism were reported to police but all of the evidence had been washed away in the rain. With the vandalism, the specimen lost much of its scientific significance, leaving the Museum to salvage what's left.

Is it right for individuals to destroy important scientific specimens so they may have a trophy to show friends or make a few bucks? We don't think so either.

This is "a good example of why such laws exist"? You've got to be kidding! By what logic? What did the current anti-collecting law accomplish in this instance? *Nothing*.

On the contrary, this is a clear example of why such restrictive collecting laws are a counter-

productive and ultimately worthless approach to a problem.

We've heard it said, time and again, that you can't legislate against stupidity—or, more precisely, you *can* legislate against stupidity, but it won't have any effect. No matter how many laws you pass, morons will be morons. It's a simple fact of life. If this incident is a "good example of why such laws exist," I think the Alberta Government has wasted my tax dollars legislating against stupidity.

No, it's not very "p.c.," but let's face it: the problem we're dealing with is morons. It's not cynicism, it's realism. Just ask the good folks at Calgary Transit: if you put up a nice, new glass-walled bus shelter, sooner (rather than later), some morons are going to drive by and shoot the glass out of it. The destruction that took place at Horsethief Canyon was the very same thing. I can state with confidence (if it isn't already obvious) that this was not the act of a responsible collector. It was the act of morons. Who can argue? Look at the facts: "...both plaster jackets were down the hill...the exposed limb bone was smashed..." I personally know scores of *fossil collectors* (I'm one myself). This sort of vandalism would sicken any of them. It was an act of morons, plain and simple.

Now with these facts in mind, let's take another look at the sorry sequence of events that resulted in the destruction of the *Albertosaurus* specimen, and what could have been done differently to prevent the situation—not by ostracizing and driving conscientious (and potentially helpful) collectors underground, but by taking steps to mitigate the "Moron Factor," which we have by now (I hope) pinpointed as the real problem:

- *The specimen was located in a spot where Dr. Philip Currie, Dinosaur Curator at the Museum, thought it would escape notice and be safe until it could be properly excavated in the spring.*

Wrongo. But hindsight is 20/20, right? Nuff said.

- *The bones were jacketed with plaster to survive the winter.*

What went wrong here? Couldn't afford a neon sign? If the bones couldn't be removed before winter, what about triangulating the location, then covering the site with natural-looking rocks/dirt/whatever? Is plaster really going to be that much better than dirt, over one cold, dry Alberta winter? A lot of good it is against vandals. And while we're on the topic, could the exposed pieces not have been removed during the fall? Plainly, a formal ex-

cavation project is the preferred method of removal, but *keep in mind the Moron Factor*. Would it really have been so anti-scientific to have carefully photographed the positions of the exposed specimens, then remove the flashiest ones, and cover the rest up with dirt? What's the worst damage that competent museum staff could do? Would it be worse than finding half the specimens lost, and the rest smashed and strewn across the countryside?

- *It was a harsh winter and spring was late. It was April 16 when the Tyrrell crew was finally able to get back to the site. One of the plaster jackets had pulled or washed off...*

"...a harsh winter and spring was late..."  
Welcome to Alberta. All the more reason why the fossils should have been protected early. It appears the plaster jackets were very useful.

- *On May 3, Currie visited the site again and discovered the specimen vandalized.*

Why did it take nearly three weeks after one of the plaster jackets had been found damaged to return to the site? Didn't the first instance of damage inspire any sense of urgency? How long were museum staff willing to tempt fate? What if the specimen hadn't been vandalized by May 3? Would the fossils have been left for another three weeks?

This whole sorry incident reads like a comedy of errors, but for its tragic outcome. How were amateur fossil collectors to blame for any of this? Realistically, it's hard to blame even the vandals for what went wrong here. Again, remember the Moron Factor: if you leave something valuable lying around unguarded for months on end, and even advertise the fact with a great white gob of plaster, what do you really expect is going to happen?

The trouble with excessively restrictive collecting laws is manifold: firstly, they don't have any effect against the real culprits, *viz*: morons. Morons don't obey laws, especially those that are as unenforceable as the current law. The only effective way to combat the Moron Factor is to employ common sense and thereby keep a step ahead of trouble.

Secondly, conscientious amateurs are driven underground, and become unwilling to report finds, for fear of confiscation or worse; potentially important discoveries will never be more than "a trophy to show friends" (to quote the article), as long as the collector is forced to hide his/her specimens like contraband. And I'm not just talking about dinosaurs—dinosaurs were obviously the

main focus of the law, but since this sledgehammer approach applies to essentially all fossils, how many important new brachiopods, or crinoids, or ammonites have been kept away from the eyes of professional researchers? Can anybody tell me—with a straight face—that the Tyrrell Museum, with its limited funding and staff (remember, they couldn't even keep tabs on a possibly complete dinosaur skeleton that was only a twenty-minute drive from the museum) is going to mount an expedition to excavate a single brachiopod that some amateur found *in situ* somewhere on a remote slope in the Rocky Mountains? And does anybody believe that passing a law is going to instantly stop hundreds of active amateurs from pursuing their interest in palaeontology? As nice as the Tyrrell Museum's public displays and inaccessible cabinets no doubt are, they're no substitute for exploring, discovering and studying fossils first-hand, which is what amateur palaeontologists *must* do.

Thirdly, this sort of law creates an “us-and-them” mentality, where “us” includes only a tiny clique of professionals and their immediate assistants, and “them” includes everybody else on the planet. This is how intelligent amateurs, eager to help, get lumped together with morons, in the eyes of the “us” camp.

I think that a more fruitful approach would be to keep the regulations in place for major vertebrate material (*in situ* skulls, articulated bones) and—though I will no doubt tread on some toes here, but it's my opinion—continue to restrict commercial collecting. Next, declare a truce with the amateurs, invite them to the Museum to meet staff, discuss mutual goals, and generally clear the air; then encourage the amateurs to explore the province—with guidelines in place for the safe handling of fossils—and to share their finds with the professionals (most amateurs would like nothing better) in an atmosphere of cooperation and trust. Everyone would benefit from such an arrangement, and a much bigger force would be created to keep a step ahead of the Moron Factor. Perhaps this scenario is too Pollyanna. I hope not.

*Is it right for individuals to destroy important scientific specimens so they may have a trophy to show friends or make a few bucks? We don't think so either.* Nor do we, the responsible amateurs. But if “The Law” in its current form supposes that it can prevent the sort of vandalism portrayed in the *Trackways* article, then—as Bumble in *Oliver Twist* affirmed—“if the law supposes that, the law is a ass—a idiot.” Or, if you prefer, a moron. □

## Dr. Ostrom Speaks on New Chinese “Feathered” Dinosaur

by Vaclav and Mona Marsovsky

Dr. John Ostrom of the Yale Peabody Museum spoke at the Royal Tyrrell Museum on June 8, 1997. Dr. Phillip Currie of the Royal Tyrrell Museum introduced Dr. Ostrom as one of the people responsible for the current characterization of dinosaurs as active creatures. It was Dr. Ostrom's description of the raptor *Deinonychus*, in 1964, that ignited renewed interest in dinosaurs and theories about warm-blooded dinosaurs. Over the years, Dr. Ostrom has pursued feathered theropods and the origin of birds across the world. Dr. Ostrom noted that the article “Nestling Fossil Feeds Bird Link” had just been published in *USA Today*, describing a new find in central Spain, one that he would like to investigate.

*Archaeopteryx*, the oldest confirmed bird, lived 150 million years ago at the Jurassic/Cretaceous boundary. Originally three specimens were found in the lithographic limestone quarry in Solnhofen, Germany.

The photo of the recently found Chinese “feathered” dinosaur, *Sinosauropteryx prima* (illustrated in October, 1996 by APS member Mike Skrepnick) inspired Dr. Ostrom to endure four months of red tape to convince the Chinese authorities to allow him see both the specimen and where it came from. After a twelve-hour train ride north east from Beijing, he arrived at the fossil's locality. His slides showed a treeless, grassy, rolling topography with spotty exposure of strata. Creeks had cut into the sediment forming cliffs from which the fossil was quarried. The thin-bedded freshwater lake sediment (1500 m thick), interbedded with volcanic ash, had preserved the details of the “feathers.” He also spent one week studying one half of the specimen in Nanjing and another week examining the other half in Beijing. After careful analysis of the “feathers,” Dr. Ostrom admitted that he really did not know if they were “feathers,” a proto-feather, hair, or some kind of very fine fibers. A chemical analysis will be required to resolve the issue. The preservation of that specimen was almost as good as the original *Archaeopteryx*.

Dr. Ostrom showed slides of the nine



*Archaeopteryx* specimens found to date, including the London specimen from Solnhofen (found 1861), the Berlin Solnhofen specimen (1877), the Maxburg specimen (1955, in a private collection and lost from public view), the Tylers Museum in Holland find (originally mislabeled as a pterodactyl), the Eichstatt Germany specimen, the Burgermeister Museum specimen in Solnhofen and the smallest (blue jay-sized), found just two weeks after he had visited the Solnhofen quarry.

Dr. Ostrom described the anatomy required for powered flight. Modern birds have a slightly different humerus structure than *Archaeopteryx*, allowing the wing to be streamlined on the upstroke. This and other observations allowed him to conclude that *Archaeopteryx* could not perform powered flight.

Dr. Ostrom concluded that more Chinese “feathered dinosaurs” are sure to be discovered, given the large size (half the size of the state of Connecticut) and thickness (1500 m) of the formation from which the *Sinosauropteryx prima* was found. □

## 1997 Field Trip Reports

### Bighorn Creek, Alberta (June 21)

Twenty-five members of the Society travelled to Bighorn Creek for a one day field trip. Bighorn Creek is located on the Ya Ha Tinda north of the Mountaineer Lodge (west of Sundre, Alberta).

The sky was mostly overcast with some sunny breaks. In the afternoon there were several rain showers, with one at about 3 o'clock that drenched those not under cover. Water levels were low, allowing easy access to the outcrops along the creek.

Several locations along the creek expose different members of the Jurassic Fernie Formation. Molluscs (ammonites, belemnites and bivalves) are the most common fossils in these beds and everyone was able to find a specimen or two. Most of the ammonites found are preserved as imprints in the shale. They were difficult to see on the black shales and almost impossible to see when wet. Some three dimensional specimens were found but these were pyritized so that only the external shape was preserved. All internal and most external structures and ornamentations had been destroyed during the fossilization process. The belemnites in the area are generally well-preserved three dimensional specimens, though badly fractured, so that it was difficult to find a complete example.

– Wayne Braunberger

### Medicine Hat area, Alberta (July 19)

Approximately 30 APS members assembled at the Red Rock Coulee Natural Area, southeast of Medicine Hat. The objective was to study the Bearpaw and underlying Dinosaur Park Formations. APS life member **Hope Johnson** briefly introduced the site.

The Bearpaw Formation is a marine deposit of Late Cretaceous age. Massive red marine concretions, some as large as three metres in diameter, dot the upper portion of the coulee. Ammonites and marine reptiles are found in this formation. The underlying Dinosaur Park Formation, also Upper Cretaceous, is terrestrial and has especially good microsite preservation for teeth, gar scales and turtle shell. The hot, sunny weather lasted all day and made us really appreciate shade and cool breezes.

The next morning, about 25 Society members met at the Sandy Point campground on the South Saskatchewan River near Empress. The fragmentary dinosaur remains in the Dinosaur Park Formation in this area were more poorly preserved than those found in the Red Rock Coulee area. Both the APS members and the rattlesnakes enjoyed the hot, sunny weather.

– Mona Marsovsky □

## A Note of Thanks

by Harvey Negrich

I have taken a moment to thank **Jean and Emmette Wallace** of Temple, Texas. These people have been Society members of long standing. It seems that they were frequent visitors to our area before the APS was formally set up; they would have been charter members if they lived in our area. Over the years they have helped many of our members find fossils not only in Texas but in many other states as well.

It appears that Emmette cashed in some of his “loonies,” leaving him with a bundle of the large, canvas coin bags that I brought back from Texas. The bags were of different sizes and are useful in collecting fossils. Many of them were stamped with a coin value and the name of the bank that circulated them. These bags were common thirty years ago but I have not seen any since the eighties. The bags are even a keepsake for those inclined. About seventy of these bags were passed out to members at the regular meeting of APS in May of 1997 and many happy people expressed a personal thanks to pass on to Emmette & Jean. □

# Dr. Bob Bakker Entertains at the Calgary Zoo

by Vaclav and Mona Marsovsky

Dr. Robert Bakker quizzed his audience at the Calgary Zoo on June 5, 1997. He stressed the importance of visiting zoos for studying animal anatomy and movement. He challenged the audience to identify the animals in his sketches. The dinosaur uncles (thecodonts), *Rutiodon* (225 million years old (MY)), *Desmatosuchus* (220 MY) and *Cheirotherium* (210 MY) were quickly identified by some of the shorter palaeontologists in the audience (how do these kids know the names of all these animals?). The *Anchisaurus* (190 MY) was a true dinosaur, which led to the discussion of the characteristics of a dinosaur (S-shaped neck, high long ankles, legs under the body, land dwelling, 3 fingers on hand and no pinky fingers). These characteristics were analyzed in the sketches of *Struthiomimus* (76 MY), *Pteranodon* (78 MY, not a dinosaur), *Diplodocus* (144 MY), *Utahraptor* (120 MY), and *Centrosaurus* (76 MY).

Dr. Bakker briefly traced the history of paleontology, starting from the 1676 discovery of a dinosaur knee, the 1840 coining of the term *dinosaur*, “terrible lizard” by Dr. Owen, and the 1844 discovery of the first complete dinosaur skeleton.

A dinosaur skull has four holes instead of the normal three (nostril, eye, ear), the extra hole

being in front of the eye. Dr. Bakker noted that only birds have this extra hole, which is filled with air and connected to air passages throughout the skull and skeleton, and attached to air sacs in the body cavity. These air-filled passages make birds twice as efficient in breathing as mammals. A vulture can fly as high as 36,000 ft. while mammals pass out at 19,000 ft. Dr. Bakker showed a sketch of a dinosaur flying at high altitude, an advantage of its “extra” air passages.

Thecodonts were the early dinosaurs. They had five fingers. Three fingers had claws, while the pinky finger and fourth finger lacked claws. The inside finger (i.e. the thumb) is always labelled as digit #1, while the pinky is #5. The meat eaters lost the two fingers that lacked claws (namely #4 and the pinky, #5). Dr. Bakker said the raptors probably climbed trees and it was

then a short hop to the development of flight and the descent of birds from dinosaurs. He said: “*T. rex* is an extremely big poultry with a bad attitude.”

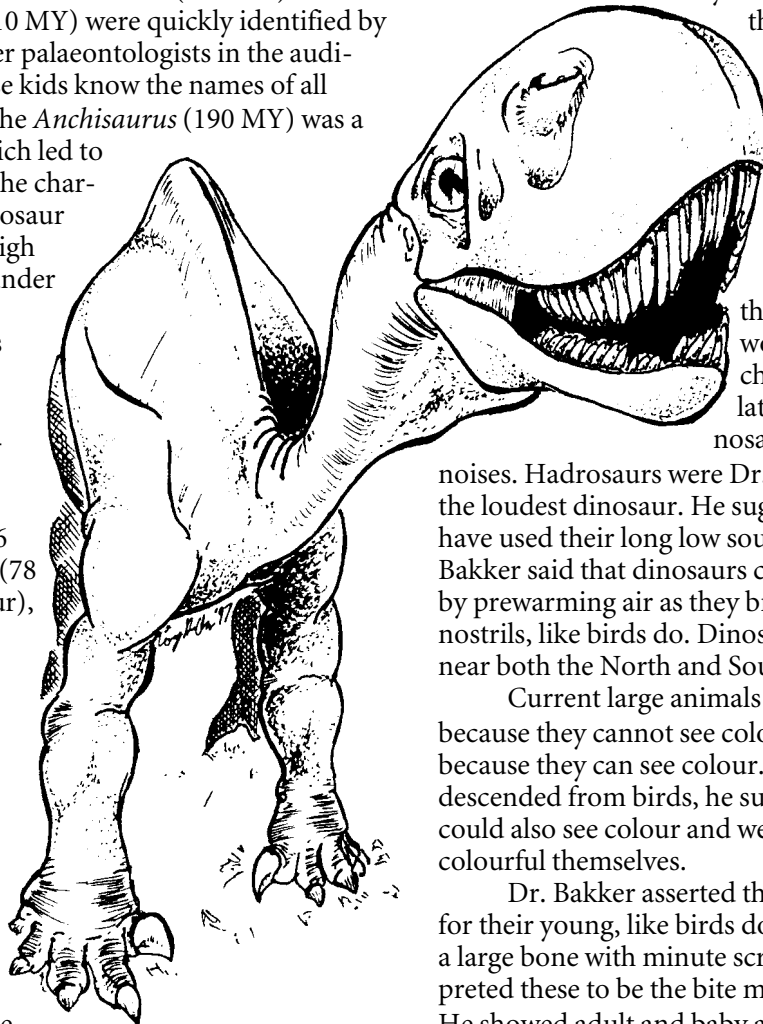
The big holes in the nostrils of a dinosaur would act like an echo chamber which on exhalation could allow dinosaurs to make different

noises. Hadrosaurs were Dr. Bakker’s choice for the loudest dinosaur. He suggested that they could have used their long low sound as a weapon. Dr. Bakker said that dinosaurs could live in cold areas by prewarming air as they breathe through their nostrils, like birds do. Dinosaurs have been found near both the North and South Poles.

Current large animals are only grey in colour because they cannot see colour. Birds are colourful because they can see colour. Since dinosaurs were descended from birds, he suggested that dinosaurs could also see colour and were therefore probably colourful themselves.

Dr. Bakker asserted that dinosaurs did care for their young, like birds do. He showed a slide of a large bone with minute scrape marks: he interpreted these to be the bite marks of baby allosaurs. He showed adult and baby allosaur teeth recovered from the same Wyoming quarry. He concluded that this find meant that the parent allosaurs brought food to the nest for the babies.

It had been proposed that *Diplodocus* stood up on its hind legs to reach food. Dr. Bakker noted



that *Diplodocus* had bird-like air sacs in its body to lighten the load. Its strong back legs would allow the hips to be a pivot point and lift the animal like a drawbridge. *Diplodocus* also had extra gut supports that were useful while the animal was rearing up. The perceived problem with this theory was that a very big heart and high blood pressure would be required to pump blood to its head. The supply of blood to the brain was still limited, even with a large heart. Dr Bakker said: “No brain, no problem.” He characterized the *Diplodocus* as the Beavis and Butthead of the dinosaur world, the “Jurassic Weenie Brain.” He theorized that *Diplodocus* had evolved a smaller brain to allow the brain to go longer without blood. The lower intelligence was compensated by staying in herds for protection (like the “group intelligence of teenagers in a mall”).

Dr. Bakker finished up with the rest of his dinosaur quiz. *Parasaurolophus* (74 MY) could not be part of a bowling team because it did not have a thumb. It had evolved from *Iguanodon* which had a spike-thumb. The hadrosaurs lost the spike-thumb since they did not need it for protection (sound was their weapon). Sketches of *Albertosaurus* (74 MY) and *Stegoceras* (74 MY) completed the evening. The screenplay of Dr. Bakker’s book *Raptor Red* could be in the movie theatres as early as this fall (1997). □

## Fossils in the News

[Thanks to Les Adler, Harvey Negrich, Sam Richter, Vaclav Marsovsky, and especially **Trudy Martin** for providing clippings. –ed.]

*Calgary Herald*, July 9, 1997:

### **Dinosaur footprints found in Australia**

SYDNEY—Erosion by cyclones has exposed a wealth of dinosaur tracks at a seaside locality on the remote northwest coast of Australia, near Broome. Palaeontologist Tony Thulborn of the University of Queensland says the footprints are Cretaceous aged (115–120 million years old). The footprints number in the thousands, and range in size from a few centimetres to two metres [sic], representing at least a dozen different animals. Says Thulborn: “By world standards it is an extremely rich, exceptionally diverse and very, very important dinosaur track site... What is unique about the site is the abundance of footprints. They are all over the place, some of them superbly preserved. All the footprints are there as if they were formed yesterday.”

*Calgary Herald*, August 11, 1997:

### **Dino-egg discovery largest in Canada**

WARNER, Alberta—The Devil’s Coulee egg site has given up yet another prize to palaeontologists excavating at the site. A nest of ten hadrosaur or ceratopsian eggs was discovered by Wendy Sloboda while dusting the ground around a single egg specimen, in the company of a Japanese film crew. The nest was to be left in place over the summer for the benefit of tour groups, then excavated in the fall for further study. [A later article, dated September 10, reports that two more eggs were found in the nest, for a total of twelve – ed.]

*Calgary Herald*, August 20, 1997:

### **\$6M museum to showcase Burgess Shale fossils**

FIELD, B.C.—This tiny town on the Trans-Canada Highway in Yoho National Park is to be the site of a new museum and research centre slated for opening July 1, 2000. The centre’s focus will be on the fossils of the world-famous Burgess Shale quarry, located only a few kilometres from the townsite.

*Calgary Herald*, August 23, 1997:

### **Palaeontologists dig up ice-age remains around Medicine Hat**

MEDICINE HAT—A team from the Alberta Provincial Museum in Edmonton has been busy excavating the remains of more than eight ice-age mammals from the banks of the South Saskatchewan River. The fossils, dated to between 500,000 and 1.6 million years, were recovered from a single 4x5-metre excavation. Sixty-eight fossils were removed from the site, including the remains of camels, horses, mammoths, prairie dogs, antelopes and a giant ground sloth. Says Jim Burns, curator of ice-age fossils at the Provincial Museum, “I’m surprised at the variety of animals that we’ve managed to come up with. I think this will go a long way to help us understand what was going on here a half-million years ago.”

*The Calgary Sun*, May 22, 1997:

### **Gout made T. rex mean**

LONDON—A report in the journal *Nature* suggests that gout, a painful joint inflammation, may have resulted in ill-tempered *Tyrannosaurus rex* specimens stalking the landscape of Cretaceous North America. Doctors at the Arthritis Centre of Northeast Ohio have found evidence of gout in the arms and legs of *T. rex* fossils. Gout is caused by an accumulation of the metabolic chemical urate,



which in turn causes the growth of new bone tissue on bones and joints.

*Calgary Herald*, April 26, 1997:

### **Serpents & Sea Monsters: paper challenges accepted genesis of snakes**

EDMONTON—University of Alberta paleontologist Michael Caldwell and Australian colleague Michael Lee of the University of Sydney have postulated that a metre-long, snake-like fossil with small hind legs, collected in Israel 20 years ago, is an ancestor of modern snakes. The fossil, found in marine sediments and named *Pachyrhachis problematicus*, is very similar in structure to the mosasaurs, giant marine reptiles of the Mesozoic. This evidence challenges the old idea that snakes evolved from land-dwelling, burrowing lizards. Caldwell and Lee consider *Pachyrhachis* to be a “missing link” between the marine mosasaurs, and the legless terrestrial modern snakes.

*New Scientist*, March 22, 1997:

### **Dinosaur nursery becomes a museum**

FRANCE—Amateur palaeontologist Alain Cabot has discovered a treasure-trove of thousands of dinosaur eggs near the town of Mèze in southern France. At least six different types of eggs are represented at the 65 to 70 million year-old site, which has been excavated by Cabot and a team of palaeontologists from the Institute of Evolutionary Science at Montpellier. The excavation has revealed the presence of thousands of nests, each containing from 5 to 15 eggs. The nest site—one of the largest in Europe—will be made into an open-air museum.

*Calgary Herald*, July 25, 1997:

### **Asteroids cited in mass dieoff**

OTTAWA—Asteroid impacts have once again been implicated in a mass extinction, this time the end-of-Eocene event, some 35 million years ago, which saw the demise of a large number of mammal species.

Richard Grieve, of the Geological Survey of Canada, has investigated two large impact craters, and has found the dates of their formation to coincide closely with each other, and with the end of the Eocene Epoch. One crater, originally 85 km. in diameter, is now occupied by Chesapeake Bay, on the U.S. east coast. Its origin has been dated to between 35.2 million and 35.5 million years ago. The second crater, called Popigai, is in northern Siberia and was 100 km. wide. It has been dated at 35.3 to

35.7 million years old. Grieve proposes that the enormous clouds of dust thrown up by the two impacts triggered a major cooling event that cooled the oceans and resulted in ice sheets on Antarctica. If nothing else, Grieve’s work appears at least to have established the age of the Siberian crater, previously estimated to be anywhere from 5 million to 100 million years old.

*Calgary Herald*, July 10, 1997:

### **Tyrrell Museum gets 5-millionth visitor**

DRUMHELLER—A major milestone was passed at the Royal Tyrrell Museum of Palaeontology on July 9. Mrs. Sharol O’Brien of Shelby, MT was the museum’s five-millionth visitor. Mrs. O’Brien and her husband and three daughters were showered with applause and prizes upon passing through the museum lobby.

*Calgary Herald*, September 17, 1997:

### **Dino fossil may break all records**

HELENA, Montana—Excavation at an unspecified spot in Montana has unearthed the remains of an enormous carnivorous dinosaur. The fossils have not yet been positively identified, but they belong to either the largest *Tyrannosaurus rex* yet found, or a new species of titanic proportions. The largest *T. rex* known to science has a 1.2 metre-long pubis bone; the new specimen’s pubis is 1.3 metres in length. The femurs, however, which are the bones most often used to estimate total size, are as yet unexcavated. The find was reported by Keith Rigby of Notre Dame University. □

### *The rumour mill*

## **Canyon Creek Road to be closed**

The editor has heard, from a reliable source, that Forestry officials are planning on gating the Canyon Creek road, west of Bragg Creek, a favourite haunt of APS members. Word has it that the closure is to restrict access to the Canyon Creek Ice Cave, where weekend crowds at this potentially dangerous spot have gotten out of hand. Apparently one person died at or near the cave earlier this year. As the road is being gated at the junction with Highway 66, the only practical means of access will be via a long (5.5 km.) mountain-bike ride to the Eng’s Mine parking lot. Stay tuned to the *Bulletin* for further information. □

# Chasing dinosaurs ...in Argentina!

## Part II: Valley of the Moon

by Vaclav Marsovsky

Ischigualasto is the name of a valley located 1200 km. west of Buenos Aires at the foot of the Andes, in the northeast corner of the San Juan province. It is commonly known as “Valley of the Moon” due to its bizarre and unusual geography. It is a spectacular place for scenery and for the Triassic dinosaurs and mammal-like reptiles found here in large numbers.

Even shortly before arriving at the Park, there is no hint of the scenery to come. The desert, typified by thorny bushes and *cordones* cactus, similar in size and shape to Arizona’s saguaro, suddenly opens up onto a sea of brown and grey badlands. The protected area covers a region of 60 km. in the northeast/southwest direction and 30 km. in the southwest/northeast direction. The area is dominated by the light-coloured badlands, the Ischigualasto Formation of Late Triassic age, and the dark red Los Colorados Formation directly above it, also of Late Triassic age.

Fossils of the mammal-like reptiles that co-existed with the first dinosaurs can be found in either formation, but at this locality they are mainly found in the pale badlands. The Los Colorados Formation is a resistant cliff former. A beautiful picture showing the two formations can be found in Louie Psihoyos’ book, *Hunting Dinosaurs* (pages 38 and 39). The fossilized bone is red/pink or black in colour. A small museum is located at the visitor centre. One can see a miniature diorama of theropod dinosaurs dining on mammal-like reptiles and a few fossils from the area (emphasis on *few*). Also on display is a copy of the skull of *Herrerasaurus*. This is likely the same skull that appears on page 41 of *Hunting Dinosaurs*.

Admission into the park is by car caravan. The guide gets into the leading car and the rest of the cars follow. Several stops are made in the valley at designated places. The first stop is by a sandstone cliff where imprints of fern leaves are visible below the overhang. Another area known as Cancha de Bochas is where dozens of soccer ball size spherical concretions are weathering out of the ground.

At our last stop, a rhynchosaur skeleton was weathering out of the ground. It was not being ex-

cavated. Rhynchosaurus or rhynchocephalians (“beak heads”) are the most common fossils in the park.

The best museum in which to see the fossils from Ischigualasto is in the city of Tucuman in the province of the same name, in the northwestern part of Argentina. This small museum is perhaps the best I have ever seen anywhere. Exceptional lighting, both natural and artificial, made photography easy. Displays were well-labelled, identifying the name, formation, locality and age of each specimen. The displays focused on the northwest part of Argentina, with numerous displays of mammal-like reptiles, the therapsids (“mammal arch”) and thecodonts (“socket-toothed reptiles”) and Triassic dinosaurs. Most of the displays were of real fossil bone with their individual specimen identification numbers clearly marked.

The display included:

- *Herrerasaurus reig* from the Ischigualasto Formation. This primitive theropod still had the original full set of five digits on hands and feet. *Herrerasaurus* was first described about thirty years ago, based on fragmentary remains. The specimen in this museum, with the exception of the front limbs and skull, is the real fossil. This may have been the specimen recently found by Paul Sereno and Fernando Novas. *Herrerasaurus* and *Eoraptor*, found together in the Ischigualasto Formation, date to 228 MY and are thought to be the base from which the theropod dinosaurs evolved, or very close to the base.

- *Riojasaurus*, a small sauropod, 190 MY. The *Riojasaurus* was found in the Los Colorados Formation in the neighbouring La Rioja province.

- *Ischigualastia jenseni*, a hippo-sized rhynchosaur, with beak-like mouth; again, this entire skeleton was the actual fossil, and beautifully preserved.

- From nearby Mendoza province, a skull of a dicynodont (“two dog-like teeth”) from the Lower Triassic.

- The original specimen of *Pterodaustro guinazui*, a flying reptile from the Lower Cretaceous, San Luis province. (Refer to the June 1997 *APS Bulletin*, page 11 for more information on this flying reptile.) We found several copies of this specimen on display in other museums in Argentina.

- This museum also had the baby *Mussaurus patagonicus* from the Upper Cretaceous of Chubut province, one of the provinces of Patagonia. A picture of this baby dinosaur is shown cupped in a pair of hands on the back jacket cover of *Hunting Dinosaurs*.

In the two weeks Mona and I were in Argentina, we just scratched the surface of interesting places to go and see. Rio Negro and Chubut provinces in Patagonia have a wealth of palaeontological sites as well, which we did not get to. These will have to wait for another trip. □

## Members in the news

Regular listeners to CBC Radio One's new national morning show, *This Morning*, were treated in mid-September to an interview with APS member **Marilyn Fraser**, as part of the show's "Aging Dangerously" series. Marilyn recounted to host Michael Enright her adventures on a solo backpacking trip to Europe, in search of mineral localities. Marilyn said she would be writing an account of her trip for a major rock-and-mineral publication, in the near future. (Marilyn wrote a major article on the dinosaur *Stegoceras validum* for the December 1995 *Bulletin*.)

Great stuff, Marilyn! I liked the segment so much, I listened to it twice!

– Howard Allen □

## Reviews

by Les Adler

**Lost World vs. Real World** by Don Lessem.  
*Earth*, August 1997, p. 20, 21.

Several experts have viewed the movie *Lost World* and have expressed their views as to the authenticity of the dinosaurs' portrayed behaviours.

Jack Horner found the baby *T. rex* amazingly lifelike. Mark Norell of the American Museum of Natural History thinks that Spielberg has gone too far. Jack Horner says that science later catches up to the movies as the velociraptors in *Jurassic Park* were caught up to by *Utahraptor*. In the movie, *T. rex* can smell prey from 20 miles away. This is acceptable to Jack Horner by comparing this ability with today's turkey vulture. *T. rex* is a fond nurturing parent—by comparison with today's birds. The dome-headed pachycephalosaurs butt on a Mercedes wagon—Dr. Robert Bakker has analyzed their neck muscles. Horner says that the *Stegosaurus* is not correctly constructed.

[Les' note: whatever the disagreements, Spielberg's imagination has generated colossal profits against the minuscule salaries of the palaeontologists.]

**The Real Jurassic Park** by Mary Schweitzer and Tracy Staedter. *Earth*, June 1997, p. 54.

Mary Schweitzer has a PhD in biology from Montana State University and was supervised by Jack Horner for her doctoral thesis. A nearly complete *Tyrannosaurus rex* skeleton was unearthed in 1990 by a team from Montana State University's Museum of the Rockies at Bozeman. Some parts deep inside a long leg bone had not completely fossilized. Some of the biomolecules appear to have remained. Under a microscope blood vessel channels can be seen and even tiny round translucent red objects with a dark centre suggesting blood cells. This led to a search for DNA. A series of tests for DNA were run producing DNA from fungi, bacteria and insects, but not from dinosaurs. Other DNA could belong to the dinosaur but it is uncertain. Other biomolecules appear to be present in the fossil tissue.

Gayle Callis who specializes in the examination of modern bone borrowed some of the *T. rex* slides which led to a search for hemoglobin and then heme units which consist of a ring-like organic porphyrin compound bound to an iron atom. Tests confirmed the presence of heme. Further tests suggested that hemoglobin is also present.

More work needs to be done before the scientists can come right out and say "this *T. rex* has blood compounds left in its tissues." Other dinosaur bone specimens exist with a good possibility of containing protein. A specimen of *Oviraptor* appears to have bits of a claw sheath, made of protein, on one of its feet, so there may be some protein remnants there. These studies will provide useful information about how proteins may be able to be preserved over long time spans, and may also yield answers to other palaeontological questions.

**Unscrambled Eggs** by Rhoda Sherwood.  
*Earth*, June 1997, p. 16.

David Varrichio, a palaeontologist at the Old Trail Museum at Choteau, Montana, has been studying dinosaur eggs laid 75 million years ago by the slender carnivore *Troodon formosus*. From the arrangement of many eggs in a *Troodon* nest the experts have decided that this dinosaur laid its eggs in pairs, a sign that *Troodon*, like modern crocodiles, had two functioning ovaries (most birds have only one). But whereas crocodiles and their close relatives lay their eggs all at once, *Troodon* laid its pairs of eggs sequentially, as birds do. Also these eggs were buried only halfway while crocodile eggs are completely buried.

**Lessons From Leavings** by Karen Chin. *Natural History*, June 1995, page 67.

Karen studies fossil feces by examining sliced coprolites microscopically. The first fossil feces were identified on the basis of shape and composition by British geologist William Buckland in the 1820s. In Montana, Jack Horner found fossilized feces of some Cretaceous dinosaurs about 26 litres in volume. Some specimens contained burrows which have many of the characteristics of modern dung beetle burrows, the most diagnostic feature being the presence of back-filling. Dung beetles are the only living organisms known to cache plant matter into such sizable burrows. These burrow traces of ancient dung beetles helped confirm that these blocks are indeed coprolites.

The specimens indicate that these Montana dinosaurs browsed on conifer stems. Such fossil evidence of dinosaur interactions with other organisms is rare.

**Fossils and the Folsom Cowboy** by Douglas Preston. *Natural History*, February 1997, pages 16–22.

George McJunkin, an African-American cowboy, not academically qualified but with a self-taught scientific background noticed some bones at the bottom of a trench after a severe storm at the Crowfoot Ranch in eastern New Mexico in September, 1908. He recognized that the bones of an extinct bison were important and he made several attempts to report his find to the appropriate authorities but was completely ignored. He lost his fossils in a fire due to a lightning strike and died in a local hotel.

After his death Carl Schwachheim and Fred Howarth found the bones where McJunkin said they would be, carried them to the Denver Museum of Natural History and unwittingly became involved in the question of the antiquity of man in the New World.

A personal feud was in progress between Drs. Hrdlicka and Figgins. On July 14, 1926 Figgins found a spear point *in situ* and on August 29, 1927 Carl Schwachheim found one of the distinctive Folsom points between the ribs of a bison skeleton at McJunkin's New Mexico site. Important palaeontologists such as Barnum Brown visited the site.

McJunkin's bone pit was one of the most important archaeological discoveries made in America adding 7,000 years of human history to be accounted for. This find also led to the discovery of the Clovis mammoth hunters.

George Agogino, a Palaeo-Indian archaeologist,

at Eastern New Mexico University became curious about the persistent tale and visited the Folsom cemetery with McJunkin's remains. The citizens of Folsom fifty years later remembered the remarkable black cowboy with his telescope, fossil bones and scientific books.

**Where do Turtles go?** by Erica Garcia. *Scientific American*, March 1997, p. 24, 26.

Olivier Rieppel of the Field Museum of Chicago and PhD student Michael de Braga of Erindale College, Ontario presented a theory at the Society of Vertebrate Paleontology meeting at New York that turtles have been classified with the wrong group of reptiles.

Turtles have long been deemed to be "living fossils," the only surviving member of the anapsid subclass which originated some 325 million years ago during the Palaeozoic Era. These two researchers propose that turtles should be placed with the diapsids which first emerged about 230 million years ago in the Triassic Period and include present-day lizards, snakes and crocodiles.

Using cladistics to identify homologous characteristics shared by certain groups, they analyzed a huge set of data on a computer, using 168 sets of characteristics. They noticed morphological similarities among the ankles of turtles, lizards and the New Zealand tuatara. Gene Gaffney, curator of Vertebrate Palaeontology at the American Museum of Natural History says that the evidence presented is somewhat skewed and that the bone ossification quoted is not particularly reliable. Also, it would only take a slight adjustment of the data matrix to move the turtles back into the anapsids. This discussion could lead to a reworking or rethinking of some other evolutionary paths.

**Moroto Morass** by Kate Wong. *Scientific American*, July 1997, p. 21, 22.

This report shows some of the uncertainties, mix-ups and conclusions reached when evidence is limited due to the scarcity of fossils.

A set of fossils was found in the 1960s in Uganda's Moroto region in East Africa and were dated as being from the Miocene Epoch at about 20 million years of age, then were put aside because of confusion.

Daniel L. Gebo of Northern Illinois University and Laura M. MacLachy of the State University of New York at Stony Brook and their associates are now placing this ape in its own genus and species as *Morotopithecus bishopi* with newly discovered extra remains and a high-quality radiometric date

suggesting an age of at least 20.6 million years for all of the remains.

This article is accompanied by large illustrations of two bones, the scapula glenoid (shoulder socket) and a lumbar (spinal) vertebra. The authors contend that this creature was more closely related to living apes and humans than some considerably later and younger fossil apes.

Gebo and MacLatchy will return to the site in 1998. Until then the jury is still out on the ape from Moroto and its role, if any, in our own genesis.

Anthropologist Carol V. Ward states that only when palaeontologists understand hominoid evolutionary relationships can they accurately reconstruct what the common ancestor of chimps and humans, from which we evolved, was like in its anatomy and behaviour.

**Madagascar's Buried Treasure** by Scott D. Sampson, David W. Krause and Catherine A. Forster. *Natural History*, March 1997, pages 24–27.

Madagascar is the fourth largest island on Earth, separated from Africa by the Mozambique Channel which is at least 240 miles wide and mostly one mile deep. Madagascar broke off from Gondwanaland about 150 million years ago and India broke off from Madagascar about 90 million years ago. Ideas about vertebrate origins are uncertain because of a lack of relevant discoveries.

The authors are investigating an area near Berivotra in northwestern Madagascar where exquisitely preserved vertebrate fossils are being found by burning off grass which conceals the fossils. Teams from the State University of New York at Stony Brook and the University of Antananarivo, Madagascar are following French, Malagasy and Japanese expeditions which found dinosaur remains in the Mahajanga Basin.

Expeditions launched in 1993, 1995 and 1996 have brought forth skeletons of a small crocodile, a portion of an upper jaw of *Majungasaurus* and a single tooth of a mammal. Pieces of theropods, sauropods, turtles, snakes, lizards, frogs, bony fishes, sharks and rays have been recovered from more than 100 locations. Consequently there are two sauropod locations to be investigated on the next trip. The 1996 season produced the most complete titanosaurid dinosaur ever found, being 80% complete, with some skull pieces. The 1995 season produced bones from four species of fossil birds providing further evidence that modern avians evolved from small theropods. (These authors also subscribe to a classification system of avian and

non-avian dinosaurs.) The vast untapped area awaits further investigation by this group which anticipates returning to the hills for more pieces of ancient treasure. □

## Highlights from Exchange Bulletins

*The APS exchanges bulletins and newsletters with other societies and clubs. Members are encouraged to examine copies of these, which are saved in the APS library. – ed.*

**The Earth Science News**—Earth Science Club of Northern Illinois, Downers Grove, IL, USA.

**May 1997**

• *Is the Tully Monster really Extinct?* by Jim Konecny: a comparison of the “weird wonder” of the Mazon Creek fauna with modern organisms.

**September 1997**

• *Clearing the Air of K/T Dust* by Allen A. Debus: a review of two books on the K/T extinction controversy.

**Trilobite Tales**—Western Interior Paleontological Society, Denver, CO, USA.

**April 1997**

• *Anomalocaris* by Andrew Turner: discussion of the Cambrian “weird wonder.”

**May 1997**

• *Lichenometry: a dating method using lichen growth* by Steven Wade Veatch.

**Paleo Newsletter**—Austin Paleontological Society, Austin, TX, USA.

**April 1997**

• *Prep Tools* by Russ McCarty: a discussion of different tools for fossil extraction and cleaning.

• *Fossil Facts* by John M. Arnold: questions to ask before forking over cash for an expensive fossil.

**MAPS Digest**—Mid-America Paleontology Society, Cedar Rapids, IO, USA.

**April 1997**

• *Special Expo XIX edition: articles on trilobite and bryozoan extinctions, conularids, cystoids, Paleozoic ammonoids and other topics.*

**British Columbia Paleontological Alliance Newsletter**—BCPA, British Columbia.

**March 1997**

• *The Piltdown Perp* by Rolf Ludvigsen: a history of the investigations into this famous hoax.

• *Fossil Shark Teeth* by Dan Bowen: photos of shark teeth from the Gulf Islands. □

## **APS MEMBERSHIP LIST September 1997**

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