Palæontological
Alberta
Society
Bulletin

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ALBERTA PALÆONTOLOGICAL SOCIETY

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

a. Promote the science of palaeontology through study and education.

b. Make contributions to the science by:
1) Discovery 2) Collection 3) Description
4) Education of the general public
5) Preservation of material for study and the future

c. Provide information and expertise to other collectors.

d. Work with professionals at museums and universities to add to the palaeontological collections of the province (preserve Alberta's heritage).

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

Single membership **$20.00 annually**
Family or Institution **$25.00 annually**

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

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UPCOMING APS MEETINGS

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

Friday, April 20, 2007—Speaker: Dr. Don Henderson, Royal Tyrrell Museum.
Bite me: Skull structure and strength in carnivorous dinosaurs.

Friday, May 11, 2007—Speaker: Philip Benham, Shell Canada Limited, and APS Program Coordinator.
Seven wonders: Palaeontological musings from travels in Egypt and Jordan.

ON THE COVER: *Anomalocaris* sp. feeding appendage. *Anomalocaris* was a trilobite predator and a prominent member of the Middle Cambrian Burgess Shale's "weird wonders" arthropod fauna. This older specimen is from the Lower Cambrian Eager Formation, Cranbrook, British Columbia. Length of specimen is 59 mm. Specimen courtesy of Wendy Morrison, photo by Howard Allen, copyright © 2007.

From the Desk of the President

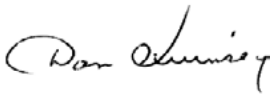
By Dan Quinsey

Our Annual General Meeting (May 11, 2007) is just around the corner. As described in our bylaws, we need fifteen percent of the Members or twenty Members, whichever is smaller, to constitute a quorum to transact business. I am confident the members who can attend will do their part to be there to help us meet quorum.

I would like the thank everyone who has participated in various capacities this year. We are finally over the hurdle of looking for volunteers to fill Board and committee positions. In fact, It would not surprise me if we see competition for positions in the near future. Good job everyone!

While you are collecting this summer, remember to think about the APS collection and save some specimens for the Society. Also, if you have any fossils you would like to donate to education or the CRLC giveaway box, or other palaeontological materials you would like to donate to the silent table auction, please contact me or any Board member. They will file the appropriate documents and if necessary make arrangements to pick them up.

Enjoy the upcoming summer events and please be safe.



(403) 247-3022
president@albertapaleo.org ❑

NOTICE !
The May 2007 General Meeting will be held on Friday, May 11
— ONE WEEK EARLY —

Notice of Annual General Meeting of Members

To the Members of the Alberta Palaeontological Society

Take notice that the Annual General Meeting of the Members of the Alberta Palaeontological Society (hereinafter called the "Society") will be held at Mount Royal College, room B108, on Friday, the 11th day of May, 2007, at the hour of 7:30 P.M. local time to deal with the following business to be brought before the Meeting:

Election of the following Board positions:

1. President
2. Vice President
3. Secretary
4. Treasurer
5. Program Coordinator

Officers, which include the President, Vice President, Secretary and Treasurer are elected for a term of one year, whereas Directors (Program Coordinator) are elected for a term of two years.

Also on the agenda

- Treasurer's presentation of the Audited Statement of the financial position of the Society.
- Secretary's presentation of the Audited Statement of the books of the Society.

By order of the Board of Directors of the Society, Dan Quinsey, President. ❑

Correction

Thanks to APS Member **Dr. Chris Collom**, of the University of Calgary, for pointing out a mistake in the December 2006 *Bulletin* (page 10). He writes: "…you illustrate a lovely slab of crinoids labeled as '*Scyphocrinites* sp. (Lower Devonian)'; this is not quite accurate. That slab is of the stalkless crinoid *Uintacrinus socialis* (Upper Cretaceous) from the Niobrara Formation of Western Kansas."

Dr. Collom offers these URLs for comparison: **www.fossilmuseum.net/fossils/Crinoids/Uintacrinus-socialis/Uintacrinus.htm** and **www.oceansofkansas.com/Sternbrg/s-uinta1.jpg** ❑

Upcoming Talks

Friday, April 20, 2007, 7:30 p.m.

Bite me: Skull structure and strength in carnivorous dinosaurs

Speaker: **Dr. Donald Henderson, Royal Tyrrell Museum of Palaeontology**

The skulls, jaws and teeth of large, carnivorous theropod dinosaurs are perhaps their most impressive aspect. The rigid, "box-like" construction of theropod skulls, a simple jaw closing mechanism, and single rows of uniform teeth make theropod skulls very amenable to analysis with simple biomechanical models. These models can help us to understand the function and the feeding habits of these extinct predators. This talk will present the findings of two research projects that looked at the mechanics of the skulls of these animals.

The amount of bone used in the construction of a skull, and the configurations of the bony elements, can suggest what sorts of forces a skull could resist. The size and shape of the eye socket in theropods are good indicators of skull strength and bite force across a range of theropods, and different groups of theropods have independently evolved similar skull adaptations.

A distinguishing feature of tyrannosaurid dinosaurs is the fusion of the left and right members of the nasal bones, and this fusion is seen in even the earliest member of the group. These bones lie along the top of the snout, and are in a "strategic" position to brace the snout against both the compressive and torsional stresses associated with a strong bite and struggling prey.

Biography

Donald Henderson earned a BSc in geology and physics from the University of Toronto in 1992. After working for a year he decided geophysics wasn't for him, and he returned to his early interests in zoology and palaeontology. He studied for two years at the University of Calgary, and then went to the University of Bristol where he was awarded a PhD in dinosaur biomechanics in 1999. He spent two years at the Johns Hopkins Medical School in Baltimore, Maryland on an NSERC post-doc, and then returned to the University of Calgary in 2001 as a post-doc and sessional instructor in the Department of Biological Sciences. In 2006 he was appointed curator of dinosaurs at the Tyrrell Museum.

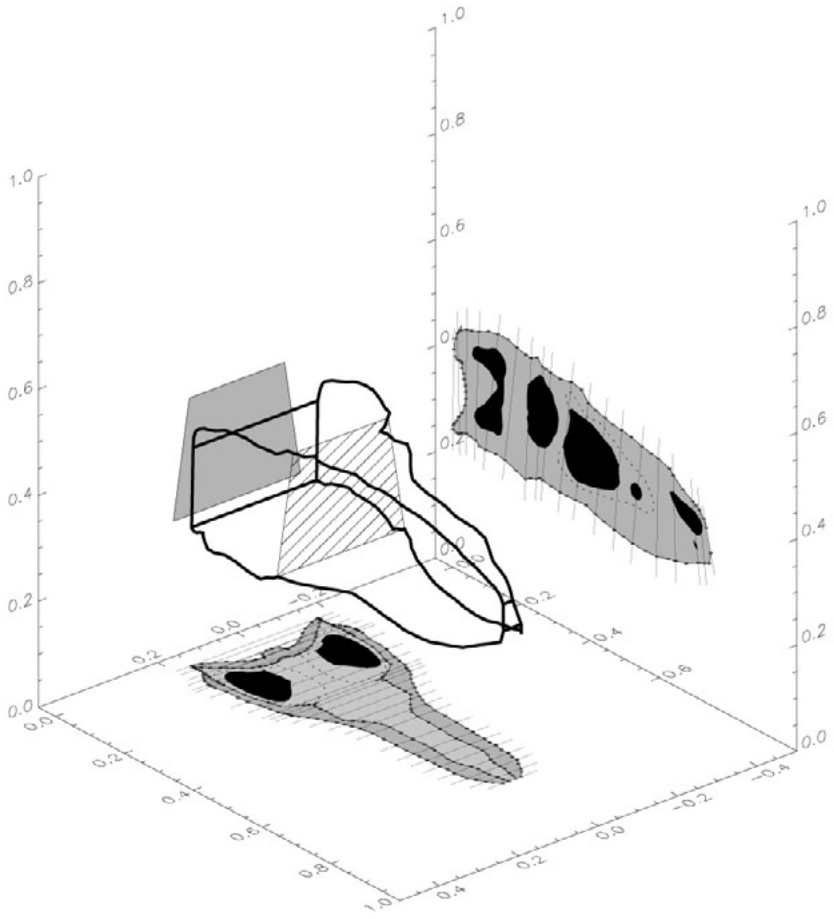


Figure 1. Schematic side (back panel) and top (lower panel) views of the skull of the tyrannosaurid *Albertosaurus libratus*, along with a 3D "wire-frame" representation of the skull derived from the two 2D views. The geometric data defining the 3D representation can be further processed to determine biomechanical properties of the skull—such as the area of the hatched cross-sectional slice shown.

Friday, May 11, 2007, 7:30 P.M.

Seven wonders: Musings from travels in Egypt and Jordan

Speaker: **Philip Benham, Shell Canada Limited**

A recent opportunity to travel through the Middle East included a tour of the Great Pyramid, one of the ancient "seven wonders of the world." As I climbed the first few limestone blocks of the pyramid my attention was drawn to the numerous specimens of *Nummulites gizehensis*, a giant foraminifer characteristic of Eocene tropical seas. How many tourists have trod on these, not seeing them? Did the builders of the ageless monument ponder what these disk shaped objects were in the rock? As I explored various archaeological sites in Egypt and Jordan I could not help but be struck by the role of geology and, in particular, palaeontology at those landmarks.

In this talk I will provide my own seven geological "wonders" associated with the archaeology of Giza, Valley of the Kings and Luxor in Egypt, and the stone city of Petra, Crusaders' castles and the Roman ruins of Jerash in Jordan as the backdrop.

The Majority of Egyptian pyramids comprise Eocene limestone chock-full of the large foraminifer *Nummulites gizehensis*. Djoser's step pyramid at Saqqara, seen here, is the oldest complete hewn stone building in history (2600 BC).

Biography

Philip Benham is an exploration geologist for Shell Canada's Newfoundland Offshore Team. He has also worked on the Niglintgak gas field in the Mackenzie Delta and Jumping Pound and Wildcat Hills in the Alberta foothills. He has arranged monthly talks as CSPG Paleo Division Chair and APS Program Coordinator since 2000. He has travelled to Madagascar, Indonesia, Guatemala and other parts of the world to explore its natural and historical wonders. ❑

Program Summary

Friday, January 12, 2007, 7.30 P.M.

Science with a social conscience: Digging dinosaurs and helping children in Madagascar

Speaker: **Dr David Krause, Stony Brook University, New York**

In 1993, Dr. Krause launched a reconnaissance expedition in search of Cretaceous dinosaurs, mammals, and other fossil backboned animals to Madagascar, a large island off the southeast coast of Africa that is home to some of the most bizarre plants and animals on the planet.

Not in his wildest dreams did he anticipate the palaeontological riches that he and his colleagues would find on that expedition, as well as on the eight field campaigns since. Among the most significant finds are a 70 million-year-old skeleton that provides a crucial missing link between dinosaurs and birds, exquisitely preserved skulls and skeletons of previously unknown plant- and meat-eating dinosaurs, a diverse array of crocodiles, and, most recently, the largest and most complete skeleton of a Mesozoic mammal from the southern hemisphere. These discoveries have profound implications for addressing questions related to plate tectonics and biogeography, specifically the timing and sequence of fragmentation of the southern supercontinent of Gondwana during the Mesozoic and the origins of Madagascar's extant fauna.

Dr. Krause's research in Madagascar, the fourth poorest country in the world, has led him to interact with the local peoples and, ultimately, to establish the Madagascar Ankizy Fund, a not-for-profit organization (administered through the Stony Brook Foundation) whose mission is to build schools and provide temporary clinics for children living in remote areas of the country. Dr. Krause will present spectacular slides of some of his exciting discoveries in Madagascar, recount some of the extraordinary adventures involved in his field work, and detail how his work led him to give back to the country by assisting with education and healthcare.

Biography

Dr. David Krause is Distinguished Service Professor in the Department of Anatomical Sciences, Department of Geosciences, and Interdepartmental Doctoral Program in Anthropological Sciences at Stony Brook University (Stony Brook, NY); Research Associate of the Field Museum of Natural History (Chicago, IL); Founder and Executive Director of the Madagascar Ankizy Fund (**www.ankizy.org**); Member of the Advisory Board of the Institute for the Conservation of Tropical Environments; and former President of the Society of Vertebrate Paleontology.

Born and raised on a cattle ranch in southeastern Alberta, Dr. Krause received his B.Sc. and M.Sc. from the University of Alberta (zoology) and his Ph.D. from the University of Michigan (geology, 1982). Dr. Krause is a 35-year veteran of field research in Canada, the United States, Pakistan, India, and Madagascar and has published over 160 research articles on fossil vertebrates. Dr. Krause has been a leader in the battle to protect fossil resources on U.S. Federal public lands from commercial exploitation. His research, humanitarian, and conservation work has been the subject of considerable media attention, including articles in *National Geographic* magazine, *Newsday*, the *New York Times*, *USA Today*, *The Chicago Tribune*, and various other major newspapers. It has also been featured in several television specials (*e.g.*, The Discovery Channel, The Learning Channel). Dr. Krause has made various appearances on CBC, NBC, CNN, and Fox newscasts and was featured in the journal *Current Biography* (February, 2002). ❑

Library Notes

By Mona Marsovsky, former APS Librarian

Recent and not-so-recent additions to the APS library

Dinosaur Park Symposium, Short Papers, Abstracts and Program, Royal Tyrrell Museum, Drumheller Alberta, Special Publication of the Royal Tyrrell Museum. Edited by D.R. Braman, F. Therrien, E.B. Koppelhus and W. Taylor, Sept. 24–25, 2005. *Donated by Dan Quinsey*

The Children's Giant Book of Dinosaurs, Publishers Distributors, Toronto Canada, *Donated by Dan Quinsey*

Alberta's Park and Protected Areas Map, Produced by Alberta Sustainable Resource Development for Community Development, 2006. *Donated by Dan Quinsey*

Parliamentary Procedure at a Glance, New Edition, by O. Garfield Jones, Hawthorn/Dutton, New York, 1971. *Donated by Dan Quinsey under the condition that it not be signed out.*

Bivalves: An Eon of Evolution—Paleobiological Studies Honoring Norman D. Newell, Edited by Paul A. Johnson and James W. Haggart, University of Calgary Press, 1998. *Donated by Roslyn Osztian*

Annotated Bibliography of Fossil Vertebrates: The Upper Cretaceous of China and Mongolia by Michael Klassen and Michael Ryan, Occasional Paper No. 5, Tyrrell Museum of Palaeontology, 1988. *Donated by Darren Tanke*

A Checklist of North American Marine Cretaceous Vertebrates Including Fresh Water Fishes, by Dale A. Russell, Occasional Paper of the Tyrrell Museum of Palaeontology No. 4, 1988. *Donated by Darren Tanke.*

West Coast Fossils, A Guide to Ancient Life of Vancouver Island, Second Edition, by Rolf Ludvigsen and Graham Beard, Harbour Publishing 1997. *Donated by Bert Van Helden.*

Soil Survey of Blackfoot and Calgary Sheets by F.A. Wyatt, J.D. Newton, W.E. Bowser and W. Odynsky, University of Alberta, College of Agriculture, Bulletin No. 39, July 1942.

Dinotour 1994 Supplement, Geology, Towns and Sites, Southern Alberta and Saskatchewan, Canada, May 7–15, 1994.

Some Ordovician Lingulid Brachiopods by G. Winston Sinclair, Sir George Williams College, Montreal, Transactions of the Royal Society of Canada, 3rd series, Section IV, XXXIX, 1945.

Annotated Bibliography of Geology of the Sedimentary Basin of Alberta and Adjacent Parts of British Columbia and Northwest Territories, Alberta Society of Petroleum Geologists, Calgary, 1958.

Arctic Bibliography, Vol. XV, Edited by Maret Martna, Prepared by the Arctic Institute of North America, McGill-Queen's University Press, 1971. ❑

News from the Dino Room

By Ron Fortier, APS Collection Curator

I mentioned all the great donations the club received in the last *Bulletin*. Would you believe I forgot to mention yet another donation that was made this past year?

This one just showed up at the APS booth at last year's Calgary Rock and Lapidary Club show.

A big blue bucket appeared, full of fossil plant material and a few other items. In all, the fossils must have come from at least three different locations. Therein lies the problem—a fossil without a location is really nothing more than a cute rock. It goes without saying that the information on the location of any fossil found is just as important as the fossil itself. Without locality information the job of a curator is next to impossible.

I've found that the easiest way to record fossil sites is to use a GPS receiver. Then you will not have to rely on your memories for all those great fossil locations. You can buy a good one for around one hundred dollars these days. ❑

Fossil leaves from "The Blue Bucket". Locality and donor unknown—thanks to whoever donated them. Photo by Ron Fortier.

The next Geological Survey of Canada and APS Rock & Fossil show is set for Saturday, March 31, 2007 at Fish Creek Public Library (Calgary) 11:00 A.M. to 3:00 P.M.

Dr. Brinkman of the RTMP and Roslyn Osztian search for microtreasures. Photo by Ron Fortier.

Results of the 2007 Microfossil Sorting Sessions

By Mona Marsovsky

APS held microfossil sorting sessions on December 2, 2006, January 6 and 27, February 10 and 24, 2007 at Mount Royal College to aid the research of **Dr. Donald Brinkman** of the Royal Tyrrell Museum.

This year APS members sorted through samples from Wolfe Coulee, in Dinosaur Provincial Park, near Brooks, Alberta. The samples were from the 75 million-year-old Lethbridge coal zone, which is located at the very top of the Dinosaur Park Formation. Fish teeth and scales were common, with *Myledaphus* teeth and denticles being the most prevalent. Several members also found shark teeth. More rare were *Paralbula* teeth and jaws. Special finds included a salamander vertebra, a coprolite, a teleost fish atlas, mammal teeth, *Belonostomus* (fish) jaw, an unidentified small jaw with a tooth and an embryonic champsosaur caudal vertebra. Not surprisingly, we also found lots of coal! An average of ten volunteers attended each of the four sessions.

APS volunteers included **Doug and Timmy Shaw**, **Reg Spratley**, **Roslyn Osztian**, **Vaclav and Mona Marsovsky**, **Pete Truch**, **Ron Fortier**, **Ossama Yousif**, **Les Adler**, **Dan Quinsey**, **Howard Allen**, **Lisa Bohach** and **Al Rasmusson**. The APS thanks Mount Royal College (especially **Mike Clark**) for allowing us to use their laboratory and microscopes. We would also like to thank Dr. Brinkman for supplying all of the raw materials, vials and pre-printed labels and for making the long drive from Drumheller for each session to guide our efforts. Although our sorting sessions are finished for this winter, we look forward to being able to search for microfossils next winter. ❑

2007 Field Trips

By Wayne Braunberger

Planning is well underway for next year's trips. A wide variety of trips is offered so there should be something for everyone. For more information contact Wayne at (403) 278-5154 or email **events@albertapaleo.org.** A field trip registration form is included with this issue of the *Bulletin* and is available on the APS website (**www.albertapaleo.org**). Information will also be available at the monthly meetings.

Please note that all fees are due at the time of registration. Non-members and unaccompanied minors will not be allowed to attend field trips. All participants will be required to read and sign a release form (waiver). Note that the registration deadlines have changed significantly from those in past years. This is to allow for more efficient planning of the trips and timely distribution of information.

Trip participant responsibilities

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

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

Trip 2007-1, June 23–24, 2007
Tolman Bridge, Alberta -Part II

Tolman Bridge was the site of the first field trip held by the APS and was visited last year. We will be going back again to explore new sites along the Red Deer River between Tolman Bridge and Dry Island Park. Plans are to arrange group camping at the ranch across from the provincial campground. The registration deadline is June 8, 2008.

Trip 2007-2, July 21–22, 2007
Cadomin/Mountain Park, Alberta

This will be the Society's first trip to the historic coal mining area of Cadomin and the abandoned town site of Mountain Park. Excellent exposures of Carboniferous to Cretaceous aged sediments can be examined along the Cadomin—Mountain Park railway. For the more adventurous the Cadomin Cave can be explored. Several campsites are in the area. The closest town is Hinton where all services are available. The registration deadline is July 6, 2007.

Trip 2007-3, August 18–19, 2007
Genesee, Alberta.

One of the classic plant localities in Alberta, this site was last visited by the Society several years ago. Due to high water in the North Saskatchewan river in past years neither site conditions nor access is known at this time. Watch for an update in the June *Bulletin*. The registration deadline is August 3, 2007.

Those of you on last year's trips will have noticed new waiver and medical forms. If you have suggestions for improvement please let me know. For the 2007 field trips I will be sending the waiver and medical forms to you along with the trip information. This information will be sent to you via e-mail or Canada Post. Please ensure that your addresses are correct and legible when sending in registration forms. When you arrive at the meeting place please have the forms completed so that less time will be spent on paperwork prior to the trip. All participants are required to have waiver and medical forms fully completed in order to attend the trip. There will be no exceptions. All personal information is held in confidence and is ultimately destroyed. ❑

Predator and Prey

Article and photos by Dan Quinsey

Predator: Mosasaur
Prey: Ammonite

Modern mammals, fish, and reptiles feed on squid and octopus, so it can also be concluded that ancient reptiles and fish fed on ammonites. Ammonites exhibiting bite marks are not rare, but often the bite mark left in the shell is confused by the collector with broken shells. There have been claims of hundreds of ammonites with the preserved tooth marks of mosasaurs. Most of these claims are false. The marks on most of the shells are holes bored or dissolved in the ammonite from limpets or other forms of gastropods, rather then holes made from the bite of a mosasaur.

The *Placenticeras* specimen on the right is a fine example of a mosasaur-bitten ammonite. The tooth marks have been left in the phragmocone (chambered portion) of the shell, where the septa support the surrounding shell, and did not allow for wide-scale collapse of the shell around the holes. The edges of the holes show an irregular, slightly broken shape. This is much different from the smooth, round holes caused by limpet borings as seen in the *Placenticeras* ammonite on the left. Limpet (inset) holes show a slightly dissolved and smooth edge to the shell around the holes. Limpets and other boring gastropods stop dissolving the shell when they get through the surface of the shell and reach the septa. They do not dissolve the underlying septa, because there is nothing further to gain.

Predator: Brittle star
Prey: Crinoid

Crinoids possess an endoskeleton composed of calcareous plates covered by a thin epidermis. Each plate is a single, very porous calcite crystal. Unfused plates are held together with ligaments or muscles. The skeleton may be divided into four basic parts: the holdfast, which anchors the crinoid to the ocean bottom; the stem, which raises the calyx above the substrate; the calyx, which contains the internal organs; and from five to as many as 200 feeding arms, which gather food.

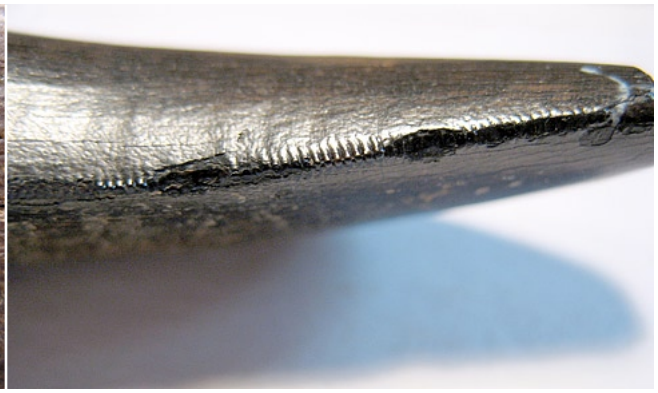
Fossil crinoids are occasionally preserved with another organism attached, commonly a brittle star entwined around the crown or near the anal pyramid. There is some debate among palaeontologists regarding this attachment. Some believe the relationship was commensal meaning the brittle star lived with the crinoid and consumed fecal pellets excreted by the crinoid as waste. However, other palaeontologists believe the brittle star may have been predatory and fed on the crinoids themselves. Below is a brittle star, *Onychaster* (arrow) deeply embedded in the calyx of the crinoid *Cyathocrinites*.

Predator: Albertosaur
Prey: Hadrosaur

Tooth-damaged dinosaur bone can be recognized by distinctive markings such as grooves or punctures. Although some damage may have been inflicted during dominance fights, most bite marks probably indicate carnivore activity. Identification of damaged bone can tell us that a particular species of dinosaur was eaten, but it generally does not indicate whether the prey was hunted and killed or opportunistically scavenged. In some cases, however, it may be possible to associate different tooth marks with specific predator activities based on the types and distribution of damage. Multiple

bite marks on the ends of sauropod limb bones, for example, are more likely to represent feeding traces as opposed to assault wounds.

The identity of the animal responsible for bite marks is usually difficult to determine because many Mesozoic vertebrates (including the crocodiles) were capable of causing generalized tooth damage to bone. Fortunately, well-preserved tooth marks can occasionally exhibit distinctive shapes, spacing, and/or serration marks that allow comparisons with fossil jaws of contemporaneous carnivores.



Parallel striation marks on the hadrosaur bone fragment (above left) indicate that the predator responsible for making these marks had serrated teeth as shown on the albertosaur tooth specimen (above right).

Even more dramatic are the very rare examples of dinosaur teeth actually stuck in the bones of their prey. In Montana, a tyrannosaurid tooth was found embedded in a *Hypacrosaurus* fibula, providing more indisputable evidence of carnivore activity. ❑

Paleo Rangers Field Trip

By Wendy Morrison

Hey, kids! 2007 is the start of another Paleo Rangers field trip season. We are planning a field trip to Horseshoe Canyon, Alberta on **Saturday, July 7** to collect dinosaur bones and other Cretaceous fossils. We will have signup and information sheets with us at the meetings. The cost is $5.00 for the field trip guide. Contact persons are **Wendy Morrison (403) 603-0243** and **Dan Mislenovich (403) 603-0252.**

Fossils in the News

Quirks and Quarks, CBC Radio 1, Feb. 3, 2007.

Dinosaurs with opposable thumbs

MONTANA—Dr. Phil Senter of Lamar State College in Orange, Texas reported that he has seen the first evidence of opposable thumbs in dinosaurs. This was observed in a specimen of *Bambiraptor feinbergi*, a knee-sized carnivore which is related to *Velociraptor*.

The specimen was found in the 75 million-year-old Two Medicine Formation in Montana. *Bambiraptor* had three fingers: a thumb, index finger and third digit. Senter and his colleagues manually manipulated the hand bones and observed a unique joint at

the base of the thumb. This joint allowed the thumb to swing under the third digit to act like an opposable thumb which may have enabled *Bambiraptor* to grasp objects using only one hand. He suggested that the animal could have grabbed caterpillars from branches or impaled soft objects on a branch or the ground. He hypothesized that *Bambiraptor* probably had feathered wings, which would have made grasping items from the ground more difficult, but would have suited a tree dweller. Dr. Senter plans to study the forelimbs of other kinds of dinosaurs (particularly bipedal plant eaters) to search for evidence of opposable thumbs in other species.

– summarized by Mona Marsovsky

The Calgary Herald, December 5, 2006.

Microfossils find first in N. America

YUKON—Geological Survey of Canada scientists describe in the September 2006 issue of the *Journal of Paleontology* the discovery of phosphatized microfossils including eggs, embryos and other remains of Early Cambrian (540 million-year-old) organisms. The microfossils, found in rocks from the Wernecke Mountains in the western Yukon, are touted as being the first of their kind found in North America. GSC scientists Leanne Pyle and Godfrey Nowlan, along with their colleages, extracted the fossils from limestone using weak acid. Similar finds have been made previously in Siberia and China. The fossils date from the "Cambrian Explosion", when many skeletal fossils first appear in the fossil record.

Sciencedaily.com, March 5, 2007.

Scientist discovers new horned dinosaur genus: *Albertaceratops*

CLEVELAND, Ohio—Cleveland Museum of Natural History curator Michael Ryan (a University of Calgary alumnus) has named a new dinosaur genus based on fossils found in southeastern Alberta. *Albertaceratops nesmoi* is named for the province and Manyberries-area rancher Cecil Nesmo who has given much support to palaeontological research.

The new genus is assigned to the subfamily Centrosaurinae, and is currently considered to be the most primitive member of that group. The skull of *Albertaceratops* is unusual for the Centrosaurinae in having long horns over each eye, like those of the Chasmosaurinae, another subfamily that includes the iconic *Triceratops*. Other centrosaurs have very short brow horns, a long nose horn and a neck frill with spikes or hooks along the rim. *Albertaceratops* has the frill with hooks, making it a centrosaur, but it has the long brow horns and the nose horn is replaced by an elongate, rounded ridge.

The new skull material of *Albertaceratops* was recovered from the lower Oldman Formation, in the Milk River region of southeastern Alberta.

For the full story and illustrations, see **www.sciencedaily.com/releases/2007/03/070304115019.htm** and **www.digitaldreammachine.com/sadrg/dinosaurs/albertaceratops.html**

Top Fossil News Stories of 2006

By Steven Francis-Coombs

In the palaeo headlines of 2006, there were many top stories which I'm going to summarize somewhat briefly. I'm not going to deal with every story, but the "bigger stuff" for that year, which I feel is important to present. Sorry if I don't mention stories that someone else feels were important to report.

First off, it is believed that animals that are stranded on islands for generations over time tend to shrink due to a limited food supply. Well, in the dinosaur world it seems that it was no different. A new species of sauropod was described from Germany, and what's so strange about this new sauropod is that it was a dwarf. This new species was named *Europasaurus holgeri* and it was 1.7 to 6.2 m in length. Its young would have been the size of a German shepherd dog. The fossils of this sauropod were initially believed to be those of juveniles, but a closer inspection suggested otherwise. It turns out they were the fossils of adults. These dinosaurs were around when central Europe was submerged under the sea.

Another discovery in Germany was a new non-avian theropod found in the world famous Solnhofen site. This place is famous for producing *Compsognathus*, and the always popular *Archaeopteryx*. The new critter to join the roster was named *Juravenator starki* by Luis Chiappe and Ursula Gohlich. *Juravenator* is a primitive coelurosaur very similar to *Compsognathus*, found in the same area. *Juravenator* was not

found with any primitive feathers or impressions like any other coelurosaurs from China, such as *Sinosauropteryx*. The authors suggests that feathers in theropods may have evolved independently and been lost in different groups of dinosaurs, although this could just be a preservational bias.

Another extraordinary find, this time in Spain gives Europe's biggest dinosaur. This monstrous dinosaur was named *Turiasaurus riodevensis* and would have been 30 to 37 m long and would have weighed somewhere between 40 and 48 t. Many features of this new giant and other European dinosaurs indicate that it belongs to a previously unknown clade (or family).

A new member of the tyrannosaur family was revealed by leading palaeontologist Xu Xing and his team. This primitive tyrannosaur was christened *Guanlong wucaii*. It was found in Middle Jurassic rocks in the Junggar basin of northwestern China. *Guanlong* represents the most primitive member of the tyrannosaurs found thus far, on the basis of a number of anatomical features. This dinosaur would have measured 3 m long and had this bizarre paper-thin crest on its head. The structure is not seen in other clan members, but is found in other theropods, such as *Dilophosaurus*. The purpose of this structure was maybe for individual recognition or as a sexual display.

Mapusaurus joins the ranks of the largest carnivores to walk the Earth.

Many years ago a treasure trove of carcharodontosaurid fossils was unearthed in Argentina. At least seven individuals were found which suggested there was some pack hunting behaviour going on. All the individuals represent a brand new theropod dinosaur named *Mapusaurus roseae*, by Argentine palaeontologist Rodolfo Coria and Canadian palaeontologist Philip Currie. *Mapusaurus* was a large theropod, comparable in size to *T. rex*. It resembled *Giganotosaurus* in overall morphology. It joins the ranks of the largest carnivores to walk the Earth.

To add to the growing work on dinosaur growth, *Allosaurus* and *Triceratops* were studied. For *Triceratops*, palaeontologists Mark Goodwin and colleagues described a new juvenile skull. Then a more extensive study was conducted by Jack Horner and Mark Goodwin, which showed the different growth stages ranging from juvenile to adult. An example of this would be the postorbital or brow horns of *Triceratops* which started off as straight stubs (juveniles), curved backwards later in growth, became straight in subadults and then curved forward in adults. The juvenile frill is ornamented by several triangle-shaped bones called epoccipitals, which change shape and ultimately become a frill in adults. Horn and frill morphologies of juveniles allowed for easy identification of young animals, while the changes in subadults and adults signalled the onset of sexual maturity.

The growth rate of *Allosaurus* was conducted by Paul Bybee and colleagues. The research shows that *Allosaurus* may have reached ages of 22–28 years before death. By plotting age against estimated mass, Bybee and his colleagues were able to render a growth curve for *Allosaurus*, which indicates that it was gaining approximately 148 kg a year.

A study done by Gregory Erikson of Florida State University and his team studied the life history of the well-known *Tyrannosaurus*. The research shows that hatchlings seldom made it through early life's troubles, such as predation, cannibalism and starvation. The first two years were the hardest for these dinosaurs. Seventy percent of the dinosaurs that survived the first two years were still alive at age 13. But few of them would enjoy a long reproductive life span; their average life expectancy was estimated to be seventeen years. This new evidence illustrates that tyrannosaurs as a group exhibited life patterns more consistent with living birds and mammals, than with fellow reptiles.

A 375 million-year-old fossil found in the Canadian arctic helps to shed new light on the evolution of tetrapods. Named *Tiktaalik roseae* by a team co-led by Neil Shubin of the University of Chicago, Ted Daeschler of the Philadelphia Academy of Natural Sciences, and Farish Jenkins of Harvard University, the animal provides another evolutionary link to the transition from water to land. This new fossil provides clearer understanding of the anatomy of sarcopterygians near the tetrapod split, and has closed the gap further between fishes and tetrapods. This critter reached lengths of 3 m, was a predator and had a crocodile-like skull, which reflects an aquatic

lifestyle. *Tiktaalik* was perhaps capable of wading in water. Its wrist structure was distinct and shows that it formed an important step in the transition from a swimming fish to an animal that could actively walk on land and support its weight.

***Castorocauda lutrasimilis*, a mammal** that lived 165 million years ago of what is now Inner Mongolia, shows that mammals had adaptations for an aquatic lifestyle. This animals resembled a beaver, but it's too ancient and primitive and is not a member of the modern groups of mammals.

The skull and other remains of a 3.3 million-year-old infant discovered by Ethiopian anthropologist Zeresnay Alemeseged, is arguably the best fossil of the species *Australopithecus afarensis*, famous for "Lucy," a 3.2 million-year-old adult female found in 1974. The new kid, christened the Dikika baby, shows details that are rarely seen for this species, such as a full set of milk teeth and unerupted adult teeth. All the ribs are found in the positions they would have occupied in life. Several fingers were curled up in a tiny grasp. And in the throat region was found a hyoid bone, which is crucial to the human voice box. From the waist down she looked like us humans, but from the waist up she exhibited many apelike characteristics. These new fossils provide even more evidence of the origins of our own species.

The fossils of marine reptiles 150 million years old were discovered by Norwegian scientists between the Norwegian mainland and the North Pole on a remote island. The finds belong to two groups of extinct marine reptiles—the plesiosaurs and the ichthyosaurs. These giant sea reptiles swam the seas at the time of the dinosaurs. One of the skeletons has been nicknamed "The Monster" because of its enormous size. The skull of "The Monster" is 3 m long and the body could be more than 8 m from the tip of its nose to its tail. The tooth of an ichthyosaur was found embedded in the neck vertebra of a plesiosaur belonging to the genus *Kimmerosaurus*. After these animals died, they came to rest at the bottom of the sea in mud, where little or no oxygen was present. The assemblage of fossils comprises twenty-one long-neck plesiosaurs, six ichthyosaurs, and one short-neck plesiosaur.

[*Steven is an APS member in Barachois, Quebec. More information on the topics covered in these items can be found by Googling key words online. –ed.*] ❑