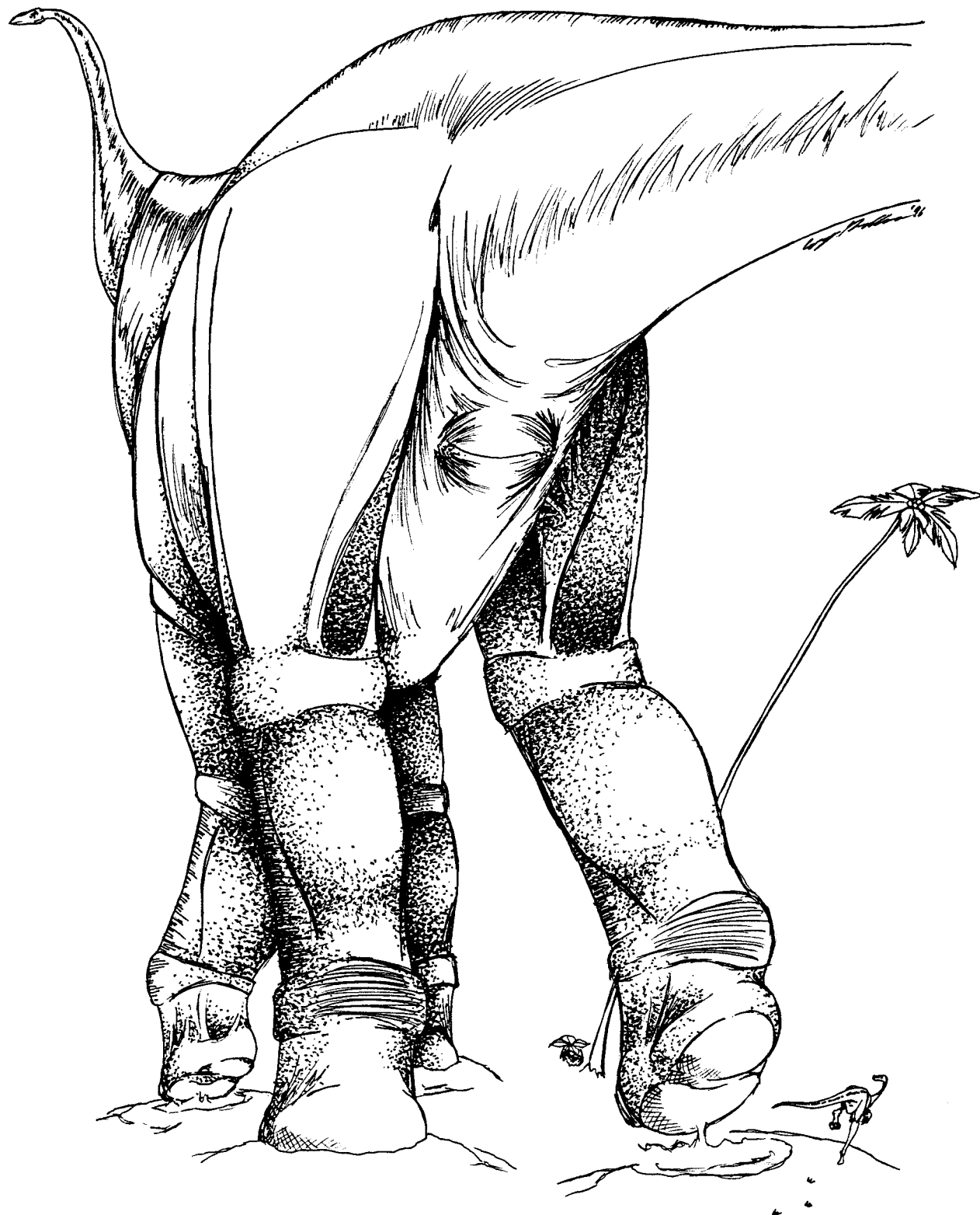


ALBERTA • PALAEOONTOLOGICAL • SOCIETY

BULLETIN

VOLUME 11 NUMBER 2

JUNE 1996



ALBERTA PALAEOONTOLOGICAL 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	\$15.00 annually
Family or Institution	\$20.00 annually

THE BULLETIN WILL BE PUBLISHED QUARTERLY: March, June, September and December.
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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

June, July and August—No meetings—see Field Trip Schedule, elsewhere in this issue.

Friday, September 15—Our annual Show-and-Tell meeting: bring your latest finds from the summer collecting season.

ON THE COVER: The giant sauropod *Seismosaurus hallorum* with *Ornitholestes* sp. (Jurassic, USA). Art by APS member Cory Gross. ©1996. Reproduced by permission.

President's Message

by Wayne Braunberger

Spring weather has not been that good, so I hope the summer is much nicer for going out in the field, particularly for our field trips. Once again three trips are planned for this year which promise to be exciting and informative. Field trips are a great way to see new or restricted areas so I hope to see many of you over the summer.

Over the past few months several successful seminars have been held; all were well attended. I would like to thank **Joe LeBlanc** for making available the basement of his home for the seminars. Without Joe's generosity we would not have been able to hold them. Next year it would be nice to hold preparation and casting seminars but a proper facility is needed. Any suggestions would be welcome. In addition, Joe arranged for the April meeting at the Calgary Zoo which was a very informative evening.

The Society has recently joined the Geological Association of Canada's Paleontology Division Affiliates Program. This should result in more interaction between amateur and professional palaeontologists. More information and details should be available in the fall.

In other news, the Society once again participated in the Calgary Rock and Lapidary Club show. Several members (**Harvey Negrich, Don Sabo, Howard Allen, Les Adler, Vaclav Marsovsky, Les Fazekas**, and myself) helped take care of the display. The Society also had a display case in the show.

Good hunting over the summer and I will look forward to seeing many of you at the September Show-and-Tell meeting. □

Welcome New Members!

Walter Andreeff, Calgary, AB
John and Dorothy Birrell, Calgary, AB
Patricia (Pat) Brennan, Calgary, AB
Steven A. Moskowitz, La Palma, CA
Ronald D. Shannon, Medicine Hat, AB
Dan Zimmerman, Maineville, OH

Corrections...

In March's recap of the Society's ten years of field trips, the author omitted two trips:

Field Trip 93-3 Scheduled for Genesee, Alberta, the trip was cancelled due to weather.

Field Trip 94-2 Led by Wayne Braunberger and Les Fazekas, participants collected brackish water molluscs of the basal St. Mary River

Formation (Upper Cretaceous) at Monarch, Alberta, then visited nearby Scabby Butte, where vertebrate (fish and reptile) fossils were collected.

Field Trip 94-3 was misnumbered as **94-2**. □

Society contributes to Junior Forest Wardens talk

In February of this year, **Holger Hartmaier** presented a talk to the Okotoks Junior Forest Wardens on fossils. Thanks to the generous donations of material from the Society and from **Joe LeBlanc** he was able to make up some grab-bags for giving away. Some prospective new members picked up Society brochures and may come out to future meetings. □

From the Editor...

Howard Allen

With the summer collecting season finally getting a start, I thought it would be a good idea to review some of the regulations regarding fossil collecting in parts of western Canada. Legislation has been established in Alberta and Saskatchewan; apparently British Columbia is in the process of creating a set of regulations, which will hopefully take into account the important contributions that can be made by amateurs.

Alberta—strict but reasonable?

The regulations are well known by most APS members, and are summarized in a leaflet called *Finding Fossils*, printed by the Tyrrell Museum and the provincial ministry of Culture and Multiculturalism. Basically:

- 1) Surface finds may be collected, with permission of the landowner, if on private land.
- 2) Excavation—that is, removal of a fossil from its original stratigraphic position in a bed—is prohibited without a permit (which you, as an amateur are unlikely to obtain).
- 3) It is illegal to remove fossils from provincial and federal parks.
- 4) All fossils found in Alberta, except those types included on a Control List, and for which a permit to own/sell/export can be obtained, or those collected prior to July 5, 1978, are the property of the province. Private collectors are considered “custodians,” which means you can keep your finds, but you can't sell or export them without a legal “Disposition Certificate.”

Saskatchewan—abandon all hope ye who enter

If anyone thought Alberta's fossil collecting regulations were harsh, then by comparison

Saskatchewan's regulations will appear to have been drafted by Draco himself.

The Provincial Government's *Heritage Property Act* lays out the grim news. Since the *Act* is written in standard, fine-print legalese, my layman's interpretation is technically suspect, but the wording appears to be relatively unambiguous.

I have presented excerpts of the exact wording of the *Act* below, verbatim, along with my interpretations. First, there are a number of important definitions:

Part I, Interpretation

2(i) "heritage property" means:

- (i) archaeological objects;
- (ii) palaeontological objects;

2(n.1) "palaeontological object" means a fossil of a vertebrate animal or a macroscopic fossil of an invertebrate animal or plant that lived in the geological past, but does not include:

- (i) a fossil fuel and fossiliferous rock intended for industrial use;
- or
- (ii) any form, in addition to those mentioned in subclause (i), of a preserved remain or trace of a multicellular organism that may be prescribed in the regulations;

This part seems clear enough. All animal and plant fossils are included in the definition. The only loopholes appear to be microfossils or industrial fossils (coal, building stone, etc.). Subclause (ii) presumably refers to a control list similar to Alberta's, exempting certain types of fossils from the regulations.

2(p) "site" includes any parcel of land or remains of any building or structure;

Thus, a "site" is any patch of land, regardless of size. The last definition of interest to us regards vertebrate fossils:

Part V, Heritage Property Conservation

66 In sections 66.1 and 66.2, "vertebrate palaeontological object" means:

- (a) the skeletal remains; or
- (b) the traces of activity; of a vertebrate animal that lived prior to January 1, 1885. 1993, c.26, s.10.

Now that we have the legal definitions out of the way, let's take a look at the laws:

66.1 (1) Every archaeological object or vertebrate palaeontological object, found in or taken from land in Saskatchewan on or after November 28, 1980 is deemed to be the property of the Crown.

(2) Every palaeontological object, other than a vertebrate palaeontological object, found in or taken from land in Saskatchewan after the coming into force of this section is deemed to be the property of the Crown. 1993, c. 26, s.10.

66.2 (1) Any person who has found in, or has taken from, land in Saskatchewan the following objects may apply to the minister for registration of those objects and shall provide to the minister any information the minister may require regarding those objects:

- (a) any archaeological object or vertebrate palaeontological object found or taken prior to November 28, 1980; or
- (b) any palaeontological object, other than a vertebrate palaeontological object, found or taken prior to the coming into force of this section.

So far, this is the same as Alberta's law: the province owns everything collected *after* the law

came into effect. Any items collected prior to the *Act* coming into effect can be registered to establish ownership. But here's where things get ugly:

67(1) No person shall, for the purpose of collecting from, researching or otherwise managing heritage property:

- (a) carry out a survey;
- (b) make collections; or
- (c) conduct excavations or other activities;

which may disturb or dislocate archaeological or palaeontological objects unless the person holds a valid and subsisting investigation permit issued pursuant to this section.

71 (1) Any person, other than a holder of a subsisting permit, who discovers a previously unknown site containing archaeological or palaeontological objects shall, within 15 days of his discovery, notify the minister.

(2) The minister shall provide suitable recognition to any person reporting a discovery mentioned in subsection (1).

In other words, *no collecting of macrofossils is allowed in Saskatchewan*, without a permit (which is likely to be issued only to academics). Period. Surface finds or excavation, public land or private—*no fossil collecting*. What's more, according to subsection 71(1), if you even *see* a few chips of petrified wood lying on the ground, you could be in big trouble if you don't report it to the Minister within 15 days. (I wonder what "suitable recognition" you'd get for reporting to the minister a few chips of petrified wood?)

What constitutes "big trouble"? How about...

Part VI, General

73 (1) Any person who contravenes any provision of this Act or the regulations, or any order or direction made or given pursuant to this Act or the regulations, is guilty of an offence and liable on summary conviction:

- (a) in the case of a corporation, to a fine of not more than \$250,000.
- (b) in the case of an individual, to a fine of not more than \$5,000, to imprisonment for a term of not more than six months or to both such fine and imprisonment.

Have a nice day.

Some members have recently suggested that the APS should undertake a project to publish the fossil collecting regulations for all provincial and territorial jurisdictions across Canada. I think this is an excellent idea, as it is very much needed if amateurs are to attempt to stay within the laws of this country. If you would like to organize or contribute to such a project, please contact me or any other members of the executive.

1996 Club Newsletter Contest

On a much more upbeat note... the marks are in from this year's annual Gem and Mineral Federation of Canada Club Newsletter Contest and... YAHOO! We finally made the Big Time! The APS *Bulletin* won a First Level award (the highest award possible) in the "Large" category.

Thanks are due to all our contributors, to **Trudy Martin** and to "**Jean**," the GMFC judge, for the kind remarks we received. □

Speculations in Natural History: Science, the Scientific Method and Fighting Creationism

By Cory Gross

I'm chickening out of doing a dinosaur article again because this time around I would like to discuss a matter of utmost importance to many people. I'm referring to creationism and so-called "creation-science." Like probably many of you out there, I am a Christian as well as a scientist; and because of these two roles, I find creationism thoroughly offensive. Unfortunately for me, the issue becomes somewhat clouded with emotion and as we all know, emotion is the death-knell for a constructive argument. However, it's not only theistic peoples who fumble the ball in creation vs. evolution debates. Almost all scientists have been looking at the wrong factor to fight against. The debate is not truly about creation vs. evolution, but faith vs. the scientific method; and until this is realized, there won't be any resolution to the debate.

The first thing we have to do is set the boundaries of science and religion. Science and religion are two different, yet compatible, methods of inquiry. Despite what many people—creationist, scientist, and lay-person—think, they are not exclusive of each other. They are not even in the same proverbial ballpark. Science is concerned with the physical, or in other words, the "how" and the "when." Religion investigates those things that science cannot...the soul; what comes after death; morality. It's concerned with the "who" and the "why." Science is concerned with increasing knowledge, religion with spiritual growth. Science does not, or should not, overstep its bounds in those respects; and I think it would do us some good to remember this.

Whenever creationists throw another volley, many of us are left wondering why the public accepts what is so obviously junk and pseudo-science—obvious to *us*. The public seems generally unable to make the distinction between real science and pseudo-science because they don't know what makes the things we palaeontologists, geologists and biologists say any more legitimate than what creationists say. When we, the scientific community, present our case to the public about almost anything, we always seem to be saying "hey, trust us...we're the scientists." What we should start doing (or at least doing better) is to try

and get the public involved, teach them about the scientific method, present the "short form" evidence to them and let them assess it for themselves.

One of the most aggravating statements I come up against in dealing with creationists, or even just the public, is "ahhhh, it's just a theory," as though a theory was just something a scientist thought up off the top of her head while sipping coffee on a Saturday morning. We have to try and get the public to know what is entailed in turning an idea into a theory. We have to make the public understand the processes of inductive and deductive reasoning, get them to understand the importance of the scientific method—the self-imposed set of rules that all scientists adhere to and the stick by which all real science is measured. They should be able to see why what creationists do or don't do disqualifies them as scientists.

In debating with creationists, we can throw up evidence (so to speak) until we're blue in the face...it won't do us any good. Quite simply, it's not the evidence that matters. We have to defend the method by which we

got the evidence. "We have this rock and it's x years old" won't cut it; "we found this rock in such-and-such a context and dated it such-and-such a way, and that's why we think it's x years old" is what should be said. Another example of this is the defence of probably the most important principle in

palaeontology: uniformitarianism, the principle that geological and biological processes that are going on now must have been going on in the past because there is no reason for it to be any different. On the Dinosaur e-mail discussion group, there was a joke going on for a while about hydrogen-filled sauropods, and this joke is actually handy to illustrate my point. Even the most hardcore creationist will admit that the idea of gasbag apatasauri floating along the treeline, dreading the next electric storm is absurd; it simply defeats common sense; yet without uniformitarianism, which is just an extension of common sense, it's entirely possible.

Now for the hard part: we have to get the public to absorb all the information I've just presented, and to think critically. Yes, we all know that critical thinking skills are only taught in art and English classes, being otherwise crushed out of you by the school system. But after being taught

We always seem to be saying "hey, trust us... we're the scientists."

about the scientific methodology, the public should be able to question creationists on their own, without our evidence or our help. The recent “man-track” problem is an example; the public should be asking where are other human remains besides footprints? Or where are these humans *before* the age of the dinosaurs, and during the time between the dinosaurs’ extinction and when humans become common in the fossil record? Another example lies in “Flood Geology.” The public has to be taught to wonder “have they disproved uniformitarianism?” or “how well do they explain why a flood can leave deposits that look like rivers or glaciers or coal forests?” This kind of questioning is useful against some pop-science as well, such as the seemingly rampant “dinosaurs did this because I say so” mentality.

How are we to go about doing this? Good question...and I wish I could tell you. One obvious way is to give a healthy treatment of this in every level of schooling. Maybe places like the Tyrrell and the Calgary Zoo can include this kind of stuff in their public outreach programs. In my humble opinion, this is why organizations like the Alberta Palaeontological Society and any other “amateur” science groups are so important: they give an opportunity for the public to become involved and they do a lot of the PR dirty-work for science.

I can’t stress enough in my overly repetitive article how important it is that we quit trying to argue our case to the diehard Creationist Right; we’re only going to be talking past them and achieving nothing. We have to face this issue with understanding and go to the public, teach them about how real science works, why creationist books sit in the “spirituality” section along with books on tarot cards, Atlantis, and UFOs. We may not be able to convert the creationist establishments, but we can at least bring an end to their popular support.

Additional reading: Roland Mushat Fry, ed. 1983. *Is God A creationist? The Religious Case Against Creation Science*. Scribner’s, ISBN 0-684-17993-8. □

This message appeared recently in the editor’s Chinese fortune-cookie:

**The man who removes a mountain
begins by carrying away small stones.**

Remember, collectors: quality, not quantity!

Program Summary

by Howard Allen

April 19, 1996: *A Visit to the Calgary Zoo*

APS member Joe LeBlanc and his friend Nora both volunteer as interpreters at the Calgary Zoo. A large turnout met at the Zoo’s education facility where Joe and Nora entertained us with a wonderful assortment of “biofacts” including skulls and bones of modern animals ranging from sawfishes through apes and echidnas to hippos and elephants. There were also a number of live animals on display in the teaching room, including ferrets, a giant millipede, kestrels and snakes. The highlight of the evening was the infamous “Zoo Quiz,” which demonstrated to the group of amateur naturalists how shaky our knowledge of nature really is! Thanks to Nora, Joe and the Calgary Zoo for a fun and educational evening, and for providing refreshments.

May 17, 1996: *Evolutionary History and Diversity of the Vertebrates, Part 2, with Dr. Gerry Morgan*

Gerry Morgan’s annual talks on vertebrate palaeontology are fast becoming one of the highlights of the Society’s program schedule. A very entertaining speaker, Gerry continued his overview of the vertebrate fossil record with a discussion of two important groups of Palaeozoic fishes: the acanthodians, or “spiny sharks” and the placoderms, a diverse but short-lived group of armoured fishes.

The acanthodians are among the earliest representatives of the jawed vertebrates, having arisen probably in Silurian time. The most generally accepted hypothesis for the origin of vertebrate jaws is that they were derived from an anterior set of bony gill arches that became enlarged and moved into a position surrounding the mouth. This theory is quite convincing when the skeleton of an acanthodian is examined: the upper and lower jaw bones appear very similar in shape and arrangement to the gill arches.

The placoderms were confined almost exclusively to the Devonian Period, but in that time they developed a wide diversity of body forms. The main identifying feature of placoderms is their body armour, which generally comprised articulated bony shields covering the head and thorax. The posterior parts of the body were usually covered in scales or were unprotected. The largest representative, *Dunkleosteus* (= *Dinichthys*) was up to 30 feet long. □

Fossils in the News

Okotoks Western Wheel, May 1, 1996:

Okotoks artist dabbles in aging art of dinosaurs

OKOTOKS, Alberta—This half-page, illustrated article features APS member (and T-shirt designer!) **Mike Skrepnick**, who is a talented professional paleo-artist. Mike's work is now very much in demand around the world. Currently working on murals for Dinosaur Provincial Park, Mike has become backlogged with work: he even had to turn down an offer from Walt Disney Studios, who wanted him to help illustrate an animated feature film.

Mike's interest in dinosaurs started in childhood and continues unabated: "I am addicted to palaeontology. There isn't a day that goes by that I don't think about dinosaurs."

The Calgary Sun, May 3, 1996:

Mesozoic masterpiece: city sculptor has it covered

CALGARY—The sculpture of a dinosaur egg and fetus adorning the cover of the May *National Geographic* magazine was created by Calgary artist Brian Cooley. The sculpture was commissioned last October. Cooley says that the project was the highlight of his 20-year career as a sculptor. "It was my other accomplishments that led to the assignment, but appearing in *National Geographic* certainly is the epitome of it all...it's like \$50,000 in free advertising."

The Calgary Herald, May 3, 1996:

Dinosaurs "hit the ground running"

WASHINGTON (AP)—Researchers at Oregon State University have concluded that just-hatched dinosaurs, far from requiring parental care, were able to run and fend for themselves. Studying the bone and muscle strength of baby dinosaurs, Nicholas Geist and Terry Jones surmise that newborn dinosaurs were similar to young crocodiles, in their ability to scamper away from danger. Montana palaeontologist Jack Horner, an advocate of the "nurturing mother" school, begs to differ. He considers the evidence to be "misinterpreted."

Calgary Herald, March 2, 1996:

Fantastic flying fossils

DRUMHELLER—This feature article written by palaeontologist Phil Currie of the Tyrrell Museum is one of a continuing series by Tyrrell staffers. Phil documents the history of pterosaur discoveries

in Alberta, by such people as Dale Russell and Wendy Sloboda. Russell found the first bone, since assigned to the genus *Quetzalcoatlus*, in Dinosaur Provincial Park. In 1992 Wendy Sloboda, also working in the park, came across what turned out to be seven pterosaur bones—one punctured by the tooth of a small predatory dinosaur, *Saurornitholestes langstoni*.

The Calgary Sun, May 17, 1996:

Dino find a real mouthful

CHICAGO—The results of recent dinosaur explorations in Morocco have been released, revealing the discovery of one new type of predatory dinosaur and the reconstructed skull of a huge carnosaur, slightly bigger than *T. rex*. University of Chicago researcher Paul Sereno announced the discovery of *Deltadromeus agilis*, an agile, lightly built predator, about 90 million years old. The other monster, *Carcharodontosaurus saharicus*, had a 1.6 metre-long skull filled with huge, oddly serrated teeth. [see the June '96 *National Geographic* for a picture of the teeth -ed.] Some of the *Deltadromeus* specimens were prepared at the Tyrrell Museum in Drumheller.

Nature, April 18, 1996:

A Triassic Lagerstätte from eastern North America

CASCADE, Virginia—This scientific article documents the discovery of a diverse and beautifully preserved Lagerstätte (fossil soft-bodied fauna, like the Burgess Shale) of Late Triassic age in the eastern US. Insects, plants, amphibians and fishes have been recovered, all preserved in remarkable detail. The insect fossils show exquisite preservation of wing veins, body hairs and other tiny features. Some fossil amphibians even show details of the muscle structure in the tail area.

The diversity of the specimens recovered from a quarry near the Virginia-North Carolina border shows that the Triassic was a time of much greater variety of life than previously thought. As well, some of the specimens found extend the fossil record for some insect types back further than previously known, and fill gaps in other lineages. Some forms were previously known only from far distant localities such as Australia and South Africa—areas which were previously thought to be well isolated in Triassic time from the land that became North America. □

[Thanks to Les Adler, Brian Allen, Holger Hartmaier, Vaclav Marsovsky, Trudy Martin and Sam Richter for providing clippings -ed.]

Tick season is here!

Now that spring has finally sprung, Alberta hikers and fossil collectors are heading into the mountains and wooded valleys, and onto the banquet tables of wood ticks. In western Canada, the height of tick season is traditionally from mid-May to early June, but with this year's late spring, tick season could be extended; indeed, ticks can often be found all summer long. In various parts of North America, ticks are carriers of a whole litany of weird diseases: Lyme disease, ehrlichiosis, babesiosis, Rocky Mountain spotted fever and tick paralysis. The following tips on tick avoidance are from the May 1996 issue of the *Mayo Clinic Health Letter*:

- Stay on the trail—If you're walking in the woods, don't trailblaze. Ticks live in low bushes and tall grass, where they can brush onto you. They don't jump, fly or dive off trees onto you.
- Wear protective clothing—Wear long-sleeve shirts and tuck your pants into your boots or socks. If you wear light-coloured clothes, you may be able to spot dark-coloured ticks before they bite.
- Use tick repellents—Insect repellents often repel ticks. Use products containing DEET or permethrin. Be sure to follow label directions.

When you get back to your car or back home, do a tick-check; pay special attention to your neck, scalp and ears, underarms and groin.

[Thanks to Sam Richter for providing the *Mayo Clinic* article—ed.]



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A cheap and easy way to copy ammonite sutures

by Howard Allen

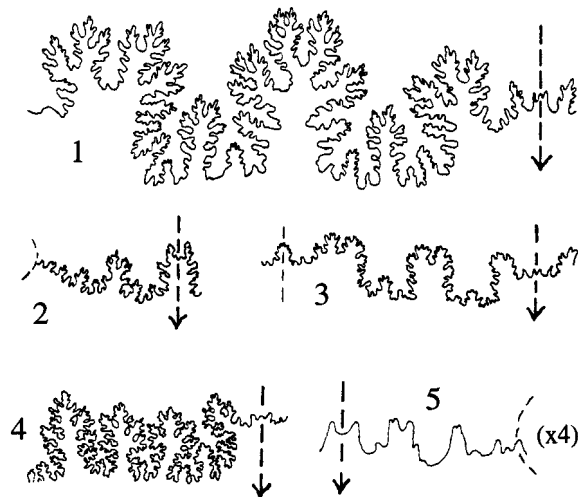
Suture lines are very important features in the identification of ammonites and other shelled cephalopods (such as the nautiloids and goniatites). When doing research at a library, it's nice to be able to compare published illustrations of sutures with those of your own specimens. Unfortunately, hauling your specimens to the library for comparison is a pain, and might net you some funny looks from fellow patrons. There are other options, of course. You might be able to take the books home, but this may be impossible in some research libraries where you don't have borrowing privileges—besides, it's no fun lugging an armload of books home (and returning them) if you don't have to; alternately, you can pay to Xerox the relevant pages and take the photocopies home. It would be great if you could just make accurate copies of your own suture patterns and take them to the library for quick comparisons.

The standard methods used by professional palaeontologists have drawbacks—cost being first and foremost. The method of choice is to use a *camera lucida*, a microscope attachment that allows you to see an image of your pencil and paper superimposed on the image of the specimen, thereby allowing you to simply draw the suture pattern directly on paper. Unfortunately, *camera lucidas* and the microscopes that accept them are wickedly expensive, and probably next-to-impossible to borrow. Photography requires macro- or micro- equipment, and is limited by specimen contrast and the fact that ammonites are three-dimensional objects with the suture wrapping around the shell's circumference: you'll rarely get the entire suture in one picture, or completely in focus.

The Scotch tape method

I don't take any credit for having invented this method. I know it's been used before; in fact, some readers will probably roll their eyes to see me writing about such a simple and obvious idea; but it may not be obvious to everybody, so I think it's worth passing on. (I only stumbled on the method recently, after many years of messing with ammonites.) My epiphany came while perusing an old Alberta Research Council ammonite paper. I noticed that one of the suture illustrations was surrounded by a faint rectangle the size and shape of...*a piece of Scotch tape!* I was delighted at the elegant simplicity of the idea, and decided immediately to try it.

Basically, the method is dead simple: stick a piece of transparent tape on your fossil and trace the suture pattern onto the tape. The advantages are mostly obvious: 1) how much does a piece of tape cost? 2) The tape is flexible, so you can wrap it right around the fossil and trace the entire suture. 3) The tape sticks, so it doesn't slip out of register while you're drawing on it. 4) Your suture illustration is reproduced at natural size.

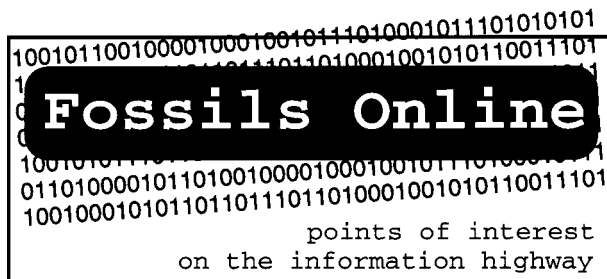


Ammonite sutures copied with the "Scotch tape method"

—all natural size except where noted; arrows point to aperture—
 1) *Baculites compressus* 2) *Ponteixites robustus* 3) *Baculites ovatus*
 var. *reesidei* 4) *Placenticerias intercalare* 5) *Borissjakoceras* sp.

Of course, as with all methods of doing things, there are a few "gotchas": 1) you need to use an extremely fine-tipped pen, the finer the better. Ink tends to spread out on the smooth tape surface, so the line winds up being about twice as wide as the pen tip. For the accompanying illustrations I used a 0.13 mm (6x0) drafting pen with standard latex-based drafting ink (Rapidograph 3084-F). 2) You must have a *very* steady hand, especially for small specimens. 3) The tape won't lie flat on strongly ribbed or knobby ammonites (e.g. scaphitoids), which makes tracing difficult, or impossible. 4) Some combinations of tape and ink tend to cause beading or skipping due to poor ink adhesion; also beware of smearing the wet ink.

After tracing the suture pattern onto tape, I stick the tape onto a light table (a window will do) and retrace onto a sheet of standard drafting vellum. If you have access to a photographic enlarger, you can use it to retrace tiny patterns at higher magnifications. This is how I retraced the *Borissjakoceras* suture at 4x magnification. The Scotch tape method could also be used for tracing the venation of some fossil leaves, but I'd avoid using it on delicate leaf compressions that consist of organic films on shale—the tape could rip the fossil right off the matrix. □



by Howard Allen

The Internet

Fossiliferous web sites: reviews

The Royal Tyrrell Museum of Palaeontology

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

After my experience logging onto this site in late March, I was all set to give it a merciless slugging: the "current and upcoming events" section was nearly a year out of date and important museum events such as the Heaton Lecture Series were nowhere to be found. I'm happy to report, however, that things have lately improved on the Tyrrell's web site, making it a definite "must surf".

Firstly, the "What's new" section has been updated, and lists various museum-sponsored activities (Day Digs, vacation camps, functions at Dinosaur Provincial Park, tours, hikes), updates on new displays, educational programs, etc.

You can take a "virtual tour" of the museum, where you click through a huge number of illustrated pages covering all manner of palaeontological topics. There's a frequently-asked-questions section, and sections covering topics in evolution, the big bang/origin of Earth, early life, trilobites, plants, etc., all well illustrated. There is a hefty list of links to other palaeontology sites on the net, as well as to the popular search engines.

Kevin Brett's Page of Death

<http://www.ualberta.ca/~kbrett/index.html>

Despite the slightly offputting name, this is one of the best sites I've seen yet for invertebrate palaeontology. Kevin Brett is a University of Alberta grad student working on his PhD in Ordovician trilobites. His "Page of Death" sets a standard for personal web pages—this is one resource no trilobite fan should be without. Brett's site is directed at both professionals and amateurs; it's got everything—great downloadable trilobite pics, lots of links to other palaeo and geology sites, a list of museums with links, links to evolution vs. creationism sites, a bibliography of trilobite references, and a trilobite classification table. He has started a directory of trilobite workers, both professional and amateur, and has included a link to an online magazine called the "Trilobite Papers." Brett's thesis topic means that there's a heavy bias toward Ordovician species, but there's plenty here for trilobites of all stripes.

The Yoho-Burgess Shale Research Foundation

<http://www.geo.ucalgary.ca/ybsrf1.html>

This is strictly an information site. It gives a history and outline of the Research Foundation, as well as contact addresses and phone numbers, and notes on Foundation-sponsored activities such as lectures and hikes to the Burgess and Mount Stephen fossil sites. There are no educational pages, no fossil pictures and no links to other sites.

The Plant Fossil Record

<http://sunrae.uel.ac.uk/palaeo/pfr2/pfr.htm>

I have mixed feelings about this site. The Plant Fossil Record (PFR) has the potential for being a useful database for students of palaeobotany. The site is managed by the International Organisation of Palaeobotany, which operates the site out of the University of East London. The PFR claims to contain data on over 10,000 fossil plants, including modern genera with fossil representatives. It is a bit outdated, since there are no data for genera described since 1985.

The home page lets you use three search modes. In the “Green Book” you enter a plant genus, and the engine searches the “description” and “occurrence” databases, returning the number of records your genus matches in the two databases. From there you can select the “descriptions” database, which allows you to enter several search terms, including genus, species, author, age, etc. This database returns information on the taxonomic status of the species and data concerning the type specimens. This could be useful to researchers. In the “occurrences” database, you enter a genus and species, and are presented with a world map supposedly showing the geographic occurrences of your species.

I found the Plant Fossil Record frustrating to use, since the coverage is very spotty and inconsistent. For example, entering the term *Metasequoia* into the “occurrences” database returns a list of several dozen localities—all in Russia or eastern Europe. After trying the names of several common genera, I could find no occurrences in North America. In fact, all the localities I found seemed to be in Russia or Eastern Europe. Even species with North American names, like *Nilsonia yukonensis* showed only Russian localities.

Keeping in mind that this is a British web site, I then went through a 1982 book on Welsh plant fossils, entering half a dozen names; despite a couple of hits in the “descriptions” database, there were no occurrences listed for the UK!

Another problem is that the “descriptions” and “occurrences” databases do not appear to be cross-referenced to each other. I entered the name *Florissantia* into the “descriptions” database, and got a taxonomic description back, but the “occurrences” database claimed “no records.” Same thing with several other genera. The “occurrences” database includes links to other institutions, such as the Smithsonian, Yale and Berkeley, which I didn’t pursue.

Some people obviously went to an awful lot of work keying in palaeobotanical data for the Plant Fossil Record. It’s a shame they didn’t coordinate their efforts better, and make it a more usable product. □

Reviews

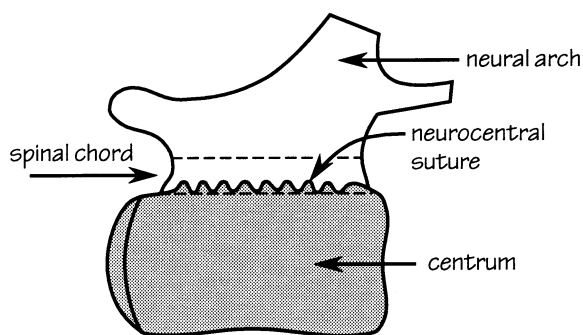
Closure of Neurocentral Sutures During Crocodylian Ontogeny: Implications for Maturity Assessment in Fossil Archosaurs by Christopher A. Brochu. *Journal of Vertebrate Paleontology*, Vol. 16, No. 1, 1996, p. 49–62.

(*Ontogeny* means the developmental history of the individual organism)

Size alone cannot be used as a criterion for determination of the maturity of an individual. It can be difficult to distinguish between adult dwarf species and young members of larger species. To this add the difference in size between males and females. I often wonder: “is that particular bone from a mature animal?” This article provides us with some of the other clues about maturity.

The article covers a **size independent criterion** for evaluation of maturity. In crocodylians the sutures between the neural arches and the centra (*neurocentral* sutures) in the vertebrae tend to remain visible until late in life. Most centra and neural arches remain separate after the hatching of the young crocodylian. During life, the suture disappears as it is covered by sheets of bone.

The closing and filling of the neurocentral sutures starts at the tail and progresses through life toward the skull. Hatchlings of modern alligators from the southern US for example, have fully open neurocentral sutures in sacral (pelvis area) vertebrae while the majority of the neurocentral sutures in the tail vertebrae are closed. The neurocentral suture closure begins early in life and the caudal (tail) vertebrae near the tip of the tail of a hatchling already have no visible suture. Conversely, closure of cervical (neck) neurocentral sutures happens last. Closure of neurocentral sutures follows a distinct caudal to cranial sequence.



Suture closure does not indicate growth stoppage. This is particularly true for caudal vertebrae, most of which are fully closed in hatchlings. Even after the cervical neurocentral sutures close, an individual may not be fully grown. This, however, needs further study.

Can this pattern be applied to other extinct reptiles? The answer is not clear. While in crocodylians the neurocentral suture closure sequence is caudal to cranial, other research seems to indicate vertebral ossification to be cranial to caudal in other orders of reptiles like lizards.

—Vaclav Marsovsky

The Great Dinosaur Egg Hunt by Philip J. Currie, photos by Louie Psihoyos. *National Geographic*, May 1996, p. 96–112.

National Geographic magazine is available by subscription. Currently the society is funding several projects on dinosaur research and palaeoanthropology, providing a series of articles for the magazine. The cover of this issue features an elongated dinosaur egg containing a complete embryo modelled by Brian Cooley of Calgary. Louie Psihoyos' brilliant photographs of dinosaur eggs, embryos, femurs and models are accompanied by Dr. Phil Currie's lucid descriptions. The 300 or so eggs shown here have mostly been found in China, many of which are believed to have been laid by therizinosaur dinosaurs during the Cretaceous Period, between 65 and 110 million years ago. The article concentrates on the ramifications of finding complete embryos, with one or two of the eggs containing fossilized yolk with fat globules. There is a possibility that DNA has been extracted from a mummified specimen. There are notes on Jack Horner's Montana finds and Argentinian finds. An amazing, glorious presentation!

—Les Adler

Dinosaur reviews by David Norman. *Scientific American*, April 1996, p. 108–109.

Dr. Norman is director of the Sedgewick Museum of Geology at the University of Cambridge, UK. Here he reviews *The Lost World* by Michael Crichton (US\$26) and *Raptor Red* by Robert T. Bakker. (US\$22).

The Lost World is a blatantly commercial enterprise—*Jurassic Park 2* in disguise, with all the originality of *Jurassic Park 1*. Crichton does acknowledge the scientific help that he gets in writing his books; unfortunately very little of the cash received filters back to the study of palaeontology.

Norman states that *Raptor Red* is no more than a children's adventure story often being sold on

the basis of Bakker's scientific credibility as a Yale graduate. The only part of the book that he likes is the last eight pages, an epilogue. He much prefers the well-written science of Stephen Jay Gould, with his power of clear exposition; "one of the great essayists of our time." —Les Adler

Captured in Amber: Science in Pictures by David A. Grimaldi. *Scientific American*, April 1996, front cover and p. 84–91.

David Grimaldi chairs the department of entomology at the American Museum of Natural History in New York. This article features a set of 30 photos of various types of creatures preserved in amber, concentrating on specimens from two locations: the Dominican Republic (Miocene, 25 million years old) and central New Jersey, USA (Cretaceous, 90–94 million years old). Most of the pictures are of greatly magnified specimens. One piece, about 2.8 cm across shows 62 whole and partial insects.

By studying the DNA thus provided scientists have been able to develop an evolutionary tree for the Dictyoptera, the group that includes termites, cockroaches and mantises, over a 130-million year period.

Looking at these pictures, you will be delighted by praying mantis, stingless bees, midges, ants, beetles, wasps, a moth, a flower, a bird's feather and a frog which were trapped in amber as long ago as 94 million years. —Les Adler

Earth magazine, April 1996.

Earth is published bimonthly. This issue contains several items of interest:

K-T Extinctions: the Dead Bodies Found by Larry O'Hanlon, p. 10.

Geologist William Zinsmeister has found fossilized fish on Seymour Island (near the tip of the Antarctic Peninsula) which are just above the boundary layer rich in iridium. It appears that the connection to the supposed asteroid impact is tenuous and that the conclusions reached here may be just a statistical illusion.

Out of Asia? by Alexander Witze, p. 12.

Currently there is much confusion relating to the fossil hominid teeth fragments being found in Asia. Age determinations have changed from 0.75 million years old to a figure of 1.75 million years. Fossils formerly identified as *Homo habilis* and *Homo ergaster* may be some other hominid genus or species. These fossils originate from China, Java and Georgia. The finds upset theories of possible migration paths from Africa to Asia.

Evolution's Greatest Blossoming by Peter Fairly, p. 16,17.

Geologist John Grotzinger of MIT has found a series of fossils in Namibia, southwest Africa, which fill in a gap between Ediacaran Precambrian fossils and the Cambrian explosion, dated 7 million years earlier than the Precambrian-Cambrian boundary. Consequently, the Cambrian "explosion" would no longer appear to be an explosion but rather the culmination of 50 million years of development.

Bad Mother Dinosaur by Don Lessem, p. 22–25.

Geist and Jones of Oregon State University, Corvallis, disagree with Jack Horner's conclusions about *Maiasaura* being a "good mother." Also, scientists from the American Museum of Natural History, New York, and the Mongolian Academy of Sciences found a nest of at least 15 eggs with the remains of an adult oviraptor that apparently died while incubating the eggs in the area of what is now the Gobi Desert.

According to the scientists who discovered it this is the strongest evidence yet for birdlike behaviour in dinosaurs. The discussions include Dr. Philip Currie's observations on the wear patterns on the teeth of hypacrosaur. In common with the *National Geographic* feature of May 1996 there is a discussion of the research taking place on embryos, juveniles, nests, eggs and the activities of "avian dinosaurs."

Bringing Dinosaurs to Life by Don Lessem. Front cover, p. 5 and p. 36–43.

Don reviews the work of paleo-artists Stephen Czerkas, Charles Knight, Mark Hallett, Karen Carr, Michael Tricic, David Peters, Greg Wenzel, Donna Braginetz, Larry Felder, Berislav Krerc and includes a painting of *Daspletosaurus* by APS member **Michael Skrepnick**. The common theme of these artists is that while many children who drew dinosaurs dropped out, these illustrators continued on, increased their knowledge of palaeontology and became professionals. By reading this article you can increase your portfolio of anecdotes about dinosaurs. All palaeontology jokes are old: Stephen Czerkas keeps a pet iguana lizard named Don (consequently he has an "Iguana Don" at home). The article also contains a criticism of Greg Paul's work.

Amongst the Top Ten Web Sites by Alexander Witze, p. 56–59.

Museum of Paleontology at the University of California, Berkeley, <http://ucmp1.berkeley.edu/> This site includes phylogeny (family tree of life),

geological time, the thinking about evolution through the centuries, species relationships, dinosaurs and constructing time-scales. The note discusses layout problems. A less technical romp through a natural history museum is provided by the Field Museum of Natural History, Chicago, at <http://www.uic.edu/museum>

Dinosaur CD-ROMs by Larry O'Hanlon, p. 64–65. This is a review of three CD-ROMs:

- *Dinosaur Museum*, Smithsonian Institution, US\$30; combines 3D photos, sounds, Museum Room, Conservatory and Game Room.
- *Encyclopedia of Dinosaurs* for Macintosh, US\$30; not as good as *Dinosaur Museum*.
- *Grolier Prehistoria: A Multimedia Who's Who of Prehistoric Life*, US\$40; good for schools and students of palaeontology and anthropology; attempts too much.

–Les Adler

When the Desert was Green by Gillian King. *Natural History*, March 1996, p. 50–54.

King is on the faculty of Cambridge University, UK, and was formerly head of the Division of Earth Sciences at the South African Museum at Cape Town, near the world's best dicynodont hunting grounds. (Dicynodonts are a group of early reptiles.)

The title refers to the fact that the area from which the fossils are being discovered is desert while the fossil environment in Palaeozoic times was lush with vegetation. In this article Gillian provides a map of the Karoo; a picture, a painting and an extensive discussion of the environment and the conclusions reached from studying many complete vertebrate fossils. The remains consist of fossilized corkscrews leading to chambers within the rocks containing complete vertebrates. The dicynodonts existed from Permian to Triassic times and include *Lystrosaurus*, the remains of which have been found on several present-day continents. Specimens range in size from rats and dogs with long slinky bodies to hippo size.

Dicynodonts were successful animals in terms of numbers of individuals, diversity of species, geographic and time range being the first vertebrates to become herbivores. Specimens range from juveniles to adults and were dimorphic (male and female). They probably became extinct due to their food supply changing rapidly with changes in climate. □

–Les Adler

Highlights from Exchange Bulletins

The APS receives several bulletins and newsletters from other societies and clubs on a regular basis. Members are encouraged to examine copies of these, which are filed in the APS library –ed.

Ontario Paleontology Association Newsletter

April 1996

- *Parenthood, Dino-Style*—An article on the Mongolian *Oviraptor* nest, copied from *Time*.
- *Droppings in the Ocean*—What keeps ichthyosaur fossils so fresh? Shrimp faeces! Copied from *WAT on Earth*, Fall 1994.

Trilobite Tales—Western Interior Paleontological Society, Denver, Colorado

March 1996

- *Big Cedar Ridge, Wyoming*—account of a trip to a fossil plant locality, illustrated.
- *Prehistoric Mammals in Kentucky*—reprint of a state park natural history leaflet.
- Reviews of several palaeontology articles.

April

- *The Colorado Fossil Collection*—an interesting item on standards to be set for an institutional collection.
- *What is Cladistics?*—a great introduction to this system of classifying organisms.
- Reviews of several palaeontology articles.

May

- *The Carlile Shale of the Milbank Granite District, Grant County, South Dakota: With Regional Correlations Based on Ammonite and Shark Faunas*—this is an abstract of a soon-to-be-published paper.
- *Book Review: Dinosaur Tracks and other Fossil Footprints of the Western United States*, by Martin Lockley and Adrian Hunt.
- *Making a Mammoth Tooth*—illustrated article on the differences between mammoth and mastodon teeth, with instructions on how to make your own out of fig newtons!
- *Dinosaur National Monument, Colorado*—a visitor's guide to this famous fossil site.
- Reviews of many other scientific and popular articles.

Paleo Newsletter—Austin Paleontological Society, Austin, Texas.

March 1996

- *Lone Star Dinosaurs—a review*—Louis Jacob's book on Texas dinosaurs.
- *You Might be Addicted to Trilobites if:*—a humorous list of symptoms.

April 1996

- *Trilobites of Morocco*—beware of fake fossils!

MAPS Digest—Mid America Paleontology Association, Cedar Rapids, Iowa

March 1996

- *The Tools and Materials for the Preparation of Marine Concretions*—renaissance of the good old cold chisel for fossil preparation.
- Reviews of several palaeontology articles.

The Earth Science News—Earth Science Club of Northern Illinois (ESCONI)

Most issues of this bulletin contain updates on US fossil collecting legislation.

April 1995

- *Fossils from the Dark Continent Shine Again*—article on new dinosaur finds in Africa.

September

- *Creature Corner: Insect Flight*—a short history on the evolution of insect flight.
- *Hypsilophodon: A "Super" Dinosaur!*—a fascinating discussion of the discovery and interpretation of this dinosaur.

November

- *Why I am Interested in Fossils*—reprint of an article by a pioneer fossil collector.

April 1996

- *The Enigmatic Tully Monster*—discussion of a "weird wonder" from the Carboniferous rocks of the Mazon Creek area of Illinois. □

Submissions for the *Bulletin*

The editor gratefully accepts any contributions to the *Bulletin*, in any form—handwritten, typed or digital (preferred). **News clippings must include the source and date of publication.** Material in digital form may be on 3.5-inch floppy disks, or by e-mail to 75272.1316@compuserve.com.

I can open most DOS/Windows and Macintosh text formats. Please include a printed hardcopy with any floppy disks. For computer graphics formats, please call me (403-274-1858) or e-mail for more information.

Collecting at Scabby Butte

Please note—anyone wishing to collect fossils at Scabby Butte, AB should be aware that there have been recent changes in land ownership, which could complicate access to the area. Those planning to make future trips to this locality should contact Les Fazekas at 248-7245 for updated information. □

Field Trips 1996

Three field trips are planned for this summer. The dates are firm. For more information on trips 96-2 and 96-3, contact Les Fazekas, field trip coordinator: (403) 248-7245

NOTE: Non-members and unaccompanied minors will not be allowed to attend field trips. Participants will be required to read and sign a release form.

Trip Participant Responsibilities

It is understood that risk is inherent to some degree in all outdoor activities. 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.
- Trip co-ordinators are not professional guides. They are simply club members who have volunteered their time for your enjoyment.
- Contact the trip leader prior to the trip and again if you cancel. The leader will be able to answer questions about the trip and required equipment.
- Inform the trip leader of any medical conditions they should be aware of in an emergency, for example: diabetes, bee-sting reaction, asthma.
- Ensure that your previous experience, ability and fitness level are adequate for the trip.
- Stay with the group. Wait for other group members frequently and at all route junctions.
- Tell the trip co-ordinator if you must turn back.
- Contribute to car pool expenses
- Enjoy!

Trip 96-1: Saturday & Sunday, June 22–23

Waterton Dam and area, Alberta

Coordinator for this trip is Wayne Braunberger, (403) 278-5154

Saturday: This day will be spent measuring the Bearpaw/Blood Reserve formations that crop out below the dam. As this is part of the Field Methods seminars, a small fee (\$2.50) will be assessed to those who did not attend the previous seminars to cover the cost of handouts. Any fossils collected from this section will be retained for the Society collection.

Sunday: A normal APS field trip will be run. At this time it is intended to visit one or two other sites in the area.

Meeting place: At 10:00 AM on both days meet at the west end of the Waterton Dam. From Pincher Creek, drive south 18 km. on Highway 6, then east 16 km. on Secondary Road 505 to the dam.

Allow at least 3.5 hours driving time from Calgary.

Potential hazards: Waterton River, steep slopes.

Clothing and equipment: sunblock, hats, rainwear, mosquito repellent, water, sturdy hiking shoes or boots, food.

Trip 96-2: Saturday & Sunday, July 20–21

Red Rock Coulee area, Alberta—Marine and non-marine Late Cretaceous formations south of Medicine Hat will be investigated on Saturday and Sunday. A visit to APS member Dr. Ron Stiem's home in Medicine Hat is arranged for Sunday afternoon.

Meeting place: Red Rock Coulee Natural Area, at 10:00AM Saturday. From Medicine Hat, drive 23 km. SW on Hwy. 3 to the junction with secondary road 887, just east of the hamlet of Seven Persons. Drive south on 887 for 24 km, then turn right at the sign to Red Rock Coulee. **Allow 4–4.5 hours driving time from Calgary.**

Potential Hazards: Rattlesnakes.

Clothing and equipment: sunblock, hats, rainwear, mosquito repellent, water, sturdy hiking shoes or boots, food.

Trip 96-3: Saturday & Sunday, August 17–18

Genesee, Alberta.—Paleocene plant fossils will be collected at this location on the North Saskatchewan River.

Meeting place: Truckstop at Alsike, Alberta, at 10:00 AM, Saturday. Alsike is at the junction of Highways 12 and 39, west of Leduc. **Allow 3.5–4 hours driving time from Calgary.** This trip is scheduled for Saturday only, but due to the distance, participants may wish to stay in the area over Saturday night and do further collecting Sunday.

Potential hazards: Steep slopes, North Saskatchewan River.

Clothing and equipment: sunblock, hats, rainwear, mosquito repellent, water, sturdy hiking shoes or boots, food. ☐