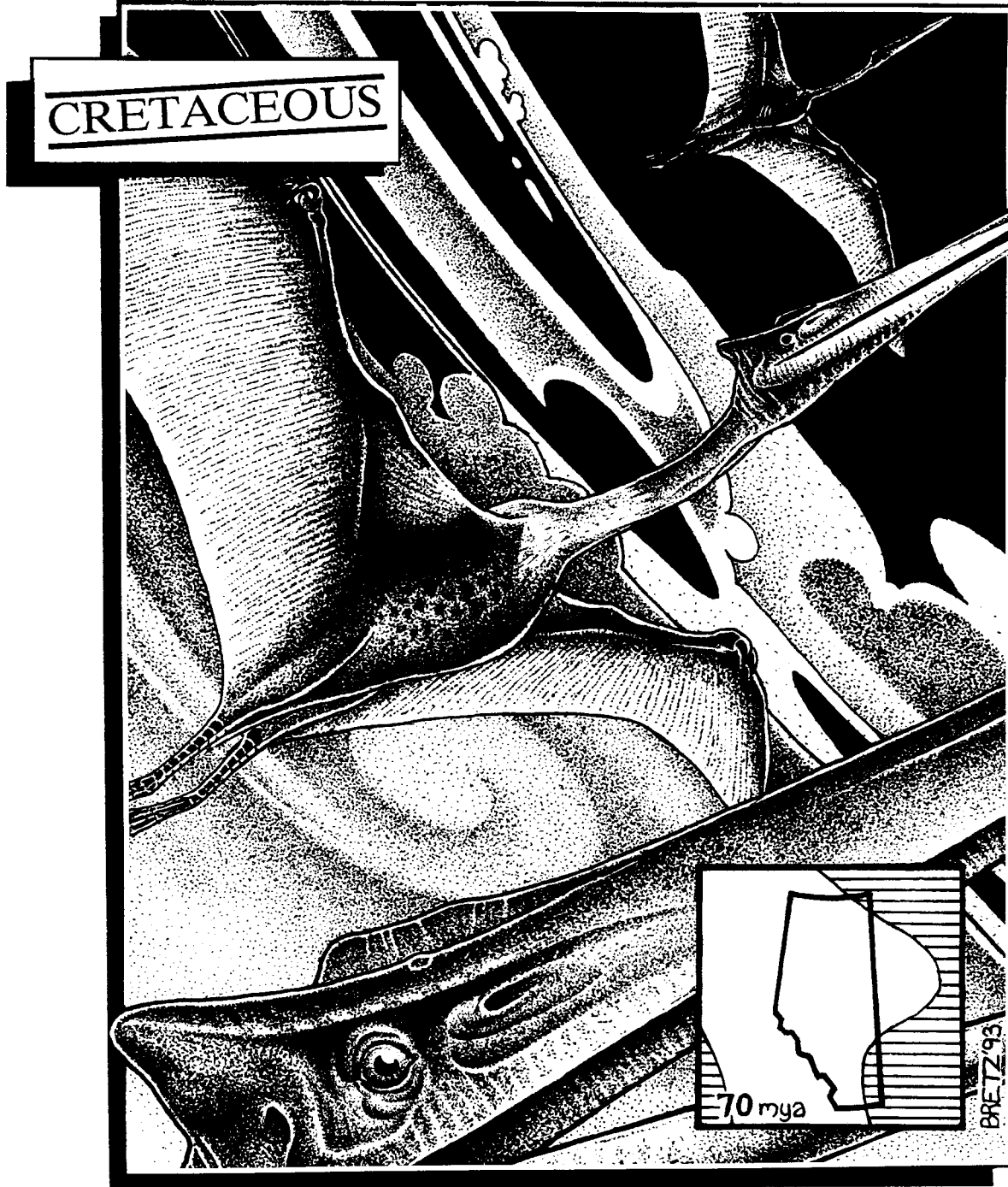


BULLETIN

VOLUME 9 NUMBER 1

MARCH 1994



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ALBERTA PALAEOLOGICAL SOCIETY

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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.

Single membership	\$10.00 annually
Family or Institution	\$15.00 annually

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

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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.

†APAC is the Alberta Palaeontological Advisory Committee

UPCOMING APS MEETINGS

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

April 22—The Canada/China Dinosaur Project: a Progress Report,
 with Dr. Donald Brinkman, Royal Tyrrell Museum of Palaeontology

May 20 or 27 (TBA)—Pre-season Field Trip Workshop (see article, page 2)

ON THE COVER: With a skull as long as a man, *Queztlacoatlus* was the largest creature ever to fly. *Queztlacoatlus* sp., Reptilia, Pterodactyloidea; Upper Cretaceous, North America. Art by Chris Bretz, APS member. Copyright ©1993. Reproduced by permission.

President's Message

by Les Adler

Spring will soon be on its way. Programs at Calgary are tentatively planned right through to September, 1994. If you are interested in field trips involving either strata which contain fossils, and sometimes collecting, with an excellent set of professionally prepared notes, you will have to phone incessantly each 3 weeks to find the status of whether the trip is feasible. This is due to the fast changes in the leader's plans, the difficulties of the terrain—quite difficult in Western Canada; the reliability of the vehicles available, and the weather conditions, which may vary from very heavy rainfall, to strong winds, excessive heat, problems with mosquitoes, cactus and thorns.

The *Chasmosaurus* T-shirts have sold well and only a few are left.

Our programs merit attendance thanks to the extraordinarily high quality of the presentations and expertise of our highly qualified speakers. □

From the Editor...

by Howard Allen

Excuses, excuses! This issue of the *Bulletin* is, as you have no doubt noticed, late.

By now many of you will be accustomed to my lack of reliability when it comes to attending meetings (including those at which I'm scheduled to talk!) and field trips, or in replying to letters and phone calls. Until this month, the *Bulletin* has always been released on time, or even ahead of time: unfortunately but inevitably, my luck has finally run out.

My employment in the oil industry takes me away from home for weeks—even months—on end. This winter's drilling season has been one of the busiest in years, and history has shown time and again that consultants must make hay while the sun shines. Unfortunately for the *Bulletin*, the sun is currently blazing. As I write this column, on March 24, the motors of a drilling rig are roaring in the background, and I've been home three days since February 1.

I'm relating this sob-story not for sympathy, but to ask for your forbearance, and to assure you that I'm not simply shirking my club duties. These delays are likely to happen periodically, and I can only hope that the membership will forgive my tardiness. I hope to get the June issue out by mid-May, so you will have plenty of time to prepare for the upcoming field-trip season. (By the way, Les, with 2cm of snow still on the ground, those mosquitoes and cactus are starting to sound more and more appealing!) □

Membership Updates

Les Adler, our illustrious president, has recently returned from five weeks in Australia, where he no doubt plundered the fossil resources of his homeland. We look forward to hearing of his exploits. (This month's President's Message arrived on an aerogramme from Melbourne!)

Roslyn Osztian is heading to her own homeland, the UK, later this spring (ah, to be in England...). She plans to visit the famous Lyme Regis fossil beds (Jurassic) of Dorset—happy hunting, Roslyn...and watch those tides!

In other news, **Wayne Braunberger** has moved from the position of APAC (Alberta Palaeontological Advisory Committee) representative, to become the APS's second Director-at-Large (with **Dr. David Mundy**). Our new APAC representative is **Don Sabo**. □

Welcome New Members!

Bryan Arazawa, Calgary, AB
 Christopher Collom, Calgary, AB
 David Engberg, Sherwood Park, AB
 Marilyn Fraser, Mississauga, ON
 Cory Gross, Calgary, AB
 Michael Hamm, Calgary, AB
 Michael Hill, Tumwater, WA
 Peter and David Mathews, Calgary, AB
 Vancouver Island Paleontological Society,
 Courtenay, BC
 Steven Weston, Calgary, AB

Field Trip Workshop set for May General Meeting

by Holger Hartmaier

Since the regular meeting in May is our last before the summer break, we would like to devote the meeting to a field trip workshop.

We invite all members to bring in examples of material collected from past field trips, including pictures and other memorabilia. We would like this meeting to be a hands-on discussion of possible future field trips that could be planned, and to give newer club members the opportunity of becoming more familiar with fossils in general, and involved in field trip preparation. At this stage we welcome any suggestions from the membership as to what could be arranged. If you have any ideas, please contact one of the executive or see us at the meeting. □

Program Summaries

November 19, 1993: *A visit to the home of Dr. Barry Richards*

Dr. Barry Richards is a sedimentologist and stratigrapher employed with the Geological Survey of Canada, at the Institute of Sedimentary and Petroleum Geology (ISPG) in Calgary. His personal fossil collecting interests include ammonites, baculites and crabs, mostly from the Cretaceous of western North America.

Society members were invited to view Dr. Richards' extensive collection at his home, during the regular meeting in November. Approximately 20–25 members arrived at 7:30 PM bearing donuts in trade for the opportunity of examining the well-displayed specimens on exhibit, and partaking of the Richards family's hospitality.

After giving a brief tour of his collection, Dr. Richards gave a slide presentation describing fossil collecting sites in southeastern Alberta, southwestern Saskatchewan, eastern Montana, South Dakota, Utah, Oregon, Washington and Vancouver Island. The collecting sites are very productive and Dr. Richards indicated that he would be willing to take interested members on collecting trips. The sites on the west coast are usually on beaches where the fossils are found in nodules, which upon splitting reveal well preserved crabs.

After the presentation, club members were able to examine the displayed specimens at their leisure and to discuss fossil collecting and preparation methods in more detail.

It is hoped that some time in the near future it would be possible to organize a weekend trip to one of these localities.

—Holger Hartmaier

December 17, 1993: Howard Allen, *Collecting Microfossils*

After one false start several months earlier, my job finally allowed me to be in town the day scheduled for my talk to the APS.

Microfossils comprise the remains of a very wide variety of organisms—basically any fossils requiring a microscope to examine in their entirety. All five kingdoms of life have microfossil representatives, though some are more amenable to collecting than others:

Kingdom Monera: blue-green algae, bacteria—represent the oldest fossils on earth, but not common or easily collectible, except stromatolites.

Kingdom Fungi: moulds, mushrooms, etc.; represented in the fossil record by spores, requiring palynological techniques to study.

Kingdom Protista: the largest and most

important group for microfossil studies—represented by the dinoflagellates, acritarchs, coccoliths, diatoms, radiolaria and foraminifera.

Kingdom Plantae: represented mainly by spores and pollens; require palynological methods.

Kingdom Animalia: several important groups are common and easily collectible as microfossils: ostracodes, conodonts, scolecodonts and micro-vertebrate fossils (teeth, fish scales, etc.).

The more common and easily collectible groups of microfossils occur in a huge and fascinating range of shapes and sizes. The only major obstacle to collecting microfossils is the necessity for a decent microscope, usually a 10x to 30x stereoscopic scope of the kind used for biological dissections and by geologists. These can sometimes be bought second-hand for less than \$300. Serious collectors will probably also want a more powerful, (and expensive) compound microscope in the 100x to 1200x range, which is needed for studying the smaller fossils, such as spores, radiolaria and diatoms.

Extraction of microfossils from rocks is accomplished by a number of methods, depending upon the chemical composition of both the rocks and the fossils: forams, ostracodes and diatoms may often be extracted simply by sieving unconsolidated modern or ancient muds and shales, or by boiling the crushed shales in detergents or washing soda. Many microfossils are composed of acid-resistant compounds and may be extracted from indurated carbonate rocks (marl, limestone) using acetic acid (vinegar) or dilute hydrochloric acid: conodonts, scolecodonts, diatoms, radiolaria, fish teeth and bones may be recovered this way.

Some microfossils are best left to the pros: pollens, spores, dinoflagellates and acritarchs are studied by palynologists, who use hydrofluoric acid, which is extremely dangerous and requires proper laboratory conditions; besides, these fossils are extremely tiny and, if you value your eyesight, require expensive German microscopes to study. There are lots of easier (and better-looking, in my opinion) microfossils to collect.

An obvious plus in collecting microfossils is their minimal storage requirements. Les Adler's garage could easily house the lifetime collections of a half-dozen individuals, with enough room left to swing a *Smilodon*.

The talk was illustrated with overhead transparencies, as well as examples of mounting slides and other paraphernalia. Microscopes supplied by myself and by Holger Hartmaier (thanks, Holger!) were set up to allow members to examine microfossils from a number of groups, including foraminifera, ostracodes and conodonts.

—Howard Allen

January 21, 1994: Dr. Charles Henderson, *Fossils and Stratigraphic Problems of the Pennsylvanian and Permian of Alberta*

Dr. Charles Henderson received his PhD in geology at the University of Calgary, where he currently works as a professor of geology. His main areas of interest are the stratigraphy and palaeontology of the Upper Paleozoic formations of western North America.

In Western Canada, Pennsylvanian and Permian rocks form a relatively thin (30 m to 250 m) sequence, which occurs in scattered locations from northeastern British Columbia to south-western Alberta. Macrofossils are quite scarce in rocks of this age, but microfossils—conodonts to be specific: the tiny, tooth-like, phosphatic feeding apparatus of an extinct wormlike organism—can be quite abundant, and are very useful in dating and correlation. As well, conodonts are used by the oil industry to gauge the temperatures to which potential oil-bearing rocks have been subjected—hence whether oil could have been generated, but not “overcooked”—since the conodonts become darker in colour with higher temperatures.

Dr. Henderson’s talk demonstrated the usefulness of fossils in resolving long-standing questions of stratigraphy. Using six case histories from western Canada as illustrations, he showed how recent work by himself and his students have challenged some long-held beliefs about the ages and relationships of some Pennsylvanian and Permian formations.

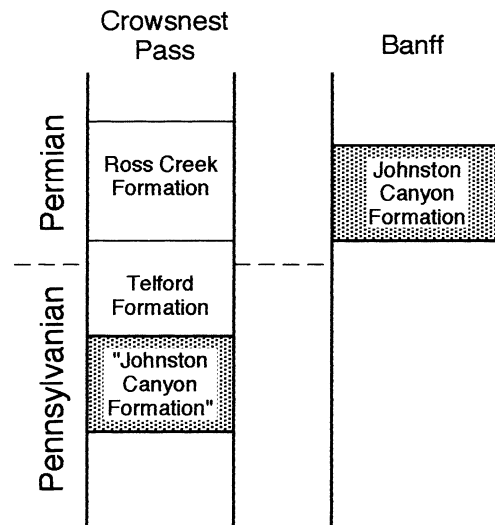
The Kindle and overlying Fantasque Formations of the Liard Basin in northeastern B.C. were both originally mapped and interpreted as being Permian in age. By collecting and studying microfossils—conodonts—Dr. Henderson and his students were able to show, by correlating the fossils with those in other parts of the world, that the Kindle Formation is actually Mississippian to Pennsylvanian in age: the overlying Fantasque was confirmed to be Permian.

In the Peace River Embayment region of the northwestern Alberta subsurface, analysis of conodonts from oil and gas well cores has shown that the Belloy Formation, traditionally considered to be Permian, is in fact mainly Pennsylvanian, only the uppermost beds being Permian in age. As well, the Belloy has been proven to be stratigraphically unrelated to nearby sediments originally correlated with the formation. Apparently the two groups of deposits were laid down during separate depositional events.

Further south, in the Rocky Mountains of western Alberta and southeastern B.C., similar conclusions have been made: in the Crowsnest Pass area, the “Permian” Telford Formation has

been shown to be mainly Pennsylvanian—rare brachiopods have helped date the beds here.

In the Banff area, nomenclatural confusion must now be cleared up, since Dr. Henderson and colleagues have discovered, using conodonts, that the Johnston Canyon Formation (Permian) of the Banff area, is not the same age as the lithologically similar “Johnston Canyon Formation” of the Crowsnest Pass region (Pennsylvanian). The latter beds will have to be renamed.



Revised Pennsylvanian/Permian stratigraphy, SW Alberta

Another stratigraphic tradition has recently been squashed in Kananaskis Country, west of Calgary. The important Permian/Triassic boundary, which marks the greatest extinction of all time, has for years been placed at the contact between the Permian Ranger Canyon Formation and the Sulphur Mountain shales, a contact marked by an unconformity. But Dr. Henderson’s group has found Permian conodonts throughout most of the “Triassic” Sulphur Mountain shales! It appears that only the top of the Sulphur Mountain Formation is Triassic, and deposition seems to have been continuous across the Permian/Triassic boundary event—no unconformity has as yet been discovered.

Dr. Henderson’s talk was illustrated by slides of outcrop sections and scanning electron micrographs of conodont fossils. A number of specimens of Pennsylvanian and Permian microfossils were presented for examination, including fusulinid foraminifera, sponge spicules, brachiopods, and the bizarre, spirally arranged teeth of the Permian shark, *Helicoprion*.

— Howard Allen □

Fossils in the News

Equinox, November/December, 1993, pg. 13:
Right Down to the Bear Bones

By Ed Struzik—Edmonton fossil collector Gene Seal's job with a local gravel company has offered a real "perk": since 1989, Seal has recovered more than a thousand fossil bones from the company's pits, including the remains of lions, camels, giant ground sloths, mammoths, Peary caribou and giant wolves among others. His latest find is the femur of a giant short-faced bear that "...weighed 2000 pounds, was five feet tall at the shoulders and ran like the wind," according to Alberta Provincial Museum curator Jim Burns.

The finds support the theory that an ice-free corridor existed along a north-south strip of western Alberta during much of the Wisconsin glacial, from 40,000 to 21,000 years ago. The presence of both southern and northern animals in Seal's collection indicates that such a corridor must have existed, to enable the mixing of the different faunas.

Seal's hobby has inspired him to return to school to pursue a career in palaeontology.

The Daily Telegraph, London,
 January 8, 1994:

Bones reveal most savage dinosaur that ever lived

By Adrian Berry, Science Correspondent—A British fossil hunter has unearthed the nearly complete skeleton of an as yet unnamed carnivorous dinosaur from an undisclosed locality on the Isle of Wight, in southern England. The 120 million-year-old (Lower Cretaceous) remains are thought to have belonged to an animal 7.5 metres long, with "horrific teeth like steak knives, about four inches long and extremely sharp," according to Museum of Isle of Wight Geology curator Steve Hutt, who discovered the fossils. Perhaps employing some Isle speculation, Mr. Hutt states matter-of-factly that "he had another weapon in the form of bacteria from rotting meat in his mouth. This meant that, if he bit another animal and it escaped, it was liable to die quite quickly of poison."

The Calgary Herald, February 7, 1994:

Tyrrell lusts after prehistoric bugs

By Mark Lowey, Herald writer—A world-famous collection of fossil insect-bearing amber has come onto the market and the Royal Tyrrell Museum of Palaeontology would love to buy it—trouble is, the owner is asking \$1 million, which is more than the museum's budget can handle.

The Acra collection comprises up to 800 complete insect fossils, including wasps, moths, beetles, flies, spiders, a snail, and biting midges, as well as a pair of gnats caught *in flagrante delicto*. The amber was collected from Lebanon, and is the source of the world's oldest discovered DNA fragments, extracted from an Acra weevil.

Ted Pike, a PhD candidate at the University of Calgary, who is completing his thesis on fossil amber, says of the collection: "It's absolutely unique. There's nothing else like it and there probably will never be again." Pike and museum staff hope to find a way to purchase the collection, for the museum, perhaps with the aid of a wealthy benefactor, before it finds its way into the hands of a private collector.

The Calgary Herald, March 3, 1994:
Mars mission seeks fossils

San Francisco (*The Observer*)—A joint US-Russia mission to explore Mars for fossils is in the works.

Plans call for a robot vehicle powered by solar panels to drive across the Martian landscape, periodically stopping to drill for rock samples, which are hoped to contain the remains of organisms up to three billion years old. The mission is set to last five years, during which time 200 kilometres of the Martian surface would be crossed.

[*The APS is not planning any field trips to this locality in the near future.* —ed.] □

[*Thanks to Meinrad Hoffman, Trudy Martin, Roslyn Osztan and Evelyn Wotherspoon for sending in clippings — ed.*]

Advertise in the BULLETIN

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	1/2 page	\$20.00
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Terms:	Cheque or money order payable in Canadian dollars	

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Membership News: Heather Whitehead accepts position as Science Librarian in USA

Heather Whitehead, well known to many APS members as our former *Bulletin* editor and still an active, contributing club member despite her geographical distance, wrote recently to update us on developments in her new career. She writes:

“...I am now a resident of Troy, New York. I was fortunate enough to be offered the position of Science Librarian at Rensselaer Polytechnic Institute in Troy, and I began working here November 1. It’s been a pretty busy last few months!

I finished school in late August with an MLIS. My final term research project was development of a computerized dinosaur database—it still needs work, but was fun and educational to create. I had the logistics of moving, getting settled, and beginning a new job in a new city and country—librarians are included under the Canada-USA Free Trade Agreement, and can work in the USA with a confirmed job offer. Jobs in Canada are extremely scarce, and many of my classmates have also wound up stateside.

Rensselaer is a very old engineering college, with about 6000 students. Troy is a small industrial town on the east side of the Hudson River, just north of Albany, NY. The Adirondacks, Berkshires and Catskill Mountains are near, and the fall foliage was pretty spectacular!

My position at RPI includes reference service, assessing and purchasing books and other materials for the sciences, teaching credit courses in library use and information retrieval, and the normal load of committee and continued learning activities. It’s quite a challenge but so far is going very well.

I miss the West, particularly its wonderful open skies and badlands, and there are very few dinosaurs to be found roaming this part of the world, but I plan to return west (and chase dinosaurs!!) for vacation.”

Heather is also an organizer with the DINOTOUR expeditions (see last December’s *Bulletin*). We look forward to hearing from, and/or seeing her this summer.

– Howard Allen □

Reviews

Cretaceous Park by Dr. Robert Bakker, *Earth*, September 1993, pp. 24–31

The lead painting across pages 24 and 25 of two Utahraptors attacking a sauropod brontosaurus with sundry other dinosaurs on a Cretaceous flood plain in the background is by APS member **Mike Skrepnick**. On page 27 Bob Bakker provides an illustrated diagram of several members of the raptor family during the Cretaceous Period: *Deinonychus* and *Utahraptor* of the Early Cretaceous and *Velociraptor*, *Saurornitholestes* and *Dromaeosaurus* of the Late Cretaceous.

Bakker describes an attack by Utahraptors on a brontosaurus and an astrodon dinosaur in narrative form and at the same time describes each dinosaur’s attributes. Bakker also describes Jim Kirkland’s find of *Utahraptor* at the Gaston Quarry in eastern Utah [*visited by Dinotour in 1993 with Jim Kirkland as guide —LA*]. Steven Spielberg featured the beast in *Jurassic Park* before the actual specimen had been found.

Bob led the “dinosaur renaissance” with his book *The Dinosaur Heresies* in which he postulated that dinosaurs were fast, quick and hot-blooded and so well-adapted that they could be serious menaces if brought into the modern world. Author Michael Crichton chose the raptor family to personify these heretical views.

After studying raptors, Bob Bakker also postulated that some dinosaurs were highly intelligent. Bob also compares rapid evolution of mammals in the Pleistocene Epoch with rapid evolution of raptors in the Cretaceous Period. He claims that Spielberg’s raptor is a logical extrapolation of evolutionary laws. Crichton threw in research on using DNA to manufacture life forms and beat Bakker to the punch in the one-liner of *Jurassic Park*. –reviewed by Les Adler

Bakker’s Field Guide to Jurassic Park Dinosaurs by Dr. Robert Bakker, *Earth*, September 1993, pp. 33–43.

Bob Bakker provides a coloured, signed rendering of each of the following dinosaurs: *Procompsognathus*, *Velociraptor*, *Utahraptor*, *Gallimimus*, *Tyrannosaurus rex*, *Dilophosaurus*, *Othys*, *Apatosaurus*, *Brachiosaurus*, *Triceratops* and *Parasaurolophus*. For each dinosaur, Bob lists the time of existence, length in feet, a scale with each sketch, weight, speed, voice, habitat, family, field marks, intelligence, group dynamics, family values, manoeuvrability, armament, attack mode and weaknesses. If you read all these remarks then you will know what to expect when you see *Jurassic Park*. – reviewed by Les Adler

Dinosaurs: A Guide to Research by Bruce Edward Fleury, 1992. Garland Publishing, Inc., New York. 468 pp.

A traditional annotated bibliography, this book provides access to the large volume of recent (mainly 1960 through August 1991) dinosaur literature that is readily available at larger university libraries. Its scope is journal articles, books, conference papers, news items from scholarly journals, and respected “popular” science publications such as *New Scientist*. Its audience is students, researchers, and people like me—neophyte writers. Coverage includes items also found in the only other dinosaur bibliography (Chure and McIntosh, 1989, *A Bibliography of the Dinosauria... 1677–1986*), but the organization of this volume makes it a much more user-friendly research tool.

The book is divided into nine chapters, each dealing with a general aspect of dinosaurs such as their ecology or evolution. Each chapter opens with a summary essay, then presents the citations to articles on the topic. Each of the over 1100 citations has a short description of its content, and may point out opposing and supporting viewpoints in other articles. Appendices include a Time Chart, glossary, and classification scheme. Indexes are by author and by subject, and refer back to the citation numbers in the chapters. Valuable additions include a Curricular Materials Index for teachers, and a list of primary journals which frequently carry dinosaur articles. The author is a biologist and a librarian, with a strong interest in evolution and ecology of communities.

I have found it fascinating reading as a stand-alone book, since the annotations give a good idea of the content of the full articles. Access by author or via the detailed subject index is easy and intuitive. The citations in each chapter are arranged alphabetically by author, which makes for easy browsing, but at times I would have preferred a chronological arrangement in order to more easily follow the development of ideas and areas of dispute.

The book is well laid out, typographically attractive and easy to read. Accuracy of the index and of details in the citations appears high. A few *Far Side* cartoons and black-and-white artistry enliven the pages, and the author cites a few works of fiction and poetry for those who “need to relax... with a good book about dinosaurs.” For anyone who needs to know where to look up articles on dinosaurs, or who wishes to sample the whole of dinosaur research without getting into the specialist literature, this book is highly recommended.

– reviewed by Heather Whitehead

New Days for old Knights by Richard Milner, *Natural History*, October 1993, pp. 20–25

On pages 20 and 21 there is a before and after presentation of Charles R. Knight’s mural *Mammoths in Winter*. The rips in the canvas are no longer visible and a yellowish tinge has been replaced by a bluish rendition. The American Museum of Natural History at New York is in the midst of renovating all of Knight’s murals so that by 1996 there will be a continuous presentation of vertebrate evolution filling six halls, the project costing \$US33 million. This article describes the team’s methods and problems such as how to apply brush strokes and colours and the choice of fabrics. Knight carefully studied the animals as presented in prehistoric cave paintings which are in agreement with the animal’s structures—for example the hump in a mammoth’s skull. These features are preserved in the latest restorations.

– reviewed by Les Adler

Ancient DNA by Svante Paabo, *Scientific American*, November 1993, pp. 86–92, with photographs and illustrations.

DNA molecules do not leave impressions in rocks. Molecular biologists have perfected methods of accurately amplifying trace amounts of DNA molecules from bone and tissue of several extinct animals. The list now includes the thylacine from Australia, alive 80 years ago, the quagga (a horse-like animal) from Africa, 140 years ago, the moa (a large flightless bird) alive 4,300 years ago, *Smilodon* (sabre-tooth cat of California), alive 13,000 years ago, mammoth (40,000 years ago). DNA has also been studied from fossil leaves (17 million years ago) and from insects in amber (40 million years ago). Scientific references accompany the article.

The material tested has degraded to 100 to 200 amino-acid base pairs from the 10,000 base pairs which exist in fresh tissue. The methods used and the problems encountered are carefully described; also the errors to be avoided, contamination risks, ventilation systems required and experimental limits that exist.

The question arises: can humans reverse extinction by resuscitating vanished species (à la *Jurassic Park*)? Paabo states that these dreams or nightmares will never be realized as scientists have no idea how to piece together millions of fragments of DNA from tissue into chromosomes of a functional animal or to set in motion the thousands of genes that regulate movement. Extinction is and always will be forever.

– reviewed by Les Adler

Insects are Forever by John Rennie, *Scientific American*, November 1993, pp. 18–20.

Because of the low rate of extinction many insect lineages are very long lived, in some cases approaching 100 million years. There are probably 3 million insect species compared to 4,000 mammal species.

Since the mid-1980s Conrad C. Labandeira, a palaeontologist at the Smithsonian Institution and John Sepkoski, Jr., of the University of Chicago have been searching the fossil record for evolutionary patterns in insect diversity and survival by studying the fossil literature worldwide in several languages. Labandeira and Sepkoski have found that they are dealing with more than 1260 insect families. Insect families have rarely vanished, while other animal groups have become extinct *en masse*. 84% of Cretaceous insect families alive 100 million years ago are still alive today. In contrast only 20% of four-legged animal families continue today. 65% of insect families were wiped out at the end of the Permian period 250 million years ago, probably because most of the vegetation was wiped out at the same time.

The appearance of flowering plants (angiosperms) surprisingly did not cause a burst of insect diversification. The current deforestation of the Earth by humans may affect insect diversity in the future. Think about that as you reach for your fly swatter!

– reviewed by Les Adler

Science Lite: Rex Rated—Abbott and Costello meet Steven Spielberg by Roger L. Welsh, *Natural History*, December 1993, pp. 28–29.

Welsh reports on *Jurassic Park*. The American Museum of Natural History at New York City recently exhibited *Dinosaurs of Jurassic Park*, where the visitors lined up to look at film clips but often passed by the authentic dinosaur remains on show with scarcely a glance. Welsh suggests a new interdisciplinary domain—anthropology of palaeontology (“ethnobotany”).

Welsh went to see the movie. He noticed that the cost of the tickets to a movie has increased to about what he paid for his first car and not much less than what he paid for his latest car. In the movie, when the *T. rex* ate the lawyer everybody cheered. Also, the commercial was more scary than the movie itself. However, there was a scary part where a scissor-sharp reptile claw came through a passageway. This caused one of the audience to let out the most horrific scream. That scream took Welsh three weeks to get over.

The genetic engineering shown in the film prompted a Nebraska farmer to state: “This sure will bring about some changes in the cattle-

breeding industry.”

Welsh’s recommendation: if you haven’t seen *Jurassic Park* yet, go see it—but leave the kids at home, and sit in the back row!

– reviewed by Les Adler

Jurassic Sea Monsters by Robert Bakker, *Discover*, September 1993, pp. 78–85.

First look at the dramatic cover and the pictures on pages 78 and 79 which show *Baptanoda* hunting and catching cephalopods (ammonites and squid). Bakker describes the process in detail and then explains the concept of ecological pyramids. He compares a land-based system to a marine-based system. In the land-based pyramid plants are at the bottom, predators are to the right, ranging from small at the bottom to large at the top; herbivores are to the left (small to large) also bottom to top. The diagram illustrates and indicates that extinction worked from the top downward with *Allosaurus* going first, as its food supply dwindled. For the marine pyramid, extinctions proceeded bottom to top with giant pliosaurs lasting longer than plesiosaurs and ichthyosaurs. Bakker provides sketches of skulls and body shapes illustrating evolutionary paths of Mesozoic marine reptiles. He also shows cubes to illustrate Jurassic and Cretaceous ecological niches. Family types are plotted against speed, prey size, near shore and open sea. With further studies on particular body parts such as the roof of the mouth and the first two neck vertebrae, unexpected evolutionary paths have been revealed. Following these discoveries Bakker attempts to develop biological rules for mass die-offs by placing the marine reptiles in position as shown on his diagrams. Examine, enjoy and learn!

– reviewed by Les Adler □

Special Thanks to a Friend of the Society: Trudy Martin

One of the APS’s most reliable contributors of news clippings and other material is Trudy Martin, secretary of the Calgary Rock and Lapidary Club (CRLC) and editor of the Calgary Lapidary Journal, the Club’s bulletin.

Over the past few years Trudy has continued to send me volumes of printed material relating to palaeontology, all at her own cost of postage and stationery, not to mention time...all this from someone who isn’t even a member of our Society!

On behalf of myself (always inexcusably slow in thanking her) and the Society, I would like to thank Trudy for her generosity.

– Howard Allen

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.

Cab and Crystal Magazine—M.L. Fraser, Ed. **Summer/Fall 1993**

- *Sex and the Tail of a Dinosaur: interview with Jack Wojcicki* by Marilyn L. Fraser—a conversation with the ExTerra Foundation's Public Relations Manager ("The Greatest Show Unearthed") about things dinosaurian.

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

January 1994

- *A Revolutionary Catastrophe!* by Allen A. Debus and Diane E. Debus—A discussion of the history of geological catastrophe theories and their relationship to evolutionary theory.

March 1994

- *Michigan mine yields 2.1 billion year-old fossils* by Joyce Hanschu—review of an article in the journal *Science*, about the discovery of fossil algae in a Michigan iron mine.
- *Thunder in their Footsteps* by Allen A. Debus—A history of the discovery and study of sauropod dinosaurs.

Paleo Newsletter—Austin Paleontological Society, Austin, Texas

November 1993

- *Ice Age Elephants (Mammoths) Roamed in Central Texas* by Jean Wallace—review of two newspaper articles documenting the discovery of a nearly complete mammoth skeleton in Texas.
- *Paleozoic Terrestrial Plants* by Fred Labahn—a primer on fossil plants and paleobotany.
- *Argentina, Home of the First Dinosaurs* by Jennifer Adams—an article on recent discoveries by Paul Sereno of South American dino ancestors.

December 1993

- *Paleozoic Terrestrial Plants* by Fred Labahn—continuation of November article, with detailed descriptions of several Paleozoic plant fossils.

January 1994

- *What is a Trilobite?*—reprint of a pamphlet on trilobites by the Black Hills Institute.
- *Dinosaur Egg Found in Chihuahua* by Virginia Friedman—review of newspaper articles documenting the discovery by a Mexican rancher of a *Kritosaurus* egg.

MAPS Digest—Mid-America Paleontology Society, Cedar Rapids, Iowa

October-November 1993 many titles of interest:

- *Silurian Nautiloids from Castle Rock Flagstone Quarry* by Jim Kostohrys
- *Fossil Cleaning* from Backbender's Gazette
- *Fluorescence in Fossil Molluscs* by W.S. Barnett
- *The Importance of Professional Identification of Your Fossil Finds* by Leslie Newberry
- *A Precolumbian Fossil Collector?* by B.L. Stinchcomb
- *Directions for Mixing and Using Butvar B76* by Russ McCarty (fossil bone preservative)

December 1993

- *Future Trilobite Collecting Potential of the Bromide Formation (Middle Ordovician) in the Arbuckle Mountains of Oklahoma* by Mark G. McKinzie—includes reference to fossil material from Canadian localities.

Vancouver Island Paleontological Society Newsletter—Courtenay, B.C.

November 1993

- *Flies, DNA and Dinosaurs* by Ed Jarzembowski—musings on the potential for finding DNA in insect fossils.
- *Field Trip of a Lifetime* by Ann Zambilowicz—travelogue of an extended summer field trip to several fossil localities across British Columbia.
- *A Trip to Horsefly* by Bruce Archibald—diary of a fruitful fossil collecting trip to central B.C.

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