

# BULLETIN

VOLUME 10 NUMBER 1

MARCH 1995

## DUNKLEOSTEUS

• DEVONIAN • REEF •



## ALBERTA PALAEOONTOLOGICAL 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

**Friday, March 17**—The Alberta Reptile and Amphibian Society: You've collected and studied their bare bones, now see reptiles in the flesh! Members should bring fossil specimens for comparison.

**Friday, April 21**—A series of mini-talks by APS members.

**Friday, May 19**—Dr. Gerry Morgan: Evolutionary History of Early Vertebrates.

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**ON THE COVER:** The Upper Devonian giant placoderm fish, *Dunkleosteus* sp., by APS member Cory Gross.  
©1994, reproduced by permission.

## President's Message

by Les Adler

In this part of the world so far the winter has been mild, encouraging the executive to plan activities for the remainder of 1995. To date the following has occurred: **Joe LeBlanc** has joined the executive as Treasurer and is also promoting our meetings on TV and with newspapers. Enquiries have been made to see if the APS can provide a judge for the Calgary School Science Fair and to assist the Calgary Science Centre during the summer with their dinosaur egg show and youngsters' activities at the Planetarium relating to dinosaurs. A group of five assisted with a fossil display during Science and Technology Week at the Chinook Shopping Centre. Joe is looking into the possibility of displaying a portion of the APS fossil collection at the Calgary Zoo.

Dinotour to Texas leaves in a few weeks with space available for latecomers. The Calgary Rock and Lapidary Club's show including fossils takes place during the first weekend of May with **Don Sabo** and **Wayne Braunberger** offering major assistance. Our group may be providing exhibits. About 60 members have rejoined for 1995; meetings, field trips and bulletins are progressing in a most satisfactory way. The T-shirts have been disposed of but we have a large supply of APS pins available for sale. **Chris Bretz** of the Alberta College of Art is drawing dinosaurs which may appear on covers at a later date. **Heather Whitehead** will be on Dinotour and hopefully will be taking notes of **Dr. Phil Currie's** observations on dinosaurs.

**Paul Milo** of the Calgary Rock Club has generously donated about two cubic feet of fossil material. This collection is being examined, with the museum-quality pieces being added to the APS collection, while the remainder will be used for door prizes and then be placed on the freebie table. This gesture is very much appreciated. Thanks again to all those assisting at meetings and in the production of our bulletins. □

## Dinosaur Boners

More palaeononsense seen in the *Bulletin*!

- Contrary to my editorial in the December '94 issue, **this is not** the 10th-anniversary issue. That distinction will be applied to the March 1996 issue: Volume 11, Number 1.

- The ceratopsian pictured on our now sold-out T-shirt is **NOT** a *Centrosaurus*, as advertised for the past year or more, but is, as Les Adler finally pointed out, a *Chasmosaurus*!

[*aah, them dinosaurs all look the same to me!—ed*]

## Upcoming Events

### March 28 (Tuesday)

The Geological Survey of Canada's Oil and Gas Forum '95, Calgary Convention Centre, 120 9th Avenue SE, Calgary, in Macleod Hall A, Exhibition Hall. **Free admission to all events.**

**Evening program: 6:00 PM**—"Pet Rock Clinic," a program for schools and the public.

**8:00 PM**—"The Comet that Killed the Dinosaurs," with Distinguished Lecturer Dr. Alan Hildebrand.

Also poster displays and lectures throughout the mornings and afternoons of March 28 (Tuesday) and March 29 (Wednesday), on a wide range of geological topics (mostly academic).

### April 21–30

DINOTOUR 1995, tour of Texas dinosaur sites; seats still available for latecomers.

### May 6 & 7

The Calgary Rock & Lapidary Club's 35th Annual Gem, Mineral & Fossil Show, West Hillhurst Arena, 1940 6th Avenue NW, Calgary. See **fossil exhibits** by the APS and members. Admission: adults \$3.00, youth/seniors \$2.00.

### May 27–September 4

**DinoMania** at the Alberta Science Centre, 701 11th Street SW, Calgary (at the Planetarium), open 7 days a week, 10 AM to 8 PM. Admission: adults \$6.75, children/seniors \$4.75. Robotic dinosaurs, displays, hands-on paleo. activities.

### June 3 & 4

Southern Alberta Rockhounds Gem, Mineral and Fossil Show, Lethbridge, Alberta. □

Seats are still available for  
**DINOTOUR 1995**

**Texas Dinosaurs**  
from beginning (Triassic)  
to end (Cretaceous) with **Dr. Philip Currie**, of the Royal Tyrrell Museum

**APRIL 21 to 30**

PRICES: US \$1,075 (double)  
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Bill Carson (403) 239-6454 or  
Corliss Moore (403) 271-2350 (eve.)

Don't delay!

## Program Summary

by Les Adler

### December 16, 1994: *Continental Drift, with Gordon Holland*

Gordon was assisted by a group of young members in setting up an impressive display of large, colourful charts illustrating the world distribution of tectonic plates and their movements.

About 150 years ago geologists designated the ages and rock type names based on fossil content. It was not until the 1950s that underwater rocks were available for examination. (The oldest rocks in the oceans are Jurassic.) Modern satellites and magnetic observations help to provide a global picture. Many geologists accept the interpretation of at least twelve plates with volcanoes and earthquakes occurring near the boundaries, and some additional areas within the continents, above plumes of rising magma in the earth's mantle. Gordon carefully explained four types of mountains and related these to the Canadian Rockies.

The audience appreciated the change of pace provided by a clear and knowledgeable lecture from a run on plants and dinosaurs.

### January 20, 1995: *Cretaceous Dinosaurs, with Wendy Sloboda*

With an attentive audience close to 40 in number, Wendy used a video and slides to show dinosaur bones and other parts being excavated at the Milk River Ridge Reservoir bone bed, the Devils's Coulee nest site and the *Tyrannosaurus* site east of Eastend, Saskatchewan.

At the Milk River Ridge location Wendy assisted in preparing large leg bones for removal to the Tyrrell Museum; at Devil's Coulee Wendy found eggshell fragments which led to the discovery of several plant-eating dinosaur nest sites. Wendy then worked on these deposits. She later found large theropod footprints with skin impressions near Warner, Alberta.

Wendy also works on the development of the *Tyrannosaurus rex* site in Saskatchewan and showed slides of the work in progress, bringing an extensive collection of casts and specimens—some on loan from the Royal Tyrrell Museum—to be handled and examined by members. Wendy has made extraordinary dinosaur finds and has accumulated professional excavating experience at an early age, as well as the ability to communicate her wonderful experiences. A really great meeting! □

## Field Trips 1995

Three field trips are planned for this summer. Locations of the June and July trips are tentative, and may be reversed. **The dates are firm. Watch for updates in the June Bulletin. For more information, contact Les Fazekas, field trip coordinator: (403) 248-7245.**

**NOTE: Non-members and unaccompanied minors will not be allowed to attend field trips.**

### Trip 95-1: Saturday & Sunday, June 17–18

**Eastend, Saskatchewan**—The site of the recent *T. rex* ("Scotty") excavation will be visited, along with Late Cretaceous exposures in southeastern Alberta.

### Trip 95-2: Saturday, July 22

**Bassano, Alberta**—Marine fossils of the Late Cretaceous Bearpaw Formation occur along the Bow River at this locality southeast of Calgary.

### Trip 95-3: Saturday & Sunday, August 19–20

**Macabee, B.C.**—This region in south-central British Columbia is well known for Tertiary (Eocene) fossil plants and insects. □

## PINS!



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- Logo: royal blue
- Lettering: gold

pins are 1" (25 mm) high, with safety clasp

**Price: \$3.00 each**  
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# DINOTOUR Field Notes by Heather Whitehead

During DINOTOUR's 1994 tour of southern Alberta and Saskatchewan, on-board scientific leader Dr. Phil Currie of the Royal Tyrrell Museum of Palaeontology gave talks in the field, and helped pass the miles on the bus with question-and-answer sessions. What follows is a summary of some of my notes from these sessions...

## *Dinosaur site notes*

### *Cowley*

The Cowley *T. rex* skeleton (*Black Beauty*) was two-thirds to three-quarters complete, and yielded a rare surprise during preparation—the skull was discovered hidden under the skeleton. The skeleton is female, not too old, and has the smallest known complete skull for any *T. rex*. This was the second good *T. rex* skeleton taken out of Alberta. The surrounding reddish rock is from an arid environment of deposition. There is little pollen so dating is difficult. The environment—drier than Drumheller, in the rain shadow of the emerging highlands, even has some sand dunes—is unusual for a large animal. The quarry base is now under water from flooding of the Oldman dam reservoir. The tail, possibly still in the hill under much overburden, may be lost.

### *St. Mary River*

The footprints at the river site are coming out of many different levels within the St. Mary River Formation, both up and down section and up and down in one place along the stream. There have been more than 200 levels identified—the largest number in the world. There are individual prints, or a few in succession, not continuous trackways. Most prints are reverses—infills of prints with the original destroyed. Think of them originating as a natural mold of a dinosaur foot, later infilled, and surviving as a natural cast; these are very good for three dimensional understanding. The St. Mary River tracks are in grey siltstone (floodplain) units between thick sandstone (crevasse splay) units. Most prints occur at the base of the thick sandstone units. Blocks on the hillside, especially if they are overturned, are good places to look. The prints can be difficult to see until you "get your eye in."

## Bits & Pieces

### Dinosaur Teeth

A baby *T. rex* had the same number of teeth as an adult. A baby hadrosaur had only about 1/100 of the adult number. Carnivores got larger teeth as they grew; hadrosaurs got more teeth. A hadrosaur had about 1200-1600 teeth (counting buds) in its mouth. The replacement interval for any particular tooth was about 1.5 years, and slowed as the animal aged. Sauropods had relatively few teeth, which were designed to strip leaves rather than chew. The result was reduced weight in their heads. Sauropod teeth were replaced regularly; there has not been much work done on growth/replacement, but rates were slower than for hadrosaurs.

### RTMP policies and research directions

- The museum is trying to get casts of all relevant items, such as the 150 dinosaur skeletons that were taken from Alberta by non-Alberta institutions. Complications arise with, for example, the *Parasaurolophus* at the Royal Ontario Museum - it is prepared as a panel mount, and is on permanent display at the ROM.
- The entire RTMP collection is catalogued, computerized, and cross referenced by storage location and collection number. The system works well.
- At one time, there were 32 dinosaur preparators on staff at the RTMP; there are now 3. Choice is to backlog in the field, or backlog in the storage and preparation areas. The museum is sending out material to qualified museums for them to prepare - specimens have gone to Australia and several places in Canada. The museum is also forced to be particular about what it can collect from the field. The estimated backlog is 125-150 tons.
- There are 30 full time dinosaur researchers worldwide. Their total budget, including salaries and field work, is less than \$1 million, worldwide. Half of that budget used to be in Alberta, but it is now way down.

...more Field Notes in the next issue!

# Fossils in the News

*Edmonton Sun,*  
*Arizona Republic,*  
*Mesa Tribune,*  
*Calgary Herald,* December 15, 1994:

## **Jurassic Park trees found**

SYDNEY, Australia (AP)—If front-page colour photos and screaming headlines are any indication, then this was definitely the palaeontological story of 1994.

While hiking in a remote area of Wollemi National Park, west of Sydney, (the exact location is being kept secret to foil tree poachers), David Noble of the National Parks and Wildlife Service came across a stand of bizarre-looking trees. Botanists quickly realized that Noble had found a tree whose nearest relatives were thought to have gone extinct during the Cretaceous Period. The trees—only 23 adults and 16 juveniles were found—dubbed “Wollemi Pines,” reach up to 40 metres in height and three metres around the base. They are “covered in dense, waxy foliage and have nobby bark that makes them look like they are coated with bubbly brown chocolate.”

The find is comparable to discoveries of other “living fossils” this century—such as the *Metasequoia* tree in China in 1944, and the coelacanth fish off Madagascar in 1938. Carrick Chambers, director of Sydney’s Royal Botanic Gardens says: “The discovery is the equivalent of finding a small dinosaur still alive on Earth.”

*Calgary Herald,* January 8, 1995:

## **Jurassic pique**

DINOSAUR PROVINCIAL PARK, Alberta—This imbecilic headline is the title of an article documenting the ongoing feud between local environmentalists and several oil and gas companies that have drilling rights within the boundaries of Dinosaur Provincial Park (Alberta’s famous *Late Cretaceous* dinosaur locality), a United Nations designated World Heritage Site.

The provincial government redrew the park boundaries in 1993 [see “*Dinosaur park to get big expansion,*” *APS Bulletin,* June 1993] removing 423 hectares of prairie (outside of the badlands sector) from the United Nations designated area, allowing oil and gas companies to drill more wells without violating the World Heritage Site. This in turn raised the ire of environmentalists. Cliff Wallis, of the Alberta Wilderness Association, says: “I’m concerned about the process by which such a prestigious designation can so easily be abused.”

*The Western Producer,* January 5, 1995:  
**New venture brings oyster fossils back into food chain**

GRANUM, Alberta—A local company is preparing to put a 70-million year old oyster bed into full time production, producing feed supplement for chicken producers. The oyster deposit, located near Hillspring in southwestern Alberta, will supply a crushing plant in Granum. One tonne of crushed oyster grit will provide 3,500 chickens with six weeks of calcium supplement, which is needed to produce strong egg shells. Until now, chicken grit has been imported from Texas oyster deposits.

*Calgary Herald,* January 15, 1995:

## **Pre-dino footprints found**

OTTAWA (CP)—A series of trackways made by 290-million year old (Permian) reptiles has been found on a Nova Scotia beach by two amateur fossil hunters. Brothers Cory and Howard van Allen discovered the tracks on surfaces exposed by a bulldozer. The tracks are parallel, showing a steady, even pace, suggesting that the reptiles either travelled in a group or followed each other. “They look for all the world like they were made yesterday,” says Ministry of Natural Resources geologist John Calder.

As a bonus, geologists also found 41 tree stumps with some trunks, leaves and branches of the extinct tree *Walchia*, from the same time period. “This opens a window on the early Permian landscape,” says Calder. “Not only are the trackways remarkable, but they’re in the context of the forest.”

*Calgary Herald,* March 1, 1995:

## **New dinosaur species discovered**

ARGENTINA—Two new dinosaur species of mid-Cretaceous age have been found by fossil hunters southwest of Buenos Aires. One—a titanic, 30-metre long, 50 tonne sauropod— named *Argentinosaurus*, is the biggest dinosaur discovered to date. The other is a giant carnivore of the abelisaurid family, similar in general shape, but larger than the unrelated *Tyrannosaurus rex*.

*Calgary Herald,* March 3, 1995:

## **Alberta badlands discoveries toasted**

DRUMHELLER—1994 was another great year for palaeontologists at the Royal Tyrrell Museum. Dr. Philip Currie reports the following finds:

- The lower jaws and a partial skull of a baby *Albertosaurus*, a 75-million year old tyrannosaurid, “the smallest ever found in Alberta.”
- Two full-sized *Albertosaurus* skeletons; one in

Dinosaur Provincial Park, the other north of Drumheller.

- Two skulls of the horned plant-eater *Centrosaurus*, one in Dinosaur Park and one on the South Saskatchewan River, north of Medicine Hat.
- Two more nest sites were uncovered at the Devil's Coulee locality, south of Lethbridge. One nest contained hypsilophodont eggs, the first found in Alberta. More hadrosaur eggs were also found at the site. The hadrosaur eggs contained fossilized embryos.

*Western People*, January 19, 1995:

### Long in the tooth

ARBORFIELD, Saskatchewan—In the mid 1970s retired farmer Dickson Hardie started finding fossil shark teeth in the banks of the Carrot River, at his farm northeast of Saskatoon. In 1979 he sent a box of the teeth and other fossils to the University of Saskatchewan, where they were met with general disinterest. Undeterred, Mr. Hardie started doing some of his own research, and continued collecting. Finally, in 1991, Royal Saskatchewan Museum assistant curator Tim Tokaryk decided to check out the area, and came into contact with Dickson Hardie, who showed Tokaryk his collection.

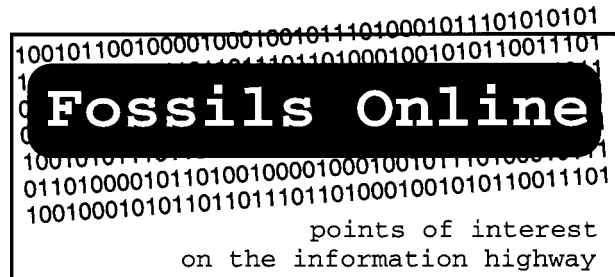
Tokaryk "was just like a kid with a box of new toys," recalls Hardie. Later that summer exploration turned up "Big Bert," a well-preserved, seven-metre long crocodile that died 93 million years ago. Half a mile away, Tokaryk's assistant Kevin Conlin discovered the skeleton of a four-metre-long bony fish, *Xiphactinus*.

Other fossils eventually uncovered include the 12-metre skeleton of a plesiosaur and a large number of bird remains. Tokaryk describes the site as "the oldest, richest and most diverse single bird locality in North America." One of the birds, assigned to a new genus and species, was named *Pasquaornis hardiei*, in honour of Mr. Hardie.

### 'Ologists with an attitude

REGINA, Saskatchewan—This article, also in *Western People*, profiles Royal Saskatchewan Museum assistant curator Tim Tokaryk and his crew of assistants and preparators. Besides the work on the Carrot River marine fossils, Tokaryk and company have been busy working on the *T. rex* skeleton (nicknamed "Scotty") recently discovered near Eastend, Saskatchewan. □

[Thanks to Brian Allen, Trudy Martin, Harvey Negrich and Evelyn Wotherspoon for handing over clippings -ed.]



### COMPUSERVE:

#### New fish lizard in Japan (January 3, 1995)

One of the oldest known ichthyosaur fossils has been reported from the town of Ogatsu, Miyagi Prefecture. The fossil shows new evidence of evolution from a land-dwelling ancestor. The ichthyosaur, dated to 245 million years (Permian) is about 1.7 metres in length. Using microscopes, paleontologists at Hokkaido University have extracted the skull, vertebrae, and many other bones from the entire body.

#### New Argentine dino found (January 19)

A report in the Buenos Aires Herald cites the discovery of a new type of dinosaur 1500 km southwest of Buenos Aires. A local resident found the complete skeleton of a 6-metre long herbivorous dinosaur, with "long neck and a relatively small head," suggesting an anchisaurid or other prosauropod, perhaps related to *Plateosaurus*. The find appears similar to contemporary species from Africa, reinforcing the theory that Africa and South America were once joined.

#### Pachycephalosaur skeleton found (February 8)

The first known postcranial remains of a pachycephalosaur were found last summer in the Hell Creek Formation of South Dakota. A surprise has emerged: it appears that the backbone contains three wedge-shaped dorsal vertebrae, causing the animal's head to be held perpendicular to the rest of the back...therefore, head-butting behaviour, the most popular explanation for the animal's thick, dome-shaped skull, would seem to be out of the question—the spine is not build like a battering ram. So what was the thick skull used for? One wag speculates: maybe they jumped up and bumped their heads into tree branches, to knock down fruit!

### THE INTERNET:

**Entertainment Weekly** (Dec 23, p. 61) carries a note about *Raptor Red*, a novel about a female velociraptor written by Bob Bakker. It was picked up by Bantam Books for \$650,000. Nice work, if you can get it!

**The Oakland Tribune** (January 6) carried this item about a man in Dixon, CA, who wanted to erect a 50-ft, 14,000 lb replica of a brontosaur on his front lawn, sort of like a plastic lawn flamingo. The Dixon planning department wants him to pay \$1044.63 for a building permit. His response: "outrageous—it's art!"

—Internet items thanks to Heather Whitehead



# Reviews

by Les Adler

**The Marvellous Mammalian Parade**, Alan B. Ternes, editor. *Natural History*, April 1994; front cover, pp. 2,3; pp. 38–91.

This issue of *Natural History* commemorates the opening of the American Museum of Natural History's Halls of Fossil Mammals and Their Extinct Relatives at Central Park, New York City. Some eighteen sections provide a sampling of mammals, past and present, and discuss the ways in which palaeontologists learn about mammalian evolution and natural history. This issue includes no articles on human ancestors, which appeared in earlier issues. Later issues have included material that creationists may not agree with, presented by several contributors in an honest way. The following articles are accompanied by some thirty paintings, illustrations, photos and charts making this issue truly excellent.

The lead presentation by Judy Rice is accompanied by an Ely Kish painting of the enormous *Indricotherium*, the largest land mammal ever. She states that most of the mammals to be discussed are extinct. The survivors—including ourselves—have overcome many trials and accidents over the last 200 million years with some traces of experiments in adaptations still in existence. Palaeontologists continue to dig up new clues and to reinterpret the story of life on this planet from the few remains that have been found of the immense past.

**A Pocket Full of Fossils** by Michael J. Novacek, pp. 40–43.

Michael is vice president and dean of science at the American Museum of Natural History. He spends each summer with a museum team collecting vertebrates in the Gobi Desert of Mongolia and specializes in mammals. He plans to travel to Chile for the same reasons. There are virtually no road maps for Mongolia, so you won't find the Tugrugeen Shireh cliffs, which have produced *Velociraptor*, *Mononykus* and a wealth of tiny fossil skulls and skeletons of Cretaceous mammals. Each year another batch of concretions erode out, containing fossils. The great thing is that entire skeletons are found, revealing secrets of locomotion, feeding, sensory systems and possible life styles. Accompanying his article you will find an Ely Kish painting of *Deltatheridium* mammals foraging for live prey amongst a family of sleeping *Protoceratops*, and a time scale of the Mesozoic and Cenozoic eras

with a combined chart of mammal evolution and mammal classification by orders.

Tugrugeen produces mostly multituberculates with some marsupials and placentals. A CAT scan has been used to examine a skull of *Zalambdel-estes*. The instrument enables scientists to identify the pathways of nerves and blood vessels from the preserved holes. Arteries and muscles have been identified. Other mammals are to be examined in this manner later. All of these mammals are small so their adaptive virtuosity is reduced; by and large, Mesozoic mammals are all noses and ears. The assortment of skeletons in Michael's shoe box is helping to illuminate the first two-thirds of mammal evolution.

**World Furry-Weight Champions** by Michael Archer, pp. 44–47.

Michael Archer is a professor of biological sciences at the University of New South Wales, Australia. He specializes in Australian fossil mammals and actively combats creationism. The paintings with his article are by Charles Knight and Jim Reece and show giant kangaroos, marsupial lions, giant snakes and flesh-eating kangaroos. Today, only three subclasses of mammals survive:

- a) egg-laying monotremes (platypuses and echidnas).
- b) pouched marsupials—opossums, wombats, koalas, kangaroos, bandicoots;
- c) unpouched placentals—rats, bats, elephants, humans.

Reproductive differences have probably distinguished marsupials from placentas for more than 90 million years.

Michael discusses the rise and fall of marsupials and placentals relative to each other over this period of time on most continents, with emphasis on the more recent successes of marsupials in Australia.

**Mammals Eggstraordinaire** by Michael Archer, pp. 48–49.

The painting of the 15 million-year old platypus *Obdurodon dicksoni* is by Jeanette Muirhead. Platypuses and echidnas are the only living mammals that lay eggs. They also have an unusual shoulder girdle structure, and lack well-formed teeth. Fossil representatives aged 63 million years old have been found in South America. A fossil platypus has been found in Australia at an age of 120 million years. So the question now becomes: will monotreme fossils be found to exist in Jurassic deposits of the United States?

**The Evolution of Creationism**, *Natural History*, July 1994, pp. 4–13.

This issue contains two articles which attempt a balanced presentation yet each is written from the viewpoint of evolutionists. I am not going to attempt to summarize these articles. In “God’s Own Scientists,” Christopher P. Toumey observes that when he meets with a group which includes several scientists, they can be flexible in their beliefs when meeting privately but in public appearances and public statements the creationists tended to close ranks in defending their orthodoxy.

In “The Struggle for the Schools” Eugenie C. Scott states that as far as possible the National Center for Science Education does its best to counter creationists. The American school system is very decentralized. When the religious right wins seats on a school board teachers stop teaching evolution so that students do not learn about evolution unless they attend a university biology course. Many school students learn nonsensical biology unconnected by an organizing theory. Eugenie provides three reference books on page 78 relating to creationists in modern North America and to controversy between creationists and evolutionists.

**How did *Archaeopteryx* Cross the Road?** by Scott Fields, *Earth*, February 1995, p. 18.

University of Aberdeen zoologist John Speakman and his colleague, Susan Thomson, studied the feathers of the two best-preserved *Archaeopteryx* fossils and compared them with the feathers of 96 modern or recently extinct birds, both flying and flightless. The feathers show subtle differences depending on whether or not the species flies. The central shaft of a typical flight feather is closest to its leading edge, the part that cuts into the wind. This asymmetry is essential to providing lift, so flying birds need and have a greater asymmetry in their feathers.

Based on measurements, the feathers of *Archaeopteryx* clearly belong with those of flightless birds. Speakman suggests that the feathers were used like a sunshade and claims that *Archaeopteryx* didn’t fly and therefore crossed the road either walking or running.

**Dinosaurs and Drifting Continents** by Paul C. Sereno, *Natural History*, January 1995, pp. 40–47.

Paul describes the adventures of locating an Early Cretaceous dinosaur deposit in Niger along the southern edge of the Sahara Desert. Paul was in Niger previously in 1990 with the British Museum and had stumbled upon a vast collection of dinosaur bones in the desert. In 1994 the bones

were excavated and transported to Algiers, then to Paris, on to Chicago and then on to the Royal Ontario Museum in Toronto for cleaning. The dinosaurs found in Niger include sauropods and a predatory dinosaur (theropod) named *Afrovenator*. They appear to have lost their lives in a flash flood about 130 million years ago in an environment near the equator with shallow lakes, rivers and stands of conifers. *Afrovenator* appears to have been the main predator, while sauropods were the prey.

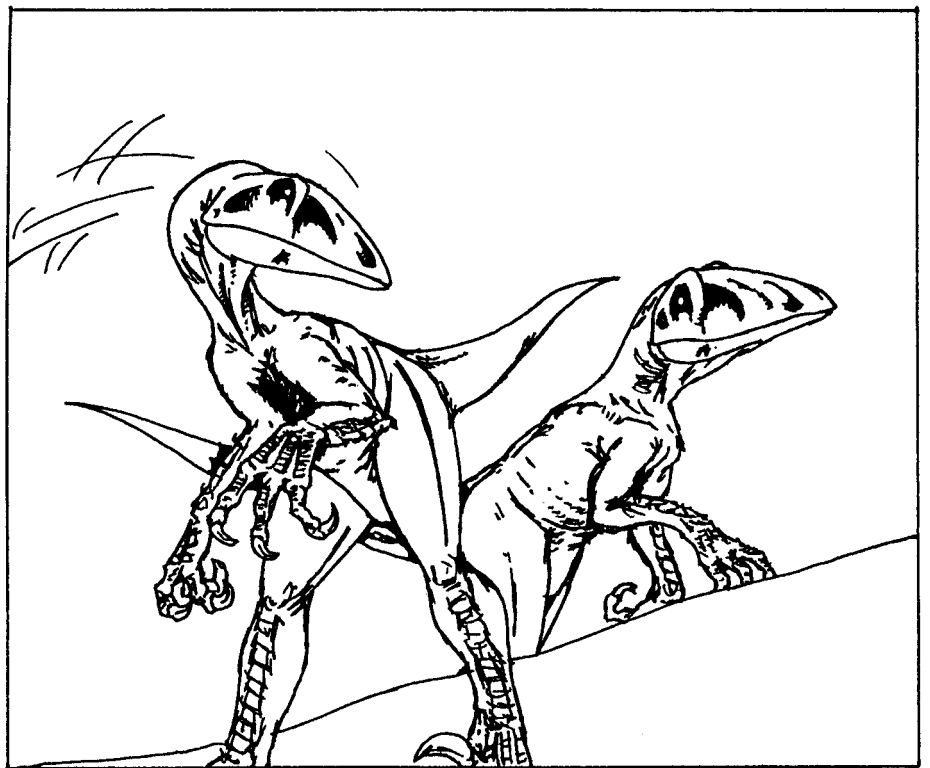
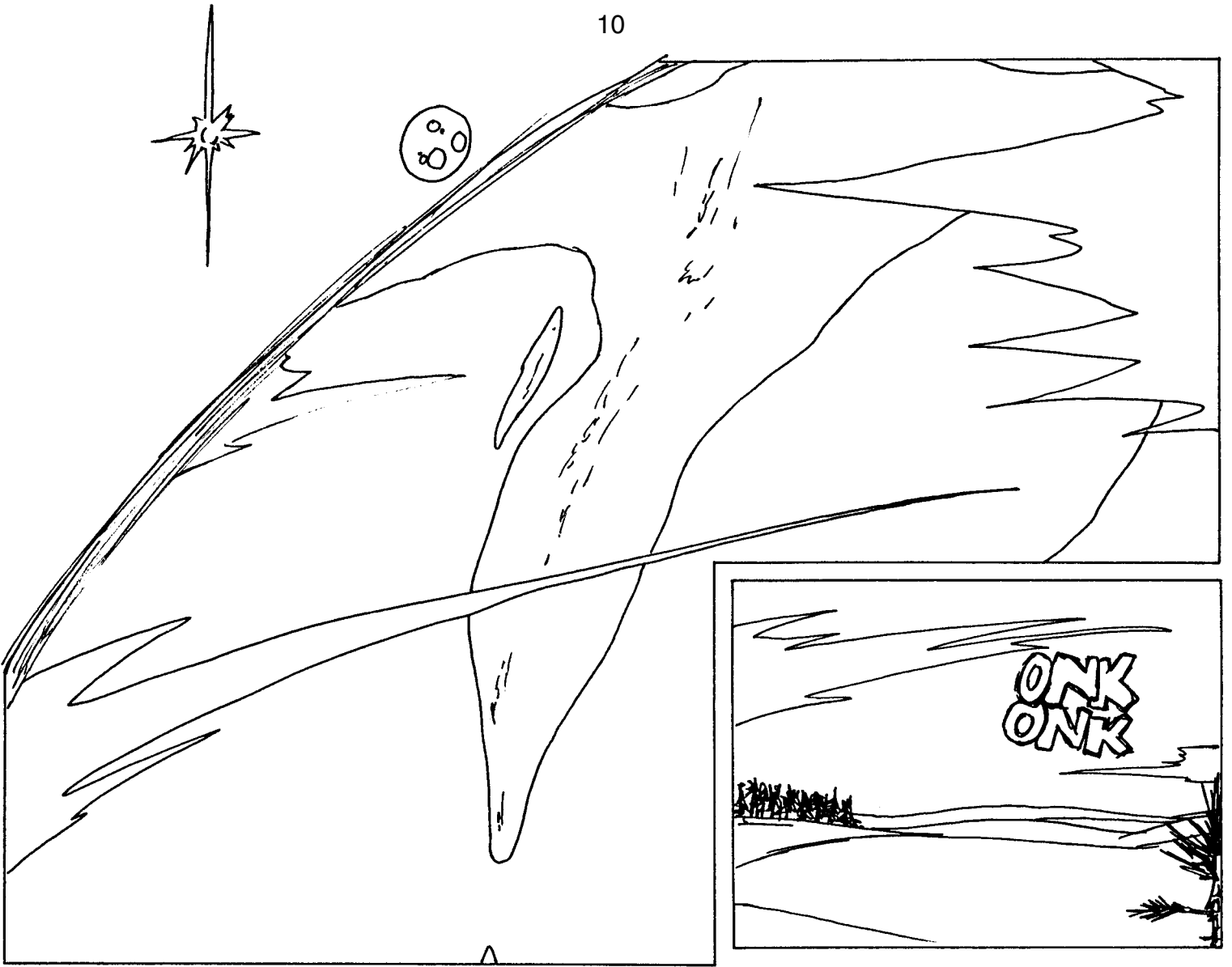
Paul discusses the types of dinosaurs found on the continents of the past, the distribution of these continents and the effects of climate and land bridges. Many questions that arise have not been answered but the new African dinosaurs support the view that dinosaur evolution was influenced by global geographic events such as an interplay between climatic events and sheer chance.

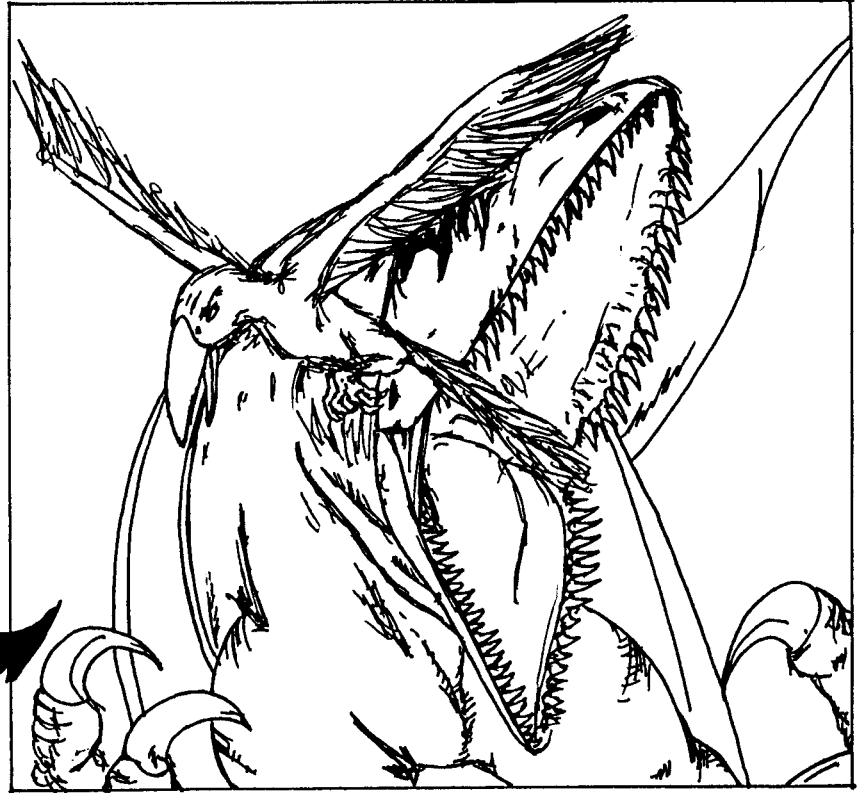
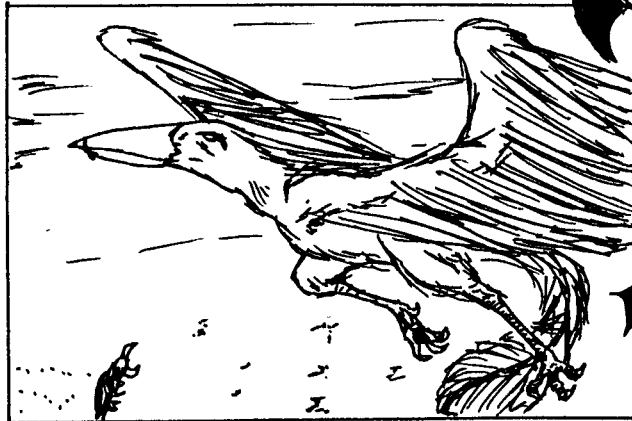
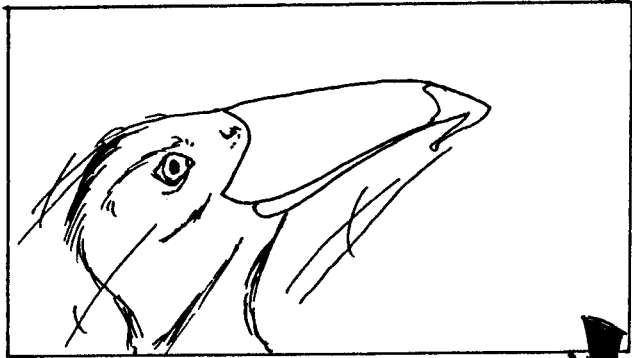
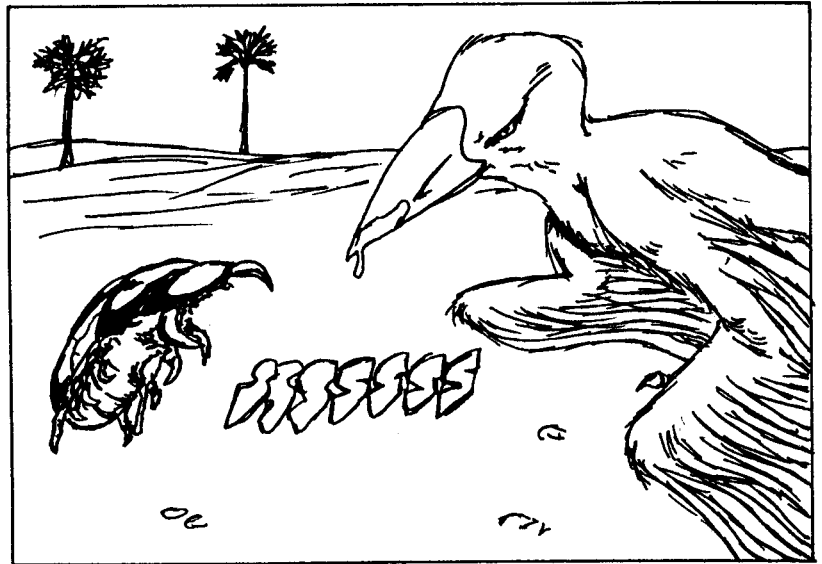
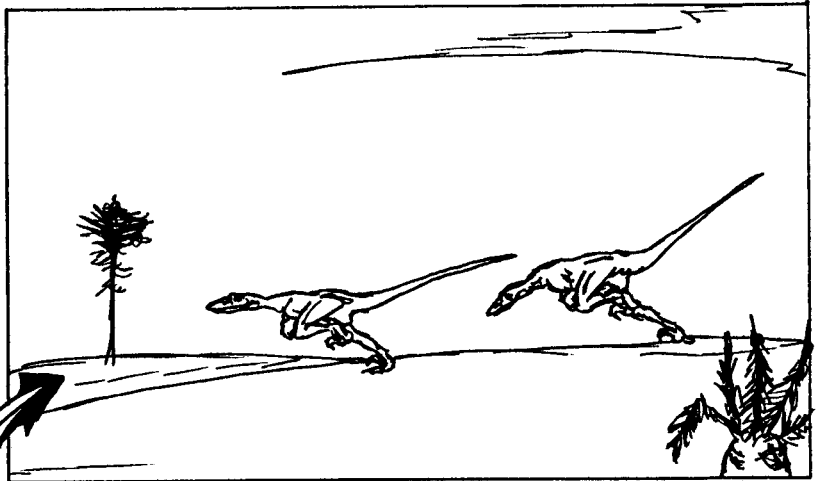
Paul Sereno is an associate professor in the Department of Organismal Biology and Anatomy at the University of Chicago. He is currently using evidence from fossils and DNA sequences to learn about the origins and early evolution of birds. He recommends David Norman’s *Illustrated Encyclopedia of Dinosaurs* as the best general book on dinosaurs and for a more technical source, *The Dinosauria*, edited by Weishampel, Dodson and Osmolska.

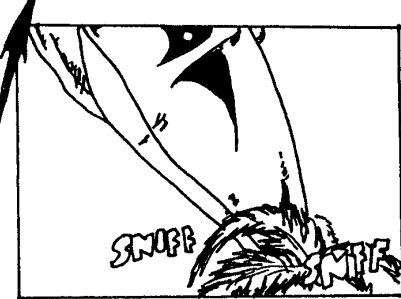
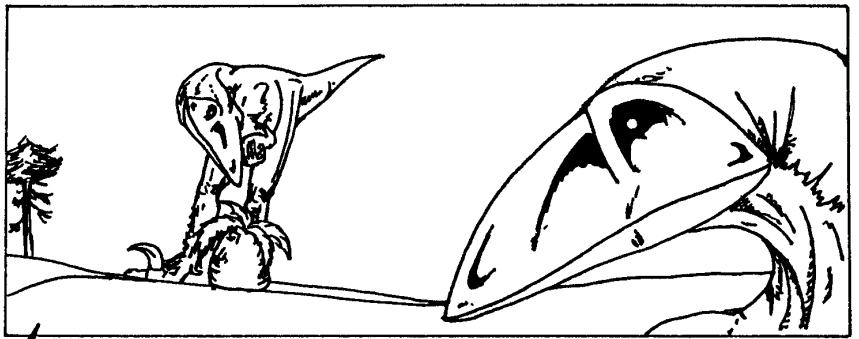
**The Bite of the Bronto** by Robert Bakker, *Earth*, November 1994, pp. 26–35 and front cover.

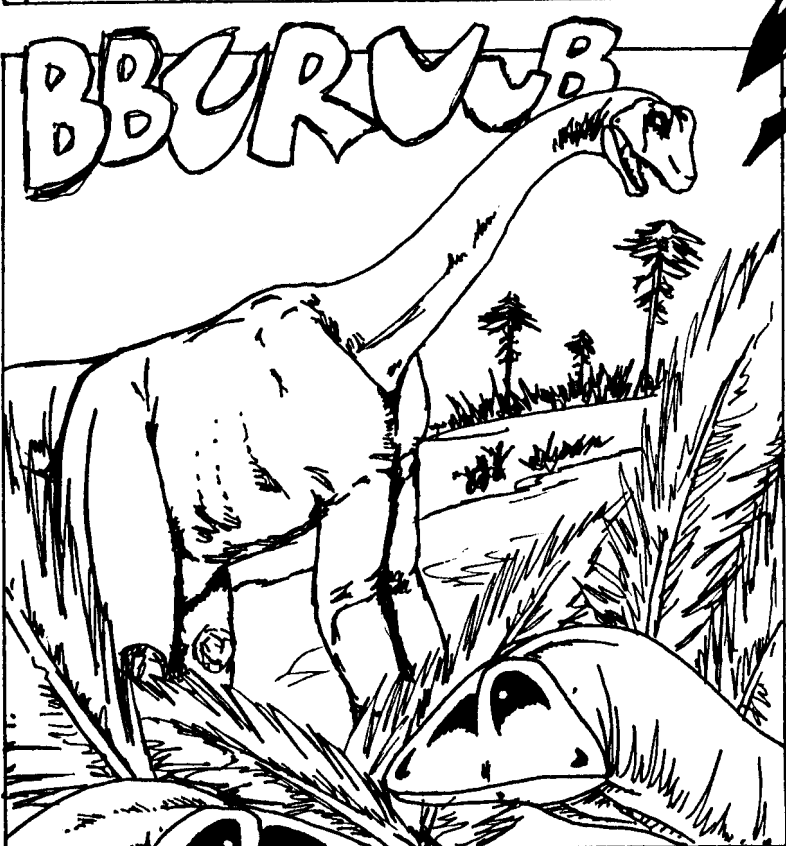
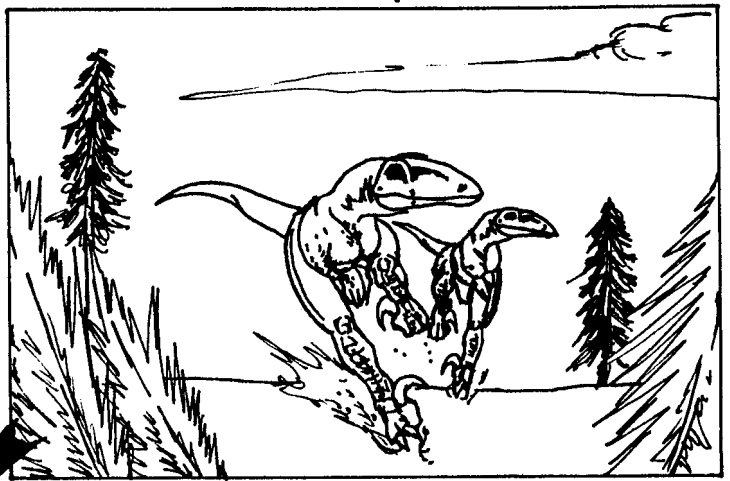
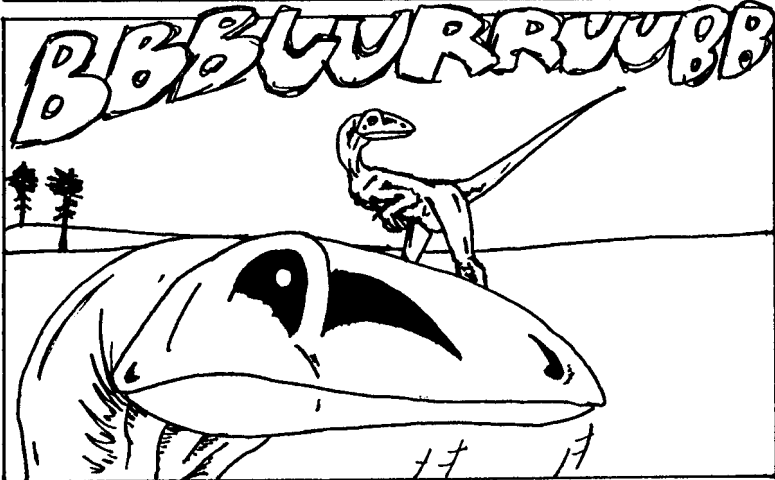
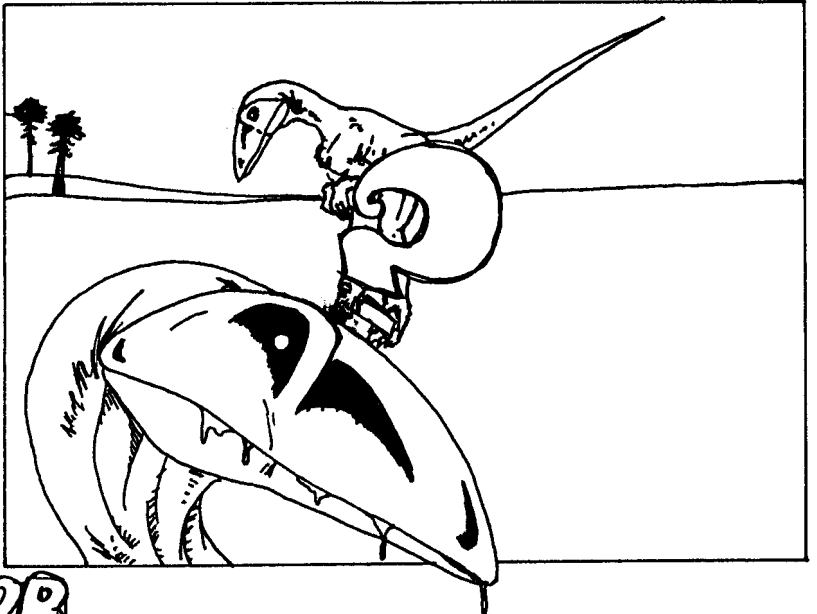
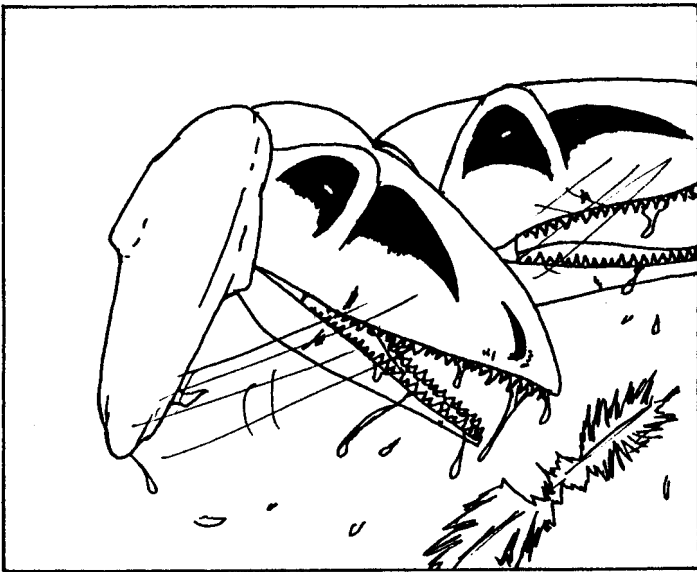
Dr. Bob Bakker deals with a number of topics in connection with the placing of the correct skull on the body of *Brontosaurus* (= *Apatosaurus*) at a number of important museums. Bob has found that many species of the brontosaurus family had a powerful biting apparatus, but not *Apatosaurus* itself. Its weaponry was its tail.

Bob uses the term “brontosaurus” while many other palaeontologists use the term “sauropod.” Professor Charles Marsh placed the wrong head on the right body in 1879. Professor McIntosh of Yale, in 1975, published a paper about the true identity of the wrong skull. The Carnegie Museum at Pittsburgh in 1913 copied Marsh. Elmer Riggs in 1901 found a *Brachiosaurus* and divided this dinosaur family into 2 sections, “Tall Shoulders” and “Whiptails.” By comparing the bones across different dinosaur families and particularly specimens of *Apatosaurus*, *Camarasaurus* and *Diplodocus* and also studies of teeth functions and tail muscles, McIntosh and Bakker produced a series of sketches showing acceptable shapes of several dinosaur heads and tails and thus were able to get the right skull on to the right body. □









# VOYAGERS

BY C. GROSS

## ALBERTA PALAEOLOGICAL SOCIETY, CALGARY, ALBERTA

*Financial Statement for Twelve Months*  
FOR THE YEAR ENDING AUGUST 31, 1994

## Balance Sheet

Assets		Liabilities and Members' Equity	
Bank Balance, Aug. 31, 1994	\$853.09	Unearned Revenue	\$10.00
Inventory of Pins at cost	\$374.37	Members' Equity	
APS T-Shirt inventory	\$250.00	Previous Year	\$1,832.86
Incorporation expense	\$78.00	Income for 1994	\$63.90
Office fixtures	\$726.50		\$1,896.76
less depreciation	\$375.20		
	\$351.30		
	\$351.30		
<b>TOTALS</b>	<b>\$1,906.76</b>		<b>\$1,906.76</b>

## Income Statement For The Year Ending August 31, 1994

REVENUE		OPERATING EXPENSES	
Coffee revenue	\$51.11	Advertising	\$0.00
Bulletin sales	\$0.00	Bank charges	\$60.00
Foreign exchange	\$32.04	Bulletin expenses	\$551.58
Members' dues	\$1,028.00	Refreshments	\$131.55
Pin sales	\$3.00	Depreciation	\$87.83
Raffle revenue	\$28.75	Field trips	\$80.28
T-shirt revenue	\$370.00	Postage	\$21.56
Other revenue	\$15.00	Library expense	\$106.49
<b>Total revenue</b>	<b>\$1,527.90</b>	Other expenses	\$173.09
		<b>Total Operating Expenses</b>	<b>\$1,212.38</b>
<b>COST OF APS T-SHIRTS SOLD</b>			
Inventory Sept. 1, 1993	\$500.00		
Purchases	\$0.00		
Less inv. Aug. 31, 1994	\$250.00		
Cost of T-shirts sold	\$250.00		
<b>COST OF PINS SOLD</b>			
Inventory Sept. 1, 1993	\$25.84		
Plus Purchases	\$359.84		
Less gifts of pins	\$9.69		
Less inv. Aug. 31, 1994	\$374.37		
Cost of pins sold	\$1.62		
<b>Cost of items sold</b>	<b>\$251.62</b>		
<b>GROSS REVENUE</b>	<b>\$1,276.28</b>		
		<b>SUMMARY</b>	
		<b>Total revenue</b>	<b>\$1,527.90</b>
		<b>Cost of items sold</b>	<b>\$251.62</b>
		<b>GROSS REVENUE</b>	<b>\$1,276.28</b>
		<b>Total Operating Expenses</b>	<b>\$1,212.38</b>
		<b>NET INCOME FOR 1994</b>	<b>\$63.90</b>

**APS MEMBERSHIP LIST March 1995**

(Active & Institutional Members—dues paid as of March 8, 1995)

**Names and contact information removed  
to protect members' privacy.**

**Exchange Bulletins**