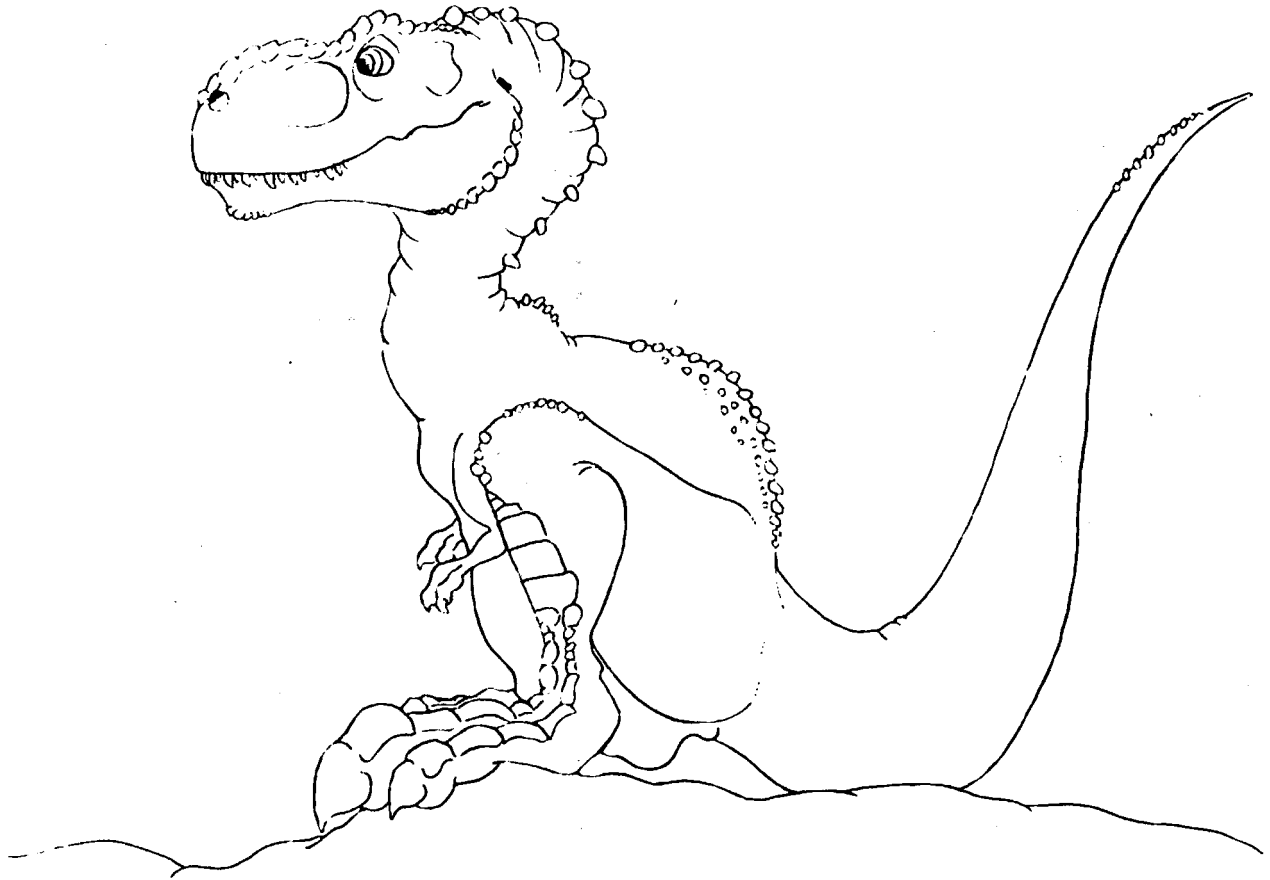


Ridge Report



The Friends of Dinosaur Ridge are developing a Junior Paleontologist program that will consist of fun activities for children up to twelve years of age. *Color the above Dinosaur to get in practice for this new program.*

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www.dinoridge.org

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The Friends of Dinosaur Ridge (FODR) a 501 C3 non-profit tax exempt organization, was established to protect the natural resources on Dinosaur Ridge and Triceratops Trail, and to educate visitors about the area's geologic, prehistoric and natural features.

Major Contributors

- ❖ Gates Family Foundation
- ❖ Coors Foundation
- ❖ Great Outdoors Colorado
- ❖ Jeffco Conservation Trust Funds
- ❖ Scientific & Cultural Facilities District (SCFD)
- ❖ Jefferson County Open Space
- ❖ Boettcher Foundation

Did you know:

- Lizard-hipped dinosaurs have hips shaped like modern birds, and bird-hipped dinosaurs have hips shaped like modern lizards.
- Mosasaurs and Plesiosaurs aren't dinosaurs at all; they're swimming reptiles.
- Coelophysis was the first dinosaur fossil taken into space – aboard the Endeavour Space Shuttle.
- Grass didn't evolve until the very end of the Cretaceous period, so no dinosaur ever munched on grass.

Friends of Dinosaur Ridge 2006

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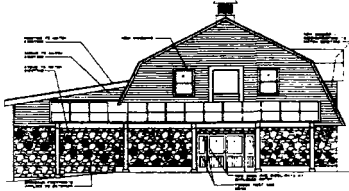
Executive Director's Report

By Joe Tempel

Ancient Environmental Education Center

The Friends have recently been notified by **Jefferson County** that we will be receiving \$30,000 in **Conservation Trust Funds** for the renovation of the barn. This brings the total fundraising effort to \$246,000. We would like to raise another \$50,000 to complete our fundraising. The design of the addition to the barn has been completed by **Andrews and Anderson Architects** and the design of the exhibits is proceeding under the direction of **Clare Marshall** with help from interns at the **Colorado Art Institute**.

We also received \$500 from the **Greater Area Gem and Mineral Council** to construct a Track Pit next to our Bone Pit. In the interests of sustainable design, 28 photovoltaic panels will be installed on the roof of a porch that will be constructed in the front of the barn. They will generate 30% of our electricity needs at the Visitor Center. When we aren't using the electricity that we generate, we will be credited for the excess electricity that will go back to **Xcel Energy**. We will receive a \$20,000 rebate from Xcel for the installation.



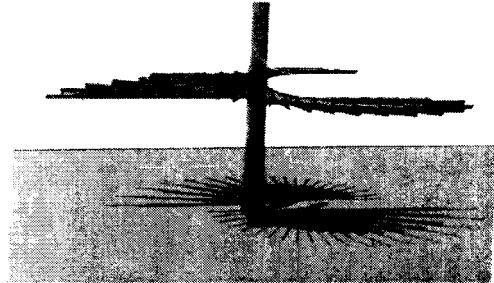
Front of barn showing addition of solar panel porch

Mural in Morrison

The **Lariat Loop Heritage Alliance** will be receiving an \$80,000 grant from **CDOT's Scenic Byway Program** for an interpretive kiosk in Evergreen, a mural in Morrison and the design of the Buffalo Overlook at the 170/Genesee exit. The mural in Morrison will be painted on **TNT's** east wall measuring 15' x 60'. It will depict the history of Morrison through time; starting with the dinosaurs. The **Scenic Byway** grant of \$24,000 will go towards the mural along with \$2,000 pledged from the **Denver Theaters and Arenas**. Additional funds (\$6,000) have been requested from **SCFD**.

Palm Frond Shade Structure at Triceratops Trail

More detailed design sketches for the shade structure have been completed by **Craig Vickers, Civets Design**. These plans have been submitted to **Yenter Companies** to engineer for wind and snow loads.



Proposed Shade Structure at Triceratops Trail

Triceratops Trail DVD

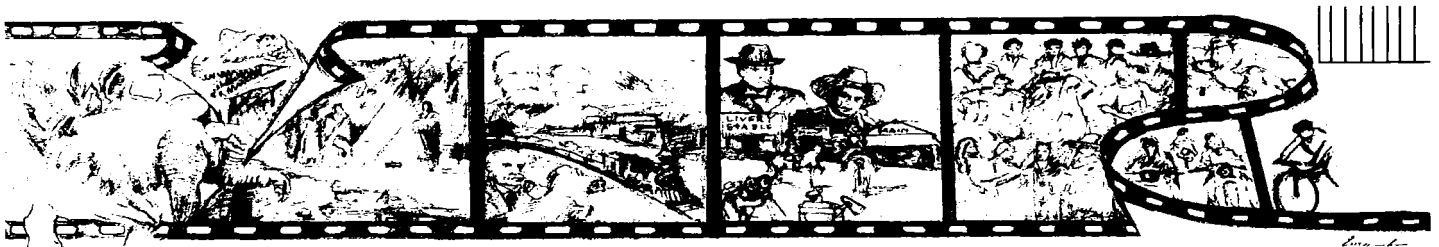
The 11-minute DVD of **Triceratops Trail** has been completed by **Steve Lusk, Slice of Life Video Features**. **Karen Bond** has pledged \$1,000 to pay for producing 1,000 copies of the DVD which was combined with our 20 minute **Dinosaur Ridge** video.

Scout Projects Completed

Clayton Kelly completed the rough grading of the recycled asphalt provided by the **City of Lakewood** for our new parking lot west of the barn. It is big enough to park 14 cars.

Cody Kerr constructed a new fence (75') on the east side of our new driveway and added fencing in order to enlarge the landscaped area around the patio behind the gift shop. **David Claybaugh**, the manager of the **Motocross Park** north of us, donated labor and equipment to pull the old fence posts and drill holes for the new posts.

Brandon Bucklin re-installed the two Road Closure signs that snapped off in a windstorm and also constructed 80' of split rail fence at the **Red Rocks Overlook**.



Artist's rendering of the mural depicting prehistoric and historic images of the Morrison area, to be painted on TNT's east wall in Morrison.

Program Director's Report By Tom Moklestad

Dinosaur Discovery Days (DDD) - The Season at a Glance

- Saturday, May 6 * Sponsor: **RMAG (Rocky Mountain Assoc. of Geologists)**
Boy Scouts of America
- Saturday, June 3 **Greg Stevinson**
- Saturday, July 1 **Bandimere Speedway**
The Fort Restaurant
- Saturday, August 5 **Andrews & Anderson Architects, PC**
- Saturday, September 2 **Greater Denver Area Gem & Mineral Council**
- Saturday, October 7** **AWG (Association of Women Geoscientists)**

*DDD combined with Boy Scout/Cub Scout Day. Registration has been capped at 900 scouts and parents. **RMAG** and others are providing some volunteers.

** DDD combined with Girl Scout/Brownie Scout Day. Registration has not begun. **AWG** is providing volunteers. In 2005 attendance topped 1000.

Triceratops Trail - School Tours booked, Open House set

The first official school tour of the **Triceratops Trail** at **Parfet Prehistoric Preserve** is booked for May 3. **T Caneer** has the honor of leading the first group, a class from an elementary school. T's relentless efforts were instrumental in establishing the trail that officially opened in late 2004. At the beginning of this year **Chip Parfet** built a small parking area for trail users, and the **City of Golden** erected signage on 19th Street that directs motorists to the "**Triceratops Trail**." The signs and the parking area should increase visitation.

An Open House at **Triceratops Trail** is planned for **September 23**. Volunteers from the Friends of Dinosaur Ridge will be at stations along the trail in order to lead discussions and give demonstrations. There is no admission charge for the event, which will run from 10:00 AM to 2:30 PM. **Stevinson Ford**, just north of the trail, has shown interest in sponsoring the event. Plans are to promote the Open House at DDD, September 2; **Golden's Farmers' Market**, September 9; and the **Denver Gem & Mineral Show**, September 15-17. By then a new 12-page Trail Pamphlet, that is currently being compiled, should be completed. An updated trail map in the pamphlet will have the new parking lot and pertinent GPS coordinates.

Volunteer Training

On April 15 veteran volunteers, **Jeff Stephenson**, **Harald Drewes**, **Pete Modreski**, and **Norb Cygan** conducted training sessions for 25 new volunteers on the Ridge and on the grounds of the Visitor Center. Most had volunteered for the May 6 DDD. Despite chilly windy weather, a few expressed an interest in volunteering more often.

Membership

We are proud to announce two new **Sponsor Level Members**:

Colorado's Ride the West (Ron) 4690 S. Yates Denver, CO 80236 (303)806-0132 or (303)907-3028	Shock Glass Inc. (Kenny Shock) 31 E. Panama Dr. #B Centennial, CO 80121-2360 (303)730-2729 or (303)730-9717
--	---

FODR's Board of Directors appreciates the support of these businesses. Call **Ride the West** to rent an RV for a special summer vacation **Ron** will help you. Owner-operated **Shock Glass** repairs windows including windshields. **Kenny Shock** or one of his brothers will come to you to install a new windshield. They did a great job on one of the side windows that was blown out of the **Vanasaurus**.

Welcome to new Family Members, **Samuel and Tanja Hard** of Northglenn.

Visitation and Attendance

	<u>1st Quarter '06</u>	<u>Change from '05</u>
Visitors to Visitor Center	6313	+6%
Tours (Attendance)	987	+122%
Other Education Programs	100	+133%

Upcoming Events

See www.dmns.org, Adult Programs, for more information on these and other museum programs.

By Pete Modreski

Sat., May 6, Dinosaur Discovery Day (DDD) (free public tour day) at Dinosaur Ridge, Morrison Colorado. "DDD's" will be held the first Saturday of each month through October. The May 6th day will feature **Boy Scout Day at Dinosaur Ridge**, with special earth science activities for Scouts. For more information please see http://www.dinoridge.org/programs/dinosaur_discovery_day.htm

Sat., May 6, Silent Auction, held by the Colorado Mineral Society,
11 a.m.-3 p.m., at Holy Shepherd Lutheran Church, 920 Kipling St.,
see <http://www.coloradomineralsociety.org/upcomingevents.html> or call 303-237-2947. No charge, all welcome.

Wednesday, May 10, "Water Is Not Where the People Are: A Front Range Challenge"
by *Bob Reynolds*.

7:00 pm, Morrison Town Hall, Morrison CO

A free public talk in the Fireside Chat series of the Friends of Dinosaur Ridge.

This lecture will bring us up to date with the **Denver Museum of Nature and Science's** research on the bedrock aquifers of the Denver Basin. Our geology-based discussion will develop the water resource story from the rocks to the rivers. After a review of what we know about the water resource distribution patterns, we will see that rapidly expanding communities in Douglas County are growing unsustainably. New sources of water will have to be found to supply the growing demand, because Colorado's surface water is already over-appropriated, this will involve reallocating existing water rights and the development of a new distribution infrastructure. A growing consensus is that the "new" water will come from High Plains farmers who will make mutually advantageous arrangements to share their water with urban users. Patterns for this process are already starting to develop as are innovative water storage plans in new surface and subsurface reservoirs.

Friday, May 12, Free Map, Compass, and GPS class: the USGS offers these free classes for the public, the 2nd Friday of each month through November, at the Denver Federal Center, Lakewood CO, Building 810. Mornings (9-11) are Map & Compass, and afternoons (12-4) are GPS. To register please call 303-202-4689, or email gpsworkshops@usgs.gov to reserve a place; bring your GPS unit if you have one.

Thursday, May 18, Backbone of America: Exploring the Continental Divide

7:00 p.m., Ricketson Auditorium, \$12 member, \$15 nonmember, Lecture, book sale & signing

Frank Clifford, environmental editor, Los Angeles Times, and author of *The Backbone of the World*, and **Bob Julyan, Tom Till**, and **Scott Bischke**, trail guides and authors of *Continental Divide* guidebooks

Take a unique armchair tour of the Continental Divide Trail (CDT), led by experienced guides who will introduce you to the four major segments of the Divide. These guides have traveled from the alkali badlands of southernmost New Mexico to the roof of the Rockies in Montana. Each speaker will share their own particular knowledge, and along the way you will discover the secret and sacred wonders that lie along this nationally treasured landmark. Learn about an organized effort that is well underway to establish a trail that runs the length of the Divide for all to enjoy.

Saturday, May 20, Silent Auction, sponsored by the Friends of Mineralogy, Colorado Chapter; Clements Community Center, 1580 Yarrow St., Lakewood, 1-4 p.m. Free, public welcome, a good chance to buy rocks, minerals, fossils, jewelry.

Wednesday, May 24, 7:00 p.m. \$12 member, \$15 nonmember

Gates Planetarium

The Birth of Stars and Planets

John Bally, PhD, professor, Department of Astrophysical and Planetary Sciences, University of Colorado at Boulder

Sit back in Gates Planetarium as Bally, a Museum research associate, presents recent images from the Hubble, Chandra, and Spitzer space telescopes, and ground-based observatories. These observations, together with the analysis of primitive meteorites, are providing hints about how our solar system formed 4.5 billion years ago. Learn the latest on the rapidly evolving understanding of stellar and planetary origins.

July 6 & 7 Dino Ridge Teachers Class, Tuition \$100

Information and registration at www.mines.edu/Outreach/Cont_Ed/teacher.shtml

On July 15, join Museum geologist Bob Reynolds for a special daytrip outside Buena Vista, Colorado, to explore the CDT. Details to come in the June/July Museum magazine, or log on to www.dmns.org

Pity the Poor Plesiosaurs

By Sam Bartlett

Early in the Jurassic Period when the reptilian Plesiosaurs crawled back into the sea, they forfeited their glory and popularity by association with the mighty dinosaurs. Also, the fact that many Plesiosaurs have been found in Kansas really doesn't help their claim to fame. Add to these the infamous event of Edward Drinker Cope putting the head on the wrong end of the Elasmosaur and you can imagine why the poor Plesiosaurs have been on the wrong end of the evolutionary chain and consequently missed the popularity that the mighty dinosaurs are celebrating.

On February 25th, a few of us including Pete Modreski and I had the opportunity to attend a mini-symposium on Plesiosaurs at the Rocky Mountain Dinosaur Resource Center (RMDRC) in Woodland Park. Five prominent researchers on Plesiosaurs were invited to discuss current discoveries and thinking. The mini-symposium was held concurrently with the unveiling of a new *Dolichorhynchops bonneri*, a short-necked Plesiosaur specimen at the RMDRC. The event also included a gala reception on the evening of February 24th but the real action was on the afternoon of the 25th.

Plesiosaurs were the great predators of the Western Interior Cretaceous Seaway. There were basically three types of Plesiosaurs. The largest were the Elasmosaurs with small heads, streamlined bodies and extraordinarily long necks, some of which had up to 73 individual vertebrae. The second of the major types were the Pliosauurs with short necks and massive heads. The Polycotylyds, the third type, were agile, short-necked forms with narrow jaws for catching prey. Plesiosaur diets consisted of fish, mollusks and even smaller marine reptiles. All three types are found in the Cretaceous Seaway of North America, and the Mesozoic shallow ocean rocks around the world; including England where some of the earliest specimens were discovered. The Plesiosaurs competed with Mosasaurs for food, and sometimes fell prey to the very large Mosasaurs, especially Tylosaurs. In addition to breathing air and giving live birth to their young like the Mosasaurs, the Plesiosaurs used their wing-like paddles for propulsion and steering. Contrary to popular urban legends, the Plesiosaurs became extinct at the end of the Cretaceous period and have no living relatives.

Dolichorhynchops bonneri

SPECIMEN DATA

Nickname: "Dolly"

Discovery Location: Wyoming and South Dakota

Diet: Marine animals (Carnivore)

Period: Late Cretaceous

Age: 80 million years old

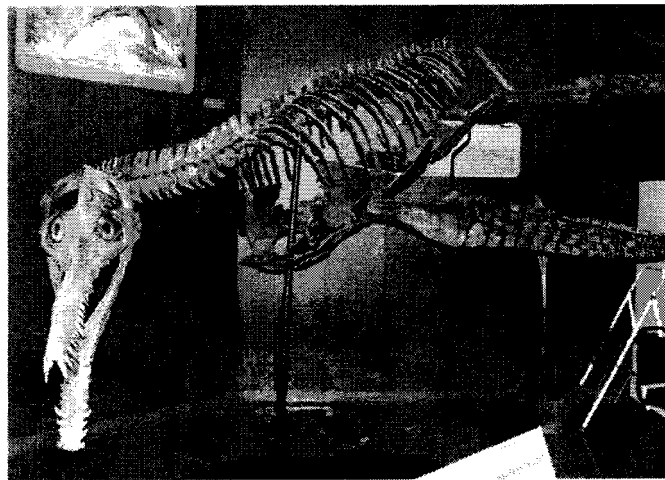
Formation: Pierre Shale

Length: 15 feet

Location of original specimen(s):

University of Kansas Natural History Museum

This is a rare short-necked plesiosaur related to the famous Elasmosaurus. This composite skeleton measures about 5 meters long, with a paddle span of over 4 meters. The skull and skeleton are based on nearly complete specimens. The original of this specimen is in the collection of the University of Kansas Natural History Museum (KUVP 40001, 40002). It was found in the Pierre Shale at the Wyoming-South Dakota border dating it at approximately 80 million years old. This marine reptile was a Cretaceous speedster, with large powerful limbs that gave it tremendous maneuverability and speed. It went extinct at the end of the Cretaceous and left no living relatives. It belongs to the family Polycotylyidae, which were some of the last great plesiosaurs in the North American seaway.



***Dolichorhynchops bonneri*:**

Cretaceous (80 mya) ,Polycotid Plesiosaur from the Pierre Shale. Prepared by the Rocky Mountain Dinosaur Resource Center, Woodland Park, CO. Photo by Pete Modreski

The first of the five lecturers was **Dr. Larry Martin**, Professor-Senior Curator at the University of Kansas, Natural History Museum and Biodiversity Research Center, whose presentation was "*Collecting Plesiosaurs.*" **Dr. Martin** regaled us with the various hunts and excavations of Plesiosaurs during the middle of the last century, when Plesiosaurs were generally ignored as being too common and unimportant in the world of dinosaurs, and also discussed some of the characteristics of the Plesiosaurs. The long-necked Elasmosaurs probably sneaked up on large schools of fish from beneath, and stealthily selected their prey. The Plesiosaurs were probably coastal inhabitants as Plesiosaurs have not been found in deep water environments and some Plesiosaurs have been found with associated gastroliths, indicating that these animals traveled far up fresh-water coastal streams and rivers to ingest cobbles that are not associated with ocean environments. **Dr. Martin** also reminded us that an Elasmosaur was the instigator of the famous **Cope-Marsh** feud when Marsh "... suggested to **Cope** gently that he had the whole thing wrong." At that point, we were reminded that **Cope's** famous Elasmosaur was hanging in the museum just above our heads. Suddenly the enormity of the creatures became obvious and the whole scope of the afternoon's discussion came into sharp focus.

The second lecturer was **Dr. Glenn Storrs**, Assistant Vice President for Natural History and Science and the Winthrow Farny Curator of Vertebrate Paleontology at the Cincinnati Museum Center. **Dr. Storrs** briefly outlined the history of paleontology from the first discoveries in 1719 through the "bone wars" of the 1890's. He then outlined the importance of Plesiosaur discoveries in the advancement of scientific thought. For instance, Plesiosaurs gave us the first vision of extinct species since Plesiosaurs were the first recognizable fossils that did not bear any resemblance to current living species. Plesiosaurs were the first transitional fossils found that bolstered the idea of extinction and deep time evolution. The collection of Plesiosaurs initiated the techniques and infrastructure of paleontology. In addition, Plesiosaurs were the first 3-D fossil reptile reconstructions and they were the first fossils to allow us to reconstruct paleo-environments. During **Dr. Storrs'** presentation, we were given brief glimpses of the mounted Plesiosaurs that were collected in the 18th and 19th centuries, including those collected by **Mary Anning**.

The third lecturer, **Bruce Schumacher**, a paleontologist with the USFS, talk was titled "*The Idiots Guide to North American Plesiosaurs.*" However **Bruce** decided not to make this presentation, instead he dwelled on the Polycotyliids and touched on paddle development. In the Polycotyliids, the skull is the key to identification. The Polycotyliids had many cups and hollows in the tips of the vertebrae. The trend in Polycotyliid development was to wider and flatter paddle bones.

The fourth presentation was given by **Dr. Ken Carpenter**, Curator of Lower Vertebrate Paleontology, Chief Preparator in the Department of Earth Sciences at the Denver Museum of Nature and Science. He discussed past and present efforts to determine how Plesiosaurs swam. Plesiosaur skeletons are rigid and flat-bottomed with high rounded sides, unlike fish which are narrow with flat sides. The well-muscled Plesiosaur paddle structures are constructed such that there are limits of motion from 65 ° in the upward motion to 20°

downward. Taking these constraints into consideration, **Dr. Carpenter** attempted, through computer modeling and actual in-the-water demonstrations, to determine the best swimming method for Plesiosaurs. After a few comic computer glitches and the somewhat Chaplin-esk swimming videos, he convinced us that the Plesiosaurs were synchronous swimmers, using their paddles in unison.

The last lecturer, **Michael Everhart**, *Adjunct Curator of Paleontology at the Sternberg Museum of Natural History*, discussed an excavation of a *Dolichorhynchops osborni* from the Niobrara Chalk in Jewell County Kansas. This specimen was removed just one step ahead of the bulldozers. Michael also outlined some of the early North American Plesiosaur discoveries by **Cope**, **Mudge** and **Williston**, several of which reside in the **Sternberg Museum**.

In summary, it is believed that the demise of the Plesiosaurs coincided with the rise of very large efficient fish during the late Cretaceous. This idea was aptly pointed out by the great assemblage of very large Cretaceous fish hanging from the ceiling just above our heads. The Plesiosaurs had fixed jaws limiting their intake to small fish, while the Mosasaurs had flexible jaws allowing them to eat large fish and an occasional Plesiosaur. Due to the distribution of known Plesiosaurs, it is believed that the Plesiosaurs dwelled near the shores of the Western Interior Cretaceous Seaway.

Gift Shop News

By Roger Bennett

The Gift Shop continues to have a good year with sales ahead of last year at this same time. We constantly strive to obtain new items for all ages and feel the shop has a variety of products for both children and adults. The newly installed Visitor signs has helped visitors to find us, and the Dino Head, for donations, has been a success because it has collected about two-thirds of its cost in the first three weeks. An art student is going to paint the head so it will look something other than a tin-dino of Oz. Although it is off-season of the year, we see many out-of-state and foreign visitors.

Come by the Gift Shop and see Roger, Jack, Barbara and Brian Davidson getting ready for another successful year with all the new items.

David J. Warren

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Guides Corner

By Sam Bartlett

As a change of pace, we would like to use this spot to present a "test" that **Pete Modreski** created for the Dino Ridge Teacher's workshop last summer. The questions in the "test" lead to the essence of the presentation by the guides on the Ridge. So, if you are not already a guide and you can pass this "test," you are well qualified to become a guide. Even if you do not know all of the answers to the questions, we will present **Pete's** answers in the next Ridge Report and then you will be qualified to become a guide. In either case, it's a win-win situation and we would love to have you join us as a tour guide.

1. What kind of dinosaurs made the majority of the tracks at Dinosaur Ridge? _____
2. These tracks are in what kind of rock type? _____
3. The Mesozoic Era is divided into three time periods, of which the middle period is famous for the huge four-legged dinosaurs and for the Morrison Formation in which their bones are contained. What is the name of this time period. _____
4. What is the "official" name for this group of huge four-legged dinosaurs? _____
5. The dinosaurs became extinct (except for the birds, which most paleontologists accept as living, true relatives of the dinosaur) at the end of which geologic time period? _____
6. How long ago did this great extinction occur? _____
7. Approximately how old (in years) are the dinosaur tracks in the Dakota Sandstone at Dinosaur Ridge? _____
8. In what time period were the tracks on Dinosaur Ridge formed? _____
9. A footprint or other impression left in rock by a long-dead living organism is called a _____
10. Name any four major groups of dinosaurs (you may use either Latin or "common" names): _____
11. Name two other places in the Rocky Mountain west where many dinosaur fossils have been found. _____
12. Circle any of the following names or groups of animals that are NOT dinosaurs:
Plesiosaurs Mosasaurs Ankylosaurs Dimetrodon Archaeopteryx
Ornithomimus Iguanodon Pterosaurs Velociraptor Lark Bunting